

**PRASAR BHARATI
DIRECTORATE GENERAL: ALL INDIA RADIO
(PLANNING & DEVELOPMENT UNIT)**

**SPECIFICATION DOCUMENT FOR CROSSED FIELD MEDIUM
FREQUENCY ANTENNA & ATU FOR ALL INDIA RADIO**

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SUMMARY:

These specifications give details of various technical parameters, accessories and spares required for a Self Radiating Crossed Field MF Antenna.

Section I, II & III are generic specifications whereas Section-IV is for a particular place wherein the frequency of operation, power and other special technical requirements along with spares as well as optional items required for self radiating antenna have been indicated.

The requirement is for a self radiating crossed field antenna capable of radiating 10kW Carrier power + 150% Modulation in MF band.

N.B: 1. The tenderer should go through all the sections of the specifications carefully and could confirm clause by clause compliance to all sections clearly. Tenders without clause by clause compliance are liable to be objected.

2. The tenderer should also indicate the list of items offered as per schedule of requirements of Section-IV, without cost details to assess the completeness of offer against AIR's requirements in the Technical bid details.

(KAILASH CHAND)
CO/ (TD)

SECTION – I

**DETAILED TECHNICAL SPECIFICATIONS FOR CROSSED FIELD MEDIUM
WAVE ANTENNA & ANTENNA TUNING UNIT**

I. INTRODUCTION:

This specification covers the design, fabrication, supply and erection of Crossed Field Antenna structure along with ATU for use as medium frequency antenna with broadcast transmitter, operating in MF Band.

II. ELECTRICAL CHARACTERISTICS of ANTENNA:

- i) Frequency Range : 525-1605 KHz.
- ii) Station frequency : 1584 KHz
- iii) Polarisation : vertical
- iv) Band width : 30KHz for DRM operation
- v) Power handling capacity : 10Kw+ 150% Modulation.
- vi) Feeding arrangement : The antenna should be suitable for being series fed at the base of the antenna structure.
- viii) Input Impedance : The input impedance of the antenna should have a flat characteristic within ± 20 KHz at the operating frequency in the range specified in (i) above. (An impedance curve for the entire frequency range will be supplied by tenderer..)

III. ANTENNA TUNING UNIT (ATU):

The ATU shall match the output power of the Transmitter to the antenna. It should be rated for handling power of 10KW + 150% modulation. All the components of the ATU, shall be housed in a metal enclosure. The enclosure shall be provided with terminals for earthing. The metal enclosure shall be painted to prevent rusting / corrosion, in same colour as the Transmitter. Suitable natural ventilation arrangement shall be provided for the ATU, to prevent undue

heating of the components. The various components of the ATU shall be mounted with proper insulation.

The input connections shall be through a bowl insulator suitable for connecting (i) 230 ohm unbalanced open wire feeder wire coming from the transmitter or 50 ohm R.F. coaxial cable coming from the transmitter. The output connection will be through Bowl insulators mounted on side wall of the ATU enclosure along with required terminals for earthing. Static leak coil of adequate rating shall be provided for discharging the lightning current safely to the ground. Adjustable spark gaps shall be provided at the input as well as output points of the ATU. Necessary voltage break-down strength characteristics of the spark gaps shall be included in the technical literature on erection of equipment supplied with the transmitter.

IV. MECHANICAL DESIGN OF ANTENNA:

1. General:

The structure shall be designed to withstand the mechanical / electrical stresses encountered in the Transportation, installation, operation and maintenance of the antenna even under the worst wind and Ice loading conditions detailed in this specification.

2. Type of structure:

(a) The antenna structure should be properly supported, The antenna structure shall be designed to withstand basic wind pressure as per IS:875-1987 with latest amendments. The design should be such as to provide uninterrupted broadcast during all seasons and will be designed for use anywhere in India. For the purpose of design calculations, therefore, basic wind pressure has to be taken as that of coastal areas in India.

(b) Galvanizing:

To prevent corrosion, the antenna structure, guy wires, accessories and other hardware required for the erection of the antenna structure shall be properly galvanized after fabrication.

V. AVIATION OBSTRUCTION LIGHTING:

The antenna structure shall be provided with AOL(aviation obstruction light) fittings, if the height of the structure is such that AOL is required to be provided as per international civil aviation norms.

VI . Erection of antenna:

The Antenna structure shall be erected and guy anchors shall be fixed by the tenderer. The tenderer shall, however, supply complete instructions with

drawings for the assembly, erection procedure, adjustments of the antenna structure.

The supplies will include galvanised guy anchor assemblies, foundations bolts, re-enforcement etc., and the necessary material including cement etc. for casting of the foundations for erecting the antenna structure.

VII. GUARANTEE

(a) The tenderer shall certify and guarantee that the design, material used and fabrication of the antenna structure and accessories has been done to ensure the capacity of the antenna to withstand the electrical and mechanical stresses with margin of safety specified in this specification encountered under the conditions detailed in the specifications.

(b) The tenderer shall guarantee the safety of the antenna structure under the specified conditions of electrical operation and wind pressure for a period of one year from the date of the taking over of the antenna system.

(c) In the event of structural or electrical failure of any component of the antenna structure/insulator within the guarantee period specified above, on account of manufacturing defects, the tenderer shall undertake to replace the component / parts which have failed and those which were damaged as a result thereof, free of cost and bear the expenditure to be incurred for re-erection of the tower.

VIII. DRAWING AND TECHNICAL INFORMATION:

(a) A drawing showing the general arrangement of the antenna offered along with the technical information shall be submitted along with the tender in the Performa given in Appendix. This will include the leaflet showing technical and physical details of base and guy insulators.

(b) The successful tenderer shall submit four sets of the following within two months of the date of acceptance of his tender:

Complete instructions with drawings for the antenna assembly erection and adjustments of the antenna structure.

IX. SPARES:

The tenderer should quote separately for the spares such as insulators, etc, which may be required in future for maintenance of the antenna.

X. DELIVERY PERIOD:

All the Delivery and erection works including measurements and handing

over shall be completed within 4(four) months of placement of order in case of Indian Firm's quote in Indian Rupee or within 4(four) months of opening of letter of credit in case of Foreign firm's FOB quote in foreign currency

XI. INSPECTION & ACCEPTANCE TEST OF THE ANTENNA AT AIR SITE:

The consignee of the tender, Chief Engineer(R&D), All India Radio & Doordarshan, Ring Road, Indraprastha Estate, New Delhi-110002, shall inspect and accept the antenna at AIR site on the basis of ATP (Acceptance Test Protocol) approved by him.

XII. PAYMENT TERMS:

As per commercial terms.

XIII. INSURANCE:

The entire store will be comprehensively insured including during transit, for free delivery at the site, till the antenna is erected and handed over to the consignee, Chief Engineer(R&D), All India Radio & Doordarshan, Ring Road, Indraprastha Estate, New Delhi-110002

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SECTION-II

APPENDIX

TECHNICAL INFORMATION TO BE SUPPLIED ALONG WITH THE TENDER

1. ANTENNA STRUCTURE :

- a. A drawing showing the general arrangement of the antenna structure offered.
- b. Dimension of the Cross-section of the antenna structure.
- c. Wind load adopted for the antenna.
- d. Aviation Obstruction Light , if required
- e. Details of climbing arrangement for accessing to higher points of the antenna structure when ever such need arises.

2. ANTENNA TUNING UNIT;

- a. A drawing showing the general arrangement of the ATU components.
- b. Full details and dimension of the ATU components.

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SECTION III

SPECIFICATION FOR PAINTING OF THE ANTENNA

Painting is an accepted method of protection against corrosion, wear, decay and other factors which affect the durability of the structures. All dust, dirt, grease, rust add scale, if any, should be thoroughly removed. Degreasing is an essential preliminary for removing dirt and grease. After degreasing and cleaning, when the work is absolutely dried, the surface is to be prepared for receiving the paint by etching. For this purpose, a priming coat of wash/etch primer should be given. The etch primer shall be of a reputed make and of a composition specifically used for zinc surfaces. After the above coat is dried, but without too much delay, a coat of zinc chromate primer should be applied. The priming coat should be allowed to dry for a minimum period of 72 hours before application of the next coat. After this the final coats of paints shall be applied. The finishing coats of high quality exterior class paint shall be applied. The first coat shall be allowed to dry for at least 48 hours before the second coat is applied. The paints, primers and thinner used must be of best quality. If the antenna is required to be painted as per International Civil Aviation Rules, the correct shade of paint shall be applied as recommended in the Rules.

SECTION-IV

**SCHEDULE OF REQUIREMENTS FOR VERTICAL CROSSED FIELD
ANTENNA FOR 10kW MW TRANSMITTER AT AIR**

SCHEDULE OF REQUIREMENTS :

S. No.	Item description	Qty.
(A)	SUPPLY PORTION material/stores	
1	a) Design, Fabrication, Galvanizing, Supply of antenna structure with Climbing arrangement suitable for handling 10 KW + 150% modulation , b) Isolation transformer, Aviation Obstruction Lights (Solid State), Cables, Conduit pipes, Junction boxes, Sunswitch, etc (only in case the antenna height is good enough and it is necessary to provide Aviation Obstruction Light as per International Civil Aviation Manual)	1 Lot 1 Lot
2	Manuals incorporating all the drawings giving description, erection procedure & maintenance of antenna including procedure for measuring twist, verticality & guy tension	4 sets
3	Antenna Tuning Unit suitable for handling 10 KW + 150% modulation, enclosed in an all weather metallic box for connecting and matching the output of the Transmitter (through a 50 Ohm R.F. Cable/ 230 ohm unbalanced open wire feeder line) to the Crossed field antenna.	1 lot
4	All the items which might have not been specifically mentioned above but are essential for the operation of the antenna	1 Lot
(B)	SERVICES/WORKS	
1	Erection of Antenna including Checking of vertically.	1 job
2	Painting of Antenna including supply of paints	1 job
(C)	OPTIONAL ITEMS	
1	Spares for the crossed field antenna	1 set
2	Ladder for climbing the antenna	1 set

Note:- 1. The tenderer shall furnish the cost details of each of the above items separately under the commercial Bid.