



WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED

(A Govt. of West Bengal Enterprise)

Office of the Chief Engineer, Procurement & Contract Department

Vidyut Bhavan(4th Floor),Bidhannagar, Block-DJ : Sector-II

Kolkata-700 091 : Phone No.033-2359-8397 : Fax No.033-2359-1921

TECHNICAL SPECIFICATION FOR FREQUENCY SYNTHESISED MICROPROCESSOR BASED VHF TRANSCIEVER BASE (FIXED)STATION SET

GENERAL:

1	Frequency Range	:	i) 66 to 88 Mhz.(LB) ii) 146 to 174 MHz. (HB)
2	No. of Channels	:	4 or more (spot freq.70.2, 79.95, 82.3 MHz.-LB 149.45, 164.9, 167.125,167.625MHz.-HB)
3	Type of Modulation	:	Frequency Modulation (Phase)
4	Type of Emission	:	11 KOF3E
5	Channel Spacing	:	12.5 KHz. (Bandwidth programmable by channel)
6	Switching Bandwidth	:	Full Band
7	Operational Temperature	:	(-)10°C to (+) 50° C
8	Frequency Stability	:	5 ppm
9	Type of Operation	:	Simplex, press to talk, (external 4Ω speaker preferable)
10	Type of Antenna	:	$\lambda / 4$ GP Antenna
11	RF Unit/ Output Impedance	:	50 Ω (nominal)
12	Normal Power Supply Voltage	:	12 VDC \pm 10% & or 13.6V (Nominal)
13	LCD Display with back light	:	To be provided
14	External PC Programming	:	Relevant programming software should be compatible to Pentium I and above based computers
15	Protection	:	Reverse Polarity and short circuit protection to be provided
16	Weight	:	Light weight and reasonable dimension
17	Housing (Case)	:	Polycarbonate sleek and good looking
18	Carrying Case	:	As available

TRANSMITTER:

1	Power Output	:	25 W over entire Band
2	Frequency Deviation	:	\pm 2.5 KHz (maximum)
3	Modulation Sensivity	:	1 to 10 mV at 1 KHz at Mike input
4	Modulation Distortion	:	Less than 5% at 1 KHz reference
5	SpuriousHarmonics	:	Better than 60 dB
6	FM Residual Noise	:	Better than 40 dB
7	Audio Frequency Response	:	1 dB to (-)3 dB of a 6dB/Octave pre-emphasis characteristic
8	Tx. Rise time	:	Less than 40 millisec.

RECEIVER:

1	Type of Receiver	:	Double Super Hetero type
2	Sensitivity	:	0.3 μ V for 12dB sinad
3	Adjacent Channel Selectivity	:	Better than 60 dB
4	Intermodulation Rejection	:	Better than 65 dB
5	Spurious Response Rejection	:	Better than 65 dB



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6	Audio Response	:	(+) 1dB to (-)3 dB/Octave de-emphasis charaterstic
7	Blocking	:	Better than 90 dB
8	Mute Delay	:	Less than 40 millisec at 20dB Sinad
9	Adio Output	:	4 W minimum into 4 Ω with less than 5% distortion
10	Squelch Sensivity	:	0.2 μ V
11	Speaker	:	Impedance 4 Ω

ENVIRONMENT:

1	Operating Temp. Range	:	(-)10°C
2	Relative Humidity	:	95% max. at 40°C

TECHNICAL SPECIFICATIONS FOR VHF HAND FREQUENCY SYNTHESIZED TRANSCEIVER SETS

A.GENERAL:

1	Frequency Range	:	Low Band (LB)66-88 MHz High Band (HB)146-174 MHz
2	No. of Channels	:	4 or more (spot Freq.70.2, 79.95, 82.3 MHz---LB 149.45, 164.9, 167.125, 167.625 MHz----HB)
3	Type of Modulation	:	Frequency Modulation (Phase)
4	Channel Spacing	:	25KHz/12.5 KHz programmable
5	Frequency Stability	:	+ /- 5PPM or better
6	Type of operation	:	Simplex, press to talk with built in Mic & Speaker
7	Type of Antenna	:	Helicval Antenna suitably matched for coverage of 3 nos.LB spot & 4 nos HB spot frequencies on respective sets separately.
8	Speaker Impedance	:	4 Ω / 8 Ω / 16 Ω
9	Output Impedance	:	50 Ω

10. The set should be provided with protection against reverse polarity and high VSWR.
11. The set should be preferably of lightweight, reasonable dimension, rugged and durable.
12. Should have inbuilt circuitry to stop transmission when battery voltage reacheds a pre-assigned minimum voltage level to prevent damage to the set as well as the battery.
13. The battery pack should be provided by long life rechargeable battery easily available in Indian Market and more than 1600 mAH without memory effect. Expected normal life of the offered battery Pack should be mentioned clearly by the Bidder.
14. The set should be provided with:-
 - a) LCD Display with back light
 - b) Tx ON indication
 - c) Channel busy indication
 - d) Battery Low alert with LED & Audible alarm
15. The set should have provision for external PC/Field Programmable. PC programming software should be compatible to Pentium I sand above based computers with Microsoft Windows 95/98/XP.
16. Belt clip should be provided for carrying purpose.



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B. TANSMITTER:

1	Power Output	:	5W over entire band
2	Max. Freq. Deviation	:	+/- 5 KHz (Wide) ÷ +/- 2.5 KHz (Narrow)
3	Modulation Distortion	:	Less than 5% at 1 KHz reference
4	Spurious & Harmonies	:	Better than 65 dB
5	FM Hum & noise	:	Better than 40 dB
6	Audio frequency response	:	+ 1dB to -3dB of 6 dB/octave pre-emphasis characteristic from 300 Hz to 2700 Hz with 1 KHz reference
7	Duty cycle	:	1 min. Tx, 4 min. Rx.

C. RECEIVER:

1	Sensitivity	:	$\leq 0.3 \mu V$ for 12 dB SINAD
2	Adjacent channel Selectivity	:	Better than 60 dB
3	Intermodulation Attenuation	:	Better than 70 dB
4	Spurious and Image Rejection	:	Better than 65 dB
5	Audio Response	:	+ 1dB to -3dB of 6 dB/octave pre-emphasis characteristic from 300 Hz to 2700 Hz with 1 kHz as reference
6	Audio output	:	500mEW(with 5% distortion with an 80hm load)
7	Squelch Sensitivity	:	0.25 μV or better at Threshhold.

D. ENVIRONEMENT:

1	Operating Temp. Range	:	-10°C to 60°C
2	Relative Humidity	:	95% max at 40°C

E. TECHNICAL SPECIFICATIONS FOR BATTERY CHARGER FOR VHF HAND HELD SETS:

1. 230 V (+/-10%), single phase AC Input
2. Output Voltage should commensurate with specification of battery pack and type of battery used.
3. The charger should be capable of monitoring the condition of the battery and charge accordingly.
4. Rapid/Slow charging facility with LED indication.
5. Charge cutoff at full charge condition and audio alarm indication
6. The charger should be compatible to work in voltage fluctuation conditions from 160V to 280V
7. The charger should not allow discharge of batteries in case of power failure during battery charging.
8. The charger adaptor should be of SMPs design with 230-volt a.c. ON LED indication & capable to Charge the battery both in rapid & slow mode.



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TECHNICAL SPECIFICATION OF 12V, (10 A+ 10A) NON SMPS TYPE BATTERY CHARGER

1	Input AC voltage	:	i) 230V(-30%/+ 20%) i.e. 160V -275 V ii) Suitable manual tap position should be provided for +/- 5% & +/- 10% of normal 230V supply. Clear marking of each tap voltage along with normal voltage must be shown on the front panel.
2	Input frequency	:	50Hz (+/- 2Hz)
3	Output Voltage a) Load Voltage b) Battery Voltage	:	12V, adjustable between 11V to 14V 10V to 17V adjustable in eight steps. Smooth variation of voltage should be incorporated with each tap position in steps of 1 Volt
4	Load voltage Regulation	:	(+/- 1%) of preset value. No load to Full rated load
5	Output current a) Load current b) Battery Voltage	:	10 Amp Simultaneously 10 Amp Simultaneously
6	Output Ripple at Load side	:	20mV PP (max)
7	Over current Protection	:	"FOLD BACK" type over current protection for full load current exceeding 110% of full load current.
8	Indication by Meter	:	a) Voltmeter indicating Load and Battery Voltage with change over selector switch. b) Ammeter indicating load Current. c) Centre Zero meter indicating Battery Charge and Discharge Current. d) AC Voltmeter indicating AC input
9	Indication by Neon	:	AC input ON should be provided
10	Indication by LED	:	Suitable indication should be provided for:- a) Normal DC Output both for load and battery b) DC fuse fail both for load and battery c) MCB trip d) Battery discharge e) Battery reverse polarity

SPECIAL REQUIREMENT:

- High quality noise & surge protection unit at the input AC supply point is to be provided for the safe guard of entire charger unit and connected VHF load.
- All switches, meters, indicators, terminals should be clearly marked and easily approachable to facilitate easy maintenance.
- One earth terminal should be provided for connecting the charger to system earth at substation.



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14. Schematic diagram of the charger should be furnished along with tender indicating the rating, make of essential components. The components should be of high quality and their manufacturer's name should be indicated along with a Bill of Materials.
15. Construction of the Charger Casing should be sheet metal of 20 SWG sheet.
16. All switches & MCBs should be of high quality and of reputed make with sufficient insulation capacity.
17. Changeover relay and other relays as will be provided in the charger circuit shall be of heavy duty and either Siemens/Havells make with minimum contact resistance for smooth functioning of the charger under any condition.

OPERATION CONDITIONS:

The charger should consist of two separate output units of which the Load Feeding Part will feed the sophisticated electronic load (VHF equipment) and the Battery Charging Part will charge a 80 AH Lead Acid Battery. Normally the load feed part shall feed the load at 12V DC, 10Amp (max) and the full charged battery shall remain connected with the Battery terminal of the charger in float condition. In the event of failure or low AC supply voltage ($< 160V$) the battery shall automatically feed the load and the load will remain disconnected from load feeding point. On return of AC supply, load is fed by first source and battery is charged automatically in float condition.

Charger should have facility to charge fully discharged or a new unchanged battery to its full charge condition.

The equipment should be protected against any surge and transient over voltage from input side.

It should be capable of operation on continuous basis. Soft start facility should be incorporated so that output DC voltage should built up smoothly without any jerk or voltage overshoot.

In case load voltage exceeds 14V, over voltage tripping facility should be available and battery will automatically feed the load with the appearance of a visual indication.

Edge connectgors should be provided for easy maintenance of control cards.

Change over should be provided through relay and connector of very good quality & adequate capacity. Successful Bidder must provide detail circuit diagram along with a photo type charger for examination and testing at our laboratory prior to final placement of relevant purchase order. Illustrated literature indicating connectively between different modules and components only with the photo type charger for examination & testing.