भारतीय मानक
Indian Standard

IS 15959 (Part 2) : 2016

(Reaffirmed 2021)

विद्युत मीटर रीडिंग, शुल्क और लोड नियंत्रण के लिए आंकड़ों का विनिमय — सहयोगी विशिष्टि

भाग 2 स्मार्ट मीटर

Data Exchange for Electricity Meter Reading, Tariff and Load Control — Companion Specification

Part 2 Smart Meter

ICS 17.220.20; 35.100.01; 91.140.50

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Equipment for Electrical Energy Measurement, Tariff and Load Control Sectional Committee, ETD 13

FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards, after the draft finalized by the Equipment for Electrical Energy Measurement, Tariff and Load Control Sectional Committee had been approved by the Electrotechnical Division Council.

This standard is published in two parts. The other part of this standard is IS 15959 (Part 1) : 2011 Data Exchange for electricity meter reading, tariff and load control — Companion specification : Part 1 Static energy meter.

Smart meter is a composite unit consisting of metrology elements, two way communication module/modules and control elements. It will have functions such as measurement, computation, event capturing, storing, communication and control. The smart meter would be required to provide data and information that are needed by various smart grid applications.

With development of smart meter standard (*see* IS 16444 : 2015 'a.c. Static direct connected watthour smart meter Class 1 and 2 — Specification'), it necessitated for enhancement of existing communication protocol standard: IS 15959 (Part 1) : 2011 'Data exchange for electricity meter reading, tariff and load control - Companion Specification Part 1 Static energy meter'. This standard addresses the additional requirements for data exchange for smart meter. The Committee initiated the work of formulating this standard applicable for smart meters in addition to IS 15959 (Part 1).

Bureau of Indian Standards has formulated many metering standards such as IS 13779 : 1999 'a.c. Static Watthour meters (Class 1 and 2) (*first revision*)', IS 14697 : 1999 'a.c. Static transformer operated watthour and var-hour meters, class 0.2S and 0.5S-Specification', IS 15884 : 2010 'Alternating current direct connected static pre-payment meters for active energy (Class 1 and 2) — Specification' and IS 15959 (Part 1) : 2011 'Data exchange for electricity meter reading, tariff and load control — Companion Specification : Part 1 Static energy meter'. This standard on the smart meter has been formulated based on the technical specifications and functional requirements published in June 2013 by Central Electricity Authority.

This standard, a companion specification, is intended to provide a field level basis for efficient and secure transfer of electricity metering data in an open manner with judicious application of features and protocols of the International Standards.

While formulating this standard it has been endeavoured not to contradict on principle of the adopted/referred standards of other international organizations/institutions on which this document is based upon. However, in case of any divergence/disparity, not amounting to conflict of interpretations that may be revealed later, provisions of this standard will prevail.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

DATA EXCHANGE FOR ELECTRICITY METER READING, TARIFF AND LOAD CONTROL — COMPANION SPECIFICATION

PART 2 SMART METER

1 SCOPE

1.1 This standard (Part 2) is intended for use along with IS 15959 (Part 1) on data exchange for electricity meter reading, tariff and load control for proper application/implementation of the provisions thereof. This standard is applicable for a.c. static direct connected watthour smart meter Class 1 and 2 that are designed as per IS 16444. Also, COSEM objects, interface classes, their instances, attributes and methods, event and status tables, DLMS services and communication profile that are to be supported are included to enable data exchange to and from Smart Meter.

1.2 This standard (Part 2) also specifies the protocol and communication testing requirements.

1.3 The smart meter shall support the following features/services:

a) Smart meter association requirements,
b) In home display services,
c) Push services,
d) Advanced security profile,
e) Communication profile,
f) Firmware upgrade,
g) Connect/disconnect services, and
h) Parameter list for smart meters.

The above features are included to support the functional requirements of Smart Meter that are listed under **11** of IS 16444.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No./International Standards	Title
15959 (Part 1) : 2011	Data exchange for electricity meter reading, tariff and load control Companion specification : Part 2 Static energy meter
16444 : 2015	a.c. static direct connected watthour smart meter class 1 and 2 — specification
IEC 62056-5-3 : 2013	Electricity metering data exchange-The DLMS/COSEM suite - Part 5-3: DLMS/COSEM application layer
IEC 62056-6-2 : 2013	Electricity metering data exchange-The DLMS/COSEM suite - Part 6-2: COSEM interface classes
DLMS UA 1000-1 Ed. 12.0	COSEM Interface Classes and OBIS Object Identification System.

3 DEFINITIONS

For the purpose of this standard the definitions given in IS 15959 (Part 1) and the following shall apply.

3.1 Import Energy — This refers to energy that flows from grid to customer premises load. It is also referred to as forward energy.

3.2 Export Energy — This refers to energy that flows from customer premises to grid. It is also referred to as reverse energy.

3.3 Last Gap — It is a notification sent from the smart meter suggesting that it is not receiving electricity from the mains.

3.4 First Breath — It is a notification sent from the smart meter suggesting that it is now receiving electricity from the mains.

4 SMART METER ASSOCIATION REQUIREMENTS

The smart meter shall support the following association requirements mentioned in Table 1 in addition to the associations mentioned in IS 15959

Table 1 Association Requirements

(*Clauses* 4 *and* 5)

Sl No.	Association	Properties
(1)	(2)	(3)
i)	Public client	As mentioned in the **5.2** of IS 15959 (Part 1)
ii)	Meter reader	As mentioned in the **5.2** of IS 15959 (Part 1)
iii)	Utility setting	As mentioned in the **5.2** of IS 15959 (Part 1)
iv)	Push (Pre-established)	Push selected parameters
v)	Firmware upgrade	Used only for firmware upgrade
vi)	IHD (if applicable)	Push selected parameters Push, read and write for utility messages Read only for identified objects

(Part 1). The new associations included in this standard are for push [*see* **1.3**], firmware upgrade [*see* **1.3**] and IHD [*see* **1.3**].

The details of properties, security and services for various associations shall be as per Table 2 and are applicable to all ports and connectivity.

5 IN HOME DISPLAY (IHD)

The IHD, when present is expected to require services from the smart meter. The IHD shall be designed to function as a DLMS/COSEM Client device and communicate with the smart meter using a dedicated Application Association as mentioned in Table 1. The connectivity options are mentioned in **5** of IS 16444. The features and other technical requirements of IHD are not part of this standard.

6 PUSH SERVICES IN SMART METER

This standard has made a provision for the smart meter to automatically notify data, events, and messages to a destination client system in an unsolicited manner (without a request from a client). For this purpose the smart meter shall invoke the push services of DLMS/COSEM. The Push setup instances shall be controlled by triggers. The triggers can be an instant of time, or a parameter deviating threshold or any abnormal events. The DLMS/COSEM push mechanism follows the publish/subscribe method. The generic push mechanism is illustrated in Fig 1.

Each of the trigger shall call a script entry in the push script table which in turn invokes a push set up object for publishing the message/data/event.

The push operation has to be modelled with the 'Push setup' IC. The push object list attribute contains a list of references to COSEM object attributes to be pushed. The smart meter shall exclusively use 'Push setup interface class: Interface class 40' which has the required attributes as illustrated (with example values) in Fig. 2.

Table 2 Detailed Association Properties for the Smart Meter

(*Clauses* 4 *and* 7.1)

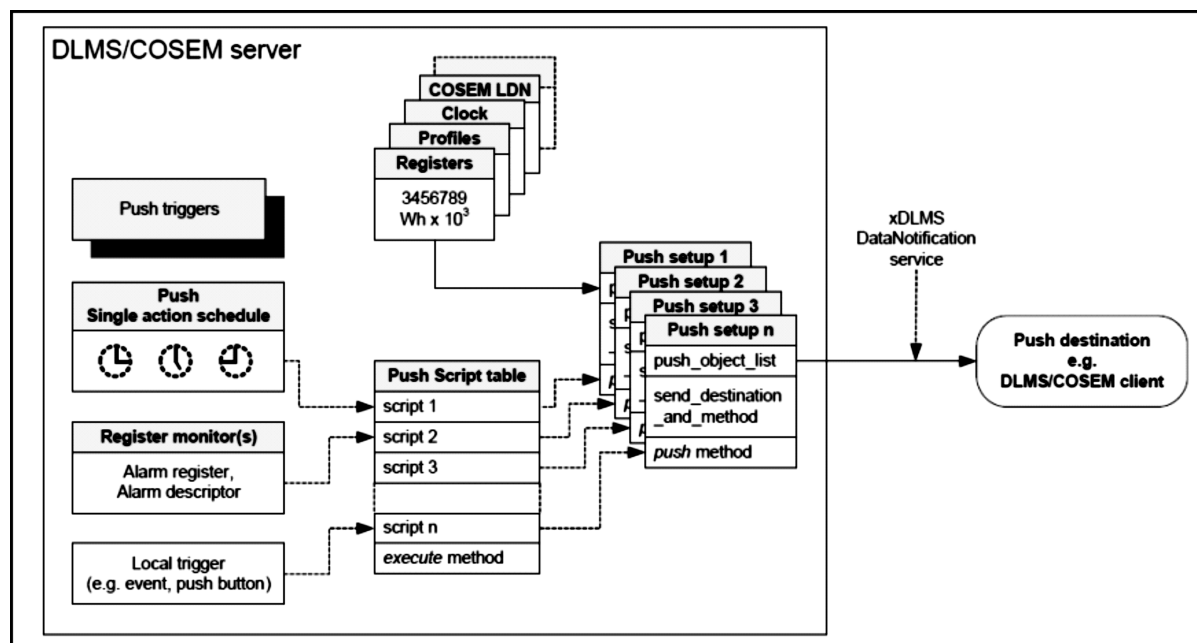| Sl No.	Feature	PC	MR	US	PUSH (Pre-established)	Firmware Upgrade	IHD (Pre-established)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	SAP Address pair in format (client, server)	(16,1)	(32,1)	(48,1)	(64,1)	(80,1)	(96,1)
ii)	Application context – Basic security	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
iii)	Application context – Advanced security	LN without ciphering Not applicable	LN-Ciphered Encrypted data transfer	LN-Ciphered Authentication and encrypted data transfer	LN-Ciphered encrypted data transfer	LN-Ciphered Authentication and encrypted data transfer	LN-Ciphered Encrypted data transfer
iv)	Sign on authentication Mechanism – 7.3.7.2 of IEC-62056-5-3	Lowest level security	Low Level security (LLS)	High Level security (HLS)	Not applicable	High Level security (HLS)	Low Level security (LLS)
v)	Services required in conformance block	Get	Get, Get with block transfer, Selective access	Get, Set, Action, Get and Set with block transfer, Selective Access, Data notification, General block transfer	Data notification, General block transfer	Get, Set, Action, Set with Block transfer,	Get, Set, Get with Block transfer,
vi)	OBIS Code for Association	0.0.40.0.1.255	0.0.40.0.2.255	0.0.40.0.3.255	0.0.40.0.4.255	0.0.40.0.5.255	0.0.40.0.6.255
vii)	OBIS Code of Security Setup object (for Advance Security Profile)	Not applicable	0.0.43.0.2.255	0.0.43.0.3.255	0.0.43.0.4.255	0.0.43.0.5.255	0.0.43.0.6.255

Fig. 1 COSEM Model of Push Operational Mechanism an Illustration

Fig. 2 Push Interface Class Structure

The trigger, for example can be a single action scheduler. The single action scheduler invokes the script meant to perform the desired action of notifying the client of identified data/message.

These Push setup instances shall be controlled by a single instance of Script table objects (class_id = 9) with push script table object identifier < 0.0.10.0.108.255 >. This push script table shall have five scripts as given in Table 3. Each script shall call the Push method of the respective Push setup instance mentioned above. This standard has identified five push setup instances and are as listed in Table 3.

Table 3 Objects for Scripts in the Push Script Table

(*Clause* 6)

Sl No. (1)	Identified Push Instance (2)	Push Setup Instance (OBIS) (3)	Push Script Table Number (4)	Usage (5)	Triggering Object OBIS and IC (6)
i)	SM to HES (data)	0.0.25.9.1.255	1	Intended to be used by smart meter to send data to HES	0.0.15.0.4.255 22 (Single Action Schedule)
ii)	HES to IHD	0.0.25.9.2.255	2	Intended to be used by smart meter to send the message received from HES to IHD	0.0.16.0.1.255 21 (Register monitor)
iii)	IHD to HES	0.0.25.9.3.255	3	Intended to be used by smart meter to send the message received from IHD to HES	0.0.16.0.2.255 21 (Register monitor)
iv)	SM to IHD	0.0.25.9.4.255	4	Intended to be used by smart meter to send the data to IHD	0.0.15.1.4.255 22 (Single Action Schedule)
v)	SM to HES (event)	0.0.25.9.5.255	5	The script shall be called through an internal mechanism on occurrence of events. There is no IC class or OBIS associated with this action	

NOTES

1 In case of Register Monitor for HES to IHD, the monitored register shall be SMO1 object.

2 In case of Register Monitor for IHD to HES, the monitored register shall be SMO2 object.

6.1 The function of each of the five identified push instances shall be as follows.

6.1.1 *Periodic Push (SM to HES): OBIS <0.0.25.9.1.255>*

In this service the selected objects list is to be periodically notified by smart meter to HES. The data list of up to 10 objects shall be selected by the buyer for the instantaneous parameters table only. The structure of data is shown in Table 4.The other attributes of Fig.2 to be decided between the buyer and the seller and implemented as per Table 3.

Table 4 Smart Meter Data to HES

(*Clause* 6.1.1)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attributes	Access Right
(1)	(2)	(3)	(4)	(5)
i)	Device ID	0.0.96.1.2.255	1/2	Read
ii)	Push setup ID	0.0.25.9.1.255	40/1	Read
iii)	Real time clock – Date and time	0.0.1.0.0.255	8/2	Read
iv)	Instantaneous. parameter 1	OBIS 1		Read
v)	Instantaneous. parameter 2	OBIS 2		Read
vi)	Instantaneous. parameter 3	OBIS 3		Read
vii)	Instantaneous. parameter 4	OBIS 4		Read
viii)	Instantaneous. parameter 5	OBIS 5		Read
ix)	Instantaneous. parameter 6	OBIS 6		Read
x)	Instantaneous. parameter 7	OBIS 7		Read
xi)	Instantaneous. parameter 8	OBIS 8		Read
xii)	Instantaneous. parameter 9	OBIS 9		Read
xiii)	Instantaneous. parameter 10	OBIS 10		Read

NOTE — Device ID shall be a combination of 3 letter Manufacture FLAG ID + Serial number.

6.1.2 *Utility Message (HES to IHD) - OBIS <0.0.25.9.2.255>*

In this service utility announcement from HES in the form of messages is to be notified by the smart meter to IHD. The HES shall transmit such messages by setting value of 'Special Message Object 1' to smart meter as per Table 5 which also gives the capture object with IC and attribute. The other attributes of Fig. 2 to be decided between the buyer and the seller and implemented as per Table 3 and **6.1.6**.

Table 5 Message to IHD

(*Clause* 6.1.2)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attributes	Access Right
(1)	(2)	(3)	(4)	(5)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8/2	Read
ii)	Push Setup ID	0.0.25.9.2.255	40/1	Read
iii)	Special Message Object 1 (SMO 1)	0.0.96.13.1.255	1/2	Read/Write

6.1.3 *Consumer Message (IHD to HES) - OBIS <0.0.25.9.3.255>*

In this service consumer response (requests, acknowledgements and the like) from IHD in the form of messages is to be notified by the smart meter to HES. The IHD shall write such response as 'Special Message Object 2' in to smart meter as per Table 6 which also gives the capture object with IC and attribute. The other attributes of Fig. 2 to be decided between the buyer and the seller and implemented as per Table 3 and **6.1.6.**

Table 6 Message to HES

(*Clause* 6.1.3)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attributes	Access Right
(1)	(2)	(3)	(4)	(5)
i)	Device ID	0.0.96.1.2.255	1/2	Read
ii)	Push setup ID	0.0.25.9.3.255	40/1	Read
iii)	Real time clock – Date and time	0.0.1.0.0.255	8/2	Read
iv)	Special message object 2 (SMO 2)	0.0.96.13.2.255	1/2	Read/Write

6.1.4 *Periodic Push (SM to IHD) OBIS <0.0.25.9.4.255>*

In this service the selected objects list is to be periodically notified by smart meter to IHD. The object list of maximum of up to 5 objects may be selected by the buyer from Table A1 for single phase meters and A14 for three phase meters and the other attributes of Fig. 2 to be decided between the buyer and the seller and implemented as per Table 3. The minimum object list shall be as per Table 7.

Table 7 IHD Object List

(*Clause* 6.1.4)

Sl No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attributes
(1)	(2)	(3)	(4)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8/2
ii)	Push Setup ID	0.0.25.9.3.255	40/1
iii)	Cumulative Energy, kWh (import) – From the beginning of the current billing period	1.0.1.9.0.255	3/2
iv)	Parameter 2 from Table A1 or A5	OBIS 2	–
v)	Parameter 3 from Table A1 or A5	OBIS 3	–
vi)	Parameter 4 from Table A1 or A5	OBIS 4	–
vii)	Parameter 5 from Table A1 or A5	OBIS 5	–

6.1.5 *Event Push (SM to HES) - OBIS <0.0.25.9.5.255>*

In this service the smart meter is to report to HES, the

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status change of any of the identified events. The mechanism is through PUSH. An Event Status Word (ESW) of 128 bit size is identified for this purpose. The object identifier for ESW is given in Table 9. Each of the bits in ESW shall reflect the current state of the event and are mapped against each of the identified events and listed in Table 10. The unused bits are left for future use. Whenever there is a change of status of any one event mapped in to ESW the smart meter shall push the object lists in Table 8.

Table 8 Object list of Event Push to HES

(*Clause* 6.1.5)

Sl No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attributes
(1)	(2)	(3)	(4)
i)	Device ID	0.0.96.1.2.255	1/2
ii)	Push Setup ID	0.0.25.9.3.255	40/1
iii)	Real Time Clock – Date and Time	0.0.1.0.0.255	8/2
iv)	Event Status word 1 (ESW 1)	0.0.94.91.18.255	1/2

Table 9 Event Status Word

(*Clause* 6.1.5)

Sl No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attributes
(1)	(2)	(3)	(4)
i)	Event status word 1(ESW 1)	0.0.94.91.18.255	1/2

6.1.6 *Special Message Objects (SMO) for HES – IHD Communications*

The special message objects are chosen for notifying messages between HES and IHD using Push services through the meter. A new set of parameters are considered for the object list of the IHD Association, called 'Special Message Objects' which will be realized as a Data instance (IC-01). The meter will initiate the push upon receipt of the special message. The assigned OBIS code, IC and attribute are given in Table 11.

The data type of the 'Value' attribute (attribute id – 2) shall be 'octet-string' which stands for binary strings. This object shall have a maximum length of 128 bytes for the 'Value' attribute.

The SMO 1 shall be used for carrying announcements and informational messages required to be displayed on the IHD.

The SMO 2 shall be used for carrying acknowledgments/ other messages from IHD to the HES.

Table 11 Special Message Object Instances

(*Clause* 6.1.6)

Sl No.	Special Message Objects - SMO	IC/ Attribute	OBIS code A.B.C.D.E.F	Purpose
(1)	(2)	(3)	(4)	(5)
i)	SMO 1	1/2	0.0.96.13.1.255	For notification from HES to IHD
ii)	SMO 2	1/2	0.0.96.13.2.255	For notification from IHD to HES

Table 10 Event Status Bit Mapping

(*Clause* 6.1.5)

Bit No.	Event id – Description	Bit No.	Event id – Description
	Three phase meter:		*Single phase meter:*
0	1/2 - R Phase - Voltage missing for 3 phase meter (Occurrence/Restoration)	51	69/70 – Earth Loading
1	3/4 - Y Phase - Voltage missing		*Common to 3 Phase and single phase meter*
2	5/6 - B Phase - Voltage missing	81	201/202 – Influence of permanent magnet or ac/dc electromagnet
3	7/8 – Over voltage in any phase	82	203/204 – Neutral disturbance – HF, dc or alternate method
4	9/10 – Low voltage in any phase	83	251 – Meter cover opening
5	11/12 – Voltage unbalance	84	301/302 – Meter load disconnected/Meter load connected
6	51/52 –R Phase current reverse (Import type only)	85	Last Gasp – Occurrence
7	53/54 – Y Phase current reverse (Import type only)	86	First Breath – Restoration
8	55/56 – B Phase current reverse (Import type only)	87	Increment in billing counter (Manual/MRI reset)
9	63/64 – Current unbalance		
10	65/66 – Current bypass/short		
11	67/68 – Over current in any phase		
12	205/206 – Very low PF		

NOTES

1 The bit position in the table is fixed. The required event ids may be selected out of the above table by buyer for ESW.

2 Bits associated with events which are not applicable shall always be set to '0'. In case of event ids the odd number is for occurrence and even number is for restoration unless specified differently.

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7 ADVANCED SECURITY PROFILE

The requirement for advanced security is outlined in **7.1.2** of IS 15959 (Part 1) is applicable. The same is expanded here for smart meter.

7.1 Encryption For Data Communication

The confidentiality of data communicated between the smart meter and the client is to be handled by the encryption mechanism chosen in the application context. Associations utilizing the 'Logical Name with ciphering' application context provide encryption/decryption services for data. Ciphering may be authentication, encryption or both. Table 2 specifies the requirements for advance security under each of the associations.

7.2 Encryption and Authentication For Data Transport

The security of data communicated between the meter (server) and the client after establishment of the Application Association is to be handled by the following settings for the associations that are required to support the advanced security profile.

a) Selection of Application Context – 'Logical Name with Ciphering'. This is to be done during Application Association establishment.

b) Value of the 'security policy' attribute (attribute 2) of the Security Setup object (class_id = 64 version 0) for the association shall be set appropriately for each Association to meet the requirements specified in Sl No. (iii) of Table 2.

c) Value of the 'security suite' attribute (attribute 3) of the Security Setup object (class_id = 64 version 0) for the association enum =0 indicate the use of 'AES-GCM-128 for encryption and authentication and AES-128 for key-wrapping'. Associations that are required to support Advanced Security Profile are required to be objects of the IC: 15, version:1 Interface Class (*see* **7.4** of IS 15959).

d) The Association object is required to carry the OBIS code of the corresponding Security-Setup object in attribute 9 [security_setup_reference *see* **7.2** of IS 15959 (Part 1)]. Definition of the system Title format and structure for Indian Companion Specification shall be as below:

System Title – Unique code (64 bits) that uniquely identifies each smart meter instance shall be a concatenation of a 3 character unique manufacturer code and a 5 byte unique serial number of the meter.

7.3 Key Requirements and Handling

7.3.1 *Master Key*

Every meter is pre-installed with a master key. HES have a record of the master key of each meter in the system. The master key is a private key and its confidentiality is to be preserved. The master key is never transmitted between the clients and servers of the system.

The smart meter shall be provided with a 'Master Key'. The utility shall modify the unique master key and further responsibility of safety, security, management of master key will be primarily with the utility.

8 IP COMMUNICATION PROFILE SUPPORT

Modern smart meters are expected to exceed the geographical limitations of conventional last-mile communication technologies by adopting the latest development in these technologies. Low Power Radio Frequency (LPRF) and Power Line Carrier (PLC) technologies are extending the envelope of smart meters that can be connected to the AMI System. Modern advances in these technologies provide for a dynamic self-healing mesh network that can be formed by individual smart meters, under an aggregating unit, and converged using a 6LoWPAN layer that provides for IP connectivity to each individual meter. This requires the smart meter to additionally support the TCP-UDP/IP communication profile.

Support for the TCP-UDP\IP Communication profile is mandatory for the NAN, WAN and IHD connectivity for smart meters complying with this standard. The 3-Layer CO HDLC Profile support is required only for the optical port *see* Fig. 3.

The communication setup objects applicable for smart meters are given in Table 12.

9 FIRM WARE UPGRADE

Smart meters shall support remote firmware upgrade feature. For this to be asserted the specific association with properties as mentioned in Tables 1 and 2 shall be used. Firmware upgrade shall be limited to the communication firmware only. Firmware upgrade shall use the Image Transfer classes and mechanisms specified in IEC62056-6-2 and IEC62056-5-3.

The smart meter shall contain 1 instance of the Image Transfer class (IC: 18) as in Table 13.

The Image Transfer mechanism is fully described in IEC 62056-6-2 Section 5.3.4.3 and the smart meter shall comply with this clause.
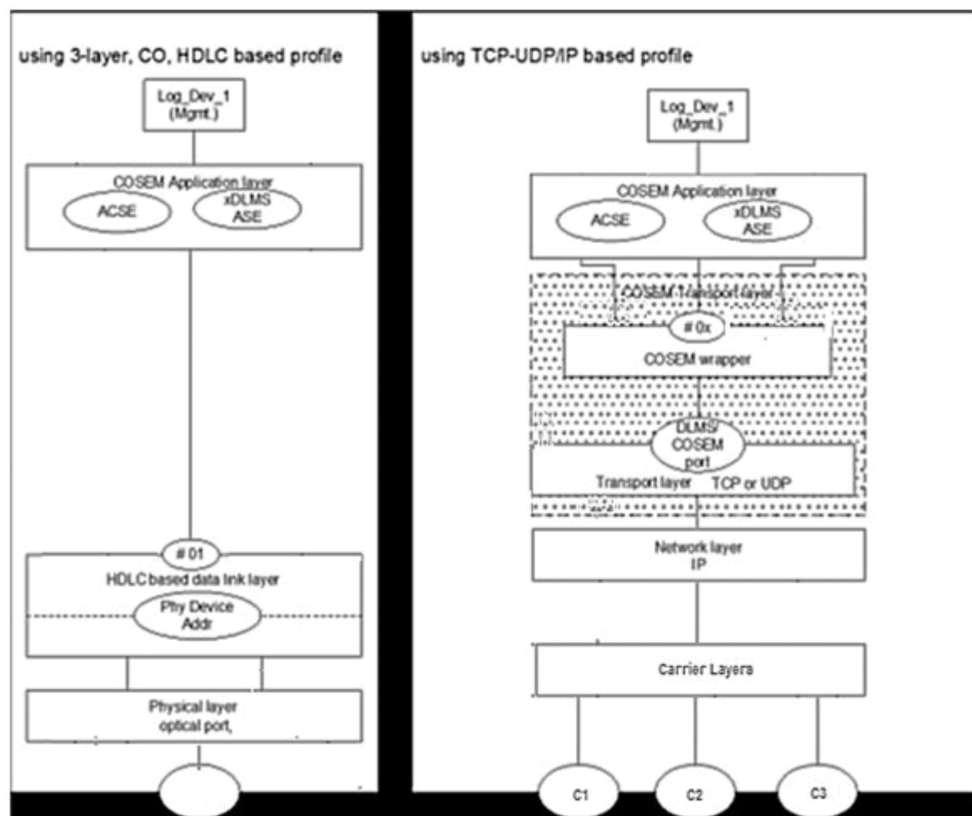
FIG. 3 COMMUNICATION PROFILES FOR SMART METERS

Table 12 Communication Setup Objects

(*Clause* 8)

Sl No.	Communication Setup and Related Objects for Serial Communication	Interface Class	OBIS Code A.B.C.D.E.F
(1)	(2)	(3)	(4)
i)	IEC HDLC Setup	23	0.0.22.0.0.255
ii)	TCP UDP Setup	41	0.0.25.0.0.255
iii)	IPV6 Setup	48	0.0.25.7.0.255

Table 13 Image Transfer Class

(*Clause* 9)

Sl No.	Function	Interface Class	OBIS Code A.B.C.D.E.F
(1)	(2)	(3)	(4)
i)	Image transfer	18	0.0.44.0.1.255

The activation of the Image is possible through the methods of the Image Transfer interface class. The 'image_activate' method of the Image Transfer object can be invoked by the client, either individually or in a broadcast message. However, the smart meter shall also support a Single Action Schedule object for performing a timed activation of the Image firmware. This shall be an instance of the Single Action Schedule (IC:22) as in Table 14.

The above instance shall be programmable to set the time at which an Image Activation script shall be executed. The script shall be contained in the Image Transfer Activation script Table. This shall be an instance of a Script Table (IC:9) as in Table 15. It shall only contain a single script that specifies the execution of the 'image_activate' method of the Image Transfer object.

Table 14 Single Action Schedule

(*Clause* 9)

Sl No.	Function	Interface Class	OBIS Code A.B.C.D.E.F
(1)	(2)	(3)	(4)
i)	Image Activation	22 – Single Action Schedule	0.0.15.0.2.255

Table 15 Instance of a Script Table

(*Clause* 9)

Sl No.	Function	Interface Class	OBIS Code A.B.C.D.E.F
(1)	(2)	(3)	(4)
i)	Image Activation - Script table	9 – Script Table	0.0.10.0.107.255

10 CONNECT/DISCONNECT

The smart meter shall support remote Connect/Disconnect services as well as local disconnect as **11** of IS 16444. For this purpose it shall use the Disconnect control Object (IC 70) as in Table 16.

Table 16 Disconnect Control Service

(*Clause* 10)

Sl No.	Function	Interface Class	OBIS Code A.B.C.D.E.F
(1)	(2)	(3)	(4)
i)	Disconnect control	70 – Disconnect Control	0.0.96.3.10.255

11 PARAMETER LIST FOR SMART METERS

The smart meters that comply with IS 16444 are categorized as:

Category D1 Single phase a.c. static direct connected watthour smart meter

D2 Three phase a.c. static direct connected watthour smart meter

NOTE — The clause reference mentioned in the following pages and notes correspond to IS 15959 (Part 1).

11.1 List of Parameters for Category D1

The parameters listed are for single phase a.c. static direct connected watthour smart meter.

The parameters identified for this are grouped under:

a) Instantaneous parameters — Table A1
b) Block load profile — Table A2
c) Daily load profile — Table A3
d) Billing profile — Table A4
e) Indian event reference tables — Tables A5 to A11
f) Name plate details — Table A12
g) Programmable parameters — Table A13

Each of the parameters is a separate entity. The OBIS code and interface class for each parameter is identified in the respective tables.

11.1.1 *Instantaneous Parameters*

Association access rights are as follows:

a) *Public client* — Read only for clock and no access for other objects.
b) *Meter reader* — Read only for all objects.
c) *Utility setting* — Read only for all objects.
d) *PUSH service* — Read only for identified objects

The instantaneous parameters are listed in Table A1.

Table A1 Instantaneous Parameters

(*Clauses* 11.1,11.1.1,11.1.2 *and* 11.1.3)

Sl. No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attributes
(1)	(2)	(3)	(4)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8/2
ii)	Voltage	1.0.12.7.0.255	3/2
iii)	Phase current	1.0.11.7.0.255	3/2
iv)	Neutral current	1.0.91.7.0.255	3/2
v)	Signed power factor	1.0.13.7.0.255	3/2
vi)	Frequency, Hz	1.0.14.7.0.255	3/2
vii)	Apparent Power, KVA	1.0.9.7.0.255	3/2
viii)	Active Power, kW	1.0.1.7.0.255	3/2
ix)	Cumulative Energy, kWh (import)	1.0.1.8.0.255	3/2
x)	Cumulative Energy, kVAh (import)	1.0.9.8.0.255	3/2
xi)	Maximum Demand, kW	1.0.1.6.0.255	4/2, 5
xii)	Maximum Demand , kVA	1.0.9.6.0.255	4/2, 5
xiii)	Cumulative power ON duration in min	0.0.94.91.14.255	3/2
xiv)	Cumulative tamper count	0.0.94.91.0.255	1/2
xv)	Cumulative billing count	0.0.0.1.0.255	1/2
xvi)	Cumulative programming count	0.0.96.2.0.255	1/2
xvii)	Cumulative energy, kWh – Export	1.0.2.8.0.255	3/2
xviii)	Cumulative energy, kVAh – Export	1.0.10.8.0.255	3/2
xix)	Load limit function status	0.0.96.3.10.255	70/2
xx)	Load limit value, in kW	0.0.17.0.0.255	71
	Load switch status - refer table A10		

NOTES

1 The above list is identified for the purpose of communication to HHU, DCU and HES.

2 The utilities may choose, based on needs, additional parameters for display purpose only.

3 The parameters at Sl No.(ix), (x), (xiii), (xiv), (xv), (xvi), (xvii) and (xviii) hold cumulative values at that instant from the date of manufacturing.

4 Item at Sl No.(xv) refers to the Billing Period Counter.

5 The RTC-Time format by default shall be HH:MM:SS

6 Signed power factor shall be verified at rated voltage, rated current and rated frequency at 0.5 lag and 0.8 lead. Signed power factor (+) indicates lag and Signed power factor (-) indicates lead.

7 Power and energy related parameters shall be verified at UPF, 0.5 lag and 0.8 lead.

8 For Sl No. (xix) smart meter shall return 1 if load switch is 'ON' (connected) and 0 if load switch is 'OFF' (disconnected).

9 The parameters at Sl. No.(xvii) and (xviii) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

11.1.2 *Snapshot of Instantaneous Parameters*

The parameters of Table A1 shall be captured as a profile generic using the country specific OBIS code 1.0.94.91.0.255. The attribute 2 of each of the capture objects shall be copied into the profile at the instant of a request from the HOST.

11.1.3 *Scaler Profile*

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A1. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.3.255. The capture objects for this profile shall include the scaler unit attributes of the instantaneous parameters listed in Table A1. Instantaneous parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

12 BLOCK LOAD PROFILE PARAMETERS

This is an array of load survey data captured as a profile. The OBIS code is 1.0.99.1.0.255, with Interface class as 7. The capture objects of this block load profile are listed in Table A2 and the captured attribute shall be 2 of each interface class. The capture object values shall be copied into a buffer of this array automatically as per capture period which shall be set through OBIS code 1.0.0.8.4.255 of recording interval 1. The array of data shall be retained inside the meter memory for the last 35 power on days for a capture period of 1800 s for minimum of 4 parameters including Real Time Clock-Date and Time.

Table A2 Block Load Profile Parameters

(*Clauses* 12 *and* 12.1)

Sl No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attributes
(1)	(2)	(3)	(4)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8/2
ii)	Average voltage	1.0.12.27.0.255	3/2
iii)	Block Energy, kWh – import	1.0.1.29.0.255	3/2
iv)	Block Energy, kVAh–import	1.0.9.29.0.255	3/2
v)	Block Energy, kWh – export	1.0.2.29.0.255	3/2
vi)	Block Energy, kVAh – export	1.0.10.29.0.255	3/2

NOTES

1 The parameters listed in this table are for load survey purpose and are logged as per the block period time.

2 For parameters at Sl No. (ii), the value shall be averaged over integration period and stored at the end of that time block.

3 The parameters at Sl No. (iii) and (iv) are the actual energy consumption during that time block.

4 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1)**.**

5 The RTC-time format by default shall be HH:MM.

6 Energy related parameters shall be verified at UPF, 0.5 lag and 0.8 lead..

7 The time stamp shall be at the end of the capture period (Ist entry value is 00:15 or 00:30 min as applicable and last entry value is 00:00 Hrs. next day).

8 The parameters at Sl No.(v) and (vi)are applicable only for meters supporting both forward (import) and reverse (export) measurement.

Association access rights are as follows:

a) *Public client* — No access for any objects.
b) *Meter reader* — Read only for all objects.
c) *Utility setting* — Read only for all objects.

12.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A2. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.4.255. The capture objects for this profile shall include the scaler unit attributes (column 4) of the parameters listed in Table A2 and parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

13 DAILY LOAD PROFILE PARAMETERS

This is an array of load survey data captured as a profile generic at the end of 24 h. The OBIS code is 1.0.99.2.0.255, with Interface class as 7. The capture objects of this daily load profile are as per Table A3 and the captured attribute shall be 2 of each interface class. The capture object values will be copied into a buffer of this array automatically as per capture period which shall be set through OBIS code 1.0.0.8.5.255 of recording interval 2. The capture period attribute shall be statically fixed as 24 h.

Association access rights are as follows:

a) *Public client* — No access for any objects.
b) *Meter reader* — Read only for all objects.
c) *Utility setting* — Read only for all objects.

Table A3 Daily Load Profile Parameters

(*Clauses* 13 *and* 13.1)

Sl No.	Parameter	OBIS code A.B.C.D.E.F	Interface Class/ Attribute
(1)	(2)	(3)	(4)
i)	Real Time Clock, Date and Time	0.0.0.1.0.255	8/2
ii)	Cumulative energy, kWh – export	1.0.2.8.0.255	3/2
iii)	Cumulative energy, kVAh – export	1.0.10.8.0.255	3/2
iv)	Cumulative energy, kWh – import	1.0.1.8.0.255	3/2
v)	Cumulative energy, kVAh – import	1.0.9.8.0.255	3/2

NOTES

1 The parameters listed in this table are meant for billing purpose and shall be logged at midnight (00 h).

2 The storage time for these parameters is same as Block load survey.

3 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

4 The parameters at Sl No. (ii) and (iii) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

13.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A3. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.5.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed in Table A3. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

14 BILLING PROFILE PARAMETERS

The billing profile parameters are listed in Table A4.

The data shall be stored up to 6 billing cycles. The billing profile is modelled as Profile generic (IC = 7) object with OBIS Code 1.0.98.1.0.255. The capture objects of this billing profile shall be as per Table A4. The capture object values will be copied into buffer of this object either automatically or asynchronously. The capture period is set to zero, billing action is controlled by billing dates as provided in **10** of IS 15959 (Part 1) and Table A13.

Association access rights are as follows:

    a) *Public client* — No access for all objects.

    b) *Meter reader* — Read only for all objects.

    c) *Utility setting* — Read only for all objects.

14.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A4. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.6.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed in Table A4 and parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

15 EVENTS

Any exceptional/fraud/tamper condition is considered as an Event and stored in an Event code object (OBIS = 0.0.96.11.e.255 IC = 1, values of e range from 1 to 6). The value attribute (attr-2) of this object stores identifier corresponding to most recent event occurred in the meter. Unique identifier is assigned to occurrence and restoration of all possible events (identified so far) in the event reference tables (*see* Tables A5 to A10). Thus event code object will tell only about the most recent event and to get a picture of all events and associated information (at the time of event) an event log object is used. An event log object is modelled as Profile generic (OBIS = 0.0.99.98.e.255 IC = 7, values of e range from 1 to 6). The buffer attribute (attr-2) of this

Table A4 Billing Profile Parameters

(*Clauses* 14 *and* 14.1)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attribute
(1)	(2)	(3)	(4)
i)	Billing date import mode	0.0.0.1.2.255	3/2
ii)	Average power factor for billing period	1.0.13.0.0.255	3/2
iii)	Cumulative energy, kWh - import	1.0.1.8.0.255	3/2
iv)	Cumulative energy, kWh for TZ1	1.0.1.8.1.255	3/2
v)	Cumulative energy, kWh for TZ2	1.0.1.8.2.255	3/2
vi)	Cumulative energy, kWh for TZ3	1.0.1.8.3.255	3/2
vii)	Cumulative energy, kWh for TZ4	1.0.1.8.4.255	3/2
viii)	Cumulative energy, kVAh - import	1.0.9.8.0.255	3/2
ix)	Cumulative energy, kVAH for TZ1	1.0.9.8.1.255	3/2
x)	Cumulative energy, kVAH for TZ2	1.0.9.8.2.255	3/2
xi)	Cumulative energy, kVAH for TZ3	1.0.9.8.3.255	3/2
xii)	Cumulative energy, kVAH for TZ4	1.0.9.8.4.255	3/2
xiii)	MD, kW	1.0.1.6.0.255	4/2,5
xiv)	MD, kVA	1.0.9.6.0.255	4/2,5
xv)	Billing Power ON duration in Minutes (During billing period)	0.0.94.91.13.255	3/2
xvi)	Cumulative energy, kWh - Export	1.0.2.8.0.255	3/2
xvii)	Cumulative energy, kVAh - Export	1.0.10.8.0.255	3/2

NOTES

1 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

2 The current cycle billing parameters shall be readable as the values of the latest billing period, on demand. This shall be in addition to the last 6 billing period data which shall be available in the profile buffer as the last 6 entries in the buffer.

3 The captured attributes in case of Interface Class 4 (Extended register) used for MD values will be attributes 2 and 5 (Value and time stamp).

4 The Billing Date - Time format by default shall be HH:MM.

5 Billing date and time shall be current date and current time.

6 The parameters at Sl No. (xvi) and (xvii) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

profile object will store (asynchronously) a new entry for every event (occurrence and restoration are considered as separate events). The capture objects for the event log object is define in Table A11. The total number of events to be stored shall be 20 for power 'ON/OFF' event and not more than 50 for all other events.

The document containing test procedure, threshold values and persistence time for event simulation shall be provided by the test requesting organization.

Capture Parameters for Event as Applicable (Event Log Profile)

Association access rights are as follows:

a) *Public client* - No access.
b) *Meter reader* - Read only.
c) *Utility settings* - Read only.
d) *PUSH service* - Read only for identified objects.

INDIAN EVENT REFERENCE TABLES (REFER TABLE A5 TO A11)

15.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A11. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.7.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed above. Parameters listed above that do not have a scaler-unit attribute shall not be included in the capture objects of this profile. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

Table A5 Indian Event Reference Table – Current Related

(*Clauses* 15 *and* 15.1)

Sl No.	Event ID	Descriptions
(1)	(2)	(3)
i)	69	Earth loading – Occurrence
ii)	70	Earth loading – Restoration

NOTES

1 Occurrence/Restoration are considered as separate events.

2 For each of the events a certain list of parameters shall be captured as per Table A11.

3 For each of the occurrence event captured, the cumulative tamper count value shall be incremented.

4 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1)

Table A6 Indian Event Reference Table – Power Related

(*Clauses* 15 *and* 15.1)

Sl No.	Event ID	Descriptions
(1)	(2)	(3)
i)	101	Power failure – Occurrence
ii)	102	Power failure – Restoration

NOTES

1 Occurrence/Restoration are considered as separate events.

2 For these events only date and time and event code shall be captured.

3 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

Table A7 Indian Event Reference Table – Transaction Related

(*Clauses* 15 *and* 15.1)

Sl No.	Event ID	Descriptions
(1)	(2)	(3)
i)	151	Real Time Clock – Date and Time
ii)	152	Demand Integration Period
iii)	153	Profile Capture Period
iv)	154	Single-action Schedule for Billing Dates
v)	155	Activity Calendar for Time Zones
vi)	157	New firmware activated
vii)	158	Load limit (kW) set
viii)	159	Enabled – load limit function
ix)	160	Disabled – load limit function

NOTES

1 Occurrence is considered as separate events.

2 For these events only date and time and event code shall be captured.

3 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

4 Event ID 156 is deliberately not used for Smart Meters as it is used in meters with RS485 port.

Table A8 Indian Event Reference Table – Others

(*Clauses* 15 *and* 15.1)

Sl No.	Event ID	Descriptions
(1)	(2)	(3)
i)	201	Abnormal external magnetic influence – Occurrence
ii)	202	Abnormal external magnetic influence – Restoration
iii)	203	Neutral disturbance – Occurrence
iv)	204	Neutral disturbance – Restoration
v)	207	Single wire operation (Neutral missing) – Occurrence
vi)	208	Single wire operation (Neutral missing) – Restoration

NOTES

1 Occurrence/Restoration are considered as separate events.

2 For each of the events a certain list of parameters shall be captured as per Table A11.

3 For each of the occurrence event captured, the cumulative tamper count value shall be incremented.

4 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

5 For Event ID 201and 202 are applicable, if the meter logs such events.

Table A9 Indian Event Reference Table – Non Roll Over Events

(*Clauses* 15 *and* 15.1)

Sl No.	Event ID	Descriptions
(1)	(2)	(3)
i)	251	Meter Cover Opening – Occurrence

NOTES

1 Occurrence is considered as separate events.

2 For these events only date and time and event code shall be captured.

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Table A10 Indian Event Reference Table —
Control Events

(*Clauses* 15 *and* 15.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	301	Load switch status - Disconnected
ii)	302	Load switch status – Connected

NOTE — Date and time of event and event ID shall be captured.

Table A11 Capture Parameters for Events

(*Clauses* 15 *and* 15.1)

Sl No. (1)	Parameter (2)	OBIS Code A.B.C.D.E.F (3)	Interface Class (4)
i)	Date and time of event	0.0.1.0.0.255	8
ii)	Event code	0.0.96.11.e.255	1
iii)	Current	1.0.94.91.14.255	3
iv)	Voltage	1.0.12.7.0.255	3
v)	Power factor	1.0.13.7.0.255	3
vi)	Cumulative Energy – kWh	1.0.1.8.0.255	3

NOTES

1 Capture parameters mentioned in the table are to be captured when event occurrence and restoration is logged.

2 Sl No. (iii) is instantaneous current used for energy consumption.

3 For event capture, RTC-Time format shall be HH:MM.

16 GENERAL PURPOSE PARAMETERS

The name plate details (*see* Table A12) and Programmable parameters (*see* Table A13) are designated as general purpose parameters.

16.1 Name Plate Details

The data are meter specific information.

Association access rights for name plate details are as follows:

a) *Public client* — No access for all objects except meter serial number.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read only for all objects.

The name plate details parameters are listed in Table A12.

This is modelled as profile generic with OBIS code = 0.0.94.91.10.255, IC = 7, Attribute = 2

16.2 Programmable Parameters

Association access rights for programmable parameters given in Table A13 are as follows:

a) *Public client* — No access for all objects except real time clock.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read, write for all objects.

The Programmable parameters are listed in Table A13.

Table A12 Name Plate Details

(*Clauses* 16 *and* 16.1)

Sl No. (1)	Parameter (2)	OBIS Code A.B.C.D.E.F (3)	Interface Class (4)
i)	Meter serial number	0.0.96.1.0.255	1 (Data)
ii)	Device ID	0.0.96.1.2.255	1
iii)	Manufacturer name	0.0.96.1.1.255	1
iv)	Firmware version for meter	1.0.0.2.0.255	1
v)	Meter type	0.0.94.91.9.255	1
vi)	Category	0.0.94.91.11.255	1
vii)	Current rating	0.0.94.91.12.255	1
viii)	Meter year of manufacture	0.0.96.1.4.255	1

NOTES

1 For Sl No. (v) a value of 6 indicates single phase a.c. static direct connected watthour smart meter

2 For Sl No. (vi) a value D1 indicates single phase a.c. static direct connected Watthour smart meter.

3 For Sl No. (vii) shall indicate current range (Ib-Imax) A.

4 For item at Sl No. (viii) year is mandatory and the format is yyyy.

Table A13 Programmable Parameters

(*Clauses* 16 *and* 16.2)

Sl No. (1)	Parameter (2)	OBIS Code A.B.C.D.E.F (3)	Interface Class (4)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8 (Clock)
ii)	Demand integration period	1.0.0.8.0.255	1 (Data)
iii)	Profile capture period	1.0.0.8.4.255	1
iv)	Single-action schedule for billing dates	0.0.15.0.0.255	22
v)	Activity calendar for time zones	0.0.13.0.0.255	20
vi)	Load limit (kw)	0.0.17.0.0.255	71
vvi)	Enable/disable load limit function	0.0.96.3.10.255	70
viii)	Image transfer	0.0.44.0.0.255	18

NOTES

1 The parameters are programmable by the utility engineers with required access rights.

2 Unit for demand integration period and profile capture period is in 'seconds'. The Demand Integration Period shall be 1 800 s (default) and programmable to 900 s. The Profile capture period shall be 1800 s (default) and programmable to 900 or 3 600 s.

3 On change of time zones settings, the on-going billing cycle data will be generated and a new billing cycle shall be commenced as per new activity calendar.

4 Programming of any of the parameters shall increment the 'Cumulative programming count' value.

5 The RTC - Time format by default shall be HH:MM:SS.

17 LIST OF PARAMETERS FOR CATEGORY D2

The parameters listed are for three phase a.c. static direct connected watthour smart meter.

12

The parameters identified are grouped under:

a) Instantaneous parameters — Table A14
b) Block load profile — Table A15
c) Daily load profile — Table A16
d) Billing profile — Table A17
e) Indian event reference tables — Table A18 to A25
f) Name plate details — Table A26
g) Programmable parameters — Table A27

Each of the parameters is a separate entity. The OBIS code and interface class for each parameter is identified in the respective tables.

17.1 Instantaneous Parameters

Association access rights are as follows:

a) *Public client* — Read only for clock and no access for other objects.
b) *Meter reader* — Read only for all objects.
c) *Utility setting* — Read only for all objects.
d) *PUSH service* — Read only for identified objects

The instantaneous parameters are listed in Table A14.

17.2 Snapshot of Instantaneous Parameters

The parameters of Table A14 shall be captured as a profile generic using the country specific OBIS code 1.0.94.91.0.255. The attribute 2 of each of the capture objects shall be copied into the profile at the instant of a request from the HOST.

17.3 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A14. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.3.255. The capture objects for this profile shall include the scaler-unit attributes of the instantaneous parameters listed in Table A14 instantaneous parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

18 BLOCK LOAD PROFILE PARAMETERS

This is an array of load survey data captured as a profile generic. The OBIS code is 1.0.99.1.0.255, with interface class as 7. The capture objects of this block load profile are as per Table A15 and the captured attribute shall be 2 of each interface class. The capture object values will be copied into a buffer of this array automatically as per capture period which shall be set through OBIS code 1.0.0.8.4.255 of recording interval 1.

Table A14 Instantaneous Parameters

(*Clauses* 17.1, 17.2 *and* 17.3)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attribute
(1)	(2)	(3)	(4)
i)	Real time clock, date and time	0.0.1.0.0.255	8
ii)	Current, I_R	1.0.31.7.0.255	3
iii)	Current, I_Y	1.0.51.7.0.255	3
iv)	Current, I_B	1.0.71.7.0.255	3
v)	Voltage, V_{RN}	1.0.32.7.0.255	3
vi)	Voltage, V_{YN}	1.0.52.7.0.255	3
vii)	Voltage, V_{BN}	1.0.72.7.0.255	3
viii)	Signed power factor, R-phase	1.0.33.7.0.255	3
ix)	Signed power factor, Y-phase	1.0.53.7.0.255	3
x)	Signed power factor, B-phase	1.0.73.7.0.255	3
xi)	Three phase power factor, PF	1.0.13.7.0.255	3
xii)	Frequency – Hz	1.0.14.7.0.255	3
xiii)	Apparent power, kVA	1.0.9.7.0.255	3
xiv)	Signed active power, kW (+ Forward; – Reverse)	1.0.1.7.0.255	3
xv)	Signed reactive power, kvar (+ Lag; – Lead)	1.0.3.7.0.255	3
xvi)	Number of power — failures	0.0.96.7.0.255	1
xvii)	Cumulative power — OFF duration in min	0.0.94.91.8.255	3
xviii)	Cumulative tamper count	0.0.94.91.0.255	1
xix)	Cumulative billing count	0.0.0.1.0.255	1
xx)	Cumulative programming count	0.0.96.2.0.255	1
xxi)	Billing date	0.0.0.1.2.255	3
xxii)	Cumulative energy, kWh – Import	1.0.1.8.0.255	3/2
xxiii)	Cumulative energy, kWh – Export	1.0.2.8.0.255	3/2
xxiv)	Cumulative energy, kVAh – Import	1.0.9.8.0.255	3/2
xxv)	Cumulative energy, kVAh – Export	1.0.10.8.0.255	3/2
xxvi)	Maximum demand, kW	1.0.1.6.0.255	4/2, 5
xxvii)	Maximum demand, kVA	1.0.9.6.0.255	4/2, 5
xxviii)	Load limit function status	0.0.96.31.0.255	70
xxix)	Load limit value, in kW	0.0.17.0.0.255	71

NOTES

1 Signed Power factor: (+) indicates lag and (–) indicates lead.

2 The parameters at Sl No. (xvii) to (xx) and (xxii) to (xxv) hold cumulative values at that instant from the date of manufacturing.

3 The above list is identified for the purpose of communication to HHU, DCU or HES.

4 The utilities may choose, based on needs, additional parameters for display purpose only.

5 Item at Sl No. (xix) refers to the Billing Period Counter.

6 Item at Sl No. (xxi) — Data type to be same as for attribute 2 of IC = 8, Clock. If not specified the billing date shall be first day of the month and time shall be 00:00h.

7 The item at Sl No. (xiv) Signed active power, kW (-Reverse) is not mandatory.

8 The RTC-Time format by default shall be HH:MM:SS.

9 Signed power factor shall be verified at rated voltage, rated current and rated frequency at 0.5 lag and 0.8 lead.

10 Power and Energy related parameters shall be verified at UPF, 0.5 lag and 0.8 lead.

11 For Sl No. (xxviii) smart meter shall return 1, if load switch is 'ON' (Connected) and 0, if load switch is 'OFF' (Disconnected).

12 The parameters at Sl No. (xxiii) and (xxv) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

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Association access rights are as follows:

a) *Public client* — No access for all objects.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read only for all objects.

Table A15 Block Load Survey Parameters

(*Clauses* 18 *and* 18.1)

Sl No.	Parameter	OBIS Code A.B.C.D. E.F	Interface Class/ Attribute
(1)	(2)	(3)	(4)
i)	Real Time Clock, Date and Time	0.0.1.0.0.255	8/2
ii)	Current, I_R	1.0.31.27.0.255	3/2
iii)	Current, I_Y	1.0.51.27.0.255	3/2
iv)	Current, I_B	1.0.71.27.0.255	3/2
v)	Voltage, V_{RN}	1.0.32.27.0.255	3/2
vi)	Voltage, V_{YN}	1.0.52.27.0.255	3/2
vii)	Voltage, V_{BN}	1.0.72.27.0.255	3/2
viii)	Block energy, kWh - import	1.0.1.29.0.255	3/2
ix)	Block energy, kVAh (lag)	1.0.5.29.0.255	3/2
x)	Block energy, kVAh (lead)	1.0.8.29.0. 255	3/2
xi)	Block energy, kVAh - import	1.0.9.29.0.255	3/2
xii)	Block energy, kWh – export	1.0.2.29.0.255	3/2
xiii)	Block energy, kVAh – export	1.0.10.29.0.255	3/2

NOTES

1 The parameters listed in this table are for load survey purpose and are logged as per the block period time.

2 The parameters at Sl No. (ii) to (vii) are the average values during the block period time and stored at the end of that time block.

3 The parameters at Sl No. (viii) to (xi) are the actual energy consumption during that time block.

4 The RTC-time format by default shall be HH:MM.

5 Energy related parameters shall be verified at UPF, 0.5 lag and 0.8 lead.

6 The time stamp shall be at the end of the capture period (Ist entry value is 00:15 or 00:30 min as applicable and last entry value is 00:00 h next day).

7 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

8 The parameters at Sl No.(xii) and (xiii) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

18.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A15. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.4.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed in Table A15. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

19 DAILY LOAD PROFILE PARAMETERS

This is an array of load survey data captured as a profile generic at the end of 24 h. The OBIS code is 1.0.99.2.0.255 with IC as 7. The capture objects of this daily load profile are as per Table A16 and the captured

attribute shall be 2 of each interface class. The capture object values will be copied into a buffer of this array automatically as per capture period which shall be set through OBIS code 1.0.0.8.5.255 of recording interval 2. The capture period attribute shall be statically fixed as 24 h.

Association access rights are as follows:

a) *Public client* — No access for all objects.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read only for all objects.

Table A16 Daily Load Profile Parameters

(*Clauses* 19 *and* 19.1)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class/ Attribute
(1)	(2)	(3)	(4)
i)	Real time clock, date and time	0.0.1.0.0.255	8/2
ii)	Cumulative energy kWh – import	1.0.1.8.0.255	3/2
iii)	Cumulative energy kVAh – import	1.0.9.8.0.255	3/2
iv)	Cumulative energy, kWh – export	1.0.2.8.0.255	3/2
v)	Cumulative energy, kVAh - export	1.0.10.8.0.255	3/2

NOTES

1 The parameters listed in this table are meant for billing purpose and shall be logged at midnight (00 h).

2 The storage time for these parameters is same as Block load survey.

3 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

4 The parameters at Sl No. (iv) and (v) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

19.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A16. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.5.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed in Table A16. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

20 BILLING PROFILE PARAMETERS

The contents of Table A17 are for billing purpose.

The data are stored up to 6 billing cycles. The billing profile is modelled as Profile generic (IC = 7) object with OBIS Code 1.0.98.1.0.255. The capture objects of this load profile are as per Table A17. The capture object values will be copied into buffer of this object either automatically or asynchronously. The capture period is set to zero, billing action is controlled by billing dates as provided in **10** of IS 15959 (Part 1) and Table A27.

Association access rights are as follows:

a) *Public client* — No access for all objects.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read only for all objects.

20.1 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A17. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.6.255. The capture objects for this profile shall include the scaler- unit attributes of the parameters listed in Table A17 above. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

Table A17 Billing Profile Parameters

(*Clauses* 20 *and* 20.1)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class No./ Attribute
(1)	(2)	(3)	(4)
i)	Billing date	0.0.0.1.2.255	3/2
ii)	System power factor for billing period Import	1.0.13.0.0.255	3/2
iii)	Cumulative energy, kWh	1.0.1.8.0.255	3/2
iv)	Cumulative energy, kWh for TZ1	1.0.1.8.1.255	3/2
v)	Cumulative energy, kWh for TZ2	1.0.1.8.2.255	3/2
vi)	Cumulative energy, kWh for TZ3	1.0.1.8.3.255	3/2
vii)	Cumulative energy, kWh for TZ4	1.0.1.8.4.255	3/2
viii)	Cumulative energy, kWh for TZ5	1.0.1.8.5.255	3/2
ix)	Cumulative energy, kWh for TZ6	1.0.1.8.6.255	3/2
x)	Cumulative energy, kWh for TZ7	1.0.1.8.7.255	3/2
xi)	Cumulative energy, kWh for TZ8	1.0.1.8.8.255	3/2
xii)	Cumulative energy, kVAh	1.0.9.8.0.255	3/2
xiii)	Cumulative energy, kVAh for TZ1	1.0.9.8.1.255	3/2
xiv)	Cumulative energy, kVAh for TZ2	1.0.9.8.2.255	3/2
xv)	Cumulative energy, kVAh for TZ3	1.0.9.8.3.255	3/2
xvi)	Cumulative energy, kVAh for TZ4	1.0.9.8.4.255	3/2
xvii)	Cumulative energy, kVAh for TZ5	1.0.9.8.5.255	3/2
xviii)	Cumulative energy, kVAh for TZ6	1.0.9.8.6.255	3/2
xix)	Cumulative energy, kVAh for TZ7	1.0.9.8.7.255	3/2
xx)	Cumulative energy, kVAh for TZ8	1.0.9.8.8.255	3/2
xxi)	MD, kW	1.0.1.6.0.255	4/2, 5
xxii)	MD, kW for TZ1	1.0.1.6.1.255	4/2, 5
xxiii)	MD, kW for TZ2	1.0.1.6.2.255	4/2, 5
xxiv)	MD, kW for TZ3	1.0.1.6.3.255	4/2, 5
xxv)	MD, kW for TZ4	1.0.1.6.4.255	4/2, 5
xxvi)	MD, kW for TZ5	1.0.1.6.5.255	4/2, 5
xxvii)	MD, kW for TZ6	1.0.1.6.6.255	4/2, 5
xxviii)	MD, kW for TZ7	1.0.1.6.7.255	4/2, 5
xxix)	MD, kW for TZ8	1.0.1.6.8.255	4/2, 5
xxx)	MD, kVA	1.0.9.6.0.255	4/2, 5
xxxi)	MD, kVA for TZ1	1.0.9.6.1.255	4/2, 5
xxxii)	MD, kVA for TZ2	1.0.9.6.2.255	4/2,5
xxxiii)	MD, kVA for TZ3	1.0.9.6.3.255	4/2, 5
xxxiv)	MD, kVA for TZ4	1.0.9.6.4.255	4/2, 5
xxxv)	MD, kVA for TZ5	1.0.9.6.5.255	4/2, 5
xxxvi)	MD, kVA for TZ6	1.0.9.6.6.255	4/2, 5
xxxvii)	MD, kVA for TZ7	1.0.9.6.7.255	4/2, 5
xxxviii)	MD, kVA for TZ8	1.0.9.6.8.255	4/2, 5
xxxix)	Billing Power ON duration in Minutes (During billing period)	0.0.94.91.13.255	3/2
lx)	Cumulative energy, kWh – export	1.0.2.8.0.255	3/2
lxi)	Cumulative energy, kVAh – export	1.0.10.8.0.255	3/2

NOTES

1 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

2 The current cycle billing parameters shall be readable as the values of the latest billing period, on demand. This shall be in addition to the last 6 billing period data which shall be available in the profile buffer as the last 6 entries in the buffer.

3 The captured attributes in case of Interface Class 4 (Extended register) used for MD values will be attributes 2 and 5 (Value and Time stamp).

4 The Billing Date - Time format by default shall be HH:MM.

5 Billing Date and Time shall be current date and current time.

6 The parameters at Sl No. (lx) and (lxi) are applicable only for meters supporting both forward (import) and reverse (export) measurement.

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21 EVENTS

Any exceptional/fraud/tamper condition is considered as an Event and stored in an Event code object (OBIS = 0.0.96.11.e.255 IC = 1, values of e range from 0 to 6). The value attribute (attr-2) of this object stores identifier corresponding to most recent event occurred in the meter. Unique identifier is assigned to occurrence and restoration of all possible events (identified so far) in the event reference tables (*see* Tables A18 to A24). Thus event code object will tell only about the most recent event and to get a picture of all events and associated information (at the time of event) an event log object is used. An event log object is modelled as Profile generic (OBIS = 0.0.99.98.e.255 IC = 7, values of e range from 0 to 6). The buffer attribute (attr-2) of this profile object will store (asynchronously) a new entry for every event (occurrence and restoration are considered as separate events). The capture objects for the event log object is define in Table A25.

21.1 Indian Event Reference Tables (*see* Tables A18 to A24)

The document containing test procedure, threshold values and persistence time for event simulation shall be provided by the test requesting organization.

Table A18 Indian Event Reference Table — Voltage Related

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Description (3)
i)	1	*R*-Phase — Voltage missing — Occurrence
ii)	2	*R*-Phase — Voltage missing — Restoration
iii)	3	*Y*-Phase — Voltage missing — Occurrence
iv)	4	*Y*-Phase — Voltage missing — Restoration
v)	5	*B*-Phase — Voltage missing — Occurrence
vi)	6	*B*-Phase — Voltage missing — Restoration
vii)	7	Over voltage in any phase — Occurrence
viii)	8	Over voltage in any phase — Restoration
ix)	9	Low Voltage in any phase — Occurrence
x)	10	Low voltage in any phase — Restoration
xi)	11	Voltage unbalance — Occurrence
xii)	12	Voltage unbalance — Restoration

NOTES

1 These are the event conditions generally recorded in consumer meters, utilities may select any the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For each of the events a certain list of parameters will be captured.

4 The list capture parameters are given in Table A25. The utility shall select the required parameters from Table A25 as per their practice.

5 For each of the occurrence event captured, the cumulative tamper count value shall be incremented

6 Capture parameters mentioned in Table A25 are captured when event occurrence and restoration is logged.

7 The attributes of each of the IC (Interface class) is to be identified while finalizing the Specification.

8 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

21.2 Capture Parameters for Event as Applicable (Event Log Profile)

Association access rights are as follows:

a) *Public client* – No access.

b) *Meter reading* – Read only.

c) *Utility settings* – Read only.

d) *Push Services* – Read only for selected events.

Table A19 Indian Event Reference Table — Current Related

(*Clauses* 21 and 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	51	R Phase — Current reverse — Occurrence
ii)	52	R Phase — Current reverse — Restoration
iii)	53	Y Phase — Current reverse — Occurrence
iv)	54	Y Phase — Current reverse — Restoration
v)	55	B Phase — Current reverse — Occurrence
vi)	56	B Phase — Current reverse — Restoration
vii)	63	Current unbalance — Occurrence
viii)	64	Current unbalance — Restoration
ix)	65	Current bypass — Occurrence
x)	66	Current bypass — Restoration
xi)	67	Over current in any phase — Occurrence
xii)	68	Over current in any phase — Restoration

NOTES

1 These are the event conditions generally recorded in consumer meters, utilities may select any the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For each of the events a certain list of parameters will be captured.

4 The list capture parameters are given in Table A25. The utility shall select the required parameters from Table A25 as per their practice.

5 For each of the occurrence event captured, the cumulative tamper count value shall be incremented

6 Capture parameters mentioned in Table A25 are captured when event occurrence and restoration is logged.

7 The attributes of each of the IC (Interface class) is to be identified while finalizing the Companion Specification.

8 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

Table A20 Indian Event Reference Table — Power Related

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	101	Power failure (3 phase) — Occurrence
ii)	102	Power failure (3 phase) — Restoration

NOTES

1 These are the event conditions generally recorded in consumer meters, utilities may select any of the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For these events only date and time of event and event ID shall be captured.

4 The attributes of each of the IC (Interface class) is to be identified while finalizing the Companion Specification.

5 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

**Table A21 Indian Event Reference Table —
Transaction Related**

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	151	Real Time Clock – Date and Time
ii)	152	Demand Integration Period
iii)	153	Profile Capture Period
iv)	154	Single-action Schedule for Billing Dates
v)	155	Activity Calendar for Time Zones
vi)	157	New firmware activated
vii)	158	Load limit (kW) set
viii)	159	Enabled – load limit function
ix)	160	Disabled – load limit function

NOTES

1 Occurrence is considered as separate events.

2 For these events only date and time and event code shall be captured**.**

3 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1).

**Table A22 Indian Event Reference Table —
Others**

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	201	Abnormal External Magnetic Influence – Occurrence
ii)	202	Abnormal External Magnetic Influence – Restoration
iii)	203	Neutral disturbance – Occurrence
iv)	204	Neutral disturbance – Restoration
v)	205	Low PF — Occurrence
vi)	206	Low PF — Restoration

NOTES

1 These are the event conditions generally recorded in consumer meters, utilities may select any the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For each of the events a certain list of parameters will be captured.

4 The list capture parameters are given in Table A25. The utility shall select the required parameters from Table A25 as per their practice.

5 For each of the occurrence event captured, the cumulative tamper count value shall be incremented.

6 Capture parameters mentioned in Table A25 are captured when event occurrence and restoration is logged.

7 The attributes of each of the IC (Interface class) is to be identified while finalizing the companion specification.

8 Support for selective access shall be as defined in **11.3** of IS 15959 (Part 1) .

**Table A23 Indian Event Reference Table —
Non-rollover Events**

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	251	Meter cover opening — Occurrence

NOTES

1 This event condition is generally recorded in consumer meters, utilities may select the above event condition based on their practice. The need and applicability of the event for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For these events only Date and time of event and event ID shall be captured on event occurrence.

**Table A24 Indian Event Reference Table —
Control Events**

(*Clauses* 21 *and* 21.1)

Sl No. (1)	Event ID (2)	Descriptions (3)
i)	301	Load switch status — Disconnected
ii)	302	Load switch status — Connected

NOTES

1 These are the event conditions generally recorded in consumer meters, utilities may select any the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by utility.

2 Occurrence is considered an event.

3 For these events only Date and time of event and event ID shall be captured.

Table A25 Capture Parameters for Events

(*Clauses* 21, 21.1 *and* 21.3)

Sl No. (1)	Parameter (2)	OBIS Code A.B.C.D.E.F (3)	Interface Class (4)
i)	Date and time of event	0.0.1.0.0.255	8
ii)	Event code	0.0.96.11.e.255	1
iii)	Current, I_R	1.0.3.7.0.255	3
iv)	Current, I_Y	1.0.51.7.0.255	3
v)	Current, I_B	1.0.71.7.0.255	3
vi)	Voltage, V_{RN}	1.0.32.7.0.255	3
vii)	Voltage, V_{YN}	1.0.52.7.0.255	3
viii)	Voltage, V_{BN}	1.0.72.7.0.255	3
xi)	Power factor, *R*-Phase	1.0.33.7.0.255	3
xii)	Power factor, *Y*-Phase	1.0.53.7.0.255	3
xiii)	Power factor, *B*-Phase	1.0.73.7.0.255	3
xiv)	Cumulative energy, kWh - import	1.0.1.8.0.255	3
xv)	Cumulative energy, kWh - export	1.0.2.8.0.255	3

NOTES

1 For each of the events a certain list of parameters will be captured.

2 The list of capture parameters are given. The utility shall select the required parameters from the table as per their practice

3 Capture parameters mentioned in the table are to be captured when event occurrence and restoration is logged.

4 For event capture, RTC-Time format shall be HH:MM.

5 The parameters at Sl No. (xv) is applicable only for meters supporting both forward (import) and reverse (export) measurement.

21.3 Scaler Profile

This profile is meant for capturing the scaler-unit of each of the parameter listed in Table A25. This is modelled as profile generic (IC = 7) and is assigned the country specific OBIS code 1.0.94.91.7.255. The capture objects for this profile shall include the scaler-unit attributes of the parameters listed above. Parameters listed above that do not have a scaler-unit attribute shall not be included in the capture objects of this profile. The profile buffer shall have only one entry. This profile is not required to be updated periodically.

22 GENERAL PURPOSE PARAMETERS

22.1 Name Plate Details

The data are meter specific information.

Association access rights for name plate details are as follows:

a) *Public client* — No access for all objects except meter serial number.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read only for all objects.

Table A26 Name Plate Details

(*Clauses* 22.1)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class
(1)	(2)	(3)	(4)
i)	Meter serial number	0.0.96.1.0.255	1 (Data)
ii)	Device ID	0.0.96.1.2.255	1
iii)	Manufacturer name	0.0.96.1.1.255	1
iv)	Firmware version for meter	1.0.0.2.0.255	1
v)	Meter type	0.0.94.91.9.255	1
vi)	Category	0.0.94.91.11.255	1
vii)	Current rating	0.0.94.91.12.255	1
viii)	Meter year of manufacture	0.0.96.1.4.255	1

NOTES

1 For item Sl No. (v) a value of 7 indicates Three Phase a.c. static direct connected watthour smart meter.

2 For Sl No. (vi) a value D2 indicates Three phase a.c. static direct connected watthour smart meter.

3 For Sl No. (vii) shall indicate current range (I_b-I_{max}) A.

4 For item at Sl No. (viii) year is mandatory and the format is yyyy.

22.2 Programmable Parameters

Association access rights for programmable parameters as given in Table A27 are as follows:

a) *Public client* — No access for all objects except real time clock.

b) *Meter reader* — Read only for all objects.

c) *Utility setting* — Read, write for all objects.

Table A27 Programmable Parameters

(*Clauses* 22 *and* 22.2)

Sl No.	Parameter	OBIS Code A.B.C.D.E.F	Interface Class
(1)	(2)	(3)	(4)
i)	Real Time Clock – Date and Time	0.0.1.0.0.255	8
ii)	Demand Integration Period	1.0.0.8.0.255	1
iii)	Profile Capture Period	1.0.0.8.4.255	1
iv)	Single-action Schedule for Billing Dates	0.0.15.0.0.255	22
v)	Activity Calendar for Time Zones	0.0.13.0.0.255	20
vi)	Load limit (kW)	0.0.17.0.0.255	71
vii)	Enable/disable load limit function	0.0.96.3.10.255	70

NOTES

1 The parameters are programmable by the utility engineers with required access rights.

2 Unit for Demand Integration Period and Profile capture period is in 'seconds'. The Demand Integration Period shall be 1 800 s (default) and programmable to 900 s. The Profile capture period shall be 1800 s (default) and programmable to 900 or 3 600 s.

3 On change of time zones settings, the on-going billing cycle data will be generated and a new billing cycle shall be commenced as per new activity calendar.

4 Programming of any of the parameters shall increment the 'Cumulative programming count' value.

5 The RTC - Time format by default shall be HH:MM:SS.

23 TESTING

The tests under this clause are applicable for smart meter designed as per IS 16444.

23.1 Tests for Data Exchange Protocol

This test shall be carried out on optical port on both types of smart meter mentioned in **10** of IS 16444. The tests shall be performed for conformity. The tests listed in Table A28 shall be applicable for single phase a.c. static direct connected watthour smart meter. The tests listed in Table A29 shall be applicable for three phase a.c. static direct connected watthour smart meter.

24 TESTS FOR SMART METER COMMUNICABILITY

The standard IS 16444 provides for use of suitable communication technologies in the design of smart meters. The data shall be presented to the HES in IS 15959 (Part 1) format. The communication capability of the meter for data exchange between meter and network devices over remote communication technology is to be verified as given below. The methodology is explained with a diagram shown in Fig. 4 for Variant-1 and in Fig. 5 for Variant – 2.

Table A28 List of Tests for Category D1 Single Phase a.c. Static Direct Connected Watthour Smart Meter

Item No.	Particulars of Test	Clause Reference to (*see* NOTE)
(1)	(2)	(3)
	COMPLIANCE TEST	
1.0	Conformance to DLMS/COSEM (IEC 62056)	K – 1[a)]
	Parameter Verification:	
2.0	SNRM/UA	4.1 and 4.2
3.0	Object list download	5.1 and 5.2
4.0	Association properties	5.1 and 5.2
5.0	Simultaneous operation	4.3
6.0	Security:	7.5
	(a) Lowest Level Security Secret	7.5.1.1
	(b) Low Level Security (LLS) Secret	7.5.1.2
	(c) High Level Security (HLS) Secret	7.5.1.3
	Parameter list:	
7.0 (a)	Instantaneous Parameters	Table A1
7.0 (b)	Snap Shot of Instantaneous Parameters	
7.0 (c)	Scaler Profile	
8.0	Block Load Profile Parameters	Table A2
9.0	Selective access by Range for Block Load Profile	11.3
10.0	Daily Load Profile Parameters	Table A3
11.0	Selective access by Range for Daily Load Profile	11.3
12.0	ToU setting	9
13.0	Billing Profile Parameters	Table A4
14.0	Billing Period	10.1 and 10.2
15.0	Billing Period Counter	11.2.1 and 11.2.2
16.0	Selective access by Entry for Billing Profile	11.3
17.0	Event code & Event logging:	8.1, 8.2 and Table A11
	(a) Indian Event Reference Table - Current Related	Table A5
	(b) Indian Event Reference Table - Power Related	Table A6
	(c) Indian Event Reference Table - Transaction Related	Table A7
	(d) Indian Event Reference Table - Others	Table A8
	(e) Indian Event Reference Table - Non Roll Over	Table A9
	(f) Indian Event Reference Table - Control	Table A10
18.0	Selective access by Entry for Event Log Profile	11.3
19.0	General Purpose Parameters:	
	(a) Name Plate Details	Table A12
	(b) Programmable Parameters	Table A13

NOTE — Clause numbers refer to IS 15959 (Part 1) and table number refer to this standard.

Table A29 List of Tests for Category D2 Three Phase a.c. Static Direct Connected Watthour Smart Meter

Item No.	Particulars of Test	Clause Reference to (*see* NOTE)
(1)	(2)	(3)
	COMPLIANCE TEST	
1.0	Conformance to DLMS/COSEM (IEC 62056)	K – 1 a)
2.0	Parameter Verification:	
2.1	SNRM/UA	4.1 and 4.2
2.2	Object list download	5.1 and 5.2
2.3	Association properties	5.1 and 5.2
2.4	Simultaneous operation	4.3
2.5	Security:	7.5
2.5.1	Lowest level security secret	7.5.1.1
2.5.2	Low level security (LLS) secret	7.5.1.2
2.5.3	High level security (HLS) secret	7.5.1.3
2.6	Parameter list:	
2.6.1 (a)	Instantaneous parameters	Table A14
2.6.1 (b)	Snap shot of instantaneous parameters	
2.6.1 (c)	Scaler profile	
2.6.2	Block load profile parameters	Table A15
2.6.3	Selective access by range for block load profile	11.3
2.6.4	Daily load profile parameters	Table A16
2.6.5	Selective access by range for daily load profile	11.3
2.6.6	ToU setting	9
2.7	Billing profile parameters	Table A17
2.8	Billing period	10.1 and 10.2
2.9	Billing period counter	11.2.1 and 11.2.2
2.10	Selective access by entry for billing profile	11.3
2.11	Event code and Event logging:	8.1, 8.2, G-1, G-2 and Table A25
2.12.1	Indian Event Reference Table - Voltage Related	Table A18
2.12.2	Indian Event Reference Table - Current Related	Table A19
2.12.3	Indian Event Reference Table - Power Related	Table A20
2.12.4	Indian Event Reference Table - Transaction Related	Table A21
2.12.5	Indian Event Reference Table – Other	Table A22
2.12.6	Indian Event Reference Table - Non Roll Over	Table A23
2.12.7	Indian Event Reference Table – Control	Table A24
2.13	Selective access by Entry for Event Log Profile	11.3
2.14	General Purpose Parameters:	
2.14.1	Name Plate Details	Table A26
2.14.2	Programmable Parameters	Table A27

NOTE — Clause numbers refer to IS 15959 (Part 1) and table number refer to this standard.

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IS 15959 (Part 2) : 2016
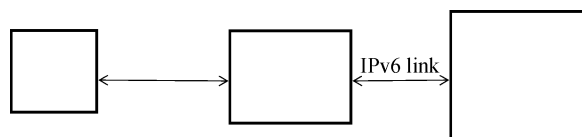
FIG. 4 BLOCK DIAGRAM

FIG. 5 BLOCK DIAGRAM

The left square is the smart meter of variant -1 having a NAN module. The middle square is a 'white box' having the same identical NAN module. The right square is a computer which can run the CTT or smart meter test software module.

The left square is the smart meter of variant - 2 having a WAN module. The right square is a computer which can run the CTT or smart meter test software module.
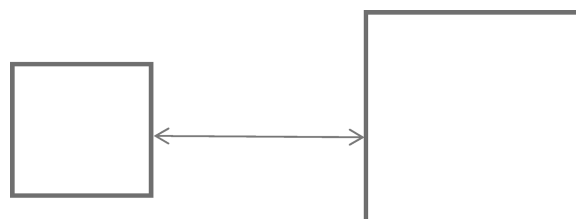
The CTT and SM test software module shall be used to verify the protocol implementation and parameter verification. The SM test software module shall have required support for carrying out the functional tests in Table A30.

NOTE — This test is an optional test, to be mutually decided between the buyer and the seller.

Table A30 List of Functional Tests

(*Clause* 24)

Sl No. (1)	Test Description (2)	Three Phase a.c. Static Direct Connected Watthour Smart Meter (3)	Single Phase a.c. Static Direct Connected Watthour Smart Meter (4)
i)	Association		
ii)	Data read	Table A14 (Any five parameters)	Table A1 (Any five parameters)
iii)	Profile read	Table A18	Table A4
iv)	Selective programmability	Table A27 (any two parameters)	Table A13 (any two parameters)
v)	Reporting of events	As per push schedule	As per push schedule
vi)	Connect/Disconnect	As per **10**	As per **10**
vii)	Firmware upgrade	As per **9**	As per **9**

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AMENDMENT NO. 1 APRIL 2017
TO
IS 15959 (PART 2) : 2016 DATA EXCHANGE FOR ELECTRICITY METER READING, TARIFF AND LOAD CONTROL — COMPANION SPECIFICATION

PART 2 SMART METER

(*Page* 1, *clause* **3.3**) — Substitute 'Last Gasp' *for* 'Last Gap'.

[*Page* 2, *Table* 2, *Sl No*. (iv), *col* 8] — Substitute 'Not applicable' *for* 'Low Level security (LLS)'.

[*Page* 2, *Table* 2, *Sl No*. (v), *col* 8] — Insert 'Data notification' and 'General protection' at the end.

[*Page* 2, *Table* 2, *Sl No*. (v), *col* 6] — Insert 'General protection, Get and Get with block transfer' at the end.

[*Page* 2, *Table* 2, *Sl No*. (v), *col* 7] — Delete 'Set with block transfer'.

[*Page* 2, *clause* **6**, *para* 3] — Insert the following after second sentence :
'Client shall be able to read attribute "Push_object_list" of Push setup objects in PUSH association.'

(*Page* 3, *Fig*. 2) — Substitute the obis code mentioned under Logical Name as '0.b.25.9.0.255' (b = 0 to 4) *for* '0.0.25.9.e.255'.

[*Page* 3, *Table* 3, *Sl No*. (i), *col* 3] — Substitute the obis code as '0.0.25.9.0.255' *for* '0.0.25.9.1.255'.

[*Page* 3, *Table* 3, *Sl No*. (ii), col 3] — Substitute the obis code as '0.1.25.9.0.255' *for* '0.0.25.9.2.255'.

[*Page* 3, *Table* 3, *Sl No*. (iii), col 3] — Substitute the obis code as '0.2.25.9.0.255' *for* '0.0.25.9.3.255'.

[*Page* 3, *Table* 3, *Sl No*. (iv), col 3] — Substitute the obis code as '0.3.25.9.0.255' *for* '0.0.25.9.4.255'.

[*Page* 3, *Table* 3, *Sl No*. (iv), col 6] — Substitute the obis code as '0.3.15.0.4.255' *for* '0.0.15.1.4.255.

[*Page* 3, *Table* 3, *Sl No*. (v), *col* 3] — Substitute the obis code as '0.4.25.9.0.255' *for* '0.0.25.9.5.255'.

(*Page* 4, *clause* **6.1.1**) — Substitute the obis code as '0.0.25.9.0.255' *for* '0.0.25.9.1.255'.

[*Page* 4, *Table* 4, *Sl No*. (ii), *col* 3] — Substitute the obis code as '0.0.25.9.0.255' *for* '0.0.25.9.1.255'.

(*Page* 4, *clause* **6.1.3**) — Substitute the obis code as '0.2.25.9.0.255' *for* '0.0.25.9.3.255'.

(*Page* 4, *clause* **6.1.4**) — Substitute the obis code as '0.3.25.9.0.255' *for* '0.0.25.9.4.255'.

(*Page* 4, *clause* **6.1.2**) — Substitute the obis code as '0.1.25.9.0.255' *for* '0.0.25.9.2.255'.

[*Page* 4, *Table* 5, *Sl No*. (ii), *col* 3] — Substitute the obis code as '0.1.25.9.0.255' *for* '0.0.25.9.2.255'.

[*Page* 4, *Table* 6, *Sl No*. (ii), *col* 3] — Substitute the obis code as '0.2.25.9.0.255' *for* '0.0.25.9.3.255'.

[*Page* 4, *Table* 7, *Sl No*. (ii), *col* 3] — Substitute the obis code as '0.3.25.9.0.255' *for* '0.0.25.9.3.255'.

(*Page* 4, *clause* **6.1.5**) — Substitute the obis code as '0.4.25.9.0.255' *for* '0.0.25.9.5.255'.

[*Page* 5, *Table* 8, *Sl No*. (ii), *col* 3] — Substitute the obis code as '0.4.25.9.0.255' *for* '0.0.25.9.3.255'.

Price Group 4

Amendment No. 1 to IS 15959 (Part 2) : 2016

(*Page* 5, *Table* 10) — Delete the following from 'Three phase meter' list

3   7/8 — Over voltage in any Phase
4   9/10 - Low voltage in any Phase
11 67/68 — Over current in any phase

(*Page* 5, *Table* 10) — Insert the following in 'Common to 3 Phase and single phase meter' list

3   7/8 — Over voltage in any Phase
4   9/10 — Low voltage in any Phase
11 67/68 — Over current in any phase

(*Page* 5, *clause* **6.1.5**) — Insert the following as second paragraph :

'An Event Status Word Filter (ESWF) object (0.0.94.91.26.255) is defined which can be read by Client in MR Association and Read/Written in US association. The data type of the ESWF object and bit mapping shall be same as ESW (bit string of 128 bits).Events which are supported in the meter shall only be configured for Event Push. Bit value'1' in ESWF string indicates that the event is supported and value '0' indicates the event is not supported for Event Push.'

[*Page* 6, *clause* **7.2**, *para* (c), *line* 8] — Substitute 'Version: 3' *for* 'Version: 1'.

(*Page* 6, *clause* **7.2**) — Insert the following at the end:

'e) MR, US and Firmware Upgrade associations shall use Service specific dedicated key ciphering. PUSH and IHD associations shall use General protection.'

(*Page* 6, *clause* **7.3.1**) — Insert the following at the end of second paragraph :

'The security setup object (0.0.43.0.e.255, e = 2, 3, 4, 5) shall be used for changing the Global key (encryption & authentication). New global key will be wrapped with Master key using AES Key wrap algorithm and key transfer method is executed in US association. The new key shall be activated immediately after the successful key transfer. The Global key shall be common for MR, US, FW and PUSH associations and hence changing of key using any of the security setup object (0.0.43.0.e.255 , e = 2, 3, 4, 5) shall reflect in all associations (MR, US, FW and PUSH). IHD Association shall use separate Global key which will be factory set. Changing of the same is not in the scope of this document.'

(*Page* 6, *clause* **7.3.1**, *para* 2) —— Substitute 'The utility shall modify the unique global key and further responsibility of safety, security, management of global key will..' *for* 'The utility shall modify the unique master key and further responsibility of safety,security,management of master key will ....'.

[*Page* 7, *Table* 13, *Sl No*. (i), *col* 4] — Substitute the obis code as '0.0.44.0.0.255' *for* '0.0.44.0.1.255'.

[*Page* 8, *Table* A1, *Sl No*. (xx), *col* 4] — Substitute '71/3' *for* '71'.

[*Page* 9, *Table* A3, *Sl No*. (i), *col* 3] — Substitute '0.0.1.0.0.255' *for* '0.0.0.1.0.255'

(*Page* 9, *Table* A2) —— Insert the following at the end of table

vii   Average current   1.0.11.27.0.255   3/2

(*Page* 10, *clause* **13.1**, *para* 1) — Insert the following sentence at the end of paragraph :

Parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list.

(*Page* 11, *Table* A7) — Insert the following at the end of table

x)	161	LLS secret (MR) change
xi)	162	HLS key (US) change
xii)	163	HLS key (FW) change
xiii)	164	Global key change(encryption and authentication)
xiv)	165	ESWF change
xv)	166	MD reset

(*Page* 11, *Table* A8) — Insert the following at the end of table

vii)	209	Plug in Communication module removal Occurrence
viii)	210	Plug in Communication module removal Restoration
ix)	211	Configuration change to post-paid mode
x)	212	Configuration change to pre-paid mode
xi)	213	Configuration change to "Forwarded only" mode
xii)	214	Configuration change to"Import and Export" mode
xiii)	215	Overload — occurrence
xiv)	216	Overload — restoration

(*Page* 11) — Insert the following before Table A5

Table B1 Indian Event Reference Table — Voltage Related
(*Clause* 15 *and* 15.1)

Sl. No	Event ID	Descriptions
i)	7	Overvoltage **-** Occurrence
ii)	8	Overvoltage **-** Restoration
iii)	9	Low Voltage **-** Occurrence
iv)	10	Low voltage **-** Restoration

NOTES
1   Occurrence / Restoration are considered as separate events.
2   For each of the events a certain list of parameters shall be captured as per Table A11.
3   For each of the occurrence event captured, the cumulative tamper count value shall be incremented.
4   Support for selective access shall be as defined in clause 11.3 of IS 15959.

[*Page* 8, *clause* **11.1**, *line* 8, (e)] — Substitute 'Tables A5 to A11and B1' *for* 'Tables A5 to A11'.

[*Page* 10, *clause* **15**, *line* 8, (e)] — Substitute 'Tables A5 to A10 and B1' *for* 'Tables A5 to A10'.

(*Page* 11, *Table* A5) — Substitute the existing table content with the following.

i)	51	current reverse — Occurrence
ii)	52	current reverse — Restoration
iii)	67	Over current — Occurrence
iv)	68	Over current — Restoration
v)	69	Earth loading — Occurrence
vi)	70	Earth loading - Restoration

(*Page* 11, *Table* A5) — Insert the following new note after Note 4:

'**5** Sl No (i) and (ii) is applicable for meter operating in 'Forwarded only' mode.'

3

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(*Page* 12, *Table* A11) — Insert the following at the end of table

| vii) | Cumulative tamper count | 0.0.94.91.0.255 | 1/2 |

[*Page* 12, *Table* A13, *line* 7, *col* (1)] — Substitute 'vii' *for* 'vvi'.

(*Page* 12, *Table* A13) — Insert the following at the end of table

ix)	Metering mode	0.0.94.96.19.255	1
x)	Payment mode	0.0.94.96.20.255	1
xi)	Last token recharge amount	0.0.94.96.21.255	1
xii)	Last token recharge time	0.0.94.96.22.255	1
xiii)	Total amount at last recharge	0.0.94.96.23.255	1
xiv)	Current balance amount	0.0.94.96.24.255	1
xv)	Current balance time	0.0.94.96.25.255	1
xvi)	LLS secret	0.0.40.0.2.255	15
xvii)	HLS key	0.0.40.0.e.255 (e=3, 5)	15
xviii)	Global key change	0.0.43.0.e.255	64
xix)	Image activation single action schedule	0.0.15.0.2.255	22
xx)	ESWF	0.0.94.91.26.255	1
xxi)	MD Reset	0.0.10.0.1.255	9 (method 1)

(*Page* 12, *Table* A13, *Notes*) — Insert the following new Notes after Note 5:

'**6** For Sl No. (ix), value shall be represented in unsigned character format and interpreted as below
- 0 => means Forwarded only metering mode
- 1 => means net metering mode

7 For Sl No. (x), value shall be represented in unsigned character format and interpreted as below
- 0 => means post paid meter
- 1 => means pre-paid meter

8 Prepayment facilities shall be achieved by HES. In "pre-paid meter " mode the parameter listed at Sl No. (xi), (xii), (xiii), (xiv) and (xv) shall only be updated in meter from HES. These parameters shall have Read Write access in US association and Read Only access in MR and IHD Associations.

9 Parameter listed at Sl No. (xii) and (xv) shall be represented as octet string (12) and interpreted in DLMS date-time format.

10 Parameter listed at Sl No. (viii) shall have execute access and Parameter listed at Sl No. (xix) shall have set access in FW association.'

[*Page* 13, *Table* A14, *Sl No.* (xxviii), *col* 3] — Substitute the obis code as '0.0.96.3.10.255' *for* '0.0.96.31.0.255'.

(*Page* 13, *Table* A14) — Insert the following at the end of table

xxx)	Cumulative energy, kVArh(QI)	1.0.5.8.0.255	3/2
xxxi)	Cumulative energy, kVArh(QII)	1.0.6.8.0.255	3/2
xxxii)	Cumulative energy, kVArh(QIII)	1.0.7.8.0.255	3/2
xxxiii)	Cumulative energy, kVArh(QIV)	1.0.8.8.0.255	3/2

(*Page* 13, *Table* A14) — Substitute the Note 12 at the end of table with the following:

'**12** The parameter at the Sl No. (xxiii), (xxv), (xxxi) and (xxxii) are only applicable for meters supporting 'import and export' energy measurement.'

4

(*Page* 14, *Table* A15) — Delete the following from table:

ix)	Block energy, KVAh(lag)	1.0.5.29.0.255	3/2
x)	Block energy, KVAh(lead)	1.0.8.29.0. 255	3/2

(*Page* 14, *clause* **18.1**, *para* 1) — Insert the following sentence at the end of paragraph :

Parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list.

(*Page* 14, *clause* **19.1**, *para* 1) — Insert the following sentence at the end of paragraph :

Parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list.

(*Page* 15, *clause* **20.1**, *para* 1) — Insert the following sentence at the end of paragraph :

Parameters that do not have a scaler-unit (like IC = 1) shall not be included in the capture objects list.

(*Page* 15, *Table* A17, *col* 1) — Substitute 'lx,lxi' *for* 'xl,xli'.

(*Page* 15, *Table* A17) — Insert the following at the end of table:

xlii)	Cumulative energy, kVArh(QI)	1.0.5.8.0.255	3/2
xliii)	Cumulative energy, kVArh(QII)	1.0.6.8.0.255	3/2
xliv)	Cumulative energy, kVArh(QIII)	1.0.7.8.0.255	3/2
xlv)	Cumulative energy, kVArh(QIV)	1.0.8.8.0.255	3/2

(*Page* 15, *Table* A17) — Substitute the Note 6 at the end of table with the following:

'**6** The parameter at Sl No. (xl), (xli), (xliii) and (xliv) are applicable only for meter supporting 'import and export'energy measurement.'

(*Page* 17, *Table* A21) — Insert the following at the end of table:

x)	161	LLS secret (MR) change
xi)	162	HLS key (US) change
xii)	163	HLS key (FW) change
xiii)	164	Global key change
xiv)	165	ESWF change
xv)	166	MD reset

(*Page* 17, *Table* A22) — Insert the following at the end of table:

vii)	209	Plug in Communication module removal Occurrence
viii)	210	Plug in Communication module removal Restoration
ix)	211	Configuration change to post-paid mode
x)	212	Configuration change to pre-paid mode
xi)	213	Configuration change to "Forwarded" only mode
xii)	214	Configuration change to "Import and Export" mode
xiii)	215	Overload — occurrence
xiv)	216	Overload — restoration

[*Page* 17, *Table* A25, *Sl No.* (iii), *col* 3] — Substitute '1.0.31.7.0.255' *for* '1.0.3.7.0.255'.

[*Page* 17, *Table* A25, *col* 1] — Substitute 'ix to xiii' *for* 'xi to xv'.

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(*Page* 17, *Table* A25) — Insert the following at the end of table

xiv)	Cumulative tamper count	0.0.94.91.0.255	1/2

(*Page* 18, *Table* A27) — Insert the following at the end of table

viii)	Image transfer	0.0.44.0.0.255	18
ix)	Metering mode	0.0.94.96.19.255	1
x)	Payment mode	0.0.94.96.20.255	1
xi)	Last token recharge amount	0.0.94.96.21.255	1
xii)	Last token recharge time	0.0.94.96.22.255	1
xiii)	Total Amount at last recharge	0.0.94.96.23.255	1
xiv)	Current balance amount	0.0.94.96.24.255	1
xv)	Current balance time	0.0.94.96.25.255	1
xvi)	LLS secret	0.0.40.0.2.255	15
xvii)	HLS key	0.0.40.0.e.255 (e=3, 5)	15
xviii)	Global key change	0.0.43.0.e.255	64
xix)	Image activation single action schedule	0.0.15.0.2.255	22
xx)	ESWF	0.0.94.91.26.255	1
xxi)	MD Reset	0.0.10.0.1.255	9 (method 1)

(*Page* 18, *Table* A27, *Note* 2) — Substitute '1800 s' *for* '3600 s'.

(*Page* 18, *Table* A27, *Notes*] — Insert the following new Notes after Note 5:

'**6** For Sl No. (ix), value shall be represented in unsigned char format and interpreted as below
- 0 => means Forwarded only metering mode
- 1 => means net metering mode

7 For Sl No. (x), value shall be represented in unsigned char format and interpreted as below
- 0 => means post paid meter
- 1 => means pre-paid meter

8 Prepayment facilities shall be achieved by HES. In "pre-paid meter " mode the parameter listed at Sl No. (xi), (xii), (xiii), (xiv) and (xv) shall only be updated in meter from HES. These parameters shall have Read Write access in US association and Read Only access in MR and IHD Associations.

9 Parameter listed at Sl No (xii) and (xv) shall be represented as octet string(12) and interpreted in DLMS date-time format.

10 Parameter listed at Sl No. (viii) shall have execute access and Parameter listed at Sl No. (xix) shall have set access in FW association.'

(*Page* 18, *clause* **22.1**) — Insert the following at the end.

The Name plate details parameters are listed in Table A27.

This is modeled as profile generic with OBIS code = 0.0.94.91.10.255, IC = 7, Attribute = 2.

[*Page* 19, *Table* A28, *Item No*. (4.0), c*ol* 3] — Substitute '5.1, 5.2 and Table 2' *for* '5.1 and 5.2'.

(*Page* 19, *Table* A28) — Delete Item No. 5.0 (Simultaneous operation).

(*Page* 19, *Table* A28, *Note*) — Substitute the following notes for the existing:

'**1** Item no 4.0 Association properties: 'PUSH', 'Firmware upgrade' & "IHD" are not the part of data verification tests.

2 Item No 19.0(b) Programmable Parameter (x), (xi), (xii), (xiii), (xiv), (xv), (xix) and (viii) is not part of data verification test.

6

3 Meter under Test should be tested for configured 'metering mode' as submitted by manufacturer.
4 Clause numbers refer to IS 15959 (Part 1) and table number refer to this standard**.'**

[*Page* 19, *Table* A29, *Item No.*(2.3), *col* 3] — Substitute '5.1, 5.2 & Table 2' *for* '5.1 and 5.2'.

(*Page* 19, *Table* A29) — Delete Item No. 2.4 (Simultaneous operation).

(*Page* 19, *Table* A29, *Note*) — Substitute the following notes for the existing:

'1 Item no 2.3 Association properties: 'PUSH', 'Firmware upgrade' & 'IHD' are not the part of data verification tests.
2 Item No 2.14.2 Programmable Parameter (x), (xi), (xii), (xiii), (xiv), (xv), (xix) and (viii) is not part of data verification test.'
3 Meter under Test should be tested for configured 'metering mode' as submitted by manufacturer.
4 Clause numbers refer to IS 15959 (Part 1) and table number refer to this standard**.'**

[*Page* 20, *Table* A30, *Sl No.* (iii), *col* 3] — Substitute 'Table A17' *for* 'Table A18'.

(*Page* 20, *Fig*. 4) — Insert the following contents in each block:

Block 1 — SM Variant— 1With NAN
Block 2 — White box having Variant — 1NANModule
Block 3 —SM Test software Module as per IS 15959(Equivalent to the DLMS Client interface at HES end for the SM)

(*Page* 20, *clause* **24**, *para* 1, *line* 4) — Delete 'CTT or'.

(*Page* 20, *clause* **24**, *para* 2, *line* 3) — Delete 'CTT or'.

(*Page* 20, *clause* **24**) — Insert the following at the end of second paragraph :

'Testing for the test of functional test given in table A30 shall be done using white Box and the SM software shall be provided by Manufacturer.'

(*Page* 20, *clause* **24**, *para* 3, *line* 1) — Delete 'CTT and' .

(*Page* 20, *Fig.* 5) — Insert the following contents in each block :

Block 1 — SM Variant— 2With WAN Module
Block 2 — SM Test software Module as per IS 15959(Equivalent to the DLMS Client interface at HES end for the SM)

(*Page* 20, *Note*) — Insert the following under Note:

'The required compatible accessories namely, White box having Variant — 1 NAN Module, router etc shall be provided by the respective manufacture for testing along with the test smart meter.'

(ETD 13)

Publication Unit, BIS, New Delhi, India

AMENDMENT NO. 2 MAY 2017
TO
IS 15959 (PART 2) : 2016 DATA EXCHANGE FOR ELECTRICITY METER READING, TARIFF AND LOAD CONTROL — COMPANION SPECIFICATION

PART 2 SMART METER

[*Page* 6, *clause* **7.2** (c)*, line* 8 (*see also Amendment No.*1)] — Substitute 'Version: 1' *for* 'Version: 3'.

[*Page* 6, *clause* **7.2** (e) (*see also Amendment No.*1)] — Substitute 'General Global Ciphering' *for* 'General Protection'.

[*Page* 15, *Table* A17, *col* 1 (*see also Amendment No.*1)] — Substitute 'xl, xli' *for* 'lx, lxi'.

[*Page*18, *clause* **22.1** (*see also Amendment No.*1)] — Substitute 'A26' *for* 'A27'.

(ETD 13)