TECHNICAL SPECIFICATION FOR VERY HIGH FREQUENCY (VHF)/ULTRA HIGH FREQUENCY (UHF) PORTABLE ELECTRONIC WARFARE (EW) MONITORING AND DIRECTION FINDER (DF) EQUIPMENT

Ser	Nomenclature	Technical Specification	To be filled up by the Manufacturer /Principal
(a)	(b)	(c)	(d)
PART -1: GENERAL SPECIFICATION.			
1.	Nomenclature	**VHF/UHF Portable Monitoring and DF Equipment**	
2.	Brand	To be mentioned.	
3.	Model	To be mentioned.	
4.	Country of Origin	Group A Countries.	
5.	Country of Manufacture/ Assembly	Group A and B Countries.	
6.	Year of Manufacture	To be mentioned.	
7.	Name of Manufacturer with complete address (Office Address, Telephone, Fax, e-mail and website)	To be mentioned.	
8.	Name of Principal with complete address (Office Address, Telephone, Fax, and e-mail)	To be mentioned.	
9.	Name of Local Agent with complete address (Office Address, Telephone, Fax, and e-mail)	To be mentioned.	
PART -2: TECHNICAL SPECIFICATION.			
10.	General Characteristics and Desired Output of the System/subsystem	a. Intercept, monitor, finding direction and geolocation of all types of signals within range with high accuracy both for fixed and moving targets. b. Perform simultaneous monitoring and recording of individual frequencies, lists of frequencies and frequency ranges. c. Detect and configure burst and frequency agile short-time signals with subsequent automatic processing including content recovery (except encrypted signals) available in the library. d. Classify, demodulate, decode a frequency spectrum and provide output in terms of audio, graphical and other functional formats. e. Carry out online and offline analysis of available spectrum in the library. f. Content recovery shall be done (except encrypted signals). A comprehensive array of modulation types should be available. g. Should support lookback collection to go back in time and collect and perform required signal analysis.	
11.	**Monitoring Receiver**		
	a. Frequency range	30 MHz to 3 GHz. However, wider bands are also appreciated.	

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(a)	(b)	(c)	(d)
	b. Frequency Accuracy	< 1ppm	
	c. Receiver sensitivity	≤ -110dBm or more.	
	d. Real time bandwidth	40 MHz. Both narrow and wide band (multiple) is also appreciated.	
	e. Demodulation Techniques	a. AM, FM, LSB, USB, ISB, CW, I/Q signals, φM, pulse including their different variations. b. Other techniques like PM, FSK, PSK, QAM, all types of SDR Demodulations should also be provided. c. Inclusion of latest demodulation techniques is also required.	
	f. Tuning Resolution	1Hz	
	g. **Scan characteristics**		
	(1) Memory Scan	Minimum 4 memory scanning plans maximum of up to 1000 frequencies.	
	(2) Frequency Scan	Minimum number of programmable memories: 02 sub bands	
12.	**Direction Finder**		
	a. Frequency range	30 MHz to 3 GHz. However, wider band is also appreciated.	
	b. DF Accuracy	≤ 3° RMS	
	c. Minimum signal duration	1ms	
	d. DF Rate	Minimum 20 DF result/min Depending on resolution.	
	e. Scanning speed	Must achieve up to 10 GHz/s	
	f. Direction finding mechanism	The system uses correlative interferometer DF method. It provides real time AOA (Angle-of-Arrival) DF mechanism. TDOA and hybrid AOA/TDOA mechanism is also appreciated.	
	g. Gain Control	Both manual and automatic.	
13.	**Analyzing Capability**		
	a. Software	All required software for instant analysis to be installed in the system.	
	b. Signal interception	(1) For encrypted and hopping signals, at least finding the emitter location is appreciated. (2) Digital recording and replay for further use of received signals. (3) SDR interception to be done automatically utilizing different techniques.	
	c. Automatic classification and processing	Automatic/manual signal processing with user-defined rules via script editor. Operator can classify and process signal manually with offline analyzer.	

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	e. Simultaneous recording of multiple signals	(1) It shall provide enhanced capabilities through post processing of recorded signals. (2) Provide systematic management of recorded signals.	
	f. Hardware architecture	The proposed system should be able to integrate with the same manufacturer's existing systems.	
	g. Analyzing Capability	(1) Minimum 02 narrowband channels are to be analyzed at a time. (2) Universal and a wide range of latest decoders are also to be installed to analyze complex signals including SDR signals. List of such decoders should be provided.	
14.	**Antenna System**		
	a. General Features	(1) It should be Omni directional antenna used for DF functionality and also compatible with the existing system. (2) Tripod to be provided for use on light vehicle and ground. (3) Segments to be mentioned. (4) It should provide suitable combination for flexible antenna operation.	
	b. Technical Features	(1) Frequency range: 30 MHz to 3 GHz (for direction finding and monitoring purpose). However, wider band with multiple sub ranges are also appreciated.	
		(2) Capability: Suitable for monitoring and Direction-Finding operation	
		(3) Frequency sub-ranges: To be mentioned	
		(4) Polarization: Vertical	
		(5) Field strength sensitivity dB μ V/m to be mentioned.	
	c. Accuracy	≤ 3° RMS (on calibration base and for 30 dB SNR)	
	d. Weight with all accessories	Maximum 20 Kg.	
	e. Dimensions:	To be mentioned.	
15.	**Others**		
	a. Electromagnetic compatibility	As per MIL STD 461E	
	b. Dimensions	W × H × D of All major equipment of the system to be mentioned	
	c. Weight	Total weight of major equipment to be mentioned.	
	d. Future Expansion	The system has the provision of expansion/ modification in future.	
16.	**Power System**		
	a. Rated voltage	AC 220 Volt (± 10 %)	
	b. Rated frequency	50 Hz for AC	
	c. Power Consumption	Power Consumption of each major equipment of the system to be mentioned. However, total power of all units should not exceed 80% of the supplied power system.	

4/27/4

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

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(a)	(b)	(c)	(d)
	d. Power source	(1) Primary: Through AC inlet. (2) Backup: Online UPS. Backup time is minimum 30 minutes.	
17.	**Common Features of the System**		
	a. Graphics User Interface (GUI)	(1) GUI shall provide various features frequency, bandwidth, and demodulation, squelch etc separately. (2) Emitter location is displayed on the map with various details of the location. Especially, Latitude- longitude to be displayed on both the online and offline map. It should display the bearing as well.	
	b. Map Integration	(1) System software shall integrate digital topological base map of Bangladesh (and surrounding), UTM map (BUTM 2010), online open street map, Google map etc in the user interface. (2) Both online and offline map (downloaded) to be provided and should be installed as and when required.	
	c. Control Software	(1) Software shall provide various function like Measurement, Calibration, Sweep Functions, Trace Functions, Marker Functions, pan Display Function, Monitor receiver functions, Signal analysis function, Task and result management functions Band scan, Channel scan, features etc (2) It shall include mission planning tools/software for the siting of various stations on the control software map display before moving to the ground.	
	d. Data transfer/storage capacity	(1) It shall transfer data using flash drive/external hard disk/ removable disk etc.	
	e. Determination of own location (GPS & Compass)	(1) Built-in Electronic GPS to find Lat -Long of own position precisely. (2) Electronic compass installed with the system.	
	f. Inter Communication System	(1) All the stations (both master and slave) are under same network arrangement. Both the station should be connected through a stable radio network for inter- connectivity. (2) For this purpose following shall be used: (a) VHF 40 Watt Radio with encryption facilities. (b) Alternative inter communication facilities must be offered by the supplier.	
	g. Inter-operability	The equipment must be compatible and inter operable with the existing monitoring and DF EW equipment of Bangladesh Army.	

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	h. **Rugged Laptop** (To be provided for monitoring receiver and direction finder)	(1) Country of Origin: Gp A. (2) Country of Manufacturer/ Assembly: Group A or B. (3) Processor: Core i7 processor or better. (4) Storage: Minimum 1 TB. (5) RAM: 32 GB RAM. (6) Combination of SSD/NVME to be provided. (7) Motherboard: To be mentioned. (8) Display: To be mentioned. (9) **Rugged Standard.** (a) Drop. MIL STD 810 F/G. (b) Vibration. MIL STD 810 F/G. (c) Rain. IP 54. (d) Temperature. Operating: -5°C to +50°C. Storage: -10°C to +55°C.	
18.	**VHF Radio Link** (VHF Radio to be provided for monitoring receiver and direction finder)		
	a. Frequency Range	30 to 88 MHz	
	b. Channel	To be mentioned	
	c. Step Size	Minimum 25 KHz	
	d. Power Output	Low: To be mentioned. High: Minimum 40 Watt.	
	e. Communication Range	To be mentioned in case of plain, urban and hilly areas	
	f. Electronic Counter Counter Measure (ECCM)	Radio equipment must have in built ECCM features	
	g. Encryption	AES 256	
	h. Data Interfaces	Ethernet 8-10 Mbps capacity.	
	j. Antenna	Details to be mentioned.	
	k. Weight	To be mentioned	
	l. Battery	(1) Battery life to be mentioned. (2) Battery type to be mentioned.	
19.	a. **Environmental conditions**.		
	(1) Radiation Protection	Safety arrangements to be provided.	
	(2) Temperature	(a) Operating temperature range: 0 °C to +55 °C.	
		(b) Storage temperature range: –40 °C to +70 °C.	
	(3) Humidity	Minimum 95% non-condensing with self-cooling mechanism and minimum noise level.	
	b. **Mechanical Resistance**		
	(1) Vibration	(a) Sinusoidal. As per MIL_STD_810E Procedure 514.5	
		(b) Random. As per MIL_STD_810E Procedure 514.5	

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	(2) Shock	As per MIL_STD_810F Procedure 516.5	

20. **List of Standard Equipment**

Ser	Description	Quantity per unit
1.	Monitoring and DF equipment	01
2.	Analyzing software	01
3.	All types of Antennas with cable and accessories	01
4.	VHF Radio with encryption facilities	01
5.	GPS	01
6.	Electronic Compass	01
7.	Rugged Laptop with analyzing software	01
8.	Storage System with 2 TB capacity	01
9.	All required cable and accessories	02 Set
10.	Detailed Schematic diagram of the system connectivity	02 set
11.	Other equipment and accessories needed for smooth running of the system	To be provided

21.	Warranty	2 (Two) Years	
22.	After Sales Service	10 (Ten) Years	
23.	Model Validity	Minimum 10 (Ten) years from signing of contract.	
24.	Any other	If any item not specifically mentioned above but required technically for full range of operation, the bidder should specify and quote such item(s) in their offer. In case of failure to specify and quote, the bidder must provide such items free of cost.	
PART III: TRAINING REQUIREMENT			
25.	Operational Training	To be provided (As per requirement of Signals Directorate)	
26.	Repair and Maintenance Training	To be provided (As per requirement of Signals Directorate)	

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

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(a)	(b)	(c)	(d)
PART IV: REPAIR AND MAINTENANCE REQUIREMENT LESS LIST OF SPARES			
27.	**Books and Publication**		
	a. Owners/Operations manual in English (Book Type) including CD/DVD)	To be provided (As per requirement of Signals & EME Directorate)	
	b. Workshop/Repair manual incl detail schematic and circuit diagram in English (Book Type) including CD/DVD	To be provided (As per requirement of Signals Directorate)	
	c. 100% Updated master spare parts catalogue including price in English (Book Type) including CD/DVD)	To be provided (As per requirement of Signals Directorate)	
PART V: SPARE PARTS REQUIREMENT			
28.	List of standard spare parts, tools and accessories	To be provided (As per requirement of Signals Directorate)	
PART VI: TOOL LIST FOR DIFFERENT LEVEL OF MAINTENANCE			
29.	Analyzer, Measuring Testing/Fault finding and Diagnostic set	To be mentioned (As per requirement of Signals Directorate)	
30.	Special Service Tools (SST)	To be mentioned (As per requirement of Signals Directorate)	
31.	Special Service Materials (SSM)	To be mentioned (As per requirement of Signals Directorate)	

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