



Government of Pakistan
PAKISTAN TELECOMMUNICATION AUTHORITY
www.pta.gov.pk

INVITATION TO BID

SUPPLY OF AUTOMATED QUALITY OF SERVICE MONITORING AND BENCHMARKING TOOLS

Pakistan Telecommunication Authority, a Government organization invites sealed bids from authorized dealers/ distributors/ manufacturers, registered with Income Tax and Sales Tax Departments and who are on Active Taxpayers List of the Federal Board of Revenue for Supply of "3 x Automated Quality of Service Monitoring and Benchmarking Tools" alongwith centralized Dashboard Tool in PTA HQs, F-5/1, Islamabad-Pakistan.

Bidding document, containing detailed terms and conditions, method of procurement, procedure for submission of bids, bid security, bid validity, opening of bid, evaluation criteria, clarification / rejection of bids, performance guarantee, etc., are available at the office of undersigned. Price of the bidding document is Rs. 1,000/- (cash payment non-refundable). Bidding Documents can also be downloaded from www.pta.gov.pk free of cost.

The bids, prepared in accordance with the instructions in the bidding documents, must reach at PTA HQs, F-5/1, Islamabad-Pakistan on or before **Tuesday 7th June 2022 at 11:00 AM Pakistan Standard Time (PST)**. Bids will be opened on 11:30 AM (PST). This advertisement is also available on PPRA website at www.ppra.org.pk.

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Pakistan Telecommunication Authority

BIDDING DOCUMENT

**SUPPLY OF AUTOMATED QUALITY OF SERVICE MONITORING AND
BENCHMARKING TOOL**

Pakistan Telecommunication Authority, Headquarters Building, F-5/1, Islamabad, Pakistan
URL: www.pta.gov.pk

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1. Introduction

- 1.1. Pakistan Telecommunication Authority (PTA) (*herein after called the “the Client” which expression shall mean and include, unless the context otherwise requires, its successors in the office and assigns*), is a statutory body established under Section 3 of the Pakistan Telecommunication (Re-organization) Act, 1996 (*herein after referred to as “the Act”*).
- 1.2. The Client intends to procure Goods i.e. **Automated QoS Monitoring and Benchmarking Tool/system**, in maximum three units having Data Collection and Data Analysis (*Post Processing*) modules and Related Services incidental thereto, as per details in **SECTION 3&4** of the Bidding Documents, to:
 - 1.2.1. Benchmark both Voice, SMS and Data QoS KPIs for at least FIVE (5) operators simultaneously and shall have the capability to expand to include more operators, if required.
 - 1.1.1. Measure all the QoS KPIs as mentioned in **PARA 4.3** of the bidding document. Both Data Collection and Data Analysis units should support all the technologies including but not limited to Global System for Mobile (GSM)/ Code Division Multiple Access (CDMA)/ Wideband Code Division Multiple Access (WCDMA)/ High Speed Download Packet Access (HSDPA)/ High Speed Upload Packet Access (HSUPA)/ High Speed Packet Access+ (HSPA+)/ Long Term Evolution (LTE)/ Voice over Long Term Evolution (VoLTE)/ Long Term Evolution Advance (LTE-Advance) etc. (*i.e. 2nd, 3rd & 4th Generation wireless technologies*) in all bands/spectrum, carrier aggregation in contiguous/noncontiguous bands/technologies and should also be capable to test 5G technologies.
- 1.3. The Client also requires to remotely manage not only its **Automated QoS Monitoring and Benchmarking Tools** to be procured through this bidding document but also existing tools (i.e. SMARTBENCHMARKER) of the Client through **Dashboard Tools** as per detailed in **SECTION 5** of the Bidding Documents, to:
 - 1.3.1. Carryout Data Collection both with and without the presence of any technical assistance in the vehicle.
 - 1.3.2. Carryout all technical functions remotely at real time from the Centralized Monitoring System (CMS) at Client’s premises.
 - 1.3.3. Connect remotely to all **QoS Tools** from the CMS and provide all necessary information to manage and monitor measurement operations in the field in real time.
- 1.4. Bids are invited on the basis of the terms and conditions illustrated in Bidding document, for which the bidders shall submit the detailed technical proposal for provision of Automated QoS Monitoring and Benchmarking Tool. The bidders shall have proven expertise in measuring and benchmarking service quality of mobile services and proven success in providing Automated QoS Monitoring and Benchmarking Solution.
- 1.5. The bidder shall also provide evidence of selling its Automated QoS Monitoring and Benchmarking Tool to at least **THREE (03)** telecom regulators and at least **SIX(06)** Telecom Vendors/Operators across the world as per format mentioned at **Annex 1.D**

2. Instructions to the Bidders

2.1. General Instructions

- 2.1.1. The bidders (both local and international having presence in Pakistan through joint venture/ consortium/ authorized agent/ dealer) having valid NTN/GST Registration being on Active Tax Payer List of Federal Board of Revenue (“FBR”) for both Income Tax and Sales Tax are invited.
- 2.1.2. The bidder should submit Technical Proposal and Financial Proposal, in separately marked sealed envelopes as per rule 36 (b) of Public Procurement Rules 2004 available on www.ppra.org.pk and as per details outlined in **SECTION 3, 4, 5 & 6** of these Bidding documents.
- 2.1.3. The bidder may request a clarification of any of clause/ provision of these Bidding documents not later than **06 DAYS** before the proposal submission due date. Any request for clarification must be sent in writing by paper mail, facsimile, or electronic mail to the Client’s address given below:

*Director (Enforcement Wireless – II)
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PTA HQs, F-5/1, Islamabad Pakistan
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- 2.1.4. The Client will, within 2-3 working days after receiving the request for clarification, respond by facsimile or electronic mail to such requests and will publish on Client’s website the response (*including an explanation of the query but without identifying the source of the query*) for information of all the intending bidders.
- 2.1.5. At any time before the submission of proposals, the Client may, for any reason, whether at its own initiative or in response to a clarification requested by the prospective bidder, amend the Bidding documents. Any amendment shall be issued in writing through addenda. The Client shall advertise the addenda in the same manner as original advertisement. The addenda shall be considered an integral part of the Bidding documents and will be binding. The Client may at its sole discretion extend the deadline for the submission of proposals.
- 2.1.6. The costs of preparing the proposal and of negotiating the contract, including visit(s) to the Client, are not reimbursable.
- 2.1.7. The Client is not bound to accept any of the proposals submitted, however, upon request, ground of rejection of bid, shall be communicated to the bidder(s).
- 2.1.8. The bidder is requested to submit proposals in English language.
- 2.1.9. While preparing the bid, the bidder shall consider Recommendations of the International Telecommunication Union (ITU) related to service quality and standards adopted by the European Telecommunication Standardization Institute (ETSI) (e.g. ETSI 102 250 and TR103 559 etc.). The bidder will also mention the standards being followed in the offered solution.

- 2.1.10. The bidder will nominate a focal person as a liaison officer to act as the primary Point of Contact (PoC) for correspondence with the Client.

2.2. Submission of the Bids

- 2.2.1. The submission and evaluation of bids will be carried out as per rule 36 (b) **“Single Stage - Two Envelope Procedure”** of Public Procurement Rules 2004 (“PP Rules”).
- 2.2.2. The original proposal (comprising of Technical Proposal and Financial Proposal) shall be prepared without any inter-lineation or overwriting.
- 2.2.3. An authorized representative of the prospective bidder shall initial all pages of the proposal and sign in full on the last page of proposal, clearly mentioning the full name of the representative. The representative’s authorization is to be confirmed by a written power of attorney accompanying the proposal.
- 2.2.4. The bidder shall prepare TWO (02) copies in hard as well soft format of the proposal. Each Technical Proposal and Financial Proposal shall be marked **“ORIGINAL”** or **“COPY”**. If there are any discrepancies between the original and the copies of the proposal, the original proposal will be taken as the correct one.
- 2.2.5. The original and copy of the Technical Proposal shall be placed in a sealed envelope clearly marked **“Technical Proposal”**. The original and copy of the Financial Proposal shall be placed in sealed envelope clearly marked **“Financial Proposal”** with the words: **“DO NOT OPEN WITH THE TECHNICAL PROPOSAL”** written on the envelope. Both envelopes shall be placed in an outer sealed envelope. The outer envelope shall bear:
- (1). Submission address mentioned at **Para 2.1.3**
 - (2). Clearly marked, **“Bid for Supply of 3x Automated Quality of Service Monitoring and Benchmarking Tool”**.
- 2.2.6. The completed Technical and Financial Proposals must be delivered at the submission address mentioned at **Para 2.1.3** by the date of **7th June, 2022** not later than Pakistan Standard Time **1100 hrs.** (PST). Any proposal received after the closing deadline shall be returned unopened.
- 2.2.7. Subject to meeting the minimum requirement as set out at **Sub-Para (1) of Para 7.2.1** of the bidding document, evaluation of the technical proposal will start in accordance with **Sub-Para (2) of Para 7.2.1** and at this stage the financial proposal shall remain unopened.
- 2.2.8. The Technical Evaluation Committee constituted by the Client will seek demo as well as presentation from bidder(s), initially qualified in accordance with **Sub-Para (2) of Para 7.2.1 of these bidding documents**, through interactive session(s) via physical presence / conference calls etc. as per mutual convenience.
- 2.2.9. No bidder shall be allowed to withdraw its bid prior as well as after the deadline for submission of bids and during the period of bid validity or any extension thereto provided by the bidder.

2.3. Bid Security

- 2.3.1. Bid security will be **PKR 02 Million** in the shape of pay order / demand draft in favor of PTA.
- 2.3.2. If the payment of bid security to the Client is being remitted from abroad, it should be remitted through SWIFT Telegraphic Transfer in the Client’s

bank account before opening of technical proposal date and time as mentioned at Para 2.2.6. The detail of the bank account is given below:

Title of Bank Account "PAKISTAN TELECOMM. AUTHORITY FUND A/C", Bank Account No. 3000942222 (Old No. NIDA 11-1), IBAN No. PK48NBPA1628003000942222 being maintained at National Bank of Pakistan, Jinnah Avenue Branch Code 1628, Blue Area, Islamabad, Pakistan (Swift code NBPAPKKA02I Routing No. 026004721 of National Bank of Pakistan, New York favoring NBP Head Office Karachi A/c No. 005640-4607) under intimation to PTA before opening of technical proposal. Provided that the bidder shall bear all the remittance charges to ensure credit of amount equivalent to PKR 2 Million.

- 2.3.3. If the payment of Bid Security is being made from sources in Pakistan, it should be made only through a Pay Order or Demand Draft or by way of credit in the Client's bank account the detail of which is given in **Para 2.3.2** above, under intimation to the Client before opening of technical proposal date and time as mentioned at Para 2.2.6.
- 2.3.4. Bid Security shall be attached with the Technical Proposal otherwise proposal will not be evaluated/accepted.
- 2.3.5. Technical bids without the required bid security will be rejected without any right of appeal.
- 2.3.6. Bid security of successful bidder will be returned on submission of Performance Bank Guarantee, whereas, bid security of technically disqualified /unsuccessful bidders will be returned along with their financial bids after opening of financial bids of technically qualified bidders. Whereas, bid security of unsuccessful bidders (financially) will be returned after award of contract to successful bidder.
- 2.3.7. The bidders shall ensure that Bid Security has been transferred to above account by the final date of submission of proposals.
- 2.3.8. In case of withdrawal of the bid by a bidder prior to deadline for the submission of bids, the Bid Security shall be forfeited and blacklisting procedure may be initiated in accordance with the PP Rules.
- 2.3.9. In case of withdrawal of the bid by a bidder after the deadline for the submission of bids and during the period of bid validity or any extension thereto provided by the bidder, the Bid Security shall be forfeited and blacklisting procedure may be initiated in accordance with the PP Rules.

2.4. Performance Bank Guarantee (PBG)

- 2.4.1. A Performance Bank Guarantee (PBG) from a bank having credit rating of at least AA+ in the prescribed format for an amount equal to **10 PERCENT** of the contract price in **PAK RUPEE** on the date of calling of the guarantee before signing the contract/agreement for carrying out the assignment. For the purpose of Bank Guarantee, the contract price will mean the total bid amount as provided in Financial Proposal. On satisfactory completion of assignment, this PBG shall be released.

2.5. Advance Bank Guarantee (ABG)

- 2.5.1. Advance Bank Guarantee (ABG) from a bank, acceptable to the client, having credit rating of at least AA+ in the prescribed format for any amount up to **80 PERCENT** of the contract price in **PAK RUPEE** on the date of calling of the guarantee can be provided if Bidder elects to get advance amount from client for carrying out this assignment. For the purpose of Bank Guarantee, contract price shall mean total bid amount as provided in Financial Proposal. On satisfactory completion of assignment, this ABG shall be released.

2.6. Technical Proposal

- 2.6.1. The Bidder shall present detailed description of the proposed system, supported by photographs, drawings, brochures, technical characteristics, screenshots for each screen or window of the software applications offered, field Advance, schedule compliance, product description, feature list, environmental conditions, site requirements and sample reports, in such a way to enable the Client to make a clear judgment and evaluation of the Quoted Solution.
- 2.6.2. The bidder must provide in the proposal a detailed account of the proposed system including specification of all elements. The bidder shall provide the technical details of all sub systems and how the system will be integrated among the different sub systems and the existing system. The proposal should also cover in details all aspects of, Supply, implementation & configurations, etc. and will also include all relevant design drawings, specifications, options etc.
- 2.6.3. Technical Proposal shall not include any financial information.
- 2.6.4. Technical Proposal shall be in accordance with Formats attached at **Annexure I**, as per following details:
- (1). A Covering Letter as per **Annexure I.A**
 - (2). Details of Local Partners / Authorized Dealer/ Supplier as per **Annexure I.B** (i.e. if any).
 - (3). A brief description of the bidder's organization and an outline of recent experience of delivering Automated QoS Monitoring and Benchmarking Tool to Telecom Regulators/Vendors/Operators (duly supported by the successful completion certificates) as per **Annexure I.C**
 - (4). Duly filled Initial Qualification Checklist along-with supporting documents as per **Annexure I.D**
 - (5). Description, Specification and Working of Quoted Solution including but not limited to details mentioned at **Para 2.6.1 & 2.6.2** as a separate annex (i.e. **Annexure I.E***)
 - (6). List of QoS KPIs being measured by the Quoted Solution as a separate annex (i.e. **Annexure I.F***)
 - (7). Presentation of the Quoted Solution for demonstration both in hard and soft (on USB) form as a separate annex (i.e. **Annexure I.G***)
 - (8). Any other relevant details

* Any suitable format can be used by the bidder

- 2.6.5. After initial qualification, the bidder shall have to demonstrate the quoted system in Islamabad, within **SEVEN (07) DAYS** of the request by the Client. This requirement is part of the technical evaluation of the Bid.

2.7. Financial Proposal

- 2.7.1. In preparing the Financial Proposal, the bidder is expected to take into account the requirements and conditions outlined in the bidding documents. The Financial Proposal should be in accordance with the table as attached at **Annexure II**. The cost shall be inclusive of all applicable taxes, duties, fees, levies, and other charges imposed under the applicable laws in Pakistan.
- 2.7.2. The proposal must remain valid for a period of **ONE HUNDRED & EIGHTY (180) DAYS** from the date of opening of Technical Proposals. The Client will make its best effort to complete bidding process within this period.
- 2.7.3. The bidder should quote its unit rates + GST charges (if applicable) clearly for each item, in the Financial Proposal and total price of each line item as well as Grand Total. However, contract shall be awarded on consolidated amount / score of the items after evaluation.
- 2.7.4. Bid shall be in **PAK RUPEE** only and inclusive of all applicable taxes i.e. GST, duties etc. as per Government of Pakistan (GoP) rules.
- 2.7.5. Bids should be inclusive of transportation/carriage charges and fixing charges and any other cost which is essentially required to complete the job.
- 2.7.6. The Financial Proposal therefore, shall be submitted in the manner of this bid documents as **Annexure II**, comprising the following:
- (1). A covering letter as attached at Annexure II.A with supporting documents (original and three photocopies along with the soft copy).
 - (2). Quoted Solution Pricing as per Annexure II.B.
 - (3). Bid Security of **PKR 2 Million** as per instructions mentioned at **Para 2.3**

3. System Requirements

3.1. Overview of Monitoring Tool

The Client intends to acquire **Automated Quality of Service (QoS) Monitoring and Benchmarking Tool** directly from system manufacturer. The system shall bear the following specifications:

- 3.1.1. The Capacity to test and benchmark Quality of Service (*QoS*) across number of mobile operators (*i.e. Continuous Measurement of AT LEAST FIVE MOBILE NETWORKS*), with the objective to reproduce end user experience in different mobile networks, device types and wireless technologies (*i.e. 2G/3G/4G etc.*) operational in Pakistan including AJK & GB.
- 3.1.2. It should have the capability to perform field tests, measure, benchmark and report QoS Key Advance Indicators (*KPIs*) as defined in mobile services licensees issued from time to time to Cellular Mobile Operators (*CMOs*) in Pakistan defined in **Para 4.3.1**, PTA service quality regulation (*Cellular Mobile Network Quality of Service (QoS) Regulations 2021*);
- 3.1.3. The systems should be capable to record detailed measurements of the network while testing; The systems should be able to collect network Advance impact on the user experience;
- 3.1.4. Equipment should be able to determine and plot the route and map it with respect to its GPS co-ordinates. Plotting shall only show the relative movements with reference to a starting reference point. The equipment should be interface-able with off-the-shelf digitized map of the region, at any time in future with minimum hardware and software up-gradation. All instances have to be time and day stamped.
- 3.1.5. The specification shall explicitly indicate the minimum and maximum levels which can be measured by such an instrument.
- 3.1.6. The system should have an extension for indoor / walk test measurement
- 3.1.7. It should support measuring audio and videos services, including streaming & social media; including emerging OTT services testing.
- 3.1.8. It should have Post Processing Tool with holistic analytics which provides insight into Advance and generates reports as desired by the Client. Details of reports required to be generated is given in **Para 4.2.4**.
- 3.1.9. It should have capability of being upgradable to consider upcoming mobile network technologies and related Advance parameters and 5G etc.;
- 3.1.10. It should have capability to measure all wireless technologies.
- 3.1.11. It should have active and optimized Power Control for phone charging.
- 3.1.12. The installation of the QoS monitoring system should be in such a way that the set up provides optimal conditions for uninterrupted data collection in a stable environment for reliable test results.
- 3.1.13. Both Data Collection and Analysis/Post Processing Tools should support all the technologies including but not limited to GSM/ CDMA/ WCDMA/ HSDPA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advance etc. (*i.e. 2nd, 3rd & 4th Generation technologies*) in all bands/spectrum and carrier aggregation of contiguous/noncontiguous bands/technologies and should be upgradeable to 5G as and when required by the client.

4. Technical and Functional Specifications

4.1. Data Collection Tool

- 4.1.1. Networks Benchmarking. The equipment should be capable of benchmarking multiple scenarios of **Voice, SMS and Data** services of least **FIVE (5)** networks simultaneously and continuously. Moreover, it should have capability to expand and include more operators, if required.
- 4.1.2. Technology Support. The equipment shall support all major cellular technologies, including but not limited to GSM/ CDMA/ WCDMA/ HSPDA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advance etc. (i.e. 2nd, 3rd & 4th Generation wireless technologies) in all bands/spectrum carrier aggregation in contiguous/noncontiguous bands/ technologies and should also be capable to test 5G technologies.
- 4.1.3. Audio /Video Testing. It should measure Voice Quality Mean Opinion Score (MOS) through latest version of Perceptual Objective Listening Quality Analysis (POLQA) for Full Band i.e. POLQA Version 3. It shall also measure Video Quality Mean Opinion Score (MOS) through latest version of ITU J.343.1
- 4.1.4. Application Based Testing. It should support Application based testing e.g., Facebook, Twitter, WhatsApp, Netflix, etc.
- 4.1.5. Device Type Support. It should provide flexibility to support multiple device types of multiple vendors including but not limited to smartphones and modems etc.
- 4.1.6. Testing Scenario. It should be able to benchmark all possible testing scenarios in auto technology and locked mode. All the technologies 2G/3G/4G and all the bands can be locked also there should be flexibility to lock/unlock any desired technologies. Moreover, the tool should be able to lock and test specific Broadcast Control Channel (BCCH)/ Primary Scrambling Code (PSC)/ Physical Cell Identity (PCI)/ Absolute Radio Frequency Channel Number(ARFCN)/ Universal Mobile Telecommunication Service (UMTS) Absolute Radio Frequency Channel Number (UARFCN)/ Evolved Universal Terrestrial Radio Access (E-UTRA) Absolute Radio Frequency Channel Number (EARFCN), etc.
- 4.1.7. Channel Capacity. It should support minimum **16 x Handsets** for **Voice, SMS and Data** services simultaneously. It should have capability to benchmark data services of all the operators simultaneously without any dependency on Laptop's modem and without any degradation. The system should also be able to support extension of more handsets up to **16 x Handsets**, without cascading and modification/alteration as and when required.
- 4.1.8. Equipment Casing. The equipment casing should be compact and capable of holding the mobile handsets securely in such a way that all mobile handsets are equally exposed to the outer environment for fair benchmarking. Most of the cabling should be fixed and reliable. The cabling that need to be done by the end user should be minimum and easy. The tool should be easy to carry around and can be used in any vehicle.

- 4.1.9. Internal Battery Backup. It should have internal battery to keep the measurement running for at least 15 minutes in case there is some issue with the inverter/power supply.
- 4.1.10. DC/AC Power. The tool should have option to operate both at 12V and 220V.
- 4.1.11. System Stability. The system should be highly stable, robust and reliable. No device should get disconnected due to normal jerks in the vehicle. In case of disconnection there should be visual/audio warning and reconnection can be done easily without any interruption in the measurement.
- 4.1.12. User Control. The testing to be done through script only. Scripting should be easy and user friendly and all the options required for making the scripts should be available. Moreover, the scripts can be saved, imported and exported.
- 4.1.13. Log Files. The system should have the capability of:
- (1). Separate log file for each device/handset.
 - (2). Log files should be saved automatically at the desired folder.
 - (3). Multiple options for saving log files e.g. user can defined the size of log file after which new log files starts automatically in sequential manner.
 - (4). Log files should be encrypted and cannot be modified afterwards.
 - (5). Log files should use Time stamp from the satellite using GPS and not from the laptop.
- 4.1.14. Device Configuration. All the devices should be configurable and device configuration can be saved and reloaded.
- 4.1.15. Custom Workspace. User should have the option to create custom workspaces that can be saved and reloaded.
- 4.1.16. Geo Mapping. The system should have ability to load Geo Maps, Google Maps, tab/shape and network files, etc.
- 4.1.17. Data Export. Any parameter can be exported in multiple formats like csv, txt, tab, KML/KMZ etc. both as image and point.
- 4.1.18. Drive Test Routes. The system should be capable:
- (1). To record drive test routes and the same can be imported/exported.
 - (2). To provide facility of navigation like Google Maps to cover the imported route in optimized manner.
- 4.1.19. Tool Display. The equipment should be capable to:
- (1). Display, record, and replay the measurements.
 - (2). Indicate the faults in the run time using audio/visual display.
 - (3). Display the progress of testing in the run time.
 - (4). Display and record all layer2/layer 3 messages, measurement reports and events, etc.
 - (5). Display all the events / the desired events during the testing on multiple windows and all the windows should be synchronized.
 - (6). Display different parameter in grid and map and the legends should be configurable.
 - (7). Display the status of the connected/disconnected devices.

- 4.1.20. Operation in Extreme Weather Conditions. The equipment should be able to work continuously for long duration without any distortion/malfunctioning under extreme weather conditions.
- 4.1.21. Power Inverter. A Universal Power Inverter with output voltage range of RMS 230V -12V DC/5V DC which can easily support the load of the desired tool.
- 4.1.22. User Interface. 2 x Laptop for each **QoS Monitoring & Benchmarking Tool** are required for User Interface as per following details:
 - (1). 1x rugged Laptop with high processor speed of minimum Core i7 (i.e. minimum 8th Generation or higher), 1TB or above SSD hard disk and 32GB or above RAM.
 - (2). 1x rigged Laptop with high processor speed of minimum Core i7 (i.e. minimum 11th Generation or higher), 1TB or above SSD hard disk and 32GB or above RAM
- 4.1.23. Standard Support. It should support the recommendations and standard of ITU and ETSI standards related to service quality in particular ETSI 102 250 and mandatory support for ETSI TR 103 559.

4.2. Data Analysis / Post Processing Tool

- 4.2.1 Post Processing of RF Data. Post Processing Tool should automatically post-process RF data from a variety of data collection tools (indoor and outdoor). It should be capable of importing and analyzing log files from multiple RF data collection tools being widely used in telecom industry.
- 4.2.2 Standalone System. It should be standalone system that can be installed on any laptop/desktop.
- 4.2.3 Post Processing Capabilities. Post Processing Tool should have the following capabilities:
 - (1). Carryout cell level and operator level analysis.
 - (2). Support analysis of multiple log files and log files can be arranged in folders/sub folders as per end user requirement.
 - (3). Correlate different parameters as per end user requirement. Different type of correlation options should be available.
 - (4). Extract user specific portion of log file for detail analysis and layer 2/Layer3 messages can easily be searched, filtered and analyzed.
 - (5). Post processing tool should be able to provide KPIs per technology, if testing is done in auto mode.
 - (6). Indicate missing neighbors/high device power/high interference etc.
 - (7). Display the connected Cells and Neighbors on the map and the approximate distance from the serving cell.
- 4.2.4 Report Generation. Post Processing Tool should be able to generate predefined and user-defined reports and templates which can be used to create reports from any log file or multiple log files from multiple data collection tools widely used in the industry for specific needs and to compare KPIs of multiple operators, technologies and timeframes. Following points need to be considered for the reports:

- (1). Built-in Reports. Generate built-in reports for different technologies that can be configured. All the formulae used in the reports and raw files need to be provided.
- (2). Customized Reports. Support making and saving of customized reports as per end user's requirement and there should be possibility of including specific logo/water mark in the reports.
- (3). Customized KPIs. Support defining customized KPIs and inclusion of customized KPIs in the report, whether it is customized report or built in report.
- (4). Geo Maps. Reports should use integrated geo Maps to visualize and analyze the data.
- (5). Exporting KPIs. Reports should display all the RF parameters/KPIs in grid and maps which can be exported in different formats like txt, csv, xlsx, xls, KML/KMZ etc.
- (6). Technology wise Segregation. Reports should be able to provide KPIs per technology, if testing is done in auto mode.
- (7). Visual Effects. Generated reports should contain graphs, bar charts, tables, maps with different KPIs/events being displayed. The reports can be extracted in different formats like pdf, word and excel etc.
- (8). Benchmarking Reports. There should be pre-defined reports for Benchmarking purpose providing comprehensive comparative analysis of multiple operators covering all technologies for voice, SMS and data services. Technology wise as well as overall Benchmarking of the operators will be required.
- (9). KPIs Formulae & International Standards. All the Formulae used in all the reports need to be provided and should be in accordance with the ITU/ETSI/3GPP etc., standards related to service quality. There should be option to modify the formulae as required after discussion with the end user.
- (10). Required KPIs. It should provide all the major KPIs related to coverage & quality that is measured for GSM/ CDMA/ WCDMA/ HSPDA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advance (i.e. 2nd, 3rd & 4th Generation wireless technologies) and all frequencies allocated to the operators. All relevant KPIs for all services, voice, data, SMS, MMS, FTP/Http (UL / DL), Video Streaming, Web Browsing, Ping, Social networking (e.g. YouTube, , WhatsApp, Twitter, Instagram, etc.) need to be covered in the reports.

4.2.5 Reported KPIs. Data Analysis/Post Processing Tool should be able to:

- (1). Report the KPIs defined in **Para 4.3**, with possibility of including/removing KPIs as desired.
- (2). Configure customized thresholds values for each KPI/parameter.
- (3). Provide summary of all the desired KPIs of each operator for number of events below/above thresholds in a single report.

- 4.2.6 Analysis of Abnormal Events. Post Processing Tool should be able to:
- (1). Perform detailed analysis of abnormal events like Drop Call, Blocked Call, Handover Failure, Inter System Handover Failure etc., with needed recommendations.
 - (2). Identify problematic areas like low coverage, low quality areas, high interference, Pilot Pollution etc.
- 4.2.7 Coverage KPIs. It should be able to provide KPIs related to network coverage and quality measured in 2G, 3G and 4G technologies.
- 4.2.8 List of Supported KPIs.
- (1). The bidder should provide the list of KPIs for all services (voice, data, SMS, MMS, FTP, UL / DL), Streaming Video, Web Browsing, Ping, Social networking (YouTube, Snap Chat, WhatsApp, Twitter, Instagram etc.), that will be reported by Post Processing Tool.
 - (2). The vendor shall also provide the relevant ITU/ETSI standards definitions and trigger points for calculation of KPIs.
 - (3). The vendor shall also provide the details of calculation of a particular KPI with variation of trigger points.

4.3. QoS KPI & RF Parameters

Following is the list of QoS KPIs/ parameters which has to be provided and tested in addition to other RF related KPIs/parameters for voice, SMS and Data services for all technologies (2G/3G/4G) by both Data Collection and Post Processing Tool:

4.3.1 **NGMS Licensed & QoS Regulation 2021 QoS KPIs**

- (1). Network Accessibility
- (2). Grade of Service
- (3). Service Accessibility / Call Setup Success Rate (CSSR)
- (4). Call Connection Time
- (5). Call Completion Ratio / Drop Call Rate (DCR)
- (6). Mean Opinion Score (Average of A2B and B2A, POLQA/PESQ)
- (7). Inter System Handover
- (8). SMS Success Rate
- (9). SMS End-to-End Delivery Time
- (10). Data Throughput (3G & 4G)
- (11). Signal Strength (RxLev, RSCP & RSRP)
- (12). RAB/E-RAB Setup Success Rate
- (13). Session Abnormal Release Rate
- (14). Latency
- (15). Webpage Loading Time

4.3.2 **Other QoS KPIs**

- (1). Inter System Handover Success Rate (CS)
- (2). Inter System Handover Success Rate (PS)
- (3). 2G Signal Strength RxLev (*No of samples in customizable Bins*)
- (4). 2G Signal Quality RxQual (*No of samples in customizable Bins*)
- (5). 3G Signal Strength RSCP (*No of samples in customizable Bins*)
- (6). 3G Signal Quality Ec/No (*No of samples in customizable Bins*)
- (7). 4G Signal Strength RSRP (*No of samples in customizable Bins*)
- (8). 4G Signal Quality RSRQ (*No of samples in customizable Bins*)
- (9). Number of Call Attempts

- (10). Number of Calls Established
- (11). Number of Calls Dropped
- (12). Number of Calls Blocked
- (13). Number of Soft Handover Failures
- (14). Number of Hard Handover Failures
- (15). Number of Intra RAT Handover Failures
- (16). Number of Inter RAT Handover Failure
- (17). Number of Intra Frequency Handover Failures
- (18). Number of Inter Frequency Handover Failures
- (19). Number of Total Handover Attempts
- (20). CSFB Call Setup Time/Call Connection Time
- (21). End-to-End SMS Delivery time
- (22). SMS e2e Delivery Success Rate
- (23). SMS Send Success Rate
- (24). SMS Receive Success Rate
- (25). SMS Send time
- (26). SMS attempts
- (27). Number of SMS attempts
- (28). Number of successful SMS
- (29). RLC Data Throughput (DL/UL)
- (30). MAC Throughput (DL/UL)
- (31). Application Throughput (DL/UL)
- (32). Modulation Scheme(DL/UL)
- (33). User Data Throughput (DL/UL)
- (34). CQI
- (35). SINR
- (36). Session Abnormal Release Rate
- (37). RAB Setup Success Rate
- (38). E-RAB Setup Success Rate
- (39). Round Trip Time (Latency)
- (40). Web Page Access Success Rate
- (41). Web Page Completion Success Rate
- (42). Packet Loss
- (43). Jitter
- (44). FTP Throughput (DL/UL)
- (45). HTTP Throughput (DL/UL)
- (46). Streaming Service Non-Accessibility
- (47). Streaming Service Access Time
- (48). Streaming Reproduction Cut-off Ratio
- (49). Streaming Reproduction Start Failure Ratio
- (50). Streaming Reproduction Start Delay
- (51). Streaming Setup Success Rate
- (52). Streaming Completion Success Rate
- (53). Streaming Audio Quality
- (54). Streaming Video Quality
- (55). VoLTE Setup Success Rate
- (56). VoLTE Call Setup Time /Call Connection Time
- (57). VoLTE Call Completion Success Rate

4.4. General Design Requirements

The general design requirements and applicable standards for all electrical, electronic, mechanical and other equipment to be provided by the Bidder for the installation and operation of Testing/Measuring facilities are given below:

4.4.1 Technical Standards

- (1). The components used in the Systems shall be designed so as to comply with any set of the international standards. It must be most stringent, latest and of highest Advance requirement
- (2). The Bidder shall state the standards the proposed equipment is compliant with.

4.4.2 Environmental Conditions

- (1). The Equipment and Software shall be designed and installed so as to perform reliably and efficiently under local climatic conditions in Pakistan:
- (2). The Advance of the Equipment and Software shall be guaranteed under the operating conditions given in table below:

Ambient temperature	-10° C to +60° C
Relative humidity	95 % at +45 °C
Atmospheric pressure	90 to 110 kPa
Altitude	> 3000 meters

- (3). The Bidder shall indicate the international specifications the equipment is compliant with.
- (4). The Equipment shall be designed and installed so as to dissipate heat generated in normal operating conditions, in other words, they must be designed to operate with natural convection, within the limits and the conditions of temperature and relative humidity defined above.

4.4.3 Mechanical Characteristics

- (1). The weight of the various fully equipped system shall be stated by the Bidder.
- (2). The components of the equipment which can be removed shall be carefully handled.
- (3). The equipment shall be capable of withstanding road bumps and sudden jerks.
- (4). Normal handling during installation and storage shall not have any adverse effects upon the equipment.
- (5). The packaging for shipping and for storage of spares shall be sufficient to protect any fragile or delicate equipment from normal handling and shipping.
- (6). Mechanical shocks during the operation & maintenance (connection of apparatus, switching on and off of the unit, opening and closing of the sub-racks doors, etc.), shall not induce perceptible operation perturbations.
- (7). The components subject to an accidental reversal of polarity shall be identified.
- (8). The mechanical design of the equipment will be such as to avoid the accumulation of dust and air particles.

- (9). The Equipment shall be protected against harmful ambient conditions such as animals, insects, dust, etc., during transport, storage, installation and normal day to day operations.
 - (10). The Bidder will provide a catalogue with complete details explaining the mechanical construction of the equipment.
- 4.4.4 Electromagnetic Environment
- (1). The mechanical design of the Testing/ measuring equipment must be fully compatible with the International Recommendations with regards to the electromagnetic compatibility (*EMC*), electrical discharge (*ESD*) & SAR. The Bidder shall indicate the international specifications the equipment is compliant with.
- 4.4.5 Physico-Chemical Environment
- (1). All the materials made of plastic, rubber, electrical insulating, etc., will be of good quality. The different plastic or rubber parts shall not be degraded by the climatic conditions in Pakistan. The use of inflammable or organic material will be minimized and the materials used for the equipment shall comply with a minimal inflammable class.
- 4.4.6 Electrostatic Environment
- (1). The Bidder shall indicate the international specifications the equipment is compliant with. The hardware must assure this electrostatic compatibility for rugged and casual usage.
- 4.4.7 Immunity to Rapid Transitory Electric Perturbations
- (1). The Bidder shall indicate the international specifications the equipment is compliant with.
- 4.4.8 Power Supply
- (1). Power chargers shall be provided to be used while drive testing in a car or any other battery is made by means of any device chosen by the Manufacturer; this device shall be described by the Bidder.
 - (2). Power converters shall be provided with a thermal release protection in case of overheating.
 - (3). Moreover, they shall be designed to provide an alarm in overheating conditions (*provisionally*).
 - (4). Particular precautions shall be taken to protect the equipment against dangerous high-frequency return paths, excess-voltages and excess-currents.
 - (5). The choice of wire and cabling, the layout of the cabling and equipment shall be such that fire shall not propagate beyond the disconnected devices, fuses and circuit breakers.

5. **Centralized Monitoring System**

The Client also intends to remotely manage the navigation of its **Automated QoS Monitoring and Benchmarking Tools** to be installed in Vehicles through **Dashboard Tools**. The primary intention is to conduct drive tests and data collection both with and without the presence of any technical assistance in the vehicle. All technical functions are expected to be carried out remotely at real time from the Centralized Monitoring System (CMS) at Client's premises. The Successful bidder shall establish a Centralized Monitoring System (CMS) at Client's Premises. The CMS shall be provided along-with all the necessary hardware & software and must be capable of full integration with new and as well as with **Client's existing Solution (i.e. SMARTBENCHMARKER)**. The CMS shall have following capabilities:

5.1. **Monitoring System Capabilities**

- 5.1.1. Real time monitoring of all Mobile Handsets in the benchmarking tools as and when required.
- 5.1.2. Integration of monitoring vehicles with automatic navigation capabilities both for online & offline monitoring mode.
- 5.1.3. Capability of configuration of drive plan route from the maps with notification.
- 5.1.4. Features to provide test instructions, real-time office-to-vehicle/vehicle-to-office communication, test routes, turn-by-turn audible navigation, work order status and progress, and failure alerts for the driver.
- 5.1.5. The system should be capable for real time viewing of all dashboard KPI's in the CMS.
- 5.1.6. Should be capable of providing the summary of KPI's and drill down with filtering options of each device or KPI group remotely.
- 5.1.7. Fast and secure communication to all measuring devices and report measurement results and status in real time.
- 5.1.8. The dashboard should show the status and positions of all connected devices and display an overview of all executed tests and their success rates
- 5.1.9. Should include customizable dashboard display of overview on all KPI's.
- 5.1.10. Should be able to abstract all KPI's for any specific polygons on a Google map. Viz. Region, municipality, zones, cities or any other customized polygon area on a map.
- 5.1.11. The results collected must be individually or collectively weighted and summarized into an overall score which can be customizable along with standard predefined scores.
- 5.1.12. Should be capable to identify issue with root cause analysis from the dashboard.
- 5.1.13. Should provide the experience from customer perspective with performance score with a perceptual weighting & aggregation of the KPI's as per ITU Recommendations.
- 5.1.14. The dashboard system should be accessible to multiple users at any time from the vehicle and NMS without any limitation.
- 5.1.15. Benchmarking capability between the service providers.
- 5.1.16. Reporting format can be export with Excel, PDF or any format availability.

- 5.1.17. User can select or configure any report format based on the chart type, or any other format.

5.2. Smart Post Processing System

The Client require a Remote Post Processing System with Real time QoS analysis & reporting for analyzing the quality of mobile networks' service from the data collected from the benchmarking tools. The system should be user interactive which provide real time dashboard, customized report, drill down analysis etc. The following are a list of non-exhaustive capabilities expected for the Smart Analytic:

- 5.2.1. Provide QoS KPIs and performance score with a perceptual weighting & aggregation of the KPI's as per ITU Recommendation.
- 5.2.2. Provide score or rating based on individual Municipality, Zones, or customized polygon created by users.
- 5.2.3. Capable of drill down with analysis on all measurement test such as Voice, Data throughput, Video etc.
- 5.2.4. Provide benchmarking report.

5.3. Interactive Maps

- 5.3.1. Show the drive test data & results on Interactive Maps.
- 5.3.2. Provide at least 1 x Screen per Operator and at least 1 x Screen for Analysis.
- 5.3.3. The Interactive Web Portal shall be able to provide following functionalities:
 - (1). Country/Region/Zone/Cluster view Filtering
 - (2). Month Wise Measurement and Filtering
 - (3). Technology used during the Test Filtering
 - (4). Voice/SMS/Data Services QoS KPIs Filtering
 - (5). Coverage QoS KPIs Filtering
- 5.3.4. Provide precise location of Voice Failed and Dropped Calls on the Interactive Map.
- 5.3.5. Provide the results in grid style on variable grid sizes are of variable size i.e. 50m, 100m, 200m, 500m, 1Km etc.

5.4. Servers

The Bidder will provide necessary servers for seamless data uploads and swift processing. The best configuration required for the system to get the best performance will be provided. The final configuration of such servers will be agreed with Client.

- 5.4.1. The storage capacity should be enough to store continuously 24 hours data of all system for at least 12 months.
- 5.4.2. The systems should include all subsidiary and supporting software for analysis post processing and other data managing activities should be included.
- 5.4.3. All necessary configurations and all necessary protocols required for the communication between the different system and probes will be provided.
- 5.4.4. Bidder to ensure that all IT requirements of Client network is applied and maintained for access to the server.
- 5.4.5. Bidder may also consider providing the services a Cloud based solution located in Pakistan.

6. General Requirement

6.1. Warranty and Technical/Hardware Support

- 6.1.1. The successful bidder shall provide free of cost maintenance of the entire system (including hardware and software of individual units and sub-systems) and technical support services during the **Warranty Period** of **THREE (03) YEARS** starting from the date of issuance of Final Acceptance Certificate (FAC) of the system by the Client.
- 6.1.2. The period for correction of defects in the warranty period is thirty (30) days from the return date of the defective equipment in the supplier's premises. Including transport, the repair time duration shall not exceed forty five (45) days.
- 6.1.3. Warranty Certificate shall be provided on the non-judicial **stamp paper** duly notarized along with the Warranty Cards duly stamped by the supplier/company.
- 6.1.4. Any part or item of the equipment becomes faulty in the Warranty Period will be replaced with the genuine/original product at the cost of the supplier/bidder and no payment shall be made by the Client in this regard.
- 6.1.5. During the Warranty Period, the successful bidder will provide system health report on a yearly basis to cover the entire hardware and software supplied by bidder. Conduct onsite annual preventive maintenance and provide action plan and health reports for all elements in the system.
- 6.1.6. Annual Maintenance Support after Warranty Period for two consecutive years.
- 6.1.7. If required, Maintenance Contract will be executed with the Contractor for the system beyond the Warranty Period. During the Maintenance Contract, the successful bidder will undertake to provide preventive and all necessary corrective maintenance for the entire system.
- 6.1.8. The successful bidder will support systems for fault diagnostics, troubleshooting and upgrades should be well timed and easily accessible with resources to work 24x7 on high severity request for initial period of three (03) years.
- 6.1.9. Local technical support shall be made available with required technical expertise.
- 6.1.10. The successful bidder shall carry sufficient inventories to assure ex-stock supply of consumable spares. Other spare/extra parts and components shall be supplied as promptly as possible, but in any case within two (2) months of placing the order.
- 6.1.11. The successful bidder shall carry out all necessary preventive maintenance of the system in a timely manner as per the agreed schedule during the warranty period.
- 6.1.12. The successful bidder shall include necessary spares for all critical parts and arrange for return-to-factory of parts for repair including processing of imports permission, customs clearance and brokering including shipping and tax expenses.

6.2. Intervention Procedures during the Warranty Period

- 6.2.1. The successful bidder will carry out all corrective maintenance as required during the Warranty Period.
- 6.2.2. Any Incident Report will be attended within 48 hours and rectified as soon as possible. However, all critical faults of the system i.e. system is down and Client cannot carry out the monitoring, must be cleared within three days of receipt of the incident.
- 6.2.3. Following a serious malfunction, the Client may call for an intervention by e-mail or letter:
 - (1). The Contractor must intervene within two days.
 - (2). This delay is defined from the time of receipt of the written request of the Client.
 - (3). Interventions are possible at any time from 0900 hours to 1700 hours from Monday to Friday (*Pakistan Standard Time*).
 - (4). Interventions at other times must be arranged by telephone between the Supplier/Vendor agent and the Project Manager of the Client.
 - (5). During the Warranty Period, the following procedures are applicable:
 - (a). Interventions concerning parts of the contracted hardware that are under guarantee shall not be billed.
 - (b). On the other hand, interventions to deal with malfunctions caused by a non-respect of the operating instructions, vandalism, accidents, lightning, fire or other unpredictable causes and which do not involve the responsibility of the Bidder are billable.
 - (c). The Contractor cannot refuse to intervene.

6.3. Insurance

- 6.3.1. The successful bidder shall be responsible for provision of equipment/system which is insured/ free of cost until the Final Acceptance Certificate (FAC) of the equipment is issued by the Client.

6.4. Related Services

- 6.4.1. Related Services to be provided are:
 - (1). Advance of on-site assembly and start-up of the supplied equipment;
 - (2). Furnishing of tools required for assembly and maintenance of the supplied equipment;
 - (3). Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Equipment;
 - (4). Supervision and repair of the supplied Equipment, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract;
 - (5). Training of the Client's personnel, on-site, in assembly, start-up, operation, maintenance of the supplied Equipment.

6.5. Equipment/System Installation

- 6.5.1. System Installation in Vehicles. The Successful bidder shall be fully responsible to cater for the power requirements of the equipment/system for installation in the vehicle(s) which may also include upgrading the existing alternator/generator, if required.
- 6.5.2. The successful bidder shall complete the installation of tools in vehicles and Dashboard Tools within the stipulated time frame agreed with Client.
- 6.5.3. The successful bidder shall be responsible for any requirements for supply, installation, integration, commissioning and maintenance of the system.

6.6. General

- 6.6.1. The successful bidder shall conduct all necessary configuration commissioning, testing and integration of the tools in the presence of Client.
- 6.6.2. The successful bidder shall provide necessary spares for immediate repair as necessary according to their discretion.
- 6.6.3. Utility requirements viz. Power for operational needs will be arranged by Client within the building premises, however the successful bidder will extend the utilities for power to the available location as per approved standards and specifications.
- 6.6.4. The successful bidder shall ensure that all equipment and materials used is suitable for the environment of Pakistan and designed for outdoor use and be adequately waterproofed and with proper cooling system for heat dissipation, up to 55°C and 95% humidity.

6.7. Trainings and Documentation

- 6.7.1. Free of Cost Training. The successful bidder shall provide the necessary user trainings free of cost prior to product delivery and ongoing training as upgrades are implemented to the staff of the Client. Training will give the participants an overview of the solution, maintenance, administration and operation aspects of the system to help them become familiar with its capabilities, and allow them to practice using the solution with generic exercises.
- 6.7.2. Training Modules. Training shall be organized in modules, and materials will be produced for each module with an overview, sample exercises and possible solution demonstrations for at least **TEN (10) PERSONS.** Training modules shall include but not limited to:
 - (1). Solution Overview
 - (2). Parameter Setting and Services Testing
 - (3). Post processing and Report Generation
 - (4). Diagnostics and Troubleshooting
 - (5). Any other Module
- 6.7.3. Documentation. The successful bidder shall supply adequate technical and operations documentation for all the parts of the complete solution. The documentation describing the actual version of the supplied system should be delivered electronically as well as hard copies and shall be in English.

6.8. Software License

- 6.8.1. Both Data Collection and Post Processing Tools should be standalone systems.
- 6.8.2. Initial validity of the Data Collection Tool, Post Processing Tools and Dashboard Tools and all other software including third party software and proprietary software should be at least **FIVE (05) YEARS** and should be extendable on mutual consent basis.
- 6.8.3. New updates regarding any software need to be provided free of cost within the validity period of the license Competency & Expertise.
- 6.8.4. The Contractor shall provide all the expertise to the Client in installation and working of the tool and all its functionalities.
- 6.8.5. Third Party registered software's (e.g. window, office & any other etc.) necessary for smooth functioning of Data Collection, Analysis & Report Generation and Dashboard Tools installed on all Laptops and Servers.

6.9. Confidentiality, Ethics and Code of Conduct

- 6.9.1. The bidder shall undertake to maintain complete confidentiality of all the information, facts, proceedings, decisions, and documents etc. provided to the Client.

7. Evaluation of the Proposals

7.1. Evaluation Process

- 7.1.1. The proposal shall be evaluated in 2 phases: (1) Technical Evaluation and (2) Financial Evaluation.
- 7.1.2. After the deadline for submission of proposals, Technical Proposals shall be opened by the Client on 1130 PST on 7th June, 2022 at the Client HQs, F-5/1, Islamabad, Pakistan.
- 7.1.3. Technical Proposal shall be evaluated in accordance with **Para 7.2.**
- 7.1.4. Financial Proposals shall remain sealed and deposited with Director (Enforcement) of PTA. Upon completion of evaluation of Technical Proposals, the Financial Proposal of qualified bidders will be opened in accordance with **Para 7.3.**
- 7.1.5. During evaluation of the bids, the Client may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing, and no change in the prices or substance of the bid shall be allowed, offered, or permitted.

7.2. Evaluation of Technical Proposals

- 7.2.1. The evaluation committee, appointed by the Client shall evaluate each Technical Proposal by assessing the documents submitted with technical proposal based on the following Evaluation Criteria.
- (1). The bidder has to comply with the minimum mandatory requirements as set out at **Annexure I.D.**
- (2). The initially qualified bidders as per **Sub-Para (1) of Para 7.2.1** will further be evaluated as per criteria defined below.

Domain	Field	Marks	Criteria
Data Collection Tool	Alarms and Notification of Failure events like Call drop, blocked call etc.	1	Yes/No
	Carrier aggregation	3	3G Carrier Aggregation =1; LTE Intra Band Carrier aggregation =1; LTE Inter Band Carrier aggregation =1;
	Carrier (ARFCN/UARFCN/EARFCN) Locking	3	One Mark each for 2G,3G &4G carrier locking
	Displaying high interference & Pilot Pollution	1	Yes/No
	Displaying missing neighbors	1	Yes/No
	Distance from Serving cells	1	Yes/No
	Equipment casing	3	Compactness =1, Exposure of all handset equally to the outer environment =1; Protection & stability of Mobile handsets/equipment =1
	Geo Mapping	1	Yes/No

Domain	Field	Marks	Criteria
	Internal Battery Backup	1	Backup < 15 min = 0, Backup ≥15& <30 min = 1
	PCI Locking	1	Yes/No
	PSC locking	1	Yes/No
	Route Navigation	1	Yes/No
	Time stamp from the satellite using GPS	1	Yes/No
	Video Testing	3	Video testing possible = 1 marks; Video KPI available as defined in SECTION 4 of bidding document = 2 marks
	VoLTE	3	VoLTE testing possible = 1 marks; VoLTE KPI available as defined in SECTION 4 of bidding document = 2
Data Collection Tool Total		25	
Experience	Experience of Key team members for installing, troubleshooting and providing after sales services	2	Exp ≥ 5 year =1; Exp≥10 =2;
	Experience of providing Similar Tools: Industry Side (>6)	2	Disqualified if <6; One mark for each additional
	Experience of providing Similar Tools: Regulator Side (>3)	2	Disqualified if <3; One mark for each additional
	Experience of the experts in Drive Testing and RF Planning & Optimization	2	Exp ≥ 5 year =1; Exp exceeding 6 years and upto 10 years =2;
	Experience of the experts in NPS Data Collection, Validation & Report Generation	2	Exp ≥ 1 year =1; Exp > exceeding 1 year and upto 2 years =2;
Experience Total		10	
Post Processing Tool	Analysis of Abnormal events (Call drop, Blocked call, Handover Failure, Inter system Handover Failure,)	4	One Mark for each
	Application Testing	2	One Mark for two application
	Benchmarking Reports	2	Availability of Benchmarking Report =1; All Licensed KPIs available in a single Benchmarking Report = 1
	Inclusion of Geo Maps in the reports	1	Yes/No
	Organization of Log files in Post Processing unit	2	Log files can be arranged in folders/sub folders =1; Complete Folder can be loaded into the Post Processing Unit along with sub folders having names as set =1
	Setting thresholds for KPIs in customized reports	1	Yes/No

Domain	Field	Marks	Criteria
	Setting thresholds for KPIs in pre-defined reports	1	Yes/No
	Summary of KPIs breaching set threshold (i.e. Percentage of samples breaching threshold or No of calls breaching threshold)	1	Yes/No
	Technology wise segregation in reports	1	Yes/No
	Video streaming	1	Yes/No
	Visual effects in Reports	2	Availability of data in Graphical format like Bar chart, line chart, pie chart etc. in the report =1; Availability of data in tabular format in the reports = 1
	Customized Reports	3	Licensed KPIs in Tabular Form= 1 Licensed KPIs in Graphical Form = 1 Detailed Statistics & Geo Coded Maps = 1
	Integration with Client's Existing Tool (SMARTBENCHMARKER)	4	Partial Integration = 2 Full Integration = 4
Post Processing Tool Total		25	
Remote Dashboard Tools	Monitoring System	5	Remote Monitoring of all Mobile Handsets =1 Online & Offline Navigation Capability = 1 Features of Provision of Remote Test Instruction = 2 Provision of Customizable Dashboard = 2
	Smart Post Processing System & Servers	5	Provision of Remote Post Processing System = 2 Provision of Rating on Municipality/Zone/ Customized Polygon =2 Provision of Adequate Storage Capacity = 1
	Network Performance Score KPIs Report as per ETSI TR 103 559	5	Availability of NPS Report =2 Provision of NPS System/Report to Regulators = 1 Mark for each Regulator
	Interactive Maps	5	Availability of Interactive Map = 2 Showing KPIs on Interactive Map = 1 Filtering of KPIs = 1 Failure Events Locations = 1
Remote Dashboard Tools Total		20	
Practical Demonstration	Data Collection & Processing Unit	5	To be assessed on the basis of Drive Test Demonstration
	KPIs & Reports	5	

Domain	Field	Marks	Criteria
	Remote Dashboard Tool	5	
Practical Demonstration Total		15	
Proposal Submission	Proposal Submission	5	Proposals properly marked & sealed =1; Proposal properly arranged with page numbers =1; All required Annexures filled as per desired format =2; soft copies provided =1
Proposal Submission Total		5	
Total		100	

- 7.2.2. A bidder shall be declared technically qualified if it meets the required minimum specifications of the system defined at **sub-Para (1) of Para 7.2.1** above and obtains at least 80% marks in Technical Evaluation as per evaluation criteria mentioned at **Sub-Para (2) of Para 7.2.1**.

7.3. Evaluation of Financial Proposals

- 7.3.1. After Technical Proposal Evaluation is completed, the Client shall notify the bidder whose proposals did not meet the minimum qualifying marks (80%) or were considered nonresponsive to the minimum specification defined at **Sub-Para (1) of Para 7.2.1** of the bidding document, indicating that their Financial Proposals will be returned unopened after seven days announcement of technical evaluation report and subsequent to opening of Financial Proposals of technically qualified bidders. The Client shall simultaneously notify the bidder(s) securing the minimum qualifying marks during Technical Evaluation, indicating the date and time set for opening the Financial Proposals. The opening date shall be informed in advance. The notification may be sent by courier letter/electronic mail/facsimile etc. The Technical Evaluation Report, depicting list of successful as well as unsuccessful bidders of technical evaluation, shall be announced on PPRA (www.ppra.org.pk) as well as Client's website (www.pta.gov.pk).
- 7.3.2. The Financial Proposals shall be opened in the presence of the authorized representatives of the successful bidders of Stage 1 who choose to attend.
- 7.3.3. The name of the bidder, the technical evaluation scores, and the financial bid shall be read aloud and recorded. The Client shall prepare minutes of the financial bid opening session.
- 7.3.4. The contract shall be awarded to the most advantageous bid i.e. lowest financial bid. In case two or more bidders quote same bid, the contract shall be awarded to the bidder securing highest marks in Technical Evaluation.

7.4. Disqualifications

- 7.4.1. Offers are liable to be rejected if; there is any deviation from the instructions as laid down in the bidding document.

- 7.4.2. Partial pricing of Quoted Solution shall not be accepted as contract will be awarded to a single successful bidder.
- 7.4.3. Splitting of bid in parts is not allowed.
- 7.4.4. Financial bid is submitted without **PKR 2 Million bid security**
- 7.4.5. Offers are received after specified date and time.
- 7.4.6. GST and NTN certificates are not attached or bidder is not in ATL for both Income Tax and Sales Tax.
- 7.4.7. Details of Local Representation are not provided
- 7.4.8. Bidder is not authorized dealer/distributor from the manufacturer of the quoted equipment
- 7.4.9. If there is any overwriting and cutting in the submitted Technical and Financial Proposals
- 7.4.10. The bidder has not complied with the minimum mandatory requirements as set out at **Annexure I.D.**
- 7.4.11. Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
 - (1) If there is a discrepancy between unit prices and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the client/ PTA there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;
 - (2) If there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and
 - (3) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.
 - (4) The amount stated in the Bid will be adjusted by the client/ PTA in accordance with the above procedure for the correction of errors and, with, the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, its Bid will then be rejected, and the Bid Security may be forfeited.

8. Award of Contract

The contract shall be awarded to the most advantageous bid selected after technical & financial evaluation. The assignment shall be commenced immediately upon Effective Date of Contract.

8.1. The Letter of Intent (LoI)

- 8.1.1. The Client shall issue a Letter of Intent (LoI) to the selected/successful bidder immediately upon acceptance of the bid. The selected bidder, within 07 days of the issuance of the LoI, will sign the contract after fulfilling all the formalities/pre-conditions mentioned in the LoI. The selected bidder shall commence the assignment on receipt of LoI and as per schedule given in the contract.

8.2. Corrupt or Fraudulent Practices

- 8.1.2. The Client requires that Bidders/Suppliers/Contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Client defines, for the purposes of this provision, the terms set forth below as follows:
“Corrupt and Fraudulent Practices” includes the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official or the supplier or contractor in the procurement process or in contract execution to the detriment of the procuring agencies; or misrepresentation of facts in order to influence a procurement process or the execution of a contract, collusive practices among bidders (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the procuring agencies of the benefits of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty;
- 8.1.3. Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- 8.1.4. Will declare a firm ineligible, either indefinitely or for a stated period of time, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for any contract within Pakistan.

Annexure I: List of Technical Proposal Forms

Annexure I.A Covering Letter

[Location, Date]

To:

Director (Enforcement-Wireless II)
Pakistan Telecommunication Authority
PTA HQs, F-5/1, Islamabad, Pakistan

Sir,

I/We, the undersigned, offer to provide the Automated QoS Benchmarking tool capable of simultaneous and continuous monitoring and benchmarking of at least five (5) mobile operators in accordance with your Bidding Document and our Proposal. I/We hereby submit our Proposal which includes separately sealed **Technical Proposal** and **Financial Proposal** along with **PKR 2 Million** Bid Security in a sealed envelope.

I/We, undertake that all requirements mentioned at **SECTION 3&4** of the Bidding Document have been fully responded in the Technical Proposal.

Our Proposal is binding upon us and cannot be modified after the submission and that we are willing to demonstrate our tool in Islamabad as required by PTA.

I/We understand you are not bound to accept our Proposal.

Yours,

Authorized Signature:

Name and Title of Signatory:

Name of Firm/Company:

Address:

Cell:

Tel:

Fax:

Email:

Annexure I. B Details of Local Partners/Authorized Dealers/Supplier

General: < In addition to the questions and forms in this section, take as much space as desired for your responses. >

Number of Local Partners/Authorized Dealers/Supplier in Pakistan: _____

Using the format below, provide information on each local partner/authorized dealer/supplier of your tool in Pakistan

Name of firm of Local Partner/Supplier/Dealer

Address

NTN Number

Name listed in ATL (YES/NO)

Date of Engagement with the Bidder's Firm/Company

Nature of engagement with the Bidder's Firm/Company

Name of Clients being Served in Pakistan by the above mentioned local Partner/Supplier/Dealer

Areas (Region) of Pakistan being served by the local partner/Authorized dealer/Supplier

Registration Documents as a Firm/Company

Details of POCs for Local Partner/Authorized Dealer/Supplier

#	Name	Designation	CNIC	Mobile Number	Landline Number	Email

Bidder's Name: _____

Signature:

Date:

Note: Supported Documents i.e. Delivery Challan and Completion Certificate etc. must be attached with Technical Proposal

Annexure I. C The Bidder Firm/Company's References

Supply of Similar Tools to Other Regulators/Vendor/Operators That Best Illustrate Expertise

General: < In addition to the questions and forms in this section, take as much space as desired for your responses. >

.

Using the format below, provide information on each assignment for which your firm/company/entity, either individually or as a corporate entity was legally contracted.

Name of Client	
Type of Client (Regulator/Vendor/Operator)	
Country	
Type of Tool Provided with Version	
Quantity of tools provided	
Date of Provision of Equipment	
Details of Service Provided, if any	

Firm's/Company Name: _____

Annexure I. D Initial Qualification Check List

Part A) General Requirement

- 1 Firm has to produce Sales Tax and Income Tax Registration. Enclose Documentary proof
- 2 Firm is on Active Tax Payers List of FBR for both Income Tax and Sales Tax. Documentary proof is to be attached.
- 3 Firm has to produce authorised dealer/ distributor certificate from the manufacturer. Enclose Documentary proof.
- 4 Affidavit that firm/company has never been black listed from any Govt. /Semi Govt./ Autonomous body. . Enclose Documentary proof.
- 5 Certificate that Bid security is enclosed with the financial bid.
- 6 Minimum 5 years of relevant experience of firm/company. Documentary proof is to be attached
- 7 Provision of Similar Tool to at least 3 or more Regulators as per below table and the documentary proof (Delivery Challan/ Completion Certificate) is to be attached.

	Regulator 1	Regulator 2	Regulator 3
Name of Regulator			
Country of Regulator			
Date of Supply of Automated QoS Tool			
Number of Data Collection Units provided			
Number of Post Processing Units provided			
Number of Handsets supported by the Outdoor Unit Provided			
Number of Operators to be Benchmarked Simultaneously			
Supported Technologies to be benchmarked			
Brief description of Supplied QoS Tool			

- 8 Provision of Similar Tool to at least 6 or more Operators/Vendors (O/P) as per below table and the documentary proof is to be attached.

	O/P 1	O/P 2	O/P 3	O/P 4	O/P 5	O/P 6
Name of Operator/Vendor						
Country of Operator/Vendor						

Date of Supply of Automated QoS Tool						
Number of Data Collection Units provided						
Number of Post Processing Units provided						
Number of Handsets supported by the Outdoor Unit Provided						
Number of Operators to be Benchmarked Simultaneously						
Supported Technologies to be benchmarked						
Brief description of Supplied QoS Tool						

Part B) Technical Requirement

S. #.	Category	Yes/No
1	One Master Computer to Control all the Slave Computers (For Time Synchronization) in benchmarking solution	
2	Support simultaneous Voice, SMS & Data Testing	
3	Support minimum of 16 x Handsets simultaneously. The solution must be extendable upto 32 x Handset without any system cascading and modification / alternation.	
4	Compliance of ETSI TS 102 250	
5	Compliance of ETSI TR 103 559	
6	Measurement of Licensed KPIs	
7	Generation of DT Maps using GPS	
8	Tool Capable of Indoor Testing	
9	Reporting of License KPIs using Post Processing Tool	
10	Simultaneous Measurement of 2G/3G/4G Technologies	
11	Support POLQA Latest Version (Both Narrowband & Wideband)	
12	Support Minimum 16 Handsets	
13	Tool can operate at 12 V DC and 220 V AC	
14	Script Making for Testing	

- 15 Availability of Separate Log File for Each Handset
- 16 Encryption of Log File
- 17 Data export in csv/tab/kmz/kml etc.
- 18 Measurement Recording, Pause & Replay
- 19 Display of Measurement Progress
- 20 Recording of Layer2/Layer 3 Messages , Events etc.
- 21 Availability of Power Invertor
- 22 Data Collection Tool and Data Analysis Tools Laptops
- 23 Availability of Cell Level & Operator Level Analysis
- 24 Support for the Analysis of Multiple Log File simultaneously
- 25 Availability KPI per Technology in Auto Mode Testing
- 26 Availability of Pre-defined Reports
- 27 Provision of Customized Report
- 28 Provision of Licensed KPI Available in Report(s)

Annexure II. List of Financial Proposal Forms

Annexure II.A Financial Proposal Submission Form

[Location, Date]

To:

Director (Enforcement-Wireless II)
Pakistan Telecommunication Authority
PTA HQs, F-5/1, Islamabad Pakistan

Sir,

I/We, the undersigned, offer to provide the *Automated QoS Monitoring and Benchmarking Tool in* accordance with your Request for Proposal and our Proposal (Technical and Financial Proposals). Our attached Financial Proposal is for the sum of [Amount in words and figures]. The amounts are inclusive of all applicable taxes in Pakistan.

Our Financial Proposal shall be binding upon us and will remain valid for **ONE HUNDRED & EIGHTY (180) DAYS** from the date of submission i.e. _____

We understand you are not bound to accept our Proposal.

Yours,

Authorized Signature:

Name and Title of Signatory:

Name of Firm:

Address:

Cell:

Tel:

Fax:

Email

Annexure II.B Pricing of Quoted Solution (Hardware/Software/O&M)

Sample detail of the equipment is given, however, the bidder can include the details as per the nature of the solution

Item	Description	Qty.	Unit Price	Total Price
Hardware for Handset	Model of Handset and brief Description	48	X	48x
GPS	Model, Manufacturer detail etc.	3	Y	3y
Equipment Casing		3	Z	3z
Software for Handset, if any		48		
Software for the Data Collection Tool		3		
Power Solution for Data Collection Unit & Charging of laptop and Handsets		3		
Laptop with Power Supply		6		
Software for Data Analysis Unit		3		
Connecting Cables for the Handsets		48 x set		
Maintenance Agreement (After Expiry of Warranty Period)				
NMS Servers		A x set		
Centralized Monitoring System		B x set		
-				
TOTAL (in figures)				
TOTAL (in words)				
Name of Bidder ----- ----- Signature of Bidder ----- -----				

ANNEXURE III: CONTRACT AGREEMENT

SUPPLY OF AUTOMATED QUALITY OF SERVICE MONITORING AND BENCHMARKING TOOL

Between

Pakistan Telecommunication Authority (PTA)

and

----- Name of bidder

Date: _____

(This Contract is signed in two sets of original, one each for both the parties)

Annexure III-A Format of Contract

(For supply and services of 3 x Automated QoS Monitoring and Benchmarking Tool)

THIS Supply and Services Contract (the “Contract”) is made at Islamabad on thisday of 2022;

By and Between

Pakistan Telecommunication Authority, a statutory body established under Pakistan Telecommunication (Re-organization) Act, 1996, having its principle office at PTA H/Q, F-5/1, Islamabad (hereinafter referred to as “**Client**” which expression shall where the context so allows include its administrators and assigns) of the **One Part**;

And

_____, a Company/Firm incorporated under the laws of _____ Pakistan vide incorporation/_____ through _____ bearing CNIC _____ having registered place of business at _____ (hereinafter referred to as “**the Supplier**” which expression shall where the context so allows include his/its successors-in-interest, executors, administrators, heirs and permitted assigns) of the **Other Part**;

(If when and where applicable the Party of the One Part and Party of Other Part shall hereinafter be collectively referred to as ‘Parties’ and individually as ‘Party’ as the context of this Agreement requires).

WHEREAS

- A. Client is desirous of procuring “3 x **Automated QoS Monitoring and Benchmarking Tools**” along-with **Remote Dashboard Tools** (Hereinafter referred to as “**System**”) and all related Services including maintenance (hereinafter referred to as the “Service”).
- B. The Supplier is a _____ (*details of incorporation*) which represents to the Client that it has the relevant expertise and holds valid and subsisting licenses/permissions, authorizations/approvals required from the Government of Pakistan, and that it has the requisite expertise and resources to provide top quality system and incidental services works as per Bidding Documents/ technical Specification/BoQ to the Client in accordance with highest industry standards and satisfaction of the Client. The Supplier undertakes that the Services shall be provided only through the staff/ labour/ workforce that has the requisite expertise and experience in this regard.
- C. Subsequent to qualified in bidding process and upon the basis of the representations and warranties of the Supplier contained herein, the Client wishes to appoint the Supplier to provide the System and Related Services at the quoted price of Rs. _____ inclusive of all taxes.

NOW THEREFORE, for the consideration provided herein the representation and warranties, covenants, conditions and promises contained herein below and intending to be legally bound, the Client and Supplier hereby agree as follows:

1. Scope of Agreement

- 1.1. Subject to terms and conditions of this Contract the **Supplier** agrees to provide **the system** as per requirements prescribed under **Bidding Documents to this agreement**;

2. Agreement Documents

- 2.1 In this Agreement, except as otherwise provided, the words, expressions and/or phrases shall have the meaning as defined in the Agreement and documents. The following documents shall be deemed to form, and be read and construed as and integral part of this Agreement:
- (1). Invitation to bid
 - (2). Bidding documents
 - (3). Bill of Quantity (BoQ) – As per Annex II-B
 - (4). General conditions of Contract
 - (5). Addenda and Corrigenda, if any, issue by the clients and duly accepted by the contractor at the signing of the Contract.
 - (6). Bid security
 - (7). Advance Bank Guarantee
 - (8). Performance Bank Guarantee
 - (9). Form of Agreement/ Contract Agreement
 - (10). Clients order to commence the work.
 - (11). Limit of Bank Guarantee.
 - (12). Any Correspondence by the Client/Contractor mutually accepted by the Client and the Supplier/Vendor.

3. Terms

- 3.1. Upon signing of this Agreement the Supplier shall be obligated to start work on specified location by Client within **07 days** and complete it within projected time **..... Calendar days**. In case of failure the Client shall be entitled to deduct any amount payable to the Supplier and assign the work to any other Supplier at its discretion.

4. Definitions

- 4.1. “Applicable Law” means the laws and any other instruments having the force of law in Pakistan from time to time.
- 4.2. “BIDDING DOCUMENTS” means the documents issued by the Client on _____, **2022** for acquiring/procurement of System and Services.
- 4.3. “Client” means “Pakistan Telecommunication Authority”,
- 4.4. “CONTRACT” means this CONTRACT including all attached documents, annexures Listed in its General Conditions (GC) and the Annexures.
- 4.5. “CONTRACT Documents” means the documents listed in the CONTRACT, including any amendment thereto.
- 4.6. “CONTRACT Price” means the total price payable to the Supplier as specified in this CONTRACT, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the CONTRACT.
- 4.7. “Day” means calendar day unless provided otherwise.

- 4.8. "Effective Date" means the date on which this CONTRACT comes into force and effect pursuant to Clause 2.1 of General Instructions. GC.
- 4.9. "GC" mean the General Conditions/Clauses of this CONTRACT.
- 4.10. "Party" means the Client or the Supplier, as the case may be, and the "Parties" means both of Client and the Supplier.
- 4.11. "Related Services" means the services incidental to the supply of the System, such as insurance, installation, training and initial maintenance and other such obligations of the Supplier under this CONTRACT.
- 4.12. "Supplier" means the person who have qualified for this Contact, including natural or fictitious person.

5. Law Governing Contract

- 5.1. This CONTRACT shall be construed and enforced according to the Laws of Pakistan.

6. Language

- 6.1. This CONTRACT has been executed in English language, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this CONTRACT.

7. Joint Venture, Consortium or Association

- 7.1. If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Client for the fulfilment of this CONTRACT and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The lead company serving as the authorized representative shall be responsible for the complete delivery of the solution. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Client.

8. Interpretation

- 8.1. The headings in this Contract are for reference purposes only and shall not affect the meaning or construction of the clauses to which they relate.
- 8.2. Any reference in this Contract to the singular shall include reference to the plural and vice versa unless the context otherwise requires.
- 8.3. References to clauses and Annexures are references to clauses and Annexures to this Contract, unless the context otherwise requires.
- 8.4. References to any statute, statutory instrument, regulation, legislation or ordinance (whether of Federal or Provincial level) shall be interpreted as a reference to the same as amended by any subsequent variation, modification or re-enactment.
- 8.5. In the event of any conflict or inconsistency between the clauses and Annexures of this Contract, the former shall prevail.

9. Entire Agreement

- 9.1. This CONTRACT constitute the entire agreement between the Client and the Supplier and supersedes all communications, negotiations and agreements (whether written or oral) of the parties with respect thereto made to the effective date of CONTRACT.

10. Fraud and Corruption

- 10.1. Supplier is under an obligation to avoid and refrain from any fraudulent or corrupt practices directly or indirectly as defined under this CONTRACT. However, if the Client determines that the Supplier or any of its personnel has engaged in corrupt, collusive, coercive, obstructive or continued delaying practices, in completing for or in executing of this CONTRACT, then the Client may, after giving **FIFTEEN (15) DAYS** notice to the Supplier, terminate this CONTRACT, and the provisions of **Clause 16.5** shall apply as if such expulsion had been made under **Sub-Clause (3) of Clause 16.5.1**.
- 10.2. For the purposes of this Sub-Clause, the terms set-forth below are defined as follows:
- 10.2.1. **“Corrupt and Fraudulent Practices”** includes the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official or the Supplier in the procurement process or in contract execution to the detriment of the procuring agencies; or misrepresentation of facts in order to influence a procurement process or the execution of a contract, collusive practices among bidder(s)/supplier(s) (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the procuring agencies of the benefits of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty;

11. Notices

- 11.1. All notices, requests or consents required hereunder shall be in writing and shall have been properly served, delivered by hand, sent by mail, facsimile or telex or any other electronic means to the addresses given below, as applicable, or such different address as a Party may designate from time to time. Any notice, request or consent by mail shall be sent through Registered Post or Courier Services as the case may be. Any notice shall be deemed to have been given:
- on the day it is delivered, if delivered by hand;
 - the day it is sent, if sent by facsimile, e-mail or telex;
 - 5 days after the date of posting, if sent by registered post/courier.

The addresses are:

Client: Pakistan Telecommunication Authority, PTA Head Quarters
Building, F-5/1, Islamabad, Pakistan.
Attention: Director (Enforcement), PTA
Tel: +92-51-2878112
Fax: +92-51-2878139
Email: enf.qos@pta.gov.pk

Bidder: _____
Authorized Representative: _____
Attention: _____
Tel: _____
Fax: _____
Email: _____

12. Waiver

- 12.1. No failure by either party to exercise any right or remedy available to it hereunder nor any delay to exercise any such right to remedy shall operate as a waiver of it nor shall any single or partial exercise of any right or remedy preclude any other or further exercise thereof or the exercise of any other right or remedy.

13. Severability

- 13.1. If any provision of this Contract shall be found by any Court, Arbitrator or Administrative body of Competent Jurisdiction to be invalid or unenforceable, such provision shall be deemed to have been deleted without affecting the remaining provisions of this Contract.

14. Settlement of Disputes

14.1. Amicable Settlement of Disputes

- 14.1.1. Any dispute between the Parties as to matters arising pursuant to this CONTRACT that cannot be settled amicably within **FIFTEEN (15) DAYS** after receipt by one Party of the other Party's request for such amicable settlement may be submitted by either Party for settlement in accordance with the provisions specified in the **Clause 17**. In such case the parties will go for arbitration proceedings in accordance with the provisions of the Arbitration Act, 1940 of Pakistan at Islamabad.

14.2. Dispute Resolution

- 14.2.1. If the parties are unable to reach an amicable settlement of a dispute under this contract, the parties agree that this dispute resolution mechanism shall be settled by arbitration in accordance with the provisions of the Arbitration Act, 1940 of Pakistan, at Islamabad Pakistan.

15. Taxes and Duties

- 15.1. The Supplier shall pay all taxes, duties, fees, levies and other impositions levied under the applicable Laws of Pakistan, the amount of which is deemed to have been included in the CONTRACT Price and any taxes, duties, fees, levies and other impositions that may be levied by the Government after the signing of this CONTRACT, otherwise if not included, same shall be deducted (if required) from the payments of Supplier, or payable by them as per applicable laws of Pakistan for the time being enforced. Client will deduct the applicable taxes and duties as per law prevalent at the time of payment which may differ from the amount at the time of CONTRACT as per **Clause 23.2**.
- 15.2. The Supplier shall be liable to pay all taxes and duties in accordance with the laws of Islamic Republic of Pakistan.

16. Commencement, Completion, Modification and Termination of CONTRACT

16.1. Effectiveness of CONTRACT

- 16.1.1. The Commencement date of this CONTRACT shall be the date of execution of this Contract. The Effective Date is _____, 2022.

16.2. Delivery of System(s)

- 16.2.1. The System(s) i.e. Automated QoS Monitoring and Benchmarking Tool alongwith remote Dashboard Tool shall be delivered by the Supplier within **TWELVE (12) WEEKS** from the Effective Date.

- 16.3. Expiration of CONTRACT
- 16.3.1. The Contract shall remain effective till Warranty Period defined in **Clause 18.4.2** unless terminated earlier pursuant to **Clause 16.5.**
- 16.4. Modifications or Variations
- 16.4.1. Any modification or variation of the terms and conditions of this CONTRACT, including any modification or variation in supply of System(s) or Related Services, may only be made in writing and mutual consent of the Parties. However, each Party shall give due consideration to any proposals for modification or variation made by the other Party.
- 16.5. Termination
- 16.5.1. By the Client
- The Client, in the following circumstances may terminate this Contract by giving a notice in writing, for a period of **FIFTEEN (15) DAYS** unless otherwise required:
- (1). If the Client is not satisfied with the standard of System(s) and Services of QoS Monitoring and Benchmarking of Mobile Service, it may by written notice require the Supplier to remedy any defect in the System and its relevant item within 15 days of the receipt of such a notice. The Client, however, may terminate this CONTRACT with immediate effect if it is not satisfied with the standard of any such remedial action under taken by the Supplier.
 - (2). If the Supplier becomes insolvent or bankrupt.
 - (3). If the Supplier or any of its personnel, in the reasonable judgment of the Client supported by evidence, has engaged in corrupt , fraudulent, collusive, coercive or obstructive practices as defined in **Clause 10.2**, in competing for or in executing the CONTRACT.
 - (4). If the Advance in whole or part of any obligation under this CONTRACT is prevented or delayed by the reasons of Force Majeure defined in **Clause 18** for a period exceeding **NINTY (90) DAYS**.
 - (5). If the Supplier fails to comply with any final decision reached as a result of arbitration proceedings pursuant to **Clause 14.2**, hereof.
 - (6). If the Client, in its sole discretion and for any reason whatsoever or at its convenience, decides to terminate this CONTRACT.
- 16.5.2. By the Supplier/Vendor
- The Supplier, by giving a notice in writing, may terminate this CONTRACT, by not less than **FIFTEEN (15) DAYS** written notice to the Client, such notice to be given after the occurrence of any of the events specified below in this Clause:
- (1). If the Client fails to make payments to the Supplier pursuant to this CONTRACT and not subject to dispute pursuant to **Clause 14.1** hereof within one month after receiving written notice from the Supplier that such payment is overdue.
 - (2). If the Advance in whole or part of any obligation under this CONTRACT is prevented or delayed by the reasons

of Force Majeure defined in **Clause 18** for a period exceeding **NINTY (90) DAYS**.

- (3). If the Client fails to comply with any final decision reached as a result of Arbitration proceedings pursuant to **Clause 14.2** hereof.

16.6. **Sanctions**

- 16.6.1. The Client will sanction the Supplier, including declaring the Supplier ineligible, either indefinitely or for a stated period of time, to be awarded any CONTRACT if it at any time determines that the Supplier has, directly or through an agent or its personnel, engaged in corrupt, fraudulent, collusive or coercive practices in competing for, or in executing, this CONTRACT;

17. Force Majeure

- 17.1.1. If at any time, during the continuance of this Contract, the Advance in whole or in part, by either party, of any obligation under this is prevented or delayed, by reason of war, or hostility, acts of the public enemy, civic commotion, sabotage, Act of State or direction from Statutory Authority, epidemic, quarantine restriction, strikes and lockouts, fire, floods, natural calamities or any act of GOD (*hereinafter referred to as "Event"*), provided notice of happenings of any such Event is given by the affected party to the other, within 21 Calendar days from the date of occurrence thereof, neither party shall, by reason of such event, be entitled to terminate this Contract, nor shall either party have any such claims for damages against the other, in respect of such non-Advance or delay in Advance provided the Contract shall be resumed as soon as practicable, after such Event comes to an end or ceases to exist. The decision of the Government as to whether the service may be so resumed (and the time frame within which the service may be resumed) or not, shall be final and conclusive, provided further that if the Advance in whole or part of any obligation under this Contract is prevented or delayed by reason of any such event for a period exceeding **NINTY (90) DAYS** either party may, at his option terminate the Contract.

18. Obligations of the Supplier

18.1. **Standard of Advance**

- 18.1.1. The Supplier shall provide the System(s) and perform the Related Services, with due diligence, skill, professionalism efficiency with professional standards, observing sound management practices, materials and methods. The Supplier shall always act, in respect of any matter relating to this CONTRACT. And shall at all times support and safeguard the Client's legitimate interests in any dealings with third Parties.

18.2. **Conflict of Interest**

- 18.2.1. The Supplier shall hold the Client's interests paramount, without any consideration for future work, and strictly avoid conflict with other assignments or its own corporate interests.
- 18.2.2. **Supplier not to Benefit from Commissions, Discount**
The payment of the Supplier pursuant to **Clause 23** shall constitute the payment in connection with this CONTRACT, and the Supplier shall not accept for its own benefit any trade commission, discount,

or similar payment(s) in connection with activities pursuant to this CONTRACT or to the Related Services or in the discharge of its obligations under the CONTRACT, and the Supplier shall use its best efforts to ensure that the Personnel, representatives, and agents of any of the Party to this CONTRACT shall not receive any such additional payment(s).

18.3. Confidentiality

18.3.1. Except with the prior written consent of the Client, the Supplier and the Personnel shall not at any time communicate or disclose to any person or entity any confidential information acquired during the execution of this CONTRACT.

18.4. Warranty

18.4.1. The Supplier warrants that all the System(s) along with its aligned equipment, installations are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the CONTRACT.

18.4.2. The Supplier shall provide the maintenance and technical support services free of cost during the warranty period of **THREE (3) YEARS** starting from the date of issuance of Final Acceptance Certificate by the Client.

18.4.3. The period for correction of defects in the warranty period is **THIRTY (30) DAYS** from the return date of the defective equipment in the supplier's premises. Including transport, the repair time duration shall not exceed **FORTY FIVE (45) DAYS**.

18.4.4. Any part or item of the equipment becomes faulty in the Warranty Period shall be replaced with the genuine product at the cost of the Supplier and no payment shall be made by the Client in this regard.

18.4.5. Any maintenance, repair, modification or correction required to be done on the system shall be done by the Supplier at their own expenses, with the consent of Client during the Warranty Period.

18.5. Client Approval

18.5.1. The Supplier shall obtain the Client's prior approval in writing before entering into a subcontract for the delivery of the System.

18.6. Appointment of Liaison Officer

18.6.1. The Supplier shall nominate a focal person as liaison officer to act as the primary point of contact for the Client. The Supplier shall provide complete contact details of Liaison officer.

18.7. Equipment/System Installation in Vehicle(s)

18.7.1. Supplier shall be fully responsible to cater for the power requirements of the equipment/system for installation in the vehicle(s) which may also include upgrading the existing alternator/generator.

19. Training and Documentation

19.1. Free of Cost Training

19.1.1. The Supplier shall provide the necessary user trainings, free of cost, prior to product delivery and ongoing training as upgrades are implemented. Training will give the participants an overview of the

solution, help them become familiar with its capabilities, and allow them to practice using the solution with generic exercises.

19.2. Training Modules

- 19.2.1. Training shall be organized in modules, and materials will be produced for each module with an overview, sample exercises and possible solution demonstrations for at least TEN (10) PERSONS. Training modules shall include but not limited to:
- (1). Solution Overview
 - (2). Parameter Setting and Services Testing
 - (3). Post processing and Report Generation
 - (4). Diagnostics and Troubleshooting
 - (5). Any Other Module

19.3. Documentation

- 19.3.1. The Supplier shall supply adequate technical and operations documentation for all the parts of the complete solution. The documentation describing the actual version of the supplied system should be delivered electronically as well as hard copies and shall be in English.

19.4. Document Prepared by the Supplier to be the Property of the Client

- 19.4.1. All plans, specifications, designs, reports and other documents, submitted by the Supplier under this CONTRACT shall become and remain the property of the Client with all allied rights and titles, including the Copy Rights and Intellectual Property Rights thereof, and the Supplier shall, not later than upon termination or expiration of this CONTRACT, deliver all such documents to the Client, together with a detailed inventory thereof.

20. Technical/Hardware Support

- 20.1. The Supplier will support systems for fault diagnostics, troubleshooting and upgrades should be well timed and easily accessible with resources to work 24x7 on high severity request for initial period of **THREE (03) YEARS**.
- 20.2. Local technical support should be available with required technical expertise.
- 20.3. The Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares. Other spare parts and components shall be supplied as promptly as possible, but in any case within **TWO (2) MONTHS** of placing the order.
- 20.4. A separate Service Level Agreement (SLA) will be executed with the Supplier for Operation and Maintenance (O&M) of the system beyond the Warranty Period on mutually agreed terms.

21. Software Licenses

- 21.1. Both Data Collection and Post Processing Tools should be standalone systems.
- 21.2. Initial validity of the of the Data Collection Tool, Post Processing Tools and Dashboard Tools and all other software including third party software and proprietary software should be at least **FIVE (05) YEARS** and should be extendable on mutual consent basis.
- 21.3. New updates regarding any software need to be provided free of cost within the validity period of the license Competency & Expertise.
- 21.4. The Supplier shall provide all the expertise to the Client in installation and working of the System and all its functionalities.

- 21.5. Third Party registered software's (e.g. window & office etc.) necessary for smooth functioning of Data Collection, Analysis & Report Generation and Dashboard Tools installed on all Laptops and Servers provided as part of the tool.

22. Obligations of the Client

22.1. Assistance and Exemption

- 22.1.1. The Client shall use its best efforts to ensure that the Government shall provide the Supplier such assistance and exemptions as possible for the Client.

22.2. Change in the Applicable Law related to Taxes and Duties

- 22.2.1. If, after the date of this CONTRACT, there is any change in Applicable Law with respect to taxes and duties which increases or decreases the cost incurred by the Supplier, then the remuneration and reimbursable expenses otherwise payable to the Supplier under this CONTRACT shall be increased or decreased accordingly by Addendum under this Contract between the parties, and corresponding adjustments shall be made to the amounts referred to in **Clauses 24.2**. The applicable changes will only take effect when reduced to writing and signed by both the parties.

23. Payments to the Supplier

23.1. Lump-Sum Payment

- 23.1.1. The total payment due to the Supplier, in consideration of the provision of System under this Contract, shall not exceed the CONTRACT Price which is an all-inclusive fixed lump-sum covering all costs required to provide System as specified in Appendix-A and Appendix-B. The CONTRACT Price may only be increased above the amounts stated in **Clause 24.2** if the Parties have agreed to additional payments.

23.2. CONTRACT Price

- 23.2.1. Total Contract price inclusive of all taxes, duties, fees, levies, and other charges imposed under the applicable law in Pakistan in PKR is (Rs_____/ - only).

23.3. Payment for Additional Services

- 23.3.1. For the purposes of determining the remuneration due for additional tools for System and Related Services as may be agreed between the parties, a breakdown of the lump-sum price shall be provided.

23.4. Terms and Condition of Payment

- 23.4.1. All the payments will be made in **PAK RUPEE** and on the recommendation of Director (Enforcement) and issuance of satisfactory completion certificate by Procurement Committee-I (PC-I) after successful delivery of the complete system to Client' head office located in Islamabad.
- 23.4.2. Payment shall be made after deduction of applicable taxes at source as per Government Rules and penalty (if any).
- 23.4.3. No mobilization advance shall be paid to the Supplier.
- 23.4.4. The Client shall made the Advance payments to the Supplier as per following schedule upon submission of Advance Bank Guarantee of equivalent amount:

- (1). **On Shipment.** Fifty (50) percent of the Contract Price shall be paid on successful delivery of complete System and all its relevant tools/equipment at Client's premises and verification by Client according to **Clause 26.** Payment will be made within 30 days of Supplier invoice receipt supported by Delivery Note acknowledgment of the Client.
 - (2). **On PAC.** Thirty (30) percent of Contract Price shall be paid upon submission of invoice supported by Provisional Acceptance Certificate (PAC) issued by Client, within 30 days of receipt of invoice. Procedure of PAC is defined at **Clause 27.**
- 23.4.5. All advance payments will be adjusted, and remaining payment, in case of no advance payments, will be made in following manner:
- (1). **On FAC:** Twenty (20) percent of Contract Price shall be paid upon submission of claim supported by Final Acceptance Certificate (FAC) issued by Client, within 30 days of receipt of invoice. Procedure of FAC is defined at **Clause 28.**
 - (2). All remaining payment as per this Contract to the Supplier shall be made in consideration of successful delivery and satisfaction of the Client as per above clauses.
 - (3). After adjustment of all payments, return and release of all Bank Guarantee submitted by the Supplier for any advance payments received by the Supplier through any earlier clause of this Contract.
- 23.4.6. The payment shall be made after the conditions listed for such payment have been met, and the Supplier has submitted the invoice with company's stamp to the Client after approval of the reports/deliverables by Client, inclusive of all taxes and duties specifying the amount due. The payment, however, will be made after deduction of all applicable taxes. As per regulation 2(2) of PPRA Eligible Suppliers (Tax Compliance) Regulations 2015, payment to the Supplier shall be linked with active tax payer status. If a Supplier is not ATL, no payment shall be made until the Supplier appears on ATL of FBR For the purpose of this Contract, payment shall be considered having been made/effectuated, when the Client has delivered irrevocable payment instructions to its bank with copy for information to the Supplier.
- 23.4.7. All payments shall be made on submission of a written invoice on Company's letter head duly signed by the Authorized representative, as per procedure laid down in this CONTRACT. The payment shall be due within one month of the receipt of invoice and after deduction of the applicable taxes and any other deduction(s) as per terms of the contract.

24. Performance Bank Guarantee

- 24.1. A Performance Bank Guarantee (PBG) from a bank having credit rating of at least AA+ in the prescribed format for an amount equal to **10 PERCENT** of the

CONTRACT price in **PAK RUPEE** on the date of calling of the guarantee before signing the CONTRACT. For the purpose of Bank Guarantee, the CONTRACT price will mean the total amount as provided in **Clause 23.2**. On satisfactory completion of assignment, this PBG shall be released. The Proforma of PBG is enclosed at Appendix-D.

25. Advance Bank Guarantee (ABG)

25.1. Advance Bank Guarantee (ABG) from a bank having credit rating of at least AA+ in the prescribed format up to a maximum of **80 PERCENT** of the bid/contract price in **PAK RUPEE** on the date of calling of the guarantee can be provided if vendor elects to get advance amount from client for carrying out this assignment. For the purpose of Bank Guarantee, the CONTRACT price will mean the total amount as provided in **Clause 23.2**. On satisfactory completion of assignment, this ABG shall be released. The Proforma of ABG is enclosed at Appendix-E.

26. Procedure for Obtaining Delivery Note Acknowledgment

26.1. The Client will issue Delivery Note Acknowledgement, on the request of Supplier for the release of payment on delivery by performing the following checks:

26.1.1. The delivered system including Data Collection Unit (Indoor/outdoor), Data Processing Unit, Dashboard Tools and supporting equipment like laptop, inverter, mobile handsets, GPS, connecting cables, software licenses, third party software etc. are according to the requirement specified in the bidding documents and Annexure-B.

26.1.2. The System and all relevant equipment fulfills all the minimum requirement/tools mentioned at **Appendix-B** of this CONTRACT.

26.1.3. The Supplier has to perform joint testing along with the Client's representative(s) and need to submit the report to the Client afterwards. The following are to be covered during the testing:

- (1). The testing will be done in Islamabad using the delivered System along with all relevant equipment/tools for one outdoor and one indoor location specified by the Client.
- (2). Comprehensive Benchmarking testing for all the operators will be done for both indoor and outdoor. The testing route for the outdoor and testing location for indoor will be provided by the Client.
- (3). All the technologies (2G/3G/4G etc.) will be tested for both indoor and outdoor.
- (4). Voice, SMS and Data services will be benchmarked for all the operators simultaneously.
- (5). Supplier has to generate the reports using Post Processing Unit from which all the licensed KPIs of voice, data and SMS services defined at **Appendix-B** can be determined.
- (6). The Client will issue the Delivery Note Acknowledgement (DNA) which will state the System equipment date after the successful testing and subsequent report provided all the issues found during the testing have been resolved and upon the approval of the Authority.

27. Procedure for Obtaining PAC

- 27.1. Provisional Acceptance Tests (PAT) will be performed by the Client's representative(s) in coordination with the Supplier against each essential requirement for both Data Collection and Post Processing Tools for the issuance of Provisional Acceptance Certificate (PAC) according to the procedure defined below:
- 27.1.1. Provisional Acceptance tests need to be performed within **FOUR (4) WEEKS** of the issuance of Successful Delivery Certificate by the Client.
 - 27.1.2. Comprehensive Benchmarking Testing will be done by the Client representatives in different cities of Pakistan. At least **THREE (3)** cities need to be tested for the purpose of PAT.
 - 27.1.3. The Client will raise the issues (if any) found during the PAT and the Supplier will have to resolve the same within **ONE (1) WEEK**.
 - 27.1.4. A System Expert of the Supplier may be available for configuration and fine tuning of the system to ensure stability and to provide hands on awareness of the system to Client's team.
 - 27.1.5. After **FOUR (4) WEEKS** or at the successful completion of the above mentioned testing, the Supplier will request the Client for the issuance of PAC provided no issue is pending at the Supplier's end.
 - 27.1.6. The Client will issue the Provisional Acceptance Certificate (PAC) which will state the PAC acceptance date after the successful PAT provided all the issues found during the testing have been resolved and upon the approval of the Authority. The PAC will not be issued if all the issues raised by the Client are not addressed to the satisfaction of the Client.

28. Procedure for Obtaining FAC

- 28.1. Final Acceptance Tests (FAT) will be performed by the Client's representative(s) in coordination with the Supplier against each essential requirement for both Data Collection (indoor/outdoor) and Post Processing Tools for the issuance of Final Acceptance Certificate (FAC) according to the procedure defined below:
- 28.1.1. Final Acceptance tests need to be performed within **EIGHT (8) WEEKS** of the issuance of PAC by the Client.
 - 28.1.2. Comprehensive Benchmarking Testing will be done by the Client representatives in different cities of Pakistan as per ETSI TR 103 559 methodology. At least **SIX (6)** cities need to be tested for the purpose of FAT which should to be different from the cities and locations done during the PAT.
 - 28.1.3. The Network Performance Score Report shall be prepared in collaboration with Supplier.
 - 28.1.4. The Client will raise the issues (if any) found during the FAT and the Supplier will have to resolve the same within **ONE (1) WEEK**.
 - 28.1.5. After **EIGHT (8) WEEKS** or at the successful completion of the above mentioned testing, the Supplier will request the Client for the issuance of FAC provided no issue is pending at the Supplier's end.
 - 28.1.6. The Client will issue the FAC which will state the FAC acceptance date after the successful FAT provided all the issues found during the testing have been resolved and upon the approval of the

Authority. The FAC will not be issued if all the issues raised by the Client are not addressed to the satisfaction of the Client.

29. Remedial Work and Payment

29.1. If the Client is not satisfied with the standard of any part of the System or any of its ancillary tools and Related Services carried out by the Supplier and requires the Supplier to rectify any defective work or part of any item of the Systems and related services, as the case may be, such remedial work or rectification as may be required shall be carried out by the Supplier at its own expense and it shall not be entitled to any additional payments/charges in respect of such remedial work.

30. Penalty

30.1. If the Supplier fails to complete or delayed the completion of milestone of **“Quality of Service (QoS) Monitoring and Benchmarking Tool”** i.e. Delivery Note Acknowledgement, Provisional Acceptance Certificate and Final Acceptance Certificate as per Clause 26, 27 and 28, Penalty @ 0.5% of the total Price will be charged per week (minimum four (04) or maximum six (06) days will be considered as one week) up to maximum of 08 weeks or beyond but limited to the amount of Performance Guarantee. Thereafter, work order will be cancelled, the agreement will be terminated and the Performance Guarantee after deduction of the penalty will be forfeited. The time taken by the Client after delivery of the solution, for provision of space for installation of Dashboard Tool , for issuance of Delivery Note Acknowledgement, Provisional Acceptance Certificate and Final Acceptance Certificate will not be counted towards the imposition of the penalty.

31. Insurance

31.1. The supplier shall be responsible for free of cost equipment insurance up to the Final Acceptance Certificate (FAC) of the equipment issued by the Client.

32. Good Faith

32.1. The Parties undertake to act in good faith with respect to each other’s rights under this CONTRACT and to adopt all reasonable measures to ensure the realization of the objectives of this CONTRACT.

33. Relationship/Status of Parties

33.1. Nothing in this Contract and no action taken by the Parties pursuant to this CONTRACT shall form, interpreted or construed as creating a partnership, association, or joint venture or other co-operative entity between the parties, nor establish a relationship of agency between the Parties.

33.2. The Parties acknowledge that nothing in this CONTRACT shall give rise to the relationship of employer/employee between the Client and the Supplier and /or any authorized representative/personnel and any substitute or replacement or any other persons providing Service to the Client or behalf of the Supplier under this Contract.

33.3. Neither Party shall have any right, power of authority to enter into any agreement, or act on behalf of, or to act as or to be an agent or representative of, or to otherwise bind the other Party unless expressly provided in the CONTRACT.

34. Limitation of Liability

34.1. Nothing in The aggregate liability of the Supplier to the Client under this CONTRACT for any losses, damages, penalties, costs and professional and other expenses of any nature shall be limited to the value of the CONTRACT.

35. Intellectual Property Rights

35.1. The Intellectual Property Rights in all drawings, documents, and other materials containing data and information furnished to the Client by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Client directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

36. Specification and Standards

36.1. Technical Specifications and Drawings

36.1.1. The System and Related Services supplied under this CONTRACT shall conform to the technical specifications and standards mentioned in Annexure-A and Annexure-B of this CONTRACT, and when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the Systems' country of origin.

36.1.2. The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Client, by giving a notice of such disclaimer to the Client.

37. Packing of the System and any ancillary tools

37.1. The Supplier shall provide such packing of the System and any ancillary tools as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the CONTRACT. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the System or any ancillary tool ' final destination and the absence of heavy handling facilities at all points in transit.

38. Integrity Pact

38.1. [Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by it through any corrupt business practice.

38.2. Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit

in whatsoever form from Client, except that which has been expressly declared pursuant hereto.

- 38.3. [Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with the Client and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.
- 38.4. [Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to Client under any law, contract or other instrument, be voidable at the option of Client . Notwithstanding any rights and remedies exercised by GoP in this regard,
- 38.5. [Name of Supplier] agrees to indemnify Client for any loss or damage incurred by it on account of its corrupt or unauthorized business practices and further pay compensation to Client in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP".

IN WITNESS WHEREOF, the parties hereto set their hands the day, month and year first above written.

For and Behalf of Client.

For and on Behalf of Supplier

By : _____

By: _____

Name: _____

Title : _____

Title : _____

Name : _____

Signature : _____

Signature : _____

Date : _____

Date : _____

Witnesses

1. _____

2. _____

Name _____

Name _____

CNIC _____

CNIC _____

Annexure III.B

SUPPLYING REQUIREMENTS

1. Overview of Monitoring Tool

The Client intends to acquire **Automated Quality of Service (QoS) Monitoring and Benchmarking Tool** from the Supplier with following abilities:

- 1.1 Capacity to test and benchmark Quality of Service (QoS) across number of mobile operators (*i.e. Simultaneous and Continuous Measurement of AT LEAST FIVE MOBILE NETWORKS*), with the objective to reproduce end user experience in different mobile networks, device types and wireless technologies (*i.e. 2G/3G/4G etc.*) operational in Pakistan including AJK & GB.
- 1.2 Perform field tests, measure, benchmark and report QoS Key Advance Indicators (*KPIs*) as defined in mobile services licensees issued from time to time to Cellular Mobile Operators (*CMOs*) in Pakistan defined in **Para 1.3.1 of Annexure III.C** of the CONTRACT, PTA service quality regulation (*Cellular Mobile Network Quality of Service (QoS) Regulations 2021*) as well as global industry standards and best practices;
- 1.3 To record detailed measurements of the network while testing; The systems should be able to collect network Advance impact on the user experience;
- 1.4 To determine and plot the route and map it with respect to its GPS co-ordinates. Plotting shall only show the relative movements with reference to a starting reference point. The equipment should be interface-ble with off-the-shelf digitized map of the region, at any time in future with minimum hardware and software up-gradation. All instances have to be time and day stamped.
- 1.5 Time dependent measurements accuracies of one-second minimum.
- 1.6 Explicitly indicate the minimum and maximum levels which can be measured by such an instrument.
- 1.7 Extension for indoor / walk test service quality and coverage measurement. Indoor benchmarking solution is not required.
- 1.8 Support measuring audio and videos services, including live streaming as well as social media; including emerging Over-The-Top (OTT) communication services testing.
- 1.9 Have Post Processing Tool with holistic analytics which provides insight into Advance and generates reports as desired by the Client.
- 1.10 Capability of being upgradable to consider upcoming mobile network technologies and related Advance parameters, such as 5G etc.;
- 1.11 Capability to measure all technologies as detailed at **Para 1.15 of Annexure III.B.**
- 1.12 Have active and optimized Power Control for phone charging.
- 1.13 The installation of the QoS system should be in such a way that the set up provides optimal conditions for uninterrupted data collection in a stable environment for reliable test results.
- 1.14 Both Data Collection and Data Analysis units should support all the technologies including but not limited to GSM/ CDMA/ WCDMA/ HSPDA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advance etc. (*i.e. 2nd, 3rd & 4th Generation wireless technologies*) in all bands/spectrum and carrier aggregation of contiguous/noncontiguous bands/technologies and should be upgradeable to 5G as and when required.

Annexure III.C SYSTEM CAPABILITIES

1. Technical and Functional Specifications

1.1. Data Collection Tool

- 1.1.1. Networks Benchmarking. The equipment should be capable of benchmarking multiple scenarios of **Voice, SMS and Data** services of least **FIVE (5)** networks simultaneously and continuously. Moreover, it should have capability to expand and include more operators, if required.
- 1.1.2. Technology Support. The equipment shall support all major cellular technologies, including but not limited to GSM/ CDMA/ WCDMA/ HSPDA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advance etc. (i.e. 2nd, 3rd & 4th Generation wireless technologies) in all bands/spectrum carrier aggregation in contiguous/noncontiguous bands/ technologies and should be upgradeable to 5G, as and when required.
- 1.1.3. Audio /Video Testing. It should measure Voice Quality Mean Opinion Score (MOS) through latest version of Perceptual Objective Listening Quality Analysis (POLQA) for Full Band i.e. POLQA Version 3. It shall also measure Video Quality Mean Opinion Score (MOS) through latest version of ITU J.343.1
- 1.1.4. Application Based Testing. It should support Application based testing e.g. Facebook, Twitter, , WhatsApp, Netflix etc.
- 1.1.5. Device Type Support. It should provide flexibility to support multiple device types of multiple vendors including but not limited to smartphones and modems etc.
- 1.1.6. Testing Scenario. It should be able to benchmark all possible testing scenarios in auto technology and locked mode. All the technologies 2G/3G/4G and all the bands can be locked also there should be flexibility to lock/unlock any desired technologies. Moreover, the tool should be able to lock and test specific BCCH/ PSC/ PCI/ ARFCN/ UARFCN/ EARFCN etc. Channel Capacity. It should support minimum **16 x Handsets** for **Voice, SMS and Data** services simultaneously. It should have capability to benchmark data services of all the operators simultaneously without any dependency on Laptop's modem and without any degradation. The system should also be able to support extension of more handsets up to **16 x Handsets**, without cascading and modification/alteration as and when required.
- 1.1.7. Equipment Casing. The equipment casing should be compact and capable of holding the mobile handsets securely in such a way that all mobile handsets are equally exposed to the outer environment for fair benchmarking. Most of the cabling should be fixed and reliable. The cabling that need to be done by the end user should be minimum and easy. The tool should be easy to carry around and can be used in any vehicle.

- 1.1.8. Internal Battery Backup. It should have internal battery to keep the measurement running for at least 15 minutes in case there is some issue with the inverter/power supply.
- 1.1.9. DC/AC Power. The tool should have option to operate both at 12V and 220V.
- 1.1.10. System Stability. The system should be highly stable, robust and reliable. No device should get disconnected due to normal jerks in the vehicle. In case of disconnection there should be visual/audio warning and reconnection can be done easily without any interruption in the measurement.
- 1.1.11. User Control. The testing to be done through script based only. Scripting should be easy and user friendly and all the options required for making the scripts should be available. Moreover, the scripts can be saved, imported and exported.
- 1.1.12. Log Files. The system should have the capability of:
- (1). Separate log file for each device/handset.
 - (2). Log files should be saved automatically at the desired folder.
 - (3). Multiple options for saving log files e.g. user can defined the size of log file after which new log files starts automatically in sequential manner.
 - (4). Log files should be encrypted and cannot be modified afterwards.
 - (5). Log files should use Time stamp from the satellite using GPS and not from the laptop.
- 1.1.13. Device Configuration. All the devices should be configurable and device configuration can be saved and reloaded.
- 1.1.14. Custom Workspace. User should have the option to create custom workspaces that can be saved and reloaded.
- 1.1.15. Geo Mapping. The system should have ability to load Geo Maps, Google Maps, tab/shape and network files etc.
- 1.1.16. Data Export. Any parameter can be exported in multiple formats like csv, txt, tab, KML/KMZ etc. both as image and point.
- 1.1.17. Drive Test Routes. The system should be capable:
- (1). To record drive test routes and the same can be imported/exported.
 - (2). To provide facility of navigation like Google Maps to cover the imported route in optimized manner.
- 1.1.18. Tool Display. The equipment should be capable to:
- (1). Display, record, pause and replay the measurements.
 - (2). Indicate the faults in the run time using audio/visual display.
 - (3). Display the progress of testing in the run time.
 - (4). Display and record all layer2/layer 3 messages, measurement reports and events etc.
 - (5). Display all the events / the desired events during the testing on multiple windows and all the windows should be synchronized.
 - (6). Display different parameter in grid and map and the legends should be configurable.

(7). Display the status of the connected/disconnected devices.

1.1.19. Operation in Extreme Weather Conditions. The equipment should be able to work continuously for long duration without any distortion/ malfunctioning under extreme weather conditions.

1.1.20. Power Inverter. A Universal Power Inverter with output voltage range of RMS 230V -12V DC/5V DC which can easily support the load of the desired tool. User Interface. 2 x Laptop are required for User Interface as per following details:

(1). 1x rugged Laptop with high processor speed of minimum Core i7 (i.e. minimum 8th Generation or higher), 1TB or above SSD hard disk and 32GB or above RAM

(2). 1x rugged Laptop with high processor speed of minimum Core i7 (i.e. minimum 11th Generation or higher), 1TB or above SSD hard disk and 32GB or above RAM

1.1.21. Standard Support. It should support the recommendations and standard of ITU and ETSI standards related to service quality in particular ETSI 102 250 and mandatory support for ETSI TR 103 559.

1.2. Data Analysis / Post Processing Tool

1.2.1. Post Processing of RF Data. Post Processing Tool should automatically post-process RF data from a variety of data collection tools (indoor and outdoor). It should be capable of importing and analyzing log files from multiple RF data collection tools being widely used in telecom industry.

1.2.2. Standalone System. It should be standalone system that can be installed on any laptop/desktop.

1.2.3. Post Processing Capabilities. Post Processing Tool should have the following capabilities:

(1). Carryout cell level and operator level analysis.

(2). Support analysis of multiple log files and log files can be arranged in folders/sub folders as per end user requirement.

(3). Correlate different parameters as per end user requirement. Different type of correlation options should be available.

(4). Extract user specific portion of log file for detail analysis and layer 2/Layer3 messages can easily be searched, filtered and analyzed.

(5). Post processing tool should be able to provide KPIs per technology, if testing is done in auto mode.

(6). Display the connected Cells and Neighbors on the map and the approximate distance from the serving cell.

(7). Indicate missing neighbors/high device power/high interference etc.

1.2.4. Report Generation. Post Processing Tool should be able to generate predefined and user-defined reports and templates which can be used to create reports from any log file or multiple log files from multiple data collection tools widely used in the industry for specific needs and to compare KPIs of multiple operators,

technologies and timeframes. Following points need to be considered for the reports:

- (1). Built-in Reports. Generate built-in reports for different technologies that can be configured. All the formulae used in the reports and raw files need to be provided.
- (2). Customized Reports. Support making and saving of customized reports as per end user's requirement and there should be possibility of including specific logo/water mark in the reports.
- (3). Customized KPIs. Support defining customized KPIs and inclusion of customized KPIs in the report, whether it is customized report or built in report.
- (4). Geo Maps. Reports should use integrated geo Maps to visualize and analyze the data.
- (5). Exporting KPIs. Reports should display all the RF parameters/KPIs in grid and maps which can be exported in different formats like txt, csv, xlsx, xls, KML/KMZ etc.
- (6). Technology wise Segregation. Reports should be able to provide KPIs per technology, if testing is done in auto mode.
- (7). Visual Effects. Generated reports should contain graphs, bar charts, tables, maps with different KPIs/events being displayed. The reports can be extracted in different formats like pdf, word and excel etc.
- (8). Benchmarking Reports. There should be pre-defined reports for Benchmarking purpose providing comprehensive comparative analysis of multiple operators covering all technologies for voice, SMS and data services. Technology wise as well as overall Benchmarking of the operators will be required.
- (9). KPIs Formulae & International Standards. All the Formulae used in all the reports need to be provided and should be in accordance with the ITU/ETSI/3GPP etc., standards related to service quality. There should be option to modify the formulae as required after discussion with the end user.
- (10). Required KPIs. It should provide all the major KPIs related to coverage & quality that is measured for GSM/ CDMA/ WCDMA/ HSPDA/ HSUPA/ HSPA+/ LTE/ VoLTE/ LTE-Advanced (i.e. 2nd, 3rd & 4th Generation wireless technologies) and all frequencies allocated to the operators. All relevant KPIs for all services, voice, data, SMS, MMS, FTP/Http (UL / DL), Video Streaming, Web Browsing, Ping, Social networking (e.g. YouTube, WhatsApp, Twitter, Instagram, etc.) need to be covered in the reports.

1.2.5. Reported KPIs. The Data Analysis/Post Processing Tool should be able to:

- (1). Report the KPIs defined in **Para 1.3 of Annexure III.C** of the CONTRACT, with possibility of including/removing KPIs as desired.
- (2). Configure customized thresholds values for each KPI/parameter.
- (3). Provide summary of all the desired KPIs of each operator for number of events below/above thresholds in a single report.

1.2.6. Analysis of Abnormal Events. The Post Processing Tool should be able to:

- (1). Perform detailed analysis of abnormal events like Drop Call, Blocked Call, Handover Failure, Inter System Handover Failure etc., with needed recommendations.
- (2). Identify problematic areas like low coverage, low quality areas, high interference, Pilot Pollution etc.

1.2.7. Coverage KPIs. It should be able to provide KPIs related to network coverage and quality measured in 2G, 3G and 4G technologies.

1.2.8. List of Supported KPIs.

- (1). The bidder should provide the list of KPIs for all services (voice, data, SMS, MMS, FTP, UL / DL), Streaming Video, Web Browsing, Ping, Social networking (YouTube, Snap Chat, WhatsApp, Twitter, Instagram etc.), that will be reported by Post Processing Tool.
- (2). The vendor shall also provide the relevant ITU/ETSI standards definitions and trigger points for calculation of KPIs.
- (3). The vendor shall also provide the details of calculation of a particular KPI with variation of trigger points.

1.3. QoS KPI & RF Parameters

Following is the list of QoS KPIs/ parameters which has to be provided in addition to other RF related KPIs/parameters for voice, SMS and Data services for all technologies (2G/3G/4G) by both Data Collection and Post Processing Tool:

1.3.1. NGMS Licensed & QoS Regulation 2021 KPIs

- (1). Network Accessibility
- (2). Grade of Service
- (3). Service Accessibility / Call Setup Success Rate (CSSR)
- (4). Call Connection Time
- (5). Call Completion Ratio/Drop Call Ratio (DCR)
- (6). Mean Opinion Score (Average of A2B and B2A, POLQA/PESQ)
- (7). Inter System Handover
- (8). SMS Success Rate
- (9). SMS End-to-End Delivery Time
- (10). Data Throughput (3G & 4G)
- (11). Signal Strength (RxLev, RSCP & RSRP)
- (12). RAB/E-RAB Setup Success Rate
- (13). Session Abnormal Release Rate
- (14). Latency

- (15). Webpage Loading Time
- 1.3.2. Other QoS KPIs
- (1). Inter System Handover Success Rate (CS)
 - (2). Inter System Handover Success Rate (PS)
 - (3). 2G Signal Strength RxLev *(No of samples in customizable Bins)*
 - (4). 2G Signal Quality RxQual *(No of samples in customizable Bins)*
 - (5). 3G Signal Strength RSCP *(No of samples in customizable Bins)*
 - (6). 3G Signal Quality Ec/No *(No of samples in customizable Bins)*
 - (7). 4G Signal Strength RSRP *(No of samples in customizable Bins)*
 - (8). 4G Signal Quality RSRQ *(No of samples in customizable Bins)*
 - (9). Number of Call Attempts
 - (10). Number of Calls Established
 - (11). Number of Calls Dropped
 - (12). Number of Calls Blocked
 - (13). Number of Soft Handover Failures
 - (14). Number of Hard Handover Failures
 - (15). Number of Intra RAT Handover Failures
 - (16). Number of Inter RAT Handover Failure
 - (17). Number of Intra Frequency Handover Failures
 - (18). Number of Inter Frequency Handover Failures
 - (19). Number of Total Handover Attempts
 - (20). CSFB Call Setup Time/Call Connection Time
 - (21). End-to-End SMS Delivery time
 - (22). SMS e2e Delivery Success Rate
 - (23). SMS Send Success Rate
 - (24). SMS Receive Success Rate
 - (25). SMS Send time
 - (26). SMS attempts
 - (27). Number of SMS attempts
 - (28). Number of successful SMS
 - (29). RLC Data Throughput (DL/UL)
 - (30). MAC Throughput (DL/UL)
 - (31). Application Throughput (DL/UL)
 - (32). Modulation Scheme(DL/UL)
 - (33). User Data Throughput (DL/UL)
 - (34). CQI
 - (35). SINR
 - (36). Session Abnormal Release Rate
 - (37). RAB Setup Success Rate
 - (38). E-RAB Setup Success Rate
 - (39). Round Trip Time (Latency)
 - (40). Web Page Access Success Rate
 - (41). Web Page Completion Success Rate
 - (42). Packet Loss
 - (43). Jitter
 - (44). FTP Throughput (DL/UL)
 - (45). HTTP Throughput (DL/UL)
 - (46). Streaming Service Non-Accessibility
 - (47). Streaming Service Access Time
 - (48). Streaming Reproduction Cut-off Ratio
 - (49). Streaming Reproduction Start Failure Ratio
 - (50). Streaming Reproduction Start Delay
 - (51). Streaming Setup Success Rate

- (52). Streaming Completion Success Rate
- (53). Streaming Audio Quality
- (54). Streaming Video Quality
- (55). VoLTE Setup Success Rate
- (56). VoLTE Call Setup Time /Call Connection Time
- (57). VoLTE Call Completion Success Rate

2. **General Design Requirements**

The general design requirements and applicable standards for all electrical, electronic, mechanical and other equipment to be provided by the Bidder for the installation and operation of Testing/Measuring facilities are given below:

2.1. **Technical Standards**

- 2.1.1. The components used in the Systems shall be designed so as to comply with any set of the international standards described in the Technical Specifications.
- 2.1.2. The Bidder shall state the standards the proposed equipment is compliant with.
- 2.1.3. Where any conflict arises between any of the above described technical standards, the most stringent or highest Advance requirement shall apply.

2.2. **Environmental Conditions**

- 2.2.1. The Equipment and Software shall be designed and installed so as to perform reliably and efficiently under local climatic conditions in Pakistan:
- 2.2.2. The Advance of the Equipment and Software shall be guaranteed under the operating conditions given in table below:

Ambient temperature	-10° C to +60° C
Relative humidity	95 % at +45 °C
Atmospheric pressure	90 to 110 kPa
Altitude	> 3000 meters

- 2.2.3. The Bidder shall indicate the international specifications the equipment is compliant with.
- 2.2.4. The Equipment shall be designed and installed so as to dissipate heat generated in normal operating conditions, in other words, they must be designed to operate with natural convection, within the limits and the conditions of temperature and relative humidity defined above.

2.3. **Mechanical Characteristics**

- 2.3.1. The weight of the various fully equipped system shall be stated by the Bidder.
- 2.3.2. The components of the equipment which can be removed shall be carefully handled.
- 2.3.3. The equipment shall be capable of withstanding road bumps and sudden jerks.
- 2.3.4. Normal handling during installation and storage shall not have any adverse effects upon the equipment.
- 2.3.5. The packaging for shipping and for storage of spares shall be sufficient to protect any fragile or delicate equipment from normal handling and shipping.
- 2.3.6. Mechanical shocks during the operation & maintenance (connection of apparatus, switching on and off of the unit, opening

- and closing of the sub-racks doors, etc.), shall not induce perceptible operation perturbations.
- 2.3.7. The components subject to an accidental reversal of polarity shall be identified.
 - 2.3.8. The mechanical design of the equipment will be such as to avoid the accumulation of dust and air particles.
 - 2.3.9. The Equipment shall be protected against harmful ambient conditions such as animals, insects, dust, etc., during transport, storage, installation and normal day to day operations.
 - 2.3.10. The Bidder will provide a catalogue with complete details explaining the mechanical construction of the equipment.
- 2.4. Electromagnetic Environment
- 2.4.1. The mechanical design of the Testing/ measuring equipment must be fully compatible with the International Recommendations with regards to the electromagnetic compatibility (*EMC*), electrical discharge (*ESD*) & SAR. The Bidder shall indicate the international specifications the equipment is compliant with.
 - 2.4.2. Immunity to Electromagnetic Pulses of Nuclear Origin. Immunity to electromagnetic pulses of nuclear origin will be proposed as an option. Documents supplied to PTA should indicate the resistance of the equipment to pulses of nuclear type. The hardware configuration used to obtain the results claimed must be described.
- 2.5. Physico-Chemical Environment
- 2.5.1. All the materials made of plastic, rubber, electrical insulating, etc., will be of good quality. The different plastic or rubber parts shall not be degraded by the climatic conditions in Pakistan. The use of inflammable or organic material will be minimized and the materials used for the equipment shall comply with a minimal inflammable class.
- 2.6. Electrostatic Environment
- 2.6.1. The Bidder shall indicate the international specifications the equipment is compliant with. The hardware must assure this electrostatic compatibility for rugged and casual usage.
- 2.7. Immunity to Rapid Transitory Electric Perturbations
- 2.7.1. The Bidder shall indicate the international specifications the equipment is compliant with.
- 2.8. Power Supply
- 2.8.1. Power chargers shall be provided to be used while drive testing in a car or any other battery is made by means of any device chosen by the Manufacturer; this device shall be described by the Bidder.
 - 2.8.2. Power converters shall be provided with a thermal release protection in case of overheating.
 - 2.8.3. Moreover, they shall be designed to provide an alarm in overheating conditions (*provisionally*).
 - 2.8.4. Particular precautions shall be taken to protect the equipment against dangerous high-frequency return paths, excess-voltages and excess-currents.
 - 2.8.5. The choice of wire and cabling, the layout of the cabling and equipment shall be such that fire shall not propagate beyond the disconnected devices, fuses and circuit breakers.

3. **Centralized Monitoring System**

The Client also intends to remotely manage the navigation of its **Automated QoS Monitoring and Benchmarking Tools** to be installed in Vehicles through **Dashboard Tools**. The primary intention is to conduct drive tests and data collection work orders both with and without the presence of any technical assistance in the vehicle. All technical functions are expected to be carried out remotely at real time from the Centralized Monitoring System (CMS) at Client's premises. The Successful bidder shall establish a Centralized Monitoring System (CMS) at Client's Premises. The CMS shall be provided along-with all the necessary hardware & software and must be capable of full integration with new and as well as with **Client's existing Solution (i.e. SMARTBENCHMARKER)**. The CMS shall have following capabilities:

3.1. **Monitoring System Capabilities**

- 3.1.1. Real time monitoring of all Mobile Handsets in the benchmarking tools as and when required.
- 3.1.2. Integration of monitoring vehicles with automatic navigation capabilities both for online & offline monitoring mode.
- 3.1.3. Capability of configuration of drive plan route from the maps with notification.
- 3.1.4. Features to provide test instructions, real-time office-to-vehicle/vehicle-to-office communication, test routes, turn-by-turn audible navigation, work order status and progress, and failure alerts for the driver.
- 3.1.5. The system should be capable for real time viewing of all dashboard KPI's in the CMS.
- 3.1.6. Should be capable of providing the summary of KPI's and drill down with filtering options of each device or KPI group remotely.
- 3.1.7. Fast and secure communication to all measuring devices and report measurement results and status in real time.
- 3.1.8. The dashboard should show the status and positions of all connected devices and display an overview of all executed tests and their success rates
- 3.1.9. Should include customizable dashboard display of overview on all KPI's.
- 3.1.10. Should be able to abstract all KPI's for any specific polygons on a Google map. Viz. Region, municipality, zones, cities or any other customized polygon area on a map.
- 3.1.11. The results collected must be individually or collectively weighted and summarized into an overall score which can be customizable along with standard predefined scores.
- 3.1.12. Should be capable to identify issue with root cause analysis from the dashboard.
- 3.1.13. Should provide the experience from customer perspective with performance score with a perceptual weighting & aggregation of the KPI's as per ITU Recommendations.
- 3.1.14. The dashboard system should be accessible to multiple users at any time from the vehicle and NMS without any limitation.
- 3.1.15. Benchmarking capability between the service providers.
- 3.1.16. Reporting format can be export with Excel, PDF or any format availability.
- 3.1.17. User can select or configure any report format based on the chart type, or any other format.

3.2. Smart Post Processing System

The Client require a Remote Post Processing System with Real time QoS analysis & reporting for analyzing the quality of mobile networks' service from the data collected from the benchmarking tools. The system should be user interactive which provide real time dashboard, customized report, drill down analysis etc. The following are a list of non-exhaustive capabilities expected for the Smart Analytic:

- 3.2.1. Provide QoS KPIs and performance score with a perceptual weighting & aggregation of the KPI's as per ITU Recommendation.
- 3.2.2. Provide score or rating based on individual Municipality, Zones, or customized polygon created by users.
- 3.2.3. Capable of drill down with analysis on all measurement test such as Voice, Data throughput, Video etc.
- 3.2.4. Provide benchmarking report.

3.3. Interactive Maps

- 3.3.1. Show the drive test data & results on Interactive Maps.
- 3.3.2. Provide at least 1 x Screen per Operator and at least 1 x Screen for Analysis.
- 3.3.3. The Interactive Web Portal shall be able to provide following functionalities:
 - (1). Country/Region/Zone/Cluster view Filtering
 - (2). Month Wise Measurement and Filtering
 - (3). Technology used during the Test Filtering
 - (4). Voice/SMS/Data Services QoS KPIs Filtering
 - (5). Coverage QoS KPIs Filtering
- 3.3.4. Provide precise location of Voice Failed and Dropped Calls on the Interactive Map.
- 3.3.5. Provide the results in grid style on variable grid sizes are of variable size i.e. 50m, 100m, 200m, 500m, 1Km etc.

3.4. Servers

The Bidder will provide necessary servers for seamless data uploads and swift processing. The best configuration required for the system to get the best performance will be provided. The final configuration of such servers will be agreed with Client.

- 3.4.1. The storage capacity should be enough to store continuously 24 hours data of all system for at least 12 months.
- 3.4.2. The systems should include all subsidiary and supporting software for analysis post processing and other data managing activities should be included.
- 3.4.3. All necessary configurations and all necessary protocols required for the communication between the different system and probes will be provided.
- 3.4.4. Bidder to ensure all IT requirements of Client network is applied and maintained for access to the server.
- 3.4.5. Bidder may also consider providing the services a Cloud based solution located in Pakistan.

3.5. Software License

- 3.5.1. Both Data Collection and Post Processing Tools should be standalone systems.
- 3.5.2. Initial validity of the Data Collection Tool, Post Processing Tools and Dashboard Tools and all other software including third party

software and proprietary software should be at least **FIVE (05) YEARS** and should be extendable on mutual consent basis.

- 3.5.3. New updates regarding any software need to be provided free of cost within the validity period of the license Competency & Expertise.
- 3.5.4. The bidder shall provide all the expertise to the Client in installation and working of the tool and all its functionalities.
- 3.5.5. Third Party registered software's (e.g. window, office & any other etc.) necessary for smooth functioning of Data Collection, Analysis & Report Generation and Dashboard Tools installed on all Laptops and Servers.

Annexure III.D PERFORMANCE BANK GUARANTEE

FORM OF PERFORMANCE BANK GUARANTEE

Note: See Contract Clause 23

Performance Guarantee for Advance Obligations

Date:-----

_____ *[On a legal document/stamp paper]*

Beneficiary: Pakistan Telecommunication Authority, Headquarters Building, F-5/1, Islamabad, Pakistan.

Date: _____

We, *[name of Bank]* are providing Advance Guarantee for _____ (hereinafter called "the Supplier") have entered into CONTRACT No. *[Reference number of the CONTRACT]* dated *[insert date]* with Pakistan Telecommunication Authority (hereinafter called the "Client"), for the provision of ***Automated QoS Monitoring and Benchmarking Tool*** (hereinafter called "the CONTRACT").

Furthermore, we understand that, according to the conditions of the CONTRACT, a Advance guarantee in the sum of PKR _____ / [PAK RUPEE _____] (*the amount equal to **10%** of the total CONTRACT Price*) is to be made against the Advance obligations of the Supplier.

We *[name of Bank]* hereby irrevocably, unconditionally and continuingly guarantee without recourse to the Client, and undertake to pay to the Client any sum or sums not exceeding in total an amount of PKR _____ / PAK RUPEE _____ only) (*the amount equal to 10% of the total CONTRACT Price*) upon receipt by us of Client's first demand in writing accompanied by a written statement stating that "the Supplier" is in breach of their obligations under the CONTRACT.

This guarantee shall be released after successful completion of the CONTRACT.

[signature(s)]

Endorsed and guaranteed by Commercial Bank in Pakistan

[Bank Stamp & Signature(s)]

Note: All italicized text is for indicative purposes only to assist in preparing this form and shall be deleted from the final product. If the bank guarantee is arranged from a bank outside Pakistan that bank guarantee has to be backed by the bank guarantee of a local bank in Pakistan with a credit rating of at least AA+.

The expiry date of this guarantee will be six months from the start date of the CONTRACT

Annexure III.E ADVANCE BANK GUARANTEE

FORM OF ADVANCE BANK GUARANTEE

Note: See Contract Clause 23

Advance Guarantee for Advance Obligations

Date:-----

_____ *[On a legal document/stamp paper]*

Beneficiary: Pakistan Telecommunication Authority, Headquarters Building, F-5/1, Islamabad, Pakistan.

Date: _____

We, *[name of Bank]* are providing Advance Guarantee for _____ (hereinafter called "the Supplier") have entered into CONTRACT No. *[Reference number of the CONTRACT]* dated *[insert date]* with Pakistan Telecommunication Authority (hereinafter called the "Client"), for the provision of ***Automated QoS Monitoring and Benchmarking Tool*** (hereinafter called "the CONTRACT").

Furthermore, we understand that, according to the conditions of the CONTRACT, a Advance guarantee in the sum of PKR _____ / [PAK RUPEE _____] *(the amount up to **80%** of the total CONTRACT Price)* is to be made against the Advance obligations of the Supplier.

We *[name of Bank]* hereby irrevocably, unconditionally and continuingly guarantee without recourse to the Client, and undertake to pay to the Client any sum or sums not exceeding in total an amount of PKR _____ / PAK RUPEE _____ only) *(the amount equal to 10% of the total CONTRACT Price)* upon receipt by us of Client's first demand in writing accompanied by a written statement stating that "the Supplier" is in breach of their obligations under the CONTRACT.

This guarantee shall be released after successful completion of the CONTRACT.

[signature(s)]

Endorsed and guaranteed by Commercial Bank in Pakistan

[Bank Stamp & Signature(s)]

Note: All italicized text is for indicative purposes only to assist in preparing this form and shall be deleted from the final product. If the bank guarantee is arranged from a bank outside Pakistan that bank guarantee has to be backed by the bank guarantee of a local bank in Pakistan with a credit rating of at least AA+.

The expiry date of this guarantee will be six months from the start date of the CONTRACT

Muhammad Asim Majeed
Account Officer (Internal Audit)

Danish Naseer
Assistant Director (Wireless)

Kaleem Ullah Tareen
Assistant Director (Law & Regulation)

Muhammad Kashif
Secretary of the Committee
Assistant Director (Enforcement Wireless-II)

Muhammad Ali
Deputy Director (Enforcement Wireless-II)

Abdur Rab Khan
Director (P&C)

Kashif Ghafoor
Head of the Committee/Director (Enforcement Wireless-II)