GOVERNMENT OF INDIA (Ministry of Home Affairs) DIRECTORATE GENERAL

CENTRAL RESERVE POLICE FORCE

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No. B.V-7/2018-19-C (HMSC)

Tele Fax:011-26107493

Dated, the y Oct'2018

- DIG (Comn), ITBP
 Block No. 2, CGO Complex
 Lodhi Road, New Delhi-03
- DIG (Comn), NSG
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 Lodhi Road, New Delhi-03
- 6. Liaison Office, Assam Rifle Room No-171, North Block, MHA New Delhi -01

Subject: <u>QRs/TDs of Hubless Man-Portable Satellite Communication</u>
<u>System.</u>

Please find enclosed here with QRs and TDs in respect of Hubless Man-Portable Satellite Communication System as per Annexure-A & Annexure-B respectively duly approved by the competent authority for further necessary action.

Encl: (QRs & TDs of Hubless Man-Portable Satellite Communication System)

{ P.R.Jha, DC (Comn)}
For DIGP (Equipment)
Directorate General, CRPF

No. B.V-7/2018-19-C(HMSC)

Dated, the 24 Oct'2018

Copy to:-

SO(IT), MHA, North Block with request to host the QRs and TDs of Hubless Man-Portable Satellite Communication System on MHA website. Soft copy is being sent through email also.

{P.R.Jha, DC (Comn)}
For DIGP (Equipment)
Directorate General, CRPF

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APPX-'A'

Frequency range:-

	RF(GHz)	IF(MHz)	LO (GHz)
, Standard KU	14.0-14.5	950-1450	13.05
Extended KU	13.75-14.5	950-1700	12.8

1 Trial Directives of BUC:-

Parameters	Specifications	
Input/output frequency	As per the Frequency table above	
Output power P-1dB	40 W	
W(dBm)		
Gain	70dB nominal	
Gain flatness	± 2dB typical	
Gain stability over	± 2dB	
temperature		
Gain control range	up to 16 dB	
Inter-modulation product	-25 dBc max (3dB total back off from rated power)	
Spurious	-55dBc max	
Frequency stability over	±0.05 PPM	
temperature:-	As per external 10 MHz reference	
Internal reference		
External reference		
Phase noise:-		
100 Hz	-63dBc/Hz max	
1KHz	-73dBc/Hz max	
10KHz	-83dBc/Hz max	
100KHz	-93dBc/Hz max	
I/P VSWR	1:5:1 max	
O/P VSWR	1:3:1 max	
Operating power	48 VDC	
requirement:-		
Operating voltage		
Power consumption (Watt	ts)	
25 W model	205 W	
or		
40 W model	275 W	
or		
50 W model	280 W	
(As per user requirement)		
Interfaces		
IF input interface	N or Qn Type	
Output interface	WR 75G or internal transceiver interface.	
System Health	Should be displayed	

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Parameters	Specifications	
Monitor & control		
Monitor	Lock/unlock status	
	Temperature and RF output power reading.	
	SSPA on/off, gain adjustment	
Control Interface	Via PC: RS 232/485 (TCP-IP option available)	
	Via modem: FSK option available	
	Via hand-held terminal: RS232 option	
	available	
Redundancy	External redundancy controller require	
Input reference		
Frequency reference 10 MHz to be supplied external via I		
	cable (internal reference option available)	
Level	-5 to +5 dBm	
Environmental condition	ons	
Operating Temperature	-30° to +55°C	
Storage Temperature	-40° to +70°C	
Humidity	0 to 100%	
Features	<u> </u>	
Monitoring &	Through RS-232/485 TCP/IP and FSK	
controlling		
Terminal for M&C	Hand held	
Weather proof	f IP-65	
packaging		

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1.2 LNB in KU band

Parameters	Specifications	
Noise figure	< 1dB	
Gain	33 dB typical	
VSWR (I/P & O/P)	≤ 2.5:1	
LO (Local Oscillator)	Auto switchable	
LO selection	22 KHz tone ON/OFF or input voltage	
Spurious	-55 dBc	
Image rejection	6 dB min	
Operating Temperature	-30° to +55°C	
Operating humidity	0 to 100	
Storage temperature	-40° to +70°C	
Operation altitude 15000 ft		
Frequency range	10.70 to 12.75 GHz	
Output frequency range	950 to 1700 GHz	
Voltage	+12 to 24 V DC	
Current	≤ 500mA	
RF I/P connector	WR 75	
RF O/P connector	Commercial available	

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1.3 Satellite Antenna:-

Parameters	Specifications
Frequency	Receive: 10.7-12.75 GHz
	Transmit: 13.75-14.5 GHz
Input/output frequency	950-1700
(MHz)	
Cross Polarization Isolation	
On axis	Rx mode-35.0 dB
	Tx Mode- 35.0 dB
Within 1.0 dB beam width	Rx mode-30.0 dB
	Tx Mode- 30.0 dB or better
Tx-Rx isolation	≥ 35 dB
VSWR	≤ 1.25:1
Antenna gain @ mid band	$Rx \ge 40.5 \text{ dBi } (\pm 0.2 \text{ dB}), Tx \ge 41.5 \text{ dBi } (\pm 0.2 \text{ dB})$
	0.2 dB)
Power handling	100W CW
Output waveguide flange	Commercial available
interface	· · · · · · · · · · · · · · · · · · ·
G/T 20°C elevation	17 dB/°K
Polarization	Liner (vertical & horizontal)
EIRP capability	> 51.3 dBW
Radiation pattern	As per ITU-R S-580-6
Wind speed	70 Km/h or better operational
	200 Km/h survival
Rain fall	180 mm/h operational, 360 mm mm/h
	survival
Operating temperature	-30° to +55°C
Storage temperature	-40° to +70°C
Weather proofing	IP 65
Humidity	100 %
Antenna	
Antenna platform	Motorized elevation over azimuth
Overrides	Manual AX/EI
Antenna Control System	
System interface	Built in intelligent control software for
	automatic satellite acquisition.
	Laptop user interface via Ethernet or Wi-
	Fi for advance antenna control.
	One button slow system
Power supply	220 V AC ± 10%, 47-53 Hz, +24/+48 V
DUC 9- IND	Antonno movido DC voltago to BUC &
BUC & LNB	Antenna provide DC voltage to BUC & LNB
Antenna controller display	Monitoring of Rx signal level in voltage,
Antenna controller display	polarization angle, IP address
QUAD band LNB	Quad band LO selection via antenna
QUILD DAILY DIVE	software embedded on terminal
	Soleman officeada off terminal

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Parameters	Specifications	
Mechanicals		
Reflector material	Carbon fiber antenna.	
Total weight	Total weight 90 Kg to be carried in max.	
	3 rugged carrying box .Each box should	
	not be more than 30 kg.	
Azimuth angel	±90° operational range (the rotational	
	range covers 180° 0.1° resolution)	
Elevation travel	10°-85° 0.1° resolution	
Polarization range	180° (± 90°) 0.1° resolution	
Features		
GPS	Integrated GPS should be available	
Ethernet or Wi-Fi	For connection with laptop and	
interface.	palmtops.	
Quad pod legs	To keep antenna well above running	
:	water and sand.	
Auto leveler	Enables auto leveling of antenna over	
·	rugged terrain and un even ground.	
De-icing kit	Should be available in case of snow	
·	accommodation	
Auto search	Should lock the satellite signal within 2	
	Minutes	
Antenna size	0.9/1.2 meter	

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1.4 Modem:-

Parameters	Specifications
Mechanical and envir	
RJ-45, 10/100 base T	Ethernet interface.
RS-232 asynchronous	serial or LAN port or RS 530 to ACU interface
AC power, IEC-320 into	erfaces, 50/60 Hz.
Operational Temperature	+5 °C to +50 °C.
Storage Temperature:	-10° to 50° C
Humidity:	Upto 95 % non-condensing
ODU Interface	
Transmit	950-1850 MHz L-band with 2.5 KHz steps; selectable on/off +24 V DC @ 2.7 Amp
Receive	950-1850 MHz L-band 2.5 KHz steps; selectable on/off +24 V DC @ 0.3 Amp
Features	
1. Data rates upto	20.0 Mbps
2. Standalone or ne	twork mobile
3. Web GUI with tra	affic statistic
4. Automatic chann	nel switching
Traffic filtering	
6. Connectivity man	
_	dth on demand (ABOD)
	outing functions High performance broad band IP
	for mesh and multi-star networks V-Sat links.
Network Topology	Star
	or
	Mesh
	or
	Hybrid
	(As per user requirement)

APPX-'E'

1.5 Network Management and Control System (NMCS):-

(A). NMCS Software:-

Description	Specifications	
Transponders	Multi transponders supported	
Transponder range	30 MHz and up	
Terminals	Scalable as per user requirement	
Hub receivers	As per the designed	
Outbound channel, signaling and traffic	1	
Supported multicast Tx channel	I per site	
Hub outbound	1	
Connection request rate	Upto 20 per second	
Simultaneous NMS GUI client connection	1 min.	
Terminal polling rates	Upto 1 terminal/second	
Event storage history	1000 events, archived daily	
CDR storage capacity	1 year, achieved daily	

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Parameters	Specifications		
(B). NMCS Server:-			
Enclosure	Standard 19"		
	2U-redundant Configuration 1U-nonredundant		
	configuration or better		
Processor	Dual Intel quad core Xeon 2.0 GHz and above, 1333 MHz		
	FSB-2X6 MB L2 cache or better		
Memory	Minimum 4 GB 667 (800) MHz		
Removable media	DVD ROM or better		
device	,		
Storage device	Redundant: 146 GBx3 7200 rpm SCSI,RAID 5		
	Non redundant: 146 GB 7200 rpm SATA or better		
NIC	Dual port GB NIC		
Power supply	Input: 100-250 V AC		
	Output: 460 Watt		
	Dual PS required for redundant configuration		
Operating system	RH enterprise Linux enterprise 5.x or equivalent		
Standard application	HTTP Web server, SQL database server, configuration,		
software	GUI applet, operations GUI applet.		

R.S.Dhaka, WO/RM Assam Rifles

Prempal Singh, SI/RM BSF S.K. Awasthi, \$1/RO CISF AC-II KAR. Thakur NSG

K.K. Roy, AD/Tele SSB Vaibhav Srivatava, AC(UAV) CRPF

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Raju Bhargava. IPS, IGP(Conn &IT),CRPF

Md. Javed Akhtar, IPS. ADG (Work & Comn), CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS DG, CRPF

TDS OF HUBLESS MANPORTABLE SATELLITE TERMINAL

All parameters/specifications mentioned in QRs will be checked by the BOO by ascertaining/verifying following checks in the presence of vendor/supplier/manufacturer. In case of any discrepancies/problems, the vendor /rep of firm will demonstrate the features to the BOO of the Force concerned. Further, if proper testing instrument for testing these parameters is not available with user organization, firm will provide the same.

- 1. Physical checks:- In this category, specifications of the equipment will be checked physically as per QRs.
- 2. Functional checks:- The vendor will show all the features/configuration of the equipment functioning on ground to the BOO during trials.

APPX-'A'

Frequency range:-

	RF(GHz)	IF(MHz)	LO(GHz)
Standard KU	14.0-14.5	950-1450	13.05
Extended KU	13.75-14.5	950-1700	12.8

1.1 Trial Directives of BUC:-

Parameters	Specifications	Trial Directives
Input/output frequence	y As per the Frequency table	BOO will check
	above	practically.
Output power P-1dB	40 W	BOO will check
W(dBm)	-	practically.
Gain	70dB nominal	Firm will produce
Gain flatness	± 2dB typical	certificate of any Govt.
Gain stability over	± 2dB	Lab. or NABL or ILAC
temperature		accredited laboratory or
Gain control range	up to 16 dB	OEM certificate.
Inter-modulation	-25 dBc max (3dB total	
product	back off from rated power)	
Spurious	-55dBc max	
Frequency stability over	· ·	
temperature:-	As per external 10 MHz	
Internal reference		
External reference	ee	
Phase noise:-		
100 Hz	-63dBc/Hz max	
1KHz	-73dBc/Hz max	
10KHz	-83dBc/Hz max	
100KHz	-93dBc/Hz max	
I/P VSWR	1:5:1 max	BOO will check
		practically
O/P VSWR	1:3:1 max	BOO will check
		practically
Operating power	48 VDC	BOO will check
requirement:-		practically
Operating voltage		

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Parameters	Specifications	Trial Directives
Power consumption (Wa		
25 W model	205 W	BOO will check practically
or		*
40 W model	275 W	
or		
50 W model	280 W	
(As per user		
requirement)		
Interfaces		
IF input interface	N or Qn Type	BOO will check practically.
Output interface	WR 75G or internal transceiver	
output interface	interface.	
System Health	Should be displayed	
Monitor & control		
Monitor	Lock/unlock status	BOO will check practically.
	Temperature and RF output	1
·	power reading.	
Control Interface	SSPA on/off, gain	
	adjustment	
	Via PC: RS 232/485 (TCP-IP	
	option available)	
	Via modem: FSK option	
	available	
	Via hand-held terminal:	
	RS232 option available	
Redundancy	External redundancy	BOO will check practically.
	controller require	
Input reference		
Frequency reference		BOO will check with the he
•	external via L-band cable	of standard testing a
·	(internal reference option	measuring instrument.
7 1	available)	
Level	-5 to +5 dBm	
Environmental condition		731
Operating Temperature	-30° to +55°C	Firm will produce certificate
Storage Temperature	-40° to +70°C	any Govt. Lab. or NABL
Humidity	0 to 100%	ILAC accredited laboratory
Features		OEM certificate.
Monitoring &	Through RS-232/485	BOO will check practically.
controlling	TCP/IP and FSK	BOO will check practically.
Terminal for M&C	Hand held	
Weather proof	IP-65	Firm will submit OE
packaging	11 -00	certificate.
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1-2 Trial Directives of LNB in KU band:-

Parameters	Specifications	Trial Directives
Noise figure	< 1dB	BOO will check practically.
Gain	33 dB typical	
VSWR (I/P & O/P)	≤ 2.5:1	
LO (Local Oscillator)	Auto switchable	
LO selection	22 KHz tone ON/OFF or	
	input voltage	
Spurious	-55 dBc	
Image rejection	6 dB min	
Operating Temperature	-30° to +55°C	Firm will produce certificate
Operating humidity	0 to 100	of any Govt. Lab. or NABL
Storage temperature	-40° to +70°C	or ILAC accredited
Operation altitude	15000 ft	laboratory or OEM
		certificate.
Frequency range	10.70 to 12.75 GHz	BOO will check all the
Output frequency range	950 to 1700 GHz	parameters practically with
Voltage	+12 to 24 V DC	the help of standard testing
Current	≤ 500mA	and measuring instrument.
RF I/P connector	WR 75	BOO will check practically.
RF O/P connector	Commercial available	BOO will check practically.

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1.3 Trial Directives of Satellite Antenna:-

Parameters	Specifications	Trial Directives
Frequency	Receive: 10.7-12.75 GHz	BOO will check practically.
	Transmit: 13.75-14.5 GHz	
Input/output frequency (MHz)	950-1700	·
Cross Polarization Isola	ition	
On axis	Rx mode-35.0 dB	Firm will submit OEM
	Tx Mode- 35.0 dB	certificate.
Within 1.0 dB beam	Rx mode-30.0 dB	
width	Tx Mode- 30.0 dB or better	
Tx-Rx isolation	≥ 35 dB	
VSWR	≤ 1.25:1	BOO will check practically.
Antenna gain @ mid	$Rx \ge 40.5 \text{ dBi } (\pm 0.2 \text{ dB}), Tx$	BOO will check practically
band	≥ 41.5 dBi (± 0.2 dB)	and firm will submit OEM
Power handling	100W CW	certificate.
Output waveguide	Commercial available	
flange interface		
G/T 20°C elevation	17 dB/°K	
Polarization	Liner (vertical & horizontal)	
EIRP capability	> 51.3 dBW	
Radiation pattern	As per ITU-R S-580-6	
Wind speed	70 Km/h or better	Firm will produce certificate
	operational	of any Govt. Lab. or NABL or
	200 Km/h survival	ILAC accredited laboratory
Rain fall	180 mm/h operational, 360	or OEM certificate.
	mm mm/h survival	
Operating temperature	-30° to +55°C	
Storage temperature	-40° to +70°C	
Weather proofing	IP 65	
Humidity	100 %	
Antenna		
Antenna platform	Motorized elevation over azimuth	Board will check practically.
Overrides	Manual AX/EI	Board will check practically.
Antenna Control System	m	
System interface	Built in intelligent control software for automatic	Board will check practically.
	satellite acquisition.	
L	Laptop user interface via	
	Ethernet or Wi-Fi for	
	advance antenna control.	
	One button slow system	
Power supply	220 V AC ± 10%, 47-53 Hz,	Board will check practically.
	+24/+48 V DC	production.
	2T/ TO V DC	
BUC & LNB	Antenna provide DC voltage	Board will check practically.

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solution	OEM certificate.
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1.4 Trial Directives of Modem:-

Parameters	Specifications	Trial Directives
Mechanical and envir	onmental:-	
RJ-45, 10/100 base T Ethernet interface.		BOO will check practically.
RS-232 asynchronous ACU interface	serial or LAN port or RS 530 to	
AC power, IEC-320 into	erfaces, 50/60 Hz.	BOO will check practically.
Operational	+5 °C to +50 °C.	Firm will produce certificate
Temperature		of any Govt. Lab. or NABL or
Storage Temperature:	-10° to 50° C	ILAC accredited laboratory or OEM certificate.
Humidity:	Upto 95 % non-condensing	
ODU Interface		
Transmit	950-1850 MHz L-band with 2.5 KHz steps; selectable on/off +24 V DC @ 2.7 Amp	BOO will check practically and firm will also submit OEM certificate.
Receive	950-1850 MHz L-band 2.5 KHz steps; selectable on/off +24 V DC @ 0.3 Amp	
Features		
 Data rates upto 2 Standalone or not 3 Web GUI with training 4 Automatic changes Traffic filtering 6 Connectivity mandalone or not 2 Adaptive bandwing 8 IP features and reperformance broad bandwing 1 	etwork mobile affic statistic nel switching	Firm will demonstrate all the feature of MODEM to the BOO and explaining the use fullness and applicability of the features.
Network Topology	Star	BOO will check practically.
	or Mesh or	
: 	Hybrid	
	(As per user requirement)	

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1.5 Trial Directives of Network Management and Control System (NMCS):-(A). NMCS Software:-

Description	Specifications	Trial Directives
Transponders	Multi transponders supported	Firm will demonstrate
Transponder range	—	all the feature of
Terminals	Scalable as per user requirement	NMCS Software to the
Hub receivers	As per the designed	BOO.
Outbound chann	el, 1	
signaling and traff	ic	
Supported multica	ast 1 per site	
Tx channel		
Hub outbound	1	
Connection reque	est Upto 20 per second	
rate		
Simultaneous NN	MS 1 min.	
GUI clie	ent	
connection	_ 1	
Terminal polli	ng Upto 1 terminal/second	
rates		
Event stora	ige 1000 events, archived daily	
history		
CDR stora	ge 1 year, achieved daily	Firm will explain to
capacity		the BOO the format in
1 0		which called data is
		recorded and also will
		explain the storage
		feature of the CDR.
(B). NMCS Server:	•	
Enclosure	Standard 19"	BOO will check
Enclosure		
	2U-redundant Configuration 1U- nonredundant	practically.
	configuration or better	
Drooppor	Dual Intel quad core Xeon 2.0 GHz	BOO will check
Processor	and above, 1333 MHz FSB-2X6 MB	
	L2 cache or better	practically.
Mamagai		
Memory	Minimum 4 GB 667 (800) MHz	
Removable	DVD ROM or better	
media device	Podundonti 146 OP-0 7000	1
Storage device	Redundant: 146 GBx3 7200 rpm	
	SCSI,RAID 5	
ı	Non redundant: 146 GB 7200 rpm	
	SATA or better	FOO
NIC	Dual port GB NIC	BOO will check
<u> </u>	100 050 1/40	practically.
Power supply	Input: 100-250 V AC	BOO will check with
•	O has to 400 West	help of standard
-	Output: 460 Watt	testing and measuring
	D 1 DO 1 1 1 1 1	instrument.
	Dual PS required for redundant	
,	configuration \\	1

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Description	Specifications	Trial Directives
Operating	RH enterprise Linux enterprise 5.x or	BOO will check
system	equivalent	practically.
Standard	HTTP Web server, SQL database	
application	server, configuration, GUI applet,	
software	operations GUI applet.	

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R.S.Dhaka, WO/RM Assam Rifles

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Prempal Singh, SI/RM BSF

S.K. Awasthi, SI/RO

AC-II K.K. Thakur NSG

K.K. Roy, AD/Tele SSB

Vaibhav Srivatava, AC(UAV),CRPF Gauri Singh, AC CRPF B.N.Sonawan, 2 I/C

P.R. Jha, DC(Comn) CRPF

Rajesh Ekka, Dy.Dir DCPW Harjinder Singh DIG(Eqpt),CRPF

DIG (Comn), CRPF

Raju Bhargaya, IPS, IG(Comp &IT), CRPF

Md. Jawed Akinar, IPS
ADG (Work & Comn), CRPF

Approved/Not Approved

Rajeev Rai Bhathagar, IPS DG, CRFF