



प्रसार भारती

( भारत का लोक सेवा प्रसारक )

कार्यालय: अपर महानिदेशक अभियन्ता (उ.क्षे.)

आकाशवाणी एवं दूरदर्शन

आठवां तल, सूचना भवन, सी.जी.ओ. कॉम्प्लेक्स, नई दिल्ली 110003



ई.मेल dirpur@gmail.com



सत्यम् शिवम् सुन्दरम्  
E-Mail dirpur@gmail.com

दिनांक: 11.06.2024

**Subject:** Supply of 100W Digital compatible VHF FM Solid States MOSFET technology based broadcast PA cum transmitter at AIR Ukhimath & AIR Bhatwari

1. Bidders are requested to offer their feedback on the **Draft Tender** Specification of the upcoming tender.
2. Bidders are requested to provide information about percentage of Make in India content in the proposed requirement as per latest and updated DPIIT guidelines.
3. Bidders are requested to submit budgetary quote of the proposed requirements.
4. Bidders are requested to submit the above detail on or before due date by e-mail to [dirpur@gmail.com](mailto:dirpur@gmail.com) or at following address.

R.K. Singh  
Assistant Director (Engg.)  
Room No. 899-C,  
O/o ADG(E-NZ)  
Akashwani & Doordarshan,  
8<sup>th</sup> floor, CGO Complex,  
Soochna Bhawan, New Delhi-110003

**Specification for:** Supply of 100W Digital compatible VHF FM Solid States MOSFET technology based broadcast PA cum transmitter at AIR Ukhimath & AIR Bhatwari.

**Due Date to offer Comments:** 26.06.2024

**Enclosed:**

1. Budgetary Quotation form for Supply of 100W Digital compatible VHF FM Solid States MOSFET technology based broadcast PA cum transmitter at AIR Ukhimath & AIR Bhatwari.
2. Specification for Supply of 100W Digital compatible VHF FM Solid States MOSFET technology based broadcast PA cum transmitter at AIR Ukhimath & AIR Bhatwari.
3. Corrigendum Letter dated: 11/06/2024

*R.K. Singh*  
11/6/2024

R.K. Singh

Assistant Director (Engg.)

For Add. Director General (NZ)



Prasar Bharati

Office of the Additional Director General (E-N.Z.)  
Akashvani & Doordarshan , Soochna Bhawan  
Lodhi Road, New Delhi – 110003



File No. 2(50)/72/NIT-24/AIR-EP

Dated: 11.06.2024

**CORRIGENDUM**

**Subject:** Supply of 100W Digital compatible VHF FM Solid States MOSFET technology based broadcast PA cum transmitter at AIR Ukhimath & AIR Bhatwari.

Sir,

This is inform you that due to technical reason the budgetary quotation invited on 03/06/2024 has been withdrawn and new budgetary quotation with new specs invited to submit up to 26/06/2024.

(R.K.Singh)  
Asstt. Director (Engg.)  
For Addl. Director General Engg.(NZ)



*Technical Specifications  
for  
Supply of 100 W VHF FM Solid-State MOSFET Technology Based Power Amplifier  
for 100 W FM Broadcast Transmitter*

**1.INTRODUCTION:**

This Specification is for *Supply of 100 W RF VHF FM Solid-State MOSFET Technology Based Power Amplifier for 100 W FM Broadcast Transmitter* to be installed at AIR Stations under North Zone.

**2.TECHNICAL SPECIFICATIONS :****2.1 RF Power Amplifier (PA):**

- 2.1.1 The Power Amplifier (PA) should be an integral part of the 100 W Digital Compatible VHF FM Solid-State MOSFET technology based Broadcast Transmitter. The Power Amplifier (PA) shall be of wide band design for operation in the entire VHF frequency band of 88 MHz to 108 MHz without tuning / change of components. The PA shall be rugged in design and will consist of MOSFET device incorporated in a separate amplifier board. The PA shall be provided with RF monitor located on Front Panel to monitor output RF Power.
- 2.1.2 The PA shall have built in protection against high Reflected Power (Short and Open loads). PA shall also be protected against, over current, over temperature, overdrive and airflow failure.


**2.2 Protection System:**

Adequate protection system should be provided to safe guard the system from damage under fault conditions. The protection system should be fast acting to safe guard the system and components. Following are the typical requirements in this regard:


- 2.2.1 Protection against over loads, transients, severe fluctuation/variation in power supply, any other malfunctioning etc. for transmitter.
- 2.2.2 Protection against over temperature on heat sinks.
- 2.2.3 Protection against blower failure and less volume of cooling air.
- 2.2.4 Protection against high VSWR including open and short conditions at output.
- 2.2.5 Immediate power fold back under severe/damaging fault conditions of VSWR and temperature. The power of transmitter should automatically come down to a suitable safe

**3. TECHNICAL PARAMETERS OF THE 100 W RF POWER AMPLIFIER FOR A 100 W FM TRANSMITTER:****3.1 GENERAL:**

|       |                             |   |
|-------|-----------------------------|---|
| 3.1.1 | Frequency Range             | 88 MHz to 108 MHz                       |
| 3.1.2 | Nominal Frequency deviation | ±75 kHz (peak)                          |
| 3.1.3 | Maximum Frequency Deviation | ±100 kHz (peak)                         |
| 3.1.4 | Frequency Setting           | Direct from front panel in 10 kHz steps |
| 3.1.5 | Class of Emission           | 180KF8E                                 |
| 3.1.6 | Stereo transmissions        | Pilot tone system                       |
| 3.1.7 | Pre-emphasis                | 0, 50 µs (selectable).                  |

  
 26/05/2024  
 उप महानिदेशक (अभि.) / DDG (E)  
 कार्यालय अपर महानिदेशक (अभि.) (ब.दे.नं.) / O/o ADG (E) (NZ)

  
 06/05/2024  
 उप महानिदेशक (प्रशा.) / DDG (Admin.)  
 प्रसार भारती / Prasar Bharati  
 कार्यालय अपर महानिदेशक (अभि.) (ब.दे.नं.) / O/o ADG (E) (NZ)  
 अग्रशरणा 6/ए टुवईन, आठवां तल, सूचना भवन, सोनीको कॉम्प्लेक्स, नई दिल्ली-110003  
 Abastwari & Doodashan, 8th floor, Soochana Bhawan, SOG Complex, New Delhi-110003

  
 उप महानिदेशक (अभि.) / DDG (E) (NZ)  
 प्रसार भारती / Prasar Bharati  
 कार्यालय अपर महानिदेशक (अभि.) (ब.दे.नं.) / O/o ADG (E) (NZ)  
 नई दिल्ली-110003  
 8th floor, Soochana Bhawan, SOG Complex, New Delhi-110003



**3.2 INPUTS**

|       |  |  |
|-------|--|--|
| 3.2.1 | Modulating input signal  | Exciter should accept Analog Mono, Analog Stereo (left and right) AES/EBU.<br>It should be capable for Mono and Stereo Broadcast using pilot tone system.    |
| 3.2.2 | Input impedance (Analog)   | 10 k $\Omega$ or greater (for Mono)<br>10 k $\Omega$ or greater (for Stereo)   |
|       | Input Impedance (AES/EBU)  | 110 $\Omega$   |
| 3.2.3 | Analog and AES/EBU input Level for $\pm 75$ kHz (peak) Deviation | <b>ANALOG AUDIO INPUT:</b><br>Input Level Adjustable from -6 dBu to +6 dBu.<br><b>AES/EBU AUDIO INPUT:</b><br>Input Level Adjustable from -12 dBFS to 0 dBFS |

**3.3 RF OUTPUT**

|       |  |   |
|-------|--|---|
| 3.3.1 | Output power (RF)  | $\geq 100$ W (Max. 110 W)   |
| 3.3.2 | Output Impedance   | 50 $\Omega$ . (Unbalanced)  |
| 3.3.3 | Output connector   | N (F) connect (Rear)  |
| 3.3.4 | Permissible VSWR   | a. 1.5: 1 with full power (auto shutdown at $>1.8$ );<br>b. Automatic power reduction beyond 1.5:1. Details of power fold back characteristics to be provided by the tenderer.<br>c. Transmitter should be protected for short and open circuit conditions. |
| 3.3.5 | Harmonic and Spurious Signal Suppression.  | Within the limits as per Radio Regulations & ITU-R Recommendations. The actual values are to be indicated.  |
| 3.3.6 | Maximum Frequency Tolerance  | As per ITU-R  |
| 3.3.7 | Synchronous AM S/N Ratio referenced to 100% AM modulation at 400 Hz, 50 $\mu$ s Pre-emphasis with FM modulation at $\pm 75$ kHz deviation. | Better than 50 dB   |
| 3.3.8 | Asynchronous AM S/N Ratio unweighted, referenced to 100% AM modulation at 400 Hz, 50 $\mu$ s Pre-emphasis and without FM modulation.       | Better than 60 dB   |
| 3.3.9 | Overall efficiency   | $\geq 55$ %   |

**3.4 MONO OPERATION:**

|       |   |                          |
|-------|---|--------------------------|
| 3.4.1 | FM S/N Ratio at $\pm 75$ kHz Deviation (30 Hz to 15 kHz), rms, unweighted | Better than 70 dB        |
| 3.4.2 | Total Harmonic Distortion plus Noise (THD+N)                              | Better than 0.2 %        |
| 3.4.3 | Amplitude response (30 Hz to 15 kHz)                                      | Better than $\pm 0.2$ dB |
| 3.4.4 | Inter Modulation Distortion (IMD) SMPTE(60 Hz/7 kHz, 4:1)                 | Better than 0.1 %        |

**3.5 STEREO OPERATION:**

|       |   |                   |
|-------|---|-------------------|
| 3.5.1 | Stereo Separation (30 Hz to 15 kHz)                             | Better than 50 dB |
| 3.5.2 | Linear Cross Talk referred to 100% modulation (30 Hz to 15 kHz) | Better than 50 dB |

*Ram*  
06-05-2024

राम बचन राम / Ram Bachan Ram

उप महानिदेशक (अभि.) / DDG (E)

कार्यालय अपर महानिदेशक (अभि.) (उ. क्षेत्र) / O/o ADG (E) (NZ)

*Ommy*  
6/5/2024  
संजय कुमार / Rajesh Kumar  
उप महानिदेशक (प्रशा.) / DDG (Adm.)

प्रखुर भारती / Prasar Bharati  
कार्यालय अपर महानिदेशक (अभि.) (उ. क्षेत्र) / O/o ADG (E) (NZ)  
आकाशवाणी एवं दूरदर्शन, आकाश तल, सूचना भवन, सीडीओ कॉम्प्लेक्स, नई दिल्ली-110003  
Akashvani & Doordarshan, 8th Floor, Sancha Bhawan, CGO Complex, New Delhi-110003

*Ommy*

प्रसार भारती / Prasar Bharati  
कार्यालय अपर महानिदेशक (अभि.) (उ. क्षेत्र) / O/o ADG (E) (NZ.)  
आकाशवाणी एवं दूरदर्शन, आकाश तल, सूचना भवन, सीडीओ कॉम्प्लेक्स, नई दिल्ली-110003  
Akashvani & Doordarshan, 8th Floor, Sancha Bhawan, CGO Complex, New Delhi-110003



|       |  |                          |
|-------|--|--------------------------|
| 3.5.3 | Non-linear Cross Talk referred to 100 % modulation                                   | Better than 50 dB        |
| 3.5.4 | FM S/N Ratio at $\pm 75$ kHz Deviation (L or R)<br>(30 Hz to 15 kHz) rms, unweighted | Better than 70 dB        |
| 3.5.5 | Total Harmonic Distortion Plus Noise (THD + N) (L or R)                              | Better than 0.2 %        |
| 3.5.6 | Inter Modulation Distortion IMD SMPTE (L or R)<br>(60 Hz/7 kHz, 4:1)                 | Better than 0.1 %        |
| 3.5.7 | Amplitude Response (L or R) (30 Hz to 15 kHz)  | Better than $\pm 0.2$ dB |
| 3.5.8 | Pilot Tone Stability   | As per ITU-R Rec.        |

**3.6 WIDEBAND COMPOSITE OPERATION:**

|       |  |                          |
|-------|--|--------------------------|
| 3.6.1 | FM S/N Ratio at $\pm 75$ kHz deviation, rms, unweighted<br>30 Hz to 15 kHz | Better than 70 dB        |
| 3.6.2 | Total Harmonic Distortion Plus Noise (THD+N) 30 Hz to 15 kHz               | Better than 0.2 %        |
| 3.6.3 | Amplitude response (30 Hz to 80 kHz)                                       | Better than $\pm 0.5$ dB |

**3.7 POWER SUPPLY INPUT:**

|       |                   |  |
|-------|-------------------|--|
| 3.7.1 | Operating voltage | AC Single Phase : 230 Volts $\pm 10$ % |
| 3.7.2 | Frequency         | 50 Hz $\pm 4$ %                        |

**3.8 AMBIENT/ENVIRONMENTAL CONDITIONS:**

|       |                   |                                     |
|-------|-------------------|-------------------------------------|
| 3.8.1 | Temperature       | 0 °C to 45 °C                       |
| 3.8.2 | HMSL              | Max upto 3500 m from mean sea level |
| 3.8.3 | Relative Humidity | Max. 95% non-condensing             |

**4. BILL OF MATERIALS (BOM):**

| Sl.No. | Items  | Quantity | Consignee                         |
|--------|--|----------|-----------------------------------|
| 1      | 100 W RF Power Amplifier Unit MOSFET Technology based for FM Transmitter | 4        | DE/DDE, All India Radio, Dehradun |

**5. PRE-DISPATCH INSPECTION AND MEASUREMENT REPORT:**

The agency/supplier will manage for pre-dispatch inspection and measurement report of the Power Amplifier Unit along with its all accs. Items at the factory/lab of the agency/supplier at the cost of the agency/supplier through the authorized engineer of All India Radio (Akashvani) Office immediately after receipt of the supply order. Necessary action shall be taken by the O/o ADG(E-NZ), All India Radio (Akashvani) & Doordarshan Office, New Delhi to send the engineer for the pre-dispatch inspection and measurement at the work place (factory/lab) of agency/supplier. The cost related to the tour/visit of the engineer from the All India Radio (Akashvani) shall be borne by the All India Radio (Akashvani) Office.

**6. TECHNICAL MANUAL:**

A technical manual of the Power Amplifier system with details of the modules, circuit diagram, testing and measurements, troubleshooting, technical spares etc. may be provided 2 sets along with each unit for the operation and technical maintenance purpose.

**7. LIST OF THE RECOMMENDED TECHNICAL SPARES AND QUOTATION:**

Module and item-wise details may be given.

**8. GENERAL TERMS AND CONDITIONS:**

**8.1 CATEGORY OF PRODUCTS:** Make in India products.

**8.2 EXPERIENCE:** Minimum 5 years experience in broadcasting equipments supply and dealing.


**8.3 WARRANTY:** 2 Years from date of supply of the items at the site.

**8.4 PERFORMANCE BANK GUARANTEE:** 5% of the tender's agreement (order cost) value, may be released after the warrantee.

  
06.05.2024  
राम बचन राम / Ram Bachan Ram  
उप महानिदेशक (अभि.) / DDG (E)

कार्यालय अपर महानिदेशक (अभि.) (उ.शे.) / O/o ADG (E) (NZ)

  
6/5/2024  
राजेश कुमार / Rajesh Kumar  
उप महानिदेशक (प्रशा.) / DDG (Admn.)  
प्रसार भारती / Prasar Bharati  
कार्यालय अपर महानिदेशक (अभि.) (उ.शे.) / O/o ADG (E) (NZ)  
आकाशवाणी एवं दूरदर्शन, आकाशवाणी, सुभाष भवन, संजीवो कॉम्प्लेक्स, नई दिल्ली-110003  
Akashvani & Doordarshan, 5th Floor, Susha Bhawan, CGO Complex, New Delhi-110003

  
उप महानिदेशक (अभि.) / DDG (Engg)  
प्रसार भारती / Prasar Bharati  
कार्यालय अपर महानिदेशक (अभि.) (उ.शे.) / O/o ADG (E) (NZ)  
आकाशवाणी एवं दूरदर्शन, आकाशवाणी, सुभाष भवन, संजीवो कॉम्प्लेक्स, नई दिल्ली-110003  
Akashvani & Doordarshan, 5th Floor, Susha Bhawan, CGO Complex, New Delhi-110003

**BILL OF MATERIAL (BOM)**

| Sl. No. | Description of items/works   | Qty.   | Make & Model | Unit | Unit Price | Amount | GST | Total Amount |
|---------|--|--------|--------------|------|------------|--------|-----|--------------|
| 1.      | 100 W RF Power Amplifier Unit<br>MOSFET Technology based<br>for AM Transmitter<br>FOR<br>DE/DDE, All India<br>Radio, Dehradun<br>(UK). | 4 Nos. |              |      |            |        |     |              |

