Local Tender Notification from Indian Original Equipment Manufacturer (OEM) for procuring "Controller System" at Electrical Communication Department (ECE), Indian Institute of Science, Bangalore

01 April 2022

This is a request for local tender quotations from Indian Original Equipment Manufacturer (OEM) or their Indian authorised distributor meant to purchase the "Controller System" for Research purposes.

Your quotation should indicate the terms and conditions of the quotation, delivery schedule, entry tax, payment terms, warranty coverage etc. The quotation should be submitted in two parts: Part I (Technical bid) and Part II (Commercial bid), and both should be submitted in separate sealed envelopes. The vendor should demonstrate the manufacture of the product within India. The Technical bid should be the same as the Commercial bid, except that the prices must not be shown in the technical bid. The Technical bid should have an itemised compliance report of all specifications indicated below. Prices quoted should include delivery of the items to the site and installation. The price must be in INR and should consist of the appropriate GST.

The last day for submitting the bid is 11th April 2022. The offer should be valid for at least 60 days from the last date of submission of quotes. Technical specifications for the Controller system, accessories and others are given below:

Controller System	CPU Intel® Xeon® Processor E3-1515M v5 Cache 8 MB SmartCache Dual-Channel DDR4-2133 (PC-17000) 8 GB standard, 32 GB maximum Storage 512 GB (or greater) solid-state, NVME Video 1 DisplayPort 1.1, 1 DisplayPort 1.2 Ethernet 1 i219 port 1 i210 port, 1588, 10/100/1000 Base T PXI Express 4 Link Configuration x4, x4, x4, x4 PXI Express 2 Link Configuration x8, x8 GPIB (IEEE 488 Controller) 1 mini-GPIB Serial Port (RS-232) 1 DB-9 Thunderbolt 3 Ports 2 Type-C Hi-Speed USB (2.0) Ports 4 Type-A SuperSpeed USB (3.0) Ports 2 Type-A PXI Trigger Bus Input/Output 1 SMB Installed Operating System Windows 10 Professional for Embedded Systems Electrical: Voltage (V) Current (Amps) Typical Current (Amps) Maximum +3.3 V 3.75 A 4.25 A +5 V 2.0 A 2.5 A +12 V 6.0 A 7.6 A -12 V 0 A 0 A +5 VAux 0.75 A 0.8 A Physical: Board dimensions Four-wide 3U PXI Express module Slot requirements One system slot plus three controller expansion slots Compatibility Fully compatible with PXI Express Specification 1.0 Operating Environment: Ambient temperature range 0 °C to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)

	Storage Environment: Ambient temperature range1 -40 °C to 71 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 limits.) Relative humidity range 5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.) Shock and Vibration: Operating shock 30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Meets MIL-PRF-28800F Class 2 limits.) Random vibration Operating 5 Hz to 500 Hz, 0.3 grms (with solid-state hard drive) Nonoperating1 5 Hz to 500 Hz, 2.4 grms (Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)
	Both Signal Generator and Analyser uses same software workflow making it easy to work across instruments for research and benchmarking purpose. Supplied systems ensure future scalability. It should support Multiple software workflows possible. Easy to develop algorithms in LabVIEW, as well as integrating existing IPs from other environments, to target VSA & VSG hardware. Supports 10 MHz to 6.6 GHz with 50 MHz analysis bandwidth Wide instantaneous bandwidth and supports RF list mode, which increases multiband measurement speed with fast and deterministic changes in configuration Can be used as spectrum analyser or vector signal analyser, making it ideal platform for research and test applications. can perform measurements for a broad range of communications standards such as GSM, EDGE, WCDMA, WiMAX, LTE, Bluetooth, WLAN and also provides a low-cost solution to high-performance RF measurements. Current 2-channel phase-coherent MIMO configuration can be scaled to 4-channel within single chassis Frequency Frequency range1 10 MHz to 6.6 GHz Tuning resolution 533 nHz Equalized Bandwidth Tuned Frequency Equalized Bandwidth 10 MHz to <120MHz 10MHz 120 MHz to<330MHz 20MHz 330 MHz to 6.6 GHz 50MHz Resolution Bandwidth 3 dB bandwidth Fully adjustable (<1Hz to 10MHz) Window 60 dB : 3 dB Ratio Flat Top 2.5, maximum 7-term Blackman-Harris 4.1, maximum Internal Frequency Reference Frequency 10 MHz Temperature stability ±1 × 10-6, maximum (15 °C to 35 °C) Aging per year ±5 × 10-6, maximum Initial achievable accuracy ±3 × 10-6, maximum

	External Frequency Reference Input Frequency 10 MHz (±10 × 10-6) Peak-to-peak amplitude 0.2 V to 1.5 V into 50 Ω Input impedance 50 Ω Lock time to external reference 1 s, maximum Spectral Purity Phase Noise Tuned Frequency Noise Density 100 MHz <-125 dBc/Hz 500 MHz <-112 dBc/Hz 1 GHz <-105 dBc/Hz 2 GHz <-98 dBc/Hz 3 GHz <-95 dBc/Hz 4 GHz <-93 dBc/Hz 5 GHz <-90 dBc/Hz 6.6 GHz <-90 dBc/Hz Amplitude Range Amplitude range Average Noise Level to +30 dBm RF input attenuation 0 dB to 50 dB in 1 dB steps, nominal Average Noise Level Frequency 23 °C ± 5 °C 0 °C to 55 °C 10 MHz to <-155 dBm/Hz; <-157 dBm/Hz, typical <-154 dBm/Hz; <-156 dBm/Hz, typical 30 MHz to <-159 dBm/Hz; <-163 dBm/Hz, typical <-158 dBm/Hz; <-162 dBm/Hz, typical 120 MHz to <-155 dBm/Hz; <-158 dBm/Hz, typical <-154 dBm/Hz; <-157 dBm/Hz, typical 3.0 GHz to <-153 dBm/Hz; <-156 dBm/Hz, typical <-152 dBm/Hz; <-155 dBm/Hz, typical 5.0 GHz to 6.6 GHz <-151 dBm/Hz; <-154 dBm/Hz, typical <-150 dBm/Hz; <-153 dBm/Hz, typical IF Rejection Tuned Frequency Interference Frequency Level 10 MHz to <-75 dBc 120 MHz to <-52 dBc 330 MHz to 6.6 GHz 187.5 MHz <-52 dBc Conditions: -30 dBm input signal; -30 dBm reference level; 0 dB attenuation. Non-Input-Related Spurs (Residual Spurs)5 10 MHz to 6.6 GHz6 <-100 dBm, typical Sideband Spurs7. Typical Sideband Spurs, >1 kHz to ≤100 kHz Offset Tuned Frequency Level 10 MHz to <-65 dBc 3.3 GHz to 6.6 GHz <-50 dBc Conditions: 0 dBm input level; 0 dBm reference level; automatic attenuation settings. Typical Sideband Spurs, >100 kHz Offset 10 MHz to <-75 dBc 50 MHz to <-70 dBc 3.3 GHz to 6.6 GHz <-65 dBc Conditions: 0 dBm input level; 0 dBm reference level; automatic attenuation settings. Modulation Typical10 IF Amplitude Flatness, 23 °C ± 5 °C Tuned Frequency Bandwidth Amplitude Flatness 10 MHz to <75MHz 5Hz ±0.25 dB 10 MHz ±0.3 dB 75 MHz to < 120 MHz 5 MHz ±0.4 dB 10 MHz ±0.6 dB 120 MHz to< 140 MHz 5 MHz ±0.45 dB 10 MHz ±0.65 dB 20 MHz ±0.9 dB

	140 MHz to< 330 MHz 5 MHz ±0.2 dB 10 MHz ±0.4 dB 20 MHz ±0.5 dB 330 MHz to< 6.6 GHz 10 MHz ±0.2 dB 20 MHz ±0.35 dB 50 MHz ±0.60 dB RF Configuration List Mode Tuning Time Nominal RF Configuration List Mode Tuning Time Accuracy Tuning Time15 0.1 × 10-6 of final frequency, 0.1 dB of final amplitude 450 µs 0.01 × 10-6 of final frequency, 0.1 dB of final amplitude 600 µs Frequency Settling Time16 Nominal Frequency Settling Time Accuracy Frequency Settling Time17 0.1 × 10-6 of final frequency 1.5 ms 0.01 × 10-6 of final frequency 6.5 ms Amplitude Settling Time18 Nominal amplitude settling time Reference level step size19 All Accuracy 0.1 dB of final amplitude Amplitude settling time20 50 µs, 5 ms Input and Output Characteristics IF/Baseband Resolution 16 bits System IF frequency range 187.5 MHz ± 25 MHz23 or 53 MHz ± 10 MHz24 Sample rate 150 MS/s Digital downconverter (OSP) bandwidth Adjustable between 60 MHz and 0.9 kHz using 150 MS Sample clock timebase.25 Onboard memory 64 MB, 256 MB
	85 MHz to 6.6 GHz frequency range 100 MHz instantaneous bandwidth Current 2-channel phase-coherent MIMO configuration can be scaled to 4-channel within single chassis Vector Signal Generators offer custom and standard modulation, as well as the ability to generate communications standards formats such as GPS, WCDMA, DVB-H, and more They support quadrature digital up conversion, which reduces waveform download and signal generation time, as well as stream-to-disk capabilities. The power and flexibility of Vector Signal Generators make them ideal for use in scientific research, communications, consumer electronics, aerospace/defense, and semiconductor test applications Frequency Characteristics Device Frequency Range Frequency Range 50 MHz to 1.3 GHz 781261-0x 50 MHz to 3.3 GHz 781262-0x 50 MHz to 6.6 GHz 781263-0x Bandwidth Modulation bandwidth1 (3 dB double sideband) >100 MHz Tuning Resolution (PXIe-5650/5651/5652) ≤1.3 GHz <1Hz >1.3 GHz to 3.3 GHz <2Hz >3.3 GHz to 6.6 GHz <4Hz Frequency Settling Time2,3 Low Loop Bandwidth

	Frequency Settling Time Median Tuning Speed (ms) Maximum Tuning Speed (ms) ≤0.1 × 10-6 of final frequency 1.5 6.5 ≤0.01 × 10-6 of final frequency 6.5 13 High Loop Bandwidth Frequency Settling Time Median Tuning Speed (ms) Maximum Tuning Speed (ms) ≤1.0 × 10-6 of final frequency 0.2 1.0 ≤0.1 × 10-6 of final frequency 0.3 2.0 ≤0.01 × 10-6 of final frequency 1.0 10.0 Internal Frequency Reference (PXIe-5650/5651/5652) Frequency 10 MHz Initial accuracy ±3 × 10-6 Temperature stability (15 °C to 35 °C) ±1 × 10-6, maximum Aging per year ±5 × 10-6, maximum Internal Reference Output (PXIe-5650/5651/5652 REF IN/OUT and REF OUT2 Connectors) Frequency 10 MHz Amplitude 1 Vpk-pk into 50 Ω Output impedance 50 Ω Coupling AC External Reference Input (PXIe-5650/5651/5652 REF IN Connector) Frequency 10 MHz ± 10 ppm Amplitude 0.2 Vpk-pk to 1.5 Vpk-pk into 50 Ω Input impedance 50 Ω Lock time to external reference External Reference Input (PXIe-5450/5451) Frequency 10 MHz Amplitude 1.0 Vpk-pk to 5.0 Vpk-pk into 50 Ω, nominal Input impedance 50 Ω Coupling AC External Reference Output (PXIe-5450/5451) Frequency 10 MHz 10 MHz Reference Clock out 0.7 Vpk-pk into 50 Ω, nominal Output impedance 50 Ω Coupling AC Spectral Purity Single Sideband Phase Noise at 10 kHz Offset Frequency Phase Noise (dBc/Hz) 100 MHz <-125, typical 500 MHz <-111 1 GHz <-105 2 GHz <-98 3 GHz <-95 4 GHz <-93 5 GHz <-90 6.6 GHz <-90 Local Oscillator Feedthrough (Uncompensated) < 3.3 GHz -100 dBm, typical >3.3 GHz -100 dBm, typical Baseband Linearity-Related Spurs (0 dBm RF OUT) 85 MHz to 250 MHz -51 dBc > 250 MHz to 6.6 GHz -56 dBc RF Output Characteristics Power Range Output11 Noise floor to +10 dBm, maximum PXIe-5673E resolution 0.1 dB, minimum PXIe-5611 1 dB, typical PXIe-5673E amplitude settling time12 Voltage Standing Wave Ratio (VSWR)14 < -10 dBm output amplitude < 1.92:1, nominal +10 dBm output amplitude < 2.2:1, nominal Pulse Modulation Rise time < 5 ns, typical Fall time < 5 ns, typical Pulse repetition frequency 50 MHz, maximum Pulse delay (PLS MOD to RF OUT Connector) 10 ns, typical Logic level 3.3 VTTL, nominal PLS MOD input impedance 1 kΩ, nominal On/Off Ratio <1GHz >50 dBc, typical <3GHz >43 dBc, typical

	≤6.6 GHz >30 dBc, typical
	Electrical AC Input Input rating1 100 to 240 VAC, 50/60 Hz, 15 - 7.5 A, 100 to 120 VAC, 440 Hz, 15 A Operating voltage range2 90 to 264 VAC Nominal input frequency 50 Hz/60 Hz/400 Hz3 Operating frequency range4 47 to 440 Hz Efficiency 85% typical Over-current protection Internal fuse in line Main power disconnect The AC power cable provides main power disconnect. Do not position the equipment so that it is difficult to disconnect the power cord. The front-panel power switch causes the internal chassis power supply to provide DC power to the PXI Express backplane. With the Timing and Synchronization upgrade, you also can use the rear-panel 15-pin connector and inhibit mode switch to control the internal chassis power supply. Protective Earth Terminal Wiring Grounding wire 2.1 mm2 (14 AWG) Ring lug # 8 Protective earth terminal torque 1.13 N · m (10 lb · in.) DC Output DC output characteristics of the . Voltage Rail Maximum Current, Single Power Supply Maximum Current, Dual Power Supplies Load Regulation Maximum Ripple and Noise (20 MHz BW) +5V_AUX 4.2 A 4.2 A ±5% 50 mVpp +12 V 75 A 122 A ±5% 100 mVpp +5 V 21.5 A 21.5 A ±5% 50 mVpp +3.3 V 60 A 60 A ±5% 50 mVpp -12 V 1.3 A 1.3 A ±5% 50 mVpp Maximum total available power, PXIe-1095 Single AC/DC power supply (786300-01) 900 W Dual AC/DC power supplies 1644 W Backplane Slot Current Capacity Slot +5 V V (I/O) +3.3 V +12 V -12 V 5 VAUX System Controller Slot 15 A - 15 A 30 A - 3 A System Timing Slot - - 9 A 6 A - 1 A Slot +5 V V (I/O) +3.3 V +12 V -12 V 5 VAUX PXI Express Peripheral Slot - - 9 A 6 A - 1 A Hybrid Peripheral Slot with PXI-5 Peripheral - - 9 A 6 A - 1 A Hybrid Peripheral Slot with PXI-1 Peripheral 6 A 5 A 6 A 1 A 1 A – Over-current protection All outputs protected from short circuit and overload with automatic recovery Over-voltage protection +12 V, +5 V, and +3.3 V clamped at 20 to 30% above nominal output voltage Power supply MTTR Replacement in under 1 minute Chassis Cooling Module cooling Forced air circulation (positive pressurization) through three 210 CFM fans Module slot airflow direction Bottom of module to top of module Module intake Rear of chassis Module exhaust Top of chassis Slot cooling capacity 82 W Secondary cooling

	Forced air circulation (positive pressurization) through one 70 CFM fan Side intake Right side of chassis Side exhaust Left side of chassis Power supply cooling Forced air circulation through two integrated fans Power supply intake Rear of chassis Power supply exhaust Top of chassis Timing and Synchronization upgrade intake Right side of chassis Timing and Synchronization upgrade exhaust Top of chassis Minimum chassis cooling clearances Above 44.45 mm (1.75 in.) Rear 101.60 mm (4.00 in.) Sides 44.45 mm (1.75 in.) Environmental Maximum altitude 4,600 m (15,000 ft.), 570 mbar (at 25 °C ambient, high fan mode) Pollution Degree 2 Operating Environment Ambient temperature range When all modules require ≤58 W cooling capacity per slot 0 °C to 55 °C (IEC 60068-2-1 and IEC 60068-2-2.)5 Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit. When any module requires >58 W cooling capacity per slot 0 °C to 40 °C (IEC 60068-2-1 and IEC 60068-2-2.)5 Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 4 high temperature limit. Relative humidity range 10% to 90%, non Storage Environment Ambient temperature range –40 °C to 71 °C (IEC-60068-2-1 and IEC-60068-2-2.)6 Meets MIL-PRF-28800F Class 3 limits. Relative humidity range 5% to 95%, nonconde Shock and Vibration Operational shock 30 g peak, half-sine, 11 ms pulse (IEC-60068-2-27.)7 Meets MIL-PRF-28800F Class 2 limits. Operational random vibration 5 to 500 Hz, 0.3 grms Non-operating vibration 5 to 500 Hz, 2.4 grms (IEC 60068-2-64.)7 Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3. Acoustic Emissions Sound Pressure Level (at Operator Position) (Tested in accordance with ISO 7779. Meets MIL-PRF-28800F requirements.) 38 W Profile Auto fan (up to 30 °C ambient) 37.7 dBA High fan 56.6 dBA 58 W/82 W Profile Auto fan (up to 30 °C ambient) 52.1 dBA High fan 66.2 dBA Sound Power Level 38 W Profile Auto fan (up to 30 °C ambient) 50.1 dBA High fan 67.8 dBA 58 W/82 W Profile Auto fan (up to 30 °C ambient) 63.8 dBA High fan 78.0 dBA System Synchronization Clocks 10 MHz System Reference Clock: PXI_CLK10 Maximum slot-to-slot skew 250 ps Accuracy ±25 ppm max (guaranteed over the operating temperature range) Accuracy with OCXO (Timing and Synchronization option) ±80 ppb max within 1 year of calibration adjustment within 0 °C to 55 °C operating temperature range (after 24 hours of operation); ±50 ppb/year long-term stability (after 72 hours of operation) Maximum

	jitter 5 ps RMS phase-jitter (10 Hz–1 MHz range) Duty-factor 45% to 55% Unloaded signal swing 3.3 V ±0.3 V 100 MHz System Reference Clock: PXIe_CLK100 and PXIe_SYNC100 Maximum slot-to-slot skew 100 ps Accuracy ±25 ppm max (guaranteed over the operating temperature range) Accuracy with OCXO (Timing and Synchronization option) ±80 ppb max within 1 year of calibration adjustment within 0 °C to 55 °C operating temperature range (after 24 hours of operation); ±50 ppb/year long-term stability (after 72 hours of operation) Maximum jitter 3 ps RMS phase-jitter (10 Hz to 12 kHz range), 2 ps RMS phase-jitter (12 kHz to 20 MHz range) Duty-factor for PXIe_CLK100 45% to 55% Absolute differential voltage (When terminated with a 50 Ω load to 1.30 V or Thévenin equivalent) 400 to 1000 mV

The participating firms must quote all-inclusive delivery prices in INR, and the entire shipment must be insured from the manufacturer's warehouse to the installation site at IISc.

Important: Please note that the system should match all technical specifications listed above and be shown to be manufactured within India.

The documents may be addressed to,

The Chairman,
Electrical communication Department
Indian Institute of Science,
Bangalore 560012.

The last date for submission of bids is 11th April 2022.

For Further enquiries contact,
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