No. B.V-7/2013-14-C(QRs)(3)
Government of India/भारत सरकार
Ministry of Home Affairs/गृह मंत्रालय
P M Division/पु.आ.प्रभाग
Prov.I/संभरण-I डेस्क

26, Man Singh Road, Jaisalmer House
New Delhi, Dated : 14th October, 2013

To,

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

Subject : QRs and Trial Directives of Fault Rectification and Repair Kit for Optical Fiber Cable.

The QRs and Trial Directives of Fault Rectification and Repair Kit for Optical Fiber Cable as per Appendix 'A' and Appendix 'B" respectively have been accepted by the Competent Authority in MHA

2. Henceforth, all the CAPFs should procure the above items required by them strictly as per the laid down Technical Specifications/QRs.

Yours faithfully,

(Smt.S.B.Nanda)
Under Secretary (Prov.II)
Tel : 23381278

Encl : As above.

Copy forwarded to : SO (IT), MHA, with the requested to host the QRs (soft copy being sent through email) on the MHA website (under the page Organisational Set up-Police Modernisation Division - Qualitative Requirements)

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

Copy to : Director (Procurement), MHA.

Copy for information to : PPS to JS (PM)

Appendix - A

QRs / SPECIFICATION OF FAULT RECTIFICATION & REPAIR KIT FOR OPTICAL FIBER CABLE

(FIND FIBER SOURCE FOR TROUBLE SHOOTING OF OPTICAL FIBRE CABLING SYSTEM)

It should include OTDR, Splicer machine and other associated items as mentioned below:-

1.	OTDR (Optical Time Domain Reflecto meter):- The "OTDR" shall be a portable, batt operated instrument with the ability to troubleshoot and certify Single mode fiber used. It sl characterize fiber, detect events, quantify events and document test results.
	a) Physical
	i. Weight: Weight less than 3 kg including battery.
	ii. Display ; 5 inch or more LCD or TFT display
	iii. Interface ; The OTDR shall have a USB port that supports a UVC- compliant fiber inspection camera
	iv. User Interface ; Touch screen or Soft Keys
	v. The OTDR shall provide illuminated indicators to indicate laser activity.
	vi. Lasers class : Class 1
	b) Environmental
	i. Operating temperature : -10° to +45° C or better
	ii. Storage temperature : -20° to +60° C or better
	c) Power Supply
	i. DC - The rechargeable battery backup shall be min 6 hours or better@ normal use.
	ii. AC - An external power adapter shall be provided with the OTDR to recharge the battery
	d) Network Connections; - The OTDR shall have an USB or RJ-45 port providing physical connection to 10/100/1000 BASE-T networks.
	e) Fiber Connections :- i) The OTDR shall use interchangeable/PC type connectors. Interchangeable styles shall include SC & FC.SC& FC interchangeable connector to be provided. **ii)** Internal memory - 1 GB or should have enough memory to store 1000 reports or better.
	f) Fiber Testing
	i. Wave length :- 1310 ± 25nm & 1550 ± 25nm
	ii. The OTDR shall be capable of acquiring continuous (real-time) and non-continuous (discrete) traces of fiber.
	iii. Fibre type; - Single mode Fiber 9/125 micro meter or as per user requirement.
	iv. The OTDR shall acquire traces on single mode fiber at 1310 ± 25nm & 1550 ± 25nm
	v. The OTDR shall automatically evaluate the fiber measurements and provide a PASS/FAIL result based upon the selected test limit.
	vi. The OTDR shall be capable of providing PASS/FAIL indication on test results based upon automatic measures of loss, reflection and length.
	vii. The OTDR shall provide an unambiguous visual indication of the "Pass" or "Fail" results for every fiber test.
	viii. Sampling resolution; - Minimum 5 cm or better.
	ix. Display (cursor) resolution ;- 1 cm or 0.01 dB or better.
	x. Number of data points :- up to 1,28,000 or better.
	g) Linearity : ± 0.03 db or better .
	i. The OTDR shall have configurable built in test limits, for PASS/FAIL analysis, based upon industry standards.
	ii. Group Index Range; 1.30000 to 1.70000 in 0.0001 steps.
	iii. Dynamic Range : 32/30 dB
	iv. Distance: up to 60 kilometers or more.
	v. Pulse widths; 3 ns to 20 µ seconds for all wavelengths.
	h) Dead zones
	i. Single mode fiber Event Dead zone ; less than 1 meters (1310/1550 nm)
	ii. Single mode fiber Attenuation Dead zone: less than 4 meters (1310 /1550 nm).
	iii. Automatically measure reflectance: -14dB to -65dB.
	iv. The OTDR shall present the trace in a conventional graphical format
	v. The OTDR should have trace zoom in / zoom out feature.

	vi. The Event table shall display reflective and loss events with descriptive icons
	vii. The OTDR shall display summary information for each event in event table.
	viii. The OTDR shall evaluate and identify bad connections and patch cords that have high reflectance in addition to good connections and patch cords.
	ix. The OTDR shall support a digital video probe for inspecting fiber end faces.
	x. The OTDR shall display the end face image on the display screen and save images.
	xi. The digital video probe shall conform to the measurement regions on OTDR as defined by IEC 61300-3-35
	xii. The OTDR shall automatically merge the end face images into the test report that contains the same file name.
	xiii. The OTDR shall support a Visual Fault Locator ("VFL") function to locate fiber breaks and optical power meter function to measure optical power for both 1.25 mm & 2.5mm connectors.
	i) Results and Reporting
	i. The OTDR shall be capable of storing results on a project basis in folders, with names created by the user.
	ii. The OTDR shall be capable of outputting trace results in Telecordia/Bellcore format or any international format .
	iii. A professional carrying case should be provided for safe transportation.
2.	**Splicer Machine:** - The splicer machine shall be portable, battery-operated instrument with the ability to splice the damaged fiber.
	a) Applicability
	i. Fibre alignment : Core to core alignment
	ii. Applicable fibre : SM, MM, DS, NZDS, G657A, G657B,
	iii. Coating diameter : 100 µm to 1000µm
	iv. Cleave length: secondary tight buffer : Least 16 mm
	v. Cleave length: secondary loose buffer : Least 16 mm
	vi. Attenuation splice mode or capability : Should be available
	vii. Cleave length: 8 to 16mm (up to 250µm coated fiber)
	viii. Cladding clamps can work separately from wind hood ; Should be available
	b) Hardware features
	i. Fibre observation ; 3 axis observation and alignment
	ii. Imaging/monitoring system : By 2 nos CCD or CMOS cameras
	iii. Magnification of image on screen ; XY style,at least 150X; X/Y : at least 300X
	iv. Display ; 4.0 to 5.0 inch display protected with tempered Glass
	v. Tiltable display ; Should be available
	vi. Invert display for "backwards" operation : Should be available
	vii. V-groove illumination : should be available
	viii. Storage of Splice data Result ; At least 1000 data
	ix. Interface : At least one USB port should be available
	c) Software features
	i. Keypad: Illuminated key pad to enable work in dark.
	ii. Self test mode : should be available
	iii. Software for data transfer to PC : should be available
	iv. Friendly GUI : should be available
	d) Physical
	i. Weight : 2.5 kg or less without battery
	ii. Carrying case ; A rugged/professional hard carrying case should be provided for safe transportation

e) Environmental & power supplies :	
i. It should be water resistance /dust-proof/anti shock/ wind resistance	
ii. Operating Temperature : -10°C to 50°C	
iii. AC power supply : Input:100-240V,AC:50/60 Hz	
iv. DC power supply ; 10V to 15V DC	
v. Operating altitude : Up to 5000 meter	
vi. Wind protection ; 30 mph(15 m/s) or better	
vii.Internal battery ; Lion or Lipo or NiMh	
viii. Charge internal battery while performing splicer ; should be available	
ix. Splices & oven cycles on internal battery : ≥ 200 cycles	
f) Splicing	
Splicer Method	Fusion
a) Pre-splice cleave angle check	should be available
b) Pre-splice dust check	should be available
c) Pre-splice crack check	should be available
d) Automatic splice program selection	should be available
e) Typical Splice loss	SME:0.02 dB, MMF:0.01 dB , DSF:0.04dB, NZ-DSF:0.04 dB
f) Splice cycle time: start to loss estimate	9 sec or less for SMF
g) Number of splice programs	At least 60 nos splice programs
h) Heating cycle time	Should be 30 seconds or less
i) Heating program preset	10 nos or more
j) Heat cycle status indication	Audio/ visual heater notification
k) Return loss (Typical)	it should be ≥ 60 dB
l) Automatic arc test	should be available
m)Arc environment compensation	should be available
n) Pressure sensor	should be available
o) Temperature sensor	should be available
p) Tool less electrode replacement	should be available
q) Menu for automatic repair (Quick optimize menu)	should be available
g) After splicing	
i. Splice loss, break & remake identical fibre	should be available
ii. Loss estimate criteria	Measured by cut-back method relevant to ITU-T standard or digital image analysis.
iii. Splice return loss	>>60dB
iv. Proof test	1.96N or better
v. Heat shrink oven	Yes
vi. Auto start oven on loading fibre	Yes
vii.Applicable splice protector length	Yes
viii. Number of oven programs	at least 5 nos
ix. Heat time: 40mm sleeve	It should be 30 sec or less
x. Heat time: 60mm sleeve	It should be 30 sec or less
xi. Electrode Capacity	≥ 2500 Splices
xii.High Precision cleaver	Fibre cleaver is an instrument for high precision Fibre cutting should be compact & light weight for SMF (9/125 µm)

	h) Accessories	
	i. Jacket remover	
	ii. High Precision cleaver	
	iii. Battery pack for splicing machine	
	iv. Battery charging adopter for battery	
	v. Electrode for splicing machine	
	vi. User manual/CD	
	vii. Spare electrode (one pair)	
	viii. Interface cable for data transfer	
	ix. Fiber stripper	
	x. Cooling tray	
	xi. Professional Carry case to house items with assys including splicer machine	
3.	**Additional tools required for OFC repair/management ;** (These kit should have adequate tool/ accessories to assist while repairing)	
	i. Fibre coat stripper 3 in one type	Should be able to remove the Fibre coating
	ii. Kevlor cutter	Should be able to cut the kevlor
	iii. Screwdriver set	Should be capable for locking & unlocking of splice box
	iv. Cable cutter	For cleaving bundle pipe of Fibre
	v. Knife	Accessorial tool for peeling fiber.
	vi. Scissors	cutting fiber
	vii. Measuring tape	Should be capable for counting the length of Fibre cable
	viii. Isopropyl alcohol 500 ml bottle	for cleaning of fiber
	ix. Connector cleaner reel type	for cleaning of fiber
	x. Duct cutter	for cutting the duct of Fibre
	xi. Ferrule marker	for marking of fibre
	xii. carrying case	All items from srl no J (i) to J(xi) should be housed properly in the professional/durable carrying case

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(SI/ EXE Sohrab Ansari, CISF)

(M S Yadav, AC (Tech), CRPF)

(Gurbachan Singh, SSO (E), BPR&D)

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✓

Approved/ Not Approved

(Pranay Sahay, IPS)
DG, CRPF

Appendix – B

(16)

TRIAL DIRECTIVE/TESTING METHODOLOGY OF FAULT RECTIFICATION & REPAIR KIT FOR OPTICAL FIBER CABLE

Trial of equipment will be conducted by a Board of Officers in the presence of Vendor /Firms rep. to assessed the actual performance of the equipment.

2) All parameter / Specifications mentioned in the QRs will be checked by board of officers by ascertaining /verifying following checks.

Physical Checks: In this category specifications of the equipment will be checked physically as per QRs.

Functional Check:- The vendors will show all features/ configuration of the equipment to the board of officers during technical evaluation.

Submission of certificates :- Specification which can not be checked due to lack of testing facilities/ expertise, a certificate of test shown against each will be provided by vendor/firm during physical evaluation.

OTDR (Optical Time Domain Reflecto meter):-The "OTDR" shall be a portable, battery-operated instrument with the ability to troubleshoot and certify Single mode fiber used. It shall characterize fiber, detect events, quantify events and document test results.

Sl No	SPECIFICATIONS	Trial/ Testing methodology
1	**a) Physical**	
	i)Weight: Weight less than 3 kg including battery.	Physical test (By using weighing machine),
	ii) Display ; 5 inch or more LCD or TFT display	Physical check with the help of measuring tape.
	iii) Interface ; The OTDR shall have a USB port that supports a UVC- compliant fiber inspection camera	Physical check.
	iv) User Interface ; Touch screen or Soft Keys	Functional Test by operating with the help of touch.
	v) The OTDR shall provide illuminated indicators to indicate laser activity.	With the OTDR have an LED indicator will turns on when the ports emits an optical signal.
	vi) Lasers class : Class 1	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier.
	b) Environmental	
	i. Operating temperature : -10° to +45° C or better	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier.
	ii. Storage temperature . : -20° to +60° C or better	-Do-
	c) **Power supply**	
	i. DC - The rechargeable battery backup shall be min 6 hours or better @ normal use.	Functional test by using the tool for 8 hours.
	ii. AC - An external power adapter shall be provided with the OTDR to recharge the battery	Functional Test by puting AC charger in use.
	d) **Network Connections** ;- The OTDR shall have an USB or RJ-45 port providing physical connection to 10/100/1000 BASE-T networks.	Physical check and also can be connected with the switch to verify

e) Fiber Connections	
i. The OTDR shall use interchangeable/PC type connectors. Interchangeable styles shall include SC & FC.SC& FC interchangeable connector to be provided	Physical test by placing different type of connector in the OTDR .
ii. Internal memory: 1 GB or should have enough memory to store 1000 reports or better	Functional Test:- by showing parameter/ specifcations of the instrument.
f) Fiber Testing	
i. Wave length :- 1310 ± 25nm & 1550 ± 25nm	Functional test by selecting the specific wave length by OTDR and Test
ii.The OTDR shall be capable of acquiring continuous (real-time) and non-continuous (discrete) traces of fiber.	Functional test by selecting the specific wave length by OTDR and Test fiber in both acquiring continuous (real-time) and non-continuous (discrete) traces of fiber.
iii Fibre type ;- Single mode Fiber 9/125 micro meter or as per user requirement.	Functional Test by connecting SM fiber and test on 1310nm & 1550nm
iv The OTDR shall acquire traces on single mode fiber at 1310 ± 25nm & 1550 ± 25nm	Functional Test by connecting SM fiber and test on 1310nm & 1550nm
v.The OTDR shall automatically evaluate the fiber measurements and provide a PASS/FAIL result based upon the selected test limit.	Functional Test by connecting SM fiber, Choose the test limit and test on 1310nm & 1550nm and view the report / results for pass & fail
vi. The OTDR shall be capable of providing PASS/FAIL indication on test results based upon automatic measures of loss, reflection and length.	Functional Test by connecting SM fiber, Choose the selected limit and test on 1310nm & 1550nm and view the report / results for pass & fail and measurement value at different events.
vii.The OTDR shall provide an unambiguous visual and audible indication of the "Pass" or "Fail" results for every fiber test.	Functional Test by connecting SM fiber, Choose the selected limit and test on 1310nm & 1550nm and view screen and listen the audible indication for pass & fail
viii. Sampling resolution: Minimum 4 cm possible.	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier. B.O.O either be accepted same or equipment may be tested from any Govt approved laboratory.
ix. Display (cursor) resolution : 1 cm or 0.01 dB or better	-do-
x. Number of data points :up to 1,28,000 or better	-do-

	g) **Linearity** : ± 0.03 db or better	
	i. The OTDR shall have configurable built in test limits, for PASS/FAIL analysis, based upon industry standards.	Functional Test by connecting SM fiber, Choose the test limit and test on 1310nm & 1550nm and view the report / results for pass & fail
	ii. Group Index Range; 1.30000 to 1.70000 in 0.0001 steps.	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier. B.O.O either be accepted same or equipment may be tested from any Govt approved laboratory.
	iii. Dynamic Range : 30/30 dB	-do-
	iv. Distance: up to 60 kilometers or more.	OEM Certificate and Functional Test measuring length of Fiber segment under test
	v. Pulse widths; 3 ns to 20 µ seconds for all wavelengths.	Functional Test, Select and show different pulse widths in OTDR Setup.
	h) **Dead zones**	
	i. Single mode fiber Event Dead zone ; less than 1 meters (1310/1550 nm)	Functional Test, Connect one meter fiber patch cord in fiber link and test OTDR should display 2 events in fiber link.
	ii. Single mode fiber Attenuation Dead zone: less than 4 meters (1310 /1550 nm)	Functional Test, Connect a 4 meters fiber patch cord on OTDR port and test to measure the length of link after the launch cable.
	iii. Autometically measure reflectance: -14dB to -65dB.	OEM Certificate or Test certificate of any Government approved/international accredited laboratory to be produced by supplier. B.O.O either be accepted same or equipment may be tested from any Govt/Govt approved laboratory.
	iv. The OTDR shall present the trace in a conventional graphical format	Functional Test: after completing the test view the Trace
	v. The OTDR should have trace zoom in / zoom out feature.	Functional Test: after completing the test view the Trace use zoom key to identify the location of event.
	vi. The Event table shall display reflective and loss events with descriptive icons	Functional Test: after completing the test view the analysis tab to identify the events reflective or Loss
	vii. The OTDR shall display summary information for each event in event table.	Functional Test: after completing the test view the analysis tab and click event for more information
	viii. The OTDR shall evaluate and identify bad connections and patch cords that have high reflectance in addition to good connections and patch cords.	Functional Test: after completing the test view the analysis tab and click connector to get the details of reflectance and also check display for good and bad connectors.
	ix. The OTDR shall support a digital video probe for inspecting fiber end faces.	Functional Test: Connector Fiber Inspector Camera and select fiber inspector test on OTDR to view the fiber end face

	x. The OTDR shall display the end face image on the display screen and save images.	Functional Test: Connector Fiber Inspector Camera and select fiber inspector test on OTDR to view and save the fiber end face.
	xi. The digital video probe shall conform to the measurement regions on OTDR as defined by IEC 61300-3-35	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier. B.O.O either be accepted same or equipment may be tested from any Govt approved laboratory.
	xii. The OTDR shall automatically merge the end face images into the test report that contains the same file name.	Functional Test: Connector Fiber Inspector Camera and select fiber inspector test on OTDR to view and save the fiber end face in the fiber OTDR test report and print report to verify.
	xiii. The OTDR shall support a Visual Fault Locator ("VFL") function to locate fiber breaks and optical power meter function to measure optical power for both 1.25 mm & 2.5mm connectors.	Functional Test: Connector Fiber Inspector Camera and select fiber inspector test on OTDR to view and save the fiber end face in the fiber OTDR test report and print report to verify.
	i) **Results and Reporting**	
	i. The OTDR shall be capable of storing results on a project basis in folders, with names created by the user.	Functional Test: Create folder in the OTDR Setup and also define user / engineer name in the OTDR Setup.
	ii. The OTDR shall be capable of outputting trace results in Telecordia/Bellcore format or any international format.	Functional Test: Import test results / reports on PC and save in telecordia / bellcore format.
	iii. A professional carrying case should be provided for safe transportation.	Physical check
Splicer Machine :The splicer machine shall be portable, battery-operated instrument with the ability to splice the damaged fiber.		
2	**a) Applicability**	
	i. Fibre alignment : Core to core alignment	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier. B.O.O either be accepted same or equipment may be tested from any Govt approved laboratory.
	ii. Applicable fibre : SM, MM, DS, NZDS, G657A, G657B,	
	iii. Coating diameter : 100 µm to 1000µm	
	iv. Cleave length: secondary tight buffer : Least 16 mm	-do-
	v. Cleave length: secondary loose buffer : Least 16 mm	-do-
	vi. Attenuation splice mode or capability : Should be available	-do-
	vii. Cleave length: 8 to 16mm (up to 250µm coated fiber)	Physical Check by measuring the length of cleave with the help of measuring tape.
	viii. Cladding clamps can work separately from wind hood ; Should be available	Physical Check : to be verified by BOOs clding clamps

b) Hardware features	
i. Fibre observation ; 3 axis observation and alignment	Functional Test by live demonstration of the equipment and viewing the fiber.
ii. Imaging/monitoring system : By 2 nos CCD or CMOS cameras	Functional Test by live demonstration of the equipment
iii. Magnification of image on screen ; XY style,at least 150X; X/Y : at least 300X	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier.
iv. Display ; 4.0 to 5.0 inch display protected with tempered Glass	Physical Check by measuring
v. Tiltable display ; Should be available	Functional Test by live demonstration of the equipment by tilting the display
vi. Invert display for "backwards" operation : Should be available	Functional Test by live demonstration of the eqpt by doing invert the display.
vii. V-groove illumination : should be available	Functional Test by live demonstration of the equipment
viii. Storage of Splice data Result ; At least 1000 data	Functional Test by live demonstration of the eqpt by storing the data of reports.
ix. Interface : At least one USB port should be available	Physical Check
c) Software features	
i. Keypad: Illuminated key pad to enable work in dark.	Functional Test by live demonstration of the equipment
ii. Self test mode : should be available	Functional Test by live demonstration by keeping the system on self test mode.
iii. Software for data transfer to PC : should be available	Functional Test by transfering the data from Machine to PC.
iv. Friendly GUI : should be available	-Do-
d) Physical	
i. Weight : 2.5 kg or less without battery	Physical test (By using weighing)
ii. Carrying case ; A rugged/professional hard carrying case should be provided for safe transportation	Physical Check
e) Environmental & power supplies	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier..
i. It should be water resistance /dust-proof/anti shock/ wind resistance	
ii. Operating Temperature : -10°C to 50°C	-Do-
iii. AC power supply : Input:100-240V,AC:50/60 Hz	Functional Test by giving presecirbed volatge range
iv. DC power supply ; 10V to 15V DC	-Do-

	v. Operating altitude : Up to 5000 meter		OEM Certificate or Test certificate of any Govt approved/ international accredited laboratory to be produced by supplier.
	vi. Wind protection ; 30 mph(15 m/s) or better		
	vii. Internal battery ; Lion or Lipo or NiMh		Physical Check by verifying the battery
	viii. Charge internal battery while performing splicer ; should be available		Functional Test by doing charge the battery through adapter and performing the splicer operation.
	ix. Splices & oven cycles on internal battery : ≥ 200 cycles		Functional Test by live demonstration
	f) Splicing		
	a)Pre-splice cleave angle check	should be available	Functional Test by live demonstration
	b)Pre-splice dust check	should be available	-Do-
	c)Pre-splice crack check	should be available	-Do-
	d)Automatic splice program selection	should be available	-Do-
	e)Typical Splice loss	SMF:0.02 dB, MMF:0.01 dB , DSF:0.04dB, NZ-DSF:0.04 dB	OEM Certificate or Test certificate of any Govt approved/international accredited laboratory to be produced by supplier.
	f) Splice cycle time: start to loss estimate	9 sec or less for SMF	
	g)Number of splice programs	At least 60 nos splice programs	Functional Test by live demonstration
	h)Heating cycle time	Should be 30 seconds or less	Functional Test by live demonstration
	i) Heating program preset	10 nos or more	Functional Test by live demonstration
	j) Heat cycle status indication	Audio/ visual heater notification	Functional Test by live demonstration
	k)Return loss (Typical)	it should be ≥ 60 dB	Functional Test by live demonstration
	l) Automatic arc test	should be available	OEM Certificate or Test certificate of any Govt approved/ international accredited laboratory to be produced by supplier.
	m) Arc environment compensation	should be available	Functional Test by live demonstration
	n)Pressure sensor	should be available	Functional Test by live demonstration
	o)Temperature sensor	should be available	Functional Test by live demonstration
	p)Tool less electrode replacement	should be available	Functional Test by live demonstration
	q)Men for automatic repair (Quick optimize menu)	should be available	Functional Test by live demonstration

	g) After splicing		
	i. Splice loss, break & remake identical fibre	should be available	Functional Test by live demonstration
	ii. Loss estimate criteria	Measured by cut-back method relevant to ITU-T standard or digital image analysis.	OEM Certificate or test certificate of any Govt approved/ international accredited laboratory to be produced by supplier.
	iii. Splice return loss	>>60dB	-Do-
	iv. Proof test	1.96N or better	-Do-
	v. Heat shrink oven	Yes	Functional Test by live demonstration
	vi. Auto start oven on loading fibre	Yes	Functional Test by live demonstration
	vii. Applicable splice protector length	Yes	Functional Test by live demonstration
	viii. Number of oven programs	at least 5 nos	Functional Test by live demonstration
	ix. Heat time: 40mm sleeve	It should be 30 sec or less	Functional Test by live demonstration
	x. Heat time: 60mm sleeve	It should be 30 sec or less	Functional Test by live demonstration
	xi. Electrode Capacity	≥ 2500 Splices	Functional Test by live demonstration
	xii. High Precision cleaver	Fibre cleaver is an instrument for high precision Fibre cutting should be compact & light weight for SMF (9/125µm)	Physical Check
	h) Accessories		
	i. Jacket remover		Physical Check
	ii. High Precision cleaver		Physical Check
	iii. Battery pack for splicing machine		Physical Check
	iv. Battery charging adopter for battery		Physical Check
	v. Electrode for splicing machine		Physical Check
	vi. User manual/CD		Physical Check
	vii. Spare electrode (one pair)		Physical Check
	viii. Interface cable for data transfer		Physical Check
	ix. Fiber stripper		Physical Check
	x. x. Cooling tray		Physical Check
	xi. xi. Professional Carry case to house items with accessories including splicer machine		Physical Check

3	**Additional tools required for OFC repair/management ;** (These kit should have adequate tool/ accessories to assist while repairing)		
	i. Fibre coat stripper 3 in one type	Fibre coat stripper 3 in one type	Physical Check
	ii. Kevlor cutter	Kevlor cutter	Physical Check
	iii. Screwdriver set	Screwdriver set	Physical Check
	iv. Cable cutter	Cable cutter	Physical Check
	v. Knife	Knife	Physical Check
	vi. Scissors	Scissors	Physical Check
	vii. Measuring tape	Measuring tape	Physical Check
	viii. Isopropyl alcohol 500 ml bottle	Isopropyl alcohol 500 ml bottle	Physical Check
	ix. Connector cleaner reel type	Connector cleaner reel type	Physical Check
	x. Duct cutter	Duct cutter	Physical Check
	xi. Ferrule marker	Ferrule marker	Physical Check
	xii. Carrying case	All items from srl no J (i) to J(xi) should be housed properly in the professional/durable carrying case	

(SI/RM Bijendra Singh, BSF) (SI/ Exe Sohrab Ansari, CISF) (M S Yadav, AC (Tech), CRPF) (Gurbachan Singh, SSO (E), BPR&D)

(Sunil Kumar, DC, ITBP) (Major Kapil Dahiya, TC (Eqpt), NSG) (S K Singh, Comdt (C-Eqpt), BSF) (Virendra Agrawal, DIG(Eqpt), CRPF)

(Shailendra Kumar, IG (Comn), CRPF)

Approved/ Not Approved

(Pranay Sahay, IPS)
DG, CRPF