

**PRASAR BHARATI
BROADCASTING CORPORATION OF INDIA
DIRECTORATE GENERAL: ALL INDIA RADIO
(TELECOM DIVISION)**

SPECIFICATION COVER SHEET

TITLE : SPECIFICATION FOR MULTI CHANNEL
STEREO DIGITAL MICROWAVE LINK

SPECIFICATION No. : TC/SPEC/6/99/D MW-LINK

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SCHEME 1) 5 kW FM Transmitter & PB Studio, **Silchar**
under NE special package.
2) 10 kW FM Transmitter, PB Studio & S/Qrs
Gangtok under NE special package.

**PRASAR BHARATI
BROADCASTING CORPORATION OF INDIA
DIRECTORATE GENERAL: ALL INDIA RADIO
(TELECOM CELL)**

Subject: Specification for the “Multi-Channel Stereo Digital Microwave Link”

1.INTRODUCTION

AIR requires Multi-Channel Digital Microwave Links for linking of programme channels from its studios to Transmitter locations. These Microwave links are to be installed using towers (or structures on top of buildings having line of sight) at different locations. The scope of work includes the supply of the Multi-Channel Microwave links as per quantities given in the tender, Pre delivery inspection, acceptance, testing and installation of equipment and commissioning at the site as per approved ATP.

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

The technical specification/requirements are detailed in Section ‘B’.

The Draft ATP for Digital Microwave Link equipment is given in Section ‘C’.

SECTION 'A'

2. LINK CONFIGURATION:

The items required for each Multi-Channel Digital Microwave Links.

A. Main Equipment

Sl.No.	ITEM	Quantity Per Station	Reference
1.	R.F. Trans Receive equipment (1+1) with auto changeover alongwith SMPS (1+1)	2 sets	Sec-B-A (i & ii)
2.	Base-band equipment consisting of Modules of Codecs (MUX-DEMUX), inter face and power supply modules housed in a separate 19" chassis along with accessories. (Mux for transmitting end and DEMUX for receive end)	2 sets (1 set each for studio & Transmitter)	Sec-B-B
3.	Antenna with accessories	2 sets	Sec.B-C
4.	R.F. Cable	2 sets	Sec.A-4.6 & Sec.B-C
5.	Work Stations required for control and settings of operational parameters of RF equipment and also base-band equipment	2 sets	Sec.B-D
6.	(2x 2KVA) UPS with individual Battery Back-Up and autochangover	2 sets	Sec.B-E
7.	Full size (42U) wired racks with jack strip, tag block and 12 nos of compatible patch cords for above transmit receive equipment, base band equipment & work station etc.	2 sets	Sec. B-F

B.

1	Installation & Commissioning along with Earth pits at both ends	One job	Sec.B-G
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C. Inspection of Microwave Link and Training .

1.	Inspection of Microwave link as per approved ATP	One Job	Sec.A-4.7
2.	Five days Training at each site as per tender requirement	One job	Sec.A-5.3(A)

D. Details of any other item required for complete integration, operation & testing of Equipment may be furnished with the tender.

3. Location of Supply:- The multi-channel stereo Microwave link shall be provided at **AIR Silchar And AIR Gangtok .**

4. SCOPE

4.1 The scope of this tender includes supply of the equipment as per specifications, technical requirements and quantities as detailed in the tender, Pre-delivery inspection of the equipment, installation and commissioning of equipment at site and acceptance testing as per mutually accepted and approved Acceptance Test Procedure (ATP)

4.2 The indenter shall provide

- i) Standard Mains Power supply
- ii) The tenderer shall obtain all the technical requirements from indenter before installations.

4.3 After Acceptance of the tender, the successful tenderer shall provide detailed plans of supply of material, installation, link budget calculation sheet, testing and commissioning as per ATP.

4.4 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 no damage to AIR material and personnel and disruption of services is done due to process of installation and commissioning.

4.5 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.

4.6 Provision of RF cable and associated materials as per site requirement shall be made accordingly. The rates of RF cables shall be quoted on per meter basis. However, the offer will be ranked on the basis of a notional cable length of 100 metres each at both ends.

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

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

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

- 4.8 The bidder shall propose and quote one and only one option for sub system. Multiple options proposed by the bidder for any sub system will not be considered and evaluated by the purchaser.

Bidder's proposal should also contain the details of the sub-contract, if any, proposed to be awarded by the Bidder for some part of the system or subsystem to another supplier, like profile of such a supplier, their experience in executing similar type of system/sub system for which the sub contract is being awarded etc. Proposals without the above mentioned details will not be evaluated and will be rejected without any further communication to the Bidder.

- 4.9 The equipment offered shall be well established and field proven. A list of clients with contacts details, to whom the equipment has been supplied, shall be enclosed.

5. GENERAL REQUIREMENTS

5.1 Technical/General details

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

- i) Though the bidder in general has to comply with all the specification (including sub system level specification), purchaser may relax some of the specifications in exceptional cases keeping in view the overall functioning of the complete system proposed by the bidders.
- ii) Purchaser reserves the right to waive some deviations based on technical assessment.
- iii) The technical offer of the tender shall contain, apart from the technical compliance statement, all original data sheets from the manufacturer in support of the technical compliance statement. The tenders containing only technical compliance statement without the original data sheet/pamphlets of the equipment offered in full may be rejected. The authorization to supply the equipment from the principals is must, if not quoted directly by the manufacturer.
- iv) The tenderer may be asked to demonstrate the equipment to show compliance to AIR's specification at the technical evaluation stage.
- v) This equipment must be of state-of-art technology, capable for 24 Hx365 days operations and shall cover more than 25 KM of air distance under city conditions.
- vi) Apart from printed technical data/specs of the equipment, Block schematic upto the sub-system, interconnection and wiring diagram, photograph, etc. should also be attached with the offer.

5.2 SPARES

Tenderer **must** quote separately, for recommended essential spares including their quantities and cost(per unit). The cost of spares shall not be counted for deciding the commercial ranking of tenders. Separate RF module & Audio modules must also be quoted as spares.

5.3 Training

- A. The tenderer shall provide 5 days training for five AIR Engineers on operation and maintenance of the equipment at each site. This will be essential.
- B. In addition to above two weeks training for eight engineers on servicing of equipment will be required to be arranged at manufacturer /supplier works. The expenses on to & fro journey and DA etc. will be borne by AIR. **The cost of this training if any, may please be quoted separately as an optional item.** This shall not be included for deciding the commercial ranking of tenders.

5.4 Compliance

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

5.5 Schedule of Material

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

5.6 Maintenance support

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

5.7 Documentation & Test Certificates

- a) **Manual:** [Two each for the station, Two for directorate, one each for Zonal office, one for STI (T) and one for R&D].
 - i) Manual for complete link, operation system, as well as each sub-system and accessories (both hard & soft copies)
 - ii) Original manuals for installation and maintenance & servicing along with drawings and wiring diagram for the system.
- b) Following information shall be provided.
 - i) MTBF figures for all sub systems
 - ii) Test procedures for parameters measured at subsystem and integrated system levels.
 - iii) Test records/reports of all the measurements performed.
 - iv) Compliance certificates(s)'
 - v) Acceptance test reports & certificates.

5.8 Environmental & power supply

- a) Ambient Temperature : -5°C to + 50°C
- b) Relative Humidity : Upto 95% non condensing at 40° centigrade temperature
- c) Safety/features :Standard features for safety & protection have to be built in / incorporated for both personnel/equipment.
- d) Power supply : 220VAC±10%, single phase, 48-52 Hz.

5.9. Miscellaneous Clauses

- i) The successful tenderer shall mention the source of supply (with proper authorization) and technical parameters for major and critical components/spares so that no difficulty is encountered later on in procuring the spares for maintenance/repair of these equipment.
- ii) If at any stage during next ten years the manufacturer proposes to stop production of these equipment and spares, supplier shall intimate AIR in advance to enable AIR to stock the critical items of spares for the life of the equipment.
- iii) Warranty and guarantee clause shall be as per the terms and conditions specified in the commercial section of the tender in this respect.
- iv) All optional items mentioned in the tender **must also be quoted**. Failing this, the tender would be liable to be rejected. However, these items would not be considered for ranking purpose.

5.10 The tenderer/firm must have a well equipped & established service center in India. The firm/tenderer must ensure repairs within 72 hours at site & in case the equipment 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. After sales service is to be ensured for post warranty period also.

5.11 **Delivery Period:** The delivery period shall be five months from the date of placement of Purchase order. The entire S ITC should be completed within the delivery period.

SECTION-B

TECHINCAL SPECIFICATIONS FOR MULTI-CHANNEL DIGITAL STEREO MICROWAVE LINK:

A. TRANS-RECEIVE EQUIPMENT

Transmitter unit should be capable of accepting E1 output from the baseband unit (Multiplexer) containing audio channels multiplexed at data rates of Nx64 kbps. Receiver end unit should be capable of providing E1 output to baseband unit (Demultiplexer) for demultiplexing audio channels at data rates of Nx64 kbps.

i) Transmitter

1.	RF power at Power Switch Output	≥ 30 dBm
2.	Frequency of operation	1427-1525 MHz with step size of not more than 1 MHz
3.	RF Frequency Stability	Better than 1.5 PPM
4.	RF Power Stability	Better than +/- 0.2 dB
5.	Modulation	Digital modulations(user selectable) QPSK/16 QAM/ 32QAM with latest version
6.	Channel band-width	≤ 500 KHz for E1 data rate (band width for QPSK/16 QAM/ 32 QAM must be specified at 64, 128, 256, 512 768 Kbps & E1 data rate)
7.	Interface	G.703 for E1 (V.35 shall be quoted as optional item)
8.	Spurious Emission	$\leq - 60$ dBc
9.	Harmonic radiation (2 nd Harmonic)	$\leq - 60$ dBc
10.	Error correction	Reed Solomon code
11.	RF Output impedance	50 Ohm (unbalanced)
12.	Switchover to stand-by mode	Auto with manual over-ride
13.	Insertion loss for Switch over unit of (1+1) mode	≤ 3 dB
14.	Mode of operation	Full-Duplex
15.	Service channels (Full duplex)	1. Voice with hand set 2. Data channel 9 kbps or more
16.	Network Monitoring software	Consisting of all necessary features & parameters as mentioned in Section B- Item D (Work station). All the features of NMS may be specified.
17.	Monitoring	Monitoring of Forward power, reflected power, Tx lock, etc.
18.	Configuration	(1+1) with auto changeover (Hot standby)
19.	Power Supply	SMPS, 24 V dc or as required

ii) RECEIVER

1.	Frequency	1427-1525 MHz synthesized with step size of 1 MHz
2.	Threshold Level (Sensitivity for given BER)	Better than -90 dBm (BER ≤ 10 E-4)
3.	L.O. Frequency stability	Better than +/- 1.5 PPM
4.	Image Rejection	≥70 dB
5.	Error Correction	Reed Solomon code
6.	Total Loss for (1+1) mode switchover unit	≤ 3 dB
7.	Monitoring	Receiver Signal Level, BER. Rx lock
8.	Configuration	(1+1) with auto changeover (Hot standby)
9.	Interface	G.703 for E1 (V.35 shall be quoted as optional item)
10.	Demodulation (digital)	QPSK, 16 QAM, 32 QAM (auto detectable)

B) AUDIO BASE-BAND UNIT

The audio base-band Unit should be a separate unit & not the integral part of the RF equipment. The system should be offered as single main chassis frame housing following hot swappable cards.

1. Power supply unit (1+1)
2. Audio Encoder/Decoder cards (2+2)
3. Fractional E1 Mux/Demux card(1+1)
4. Interface Module (1+1)

Encoder card and Mux card are to be provided at studio site and Decoder and Demux cards are to be provided at Transmitter site. The system should have capability for remote configuration, monitoring and control, Fault logging and alert through software using PC/Workstation.

This Audio baseband unit should fulfill the technical requirement of Endlink equipment by multiplexing/ demultiplexing audio channels having data rate of 64kbps to 256 kbps per channel (in 64 kbps increments) and interface with E1 circuits and which are being provided by MTNL/BSNL or Microwave(Trans-Receive equipment(specified-Section B-item A). This unit should be ITU-T G.703 complaint.

1.	Numbers & Type of Channel	Two stereo Channels (four Mono) and capacity for up-gradation up to 4 stereo channels.
2.	Redundancy	One each stand-by audio-card/ module for each stereo channel . Hot swappable audio-card/module
3.	Base band of each channel	20 Hz to 20 KHz
4.	Operating Modes	Stereo, Joint stereo, Dual Mono, Mono
5.	Source coding/compression	ISO-MPEG I Layer-2 Optional: APTX, enhanced APTX

6.	Audio Inputs/Outputs	The base-band modules must have features for both analog & digital input/outputs(AES/EBU). It should be user selectable through a switch/software.
7.	Audio Input Level (Analog) Nominal Level (at 1 KHz) Maximum Level (at 1 KHz) Impedance	0 dBu +18 dBu 10 KOhm & 600 ohm balanced(Analog)
8.	Audio Output Level Analog Nominal Level (at 1 KHz) Maximum Level (at 1 KHz) Impedance	0 dBu +18 dBu 600 ohm balanced(50ohm Optional)
9.	Data Rates	64/128/192/256 Kbps per stereo channel (User selectable, from 64 kbps to 2 Mbps)
10.	Dynamic Range	≥90 dB
11.	A/D & D/A Resolution	16,24 Bits (selectable)
12.	Sampling Frequency	32/48 Khz (Selectable)
13.	Audio Input (Digital) Impedance (Digital Input)	1. AES/EBU Standard (Professional) (XLR connector) 2. 110 Ohm for digital input (XLR connectors)
14.	Audio Output (Digital)	1. AES/EBU - Standard (Professional) XLR 2. Impedance –110 Ohm
15.	Cross talk between any two Channels (at 1 KHz nominal level)	Better than 80 dB
16.	T.H.D. (at 1 Khz at –1 dBFS)	Better than 0.1%
17.	Frequency response	≤ +/- 0.5 dB (20 Hz- 20 KHz)
18.	BER Immunity	1x10 E-4 (for no subjective loss in quality)
19.	Auxillary Data Channel	One, 9.6 Kbps, serial RS232
20.	Base band Interface	G 703 for E1 (V.35 optional but must be quoted)
21.	Remote Access Interface	RS-232 asynchronous
22.	Monitoring	Indicators for Power, faults Alarms, Local Loop-back, Tx lock, Rx-sync lock,etc.
	Signals Supported	Send Data, Serial clock timings, Receive Data, Signal ground ,etc.
23.	Configuration	Simplex , audio base band equipment with multiplexer at Transmit & demux at receive end, with redundant power supply Module, redundant Mux/demux Module & redundant interface Module
	Power supply (module) switching	Auto
24.	Mounting	19” Rack

C) ANTENNA (TRANSMIT/RECEIVE) ALONG WITH FEED & R.F. CABLE

Antenna should be of reputed make similar to Andrews/RFS/Gabriel & shall 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.

1.	Diameter (nominal)	≤ 2 M
2.	Gain (dBi) (midband)	≥ 26 dBi
3.	Front to back ratio (dB)	≥ 30
4.	Power Rating	50 W
5.	Polarization (mono-polar)	Linear adjustable (Vertical or Horizontal)
6.	Impedance	50 ohm (N.connector)
7.	Type	Grid pack/Flat panel
8.	Weight(including mounting accessories)	≤ 50 kg
9.	Azimuth adjustment (degree)	180 degree
10.	Elevation, adjustment (degree)	+/-10 degree
11.	Wind velocity (Survival)	180 Kmph
12.	Return loss	Better than 18 dB
13.	R.F. cable loss at 1.5 GHz	≤ 5 dB per 100 Meters
14.	R.F. cable impedance	50 Ohm
15.	Size of R.F. Cable	7/8”(Foam dielectric)

D) Work Station (19” Rack – Mounted)

A work station (with windows X-P) Professional or latest version) similar to HP/ IBM/ Compaq/DELL shall be offered. This work station should be compatible with R.F. Transmitter & Receiver and also with Base-band units for control and setting of the operational parameters including the logging.

Specs of Work Station:

Pentium-4 or latest version, with minimum 1.5 GHz, 80 GB HDD, 512 MB DDR2 SD RAM, CD-RW/DVD Combo Drive(52x32x52x;16x or better), 32 MB Video RAM, 10/100 Base T NIC card, Keyboard, Mouse with pad, four nos. of USB ports, Serial and parallel ports, Windows X-P Professional or later version. Detail of software shall be furnished in the tender. Special interface card for the purpose of NMS shall be provided. The flat panel monitor should be LCD display of 15” or more. Work station shall be complete with necessary interfaces, connectors etc. The concerned Health Monitoring Software should be installed in the computer and a restoration copy shall also be supplied in a CD. Computer should be rack mounted.

Network Monitoring Software (NMS):-

FEATURES:

The NMS (with license) must be using the industry standards SNMP as the underlying framework for managing network devices, providing a simple, intuitive suite of tools to configure network elements, monitor performance, detect and correct faults quickly.

It should allow remote performance monitoring, fault management, BER measurements, Security management, configuration and control of Microwave link equipment.

- Network diagnostics for Microwave Link
- Proactive alarm/fault notification

- Remote Microwave link configuration and monitoring
- Capacity Planning and Network performance monitoring
- Based on industry standard SNMP, easy to integrate

E) Rack Mountable UPS (1+1)

The UPS similar to APC/Libert/Emerson shall be supplied in (1+1) configuration with individual battery bank (preferably load sharing) along with auto change-over switch at both transmitting and receiving sites.

1.	Type	On line, pure sine wave
2.	Power rating	2 KVA, Single phase
3.	Battery back up	For 30 minutes operation on full rated load of UPS
4.	Type of Battery	Maintenance free, sealed Lead-Acid having a life time of not less 18 months.
5.	Input voltage range	160-275 V AC
6.	Input frequency range	45-55 Hz (auto selection)
7.	Output Voltage	220V, 50 Hz, Single phase
8.	Output Voltage regulation	+/- 1% static, 5% dynamic
9.	Output frequency	50 Hz +/- 0.1 Hz
10.	Bypass feature	Automatic & manual both
11.	Type of approval	ISO certified, standard, reputed make
12.	Efficiency at full load (nominal input)	Better than 85%
13.	Metering & indicators	Meters/ Indicators should be there to monitor input & output voltage and overload, etc.

F. WIRED RACKS FOR EQUIPMENT

All the above indoor equipment including work station should be installed in the full size, 16 SWG wired rack (42U) along with requisite jack- strip, tag block, patch cords (12 nos) & other items both at transmitting and receiving site. The rack should be similar to President/ Comcon/ HCL make. The rack must be properly fitted, grouted and earthed. The rack should be powder coated as per six tank process with air ventilation. It should be fitted with cooling fan, light, power distribution board with proper RFI and EMI fitters. Jack strip, Tag block, patch cords, cables and connectors used shall be of highest professional quality and of reputed brand. Brand offered shall be mentioned in the bid. Ordinary cables and connectors shall not be acceptable and shall be rejected.

G. INASTALLATION & COMMISSIONING

The workmanship of the entire installations shall be of highest professional standard. One pair of earth-pits (one for equipment and other for antenna) shall be provided by the integrator at each site, both at Studio end and at Transmitter end, as per AIR Specification. Racks and all the equipment must be earthed. The firm, shall have to arrange all the material equipment required for installation , commissioning and testing at site at their own cost.

SECTION C

DRAFT ATP FOR 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. Transmitter
- ii) R.F. Receiver
- iii) Base Band Unit
- iv) Other peripheral equipment such as Computer & UPS etc.

b) Integrated Setup

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

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) Suggestive list of the test & measuring equipment(details shall be furnished)
 - 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 the indenter, if needed.).

4.1 RF TRANSMITTER

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

4.2 Base band Unit (MUX/DEMUX)

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

4.3 RECEIVER

- i) Functionality check for individual monitoring setups for Analog signal and Digital 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 channies, 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 AIR 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 and conformity with the 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 mutual discussion.

DIGITAL MICROWAVE LINK CONFIGURATION (MULTI CHANNEL)

