Reminder

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

No. : 2(10)/2024-SCDITEC/STL-20Nos. **Dated: 21.07.2025**

Subject: Specification for the "SITC of Multi-Channel Stereo Digital Microwave Link at 20 sites" for Industry feedback & budgetary quotes –reg.

Reference: DG:Akashvani letter of even no. dated 15.05.2025 & 02.06.2025.

Dear Sir,

This is regarding above. As DG:Akashvani is planning for Procurement of SITC of Multi-Channel Stereo Digital Microwave Link at 20 sites on open tender basis, The prospective bidders were requested for their Industry feedback (If any) and budgetary quotes on subject equipments.

In this regards, 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 26.07.2025:

1. satellitedivision@prasarbharati.qov. in

Encl: as Above

21/07/2025
(Manoj Kumar Gupta)
AD(E-SCD)
For Director General

To,

1. Prasar Bharati website

2.The Prospective bidders

3.DDG(E)(Procurement Division)

प्रसार भारती / Prasar Bharati
(India's Public Service Broadcaster)
आकाशवाणी महानिदेशालय/ Directorate General: Akashvani
Satellite Connectivity Division

SPECIFICATION COVER SHEET

TITLE	: SPECIFICATION FOR SITC OF MULTI CHANNEL STEREO DIGITAL MICROWAVE LINK
SPECIFICATION No.	: SCD/SPEC/20/2025/Digital MW-LINK
DATE OF APPROVAL	: 14.05.2025
NO OF PAGES	: 25
APPROVAL FILE No.	: 2(10)/2024-SCD/TEC/STL-20 Nos.

SUMMARY OF CONTENTS:

(Kamal Singh) [DDE-SCD] [DDG(E)(SCD)]	(Jitender Katara) (DDG (E)(Planning)	(Jitender Pruthi) [DDG(E)(NBH)]	(B.K. Oberoi)

सत्यमेव जयते
प्रसार भारती / Prasar Bharati
(India's Public Service Broadcaster)
आकाशवाणी महानिदेशालय/ Directorate General: Akashvani
Satellite Connectivity Division

Subject: Specification for the "Supply, Installation, Testing & Commissioning (SITC) of Multi-Channel Stereo Digital Microwave Link".

INTRODUCTION:

All India Radio requires Multi-Channel Digital Microwave Links for transporting of programs from Studio Complex to Transmitter sites mentioned under Annexure-A. These Microwave links are to be installed using towers (or structures on roof top of buildings having clear line of sight) at locations as per list Annexure A.

A block diagram showing the Digital Microwave Link set up is enclosed as Annexure-B.

SECTION 'A'

1. **BILL OF MATERIAL:**

A. Mandatory items:

Sl. No.	ITEM	Specification on	Quantity
1(a)	R.F. Trans equipment (1+1) with autochangeover unit along with accessories (Station wise requirement details are given at Annexure 'A')	Section-B.1	1 Set/Station
1(b)	R.F. Receive equipment (1+1) with autochangeover unit along with accessories (Station wise requirement details are given at Annexure 'A')		1 Set/Station
2.	Baseband System housed in a standard 19" rack having following configuration at a Station.	Section-B.2	
(a)	At AIR, Studio site: (1+1) i.e. 2 chassis; each chassis containing Power supply card in 1+1 redundant mode and relevant cards for 2 audio channels (individual card per audio channel)- as per site details in Annexure-A (Detail of cards be furnished in BOM)		1 Set/Station
(b)	At AIR, Transmitter site: (1+1) i.e. 2 chassis; each chassis containing Power supply card in 1+1 redundant mode and relevant cards for 2 audio channels (individual card per audio channel)-as per site details in Annexure-A (Detail of cards be furnished in BOM)		1 Set/Station
3. (a)	Dish Antenna (solid parabolic with radome 1.8 meter dia. nominal) with accessories for Srinagar, Kargil & Pauri.	Section-B.3	2 Sets/Station (One set each at Studio and Transmitter end)
3. (b)	Dish Antenna (Grid pack/Flat Panel/Solid 1.8 meter dia. nominal) with accessories for rest stations.		2 Sets/Station (One set each at Studio and Transmitter end)
4. (i)	(i) RF Cable with accessories (100 meters each). (Cost per meter shall also be quoted for RF cable)	Section-B.4	2 Sets/Station (One set each at Studio and Transmitter end)
4. (ii)	(ii) Surge Suppressor		2 Set/Station
5.	2KVA (1+1) UPS in parallel load sharing mode with individual separate Battery Bank.	Section-B.5	2 Set/Station (1 set at each end)

6.	Stereo Wired Racks with Cables, Connectors and accessories.	Section-B.6	2 Set/Station (1 set at each end)
7.	Installation, Testing and Commissioning of complete link along with provision of proper Earthings (as per AIR Specification) at both Studio and Transmitter end.	Section-B.7	1 Job/Station
8.	5 Meters Structure including civil works to support dish Antenna & RF cable on building Roof top.	To be provided by the tenderer	5 nos.
9.	Training of Two days for AIR engineers at all sites (as per AIR Specification).	Section-A.9	1 Job/ Station
10.	(a) Pre dispatch Inspection as per ATP.	Secion-A.8	1 Lot
	(b) Technical Manuals set of all equipments. (Two sets for each station, Two sets for DDG (E)(SCD), DG:AIR, One set each all for five Zonal offices, one sets for NABM (T), Delhi and one for ADG(E) R&D, New Delhi.	Section-A.10	49 sets
11.	Details of any other item required for complete integration, commissioning & operation may be furnished with the tender.	------	1 Lot /Station

OPTIONAL ITEMS:

Sl. No.	ITEM	Specification on	Quantity
1.	Spares as per list	Section-A .12	1 set
2.			

1. Scope:

The scope of this tender includes supply, installation, testing & commissioning (SITC) of **Multi-Channel Stereo Digital Microwave Link** as per specifications, technical requirements and quantities as mentioned in the AIR specification at the sites mentioned under Annexure-A.

3. Quantity:

Total Quantity and configuration of Multi-Channel Digital Microwave Link at each of the Stations is given, station wise, in Annexure- A.

4. Location for supply:

Equipment is to be Supplied, installed, tested and commissioned at Studios and Transmitter locations at Stations mentioned in Annexure-A.

5. Eligibility:

The bidder shall have proven experience of carrying out SITC of Microwave Links/Broadcast equipments i.e. Studio, Transmitters, Earth Stations. Bidders shall provide documentary proof (with

certificate from client including contact details like telephone nos. and E-Mail address) of successfully carrying out at least one work of SITC.

Bids not fulfilling eligibility criterion shall be rejected without any further reference.

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 for mandatory as well as optional items. Make and model of each item must be mentioned.

7. Compliance:

The compliance from original equipment manufacturer only will be considered. While complying to the specifications, 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-Mail 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 (SITC) shall be done as per mutually accepted and approved Acceptance Test Procedure (ATP). Draft ATP is annexed as Section-C.

a) Pre-dispatch Inspection:

Pre-dispatch Inspection of the links shall be carried out at Integrator's works by the Engineer (s) of All India Radio. The performance certificate along with measurements taken on all equipments (duly certified by OEM) is required to be submitted by the tenderer before inspection at their premises.

Complete equipment ordered shall be inspected in a single lot. Supplier has to ensure that complete set of equipments for a lot are offered, for inspection.

Pre dispatch inspection shall be carried out for all equipments i.e. RF trans & receive system, Audio Baseband unit alongwith Antenna, UPS, RF cable, rack etc., on the basis of OEM certified performance certificate alongwith measurement.

During the Pre-dispatch inspection, supplier shall put up all the equipments for test on the test bench at integrator premises before the AIR representative and shall provide, electric energy,

consumable materials, tools, testing instruments, labour and any kind of assistance required 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. A typical draft ATP is enclosed. Detail ATP shall be submitted by the vender/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.

The expenses towards to and fro journey, DA and lodging in respect of Inspection Engineers(s) will be borne by Prasar Bharati.

b) Site Acceptance Test:

After completion of Installation of all the equipments at the Station, Final inspection and testing of the installation at the Station will be carried out by the representatives of AIR for certifying the installation. This will include visual examination of the installation, overall performance measurements, link level measurements as per ATP 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 three days training to AIR Engineers on settingup, configuration, operation and maintenance of the equipment at each Station.

10. Manual/Documentation & Test Certificates:

Set of Manuals consisting of following should be provided to as per bill of material.

a) Manual for operation, configuration, maintenance of each equipment, sub system, 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 systemlevels.
c) Test records/reports of all the measurements performed for each equipment andintegrated system.

11. Delivery Period:

The Delivery Period for SITC and handing over of complete installation for all the sites shall be 9 months from the date of issuing of Advance A/T or 6 months from the date of decision letter (DL) from WPC in respect of STL whichever is later.

12. Spares:

Tenderer must quote separately essential spares as recommended by the OEM, including their quantities and cost (per unit). The cost of spares shall not be counted for deciding the commercial ranking of tenders. Various RF modules like transmitter, receiver, interface units, Audio Encoder-Decoder modules, Multiplexer-Demultiplexer modules, Power supply modules, and any item which is to encounter more wear and tear etc. must be quoted as spares along with other units.

13. 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 given.

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-14.

iii) The tenderer may be asked to demonstrate the equipment to show compliance to AIR's specification at the technical evaluation stage. The tenderer shall furnish the list of the customers along with contact details (including Telephone No's, E-Mail) where similar equipment has been supplied by the tenderer/manufacturers. In the absence of such list, tender may be rejected.

iv) This equipment shall be of state-of-art technology, capable for 24 Hx365 days 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 equipment offered fully incorporate the standard features 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) Provision of RF cable and associated materials as per site requirement shall be made. The rates of RF cables may be quoted on per meter basis. However, the offer will be ranked on the basis of a notional cable length of 100 meters each at both ends.

viii) 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.

ix) 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,hoisting of Dish antenna on the tower, routing of the cable, length of the RF cable, etc. 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 AIR.

x) 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 AIR. This may include dismantling of existing antenna/cable etc. and other minor items in case no suitable alternate location is available at tower platform for mounting of new antenna.

xi) After Acceptance of the tender, within one month, the successful tenderer shall also provide detailed plans of supply of material, installation, testing and commissioning as per ATP.

xii) 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. The successful tenderer shall make good all damage to the purchaser's buildings, property, equipment, article and departmental personnel arising from the erection of the tower and/or mounting of antenna on tower in the course of such erection or mounting and throughout the guarantee period.

xiii) The successful tenderer shall indemnify and hold harmless the purchaser against all the claims in respect of damages to buildings, property, articles, situated nearby not belonging to the purchaser, and public personnel arising from the erection of the tower and/or mounting of antenna on tower in the course of such erection or mounting and throughout the guarantee period.

xiv) The successful tenderer shall indemnify and hold harmless the purchaser against claims in respect of injury to any personal howsoever arising from the erection of the tower and/or mounting of antenna on tower in the course of such erection or mounting and throughout the guarantee period.

xv) 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.

xvi) The tenderer shall be responsible for safe erection or work on the tower and other accessories etc. The tenderer shall take all necessary safety measures and precautions during the SITC work. The firm shall have to arrange all the installation material required for installation and insure all the personnel climbing the towers at their own cost. Any fixtures, clamps or mounting accessories needed for hoisting the dish on the tower has to be arranged by the firm. Tower work shall be got done at site under the supervision of qualified representative of the firm.

xvii) 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.

xviii) All the equipments shall carry a warranty for 12 Months from the date of acceptance of installation at site against any manufacturing defects and failures.

xix) All optional items mentioned in the tender must be quoted. Failing this, the tender would be liable to be rejected. However, these items would not be considered for ranking purpose.

xx) The tenderer/firm must have a well equipped & established service center in India. The complete address and contact details of the Service centers in India, duly certified by the OEM, shall be indicated. The firm/tenderer must ensure to repair/rectify of any defect of any equipment during guarantee/warrantee period, within 72 hours at site (from the time of first intimation to OEM/tenderer) & in case the equipment can not 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.

xxi) If the supplier failed to rectify the faults within the stipulated period of 72 hrs., the guarantee period for that particular site equipment/items would be extended corresponding to the outage period.

14. Environmental & power supply

a) Ambient Temperature (for outdoor units):
-30ºC to + 40ºC – For Srinagar, Kargil & Pauri (Hill Stations).
-10ºC to + 50ºC – For Other Stations.
-10ºC to + 40ºC – For indoor units.

b) Relative Humidity : Upto 95% non condensing at 40ºC.

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

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

SECTION-B

TECHINCAL SPECIFICATIONS FOR SITC OF MULTI-CHANNEL DIGITAL STEREO MICROWAVE LINK:

1. TRANSMITTER EQUIPMENT & RECEIVER EQUIPMENT:

Transmitter equipment and Receiver equipment housed in a chassis should be supplied in 1+1 hot standby configuration. Transmitter section of this RF equipment should be capable of receiving data from the Audio baseband equipment and the receive section should be capable of retrieving the data from the RF receiver and feed it into Audio baseband equipment for facilitating demultiplexing of the Audio.

KEY FEATURES:

1. Simplex operation.
2. 19-inch rack mounting.
3. Each Trans and Receive unit should be capable of working independently in case of failure of Auto-Change over switch. All connectors and cables required for independent operation of standalone Trans-Receive unit shall be supplied.

TX & RX System:

1	a) Frequency of operation: b) Step Size: c) RF Frequency Stability:	1518-1525 MHz, Fully Synthesized, tunable Less than 1MHz. Better than or Equal to ± 3 PPM.
2	Modulation/Demodulation:	32 QAM
3.	RF Bandwidth:	≤500KHz
4.	Data Rates:	2 Mbps
6.	Forward Error correction	Reed Solomon
7.	RF O/P power at (1+0 mode)	≥30dBm at 50 ohms
8.	Spurious and Harmonics Emission	< - 60 dBc
9.	Receiver Sensitivity (for 10^{-6} BER)	Better than –88dBm
10.	Dynamic Range	Better than 40 dB
11.	(a)Configuration: (b) Insertion loss for change over unit of (1+1) mode	(1+1) Hot standby with auto changeover. Also should work in 1+0 mode (Change over switch by pass mode. Tx ≤ 2 dB Rx< 5 dB
12.	Power Supply:	230 VAC ±10%, 50 Hz ±2 Hz
13.	Standard Compliance:	ETS /EN international Standards for EMC/EMIand Radio Performance.
14.	Size:	19" Rack mount.

2. AUDIO BASE BAND UNIT:

Baseband unit with relevant cards and accessories:

The audio base-band Unit should be a separate unit & not an integral part of the RF equipment. The system should be offered as **(1+1)** with Power supply module in 1+1 redundant mode and relevant cards required to meet specifications for 2 audio channels as per site details in Annexure-A and other specs. (Detail of card layout to be furnished by tenderer).

Base band unit should fulfill the following features. The unit should be ITU-T complaint and it is to interface with circuits or Microwave link Transmitter & Receiver equipment (specified –Section B-Item 1).

1. Baseband equipment should be able to transport audio channels with analog & digital input/outputs, each occupying data rate from 64 kbps to 384 Kbps per channel (in 64 kbps increments) in simplex mode.

2. Baseband equipment should be able to transport Simplex data stream upto ≥1.2Mbps in simplex mode, multiplexed with the coded audio data over output.

3. The system should be designed for continuous 24 Hours operation andshould be software upgradable.

4. It should have Status display by LED's or other visual form and audio alarm incase of failure.

1.	Input/output	Analog and Digital (AES/ EBU)
2.	Audio Channels 2 No., Mode	Mono, Dual Mono, Stereo
3.	Baseband interface	Should be able to connect directly to Radio link equipment.
4.	Frequency Response	Within +/-1 dB for 30 Hz to 15 KHz w.r.t 1Khz at nominal level
5.	Audio input level (nominal at 1 KHz)	0dBu
6.	Audio input level(Max. at 1KHz)	18 dBu above nominal
7.	Input Impedance (For Analog)	600 Ω Balanced / ≥10 K Ω (userSelectable)
8.	Audio output level (nominal at1 KHz)	0dBu
9.	Audio output level (Max. at 1KHz)	18 dBu above nominal
10.	Output Impedance (ForAnalog)	600 Ω / ≤100 Ω (user Selectable)
11.	Input / Output Impedance (For Digital Audio)	110 Ω

12.	Input / Output connectors	XLR In case the connectors on the encoder/decoder module are differentfrom XLR, suitable adopters for terminating audio input/output on XLR connectors shall be provided and all XLR connectors shall be terminated on a back panel in therack at no extra cost to the indentor.
13.	Coding Algorithm	MPEG4 AAC HE.v1&v2 or more
14.	A to D Conversion	24 Bit
15.	Sampling Frequency	48 KHz
16.	THD+ N (1 KHz at max output level; Unweighted)	Less than 0.1%
17.	Cross talk	Better than 80 dB
18.	SNR (Unweighted)	Better than 85 dB
19.	Audio coded data rate	Configurable 64, 128,192, 256,384 kbpsper channel
20.	Mounting	19" Rack

3. ANTENNA (TRANSMIT & RECEIVE) ALONG WITH FEED:

Antenna should be of reputed make and should be fully compatible with RF part of the link. All the parts of the antenna such as mounting fixtures etc. must be of same make and should be the part of the antenna kit from the same manufacturer.

Antenna should be supplied with Radome arrangements for installation at AIR Srinagar, Kargil & Pauri stations.

1.	Diameter (nominal)	1.8 M (around)
2.	Gain (dBi) (mid band)	≥ 26dBi
3.	Front to back ratio (dB)	≥ 30
4.	Polarization (mono-polar)	Linear adjustable (Vertical orHorizontal)
5.	Impedance	50 ohm (N. connector)
6.	Type i. For AIR Srinagar, Kargil & Pauri ii. For Rest of the stations as per Annexure-A	Solid parbolic with Radome Grid pack/Flat panel/Solid
7.	Weight (including mounting fixtures) a) For AIR Srinagar,Kargil & Pauri Solid parabolic dish with Radome etc. b) For Rest of the stations as per Annexure-A	≤ 90 kg ≤60 kg
8.	Azimuth adjustment (degree)	Min ±45 degree
9.	Elevation, adjustment (degree)	Min ± 5 degree
10.	Wind velocity (Survival)	180 Kmph
11.	VSWR	≤ 1.30

4. (i) RF Cable:

1.	R.F. cable loss at 1.5 Ghz	≤ 5.5 dB per 100 Meters
2.	R.F. cable impedance	50 +/- 1 Ohms

RF Cable should be provided with all installation and earthing kits. Any joints in the cable are not permissible. This Cable is to be earthed at Equipment rack, at Antenna end and in between along the length of the tower.

Keeping in view of topography, earth resistance value should be at par with at least permissible value maintained at respective station records.

(ii) Surge suppressor:

S. no.	Specification	Parameter
1.	RF Lighting protection	700MHz to 2.7GHz, 700W
2.	Insertion Loss	≤0.1dB
3.	Connector	N(F) to N(F)
4.	Surge suppressor shall be provided along with N(F) to N(F) adopter for bypass.	

5. 2KVA UPS in (1+1) Parallel Redundant Load sharing Configuration:

2KVA Rack mountable shall be supplied in (1+1) parallel configuration. Eachsuch unit (i.e. 2KVA UPS in 1+1 parallel configuration) shall be required to be supplied at Studio end as well as at Transmitter end.

1.	Type	On line, pure sine wave
2.	Power rating	1400W/2 KVA, Single phase
3.	Configuration	(1+1) Parallel Redundant load sharingmode
4.	Output Bus bar	The output of both the UPS's will be connected to a single bus bar.Normally when both UPS's are OK theyshall share 50:50 loads. In case of failure of any of the UPS, full load will be taken over by other unit.
5.	Battery back up	For 30 minutes operation on full load
6.	Type of Battery	Sealed Maintenance free battery. Separate Battery pack has to be provided for individual UPS. (Batteries need not be Rack Mounted)
7.	Input voltage range	230±20% V A/C (at full load)
8.	Input frequency range	50 ± 5% Hz
9.	Output Voltage	220V, 50 Hz, Single phase
10.	Output Voltage regulation	+/- 2%
11.	Output frequency	50 Hz
12.	Type of approval	ISO certified, standard, reputed make
13.	Metering & indicators	It should be possible to monitor battery low, over Load etc. through Meters/Indicators. It should also be possible to monitor all types of alarms.

14	Maintenance Bypass	Suitable circuit breakers be provided to facilitate removal of defective or installation of repaired UPS without affecting normal operation at load side.

6. WIRED RACKS FOR EQUIPMENT:

All the above indoor equipment shall be installed in the full size, 16 SWG wired rack of height 42U and overall depth of not more than 800 mm along with requisite jack- strip, Tag block, side panels, back door & other items both at transmitting and receiving site.

Audio distribution Amplifier (Analog & Digital) inputs and outputs shall be wired. It is to feed Audio to input of normal and standby Encoder and to the switcher of monitoring Amplifier input at studio site. At transmitter and studio site monitoring amplifier input is to be wired as shown in block diagram Audio distribution and Monitoring amplifier shall be provided by the Tenderer**.** All channels input at studio site and output at transmitter site are required to be wired as detailed tentatively in Annexure' C.'

The rack must be properly fitted, grouted and earthed. The rack shall be powder coated as per six tank process with air ventilation. It shall be fitted with cooling fan, light, power distribution board with proper RFI and EMI fitters. The jack strip, Tag block,cables and connectors used must be of highest professional quality. All these items shall be of reputed brand. The brand offered shall be mentioned in the bid (Ordinary cables and connectors shall not be accepted).

Typical stereo Patch panel configuration for a 2 audio channel configuration system is shown at Annexure-'C'. For other audio channel configurations similar wiring has to be adopted. Successful tenderer will be required to submit detailed rack wiring diagram within 15 days of placement of order to this Directorate for approval.

7. INSTALLATION & COMMISSIONING:

Installation will include installation of all the equipments within the wired racks, hoisting of the dish antenna over the towers or the roof top steel structure, routing of the RF cable from the antenna to indoor system, earthing of RF cable at either end and in between along the length of tower, and providing earth pits as per AIR Specifications (Earth resistance should be <1 ohm or keeping in view of topography, earth resistance value should be at par with at least permissible value at both the Studio and Transmitter end at each of the Station. Racks and all the equipment must be earthed. The workmanship of the entire Installations shall be of highest professional standard.

Installation schedule at stations has to be intimated at least 3 weeks in advance. Complete Installation at each station shall thereafter be offered for Site Acceptance Test and Inspection at site, shall be conducted by the representatives of DG: AIR.

SECTION C

DRAFT ATP FOR SITC OF MULTI CHANNELSTEREO DIGITAL MICROWAVE LINK

1. **INTRODUCTION:**

This document describes the Acceptance Test Procedure (ATP) for testing the various units of the Digital Microwave Link 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**

The items to be tested first individually and then integrated are as follows:

a) Individual Items:

i) R.F. Tran & receive Equipment.
ii) Base Band Unit.
iii) Other peripheral equipment such as UPS etc.

b) Integrated Setup:

Complete integrated setup from Audio input to base-band unit to audio output from base band unit.

3. **TEST EQUIPMENT:**

a. All requisite test equipment conforming to the required standard for testing and commissioning shall have to be provided by the supplier.
b. Indicative List of the test & measuring equipment:

i) Spectrum Analyzer (>2 GHz range).
ii) Power Meter with sensor & Attenuator etc.
iii) Frequency counter.
iv) Signal Generator.
v) Audio Analyzer.
vi) BER Tester.
vii) Digital Modulation Analyzer having Digital demodulation feature.
viii) PC with Printer.
ix) Directional Coupler, inter-connecting cables, attenuators, combiners,Dividers, etc. as may be necessary for the tests.
x) Any other equipment and standard reference source/setup necessary for measurements.

4. TESTS REQUIRED TO BE CARRIED:

(NOTE: This is only a tentative list, additional items of tests may be specified by theindenter, if needed.).

4.1 RF TRANSMITTER & RECIEVER:

i) Functionality test for individual RF Transmitter & Receiver and in (1+1) configuration
i) Power output check
ii) Frequency stability and accuracy
iii) Spurious & Harmonics
iv) DATA rate & coding standards
v) Digital modulation
vi) Any other tests to check the conformity to the specs.

4.2 Audio Base band Unit:

a) Functionality test for individual Base-Band unit.
b) Coding standard, data rates check.
c) All Base-band measurements i.e. Frequency response, THD Noise level, Crosstalk etc. as mentioned in ATP.

4.3 RECEIVER

i) Functionality check for individual monitoring setups for Analog signal andDigital signal.
ii) Tests for Analog output receiver including sensitivity, carrier lock range,audio output level: THD, Noise level, frequency response, cross talk etc.
iii) Test for Digital O/P receiver including, carrier lock range, BER, Eb/No, Audio output, level, THD, Noise Level, frequency response, cross talk for both stereo channels, BER immunity test etc.

4.4 INTEGRATED SETUP

i) After the individual tests the equipment will be installed and integrated to Work as MW link as per specs. The integrated setup will then be tested for complete system performance and functions.
ii) The tests for commissioning would include the integration check and Conformity to system specs. including
a. EIRP
b. Radiation conformity to standard specified
c. Emissions conforming to international standard. Overall Performance measurements to meet the specs.
d. Cable Loss (both at Transmitting & Receiving end)
e. Alignment of dish for optimum performance

4.5 PERIPHERAL EQUIPMENT

All peripheral equipment shall be tested for the various functionality prescribed andconformity with these specifications.

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

5. GENERAL

i) Based on above supplier is required to give a detailed ATP document giving procedure for tests of individual item as well integrated setup. This should include test setup, equipment details, inter-connection diagram and the format for test reports.

ii) The indenter will examine the same and then it will be finalized after mutualdiscussion.

Annexure-A

LIST OF STATIONS FOR STUDIO TO TRANSMITTER CONNECTIVITY:

NORTH EAST ZONE

State/station	FROM	TO	Audio Channel Number	Remarks
MANIPUR				
1. IMPHAL	STUDIO	FM-TX	2 Nos.	
2. IMPHAL	STUDIO	TX	2 Nos.	
TRIPURA				
3. AGARTALA	STUDIO	FM-TX	2 Nos.	
4. AGARTALA	STUDIO	TX	2 Nos.	
NAGALAND				
5. KOHIMA	STUDIO	FM TX	2 Nos.	

EAST ZONE

State/station	FROM	TO	Audio Channel Number	Remarks
ODISHA				
6. SAMBALPUR	STUDIO	TX	2 Nos.	
7. JEYPORE	STUDIO	TX	2 Nos.	
BIHAR				
8. PATNA	STUDIO	TX	2 Nos.	

SOUTH ZONE:

State/station	FROM	TO	Audio Channel Number	Remarks
ANDHRA PRADESH				
9. CUDDAPAH	STUDIO	TX	2 Nos.	
10. VIJAYAWADA	STUDIO	TX	2 Nos.	

WEST ZONE

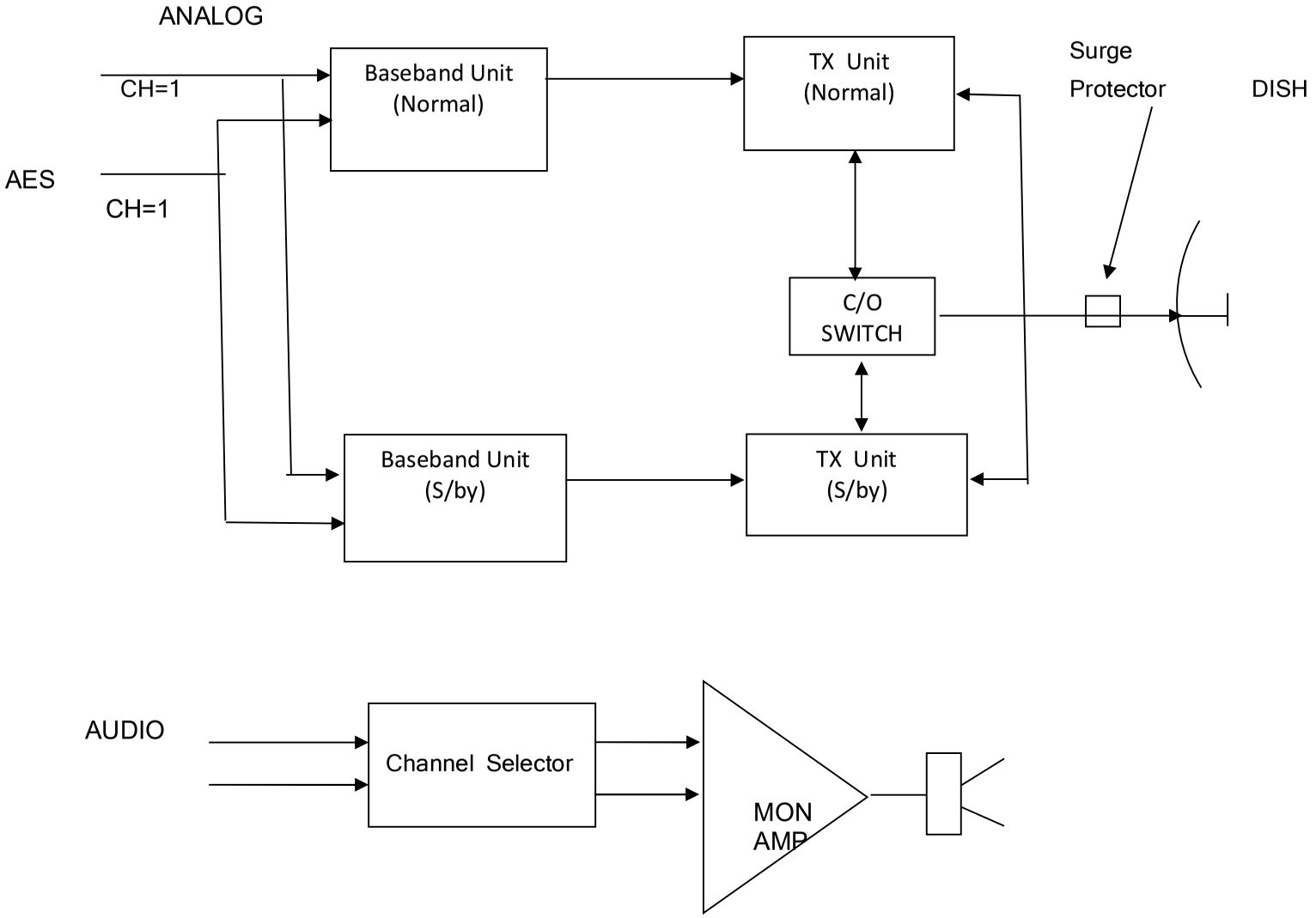
State/station	FROM	TO	Audio Channel Number	Remarks
MAHARASHTRA				
11. AURANGABAD	STUDIO	TX	2 Nos.	

NORTH ZONE

State/station	FROM	TO	Audio Channel Number	Remarks
JAMMU & KASHMIR				
12. SRINAGAR	STUDIO	TX	2 Nos.	
LADDAKH				
13. KARGIL	STUDIO	TX	2 Nos.	
RAJSTHAN				
14. KOTA	STUDIO	TX	2 Nos.	
15. JODHPUR	STUDIO	TX	2 Nos.	
16. KOTA-BUNDI	STUDIO	TX	2 Nos.	
CHANDIGARH				
17. CHANDIGARH-KASAULI	STUDIO	TX	2 Nos.	
UTTAR PRADESH				
18. AGRA	STUDIO	TX	2 Nos.	
UTTARAKHAND				
19. PAURI	STUDIO	TX	2 Nos.	
20. ALMORA	STUDIO	FM-TX	2 Nos.	

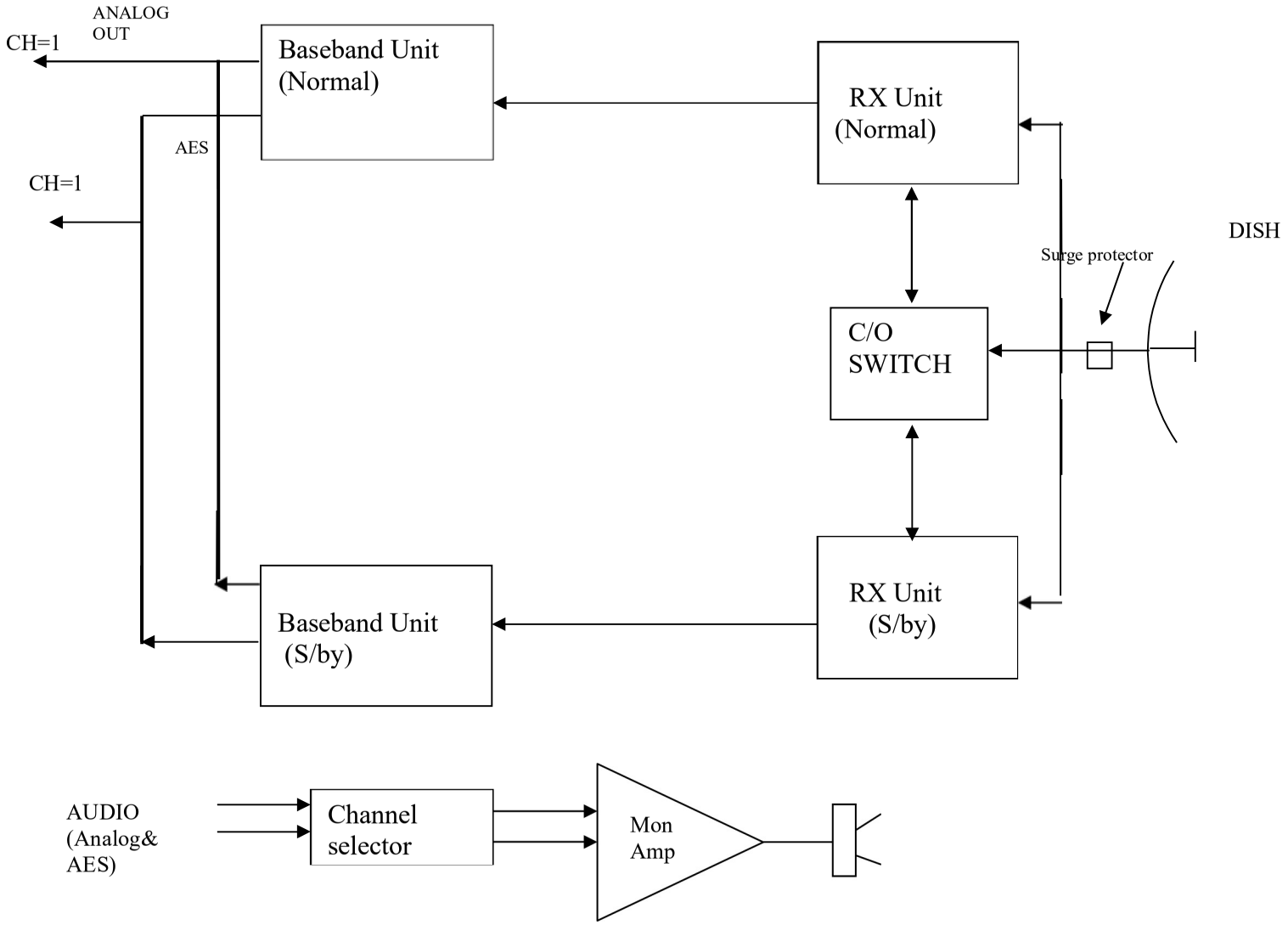
Annexure-B

REPRESENTATIVE DIAGRAM FOR STL AT STUDIO END FOR 1+1 CONFIGURATION



Note: Higher configurations will be similarly wired.

REPRESENTATION DIAGRAM FOR STL AT RECEIVING END FOR 1+1 CONFIGURATION



Note: Higher configurations will be similarly wired.

Annexure-C

Typical Wiring Diagram for Stereo Jack Strips to be installed at Studio End for 2 channels

(ANALOG MONITORING JACKS)

DA1(Analog) DA2(Analog)

CH#1 OUT	CH#1 CHK	DA1 IN	OUT1	OUT2	OUT3	OUT4	ENC#1 (N) IN	ENC #1 S/BY IN	**CH#2 OUT**	CH#2 CHK	DA2 IN	OUT 1	OUT 2	OUT 3	OUT 4	ENC# 2 (N) IN	ENC #2 S/BY IN	MON . IN	

(DIGITAL MONITORING JACKS)

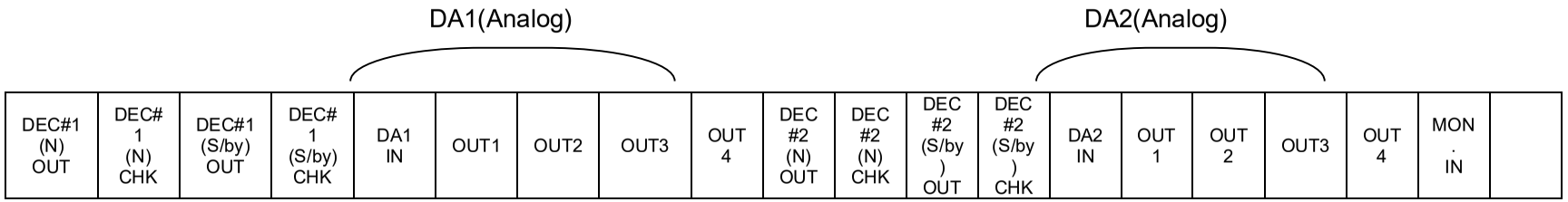
DA1(Digital) DA2(Digital)

CH#1 OUT	CHK	DA1 IN	OUT1	OUT2	OUT3	OUT4	ENC#1 (N) IN	ENC #1 S/BY IN	CH#2 OUT	CHK	DA2 IN	OUT 1	OUT 2	OUT 3	OUT 4	ENC# 2 (N) IN	ENC #2 S/BY IN	MON . IN	

Annexure-C

Typical Wiring Diagram for Stereo Jack Strips to be installed at Receiving End for 2 channels

(ANALOG MONITORING JACKS)



(DIGITAL MONITORING JACKS)