Suppliers Engagement –Technical

January 2024

Observations from TEAP evaluations

Standards and Specifications

- Design the product to fulfill Eskom specifications, products supplied to other South African utilities may not meet Eskom requirements.
  - *Eskom 240-126910106, Particular requirements for smart metering system*

- Obtain third party technical specifications / standards timeously and study them thoroughly to ensure compliance. Some of the referenced technical specifications / standards are given below:

  - *STS 101-2* is obtainable from the STS Association (free for members, https://www.sts.org.za)

  - *IDIS Package 2* is obtainable from the DLMS User Association (free for members, www.dlms.com)

  - *G3-PLC* specifications are obtainable from the G3-Alliance (free for members, https://g3-alliance.com)
    NB: Most OEMs with the South African market are members of these associations / alliances

  - *NRS 049* specifications are normally issued with the tender. Alternatively, they can be obtained from the NRS Association (contact: Nomakhuwa Mthembu at MthembNJ@eskom.co.za or nrs@eskom.co.za

- Involve OEM engineering / R&D teams early in the process.

Mandatory requirements

Mandatory Requirements	**Evidence required**
Technical Schedule (mandatory requirements and functional evaluation sheet) are completed	Completed *Technical Schedule* submitted
2 (two) Samples of each tendered product submitted	Samples submitted
All meters shall be of the split meter design as defined in Eskom standard 240-126910106 clause 2.3.1	This will be determined from the submitted samples.
Meters shall be capable of bi-directional energy metering and be able to measure and record active energy (import and export) and reactive energy (Q1, Q2, Q3 & Q4). Accuracy for active energy shall be class 1 according to SANS/IEC 62055-31 or SANS 1524-1 and accuracy for reactive energy shall be class 2 according to SANS/IEC 62053-23 or SANS/IEC 62053-24. Meter shall have markings and test outputs required for active and reactive energy measured as defined and referenced in SANS/IEC 62055-31 or SANS 1524-1 and SANS/IEC 62053-23 or SANS/IEC 62053-24.	This will be determined from the submitted samples.
Commitment and declaration to fully integrate field devices (smart meters and DCUs) with Eskom approved HESs within 3 month of contract award.	Declaration in signed company letterhead.
The dimension of the meters shall be according to 8.2 of NRS049 (BS Single phase & Three Phase) and Annex C of NRS049 for Single Phase DIN-Rail meters.	This will be determined from the submitted samples.
Meter terminal connections shall be according to NRS049.	This will be determined from the submitted samples.
All submitted test samples shall be with the LLS password stipulated in Section 3 (6)	Supplier to confirm and submitted samples will be verified
HDLC optical port is used for PHASE II testing. This port is mandatory for all smart meter samples, IEC 1107 (Mode E) shall not be accepted for PHASE II testing	Supplier to confirm that the HDLC optical port is implemented
Where a data concentrator/gateway sample is submitted, the following information shall be declared: • G3-PLC pre-shared key (PSK), • G3-PLC MAC address • G3-PLC frequency (Cenelec A or FCC) • Data concentrator/gateway web interface log in credentials (at least with administrator account)	Data concentrator/gateway and meter sample(s) G3-PLC information provided in *Technical Schedule*.

Mandatory requirements observations

- Ensure that the product meets physical design requirements – e.g., terminal arrangements, dimensions of the product, etc. – these ensure that the product is physically compatible with Eskom's installation standards / practice. These are checked by the technical team, e.g., by measuring the dimensions.

- Primary smart meter function is bi-directional electrical energy and demand measurement. Ensure product is capable of measuring these according to referenced standards and have functional accuracy test outputs marked for kWh and kVArh measurements.

- Always configure DLMS, STS and/or G3-PLC passwords or encryption as required for the tender. Refrain from non-specified configurations.

- Thoroughly complete the *Technical Schedule* providing sufficient evidence for your product with Eskom specifications. Ensure that the evidence provided (i.e., manuals, certificates, etc.) respond specifically to the tender requirements and is not generic product information.

- In the *Technical Schedule* direct the technical evaluators to the exact evidence (e.g., page number, certificate, clause) that confirms compliance to a particular requirement.

Functional evaluation Test Cases

Test Case No.	Test case name	Description
TC01	Meter registration	Test that meter implements all COSEM objects and functionality that supports automatic meter registration. Check that System Title and COSEM Logical Device Name formats are according to IDIS 2. Check that DLMS security is implemented in meter firmware is at least Suite 0. For Items 1, 2 and/or 4 only - Check that smart meter and Data Concentrator comply with G3-PLC specification join process.
TC02	Remote tariff programming	Load Eskom approved tariff (e.g., Homeflex) into meter, and set energy rate (Rand/kWh) in prepayment charge tables according to tariff.
TC03	Meter reading (On demand)	Read import and export total energy registers and rate registers. NOTE 1: At its discretion, the Eskom technical team may inject import and export energy into smart meter to verify four quadrant measurement capability. Read available credit. Read STS data elements (i.e., DRN, TI, KRN, KT and SGC) from IEC 62055-41 attributes IC. Read Load Profile 1 and Load Profile 2, default profile entries, capture objects and capture period. Set LP1 and LP2 integration period to 5, 10-, 15-, 30- and 60-minutes capture period.
TC4	Meter reading (For billing)	Read Billing Profile, default profile entries, capture objects and capture period.
TC5	Disconnection and reconnection	Disconnect meter and re-connect it. NOTE 2: Disconnect Arbitrator or IDIS 2 disconnector objects may be implemented. Set smart meter power limit and verify that it disconnects when limit is exceeded.
TC6	Clock synchronisation	Synchronize meter's clock to a preselected date and time.
TC7	QoS reporting	Test that meter implements all objects and functionality that supports quality of supply reporting.
TC9	Firmware update	Test that meter implements all objects and functionality that supports firmware upgrade.
TC10	Meter supervision	Test that meter implements all objects and functionality that supports event / alarm detection and reporting.
TC11	Consumer information	Check that CIU provides relevant information during all test cases.
TC21	Prepayment	Change meter to post-payment (credit) mode. Change meter to prepayment mode (monetary currency and energy). Insert STS credit token via communication interface (monetary and energy credit). Set period and amount for standing charge collection.
TC100	Object list	Read meter's object list using Management Client and check that all objects specified in Eskom 240-126910106 clause are implemented in the meter firmware.
TC200	Data concentrator administration	Log into data concentrator web interface using admin password via local interface (e.g., LAN port). View list of meters connected to data concentrator.

Functional evaluation Observations

- All test cases are evaluated by sending DLMS messages to the smart meter through its HDLC optical port and the smart meters responses from the port or on the CIU are checked to determine compliance.

  - Ensure that all required objects are implemented and behave as required by Eskom specifications. For example, the following is evaluated:
    - Correct OBIS codes,
    - Correct data types,
    - Correct system title and Logical Device Name format,
    - STS 101-2 token format and response are correct, etc.

  - Ensure CIU displays all information required for the test cases.

- Ensure samples are configured correctly, for example:

  - G3-PLC Pre-Shared Key is the same in smart meter and data concentrator.
  - Submitted smart meter samples are pre-loaded on the data concentrator.
  - Load profile should be configured as per Eskom specification.
  - STS meter key and SGC shall be as required in the

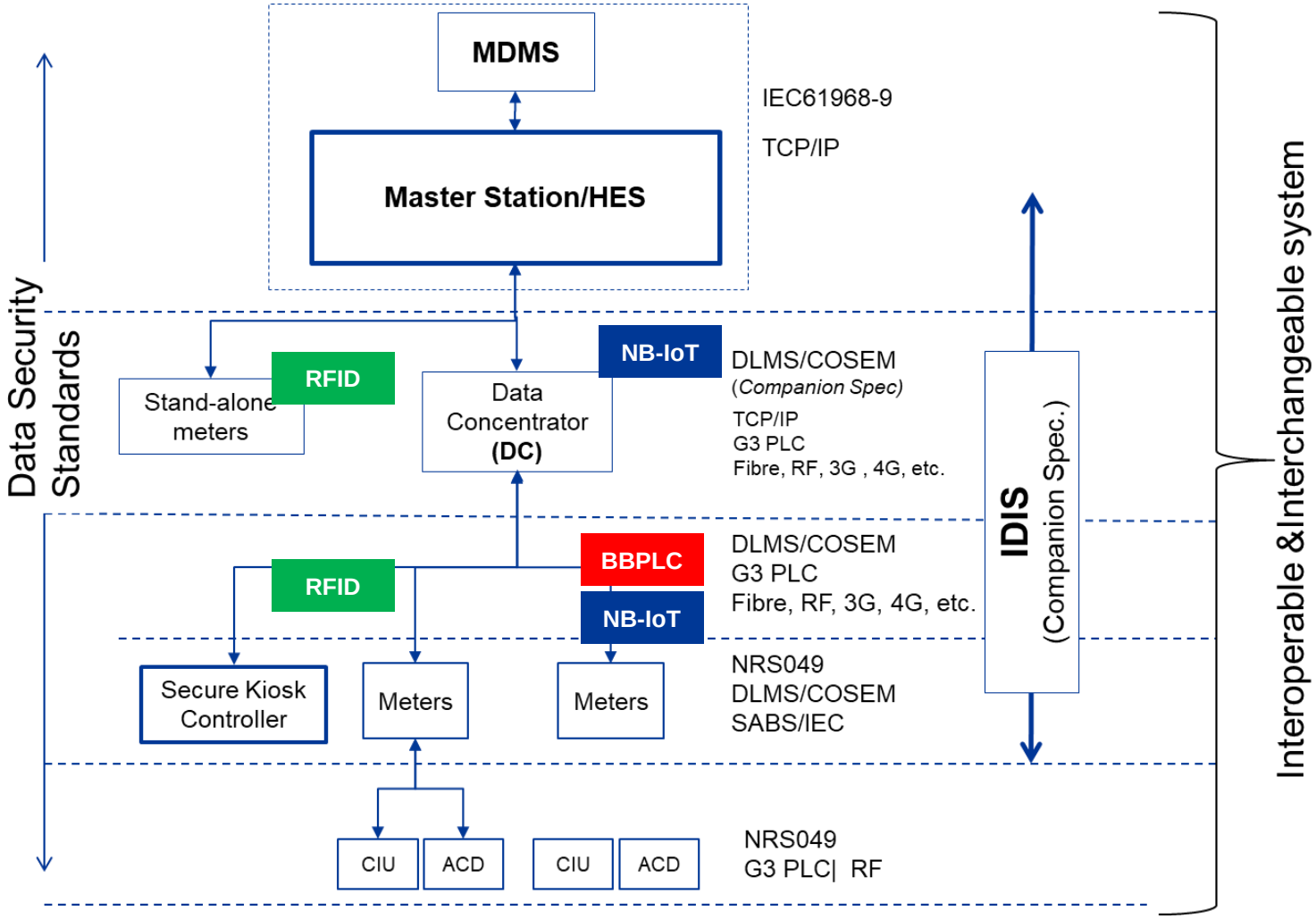
Eskom Smart Meter Standard Rev 3.1 (Draft)

Eskom Smart Meter Standard Rev3.1 (Draft)

Changes

- Reference to recently published **NRS 049-2:2024**
- Inclusion of Broad Band PLC and NB-IoT
- Requirement for modular telecommunication module – to accommodate future technologies
- Data concentrator / network gateway with sensors / measurement capabilities (additional external ports)
  - Temperature
  - Smoke detection
  - Humidity
  - Power quality
  - Partial discharge
  - Total energy dispensed by the transformer.
- Requirement for non-proprietary interface between HES and data concentrator / network gateway (IEC 62056-9-1 web service proposed)
- Requirement for RFID tagging
  - Meters and Data Concentrators shall be RFID tagged for the purposes of asset tracking.
  - The RFID tag shall be affixed to the Meters and Data Concentrator such that it possible to read the RFID tag with the applicable scanner when the meter installed without the need to first disconnect and remove the meter or Data Concentrator from the installation point.
  - The RFID tag number shall correspond or match the serial number of the meter or Data Concentrator.

Eskom Smart Meter Standard Rev3.1 (Draft)



Comments on draft specification due on 28 January 2025

To be directed to Commercial

Email Title: Eskom Smart Meter Standard

BBPLC

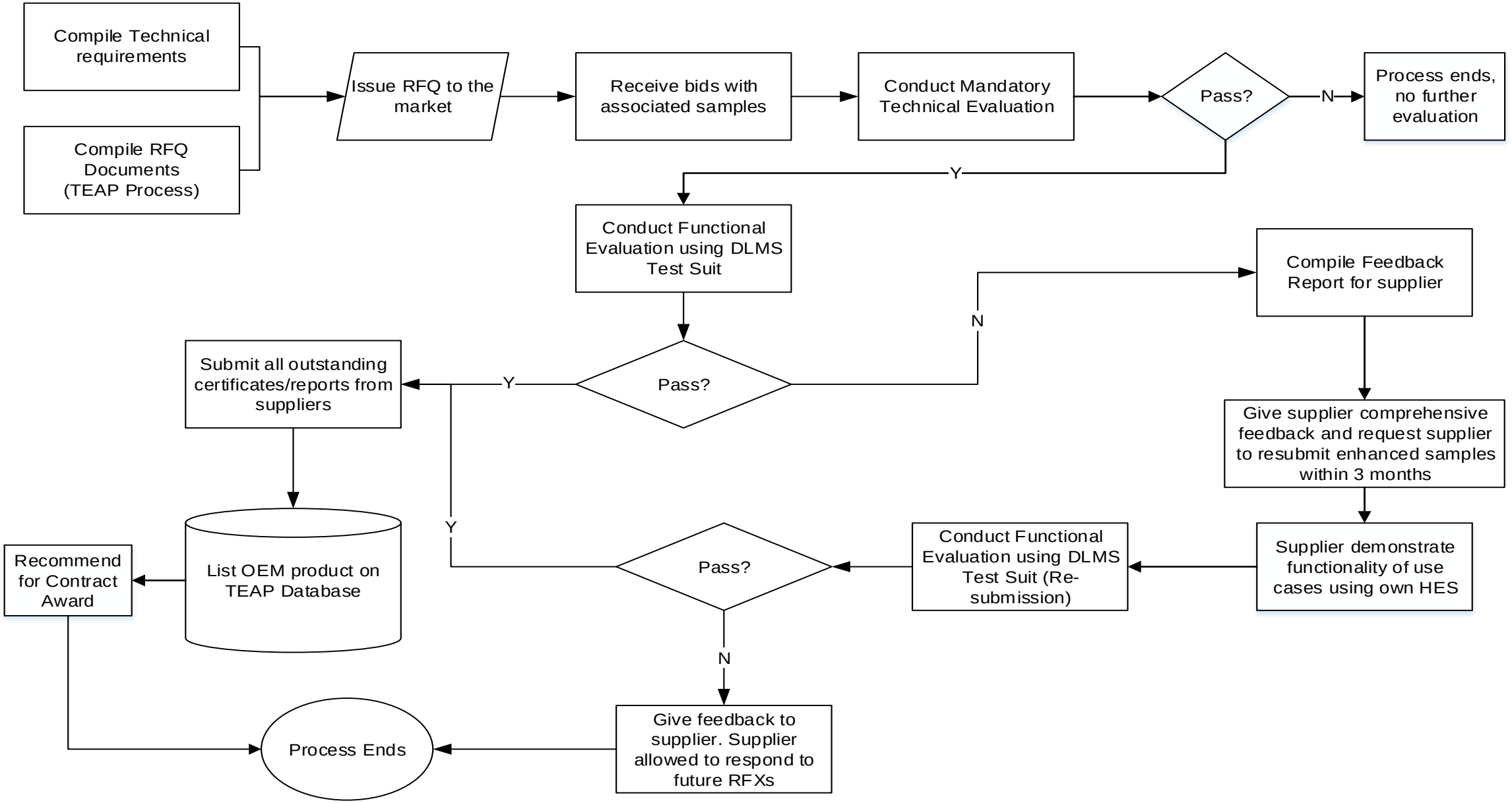
Information required on BB-PLC in AMI

1. List of international technical, environmental and safety standards which your BB-PLC conforms to.
2. Specify hardware (coupling devices, filters, signal amplifiers and repeaters your solution use)
3. What is the operation frequency for your BB-PLC?
4. Has your BB-PLC been approved by regulatory body such as ICASA or an equivalent of it from other countries?
5. What maximum coverage distance can your equipment achieve? (specify the conditions necessary for this performance)
6. Specify the power requirements for BB-PLC systems, eg transmission power and power consumption for every component.
7. Specify backup power systems requirements
8. What maximum data rates/bandwidth does your equipment supports?
9. What network topology does your equipment supports?
10. What modulation techniques does your equipment use?
11. Which technique does your equipment use to overcome noise and interference?
12. How does your BB-PLC protocol stack integrate with the DLMS/COSEM application layer (IEC 62056-5-3)?

Supporting documentation required

1. Product manuals /Equipment data sheets.
2. Technical System layout drawings (Network drawings)
3. Previous installation base (where applicable)
4. Product ranges (catalogue)
5. Provide protocol stack diagram if available and any other supporting technical documentation.

Evaluation Process



After Contract award

- Training
- Tariff scheme development
- HES integration
- Field technical support
- Listed products cannot modified or enhance without Eskom approval (e.g. firmware changes)

- Comments on draft specification due on 28 January 2025
- To be directed to Commercial
- Email Title: Eskom Smart Meter Standard