Test and Certification Committee (TCC)

Protocol Implementation Conformance Statement (PICS) for Echonet Lite Profile Interface

Revision 0v10

1 Notices

1.1 Copyright

1.2 Revision History

Table 1.21 List of Revision History

Version	Date	Author	Comments
0v00	2013-12-06	Olga Kozeruk	Initial draft
0v01	2013-12-13	Olga Kozeruk	Removed “N/A” column from “Status” column
0v02	2013-12-19	Olga Kozeruk	Added PICS for PANA and made 6LowPAN Neighbor Discovery prohibited.
0v03	2013-12-20	Olga Kozeruk	Removed Irrelevant items
0v04	2014-01-31	Olga Kozeruk	• The O.1 and O.2 footnotes were changed. • The “10.10 IPv6 Neighbor Discovery” was changed.
0v05	2104-04-04	Olga Kozeruk	Items IP2-IP4, IP12-IP13, ICMP6, ICMP7 were made optional.
0v06	2014-07-17	Chin-Sean Sum, Olga Kozeruk	Modification of PICS proforma in accordance to changes in ENET Technical Profile 2v03 clause 3.7
0v07	2015-06-12	Olga Kozeruk, Toyoyuki Kato	Addition of Enet HAN support.
0v08	2015-08-27	Toyoyuki Kato, Olga Kozeruk	• Addition of “10.4 MAC sub-layer function”. • Changed referenced standard version to 2v06 (Wi-SUN-Echonet-Profile-2v06) • Added SEC20-21 for Push/Pull key update
0v09	2016-07-13	Noriyuki Sato, Olga Kozeruk, Toyoyuki Kato	• Revision of Wi-SUN Logo displayed on the front page. • Removal of FD3 defined in 10.2, and re-organization of the table. • Addition of “10.3 Device Role type (R)” • Addition of RS2, RS3, RS3.1 and RS3.2.

			• Addition of “10.5 Sleep support (SL)”. • Removal of ND4.2, ND5.3 and ND5.4. • Addition of MLF24, MLF24.1, MLF24.2, MLF24.3 and MLF24.4 in 10.5. • Update of [Wi-SUN-ENET] specified in sub-clause 3.1. • Addition of the table in "5.1 Scope". • Renumbering the item numbers defined in the tables throughout this document, to make them identical with ENET TPS. • Modification of the other relevant parts according to the above revision.
0v10	2017-03-28	Toyoyuki Kato	• Reflecting "R4" defined in 10.3 into 10.4 and 10.5.

2 Contents

3 References

3.1 Normative references

This section lists the normative references that define partial specifications of this standard or ones that are related to the standard.

This document is to recommend that any update in those references should be reflected in the subsequent implementations according to the standard.

[6LOWPAN]	Transmission of IPv6 Packets over IEEE 802.15.4 Networks (6LoWPAN), IETF RFC 4944
[6LPHC]	Compression Format for IPv6 Datagrams in 6LoWPAN Networks, IETF RFC 6282
[6LPND]	Neighbor Discovery Optimization for IPv6 over Low-Power Wireless Personal Area Networks (6LoWPANs), IETF RFC 6775
[802.15.4]	IEEE Std. 802.15.4 - 2011™, IEEE Standard for Information Technology - Telecommunications and Information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs), September 2011
[AH]	IP Authentication Header, IETF RFC 4302
[ESP]	IP Encapsulating Security Payload (ESP), IETF RFC 4303
[ICMP6]	Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification, IETF RFC 4443
[IP6ADDR]	IP Version 6 Addressing Architecture, IETF RFC 4291
[IPv6]	Internet Protocol, Version 6 (IPv6) Specification, IETF RFC 2460
[IPv6-RH]	Deprecation of Type 0 Routing Headers in IPv6, IETF RFC 5095
[ND]	Neighbor Discovery for IP version 6 (IPv6), IETF RFC 4861
[SLAAC]	IPv6 Stateless Address Autoconfiguration, IETF RFC 4862
[ULA]	Unique Local IPv6 Unicast Addresses, IETF RFC 4193
[Wi-SUN-ENET]	20160617-Wi-SUN-Echonet-Profile-2v08 , webftp.wi-sun.org

3.2 Informative References

None

4 Abbreviations and Special Symbols

4.1 Abbreviations

HEMS	Home Energy Management System
HAN	Home Area Network
MC	Multicast
PAN	Personal Area Network
SM	Smart Meter

4.2 Special Symbols

M	Mandatory
O	Optional
O.I	Optional, but support of at least one of the group of options labeled O.I is required.
N/A	Not applicable
X	Prohibited
I	Irrelevant (not tested)
“item”	Conditional, status dependent upon the support marked for the “item”

5 Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a given standard. Such a statement is called a protocol implementation conformance statement (PICS).

5.1 Scope

This document provides the protocol implementation conformance statement (PICS) proforma for interface part of Wi-SUN Echonet Lite over IP profile defined in section “3.6 Recommended usage for single-hop home network”, “3.7 Recommended usage for single-hop smart meter-HEMS network”, “3.8 Recommended usage for single-hop home network among devices “, “3.9 Recommended usage for the home are network (HAN) employing relay device “ and ”3.10 Recommended usage for home area network among devices with an extension of sleeping end device support” of [Wi-SUN-ENET]. The following table provides more detailed scope of this document.

Network type	**Device Role Type**	**reference section in [Wi-SUN-ENET]**	**Sleeping end device support**	**Relay support**	**Note**
Single-hop smart meter-HEMS network	Coordinator	3.7	No	No	
	End device		No	No	
Single-hop HAN	Coordinator	3.8	No	No	
	End device		No	No	This device can connect to Extended HAN Coordinator
Extended HAN	Coordinator	3.9 and 3.10	Yes	Yes	
	Relay device		Yes	Yes	
	End device	3.9	No	Yes	
	Sleeping end device	3.9 and 3.10	Yes	Yes	

5.2 Purpose

The supplier of a protocol implementation claiming to conform to standard specification [Wi-SUN-ENET] shall complete the following PICS proforma and accompany it with the information necessary to identify fully both the supplier and the implementation.

The PICS is in the form of answers to a set of questions in the PICS proforma. The questions in a proforma consist of a systematic list of protocol capabilities and options as well as their implementation requirements. The implementation requirement indicates whether implementation of a capability is mandatory, optional, or conditional depending on options selected. When a protocol implementer answers questions in a PICS proforma, they would indicate whether an item is implemented or not, and provide explanations if an item is not implemented.

6 Instructions for Completing the PICS Proforma

If a given implementation is claimed to conform to a particular standard, the actual PICS proforma to be filled in by a supplier shall be technically equivalent to the text of the PICS proforma in this document, and shall preserve the numbering and naming and the ordering of the PICS proforma.

PICS which conforms to this document shall be a conforming PICS proforma completed in accordance with the instructions for completion given in this document.

The main part of the PICS is a fixed-format questionnaire, divided into tables. Answers to the questionnaire are to be provided in the rightmost column, either by simply marking an answer to indicate a restricted choice (such as Yes or No), or by entering a value, set, or range of values.

7 Identification of the Implementation

Implementation under test (IUT) identification

IUT name: _MIRUECO mini_____

IUT version: _3.100_____

System under test (SUT) identification

SUT name: _MIRUECO mini_____

Software Version: _5.10A_____

Hardware Version: _3.100_____

Operating system (optional): _____

Applicant

Name: _Mediotec co.,Ltd _____

Address: _1-28-11,Shinjyuku,Shinjyukuku,Tokyo,160-0022,Japan _____

_____

Telephone number: _+81-3-3226-5500_____

Facsimile number: _____

Email address: _ nakamura@mediotec.co.jp _____

Additional information: _____

_____

8 Identification of the Protocol

This PICS proforma applies to standards given in the following:

- Wi-SUN-Echonet-Profile [Wi-SUN-ENET]
  Version: Wi-SUN-Echonet-Profile-2v08

9 Global Statement of Conformance

Requirement	Support
Are all mandatory features implemented?	[レ]Yes [ ]No

Note -- Answering 'No' indicates non-conformance to the specified protocol standard. Non-supported mandatory capabilities are to be identified in the following tables, with an explanation by the implementer explaining why the implementation is non-conforming.

The supplier will have fully complied with the requirements for a statement of conformance by completing the statement contained in this sub-clause. However, the supplier may find it helpful to continue to complete the detailed tabulations in the sub-clauses that follow.

10 PICS Proforma Tables

The following tables are composed of the detailed questions to be answered, which make up the PICS proforma.

10.1 Profile usage (PU) types

Item number	Item description	Reference	Status	Support	
				Yes	No
PU1	Single-hop smart meter-HEMS network	[Wi-SUN-ENET] 3.7	O.1		✓
PU2	Single-hop HAN	[Wi-SUN-ENET] 3.8	O.1	✓	
PU3	Extended HAN	[Wi-SUN-ENET] 3.9, 3.10	O.1		✓

O.1: Optional, but one and only one of the features described in PU1, PU2 and PU3 is required to be implemented. Devices under test supporting multiple Profile usages must submit separate PICS for each profile usage and must be tested separately.

10.2 Functional device (FD) types

Item number	Item description	Reference	Status	Support	
				Yes	No
FD1	FFD	[802.15.4] 5.1	O.2	✓	
FD2	RFD	[802.15.4] 5.1	O.2		✓

O.2: Optional, but one and only one of the features described in FD1 and FD2 is required to be implemented. Devices under test supporting multiple Functional Device types must submit separate PICS for each device type and must be tested separately.

10.3 Device Role type (R)

Item number	Item description	Reference	Status			Support	
			PU1	PU2	PU3	Yes	No
R1	Coordinator	[Wi-SUN-ENET] 3.6.1	FD1:O.3 FD2:X	FD1:O.4 FD2:X	FD1:O.5 FD2:X	レ	
R2	Relay device	[Wi-SUN-ENET] 3.9.1	X	X	FD1:O.5 FD2:X		レ
R3	End device	[Wi-SUN-ENET] 3.6.1	FD1:O.3 FD2:M	FD1:O.4 FD2:M	FD1:X FD2: O.6		レ
R4	Sleeping end device	[Wi-SUN-ENET] 3.10.1	X	X	FD1 O.5 FD2: O.6		レ

O.3, O.4: Optional, but one and only one of the features described in R1 and R3 is required to be implemented. Devices under test supporting multiple Functional Device types must submit separate PICS for each device type and must be tested separately.

O.5: Optional, but one and only one of the features described in R1 and R2 is required to be implemented. Devices under test supporting multiple Functional Device types must submit separate PICS for each device type and must be tested separately.

O.6: Optional, but one and only one of the features described in R3 and R4 is required to be implemented. Devices under test supporting multiple Functional Device types must submit separate PICS for each device type and must be tested separately.

10.4 Relay Support (RS)

Item number	Item description	Reference	Status			Support	
			PU1	PU2	PU3	Yes	No
RS1	Relay endpoint	[Wi-SUN-ENET] 3.9.3.3	X	X	R1,R3,R4: M R2: X		レ
RS2	Relay intermediate	[Wi-SUN-ENET] 3.9.3.3	X	X	R1,R3,R4: X R2: M		レ
RS3	Multicast Transmission from PAN Coordinator	[Wi-SUN-ENET] 3.9.11.1	X	X	FD1,RS1:M		レ
RS3.1	Adaptive selection of transmission MC frame with or without SLR IE	[Wi-SUN-ENET] 3.9.11.1	X	X	RS3: O.7		レ
RS3.2	Send two multicast frame – with SLR IE and without SLR IE	[Wi-SUN-ENET] 3.9.11.1	X	X	RS3: O.7		レ

O.7: Optional, but at least one of the features described in RS3.1 and RS3.2 is required to be implemented. Devices under test supporting multiple Functional Device types must submit separate PICS for each device type and must be tested separately.

10.5 Sleep support (SL) types

Item number	Item description	Reference	Status			Support	
			PU1	PU2	PU3	Yes	No
SL1	Sleeping device	[Wi-SUN-ENET] 3.10.1, 3.10.3, 3.10.6.1	X	X	R1, R2: X R3: O R4: M		レ
SL2	Sleeping support	[Wi-SUN-ENET] 3.10.1, 3.10.3, 3.10.6.1	X	X	R1, R2: M R3,R4: X		レ

10.6 MAC sub-layer function

Item number	Item description	Reference	Status			Support	
			PU1	PU2	PU3	Yes	No
MLF10.2	Active scan	[Wi-SUN-ENET] 3.7.6.1, 3.8.6.1, 3.9.6.1, 3.10.6.1	R1: O R3: M	R1: O R3: M	R1: O R2, R3: M	✓	
MLF10.2.1	Transmission of Capability Notification IE in EBR	[Wi-SUN-ENET] 3.7.6.1, 3.8.6.1 3.8.3.1, 3.10.3.2.1	X	R3:O[1]	R1: X R2,R3,R4: M		✓
MLF10.2.2	Transmission of Capability Notification IE in EB	[Wi-SUN-ENET] 3.8.3.1, 3.10.3.2.1	X	O**Error! Bookmark not defined.**	M		✓
MLF10.2.3	Reception of Capability Notification IE in EBR and EB	[Wi-SUN-ENET] 3.8.3.1, 3.10.3.2.1	X	M[2]	M	✓	
MLF24	Relay support in HAN	[Wi-SUN-ENET] 3.9.3	X	X	M		✓

1 All flags must be set to zero in the IE.

2 This feature is required for the compatibility purpose only and the content of the received IE should not be used for any network configuration or routing purposes.

10.7 Adaption Layer of 6LoWPAN

Item number	Item description	Reference	Status	Support	
				Yes	No
6LP1.1	Addressing Modes (EUI-64)	[6LOWPAN] 3	M	☑	
6LP2	Frame Format	[6LOWPAN] 5	O[3] (#1)	☑	
6LP3	Stateless Address Autoconfiguration	[6LOWPAN] 6	M	☑	
6LP4	IPv6 Link Local Address	[6LOWPAN] 7	M	☑	
6LP5	Unicast Address Mapping	[6LOWPAN] 8	M[4] (#2)	☑	
6LP9	Non-Compressed Fields	[6LOWPAN] 10.3	M	☑	

10.8 Fragmentation of 6LoWPAN

Item number	Item description	Reference	Status	Support	
				Yes	No
6LPF1	Fragmentation type and Header	[6LOWPAN] 5.3	M	☑	

10.9 6LoWPAN Header Compression

Item number	Item description	Reference	Status	Support	
				Yes	No
6HC1.1	LOWPAN_IPHC (Base Format)	[6LPHC] 3.1.1	M	☑	
6HC2.1	Stateless Multicast Address Compression	[6LPHC] 3.2.3	M	☑	

3 Header Type = LOWPAN_HC1 shall not be used and Header Type = LOWPAN_BC0 and [6LOWPAN] 5.2 are option

4 16bit address (short address) shall not be used

10.10 6LoWPAN Neighbor Discovery

Item number	Item description	Reference	Status	Support	
				Yes	No
6ND	6LowPAN Neighbor discovery	[6LPND]	X		✓

10.11 Network Layer: IPv6

Item number	Item description	Reference	Status	Support	
				Yes	No
IP1	Header Format	[IPv6] 3	M	✓	
IP1.1	Extension Headers	-	I		✓
IP1.2	Extension Header Order	[IPv6]4.1	I		✓
IP1.3	Options	[IPv6] 4.2	I		✓
IP1.4	Hop-by-Hop Options Header	[IPv6] 4.3	I		✓
IP1.5	Routing Header	[IPv6]4.4	I		✓
IP1.6	Fragment Header	[IPv6] 4.5	I		✓
IP1.7	Destination Options Header	[IPv6] 4.6	I		✓
IP1.8	No Next Header	[IPv6]4.7	I		✓
IP1.9	AH Header	[AH]	I		✓
IP1.10	ESP Header	[ESP]	I		✓
IP2	Deprecation of Type 0 Routing Headers	[IPv6-RH]	I		✓
IP3	Path MTU Discovery	[IPv6] 5	I		✓
IP4	Flow Labels	[IPv6] 6	X		✓
IP5	Traffic Classes	[IPv6] 7	X		✓

10.12 Network Layer: ICMPv6

Item number	Item description	Reference	Status	Support	
				Yes	No
ICMP1	Message Format	[ICMP6] 2.1	M	✓	
ICMP2	Message Source Address Determination	[ICMP6] 2.2	M	✓	
ICMP3	Message Checksum Calculation	[ICMP6] 2.3	M	✓	
ICMP4	Message Processing Rules	[ICMP6] 2.4	M	✓	
ICMP5	Destination Unreachable Message	[ICMP6] 3.1	M[5]	✓	
ICMP6	Packet Too Big Message	[ICMP6] 3.2	I		✓
ICMP7	Time Exceeded Message	[ICMP6] 3.3	I		✓
ICMP8	Parameter Problem Message	[ICMP6] 3.4	M	✓	
ICMP9	Echo Request Message	[ICMP6] 4.1	M	✓	
ICMP10	Echo Reply Message	[ICMP6] 4.2	M	✓	

10.13 IP Addressing

Item number	Item description	Reference	Status	Support	
				Yes	No
IPAD1	IPv6 Addressing	[IP6ADDR]	M[6] (#1)	✓	
IPAD1.2	Link Local Unicast Address	[IP6ADDR] 2.5.6	M[7] (#2)	✓	
IPAD1.5	Multicast Address	[IP6ADDR] 2.7	M[8] (#3)	✓	
IPAD1.6	Prefix Length		/64	✓	
IPAD2	Stateless Address Autoconfiguration	[SLAAC]	M	✓	

5 The port unreachable (code=4) is only applicable.

6 Some of the functions may not be used.

7 EUI-64 address based Link Local Address shall be supported.

8 ff02::1 shall be used for transmission.

Item number	Item description	Reference	Status	Support	
IPAD2.1	Creation of Link Local Address	[SLAAC] 5.3	M	✓	

10.14 IPv6 Neighbor Discovery

Item number	Item description	Reference	Status	Support	
				Yes	No
ND2	Address Resolution	[ND] 7.2	M	✓	
ND4	Duplicate Address Detection	[SLAAC] 5.4	I		✓
ND11	Source/Target Link-layer Address Option	[ND] 4.6.1	M	✓	
ND8	Neighbor Solicitation (NS) Message	[ND] 4.3	(#1)	✓	
ND8.1	NS Transmission		O		✓
ND8.2	NS Reception		M	✓	
ND9	Neighbor Advertisement (NA) Message	[ND] 4.4	(#2)	✓	
ND9.1	Solicited NA Transmission		M	✓	
ND9.2	Solicited NA Reception		ND8.1:M	✓	

(#1) See ND8.1 and ND8.2
(#2) See ND9.1 and ND9.2

10.15 Security

Item number	Item description	Reference	Status			Support	
			PU1	PU2	PU3	Yes	No
SEC1	PANA Protocol	[PANA]	M	M	M	✓	
SEC2	PANA Authentication Agent (PAA)	[PANA] 3	R1:M R3:X	R1:M R3:X	R1:M R2:X R3:X	✓	
SEC3	PANA Client (PaC)	[PANA] 3	R1:X R3:M	R1:X R3:M	R1:X R2:M R3:M		✓
SEC4	PANA Processing Rules	[PANA] 5	M	M	M	✓	
SEC5	PANA Message Format	[PANA] 6	M	M	M	✓	
SEC6	PANA Messages	[PANA] 7	M	M	M	✓	

SEC7	PANA AVPs	[PANA] 8	M	M	M	✓	
SEC8	PANA Retransmission Timers	[PANA]9	M	M	M	✓	
SEC9	EAP Packet Format	[EAP] 4	M	M	M	✓	
SEC10	EAP Identity Message	[EAP] 5.1	M	M	M	✓	
SEC11	EAP Notification Message	[EAP] 5.2	M	M	M	✓	
SEC12	EAP-PSK Standard Authentication	[EAP-PSK] 4.1	M	M	M	✓	
SEC13	EAP-PSK Message Format	[EAP-PSK] 5	M	M	M	✓	
SEC14	HMAC-SHA2-256 Algorithm	[HMAC-SHA256] 2	M	M	M	✓	
SEC15	Security configuration for Coordinator on single-hop HAN	[Wi-SUN-ENET] 3.8.5	X	FD1:M FD2:X	X	✓	
SEC16	Security configuration for Device on single-hop HAN	[Wi-SUN-ENET] 3.8.5	X	FD1:X FD2:M	X		✓
SEC17	Security configuration for Coordinator on multi-hop HAN	[Wi-SUN-ENET] 3.9.5	X	X	R1:M R2:X R3: X		✓
SEC18	Security configuration for Relay Device on multi-hop HAN	[Wi-SUN-ENET] 3.9.5	X	X	R1:X R2:M R3: X		✓
SEC19	Security configuration for End Device on multi-hop HAN	[Wi-SUN-ENET] 3.9.5	X	X	R1: X R2: M R3: M		✓
SEC20	Support of HAN Group Key update by Push	[Wi-SUN-ENET] 3.8.5.4 , 3.9.5.4.	X	FD1:M FD2:M	M	✓	
SEC21	Support of HAN Group Key update by Pull	[Wi-SUN-ENET] 3.8.5.4 , 3.9.5.4.	X	FD1:M FD2:O	R1: M R2: O R3: O	✓	