

132KV NANYUKI-RUMURUTI UNDERGROUND CABLE

PREAMBLE

The details in the following technical data sheets should be used to augment the Employer's Requirements and as such the previously approved designs, unless otherwise advised, takes precedence in case of omissions and/ or inconsistency.

TECHNICAL DATASHEETS

[Table of Contents](#)

TECHNICAL DATASHEETS FOR ADSS /APPROACH CABLE	2
TECHNICAL DATASHEETS FOR JOINT BOXES	2
TECHNICAL DATASHEETS FOR CCTV SURVEILLANCE CAMERAS	3
TECHNICAL DATASHEETS FOR DRONE(UNMANNED AERIAL VEHICLE)	11
TECHNICAL DATASHEETS FOR UNDERGROUND CABLE DETECTION AND SURVEILLANCE DATA SHEETS	14
TECHNICAL DATASHEETS FOR HANDHELD DATA COLLECTOR DATASHEET	15
TECHNICAL DATASHEETS FOR FIREWALL	17
TECHNICAL DATASHEETS FOR OPTICAL GROUND WIRE	18
TECHNICAL DATASHEETS FOR 132 KV SURGE ARRESTORS	19
TECHNICAL DATASHEETS FOR 132 KV XLPE CABLE	21

TECHNICAL DATASHEETS FOR ADSS /APPROACH CABLE

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____

Model: _____

Type: _____

DESCRIPTION	UNIT	REQUIRED	OFFERED
GENERAL			
Reference Standards	Yes	IEC9001, ISO14001, IEC60793-1, IEC60793-2, ITU-TG.655, IEC60794-3-10, IEC60794-3-20 standards	
Double jacket outer diameter	No*mm		
Type tests	Yes	Yes	
Maximum pulling Tension	N		
Cable offered has been in operation for more than 5 years.	YES	YES. Provide Completion certificate	
Minimum bending radius	mm		
Standard weight			
Weight of grease			
OPTICAL CHARACTERISTICS			
Total number of Optical Fibers	Number	48 or 96 as per project spec	
Number of Fibers per buffer tube (max)	Number	12	
Fiber Type/Mode		G.655/Single Mode	
Operating wavelengths	nm	1550, 1625	
Cladding diameter	μm/μm	1251	
Maximum Transmission Rate	Gbps	40	
Mode field Diameter at 1550nm	μm	(8-11)±0.6	
Core concentricity error	μm	<0.8	
Cladding Non-circularity	%	<1.0	
Cable cut off wavelength	nm	<1450	
Macrobend loss			
Loss	mm	30	
Number of turns	Number	100	
Maximum at 0.1dB	dB	0.1dB	
Attenuation Coefficient			
At 1550nm	dB/km	0.22	
At 1625nm	dB/km	0.24	
PMD Coefficient	ps/√km	<0.2	

TECHNICAL DATASHEETS FOR JOINT BOXES

JOINT BOXES

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____
 Model: _____
 Type: _____

DESCRIPTION	UNIT	REQUIRED	OFFERED
GENERAL			
Capacity of Fibers spliced	number	24 or 48 or 96 as per project spec	
Entrance Ports			
2 way	YES	YES	
3 way	YES	YES	
Material		Metal and Aluminium Alloy	
Colour		Silver	
Weight			
TECHNICAL			
Fiber radius of curvature	mm	≥43	
Fiber length of the plate to stay	mm	≥1500mm	
Additional Attenuation of optical discs to stay	dB	≤0.01dB	
Maximum capacity of fiber optic			
Operational Temperature range	°C	-40°C to 80°C	
Flattening performance	N/100mm	2000N/100mm	
IP Rating		IP65	
Atmospheric Pressure	Kpa	62-106Kpa	
Working Temperature	°C	-40°C to 65°C	
Insulation Resistance	MΩ	2*104MΩ	

TECHNICAL DATASHEETS FOR CCTV SURVEILLANCE CAMERAS

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____
 Model: _____
 Type: _____

S n.	Specifications	Unit	Data	
			Required	Offered
1.0	OUTDOOR WIRELESS IP CAMERA			
1.1	Manufacturer and Country of Origin		To be Specified	
1.2	Type		Outdoor Wireless IP Camera	
1.3	Standards		EN 55022 Class B, EN 55024, EN 50130-4, EN61000-6-1/3/2, EN 61000-3-2/3 and FCC Part 15 Subpart B Class B,	

S n.	Specifications	Unit	Data	
			Required	Offered
			IEC62262, IEC61000-4-5, IEC60068-2-11.	
1.4	Image Sensor		1/2.8" 2.0-megapixel progressive scan CMOS sensor	
1.5	Resolution and Day/Night Mode		1920*1080 resolution Auto/Color/Monochrome (removable infrared-cut filter) mode	
1.6	Shutter Speed		1/100000s to 1s electronic shutter speed	
1.7	Dynamic Range		128dB wide dynamic mode	
1.8	Digital Noise Reduction		Self-adaptive to 2D or 3D DNR	
1.9	Backlight Compensation		Supported	
1.10	Defog		Automatic/manual	
1.11	Image Stabilisation		Electronic Image Stabilisation	
1.12	IR coverage		Up to 80meters	
1.13	Angular Field of View		Horizontal: [43° Wide 14°(Tele)] and Vertical: [22° (Wide) 9° (Tele)]	
1.14	Video Compression		H.265/H.264/MJPEG	
1.15	Multiple streaming		Double Full HD streams and Treble streams (30fps or 25fps)	
1.16	Audio Compression		G.711a/G.711u/G.726/OPUS	
1.17	Network Protocols		TCP, UDP, IPv4, IPv6, DHCP, DHCPv6, DNS, ICMP, SIP, RSP, SSL, NTP, SNMP, 802.1x, QoS, DDNS	
1.18	Streaming Transmission and Encryption		Unicast/Multicast AES 128/192/256 encryption algorithm	
1.19	Intelligent Analytics		Loitering detection, Intrusion detection, Abandoned object detection, removed object detection, Target color recognition, Humans and vehicles distinguish, motion detection, tampering detection	
1.20	Electrical and Serial Interfaces		1xRJ-45 10/100Base-T self-adaptive Ethernet port, At least 1* RJ-45 10/100Base-T self-adaptive Ethernet port	
1.21	Alarm and Audio Interfaces		Alarm: 2 channel input and 2 channel output,	

S n.	Specifications	Unit	Data	
			Required	Offered
			Audio: 1 channel input and 1 channel output	
1.22	Memory card Slot		Built in 32G memory slot	
1.23	Power Supply		DC12V \pm 25%, DC24V \pm 25%, AC24V \pm 25%, POE(IEEE802.3at)	
1.24	Physical Characteristics		6kV surge voltage protection, IK10 vandal proof metal casing, IP66 IP protection, 10-day salt spray test rating	
2.0	IP PAN TILT ZOOM CAMERA			
2.1	Manufacturer and Country of Origin		To be specified	
2.2	Type		IP Pan Tilt Zoom Camera	
2.3	Standards		EN 55022 Class B, EN 55024, EN 50130-4, EN61000-6-1/3/2, EN 61000-3-2/3 and FCC Part 15 Subpart B Class B, IEC62262, IEC61000-4-5, IEC60068-2-11.	
2.4	Image Sensor		1/2.8" 2.0-megapixel progressive scan CMOS sensor	
2.5	Resolution and Day/Night Mode		1920*1080 resolution Auto/Color/Monochrome	
2.6	Shutter Speed and Iris Diaphragm		1/100000s to 1s, Automatic iris diaphragm	
2.7	Dynamic Range	dB	120dB WDR	
2.8	Digital Noise Reduction		self-adaptive to 2D or 3D	
2.9	Backlight Compensation and highlight suppression		Supported	
2.1	Defog		Automatic/Manual	
2.11	Image Stabilisation		G-Sensor Unit Electronic Image stabilization	
2.12	Lens		Focal Length: 4.5mm-135mm, Zoom: 30X Optical zoom and 16X Digital zoom,	
2.13	Angular and Rotational Field of View		Angular: [60.89° Wide 2.67°(Tele)] and Vertical: [37.34° (Wide) 1.51° (Tele)] Rotation: (Horizontal:0° to 360°, Vertical: -20° to +90°), Horizontal Rotation Speed: [Manual: 0.1° /s to 450° /s, Preset \geq 450° /s], Vertical rotation speed: [Manual: 0.1° /s to 400° /s, Preset \geq 400°	

S n.	Specifications	Unit	Data	
			Required	Offered
			/s], 256 preset positions, : 8 scan lines each with 32 preset positions Max of 5 scan lines each 10minutes,	
2.14	Video Compression		H.265/H.264/MJPEG	
2.15	Multiple streaming		Double Full HD streams and Treble streams (30fps or 25fps)	
2.16	Media Encryption		AES128/192/256 encryption algorithm	
2.17	Network Protocols		TCP, UDP, IPv4, IPv6, DHCP, DHCPv6, DNS, ICMP, SIP, RSP, SSL, NTP, SNMP, 802.1x, QoS, DDNS	
2.18	Streaming Transmission and Encryption		Unicast/multicast steaming transmission and stream encryption capable	
2.19	Intelligent Analytics		Park Action: Home position, preset position tour, pattern scan, horizontal scan, vertical scan, random scan, frame scan and panoramic scan ISP Packages: 5 defined scenarios (outdoor, indoor, motion capture, lowlight, and backlight modes), Event Triggers: motion detection, covering detection, alarm input, intelligent analytics alarm and network disconnection	
2.2	Electrical and Serial Interfaces		One RJ-45 10/100/1000Base-TX self-adaptive Ethernet port	
2.21	Alarm Interfaces		4-channel alarm input and 1-channel alarm output(pigtail)	
2.22	Memory card Slot		Micro SD cards in 64GB maximum memory slot of Speed class ≥ 6	
2.23	Power Supply		DC12V \pm 25%, DC24V \pm 25%, AC24V \pm 25%, POE(IEEE802.3at)	
2.24	Maximum Power consumption		45W	
2.25	Physical Characteristics		6kV surge voltage protection, IK10 vandal proof metal casing, IP66 IP protection, 10-day salt spray test rating	
3.0	IP DOME CAMERA			
3.1	Manufacturer and Country of Origin		To be Specified	
3.2	Type		IP Dome Camera	
3.3	Standards		EN 55022 Class B, EN 55024, EN 50130-4, EN61000-6-1/3/2, EN 61000-3-2/3 and FCC Part 15 Subpart B Class B, IEC62262, IEC61000-4-5, IEC60068-2-11.	

S n.	Specifications	Unit	Data	
			Required	Offered
3.4	Image Sensor		1/2.7" 2.0-megapixel progressive scan CMOS sensor	
3.5	Resolution and Day/Night Mode		1920*1080 resolution Auto/Multicolor/Monochrome (removable infrared-cut filter)	
3.6	Shutter Speed and Iris Diaphragm		1/100000s to 1s Automatic iris diaphragm Gain Control: Automatic/Manual	
3.7	Dynamic Range		120dB wide dynamic mode	
3.8	Digital Noise Reduction		Self-adaptive to 2D or 3D	
3.9	Backlight Compensation and highlight suppression		Supported	
3.10	IR coverage		30m minimum	
3.11	Image Stabilisation		G-Sensor Unit Electronic Image stabilization	
3.12	Lens		Focal Length: 2.8-12mm F1.4max, Zoom: 30X Optical zoom and 16X Digital zoom	
3.13	Angular Field of view and Camera Angle Adjustment		Angular field of view: Horizontal: [106° Wide 36°(Tele)] and Vertical: [57° (Wide) 20° (Tele)], Camera angle adjustment: (Pan:0° to 356°, Tilt: 0° to 75°, Rotation: 0° to 356°),	
3.14	Video and Audio Compression		Video: H.265/H.264/MJPEG Audio: G.711a/G.711u/G.726/OPUS	
3.15	Multiple streaming		Double Full HD streams and Treble streams (30fps or 25fps)	
3.16	Media Encryption		AES128/192/256 encryption algorithm,	
3.17	Network Protocols		TCP, UDP, IPv4, IPv6, DHCP, DHCPv6, DNS, ICMP, SIP, RSP, SSL, NTP, SNMP, 802.1x, QoS, DDNS	
3.18	Streaming Transmission and Encryption		Unicast/multicast steaming transmission and stream encryption capable	
3.19	Intelligent Analytics		Intelligent detections: (motion detection, covering detection), Event actions: [Alarm output, SD card recording and snapshot],	
3.20	Electrical and Serial Interfaces		1xRJ-45 10/100Base-T self-adaptive Ethernet port, 1*RS485 serial port	
3.21	Alarm Interfaces		1-channel alarm input and 1-channel alarm output	
3.22	Memory card Slot		64GB	
3.23	Power Supply		DC12V±25%, DC24V±25%, AC24V±25%, POE(IEEE802.3at)	
3.24	Maximum Power consumption	W	9W	
3.25	Physical Characteristics		4kV surge voltage protection, IK10 vandal proof metal casing, IP66 IP	

S n.	Specifications	Unit	Data	
			Required	Offered
			protection, 10-day salt spray test rating	
4.0	VIDEO SURVEILLANCE SERVER			
4.1	Manufacturer and Country of Origin		To be Specified	
4.2	Type		Video Surveillance Server	
4.3	Access Channels		8 maximum video access channels, 8 video playback and download channels	
4.4	Bandwidth	Mbit/s	input bandwidth: 128Mbit/s, Video forwarding channels: 32 output bandwidth: 256Mbit/s,	
4.5	Video Formats		H.264/H.265	
4.6	Decoding Performance		1-channel 4K or 8-channel 1080p or 16-channel 720p	
4.7	Preview Modes		1/4/8/9/16 panes	
4.8	Stacking function		2 to 16 such modules, 2 number if storage disks with Hot-swappable SATA3.0	
4.9	Disk tyoe		8TB enterprise-level hard disk	
4.10	RAID Level		non-RAID mode/RAID1	
4.11	Recording modes		(supported manual recording, scheduled recording, and alarm-triggered recoding), Query by time or events option, Batch download or download by time segment options	
4.12	Media Encryption		supports multiple encryption algorithms such as AES256	
4.13	Compatibility		Supports access of devices that comply with the GB/T 28181, ONVIF 2.4, or ONVIF Profile S protocol, DHSDK, also supports connection to other platforms that comply with various protocols such as GB/T 28181 to implement diverse functions such as live video viewing and PTZ control and alarm reporting	
4.14	Protocols		TCP, UDP, IPv4, HTTPS, RTP, RSTP, RTCP, AIP, SSL, NTP, HTTP	
4.15	External Interfaces		at least 1*HDMI 2.0, 1*VGA, 2*10/100/1000Mbit/s Ethernet ports, 1* USB3.0, 1*USB2.0, 1*BNC Audio input, 1*BNC Audio output, 2*input Alarm channels, 1*output Alarm channels	
4.16	Power Consumption	W	<60W	
4.17	Power Supply	VAC	100VAC to 240VAC(50Hz/60Hz)	
4.18	Cabinet		Standard 19-inch 9U cabinet	

S n.	Specifications	Unit	Data	
			Required	Offered
5.0	3KVA BATTERY BACKUP SUPPLY (Small/Medium Substation – 132kV and 220kV stations)			
5.1	Manufacturer and Country of Origin		To be Specified	
5.2	Type		3kVA Battery Backup Supply	
5.3	Output Power Capacity		2.7kW/3.0kVA	
5.4	Output Voltage and distortion	V	230V nominal, configurable for 220V, 230V, or 240V nominal output voltage, distortion less than 5% at full load	
5.5	Output Frequency	Hz	47 - 53 Hz for 50 Hz nominal, 57 - 63 Hz for 60 Hz nominal	
5.6	Output Connections		(8) IEC 320 C13 (Battery Backup), (2) IEC Jumpers (Battery Backup), (1) IEC 320 C19 (Battery Backup)	
5.7	Input Voltage	V	230V, 220V or 240V	
5.8	Input Frequency	Hz	50/60 Hz +/- 3 Hz (auto sensing)	
5.9	Input Connections		IEC-320 C20, Schuko CEE 7 / EU1-16P, British BS1363A	
5.10	Input Voltage Range	V	160-286V	
5.11	Battery Type		Maintenance-free sealed Lead-Acid battery with suspended electrolyte: leak proof	
5.12	Recharge Time	Hours	3hrs	
5.13	Interface Ports		USB	
5.14	Control Panel		Multi-function LCD status and control console	
5.15	Audible Alarm		Alarm when on battery, distinctive low battery alarm, configurable delays	
5.16	Surge Energy Rating	Joules	365 Joules	
5.17	Filtering		Full time multi-pole noise filtering, 0.3% IEEE surge let-through, zero clamping response time, meets UL 1449	
5.18	Operating Temperature	°C	0 - 40 °C	
5.19	Audible Noise	dBA	53.0dBA at 1 meter from surface of unit	
5.20	Online Thermal Dissipation	TU/hr	375.0BTU/hr	
5.21	Protection Class		Minimum IP20	
5.22	Certification		CE, CSA, EAC, EN/IEC 62040-1, EN/IEC 62040-2, RCM, VDE	
6.0	5KVA BATTERY BACKUP SUPPLY(Large Substations – 400kV and 500kV substations)			
6.1	Manufacturer and Country of Origin		To be Specified	
6.2	Type		5kVA Battery Backup Supply	
6.3	Output Power Capacity		3.5kW/5.0kVA	

S n.	Specifications	Unit	Data	
			Required	Offered
6.4	Output Voltage and distortion	V	230V, configurable for 220V, 230V, or 240V nominal output voltage, distortion less than 5% at full load	
6.5	Efficiency at Full load	%	92%	
6.6	Output Frequency	Hz	47 - 53 Hz for 50 Hz nominal, 57 - 63 Hz for 60 Hz nominal	
6.7	Output Connections		8) IEC 320 C13 (Battery Backup), (2) IEC Jumpers (Battery Backup), (1) IEC 320 C19 (Battery Backup)	
6.8	Input Voltage	V	230V, 220V or 240V	
6.9	Input Frequency	Hz	50/60 Hz +/- 5 Hz (auto sensing)	
6.10	Input Connections		IEC-320 C20, Schuko CEE 7 / EU1-16P, British BS1363A	
6.11	Input Voltage Range	V	140-280V	
6.12	Battery Type		Maintenance-free sealed Lead-Acid battery with suspended electrolyte: leak proof	
6.13	Recharge Time	Hours	3hrs maximum	
6.14	Interface Ports		USB	
6.15	Control Panel		ED status display with load and battery bar-graphs and On Line: On Battery: Replace Battery: Overload and Bypass Indicators	
6.16	Audible Alarm		Alarm when on battery, distinctive low battery alarm, configurable delays	
6.17	Surge Energy Rating	Joules	555 Joules	
6.18	Filtering		Full time multi-pole noise filtering, 0.3% IEEE surge let-through, zero clamping response time, meets UL 1449	
6.19	Operating Temperature	°C	0 - 40 °C	
6.20	Audible Noise	dBA	55.0dBA at 1 meter from surface of unit	
6.21	Online Thermal Dissipation	TU/hr	1057.0BTU/hr	
6.22	Protection Class		Minimum IP20	
6.23	Certification		CE, EN 50091-1, EN 50091-2, EN 55022 Class A, EN 60950, EN 61000-3-2, GOST, UL 1778, VDE	

TECHNICAL DATASHEETS FOR DRONE(UNMANNED AERIAL VEHICLE)

DRONE TECHNICAL DATA SHEETS		UNIT		DATA
			Required	Offered
1	<u>OPERATING SPECIFICATIONS</u>			
a	Operational Altitude	Ft	1000-12000	
	<input type="checkbox"/>			
b	Radio Range	km	10	
	<input type="checkbox"/>			
c	Sensor agnostic system		Yes	
	<input type="checkbox"/>			
d	Full autonomous flying, terrain following, target tracking, real time GPS waypoints		Yes	
	<input type="checkbox"/>			
e	Dual Mode – Wireless and Laptop		Yes	
	<input type="checkbox"/>			
f	Automated return home		Yes	
	<input type="checkbox"/>			
g	Payload	Kg	7	
	<input type="checkbox"/>			
h	Can fly in crosswinds	Kph	50	
	<input type="checkbox"/>			
i	Flight Management Integration		Yes	
	<input type="checkbox"/>			
j	Auto Takeoff, flight, and Landing		Yes	
	<input type="checkbox"/>			
k	Parachute		Yes	
	<input type="checkbox"/>			
l	Control			
	<input type="checkbox"/>			
	- Semi-automatic control via joystick		Yes	
	<input type="checkbox"/>			
	- Waypoints – terrain following accuracy		Yes	
	<input type="checkbox"/>			
m	GPS integration		Yes	
	<input type="checkbox"/>			
n	Real time downlink data		Yes	
	<input type="checkbox"/>			
o	Flight Time			
	<input type="checkbox"/>			
	- Fuel Powered	Min	90	
	<input type="checkbox"/>			
	- Electric Powered	Min	30	

DRONE TECHNICAL DATA SHEETS		UNIT	Required	DATA Offered
	<input type="checkbox"/>			
p	Sealing	IP	65	
	<input type="checkbox"/>			
q	Operating Temperature	°C	-10 to 70	
r	Absolute X,Y,Z Accuracy (RTK/PPK activated)	ppm	150 cm + 2	
s	Absolute Vertical/Horizontal Accuracy			
	- With GCPs	cm	3	
	- Without GCPs	m	5	
2	<u>CAMERA SPECIFICATIONS</u>			
a	Pixels (Minimum)	MP	16	
b	Electronic Shutter Speed		Yes	
c	Still Photography Modes		Single Shot/Burst Shooting	
d	Video Recording Modes		UHD, FHD, HD	
e	Supported File Systems			
	- Photo Formats		JPEG,	
	- Video Formats		MPEG, MP4, MOV	
f	Optional Image Formats		AutoCAD, ArcGIS, Trimble Business Center, Leica Geo Office, VAGNET Office Tools, MicroStation	

DRONE TECHNICAL DATA SHEETS		UNIT	DATA	
			Required	Offered
g	Supported SD Cards		Micro SD (Min) 128 GB	
h	Ground Sampling (Maximum)	cm/pixel	1	
i	Nominal Minimal Coverage (At 120m/400ft)	ha	220	
j	Minimal Coverage (At 1,500m/5000 ft)	km2	40	
3	<u>TABLET/iPAD SPECIFICATIONS</u>			
	-			
a	Display (minimum)	In	10	
b	Storage (minimum)	GB	256	
c	Memory (minimum)	GB	8	
d	Cramped Keyboard		Yes	
4	<u>ROUTE SURVEY SYSTEM</u>			
	-			
a	Weight	Kg	3.5 (Max)	
b	Field of View	°	45 (Min)	
c	Multiple Target Capability	No.	5	
d	Scan Speed	Scan/sec	120 (Min)	
e	Measurement Rate	Measurements/sec	100,000	

TECHNICAL DATASHEETS FOR UNDERGROUND CABLE DETECTION AND SURVEILLANCE DATA SHEETS

Table of compliance

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____
 Model: _____
 Type: _____

DESCRIPTION	UNIT	REQUIRED	OFFERED
SENSOR UNIT			
Operating Temperature		0 to 50°C	
Humidity		20% to 80% noncondensing	
Networking		Dual Gigabit Ethernet	
Operating System		Windows 10 Pro 64-bit	
SSD		Min. 2x120GB RAID1 array	
USB		4 USB 2.0 on rear panel, 2 on front panel 4 USB 3.1 on rear panel (2 Gen 1, 2 Gen 2)	
Video		DisplayPort 1.4, HDMI 2.0b, DVI-D	
Standard Alarm Interface		TCP/IP via Network Manager software (API)	
Optional Alarm Interfaces		Relay closures via I/O modules or ASCII output	
Optical: Laser classification Connector type Fiber connections		Class 1, 1550nm wavelength FC/APC Four (4)	
Power Power Supply Voltage Power		Dual redundant field-replaceable 100 – 240VAC, 50Hz 200W max	
Mechanical: Style Rack clearance Weight Rack Space		Standard 19 inch rackmount, 51cm deep 5cm front, 15cm rear Sensor Unit: 23kg Fiber Connection Module: 5kg Keyboard/monitor/mouse: 10.5kg 6 RU contiguous rack space, min. 30cm above floor 4 RU – sensor unit 17.8cm 1 RU – fiber connection module 4.5 cm 1 RU – keyboard/monitor/mouse 4.5cm	
Standards		FCC Part 15 Subpart B Class A CE: Conformant to EMC Directive 2014/30/EU Safety: EN 60950-1:2006 +A2:2013	
Detection Processing	km	100	
Detection Resolution	m	Non cut-immune configuration – 15 Cut immune configuration – 30	
ALARM REPORTING			
Target Resolution	m	45m for simultaneous alarms	
Location Accuracy	m	4m in a quiet environment	
Virtual alarm zones (software assignable)	Zones	1440 per sensor unit	

Cable cut response	m	±30	
Transmission Protocol		TCP	
Interface Mode		Server	
Number of Connections		1 or more	
Default Port		4122	
Report Mode		0	
Data Formatting		XML version 1.0	
XML Namespace		Proprietary	
Text Encoding		US-ASCII	
Nuisance Alarm Rate		To be determined on site	
FAR	km/month	≤1	
SENSOR CABLE			
Sensor cable number of fibres	No.	Standard cable (12,24,36,48) Armoured cable (24)	
Max length per reel	km	5	
Fiber count	No.	Optional: 12,24,36,48 (2 required as sensor fibers, remaining dark fibers available for additional applications)	
Fiber type/wavelength	nm	1550 single mode	
Bend radius (smallest allowable)	mm	Dynamic (during installation) – 220 Static (during operation) – 110	
Tensile rating	N	During installation – 2700	
Outside diameter/weight	mm; kg/km	11.5 max; 75	
Optical power loss			
Max. allowable loss	dB/km	0.3	
Max. cable attenuation	dB/km	0.25 @ 1550nm	
Max loss per event	dB	0.1	
Probability of Detection (PD)	%	95	
CONDUIT			
Material		Flexible Innerduct – high density polyethylene	
Size	mm	OD 42.2; ID 35.3; Wall thickness 3.12	
Weight	kg/km	394	
Length	m	1829	
Bend Radius	cm	46	
ADJUSTABLE DETECTION PARAMETERS			
Disturbance Threshold	Level	5	
Alarm Threshold	Count	10	
Duration Threshold	s	2	
Disturbance Life	s	15	
Disturbance Mask	s	0.3	
Disturbance Range	m	6	
Event Life	s	60	
Environment Compensation		Spatial - Yes Temporal – Yes	
Parallel Motion Rejection		Yes	
Perpendicular Motion Rejection		Yes	

TECHNICAL DATASHEETS FOR HANDHELD DATA COLLECTOR DATASHEET

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____
 Model: _____
 Type: _____

DESCRIPTION	UNIT	REQUIRED	OFFERED
PHYSICAL			
Size	mm	196x93.4x17.2	
Weight	g	385	
Processor		Qualcomm Snapdragon 626,Octa-Core	
Memory		4 GB RAM	
Storage		64GB	
User Interface Keyboards		2 volume keys,power key,3 programmable keys,standard Android touch panel	
Battery		8000mAh Li-Ion removable battery	
Battery life		72hours at 20 with GPS on	
Charging time		4 hours	
ENVIRONMENTAL			
Temperature			
Operating	°C	-20 to +55	
Storage	°C	-40 to +70	
Humidity		95%	
Water & Dust Proof	IP	67	
Free Drop	m	1.2	
INPUT/OUTPUT			
Expansion		Micro SD memory card(upto 256GB)	
Display			
Size		6 inch capacitive multi-touch	
Resolution	pixels	1920x1080	
Brightness	CD/m2	500	
AUDIO		Built-in microphone and speaker Audio jack through USB-C Pogo pin connector	
I/O		USB 3.0,external antenna connected	
Digital Camera			
Rear		13MP with auto-focus and LED Flash	
Front		5MP	
Sensors		Ambient light sensor, digital compass, gyrometer, accelerometer, barometer	
GNSS			
GNSS Receiver		U-blox Neo-M8T	
Internal antenna: 72 channels.		GPS L1 C/A, GLONASS, BeiDou, SBAS	
Integrated real-time		SBAS (WAAS/EGNOS/MSAS/GAGAN/QZSS)	
Tri constellation system		GPS/GAL, GPS/GLO/GAL or GPS/BeiDou/GAL	
External antenna connector		Yes	
Protocol		Location Services	
ACCURACY			
Real-Time SBAS		< 2m	

TECHNICAL DATASHEETS FOR FIREWALL

Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____

Model: _____

Type: _____

Type:				
S n.	Specifications	Unit	Data	
			Required	Offered
1.0	INDUSTRIAL FIREWALL			
1.1	Manufacturer and Country of Origin		To be Specified	
1.2	Type		Industrial Firewall	
1.3	Description		Multiport firewall with 4 x GE RJ45 interfaces, 2 * Shared Media pairs (GE RJ45/GE SFP), 1 DB9 Serial Port, 1 USB(Client/Server), 1*RJ45 Console Port,	
1.4	Power Consumption		48VDC power supply and external	
	Power supply		12VDC power AC adapter connection	
	Power consumption (Average/Max)	W	11.6W/14W	
	Max Current	A	-48VDC/0.5A	
1.5	System Performance	Gbps	1.5Gbps	
	IPv4 Firewall Throughput	µs	4 µs	
	Firewall Latency (64 byte, UDP)			
	IPsec VPN throughput (512 byte)	Mbps	45Mbps	
	IP Throughput (HTTP)	Mbps	200Mbps	
1.6	Compliance		FCC Part 15 Class A, C-Tick, VCCI, CE, UL/cUL, CB	
1.7	Certifications		IEC 61850-3 (EMC) and IEEE 1613 Emission Compliant ICASA Labs: Firewall, IPsec, IPS, Antivirus, SSL-VPN	
1.8	Device Support Licences		5 years Hardware Unit, 24x7 Comprehensive Support license	
			5 years Advanced Hardware Replacement, Firmware and General Upgrades, VPN, Traffic	

S n.	Specifications	Unit	Data	
			Required	Offered
			Management, Threat protection bundle Services license (Application Control, IPS, AV, Botnet IP/Domain, Mobile Malware Service, Web Filtering, Antispam, Cloud support services including Virus Outbreak and Content Disarm & Reconstruct Services).	

TECHNICAL DATASHEETS FOR OPTICAL GROUND WIRE

•
Data about offered equipment to be filled in by the bidder.

Name of Manufacturer: _____

Model: _____

Type: _____

DESCRIPTION	UNIT	REQUIRED	OFFERED
GENERAL			
Reference Standards	Yes	IEC60794-4-1, IEEE-1138 standards	
Stranding Direction – Outer Layer	Direction	Right Hand	
Number and Diameter of Aluminium Allow strands	No*mm		
Number and Diameter of Aluminium clad steel strands	No*mm		
Type tests	Yes	Yes	
Cable offered has been in operation for more than 5 years.	YES	YES. Provide Completion certificate	
Internal Fiber tube Diameter	mm		
Overall diameter	mm		
Guaranteed Ultimate Tensile Strength	kN		
Final Modulus of elasticity	N/mm ²		
Maximum Short Circuit Current Capacity	kA ² sec		
Maximum Temperature withstand under short circuit current (1sec) without optical or mechanical degradation			
Standard weight			
Weight of grease			
Maximum Tensile Strength –Long Term	Kg/mm		
Maximum Tensile Strength –Short Term	Kg/mm		
Lightning withstand as per IEC 60794-4-1			
Maximum DC Resistance at 20°C	Ohm/km		
OPTICAL CHARACTERISTICS			
Total number of Optical Fibers	Number	24 or 48 or 96 as per project spec	
Number of Fibers per buffer tube (max)	Number	12	
Fiber Type/Mode		G.655/Single Mode	
Fiber Colour codes Standard		TIA-598C	
Buffer/binder Colour Coding followed		YES	
Operating wavelengths	nm	1550, 1625	
Cladding diameter	µm/µm	1251	
Maximum Transmission Rate	Gbps	40	
Mode field Diameter at 1550nm	µm	(8-11)±0.6	

Core concentricity error	μm	<0.8	
Cladding Non-circularity	%	<1.0	
Cable cut off wavelength	nm	<1450	
Macrobend loss			
Loss	mm	30	
Number of turns	Number	100	
Maximum at 0.1dB	dB	0.1dB	
Attenuation Coefficient			
At 1550nm	dB/km	0.22	
At 1625nm	dB/km	0.24	
PMD Coefficient	$ps\sqrt{km}$	<0.2	

TECHNICAL DATASHEETS FOR 132 KV SURGE ARRESTORS

132 kV surge Arrestors		Required	Offered
1.	Manufacturer and country of origin		
2.	Type	MOA	
3.	Standard	IEC 60099-4	
4.	Installation	outdoor	
5.	Rated voltage of arrester (kV)	120	
6.	Maximum overvoltage factor on the system due to any switching duty, PU	2.3	
7.	Rated system frequency, HZ	50	
8.	Condition of system neutral	Solid	
9.	TOV capacity:		
	<ul style="list-style-type: none"> For 1 second, kVrms For 10 second, kVrms 	≥ 139 ≥ 132	
10.	Max. permissible line to ground voltage (kV)		
11.	Power frequency withstand voltage, 1 min., kV	≥ 325	
12.	Impulse voltage at (1.2/50 microsecond)	750	
13.	Residual voltage at (8/20 microsecond) and at 10 kA, (kV)	≤ 311	
14.	Residual voltage at (30/60 microsecond) and at 1,0 kA, (kV)	≤ 257	
15.	Rated discharge current (kA)	10	
16.	Maximum discharge current (kA)		
17.	Creepage distance (mm)	4495	
18.	Overall dimensions (mm) (height)		
19.	Overall weight (kg)		
20.	Max. residual voltage with current wave of (30/70 micro sec.) at 1 kA (kV)		
21.	Energy capability as per IEC 60099-4		
22.	Line discharge class (IEC)	3	

23.	2 impulses, as per IEC 99-4, kJ/kV, Ur	7,8	
24.	Pressure relief withstand		
25.	Catalogues No.		
26.	Standards applied	IEC 60099-4	
27.	Manufacturer quality system in accordance with ISO 9001		
	– Date of issue	Yes	
	– Validity	Latest	
	– Certificate attached to the offer		
28.	Type test certificate to be issued by independent laboratory or independently witnessed type test certificate to be submitted	Yes	
	– Certificate to be attached to the offer	Yes	
	– Report to be attached to the offer	Yes	

TECHNICAL DATASHEETS FOR 132 KV XLPE CABLE

Description	Minimum Requirements		Data Offered
	Unit	Data	
Manufacturer's name		to be specified	
Country of manufacture			
Location of manufacturing site		to be specified	
Manufacture quality certification		ISO 9001	
Circuit rating required	MVA		
General description of cable			
Number of cores		1	
System voltage	kV	132	
Conductor size	mm ²		
Insulation type		XLPE	
Metal sheath type		Lead	
Over sheath type		HDPE	
Insulation Coordination			
Highest system Voltage (Um) (Insulation class)	kV	145	
Nominal Voltage between conductors	kV	132	
Rated frequency	Hz	50	
Nominal Voltage between conductor and sheath (Uo)	kV	76.2	
Rated Withstand impulse Voltage(altitude < 1000 M)	kV	650	
Rated short duration power frequency withstand voltage (altitude < 1000 M)	kV	275	
Rating		1	
Maximum continuous direct- buried current rating assuming Ground temperature of 30o C, Max. Soil Thermal resistivity of 2.7Km/W, Flat formation configuration and special bonding of metal sheath Guaranteed current rating Single Trench Calculation Method	A	To be specified IEC 60840	
Maximum continuous in air current , assuming Air Temperature (in shade) of 40°C, Flat formation configuration spacing of 250 mm, Thermally independent of other circuits and special bonding of metal sheath Calculation Method	A	To be specified IEC 60840	
Maximum permissible core temperature for continuous operation	°C	90	
Short circuit capacity for 1 sec	kA	To be specified	
Permissible Max. Sheath Temperature	°C		
Permissible Max. Conductor Temperature	°C		
Permissible emergency Overload			
Applied on 100% continuous load		to be specified	
Emergency current rating	A		
Max. Emergency temperature	°C		
Allowable duration/ operation	h		
Allowable total duration/ operation	h		
Max. average duration/average on total life of cable	h		
Applied on 50% continuous load		to be specified	
Emergency current rating	A		
Max. Emergency temperature	°C		
Allowable duration/ operation	h		

Description	Minimum Requirements		Data Offered
	Unit	Data	
Allowable total duration/ operation	h		
Max. average duration/average on total life of cable	h		
Applied on 100% continuous load		to be specified	
Emergency current rating	A		
Max. Emergency temperature	°C		
Allowable duration/ operation	h		
Allowable total duration/ operation	h		
Max. average duration/average on total life of cable	h		
Construction features			
Conductor			
Material		Copper	
Nominal cross section	mm ²		
Shape and type of conductor	mm		
Overall diameter			
Water bl°cking method		tape/yarn	
Semiconductor blinder tape		yes	
Conductor Screen			
Material		Fully bonded	
Nominal Thickness	Mm	Semicon. XLPE	
Minimum Thickness	mm		
Nominal overall diameter	mm		
Compound identification reference	mm		
Insulation			
Material		XLPE	
Nominal Thickness	mm	20	
Minimum Thickness	mm	yes	
Nominal overall diameter	mm		
Max. Continuous operating temperature	°C		
Compound identification reference			
Maximum stress at nominal voltage			
At conductor screen	kV/mm		
At insulator screen	kV/mm		
Maximum stress at impulse voltage	kV/mm		
At conductor screen	kV/mm		
At insulator screen	kV/mm		
Insulation screen			
Material		Fully bonded	
Nominal Thickness		Semicon. XLPE	
Nominal overall diameter	mm		
Compound identification reference	mm		
Indelible ink marking on screen			
XLPE manufacturing methods			
Extrusion line type e.g CCv,MDCV,VCV		VCV	
Single pass/triple exclusion		Yes	
Curing method	days	dry	
Cooling method		dry	
Degassing period			
Bedding for moisture absorption			
Type of Material	mm		
Nominal Thickness	mm		
Minimum thickness	mm		
Nominal overall diameter	mm		
Metallic screen			

Description	Minimum Requirements		Data Offered
	Unit	Data	
Type and Material			
Nominal Thickness	mm	Copper wire	
Minimum thickness	mm		
Nominal diameter over screen	mm		
Cross sectional area of the screen	mm ²		
Short time current density(1sec)	2kA/mm ²		
Bedding/Binder tape			
Type and Material			
Nominal Thickness	mm		
Minimum thickness	mm		
Nominal overall diameter over bedding	mm		
Metallic screen			
Type and Material	-	lead-alloy ½ C	
Nominal Thickness	mm		
Minimum thickness	mm		
Nominal diameter over screen	mm		
Cross sectional area of the screen	mm ²		
Short time current density(1sec)	2kA/mm ²		
Protective anti corrosion external sheath covering			
Bitumen undercoat			
Type and material		HDPE	
Colour		Black	
Nominal thickness			
Minimum thickness	Mm		
Termite resistant	mm		
Type of anti-termite protection			
Thermal resistivity			
Type of fire protection for closing section	Km/w	Yes Specify max. 6.0	
Type of conductive outer layer		Graphite/or semicon. polymer	
Weight of completed cable		to be specified	
Copper			
Insulation	Kg/m		
Lead alloy	Kg/m		
Gross weight	Kg/m		
Losses			
Maximum dielectric loss per meter/ phase when operating at nominal voltage frequency and at maximum conductor temperature	W/m	to be specified	
Maximum sheath loss per meter/ phase when operating at nominal voltage frequency and at current stipulated in item 3 with sheath bonded and earthed as recommended (sectionalising Cross bonding)	W/m	to be specified	
Maximum conductor loss per meter/ phase when operating at nominal voltage frequency and at current stipulated in item 3	W/m	to be specified	
Total loss of cable per metre/ phase of three phase circuit	W/m	to be specified	
Electrical values			
Maximum dc resistance of conductor at 20°C	Ω/m	to be specified	

Description	Minimum Requirements		Data Offered
	Unit	Data	
Maximum ac resistance of conductor at operating temperature C	$\mu\Omega/\text{m}$	to be specified	
Equivalent reactance of three phase circuit	$\mu\Omega/\text{m}$	to be specified	
Electrostatic capacitance per conductor of cable at nominal voltage and operating temperature	pF/m	to be specified	
Max. charging current per conductor at nominal voltage	mA/m	to be specified	
Charging capacity of three phase system (at U_0)	Var/m	to be specified	
Max. dielectric loss factor of cable at nominal voltage and frequency at a conductor temperature of;		to be specified	
Positive and negative impedance	Ω/m	to be specified	
Zero sequence impedance (as installed conditions)		to be specified	
Resistance	Ω/m		
Reactance	Ω/m		
Capacitance	pF/m		
Surge impedance	Ω/m	to be specified	
Bonding and earthing			
Type of special bonding			
Max. Sheath potential of completed cable with conductor at max. earth fault current of 31.5 kA with sheath bonded and earthed as recommended	V/m	to be specified	
Max. sheath potential of completed cable with conductor at rated current with sheath bonded and earthed as recommended	V/m	to be specified	
Testing			
Routine tests		yes	
As per IEC 60840			
Additional tests specified as required by the Employer.			
Sample tests		IEC 60840	
5 U_0 for 1 h (as per Employer's spec)			
Type tests		yes	
Test regime			
Location of test			
date of test			
Commissioning tests			
AC voltage withstand		1.7 U_0 for 1 hour	
Partial discharge monitoring		< 10pC	
Over sheath DC voltage test	kV	12kV for 15 minutes	