

	<p style="text-align: center;">INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036</p> <p style="text-align: center;">Telephone: (044) 2257 4426 E-mail: rganti@ee.iitm.ac.in</p>	
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Prof. Radhakrishna Ganti
Project Coordinator

Ref: ELE/2018/RADA/PCB Layout Analysis
Dated: 20.12.2018

Limited Tender No: ELE/2018/RADA/PCB Layout Analysis

Due Date: 3.1.2019, 3:00pm

Pre-Bid meeting: - Not required.

Technical Bid opening meeting on Due Date: 3.1.2019, 3:30pm

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of **“Layout and Analysis of a PCIe PCB”** conforming to the specifications given in **(Annexure-I)**:

Instructions to the Bidder

- I. **Preparation of Bids:** - The Limited tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.
- II. **Delivery of the tender:** - The tender shall be sent to the below-mentioned addresses either by post or by courier so as to reach the following address before the due date and time specified in our Schedule:
**EE Stores,
Department of Electrical Engineering,
IIT Madras
Chennai - 600 036.**
- III. **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. In respect of opening of financial bid, those bidders who are technically qualified only will be called for.
- IV. **Price:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to **Department of Electrical Engineering.**

The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. IIT Madras is eligible for concessional GST and relevant certificate will be issued.

In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

- V. **Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate about the percentage of payment and it should be included in the originally quoted basic price, if any.
- VI. **Terms of Delivery:** - The item should be supplied to our Departments as per Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.
- VII. **Technical Bid Opening:** The technical bid will be opened tentatively on **3.1.2019, 3:30pm** at the Department of Electrical Engineering, IIT Madras and the financial bids of those tenders who are technically qualified will be opened at a later date under intimation to them.
- VIII. IIT Madras reserves the full right to accept / reject any tender at stage without assigning any reason.

Yours sincerely,

Prof. Radhakrishna Ganti
Department of Electrical Engineering,
IIT Madras
Chennai - 600 036.

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **3.1.2019, 3:00pm**.
The offers / bids should be submitted in two bids systems (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Limited Tender for supply of "**Layout and Analysis of a PCIe PCB**" should be written on the left side of the Outer bigger cover and sealed.
2. If an Indian agent is involved, the following documents must be enclosed:
Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
3. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
4. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid
5. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
6. **Validity:** Validity of Quotation not less than 60 days from the due date of tender.
7. **Delivery Schedule:** - The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
8. **Risk Purchase Clause:** - In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
9. **Advance Payment:** - No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.

10. **On-site Installation:** - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras.
11. **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (For more details please refer our Technical Specifications).
12. **Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
13. **Acceptance and Rejection:** - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.
14. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**
15. **Disputes and Jurisdiction:** -
 - a. **Settlement of Disputes:** Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate one arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceedings shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.
 - b. **The Applicable Law:** This Purchase Order shall be construed, interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
 - c. Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.
16. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE COMPANY WITH DATE**

Vendor/Firm Compliance

- a. Firm must have prior experience in design/layout/routing of 100G ethernet, PCI express 3rd gen, JESD204B, QSFP+ interfaces.
- b. Firm must have experience of designing boards having Xilinx UltraScale plus FPGA with stackup for at least 22 layers.
- c. Minimum yearly turnover of the firm should be at least INR 10 crores.
- d. Firm should have existed for at least 10 years.
- e. Technical evaluation committee at IITM may ask for the demonstration of previously developed hardware (having features as mentioned in item (a) and (b)) by the firm.
- f. Firm must have ISO 9001 -2015 compliance for PCB design services for at least last 5 years.
- g. Documentary evidence may be asked by the IITM to verify the claims made by the vendors.

Work to be carried out by vendor

- (a) This will be a four stage development work as per the break up & milestones given below. A stage will be considered as over only after all the deliverables related to that stage are handed over to IITM:

Sl.No	Stage 1 activities & milestone
01	Design Study & database creation
02	Footprint Creation / QA
03	Design packaging
04	Board mechanicals and Major component placement
05	Placement completion
06	Stackup build ^{***}
07	SI, PI, Thermal data preparation
08	Placement Review
09	Placement review comments implementation
10	Placement Signoff
*** Based on consultation with a reputed fab. At this stage the details should be shared with IITM and technical approval of IITM is required (so as to verify the capabilities of the fab) before proceeding.	
Milestone-1 -Placement completed Board file	
Stage 2 activities and milestone	
11	Technology setup
12	Stackup signoff
13	Pre route SI analysis
14	Pre route PI analysis
15	Pre route Thermal analysis

16	Pre route DFA analysis
Milestone-2--Pre route Analysis reports	
Stage 3 activities and milestone	
17	Critical signal routing
18	Review -Critical signal routing
19	Comments implementation
20	Plane creation, length matching
21	Post route SI analysis
22	SI report preparation
Milestone-3-Post rout Analysis reports	
Stage 4 activities and milestone	
23	Plane creation, routing completion
24	Routing Signoff
25	Post route PI analysis
26	Post route Thermal analysis
27	Assembly, Silkscreen, Fabnotes
28	Design Signoff
29	Gerber setup, generation and Pre-CAM
30	Post route DFA analysis
31	Board QA
32	DFM and deliverables
Milestone-4-Final deliverables	

- (b) The work should be completed within 6 weeks after placing supply order.
- (c) The work progress will be reviewed by IITM team after every 10 working days. Vendor has to take approval of IITM for any amendment/modification.
- (d) The schematic of the board will be shared with L1 vendor after signing NDA
- (e) The proprietorship of all the work/design files will be with IITM only. Vendor will not share any details of the work with any party in any manner whatsoever.
- (f) The cost for each stage should be separated and explicitly be mentioned.

Deliverables

- (a) Board files and all design related files
- (b) Gerber files
- (c) PCB stackup
- (d) SI & PI reports
- (e) Thermal analysis report

Technical specifications

Salient features of board:

1. 100 Gig lines
2. 25 gig lines
3. Memory modules
4. Optical connectors
5. PCIe Gen3 interface
6. 2 Xilinx RFSOC XCZU21DR1156
7. The board layout design should be compatible with a full length, Dual width PCIE form factor.

Layout Specifications				
SI No.	Description	BB Card		
1	Total comps	2022		
2	Comp types	263		
3	Total pins	9500		
4	Total net types	1740		
5	Connections	8700		
6	Board Size	312x111.5 mm (PCIe compliant Full height, Full length)		
7	Board build up and No. of Layers:	HDI, 16 -- 20 (Approx)		
8	Board Thickness and finish	1.6 mm		
SI, PI & thermal analysis requirement				
1	Pre & Post Signal Integrity Analysis. (including NEXT FEXT)			
	Interlaken Interface 25Gx 4 Lanes, 100G Ethernet 25Gx 4 Lanes, RGMII (4), eMMC (2), PL DDR4 (2), PS DDR4 (2) - SODIMM 64 Bit, QSPI Flash (4), UART/I2C, QSFPx 8 Lanes(25G Ethernet), PCIe Gen.3 x 4 Lanes, Clock signals (15), SGMII,I2C,SPI ,SFP			
2	Power Integrity Analysis (Decoupling, Plane Noise & IR Drop analysis)			
	~16 Power Nets			
3	Thermal Analysis			