PRASAR BHARATI
(India's Public Service Broadcaster)
Directorate General: Akashvani
Satellite & Connectivity Division (SCD)
(Previously Telecom Division)

File No. 3(3)/2025-26SCD/CES equipments Dated: 27.08.2025

Reference. DG:Akashvani letter even no. dated 05.08.2025.

Subject: Specification for the SITC of C-Band Up-Convertor, SSPA 50 Watt, 8 Channel MCPC Encoder, DVBs Modulator and Professional IRD Receivers for Captive Earth Stations.

Dear Sir,

DG:Akashvani is planning for procurement of SITC of C-Band Up-Convertor, SSPA 50 Watt, 8 Channel MCPC Encoder, DVBs Modulator and Professional IRD Receivers for various Captive Earth Stations on open tender basis. The draft Specification for the same is enclosed.

In this regard, the prospective bidders from India are once again requested to give their industry feedback (if any) on the enclosed draft Specification and also requested for their budgetary quote to get an estimated cost for subject procurement.

The industry feedback (if any) and budgetary quote may be sent to this Directorate at the following e-mail up to 03.09.2025.

satellitedivision@prasarbharati.gov.in

Encl: as above

27/08/2025
Manoj Kumar Gupta
Assistant Director (E-SCD)
DG:Akashvani

To,

1. Prasar Bharati Website

2. The Prospective bidders

3. DDG(E) (Procurement Division)

PrasarBharati
(India's Public Service Broadcaster)
Directorate General: Akashvani
Satellite Connectivity Division
E-mail: satellitedivision@prasarbharati.gov.in

Specification for the SITC of C-Band Up-Convertor, SSPA 50 Watt, 8 Channel MCPC Encoder, DVBs Modulator and Professional IRD Receivers for Captive Earth Stations.

SPECIFICATION NO : SCD/SPEC/2025-26/CES

DATE OF APPROVAL :

NO OF PAGES : 20

APPROVAL FILE NO : 3(3)/2025-26SCD/CES Equipment's

SUMMARY OF CONTENTS:-

PRASAR BHARATI
DIRECTORATE GENERAL: AKASHVANI
(PLANNING & DEVELOPMENT UNIT)
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No. SCD/SPEC/2025-26/CES

Subject: Specification for the SITC of C-Band Up-Convertor, SSPA 50 Watt, 8 Channel MCPC Encoder, DVBs Modulator and Professional IRD Receivers for Captive Earth Stations.

(i) INTRODUCTION

Name of the Project/Scheme

Procurement of C-Band Up-Convertor, SSPA 50 Watt, 8 Channel MCPC Encoder, DVBs Modulator and Professional IRD Receivers for Captive Earth Stations.

In AIR Network 37 Earth stations are being used for the up-linking of programme on Radio Network. Captive Earth Stations were provided at the AIR Stations in state capitals and union Territory to uplink the contents which can be received by downlink at AIR stations in order to relay the particular content.

Out of 37 Earth Stations 5 number of Earth station are installed in year 2018 and rest are installed before year 2008. Most of the Up-Convertor, SSPA, MCPC, Encoder, DVBs Modulators and IRD Receivers had already served their useful life. These critical equipment's are frequently giving problem and in many Earth Station, these equipment's are working in (1+0) mode. Recently Directorate is in receipt of the request from AIR, Chennai, Mumbai, Kolkata& NBH Delhi to provide 8 Channel encoder and DVBS modulator as spares for carrying out the smooth transmission from the earth stations installed at these stations, as no Spares is provided to them. Open Mode Transmission System having 8 Channel Encoder and DVBs Modulator were installed in AIR, Chennai, Mumbai, Kolkata& NBH Delhi in year 2020-2021.

SECTION 'A'

1. BILL OF MATERIAL

AIR requires following Equipments/Services as per specification detailed under section A&B. Tenderer shall quote price of each items separately with necessary breakup keeping in view of the following.

(i) Make and Model of Each Item is to be mentioned.

(ii) Intender reserve full right to choose schedule the quantities of Equipments/Service etc. At the time of placing order.

(iii) All items mentioned under mandatory items will be taken into consideration for ranking purpose.

(iv) Present requirement is for NBH Delhi,AkashvaniAlmora, AkashvaniRothak, Akashvani Srinagar, Akashvani Varanasi, Akashvani Kolkata, Akashvani Mumbai, Akashvani Chennai, AkashvaniAizwal

MANDATORY ITEMS PER SITE:

S.N	ITEM	Quantity	Zone	Place	Reference
1.	50 W C-Band Solid State Power Amplifier (1+1) in Hot Standby configuration with provision of power measurements display and auto-changeover unit along with Dummy load Comprising HPA -2 Nos Changeover with dummy load 1 No alongwith flexible waveguide fitted with couplers	5 Sets (1+1)	NZ	NBH Delhi (02Set) Almora (01 Set), Rothak (01 Set)	**(B-1)**
			EZ	Akashvani Kolkata (01 Set)	
2.	Synthesized IF to C-Band Up-Convertor (1+1) with auto-changeover Unit. Comprising sized IF to C-Band Up-Convertor(1+1) with auto-changeover unit. ComprisingUp-Convertor -2 Nos. Changeover- 1 Nos alongwith cables and connectors	7 Sets (1+1)	NZ	NBH Delhi (02 Set), Almora (01 Set), Srinagar (01 Set),Varanasi (01 Set)	**(B-2)**
			EZ	Akashvani Kolkata (01 Set)	
			NEZ	AkashvaniAizwal (01 Set)	
3	Digital Encoder 8-Channel along with cable/connectors /adopters	5 Nos.	NZ	NBH Delhi (02)	**(B-3)**
			EZ	Akashvani Kolkata(01)	
			WZ	BH Mumbai (01)	
			SZ	Akashvani Chennai (01)	
4	Digital IF Modulator IF combiner -6:1	5 Nos.	NZ	NBH Delhi (02)	**(B-4)**
			EZ	Akashvani Kolkata (01)	
			WZ	Akashvani Mumbai (01)	
			SZ	Akashvani Chennai (01)	
5	Receiving System: (i) Professional IRD Receivers (ii) Inter connecting CablesConnector (F type Male to Male 10 Nos. of 2 meter each) and accessories along with L-Band splitter 1:8	8 Nos.	NZ	NBH Delhi (02), Almora (01)	**(B-6)**
			EZ	Akashvani Kolkata(02)	
			WZ	BH Mumbai (02)	
			SZ	Akashvani Chennai (01)	
6	Details of any other items required for complete integration of the system	1 set			
7	Installation, Testing & Commissioning at site	1 Job			
8	Inspection	1 Job			
9	Manuals	1 Set			
10	Operation & Maintenance Training at Site	1 Job			

2 . QUANTITY

S.No	*For Items*	*Quantity*
1	C-Band SSPA 50 W(1+1)	5 Set
2	C-Band Up Convertor(1+1)	7 Set
3	8 Channel MCPC Encoder	5 Nos.
4	DVBs Modulator	5 Nos.
5	Professional IRD receivers	8 Nos.

3. LOCATION FOR SUPPLY & INSTALLATION

Equipment set as per BOM is to be Supplied, Installed, Tested and commissioned, one set at following location namely 1. NBH Delhi, 2. AkashvaniAlmora, 3. AkashvaniRothak , 4. Akashvani Srinagar, 5. Akashvani Varanasi, 6. Akashvani Kolkata 7. Akashvani Chennai, 8. AkashvaniMumbai , 9. AkashvaniAizwal.

4. **SCOPE**

The Scope of this tender includes SITC of the equipment's as per specification, technical requirements and quantities as detailed in the tender along with Installation, testing and commissioning of the equipment's as per mutually accepted ATP.

5. **ELIGIBILITY**

The bidder shall have proven experience of carrying out SITC of Earth Station or, related experience. Bidder shall provide documentary proof (with attested copies of certificate from client including contact details like Telephone nos. and e-mail address of successfully carrying out at least one work of SITC.

6. SCHEDULE OF MATERIAL

A comprehensive schedule of material offered shall be attached with the offer as mentioned in Section A-1 in the same format as price bid minus the price. Price against each item as indicated in Section A-1 (Bill of Material) shall be mentioned separately item wise.

7. **COMPLIANCE**

The compliance from original equipment manufacturer (OEM) only will be considered while complying with the specification, it may be noted that just mentioning 'complied' will not suffice. Compliance should be supported by proper data/ documentation and should substantiate the specifications. In compliance statement each specification item complied, reference of compliance documents page no. Etc. should be indicated.

One no. of Encoder, Digital receiver and Modulator shall have to be submitted within one month of opening of Technical Bids for testing its compatibility.

Each page of the datasheet/specification shall be duly signed, with seal, by both the OEM and tenderer. The full name, Postal and Telephone contact details including E-mails address of the person signing on behalf of OEM must be indicated on at least one of the pages. Bids not complying with the above shall be rejected.

8. **INSPECTION**

Inspection of the equipment and testing of the installed Equipment shall be done as per mutually accepted and approved Acceptance Test Procedure (ATP). Draft ATP is annexed keeping the requirements of SITC.

(i) PRE-DISPATCH INSPECTION

Pre-dispatch Inspection of the equipment's shall be carried out at integrator's works by the Engineers(s) of All India Radio. The expenses towards to and fro journey, DA and lodging as per Govt. Of India norms will be borne by PrasarBharati. The performance certificate along with measurements taken on all equipment's (duly certified by OEM) is required to be submitted by the tenderer before inspection at their premises.

During the Pre-dispatch inspection, supplier shall put up all the equipment's for test on the test bench at integrator premises before the AIR representative and shall provide electric energy, consumable materials, and tools. Testing instruments, and assistance of required 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 for each equipment will be checked and all parameters/ values will be measured as per ATP. Typical details are enclosed in draft ATP. Details ATP shall be submitted by the Firm/OEM and after mutual discussion it shall be approved and inspection shall be carried out on these lines. Three weeks prior intimation for carrying out inspection at Works is to be given by the supplier to the indenter. Inspection charges, if any, are to be quoted separately in the commercial bid.

(ii) **SITE INSPECTION**

After completion of Installation of all the equipment's at the Station, final inspection of the installation at the Station will be carried out by the representatives of AIR for certifying the Installation. This inspection will include visual examination of the installation, overall performance measurements, link level measurements and any other measurement/ examination considered necessary by AIR. At least seven working days' prior notice shall be given by the supplier for conducting final Site Acceptance Test

9. TRAINING

The tenderer shall provide one day training to AIR engineers on setting up, configuration, operation and maintenance of the equipment at each site.

10. MANUAL/ DOCUMENTATION & TEST CERTIFICATES

Manual: 1 Set comprises Two each for the stations, One for Directorate& one set for concerned zonal office). Each manual shall consist of following.

(i) Manual for operation, configuration, maintenance of each equipment, sub system, NMS, accessories and complete integrated link along with drawings and wiring diagram for the system.(both hard soft copies)

(ii) Test procedures for parameters measured at subsystem and integrated system levels.

(iii) Test records/reports of all the measurements performed for each equipment and integrated system.

11. DELIVERY PERIOD

The Delivery Period for SITC and handing over of complete installation for all the sites shall be Five months from the date of A/T or 5 month from the date of decision letter (DL) from WPC in request of RF equipments whichever is later. Part supply will be accepted for Non RF equipment. Part payment of supply of Non RF equipment will be paid after acceptance of equipment & installation at site after certification by Installation Officer (IO). SITC Installation payment will be made only after completion of SITC.

12. GENERAL REQUIREMENTS

Technical/General Details.

(i) 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. Apart from printed technical data/specs of the equipment's from the OEM, Block schematic upto the sub-system, interconnection and wiring diagram should be given.

(ii) The equipment's offered shall be of renowned make, established and field proven. All the equipment's should conform to the power supply and environmental requirement as detailed in para A-13

(iii) The tender may be asked to demonstrate the equipment's to show compliance to AIR's specification at the technical evaluation stage.

One set of Encoder, IF Modulator and IRD receiver shall be submitted by tenderer at technical evaluation stage for checking compliance with DTH Free to AIR STB (This is mandatory)

(iv) This equipment's shall be state of art technology, capable for 24x7 operation. It should be incorporated with standard feature of safety and protection.

(v) Installation & commissioning at respective stations shall be carried out without any disruption of AIR/Doordarshan services. This may require installations at some sites to be carried out even during night hours for which adequate arrangements will have to be made by the supplier at no extra cost to the indenter.

(vi) The tender shall ensure that the equipment's offered fully incorporate the standard feature of safety and protection including shielding from EMI/RFI as the receive end of the link will be installed at high power transmitter site.

(vii) Apart from printed technical data/specs of the equipment's, Block schematic up to the sub-system, interconnection and wiring diagram, photograph etc. must also be attached with the offer.

(viii) Successful bidder may conduct site survey at all the stations, if felt necessary, to ascertain the conditions at stations for facilities installation of indoor equipment's.
Minor changes at site, if any necessitated due to site condition shall have to be taken care of by the supplier during installation without any extra cost to the indenter.

(ix) After Acceptance of the tender, the successful tender shall also provide detailed plans of supply of material, testing and commissioning as per ATP.

(x) During the installation of these equipment's, supplier shall be responsible for safety and security of his material and personnel. At the same time the supplier shall also ensure that there is no damage to AIR material and personnel.

(xi) Maintenance support including availability of spares for baseband equipment's is to be ensured for at least 10 Years from the date of supply.
Details of the same should be mentioned in the tender. If at any stage during next ten years the manufacturer proposes to stop production of these equipment's and spares supplier shall intimate AIR in advance to enable AIR to stock the critical items of spares for the life of the equipment's

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

(xiii) The firm/tenderer must ensure repairs within 72 hours at site & in case the equipment's cannot be repaired at site then the firm shall bear all the charges including to from freight charges to repairs the equipment within or outside the country during the warranty period. For all equipment's after sales services is to be ensured for post warranty period also for 10 years

13. ENVIRONMENTAL & POWER SUPPLY

a) Ambient Temperature: - -10° C to +40°- For indoor equipment

b) Relative Humidity:Upto 95% non-condensing at 40° C

c) Safety/Features: Standard features for safety & protection have to be built in/ incorporated for both Personnel/equipment.

d) Power Supply: 230 VAC± 10%, single phase, 48-52 Hz.

SECTION-B

TECHNICAL SPECIFICATIONS

1. 50 W C-BAND SOLID STATE POWER AMPLIFIER (1+1) WITH AUTO CHANGE-OVER UNIT FOR S.S.P.A ALONG WITH DUMMY LOAD.

SSPA shall be of compact and composite construction lightweight and rack mounted with front access for operation and control etc. It should be available along with its inbuilt/associated power supply unit. It should also have front panel meter to monitor forward power, VSWR alarm, Reverse power and indication for status, alarm, faults, over temperature, etc. The SSPA should have its own cooling arrangements. It should not require any external cooling.

(i)	Type	SSPA
(ii)	Rated output power at the output of wave -guide flange	50 W Continuous
(iii)	frequency Range	5850 MHz -6425 MHz
(iv)	Gain frequency Response	$\pm$1 dB over any 40 MHz
(v)	Saturated output power	Nominal +47dBm
(vi)	R.F level control	0-20 dB continuous
(vii)	Gain stability for constant temp.& drive	$\pm$2 dB over 0^0 to 50^0 Celsius
(viii)	Input VSWR	$\leq$ 1.3:1
(ix)	Output VSWR	$\leq$ 1.3:1
(x)	Phase Noise	Should meet IESS 308/309
(xi)	Harmonic	Better than:- 50 dBc (at rated output)
(xii)	Spurious (in band)	Better than:- 60 dBc (at rated output)
(xiii)	S.S.P.A standby operation	1+1 hot redundancy auto change- over with manual over ride
(xiv)	Mounting	19'' Rack
(xv)	Two tone inter-modulation at 3 dB total back off from 1 dB compression point	-25 dBc or better
(xvi)	Monitoring	RF output sample port
(xvii)	RF input connector	N female
(xviii)	Gain	$\geq$ 46 dB
(xix)	RF output	CPR137
(xx)	Operating temp.range	0^0 to 50^0 C

2. SYNTHESIZED IF TO C-BAND UP CONVERTER (1+1) WITH AUTO CHANGEROVER UNIT

It should be possible to operate the Upconverter manually. The Upconverter should not require a PC or a controller for normal operation and control. Any interface required for operation in (1+1) hot standby mode with auto changeover shall be included in the offer.

1	Input Frequency	52 MHz to 88 MHz
2	Output frequency	5850 MHz to 6425MHz
3	Frequency setting	Synthesized,125 KHz step size
4	Frequency stability	Better Than $\pm 1X10^{-9}$ or better per day
5	Input impedance	75 □
6	Output impedance	50 □
7	Input level	-15dBm nominal
8	Input connector	BNC-F
9	Input return loss	19 dB or better
10	P1 dB Output level	+10 dBm or more
11	Overall Conversion gain	30 dB or more
12	Gain control	> 30dB insteps of 0.2 dB or smaller
13	Gain Slope	$\pm$0.05dB/MHz
14	Output Return loss (VSWR)	19dB or better ($\leq$1.25:1)
15	Amplitude/gain stability	$\pm$ 0.25 dB per day at constant temp
16	Type of conversion	Dual conversion spectrum non-inverted
17	Third order IMD product	-40dBc with two equal carriers at 10 dB total output Back off from P1 dB
18	Phase noise	-70 dBc/Hz.100 Hz away from carrier -80 dBc/Hz, 1 KHz away from carrier -100 dBc/Hz, 1MHz away from carrier
19	Spurious (in Band)	-60 dBc below carrier (un-modulated)
20	Standby operation	1+1 hot redundancy, auto change-over with manual over ride feature
21	Mounting	19” Rack
22	Test Port	IF and RF
23	Remote Interface	RS232/ RS485 for Parameter setting
24	Front Panel Indications	Power, Standby, Faulty, Remote/Manual
25	Operating temp	0^0 to + 50^0 C

3. AUDIO BASE BAND DIGITAL ENCODER

Sr. No.	Parameter	Specification
1.	Audio Input No. of Channel	Analog and digital AES/EBU compatible as standard professional, which can be selectable in stereo channel. Eight Stereo (XLR or adaptor cable)
2.	Audio encoding format	MPEG-1& MPEG-4with ACC,ACC-LC,ACC,HEv1&v2
3.	Mode	Stereo, Dual Mono channel
4.	Encoding rate	64Kbps to 384 kbps
5.	Sampling frequency	48KHz
6.	Frequency Response	50 Hz to 15 KHz< +0.5dB
7.	Distortion	<o.1 %from 50 Hz to 15 KHz
8.	Signal to noise ratio	≥80 dB
9.	UDP Multicast IP (TS) Input Port (at least 1 MBPS Stream)	Mux with one stereo Audio (Analog and Digital) at Sr. No 1
10.	Output	DVB-ASI and UDP Multicast IP TS Simultaneous
11.	Input Power	230 VAC nominal, 50 Hz
12.	Operating Temp.	0 to + 50^0C

4. DIGITAL IF MODULATOR with Auto Changeover Unit

Modulator is to be DVB S/S2 Compliment	
ASI Inputs IP Inputs (UDP Multicast IP TS)	2 nos. 1 no.
Compliance	Backward compatible mode. (Should be capable of operating on DVB-S, DVB-S2 and IP mode, One at a time) Constant coding and Modulation (CCM)
Input bit-rate	64 Kbps to 10 Mbps
Forward Error Correction and Modulation Scheme	
FEC coding (LDPC), Reed Solomon & Convolution	DVS-S 1/2 , 2/3,3/4, 4/6, 7/8 DVS-S2 1/3, 2/5, 1/2 , 3/5, 2/3, 3/4 , 4/5, 5/6, 8/9, 9/10
Spectrum Roll off factor	DVB-S:10%,15%,25% and 35% selectable DVB-S2: 20%,25% and 35% selectable
Modulation Format	DVB-S:QPSK DVB-S2:QPSK
Baud Rates	Variable, 0.05 to 10 M symbols/sec
IF OUTPUT INTERFACE SPECIFICATION	
Output Frequency range	52 to 88 MHz tunable
Synthesizer Step Size	1 KHz, step
Frequency Stability	<+ 0.1 Khz (all causes over 10 years)
Output Impedance	75 ohms unbalanced
Connector	BNC, female
Output Return Loss	>20 dB(50-90MHz)
Output Level range	-20 to 0 DBm
Level Step Size	0.1 dB, steps
Spurious Outputs	<-65 dBc/4KHz@-10dBm
Synthesizer phase noise	Meets requirements of IESS-308
CW mode	Selectable
Noise floor (C/No)	<-120 dBc/Hz
Spectrum Sense	Normal/Inverted

Note: The Tenderer shall demonstrate all quoted equipment's for confirming compatibility with CES, NBH, Akashvani Delhi setup as part of technical evaluation, if required.

5. INTER FACILITY LINKS

The tenderer should quote for waveguidescouplers, adaptors, cables and other accessories required for Antenna connection to the output of SSPA. All these accessories should be professional standard and compatible with the system. Technical specification and detailed quantity should be mentioned in the offer.

6. DIGITAL SATELLITE RECEIVER WITH L-BAND INPUT

The IRD should have a front panel display and one should be able to enter or edit all the parameters for a perfectreception of the signals. There should be provision for observing the BER of the signal and signal level on the front panel. It will be required for receiving Audio Signal Only

RF Parameters Specification:

(a)	**Input Frequency Range**	**950-1750sMHz**
(b)	**No. Of Inputs**	**1 nos.**
(c)	**Tuning Step Size**	**1 KHz**
(d)	**Satellite Frequency Bank**	**C-& KU Band, selectable**
(e)	**Input impedance**	**75 Ohms**
(f)	**Input Connector**	**F-Type Female**
(g)	**Output Connector**	**XLR for Analog & AES-EBU**
(h)	**Input Power Range**	**-30 to-65 dBm per carrier**
(i)	**De-modulation Method**	**DVB-S QPSK, DVB-S2 QPSK demodulation**
(j)	**Variable Symbol Rates**	**0.128 to 10 M sym/sec**
(k)	**Convolution Inner FEC Rates Selectable**	**R=1/2,2/3,3/4,5/6,7/8(DVB-S, QPSK) R=1/3,2/5, 1/2 , 2/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (DVB S-2, QPSK)**
(l)	**IF filter Bandwidth**	**Automatic selection (Dependent on symbol Rate)**
(m)	**ASI Output**	**1 No.**
(n)	**IP Output**	**1 No. (required for streaming such as UDP/RTP,SRT,AOIP**

Audio and Video Decompression Parameters

(a) Audio Decompression Type: i) MPEG-1Layer-II audio, i.e. Dual Mono, Stereo

ii) MPEG-4 with AAC, AAC-LC & AAC HE v1 &v2

Audio Output:-Analog/(AES/EBU) 4 nos.

Analog Audio Output Specification

Parameters	Specification
(a) Output Impedance	600 ohm (balanced)
(b) Number of Outputs	4 stereo, configurable as stereo, joint stereo, Mono
(c) Connector Type	XLR Make socket or with suitable Adapter
(d) Data Rate	64-256 Kbps (MPEG-1, layer 2 and MPEG-4 selectable

Each analog audio output shall be presented as a stereo pair. In the event of Mono" transmission, the same encoder input channel will be output to both left and right connector. In other modes ("Stereo"' and "Dual Mono"), the two encoder input channels will be output as left and right.

Digital (AES/EBU) Audio Output Specification

Parameters	Specification
(a) Output Impedance	110 ohm (balanced)
(b) Number of Outputs	4 Stereo, configurable as stereo, joint Stereo, Mono
(c) Connector Type	XLR Male Socket or with suitable Adapter
(d) Data Rate	64-256 Kbps (MPEG-1, layer 2 and MPEG-4 selectable

Audio Performance Specification (at 48 KHz sampling rate)

(a) Frequency response	50 Hz to 15 KHz,±0.5dB
(b) THD+N (1KHz at max. Level)	0.1% from 50 Hz to 15 KHz
(c) Dynamic range	≥ 80 dB
(d) Cross talk at 1 KHz	≥ 80 dB
(e) Signal to noise ratio	≥ 80 dB

Note: The IRD offered should be able to receive both SCPC and MCPC signal IRD shall be able to receive free to AkashvaniDoordarshan's DTH radio signal. Interoperability with various model of different make shall be checked during technical evaluation stage. For this purpose the supplier shall be required to submit one no. IRD to Akashvani for checking compliance, if required.

Section 'C'

DRAFT ATP

1 INTRODUCTION

This document describes the Acceptance Test Procedure (ATP) for testing the various units of CES Equipment under procurement. It covers the details of the item to be tested, list of equipment required for testing and the tests required to be carried out.

2 ITEMS TO BE TESTED

(I) Solid State Power Amplifier (SSPA).
(II) Up-converter.
(III) Digital Encoder and Modulator.
(IV) IRD

3 TEST EQUIPMENT

a. All requisite test equipment conforming to the required standard for testing and commissioning shall be provided by the supplier
b. List of the test & measuring equipment's. (This is a tentative list. Additional equipment shall be specified by the indenter if needed).
c. Audio analyzer and Spectrum Analyzer(> 8 GHz range)
d. Power Meter with sensor & Attenuator etc.(Capable to measure 125 W)
e. Frequency counter (≥7 GHz)
f. Signal Generator (≥ 7 GHz)
g. Noise figure meter with noise source
h. Digital Modulation Analyzer.
i. PC with Printer.
j. Any other equipment and standard reference source/setup necessary for measurements.
k. Calibrated Directional coupler, inter-connecting cables, Attenuator, combiner, Dividers, adopters etc. as may be necessary for the test.

4 TEST REQUIRED TO BE CARRIED

(Note: This is only a tentative list, Additional items of tests may be specified and carried out by the indenter, if needed.

4.1 S.S.P.A

(i) Functionality test for individual SSPA and in (1+1) configuration
(ii) Power output check
(iii) Gain check
(iv) Gain flatness check
(v) Frequency response
(vi) IMD Product
(vii) Spurious
(viii) Any other tests to check the conformity to the specs

4.2 UP-CONVERTER

(a) Functionality test for individual up-convertor and in (1+1) configuration
(b) Output frequency check
(c) Output level and stability check
(d) Frequency stability
(e) IMD Product
(f) Spurious check
(g) Phase Noise check
(h) Any other test to check the conformity to the specs.

4.3 DIGITAL MODULATOR AND DIGITAL ENCODER

(1) Functionality test for individual modulator and in (1+1) configuration
(2) I.F. Range
(3) O/P Frequency stability and accuracy
(4) O/P level stability
(5) Coding standard, data rates check
(5) Digital modulation selectability check
(6) All Base-band measurements along with receivers.
(7) Spurious Check
(9) Any other test to check the conformity to the specs.

4.4 INTEGRATED SETUP (AT SITE)

a) After the individual tests the equipment will be installed and integrated to work as CES as per Specification. The integrated setup will then be tested for complete system performance and functions.

b) The tests for commissioning would include the integration check and conformity to system Specification including:

(i) Overall uplink/down-link check and performance measurements to meet the specs.

(j) Any other tests necessary to check the conformity to specs.

4.5 In addition, all the manuals/drawings will be inspected for completeness.

5. GENERAL

(i) Based on above, supplier shall give a detailed ATP document giving procedure for tests of Individual item as well integrated setup. This should include test setup, equipment details, inter-connections diagram and the Format for test reports.

(ii) The indenter will examine the same and then it will be finalized after mutual discussion.

List of Station-ANNEXURE-A:

S.No	Name of station (Consignee)	C-Band SSPA 50 Watt	C-Band UP-Convertor	8-Channel MCPC Encoder	DVBs Modulator	Professional IRD Receivers
1	NBH Delhi	02 Set (1+1)	02 Set (1+1)	02 Nos.	02 Nos.	02 Nos.
2	AkashvaniAlmora	01 Set (1+1)	01 Set (1+1)	-	-	01 No.
3	AkashvaniRothak	01 Set (1+1)	-	-	-	-
4	Akashvani Srinagar	-	01 Set (1+1)	-	-	-
5	Akashvani Varanasi	-	01 Set (1+1)	-	-	-
6	Akashvani Kolkata	01 Set (1+1)	01 Set (1+1)	01 No.	01 No.	02 Nos.
7	Akashvani Chennai	-	-	01 No.	01 No.	01 No.
8	AkashvaniMumbai	-	-	01 No.	01 No.	02 Nos.
9	AkashvaniAizwal	-	01 Set (1+1)	-	-	-

ANNEXURE-1

REPRESENTATIVE BLOCK DIAGRAM OF CAPTIVE EARTH STATION