

**PRASAR BHARATI**  
**(BROADCASTING CORPORATION OF INDIA)**  
**DIRECTORATE GENERAL; ALL INDIA RADIO**  
**(PLANNING & DEVELOPMENT UNIT)**

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F. No: 27/12/1(12) Kasauli (Part of Chandigarh FM Tr. Scheme)/2005-D(TD/FM)

Specification for Supply, erection, testing and commissioning (SETC) {of RF Cable/ diplexer & overhauling of existing 16 Panel VHF FM Antenna, RF Rigid Lines & accessories including the Interim Set up as per AIR specification for VHF FM Transmitters set up }

{ SITE- Kasauli (Part of Chandigarh FM Tr. Scheme) }

{Specification no: SETC RF Cable/diplexer & Overhauling of existing 16 P Antenna / 12 /  
Kasauli (Part of

Chandigarh FM Tr. Scheme)/ November-March (Revision -2 ) /2006- D(TD/FM)}

[ **Total number of pages - 34 Nos.**]

Date of approval by  
Committee of Chief  
Engineers

: 16.11.2005, 21.11.2005, 27.02.2006 & 02.03.2006

Chief Engineers Committee  
Approval reference.

: FNo. 27/12/Spec/CEs Comm.-I/2005-D(TD/FM)&  
F. No: 27/12/1(Ranchi-1)/2003-D(TD/FM)  
F. No: 27/12/1(12) Kasauli (Part of Chandigarh FM Tr.  
Scheme)/2005-D(TD/FM)

The Committee of Chief Engineers has approved the above Specification after discussions held in the meetings on 16.11.2005, 21.11.2005, 27.2.2006 & 2.3.2006 under the chairmanship of CE(D).

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## **SECTION 6.0 SCHEDULE OF ERECTION, TESTING & COMMISSIONING**

**SECTION 6.1** {Schedule of Erection, testing & commissioning of RF Cable, diplexer& overhauling of existing 16 Panel VHF FM Antenna RF

Rigid

Lines & Accessories *including the interim set up* } at

Kasauli (Part of Chandigarh FM Tr. Scheme)

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**N.B. :**

**1. The Tenderer shall submit schedule of material /requirement of SETC without price as above in Section 4.0 to Section 6.0 of AIR Specification (two bid system i.e. technical bid and commercial bid).**

**2. Each statement of this specification has to be complied with & supported by printed literature/data sheets from the manufacturer of the equipment by the tenderer, without which tender will be considered incomplete & is liable to be rejected. The tenderer should make a detailed offer.**

**3. All the technical details , Schematic drawings and schedule of requirement/material must be submitted and enclosed with the tender by the tenderer and failing which the tender is liable to be rejected.**

**4. The tenderer shall submit the tender offer to AIR in the format given below .**

<b>Sr No. of AIR Spec. Section wise &amp; Clause wise</b>	<b>Details of AIR Spec.</b>	<b>Performance figures of equipment, schematic drawing Nos. and Model No.</b>	<b>Compliance Yes/NO</b>	<b>Ref to tender page No.</b>	<b>Remarks</b>
Section 1.0					
Section 2.0					
Section 3.0					
Section 4.0					
Section 5.0					
Section 6.0					

**5. Tenderer shall quote the rate / cost of individual items in the tender offer while submitting the offer for spares.**

**6. The tenderers shall fill up their name in CAPITAL LETTERS, full address with pin code , phone number, fax number, e-mail address and with their full signatures , failing which the tender shall be liable to be rejected.**

## **SECTION 1.0 TECHNICAL REQUIREMENTS ( EXISTING FM STATIONS )**

SITE - Kasauli (Part of Chandigarh FM Tr. Scheme)

<b>S. No</b>	<b>Project</b>	<b>Interim arrangement required</b>	<b>Overhauling of existing 16 P Antenna</b>	<b>*RF Co-axial cable Length (M) &amp; Size</b>	<b>Diplexer</b>	<b>RF rigid lines &amp; accessories required</b>	<b>Reference to SECTION of AIR Specification</b>
1.	Kasauli (Part of Chandigarh FM Tr Scheme)	<b>Pl. see Note No.I</b>	1Job	1x125M (3-1/8") <b>Pl. see Note No.II</b>	1No.	Yes	5.1 / 6.1

**Note: a. TV Tower height -115 M**

**Note : I Interim arrangement - Antenna & RF cable to be provided by AIR  
II Exact length will be intimated at the time of placement of order.**

## **SECTION 2.0 GENERAL SPECIFICATION**

### **SECTION 2.0**

**Note : Please refer tender documents for general term and conditions of contract for SETC works including all the commercial aspects like ;**  
Packing and Packing List, Insurance and Marine Risk etc., Guarantee, Payment terms, Penalty/Compensation for Delay, Damages and Liabilities, Time Period and Extension for Delay , Foreclosure of Contract due to Abandonment or Reduction in Scope of Work, Cancellation of Contract in Full or Part, Recovery of Security Deposit, Performance Guarantee, Indian Electricity Rules ,Unsatisfactory Workmanship, Damages Incurred During Erection , Tenderer Liable for Damages, Defects, Recovery of Compensation, Ensuring Payment and Amenities, Labour Laws to be Complied by Tenderer, Minimum Wages Act Compliance, Tenderer to Indemnify Government against Patent Rights, Return of Surplus Material, Employment of Technical Staff and Employees, Release of Security Deposit, Safety Code, insurance from manufacturer's works/factory to site etc **i.e. in totality** .

### **GENERAL SPECIFICATIONS :**

All equipment and items of SETC as per AIR specification shall be used for round the clock continuous operation without any interruption in VHF FM broadcast service at AIR station.

Each statement of this specification has to be complied with & supported by printed matter from the manufacturer of the equipment by the Tenderer .

#### **1.0 SCOPE:**

Supply, erection, testing and commissioning (SETC) of {RF Cable, diplexer, Overhauling of existing 16 Panel VHF FM Antenna, RF Rigid Lines & Accessories including the Interim Set up as per AIR specification for each site for VHF FM Transmitters set up }

The broad scope of above supply, erection, testing and commissioning (SETC) on FM Band-II Aperture are as follows:

- 1.11 RF cable as per Specification - This will also include the dismantling and packing of the existing 3-1/8" RF Cable.
- 1.12 Diplexer as per specification .
- 1.13 RF Rigid Lines as per the specification.

1.14 Overhauling of existing 16 Panel VHF FM Antenna

2.0 For completion of the SETC all the items, fittings and accessories which are necessary for the setup , which may not have been specifically mentioned or which the Tenderer may not explicitly mention in the tender but all the same are necessary for the operation of the equipment shall be deemed to be included in the tender and shall be provided by the successful Tenderer without any additional payment by the Indentor . The full technical details and technical literature/ pamphlets shall be submitted by the Tenderer.

3.0 INSPECTION: Inspection will be as per detail given in Annexure I of AIR Specification by the representative of All India Radio at manufacturers works.

Before giving the call for inspection to the Indentor, the Tenderer should satisfy them selves that the offered equipment etc. are as per the AIR Specification and approved drawings. Tenderer shall submit one set of complete performance figures as per ATP to the Indentor before giving call for inspection to the Indentor.

Prior intimation for carrying out inspection and pre-despatch performance test as per ATP at works is to be given by the Tenderer to the indenter at least 6 weeks in advance.

The total inspection period for each SETC shall be 2 working days (for RF Cable, diplexer and RF Rigid Lines & accessories etc. ). Expenses for inspection charges on account of providing of infrastructure are to be quoted separately.

3.1 Acceptance Test Procedure will be submitted by the Tenderer with in one month of placement of order in respect of all the equipment /items. This will include all tests so as to assess the performance of the equipment vis-à-vis all specifications .

4.0 The successful Tenderer shall supply within one month from the date of acceptance of the tender, 2 sets of complete design & drawing documents in respect of the setup for the approval of AIR. Tenderer should submit detailed design, complete drawings with full details as per the specification.

5.0 DESIGN & DRAWING DOCUMENTS :

( **Total 3 sets** )

{ SITE - Kasauli (Part of Chandigarh FM Tr. Scheme)}

After approval of all the design document and drawings of complete set up (as per the specification)

The Tenderer shall send ,

**one set** of all above complete drawing documents **to site** i.e Installation officer / Superintending Engineer/ Station Engineer, All India Radio, concerned;

( **TOTAL - 1 SET** )

**one set** of the above documents to the Chief Engineer of the Zone (NZ) and

( TOTAL - 1 SET)

**one set** of the above documents to Director Engg.(Proj.), P&D Unit, DG, AIR, New Delhi-110001

( TOTAL - 1 SET)

**i.e. in brief, 3 sets** of such drawings and design document are required against SETC. A soft copy of these documents on CD shall be provided to DE(Proj.), P&D Unit, DG:AIR, New Delhi by the Tenderer.

- 6.0 All the necessary measuring equipment and tools etc. required for completion of Erection of the project will be arranged by the Tenderer during SETC and no additional amount shall be paid on this account.
- 7.0 Supply , erection, testing and commissioning (SETC) of above “set-up” as per specification shall be done by Qualified Engineer at site.
- 8.0 The Tenderer should either be original equipment manufacturer or supply the equipment only from the original equipment manufacturer. Original manufacturers should have ISO certification for the manufacturing work and the documentary proof for all above are to be enclosed by the Tenderer with the Tender paper/documents.
- 9.0 The Tenderer may make a site visit before submitting the tender document.
- 10.0 DELIVERY PERIOD (FOR SETC):
- 10.1 SUPPLY, ERECTION, TESTING & COMMISSIONING: - 12 months from the date of placement of order .
- 10.1.1 The time period for erection, testing and commissioning shall be as per 10.1 (from the date of placement of order) however, Tenderer shall try to complete the project before the above period.
- 11.0 The Tenderer shall prepare the PERT chart of the total project activities and submit the same to Zonal Office and Director Engg (Project), P&D Unit, DG,AIR, New Delhi- 10001 after the placement of order and within one month.
- 12.0 All information submitted by the Tenderer & all markings, notes, designation on the design, drawing documents & associated write-ups shall be in "English language" only. All dimensions and units on drawings and all references to weights and measures and quantities shall be in metric units.
- 13.0 Complete printed technical information in support of compliance statement should be furnished with the tender to assess the full merit of the offer. The tender & the associated information should be submitted in duplicate.

- 14.0 Descriptive information giving complete details of each equipment offered . shall be given by the Tenderer.
- 15.0 Make, model and type of individual units along with printed technical details shall be given by the Tenderer.
- 16.0 The Tenderer shall make his own arrangements for temporary power supply, water etc. and for the storage of equipment / material including the safe custody at erection site from the start of work & up to completion of the project. All responsibility regarding above arrangements shall be of the Tenderer.
- 17.0 The Tenderer shall make his own arrangements for providing accommodation for his workmen at site.
- 18.0 The Tenderer shall make his own arrangements for the labour, skilled and unskilled.  
The Tenderer should conform to all local State laws/Central laws and regulations amended up to date concerning labour and their employment as applicable. The insurance etc of the labourers shall be the responsibility of the Tenderer including any kind of pre /post action and consequences relating to above insurance etc.
- 19.0 Prior approval of the Indenter in writing, shall be obtained, if the Tenderer desires to sublet or assign any section of the work Such permission or consent shall not, however, absolve the Tenderer from his liabilities in this contract or any part thereof.
- 20.0 The Tenderer is required to submit details of his previous experience in similar type of project i.e. the capacity of their organizational set up for undertaking such work.
- 21.0 The Tenderer shall indemnify the purchaser, his employees and purchaser employees from any liability that may arise out of infringements of patents and copy rights associated with the design, fabrication, erection of any equipment etc.
- 22.0 Tenderer shall submit detailed Supply, erection, testing and commissioning schedule of equipment/requirement offered as per specification. This list should be in the same format as in the price bid minus the price.
- 23.0 HANDING OVER OF DETAILED MANUALS & DRAWING:
- 23.1 At the time of handing over, the Tenderer shall hand over technical manuals (for erection, testing, commissioning, Operation, maintenance & theory of operation manuals, fault diagnostic with a copy of the Inspection Report carried out at factory and performance measurement carried out at the time of commissioning on site) of each site SETC (RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories) after incorporating the necessary corrections / changes etc. during the SETC to the

following . **(Total :6 Sets)**

23.1.1 DE (Projects), P&D Unit, DG: AIR, New Delhi with One soft copy on CD of all these manuals, drawings, instructions, performance measurements, amendments, etc. **one set for site - Mussoorie (Part of Dehradun FM Tr. Scheme).  
(TOTAL- 1 set)**

23.1.2 **Chief Engineer (North Zone): - one set for site - Kasauli (Part of Chandigarh FM Tr. Scheme) (TOTAL- 1set)**

23.1.3 *Site consignee - The Superintending Engineer/Station Engineer*

The Station Engineer, AIR, Kasauli..

-- **one set** Kasauli (Part of Chandigarh FM Tr. Scheme)

23.1.4 At the time of handing over, the Tenderer shall also hand over technical manuals of RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories only (after incorporating the necessary corrections/ changes, if any , during the SETC) for testing, operation, maintenance & theory of operation and fault diagnostic to the following.

23.1.4.1 DE(Transmitter Maintenance), DG:AIR - 1 set

23.1.4.2 Technical Library, P&D Unit, DG:AIR - 1 set

23.1.4.3 Staff Training Institute (Technical) - 1 set

Total - 3 sets

24.0 In support of Tenderer's claim an "up-to-date" list of their customers alongwith complete set of detailed actual performance figures for SETC project similar to AIR Specification (duly certified by the customers) must be furnished alongwith the tender.

A supply record of similar SETC project power wise and year wise in the last 2 years for field proven and satisfactory operation may be enclosed. Names, Address, E-mail, telephone nos. and Fax numbers of customers must be indicated.

25.0 In case of 'kits' complete details of component that form part of kit should be spelled out/clearly given i.e. the details of the component/item offered in the kit including their part no. and quantities.

26.0 INFORMATION TO PRECEDE DESPATCH OF EQUIPMENT:

Following information should be supplied to Indentor and each of the consignees, prior to dispatch of equipment:

- 26.1 Detailed list of equipment under dispatch .
- 26.2 Photographs, detailed engineering drawings showing location/details of components in the various units and sub units with Item/part number marked thereon.
- 27.0 Tenderer shall take all the necessary safety precautions while carrying out the SETC work as per the relevant IS Standards in respect of all erection activities to ensure the safety of the his employees and purchaser employees. Tenderer shall use proper and specified/recommended tools and safety devices and ladders etc during the erection of project.
- 28.0 All material to be used at site of work shall be got verified from the AIR representative authorized by Directorate before commencement of erection.
- 29.0 The Tenderer is required to undertake a pledge for providing prompt after sale service. In any case, the response shall be made available within 48 hours.
- 30.0 After completion of work the Tenderer shall remove dust, dirt, debris and leave the building/premises in a clean condition .
- 31.0 Confirmatory documentary evidence of the equipment that all the equipment as per the individual specification have been actually purchased /imported from the original manufacturers shall be submitted by the Tenderer.
- 32.0 Tenderer shall submit the following details which are required along-with tender to assess the full merit of the offer :  
"Complete information, details, parameters and drawings as mentioned in specification and information required for Fixing/ Mounting the various Fixtures / Accessories are to be submitted with tender."
- 33.0 TRAINING (OPTIONAL) (At site): Tenderer will arrange training at site/place as decided by Directorate for 3 working days.
- 34.0 SUPPLY, ERECTION, TESTING AND COMMISSIONING :
- The SETC {of RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories including the Interim Set up as per AIR specification for VHF FM Transmitters set up}, shall be undertaken by the Tenderer in accordance with ATP and in conformity with the AIR Specification.
- 34.1 SUPPLY: Supply of RF Cable, diplexer , RF Rigid Lines & accessories etc. shall be as per SECTION 5.0 of AIR Specification.
- 34.2 ERECTION: RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna

, RF Rigid Lines & accessories including the interim set up ( as per SECTION 6.0) at site will be erected in the transmitter complex as per layout plan approved by AIR.

34.3 TESTING:

RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories and associated equipment are to be tested after the erection, after making all the initial checks including physical inspection and continuity checks of wiring/cabling etc. as per drawings. Only after satisfying that erection is fit for testing (without the application of RF power), the testing will be taken up with RF power in a sequential manner in respect of all the equipment. The testing will be undertaken by the Tenderer as per standard practice followed by the manufacturer and in conformity with procedure laid down in ATP.

34.4 COMMISSIONING AT SITE: After erection and testing of the RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories including the interim set up as per AIR Specification , for VHF FM Transmitters , performance figures/measurement for all parameters are to be taken by the Tenderer in the presence of AIR's representative as per ATP.

Field strength survey of actual 360° horizontal radiation pattern shall be carried out upto the threshold of 48 dBu i.e. minimum required signal strength for rural monophonic service by the Tenderer. The F.S. Survey shall also give the details of coverage corresponding to 74 dBu, 66 dBu, 54 dBu contours ( Stereophonic service).

In brief, full antenna radiation pattern is to be got validated on site after commissioning.

The performance measurement of the RF Cable, diplexer & overhauling of existing 12 Panel VHF FM Antenna , RF Rigid Lines & accessories along with transmitter and associated equipment will be taken at site as per the Acceptance test procedure (ATP) approved by AIR .

35.0 In case of any tender where unit rate of any item/items appears unrealistic, such tender will be considered an unbalanced and in case the Tenderer is unable to provide satisfactory explanation , such a tender is liable to be disqualified and rejected.

36.0 On acceptance of the tender, the name of the accredited representative(s) of the Tenderer who would be responsible for taking instructions from DG:AIR ,New Delhi-110001 or his authorized representative shall be communicated in writing to Indentor.

We hereby fully agree to the above GENERAL SPECIFICATIONS { of RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & accessories including the interim set up as per AIR Specification for VHF FM Transmitter in respect of site Kasauli (Part of Chandigarh FM Tr. Scheme) } .

Signature of Tenderer with date and seal

Full Name in CAPITAL LETTERS:  
Full Address with PIN code in CAPITAL LETTERS:  
Telephone No.:  
FAX No. :  
E-Mail:

Witness Signature:  
Full Name in CAPITAL LETTERS:  
Full Address with PIN code in CAPITAL LETTERS:  
Telephone No.:

( PURCHASE SECTION )  
P & D UNIT, DG :AIR

## SECTION 3.0 TECHNICAL SPECIFICATIONS

### SECTION 3.0 TECHNICAL SPECIFICATIONS

#### 3.1 RF CO-AXIAL AIR DIELECTRIC FEEDER CABLE, 1X3- 1/8"

- 1.0 RF coaxial air di-electric , Co-axial Feeder Cable of size (Nominal) 3- 1/8"
- 1.1 Capable of handling  $\geq 40$  KW Average Power at around 40° C Ambient Temp
- 1.2 Attenuation  $\leq 0.4$ dB / 100M
- 1.3 Impedence 50 ohm

Actual Cable length will be intimated at the time of order however of feeder cable length may be considered as given in SECTION 5.0 of AIR Specification.

2.0 All accessories associated with Feeder cable are to be provided as per details given below.

- 2.1 3 -1/8" EIA flange connectors - 2 per station.
- 2.2 3 -1/8" EIA flange Gas Pass connector-1o per station.
- 2.3 hoisting stocking s,- 2nos per station .
- 2.4 earthing kits-3nos per station .
- 2.5 wall gland-1nos per station.
- 2.6 cable clamps with nut, bolt washer (adjustable width) and associated accessories.
- 2.7 Any other accessories offered for the completeness - 1 Lot  
of the system ( Items wise details of offered and included material , items & part are to be given by the Tenderer )

3.2.1.1 Dehydrator with tubing & accessories :-- As per cable manufacturer's recommendation for ensuring required Pressurisation in entire RF Cable and Antenna System -- Chain for supplying dry air for Pressurisation -- for one feeder cable and Antenna system.

Qty -2Sets.

3.2.1.2 GUARANTEE: Tenderer shall submit with his tender an undertaking to accept the following guarantees:

(i) A guarantee that the equipment supplied will be in accordance with these specifications, varied only to the extent stated in his tender and agreed to in the contract.

(ii) A guarantee to make good within 30 days at his own expense any component which becomes defective under normal operating conditions within 18 months from the date of acceptance of the equipment at

respective site.

- (iii) A guarantee to supply all components for a period of 10 years from the date of acceptance of equipment at site, at rates at which these are being supplied by him to other customers & also should match prices of original manufactures of these components prevailing at the time.
- (iv) If at any stage, during next 10 years, the manufacturer stops production of this model of equipment , he shall intimate All India Radio in advance to enable the later to stock the critical items

3.2.1.3 Inspection /Acceptance tests: will be carried out at the suppliers works as per Annexure -I . It will be the responsibility of the supplier to arrange equipment and instruments for inspection. Charges for inspection, if any, may be quoted separately.

## SECTION 3.0 TECHNICAL SPECIFICATIONS

### 3.2 SPECIFICATION OF DIPLEXER :

Frequency of VHF FM Transmitter #1 : 107.2 Mhz\*  
 Frequency of VHF FM Transmitter #2 : \*\*\*.\* Mhz (to be intimated at the time of placement of order).  
 ( \* Exact frequencies will be intimated at the time of placement of order ).

1. Diplexers are required by AIR for combining the power of two VHF FM Transmitters operating on different frequencies for feeding to a single Antenna. Output power of each Transmitter will be 10 KW nominal and their output impedance will be 50 ohms, nominal. The Transmitter specifications will confirm to relevant ITU/ CCIR Regulations.
2. The combined RF power from the Diplexer will be fed into a circularly polarized pole or panel type FM antenna through a 50 ohms co-axial Feeder cable. Antenna Impedance will also be 50 ohms, nominal, with maximum permissible VSWR of 1.2:1. The Transmitter will be procured by AIR.
3. The Diplexer shall be of compact & rugged design & with minimum floor area requirements. It should have natural ventilation cooling. Diplexer modules should be mounted on sturdy, unitized frames.
4. The Diplexer shall be of balanced Band Pass Constant Impedance design. Filter cavities should be constructed of high grade aluminium & inner probes inside cavities should be constructed of high grade copper. The tunable probes should be attached to the cavity top with temperature compensated invar rods.
5. The individual filter should be tunable in the range and tuning control should be lockable. It should be possible to easily retune the Diplexer at site to a new frequency within the band width.

### 6.0 TECHNICAL SPECIFICATION:

SNo.	TECHNICAL PARAMETER	SPECIFICATION
6.1	No. of inputs	2 nos.
6.2	Emergency wide band input	To be provided ( it should be possible to put through any of the two Transmitters in case of failure of any input module of Diplexer).
6.3	Maximum power into each input	12 KW

6.4	Maximum output power rating	35 KW
6.5	Input Impedance for each input	50 Ohms
6.6	Output Impedance	50 Ohms
6.7	Input VSWR over 150 KHz band	Less than 1.05 : 1
6.8	Carrier frequency of Transmitters	As above . However, it may be necessary to change the frequencies in the band 88 -108 Mhz
6.9	Frequency range of operation	88-108 MHz.
6.10	Minimum difference between Transmitter Frequencies.	1 MHz or more.
6.11	VSWR band with /channel bandwidth	(+/-) 150 KHz off carrier.
6.12	Effective constant impedance bandwidth	(+/-) 150 KHz off carrier.
6.13	Insertion loss	less than 0.3 db.
6.14	Isolation (between inputs)	50 db or more
6.15	Group delay	less than 30 n sec.
6.16	Frequency response	less than 0.1 db
6.17	Ventilation	Natural air Ventilation
6.18	U-Link Patch Panel	The Diplexer is to be provided with U-Links & shorting switches so that it is possible to by-pass any of its defective modules and feed any of the two Transmitters into the Wide band Input Port. Details and diagrams should be included with tender.

7.0 All necessary terminating loads should be included in the tender and their ratings should be indicated.

8.0 Size of the Diplexer should not exceed 1.9 m (D) X 1.2 m ( W)X 2.8 m (H). A drawing giving full dimensions & layout of modules & input/output ports with dimensions should be enclosed with the tender. Frontage of Diplexer should not exceed 1.2 M.

9.0 An interlock & display system should be included in the design. This should take care of patching arrangement of transmitters. Details should be given in the tender.

10.0 A monitor and control system should be quoted separately. This should include Forward & Reflected Power Metering on the input as well as output sides. Full details should be forwarded with the tender.

11.0 The Transmitter outputs are available on 3-1/8" unflanged rigid coaxial lines. The output of the Diplexer will be connected to 3 1/8" dia feeder cable /having 3 1/8" EIA Flange connector. The input/output of the Diplexer are to match with these lines/connectors.

13.0 Recommended spares should be quoted separately. This list should be based upon actual failure pattern observed in previous supplies. The spare filters should also be able to be tuned to any frequency in the 88-108 MHz range.

14.0 One copy of detailed manual, a complete set of drawings and all other relevant documents including details of metering, monitoring and alarm should be forwarded with tender for proper evaluation.

15.0 Diplexer should be guaranteed for a period of two years from date of supply.

16.0 Inspection/Acceptance tests will be carried out at the suppliers works. It will be the responsibility of the Supplier to arrange equipment and instruments for inspection. This will include a set of full measurements and checking change of frequency & retuning. One copy of Manual including Tuning process should be forwarded within two months of Supply Order. Charges for inspection, if any, may be quoted separately.

17.0 Complete set of Instruction Manuals including Erection instructions/drawings and tuning procedure should be supplied within two months of placement of Supply Order.

18.0 GUARANTEE: Tenderer shall submit with his tender an undertaking to accept the following guarantees:

(i) A guarantee that the equipment supplied will be in accordance with these specifications, varied only to the extent stated in his tender and agreed to in the contract.

(ii) A guarantee to make good within 30 days at his own expense any component which becomes defective under normal operating conditions within 18 months from the date of acceptance of the equipment at respective site.

(iii) A guarantee to supply all components for a period of 10 years from the date of acceptance of equipment at site, at rates at which these are being supplied by him to other customers & also should match prices of original manufactures of these components prevailing at the time.

iv) If at any stage, during next 10 years, the manufacturer stops production of this model of equipment , he shall intimate All India Radio in advance to enable the later to stock the critical items.

## SECTION 3.0 TECHNICAL SPECIFICATIONS

### 3.3 RF RIGID LINES & ACCESSORIES :

#### RF COAXIAL RIGID LINES & ACCESSORIES FOR COMPLETENESS OF SYSTEM

##### 1.0 Technical Specification of Rigid lines (50 Ohm):

Sno.	Technical Parameter	1-5/8"	3-1/8"
1.1	Average Power Rating	$\geq 15$ KW	$\geq 50$ KW
1.2	VSWR	1.05:1.0	1.05:1.0
1.3	Attenuation	$\leq 0.60$ dB/100M	$\leq 0.32$ dB/100M
1.4	Ambient temperature	40°C	40°C
1.5	Inner Conductor Temp.	$\geq 100$ °C	$\geq 100$ °C
1.6	Peak Power Rating	275 KW	1100 KW

2.0 Complete erection material for connecting the output of each transmitter to input ports of Combiners such as rigid lines, elbows, unions and matching reducers, wherever necessary to complete the erection for feeding to the Antenna and Dummy Load .

Complete erection material and accessories for connecting the output of transmitters to input ports of diplexer and combined output from the output port of Combiner to Input of following Antenna Switch frame /Patch Panel - such as rigid lines, elbows, unions, matching adaptors, reducers, where ever necessary to complete the erection - will also include the following items .

- 2.1 Any accessories offered for the completeness of the system ( Items wise details of offered and included material , items & part are to be given by the Tenderer ) - 1 Lot

Note: Following RF coaxial rigid lines /accessories will be given by AIR. After completion of work , balance quantity , if any , will be returned by the tenderer to AIR immediately. However rate per number shall be quoted as "OPTIONAL ITEM" by the tenderer.

1. 3-1/8" rigid line - 12 M
2. 3-1/8" Elbows with inner and bullets - 12 nos.
3. 3-1/8" Couplings with inner and bullets - 20 nos.
4. 3-1/8" Field Flange with inners and bullets - 2 nos.
5. 3-1/8" to N Test Reducer - 1 no.
6. 3-1/8" to 1-5/8" reducer/adopter-2nos.

7. 1-5/8" to 7/8" reducer/adopter-2 nos.
8. 1-5/8" rigid line - 6 M
9. 1-5/8" Elbows with inner and bullets - 6 nos.
10. 1-5/8" Couplings with inner and bullets - 20 nos.
11. 1-5/8" to N Test Reducer - 1 no.

**GUARANTEE:** Tenderer shall submit with his tender an undertaking to accept the following guarantees:

- (i) A guarantee that the equipment supplied will be in accordance with these specifications, varied only to the extent stated in his tender and agreed to in the contract.
- (ii) A guarantee to make good within 30 days at his own expense any component which becomes defective under normal operating conditions within 18 months from the date of acceptance of the equipment at respective site.
- (iii) A guarantee to supply all components for a period of 10 years from the date of acceptance of equipment at site, at rates at which these are being supplied by him to other customers & also should match prices of original manufactures of these components prevailing at the time.
- (iv) If at any stage, during next 10 years, the manufacturer stops production of this model of equipment, he shall intimate All India Radio in advance to enable the later to stock the critical items

#### **4.0 INSPECTION AT MANUFACTURER'S WORKS:**

#### **ANNEXURE-'I'**

##### **1.0 INSPECTION DETAILS AT MANUFACTURE WORKS**

The inspection for acceptance of the RF cable, diplexer and RF rigid lines will be carried out at the Works of the Manufacturer in accordance with Acceptance Test Procedure (ATP).

All facilities like complete set of measuring instruments, power supply, manual assistance, etc. will be provided by the supplier without any additional charges. Inspection will be as per Specification. Engineers of All India Radio will carry out detailed inspection at manufacturers works.

The manufacturer shall put up the RF cable, diplexer and RF rigid lines, for test on the test bench at manufacturers works before the representatives and shall provide without any extra charges electric energy, consumable materials, tools, testing instruments, labour and assistance of every kind for carrying out acceptance tests.

The inspection shall be carried out by the AIR Engineers. The inspection period for SETC shall be 2 working days at the manufacturer works. Complete details and specifications of Supply part of SETC i.e. RF cable , diplexer and RF rigid lines etc. will be checked and the parameter values will be measured.

The complete Acceptance Test Procedure (ATP) will be prepared by the manufacturer and submitted to Indentor for approval. This Procedure after modification (if required during the process of approval) shall form the basis for Performance/Inspection Tests to be carried out. ATP will also indicate full details of set up for measuring/testing equipment to be deployed during the Performance Measurement/ Inspection Test at factory.

Operation checking of the RF cable , diplexer and RF rigid lines etc and measurements will be carried out at any three frequencies in the VHF band, 88 to 108 MHz. Complete set of instruments will be made available in advance and the list of these measuring instruments alongwith their set ups may be forwarded alongwith the Tender.

Exhaustive checkings/measurements will be carried out so as to completely check the compliance of the RF cable , diplexer and RF rigid lines etc with the requirements and as per the order.

It is mandatory that all these checking and measurements i. e. Operation checking at any three frequencies in the VHF band, 88 to 108 MHz, are carried out well in

advance and these measurements details, graphical printout notes and figures must be available, at the factory at the time of inspection.

These must also be submitted to All India Radio alongwith the call for inspection well in advance for analyzing etc. Diplexer, RF cable and rigid lines etc. will be tested for 24 hours of continuous operation on full rated power output.

Following information should also form part of above data which will also be checked for RF cable , diplexer and RF rigid lines etc with the requirements and as per the order during inspection by indenter's representative at manufacturer's works :-

1. Make , type , model no and country of origin of equipment Antenna , Accessories and spares and other items /equipment.
2. Dimension of Sub-Units and Accessories.
3. Working/operation of all Sub-Units and Accessories.
4. System configuration check and completeness of Diplexer and other items /equipment
6. Checking meter readings and calibration.
7. Measurements of all parameters as per of specification . All the parameters will be measured on any 3 different frequencies in VHF FM band.
8. Checking of all power levels, meters, LEDs etc.
9. Checking of RF voltages on test points.

**INSPECTION:**

Contractor shall quote charges for Inspection at manufacturer's works by two AIR Engineers for 2 working days in respect of all equipment/items of Section 5.0 of AIR Specification for each site SITC as per Section 1.0

S.No.	DESCRIPTION	QTY	RATE	UNIT	AMOUNT
	Charges for inspection at manufacturer's works by two AIR Engineers for 2 working days in respect of RF Cable , Diplexer & RF Rigid Lines & Accessories .				
1.	Kasauli (Part of Chandigarh FM Tr. Scheme)	1 no		each	

**Section 4.0 (page no 21 to 23)**

**TOTAL AMOUNT: (In figures and words)**

Signature of Contractor with date and seal  
Full Name in CAPITAL LETTERS:

( PURCHASE SECTION )  
P & D UNIT, DG:AIR

## SECTION 5.0 SCHEDULE OF (SUPPLY)

### SECTION 5.1 Schedule of Supply Kasauli (Part of Chandigarh FM Tr. Scheme)

SNo.	DESCRIPTION	Qty	RATE	UNIT	AMOUNT
<b>1</b>	<b>RF coaxial</b> Feeder Cable air di-electric of size 1x 3- 1/8" as per Section 3.1of AIR Specification. *Actual length will be intimated at the time of placement of order. (The following accessories are to be included as part of RF Feeder cable)	1x115 M each*		M	
	1.1 3-1/8" EIA flange connectors	2 nos.		each	
	1.2 3-1/8" EIA flange Gas Pass connector	1 no.		each	
	1.3 Hoisting stockings (1 Set )for each 115 M cable as per recommendation of manufacturer	1 set		set	
	1.4 Earthing kits, ( I Set Shall be with 3nos of earthing kits)	1 sets		each	
	1.5 Wall gland/ feed through assembly with accessories	1 nos.		each	
	1.6 Cable clamps with nut, bolt washer(adjustable width) (Suitable for one RF cables)	130 sets		Set	
	1.7 Any other accessories offered for the completeness of the system	1 lot		lot	
SNo.	DESCRIPTION	Qty	RATE	UNIT	AMOUNT
<b>2</b>	Dehydrator with tubing and accessories :As per <b>Cable manufacturer's recommendation</b> for ensuring required Pressurisation in entire chain ( to be supplied each for supplying dry air for Pressurisation of RF feeder cable and Antenna system. )	2 nos		each	
<b>3</b>	Diplexer complete as per Section 3.2 of AIR Specification.	1 set/ system		set/ system	
<b>4</b>	Complete erection material {RF Rigid lines & accessories as per Section 3.3 of AIR Specification as given below				
	4.1 Any other accessories offered for the completeness of the system	1 Lot		lot	
<b>TOTAL</b>					

**SECTION 5.1 Schedule of Supply at Kasauli (Part of Chandigarh FM Tr. Scheme) ( page number 24 to 25 )**

**TOTAL AMOUNT: (In figures and words)**

Signature of tenderer with date and seal  
Full Name in CAPITAL LETTERS:

**( PURCHASE SECTION )  
P & D UNIT, DG:AIR**

**SECTION 5.0 SCHEDULE OF (SUPPLY) (OPTIONAL)**

**SECTION 5.1 Schedule of Supply Kasauli (Part of Chandigarh FM Tr. Scheme)**

<b>SNo.</b>	<b>DESCRIPTION</b>	<b>Qty</b>	<b>RATE</b>	<b>UNIT</b>	<b>AMOUNT</b>
1.0	Complete erection material {RF Rigid lines & accessories as per Section 3.3 of AIR Specification as given below				
1.1	3-1/8" rigid line	6 M		M	
1.2	3-1/8" elbows with inner and bullets	6 nos.		each	
1.3	3-1/8" couplings with inner and bullets	6nos.		each	
1.4	3-1/8" field flange with inners and bullets	1 no.		each	
1.5	3-1/8" to N test reducer	1 no.		each	
1.6	3-1/8" to 1-5/8" reducer/adopter	1 no.		each	
1.7	1-5/8" to 7/8" reducer/adopter	1 no.		each	
1.8	1-5/8" rigid line	6 M		M	
1.9	1-5/8" elbows with inner and bullets	6 nos.		each	
1.10	1-5/8" couplings with inner and bullets	6 nos.		each	
1.11	1-5/8" to N test reducer	1 no.		each	
1.12	Training at site for 3 working days ( optional)	1 Job		1Job	
	<b>TOTAL</b>				

**SECTION 5.1 Schedule of Supply at Kasauli (Part of Chandigarh FM Tr. Scheme)  
(OPTIONAL) ( page number 26 to 27 )**

**TOTAL AMOUNT: (In figures and words)**

Signature of tenderer with date and seal  
Full Name in CAPITAL LETTERS:

**( PURCHASE SECTION )  
P & D UNIT, DG:AIR**

## SECTION 6.0 SCHEDULE OF ERECTION, TESTING & COMMISSIONING

**SECTION 6.1** {Schedule erection, testing & commissioning of RF Cable, diplexer & overhauling of existing 16 Panel VHF FM Antenna , RF Rigid Lines & Accessories including the interim set up } at Kasauli (Part of Chandigarh FM Tr. Scheme )

S.No	Description	Qty.	Rate	Unit	Amount
1	<p><b>(Interim arrangement)</b> Making arrangement for the interim set up for diverting the existing broad- cast services on dipole antenna along with RF co-axial cable including all related erection work of adopter /reducer connectors etc. at both the ends complete as required.</p> <p>(Existing TV Tower Height - 115 M )</p>	one Job		Job	
2	<p><b>(New Erection)</b> Erection, testing , commissioning of new diplexer as per specification in the existing transmitter hall including placement, fixing, Erection of rigid lines/connections of RF chain including the existing/new transmitters and connections of diplexer's output to the input of RF Rigid line/ RF cable along with fixing of necessary hardware of the systems complete as per site requirement as required.</p>				
S.No	Description	Qty.	Rate	Unit	Amount
2.1	3-1/8" rigid line	12 M		M	
2.2	3-1/8" elbows with inner and bullets	12 nos.		each	
2.3	3-1/8" couplings with inner and bullets	20nos.		each	
2.4	3-1/8" field flange with inners and bullets	2 nos.		each	
2.5	3-1/8" to N test reducer	1 no.		each	
2.6	3-1/8" to 1-5/8" reducer/adopter	2 nos.		each	
2.7	1-5/8" to 7/8" reducer/adopter	2 nos.		each	

2.8	1-5/8" rigid line	6 M		M	
2.9	1-5/8" elbows with inner and bullets	6 nos.		each	
2.10	1-5/8" couplings with inner and bullets	20 nos.		each	
2.11	1-5/8" to N test reducer	1 no.		each	
2 .1 2	Any other accessories offered for the completeness of the system ( Items wise details of offered and included material , items & part are to be given by the tenderer)	1 job		job	
<b>S.No</b>	<b>Description</b>	<b>Qty.</b>	<b>Rate</b>	<b>Unit</b>	<b>Amount</b>
3.	Dismantling of existing 16 panel VHF FM antenna along with RF co-axial cable including all related items/ hardware/ adopter /reducer connectors etc. at both the ends complete as required. (Existing TV Tower Height - 115 M )	One Job		Job	
3.1	Overhauling of existing 16 panel VHF FM antenna on ground including physical checking/necessary care for the safety and satisfactory operation of the antenna system like cleaning, ingress of moisture pressurisation etc. at site including Supply and replacement of "o" ring/ gaskets /connectors/dipoles alongwith branch/distributor RF co-axial cable including all related items/ hardware/ adopter /reducer etc. as per actual site requirement complete as required Rate for the items to be used in overhauling are to quoted for each item separately	One Job		Job	
	3.1.1 "o" ring	100 nos		no.	
	3.1.2 branch RF co-axial cable with end connectors	10 nos		no.	
	3.1.3 distributor RF co-axial cable with end connectors	10 nos		no.	
	3.1.4 Dipoles	5 nos.		no.	
	3.1.5 any other item felt necessary by the contractor.	1 lot		lot	

S.No	Description	Qty.	Rate	Unit	Amount
3.2	Erection, testing , commissioning of existing 16 panel VHF FM antenna after overhauling as above in 3.1 along with hauling of the complete panel antenna system (alongwith reflectors ,power dividers, distributor feed cables complete, as per requirement at site.) including all related items/ hardware/ adopter /reducer connectors etc complete as required.  (Existing TV Tower Height - 115 M )	One Job		Job	
4	<b>( Dismantling - feeder cable )</b> 5.1 Removing the existing 3-1/8" RF cable along with its mounting fixtures and accessories and packing the RF cable on cable drum and accessories in boxes, so as the same can be dispatched and used at new locations. Existing TV Tower Height -115 M	One Job		Job	
S.No	Description	Qty.	Rate	Unit	Amount
5.	<b>(New Erection)</b> 6.1 Erection, testing and commissioning of new 1x3-1/8" RF co-axial cables as per specification on the existing tower including modification/ fabrication of the cable tray as per drawing for the vertical portion alongwith supply of complete hardware material and accessories etc. complete as required at site. Existing TV Tower Height -115 M	One Job		Job	
	5.2 Erection, testing and commissioning of new Dehydrator with tubing and accessories including making pressurisation connections etc. as per specification / manufacture's recommendations	1job		job	

	complete as required at site.				
	5.3 Horizontal tray including protecting of MS canopy , rate per meter shall be quoted by the tenderer. ( tentative quantity, however actual quantity in running length shall be paid to the tenderer by the indenter ,if required at site).	5 M		M	
6	Checking of complete transmitter set up as above before application of RF power and recording the test and measurement values in the form of graphical printout for necessary reference as per specification of technical parameters.	One Job		Job	
7	Testing of the complete RF chain on full RF power from transmitter on the newly installed RF cables, Diplexer and the overhauled 16 panel VHF FM antenna.	One Job		Job	
<b>S.No</b>	<b>Description</b>	<b>Qty.</b>	<b>Rate</b>	<b>Unit</b>	<b>Amount</b>
9	Final performance measurements of the complete RF chain i.e. RF cable, diplexer and 16 panel antenna as per specification alongwith graphical printouts of the measurements like VSWR/return-loss - for entire frequency range of 88 MHz to 108 MHz, isolation, horizontal/vertical pattern circulatory for omni-directional pattern. Actual F.S. pattern upto the signal strength of 48 dBu.  Including actual F.S. pattern upto the signal strength for 54 dBu, 66 dBu & 74dBu	One Job		Job	
10	Earthing of complete set up as per manufacturer recommendations.(Earthing kits for each RF cable are to be provided at different locations and complete earthing work shall be as per either manufacturer recommendation or as per AIR drawing TM - 15108/2 and TM-15175/2	3 Jobs		J o b	
	<b>TOTAL</b>				

**TOTAL AMOUNT: (In figures and words)**

Note : 1) The tenderer shall take up the work at Kasauli (Part of Chandigarh FM Tr. Scheme )in co-ordination/consultation with the concerned Superintending Engineer/Station Engineer, AIR & Doordarshan, and the Chief Engineer of respective Zones, Project Wing and Maintenance Wing.

2)The erection, testing & Commissioning work shall be carried out at site probably during the night hours from 0.00 hrs. to 05.30 hrs. after getting the written permission of the competent authority for the start of work in accordance with the terms and conditions mentioned in the permission issued by AIR Dte./ Doordarshan Dte.

3) Tenderer is required to take into consideration the aspect of the constraint in the time made available by the AIR for the Erection, testing & Commissioning work at the site as above and the job is required to be completed in the stipulated and scheduled time frame as given in the permission, as above.

4) RF coaxial cables including Dehydrator with tubing and accessories , RF coaxial rigid lines and diplexer will be part of supply to be arranged by the tenderer as per specification.

5) The dipole antennas required for interim set up shall be provided by AIR, however, fixing of these antennas will be undertaken by the tenderer as part of interim set up erection.

6) The quantities mentioned in Section 6.0 of AIR Specification *erection, testing and commissioning* are as per the tentative requirement anticipated .

7) The quantities mentioned in the schedule of requirement of *erection, testing and commissioning* in SECTION 6.0 may *increase or decrease* as per site requirement. However payment will be made to the tenderer *as per actual quantity used /erected at site after satisfactory completion of work* .

Tenderer *shall quote the rates per meter length /per number / per job* in respect of erection, testing and commissioning,

**SECTION 6.1** {Schedule of Erection, testing & commissioning of RF Cable, Antenna switch panel/frame & diplexer/, & overhauling of existing 12 Panel VHF FM Antenna RF Rigid Lines & Accessories *including the interim set up* } at Kasauli (Part of Chandigarh FM Tr. Scheme ) ( **page number 28 to 34** )

Signature of tenderer with date and seal

Full Name in CAPITAL LETTERS:

( **PURCHASE SECTION** )  
**P & D UNIT, DG:AIR**