प्रसार भारती/ PRASAR BHARATI
भारत का लोक सेवा प्रसारक/ INDIA'S NATIONAL PUBLIC SERVICE BROADCASTER
आकाशवाणी महा निदेशालय /DIRECTORATE GENERAL: ALL INDIA RADIO
योजना और विकास एकक आकाशवाणी भवन, संसद मार्ग, नई दिल्ली-110001
P & D UNIT, AKASHVANI BHAWAN, SANSAD MARG, NEW DELHI-110001
[क्रय अनुभाग /PURCHASE SECTION]

No. 01(34)11/NIT-32/2019-D(P)/ 251

Dated: 26.06.2019

Notice inviting e-Tender No. 32/2019

E-tenders are invited for and on behalf of Director General, All India Radio under two bid systems for Supply/SITC/SETC of the following Equipments from firms registered with DGS&D/NSIC and from reputed manufacturers/authorized agents and stockiest dealing with the equipments as detailed below:

Sl. No.	Tender Ref. no.	Description of Stores	Qty.	Estimated Cost of work/ Procurement (Rs. in Lakh)	EMD (Rs. In Lakh)	Tender Submission Date/Time (online)	Tender Opening Date/Time (Online)
1	No. 12(30)01 /2019-D(P)/ 658/ D(P-S) Cell	Supply, Erection, Testing and Commissioning (SETC) of FM Combiners & RF Cables etc. at Jaipur	(1) Place	368.79	7.38	08.08.2019 (02:30 PM)	08.08.2019 (03:00 PM)
2	No.12(32)01/FM Antenna / 2019/D(P)/660 /D(P-S) Cell	Supply of 2 Bay Vertically Polarized Side Mount VHF FM Antenna.	(100) Nos.	230.67	4.62	08.08.2019 (02:30 PM)	08.08.2019 (03:00 PM)
3	No. 12(33)10 /Processor/ 2019/D(P)/ 661/D(P-S) Cell	Supply of Stereo FM Digital Audio Broadcast Processor.	(32) Nos.	139.27	2.79	13.08.2019 (02:30 PM)	13.08.2019 (03:00 PM)
4	No. 12(35)01 /RF Cable/ 2019/D(P)/ 662/D(P-S) Cell	Supply of 7/8" & 3/8" RF Coaxial Foam Dielectric Cable and Accessories (for VHF FM Transmitter Setup)	(100) Places	60.00	1.20	13.08.2019 (02:30 PM)	13.08.2019 (03:00 PM)
5	No. 12(36)01/ FMTr/ 2019/ D(P)/ 663/ D(P-S) Cell	Supply of 100 W Digital Compatible VHF FM Solid-State MOSFET Technology Based Broadcast Transmitter in (1+1) configuration alongwith pre-wired Rack including Programme Input & Monitoring equipments and other associated equipments/ items	(100) Places	1280.00	25.60	20.08.2019 (02:30 PM)	20.08.2019 (03:00 PM)

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NOTE:

i. The bid forms, General Instructions to Bidders and other details including amendments/ changes can be viewed/ downloaded from the website www.tenderwizard.com/PB.

ii. Tender notice is also available on the AIR website www.allindiaradio.gov.in (using the link: Tender) and CPP PORTAL on website http://eprocure.gov.in.

26/6/2019

(हृदेश कुमार/ Hirdesh Kumar)
उप निदेशक (अभि.)/ Dy. Director (Engg.)
कृते महा निदेशक आकाशवाणी/for Director General: All India Radio
E-mail: depurchase@prasarbharati.gov.in
Tele :-011-2342 1040

PRASAR BHARATI
(India's Public Service Broadcaster)
DIRECTORATE GENERAL: ALL INDIA RADIO
(PLANNING & DEVELOPMENT UNIT)
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Specification for Supply, Erection, Testing and Commissioning (SETC) of FM Combiners & RF cables etc. at Jaipur.

CONTENTS

A. ESSENTIAL REQUIREMENT FOR THE TENDER:

1. (i) The tenderer should submit Schedule of Requirements/Materials for SETC without *price in the same format as given in Section-5.0* of 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 of supply, failing which, the tender shall be considered incomplete and is liable to be rejected.
2. Each statement of the technical 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, failing which, the tender shall be considered incomplete and is liable to be rejected.
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.

(Y P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

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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 tenderers				
B. Essential eligibility criteria for tenderer				
Section-1.0 Clause wise				
Section-2.0 Clause wise				
Section-3.0 Clause wise				
Section-4.0 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 complete technical specifications (Section wise & Clause wise) compliance statement along with Schedule of Requirements/Materials (un-priced) must be signed & stamped on each page by the respective Original Equipment Manufacturer (OEM) in the tender document including the clarifications, if any, asked by AIR, failing which the tender shall be considered incomplete and is liable to be rejected.
   In case tender offer is from other than the Original Equipment Manufacturer, the tenderer must also sign & stamp each page of the complete Technical specifications compliance statement (Section wise & Clause wise) including the clarifications, if any, asked by AIR, failing which the tender shall be considered incomplete and is liable to be rejected. The OEM & tenderer should mention their names in CAPITAL LETTERS & designation of the signatories, full address with pin code, phone number, fax number, e-mail addresses 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 letter head pad duly signed & stamped on each page. In case tender offer is from other than the Original Equipment Manufacturer, the tenderer must also give guarantee on their letter head pad duly signed & stamped on each page, failing which the tender shall be considered incomplete and is liable to be rejected without any notice/back reference. Guarantee shall be as per the format given in clause 13 of Section-2.0
8. In case tender offer is from other than the Original Equipment Manufacturer, the tenderer should also furnish a certificate from the OEM that the tenderer can quote items of the OEM directly, failing which the tender shall be considered incomplete and is liable to be rejected without any notice/back reference.
9. 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.
10. Any change/modifications in the AIR technical specifications format, language, technical parameters or of any other nature including the deletion of clause, words, lines in the technical compliance statement by the OEM/ tenderer will not be acceptable to AIR and the tender is liable to be rejected.

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

(Y P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

B. ESSENTIAL ELIGIBILITY CRITERIA FOR TENDERER:

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

(b) (i) The OEM of the FM Combiner must have an experience of manufacturing and supplying FM Combiners for at least last 10 years. Documentary evidence to support this must be provided.

(ii) The OEM should have supplied FM Combiners to reputed/public broadcasters. The OEM must provide the details of past supply record **(in the format given below)** for at least 10 Nos. of such offered FM Combiners of power ratings ≥ 120kW, supplied during last five years ending last day of the month previous to the one in which the tender is invited.

Order No. with date, reference	FM Combiner Type, Model with Output Power rating	Qty.	Name of the broadcaster with full postal address including e-mail address to whom FM Combiner was supplied, for getting feedback on FM Combiner performance	Remarks
(1)	(2)	(3)	(4)	(5)

(iii) All India Radio reserves the right to get performance feedback of the FM Combiners from any of the above broadcasters named by the tenderer/OEM.

(iv) Copies of orders for supply and Completion certificates/delivery challans/invoice of at least 5 Nos., out of the 10 Nos. of FM Combiners submitted by the tenderer in above format, are also to be enclosed by the tenderer.

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

(d) The OEM of the offered FM Combiners must have his local office/authorized representative/dealer in India for after sales support. **A certificate as per Annexure-II** 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.

(Y.P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

SECTION-1.0

TECHNICAL REQUIREMENTS

S. No.	Project	FM Combiner with Qty.	RF coaxial copper rigid lines & accessories	RF coaxial air dielectric Cable & accessories	Dehydrator/ Pressurising Unit	Antenna Switch frame/Patch Panel
1.	Jaipur	Yes (2 Nos.)	Yes	Yes (2 Nos.)	Yes (2 Nos.)	Yes

SECTION-2.0

GENERAL SPECIFICATIONS

Note : Please refer tender documents for general terms and conditions of contract for SETC works 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**.

All equipment and items of SETC as per AIR specification shall be used for round the clock operation.

1.0 SCOPE:

Supply, Erection, Testing and Commissioning (SETC) of FM Combiner, RF coaxial copper rigid lines, RF Coaxial cable, Dehydrator/Pressurising Unit, Antenna Switch frame/Patch Panel and accessories as per AIR specification at Jaipur.

The broad scope of above Supply, Erection, Testing and Commissioning (SETC) are as follows:

1.1 FM Combiner as per specification.
1.2 RF coaxial copper rigid lines as per specification.
1.3 RF coaxial cable & Dehydrator/Pressurizing Unit as per specification.
1.4 Antenna Switch Frame/Patch Panel as per specification.
1.5 Horizontal Cable tray as per specification.

2.0 For completion of the SETC, all 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 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 AIR. The full technical details and technical literature/pamphlets shall be submitted by the tenderer.

3.0 INSPECTION:

a. Detailed inspection of complete FM Combiner system will be carried out at Manufacturer's works by **two engineers** of All India Radio as per details given in Annexure-I.
b. Call for Pre-dispatch Inspection (PDI) of all FM Combiners at OEM's Works is to be given by the tenderer to All India Radio at least **8 weeks** in advance. Inspection period shall be two working days for each FM Combiner system. Testing/measurements reports as per approved ATP must be submitted to All India Radio along with the call for inspection of FM Combiners for analyzing etc.
c. For AIR inspecting engineers, expenses towards to and fro air journey, boarding, lodging etc. will

(Y.P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

be borne by All India Radio.

d. The complete Acceptance Test Procedure/Protocol (ATP) will be prepared by the OEM of the FM Combiner and other equipment/items as per Section-5.0 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. AIR has the right to include other technical parameters in ATP submitted by OEM within the ambit of specification of the product offered.

e. All other associated equipment, items and accessories i.e. RF coaxial copper rigid line, RF coaxial air dielectric cable, Dehydrator/Pressurising Unit, Antenna Switch Frame/patch Panel, Horizontal Cable tray etc. will be accepted on the basis of OEM's test certificates (as per AIR specifications) duly stamped and signed by respective OEM on the letterhead of the OEM, failing which, test certificates will be considered incomplete and equipment offered by the firm is liable to be rejected.

4.0 SUBMISSION OF DETAILED DESIGN & DRAWING DOCUMENTS WITHIN ONE MONTH OF ISSUE OF ACCEPTANCE OF TENDER:

The successful tenderer will perform site visit(s) alongwith the officer from Zonal Office and prepare two(2) Sets of neatly drawn colour printed detailed design & drawing documents regarding layout/placements of FM combiner(s), Horizontal cable tray, RF coaxial air dielectric cable(s), Dehydrator/Pressurising Unit, RF coaxial copper rigid lines, Antenna switch frame/Patch panel etc. in respect of complete setup at site and shall submit to DDG (E-FM), P&D Unit, DG: AIR, duly verified & signed by concerned Zonal Office, for approval within one month of issue of Acceptance of Tender.

The tenderer shall supply one original colour printed set of approved design and drawing documents of complete setup along with soft copy on CD as per the distribution given below:

(i) DDG (E)/Director (Engg.)/Installation officer of concerned site of All India Radio
(ii) ADG (E-NZ)
(iii) DDG (E-FM), P&D Unit, DG, AIR, New Delhi **i.e. in brief, total 3 Sets.**

5.0 All the necessary measuring equipments and tools etc. required for completion of Erection, Testing & Commissioning of above FM Combiners will be arranged by the tenderer during SETC and no additional amount shall be paid on this account.

6.0 Erection, Testing and Commissioning (ETC) of above "set-up" as per AIR specification shall be done under the supervision of qualified engineer of OEM duly trained and certified by OEM of FM Combiner.

7.0 DELIVERY PERIOD:

1. For Indian Bidders:
Supply, Erection, Testing & Commissioning (SETC) will have to be completed within 5 months from the date of Acceptance of Tender or 5 months from the date of the Decision Letter from WPC (wherever is required) in respect of RF equipment, provided by AIR, whichever is later. The tenderer shall complete SETC within 5 MONTHS.

2. For Foreign Bidders:
Supply, Erection, Testing & Commissioning (SETC) will have to be completed within 5 months from the date of Opening of Letter of Credit (LC). The tenderer shall complete SETC within 5 MONTHS.

(Y P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

However, the Payment for the tender shall be linked to various milestones of SETC work as detailed below:

Lot-I:

S. No.	Milestone	Payment
1	On receipt of Complete Equipment as per Schedule of Requirements/Materials for SETC in good condition at site	70% of Equipment Cost
2	After successful completion of Erection, Testing & Commissioning at site	30% of Equipment cost +100% of ETC Cost

8.0 LANGUAGE/UNITS:

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

9.0 INFORMATION TO BE SUPPLIED WITH THE TENDER:

(i) The complete technical specifications (Section wise & Clause wise) compliance statement alongwith Schedule of Requirements/Materials (un-priced) duly signed & stamped on each page by the respective Original Equipment Manufacturer (OEM) and countersigned by the tenderer as per the format given above in clause A (3), to assess the full merit of the offer, without which the tender offer will be considered incomplete and is liable for rejection.

(ii) Complete printed technical literature/data sheet/schematic drawings/detailed information including technical manual of FM Combiner and associated equipments/items as per Section-5.0 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) Detailed Schedule of Requirements/Materials offered for SETC of the FM Combiner, associated equipments & accessories should be in conformity with Section-5.0 without any change in the format without price, failing which, the tender will be considered incomplete and is liable for rejection. The tenderer must quote all items.

(iv) Descriptive information and complete details of each equipment offered shall be given by the tenderer.

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

(vi) A copy of the Technical Manual must be enclosed with technical bid for assessing the complete FM Combiner system. The Technical Manual must include at least the details given below:

(a) General description of the offered FM Combiner, block diagram/schematic drawings etc.

(b) A suggestive drawing/ floor equipment layout plan with dimensions in metres for installation of the FM Combiner system with all allied equipment.

(c) Diagrams showing the isometric view of FM Combiner and allied equipment with dimensions in metres.

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

(e) The procedure of frequency tuning of FM Combiner should be described in detail with practical examples.

(f) Photograph of the FM Combiner showing Front, Rear, Side & Top view of the FM Combiner.

(g) **All *Do's and Don'ts* which are essential for safe Installation, Operation & Maintenance of the FM Combiner.**

(V.P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

10.0 INFORMATION TO PRECEDE DESPATCH OF EQUIPMENT:
Following information should be supplied to The DDG (E-FM), P & D Unit, DG: AIR and the consignee prior to dispatch of equipment:
(a) Detailed list of equipments under dispatch.
(b) Photograph showing location of various units/subunits with item numbers marked thereon.

11.0 INFORMATION TO BE SUPPLIED BY THE TENDERER WITHIN ONE MONTH AFTER ISSUE OF ACCEPTANCE OF TENDER:
One set of Technical Manuals (Installation, Testing, Commissioning, Operation & Maintenance, including theory of operation and fault diagnosis) **COLOUR** printed and duly bound for FM Combiner along with associated equipment, items & accessories along with soft copy on CD must be supplied to "DDG (E-FM), P & D Unit, DG: AIR, New Delhi-110001".

12.0 INSURANCE AND MARINE RISKS ETC.
Please refer to commercial terms.

13.0 GUARANTEE: Tenderer shall submit with his tender an undertaking to accept the following guarantees:
[This Guarantee clause is applicable to all the equipments/items mentioned in Schedule of Requirements/Materials (un-priced)].

(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 7 days (from the date of first intimation to OEM/tenderer) at tenderer's expense any component which becomes defective under normal operating conditions for 30 months from the date of commissioning by the tenderer at site. If the tenderer failed to rectify the fault within the stipulated period of 7 days, the guarantee period 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 supply, at rates at which these are being supplied by the firm 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 FM Combiner, the firm shall intimate All India Radio in advance to enable the latter to stock the critical items.

14.0 MAINTENANCE SUPPORT AND SPARES:
(a) The minimum recommended essential spares (like adaptor, terminating loads or any other critical spares suggested by the OEM), required to maintain the continued service of the FM Combiner in a reliable manner, shall be quoted separately by the tenderer.
(b) The minimum recommended essential spares may be based on predicted rate of failure.
(c) In case, the tenderer quotes the optional items as 'a set', the details of the components/items offered in the 'set' must be spelt out clearly including their Make & Model and quantity.

15.0 ESSENTIAL REQUIREMENT FOR LOCAL OFFICE/AUTHORIZED REPRESENTATIVE/ DEALER:
(a) The OEM should have complete setup for maintenance/repair of the FM Combiners in India, either of its own or through local office/authorized representative/dealer.

(Y P Singh, AE) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

(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 FM Combiners or other equipment requiring repairs will be repaired at site. 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 FM Combiners after the completion of guarantee period, shall also be provided by the respective OEM of the FM Combiners and other associated equipments through their local offices/representatives/dealers in India.

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

(e) At the discretion of AIR, AIR representative(s) 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.

16.0 After completion of work, the tenderer shall remove dust, dirt, debris and leave the building/premises in a clean condition.

17.1 The tenderer shall make his own arrangements for providing accommodation for his workmen at site along with storage of equipment/material including the safe custody at site.

17.2 The tenderer should confirm 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.

17.3 The tenderer shall indemnify AIR and his 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.

17.4 The successful tenderer should indemnify and hold harmless AIR against all claims in respect of damages to buildings, property, articles, situated nearby not belonging to the AIR and public personnel arising from the erection, testing & commissioning (as per SETC specification) in the course of such erection and throughout the guarantee period.

17.5 The successful tenderer should indemnify and hold harmless AIR against claims in respect of injury to any person howsoever arising from the erection (as per SETC specification) in the course of such erection and throughout the guarantee period.

18.0 HANDING OVER OF DETAILED MANUALS:

Two sets of Technical Manuals for FM Combiner, associated equipments and all other items & accessories, **colour printed** & duly bound copies along with Inspection report, OEM test certificate of associated equipments and soft copies on CD are to be supplied to consignee.

The above Technical Manual and soft copies are required to be sent (irrespective of number of FM Combiner ordered) to the officers/offices as per Section-5.0.

19.0 SUPPLY, ERECTION, TESTING AND COMMISSIONING:

The SETC of FM Combiner, RF coaxial copper rigid lines, RF coaxial air dielectric cable, Dehydrator/Pressurising Unit, Antenna switch frame/patch panel, Horizontal Cable tray & accessories shall be undertaken by the tenderer in accordance with ATP and in conformity with the AIR Specification.

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19.1 SUPPLY: Supply of FM Combiner, RF coaxial copper rigid lines, RF coaxial air dielectric cables, Dehydrator/Pressurising Unit, Antenna switch frame/patch panel & accessories shall be as per Section-5.1 of AIR Specification.

19.2 ERECTION: Erection of FM Combiners & accessories (as per Section-5.2) at site will be done in the transmitter complex as per layout plan approved by AIR.

19.3 TESTING: After the erection, FM Combiner and associated equipment are to be tested, making all the initial checks including physical inspection and continuity checks of wiring/cabling etc. as per drawings. The testing will be undertaken by the tenderer as per standard practice and in conformity with ATP/SAT. The testing in a sequential manner in respect of all the equipments will be taken up with RF power, only after satisfying that erection is fit for RF Power application.

19.4 COMMISSIONING AT SITE: After successful completion of erection of FM Combiner, RF coaxial copper rigid lines, RF coaxial air dielectric cables, Dehydrator/Pressurising Unit, Antenna switch frame/patch panel & accessories, final performance measurements of the FM Combiner and accessories as per ATP/SAT is required to be taken at site along with graphical printouts of the measurements like VSWR/return-loss, isolation etc. at operating frequency before connecting the FM combiner in actual circuit for testing & commissioning.

19.5 On acceptance of the tender, the name of the accreditated 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 AIR.

20.0 ENVIRONMENTAL CONDITIONS FOR FM COMBINER AND ALL ASSOCIATED EQUIPMENTS:

(i)	Operating temperature range	0 °C to 45 °C
(ii)	Relative Humidity	95% non –condensing
(iii)	Working altitude	Up to 1000 meters AMSL

21.0 POWER SUPPLY FOR IN DOOR EQUIPMENT:

(i)	Operating voltage	AC Single Phase : 230 Volts ± 10 %
(ii)	Frequency	50 Hz ± 4%

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SECTION-3.0

TECHNICAL SPECIFICATIONS

3.1 SPECIFICATION OF FM COMBINER:

Exact frequency of the transmitter for feeding to Narrow Band Input (NB) will be intimated at the time of placement of order.

Introduction:

1. FM Combiners are required by AIR for combining the power of VHF FM Transmitters operating on different frequencies for feeding into a single Antenna.
2. The FM Combiners shall be complete with reject loads, by-pass patch panel, metering panel, interlock circuit, LED mimic diagram and all connection with RF coaxial copper rigid lines etc. mounted on a **MS channel** frame as per schematic diagram, drawing No TM-16747. All three 4-port by-pass patch panel will be of size 6-1/8".
3. By-passing the Combiner: In case of malfunctioning of the FM combiner or other requirement such as maintenance/retuning of the FM Combiner, the provision should exist for by-passing the FM Combiner i.e. provision for connecting the WB input port directly to WB output port as per schematic diagram, drawing No TM-16623/1.This feature is must. Full details including Engineering Drawings are to be given with the tender.
4. The FM Combiner shall be of compact, rugged design & with minimum floor area requirements. It should have natural ventilation cooling. FM Combiner modules should be mounted on sturdy, unitized frames.
5. The FM Combiner shall be of balanced Band Pass Constant Impedance design. Filter cavities should be constructed of high grade Aluminum & inner probes inside cavities should be constructed of high grade silver coated copper/silver coated aluminum. The tunable probes should be attached to the cavity top with temperature compensated invar rods.
6. The individual filter should be tunable in the frequency range and tuning control should be lockable. It should be possible to easily retune the FM Combiner at site to a new frequency within the VHF FM Band i.e. 88 MHz to 108 MHz.
   The cavity plunger position vis-à-vis frequency graph is to be provided. Probe will be given graduation marking.
   Full details including illustration, schematic diagrams are to be given with Tender.

7. **TECHNICAL SPECIFICATION:**

S. No.	Technical Parameters	Technical Specifications
(i)	Frequency Range	88 MHz – 108 MHz
(ii)	Minimum Channel Separation	800 kHz
(iii)	Minimum Number of poles(Cavities)	3 Nos.
(iv)	Number of inputs/outputs at each combiner	
	(a). Narrow Band input for transmitter	1No
	(b). Wide Band input	1 No To be provided (it should be possible to put through any of the two transmitters in case of failure of any input module of FM Combiners).
	(c). Combined Wide Band Output	1 No.
(x)	Impedance (All input & output Ports)	50 Ω ± 0.5 Ω

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(vi)	**Power Ratings**		
	FM Combiner-I		
	(a). Narrow Band Input Power		25 kW
	(b). Wide Band Input Power		120 kW
	(b). Combined Wide Band Output Power		120 kW
	FM Combiner-II		
	(a). Narrow Band Input Power		25 kW
	(b). Wide Band Input Power		120 kW
	(c). Combined Wide Band Output Power		120 kW
(vii)	Technical specification of FM Combiner-I & FM Combiner-II at patch panel inputs and outputs.		
a.	**Narrow Band Input:**		
	(a) Insertion Loss, Centre frequency ± 150 kHz		≤ 0.3 dB
	(b) Frequency Response, Centre frequency ± 150 kHz		Within ± 0.1 dB
	(c) Group Delay variation over channel Bandwidth, Centre frequency ± 100 kHz		≤ ± 25 n sec.
	(d) Return Loss for Centre frequency ± 150 kHz		Better than 26 dB
b.	**Isolation Between:**		
	(i) Narrow Band to Wide Band, Centre frequency ± 150 kHz		Better than 32 dB
	(ii) Wide Band to Narrow Band		Better than 50 dB
c.	**Wide Band Input:**		
	(a) Insertion Loss		≤ 0.1 dB
	(b) Return loss		Better than 26 dB
(viii)	Ventilation		Natural air ventilation
(ix)	Ambient Temperature		0°- 45°C
(x)	Humidity		95 %
(xi)	Connector size	FM Combiner-I	FM Combiner-II
	(a) Narrow Band input	3-1/8" EIA Unflanged male	3-1/8" EIA Unflanged male
	(b) Wide Band input	6-1/8" EIA Unflanged male*	6-1/8" EIA Unflanged male
	(c) Combined Wide Band Output	6-1/8" EIA Unflanged male	6-1/8" EIA Unflanged male

*Provide 6-1/8" to 4-1/2 Reducer for connecting 4-1/2" Rigid line"

8. MECHANICAL DATA:

(i)	Dimensions	Height (H)	≤ 2200 mm
		Width (W)	≤ 1700 mm
		Depth (D)	≤ 2300 mm
(ii)	Weight	To be given by the tenderer	

9. All necessary terminating loads should be included in the tender and their ratings should be indicated.
10. An interlock & mimic LED display system should be included. This should take care of patching arrangement of transmitters. Details should be given in the tender.

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11. Digital Metering arrangements for Forward & Reflected power measurement at each input port and output port of the Combiner shall be provided. Directional couplers (total 5 Nos.) used for power metering systems shall have directivity 30 dB or better. Full details should be supplied along with the tender.
12. Earthing work: Two independent earth systems will be provided by the tenderer/OEM as per Drawing No. TM 16599, at each place. The value of earth resistance of each system should be less than 1 Ω. Copper plate & copper strip used in earthing shall be of 99% purity.

3.2 RF COAXIAL COPPER RIGID LINES & ACCESSORIES FOR COMPLETENESS OF SYSTEM

Following are the Technical Specifications of RF coaxial copper rigid lines & associated accessories:

All RF coaxial copper rigid lines with associated accessories are to be offered as per details given SECTION-5.0. RF coaxial copper rigid lines and associated accessories should be of standard make. the technical specifications/parameters are to be supported with printed technical literature/data sheet from the OEM.

The tenderer is also required to submit certificates from recognized laboratory testifying composition of materials used for RF coaxial copper rigid lines and associated accessories.

Figures showing rigid lines accessories are also enclosed for reference.

Technical Specification of RF Coaxial Copper Rigid lines & accessories:

S. No.	Technical Parameters	Technical Specifications		
(i)	Size	3-1/8"	4-1/2"	6-1/8"
(ii)	Attenuation @100 MHz at 20°C	≤ 0.35 dB/100M	≤ 0.25 dB/100M	≤ 0.1 dB/100M
(iii)	Average power handling capacity at ambient temperature 40°C @ 108 MHz	≥ 45 kW	≥ 75 kW	≥ 160 kW
(iv)	Frequency Range	88 MHz-108 MHz	88 MHz-108 MHz	88 MHz-108 MHz
(v)	Impedance	50 Ω	50 Ω	50 Ω
(vi)	VSWR	< 1.05:1.0	< 1.05:1.0	< 1.05:1.0
(vii)	Material for Outer & Inner Conductor of Rigid lines	High conductivity copper conforming to 95% IACS/99% purity	High conductivity copper conforming to 95% IACS/99% purity	High conductivity copper conforming to 95% IACS/99% purity
(viii)	Material for Outer Conductor for Elbows & Adapters	Aluminium/ Aluminium alloy	Aluminium/ Aluminium alloy	Aluminium/ Aluminium alloy
(ix)	Material for Inner Conductor for Elbows, Adapters and all the entire support inner bullets	Silver-plated brass/ Silver-plated Aluminium	Silver-plated brass/ Silver-plated Aluminium	Silver-plated brass/ Silver-plated Aluminium
(x)	Material for all the support insulators	High quality Virgin Teflon(PTFE)	High quality Virgin Teflon(PTFE)	High quality Virgin Teflon(PTFE)

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3.3 RF CO-AXIAL AIR DIELECTRIC CABLES & DEHYDRATOR/PRESSURISING UNIT

Technical Specification of RF Co-axial air dielectric cables & Dehydrator/Pressurising Unit

S .No.	Technical parameter	Technical specification
(i)	Size	5" or 5-1/2"
(ii)	Average Power Rating of RF Coaxial Air Dielectric Cable(Corrugated Copper, PE Jacket, PE/PP spiral spacer) at standard conditions VSWR 1.0, ambient temperature 40° C (@ 108 MHz)	≥ 120 kW
(iii)	Attenuation of each RF Coaxial Air Dielectric Cable (Corrugated Copper, PE Jacket, PE/PP spiral spacer) at standard conditions VSWR 1.0, ambient temperature 20° C (@ 108 MHz in dB/100 M)	≤ 0.30
(iv)	Frequency Range	88 MHz-108 MHz
(v)	Impedance	50 Ω ± 0.5

The RF Coaxial Air Dielectric Cable shall be as per AIR Specification, failing which, tender will be considered incomplete and is liable to be rejected.
The RF Coaxial Air Dielectric Cable shall be supplied as per the details given below:

5" or 5-1/2" - 2 Nos.
One RF Coaxial Air Dielectric Cable shall be supplied with 6-1/8" EIA flange Gas Barrier Connector (with gas inlet) fitted at both end of the cable alongwith 'O' rings, nuts, bolts & washers, silicon grease etc and other one shall be supplied with 4-1/2" EIA flange Gas Barrier Connector (with gas inlet) fitted at both end of the cable alongwith 'O' rings, nuts, bolts & washers, silicon grease etc.
All following accessories associated with RF coaxial air dielectric cable are to be provided:

(i) Hoisting stockings
(ii) Earthing kits
(iii) Wall gland
(iv) Cable Clamps (adjustable height) with nut, bolt & washer and associated accessories (Material for cable clamp should be hot dip galvanized/stainless steel with stainless steel screws, nuts, bolts & washers)
(v) 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).

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3.4 Dehydrator/Pressurising Unit with tubing & accessories for RF Co-axial air dielectric cable:

For pressurization of entire RF coaxial air dielectric cable

Qty -1 Set

S. No.	Technical Parameter	Technical Specification
1.	Dehydrator Type	Autometic
2.	Operating Voltage	Single Phase as per Section-1.0
3.	Output Capacity (SCFM)	> 0.3
4.	Ambient Humidity, % maximum	85% RH
5.	Output Pressure	adjustable from 2.0 psig to 8.0 psig
6.	Low Pressure Alarm	adjustable from 1.0 psig to 2.0 psig
7.	High Pressure Alarm	adjustable from 3.0 psig to 9.0 psig
8.	Output dew point	-40°C or better
9.	Operating temperature	0-40°C
10.	Power Fail Alarm	Loss of input power
11.	High Humidity Alarm	Details to be given by the tenderer
12.	Excess Run Alarm	Details to be given by the tenderer
13.	Dry air storage tank capacity, if applicable	Details to be given by the tenderer
14.	Max. active Power consumption	Details to be given by the tenderer
15.	Compressor Rating	Details to be given by the tenderer
16.	Protection against earth fault	Details to be given by the tenderer
17.	Protection against overload	Details to be given by the tenderer
18.	Dimensions, H × W × D, (mm)	Details to be given by the tenderer
19.	Net Weight (kg)	Details to be given by the tenderer
20.	In addition to above, Dehydrator should have communication over IP facility for alarms/status	Details to be given by the tenderer

3.5 ANTENNA SWITCH FRAME/PATCH PANEL:

The Antenna Switch Frame/Patch Panel with Mimic Diagram, Digital Power Meters {for Forward & Reflected Power readings at inputs and outputs ports}shall have the provision for connecting the Combined Transmitters Output Power to either a split Antenna System or complete Antenna through manual patching facilities.

3.5.1 Frequency Range: 88 MHz-108 MHz

3.5.2 Other Technical Details:

S. No.	Name of Site	No. of Ports and U-Links	VSWR	Insertion Loss @ 108 MHz	Average Power Handling Capacity	Input Connector	Output Connector
1.	Jaipur	6 Ports & 3 U-Links	< 1.05	< 0.1 dB	160 kW	6-1/8" EIA	2×6-1/8"EIA

3.5.3 Mechanical Details: Dimensions and weight to be given by the tenderer.

3.5.4 Provision to connect with the transmitter interlocks should be provided.

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3.5.5 Technical data/details: The following technical data/details are to be provided by the tenderer to assess the full merit of the offer without which tender will be considered incomplete & is liable to be rejected. The tenderer should make a detailed offer.

(i) The Antenna Switch Frame /Patch Panel shall be designed to connect combined RF output power of FM Transmitters to split antenna system for equal power outputs to each upper and lower half antenna.

(ii) Manual patching facilities for use during maintenance or emergency conditions shall be provided by the tenderer. The Patch Panel shall also have arrangement for directly connecting the transmitters to upper and lower half of antenna.

(iii)**Power Monitoring Unit with meter:** Antenna Switch Frame/Patch Panel Power Meter shall have the provision for Forward & Reflected Power Monitoring Unit with meter at inputs and outputs ports i.e. separate Power Monitoring Unit with meters at the input and at both the output ports individually. The accuracy of the power meters should be better than ± 4%. Directional couplers used for power metering systems shall have directivity 30 dB or better. The metering details should be clearly shown as above in the technical details.

(iv) VSWR/Return loss graphs for Antenna Switch Frame/ Patch Panel shall be submitted by the tenderer for entire frequency range (88 MHz-108 MHz).

(v) All the U links of Patch panel should be provided with quick release type arrangement for easy operation and should meet the following criteria:

a) With interlocking switches (minimum 4)
b) No tools shall be required and the operation shall be possible by use of normal hand power and not muscle power.
c) To complete switching operation, involving movement of 2 or more U-link, an engineer should be able to perform the process in maximum 15 seconds.

3.6 RF Cable Tray:

Horizontal Cable tray as per drawing No. TM-14453/3 to support RF Coaxial Cables from AIR FM building to Pvt. FM Broadcaster building shall also be provided by the tenderer.

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ANNEXURE-I

SECTION-4.0

INSPECTION DETAILS

The inspection for acceptance of the Complete FM Combiner system will be carried out at the Manufacturer's 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. Complete details and specifications of the FM Combiner system will be checked and all parameter values will be measured.

All the spares ordered as per AT will be tested in actual circuit at Manufacturer's Works by Engineers of AIR.

Testing/measurements including operational & functional checking of all the FM Combiner shall be carried out at three different frequencies in addition to operating frequency of the transmitter in the VHF Band i.e. 88 MHz to 108 MHz as per approved ATP.

Tenderer shall arrange for the photographs of Complete FM Combiner system which will be attached with the ATP/Inspection report.

Exhaustive checking and measurements will be carried out so as to completely check the compliance of the FM Combiner as per AIR specifications.

It is mandatory that all these testing/measurements of FM Combiner System as per parameters in Section-3.0 at three frequencies in addition to operating frequency of the transmitter in the VHF band i.e. 88 MHz to 108 MHz, are carried out well in advance. These must be submitted to All India Radio along with the call for inspection of FM Combiners well in advance for analyzing etc. These measurement details, graphical printout, notes and figures must be available at the factory at the time of inspection.

All other associated equipments, items and accessories i.e. RF coaxial copper rigid lines, RF coaxial air dielectric cables, Dehydrator/Pressurising Unit, Antenna Switch Frame/Patch Panel etc. will be accepted on the basis of OEM test certificates (as per AIR specifications) duly stamped and signed by respective OEM on the letterhead of the OEM, failing which, test certificates will be considered incomplete and equipment offered by the firm is liable to be rejected. OEM test certificates are also to be submitted by the tenderer to All India Radio before giving call for inspection for analyzing etc. These OEM test certificates must also be available at the time of inspection.

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SECTION-5.0

SCHEDULE OF SUPPLY, ERECTION, TESTING & COMMISSIONING OF FM COMBINERS AND ACCESSORIES AT JAIPUR

SECTION-5.1 SCHEDULE OF SUPPLY FOR FM COMBINERS AND ACCESSORIES

S. No.	DESCRIPTION	Make	Model	Qty.
1	Supply of FM Combiner complete as per AIR Specification along with: (i) All the necessary hardware items/components required for frequency change/tuning in complete VHF band i.e. 88 MHz to 108 MHz. (ii) Terminating loads – 2 Nos. for each combiner (total 4 Nos.) (iii) All interlocks & mimic LED displays. (iv) Metering arrangements for forward & reflected power measurements at each input port and output port of the FM Combiner. Directional couplers (total 5 Nos.) used for power metering systems shall have to be provided.			2 Set Complete
2	Supply of any accessories offered for the completeness of the system (Items wise details of offered and included material are to be given by the tenderer)			1 Lot
3	Supply of additional hardware material as per AIR Specification as given below:			
3.1	6-1/8" RF coaxial copper rigid line (complete with outer, inner & insulators)			18 M*
3.2	6-1/8" Un-flanged 90° Elbow with equal leg (complete with outer, inner & insulators)			10 Nos.
3.3	6-1/8" Clamp type Coupling (complete with outer, inner & insulators)			10 Nos.
3.4	6-1/8" Field Flange (Clamp type)			2 Nos.
3.5	Bullet for 6-1/8" Coaxial copper rigid line			16 Nos.*
3.6	6-1/8" to N Test Reducer			1 No.
3.7	6-1/8" to 4-1/2" Reducer unflange			1 No.
3.8	Hanger for 6-1/8" RF coaxial copper rigid line			10 Nos.
3.9	4-1/2" RF coaxial copper rigid line (complete with outer, inner & insulators)			18 M*
3.10	4-1/2" Un-flanged 90° Elbow with equal leg (complete with outer, inner & insulators)			5 Nos.
3.11	4-1/2" Clamp type Coupling (complete with outer, inner & insulators)			5 Nos.
3.12	4-1/2" Field Flange (Clamp type)			2 Nos.
3.13	Bullet for 4-1/2" Coaxial copper rigid line			12 Nos*.
3.14	4-1/2" to N Test Reducer			1 No.
3.15	Hanger for 4-1/2" RF coaxial copper rigid line			10 Nos.
3.16	3-1/8" RF coaxial copper rigid line (complete with outer, inner & insulators)			18 M*
3.17	3-1/8" Un-flanged 90° Elbow with equal leg (complete with outer, inner & insulators)			7 Nos.
3.18	3-1/8" Clamp type Coupling (complete with outer, inner & insulators)			10 Nos.
4.	Supply of 5" or 5-1/2" RF coaxial air dielectric cable as per Specification with 6-1/8" EIA flange Gas Barrier Connector (with gas inlet at one end) fitted at both end of the cable alongwith 'O' rings, nuts, bolts & washers, silicon grease etc.			60 M*

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4.1	Hoisting stockings for each cable as per recommendation of manufacturer.			1 Set
4.2	Earthing kits for 5" or 5-1/2" RF coaxial air dielectric cable			2 Nos.
4.3	Wall gland/ feed through assembly with accessories for 5" or 5-1/2" RF coaxial air dielectric cable			2 Nos.
4.4	Cable clamps with nut, bolt washer (adjustable height) for 5" or 5-1/2" RF coaxial air dielectric cable			60 Nos.*
5.	Supply of 5" or 5-1/2" RF coaxial air dielectric cable as per Specification with 4-1/2" EIA flange Gas Barrier Connector (with gas inlet at one end) fitted at both end of the cable alongwith 'O' rings, nuts, bolts & washers, silicon grease etc.			60 M*
5.1	Hoisting stockings for each cable as per recommendation of manufacturer.			1 Set
5.2	Earthing kits for 5" or 5-1/2" RF coaxial air dielectric cable			2 Nos.
5.3	Wall gland/ feed through assembly with accessories for 5" or 5-1/2" RF coaxial air dielectric cable			2 Nos.
5.4	Cable clamps with nut, bolt washer (adjustable height) for 5" or 5-1/2" RF coaxial air dielectric cable			60 Nos.*
6	Any other accessories offered for the completeness of the system			1 Lot
7	Dehydrator/Pressurising Unit with tubing & accessories as per AIR specification			2 Sets
8	Antenna Switch Frame/Patch Panel complete as per AIR Specification			1 Set
9	Supply of materials for new Horizontal Cable tray as per AIR Specifications (as per drawing no TM-14453/3)			60 M*
10	Inspection charges at manufacturer's works of FM Combiner as per AIR specification.			1 Lot
11	Technical Manuals (Installation, Testing, Commissioning, Operation, Maintenance & Service, including theory of operation and fault diagnosis) **COLOUR** printed and duly bound for FM Combiner along with associated equipment, items & accessories along with soft copy on CD shall be supplied as per distribution given below:			
11.1	For DDG (E-FM), P & D Unit, DG: AIR, New Delhi-110001 (Within one month of issue of Acceptance of Tender) **(irrespective of number of FM Combiners to be ordered)**			1 Set
11.2	For Consignee (To be supplied along with the equipment)			2 Sets
11.3	For the following Offices/Officers, Technical manuals are to be supplied along with the equipment as per distribution given below) **(irrespective of number of FM Combiners to be ordered)**			
	(i) DDG (E-FM), P&D Unit, DG:AIR			1 Set
	(ii) Zonal Office (Project Wing)			1 Set
	(iii) Zonal Office (Maintenance Wing)			1 Set
	(iv) DDG (E-TM) DG: AIR			1 Set
	(v) Technical Library, P&D Unit, DG:AIR			1 Set
	(vi) NABM (Technical), New Delhi			1 Set
	Total			6 Sets

* Length/ Quantity may vary as per actual site requirements.

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SECTION-5.2 SCHEDULE OF ERECTION, TESTING & COMMISSIONING FOR FM COMBINERS AND ACCESSORIES AT JAIPUR

S. No.	DESCRIPTION	Qty.
1.	Erection, Testing & Commissioning (ETC) of FM Combiners and other accessories etc. as per AIR Specifications.	1 Job
2.	Erection, Testing & Commissioning (ETC) of new RF coaxial copper rigid lines and other accessories etc. as per AIR Specifications.	1 Job
3.	Erection, Testing & Commissioning (ETC) of two nos. of new RF coaxial cables and other accessories etc. as per AIR Specifications on the horizontal cable tray (any hardware required for the same shall be provided by the tenderer).	1 Job
4.	Erection, Testing & Commissioning (ETC) of new Dehydrator/Pressurising Unit with tubing & accessories including making pressurization connections etc. as per specification at site.	1 Job
5.	Erection, Testing & Commissioning (ETC) of new Horizontal Cable tray as per AIR Specifications (as per drawing no TM-14453/3).	1 Job
6.	Erection, Testing & Commissioning (ETC) of Antenna Switch Frame/Patch Panel as per AIR Specifications.	1 Job
7.	Providing independent **Earth System** including all material & labour as per drawing no TM16599. The value of earth resistance of each earth system shall be less than 1Ω.	1 Job

SECTION-5.3 SCHEDULE OF SPARE ITEMS (OPTIONAL):

(These will not be considered for ranking purpose.)

S. No.	DESCRIPTION	Qty.
1	Adaptors (Items wise details, including part number, if any are to be given by the tenderer)	1 Lot
2	Micro switches for Interlocks	1 Set
3	Power Meter	1 Set
4	Terminating loads (1 kW, 50 Ω)	1 Set
5	Any other items/accessories based upon actual failure pattern are to be given by the tenderer. (Items wise details, including part number, if any are to be given by the tenderer)	1 Lot

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ANNEXURE-II

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, address, contact number (Mobile number) & e-mail address of 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 :

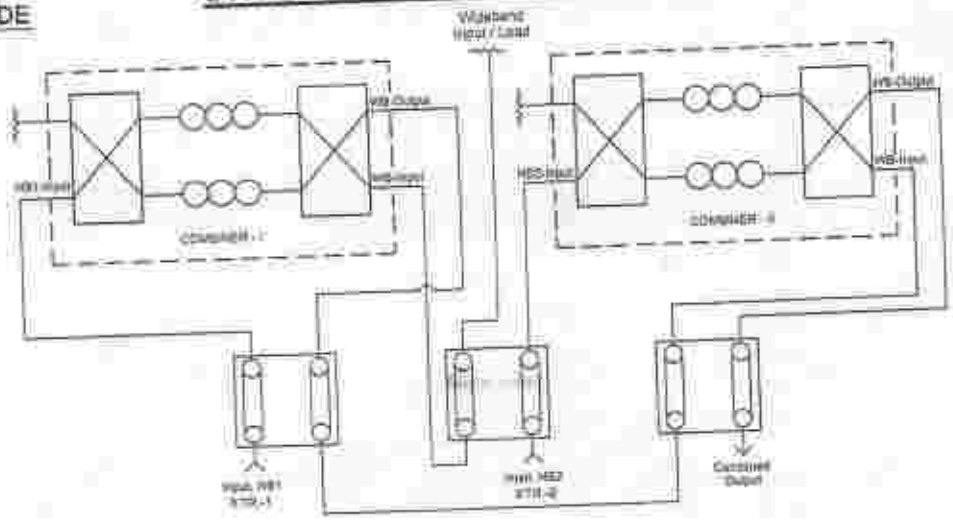
(Authorized Signatory of local office/authorized representative/dealer) Name : Signature :	**(Authorized Signatory of FM Combiner OEM)** Name : Signature :
Place and Date:	Place and Date:

(Y P Singh, AD) (Manzoor Ali, ADE) (Sandeep Singh, DDE) (Rajendra Nahar, DDE) (Sanjeev Pandey, DDE)

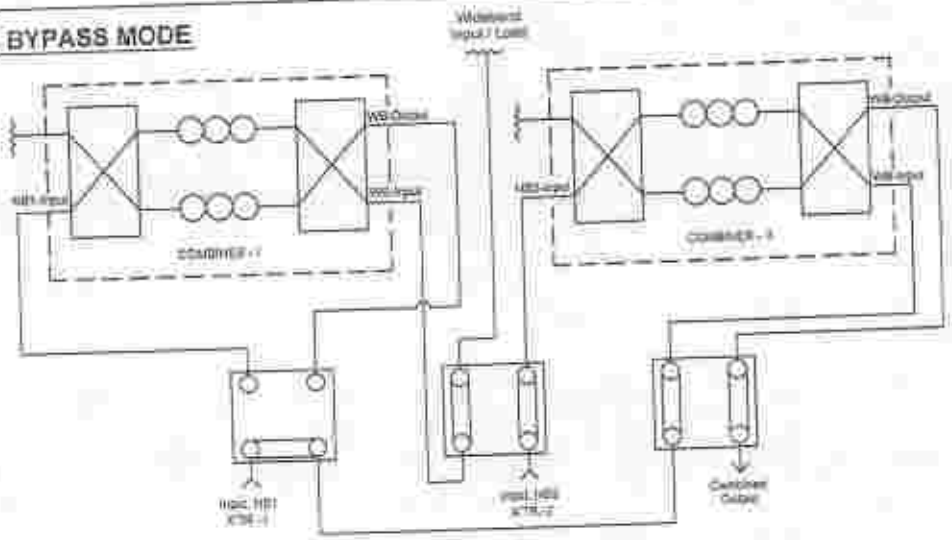
240 200

BYPASS ARRANGEMENT OF FM COMBINERS

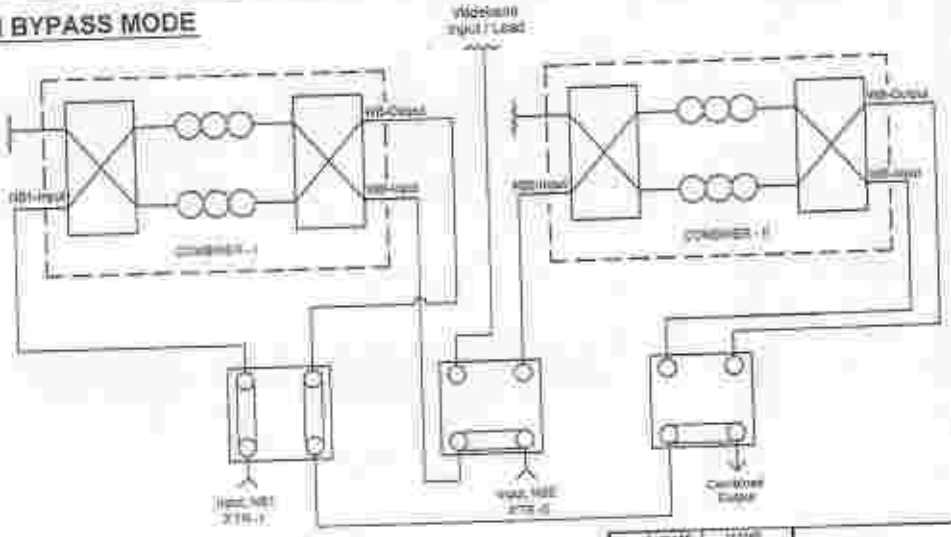
...RMAL MODE



COMBINER - I BYPASS MODE



COMBINER - II BYPASS MODE



NOTES:-

1. THIS DRAWING IS TO BE READ WITH REFERENCE TO AM SPECIFICATION.
2. THE REJECT LOAD, INTERLOCK CIRCUIT, LED PANEL DIAGRAM WITH ALL RADIO LINK CONNECTION, U LINK PATCH PANEL ETC. TO BE PROVIDED BY CONTRACTOR.
3. METERING ARRANGEMENT FOR FORWARD AND REFLECTED POWER TO BE PROVIDED BY CONTRACTOR ON IP AND OP SIDE.
4. ALL NECESSARY HARDWARE FOR BYPASSING ARRANGEMENT TO BE INTEGRAL PART OF THE FM COMBINERS.

	DATE	NAME
DRN		HARDIK
CHD		
APD		
COMP		
T.C.		

SCALE :- N.T.S.

GENERAL

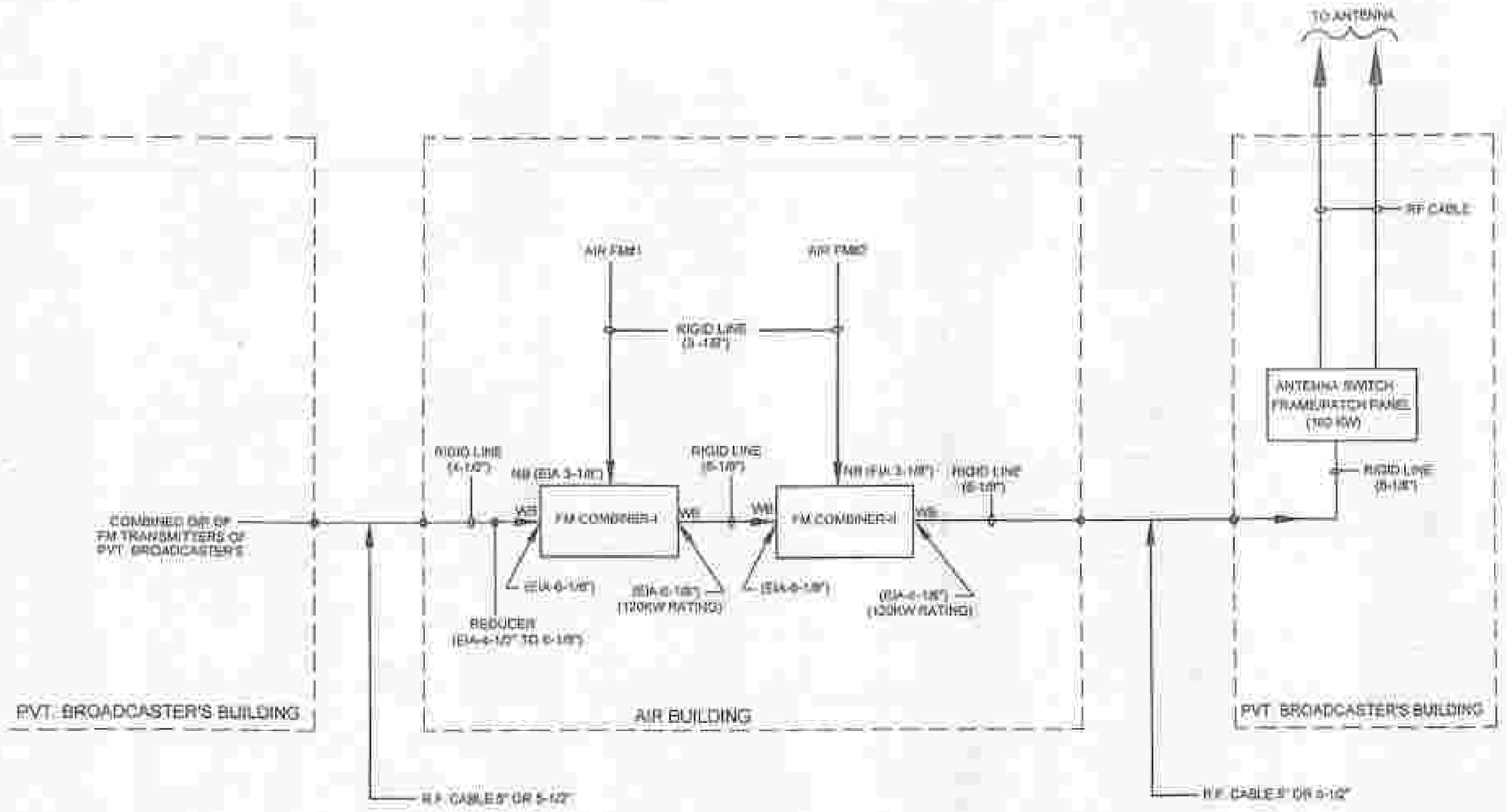
BYPASS ARRANGEMENT OF FM COMBINERS

ALL INDIA RADIO
NEW DELHI, INDIA

APPD :-

DRG. NO.- TM-15833/1

PROPOSED R.F. COMBINING ARRANGEMENT FOR FM TRANSMITTERS (2 Nos.) AT JAIPUR



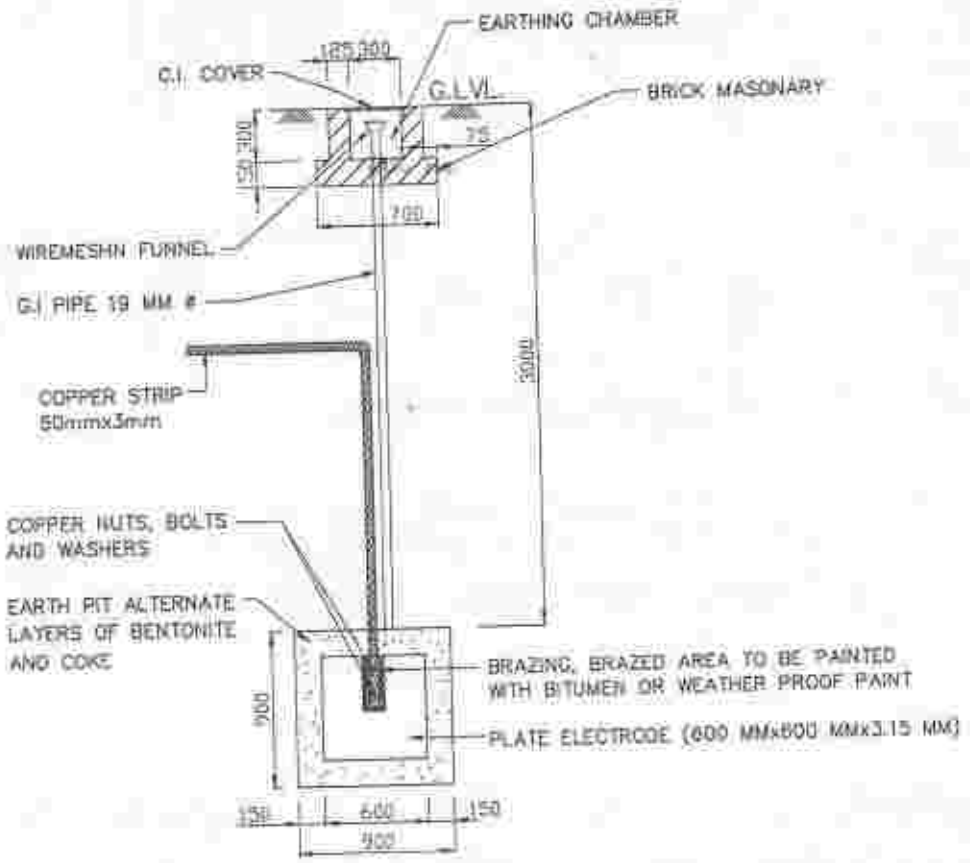
NOTES:-

1. THIS DRAWING IS TO BE READ WITH REFERENCE TO AIR SPECIFICATION.
2. THE REJECT LOAD, INTERLOCK CIRCUIT, LED MIMIC DIAGRAM WITH ALL RIGID LINE CONNECTION, U-LINK PATCH PANEL ETC. TO BE PROVIDED BY OEM/TENDERER.
3. METERING ARRANGEMENT FOR FORWARD & REFLECTING POWER TO BE PROVIDED BY OEM/TENDERER ON INPUT & OUTPUT SIDES.
4. ALL NECESSARY HARDWARE FOR BY-PASSING ARRANGEMENT TO BE AN INTEGRAL PART OF THE FM COMBINER.

NAME	DATE		FM TR. SETUP JAIPUR	ALL INDIA RADIO P & D UNIT NEW DELHI, INDIA
DRN	FEB. 2016	Chauhan		
TRD				
CKD				
COMP				
C.D.				
SCALE :- N.T.S.			R.F. COMBINING ARRANGEMENT (PROPOSED)	APPD. :-
				DRG. No.- TM.- 16747

(238) (198)

COPPER PLATE EARTHING



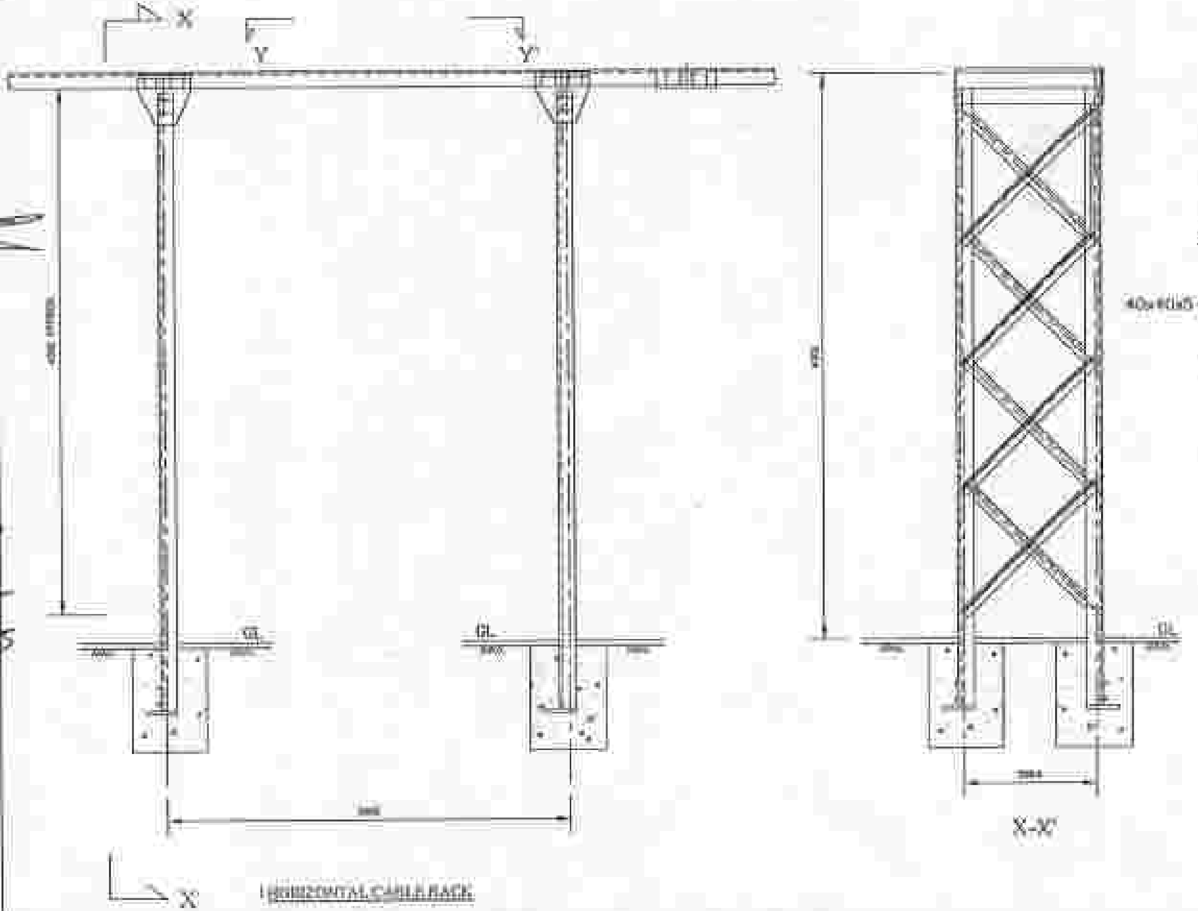
NOTE

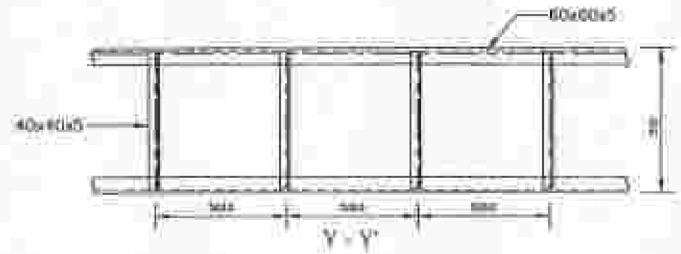
PLATE EARTH – PIT SIZE OF 900x900x3900(or more)MM IS EXCAVATED & COPPER PLATE OF SIZE 600x600x3.15 MM IS PLACED VERTICALLY IN THE EXCAVATED PIT. THE PLATE SHALL BE CONNECTED TO COPPER STRIP OF 50x3 MM. THE BOLTS, NUTS, CHECK NUTS & WASHERS SHALL BE OF COPPER. THE PIT IS FILLED WITH ALTERNATE LAYERS OF COCK & BENTONITE UP TO A DEPTH OF 900 MM & REMAINING PORTION FILLED WITH LOOSE SOIL WITHOUT STONES. THE MASONARY CHAMBER AT GROUND LEVEL OF SIZE 700x700x150 MM WITH A HOLE IN MIDDLE TO PASS THE G.I. PIPE OF 19 MM DIA WITH A PROVISION FOR FUNNEL & PROVIDED WITH C.I. FRAME & COVER WITH LOCKING ARRANGEMENTS. THE FUNNEL SHALL BE FIXED WITH WIREMESH. THE MAIN HOLE COVER SHALL BE PAINTED & MARKED WITH RESISTANCE OF THE EARTH.

All the dimensions are in millimeters.

ALL INDIA RADIO
P & D UNIT
NEW DELHI
DRG. No. TM-16599

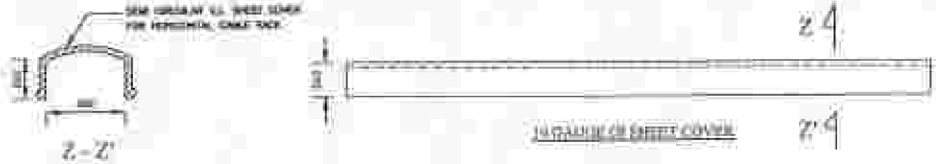
S NO	DATE	BRIEF RECORD	INITIAL
1	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	
3	[illegible]	[illegible]	[illegible]





NOTES:-

1. THIS DRG. IS FOR REFRENCE ONLY.
2. THE HEIGHT OF HORIZONTAL RACK WILL BE ABOUT 4.0 M.
3. MAXIMUM SPACING BETWEEN VERTICAL SUPPORTS BE 4.0 M.
4. 14 GUAGE G.I. SHEET COVER SHOULD BE PROVIDED ON HORIZONTAL CABLE RACK TO PROTECT CABLES.
5. ALL DIMENSION ARE IN MILLIMETRES.



GENERAL

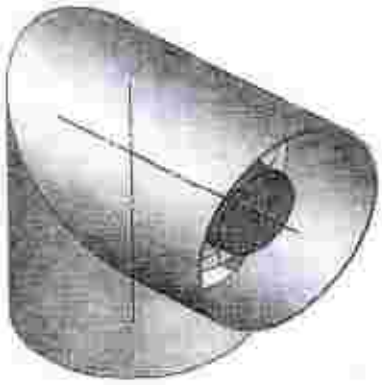
DETAILS OF HORIZONTAL CABLE RACK

ALL INDIA RADIO
NEW DELHI INDIA

SCALE - N.T.S.

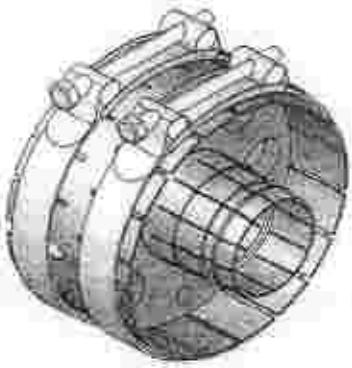
NO. TM- 14453/3

FIGURES SHOWING RIGID LINE ACCESSORIES (FOR REFERENCE)



Un-flanged 90° Elbow with equal leg

inner & insulators



Coupling (Clamp type)

Field Flange (Clamp type)