

## Tender Details

**Tender No:** SCL/PS4/2019E0148101

**Tender Date:** 22/07/2019

**Purchase Entity:** Pur\_Entity4

## Tender Notice

E Procurement Tender No. SCL/PS4/2019E0148101 dated 22.07.2019 SEMICONDUCTOR LABORATORY [SCL] invites ONLINE offers in TWO part system through e tender portal <https://eprocure.isro.gov.in> for Supply of PGA Package 3 Types Package. Tender documents can be downloaded from 25.07.2019 to 20.08.2019. The vendors need to get enrolled in the e tender portal to access tender and submit their offer online. Vendors need to have Digital Signature Certificate as detailed on our e portal and corporate email ID to register on the above portal. Only online tenders will be accepted. No Manual/Postal/ courier/ email/fax tender will be entertained. Please note Tender fee shall not be applicable for tenders submitted online through this portal.

Vendors interested to participate in this e Tender are required to register themselves as vendors, if not already registered, in our e procurement portal <https://eprocure.isro.gov.in> by downloading plugins and help demos listed on the home page of the e procurement link mentioned above to complete the vendor registration process. They can seek help from help desk 020 25315555 / 9167969601 (Email: [support.isro@nextenders.com](mailto:support.isro@nextenders.com)) also the home page of e procurement portal may be accessed for any technical help for registration and subsequent process. Vendors may please note that without registering in our E procurement portal they will not be able to quote for this tender.

This being a two part tender Technical and Commercial part separate, the Technical part should not contain any pricing information. The tenders containing Price details in technical part will be treated as unsolicited offers and rejected. Prices should be indicated in the Price Bid format only.

## Tender Attachments

### Technical Write-up/Drawings

#### Attachment - I:

IDT00235200000000000isro05401.pdf

#### Attachment - II:

IDT00235200000000000isro05402.zip

#### Attachment - III:

IDT00235200000000000isro05403.zip

#### Attachment - IV:

IDT00235200000000000isro05404.zip

#### Attachment - V:

IDT00233500000000000isro05405.pdf

### Instructions to Tenderers (PT)

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1. Interested Tenderers may, login to <http://eprocure.isro.gov.in> and submit offers as per details in the tender notification.

In case of any clarifications vendors can seek the same over email/fax two weeks prior to submission of bids through EGPS.

2. Bid /Open Authorization shall be submitted online only complying specified schedule and complete in all respects with technical specifications, drawing including pamphlets and catalogues.

3. This being a two part tender Technical and Commercial part separate, the Technical part should comprise only technical information, unpriced bid form and drawing etc. and it shall not contain any pricing information. The tenders containing Price details in technical part will be treated as unsolicited offers and will be rejected. Prices should be indicated in the Price Bid format only.

4. In this tender either the Indian Agent on behalf of the Principal/OEM or the Principal/OEM itself can bid, but both cannot bid simultaneously for the same item. Indian agents while quoting on behalf of

their principals shall provide necessary latest date of authorization letter obtained from their Principal/manufacturers in their bid.

5.If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the tender for the same item. If submitted, all offers submitted by the said agent shall be excluded from the procurement process.

6.Request for the extension of the due date will not be considered.

7.SCL reserves the right to accept or reject any / or all the tenders in part or full without assigning any reasons thereof. The bidder is at liberty to seek information related to bidding conditions, bidding process and/or rejection of its bid.

8.The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portions of the quantity offered and the tenderer shall supply the same at the rates quoted.

9.Bids submitted other than the EGPS mode shall not be considered.

10.SCL reserves the right to verify all claims made by the bidder.

11.SCL reserves the right to change any milestone date of the tendering activity / tender schedule.

12.Tender which is not submitted in terms of instructions mentioned herein is liable to be rejected.

13.If tender opening date happens to be a public holiday, tender will be opened on the next working day and interested bidders may depute their representatives to attend the tender opening, with proper authorization.

14.It is expressly agreed that the acceptance of the Stores Contracted for is subject to final approval in writing by the Purchaser.

15.It is to be noted that the drawings, specifications, enduse etc. given by the purchaser, are confidential and shall not be disclosed to any third party.

16.Prices are required to be quoted according to the units indicated in the tender. Where quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.

17. The quote should indicate quantity wise unit rate separately which have to be filled online. The Prices are to be mentioned both in figures as well as in words and currency. The taxes, duties etc. are to be calculated and indicated in the column provided in online forms explicitly.

18.Bidders are expected to comply with commercial and other terms and conditions given in Vendor Specified Terms of this tender. In case of any deviation, the reasons thereof should be clearly specified in the vendor specified terms column.

19. All available technical literature, catalogues and other data in support of the specifications and details of the items should be furnished along with the offer.

20. Specifications: Stores offered should strictly conform to our specifications. Deviations, if any, should be clearly indicated by the tenderer in their bid. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples wherever necessary along with the quotations. Test certificates wherever necessary should be forwarded along with supplies. Whenever options are called for in our specifications, the tenderer should address all such options. Wherever specifically mentioned by us, the tenderer could suggest changes to specifications with appropriate response for the same.

21. The approximate net and gross weight and dimensions of the items offered shall be indicated in your offer. If dimensional details are available, the same should also be indicated in your offer.

22. The Tenderer would provide, the name of his banker as well as latest income tax clearance certificate duly countersigned by the income tax officer of the circle concerned under the seal of his office, if required by the purchaser duly evaluation of the tender.

23. Subletting and Assignment: The contractor/supplier cannot sublet, transfer or assign the order/Contract or any part thereof or interests therein or benefit or advantage thereof in any manner whatsoever, to any other party save with the previous written consent of the purchaser. Such consent by the purchaser, however, shall not relieve or discharge the contractor/supplier from any obligation, duty or responsibility under the Purchase Order/Contract.

24. The contractor/supplier shall indemnify the purchaser against Workmen Compensation Act.

25. The bids shall be opened on 1st day of opening schedule as indicated in the Tender in the presence of the bidders/their authorized representatives who may like to attend the tender opening against presentation of Authorization letter.

Due to any breakdown in Server/Link bid opening will be continued on the following dates. The schedule of opening of Price bids shall be intimated separately to the technically qualified bidders only.

#### 26. PROCEDURE FOR EVALUATION OF TENDERS:

##### Technical Evaluation Criteria :

Vendor meeting the eligibility criteria and basic technical specifications, drawing mentioned in SCL Tender shall be considered to be technically qualified.

##### Evaluation of Price Bids:

The following elements shall be considered for evaluation of Priced Commercial offer:

a. Price quoted by the bidder in the price bid template for meeting the functionalities given in the Tender and Technical Specifications sheet.

b. . Compliance with the Payment Terms prescribed in this tender document. In the event, the bidder offers Payment Terms stringent than SCL prescribed Payment Terms, the bid of the bidder shall be loaded suitably.

e. In the event of the bidder seeking a confirmed Letter of Credit, the bidder's bid shall be loaded at the rate of 0.5 percent of the LC value towards confirmation charges.

f. In the event of the bidder requiring SCL to bear bank charges outside India (foreign bank charges), the bidder's bid shall be loaded at the rate 0.5 percent of the quoted value towards bank charges outside India.

27. The bid should contain the following information:

a. Agency Commission: Bidders are required to provide the following information in respect of their authorised Indian Agent, if any, along with bid as the same is mandatory as is required for consideration of the bid. Name, Address, Telephone no. , fax no., email of the Indian Agent including the contact person. A letter from the Manufacturer/supplier in the current date certifying that the said Indian Agent is their authorised Indian Agent and also indicating the responsibilities/role of the Indian Agent under the proposed purchase. Renumeration/service charges payable to the Indian Agent under the proposed purchase. The amount of agency commission included in the price and payable to Indian Agent of the contractor shall be paid directly to the Indian Agents by the Purchasers in equivalent in Indian rupees on the basis of an invoice from him applying TT buying rate of exchange ruling on the date of placement of the Purchase Order and which shall not be subject to any further exchange variations. The payment will be released to the Indian Agents within 30 days from the date of acceptance of the goods.

28. Part shipment is not allowed unless specifically agreed to by us.

29. All documents/correspondence should be in English Language only.

## &#8195;II. TERMS AND CONDITIONS

### 1. DEFINITIONS:

a) The term Purchaser shall mean the President of India or his successors or assignees.

b) The term Contractor/Supplier/Vendor shall mean, the person, firm or company with whom or with which the order for the supply of stores is placed and shall be deemed to include the Contractor's Successors, representatives, heirs, executors and administrators unless excluded by the Contract.

c) The term Purchase Order shall mean the communication signed on behalf of the Purchaser by an officer duly authorised intimating the acceptance on behalf of the Purchaser on the terms and conditions mentioned or referred to in the said communication accepting the Tender or offer of the Contractor for supply of stores of plant, machinery or equipment of part thereof.

d) The term Stores shall mean what the Contractor agrees to supply under the Contract as specified in the Purchase Order.

## 2.PRICES:

Tenders offering firm prices will be preferred. Where a price variation clause is insisted upon by a tenderer, quotations with a reasonable ceiling should be submitted. Such offers should invariably be supported by the base price taken into account at the time of tendering and also the formula for any such variations.

## 3.DEMURRAGE:

Supplier shall bear demurrage charges, if any, incurred by the purchaser due to delayed presentation of shipping documents as prescribed to the bankers within a reasonable time (say within 1012 days) from the date of bill of lading for sea consignments and within 34 days from the date of Air Way Bill for air consignments.

## 4.GUARANTEED TIME DELIVERY:

The time for and the date of delivery stipulated in the Purchase Order shall be deemed to be the essence of the Contract. Delivery must be completed within the date specified therein.

## 5.INSPECTION AND ACCEPTANCE TEST:

5.1The Purchasers representatives shall also be entitled at all reasonable times during manufacture to inspect, examine and test on the Contractors premises the material and workmanship of all stores to be supplied under this Contract and if part of the said stores is being manufactured on other premises, the Contractor shall obtain for the purchasers representative permission to inspect, examine and test as if the equipment were being manufactured on the Contractors premises. Such inspection, examination and testing shall not release the Contractor from the obligations under this Contract.

5.2For tests on the premises of the Contractor or of any of his subContractors, the Contractor shall provide free of cost assistance, labour, material, electricity, fuel and instruments as may be required or as may be reasonably needed by the purchasers representative to carry out the tests efficiently.

5.3When the stores have passed the specified test, the purchaser representative shall furnish a certificate to the effect in writing to the Contractor. The Contractor shall provide copies of the test/s certificates to the purchaser as may be required.

## 6.PORT OF ENTRY:

New Delhi (for air shipment) / Mumbai (for sea shipment)

7. CONSIGNEE:

Sr. Purchase and Stores Officer, Stores

8. SHIPPING MARKS.

The mark on the shipping documents such as invoice, bill of lading and on the packages should be as follow:

PURCHASE ORDER NO.

DATED

GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

(name of the Centre/Unit)

Destination:

9. Port of Entry:

10. CONTRACTORS DEFAULT LIABILITY:

The purchaser may upon written notice of default to the Contractor terminate the Contract in whole or in part in circumstances detailed hereunder:

a) If in the judgement of the Purchaser the Contractor fails to make delivery of Stores within the time specified in the Contract/agreement or within the period for which extension has been granted by the Purchaser to the Contractor.

b) If in the judgment of the Purchaser the Contractor fails to comply with any of the other provisions of this Contract.

11. In the event the Purchaser terminates the Contract in whole or in part as provided in Contractor Default Liability, the Purchaser reserves the right to Purchase, upon such terms and in such a manner as



he may deem appropriate, stores similar to that terminated and the Contractor shall be liable to the Purchaser for any additional costs for such similar stores and/or for liquidated damages for delay as defined in LD Clause until such reasonable time as may be required for the final supply of stores.

11.1 If this Contract is terminated as provided in Clause Contractor Default Liability, the Purchaser in addition to any other rights provided in this Article, may require the Contractor to transfer title and deliver to the Purchaser under any of the following clauses in the manner and as directed by the Purchaser:

a. Any completed stores.

b. Such partially completed stores, drawing, information and Contract rights (hereinafter called manufacturing material) as the Contractor has specifically produced or acquired for the performance of the Contract as terminated. The Purchaser shall pay to the Contractor the Contract price for completed stores delivered to and accepted, by the purchaser and for manufacturing material delivered and accepted.

11.2 In the event the Purchaser does not terminate the Contract as provided in Contractor Default Liability, the Contractor shall continue the performance of the Contract in which case he shall be liable to the purchaser for liquidated damages for delay as set out in LD Clause until the stores are accepted.

## 12. REJECTION :

In the event that any of the stores supplied by the Contractor is found defective in material or workmanship or otherwise not in conformity with the requirements of the Contract specifications, the purchaser shall either reject the stores or request the Contractor, in writing, to rectify the same. The Contractor, on receipt of such notification, shall either rectify or replace the defective stores free of cost to the purchaser. If the Contractor fails to do so, the purchaser may at his option either

a. replace or rectify such defective stores and recover the extra cost so involved from the Contractor, or

b. terminate the Contract for default as provided under Contractor Default Liability, above, or

c. acquire the defective stores at a reduced price considered equitable under the circumstances. The provision of this article shall not prejudice the Purchaser's rights under LD Clause

## 13. EXTENSION OF TIME:

If the completion of supply of stores is delayed due to reason of force majeure such as acts of god, acts of public enemy, acts of Government, fires, floods, epidemics, quarantine restriction, strikes, freight embargoes, etc., the Contractor shall give notice within 15 days to the purchaser in writing of his claim for an extension of time. The purchaser on receipt of such notice after verification, if necessary, may

agree to extend the Contract delivery date as may be reasonable but without prejudice to other terms and conditions of the Contract.

#### 14. GUARANTEE AND REPLACEMENT:

a. The Contractor shall guarantee that the stores supplied shall comply fully with the specifications laid down for material, workmanship and performance.

b. If in the opinion of the purchaser it becomes necessary to replace or renew any defective stores, such replacements or renewals shall be made by the Contractor free of all costs to the Purchaser.

c. If the stores or any portion thereof is damaged or lost during transit, the Purchaser shall give notice to the Contractor setting forth particulars of such stores damaged or lost during transit. The replacement of such stores shall be effected by the contractor within a reasonable time to avoid unnecessary delay in the intended usage of the Stores.

In case the purchaser agrees, the price towards replacement items shall be paid by the purchaser on the basis of original price quoted in the tender or as reasonably worked out from the tender.

#### 15. REQUIREMENT OF ADDITIONAL NUMBERS OF THE STORES/SPARE PARTS ORDERED:

The Contractor shall also undertake the supply of additional number of items covered by the order as considered necessary by the purchaser at a later date, the actual price to be paid shall be mutually agreed to after negotiations.

#### 16. PACKING:

a. The Contractor wherever applicable shall pack and crate all stores for sea/air shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road, rail or sea for space qualified stores. The Contractors shall be held responsible for all damages due to improper packing.

b. The Contractor shall ensure that each box / unit of shipment is legible and properly marked for correct identification. The failure to comply with this requirement shall make the Contractor liable for additional expenses involved.

c. The Contractor shall notify the purchaser of the date of shipment from the port of embarkation as well as the expected date of arrival of such shipment at the designated port of arrival.

d. The Contractor shall give complete shipment information concerning the weight, size, content of each packages, etc.

e. Transshipment of equipment shall not be permitted except with the written permission of the purchaser.

f. Apart from the despatch documents negotiated through Bank, the following documents shall also be airmailed to the purchaser within 7 days from the date of shipment by sea and within 3 days in case of airconsignments:

a. Commercial Bill of Lading / Air Way Bill / Post parcel Receipt Two nonnegotiable copies)

b. Invoice (3 copies)

c. Packing List (3 copies)

d. Test Certificate (3 copies)

e. Certificate of Origin.

The Contractor shall also ensure that one copy of the packing list is enclosed in each case.

#### 17. LANGUAGE AND MEASURES:

All documents pertaining to the Contract including specification, schedule, notice, correspondence, operating and maintenance instructions, drawings or any other writings shall be written in English language. The metric system of measurement shall be used exclusively in the Contract.

#### 18. INDEMNITY:

The Contractor shall warrant and be deemed to have warranted that all Stores supplied against this Contract are free and clean of infringement of any patent, copyright or trade mark and shall at all times indemnify the purchaser against all claims which may be made in respect of stores for infringement of any right protected by Patent, Registration of design or Trade Mark, and shall take all risk of accident or damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfilment of the Contract.

#### 19. COUNTER TERMS AND CONDITIONS OF SUPPLIERS:

Where counter terms and conditions/printed or cyclostyled conditions have been offered by the supplier, the same shall not be deemed to have been accepted by the purchaser unless specific written acceptance thereof is obtained.

## 20. SECURITY INTEREST:

On each item to be delivered under this Contract, including an item of work in progress in respect of which payments have been made in accordance with the terms of the Contract, purchaser shall have a security interest in such items which shall be deemed to be released only at the time when the applicable deliverable item is finally accepted and delivered to the purchaser in accordance with the terms of the Contract. Such security interest of the purchaser shall constitute a prior charge as against any other charge or interest created in respect of such items by any entity.

## 21. RECOVERY OF SUM DUE:

Whenever any claim for the payment of, whether liquidated or not, money arising out of or under this Contract against the Contractor, the purchaser shall be entitled to recover such sum by appropriating in part or whole, the security deposited by the Contractor, if a security is taken against the Contractor. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable as the case may be shall be deducted from any sum then due or which at any time thereafter may become due to the Contractor under this or any other Contract with the purchaser. Should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the purchaser on demand the remaining balance due. Similarly, if the purchaser has or makes any claim, whether liquidated or not, against the Contractor under any other Contract with the purchaser, the payment of all moneys payable under the Contract to the Contractor including the security deposit shall be withheld till such claims of the purchaser are finally adjudicated upon and paid by the Contractor.

22. In e procurement system submission of bid is a two step process. After submission of their bids, bidders have to wait for bid sealing by Purchaser. Subsequently, bidders have to complete open authorization in the e procurement system to enable the Purchaser to open the bid. If open authorization is not completed by the bidder, then Purchaser will not be able to open the bid and the bid becomes invalid.

In case bidder encounters any technical snag pertaining to e procurement system while acting on the tender, computer screen shot of the error message with date and time stamp on the web browser along with the query shall be emailed by the bidder to the help desk, for resolution of the problem, at least 4 working days before the due date and time of bid submission. The contact detail of the help desk is available on the home page of the e procurement website.

Purchaser will make all efforts to resolve technical queries reported by the bidders but will not be bound to do so if the problems are reported beyond the time mentioned above. Purchaser will not be responsible for non submission of bids for such cases.

The time taken to ascertain, evaluate and suggest a solution for the problem reported by bidder may vary from case to case. Hence bidders are advised to submit the bid well in advance before closing date and time to avoid last minute issues.

## Bid Templates

### Document Solicited from Vendor

Attachment 1:

Attachment 2:

### Elibility Criteria

### Item Specifications

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
1	Bids of vendors meeting the following eligibility criteria shall only be considered for technical evaluation and further processing:			
2	1.Vendor must have experience of minimum 5			

	years design and manufacturing of large sized, multilayered, Aluminium Nitride (AlN), Pin Grid Array (PGA) Packages with large pin counts.			
3	2. Vendor must have capability to do the electrical design of the packages with multiple power planes meeting signal and power integrity requirements as specified in the "Scope of work" document(s).			
4	3. To support above, vendor must submit their detailed manufacturing/design guidelines for AlN multilayered packages specifying wire bond fingers dimension & pitch, tolerances, trace materials, plating details, layer /tape thicknesses, material properties,			

	flatness, surface finish details etc.			
5	4.The size, number of PGA pins, number of package layers that have been designed and fabricated in the past shall be minimum of 80% of the requirement detailed in the “Scope of Work” document for each item (package).			
6	5.To support above, vendors must submit the list of equivalent AIN packages which are developed and fabricated by themselves.			

**Annexure -I scope of work for Development of CPGA for MIDSS502 (ATCOR)**

**Item Specifications -I**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
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1	This document provides die details necessary for developing Ceramic PGA package.			
2	1.PACKAGE REQUIREMENT:The package shall be custom designed to meet die requirements defined in terms of various interfaces.			
3	i.Package Material shall be Aluminium Nitride (AlN).			
4	ii.Geometric details of the device die are given in Table 1 and also shared as MIDSS502.dxf.iii.Die pad names and coordinates are given in MIDSS502.xls.iv.Package design drawing provided as MIDSS502-package.pdf for pin outs and mounting details. v.Package development as per &#161;°Material specifications for CPGA&#161;± shared as			

	annexure "CIV.			
5	2.PACKAGE TO PIN CONNECTOIN SCHEME:Package to pin connection scheme is shared as MIDSS502.xls.			
6	3.DIE INTERFACE:The die mounting surface shall be planar with flatness of approx 100 &#236;m. The cavity design shall permit sealing with a window. The cavity design shall maintain maximum separation of 0.7 mm to 1.5 mm between die top surface and window bottom surface.			
7	4.ALIGNMENT MARKING REQUIREMENTS FOR PGA:There are four alignment markers at each corner of the die. There shall be provision to align the die with respect to package. In order to ensure above requirement package shall have			

	alignment marks at four corners of die cavity area about 200 microns from die corner.			
8	5.PACKAGE MOUNTING:Mounting holes are required for mechanical mounting of the package. The Vendor shall propose suitable solution for fixing the package on a metal mount. The Vendor shall also provide stress free mounting approach for the proposed design.			
9	6.DEVICE SEALING:Device shall be sealed by SCL with a window, keeping gap between rear face of the window and the die between 0.7mm to 1.5mm. The window with B-staged epoxy shall be procured separately by SCL. Vendor to design package cavity depth and surface finish			

	accordingly. Sealing area flatness to be approx 100µm.			
10	7. ELECTRICAL INTERFACE: All the electrical connections from die pads (132) shall be taken to package pads (132) through wire bonding. On package, signals from 132 pads shall be mapped to approximate 84 pins on package. Connection sheet (MIDSS502.xls) shared with this scope of work gives the details of internal connection within the package.			
11	8. SIGNAL INTEGRITY ANALYSIS: The Vendor shall model data lines, clock lines, critical control lines and package / pin parasitic. SCL will provide IBIS model. The Vendor shall carry out signal integrity analysis to			

	<p>demonstrate signal shapes of critical nets. Vendor shall carry out impedance controlled (single ended: 50 Ohm) routing for interconnecting chip pads. The routing shall ensure low crosstalk (around 60dB) between bias and clock lines. Clock and video lines shall be shielded by ground planes. Required clock skew, delay and coupling requirements shall be provided.</p>			
12	<p>i. Critical Signals Device require different bias voltages, single ended signals and ground planes. Criticality of these input/output pads for Device functioning with their description is defined for routing purpose and shared in MIDSS502.xls.</p>			
13	<p>ii. Layer Stack up (tentative) Approximate twelve layers are required</p>			

	<p>in package for signal routing and to provide power and ground plane. Typical layer stack-up is provided in Table 2. Power and ground plane may be decided based on the power needed as per the Critical net list.</p>			
14	<p>9.THERMAL DISSIPATION REQUIRMENT:Total power dissipation in die would be around 500mW.</p>			
15	<p>10.ASSEMBLY CONSTRAINTSi.Wire bonding with 1mil/1.25 mil Al wire. Maximum bond wire length allowed is 100D.ii.Minimum Ledge length (bond finger length including pull back) and Ledge width should be minimum 0.9 mm and 0.1 mm respectively.iii.Cavity size should be about 3.6 mm larger than the die size.</p>			

16	11.LAYOUT TOLERANCE PARAMETERS as per Table 3 of Annexure - 1			
17	This is a two part tender-technical (Part-1) and commercial (Part-2). Technical bid (Part-1) should comprise only technical information; it shall not contain any pricing information.Following are to be submitted by the bidders along with Part 1 of the bid:			
18	i.Compliance of this Annexure –I tilted as “Scope of work for Development of CPGA package for ATCOR (MIDSS502)”.			
19	ii.Compliance to SCL package design drawing shared as MIDSS502-package.pdf.			
20	iii.Compliance to “Material specifications for CPGA”			

	attached as annexure –IV.			
21	iv.Preliminary package drawing.			
22	v.Documents required as per “Eligibility criteria”.			
23	vi.If the bidder is not OEM, then bidder need to submit the authorization certificate from OEM stating them as authorized agents for bidding and supplying the tendered components.			
24	vii.Un-priced bid of the tendered item. Please note that NO pricing information is to be included in Part-1 of the bid.			
25	viii.Submission of item 12-i to 12-vii is mandatory for bid evaluation.			
26	13.After placement of PO, the selected vendor has to share following:i.Package configuration and			



	drawings.			
27	ii. Package layout in layout tool specific format / neutral format.iii.RLC spice file of critical nets; lumped model and distributed model.			
28	iv. Achieved delays and skew in critical nets.			
29	v. Cross talk and coupling report for all nets.			
30	vi. Changes suggested by SCL shall be seamlessly implemented by the Vendor. 14. Before fabrication final drawing of Package will be approved by SCL.			

**Annexure -II scope of work for Development of CPGA for 10P**

**Item Specifications -II**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
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1	This document provides die details necessary for developing Ceramic PGA package.1.PACKAGE REQUIREMENT:The package shall be custom designed to meet die requirements defined in terms of various interfaces.			
2	i.Package Material shall be Aluminium Nitride (AlN).			
3	ii.Geometric details of the device die are given in Table 1 and also shared as 10P.dxf.iii.Die pad names and coordinates are given in 10P.xls.iv.Package design drawing provided as 10P-package.pdf for pin outs and mounting details. v.Package development as per “Material specifications for CPGA” shared as annexure –IV.			
4	2.PACKAGE TO PIN CONNECTOIN SCHEME:Package to pin			

	connection scheme is shared as 10P.xls.			
5	<p>3.DIE INTERFACE:The die mounting surface shall be planar with flatness of approx 100 &amp;#236;m. The cavity design shall permit sealing with a window. The cavity design shall maintain maximum separation of 0.7 mm to 1.5 mm between die top surface and window bottom surface.</p>			
6	<p>4.ALIGNMENT MARKING REQUIREMENTS FOR PGA:There are four alignment markers at each corner of the die. There shall be provision to align the die with respect to package. In order to ensure above requirement package shall have alignment marks at four corners of die cavity area about 200 microns from die corner.</p>			

7	<p>5.PACKAGE MOUNTING:Mounting holes are required for mechanical mounting of the package. The Vendor shall propose suitable solution for fixing the package on a metal mount. The Vendor shall also provide stress free mounting approach for the proposed design.</p>			
8	<p>6.DEVICE SEALING:Device shall be sealed by SCL with a window, keeping gap between rear face of the window and the die between 0.7mm to 1.5mm. The window with B-staged epoxy shall be procured separately by SCL. Vendor to design package cavity depth and surface finish accordingly.Sealing area flatness to be approx 100µm.</p>			
9	7.ELECTRICAL			

	<p>INTERFACE:All the electrical connections from die pads (242) shall be taken to package pads (242) through wire bonding. On package, signals from 242 pads shall be mapped to approximate 168 pins on package. Connection sheet (10P.xls) shared with this scope of work gives the details of internal connection within the package.</p>			
10	<p>8. SIGNAL INTEGRITY ANALYSIS:The Vendor shall model data lines, clock lines, critical control lines and package / pin parasitic. SCL will provide IBIS model. The Vendor shall carry out signal integrity analysis to demonstrate signal shapes of critical nets. Vendor shall carry out impedance controlled (single ended: 50 Ohm) routing for</p>			

	<p>interconnecting chip pads. The routing shall ensure low crosstalk (around 60dB) between bias and clock lines. Clock and video lines shall be shielded by ground planes. Required clock skew, delay and coupling requirements shall be provided.</p>			
11	<p>i. Critical Signals Device require different bias voltages, single ended signals and ground planes. Criticality of these input/output pads for Device functioning with their description is defined for routing purpose and shared in 10P.xls.</p>			
12	<p>ii. Layer Stack up (tentative) Approximate twelve layers are required in package for signal routing and to provide power and ground plane. Typical layer stack-up is provided in Table 2. Power</p>			

	and ground plane may be decided based on the power needed as per the Critical net list.			
13	9.THERMAL DISSIPATION REQUIRMENT:Total power dissipation in die would be around 3W.			
14	10.ASSEMBLY CONSTRAINTSi.Wire bonding with 1mil/1.25 mil Al wire. Maximum bond wire length allowed is 100D.ii.Minimum Ledge length (bond finger length including pull back) and Ledge width should be minimum 0.9 mm and 0.1 mm respectively.iii.Cavity size should be about 3.6 mm larger than the die size.			
15	11.LAYOUT TOLERANCE PARAMETERS as per Table 3 of Annexure - 2.			
16	12.DOCUMENTS REQUIRED WITH THE			

	<p>TECHNICAL BID This is a two part tender- technical (Part-1) and commercial (Part-2). Technical bid (Part-1) should comprise only technical information; it shall not contain any pricing information. Following are to be submitted by the bidders along with Part 1 of the bid:</p>			
17	<p>i. Compliance of this Annexure – II titled as “Scope of work for Development of CPGA package for SLA-14k-FI-10P”.</p>			
18	<p>ii. Compliance to SCL package design drawing shared as 10P-package.pdf.</p>			
19	<p>iii. Compliance to “Material specifications for CPGA” attached as annexure – IV.</p>			
20	<p>iv. Preliminary Package</p>			



	drawing.			
21	v.Documents required as per “Eligibility criteria”.			
22	vi.If the bidder is not OEM, then bidder need to submit the authorization certificate from OEM stating them as authorized agents for bidding and supplying the tendered components.			
23	vii.Un-priced bid of the tendered item. Please note that NO pricing information is to be included in Part-1 of the bid.			
24	viii.Submission of item 12-i to 12-vii is mandatory for bid evaluation.			
25	13.After placement of PO, the selected vendor has to share following:i.Package configuration and drawings.			

26	ii. Package layout in layout tool specific format / neutral format.			
27	iii. RLC spice file of critical nets; lumped model and distributed model. iv. Achieved delays and skew in critical nets.			
28	v. Cross talk and coupling report for all nets.			
29	vi. Changes suggested by SCL shall be seamlessly implemented by the Vendor.			
30	14. Before fabrication final drawing of Package will be approved by SCL.			

**Annexure -III scope of work for Development of CPGA for 4P**

**Item Specifications -III**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Remarks
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1	This document provides die details necessary for developing Ceramic PGA package.1.PACKAGE REQUIREMENT:The package shall be custom designed to meet die requirements defined in terms of various interfaces.			
2	i.Package Material shall be Aluminium Nitride (AlN).			
3	ii.Geometric details of the device die are given in Table 1 and also shared as 04P.dxf.iii.Die pad names and coordinates are given in 04P.xls.iv.Package design drawing provided as 04P-package.pdf for pin outs and mounting details. v.Package development as per “Material specifications for CPGA” shared as annexure –IV.			
4	2.PACKAGE TO PIN CONNECTOIN SCHEME:Package to pin			

	connection scheme is shared as 04P.xls.			
5	<p>3.DIE INTERFACE:The die mounting surface shall be planar with flatness of approx 100 &amp;#236;m. The cavity design shall permit sealing with a window. The cavity design shall maintain maximum separation of 0.7 mm to 1.5 mm between die top surface and window bottom surface.</p>			
6	<p>4.ALIGNMENT MARKING REQUIREMENTS FOR PGA:There are four alignment markers at each corner of the die. There shall be provision to align the die with respect to package. In order to ensure above requirement package shall have alignment marks at four corners of die cavity area about 200 microns from die corner.</p>			

7	<p>5.PACKAGE MOUNTING:Mounting holes are required for mechanical mounting of the package. The Vendor shall propose suitable solution for fixing the package on a metal mount. The Vendor shall also provide stress free mounting approach for the proposed design.</p>			
8	<p>6.DEVICE SEALING:Device shall be sealed by SCL with a window, keeping gap between rear face of the window and the die between 0.7mm to 1.5mm. The window with B-staged epoxy shall be procured separately by SCL. Vendor to design package cavity depth and surface finish accordingly.Sealing area flatness to be approx 100µm.</p>			
9	7.ELECTRICAL			

	<p>INTERFACE:All the electrical connections from die pads (124) shall be taken to package pads (124) through wire bonding. On package, signals from 124 pads shall be mapped to approximate 124 pins on package. Connection sheet (04P.xls) shared with this scope of work gives the details of internal connection within the package.</p>			
10	<p>8. SIGNAL INTEGRITY ANALYSIS:The Vendor shall model data lines, clock lines, critical control lines and package / pin parasitic. SCL will provide IBIS model. The Vendor shall carry out signal integrity analysis to demonstrate signal shapes of critical nets. Vendor shall carry out impedance controlled (single ended: 50 Ohm) routing for</p>			

	<p>interconnecting chip pads. The routing shall ensure low crosstalk (around 60dB) between bias and clock lines. Clock and video lines shall be shielded by ground planes. Required clock skew, delay and coupling requirements shall be provided.</p>			
11	<p>i. Critical Signals Device require different bias voltages, single ended signals and ground planes. Criticality of these input/output pads for Device functioning with their description is defined for routing purpose and shared in 04P.xls.</p>			
12	<p>ii. Layer Stack up (tentative) Approximate twelve layers are required in package for signal routing and to provide power and ground plane. Typical layer stack-up is provided in Table 2. Power</p>			

	and ground plane may be decided based on the power needed as per the Critical net list.			
13	9.THERMAL DISSIPATION REQUIRMENT:Total power dissipation in die would be around 500mW.			
14	10.ASSEMBLY CONSTRAINTSi.Wire bonding with 1mil/1.25 mil Al wire. Maximum bond wire length allowed is 100D.ii.Minimum Ledge length (bond finger length including pull back) and Ledge width should be minimum 0.9 mm and 0.1 mm respectively.iii.Cavity size should be about 3.6 mm larger than the die size.			
15	11.LAYOUT TOLERANCE PARAMETERSas per Table 3 of Annexure - III			
16	12.DOCUMENTS REQUIRED WITH THE			



	<p>TECHNICAL BID This is a two part tender- technical (Part-1) and commercial (Part-2). Technical bid (Part-1) should comprise only technical information; it shall not contain any pricing information. Following are to be submitted by the bidders along with Part 1 of the bid:</p>			
17	<p>i. Compliance of this Annexure – III titled as “Scope of work for Development of CPGA package for SLA-14k-FI-04P ”.</p>			
18	<p>ii. Compliance to SCL package design drawing shared as 04P-package.pdf.</p>			
19	<p>iii. Compliance to “Material specifications for CPGA” attached as annexure – IV.</p>			
20	<p>iv. Preliminary Package</p>			

	drawing.			
21	v.Documents required as per “Eligibility criteria”.			
22	vi.If the bidder is not OEM, then bidder need to submit the authorization certificate from OEM stating them as authorized agents for bidding and supplying the tendered components.			
23	vii.Un-priced bid of the tendered item. Please note that NO pricing information is to be included in Part-1 of the bid.			
24	viii.Submission of item 12-i to 12-vii is mandatory for bid evaluation.			
25	13.After placement of PO, the selected vendor has to share following:i.Package configuration and drawings.			

26	ii. Package layout in layout tool specific format / neutral format.			
27	iii. RLC spice file of critical nets; lumped model and distributed model. iv. Achieved delays and skew in critical nets.			
28	v. Cross talk and coupling report for all nets.			
29	vi. Changes suggested by SCL shall be seamlessly implemented by the Vendor.			
30	14. Before fabrication final drawing of Package will be approved by SCL.			

**Vendor Specified Terms**

Description	Vendor Terms
1. This being a two part tender Technical and Commercial part (Price Bid) separate, the Technical part should comprise only technical information, drawing & unpriced bid form etc and it should not contain any pricing information. The tenders containing Price details in	

<p>technical part will be treated as unsolicited offers and will be rejected.</p> <p>Prices should be indicated in the Price Bid (commercial part) format only.</p>	
<p>2.Export Formalities, Taxes and Duties:</p> <p>Any export approvals/Govt. clearances required, Taxes and duties as per laws of the exporting country shall be the responsibility of Vendor.</p> <p>Any Govt. formalities/Clearances required, Taxes and duties etc payable as per Indian Laws shall be PURCHASER responsibility.</p>	
<p>3.Delivery Terms:</p> <p>For imported stores, prices shall be quoted on FOB/FCA nearest International/Gateway airport basis inclusive of all taxes, levies, duties arising in the bidder country.</p> <p>For Indigenous stores, prices shall be quoted on F.O.R. destination basis i.e. SCL, S.A.S. Nagar, Mohali, Punjab exclusive of GST as may be applicable.</p>	

<p>4.GST (for indigenous Vendor):</p> <p>Purchaser is entitled to concessional CGST of 2.5 % and IGST of 5 % as per Ministry of Finance, Department of Revenue, Notification Nos. 45/2017 Central Tax (Rate) and 47/2017 Integrated Tax (Rate) both dated 14th November, 2017 respectively and would accordingly issue Exemption Certificate in favour of the contractor quoting in Indian Rupees. The bidder should take note of the same while quoting the prices in Indian Rupees.</p>	
<p>5.For imported materials, Purchaser is entitled to issue Customs duty exemption certificate (CDEC) to the contractor under customs notification no.51/96 dated 23.07.1996 and subsequent amendments to enable the contractor to avail off the benefit of concessional rate of customs duty under this notification. CVD under this notification is nil. In addition to the above CDEC, any documentary support requested by the contractor from the purchaser for customs clearance of goods against the above CDEC shall be provided by the purchaser. (Purchaser will provide Customs Duty Exemption Certificate in case of Import Orders/ imported supplies/ High Sea Sales).</p>	
<p>6.Delivery Period:</p> <p>The contractor shall specify their best delivery period inclusive of all Govt. formalities of the exporting country.</p>	
<p>7.Liquidated Damages (LD):</p>	

<p>If the Contractor fails to deliver the stores within the time specified in the contract or any extension thereof, the purchaser shall recover from the Contractor as liquidated damages a sum of onehalf of one percent (0.5 percent) of the Contract price of the undelivered stores for each calendar week of delay. The total liquidated damages shall not exceed ten percent (10 percent) of the Contract price.</p>	
<p>8. Terms of Payment (For Foreign supplier):</p> <p>Payment shall be released after shipment. Vendor is requested to send the original documents (i.e invoice, Packing List, AWB or BL etc.) routed through Vendor Banker to Purchaser Banker(whose details shall be indicated in the purchase order)</p> <p>Indian agent remuneration/service charge shall be payable by the Purchaser directly to the Indian agent in Indian Rupees based on T.T buying rate of exchange prevailing on the date of placement of purchase order within 30 days of acceptance of material at purchaser site.</p>	
<p>9. Terms of Payment (For indigenous vendor):</p> <p>Terms of payment in case of indigenous supplier(S):</p> <p>100% payment of the PO value shall be paid for the accepted stores within 30 days from the date of receipt of the materials at SCL.</p>	

<p>10. Bank Charges:</p> <p>While the purchaser bank charges shall be borne by the purchaser, the contractor shall bear the bank charges payable to his banker.</p>	
<p>11. Security Deposit (SD):</p> <p>On acceptance of the tender, the Contractor shall submit security deposit for ten percent (10 percent) value of the Purchase Order (PO) within 15 days from the date of PO towards successful execution of the PO. Security Deposit shall be submitted through Demand Draft / Bankers Cheque/ fixed deposit receipt or Bank Guarantee from any of the Scheduled Banks executed on nonjudicial stamp paper of appropriate value, and shall be valid for a period of sixty (60) days beyond the date for completion of the Purchase Order.</p> <p>(This will be returned by SCL immediately on execution of the PO satisfactorily as per order terms. If not, the amount will be forfeited).</p> <p>Central PSUs/PSEs/PSEs/Autonomous Bodies/MSEs shall be exempted from the payment of Security Deposit, and instead, an Indemnity Bond shall be secured from them in lieu of the Security Deposit.</p>	
<p>12. REJECTION:</p> <p>In the event that any of the stores supplied by the Contractor is found defective in material or workmanship or otherwise not in conformity with the requirements of the Contract specifications, the purchaser shall either reject the stores or request the Contractor, in writing, to</p>	

<p>rectify the same. The Contractor, on receipt of such notification, shall either rectify or replace the defective stores free of cost to the purchaser.</p>	
<p>13.Replacement:</p> <p>If the stores or any portion thereof is damaged or lost during transit, the Purchaser shall give notice to the Contractor setting forth particulars of such stores damaged or lost during transit. The replacement of such stores shall be effected by the contractor within a reasonable time to avoid unnecessary delay in the intended usage of the Stores.</p> <p>In case the purchaser agrees, the price towards replacement items shall be paid by the purchaser on the basis of original price quoted in the tender or as reasonably worked out from the tender.</p>	
<p>14.GUARANTEE AND REPLACEMENT:</p> <p>a.The Contractor shall guarantee that the stores supplied shall comply fully with the specifications laid down for material, workmanship and performance.</p> <p>b.If in the opinion of the purchaser it becomes necessary to replace or renew any defective stores, such replacements or renewals shall be made by the Contractor free of all costs to the Purchaser.</p> <p>c.If the stores or any portion thereof is damaged or lost during transit, the Purchaser shall give notice to the Contractor setting forth</p>	



<p>particulars of such stores damaged or lost during transit. The replacement of such stores shall be effected by the contractor within a reasonable time to avoid unnecessary delay in the intended usage of the Stores.</p> <p>In case the purchaser agrees, the price towards replacement items shall be paid by the purchaser on the basis of original price quoted in the tender or as reasonably worked out from the tender.</p>	
<p>15.Validity:</p> <p>The offer should be valid for a minimum period of 120 from the date of opening of Technical bid or any extension given thereof and 90 days after opening of Price Bid.</p>	
<p>16.Mode of Despatch:</p> <p>Stores should be shipped through Purchaser nominated freight forwarder whose contact details shall be mentioned in the purchase order.</p>	
<p>17.Insurance of Stores:</p> <p>Insurance wherever necessary, will be arranged by the Purchaser. The</p>	

<p>necessity or otherwise of insurance will be as indicated in the Purchase Order/Contract.</p>	
<p>18.Packing and Forwarding:</p> <p>The Contractor shall pack and crate all stores for air/sea/road shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road, rail, air or sea. The Contractors shall be responsible for all damages due to improper packing.</p>	
<p>19.Arbitration:</p> <p>In the event of any dispute/s, difference/s or claim/s arising out of or relating to the interpretation and application of the Contract, such dispute/s or difference/s or claim/s shall be settled amicably by mutual consultations of the good Offices of the respective Parties and recognizing their mutual interests attempt to reach a solution satisfactory to both the parties. If such a resolution is not possible, within 30 days from the date of receipt of written notice of the existence of such dispute/s, then the unresolved dispute/s or difference/s or claim/s shall be referred to the Sole Arbitrator appointed by the Parties by mutual consent in accordance with the rules and procedures of Arbitration and Conciliation Act 1996 as amended from time to time. The arbitration shall be conducted in New Delhi in the Arbitration and Conciliation Centre , New Delhi (Domestic and International) as per its rules and regulations. The expenses for the</p>	

<p>Arbitration shall be shared equally or as may be determined by the Arbitrator. The considered and written decision of the Arbitrator shall be final and binding between the Parties. The applicable language for Arbitration shall be English only.</p> <p>Work under the Contract shall be continued by the CONTRACTOR during the pendency of arbitration proceedings, without prejudice to a final adjustment in accordance with the decision of the Arbitrator unless otherwise directed in writing by the DEPARTMENT or unless the matter is such that the works cannot be possibly continued until the decision (whether final or interim) of the Arbitrator is obtained.</p>	
<p>20.Applicable Law: The Contract shall be interpreted, construed and governed by the laws of India.</p>	
<p>21.Address of Indian Agent, if any:</p>	
<p>22.Any Other Term:</p>	

**Supporting Documents from Vendor**

**Attachment - I:**

**Attachment - II:**

**Price Bid Form**

Item Description	Slab Range	Qty	UOM	Currency	Unit Price	Total Price
PGA package for ATCOR (MIDSS502) (Development and fabrication as per "scope of work" attached as annexure-I pga for ATCOR	-	100	No.	-	-	-
PGA package for SLA-14K-F1-10P (Development and fabrication as per "scope of work" attached as annexure-II PGA for 10P	-	100	No.	-	-	-
PGA package for SLA-14K-F1-4P (Development and fabrication as per "scope of work" attached as annexure-III PGA	-	100	No.	-	-	-

for 4P						
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Break-up of other taxes and other costs should be specified in respective narration columns.

Sum of these Break-up values should be specified in respective value columns.