



केन्द्रीय इलेक्ट्रॉनिकी अभियांत्रिकी अनुसंधान संस्थान
CSIR-Central Electronics Engineering Research Institute
पिलानी (राजस्थान) 333 031
Pilani (Rajasthan)-333 031,INDIA

Fax : 01596 – 242135,242294
Phone : 01596 – 244710

Gram : "ELECTRONIC" Pilani

No. SPO/EOI/SPTG/10-Pur/2024/03/E-14

Dated: 22.07.2024

**EXPRESSION OF INTEREST FOR PROCUREMENT OF CUSTOMIZED
MMIC DESIGN, FABRICATION, PACKAGING, TESTING AND
COMPREHENSIVE TRAINING.**

Introduction

CSIR-CEERI is premier Institute working in the semiconductor device fabrication, microwave tube fabrication and electronic system development.

CSIR-CEERI, Pilani invites expression of interest for customized MMIC design, fabrication, packaging, testing and comprehensive training thereof from reputed suppliers/companies. The demonstration/technical discussion and presentation on customized MMIC design, fabrication, packaging, testing and comprehensive Training capability by interested companies/ suppliers will be done by virtual mode such as MS team or similar platform. The details of item for EOI are as follows:

Objectives

The primary objectives of the activity are:

2. To design, fabricate and characterize state-of-the-art MMICs meeting the specified technical requirements.
2. To provide comprehensive training in the MMIC design, circuit level simulation, layout implementation, and co-simulation including packaging and thermal effects, chip fabrication, packaging,, testing and on-board validation of the same.

Scope

The scope of this activity will include, but not be limited to:

1. Design and Fabrication

- Design of MMIC as per the provided specifications in collaboration with the scientific team at CSIR-CEERI.
- The design steps may include, but not limited to the circuit level simulation with appropriate process design kits (PDKs) from a reputed commercial semiconductor foundry, design optimization, layout implementation, and co-simulation of the same with packaging and thermal effects.
- Regular appraisal in form of physical/virtual meetings to scientific team at CSIR-CEERI about the design step and/or any design iterations/ optimizations/ modifications to achieve the desired specifications with the help of Keysight ADS design tool.

- Regular sharing of relevant design documents i.e. circuit simulation files, results and layout with the scientific team at CSIR-CEERI.
- Fabrication of the optimized MMIC design from a reputed commercial semiconductor foundry.

2. **Chip Packaging**

- Packaging of the fabricated MMIC using an appropriate packaging material considering the thermal effects.
- Regular appraisal to the scientific team at CSIR-CEERI about packaging solutions, footprints and sharing of relevant documents.

3. **Testing and Validation:**

- Development of comprehensive testing protocols, testing of the packaged chips and providing training to the scientific team at CSIR-CEERI about the same.
- Provide testing results and validation of the performance and reliability of the developed chips with the specifications.

4. **Technical appraisal:**

- Interested parties should share a plan (with schedule and timeline) for technical appraisal to the related team at CSIR-CEERI as each stage (design, development and testing).
- Conduct training sessions on various aspects of chip development.
- Provide access to resources and tools for effective learning and skill development.

5. **Intellectual Property Rights:**

- All the intellectual property generated with this activity will be reserved by CSIR-CEERI.

Specifications

The chips to be developed should meet the following specifications:

1. **CMOS 2.4GHZ ZIGBEE/ISM TRANSMIT/RECEIVE RFIC**

Key Features

- 2.4 GHz Zigbee high-power single-chip, single-die RF front-end IC.
- Single-ended 50 Ω input and output ports.
- Integrated PA with up to +33 dBm output power.
- Integrated LNA with 2.5 dB noise figure.
- Transmit/receive switch circuitry.
- High transmit signal linearity meeting standards for OQPSK modulation.
- Low voltage (1.8 V) CMOS control logic.
- ESD protection circuitry on all ports.
- DC decoupled RF ports.
- Full on-chip matching and decoupling circuitry.
- Market proven CMOS technology.
- Small QFN, 16-pin (3 x 3 x 0.55 mm) package with exposed ground pad.

2. **X-Band 10 W GaN Power Amplifier (GaN Monolithic Microwave IC in SMD leadless package)**

Key Features

- Frequency Range: 8 – 12 GHz
- Small signal gain ~ 25 dB
- Large signal gain ~ 21 dB
- Gain flatness ~ 1 dB
- i/p return loss $S_{11} < -15$ dB
- o/p return loss $S_{22} < -15$ dB
- RF Pin ~ 20 dBm
- PSAT 39~41 dBm
- PAE > 35%
- Drain Bias $V_D = +28$ V.
- $I_{DQ} = 1.8 \sim 2.2$ A
- Gate bias = -3.45 V to -2.45 V
- Operational temp ~ -40 to +95 °C
- Junction temp ~ +175 °C
- Package Dimensions: 5 mm X 5 mm on 100 um thick substrate
- Performance Under continuous wave Operation
- Standard high performance QFN/ hermetic package

3. **16 TO 20 GHz GaN Power Amplifier (GaN Monolithic Microwave IC in SMD leadless package)**

Key Features

- Technology node (GaN) 0.15 μ m
- Frequency range: 16 to 20 GHz
- Cut of frequency 45-50 GHz
- Linear gain is 30 dB
- $P_{out} = 36$ dBm for $P_{in} = 18$ dBm
- NPR > 13 dB for $P_{out} = 4$ Watts
- PAE = 28% at P_{sat}
- i/p return loss $S_{11} < -10$ dB
- o/p return loss $S_{22} < -12$ dB
- gate bias = -3.8 V to -1.8 V
- DC bias: $V_D = 28$ Volts @ $I_{DQ} = 260$ mA
- Operational temp ~ -40 to +95 °C
- 28 Leads – QFN 5x5mm²
- MSL3
- Performance Under continuous wave Operation

CSIR- Central Electronics Engineering Research Institute, (CSIR-CEERI), Pilani, (Rajasthan) INDIA is an institute of Council of Scientific and Industrial Research, an autonomous body under Department of Scientific and Industrial Research (Government of India), New Delhi.

CSIR-CEERI is interested in procuring the above mentioned Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training for R&D activity and invites prospective manufacturers/ Class – I Local Supplier and Class – II Local Supplier to discuss with the Technical Committee about the specifications and also demonstration / technical presentation of above mentioned Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training by interested manufacturer’s/ Class – Local Suppliers and Class – II Local Suppliers. **Meeting will be held through MS Team or another similar platform. The date of meeting will be informed along with MS Team link after opening the Technical Proposal.**

Please mention the below reference for submitting the Technical Proposal of the Equipment against EOI			
Sl. No.	File Number	Description of Item	Date, Time and Place
1.	SPO/EOI/SPTG/10-Pur/2024/03/E-14	Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training	Will be informed after opening the Technical Proposal.

1. The address for submission of document and for obtaining further information:

Stores & Purchase Officer
Purchase Section
CSIR- Central Electronics Engineering Research Institute,
CEERI Campus, Pilani – 333031,
Dist. – Jhunjhunu (Rajasthan), INDIA.

Telephone No. 01596 – 252428
Email: spo@ceeri.res.in

2. The Bidding document can be downloaded free of cost directly from Central Public Procurement Portal (CPPP) of Government of India website <https://etenders.gov.in> and CSIR-CEERI website <https://www.ceeri.res.in>
3. Schedule for submission: The schedule of submission of Technical proposals, Technical leaflet/ literature and other Technical supporting documents and opening of proposals is as follows:

Date and Time of Submission of proposals for Consumables and Equipments.		Date and Time of Opening of proposals of Consumables and Equipments.	
Date	Time	Date	Time
13.08.2024	2.30 P.M.	14.08.2024	3.30 P.M.

4. Date and Time for receipt of proposals: Technical Proposal, Technical leaflet/ literature and other Technical supporting documents may be submitted through CPP Portal or through email before due date and time to CSIR-CEERI, Pilani – 333031 (Rajasthan), on or before date and time mentioned in point No.3, for submission of Technical proposals. Late / delayed proposals will not be considered. In case the last date and time is declared a holiday at a later date, then the due date and time for receipt, opening will be shifted to the next working date and time automatically. No corrigendum will be issued in this regard.
5. Pre Indent conference: The date and time of pre indent conference of Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training will be informed to

vendors along with **MS Team link through email**. Interested bidders are requested to email their willingness for making their presentation/ demonstration to spo@ceeri.res.in on or before 05.08.2024 at 5.00 P.M.. Bidders will be allotted time slots to make presentations on their, products profile, detailed specifications and technical capabilities etc.

6. Eligibility Criteria: The bidders representatives who attend the pre indent conference should possess all the technical details of the R&D Software, its capability, complete information of the company, previous experience, various technologies involved available in India and financial capabilities etc. The representatives should be capable enough to answer all queries of the Technical Sub Committee. An example of EOI eligibility criteria is mentioned in Table 1.

Table 1: An example of EOI eligibility criteria

Sr. No.	Criteria	Sub-criteria	Weightage*	Break-up of Weightage
01	Past experience with firm		10	
02	Financial strength and Sales of R&D		20	30 Lakh
03	Experience in MMIC Design, fabrication, packaging and testing		40	
04	MoU or NDA with foundry for PDK and design tools availability.	ISO companies, BIS standard, if available	20	
05	Design training provided by bidder		10	

Minimum Qualified Marks: 60 Marks.

*Weightage (out of 100) should be pre-decided and in EOI documents by the Competent Authority based on assessment of the required profiles of the potential bidders. The marking/grading scheme for allotting marks (out of 100) for various parameters should also be laid down.

Evaluation of EOI: The bidders should be evaluated for short-listing, inter-alia, based on their past experience of performance in a similar context, financial strength and technical capabilities, among others. Each bidder should be assigned scores based on the sum of marks obtained for each parameter multiplied by the weightage assigned to that parameter. All bidders who secure the minimum required marks (normally 60 (sixty) per cent) should be shortlisted. The minimum qualifying marks should be specified in the EOI document may specify a ‘fail-pass criteria’ with the minimum qualifying requirement for each of the criteria, such as minimum years of experience, minimum number of assignments executed and minimum turnover. Under such circumstances, all bidders who meet the minimum requirement, as specified, should be shortlisted. In two stage bidding the Technical bids should be first analyzed/ scrutinized by the Technical Sub Committee.

7. The technical committee shall finalize the specifications after knowing/obtaining details about relevant/available technology in the market suiting to the requirement and needs of our Laboratory/ Institute.

8. The tender document and contract will be finalized based on past experience of performance in a similar context, financial strength and technical capabilities and other allied technical services. Contract will be awarded to the lowest evaluated bidder after a separate bidding process based on two bid system.
9. For evaluating the responses, CSIR-CEERI may call for further presentations of their case in person or presentation can be considered via Skype/Video Conferencing also.
10. The Director, CSIR-Central Electronics Engineering Research Institute, Pilani – 333031 (Rajasthan), INDIA reserves the right to accept or reject any or all EOI Notification/tenders/offers or withdraw the Notice at any stage of processing without assigning any reason whatsoever, such an event would not cause obligation of any kind to CSIR-CEERI.

Stores & Purchase Officer

1. INTRODUCTION

CSIR-CEERI is interested in purchasing various R&D Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training which will be utilized in R&D activities.

2. OBJECTIVE

The objective this EOI is to identify prospective supplier to supply the required Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training, Eligibility criteria for bidders are mentioned in the tender document etc. A separate tender will be floated for the supply of Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training on the recommendations of Technical Sub Committee, after EOI.

3. SCOPE OF SUPPLY

The Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training is required for on-going R&D mission project and activities.

4. Eligibility Criteria

Technical

1. Indian Manufacturers, Class – I Local Supplier and Class – II Local Suppliers are eligible for supply of Software.

Eligibility of Class – I Local Supplier / Class – II Local Supplier/ Non-local suppliers for different types of procurement.

- (a) In procurement of all goods, services or works in respect of which the Nodal Ministry/ Department has communicated that there is sufficient local capacity and local competition, only Class – I local suppliers, as defined under the Order, shall be eligible to bid irrespective of purchase value.
- (b) In procurement of all goods, services or works, not covered by sub-para (a) above, and with estimated value of purchases less than Rs. 200 Crore, in accordance with Rule 161(iv) of GFR, 2017, Global tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure. Only Class –I local supplier and class – II local supplier, as defined under the Order, shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry has been issued. In global tender enquires, Non-local suppliers shall also be eligible to bid along with Class – I local suppliers and Class –II local suppliers.
- (c) For the purpose of this Order, works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts.

Commercial

1. The bidder should not have been black listed / holiday listed by any other CSIR laboratory, or by any other R&D organization or by Government of India. A self declaratory letter in this regard must be enclosed.

5. Proposals

Technical

- a) Detailed specifications of the Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training supported by technical brochures/ data sheets in English. The Bidder shall provide the complete technical information.
- b) Detailed brochure / datasheets on the technologies / techniques involved.
- c) Other utilities if any.

Bidder Information

- a) Company information – Status of bidder, registration certificate, and detailed write up about bidder history.
- b) Details of Personnel – Details of all key technical, commercial and service personnel.
- c) Location of factory involved in production of above mentioned items.
- d) Details of financial information about company in the last 3 years, like turnover, copies of audited balance sheet etc.
- e) Details of their offices setup in India.
- f) Self certified letter about holiday listing / black listing in bidder letter head.
- g) Code of Integrity and conflict of interest duly signed by the authorized representative must be enclosed.
- h) Copies of Purchase orders / contracts of similar Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training supplied in the last 3 years and the performance certificate from the respective clients.
- i) The Bidder shall indicate the timelines necessary for supply
- j) Vendors must submit the Certificate on their Letter Head that they are Class – I Local Supplier or Class – II Local Supplier and also mentioned the percentage of local contents which are manufacturing in India.

Sl. No.	Name of the Buyer with location	Date and Reference Number of Purchase order (if available)	Date of Compulsion	Performance Certificate

6. Other terms

Purchase of EOI Document

The Expression of Interest document shall be downloaded from Central Public Procurement Portal (CPPP) website <http://etenders.gov.in> and CSIR-CEERI Website www.ceeri.res.in free of cost.

Clarifications of the EOI Document

Any clarification in the EOI document may be sent in writing to the following through email: Stores & Purchase Officer, email: spo@ceeri.res.in

However, no extension of the time or date of EOI submitted will be provided on the ground that CSIR-CEERI has not responded to any query/clarification raised by any Prospective Bidder.

Amendment of Terms and Conditions of EOI

1. CSIR-CEERI may at its discretion or as a result of query, suggestion or comment of Bidder, may modify the EOI document by issuing an amendment or a corrigendum at any time before opening the EOI. Any such addendum or corrigendum will be uploaded on CPP Portal <http://etenders.gov.in> and CSIR-CEERI Website www.ceeri.res.in and the same will be binding on all the Bidders, as the case may be.
2. CSIR-CEERI at its discretion may extend the due date of submission of EOI and the decision of CSIR-CEERI in this respect would be final and binding on the respondents. In the event of changes in the time schedule. CSIR-CEERI website www.ceeri.res.in . Interested Bidders are advised to check the above website regularly for corrigendum / addendum, if any, which will be published only in the website.
3. No oral modification or interpretation of any provisions of this EOI shall be valid. Written communication shall be issued by CSIR-CEERI when changes, clarifications or amendments to the EOI document are deemed necessary by CSIR-CEERI at its sole discretion.
4. EOI submission should be in English language, EOI response should be free from correction, over writing, errors or omissions etc. Duly authorized representative of the prospective bidder shall sign on each page of the EOI documents. EOI documents should be prepared in such a way so as to provide a straight forward, concise description of the Customized MMIC Design, Fabrication, Packaging, Testing and Comprehensive Training bidder and capabilities to satisfy the requirements of this EOI.
5. EOI that are incomplete in any respect or those that nor consistent with the requirements as specified in this document may be considered non-responsive and may be liable for rejection and no further correspondence will be entertained with such Bidders.
6. If at any time during the examination, evaluation and comparison of EOI, CSIR-CEERI its discretion can ask the Bidder for the clarification of its EOI. The request for clarification and the response shall be in writing. However, no post submission of EOI, clarification at the initiative of the Bidder shall be entertained.
7. Canvassing by bidders in any form, including unsolicited letters on EOI, submitted or post corrections shall render their EOI response liable for summarily rejection.
8. The cost of charges incurred in preparation and submission of EOI response shall not be entitled by any bidder.
9. Conditional offers will be summarily rejected. EOI which is found to be incomplete in content and / or attachments and / or authentication etc. is liable to be rejected.
10. CSIR-CEERI is not responsible for any firm/ agency expression of representing to express himself/ themselves to be the agent or third party representing CSIR-CEERI in this process.
11. Disregard of any instruction may result in offer being ignored.
12. All cost and expenses associated with submission of EOI shall be borne by the Bidder while submitting the EOI. CSIR-CEERI shall have no liability, in any manner in this regard, or if it decides to terminate the process of short listing for any reason whatsoever.

Stores & Purchase Officer

Bidder Information Form*(Refer para 5.1.2 (ix)(a) of the CSIR Manual)*

- (a) *The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done of the letter head of the firm]*

Date: *[insert date (as day, month and year) of Bid Submission]*

Tender No.: *[insert number from Invitation for bids]*

Page 1 of _____ pages

01.	Bidder's Legal Name <i>[insert Bidder's legal name]</i>
02.	In case of JV, legal name of each party: <i>[insert legal name of each party in JV]</i>
03.	Bidder's actual or intended Country of Registration: <i>[insert actual or intended Country of Registration]</i>
04.	Bidder's Year of Registration: <i>[insert Bidder's year of registration]</i>
05.	Bidder's Legal Address in Country of Registration: <i>[insert Bidder's legal address in country of registration]</i>
06.	Bidder's Authorized Representative Information Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i>
07.	Attached are copies of original documents of: <i>[check the box(es) of the attached original documents]</i> Articles of Incorporation or Registration of firm named in 1, above.

Signature of Bidder _____

Name _____

Business Address _____

Format for declaration by the Bidder for Code of Integrity & conflict of interest
(Refer para 3.2.1 & 5.1.2 (ix)(m) of the CSIR Manual)

(On the Letter Head of the Bidder)

Ref. No: _____

Date _____

To,

(Name & address of the Purchaser)

Sir,

With reference to your Tender No. _____ dated _____ I/We hereby declare that we shall abide by the Code of Integrity for Public Procurement as mentioned under Para 1.3.0 of ITB of your Tender document and have no conflict of interest.

The details of any previous transgressions of the code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity are as under:

- a
- b
- c

We undertake that we shall be liable for any punitive action in case of transgression/ contravention of this code.

Thanking you,

Yours sincerely,

Signature
(Name of the Authorized Signatory)
Company Seal