

**PRASAR BHARATI**  
**DIRECTORATE GENERAL: ALL INDIA RADIO**  
**(PLANNING & DEVELOPMENT UNIT)**

**Draft Specification Document for SITC of DSNG ( Broadcast Terminal )**  
**at 4 AIR Stations of Port Blair, Panjim, Gangtok & Puducherry**

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**Subject: Draft Specification Document for SITC of DSNG ( Broadcast Terminal )  
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**INTRODUCTION:-**

AIR requires DSNG ( Broadcast Terminal ) for 4 AIR Stations at Port Blair, Panjim, Gangtok & Puducherry to uplink its Radio programmes for distribution in its network through Satellite. **DSNG ( Broadcast Terminal ) at 4 Stations** are static and are to be installed at respective stations. The Programmes uplinked by these **DSNG ( Broadcast Terminal )** will be received by other AIR stations using their Radio Networking (Receive) Terminal (RNT) and will be used either for Recording or for Broadcasting through their Terrestrial Transmitters. A Representative diagram of **DSNG ( Broadcast Terminal )** is placed at Annexure-I at page no.16.

**SECTION-A****1. BILL OF MATERIAL:**

AIR requires following Equipment / Services as per specifications detailed under Section A, B & C. Tenderer shall quote price of each item separately with necessary breakup keeping in view of the following.

- (i) Make and Model of Each Item is to be mentioned.
- (ii) Indenter reserves full right to choose schedule the quantities of Equipment / Services etc. at the time of placing order.
- (iii) All items mentioned under mandatory category will be taken into consideration for ranking purpose.
- (iv) Present requirement is for **AIR ,Stations at Port Blair, Panjim, Gangtok & Puducherry.**

**Mandatory Items per Site**

S.No.	Item	Quantity	Reference Section
1.	Audio Codec ( 1 No at Studio site of respective AIR, Station and another at DTH Set up , Doordarshan , Todapur , Delhi)	2 Nos	B-1
2.	IP Modem ( 1 No at Studio site of respective AIR, Station and another at DTH Set up , Doordarshan , Todapur , Delhi)	2 Nos	B-2
3.	C -band ( Normal) BUC 10 Watt	1 No.	B-3
4.	C – band 1.8 m Antenna	1 No.	B-4
5.	Details of any other items, required for complete integration of the system.eg. LNBC, splitter, Cables & Connectors.	1 Set	B-8
6.	Installation, Testing & Commissioning of <b>DSNG ( Broadcast Terminal )</b>	1 Job	B-9

	at sites ( Concerned equipment at Studio site of respective AIR, Station and remaining at DTH Set up ,Doordarshan , Todapur , Delhi) for complete Setup as per diagram at Page 16		
7.	Inspection	1 Job	A-7
8 .	Manuals	1 set	A-9
9.	Operation & Maintenance Training at Site	1 Job	A-8
<b>Optional Items</b>			
1	Single Channel Encoder	1 No.	B-5
2.	Audio Codec ( IP )	1 No.	B-6
2.	IRD (2 stereo O/P Channels)	1 No.	B-7

## 2. Quantity:

Total Quantity is to be Four times as per BOM at Section A-1 for **AIR Stations at Port Blair, Panjim, Gangtok & Puducherry and receiving equipment at DTH , Doordarshan, Todapur, Delhi.**

## LOCATION FOR SUPPLY & INSTALLATION:-

Supply, Installation, Testing and Commissioning at **AIR Stations of Port Blair, Panjim, Gangtok & Puducherry, and receiving equipment at DTH , Doordarshan, Todapur, Delhi.**

## 3. SCOPE:

The scope of this tender includes supply of the equipment as per specifications, technical requirements and quantities as detailed in the tender along with Installation, testing and commissioning of the equipment as per mutually accepted ATP.

## 4. ELIGIBILITY:

The bidder shall demonstrate quoted Equipment with full integration of equipment testing before Technical Evaluation Committee as per Diagram Shown at page 16. The time frame will be within 15 days after closing Date of Tender. TEC will not consider tenders submitted by those tenderers for technical evaluation, who fails to demonstrate quoted equipment within prescribed time ie, 15 days after closing Date of Tender., No further extension will be granted . Demonstration Clause is mandatory for all tenderer.

## **5. 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.

## **6. COMPLIANCE**

The compliance from Original Equipment Manufacturer (OEM) only will be considered. While complying to 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.

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.

## **7. 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.

### **a) Pre-dispatch Inspection:**

Pre-dispatch Inspection of the Equipment 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 (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 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.

**b) Site Inspection:**

After completion of Installation of all the equipment 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 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.

**8. TRAINING**

The tenderer shall provide one day training to AIR Engineers on Setting up, Configuration, Operation and Maintenance of the Equipment at each Station.

**9. MANUAL/ DOCUMENTATION & TEST CERTIFICATES**

1 Set of complete Manual for concerned station, One Set for Directorate & one Set for concerned Zonal Office. Each manual shall consist of following.

- a) 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)
- b) Test procedures for parameters measured at subsystem and integrated system levels.
- c) Test records/reports of all the measurements performed for each equipment and integrated system.

**10. DELIVERY PERIOD:-**

The Delivery Period for SITC and handing over of complete installation for all the sties shall be Three (3) months from the date of AT/PO.

**11. GENERAL REQUIREMENTS:**

**a. 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 from the OEM, Block schematic upto the sub-system, interconnection and wiring diagram should be give.
- ii) The equipment offered shall be of renowned make, well established and field proven. All the equipments should conform to the power supply and environmental requirement as detailed in para A-13.
- iii) The tenderer may be asked again to demonstrate the equipment to show compliance to AIR's specification at the technical evaluation stage.
- iv) This equipment shall be of state of art technology, capable for 24 x7 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 tenderer shall ensure that the equipments 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, Block schematic upto 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 facilitating installation of indoor equipments.  
Minor changes at site, if any, necessitated due to site conditions 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 tenderer shall also provide detailed plans of supply of material, testing and commissioning as per ATP.
- x) During the installation of these equipment, 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) The successful tenderer shall fully discharge all obligations under the Indian Workmen's Compensation Act in so far as it affects the workmen under his employment.

- xii) Maintenance support including availability of spares for baseband equipment 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 and spares, supplier shall intimate AIR in advance to enable AIR to stock the critical items of spares for the life of the equipment
- xiii) 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.
- xiv) The firm/tenderer must ensure repairs within 5 working day at site & in case the equipment cannot be repaired at site then the firm shall bear all the charges including to from freight charges to repair the equipment within or outside the country during the warranty period. For all equipments after sales service 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 build in/ incorporated for both personnel/equipment.
- d) Power Supply : 230 VAC± 10%, single phase, 48-52 Hz.



**SECTION -B****TECHNICAL SPECIFICATIONS****1. AUDIO BASE BAND CODEC:**

S.No.	Parameter	Specification
1.	Audio Input	Analog
	No. Of Channels	1 Stereo
2.	Audio encoding Format	MPEG4 With AAC LD, AAC .HE v1 & v2
3.	Mode	Stereo channel
4.	Encoding rate	64 kbps to 256 kbps
5.	Sampling frequency	44.1 KHz
6.	Audio Frequency Range(Analog)	500 Hz to 10 KHz, $\pm 0.5$ dB
7.	Distortion	<0.5 % from 500 Hz to 10 KHz
8.	Signal to noise ratio	$\geq 70$ dB
9.	Output	MPEG over IP
11	Input power	230 VAC normal, 50 Hz
12	Operating temperature	0 to + 40° C

**2. IP Modem ( L- Band)**

<b>Modulator is to be DVB S2 Compliant</b>	
Inputs	1 nos.
Compliance	DVB-S2/ IP mode)
Input bit-rate	64 kbps to 1 Mbps with step size 1bps
<b>Forward Error Correction and Modulation Scheme</b>	
FEC	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-S2: 25% and 35% selectable
Modulation Format	QPSK
Baud Rates	64 Ksps to 1 M symbols/sec
<b>OUTPUT INTERFACE SPECIFICATIONS</b>	
Output Frequency range	950-1525 MHz tunable

Synthesizer Step Size	1 KHz, step
Frequency Stability	<± 0.5 kHz
Output Impedance	75 ohms unbalanced
Connector	BNC, female or, any other
Output Level Range	-20 to 0 dBm
Level Step Size	0.1 dB, steps
Spectrum sense	Normal/Inverted

### 3. C band 10 W BUC:

S.No.	Parameter	Specification
1.	RF Frequency	5.85 to 6.425 GHz
2.	IF Frequency	950 to 1,525 MHz
3.	Output Power	10 W
4.	DC Power Voltage Range	+18 to +48 VDC
5.	IF Connector	F type
6.	RF Output Interface	Waveguide, CPR137
7.	Operating Temperature Range	-40 to +55 °C
8.	NMS	Required through Ethernet port.

### 4. 1.8 m C Band ( Normal ) Antenna with fixing arrangement for 10 W BUC.

(A) ELECTRIC SPECIFICATIONSS		
a)	Type	Elevation over Azimuth
B )	Frequency Range a) Transmit b) Receive	5.850 to 6.425 GHz 3.700 to 4.200 GHz
c)	Antenna gain	i)Transmit:≥ 35 dBi ii)Receive :≥ 30 dBi
d)	Polarisation	Linear Orthogonal
e)	Antenna Type	Prime Focus or, offset
f)	Cross polarization isolation	≥ 25 dB
g)	Output wave guide flange interface a) Transmit port b) Receive Ports	CPR-137 G CPR-229 G
h )	Azimuth movement	0 to 270 degree
I )	Elevation movement	5 to 90 degree

**Note: Antenna radiation pattern & X-Pole of feed system shall be got cleared by the supplier from NOCC/DOT before the completed installation is offered for acceptance for commissioning by AIR).**

## 5. Encoder ( Optional )

S.No.	Parameter	Specification
1.	Audio Input	Analog or Digital AES/EBU
	No. Of Channels	1 Stereo
2.	Audio encoding Format	MPEG4 With AAC LD, AAC .HE v1 & v2
3.	Mode	Stereo,
4.	Encoding rate	64 kbps to 256 kbps
5.	Sampling frequency	44.1 KHz or better
6.	Audio Frequency Range(Analog)	50 Hz to 10 KHz, $\pm 0.5$ dB
7.	Distortion	<0.5 % from 50Hz to 10 KHz
8.	Signal to noise ratio	$\geq 70$ dB
9.	Output	MPEG over IP
11	Input power	230 VAC normal, 50 Hz
12	Operating temperature	0 to + 50° C

## 6. AUDIO BASE BAND CODEC ( Optional):

S.No.	Parameter	Specification
1.	Audio Input	Analog and Digital AES/EBU selectable
	No. Of Channels	1 Stereo
2.	Audio encoding Format	MPEG4 With AAC LD, AAC .HE v1 & v2
3.	Mode	Stereo channel
4.	Encoding rate	64 kbps to 256 kbps
5.	Sampling frequency	44.1 KHz, or higher sampling rate
6.	Audio Frequency Range(Analog)	500 Hz to 10 KHz, $\pm 0.5$ dB

7.	Distortion	<0.5 % from 500 Hz to 10 KHz
8.	Signal to noise ratio	≥ 70 dB
9.	Output	MPEG over IP
11	Input power	230 VAC normal, 50 Hz
12	Operating temperature	0 to + 40° C

## 7. Professional IRD Receiver ( Optional)

The IRD should have a front panel display 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 Parameter Specifications:

(a)	Input Frequency Range	950-1750 MHz
(b)	No. Of Inputs	1 nos.
(c)	Tuning Step Size	1 KHz
(d)	Satellite Frequency Bank	C-Band,
(e)	Input Impedance	75 Ohms
(f)	Input Connector	F-Type Female
(g)	Output Connector	XLR for analog or, AES-EBU or, Break-out Box with XLR.
(h)	Input Power Range	-65 to -30 dBm per carrier
(i)	De-modulation Method	DVB-S2 QPSK demodulation
(j)	Variable Symbol Rates	64 k symbols/sec to 1 M symbols/sec
(k)	Convolutional Inner FEC Rates selectable	R=1/3, 2/5, 1/2, 3/5, 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

### Audio Decompression Parameters

(a) Audio Decompression Type: - MPEG-4 with AAC LD & AAC HE v1 &v2.

### Audio Output:-

Each Analog /Digital audio output shall be presented as a stereo .

**Analog Audio Output Specifications**

Parameter	Specification
(a)Output Impedance	600 ohm(balanced)
(b)Number of Outputs	2 Stereo, configurable as Stereo, Joint Stereo Mono, Dual mono.
(c)Connector Type	XLR Male Socket or with suitable Adapter
(d)Data Rate	64-256 kbps(MPEG-4 )

**Audio Performance Specifications (at 44.1 KHz or higher sampling rate)**

(a) Frequency Range (Analog)	50 Hz to 10 KHz, $\pm 0.5$ dB
(b) THD+N (1 KHz at max. Level)	0.1% from 50Hz to 10 KHz.
(c) Signal to noise ratio	$\geq 70$ dB

**8. INTER-CONNECTING CABLES, CONNECTORS AND ACCESSORIES**

Interconnecting RF & Audio cables, power supply cables, connectors, audio patch chord and other accessories required for the monitoring system shall be included in the tender. **C-BAND PLL LNBC Make & Model is to be specified and comply following specification .**

RF Frequency: 3.4 to 4.2 GHz, LO Frequency: 5.15 GHz,& LO Frequency Stability +/- 15 kHz.

**9. INSTALLATION & COMMISSIONING**

Installation will include all the equipment within the wired racks at stations. All BOM mentioned is to be integrated to the existing system. Commissioning Certificate will be issued by the official posted at respective stations.

## **SECTION 'C'**

### **DRAFT ATP**

#### **1. INTRODUCTION**

This document describes the Acceptance Test Procedure (ATP) for testing the various units 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**

- a) Codec, Encoder( Optional) and Modulator.
- b) Monitoring System comprising IRD (Optional) .

#### **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.  
(This is a tentative list. Additional equipment shall be specified by the indenter if needed).
  - i. Audio analyzer and Spectrum Analyzer
  - ii. Digital Modulation Analyzer.
  - iii. PC / Laptop with Printer.
  - iv. Any other equipment and standard reference source/setup necessary for measurements.
  - v. 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 DIGITAL MODULATOR AND DIGITAL ENCODER**

- a) Functionality test for individual modulator
- b) L- band Range

- c) O/P Frequency stability and accuracy
  - d) O/P level stability
  - e) Coding standard, data rates check
  - f) Digital modulation selectability check
  - g) All Base-band measurements along with receiving Codec or IRD ( Optional)
  - h) Any other test to check the conformity to the specs.
- .

## **5. GENERAL**

- a) 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.
- b) The indenter will examine the same and then it will be finalized after mutual discussion.

Proposed Setup of DSNG ( Broadcast Terminal) as shown below:

GSAT-10/GSAT 18

