MARKET OPERATOR

SPECIFICATIONS FOR THE PROGRAMMABLE DIGITAL GRID ENERGY METERS

The following are the minimum technical specifications for the programmable electronic grid energy meters for installation at the Nigerian Electricity Trading Points.

POWER SUPPLY:

Voltage: -   3x 11000/110V, 33000/110V, 132000/11 and 330000/110V.

Current: -   3 X -/1A, 3 X-/5A

Frequency: –   50Hz Tolerance $\pm$2%

System: -   3-Phase 3 wire (or 3-Phase 4 wire for 11,) 33, 132 and 330KV

Secondary voltage variation: 85V—135V

Supply voltage variation $\pm$5%

Internal Battery: -   Lithium CR20255 –1HF or an equivalent giving a total Stand-by life of 10 years (minimum)

Auxiliary Battery: -   Embedded in the meter for down-loading stored data during power outage

ACCURACY CLASS

- (1) **0.2**   for 132,330kv voltage levels and for loads above 50MVA.
- (2) **0.5**   for 11 and 33kv voltage levels.
- *__MUST BE DLMS/COSEM COMPLIANT -__* For interoperability with other meter makes, with respect to AMR.

ENVIRONMENTAL CONDITIONS

Operating Temp Range: - -15°c to 60°c

Storage Temp Range: - -15°c to $+70^{o}$c

Humidity: - Annual mean 75% (for 30 days spread over one year, 95%)

BURDEN

Voltage Circuit: - 1.12W or 2.45VA

Current Circuit: - /5A Meter 0.12 VA

/1A Meter 0.02VA

CASING

Material:- The casing shall be for panel or wall mounting with fire retardant type of Bakelite or Polycarbonate.

Screws: - All Screws should be stainless steel or nickel – plated brass.

Current Terminals: Screw type 2 per terminal (6mm)

Cable size: $4.0mm^2$.

Voltage Terminals: Screw type: 1 per terminal (4mm)

Cable: $2.5mm^2$.

Auxiliary Terminal: Screw type: 3mm

Cable: $1.5mm^2$.

INSULATION

- 2.0 KV for 1 minute for current circuit
- 2.0 KV for 1 minute for voltage circuit
- 4.0 KV for 1 minute for current, voltage, all relay contacts plus auxiliary inputs plus the RS232/485 ports together.
- 4.0 KV for 1 minute between all relay contacts and the auxiliary input plus communication port (RS232 or RS485)
- 4.0 KV for 1 minute between one set of relay contacts and the other relay contacts.

NAME PLATE

The name plate should contain the following:-

- Meter serial number
- Operating current and voltage
- Accuracy class
- Frequency
- Pulse nominal value etc.

MEASURED QUANTITIES
- Import KWH
- Export KWH
- Import KVArH
- Export KVArH
- Apparent KVA maximum Demand
- Four Quadrant KVArH
- Load Profile (180-450days)
- Line parameters e.g. line voltage, current, power factor, active and reactive power, phase angle, frequency and phase rotation.

TARIFFICATION:-   Time of use register
                            Maximum demand register
                            Integration period options: 15 min, 30 minutes etc.
                            Switching times
                            Seasons times
                            Billing dates
                            End of billing dates etc.

DISPLAY
The display should be capable of displaying Default, Customer and Utility modes.

EVENTS MONITORING

The meter should be able to monitor the following events among others:-

- Battery fail indication
- Battery elapse warning
- Meter fail Indication
- Reverse run warning
- Over Current
- Phase failure
- Partial demand
- Meter communication event
- Time and date of events, etc.

DATA STORAGE

It should be capable of storing measured quantities as end-month historical values for up to 16 months.

COMMUNICATION

- RS232 and RS485 must be fitted as standard
- Optical port: - Opto – electronic, bi-directional
- Protocol: -   Flag IEC 62056 - 21 (formerly IEC 61107)
- ***Built-in GSM/GPRS Modem with omni-directional antenna***
- ***Provision for external modem may be considered***

SAFETY CLASS

- Category -   EN61010, EN61011 Class II

REAL TIME CLOCK

- Type: -   Capable of synchronizing to A.C. Supply or to a crystal Oscillator
- Accuracy: -   Better than 0.5 of a second per day at $50^{o}C$