

**Terms of Reference  
(TOR)  
Network Simulation Tools/Software and Map**



འབྲུག་བཅད་དོན་བརྒྱུད་འབྲེལ་དང་བཅད་བརྒྱུད་དབང་འཛིན།  
**Bhutan InfoComm and Media Authority**  
**Royal Government of Bhutan**

**October 2024**



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## 1. Background

The Bhutan InfoComm and Media Authority (BICMA) is responsible for regulating and facilitating the development of Bhutan's information, communication, and media sectors. Given its mandate to ensure safe and reliable communication services in the country, BICMA has a critical need for network simulation tools and software to effectively review the nation's communication coverage.

For BICMA, network simulation tools are indispensable for effective planning, regulatory oversight, and innovation in Bhutan's telecommunications sector. These tools enable informed decision-making, ensure efficient use of resources, and support the development of a robust, reliable, and inclusive communication infrastructure that meets the needs of Bhutan's citizens and supports the country's socio-economic development. In these cases, the availability of appropriate network simulation tools/software is essential.

Network Simulation tool/software is one of the essential elements and critical tools for ICT regulators to ensure and strengthen its regulatory roles. However, the Authority does not have these simulation software/tools to carry out Network coverage and analysis works. Therefore, the Authority intends to procure the required Network simulation tool/software.

## 2. Objectives

Following are the objectives of Network simulation software/tool and Map.

- a. To enhance the planning and design of Bhutan's communication networks by simulating different network configurations, topologies, and technologies.
- b. To simulate network performance under various conditions, including high traffic, equipment failure, and natural disasters.
- c. To plan and optimize network expansions to Bhutan's rural and remote areas using simulation and mapping tools.

## 3. Scope of the Work

The scope of the work for procuring Network Simulation tools/software and map are:

- a. Supply Network Simulation tools/software and map as per the required technical specifications and the quantities mentioned under the *Technical Specifications and Requirements*.
- b. Provide all supports and maintenance i.e Physical in-person training, Installation and Setup, Technical Support and AMC (Annual Maintenance Charge) as specified by the Purchaser.



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- c. Both Software and hardware requirements should be in compliance with Compliance and Standards as specified in Technical Specification and requirement by the purchaser. It should be the sole responsibility of the winning bidder to assess and reassess all the requirements.

#### **4. Instruction on the Bid**

##### **4.1 Category of Supply**

1. The Bid should consider supplying the *Network Simulation tools/software and map as per the technical requirement.*
2. The supply of the above mentioned shall be considered as the one lot. A winning bidder needs to clearly provide the technical and financial details as specified in the bid.
3. The work should not change the existing proposed modality for the procurement of Network Simulation tools/software and map, unless agreed between the parties.

##### **4.2 Language of the Bid**

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser, shall be written in English.

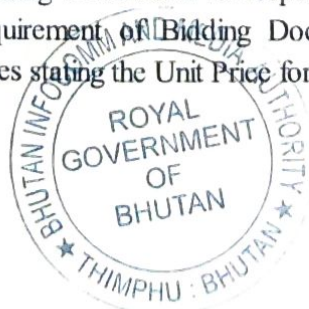
##### **4.3 Document Comprising the Bid**

The Bid prepared and submitted by the Bidder shall comprise the following components:

- a. Bid Form, Technical Data Sheets and Financial Quote and any other documents mentioned as required in the eGP for Network Simulation tools/software and map as per specified in the Terms of Reference.
- b. Power of Attorney indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity.

##### **4.4 Bid Price**

- a. Bidders shall quote for the entire Scope of Supply including Hardware, Software, Map and Support maintenance and physical in-person training in Bhutan with a break up of prices of individual particulars/quantities specified in the technical requirements.
- b. The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Supply, transportation to site, all in accordance with the requirements of Bidding Documents. The Bidder shall complete the appropriate Price Schedules stating the Unit Price for each item and total Price.



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- c. **The quoted price should be inclusive of transport, insurance and all associated costs, taxes and fees, markup etc.**
- d. Prices quoted by the Bidder shall not be subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

**4.5 Bid Submission**

The minimum days for Bids submission will be as specified in the eGP.

**4.6 Pre-Bid Meeting**

Pre-bid meetings shall be conducted if required from bidders as per the procurement norms.

**4.7 Bid Currencies**

The price quoted shall be in Ngultrum.

**5. Minimum Mandatory Eligibility Requirements**

The bidders shall fulfill the following mandatory requirements to be eligible for further technical evaluation. The bidders not fulfilling these mandatory requirements will not be evaluated.

SI No	Mandatory Requirement	
1	Valid Trade license	<b>Required</b>
2	Valid Tax Clearance Certificate	<b>Required</b>
3	Manufacturer Authorization	<p><b>Required</b></p> <p>(The manufacturer authorisation is required in order to ensure the genuinity and originality of the products (Hardware or Software and Map). The Bidders have to obtain the signed and sealed manufacturer authorisation).</p> <p><b>(It is not the dealership certificate but the evidence to provide the originality of products from the manufacturer).</b></p>



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4	Technical Resources and Materials	<p>(i) Submit the CV of the Technical Resource person from the manufacturer who will impart the physical in-person training to the officials of BICMA in Bhutan and should be supported with evident certificates.</p> <p>(ii) The Bidder shall also provide the detailed documents required by the procuring agency including the brochures/specific datasheet of the products which they are bidding for.</p>
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## 6. Technical Specifications and Requirements

	Particulars	Sub-Items	Technical Specifications and Standards <i>Network Simulation Software should have all functionalities as specified)</i>	Quantity
Network Simulation Software/Tools and Map	Software Functionalities	Network Design and Planning	<ul style="list-style-type: none"> <li>Should allow the network topologies and provide tools for planning coverage, capacity, and performance of GSM, UMTS, LTE and 5G network services.</li> <li>Advance indoor/outdoor multi terrain</li> </ul>	A Packaged Licensed software with all functionalities
		Traffic Modeling	<ul style="list-style-type: none"> <li>Should be able to simulate different types of network traffic and model traffic patterns to test network performance of GSM, UMTS, LTE and 5G network services.</li> <li>Capable of handling real time simulations.</li> </ul>	



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		Optimization	<ul style="list-style-type: none"> <li>• Should be able to optimize network parameters like frequency planning, handover strategies, and resource allocation and, offer automated optimization routines and analysis.</li> <li>• Should have tools for minimizing and managing interference.</li> </ul>	
		Visualization:	<ul style="list-style-type: none"> <li>• Should have an Interactive GUI for designing, visualizing, and analyzing network topologies, coverage, signal strength and other metrics.</li> <li>• Tools for generating geographic maps, performance charts, and graphs.</li> <li>• Advanced at least 2D visualization capabilities</li> </ul>	
		Propagation Models	<ul style="list-style-type: none"> <li>• Should be able to implement different radio propagation models to simulate how signals travel through the environment and include models for urban, rural, and indoor scenarios.</li> <li>• Automatic propagation model selection</li> <li>• Detailed modeling of access networks</li> </ul>	
		Integration and Data Management	<ul style="list-style-type: none"> <li>• Integrates with Geographic Information Systems (GIS) for accurate mapping and spatial analysis and Uses GIS data to enhance the realism of simulations.</li> <li>• Support for data import/export</li> </ul>	
		Multi Radio Access Radio Technology support	Including Wifi, and other mobile network technologies	
		Performance	<ul style="list-style-type: none"> <li>• Capable of handling multiple and diverse simulations</li> </ul>	

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			<ul style="list-style-type: none"> <li>Real-time monitoring of simulation performance</li> </ul>	
		Reporting	Generates detailed reports on network performance, coverage, and capacity	
Map	Licensed Map and Integration	<ul style="list-style-type: none"> <li>Should be able to provide the licensed map that is compatible to be integrated with the software.</li> <li>Support for various geographic data and should be able to be integrated with the map services.</li> <li>Import/Export Capabilities</li> </ul>	One Packaged Licensed map that integrates with simulation software	
	Rendering and Visualization	<ul style="list-style-type: none"> <li>Capability for custom and layer management</li> <li>High resolution and at least 2D visualization.</li> </ul>		
	Analysis Performance	<ul style="list-style-type: none"> <li>High accuracy of geographic data and alignment with real-world coordinates</li> <li>Regular updates and maintenance</li> </ul>		
Hardware Requirement for server setup	Storage	At Least 1 TB SSD or higher	Supply either one PC or Laptop	
	RAM	At least 32 GB or higher		
	Processor	13th Gen Core i7 @ 3.5GHz or higher		

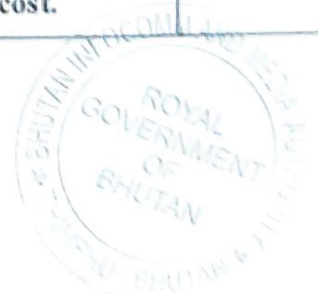


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		Graphics	Higher visualization for map rendering.	
		Display	Resolution: UHD higher resolution Refresh Rate: 120Hz or higher	
		Supported operating system	Licensed Windows 11 (64-bit) Pro or Enterprise Editions or higher	
Compliance and Standards		<ul style="list-style-type: none"> <li>● Compliance with industry standards for all the Hardwares, Softwares and Maps</li> <li>● Adherence to regulatory requirements as applicable</li> <li>● Comprehensive user manuals,documentation, and training resources</li> <li>● Should provide a Manufacturer Authorization</li> <li>● Warranty of the products</li> </ul>		NA
Support and Maintenance	Physical in-person training	Conduct Physical (In person) Training for the BICMA officials to observe and learn the operation. The physical in-person training to be conducted in Thimphu for a minimum period of three (3) working days.		Minimum three (3) working days
	Installation and setup	Provide and give complete initial installation and setup of software		NA
	Technical Support	Availability of support via email, phone, and chat Access to a knowledge base and user forums		NA
	AMC (Annual maintenance charge)	Annual maintenance should be supported until 5 years. Renewal only after 5 years. <b>This means, the suppliers have to support the BICMA in any maintenance, repair, software updates, troubleshooting and license renewal of the systems or softwares for five years free of cost.</b>		NA

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## 7. Financial Quote Table

A bidder can quote either for Network Simulation tool/software and map in the following table format:

Particulars	Sub-Items	Specific products model/mode, And Name of the manufacturers/ country origin	Unit Price	Quantity	Total Price (Nu)
Network Simulation Software/Tools and Map	Software (A Packaged Licensed software with all functionalities )			NA	
	Map (One Packaged Licensed map that integrates with simulation software )			NA	
	Hardware (Price for either laptop of PC as per requirement specified)			NA	
	Support and Maintenance (Physical In-person Training, Installation and Setup, Technical Support and AMC (5 years))			NA	
<b>Total Quoted Price</b>					

## 8. Technical Support and Warranty

- a. Quality assurance is expected from the supplier, such that any error or fault in hardware products and its subsystem, map, software requirement installation tools mentioned in technical specifications shall be acted upon, resolved, mitigated and/or replaced accordingly at no cost to the Purchaser.



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- b. The winning bidder/supplier shall provide free support and provide after-sales services for a period of five (5) years from the time of acceptance of the hardware and software and map.
- c. The winning bidder/supplier shall ensure that all products and installations are accurate, complete, operable, uncompromised, and error-free.
- d. The local suppliers shall enter into contract with the manufacturer to provide any warranty support for (5) years.

## 9. Deliverables

- a. The winning bidder(s)/supplier(s) should deliver the fully functional goods/products and set-up and installation accordingly as per the requirement.
- b. The supplier shall provide the necessary installation, setup and configuration services of all deliverables, to include but not limited to hardware, software, map, Documentation Support and Maintenance.
- c. The winning bidder(s)/suppliers should provide physical in-person training to the BICMA officials in Thimphu for a minimum period of three working days.
- d. The winning bidder(s)/suppliers should provide documentation and manuals on how to use the softwares.

## 10. Expected Outcomes

- a. Supplied goods/products should be of high quality as in the technical specifications and provide after sales services and warranty as specified.
- b. Quality of work like installation, operational and hands-on- physical in-person training should be as deemed necessary.

## 11. Work Plan

The tender shall include a work-plan, which shall not exceed four (4) months for the delivery of equipment from the date of award and seven (7) days for completion of installation and operational training.





## 12. Supplier's Roles and Responsibilities

- a. The bidder/firm shall carry out the tasks and specific activities outlined in this TOR and in eGP to deliver the specific expected output professionally and responsibly.
- b. Prepare relevant documentation/manual of the delivered whole products (Hardware, software and map) and provide to the purchaser.
- c. Control on his/her assigned staff for this assignment.

## 13. The Purchaser's Responsibilities

- a. The Purchaser shall pay only to the winning bidder for all service fee outlined in the contract upon submission and acceptance of the bidder's performed work by the Purchaser.
- b. Enable the bidder to execute his tasks as per the agreed work-plan.

## 14. Duration of Assignment

The duration of the assignment from the date of Award is tentatively four and half months and it may be subdivided into the following:

- a. 4 months: Delivery of Network Simulation Software/Tool and Map
- b. 7 days: Installation, Setup and Physical Hands on Training

## 16. Mode of Payment

- a. 100% of total amount on full delivery of Network Simulation Tool/Software and Map and on completion of the work (installation, Setup and operational physical Training).

## 17. Bid Security

The bidder shall provide/submit the bid security as mentioned in the eGP. Any defaulting bidders shall be served with a notice to deposit the stated amount in Bid Securing Declaration within 5 days which the bidder shall be debarred (across all Government Agencies) for a period of one year. The Authority will immediately go to the next bidder, once the notice is served to the defaulting bidder. Without the bid security, the bid will be considered unresponsive.



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## 18. Tax Deducted at Source (TDS)

The TDS shall be deducted as per the Procurement Rules and Regulations of Bhutan during the payment.

## 19. Performance Security

The performance security shall be paid by the bidder to the Purchaser via eGP prior to formal signing of the contract agreement. The performance security shall be returned to the bidder after one year of the payment of bid amount by the Purchaser.

## 20. Opening and Evaluation of Bids

The Tender Opening Committee will open the bids and the Tender Evaluation Committee shall evaluate the bids.

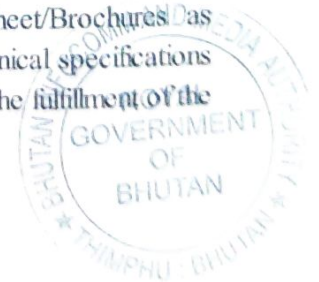
- a. **Mandatory Eligibility Requirement:** Non compliance to the minimum mandatory eligibility requirements will be treated as non responsive and the bid shall not be considered for further evaluation.
- b. **Clarification on Bid:** To assist in the examination, evaluation and comparison of bids, the Purchaser may at its discretion, ask the Bidder for clarification of its bid. The request for clarification and the response shall be in writing in eGP and no change in price or substance of the bid shall be sought, offered or permitted. The bidders who fulfilled technical requirements will be financially evaluated.
- c. **Preliminary Examination:** The Purchaser will examine the bids to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, and whether the bids are generally in order. Prior to the detailed evaluation, the Purchaser will determine the substantial responsiveness of each bid. For purposes of these clauses, a substantially responsive bid is one which conforms to all the terms and conditions of the bid without material deviations. A bid determined as not substantially responsive will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

### d. Evaluation Criteria:

#### (i) Technical Evaluation

The bid fulfilling the **mandatory requirements** will be considered for technical evaluation. The bidder should submit the technical proposal (Submit Technical Datasheet/Brochures as mentioned). The technical evaluation will be done as per the required technical specifications and compliance to the Terms of Reference (ToR). The evaluation will check the fulfillment of the

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technical proposal of the Bidders as per the technical specification requirements. Not fulfilling the technical specifications requirement will be considered technically non-responsive. **The bid will be considered for the next evaluation which is financial evaluation only if the technical specifications are fulfilled.**

The Purchaser may also seek clarification from the Bidders regarding technical details in writing or through presentations by the Bidder if the Purchaser feels the need to determine its technical fulfillment.

#### **(ii) Financial Evaluation**

The bids fulfilling the technical evaluation will only be financially evaluated. The award shall be made to the respective responsive bidder having the lowest financial proposal and meeting the technical specification prescribed in Terms of Reference.

**Note:** The Purchaser is not bound to select any of the firms submitting the bid. Furthermore, since a contract will be awarded in respect of the bid which is considered most responsive to the needs of the project concerned, due consideration being given to the Purchaser's general principles, including economy and efficiency. The Purchaser does not bind itself in any way to select the firm offering the lowest price.

### **21. Award Letter and Contract Signing**

- a. If required, negotiations shall be conducted with the firms based on ranking of the procurement.
- b. Standstill period shall observe from the date of issuance of the letter of intent to award to allow the bidders to lodge complaints if aggrieved by the decision of the tender committee.



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**22. Tentative Time frame for the Completion**

Activities	Oct 2024	Nov 2024	Dec 2024	Jan 2025	Feb 2025	March 2025	Apr 2025	May 2025	June 2025
Float tender									
Opening, Evaluation and Awarding of work									
Delivery of Network Simulation Tool/Software and Map									
Inspection installation, Setup and training.									
Payment									

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