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**PRASAR BHARATI**  
**(BROADCASTING CORPORATION OF INDIA)**  
**ALL INDIA RADIO**  
**(TELECOM CELL)**  
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**SPECIFICATIONS COVER SHEET**

TITLE	:	Requirement of Upconverters for DTH Services
SPECIFICATION NO.	:	11(54)-05/Upconverter
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SCHEME	:	Proposal for change in scope – Requirement of Up Converters and HPA for DTH Services– 10 <sup>th</sup> Plan

**PRASAR BHARATI**  
**(Broadcasting Corporation of India)**  
**DIRECTORATE GENERAL:ALL INDIA RADIO**  
**( TELECOM CELL )**

**No.11(54)-05(UP\_DTH)-TC**

**Sub:- Specification for the Upconverters for DTH Services**

**1. INTRODUCTION**

AIR requires C-Band Upconverters for DTH services at various stations. The scope of the work would include the supply of C-Band Upconverters as per quantities given in the tender and its acceptance testing etc.

**2. Bill of Material**

The supply of C-Band Upconverters will include below mentioned equipment and accessories :-

<b>Sl.No.</b>	<b>Item</b>	<b>Quantity</b>
1.	C-Band Upconverter (1+1)	17 sets

The details of the General as well as Technical requirements including the specifications for the equipment are detailed below to enable the tenderer to quote for these equipment.

**3. Location :** This equipment shall be supplied at 5 zonal offices i.e. Delhi, Kolkata, Mumbai, Chennai & Guwahati.

**4. SCOPE**

4.1 The scope of this tender includes supply of the equipment as per specifications, technical requirements and quantities as detailed in the tender and Pre-delivery inspection as per Acceptance Test Procedure(ATP)

4.2 After acceptance of the tender, the tenderer should also provide detailed plans of supply material, testing and commissioning as per ATP.

4.3 The tenderer shall ensure that the equipment offered fully incorporate the

standard features of safety and protection including shielding from EMI / RFI.

4.4 Inspection will be carried out at Supplier/Integrator's Works by the Engineer(s) of All India Radio. The supplier shall put up the equipment for test on the test bench at supplier/integrator premises before the AIR representative and shall provide, without any extra charges, electric energy, consumable materials, tools, testing instruments, labour and assistance of every kind for carrying out acceptance tests. All the individual factory test reports of the complete lot of the equipment shall be made available to the inspecting authority before inspection.

Complete specifications and details will be checked and all parameters values will be measured. Typical details are enclosed in ATP, the inspection will be carried out on those lines.

Prior intimation for carrying out inspection at Works is to be given by the supplier to the indenter at least two weeks in advance. **Inspection charges are to be quoted separately, if any.**

4.5 The bidder shall propose and quote one and only one option. Multiple options proposed by the bidder will not be considered and evaluated by the purchaser.

4.6 The equipment offered should be well established and field proven. A list of clients, to whom the equipment has been supplied, must be enclosed.

## **5 GENERAL REQUIREMENTS**

### **5.1 Technical/ General Details**

The tenderer, in order to enable the indenter to carry out the full technical evaluation of the tender, should give all the details required to ascertain full merits and demerits of the technical offer.

The tender/offer should also include the following details :

- i) Though the bidder in general has to comply with all the specification (including sub system level specification), purchaser may relax some of the specifications in exceptional cases keeping in view the overall functioning of the complete system proposed by the bidders.
- ii) Purchaser reserves the right to waive some deviations based on technical assessment.
- iii) The technical offer of the tender should contain, apart from the technical compliance statement, all original data sheets of the manufacturer in support of

the technical compliance statement. The tenders containing only technical compliance statement without the original data sheet/pamphlets of the equipment offered in full may be rejected. The authorization to supply the eqpt from the principals' is must if not quoted directly by the manufacturer.

- iv) The firms may be asked to demonstrate the equipment at the technical evaluation stage, if required, to show compliance to AIR's specification.
- v) This equipment must be of state-of-art technology, capable for 24 hrx365 days operations.

Apart from printed technical data/specs of the equipment, photograph etc. should also be attached with the offer.

## 5.2 Spares

Tenderer must quote separately for recommended essential spares including their quantities and cost (per unit). The cost of spares shall not be counted for deciding the commercial ranking of tenders.

## 5.3 Training

The tenderer shall be required to provide 2 days training for five AIR Engineers on operation and maintenance of the equipment at a central location. This will be essential.

## 5.4 Compliance

While complying to our specifications, it may please be noted that just mentioning 'complied' will **NOT** suffice. The compliance should be supported by proper data/documentation from original equipment manufacturer substantiating the compliance in respect of the specs. Deviations, if any, may be brought out clearly in the compliance statement. Proposals without the explicit compliance statement would not be evaluated and would be rejected without any communication to the bidder.

## 5.5 Schedule of Material

A comprehensive schedule of material offered should be attached with the offer in the same format as price bid minus the price. The price bid shall also be mentioned in the same format in the commercial bid. The tenders not complying this will be rejected

## 5.6 Maintenance support

Maintenance support including availability of spares is to be ensured for at least 10 years from the date of supply. Details of the same should be mentioned in the tender.

## 5.7 Documentation & Test Certificates

### a) **Manual:** [One set of Manual with each system].

i) Manual for complete system, as well as each sub-system and accessories (both hard & soft copies)

ii) Original manuals for installation, and maintenance & servicing along with drawings & wiring diagram for the system

b) MTBF figures for all sub systems

c) Test records/ reports of all the measurements performed.

d) Compliance certificate(s)

e) Non-conformance reports.

f) Acceptance test reports & certificates.

## 5.8 Environmental & power supply

- |    |                                    |   |  |
|----|------------------------------------|---|--|
| a) | Ambient Temperature<br>(operating) | : | 0°C to +50°C   |
| b) | Relative Humidity                  | : | 95% non condensing at 45°C temperature   |
| c) | Safety                             | : | Standard features for safety & protection have to be built in/ incorporated for both personnel/ equipment. |
| d) | Power supply                       | : | 220VAC±10%,Single phase,48-52 Hz   |

## 5.9 Miscellaneous Clauses

i) The supplier shall mention the source of supply (with proper authorization) and technical parameters for major and critical components/spares so that no difficulty is encountered later on in procuring the spares for maintenance/repair of these equipment.

ii) If at any stage during next ten years the manufacturer proposes to stop production of these equipment and spares, supplier shall

intimate AIR in advance to enable AIR to stock the critical items of spares for the life of the equipment.

- iii) Warranty should be at least two years from date of receipt of equipment by AIR

**5.10** The tenderer/ firm must have a well-equipped & established service center in India. The firm/ tenderer must ensure repairs within 72 hours at site & in case the equipment cannot be repaired at site then the firm shall bear all the charges, including to & fro freight charges, to repair the equipment within or outside the country during the warranty period. After sales service is to be ensured for post warranty period also.

**5.11 Delivery Period** : The Delivery period shall be 3 months from the date of placement of Purchase order.

**6. TECHNICAL REQUIREMENTS:**

The equipment to be supplied should conform to the "Technical specifications" detailed below:-

**IF TO C-BAND UP CONVERTER (1+1) WITH AUTO CHANGEOVER MECHANISM**

It should be possible to operate the Upconverter manually (with front panel control). The Upconverter should not require a PC or a controller for normal operation and control. Upconverter (1+1) must have an auto changeover (hot standby) mechanism. The changeover switch may be either an in-built one or an independent .

1.	Input Frequency	52 MHz to 88 MHz
2.	Input impedance	75 Ω
3.	Input Return loss	20 dB or better
4.	Input level	-20 dBm to +1 dBm
5.	Input connector	BNC-F
6.	Output Frequency	5845 MHz to 6425 MHz
7.	Output Impedance	50 Ω
8.	Output Return loss	19 dB or better
9.	Output level at 1dB compression point (P1)	>= +10dBm
10.	Overall Conversion gain	30 dB or more
11.	Gain control Step size	0.2dB steps or smaller
12.	Gain slope	± 0.05 dB/MHz
13.	Type of conversion	Dual conversion spectrum not inverted
14.	Amplitude response	± 0.5 dB over the input frequency

		range of 52 MHz to 88 MHz.
15.	Third order IMD Products	-40dBc with two equal carriers at 10dB total output Backoff.
16.	Phase noise	-70 dBc/Hz, 100 Hz away from carrier -80 dBc/Hz, 1 KHz away from carrier -100 dBc/Hz, 1 MHz away from carrier
17.	Frequency stability	Better than $\pm 1 \times 10^{-8}$ over temp 0 to 50 degrees Celsius $\pm 1 \times 10^{-9}$ or better per day
18.	Gain stability	$\pm 0.25$ dB per day at constant temp.
19.	Spurious	-60 dBc or better.
20.	Frequency setting	Synthesised with minimum 125 KHz step size
21.	Standby operation	1+ 1 hot redundancy auto change over with manual over ride.
22.	Mounting	19" rack
23.	Test Port	RF and IF
24.	Remote Interface	R S- 232 R S- 484 Parameters settings: Frequency, gain, fault status, priority, etc.
25.	LED Indications	Power, standby, LO fault, Remote/Manual etc.

**DIRECTORATE GENERAL:ALL INDIA RADIO  
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**DRAFT ACCEPTANCE TEST PROCEDURE FOR C-BAND UP CONVERTER**

**INTRODUCTION**

New Upconverters are to be tested before acceptance to ascertain the performance of the equipment.

**SCOPE**

This document describes the test procedure for Upconverter. Details of the operating parameters and setting at which measurements are to be carried out are given in subsequent sections.

**OBJECTIVE**

To carry out acceptance test comprising of:

- RF measurements
- Endurance test
- Auto changeover & Manual operation
- Copying of Data by the Slave unit from Master

**TEST EQUIPMENT ( all the test & measuring eqpt have to be arranged by the firm only)**

- (a) Spectrum analyser
- (b) Power meter
- (c) Frequency counter

**RF MEASUREMENTS**

**(i) Output power and stability:**

Output power of each unit may be measured. Stability of the output power over 24 hour period may also be measured.

**(ii) Output frequency and stability:**

Output frequency of each unit may be measured. Frequency stability over 24 hour period may also be checked up.

**(iii) Spurious and Harmonics:**

The spurious and harmonics may be measured on Spectrum analyser.

Aforementioned test may be carried out for both main as well as standby unit. Changeover operation, both manual as well as automatic, may also be checked up.

**C-BAND UPCONVERTER**

Model No. \_\_\_\_\_

S.No. \_\_\_\_\_

Input/Output frequency & level

**Observations:**

Input Level (dBm)	Input Frequency (MHz)	Output Frequency (MHz)	Output Level (dBm)	Conversion Gain (dB)
	52.00			
	55.00			
	60.00			
	65.00			
	70.00			
	75.00			
	80.00			
	85.00			
	88.00			

Signature  
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