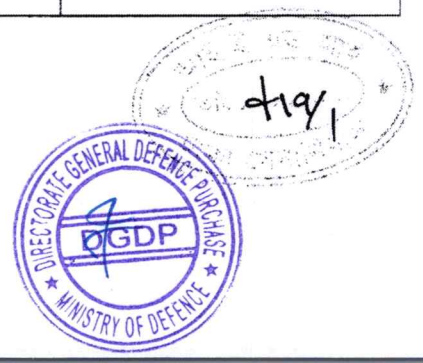
TECHNICAL SPECIFICATION FOR VHF/UHF PORTABLE EW SYSTEM (DP-5)

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 EW System.	
2.	Brand	To be mentioned.	
3.	Model	To be mentioned.	
4.	Country of Origin	Group ACountries.	
5.	Country of Manufacture/ Assembly	Group A & 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, e-mail and website)	To be mentioned.	
9.	Name of Local Agent with complete address (Office Address, Telephone, Fax, e-mail and website)	To be mentioned.	
PART -2: TECHNICAL SPECIFICATION.			
10.	General Characteristics and Desired Output of the System/subsystem	The system includes monitoring, direction finding and jamming capabilities with built in inter communication system. The system shall: 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 look back collection to go back in time and collect and perform required signal analysis.	



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(a)	(b)	(c)	(d)
11.	**Monitoring Receiver**		
	a. Frequency range	20 MHz to 3 GHz. However, more wide band is also appreciated.	
	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	AM, FM, LSB, USB, ISB, CW, I/Q signals, φM, pulse including their different variations. However, other techniques like PM, FSK, PSK, QAM, all types of SDR Demodulations should also be provided. Inclusion of latest demodulation techniques is also required.	
	f. Tuning Resolution	1Hz	
	g. **Scan characteristics**		
	(1) Memory Scan	Minimum 5 memory scanning plans maximum of up to 1000 frequencies.	
	(2) Frequency Scan	Number of programmable memories Up to 3 sub-bands.	
12.	**Direction Finder**		
	a. Frequency range	20 MHz to 3 GHz. However, more wide band is also appreciated.	
	b. DF Accuracy	< 1.5° RMS	
	c. Minimum signal duration	1ms	
	d. DF Rate	Minimum 20 DF result/min Depending on resolution.	
	e. Scanning speed	More than 2 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 softwares 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.	
	d. Library/Database	(1) The system contains a comprehensive databasewhich automatically detects, demodulates and decode any signal. (2) It will show alarm on the previously recorded signal, if it appears again.	

4/9/1

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

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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 vehicular system (Segment to be mentioned). (2) It should provide suitable combination for flexible antenna operation.	
	b. Technical Features	(1) Frequency range: 20 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: 20-3000 MHz (may provide more)	
		(4) Polarization: Vertical	
		(5) Field strength sensitivity dB μ V/m as follows: (a) ≤ 4 μV/m @ 20 to 160 MHz, typ 1 μV/m (b) ≤ 4 μV/m @ 160 to 700 MHz, typ 1 μV/m…3 μV/m (c) ≤ 10 μV/m @ 700 to 3000 MHz, typ 1 μV/m …7 μV/m (d) Accuracy: < 1.5° RMS (on calibration base and for 30dB SNR) (e) Antenna type: Interferometry. Array of multiple dipoles to be mentioned.	
	c. Weight:	Maximum20 Kg.	
	d. Dimensions:	To be mentioned	

DIRECTORATE GENERAL DEFENCE PURCHASE
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15.	**Others**		
	(1) Electromagnetic compatibility	As per MIL STD 461E	
	(2) Dimensions	W × H × D of All major equipment of the system to be mentioned.	
	(3) Weight	Total weight of major equipment to be mentioned.	
	(4) Lightning protection system	The system must have built in integrated lightning protection system.	
	(5) Future Expansion	The system has the provision of expansion/ modification in future.	
16.	**Jamming Station**		
	General Characteristics		
	a. General Characteristics	It should be Manpack system with built in inter-communication features. It should also have the provision of mounting on light vehicle especially on existing pick up of Bangladesh Army/ equivalent vehicle. The system shall: (1) Detect, track and jam of all conventional and sophisticated emitters/signals including frequency-agile signals within range. (2) Powerful electronic warfare support (ES) functionality. (3) Integrated with the existing DF and C2 Analysis Station in same network arrangement. (4) Multiple ECM mode (Spot and responsive jamming, repeater jamming, Follower jamming, Barrage jamming etc.) is available within the system. The jammer is also expected to have the capability of self-protection jamming. (5) Jam (Directional Jamming) VHF/UHF transmitter from a distance of approx 10 - 20 km on standard scenario.	
	b. **Technical Features**		
	(1) Frequency range	20 MHz to 3 GHz. However, more wider band is also appreciated.	
	(2) Receiver sensitivity	-120dBm or more.	
	c. **Receiver section**		
	(1) Frequency resolution	1kHz	
	(2) Frequency accuracy	Better than ± 1 ppm.	
	(3) Realtime Bandwidth	For Receiver: 40 MHz For Jamming: 60 MHz However, more wideband is also appreciated.	

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	(4) Trackable frequency hop rate	100 to 500 Hops/s. However, more hopping rate is also expected.	
	d. **Exciter/signal generator**		
	(1) No of narrowband modulators (for parallel generation of jamming signals)	8-16, user-defined: Generation possible of comb of rays with user defined span (limited to 60 MHz) and resolution. However, more number of modulators are also appreciated.	
	(2) Jamming modes	Continuous, Deception, Wideband, Barrage, Sweep, Fast Sequential, Look Through, FH Follower	
	(3) Jamming signal modulation modes	AM, FM, CW, FSK, MSK, DDS multi sweep digital. Other modes are to be mentioned.	
	(4) Signal generation method for jamming	DDS method is used. It has Barrage jamming Open library of jamming waveforms. However, other methods like DRFM, AWG, DDS/FPGA hybrid methods may also be integrated.	
	e. **Power amplifier**		
	(1) Output power	Upto 250 W. The subsystem output power to be mentioned basing on sub systems. However, more wattage with lighter setup is also appreciated.	
	(2) Maximum number of Jamming channel/Frequency	1600 Channel within 60 degree in one direction.	
	(3) System BITE operation	Should be available.	
	(4) Amplifier type	Semiconductor amplifier including harmonic filters	
	(5) Harmonic Filter	It is provided for lower sub-band	
	(6) Dummy Load	It is provided for each sub-band	
	f. **Antenna System**		
	(1) General Features	(a) Directional antenna to be used for Jamming purpose. (b) Manpack/ mounted on light veh especially on existing pick up of Bangladesh Army/ equivalent system should be available. (c) Number of antennas with different sub-band (sub bands to be mentioned).	
	(2) Technical Feature	(1) Frequency range: 20 MHz to 3 GHz. However, more wide band is also appreciated.	
		(2) Capability : jamming and monitoring.	
		(3) Frequency sub-ranges: should have multiple sub ranges (to be mentioned).	

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

Ser	Nomenclature	Technical Specification	To be filled up by the Manufacturer /Principal
(a)	(b)	(c)	(d)
		(4) Gain (i) >1.3 dBi @ 20 to 500 MHz (ii) >5dBi @ 50 to 550 MHz (iii) >7dBi @ 550 to 3000 MHz	
		(5) Antenna type: Suitbale for manpack version to be mentioned (Wideband Discone Antenna, Whip/ monopole, log periodic blade/pannel antennas etc may be considered).	
	g. Wide range of Jamming	(a) It has provision of sequential of parallel jamming. (b) The system is capable of jamming frequency hopping signal and SDR signals.	
	h. Wideband detector and exciter	(a) Excellent reception characteristics, high scan speeds and maximum hold function. (b) It should provide high real-time bandwidth.	
17.	Power System		
	(1) Rated voltage	AC 220 Volt (± 10 %)	
	(2) Rated frequency	50 Hz for AC	
	(3) 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) Power source	(1) Primary: Through AC inlet. (2) Secondary: Through small generator (upto 2 kVA). (3) Backup: Online UPS. (4) The battery backed power system should provide minimum 1 hr battery backup.	
18.	**Common Features of the System**		
	a. Graphics User Interface (GUI)	(1) GUI shall provide various features frequency, bandwidth, 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 (also downloaded map) view is available and should be installed as and when required.	

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

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	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.	
		(2) Two Ethernet connectivity to be provided to transfer measured data from monitoring/DF equipment to the workstation.	
	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 50 Watt Radio with encryption facilities. (b) Provision of external data connectivity should be provided.	
	g. Inter-operability	The entire system must be interoperatable with the existing system of Bangladesh Army.	
	k. Rugged Laptop	(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^{0}C to +50^{0}C Storage: -10^{0}C to +55^{0}C	

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19.	**VHF radio link**(VHF Radio to be provided for monitoring receiver, direction finder and Jammer)		
	a. General Characteristics	Frequency: 30 to 500 MHz, 2320 channels (25 kHz) RF output power: 10 W, 5W, 0.5 W. (To be mentioned)	
	b. Transmission and ECCM Protections	Analog fixed frequency (clear or scrambled). Digital fixed frequency (clear or encrypted). Fast Frequency Hopping (FFH). Free Channel Search (FCS) Automatic mixed mode FH or FCS	
	c. Interoperability	With other standard VHF radios for voice communication.	
	d. Standard Features	Battery life: (To be mentioned) Weight (Transceiver): 3-5 kg. Smaller and portable.	
	e. Data Interfaces	Ethernet 8-10 Mbps capacity.	
	f. Antenna	To be mentioned.	
	g. Battery	Rechargeable Li-ion battery Disposable alkaline cells	
20.	g. **Environmental conditions**		
	(1) Radiation Protection	Safety arrangements to be provided.	
	(2) Temperature	(a) Operating temperature range: 0 °C to +60 °C.	
		(b) Storage temperature range: –40 °C to +70 °C.	
	(3) Humidity	Humidity of up to 95% non-condensing with self-cooling mechanism and minimum noise level.	
	Mechanical Resistance		
	a. Vibration	(1) Sinusoidal. As per MIL_STD_810E Procedure 514.5	
		(2) Random. As per MIL_STD_810E Procedure 514.5	
	b. Shock	As per MIL_STD_810F Procedure 516.5	

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE

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(a)	(b)	(c)	(d)

21. **List of Standard Equipment in each Station**

Ser	Description	Quantity per unit
1.	For two Monitoring and DF Station with all accessories to be	*01 Set
2.	Analyzing software	01
3.	All types of Antennas with cable and accessories	01
4.	VHF 50 Watt Radio with encryption facilties	01
5.	GPS	01
6.	Electronic Compass	01
7.	Rugged Laptop with analyzing software	02
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
List of Standard Equipment for Jamming station		
1.	Communication jammer with all accessories.	01
2.	Processing unit.	01
3.	Exciter-Receiver unit with all necessary modules.	01
4.	Power amplifier along with harmonic filters	01
	a. 250W Power Amplifier (20 to 500 MHz).	01
	b. 150W Power Amplifier (500 to 1000 MHz).	01
	c. 70W Power Amplifier (800 to 3000 MHz).	01
5.	Jamming Software.	01
6.	Directive and polarized antenna to be given as follow: (a) 20-550 MHz for reception and emission. (b) 400-3000 MHz for reception only. (c) 400-3000 MHz for emission only. (d) Suitable antenna to be provide (Log periodic blade antenna may be considered).	01
7.	Dummy load	01
8.	VHF 50 Watt Radio with encryption facilties	01
9.	GPS along with antenna	01
10.	Electronic Compass	01

22.	Warranty	2 (Two) Years	
23.	After Sales Service	10 (Ten) Years	
24.	Model Validity	Minimum 10 (Ten) years from signing of contract.	
25.	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.	

419/1

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(a)	(b)	(c)	(d)
PART III: TRAINING REQUIREMENT			
26.	Operational Training	To be provided (As per requirement of Signals Directorate)	
27.	Repair and Maintenance Training	To be provided (As per requirement of Signals Directorate)	
PART IV: REPAIR AND MAINTENANCE REQUIREMENT LESS LIST OF SPARES			
28.	**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			
29.	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			
30.	Analyzer, Measuring Testing/Fault finding and Diagnostic set	To be provided mentioned (As per requirement of Signals Directorate)	
31.	Special Service Tools (SST)	To be provided mentioned (As per requirement of Signals Directorate)	
32.	Special Service Materials (SSM)	To be provided mentioned (As per requirement of Signals Directorate)	

DIRECTORATE GENERAL DEFENCE PURCHASE DGDP MINISTRY OF DEFENCE