File No.J-11015/2/2020-D(TD/FM)

□ार भारती/Prasar Bharati
(भारत का लोक सेवा □ारक)
(*India's Public Service Broadcaster*)
आकाशवाणी महानिदेशालय /Directorate General: All India Radio
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[एफ. एम. डिजाईन अनुभाग /FM Design Section]
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File No. J-11015/2/2020-D (TD/FM) Dated 13.01.2020

Subject: Procurement of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna with omnidirectional/directional patterns-regarding getting industry feedback.

AIR is going to procure 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna with omnidirectional/directional patterns. The technical specification [**AIR specification No. 6-BAY VHF FM ANTENNA/46/JANUARY/2020/-D(TD/FM)]** for the supply of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna with omnidirectional/directional patterns are herewith enclosed. The feedback, if any, is required on technical specifications from Original Equipment Manufacturers (OEMs) of the product/prospective bidders.

OEM/prospective bidders may submit their feedback to this Directorate via e-mail on or before 28.01.2020 by 1700 Hrs. at the following e-mail addresses.

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Encl: As above.

(Manzoor Ali)
Assistant Director (Engg.)
for Director General

PRASAR BHARATI
(*India's Public Service Broadcaster***)**
DIRECTORATE GENERAL: ALL INDIA RADIO
(PLANNING & DEVELOPMENT UNIT)
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SPECIFICATION FOR SUPPLY OF 6-BAY CIRCULARLY POLARIZED SIDE MOUNT (POLE TYPE) VHF FM ANTENNA WITH OMNI-DIRECTIONAL/DIRECTIONAL PATTERNS

CONTENTS

A. ESSENTIAL REQUIREMENT FOR TENDER:

1. The tenderer should submit Schedule of Requirements/Materials for Supply (un-priced) *in the same format as given in* AIR Specification in the technical bid, failing which, the tender shall be considered incomplete and is liable to be rejected.

   (ii) It is also mandatory to mention ***Make & Model of the offered equipment*** in the Schedule of Requirements/Materials for supply, failing which, the tender shall be considered incomplete and is liable to be rejected.

2. Each statement of this specification has to be complied with & supported by printed technical literature, technical data sheets, schematic drawings and technical manuals from the manufacturer of the equipment by the tenderer, to assess the full merit of the offer ,without which tender will be considered incomplete and is liable to be rejected.

U. S. Pandey, AE Manzoor Ali, ADE Sanjeev Pandey, DE Rajendra Nahar, DE

3. The tenderer should submit the tender offer to AIR in the format given below, section wise & clause wise, in respect of all the sections of technical specifications. The OEM/tenderer must provide the page number reference, in column (4) of the table given below, of the technical bid clearly indicating the volume number also, if any, for each supporting document to verify the parametric values shown in the compliance statement, to assess the full merit of the offer, failing which the tender shall be considered incomplete and is liable to be rejected.

S. No. of AIR Specifications (Section wise & Clause wise) (1)	Details of AIR Specifications (Part/ Section wise & Clause wise) (2)	Compliance **(Yes/No)** (3)	The page no. of the tender offer, where the information/ supporting document is available. (4)	Remarks (5)
A. Essential requirements for tender				
B. Essential eligibility criteria for tenderer				
Section-I Clause wise				
Section-II Clause wise				
Section-III Clause wise				

4. The tenderer should also quote the rate/cost of individual items in the tender offer while submitting the offer in respect of spares **(OPTIONAL)** in commercial bid.

5. The tenderer should submit the complete technical specification (Section wise & Clause wise) compliance statement along with Schedule of Requirements/Materials (un-priced) duly signed & stamped by the respective OEM in the tender document. In case, tender offer is from other than the OEM, the tenderer must also sign & stamp on the technical specifications compliance statement (Section wise & Clause wise), failing which the tender shall be considered incomplete and is liable to be rejected. The OEMs & tenderer should mention their names & designation of the signatories, full address with pin code, phone number, fax number, E-mail etc.

6. All the volumes of the entire tender offer must be page numbered.

7. The authorization and guarantee must be given by respective Original Equipment Manufacturer (OEM) on their letterhead pad duly signed & stamped. In case tender offer is from other than the Original Equipment Manufacturer, the tenderer must also give guarantee on their letterhead pad, duly signed & stamped, failing which the tender shall be considered incomplete and is liable to be rejected.

8. Public Procurement (Preference to Make in India) Order No. P-45021/2/2017-B.E-II dated 15.06.2017 of Government of India, Ministry of Commerce and Industry, Department of Industrial Policy and Promotion

shall be applicable.

9. Any change/modifications in the AIR technical specifications format, language, technical parameters or of any other nature including the deletion of clause, words, lines etc. by the OEM/ tenderer will not be acceptable to AIR and the tender is liable to be rejected.

10. ***Optional items will not be considered for ranking purpose.***

B. <u>ESSENTIAL ELIGIBILITY CRITERIA FOR TENDERER:</u>

(a) The tenderer should either be the OEM of VHF FM Antenna or their authorized representative/dealer.

(b) The OEM of the VHF FM Antenna must have an experience of manufacturing and supplying 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna of power rating not less than 45 kW for **at least last 5 years**. Documentary evidence to support this must be provided. The OEM must provide the details of past supply records in the format given below for last three years ending last day of the month previous to the one in which the tender is invited for at least 10 Nos. of such VHF FM Antenna of power rating not less than 45 kW. Copies of supply order should also be enclosed with the offer.

Supply order Number with date	Type, Model & Power rating of VHF FM Antenna supplied	Quantity supplied	Name of the Customers/broadcasters with full postal address **including e-mail addresses** to whom VHF FM Antenna was supplied. All India Radio reserves the right to get performance feedback from any of the above Customers/broadcasters named by the tenderer/OEM.
(1)	(2)	(3)	(4)

(c) In case tenderer is the authorized representative/dealer i.e. other than OEM, the tenderer must be in the business of sales and supply of VHF FM Antenna/TV Antenna for last **three** years or more **OR** must be an authorized representative/dealer of any OEM of VHF FM Antenna/TV Antenna for last three years or more.Documentary evidence to support this must be provided.

(d) The OEM of the offered VHF FM Antenna must have his local office/authorized representative/dealer in India for after sales support. **A certificate as per Annexure-I** duly signed by the OEM as well as local office/authorized representative/dealer must be submitted with the offer. Copy of Agreement/MoU executed between OEMs and their authorized representative/dealer duly signed by both, must also be submitted with the offer.

(e) The OEM must have his own test bench including test field, rotating tower, suitable receiving equipments for measuring various parameters and their analysis. The tenderer must submit the necessary supporting documents along with detailed drawings, photographs etc. of the test set up facilities at OEM works, failing which the tender is liable to be rejected.

SECTION-I

GENERAL SPECIFICATIONS:

1.0 The 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna as per AIR specification shall be used for round the clock for continuous operation without any interruption in VHF FM broadcast service at AIR station for FM transmitter/studio setup**.** The offered equipment/items as per specification shall be field proven for satisfactory operation.

1.1 Please refer tender documents for general terms and conditions of contract for supply including all the commercial aspects like, Packing and packing list, Insurance and Marine Risk etc. 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 supply, Cancellation of contract in full or part, Recovery of security deposit, Performance Guarantee, Unsatisfactory workmanship, Damages incurred during transit, tenderer liable for damages, Defects, Recovery of compensation, Ensuring payment and amenities, tenderer to indemnify Government against Patent Rights, Release of security deposit, Safety Code, insurance from manufacturer's works/factory to respective site etc. **i.e. in totality**.

1.2 INSPECTION:

a. Detailed inspection of complete VHF FM Antenna system will be carried out at Manufacturerôs works by **two engineers** of All India Radio as per details given in Section-III.

b. Prior intimation for carrying out inspection at OEMôs Works is to be given by the tenderer to All India Radio at least **8 weeks in advance**. Inspection period will be as per details given in Section-III.

c. For AIR inspecting engineers, expenses towards to and fro air journey, boarding, lodging etc. will be borne by All India Radio.

d. The complete Acceptance Test Procedure/Protocol (ATP) will be prepared by the OEM of the VHF FM Antenna and other equipment/items as per Section-IV (A&B) and submitted to DDG (E-FM), P&D Unit, DG: AIR for approval within one month of issue of Acceptance of Tender. ATP will also indicate full details of setup for measuring/testing equipments to be deployed during the performance measurements/inspection at factory. The **approved ATP** shall form the basis for performance measurements/inspection to be carried out. All India Radio has the right to include other technical parameters in ATP submitted by OEM within the ambit of specification of the product offered.

1.3 INFORMATION TO BE SUPPLIED WITH THE TENDER:

(i) The complete technical specifications (Section wise & Clause wise) compliance statement alongwith Schedule of Requirements/Materials for supply (un-priced) of VHF FM antenna system, duly signed & stamped by the respective Original Equipment Manufacturer (OEM) and countersigned by the tenderer

as per the format given above in clause A (3).

(ii) Complete printed technical literature/technical data sheet/schematic drawings/detailed information including Technical Manual of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna and associated equipments/items as per Section-IV (A&B) from the Original Equipment Manufacturer (OEM) in support of compliance statement should be furnished for all the items of the tender, to assess the full merit of the offer, without which the tender offer will be considered incomplete and is liable for rejection.

(iii) Schedule of Requirements/Materials (un-priced) for supply of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna, associated equipments & accessories should be in conformity with Section-IV (A&B) without any change in the format, failing which, the tender will be considered incomplete and is liable for rejection. The tenderer must quote all items.

(iv) Country of Origin, Make, Type & Model of all the offered items should be mentioned including the name & address of their OEM(s).

(v) A copy of the Technical Manual must be enclosed with technical bid for assessing the complete 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna. The Technical Manual must include at least the details given below:

(a) General description of the offered 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna, block diagram/schematic drawings etc.

(b) A suggestive drawing with dimensions in metres for installation of the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system with all allied equipment.

(c) Diagrams showing the isometric view of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna and allied equipment with dimensions in metres.

(d) Installation Manual & drawings with dimensions in respect of offered equipment.

(e) Photograph of the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna.

(f) **All *Do's and Don'ts* which are essential for safe Installation, Operation & Maintenance of the** 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna**.**

1.4 DOCUMENTS TO BE SUPPLIED BY THE TENDERER WITHIN ONE MONTH AFTER ISSUE OF ACCEPTANCE OF TENDER:

One set of Technical Manuals (for Installation, Testing, Commissioning, Operation & Maintenance, including theory of operation and fault diagnosis) **COLOUR** printed and duly bound for 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna along with associated equipment, items & accessories along with soft copy on pen drive must be supplied to ñDDG (E-FM), P & D Unit, DG: AIR, New Delhi-110001ò.

1.5 INFORMATION TO PRECEDE DESPATCH OF EQUIPMENT:

Following information should be supplied to the DDG (E-FM), P & D Unit, DG:AIR and each of the consignee, two months prior to dispatch of Equipment:

a) Detailed list of equipment under dispatch.

b) Photograph showing location of various units/subunits with item numbers marked thereon.

1.6 DOCUMENTS TO BE SUPPLIED ALONGWITH EQUIPMENT:

Technical manuals (for Installation, Testing, Commissioning, Operation & Maintenance, including theory of operation and fault diagnosis) for 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM

Antenna along with associated equipment, items & accessories and inspection report shall be supplied as per the details given below: -

(i) For Consignee- 1 Set each comprising of two hard copies **COLOUR** printed and duly bound alongwith one soft copy on pen drive.
(ii) For the following Offices/Officers-One soft copy on pen drive for each offices/officers
DDG(E-FM), DDG(E-TM), Zonal Offices (Maintenance Wing of all five zones), Zonal Offices(Project Wing of all five zones), Technical Library(P&D Unit), R&D & NABM (T)

1.7 GUARANTEE:

The 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 15 days (from the date of first intimation to OEM/tenderer) at tendererôs expense any component which becomes defective under normal operating conditions for **30 months** from the date of supply. If the tenderer failed to rectify the fault within the stipulated period of 15 days, the guarantee period for that particular equipment/item would be extended corresponding to the outage period.
(iii) A guarantee to supply all components for a period of ten years from the date of acceptance of Equipment at site, at rates at which these are being supplied by him to other customers and also should match prices of original manufactures of these components prevailing at that time.
(iv) If at any stage during next 10 years, the manufacturer stops production of this model of Equipment, the tenderer/OEM shall intimate All India Radio in advance to enable the latter to stock the critical items.

1.8 LANGUAGE/UNITS:

All information supplied by the tenderer & all markings, notes, designation on the drawings & associated write-ups shall be in ñ**English language"** only.
All dimensions, units on drawings, all references to weights, measures & quantities shall be in MKS.

1.9 DELIVERY PERIOD OF EQUIPMENT:

1. For Indian Bidders:
Supply will have to be completed within Five (5) months from the date of Acceptance of Tender or Four (4) months from the date of the Decision Letter from WPC(wherever is required) in respect of RF equipment, provided by AIR, whichever is later.

2. For Foreign Bidders:
Supply will have to be completed within Four (4) months from the date of Opening of Letter of Credit (LC).

1.10 PACKING AND PACKING LISTS:

All the equipment should be securely and properly packed to withstand transit hazards. Equipment packing shall be fit for sea freight and incorporate adequate protection against ingress of moisture. Packing slips giving details of the items contained in each package shall be placed inside the package in a water proof

envelop to enable easy identification and should contain cross references to item/part numbers of installation drawings/components lists. Copies of packing slips and other details should be sent separately to respective consignee and also to The DDG (E-FM), P & D Unit, DG: AIR, New Delhi.

1.11 INSURANCE AND MARINE RISKS ETC:

Please refer to commercial terms.

1.12 ESSENTIAL REQUIREMENT FOR LOCAL OFFICE/AUTHORIZED REPRESENTATIVE/ DEALER:

(a) The OEM should have complete setup for maintenance/repair of the VHF FM Antenna in India, either of its own or through local office/authorized representative/dealer.

(b) The local office/authorized representative/dealer will be the nodal point for resolving issues related to after sales support. It is the responsibility of local office/authorized representative/dealer to arrange the repair/replacement of faulty items. Any module of VHF FM Antenna or other equipment requiring repairs will be repaired. If it is not feasible to repair the module at site, the same will be collected from the site by local office/authorized representative/dealer that will arrange repairs locally. The cost of transportation, repairs etc. shall be borne by the tenderer during the guarantee period.

(c) After sales support for the repairs/maintenance of VHF FM Antenna system after the completion of guarantee period, shall also be provided by the respective OEM of the VHF FM Antenna and other associated equipments through their local offices/authorized representatives/dealers in India.

(d) The details of technical facilities available with local office/authorized representative/dealer for after sales support such as test bench, necessary test & measuring equipment and photographs thereof, must be provided in the technical bid.

(e) At the discretion of AIR, the representative(s) of AIR may visit the works of local office/authorized representative/dealer of OEM in India to ensure/verify that adequate technical infrastructure is available for after sales service for timely resolving the issues related to attending/replacing the equipments. Tenders from the tenderers who failed to meet these criteria shall be considered incomplete and is liable to be rejected.

SECTION-II

TECHNICAL SPECIFICATIONS:

1.0 INTRODUCTION:

The 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna with omnidirectional/directional patterns are required for use with FM transmitters of All India Radio for multi frequency operation in the band 88 MHz-108 MHz in tropical condition of heavy rain fall, high humidity and desert region. Two or more FM transmitters shall be combined and fed to this antenna.

The tenderer is required to offer complete Antenna System, comprising of Dipoles, reflectors for directional, Inter bay RF coaxial air dielectric feeders/Rigid lines, Power Splitters, Fine Tuning arrangement (on site) and other accessories for the completeness of offered Antenna System.

1.1 The FM antenna will be mounted between 80 M to 100 M on one face of 100 M FM tower having a square cross section of 650 mm × 650 mm. A GI pipe of 100 mm inner dia. category óCô already installed on the tower by AIR for fixing the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system. **In case of directional antenna system, the tenderer is required to accommodate reflector within the available space of 600 mm i.e. distance from face of tower to centre of pipe to achieve the desired directional radiation pattern in Horizontal Plane**. Refer Annexure-III, Annexure-IV, Annexure-VI & Annexure-VII.

1.2 Following equipment and items will be provided by AIR.

1.2.1 The transmitter conforming to ITU-R Rec.

1.2.2 RF coaxial air dielectric cable, rigid lines (for inter connections of transmitter in the transmitter hall), Dehydrator, Dummy load and RF coaxial switch (for selection of Antenna or Dummy load) etc.

1.2.3 Self-supporting lattice steel 100 M tower.

1.2.4 A GI pipe of 100 mm inner dia. category óCô already installed on the tower by AIR for fixing the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system.

All the items required for the completeness of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system offered by the tenderer and its mounting for optimum performance shall be supplied by the tenderer except equipment and items mentioned above in Para No.1.2.1, 1.2.2, 1.2.3 and 1.2.4.

2.0 ELECTRICAL PARAMETERS:

		Omni-directional antenna	**Directional antenna**
2.1.1	**Polarization**	Circular	
2.1.2	**Input impedance**	50 Ý unbalanced	
2.1.3	**Frequency band**	88 MHz-108 MHz	
2.1.4	**VSWR**		
2.1.4.1		Less than or equal to **1.2: 1.0** over 8 MHz from 100 MHz to 108	

		MHz in the frequency range (88 MHz-108 MHz). VSWR to be optimized by the tenderer/OEM to 1.1: 1.0 on operating frequencies (to be intimated later at the time of placement of the order).	
2.1.4.2		VSWR and Return Loss Value (dB) in Graph form over the entire frequency range (88 MHz-108 MHz) to be enclosed with the tender.	
2.1.5	**Continuous Average Power rating**	≥ 45 kW	
2.1.6	**Downward beam tilt**	1° for entire Frequency Range i.e. (88 MHz –108 MHz)	
2.1.7	**Null filling**	Required, 10%	
2.1.8	**Front/Back Ratio (Horizontal patterns)**	NA	≥ 6.0 dB for both Horizontal & Vertical components (Refer annexure-V)
2.1.9	**Antenna Gain**	≥ 5.5 dBd for omni-directional	≥ 7.5 dBd for directional
2.1.9.1	**Antenna gain** (in dBd)	Antenna gain over the entire frequency range of 88 MHz - 108 MHz for omnidirectional & directional shall be enclosed with the tender.	
2.1.9.2	**Radiation pattern in vertical Plane (0° to ± 90°)**	Radiation pattern in vertical Plane (in dB) for omni-directional & directional should be enclosed with the tender.	
2.1.9.3	**Radiation pattern in Horizontal plane (0° to 360°)**	Radiation pattern in Horizontal plane (in dB) for omni-directional & directional should be enclosed with tender.	

2.1.10 No. of vertical Bays: 6

2.1.11 Spacing between Bays: Approximately 0.9ə to 1.0ə. Actual distance to be indicated in tender, and a full Engineering drawing to be enclosed.

2.1.12 Antenna Mounting details: The FM antenna will be mounted between 80 M to 100 M on one face of existing 100 M FM tower having a square cross section of 650 mm × 650 mm. A GI pipe of 100 mm inner dia. category óCô already installed on the tower by AIR for fixing the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system. **In case of directional antenna system, the tenderer is required to accommodate reflector within the available space of 600 mm i.e. distance from face of tower to centre of pipe to achieve the desired directional radiation pattern in Horizontal Plane**. Refer Annexure-III & Annexure-IV.

Full details of antenna arrangement and the engineering drawings with dimensions to be submitted with the tender.

2.1.13 The six (6) dipoles of the FM Antenna will be mounted on a 100 mm inner dia. category óCô GI pipe on one face of the tower. Expected field pattern (circular polarization) with such a supporting tower should be submitted alongwith the tender. Details for carrying out field adjustments for ensuring that actual Radiation Pattern (Horizontal and Vertical plane) conforms to AIR specification, **if any,** in the field **or** at site are to be enclosed with the tender.

2.1.14 Inter-bay feeding/Feed System: Full details of Feeding arrangement and the engineering drawings

with dimensions along-with the details of inter-connecting RF co-axial air dielectric cables/rigid lines etc. to be submitted with the tender. The entire feeding system should be adequately protected against heavy rainfall, extreme daily temperature variance.

2.2. MECHANICAL DETAILS (ANTENNA SYSTEM):

(i) Antenna Weight (without supporting hardware): ≤ 400 Kg
(ii) Antenna Wind Load: ≤ 650 Kg
(iii) Maximum Wind Speed: 180 kmph
(iv)Antenna aperture: 18000 mm

2.2.2 External material of Dipoles and rigid feed lines: Exterior of dipoles will be made of stainless steel or Marine Brass. Rigid lines with Marine Brass or Copper.

2.2.3 External material of Reflector: Exterior of Reflector will be made of hot dip galvanized/stainless steel.

2.2.4 Internal material (for Power Divider, Rigid lines & interconnecting feed cables/ lines): Inner lines of Dipoles will be of copper, Brass & those of Power Dividers will be of copper or Brass. All electrical contacts will be silver plated. All inners and bullets of connecting head or mating head will be made of Beryllium copper and silver plated. Insulators will be made of virgin Teflon.

2.2.5 Pressurization: Pressurization is must up to the antenna dipoles i.e. in the RF coaxial cable, power dividers, sub-dividers/splitters and branch cables.

2.2.6 Ambient Temperature/RH: -5º C to 50º C, RH 95% Non-Condensing.

2.2.7 Input connector: Main power divider of antenna system: To match with 3-1/8" EIA Flange connector, RF output of FM transmitter will be available through the 3-1/8" EIA Flange connector mounted on 4" RF coaxial air dielectric cable.

2.2.8 Set of clamps: Suitable clamps for dipoles, Power Divider/Splitter and RF coaxial air dielectric cables / rigid lines etc. are to be included in the offer and the mechanical details (weight, dimension & materials used etc.) be indicated in the tender.

2.2.9 The entire Antenna System should be adequately protected against heavy rain fall & humid climate of tropical region. Each component/Sub system of the Antenna System should be adequately protected for extreme weather conditions. The Antenna system should also be well protected against dust as well as desert conditions of extreme day and night temperature variations.

SECTION-III

INSPECTION DETAILS:

The inspection for acceptance of the Complete 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system will be carried out at the Manufacturerôs Works by **two Engineers** of All India Radio (AIR) in accordance with Acceptance Test Procedure/Protocol(ATP). All facilities like complete set of measuring instruments, power supply, manual assistance etc. will be provided by the manufacturer.

The tenderer shall put up all the 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system for inspection in lot, out of which one 6-Bay directional antenna system and one 6-Bay omni-directional antenna system shall be inspected. Complete details and specifications of the above Antenna System will be checked and all parameter values will be measured. Inspection period shall be one working day for each Antenna system. One randomly selected single Bay (pole type) antenna shall be tested on full rated power of single bay for 02 Hrs. at a frequency of 108.0 MHz to ensure the power handling capability of the antenna. The OEM should have the facility to test the single bay (pole type) antenna on full power of single bay.

For the remaining antenna system, the VSWR/Return loss vs frequency measurement in the VHF Band II i.e. 88 MHz to 108 MHz and pressurization up to antenna dipoles are to be checked. Inspection period shall be one additional working day against every set of three Antenna system. Other technical parameters as per Section-II will be accepted on the basis of Original Equipment Manufacturerôs(OEM) Test Certificates, duly signed and stamped on the letter head of the OEM, failing which Test Certificates will be considered incomplete and equipment offered by the firm is liable to be rejected.

Exhaustive checking and measurements will be carried out so as to completely check the compliance of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna System and its sub systems as per approved ATP (based on AIR as well as OEM specifications).

It is mandatory that all these testing/measurements of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna System as per parameters in Section-II at any three frequencies including operating frequencies in the VHF band i.e. 88 MHz to 108 MHz, are carried out well in advance as per approved ATP. These must be submitted to All India Radio along with the call for inspection of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna well in advance for analyzing etc. These measurement details, graphical printouts and figures must also be available at the factory at the time of inspection.

Following information should also form part of above data which will also be checked for each 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna during inspection by AIR representative **at manufacturer's works:**

1.0 Origin of Country, Make, Type and Model of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna, its accessories and spares.

SECTION-IV (A)

1. SCHEDULE OF REQUIREMENTS/MATERIALS (UN-PRICED) {FOR ONE SET OF 6-BAY CIRCULARLY POLARIZED SIDE MOUNT (POLE TYPE) VHF FM ANTENNA} WITH OMNI-DIRECTIONAL PATTERNS

S. No.	Description	Make	Model	Unit	Qty
1.	6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system **with Omni-directional patterns** complete as per AIR Specification including Power divider/splitter, fine tuning arrangement, antenna clamps etc. with technical manual as per AIR Specification			Set Complete	1Set Complete
2.	Any other items/hardware materials etc. offered for the completeness of the above antenna system. (Item wise details of the offered items/hardware materials etc. shall be given by the tenderer)			Lot	1 Lot
3.	Inspection charges at manufacturerôs works of VHF FM Antenna as per AIR specification.			Lot	1 Lot

2. SCHEDULE OF REQUIREMENTS/MATERIALS (UN-PRICED) {FOR ONE SET OF 6-BAY CIRCULARLY POLARIZED SIDE MOUNT (POLE TYPE) VHF FM ANTENNA} WITH DIRECTIONAL PATTERNS

S. NO.	Description	Make	Model	Unit	Qty
1.	6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna system **with directional patterns** complete as per AIR Specification including Reflectors, Power divider/splitter, fine tuning arrangement, antenna clamps etc. with technical manual as per AIR Specification			Set Complete	1Set Complete
2.	Any other items/hardware materials etc. offered for the completeness of the above antenna system. (Item wise details of the offered items/hardware materials etc. shall be given by the tenderer)			Lot	1 Lot
3.	Inspection charges at manufacturerôs works of VHF FM Antenna as per AIR specification.			Lot	1 Lot

SECTION-IV (B)

SCHEDULE OF REQUIREMENTS/MATERIALS (UN-PRICED) FOR 6-BAY CIRCULARLY POLARIZED SIDE MOUNT (POLE TYPE) VHF FM ANTENNA (SPARES) (OPTIONAL)
(*Not to be considered for ranking purpose)* {The tenderer must quote all items}

S. NO.	Description	Make & Model	Unit	Qty
1.0	List of recommended spares and any other accessories. (Items wise details of offered material including part number are to be given by the tenderer)		Set Complete	1 Set Complete
2.0	(a) ñOò ring		Set	1 Set
	(b) Silicon grease		Lot	1 Lot
	(c) Connectors assorted sizes		Set	1 Set
	(d) RF distributors air dielectric coaxial cables		Set	1 Set
	(e) Dipole		No.	2 Nos.
	(f) Reflector		No.	2 Nos.
3.0	Any other items/hardware etc. offered for the completeness of the above antenna system. (Item wise details of the offered items/hardware materials etc. shall be given by the tenderer)		Lot	1 Lot

All India Radio at its own discretion may procure spares for a value not exceeding 10% of the cost of equipments. The tenderer should quote all the essential spares.

ANNEXURE-I

PERFORMA FOR INFORMATION ABOUT LOCAL OFFICE /AUTHORIZED REPRESENTATIVE/ DEALER IN INDIA FOR AFTER SALES SUPPORT

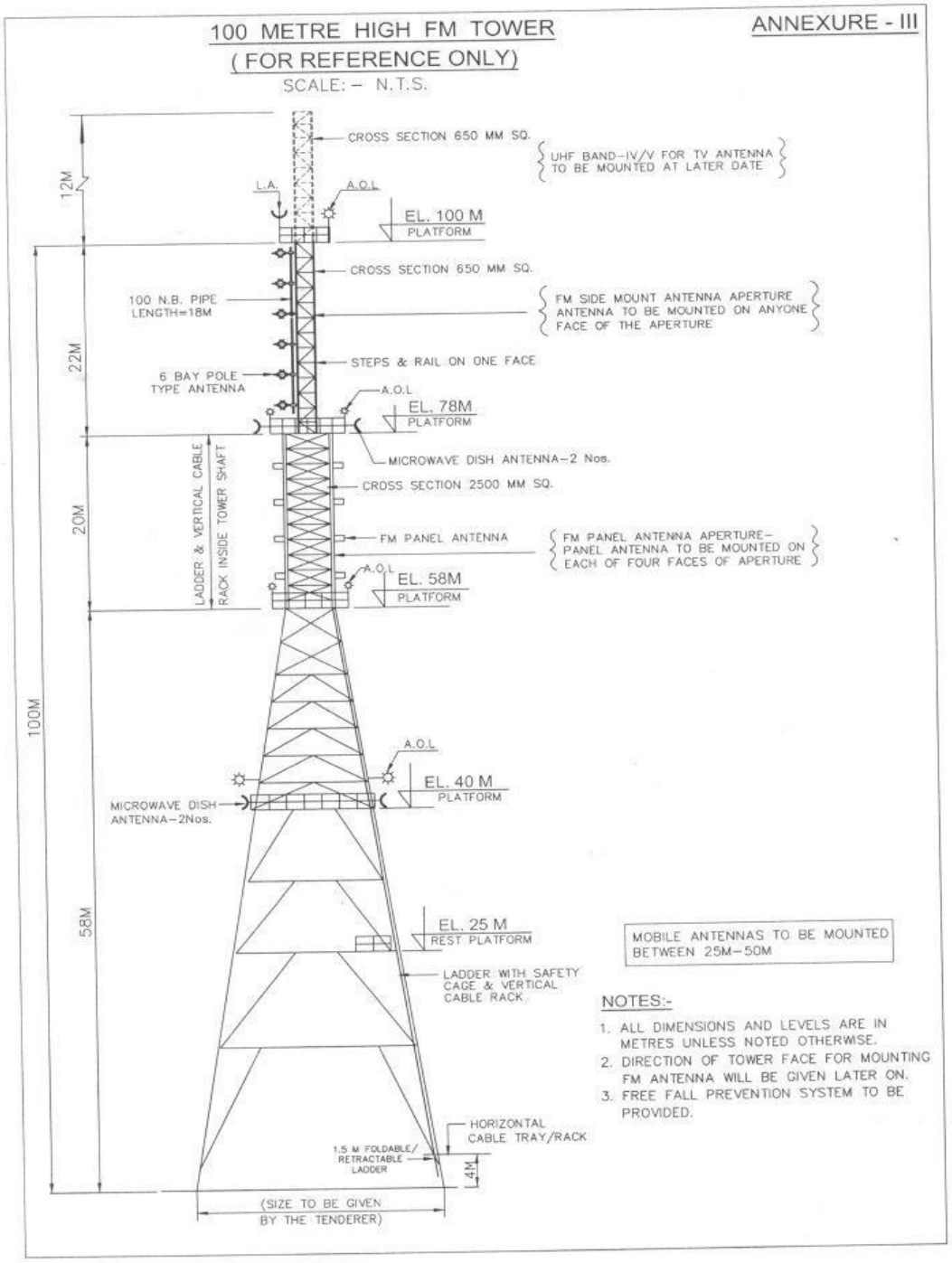
1.	Address of local office/authorized representative/dealer	
	Telephone (Landline) No.	
	Mobile No.	
	E-mail Address	
2.	Address for communication (if different)	
3.	Legal Status (local office/authorized representative/dealer)	
4.	Name, contact number (Mobile number) & e-mail address of official representative of the local office/authorized representative/dealer	
5.	Brief details of Technical facilities available for after sales support: The details of technical facilities available with local office/authorized representative/dealer for after sales support such as test bench, necessary test & measuring equipment and photographs thereof, must be provided in the technical bid.	
6.	Main line of business, specialization and number of years of operation	
7.	Total number of permanent technical employees including their designation and qualification	
8.	Details of Agreement/MoU for after sales support with OEM (Copy must be provided with the offer)	Date of Agreement: Executed at : Executed by :

(Authorized Signatory of local office/authorized representative/dealer) Name : Signature :	**(Authorized Signatory of Antenna OEM)** Name : Signature :
Place and Date:	Place and Date:

ANNEXURE-II

List of Places for Supply of 6-Bay Circularly Polarized Side Mount (Pole Type) VHF FM Antenna with omni-directional & directional patterns

S. No.	Name of places	State	Qty.	Requirement of Radiation Patterns
1.	Nanpara	Uttar Pradesh	1 No.	Omni-Directional
2.	Gadania	Uttar Pradesh	1 No.	Omni-Directional
3.	Narkatiaganj	Bihar	1 No.	Omni-Directional
4.	Dahod	Gujarat	1 No.	Omni-Directional
5.	Jaspur	Uttrakhand	1 No.	Omni-Directional
6.	Rampur	Uttar Pradesh	1 No.	Omni-Directional
7.	Sitamarhi	Bihar	1 No.	Directional
8.	Bathnaha	Bihar	1 No.	Directional
9.	Maharajganj	Uttar Pradesh	1 No.	Directional

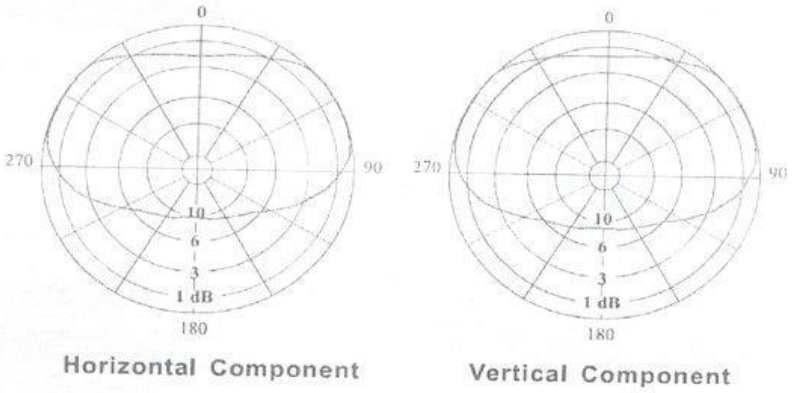


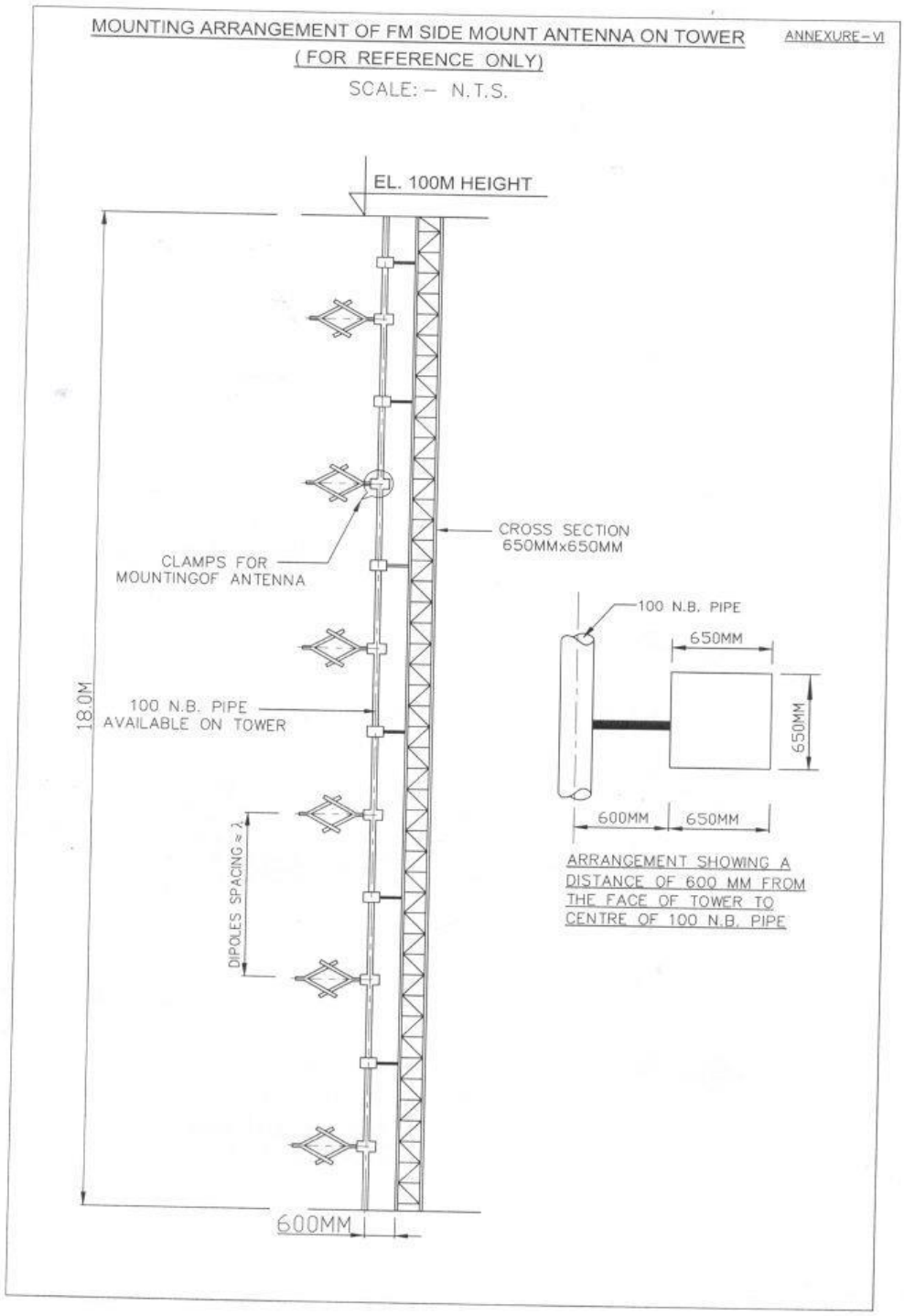
U. S. Pandey, AE Manzoor Ali, ADE Sanjeev Pandey, DE Rajendra Nahar, DE

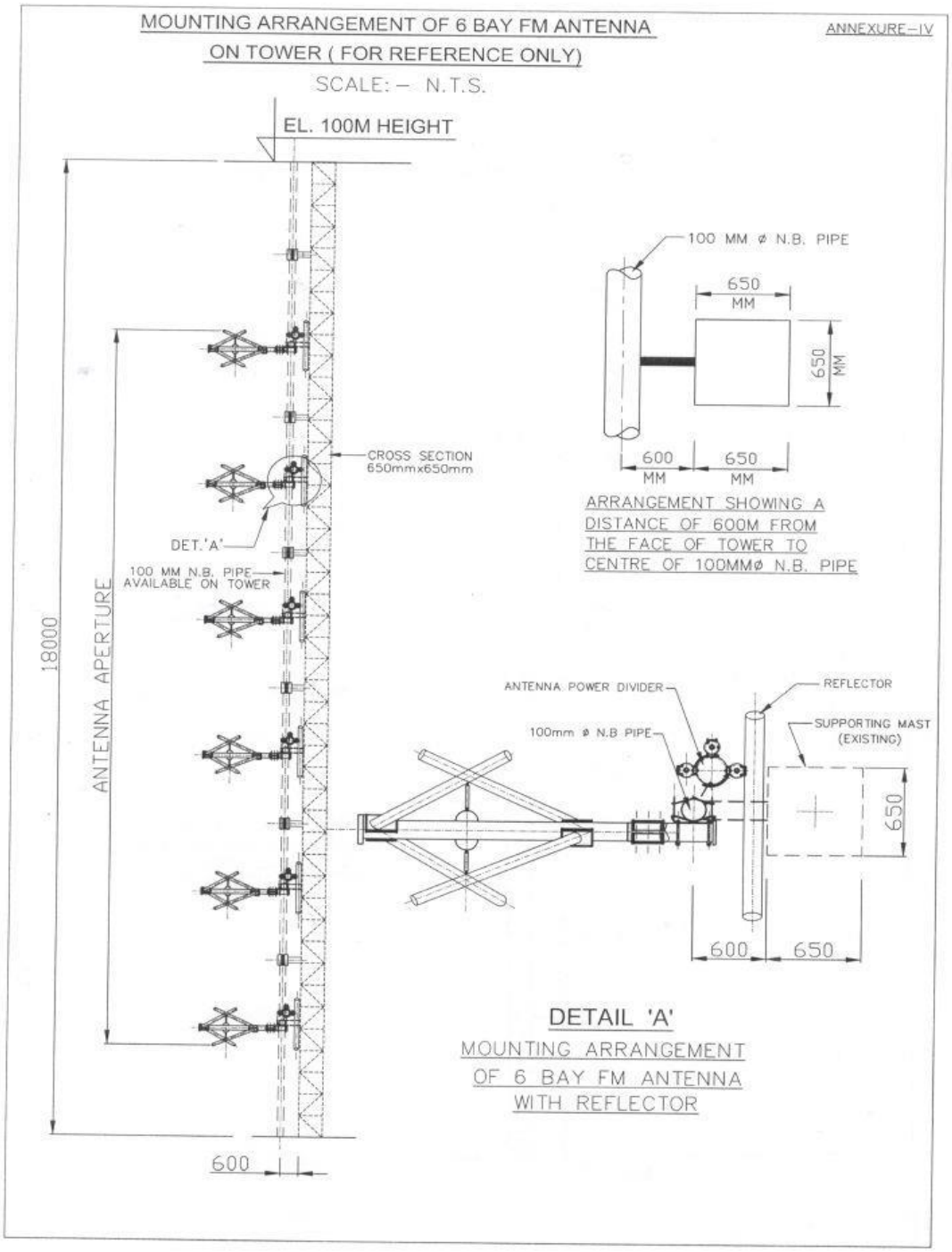
Annexure-V

HORIZONTAL RADIATION PATTERNS FOR DIRECTIONAL ANTENNA

(For reference only)




MOUNTING ARRANGEMENT OF FM SIDE MOUNT ANTENNA ON TOWER
ANNEXURE-VI
(FOR REFERENCE ONLY)
SCALE:- N.T.S.
EL. 100M HEIGHT
CROSS SECTION
650MMx650MM
CLAMPS FOR
MOUNTINGOF ANTENNA
100 N.B. PIPE
AVAILABLE ON TOWER
18.0M
DIPOLES SPACING ≈ λ
600MM
100 N.B. PIPE
650MM
650MM
600MM
650MM
ARRANGEMENT SHOWING A
DISTANCE OF 600 MM FROM
THE FACE OF TOWER TO
CENTRE OF 100 N.B. PIPE


MOUNTING ARRANGEMENT OF 6 BAY FM ANTENNA
ON TOWER (FOR REFERENCE ONLY)
SCALE:- N.T.S.
ANNEXURE-IV
EL. 100M HEIGHT
18000
ANTENNA APERTURE
600
CROSS SECTION
650mmx650mm
DET.'A'
100 MM N.B. PIPE
AVAILABLE ON TOWER
100 MM ø N.B. PIPE
650
MM
650
MM
600
MM
650
MM
ARRANGEMENT SHOWING A
DISTANCE OF 600M FROM
THE FACE OF TOWER TO
CENTRE OF 100MMø N.B. PIPE
ANTENNA POWER DIVIDER
100mm ø N.B PIPE
REFLECTOR
SUPPORTING MAST
(EXISTING)
650
600
650
DETAIL 'A'
MOUNTING ARRANGEMENT
OF 6 BAY FM ANTENNA
WITH REFLECTOR

ANNEXURE-VII

The isometric view of the Antenna system with Reflector is shown below:

(For reference only)