52)

No. B.V-7/2015-16-C (QRs)-(2) 934
भारत सरकार/Government of India
गृह मंत्रालय/Ministry of Home Affairs
पुलिस आधुनिकीकरण प्रभाग /Police Modernization Division
संभरण-I डेस्क /Prov.I Desk

26, Man Singh Road, Jaisalmer House
New Delhi, the 5th May, 2015

To,

DsG : AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject: QRs and Trial Directives of Wireless Mesh Radio.

Sir,

The QRs and Trial Directives in respect of Wireless Mesh Radio as per Annex-I and Annex-II respectively have been accepted by the Competent Authority in MHA.

2. Henceforth, all the CAPFs should procure the above item required by them strictly as per the laid down QRs.

3. Concerned CAPFs will be accountable for correctness of the QRs and Trial Directives of Wireless Mesh Radio.

Yours faithfully,

5/5/15

(M. K Chahar)
Under Secretary to the Govt. of India
Tel : 23381278

Encl: As above.

Copy forwarded to SO (IT), MHA, with the request to host the QRs and Trial Directives of Wireless Mesh Radio on the website of MHA (under the page Organizational Set-up - Police Modernization Division - Qualitative Requirements – Communication Equipments), soft copy is being sent through email.

(R K Soni)
Section Officer (Prov.I)

Copy to: DDG (Procurement), MHA.

O/C

Appendix 'A'

QRs of Wireless Mesh Radio

SL No	Parameter	Specifications
General architecture		
(a)	Each mesh radio to have a wrist computer/pda and its accessories.	
(b)	Ground control station to have operator console for managing audio, video data from the mesh ntw. 1x Ground contrl station per 12 mesh radios (ie. 1 per team)	
(c)	04x repeaters per (50 mesh radios)	
Technical Specification of Mesh Transceiver		
(a)	Frequency range	UHF band
(b)	No of Channel	24 channels or more (Programmable/selectable)
(c)	Frequency Stability	±1.0 PPM or better
(d)	Protocol	Standard Digital Technology
(e)	Type of Emission	Modulation technique complying to open standard protocol approved by ETSI/FCC.
(f)	Type of Operation	IP Mesh Radio
(g)	Type of Antenna	Helical / wrap dipole antenna
(h)	Weight	Less than 1600 grams excluding bty.
(j)	Power Source	Ni-Mh or Li-ion rechargeable battery with belt clips to meet the operating time of 10 Hours (voice and data) or more
Transmitter		
(a)	R F Power output	Min 1Watt
(b)	Audio distortion	Less than 3% @ 1 Khz
Receiver		
(a)	Audio Output	500 mW or higher
Environmental Specification		
(a)	Operating Temperature	-20°C to +55 °C or better
(b)	Storage Temperature	-20^0 C to + 60^0 C to better
(c)	Humidity	90% at 50 °C (as per MIL810E)
(d)	Environmental standard	MIL 810 F
(e)	Water proof Protection	IP 54, IP55 or better
GPS The radios should have GPS to function with an accuracy of less than 15 meter and should be able to transmit back the coordinates to be displayed on Ground Control Station, Ruggedized PDA/Wrist computer along with supplied adequate Geo software.		

SL No	Parameter	Specifications
Mesh Radio Features		
(a)	Text messages	Should be capable of storing and sending at least 100 pre defined messages with minimum 250 characters.
(b)	Emergency Button	Should be provided or programmable on the keypad.
(c)	Mode of calls	Should be configurable to make selective call
(d)	Simultaneous Voice/Data session	Should be available.
(e)	Remote Radio Killing/Stun/Revive facility	Should be available
(f)	Networking	IPv4 based inter-networking with other media like satellite terminal / long range radio systems
(g)	Mesh network	Multi-hop self-healing and self-forming mesh networking
(h)	Secrecy	Should provide inherent protection against casual eavesdropping with any commercial grade secrecy
(j)	Data rate	Minimum 1Mbps or better
(k)	Communication Range per hop	1000 mtrs or more for line of sight and 500 mtr or more for non-line of sight
(l)	Min number of hops	3 or more
(m)	VOX	Should have a VOX module
(n)	Interface Ports	USB or with a suitable plug in connector for USB interface.
		Ethernet
Ruggedized PDA/Ruggedized Wrist Computer. Ruggedized PDA/Ruggedized Wrist computer with display that should be seen when wearing night vision Goggle's.		
General		
(a)	Features	Extremely Rugged- Withstands Shock, Spills and Dust.
		Intel Atom Processor- or better
		In-built GPS
		Wireless WAN
		Biometric
		Integrated Camera
		Tactical display with extremely low signature in the non viewing plane
		Alert user with sound and/or vibration on receiving data
		Weight should 1 kg or less.

SL No	Parameter	Specifications
(b)	Software	Genuine Windows 7, Professional or any other better OS and all mandatory software for operating the PDA/Ruggedized wrist computer.
(c)	CPU	Intel Atom Processor 512KB L2 cache or better and supporting the software's without having bearing on operational communication.
		Processor speed 1.33GHz or higher and supporting the software's without having bearing on operational communication.
		533MHz FSB or better and supporting the software's without having bearing on operational communication.
(d)	Storage & Memory	2GB RAM or better and supporting the software's without having bearing on operational communication.
		16GB HDD or better and supporting the software's without having bearing on operational communication.
(e)	Display	Screen size of rugged PDA /Wrist Computer to be of min 640x480 resolutions, sunlight-viewable TFT active matrix LCD and night vision compatible.
		External video support
		Anti-reflective screen treatment
		LED backlighting
(f)	Audio	Intel high definition audio
		Integrated speaker
		Convenient keyboard volume and mute controls
(g)	Keyboard & Input	Touch screen/Keyboard with 61 dedicated keys
		Integrated stylus holder (x 2)
		Zoom (in/out) and scroll (up/down) buttons
		4 user-defined programmable buttons
(h)	Interface	Headphones/speaker Mini-jack stereo
		Microphone/line in Mini-jack
		USB 2.0
		Ethernet (RJ-45)
		Serial Port with expansion module
		Wireless WiFi Link 802.11a/b/g or latest
		Bluetooth v2.0 + EDR or better

Electrical Parameters of Ruggedized PDA/Wrist Computer		
(a)	Power Supply	Twin hot-swappable lithium ion battery packs.
		Battery operation: 10 hours or more
		Battery charging time: 7 hours off, 10 hours on
		AC Adapter: AC 100V-240V 50/60Hz, Auto sensing/switching worldwide power supply
(b)	Power Management	Suspend/Resume Function, Hibernation, and Standby.
(c)	Integrated Option	Choice of 1D, 2D barcode or RFID6 reader
		Mobile Broadband Solutions
		EV-DO Rev. A
		HSDPA
		2.0MP camera with LED flash
		32GB SSD
		Global positioning system (GPS) receiver
		Fingerprint scanner
Mechanical Parameters of Ruggedized PDA/Wrist Computer		
(a)	High Temperature	Storage temperature 60^0 C and Operating temperature 50^0 C or better
(b)	Low Temperature	Storage temperature -40^0C and Operating Temperature - 20^0C or better
(c)	Humidity	Withstand Humidity of 95% for 10 days
(e)	Weight	1 Kg or lesser
Software. The system should come with some basic software and should have provision for adding additional software in the future.		
(a)	Blue Force Tracking	Ability to see location of all the other nodes w.r.t. the wearer's node with correct orientation on a radar type display.
(b)	Video	Ability to see video feed by selecting any node.
(c)	Text Messaging	Ability to send text message to individual node or all nodes
(d)	SOS / Emergency Button	Ability to communicate distress by single button press. The distress signal and the location of the wearer in distress will be accessible by any node in the network.
(e)	Kill Switch	Ability to deactivate the system and wipe all data remotely.
(f)	Location / Navigation	Ability to put location of wearer on a GIS map.

Operating Console of Ground Control Station		
(a)	Operating Control Software	OCU and software for the Receiver Node
	(i)	Displaying and tracking GPS location of mesh radios on a Map with Blue Force Tracking and should be compatible with commercial GIS software including Google earth.
	(ii)	Configuring the Mesh Network
	(iii)	Displaying 4 or more simultaneous real-time video feeds on tactical display
	(iv)	VOX capability for Audio Communication
	(v)	Saving video from one or more feeds
(b)	Operator Console Hardware	Man portable with Display screen and 1TB Storage
Accessories		
(a)	Battery Charger	Single and multiple unit rapid charger
(b)	Hands free Kit (VOX unit with PTT)	For duplex comn. Wireless PTT (Preferred)
(c)	Programming kit	All necessary software and hardware required for programming of the set.
(d)	Body worn camera	(i)Weight less than 500gm
		(ii)Digitally Fused day and night camera for wireless mesh radio.
		(iii)Should be helmet mounted also.
		(iv)Mil std 810F or better.
		(v)Uncooled thermal imager. (aa) Spectral range 8 to 14 µm or better. (ab) Sensor resolution 348x288 or better. (ac) Pixel Pitch 17 µm or less.
		(vi)Low Lux CCD/CMOS imager (aa) 1/4" or better CMOS or CCD. (ab) Sensor Resolution >450TVL
		(vii)Field Of view 34° x 25° or better.
		(viii)Human recognition range 120m or better
		(ix)Human identification range 60m or less.
		(x)Frame rate not less than 25 FPS.

SL No	Parameter	Specifications
		(xi)Camera Should support (aa) Thermal picture mode. (ab) Day picture mode. (ac) Fusion mode.
		(xii)Powered from wireless mesh radio.
		(xiii)Output video port should be there and suitable connectors should be provided for video output to a TV and DVR or a wireless transmitter.
		(xiv)Single output should support Fused/ Day/ TI video, user should be able to select the output type using control panel on the camera.
		The system integrator should provide a suitable software for video compression for transmission over mesh radio with limited loss.
(e)	Literature	User- manual in Hindi and English with each radio sets.
		Technical repairing manual with complete block diagram, circuit layout etc at a scale of 10% of equipment's being procured.
(f)	Training	Firm would train teams of maximum operator and mechanic in handling, operating and repairing of radio receiver free of cost after procurement.
(g)	Headset	Should be combination of following headsets:- (i)Bone conduction and covert headset. (aa) Well vented and flexible. (ab) Robust. (ac)Headset adjustable & worn around the back of the head. (ad)Audio perceived by the auditory nerve thus reducing the pressure of the ear phone when worn with helmet. (ae) Allows peripheral hearing. (af) Compatible with various type of tactical helmets. (ag) Clarity of audio at (1/4th) of the volume of the radio set.
		(ii) D style earpiece with flexible microphone (aa) Comfortable ear hook for secure fit. (ab) Adjustable for ease of use. (ac) Allows peripheral hearing. (ad) Compatible with various type of tactical helmets. (ae)Clarity of audio at (1/4th) of the volume of the radio set.

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SL No	Parameter	Specifications
		(iii) Surveillance headset with adjustable/vox microphone (aa) Comfortable ear hook for secure fit. (ab) Adjustable for ease of use. (ac) Allows peripheral hearing. (ad) Compatible with various type of tactical helmets. (ae) Clarity of audio at (1/4th) of the volume of the radio set. All the above headset should have a combination of finger tip, wireless and regular PTT.
Signal Amplifiers/Boosters/Repeater		
(a)	Range	Coverage of 20 km or more having LOS
(b)	Power Output	2W or more
Misc		
(a)	Vendor should mention the service centres across India for repairing of equipment's after sale warranty support.	
(b)	Should provide after sales support, supply of spares for at least 6 years after warranty period.	
(c)	The firm should enclose DOT/WPC license for supplying radio equipment for the above equipment.	
(d)	Firm should train teams of max operators and mechanic in handling, operating and repairing of radio receiver free of cost after procurement. Training provided should be in Hindi and English.	
(e)	The equipment if faulty within the warranty and AMC period should be repaired/replaced within 72 hours from reporting of fault.	

Insp/Tele M.C. Joshi

Suresh Pal Singh
(Insp/T, BSF)

M.K. Singh
(AC -I, NSG)

Sonu Sikarwar
(Asst. Comdt, CISF)

Hem Pushap
(DY. Comdt. CRPF)

S.K. Thakur
(Dy Comdt, AR)

Major. Vikram Savant
(NSG)

Major Ashwani Sulhar
(NSG)

Kapil
(SSA(E), BPR&D)

Virendra Agrawal
DIG (Eqpt), CRPF

J.S. Sandhu
DIG (Comn), CRPF

Shailendra Kumar
IG (Comn), CRPF 16/3/15

Approved/ ~~Not Approved~~

(Prakash Mishra, IPS)
DG, CRPF

Appendix 'B'

TRIAL DIRECTIVE FOR WIRELESS MESH RADIO

1. All parameters/Specifications mentioned in QRs will be checked by Board of Officers by pertaining/verifying following check in the presence of Firm Representative.

2. (i) Physical Checks :- In this category, specifications of the equipment will be checked physically as per QRs.
(ii) Functional checks: - Firm will show all the features/configuration of the equipment to the board of officers during trials.
(iii) Submission of Certificates: Specification which cannot be checked due to lack of testing facilities. Expertise, Certificate of any Government authorized/NABL/ILAC Approved Laboratory has to be provided by the firm during trial.

SL No	Parameter	Specifications	Trial Procedure
General architecture			
(a)	Each mesh radio to have a wrist computer/PDA and its accessories.		BOO to check the Tender sample of min 12 mesh radios with min 01 x ground station and min 4 repeaters.
(b)	Ground control station to have operator console for managing audio, video data from the mesh ntw. 1x Ground control station per 12 mesh radios (ie. 1 per team)		
(c)	04x repeaters per (50 mesh radios)		
Technical Specification of Mesh Transceiver			
(a)	Frequency range	UHF band	Board of Officers will check frequency range of UHF set by programming any lowest, highest and any random frequency in UHF Band and will measure with the help of standard testing instruments. The RF output and sensitivity of radio set in entire band should be same.
(b)	No of Channel	24 channels or more (Programmable/selectable)	B.O.O will check all these parameters one by one with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or National Accreditation Board for Testing and Calibration Laboratories (NABL) approved laboratory or International Laboratory Accreditation Corporation (ILAC) approved laboratory
(c)	Frequency Stability	±1.0 PPM or better	
(d)	Protocol	Standard Digital Technology	
(e)	Type of Emission	Modulation technique complying to open standard protocol approved by ETSI/FCC.	
(f)	Type of Operation	IP Mesh Radio	BOO will practically check.

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SL No	Parameter	Specifications	Trial Procedure
(g)	Type of Antenna	Helical / wrap dipole antenna	Board of Officers will check Physically and practically to assess flexibility & ruggedness of antenna.
(h)	Weight	Less than 1600 grams excluding bty.	Board of Officers will measure weight with the help of weighing machine.
(j)	Power Source	Ni-Mh or Li-ion rechargeable battery with belt clips to meet the operating time of 10 Hours (voice and data) or more	Physical check to assess type, make & voltage of battery and it should be as per specification.
Transmitter			
(a)	R F Power output	Min 1Watt	B.O.O will check all these parameters in the UHF Band with the help of standard testing instruments. If the standard test instruments are not available then firm must produce certificate of any Govt. accredited lab or s (NABL) or (ILAC) approved laboratory.
(b)	Audio distortion	Less than 3% @ 1 Khz	
Receiver			
(a)	Audio Output	500 mW or higher	BOO will practically check
Environmental Specification			
(a)	Operating Temperature	-20°C to +55 °C or better	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
(b)	Storage Temperature	-20^0 C to + 60^0 C to better	
(c)	Humidity	90% at 50 °C (as per MIL810E)	
(d)	Environmental standard	MIL 810 F	
(e)	Water proof Protection	IP 54, IP55 or better	
GPS The radios should have GPS to function with an accuracy of less than 15 meter and should be able to transmit back the coordinates to be displayed on Ground Control Station, Ruggedized PDA/Wrist computer along with supplied adequate Geo software.			BOO will practically check GPS function.
Mesh Radio Features			
(a)	Text messages	Should be capable of storing and sending at least 100 pre defined messages with minimum 250 characters.	Board will check it practically by sending pre-defined messages from one radio to another. Message should be displayed in the screen or heard by the receiving radio.
(b)	Emergency Button	Should be provided or programmable on the keypad.	Board will check it practically by pressing emergency button.
(c)	Mode of calls	Should be configurable to make selective call	Board will check it practically by making call.

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SL No	Parameter	Specifications	Trial Procedure
(d)	Simultaneous Voice/Data session	Should be available.	Board will check it practically and firm will demonstrate the same.
(e)	Remote Radio Killing/Stun/Revive facility	Should be available	Board will check it practically by sending kill command to particular radio. Radio set received kill command will get killed. Similarly, Set should revive it we again send revive command to killed radio.
(f)	Networking	IPv4 based inter-networking with other media like satellite terminal / long range radio systems	Firm will demonstrate features related with equipment to Board of Officers during trial.
(g)	Mesh network	Multi-hop self-healing and self-forming mesh networking	Firm will demonstrate the same to Board of officers during trial.
(h)	Secrecy	Should provide inherent protection against casual eavesdropping with any commercial grade secrecy	Firm will produce OEM certificate.
(j)	Data rate	Minimum 1Mbps or better	Board will check it practically and firm will demonstrate the same.
(k)	Communication Range per hop	1000 mtrs or more for line of sight and 500 mtr or more for non-line of sight	Board will carry out practical check as well as functional test.
(l)	Min number of hops	3 or more	
(m)	VOX	Should have a VOX module	
(n)	Interface Ports	USB or with a suitable plug in connector for USB interface.	Board will check it physically and practically.
		Ethernet	

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SL No	Parameter	Specifications	Trial Procedure
Ruggedized PDA/Ruggedized Wrist Computer. Ruggedized PDA/Ruggedized Wrist computer with display that should be seen when wearing night vision Goggle's.			
General			
(a)	Features	Extremely Rugged- Withstands Shock, Spills and Dust.	Board will carry out physical check as well as functional test of all these entire parameters one by one. Firm to submit certificate of OEM and give demonstration of all features.
		Intel Atom Processor- or better	
		In-built GPS	
		Wireless WAN	
		Biometric	
		Integrated Camera	
		Tactical display with extremely low signature in the non-viewing plane	
		Alert user with sound and/or vibration on receiving data	
		Weight should 1 kg or less.	
(b)	Software	Genuine Windows 7, Professional or any other better OS and all mandatory software for operating the PDA/Ruggedized wrist computer.	Board will check it practically and firm will demonstrate the features of the related software.
(c)	CPU	Intel Atom Processor 512KB L2 cache or better	Board will carry out physical check as well as functional test of all the parameters mentioned here one by one and firm will demonstrate the features of the related equipment.
		Processor speed 1.33GHz or higher	
		533MHz FSB or better	
(d)	Storage & Memory	2GB RAM or better	Board will carry out practical check as well as functional test.
		16GB HDD or better	
(e)	Display	Screen size of rugged PDA /Wrist Computer to be of min 640x480 resolutions, sunlight-viewable TFT active matrix LCD and night vision compatible.	Board will carry out physical check as well as functional test of all the parameters mentioned here one by one and firm will demonstrate the features of the related equipment.
		External video support	
		Anti-reflective screen treatment	
		LED backlighting	

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SL No	Parameter	Specifications	Trial Procedure
(f)	Audio	Intel high definition audio	Board will carry out physical check as well as functional test of all the parameters mentioned here one by one and firm will demonstrate the features of the same.
		Integrated speaker	
		Convenient keyboard volume and mute controls	
(g)	Keyboard & Input	Touch screen/Keyboard with 61 dedicated keys	Board will carry out practical check as well as functional test.
		Integrated stylus holder (x 2)	
		Zoom (in/out) and scroll (up/down) buttons	
		4 user-defined programmable buttons	
(h)	Interface	Headphones/speaker Mini-jack stereo	Board will carry out practical check as well as functional test.
		Microphone/line in Mini-jack	
		USB 2.0	
		Ethernet (RJ-45)	
		Serial Port with expansion module	
		Wireless WiFi Link 802.11a/b/g or latest.	
		Bluetooth v2.0 + EDR or better	
Electrical Parameters of Ruggedized PDA/Wrist Computer			
(a)	Power Supply	Twin hot-swappable lithium ion battery packs.	BOO will Physically check battery to assess type, make & voltage/ capacity of battery.
		Battery operation: 10 hours or more	
		Battery charging time: 7 hours off, 10 hours on	
		AC Adapter: AC 100V-240V 50/60Hz, Auto sensing/switching worldwide power supply	
(b)	Power Management	Suspend/Resume Function, Hibernation, Standby.	Board will carry out practical check as well as functional test.
(c)	Integrated Option	Choice of 1D, 2D barcode or RFID6 reader	Board will carry out physical check as well as functional test of all the parameters mentioned here one by one and vender will demonstrate the features of the same.
		Mobile Broadband Solutions	
		EV-DO Rev. A	
		HSDPA	
		2.0MP camera with LED flash	
		32GB SSD	
		Global positioning system (GPS) receiver	
		Fingerprint scanner	

SL No	Parameter	Specifications	Trial Procedure
Mechanical Parameters of Ruggedized PDA/Wrist Computer			
(a)	High Temperature	Storage temperature 60° C and Operating temperature 50° C or better	Firm must produce certificate of any Government accredited Lab. or NABL or ILAC approved laboratory.
(b)	Low Temperature	Storage temperature -40°C and Operating Temperature -20°C or better	
(c)	Humidity	Withstand Humidity of 95% for 10 days	
(e)	Weight	1 Kg or lesser	Board will measure weight with the help of weighing machine.
Software. The system should come with some basic software and should have provision for adding additional software in the future.			Board will carry out practical check and firm will demonstrate the feature of the related software.
(a)	Blue Force Tracking	Ability to see location of all the other nodes w.r.t. the wearer's node with correct orientation on a radar type display.	Board will carry out practical check as well as functional test and firm will demonstrate the same.
(b)	Video	Ability to see video feed by selecting any node.	Board will carry out practical check as well as functional test and firm will demonstrate the same.
(c)	Text Messaging	Ability to send text message to individual node or all nodes	Board will check it practically by sending pre-defined messages from one radio to another. Message should be displayed in the screen or heard by the receiving radio.
(d)	SOS / Emergency Button	Ability to communicate distress by single button press. The distress signal and the location of the wearer in distress will be accessible by any node in the network.	Board will check it practically by pressing emergency button.
(e)	Kill Switch	Ability to deactivate the system and wipe all data remotely.	Board will check it practically.
(f)	Location / Navigation	Ability to put location of wearer on a GIS map.	Board will carry out practical check as well as functional test and firm will demonstrate the same.

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SL No	Parameter	Specifications	Trial Procedure
Operating Console of Ground Control Station			
(a)	Operating Control Software	OCU and software for the Receiver Node	Board will carry out practical check as well as functional test of all the parameter mentioned here one by one and firm will demonstrate the same.
	(i)	Displaying and tracking GPS location of mesh radios on a Map with Blue Force Tracking and should be compatible with commercial GIS software including Google earth.	
	(ii)	Configuring the Mesh Network	
	(iii)	Displaying 4 or more simultaneous real-time video feeds on tactical display	
	(iv)	VOX capability for Audio Communication	
	(v)	Saving video from one or more feeds	
(b)	Operator Console Hardware	Man portable with Display screen and 1TB Storage	BOO will carry out physical check as well as functional test and firm will demonstrate the same.
Accessories			
(a)	Battery Charger	Single and multiple unit rapid charger	Board of officers will check it practically by charging the batteries from rapid charger and note down whether the batteries are holding charge properly or otherwise.
(b)	Hands free Kit (VOX unit with PTT)	For duplex comn. Wireless PTT (Preferred)	Board will check it physically and practically.

SL No	Parameter	Specifications	Trial Procedure
(c)	Programming kit	All necessary software and hardware required for programming of the set.	Board of officers will check it practically to assess that all necessary software and hardware required for programming are available and working properly.
(d)	Body worn camera	(i)Weight less than 500gm	a) Firm must produce certificate of any Govt. accredited lab or (NABL) or (ILAC) approved laboratory for compliance of MIL Std 810 F or better. b) Firm to produce OEM certificate for remaining parameters/features and BOO to also carry out physical check and functional check of all the parameters/features/functions by using suitable standard instruments which will be provided by firm.
		(ii)Digitally Fused day and night camera for wireless mesh radio.	
		(iii)Should be helmet mounted also.	
		(iv)Mil std 810F or better.	
		(v)Uncooled thermal imager. (aa) Spectral range 8 to 14 µm or better. (ab) Sensor resolution 348x288 or better. (ac) Pixel Pitch 17 µm or less.	
		(vi)Low Lux CCD/CMOS imager (aa) 1/4" or better CMOS or CCD. (ab) Sensor Resolution >450TVL	
		(vii)Field Of view 34° x 25° or better.	
		(viii)Human recognition range 120m or better	
		(ix)Human identification range 60m or less.	
		(x)Frame rate not less than 25 FPS.	
		(xi)Camera Should support (aa) Thermal picture mode. (ab) Day picture mode. (ac) Fusion mode.	

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SL No	Parameter	Specifications	Trial Procedure
		(xii)Powered from wireless mesh radio.	
		(xiii)Output video port should be there and suitable connectors should be provided for video output to a TV and DVR or a wireless transmitter.	
		(xiv)Single output should support Fused/ Day/ TI video, user should be able to select the output type using control panel on the camera.	
		The system integrator should provide a suitable software for video compression for transmission over mesh radio with limited loss.	
(e)	Literature	User- manual in Hindi and English with each radio sets.	Board will check it physically in detail to confirm that User and Technical manual are available in Hard as well as in Soft Copy in both Hindi and English languages.
		Technical repairing manual with complete block diagram, circuit layout etc at a scale of 10% of equipment's being procured.	
(f)	Training	Firm would train teams of maximum operator and mechanic in handling, operating and repairing of radio receiver free of cost after procurement.	Training of equipment will be conducted by the Board of Officers in the operational area of the force in the presence of Firm representative to ascertain the user satisfaction.
g)	Headset	Should be combination of following headsets:- (i) Bone conduction and covert headset. (aa) Well vented and flexible. (ab) Robust. (ac) Headset adjustable & worn around the back of the head. (ad) Audio perceived by the auditory nerve thus reducing the pressure of the ear phone when worn with helmet. (ae) Allows peripheral hearing. (af) Compatible with various type of tactical helmets. (ag) Clarity of audio at (1/4th) of the volume of the radio set.	Board will carry out physical check as well as functional test of all parameter mentioned here one by one and firm will demonstrate the features of the same.

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SL No	Parameter	Specifications	Trial Procedure
		(ii) D style earpiece with flexible microphone (aa) Comfortable ear hook for secure fit. (ab) Adjustable for ease of use. (ac) Allows peripheral hearing. (ad) Compatible with various type of tactical helmets. (ae) Clarity of audio at (1/4th) of the Volume of the radio set.	
		(iii) Surveillance headset with adjustable/vox microphone (aa) Comfortable ear hook for secure fit. (ab) Adjustable for ease of use. (ac) Allows peripheral hearing. (ad) Compatible with various type of tactical helmets. (ae) Clarity of audio at (1/4th) of the volume of the radio set. All the above headset should have a combination of fingertip, wireless and regular PTT.	
Signal Amplifiers/Boosters/Repeater			
(a)	Range	Coverage of 20 km or more having LOS	Board will check it practically.
(b)	Power Output	2W or more	
Misc			
(a)	Firm should mention the service centres across India for repairing of equipment's after sale warranty support.		Firm to submit relevant supporting documents for the same
(b)	Should provide after sales support, supply of spares for at least 6 years after warranty period.		Firm to submit relevant supporting documents for the same.
(c)	The firm should enclose DOT/WPC license for supplying radio equipment for the above equipment.		Firm to submit relevant supporting documents for the same.

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Misc		Trial Procedure
(d)	Firm should train teams of max operators and mechanic in handling, operating and repairing of radio receiver free of cost after procurement. Training provided should be in Hindi and English.	Training of equipment will be conducted by the Board of Officers in the operational area of the force in the presence of Firm representative to ascertain the user satisfaction.
(e)	The equipment if faulty within the warranty and AMC period should be repaired/replaced within 72 hours from reporting of fault.	Firm to submit relevant supporting documents for the same.

Suresh Pal Singh
(Insp/T, BSF)

M.K. Singh
(AC -I, NSG)

Sonu Sikarwar
(Asst. Comdt, CISF)

Hem Pushap
(DY. Comdt. CRPF)

S.K. Thakur
(Dy Comdt, AR)

Major. Vikram Savant
(NSG)

Major Ashwani Sulhar
(NSG)

Kapil
(SSA(E), BPR&D)

Virendra Agrawal
DIG (Eqpt) CRPF

J.S. Sandhu
DIG (Comn), CRPF

Shailendra Kumar
IG (Comn), CRPF 16/3/15

16/3/15

Approved/ ~~Not Approved~~

(Prakash Mishra, IPS)
DG, CRPF