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

Ref No: EmA&ID/2021/SSR/44/14489. Date: 16/11/2021

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

Sub: Fabrication, testing and supply of prototype USB powered signal processing system for portable magnetometers along with its accessories

Dear Sir/Madam,

1. Quotations are invited for fabrication, testing and supply of prototype USB powered signal processing system for portable magnetometers along with its accessories conforming to technical specifications EmA&ID/EMAS/MS/21/44 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/MS/21/44 dated 10.11.2021

S.Sundar Rajan.
S.Sundar Rajan
SO/G, EmA&ID

Work Order Enquiry No: EmA&ID/2021/SSR/44/14489 dated:16.11.2021

Technical specification

Document no.	Revision no.	Date of Issue	No of pages
EmA&ID/EMAS/MS/21/44	0	11.10.2021	6

Fabrication, testing and supply of prototype USB powered signal processing system for portable magnetometers along with its accessories

1.0 SCOPE

Tender is invited for Fabrication, testing and supply of prototype USB powered signal processing system for portable magnetometers along with its accessories. 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 tender specification document is as described below.

Para 2.0 gives the details of deliverables.

Para 3.0 gives the technical requirements.

Para 4.0 gives general requirements

Para 5.0 gives the requirement of raw material procurement.

Para 6.0 gives the requirement of manufacturing and workmanship.

Para 7.0 gives the requirements of inspection and testing.

Para 8.0 gives the requirements of documentation.

Para 9.0 gives the requirements of quality assurance.

Para 10.0 gives the requirements of packaging and delivery

Para 11.0 gives the requirements of confidentiality.

2.0 DETAILS OF DELIVERABLES

The scope of supply is tabulated in table below

S.No	Description	Nos
1	Fabrication, testing and supply of prototype USB powered signal processing system for portable magnetometers along with its accessories	1 Set

3.0 Technical requirements

3.1 The block diagram of the system to be developed is enclosed in Annexure-A. The detailed circuit diagram along with list of components shall be worked out by the supplier and details of the same shall be submitted for approval.

3.2 Tools required for programming of FPGA, USB interface shall be provided by the supplier.

3.3 The system to be developed must meet the following technical requirements

Operating frequency	300 KHz to 8.5GHz
Architecture	Quad RC Four receiver
Dynamic range	124 dB at 10 Hz bandwidth
Noise	0.005dB at maximum bandwidth of 140 kHz
Typical signal processing time	Less than 182 us
Calibration algorithm	12 term , 8 term programmable
Temperature stability	0.02 dB/^{o}C
Measurement uncertainty	0.7dB/8o with bandwidth of 10 Hz
Spurious responses	-76dBc typical
Load match	40dB min
Source match	46dB min
Directivity	40 dB min
Cross talk	< -90dB
Maximum input level	+20dBm
Impedance	50 ohms
Connectors	Type N, female
Measuring parameter	S- Parameters , 1dB gain compression ,
Error correction	12 error
Markers	8
Display channels	4 Nos
Display formats	Amplitude (linear , logarithmic) , phase , group delay , VSWR , time domain
Frequency setting resolution	10 Hz
Frequency accuracy	10 ppm max
Frequency temperature stability	± 0.5ppm/oC max
Harmonics	-20dBc max

Phase noise	< 70 dBc/Hz
Test signal power	10 dBm
Power setting resolution	0.1dB

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

3.5 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.

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

3.7 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.

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

3.9 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 with plastic connectors for interconnection. Detailed specification of the same shall be printed on the system.

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 Quality assurance requirements

9.1 Quality surveillance and expediting, relating to all the aspects of the contract will be carried out by the buyer or his authorized representative for which purpose the Bidder and his subcontractor shall

9.1.1 Allow access at all reasonable times during manufacture, assembly and testing to the premises in which the work is being carried out.

9.1.2 Furnish the latest drawings and/or tooling, gauges, instruments, testing equipment etc. required for inspecting the jobs. Prints of all the latest required drawings and approved procedures shall be made available for inspection and retention, if so desired.

9.1.3 Produce an inspection plan to the buyer's satisfaction and notify when checkpoints on the plan are imminent so that the buyer's representative may be present, if it is so desired.

9.2 The Bidder shall be responsible for the inspection of the components that is subcontracted by him.

9.3 Waiving of quality surveillance by the buyer's or acceptance of the items by the buyer or his authorized agent, shall not relieve the Bidder from the responsibility for

supplying the items in accordance with specification requirements of this document and purchase order.

10.0 Packaging and safe delivery requirements

10.1 Each component shall be marked with Bidder's identification as well as the identification indicated in drawing in such a way that the markings can be conveniently read and cannot get destroyed during handling, cleaning, etc.

10.2 Bidder shall make necessary arrangements for all components using a suitable PVC cover or molded thermocol. Proper care should be taken while handling the component during fabrication, inspection, testing and packing. Acceptance of the test setup will be made only after the vacuum integrity is tested at buyer's premises.

10.3 After completion of all testing and identifying the components, the components shall be packed suitably for shipment, so that no damage occurs in transit. The buyer shall subject the packing procedure to prior approval. At least one copy of packing list shall be kept in the package for quick and easy verification.

10.4 The Bidder shall be responsible for proper and safe delivery. The bidder shall provide support for the installation of the test setup inside buyer's premises.

10.5 The delivery of the setup shall be made at BARC, Trombay, Mumbai, 400085.

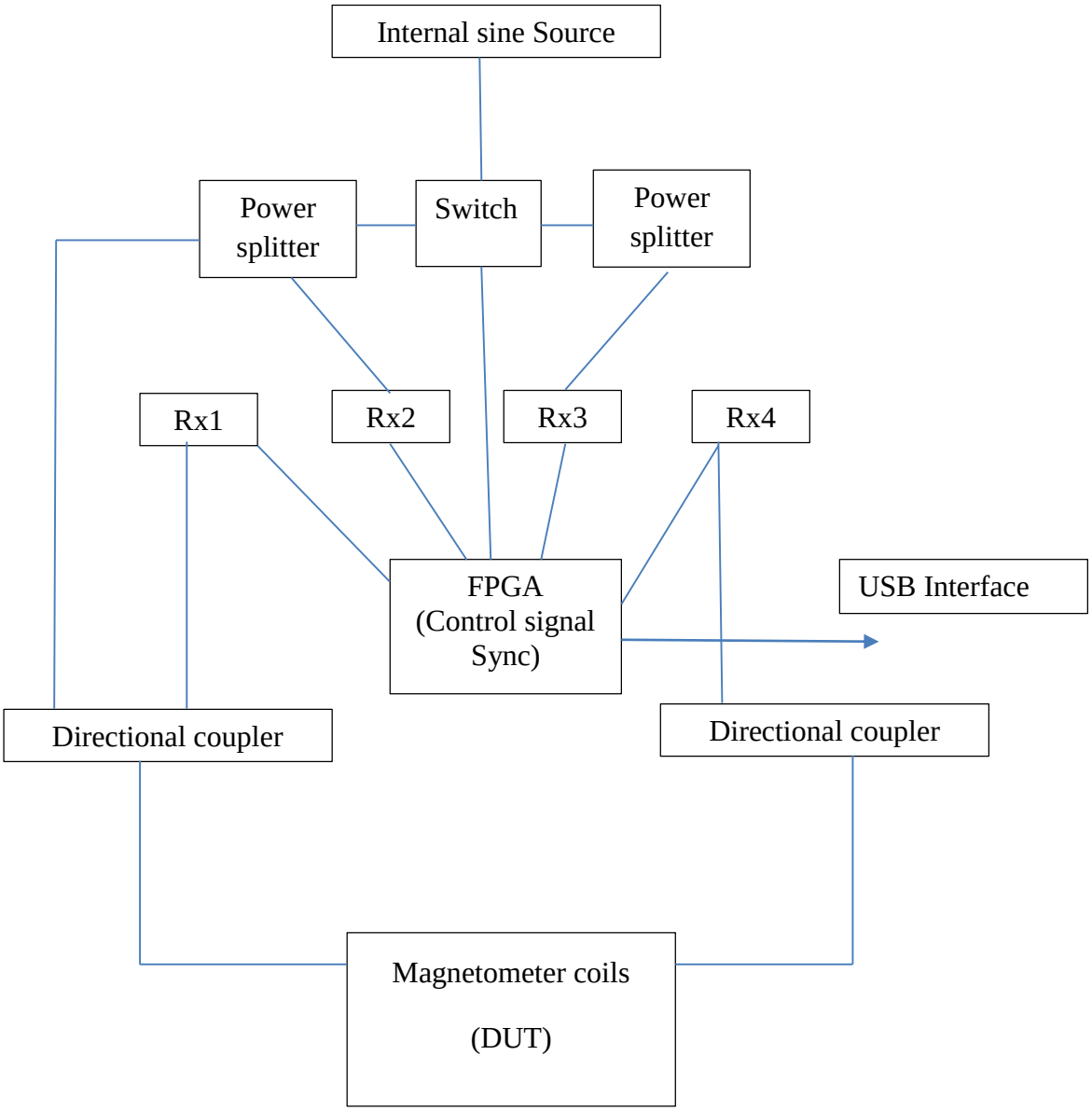
11.0 CONFIDENTIALITY CLAUSE

11.1 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.

11.2 "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.

11.3 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).

Annexure-A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Power splitter
Switch
Power splitter
Rx1
Rx2
Rx3
Rx4
FPGA (Control signal Sync)
USB Interface
Directional coupler
Directional coupler
Magnetometer coils
(DUT)