

DESCRIPTION STORES AND TECHNICAL SPECIFICATIONS

Description/specifications, Material Code, Quantity of Items.

S. No.	Description	Qty. (No.)	Specification No.
1.	2x20 KW UHF Antenna Systems for Mehboobnagar (A.P)	1	Spec No. Tx. D./1/2009/HPT/Uant Dated 19.08.2009

Note: -

Delivery instruction

- a. Delivery Period 6 Months.
- b. Destination : Mehboobnagar (A.P)

Taxes

1. All taxes as applicable, must be quoted and shown separately.
2. The supplier shall be required to submit their claim in excisable/Modvat Invoice, if Service Tax/Excise/countervailing Duty is involved in the claim.

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PRASAR BHARATI
(BROADCASTING CORPORATION OF INDIA)
DOORDARSHAN BHAVAN: NEW DELHI

**Technical Specifications of Analogue UHF (Broad band) 2 x 20KW TV
Transmitting Antenna System at Mahboobnagar (AP).**

Introduction:-


- a) The UHF Band IV & V, Panel type antenna is required to be mounted on top of Existing square lattice steel TV Tower cross section 640mm x 640mm (outer to outer) TV tower of Doordarshan (Antenna system shall be mounted and installed by Doordarshan)
- b) The Antenna system should be suitable for operation with twin R.F. feeder cables, in order to facilitate half antenna operation under fault conditions.
- c) The 'Antenna System' should be complete in all respects.
- d) The antenna system should be rugged in construction, and should be capable of withstanding corrosive climate of coastal regions. The radiators are to be made of corrosion protected material / hot dip galvanized steel. All feed lines and transmission lines are to be made from bronze, brass or stainless steel for corrosion protection.

2. Technical Specifications:

2.1.	Type Configuration	Panel Type
2.2	Frequency Range	Broadband for full UHF band IV and V Capable of Operation on any channel(CCIR system PAL-G) in UHF bands IV and V(470 MHz to 860 MHz)
2.3	Power handling capacity	2 x 20 kW of peak video power and 2 x 2 kW of Audio power. Each half antenna should be capable of handling 20 kW of peak video power and 2 kW of Audio power.
2.4	Polarization	Horizontal
2.5	Horizontal Radiation Pattern	(a)-Omni Directional (b)-Typical pattern may be attached.
2.6	Circularity of horizontal radiation pattern	(a)-Less than or equal to ± 1.5 dB from average values. (b)-A typical radiation pattern showing it in dB should be attached with the offer.
2.7	Vertical Radiation Pattern	(a)-It should be possible to introduce beam tilt & null fill. Typical value of Beam Tilt is 0.5 deg. Null fill is 10%. (b)- A typical pattern should be attached.

2X20KW UHF Antenna System for Mahboobnagar

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2.8	Net gain of Antenna System after deducting all losses, with reference to $\lambda/2$ dipole (After Subtracting loss due to internal Cabling, Beam tilt and Null fill etc.) at Mid Band Frequency (At 666MHz).	Not less than (minimum) 13.8dBd at midband in direction of maximum radiation (with 0.5 deg. beam tilt and 10% null fill). The detailed calculations for achieving the net max. antenna gain in dB should be attached.
2.8.1	Following information is mandatory to verify the net antenna gain of the antenna system;	The formula used for calculation of Net Gain of Antenna System, must also be provided.
2.8.1 a	Horizontal Directivity	
2.8.1 b	Vertical Directivity	
2.8.1 c	Beam Tilt & Null Fill Losses	
2.8.1 d	Internal Branch Feeder cable losses of the antenna system	
2.9	VSWR of the whole Antenna System(470 MHz to 860 MHz)	(a) 1.05 at vision band of frequencies (operating channel #23(-), Freq. Band 486MHz to 494MHz). (b) 1.10 in the remaining band of operation channels.
2.10	Input Impedance	50 Ohms nominal
2.11	Input Connector	3 $\frac{1}{8}$ " EIA Flange connector (one for each half antenna)
3.0	<u>Mechanical characteristics of Antenna</u>	
3.1	Maximum wind speed for survival	216 km/ hr (60m/sec).
3.2	Provision of Radome	Each antenna Panel should be covered with radome but radome for whole antenna system is not required.
3.3	Climbing Access	A safe climbing access for repair of antenna system i.e. branch feeder cables, panels, power splitters etc. must be available and a detailed drawing with dimensions of climbing access is to be provided.

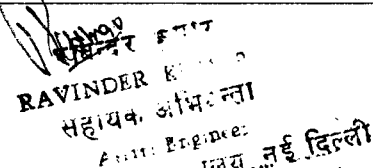
3.4	Antenna Support Structure	Antenna is to be supplied along with antenna support structure/steel spine(cross section of spine shall be 640mm x 640mm(outer to outer)) which is to be fixed on the top of square TV tower having top cross section of 640 mm x 640 mm(outer to outer). A detailed typical mechanical structure alongwith drawing with all dimensions in m.m. of the 'interface' of antenna support structure with the square tower should be attached with the offer. Drawing of top portion of tower, over which antenna to be mounted is enclosed. This is essential and mandatory requirement without which the offer may be rejected.
3.5	Lightening protection and aviation light	(a) A Lightening conductor and twin aviation lights (L.E.D. based) with inter blinking arrangement with the existing tower top should be provided with antenna support structure. (b) The aviation lights should work on 24 V DC power supply. A suitable length of power supply cable should also be supplied to connect the light with existing power supply point located inside transmitter hall on ground. (c) Colour of the radome of antenna system must be as per ICAO norms.
3.6	Antenna system weight in kg. (Dead Load)	Total weight of the antenna system with support structure/steel spine should not exceed 4700 kg.
3.7	Wind load in kg.	Wind load of the whole antenna system with support structure at wind speed of 216 km/hr, should not exceed 7000 kg.
3.8	Total antenna system height	The total height of the complete antenna system including support structure should be provided with detailed mechanical drawing.(Manufacturing drawings). The max height of the antenna system should be (less than or equal to) ≤ 16 m. Antenna should be split in two equal parts in height (it is proposed to haul up individual parts separately and assemble on tower)
3.9	Accessories required	All accessories required for completeness of the system, should be quoted with the offer.

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3.10	<p>A Suitable Automatic Dehydrator (Pressurization) system for the 4" Dia. Dual RF feeder cables of length of 2X185 meters and the supplied Antenna system. It should provide pressurized dry air to the system and continuously purges the collected moisture to the atmosphere. The offered Automatic Dehydrator (Pressurization) system should be capable to provide pressurization of cable and antenna system with adequate provision to cover up small leakage (2 psi in 24 hours) within justified duration. Detailed data sheet should be provided. The dehydrator system must be factory adjusted with the pressure setting 3 psig ON and 5 psig OFF.</p>	<p>(a) The pressurization and dehydrator system should be specified. (b) The detailed specs with make, model and data-sheet of the Dehydrator should be attached. (c) The sealing compound for sealing various joints of the Antenna System should also be provided. (d) At least 20feet dual standard tubing must be offered with the dehydrator system to connect dehydrator with RF feeder cable. (e) The offered Automatic Dehydrator (Pressurization) system should work on single phase 230 volts 50 Hz AC. (f) It should be capable to handle the climatic condition of India (Temp. 0°C to +45°C). (g) Detailed data sheet should be provided (h) Dehydrator system should be two port many fold to pressurize dual Feeder Cables.</p>
3.10.1	<p>The offered Automatic Dehydrator (Pressurization) system have the provision for various alarms, indicators and safety valves for safety of antenna ,cable and dehydrator systems .</p>	<p>Required features:- 1. Low pressure alarm & switch 2. High pressure alarm & switch 3. Pressure gauge 4. Dehydrator pressure switch (Adj.) 5. Visual moisture indicator 6. High pressure safety relive valve. 7. Pressure and humidity monitor. 8. Leakage indicator alarm. 9. Provision for field adjustment of working pressure between 2 psig and 15 psig.</p>
3.11	<p>Splitter/T-transformer and patch-panel. Refer annexure-I</p>	<p>(a) A 7-port rigid coaxial line (dia. 3/8") patch panel with T-splitter for half antenna operation is also to be quoted with their diagram and specs. (b) The necessary diagram for various inter-lock with transmitter is also to be provided.</p>
3.11	<p>Schematic diagram</p>	<p>A block schematic diagram with all the items like 7-port-patch panel, transformer, RF main feeder cables, antenna panels etc. should be attached with the offer. The detailed specs. of</p>

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		each item like T-transformer, splitters, power-dividers, antenna panels etc. should also be provided with the offer. A suggestive block diagram is attached in annexure-III.
3.12	Accessories	All accessories which are essential to complete the system should be quoted with offer. A suggestive list of accessories given below:- (a) 3/8" EIA Flange to non-flange adopter (b) Any other item to complete the system.

3.13 A suggestive list of bill of material in Annexure-II is provided which shall be supplied as "one antenna system" by the firm. However, firm is to attached its final Bill of Material without price for "One Antenna System".

2X20KW UHF Antenna System for Mahboobnagar

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General Instructions for the Tenderer to COMPLETE OFFER:

- 4.1 All the relevant technical pamphlets, data sheets drawings, block diagrams list of all items quoted with description of the functioning of the system should be attached with the offer, otherwise offer may not be considered for analysis.
- 4.2 The details of past supply for the similar Antenna system should be provided in the following format:

Name and Postal Address of the Firm	Name of the contact person with E mail id	Telephone and Fax Nos.	Make and Model of the Antenna System supplied	Power capacity of the similar antenna system supplied	Quantity supplied

- 4.3. The set of essential spares, modules, tool and other necessary equipment should be quoted separately with the offer.
- 4.4. A detailed installation, operation and maintenance manuals along with relevant drawings pamphlets, data sheet etc should be attached with the offer for analyzing the technical requirement of Doordarshan. The offer without operation and maintenance manual will not be considered for analysis and may be rejected with out making reference to the firm.
- 4.5 The Antenna system manufacturer /bidder must have his local office / representative in India. The name, contacts, address, of local office / representative along with manufacturer's authority letter in favour of local representative must be given with the offer. The local office / representative in India will be nodal point for resolving after sales issues. In case any module/part of the antenna system requires repairs at factory, the same would be handed over to local office / representative in India, who would arrange repairs locally or export the defective modules/part to its O.E.M. and arrange its repair etc. The repaired item, will have to be delivered by the local representative at transmitter site in India.
- 4.6. **SPARES:** Essential spares required for the maintenance of the antenna system should also be quoted separately. The value of such spares should not exceed 5% of the total cost of the equipment. Doordarshan shall exercise option to order spares separately. The spare cost shall not be accounted for deciding the offer of the main antenna system. The manufacture shall also give a certificate attached with the offer to supply maintenance support and all spare during the life time of the Antenna. The life of the Antenna system should be certified by the manufacturer. This is an essential requirement. The cost of spare shall not be taken into account for ascertaining the lowest tenderer.
- 4.7 **ACCESSORIES:** All essential accessories required that shall complete the system should be included in the offer.
- 4.8 **PRICE:** The tenderer along with the offer must quote item wise price of all the items, which constitute the system, separately. Prices of all the optional items should also be included separately. A copy of the "price bid" showing/provided for all items of

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bill of material without showing the prices must be attached with the "Technical bid". The B.O.M. of Technical bid shall be without price. All items/ equipment requirement for the completeness of the Antenna System should be quoted and provided with the offer.

4.9. TECHNICAL LITERATURE:

- (a) Two sets of technical data sheets of the equipment offered, Installation manuals, operational and service manual shall be supplied with the each set of antenna system.
- (b) One set of above shall be supplied to this Directorate along with the tender for the purpose of evaluation.
- (c) The compliance of technical parameters of this specification should be supported by the figures in the published data sheets manuals etc of the antenna system.
- (d) For any bought out item quoted the original pamphlets, data sheets, of the manufacturer should be provided.

4.10. INSPECTION:

- (a) All the equipment to be supplied against the supply order for this tender shall be subjected to inspection at New Delhi/ manufacturer's facility by Doordarshan at purchaser's cost.
- (b) The firm shall submit all the drawings, wiring/ connection diagrams etc. at the time of inspection. All technical equipment required for inspecting the system shall be provided by the Manufacturer to the inspector.
- (c) An acceptance test procedure for the Antenna system should be supplied by the firm one month in advance of the inspection of the system so that same procedure could be followed by D.D. inspector for acceptance of the system.
- (d) Theoretical calculations/ test result of the antenna system offered shall accompany the quotation. The customer has the right to verify and evaluate the claimed parameters of the system
- (e) All necessary metal parts of the antenna system should be at ground potential so that electric and lightning are discharged to earth.
- (f) The antenna system should be of highest broadcast quality standards, should be rugged in construction to withstand even the corrosive weather.

5.1. GUARANTEE:- The antenna system shall be guaranteed against any manufacturing defects for a period of two years from the date of supply. Any parts failing damaged during the guarantee period shall be repaired/ replaced free of charge by the supplier as per specification at the site.

5.2 The suggestive bill of material required for one Antenna System is provided at Annexure-I

5.3 The dimensions, weight, no of panels, typical layout of the system should be provided with the offer.

5.4 All items / equipments required for the completeness of the Antenna System should be quoted and provided with the offer.

5.5 Break-up of prices of all items/equipment should be provided..

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- 5.6 Theoretical calculation/test result of the antenna system offered shall attached with the offer. The customer has the right to verify and evaluate the claimed parameters of the system.
- 5.7 Special items and installation tools required for the system shall be quoted.
- 5.8 All metal parts of the antenna system should be at ground potential so that electric and lightening are discharged to earth.
- 5.9 Supervision in installation and commissioning of Antenna System as per specs at DD site should be quoted separately as an optional item.

6.0 COMPLIANCE:-

A point- by-point compliance statement for all the above paras including Annexures from the principal manufacturer duly signed in respect of all the points, sub-points and paras laid down in this specification from page 1 onwards is to be enclosed along with the offer. Mere signature on a copy of our specification shall not be accepted as a compliance statement. Compliance statement in the format as indicated below only shall be accepted. The manufacturer should also record the performance figures of the equipment offered in the quote for which the compliance statement is enclosed. The figures so mentioned should be supported by highlighted record of these in the technical literature/data sheets enclosed with the tender. The data sheets should be included as desired in this specification. Any deviation from the specification detailed in the compliance statement is to be highlighted separately. Offers without the proper & duly completed compliance statement are likely to be rejected with the sole responsibility of tenderer and no further claim/correspondence will be entertained. All the pages of technical bid must be numbered. **Page no. of location of data sheet should be given in page no. column.**

The compliance statement from the manufacturer duly signed on its letterhead is to be provided in the following format:-

Para No. Of DD Spec.	DD spec value & Details	Quoted items value and details, as per the data sheet of offered system.	The page no. of the offer, where the information is available.	Compliance OR Deviation


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Annexure-II

SUGGESTIVE BILL OF MATERIAL

(Bill of material must be in the format given below for technical and commercial quotes).

S.No	Name of Item	Make & Model	Quantity
1.	<p>1.1 2x20 kW of peak visual and 2x2kW of Aural power, panel type Band IV&V,UHF TV transmitting antenna system complete of specified power capacity.</p> <p>1.2 This panel type antenna system should be supplied with support Structure and each panel should be covered with radome.</p> <p>1.3 A mechanical structure alongwith drawing showing all dimensions in mm for the interface between the top of square Tower of size 640 mm x 640 mm is to be attached with the Offer. This is a mandatory requirement.</p>		One set
2.	Installation, Maintenance & Technical Manuals(Two set for consignee and one set at Directorate)		Three Set
3.	Automatic dehydrator(the data sheet should be attached)		One No.
4.	7-Port rigid line U-link patch panel with broad band T-transformer.(Inputs and outputs unflanged, 3 1/8" dia.)		One No.
5.	All hardware items for fixing the antenna on tower, including sealing compound		One set
6.	3 1/8" EIA Flange to non flange adopter		Two Nos
7.	Any other item for the completeness of antenna system		

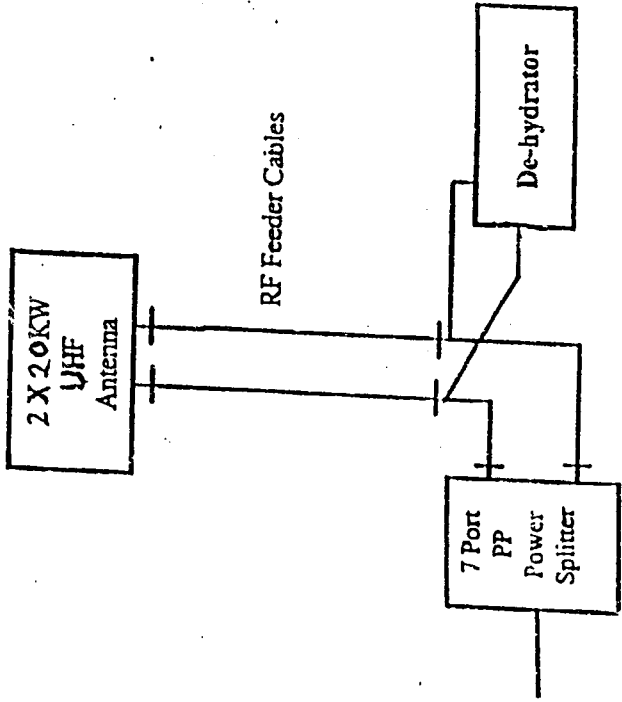
Optional: Training fee only for imparting training on Antenna equipment, installation, measurement etc. to two Doordarshan engineers at manufacturer site for 5 working days. All expenditures (To & Fro fare, boarding & lodging etc.) on Doordarshan engineers will be borne by concerned office/Kendra.

2X20KW UHF Antenna System for Mahboobnagar

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Suggestive 2X20KV VHF TV Transmitter Antenna System Block Diagram (Indicative only)

ANNEXURE III

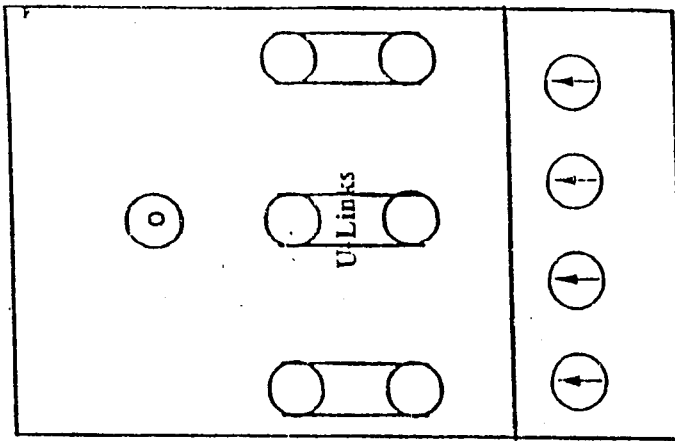
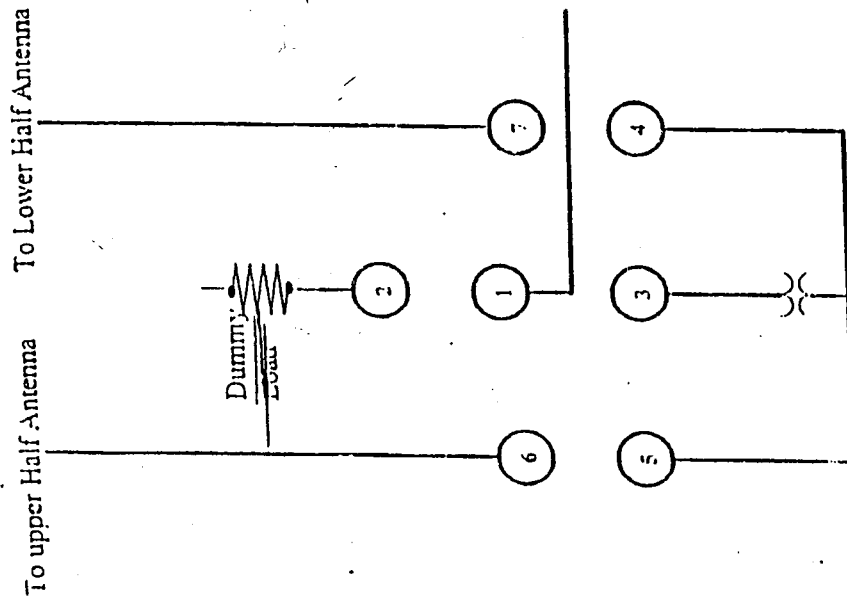


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Suggestive Diagram of 7 port patch panel



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