

DIRECTOR GENERAL BORDER SECURITY FORCE
PROVISIONING DIRECTORATE (MOD CELL)

EXPRESSION OF INTEREST

Commandant (ord)
HQ DG BSF, Prov Dte (Ord Sec)
Block No. 10, CGO Complex
Lodhi Road, New Delhi
(Tele/Fax No. 011-24367683)

The Sub-group of Technical Experts constituted by MHA vide their letter No. IV-24011/12/2011-Prov-I dated 13 Jun 2012, No. IV-24011/12/2011-Prov-I dated 28 Dec 2012 & UO No. IV-24011/12/2011-Prov-I- 350 dated 27 Jun 2013 held its meeting at BSF Headquarters on **21st April 2017** to formulate the Qualitative Requirement of **“Man Portable Automatic Direction/Location Finder”**. After detailed deliberations the referred Sub-group has formulated the QRs/TDs which are as under:-

Draft QRs of Man Portable Automatic Direction/Location Finder

General: For operational deployment in jungle/hilly terrain, manportable automatic radio direction finder system should be able to find the direction of the clandestine/hostile transmitter (Line of Bearing) and location fixing (LF) while on move. It should have minimum following capabilities:

(a) Frequency range of the system is 20 MHz to 1GHz. The equipment should be able to work in DF mode & receive mode by press of a button.

It should show the direction of signal (Line of Bearing) in the DF mode and in receiver mode the system should be able to detect, listen & record the demodulated audio signals.

(b) High scan speed of a user defined frequency range or the entire frequency range to provide a fast overview of the spectrum and waterfall for active transmissions.

The equipment should be able to carry out automatic library base (memory channel scanning) target frequency search/Memory search to find if they are active for listening and then Direction/location finding.

(c) Should provide real time bandwidth of min 10 MHz for finding out the Radio transmission network talking to each other.

(d) Should be laptop controllable via LAN as well as front panel controllable. It should have built-in internal signal recording & reply capability (in the equipment) as well as possible to record signals on Laptop.

(e) Should be self-sufficient with built-in battery operated as well as mains for operation and charging the internal batteries.



- (f) Demodulated signal audio listening by headphone or by built in loudspeaker.
- (g) Direction finding antenna should have built-in GPS and compass for automatic DF and LF while on continuous move.
- (h) DF antenna to be based on correlative interferometer/Watson Watt principle for direction finding (Line of Bearing). Equipment's own position as well as signal LOB should be displayed on Map.

Draft QRs of Man Portable Automatic Direction/Location Finder

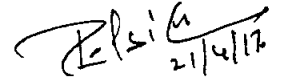
S N	Parameters/Specifications	
a)	Frequency range for DF and receiver mode	20 MHz to 1 GHz
b)	Rx sensitivity	
	Amplitude Modulation/6 KHz bandwidth	1 μ V at 10 dB SINAD
	Frequency Modulation/15 KHz bandwidth	1 μ V at 15 dB SINAD
c)	Frequency resolution	1Hz
d)	Display	Average, RMS, Max Peak, Sample
e)	Rx- Pre-selection	
	>30MHz	Low Pass Filter
	< 1.5 GHz	Tuned band pass filters
f)	Rx IF Spectrum Display range	1 KHz to 10 MHz
g)	De-Modulation	AM, FM, Pulse, I/Q, USB, LSB, CW
h)	Rx scan modes	Frequency scan, Memory scan, Panorama scan (Fast Fourier Transform based scanning)
i)	Rx scan speed	Up to 1.8 GHz/s
j)	I/Q output(\leq 200 KHz)	Ethernet port
k)	Audio Output	Built in speaker & headphone
	Digital output	Ethernet port
	Analogue output (IF filter & modulation)	10 Hz/300Hz to 12.5 KHz
l)	Data, Control, interfaces	Ethernet port
m)	Recording	USB & SD card
n)	Map display function	Built in automatic display of own position & line of bearing (LoB) on Map
o)	Power Supply	220V, 50Hz & inbuilt battery operated
p)	Battery operating time	\geq 3 Hrs
q)	Built in display	Color graphic, RF spectrum, IF spectrum, Water Fall, Polar Diagram for Bearing, Map, Distance from target.
r)	Weight	\leq 6 Kg (Excluding Antenna & Battery)
Antenna System		
i)	Frequency Range	20MHz to 1 GHz
ii)	DF method	Correlative Interferometer/Watson

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		Watt/Doppler
iii)	GPS & Compass	In built GPS & electronic compass
iv)	System DF Accuracy	2° to 3°
Environmental Specification:		
i)	Operating temp	-20 °C to +55 °C
ii)	Storage temp	-40 °C to +70 °C
iii)	Climatic & mechanical	MIL-STD810F or More

Note- All firms are requested to comment upon the above mentioned QRs and furnish original OEM Brochures/ catalogues. Firms are also requested to quote their Model Name/ Number being offered on the proposed QRs.

The Sub-group has decided to upload the QRs/ TDs on BSF website for 15 days to invite the views/ comments/ suggestions of prospective bidders to make the QRs more broad based.

 21/4/17

(Rishipal Singh)

Second-In-Command (Mod)

Draft Trial Procedure of Man Portable Automatic Direction/Location Finder

S N	Parameters/Specifications		Trial Procedure
(a)	Frequency range for DF and receiver mode	20 MHz to 1 GHz	BOO will check practically frequency range in both modes with the help of standard testing instrument. If testing instrument is not available than firm will provide the same.
(b)	Rx sensitivity		BOO will check practically Rx sensitivity in AM, FM modes with help of standard testing instrument. If testing instrument is not available than firm will provide the same.
	Amplitude Modulation /6 KHz bandwidth	1 μ V at 10 dB SINAD	
	Frequency Modulation/ 15 KHz bandwidth	1 μ V at 15 dB SINAD	
c)	Frequency resolution	1Hz	BOO will check practically.
d)	Display	Average, RMS, Max Peak, Sample	
e)	Rx- Pre-selection		Firm to submit certificate from OEM.
	>30MHz	Low Pass Filter	
	< 1.5 GHz	Tuned band pass filters	
f)	Rx IF Spectrum Display range	1 KHz to 10 MHz	BOO will check practically with help of standard testing instrument. If testing instrument is not available than firm will provide the same.
g)	De-Modulation	AM, FM, Pulse, I/Q, USB, LSB, CW	
h)	Rx scan modes	Frequency scan, Memory scan, Panorama scan (Fast Fourier Transform based scanning)	BOO will check practically Rx scan modes.
i)	Rx scan speed	Up to 1.8 GHz/s	BOO will check practically.
j)	I/Q output(\leq 200 KHz)	Ethernet port	BOO will check practically.
k)	Audio Output	Built in speaker & headphone	BOO will check practically.
	Digital output	Ethernet port	
	Analogue output (IF filter & modulation)	10 Hz/300Hz to 12.5 KHz	BOO will check practically with help of standard testing instrument. If testing instrument is not available than firm will provide the same.

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l)	Data, Control, interfaces	Ethernet port	BOO will check practically.
m)	Recording	USB & SD card	BOO will check practically.
n)	Map display function	Built in automatic display of own position & LoB on Map	BOO will check practically the Map display function.
o)	Power Supply	220V, 50Hz & inbuilt battery operated	BOO will check physically & practically.
p)	Battery operating time	≥ 3 Hrs	
q)	Built in display	Color graphic, RF spectrum, IF spectrum, Water Fall, Polar Diagram for Bearing, Map, Distance from target.	BOO will check practically one by one built in display modes.
r)	Weight	≤ 6 Kg (Excluding Antenna & Battery)	BOO will check weight with the help of weighing machine.

Antenna System

i)	Frequency Range	20 MHz to 1 GHz	BOO will check practically frequency range in both modes with the help of standard testing instrument. If testing instrument is not available than firm will provide the same.
ii)	DF method	Correlative Interferometer/Watson Watt/Doppler	Firm to submit certificate from OEM.
iii)	GPS & Compass	In built GPS & electronic compass	BOO will check practically.
iv)	System DF Accuracy	2° to 3°	BOO will check practically.

Environmental Specification:

i)	Operating temp	-20 °C to +55 °C	The firm must produce certificate approved by any Govt. Lab. or NABL/ ILAC accredited laboratory empowered to conduct these tests.
ii)	Storage temp	-40 °C to +70 °C	
iii)	Climatic & mechanical	MIL-STD810F or More	

R. S. G.
21/4/12
(Rishipal Singh)

Second-In-Command (Mod)