

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

**SPECIFICATION DOCUMENT OF PROFESSIONAL DRM MONITORING RECEIVER AND DRM
GENERAL PURPOSE RECEIVER**

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N.B: 1. The tenderer should go through all the sections of these specifications carefully and should confirm clause-by-clause compliance of all the sections clearly. Tenders received without clause by clause compliance are liable to be rejected.

2. The tenderer should indicate the items offered as per schedule of requirements, Section-III, without cost details in technical bid to assess the completeness of offer against AIR's requirement

(R.K.SAINI)

Dy. Director Engg. (TD/MW)

SECTION - I
GENERAL CONDITIONS OF TENDER / CONTRACT

1.0 GENERAL:

These specifications cover the supply of **PROFESSIONAL DRM MONITORING RECEIVER AND DRM GENERAL PURPOSE RECEIVER** for measurement of DRM parameters and monitoring of DRM broadcast, respectively, in stationary as well as mobile mode.

1.1: BROAD SCOPE OF SUPPLIES/ SERVICES:

- (i) Established brand of Professional DRM Monitoring Receiver with built-in-instrument for DRM measurements and mobile testing.
- (ii) Established brand of General purpose DRM receiver.
- (iii) Set of manuals for all the above equipment.

1.2 LANGUAGE AND SYSTEM OF MEASURES:

All information supplied by the tenderer and all markings, notes, designations on the drawings and associated write-ups etc. shall be in "English" language.

All dimensions and units on drawings and all references to weights, measures and quantities shall be in "Metric" Units.

1.3. DOCUMENTS TO BE SUPPLIED ALONGWITH TENDER:

The tender and associated information shall be submitted in duplicate.

Sufficient information shall be furnished to enable AIR to adjudge the full merit of the offer.

1.3.1. Compliance statement on each and every clause of these specifications (in the order in which they appear in these specifications) indicating clearly whether or not the equipment and accessories offered conforms to these specifications.

A tender without clause by clause compliance to these specifications is liable to be rejected.

1.3.2. All documents like pamphlets, data sheets, write-ups, drawings, block schematic etc. in support of compliance statement will be furnished in printed form.

1.3.3. An overall schematic of the equipment with details showing all interfaces.

1.3.4 Details of the internal test procedures/standards followed for quality control of the equipment offered and to supply a copy of ISO certification.

1.3.4. A general undertaking to accept / furnish the guarantees, which will be required to be complied by the contractor as listed under Clause 1.10.3 of Section- I.

1.3.5. A supply record giving the names of the customers, countries, locations, year of supply at site, type and other details of the similar equipments supplied by the tenderer or his OEM.

1.3.7 An acceptance test procedure (ATP) duly approved by AIR, shall be the basis for acceptance of equipments. This should include environmental & ruggedness tests in addition to the technical performance parameters.

1.3.8 Any other information, which the tenderer feels relevant to his offer.

1.4 DOCUMENTS TO BE SUPPLIED AFTER PLACEMENT OF ORDER/ACCEPTANCE OF TENDER :

1.4.1 The following documents in duplicate in hard copies as well as CD form for approval shall be supplied within **one months** of the date of acceptance of the tender to the Director Engineering (Transmitter Design Section), P&D Unit, DG: AIR, New Delhi-110 001.

- a) Detailed technical description along with schematic and drawings of equipments.
- b) Detailed Draft "Inspection and Acceptance Test Procedure" (ATP) as per specification for approval by AIR. This ATP after approval by AIR will form the basis for final acceptance.

1.4.2 One set each of the above mentioned documents after updating as per approval of AIR shall be supplied to the Director Engineering (Transmitter Design), P&D Unit, DG: AIR, New Delhi-110 001 and concerned Zonal Chief Engineer (Project), and two sets each to the ultimate consignee. (Total 4 sets per equipment.)

1.5 DOCUMENTS TO PRECEDE DISPATCH OF EQUIPMENTS:

The following documents shall be supplied, one month prior to the dispatch of equipment. One set of these shall be sent to Director Engineering (TD), P&D Unit, Akashvani Bhavan, New Delhi, one set each to the respective Zonal Chief Engineer and two set to the consignee.

- (a) Detailed list of equipment under dispatch vis-a-vis reference of supply order.
- (b) Drawings / Photographs showing location of various components indicating their part numbers in the various units/sub assemblies.

1.6 DOCUMENTS TO BE SUPPLIED ALONG WITH THE EQUIPMENTS :

1.6.1 Along with each equipment following documents shall be supplied.

- (a) Technical Manuals covering detailed circuit descriptions, schematic/circuit drawings for operation & maintenance, fault location and trouble shooting of equipment, in printed form as well as CD form.
- (b) Test reports of the tests conducted on each of equipment during manufacturing of these equipments at the manufacturer's works.

1.6.2 Three sets each of the above [one set for Transmitter Design Section, one set for Maintenance Wing and one set for Staff Training Institute (Tech.)] shall be packed separately and supplied to the Director Engineering (TD) P&D Unit, Directorate General, All India Radio, New Delhi. One set each shall be supplied to Zonal Chief Engineer (Projects), Zonal Chief Engineer (Maintenance), and two set each shall be supplied to the consignee. (Total 7 sets per transmitter.)

1.7 DELIVERY OF EQUIPMENT:

The delivery of the entire equipment at AIR site shall be completed within **06(six)** months from the date of placement of order in case of India Rupee quote. In case of FOB quote, the delivery of the entire equipment at AIR site shall be completed within **06(six)** months from the date of opening of the letter of credit. The equipments for each of the AIR sites shall be packed separately.

1.8 PACKING & MARKING DETAILS:

Please refer to the relevant para in the booklet "Instruction to bidders"

1.9 INSURANCE AGAINST WAR AND MARINE RISK:

Please refer to Commercial terms for transportation by Sea and Land up to site.

1.10 COMPLETENESS OF SUPPLIES, QUALITY & WORKMANSHIP OF MATERIAL USED, WARRANTY & GUARANTEE AND AVAILABILITY OF SPARES :

An undertaking to accept the following terms and conditions along with those contained in para 8, P-49 of the Booklet "Instruction to bidders" with the exception of para 8.2.2 of the Annexure II (General terms and conditions), shall be submitted along with tender.

1.10.1 Correctness, completeness shortages and damages of stores:

- (a) The stores will be complete in every respect with mountings, fittings, fixtures and standard accessories which are normally supplied even though not specifically mentioned in these specifications. The Contractor shall not be eligible for any additional payment in respect of such mounting, fitting and fixtures and accessories which are needed for safe and efficient operation of the equipment.
- (b) The Contractor shall arrange to replenish/repair all the items reported as shortage/ damages free of cost to AIR and send the same to the ultimate consignee at the earliest, but not later than a period of one month from the date of such intimation from AIR. Payments for freight, insurance and other incidentals for such items shall be made by the Contractor. AIR shall not pay anything extra on this account.

1.10.2 Free replacement of components:

The Contractor shall furnish guarantee to make good, at his own expense, any equipment which becomes defective within 18 months from the date of receipt of last consignment at site or 12 months from the date of acceptance of the equipment at AIR transmitter site, whichever is earlier. Manufacturer shall offer an exchange program to ship replacement equipment in advance from a service centre in exchange of defective equipment. This supercedes the para 8.2.2 of the Annexure II (General Terms and Conditions) of the "Instruction to Bidders".

1.10.3. Materials & workmanship:

(i) Should any defect be noticed in the design, material and /or workmanship of any equipment, within a period of 18 months from the date of receipt of last consignment at site or within a period of 12 months from the date of acceptance of the equipment, whichever is earlier, it shall be replaced by the supplier free of cost, freight and insurance paid, to the ultimate consignee. All India Radio shall inform the supplier about any defects noticed. On receipt of such intimation, the supplier shall investigate the cause of defects and submit a report within 14 days and arrange rectification/replacement / modification of the defective equipment at AIR site without any cost to All India Radio. All such rectifications / replacements modification of the defective equipment based on report shall be done immediately, within a period not exceeding one month from the date of receipt of information by the supplier at no cost to AIR. If the supplier fails to take proper corrective action to repair/ replace the defective item/items satisfactorily within the period of one month as stated above, All India Radio shall be free to take such corrective action as may be deemed necessary, after giving notice to the supplier, at the risk and cost of the supplier. This supercedes para 8.2.2. of the Annexure II (General Terms and Conditions) of the "Instruction to bidders".

(ii) In case the equipment falls short of the guaranteed performance level, All India Radio will be free to either reject the equipment completely or impose penalty on the supplier so as to recover the cost of the deficiency. However this does not entitle the supplier to deliberately supply substandard equipment or conceal the defects of the equipment supplied by Firm.

1.10.4 Availability of spares:

- i) The supplier / manufacturer shall submit an undertaking for supply of spare parts, for a period of ten years from date of commissioning.
- ii) If at any stage during next 10 years from the date of commissioning, the manufacturer stops production of this model of transmitter or any of the spare parts, the supplier is required to submit an undertaking for giving an adequate advance notice to AIR so that the latter can procure, if necessary, the balance of the life time spare parts and critical items.

1.11 INSPECTION/ ACCEPTANCE:

1.11.1 Pre-dispatch Inspection / Acceptance Tests at manufacturer's Works:

- a) AIR will depute 2(two) engineers and carry out the inspection of the equipments at Manufacturer's works, as per Acceptance Test Procedure (ATP) approved by AIR. The various tests to be performed and the measurements to be done will be to check the conformity of the equipment offered to these specifications and the various conditions of the A/T.
- b) The contractor shall give at least 8 (eight) weeks notice to AIR to carry-out the inspection, before the consignment is ready for inspection.
- c) The equipment manufacturer shall put up the equipment on the test bench, at his works, before AIR inspectors and shall provide, without any extra charge, other than that indicated in 1.11.1 (e), the power supply, consumable materials, tools, testing instruments and labour etc. as considered necessary for the tests to be carried out at the manufacturer's premises.
- d) The equipment shall be tested at the Mains Input Voltage and frequency specified against the various equipment in Section - II. Alternatively, the equipment shall be tested at the voltage and frequency available at the manufacturer's works subject to an undertaking by the tenderer that the

equipment shall be capable of being operated and tested successfully by AIR engineer at AIR site at the Mains Input Voltage and frequency specified in this Document in Section – II.

- e) The expenditure towards To & Fro Air Journey, lodging, boarding & Daily Allowance of the inspecting Officers shall be borne by AIR.
- f) The supplier shall ensure safety of AIR's Inspectors, while on Inspection at the equipment manufacturer's works, against any accidental injury, accidents, death etc, at no cost to AIR.

1.11.2 Inspection/Acceptance Tests at AIR site (In India):

AIR will carry-out the following inspections/tests at AIR site, in India.

- a) Physical inspection, after receipt of the equipment at AIR site, for reporting any shortages or damages for free replacements / repairs by the manufacturer/contractor.
- b) Testing of equipment as per the ATP to confirm the performance of the equipment to Contract specifications, before finally accepting the equipment.
- c) If any equipment fails or is found defective on receipt at site, it will be supplied free of cost to AIR site by the manufacturer / contractor.

1.12 TRAINING OF AIR ENGINEERS AT AIR SITE:

The tenderer shall organize a practical demonstration to train a group of about 10 AIR engineers free of cost to AIR, for operation, maintenance and trouble shooting of the DRM Professional Receiver equipment. The practical demonstration is required to be done with a view to develop necessary skills for efficient operation/ utilization and maintenance of the equipment by AIR staff. (The expenditure towards to & fro Journey, lodging, boarding & Daily Allowance for the trainees as per Govt. of India norms shall be borne by AIR.)

1.13 AFTER-SALES SUPPORT:

The equipment manufacturer/contractor shall guarantee for the after-sales support for all the equipment offered under the contract for a minimum period of 10 years, after acceptance of the equipment. The details of the type of after-sales support and list of the various after-sales support centers in India and elsewhere shall be indicated in the tender.

SECTION-II

(Technical parameters of equipments)

2.0 General

The section defines the technical parameters of the equipment capable of monitoring and measurement of AM, DRM and AM-DRM (SCS/MCS) Simulcast broad cast of AIR transmitters.

2.1 PROFESSIONAL DRM MONITORING RECEIVER:

2.1.1 General:

This professional grade stand alone DRM Monitoring receiver shall be used for DRM reception and transmitter monitoring & measurement. The receiver shall be capable of continuous (24x7Hrs) operation. The receiver shall have well tested DRM receiver software updateable via built-in DVD drive, fully remote controlled via LAN and Ethernet. It should have following key features:

➤ Applications:

DRM/AM/SSB Reception, Modulation quality measurements, Modulation parameter measurements, two configurable alarm signals to trigger conditions (e.g. audio dropouts or field strength), Spectrum monitoring, logging of RSCI, RSCI output (compatible to ETSI TS 102 349 V1.2.1) via LAN, QoS(Quality of Service) monitoring, high accuracy field strength measurement.

➤ Monitoring

- Display, recording and online UDP output (RSCI) of
- Field strength (antenna factor can be specified)
- Estimated signal-to-noise ratio
- Estimated delay spread
- Estimated Doppler spread
- Audio quality
- Frequency offset
- Location information via external NMEA-complaint GPS receiver interface
- Display of power spectrum, channel impulse response, field strength, Signal-to-noise ratio

➤ Alarm: Two independent alarms(associated with relays) configurable to multiple trigger conditions:

- Spectrum mask violated above specified level
- RF level below specified value.
- S/N level below specified value
- Audio dropouts above specified ratio
- Audio level below specified value
- MDI errors above specified rate
- Frequency offset above specified value

• Interfaces

- Headphones output with volume control
- Built-in loudspeaker with volume control
- Line output

- Two relays output
- Ethernet 100 Base T-port
- Two RS 232 connectors
- Two USB 2.0 connectors
- Antenna input N type female connector with 50 Ohm
- External loudspeaker output
- Remote Control via
 - Graphical user interface
 - RSCI (Receiver Status and Control Interface)
 - Web interface

2.1.2 Technical Specification:

S. No.	Parametre	Specification
1	Applications:	DRM/AM/SSB Reception, Modulation quality measurements, Modulation parameter measurements, two configurable alarm signals to trigger conditions (e.g. audio dropouts or field strength), Spectrum monitoring, logging of RSCI, RSCI output (compatible to ETSI TS 102 349 V1.2.1) via LAN, QoS(Quality of Service) monitoring, high accuracy field strength measurement.
2	Reference Oscillator accuracy	< 5ppm
3	Input Freq. range	100KHz to 27.4 MHz
4	Level measurement accuracy	±1dB

5	RF Data Band width	40 KHz, ripple 0.2 dB
6	DRM spectrum mask monitoring	within ± 30 kHz
7	Input level	DRM decoding : – 110 to 20dBm In-channel IP3: + 15dBm (noise figure 15 dB) Out of band IP3; + 30dBm (noise figure 15 dB)
8	Phase noise at ± 20 Hz	-80dBc/Hz

9	Phase noise at ± 20 kHz	-130dBc/Hz
10	DRM Parameter according to ETSI ES 201 980 V2.1.1	4.5, 5.0, 9.0, 10, 18, & 20 kHz bandwidth Modes A, B, C and D, QAM 4, 16, 64, All code rates, EEP & UEP, Hierarchical modes and Simulcast modes.
11	Audio decoder	MPEG-4 AAC+SBR, HVXC+SBR, CELP+SBR
12	Monitoring	Field strength, Estimated signal-to-noise ratio Estimated delay spread, Estimated Doppler spread, Audio quality, Frequency offset
13	Display	Power spectrum, Channel impulse response, Field strength, Signal-to-noise ratio
14	Alarm	Two independent alarms(associated with relays) configurable to multiple trigger conditions: i) Spectrum mask violated above specified level ii) RF level below specified value. iii) S/N level below specified value iv) Audio dropouts above specified ratio v) Audio level below specified value vi) MDI errors above specified rate vii) Frequency offset above specified value
15	Interfaces	i) Headphones output with volume control ii) Built-in loudspeaker with volume control iii) Line output

		iv) Two relays output v) Ethernet 100 Base T-port vi) Two RS 232 connectors vii) Two USB 2.0 connectors viii) Antenna input N type female connector 50 Ohm ix) External loudspeaker output
16	Remote Control	GUI, RSCI & Web interface
17	Power Supply:	230V , 50Hz AC

2.2 DRM General Purpose Receiver:

This general purpose hand held all band portable radio receiver should have following Key Features:

- DRM/AM(LW/MW/SW)/FM Services
- Recordings onto SD card (supports instant and scheduled DRM recordings, also supports MP3 playback)
- Easy Play / Pause Control (supports DRM recording to internal memory)
- 40 Station Presets (10 for each mode), dual alarm clocking settings and ten programmable recordings for digital broadcasts
- Antenna Input, Digital Output, Analog (Headphone) Output and Dual Speakers
- AC mains 230V and Battery Operations

SECTION-III

SCHEDULE OF REQUIREMENTS:

AIR REQUIRES THE FOLLOWING EQUIPMENTS AS PER TECHNICAL SPECIFICATIONS DETAILED UNDER SECTION I & II

Note: The combined cost of both the equipment comprising of item no. 3.0 to 3.4 will be taken for ranking purpose

Item	Detailed Schedule of Material	Quantity
3.0	Supply of equipments for monitoring and measurement of AM, DRM and AM-DRM(SCS/MCS) Simulcast broad cast of AIR transmitters at the following AIR Sites(There are 36 sites in total): (i) 300kW MW Transmitters at Cuttack, Srinagar, Imphal, Jodhpur, Nagpur (ii) 200kW MW Transmitters at Kargil, Indore, Najibabad (iii) 100kW MW Transmitters at Cuddapah, Delhi - 'B', Kohima, Portblair, Shilling, Shimla and Raipur (iv).20kW MW Transmitters at Naushera, Kupwara, Aizwal, Ambikapur ,Bhuj, Chattarpur, Chennai, Darbhanga, Gangtok, Jalgaon, Kota, Udipi, Rewa, Hyderabad, Leh, Ratnagiri, Rohtak, Silchar, Trivandrum , Tirunelveli and Tura.	
3.1	PROFESSIONAL DRM MONITORING RECEIVER along with standard accessories as per clause 2.1 of Section II	36Nos
3.2	DRM General purpose Receiver along with standard accessories as per clause 2.2 of section II	10Nos per site
3.3	Manuals for all above equipments	36 Sets
3.4	Training for operation, maintenance, trouble shooting of equipment for AIR engineers at a few selected AIR sites.	Per site basis