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

File No. 3(3)/(2026-31)BINDSCD/CESEquipment's Dated: 12.06.2026

Subject: Specification for the SITC of C-Band Up-Convertor, 8 Channel MCPC Audio Encoder, DVBs-S/S2 Modulator and Professional IRD Receivers for 32 Nos.Captive Earth Stations.

Dear Sir,

DG:Akashvani is planning for procurement of SITC of C-Band Up-Convertor, 8 Channel MCPC Audio Encoder, DVB-S/S2 Modulator and Professional IRD Receivers for 32 Nos. Captive Earth Stations on open tender basis. The draft Specification for the same is enclosed.

In this regard, the prospective bidders from India are requested to give their industry feedback (if any) on the above 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 19.06.2026.

satellitedivision@prasarbharati.gov.in

Encl: as above

12/06/2026
Manoj Kumar Gupta
Assistant Director (E-SCD)
For DG:Akashvani

To,

1. Prasar Bharati Website
2. The Prospective bidders
3. DDG(E) (Procurement Division)

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Specification for the SITC of C-Band Up-Convertor, 8 Channel MCPC Audio Encoder, DVB-S/S2 Modulator and Professional IRD Receivers for 32 Nos. Captive Earth Stations.

SPECIFICATION NO	:	SCD/SPEC/2026-27/CES
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SUMMARY OF CONTENTS: -

PRASAR BHARATI
DIRECTORATE GENERAL: AKASHVANI
(PLANNING & DEVELOPMENT UNIT)
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No. SCD/SPEC/2026-27/CES

Subject: Specification for the SITC of C-Band Up-Convertor, 8 Channel MCPC Audio Encoder, DVB-S/S2 Modulator and Professional IRD Receivers for 32 Nos. Captive Earth Stations.

INTRODUCTION

Name of the Project/Scheme

Procurement of C-Band Up-Convertor, 8 Channel MCPC Audio Encoder, DVB-S/S2 Modulator and Professional IRD Receivers for 32 Nos. Captive Earth Stations.

In AIR Network 37 Earth stations are being used for the up-linking of programmes 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, Audio Encoder, 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. The adoption of multi-channel technology, being highly spectrum-efficient, will facilitate the simultaneous transmission of a substantially higher number of stereo channels. This enhancement will empower all Capital Stations to significantly expand their broadcasting capacity, including the introduction of dedicated and special-interest programmes designed to address the diverse aspirations, cultural preferences, and informational needs of local populations.

SECTION 'A'

1. BILL OF MATERIAL

AIR requires following Equipment's/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 Equipment's/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 32 Nos CES in Akashvani Network.

S. No.	ITEM	Quantity	Make	Model	Reference
1	a) Synthesized IF to C-Band Up-Convertor (1+1) with auto-changeover Unit. Comprising synthesized IF to C- Band Up-Convertor (1+1) with auto-changeover unit. Comprising Up-Convertor -2 Nos. Changeover- 1 Nos. along with cables and connectors (Along with Technical, Operational and Maintenance Manual)	1 set			(B-1)
	(b)Synthesized IF to C-Band Up-Convertor along with cables and connectors. (Along with Technical, Operational and Maintenance Manual)	1 no			
2	Digital Audio Encoder 8-Channel alongwith cable/connectors/adopters (Along with Technical, Operational and Maintenance Manual)	1 no			**(B-2)**
3	**(a)**Digital IF DVB-S/S2 Modulator(1+1) with auto-changeover unit with 19'' Rack mounted IF combiner 8:1 along with cable/connectors/adopters (Along with Technical, Operational and Maintenance Manual)	1 set			**(B-3)**
	(b) Digital IF DVB-S/S2 Modulator along with cable/connectors/adopters	1 no			

	(Along with Technical, Operational and Maintenance Manual)				
4	Receiving System: (1) Professional IRD Receivers with acces sories (Along with Technical, Operational and Maintenance Manual) along with Inter connecting Cables of length two meter with F type Male connector fitted at both ends.	1 set			(B-4)
	(2) L-Band splitter 1:8	1 no			
5	Details of any other items required for complete integration of the system	1set/site			**(B-5)**
6	Installation, Testing & Commissioning	1Job/site			
7	Operation & Maintenance Training	1 Job/site			

2 .TOTAL QUANTITY OF EQUIPMENT

S.No	For Items	Total Quantity	Unit Price (INR)	Total Price excluding GST (INR)	% GST	Total Amount Including GST (INR)
1	(a) C-Band Up Convertor(1+1)	32 Sets (1+1)				
	(b) C-Band Up Convertor	32 Nos.				
2	8 Channel MCPC Encoder	96 Nos.				
3	(a) DVBs Modulator(1+1)	32 Sets (1+1)				
	(b) DVBs Modulator	32 Nos.				
4	Professional IRD receivers	250 Nos.				
5	L-Band splitter 1:8	32 Nos.				

3. LOCATION FOR SUPPLY & INSTALLATION

Equipment as per BOM is to be Supplied, Installed, Tested and commissioned, at 32 locations as per list of Stations - ANNEXURE-'A.

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 OEM of each offered equipment must be manufacturing and supplying the similar equipment for at Least last 5 years. Customer list supplied during last 5 years and PO copies for Qty 2 Nos. each of the similar equipment supplied during last 2 year from each OEM to be enclosed by the bidder.

The similar equipment offered by each OEM should be deployed in DSNG/Earth station application for used on 24/7 basis and Documentary evidence to support this (PO copies, of end user) should be enclosed by bidder.

The bidder shall have proven experience of carrying out SITC of DSNG/Earth Station. Bidder shall provide documentary proof (with Po copies of end user including contact details Telephone nos. and e-mail address of end user to verify) and should have successfully carrying out at least two works of SITC of DSNG/ Earth station.

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 Up convertor and Modulator shall have to be submitted as per Clause 12(iii)

Each page of the technical compliance shall be duly signed, with seal, by respective OEM on their letterhead and also signed, stamped by the bidder. Each page of the datasheet/specification shall be duly

signed, with seal, by the bidder. The full name, Postal and Telephone contact details including E-mails address of the person signing on behalf of OEM and bidder 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 Prasar Bharati. 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 bidder/integrator 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 Eight months from the date of A/T or 3 month from the date of decision letter (DL) from WPC in request of RF equipment whichever is later.

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 up to the sub-system, interconnection and wiring diagram should be given.

(ii) The equipment's offered by bidder 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, Up converter and IRD receiver shall be submitted by tenderer at technical evaluation stage for checking compliance with DTH Free to AIR STB and AIR Tech specs (This is mandatory).

AIR will give 2 weeks to submit the offered models for demo/testing by each bidder from the date of intimation to each bidder. No extension whatsoever will be granted to any bidder and bidders who are unable to submit the units within the specified period, their bid will be summarily rejected without any further reference.

(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 all offered equipment's is to be ensured for at least 10 Years from the date of supply at prevailing rates after expiry of warranty period.
Details of the same should be mentioned in the tender. If at any stage during next ten years if any OEM of the offered equipment 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 Bidder must ensure repairs within one week at site from the date of intimation of failure. In case the equipment's cannot be repaired at site, the bidder shall bear all the charges including to & fro freight charges to repairs the equipment within or outside the country during the warranty period. In such cases, the defective equipment shall be replaced or repaired within a period not exceeding 6 weeks from the date of pick-up of the equipment from site. After sales services is to be ensured for post warranty period also for 10 years at prevailing rates.

13. ENVIRONMENTAL & POWER SUPPLY

a) Ambient Temperature: 0° C to +50°C- 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. SYNTHESIZED IF TO C-BAND UP CONVERTER (1+1) WITH AUTO CHANGEROVER UNIT

It should be possible to operate the Up-Converter from front panel. The Up-Converter should not require a PC or a controller for normal operation and control. Changeover unit required for operation in (1+1) hot standby mode with auto changeover shall be included in the offer.

All Up-converter units and changeover unit (for 1+1 operation) must be independent 19'' rack mounted units for ease of operation, maintenance and replacement in case of failure.

1	Input Frequency	52 MHz to 88 MHz
2	Output frequency	5850 MHz to 6425MHz
3	Frequency setting	Synthesized,1 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	0 dBm nominal
8	Input connector	BNC-F
9	Input return loss	20 dB or better
10	P1 dB Output level	+15 dBm or more
11	Overall Conversion gain	35 dB or more
12	Gain control	> 30dB insteps of 0.1 dB or smaller
13	Gain Slope	±0.05dB/MHz
14	Output Return loss (VSWR)	20dB or better
15	Amplitude/gain stability	±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 with carrier (@ 0 dBm output)	-65 dBc at P1dB
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 and web GUI(RJ-45)
24	Front Panel Indications	Power, Standby, Faulty, Remote/Manual
25	Operating temp	0^0C to + 50^0 C
26	Controls and Remote interface	Front panel control with web GUI (RJ-45) interface

2. DIGITAL AUDIO ENCODER 8-CHANNEL

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 (any channel from 1-8). Eight Stereo (XLR or D type with adaptor cable with XLR)
2.	Audio encoding format	MPEG-1& MPEG-4with AAC, ACC-LC, AAC HEv1&v2
3.	Mode	Stereo, Dual Mono channel selectable per channel
4.	Encoding rate	64 Kbps to 384 kbps

5.	Sample rates supported	48,96 and 192 KHz
6.	Frequency Response	50 Hz to 15 KHz≤ ± 0.3dB
7.	Distortion (THD+ N)	<0.01 % @ 1 KHz
8.	Signal to noise ratio	≥80 dB
9.	ASI Input UDP Multicast IP (TS) Input Port (≥ =1 MBPS Stream)	1 Nos for ASI Mux (up to 10 Mbps) Mux with one stereo Audio (Analog and Digital) at Sr. No 1
10.	Output	DVB-ASI (BNC) and UDP Multicast IP TS Simultaneous (RJ-45)
11.	Input Power	230 VAC nominal, 50 Hz
12.	Operating Temp.	0^{o}C to + 50^{0}C
13	Controls and Remote Interface	Front panel control with web GUI(RJ-45) interface

3. DIGITAL IF DVB-S/S2 MODULATOR (1+1) WITH AUTO CHANGEOVER UNIT

1	Modulator is to be DVB S/S2 Compliment	
2	ASI Inputs IP Inputs (UDP Multicast IP TS)	2 nos. 1 no.
3	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)
4	Input bit-rate	64 Kbps to 10 Mbps
5	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
6	Spectrum Roll off factor	DVB-S:10%,15%,25% and 35% selectable DVB-S2: 20%,25% and 35% selectable
7	Modulation Format	DVB-S:QPSK DVB-S2:QPSK
8	Baud Rates	Variable, 0.05 to 10 M symbols/sec
	IF OUTPUT INTERFACE SPECIFICATION	
9	Output Frequency range	52 to 88 MHz tunable

10	Synthesizer Step Size	1 KHz, step
11	Frequency Stability	<+ 0.1 Khz (all causes over 10 years)
12	Output Impedance	75 ohms unbalanced
13	Connector	BNC, female
14	Output Return Loss	>20 dB(50-90MHz)
15	Output Level range	-20 to 0 DBm
16	Level Step Size	0.1 dB, steps
17	Spurious Outputs	<-65 dBc/4KHz@-10dBm
18	Synthesizer phase noise	Meets requirements of IESS-308
19	CW mode	Selectable
20	Noise floor (C/No)	<-120 dBc/Hz
21	Spectrum Sense	Normal/Inverted
22	Controls and Remote Interface	Front panel control with and web GUI(RJ-45) interface

All Modulator and changeover unit (for 1+1 operation) must be independent 19' ' rack mounted units for ease of operation, maintenance and replacement in case of failure.

4. PROFESSIONAL IRD RECEIVER WITH L-BAND INPUT

The IRD should have a front panel display and also Web GUI and one should be able to enter or edit all the parameters for a perfect reception 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**	**950-2150MHz**
(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 or D type with XLR cable 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)	**Sample rate supported (digital/ analog)**	**48,96,192 KHz**
(n)	**ASI Output**	**1 No.**
(o)	**IP Output**	**1 No. (required for streaming such as UDP/RTP, SRT, AOIP**
(p)	**Controls and Remote interface**	**Front panel control with and web GUI(RJ-45) interface**

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)

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 (M) or D type with XLR cable
(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	8 Stereo, configurable as stereo, joint Stereo, Mono
(c) Connector Type	XLR (M) or D type with XLR cable
(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,+-0.3dB
(b) THD+N	0.01% @1Khz
(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 Akashvani Doordarshan'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.

5. INTER FACILITY LINKS

The Bidder should quote for all necessary adaptors, cable and other accessories as required for complete SITC setup as per BOM. Details of and other/ additional items required for complete integration of the system should be specified in Section A item 5 of BOM. All offered cables, connectors and accessories should be professional standard and of reputed make and compatible with the system units. Tech Details and detailed quantity should be mentioned in the offer.

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) Up-converter.
(II) Digital Encoder
(III) DVBs Modulator.
(IV) IRD Receivers
(V) L-Band Splitter 1:8

3 TEST EQUIPMENT (As per requirement of above Units to be tested)

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.(As required)
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 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.

4.2 DIGITAL MODULATOR AND DIGITAL AUDIO 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
(6) Digital modulation select ability check
(7) All Base-band measurements along with receivers.
(8) Spurious Check
(9) Any other test to check the conformity to the specs.

4.3 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.

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

4.4 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.

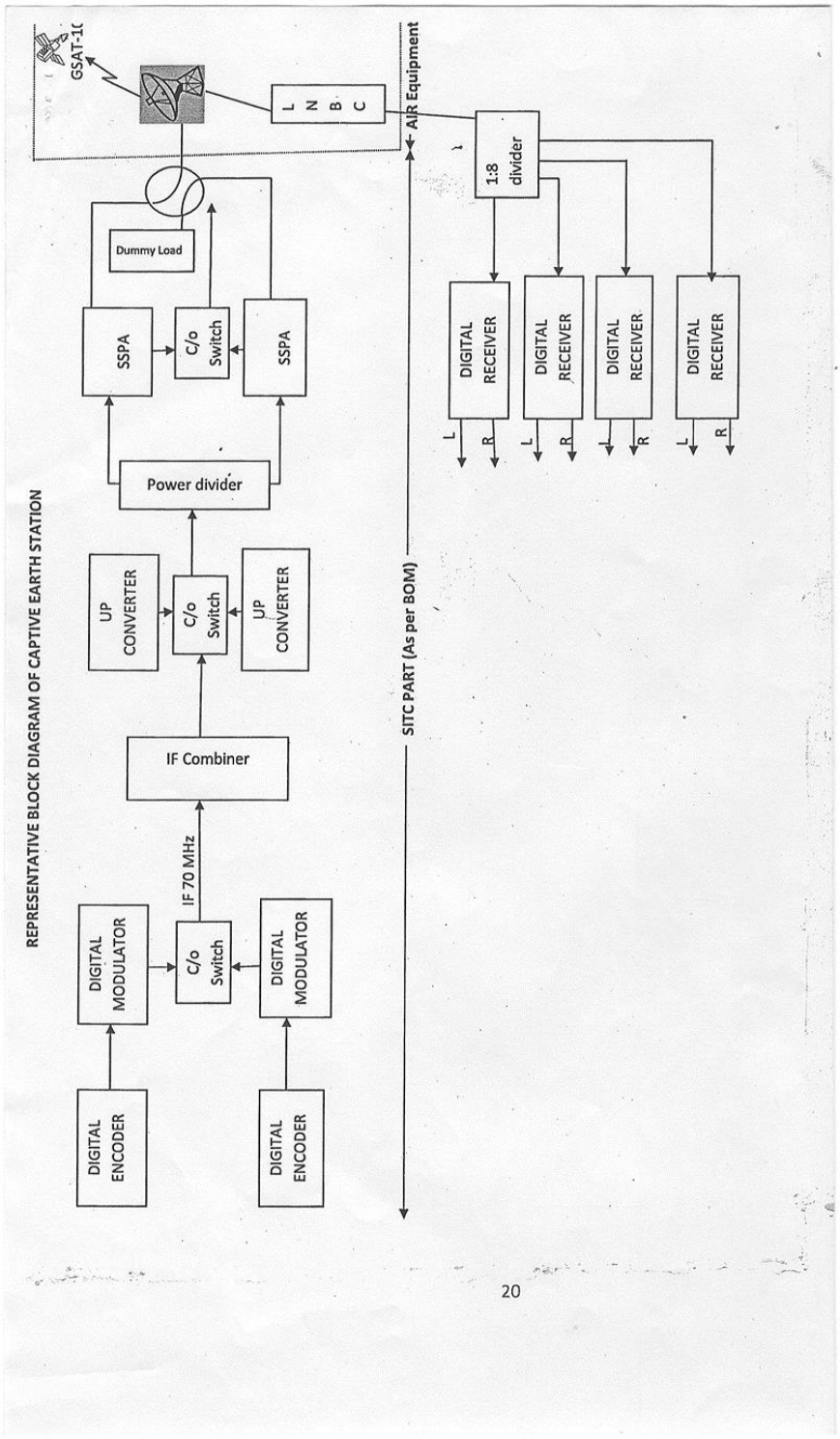
(ii) The indenter will examine the same and then it will be finalized after mutual discussion.

List of Stations –ANNEXURE-'A'

S.No	Zone	Name of station (Consignee)	C-Band UP-Convertor		8-Channel MCPC Audio Encoder	DVB-S/S2 Modulator		Professional IRD Receivers	L-Band Splitter 1:8
			Sets	Nos.	Nos.	Sets	Nos.	Nos.	Nos.
1	NZ	NBH Delhi	01 Set	01 No.	03 Nos.	01 Set	01 No	05 Nos.	01 No.
2	NZ	Shimla	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
3	NZ	Rohtak	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
4	NZ	Srinagar	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
5	NZ	Lucknow	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
6	NZ	Jaipur	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
7	NZ	Jalandhar	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
8	NZ	Almora	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
9	NZ	Jammu	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
10	NZ	Leh	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
11	NZ	Varanasi	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.
12.	SZ	Chennai	01 Set	01 No.	03 Nos.	01 Set	01 No.	05 Nos.	01 No.

13	**SZ**	**Trivandram**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
14	**SZ**	**Bangalore**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
15	**SZ**	**Hyderabad**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
16	**EZ**	**Patna**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
17	**EZ**	**Ranchi**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
18	**EZ**	**Kolkata**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
19	**EZ**	**Cuttack**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
20	**WZ**	**Mumbai BH**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
21	**WZ**	**Mumbai VBS**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
22	**WZ**	**Bhopal**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
23	**WZ**	**Ahmedabad**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
24	**WZ**	**Raipur**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
25	**WZ**	**Aurangabad**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
26	**NEZ**	**Guwahati**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
27	**NEZ**	**Shillong**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
28	**NEZ**	**Itanagar**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
29	**NEZ**	**Kohima**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**

30	**NEZ**	**Agartala**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
31	**NEZ**	**Aizwal**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
32	**NEZ**	**Imphal**	**01 Set**	**01 No.**	**03 Nos.**	**01 Set**	**01 No.**	**05 Nos.**	**01 No.**
	DTH Todapur to be handed over to NBH Delhi		**Nil**	**Nil**	**Nil**	**Nil**	**Nil**	**90 Nos.**	**Nil**


REPRESENTATIVE BLOCK DIAGRAM OF CAPTIVE EARTH STATION
GSAT-1(
L N B C
AIR Equipment
SITC PART (As per BOM)
1:8 divider
Dummy Load
SSPA
C/o Switch
SSPA
Power divider
UP CONVERTER
C/o Switch
UP CONVERTER
IF Combiner
IF 70 MHz
DIGITAL MODULATOR
C/o Switch
DIGITAL MODULATOR
DIGITAL ENCODER
DIGITAL ENCODER
DIGITAL RECEIVER
DIGITAL RECEIVER
DIGITAL RECEIVER
DIGITAL RECEIVER
L
R