

Government of India  
Bhabha Atomic Research Centre  
Electromagnetic Applications & Instrumentation Division

Ref No: EmA&ID/2021/SSR/43/14468

Date: 16/11/2021.

-----To whom so ever it may concern-----

Sub: Development, testing and supply of low noise wide bandwidth signal amplifier and its associated system

Dear Sir/Madam,

1. Quotations are invited for development, testing and supply of low noise wide bandwidth signal amplifier and its associated system conforming to technical specifications EmA&ID/EMAS/CRY/21/43 dated 10.11.2021.
2. Bidder shall quote for above job inclusive of raw material
3. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.

The quotation must reach The Head, Electromagnetic Application & Instrumentation Division by 26.11.2021 and must be sent in a sealed envelope super scribed with the reference number & the due date given above only through India Ordinary Post/Speed Post.

4. The address on the envelop should read: The Head,  
Electromagnetic Application & Instrumentation  
Division,  
RCnD Bldg., North Site  
BARC, Trombay,  
Mumbai - 400 085.  
(Kind Attn: S.Sundar Rajan, SO/G)
  5. The bidder shall complete the job within 2 months from the date of firm work order issued to the bidder.
  6. Head, Electromagnetic Application & Instrumentation Division reserves the rights to accept / reject any or all quotations without assigning any reason.
  7. Quotation must also indicate the validity of offer. Quotation must also indicate the GST No and PAN number of the supplier.
  8. The quotation has to be signed by authorized person with company seal.
  9. Payment will be made by EFT only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. Income tax as applicable will be collected at the time of payment.
  10. In case of any technical clarifications, the supplier may kindly contact the indenting officer through Email only. (Email ID:sundara@barc.gov.in)
- Encl.: Technical Specification Sheet no: EmA&ID/EMAS/CRY/21/43 dated 10.11.2021

S. Sundar Rajan  
S.Sundar Rajan 16/11/2021.  
SO/EmA&ID

Technical specification

Document no.	Revision no.	Date of Issue	No of pages
EmA&ID/EMAS/CRY/21/43	0	10.11.2021	4

Development, testing and supply of low noise wide bandwidth signal amplifier and its associated system

1.0 SCOPE

This document specifies the requirement for development, testing and supply of low noise wide bandwidth signal amplifier and its associated system. The complete job shall be carried out strictly as per requirements, specifications and its compliance standards as detailed in this document. In this specification the supplier shall be referred to as the “supplier” and Bhabha Atomic research Centre shall be referred to as the “buyer”.

The supplier shall arrange for required raw materials and tools required to complete the above job. The brief description of contents of the document is as described below.

Para 2.0 gives the details of deliverables.

Para 3.0 gives the job description details.

Para 4.0 gives general requirements

Para 5.0 gives raw material procurements

Para 6.0 gives the requirement of manufacturing and workmanship.

Para 7.0 gives the inspection and testing

Para 8.0 gives the documentation requirements

Para 9.0 gives the confidentiality clause.

2.0 DETAILS OF DELIVERABLES

The scope of supply is tabulated in table below

S.No	Description	Nos
1	Development, testing and supply of low noise wide bandwidth signal amplifier and its associated system (compatible connector and power supply)	1 Set

3.0 JOB DESCRIPTION

3.1 The signal amplifier system shall meet the following requirements

Frequency range	0.3 to 14 GHz
Small signal gain	36 dB
Noise temperature	4.2K
Noise figure	0.062 dB Typical
IRL (4-14 GHz)	15 dB
ORL ( 1- 14 GHz)	20 dB
P1dB	-10 dBm at 5 GHz
OIP3	0 dBm at 5 GHz

Connector	SMA for RF and Nano-D connector for power supply
Enclosure	Gold plated Aluminum module of less than 25 x 25 x 10mm

3.2 The power supply for the above signal amplifier shall meet the following requirements

Input voltage	12V
Output voltage	Drain voltage max ( 2.5V at 65mA) ,Gate voltage (+/- 10v)
Ripple and noise	Less than 3mVpk-pk

3.3 The schematics along with bill of materials including connectors shall be submitted in PDF format.

3.4 Based on the approved schematics, the supplier shall work out the PCB layout on each boards and submit the gerber file for approval before fabrication of the board.

3.5 The PCB board fabricated shall be first tested for continuity and the report of the same shall be submitted for purchaser review.

3.6 The components shall be sequentially mounted on each boards and shall be tested. Test report of individual IC's mounted on the board and the integrated board shall be submitted for approval.

3.7 The tested and qualified board shall be mounted on the 19" rack and the complete board assembly shall be tested of its signal integrity.

3.8 To carry out the functional testing of the board, two saw tooth waveform of very low frequency shall be generated through signal generator and tested of quench detection signal.

#### 4.0 GENERAL REQUIREMENTS

4.1 The supplier shall workout a detailed design to meet fabrication requirements and work description, quantity and main fabrication material. They shall submit along with the offer dimensional drawing giving all the salient features, material details of individual items and assembly view of the fixtures.

4.2 The Supplier shall indicate in detail the standards adopted for the materials and processes and the quality control procedures followed by them.

4.3 Supplier can suggest the color, aesthetics, and other details as suitable. Supplier must offer best quality/IS certified material only.

4.4 Supplier should have similar work experience and along with the offer, shall submit the details of past experience with documentary proof.

4.5 The supplier shall incorporate minor changes in the design as required at the time of execution of work at no extra cost.

#### 5.0 RAW MATERIAL PROCUREMENT

5.1 All the analog IC's and digital IC's , high precision reference resistors etc shall be strictly of industrial grade and shall be purchased only from very know distributors like Farnell , RS components , Mouser or Digikey. Proof of same shall be provided.

5.2 The PCB board shall be of FR4 material.

5.3 The enclosure shall be of Al 6061 T6 grade and shall be gold plated upto 100u. all the fasteners used for connecting the amplifier system with the enclosure shall be of SS304/SS316(cryogenic compatible).

## 6.0 REQUIREMENTS OF MANUFACTURING AND WORKMANSHIP

6.1 The supplier shall carry out the assembly of the PCB in a static charge free environment or place so that the IC does not damaged during assembly.

6.2 The PCB component assembly shall strictly be carried out using temperature controlled soldering station and the temperature of the soldering process shall be controlled to avoid damaging of the ICs and other components.

6.3 The supplier shall workout a detailed design to meet fabrication requirements and work description, quantity and main fabrication material. He shall submit along with the offer dimensional drawing giving all the salient features, material details of individual items and assembly view of the fixtures.

6.4 The supplier shall indicate in detail the standards adopted for the materials and processes and the quality control procedures followed by them.

6.5 Supplier can suggest the color, aesthetics, and other details as suitable. Supplier must offer best quality/IS certified material only.

6.6 Supplier should have similar work experience and along with the offer, shall submit the details of past experience with documentary proof.

6.7 Materials, tools, manpower etc required for the above work will not be supplied by the user. Supplier has to arrange the above on his own (No free issue material).

6.8 The supplier must incorporate minor changes in the design as required at the time of execution of work at no extra cost.

## 7.0 INSPECTION AND TESTING

7.1 The testing of individual boards with simulated signal and testing of integrated system shall be witnessed by the purchaser.

## 8.0 DOCUMENTATION REQUIREMENTS

8.1 Upon the receipt of work order, the supplier shall submit revised schematics of the purchaser approval including bill of materials and the supplier's part nos.

8.2 The proof of purchase of industrial grade IC's from very know distributors like Farnell , RS components , Mouser or Digikey. Proof of same shall be provided.

8.3 The PCB layout gerber files shall be submitted for approval.

8.4 The test report of the PCB's and integrated PCB's shall be submitted.

## 9.0 CONFIDENTIALITY CLAUSE

9.1 No party shall disclose any information to any third party concerning the matters under this Contract generally. In particular, any information identified as "Proprietary" in nature by disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party. This clause shall apply to sub-contractors, consultants, advisors or the employees engaged by a party with equal force.

9.2 "Restricted information" categories under section 18 of the Atomic Energy Act, 1962 and "Official secrets" under section 5 of the Official Secrets Act, 1923: Any contravention of the above mentioned provisions by any contractor / sub-contractor, consultant, advisor or the employees of the contractor will invite penal consequences under the aforesaid legislation.

9.3 Prohibition against the use of BARC's name without permission for publicity purpose. The contractor or sub-contractors, consultants, advisors or the employees engaged by a party shall not use BARC's name for publicity purpose through any public media like: press, radio, TV or Internet without any prior approval of BARC (wide circular ref.: 2/Misc-9/Lgl/2001/92 date 30/04/2001)