

ANNEX II: TECHNICAL SPECIFICATIONS & ANNEX III: TECHNICAL OFFER

SECTION 3: TECHNICAL DATA SCHEDULE

LOT 3: Development of remote supervision and control systems for the medium voltage distribution grid in the area of Elektrosrbija Kraljevo

TECHNICAL REQUIREMENTS FOR THE MAIN COMMUNICATION UNIT (MCU) CABINET

SECTION 3: TECHNICAL DATA SCHEDULE 18

TECHNICAL REQUIREMENTS FOR THE MAIN COMMUNICATION UNIT (MCU) CABINET

Item	Description	Unit	Required	Guaranteed
1	GENERAL			
1.1	Manufacturer			
1.2	Type			
1.3	Model			
1.4	Country of origin			
1.5	Standards		IEC 60099-4, ETSI 300-220/UHF HIGH 300-113 ETS 300-683 LVD72/23/EEC (93/68/EEC)	
1.6	QMS		ISO 9001	
1.7	Mount location (indoor/outdoor)		outdoor	
1.8	SCADA interface		RS232, Ethernet, RS485	
2	RADIO TRANCEIVER			
2.1	Data rates		4800...19200 bps	
2.2	VHF Range		140 – 174 MHz	
2.3	UHF Range		440 – 470 MHz	
2.4	Frequency splits		Various Tx/Rx frequency splits configurable	
2.5	Operating regime		Halfduplex, simplex	
2.6	Modulation		4 level FSK	
2.7	Forward Error Correction		yes, with frequency overlapping	
2.8	Buffering		yes	
2.9	Collision avoidance		yes, configurable by user	
2.10	Repeating		Multiple repeating, minimum 6 repeaters in one radio connection	
2.11	Standards		ETSI 300113, ETSI 301489, EN 609 50-1, MPT1411, FCC Rule 90.210	
3	RADIO TRANSMITTER			
3.1	Transmitter power (TX power)	W	0.01 W – 5.0 W configurable by user	

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Item	Description	Unit	Required	Guaranteed
3.2	Accuracy of power	dB	+/- 2 dB	
3.3	The parasite emission signal	dBm	MAX – 37 dBm	
4	RADIO RECEIVER			
4.1	Sensitivity		-110... -116 dBm@ BER 10 ⁻⁶ . (depending on data rates and bandwidth)	
4.2	The parasite emission signal	dBm	MAX – 57 dBm	
4.3	Adjacent channel rejection	dB	> 60 dB	
5	SERIAL INTERFACE RS-232			
5.1	Three-wire, Rx/Tx/GND		yes	
5.2	Data rates		600...57600 bps	
5.3	Flow control		DCD/CTS/DSR signals for flow control	
6	PROTOCOL			
6.1	DNP3 (master/slave)		yes	
7	CONNECTORS			
7.1	Ethernet connector		RJ45	
7.2	Antenna connector		BNC female	
8	RATED VALUES			
8.1	Casing power source voltage	V AC	230 VAC	
8.2	Power block (AC/DC)		12 V DC, 12 Ah rechargeable batteries	
8.3	Power block (AC/DC) consumption	A	0,14 A DC (stand-by)	
8.4	Power Supply for radio communication module	V DC	12	
8.5	Frequency range	MHz	430 – 470	
8.6	Output power	W	0.01 - 5	
8.7	Bandwidth	kHz	12,5	
8.8	Receiver sensitivity	dBm	from -110 to -118 dBm at BER lower than 10 ⁻⁶	
9	CASING			
9.1	Material		Stainless steel	

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TECHNICAL REQUIREMENTS FOR THE MAIN COMMUNICATION UNIT (MCU) CABINET

Item	Description	Unit	Required	Guaranteed
9.2	Protection class	IP	IP2X	
9.3	Temperature range	° C	-25° C to + 60 ° C	
9.4	Casing open alarm and signaling		yes	
9.5	Radio communication module casing class	IP	IP50	
9.6	Radio communication module temperature range	° C	-25° C to + 60 ° C	
10	DOCUMENTATION			
10.1	The device shall be delivered with complete documentation (CD and printouts) for mounting and maintenance. The documentation shall be on Serbian		Yes	
11	CERTIFICATE OF COMPLIANCE AND TESTING DOCUMENTATION			
11.1	The device shall be delivered with complete certificate of compliance documentation: factory test sheets in accordance with IEC standards			
12	FUNCTIONS			
12.1	"Store and forward" (transmitter and receiver) functionality installed;			
12.2	Event triggered communication ("event driven" system);			
12.3	Option of communication between the SCADA server and base (repeater) station with the remote unit with a digital communication module via a direct or alternative digital radio communication route (option to set direct or alternative paths via base (repeater) station)			
12.4	Option of connecting the remote terminal unit with a digital communication command module to the new repeater network on frequencies pre-approved by RATEL according to DNP3.0 master			

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TECHNICAL REQUIREMENTS FOR THE MAIN COMMUNICATION UNIT (MCU) CABINET

Item	Description	Unit	Required	Guaranteed
12.5	Communication options - "point to point", "point to multipoint" and "peer to peer" ("mesh" technology with "multirepeating" functionalities);			
12.6	Battery capacity and charging control as well as protection against deep discharge installed.			
12.7	Internal status test functionality implemented. LED present to indicate a test in progress.			
12.8	Option of multiple attempts to establish communication with the base (repeater) station in case of communication issues installed (total number of attempts not less than 30 via direct and not less than 30 via alternative route);			
12.9	Option to test all LEDs on the panel and all status messages displayed on the panel			
12.10	Option of remote frequency adjustment on the remote unit with a communication radio module from the dispatcher centre within the range of 435 – 470MHz;			
12.11	Option of software adjustment of output power within the range of 10 mW to 5,0 W;			
12.12	Implemented communication link quality test (communications test)			
12.13	Data transmission quality testing (Bit Error Rate test);			
12.14	Option to measure the RSSI factor in real time (measuring signal reception quality in real time);			
12.15	Presence of Debounce filtering function, i.e. the option to define the digital input filtering time to eliminate possible digital signal peaks; the option of allotting a different time to each individual digital input point is required;			

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Item	Description	Unit	Required	Guaranteed
12.16	Option of operation as a repeater in one or several parallel radio systems			
12.17	Power unit overvoltage protection			
OVERALL COMPLIANCE WITH THE REQUIREMENTS (YES/NO)				