

TECHNICAL SPECIFICATION OF GPRS based MODEM

1. **SCOPE:** The scope of work is on turn-key basis covering modem supplies, application for solution engineering and integration.

- Supply of GPRS Modems for data acquisition from HT DLMS meters
- In future, if required Integration of the meter data with RAPDRP MDM system as per the requirement of UGVCL/GUVNL.
- Supply of Software for management of meter data like Instantaneous parameters, Load survey, Tamper Data, TOD energy, Billing parameters, Customized reports as per user requirement etc with Discom hierarchy with adequate bandwidth as per utility requirement with adequate licenses for viewing data.
- AMR services for Meter Reading and reporting, Meter data acquisition services along with software management of meter data like Instantaneous parameters, Load survey, Tamper Data, TOD energy, Billing parameters, Customized reports as per UGVCL requirement etc., with adequate bandwidth and licenses for viewing data.
- All IT Network infrastructure, Database and Application Server(s), Band-width for AMR reading, security, firewall, encryption, etc. deemed necessary for AMR reading as per utility defined schedule(s) shall remain in the scope of the Bidder.
- Meter reading shall be executed by the bidder at his Data-Centre/cloud, bidder shall maintain the AMR data center infrastructure at his premises and provide meter reading data.
- Provide raw Common Data Format file(s) to UGVCL after successful meter reading over UGVCL FTP port for Instantaneous parameters, Load survey, Tamper Data, TOD energy, Billing parameters,
- Provide billing data file(s) in the pre-defined format for update into the billing system of GUVNL, the billing format shall be provided to the successful bidder.
- The software system shall have provision to provide for on-demand metering data as per UGVCL intimation and requirement(s).
- Daily, weekly, Monthly Report(s) and associated format(s) in line with UGVCL requirement(s) to be provided over internet via secure login credential(s), which will be provided to successful bidder after mutual agreement(s).

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- All the data transfer and storage must be secured to ensure data integrity.
- The data should not be shared to any third party.
- Provide support for Meter data availability. If data is not available, the Vendor shall provide root cause analysis of the case and shall give guide line to field staff for resuming data availability.
- After completion of order or as an when required by UGVCL, backup of all data in specific standard format to be given to UGVCL.
- In future, UGVCL may provide server infrastructure in his premise bidder should migrate application as well as database.
- Rate of modem shall include all required licenses cost.
- Software Support of Application shall be provided by bidder for 5 years.

Meter Parameters Reading Frequency

Meter Parameter	Reading Frequency
Instantaneous Data	30 minute interval
Load Survey Data	Daily once
Mid night Data	Daily once- On Next Day of each DAY before 07:00 hrs
Monthly Billing Data	Monthly once - On xx Day of each Month before 07:00 hrs
Tamper data	As and when occurred
On-Demand Data requirement(s)	As per UGVCL Intimation.

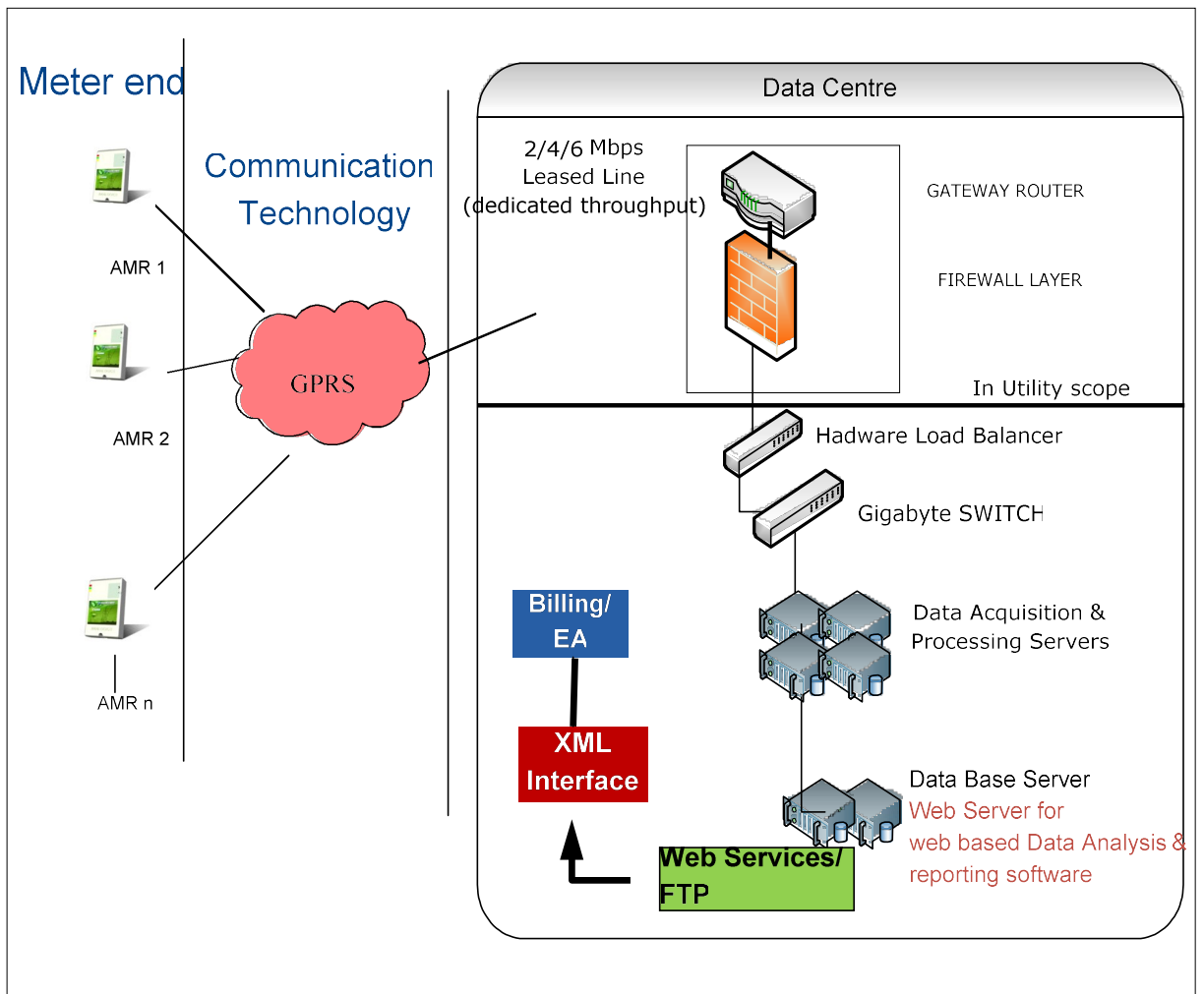
2. TECHNICAL SPECIFICATION OF GPRS based MODEM : The offered MODEM shall be an intelligent device connected to an Electronic Energy Meter by means of optical and RS232 port, installed at various consumer premises (HT/LT consumers) to collect the following data as per configured frequency/On demand.

- a. Complete Meter data stored in the meter.(hourly/daily/weekly/monthly)
 - Instantaneous parameters, at the time of reading
 - Billing data, present and last 12 months histories
 - Load survey, 30 days/complete no. of days stored
 - Tamper data, Settings/Configuration data
- b. Instantaneous parameters.(Every 15/60 minutes/daily)

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Existing RAPDRP MDAS Architecture:

The GPRS MODEM at consumer meter end should have suitable interface facility to connect with the meter by using the RS 232 cable. The GPRS MODEM shall also be retrofitted on optical and RS232 port of the meter.



Key Features:

- Compatible with various standard DLMS compliant Meters

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- Shall have meter detect and meter data read feature which enables communication with all popular Indian energy meters including DLMS meters using built-in meter specific protocol stack.
- Shall have auto restart feature with built-in watchdog timers and intelligence
 - Shall have on-line tamper detection feature through which GPRS MODEM will continuously poll the meter for any new tamper and will send the event to the server and also to a set of pre-programmed mobile numbers as an SMS alert.
 - Shall have program over the air (POTA) feature which will reduce the manual field visits and also save project time. The modem firmware shall be reprogrammed from the server remotely.
 - Remote start/stop and restart feature.
 - Auto recover feature incase modem / network hanging
 - Comprehensive self-diagnosis feature which will create log file with all at a periodicity and link check for communication.
 - On demand SMS request through SMS for Instantaneous Parameters
- Real time outages, alarms as alerts to server and to configured mobile numbers Automatic GPRS connection (no AT commands required) and watchdog for reliable Communication
 - Inbuilt 3 Phase Power supply as well as operational on single phase
 - Automatic pushing of meter data at configured regular intervals
 - On line monitoring of vital Instantaneous parameters like voltages, currents energies, powers, power factors.
 - IP (internet protocol) based Communication, enabling simultaneous data access from thousands of GPRS Modems.
- Shall use meter supported baud rate to read meter data and shall use maximum network supported baud rates to push the data to server.
- Shall have a configuration over the air feature through which all the GPRS MODEM operational settings will be configured.
- Shall have a configurable scheduled meter read and data transmit feature to enable grouping of the meters so that the loading on the server is equally distributed from all the field installed modems.

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- Shall have selective on-demand meter read feature through which server can send an on demand request to modem to read the selective parameters from the meter.

2.1. Power Supply Section:-

2.1.1. Input specifications:-

- The offered GPRS MODEMS should capable of operating on three phase supply drawn from the meter input itself. Auxiliary power supply will not be acceptable.
- The GPRS MODEM shall have three phase AC input supply and should be capable of proper functioning within the power supply range of 77 AC P-P to 470V AC P-P, 50 Hz so that same GPRS MODEM shall be used for DTR meters, HT and LT Tri vector meters.
- However the GPRS MODEM should also be capable of operating on single phase 230V, 50 Hz power supply. The GPRS MODEM shall be suitably protected against surges.
- Average Power consumption of the GPRS MODEM shall not be more than 3.5 VA under idle and during data transfer.

2.1.2. Withstand capacity against surges should be according to Indian conditions i.e. 6.0 kV.

2.1.3. Input terminals: The power supply input shall be a suitable two core integrated cable coming out from AMR box.

2.1.4. The GPRS MODEM shall have capability to work under continuous power on condition.

2.2. GPRS Section:-

The GPRS module shall comply with the following:

2.2.1. The module shall operate in dual Band GSM 900/1800MHz.

2.2.2. The module shall be compliant with ETSI GSM Phase 2+ Standard.

- Class 4 (2W) @ 900 MHz
- Class 1 (1W) @ 1800 MHz

2.2.3. The module shall support Point-to-Point transmission and Cell Broadcast features.

2.2.4. Serial binary and suitable data format for data transfer.

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2.2.5. Short messaging service (SMS) features.

- Text and PDU
- Point to point (MT/MO)
- Cell broadcast

2.2.6. GPRS MODEM should support both data and SMS transmission.

2.3. SIM Card Section:-

2.3.1. For placing the SIM Card, a SIM Card Holder shall be provided on the motherboard and shall be accessible only by opening/sliding the cover, GPRS MODEM shall not be opened for replacing the SIM card.

2.3.2. The SIM Card supported shall be of 1.8V/3V Interface.

2.3.3. Interlocking facility shall be provided under the device cover.

2.3.4. SIM card slot/cover shall be sealed to avoid access to unauthorized. The offered GPRS MODEM shall comply for ESD as per IEC61000-4-2.

2.4. Communication Interface & Capabilities:-

2.4.1. A RS232 Serial Link supporting up to 115,200 bauds with an auto- bauding option shall be provided. However the data transfer rate for remote meter reading shall depend on meter compatibility.

2.4.2. The RS232 output shall be provided on a 9-pin female//RJ11 connector which can be connected to electronic energy meter's optical / serial communication port through suitable communication cable.

2.4.3. The GPRS MODEM shall be suitably pre-configured for meter reading & transferring the data to the DC.

2.4.4. GPRS MODEM should be Quad band GPRS MODEM capable of operating at 900 and 1800 MHz GSM transmission.

2.4.5. GPRS MODEM should support both Data and SMS transmission. It should have GPRS features.

2.5. RF section:-

A SMA interface shall be provided on the GPRS MODEM to which either a fixed or a wired (with magnetic base) Dual Band built-in Antenna of minimum -6dbi gain can be connected.

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Provision shall also be made to connect 14dbi high gain external yagi antenna to improve poor signal strength.

2.6. Network Identification Section:-

For determining the health of the device an LED shall be provided on the GPRS MODEM which will depict the current functioning status (power up/ registered in network/transmitting data).

2.7. Data Features for GSM/GPRS module :

Internet Services: TCP, UDP, HTTP, FTP

GPRS Data transmission features:-

GPRS Class B Multi slot class 12 or class B Multi slot class 10

- Packet channel support : PBCCH
- Coding Schemes: CS1 to CS4 compliant with SMG32 (Release 97)

3. EMI/EMC Specifications:-

The GPRS MODEM shall meet the following EMI/EMC specifications:

- Electrostatic Discharge IEC61000-4-2
- Fast Transient Burst IEC61000-4-4
- Surges Immunity IEC61000-4-5
- Conducted Emission CISPR22 (class B)

4. Mechanical Specifications:-

The Mechanical Specifications of the GPRS MODEM shall be as follows:

- GPRS MODEM shall be compact, as this device will be placed in a compact meter boxes,
- Mounting Arrangement: Easy mounting arrangement with a hook Provision on the GPRS MODEM supported with the screw fixing arrangement. So that it will be comfortably fixed inside the meter Box.
- The GPRS MODEM shall comply with IP55 rating.
- Sealing Arrangement: The Top and Base Cover shall have a suitable sealing arrangement so that the GPRS MODEM cannot be tampered.
- The GPRS MODEM shall be a compact model housed in a polycarbonate/ engineering plastic enclosure.

5. Environmental specifications:-

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The GPRS MODEM shall meet the following environmental specifications:

Temperature: -10 degrees to +55 degree and Humidity: up to 95% RH (non - condensing)

6. Functional specifications:-

The GPRS MODEM should be an intelligent device and capable of providing the following functionalities on GPRS network:

- The GPRS MODEM should be capable for long duration data transfer to central station as per configuration via suitable GPRS MODEMR software.
- When the GPRS MODEM is busy in collecting the data from the meter and the request comes to get the data, then priority shall be given to request from central station software.
- Power Outage Notification: In the event of an outage, the GPRS MODEM should be able to send the outage alert to Data center, there after SMS to predefined number to notify the outage event with date and time of occurrence/restoration.
- The GPRS MODEM should be capable of operating with SIMs of local GPRS/ Service provider in the area.
- GPRS MODEM should be capable for continuous working for 24 hours every day under field conditions, even when enclosed in Metering Cubicles at Consumer sites.
- Software shall have facility for Auto-Scheduler to enable automatic/Unattended data collection during night hours.

6.1. Data transfer in push Mode:

- By default GPRS MODEM should be configured for push mode of data transfer i.e. GPRS MODEM shall automatically establish a session with Static IP of MDA Server at DC at specified time (once in a hour/day/week/month) for the purpose of meter reading through GPRS only. This configuration of the GPRS MODEM shall be configurable remotely.
- If GPRS MODEM could not establish connection to the Server placed at Data center at specified time, then it shall retry the same as configured.

6.2. Data transfer in pull Mode

- In case the data is required on demand from the Data center end (Server end), then connection shall be established from head end to the device.

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- User shall have option to get the meter data available in the memory of intelligent AMR, invoke the Modem to read & upload the meter data.
- Provision to generate reports of successful automatic meter reading(AMR) Calls and unsuccessful AMR calls separately shall be provided.
- Provision for flexible scheduling of meter reading by AMR software automatically on a pre-defined hourly, daily, weekly or monthly basis.
- Provision shall be made to read the groups of energy meters in one go from the AMR software and the searchable by Meter number, or as a separate group.

Software requirement

1. The software supplied shall be capable of store and display following parameters

- Storing and displaying meter data according to administrative hierarchy
- Storing and displaying Tamper data recorded in meter and generation of alarms, SMS through the software
- Storing and displaying Instantaneous data
- Storing and displaying load survey data, system should be capable of storing data as and when load survey integration period is changed
- Storing and displaying TOD data
- Graphic presentation
- Capability of customized reports by users
- System should be scalable for about 15000 meters
- Use of open source platform is desirable

2. Various sample reports from our existing Base computer system

These are indicative reports. System should cover various reports in user friendly manner. The screen shots of various report available in our existing one of the software is as under.

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