



# PROVINCIAL ELECTRICITY AUTHORITY

Specification No.: RTES-N1-กบข.-001/2565 : กล้องถ่ายภาพความร้อน ความละเอียด 640X480  
PIXELS (THERMAL IMAGING CAMERA)

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## C3 Schedule of detailed requirement

### Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
1	-	set(s)	<p><b>กล้องถ่ายภาพความร้อน ความละเอียด 640x480 Pixels (Thermal Imaging Camera), to use for checking all type of electrical equipment for predictive maintenance program, with :</b></p> <p>1.1 กล้องถ่ายภาพความร้อน ความละเอียด 640x480 Pixels (Thermal Imaging Camera), with :</p> <p>Detector Resolution : Focal Plane Array (FPA), uncooled microbolometer, 640x480 pixels, non-interpolate (or better)</p> <p>Minimum spectral range coverage : 7.5 to 14 <math>\mu</math>m</p> <p>Field of View (FOV) : not less than 24 ° x 18 °</p> <p>Minimum focus distance : not more than 0.3 m</p> <p>Instantaneous field of view (IFOV) : not more than 0.66 mrad</p> <p>Thermal sensitivity at 30° C (NETD) : not more than 0.04 ° C (40 mK) (at 30 Hz image frame rate)</p> <p>Image frame rate (on display) : not less than 30 Hz, non-interlaced</p> <p>Display : not less than 4 " colour display (Resolution: <math>\geq</math>640x480 pixels)</p> <p>Focus : Three focus systems (or better)</p> <p>1. One shot contrast/passive auto focus</p> <p>2. Laser distance auto focus</p> <p>3. Manual focus</p> <p>Digital or Electronic zoom : 1-8X continuous or better</p> <p>Visual : 5 Mpixels (or better), full color</p> <p>Video output : Display port to HDMI or DVI</p> <p>Temperature range : 0 ° C to 1500 ° C, or better</p> <p>Accuracy : <math>\pm</math> 2 ° C, <math>\pm</math>2 % of reading (whichever is greater) or better</p>



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Item	PEA Material No.	Quantity	Description
			Atmospheric transmission correction : input correction for humidity, temperature and measuring distance
			Programmable buttons : Not less than 2 buttons
			Reflected ambient temperature : Automatic, base on input of reflected temperature
			Emissivity correction : variable from 0.01 to 1.0 or select from listings in pre –defined materials list (at 0.01 step)
			Measurement mode : 3 movable spot, 3 areas (auto maximum and minimum temperature), or better
			Image Enhancement mode : MSX or Evershap function feature
			Image storage : not less than 8 GB removable memory card
			File format
			-Thermal : 16 bit radiometric IR digital image (or better)
			-Visual : Visual image shall be linked with corresponding thermal image
			Laser pointer : Laser pointer including laser distance meter value
			Interface : USB for connection between the camera and notebook computer
			Wireless connection : Bluetooth
			Battery : Rechargeable battery, at least 3 hours operation for each battery
			Operating temperature : up to 50 ° C, or better



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Item	PEA Material No.	Quantity	Description
			<p>Protection : IP 54, or better</p> <p>Total weight (include battery) : not more than 1.7 kg</p> <p>Warranty : 1 year</p> <p>Complete with :</p> <ol style="list-style-type: none"><li>1. Thirty (30) seconds voice annotation with each image file, or better</li><li>2. Video output port</li><li>3. Communication cable</li><li>4. Standard lens (IFOV not more than 0.66 mrad)</li><li>5. One (1) set battery charger and three (3) sets battery</li><li>6. AC Power adapter, single phase, 230 VAC, 50 Hz</li><li>7. Data analysis and reporting software comprising useful function for Windows operating system with:<ul style="list-style-type: none"><li>- thumbnail image viewer</li><li>-support drag and drop transfer of selected images from memory card to computer</li><li>-independent emissivities correction variable from 0.1 to 1.0 or select from listings in pre-defined materials list (at 0.01 step)</li><li>- spot tools, area tools, line tools with maximum, minimum and average temperature, Delta T calculation function</li><li>- voice note replay</li><li>- wizard driven report generation, the report can be modified by user</li></ul></li><li>8. Color inkjet multifunction printer (print, scan and copy), resolution 4,800x1,200 dpi for full color report, A4 document size or better</li><li>9. Transport case</li><li>10. Instruction manual in English and Thai</li><li>11. Other accessories according to manufacturer's design and auxiliary equipment necessary to complete.</li></ol>



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Item	PEA Material No.	Quantity	Description
			<p>12. Contractor shall provide Level I infrared thermographer certified course for (1) one PEA's personnel per each unit. The course's instructor shall hold a valid Level III certificate per ANSI (American National Standards Institute) standard.</p> <p>1.2 Notebook computer with</p> <ul style="list-style-type: none"><li>Processor CPU : Intel Core i7, Gen 11<sup>th</sup>, 2.80 GHz or better</li><li>Core CPU : not less than 4 cores, 8 threads</li><li>Cache CPU : not less than 12 MB</li><li>Memory RAM : not less than 16 GB LPDDR4x or better</li><li>Storage : not less than 256 GB SSD (removable)</li><li>Display : not less than 12.3" color display, 100% sRGB color or better</li><li>Operation System : Window 10 Pro 64-bit or later edition with Digital license or Full package Product (FPP)</li><li>Wireless : Wi-fi 5 and Bluetooth 5.0</li><li>Network port : Ethernet port (Adapter accepted)</li><li>Connection port : USB-A 3.0 and USB-C 3.1 or better</li><li>Display port : VGA or HDMI (Adapter accepted)</li><li>Battery Life : up to 10 hours (for typical device usage)</li><li>Camera : HD</li><li>Accessories : Bluetooth Mouse, Bluetooth Keyboard with trackpad</li><li>Weight : not more than 1.300 kg (exclude accessories)</li><li>Power supply : Single phase, 230 VAC, 50 Hz and battery operated</li><li>Warranty : 1-year limited hardware warranty</li></ul>



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Item	PEA Material No.	Quantity	Description
			<p>The notebook computer shall be completed with :</p> <ul style="list-style-type: none"><li>● Microsoft Office Home &amp; Business 2019 with product license or later edition</li><li>● Antivirus software (later edition) with product license</li><li>● Power supply adapter and Power cord</li><li>● Notebook Bag</li></ul> <p>Note :</p> <ol style="list-style-type: none"><li>1. The bidder has to quote the unit costs.</li><li>2. The bidders shall be sole distributor or authorized representative and have permanent office in Thailand; otherwise, shall not be accepted.</li><li>3. The device is able to search details or catalogs on the manufacturer's website. If any information does not match the manufacturer's website, PEA will not be considered.</li><li>4. The bidder has to quote training course, spare parts and optional accessories with a list of quantities and their itemized prices, if any; PEA reserves the right to purchase the training course, spare parts and optional accessories by some or all of items, to adjust their quantities, or to cancel them.</li><li>5. Evaluation and comparison of bid price shall not include the training course, spare parts and optional accessories.</li><li>6. The bidder has to submit sufficient references describing the previous experience of the suppliers (e.g. list of supply of equipment and/or materials having the same of similar design as proposed, field experience, the registration of TISI, the copies of license, etc.) to the satisfaction of PEA.</li></ol>



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Item	PEA Material No.	Quantity	Description
			<p>7. Training course shall be provided by the contractor for two (2) PEA's personnel per each unit, not less than one (1) day, for operation and maintenance of handheld infrared camera complete with software training, the contractor has to support for all expenses.</p> <p>8. The bidders have to supply one (1) complete set the กล้องถ่ายภาพความร้อน ความละเอียด 640x480 Pixels (Thermal Imaging Camera) and accessories to the site of PEA for demonstration, within five (5) days, counted from the bid closing date. The sample will be returned after consideration. Any bidder cannot supply sample, the bid shall be rejected. In case of the กล้องถ่ายภาพความร้อน ความละเอียด 640x480 Pixels (Thermal Imaging Camera) and/or accessories are not functional with PEA's requirement, the bid shall be rejected</p> <p>9. The bidders must provide spare parts service for the products offered for sale for a period of 1 year by attaching the certification documents together with the quotation.</p> <p>10. กฟภ. ขอสงวนสิทธิ์ในการแจ้งให้บริษัทยื่นเสนอราคานำอุปกรณ์มาทดสอบเพื่อทำการตรวจรับกับอุปกรณ์ในระบบไฟฟ้า ตามหัวข้อการทดสอบที่ กฟภ. มีการใช้งาน</p>