

Environmental Sensing Profile (ESP)

Bluetooth® Implementation Conformance Statement (ICS) Proforma

- **Revision:** ESP.ICS.p3
- **Revision Date:** 2023-02-07
- **Prepared By:** BTI
- **Published during TCRL:** TCRL.2022-2



This document, regardless of its title or content, is not a Bluetooth Specification as defined in the Bluetooth Patent/Copyright License Agreement (“PCLA”) and Bluetooth Trademark License Agreement. Use of this document by members of Bluetooth SIG is governed by the membership and other related agreements between Bluetooth SIG Inc. (“Bluetooth SIG”) and its members, including the PCLA and other agreements posted on Bluetooth SIG’s website located at www.bluetooth.com.

THIS DOCUMENT IS PROVIDED “AS IS” AND BLUETOOTH SIG, ITS MEMBERS, AND THEIR AFFILIATES MAKE NO REPRESENTATIONS OR WARRANTIES AND DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, THAT THE CONTENT OF THIS DOCUMENT IS FREE OF ERRORS.

TO THE EXTENT NOT PROHIBITED BY LAW, BLUETOOTH SIG, ITS MEMBERS, AND THEIR AFFILIATES DISCLAIM ALL LIABILITY ARISING OUT OF OR RELATING TO USE OF THIS DOCUMENT AND ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING LOST REVENUE, PROFITS, DATA OR PROGRAMS, OR BUSINESS INTERRUPTION, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY, AND EVEN IF BLUETOOTH SIG, ITS MEMBERS, OR THEIR AFFILIATES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

This document is proprietary to Bluetooth SIG. This document may contain or cover subject matter that is intellectual property of Bluetooth SIG and its members. The furnishing of this document does not grant any license to any intellectual property of Bluetooth SIG or its members.

This document is subject to change without notice.

Copyright © 2014–2023 by Bluetooth SIG, Inc. The Bluetooth word mark and logos are owned by Bluetooth SIG, Inc. Other third-party brands and names are the property of their respective owners.



Contents

1	Identification of the implementation.....	4
1.1	Implementation Under Test (IUT) identification	4
1.2	Versions	5
1.3	Roles.....	5
1.4	Transports	5
1.5	ES Sensor role.....	5
1.5.1	Services – ES Sensor role	5
1.5.2	GAP Requirements – ES Sensor role.....	6
1.6	Collector role	6
1.6.1	Service Support – Collector role	6
1.6.2	Services and Characteristics – Collector role	7
1.6.3	Features – Collector role.....	7
1.6.4	GATT Requirements – Collector role.....	8
1.6.5	GAP Requirements – Collector role	9
2	References.....	11
3	Revision history and acknowledgments	12

1 Identification of the implementation

1.1 Implementation Under Test (IUT) identification

Identification of the Implementation Under Test (IUT) is to be filled in to provide as much detail as possible regarding version numbers and configuration options.

An ICS contact person to respond to queries regarding information supplied in this ICS proforma is named in the Declaration of Compliance: Summary of Selected Specifications in Implementation.

1.2 Versions

Table 0: Major Versions (X.Y)

Item	Version	Reference	Status
1	ESP v1.0	[1]	M

Table 1: No longer used

1.3 Roles

Table 2: Role Requirements

Item	Role	Reference	Status
1	Environmental Sensor	[1] 2.1	C.1
2	Collector	[1] 2.1	C.1

C.1: Mandatory to support at least one of ESP 2/1 “Environmental Sensor” OR ESP 2/2 “Collector”.

1.4 Transports

Table 3: Transport Requirements

Item	Transport	Reference	Status
1	Profile supported over BR/EDR	[1] 1.5	C.1
2	Profile supported over LE	[1] 1.5	C.1

C.1: Mandatory to support at least one of ESP 3/1 “Profile supported over BR/EDR” OR ESP 3/2 “Profile supported over LE”.

1.5 ES Sensor role

1.5.1 Services – ES Sensor role

Table 4: Service Requirements – ES Sensor Role

Prerequisite: ESP 2/1 “Environmental Sensor”

Item	Service / Capability	Reference	Status	Inter-Layer Dependency
1	Environmental Sensing Service	[1] 3	M	[2] ESS
2	Environmental Sensing Service UUID in AD in GAP Discoverable Mode	[1] 3.1.1.1	O	N/A
3	Local Name in AD or Scan Response	[1] 3.1.1.2	O	N/A
4	Appearance in AD or Scan Response	[1] 3.1.1.4	O	N/A
5	Service Data in AD	[1] 3.1.1.5	O	N/A
6	Device Information Service	[1] 3	O	[5] DIS 2/1

Item	Service / Capability	Reference	Status	Inter-Layer Dependency
7	Battery Service	[1] 3	O	[6] BAS 2/1

1.5.2 GAP Requirements – ES Sensor role

Table 5: GAP Requirements – ES Sensor Role

Prerequisite: ESP 2/1 “Environmental Sensor”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Peripheral	[1] 2.4	C.3	[4] GAP 5/3 or GAP 38/3
2	LE security mode 1	[1] 6.1	C.3, C.4	[4] GAP 25/1
3	General discoverable mode (BR/EDR)	[1] 7.1	C.2	[4] GAP 1/3
4	Limited discoverable mode (BR/EDR)	[1] 7.1	C.2	[4] GAP 1/2
5	Unauthenticated Pairing (LE security mode 1 level 2)	[1] 6.1	C.4	[4] GAP 25/8
6	Authenticated Pairing (LE security mode 1 level 3)	[1] 6.1	C.4	[4] GAP 25/7
7	LE security mode 1 level 4	[1] 6.1	C.4	[4] GAP 25/9

C.1: No longer used.

C.2: Mandatory to support at least one of ESP 5/3 “General discoverable mode (BR/EDR)” OR ESP 5/4 “Limited discoverable mode (BR/EDR)” IF ESP 3/1 “Profile supported over BR/EDR”, otherwise not defined.

C.3: Mandatory IF ESP 3/2 “Profile supported over LE”, otherwise not defined.

C.4: Mandatory to support at least one of ESP 5/2 “LE security mode 1” OR ESP 5/5 “Unauthenticated Pairing (LE security mode 1 level 2)” OR ESP 5/6 “Authenticated Pairing (LE security mode 1 level 3)” OR ESP 5/7 “LE security mode 1 level 4” IF ESP 3/2 “Profile supported over LE”, otherwise not defined.

Table 6: No longer used

1.6 Collector role

1.6.1 Service Support – Collector role

Table 7: Service Support – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Service	Reference	Status
1	Discover Environmental Sensing Service	[1] 4	M
2	Discover Device Information Service	[1] 4	O
3	Discover Battery Service	[1] 4	O

1.6.2 Services and Characteristics – Collector role

Table 8: Discover Environmental Sensing Service and Attributes – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status
1	No longer used	N/A	N/A
2	Discover ESS Characteristic	[1] 4.3.1	M
3	Discover ES Measurement Descriptor	[1] 4.4.1	M
4	Discover ES Trigger Setting Descriptor and ES Configuration Descriptor	[1] 4.4.2	O
5	Discover Characteristic User Description Descriptor	[1] 4.4.3	O
6	Discover Valid Range Descriptor	[1] 4.4.4	O
7	Discover Descriptor Value Changed Characteristic	[1] 4.5	O

Table 9: Battery Service Support – Collector Role

Prerequisite: ESP 2/2 “Collector” AND ESP 7/3 “Discover Battery Service”

Item	Capability	Reference	Status
1	Read Battery Level Characteristic	[1] 4.3.3, 4.8	O
2	Receive Battery Level characteristic notifications	[1] 4.8	O

1.6.3 Features – Collector role

Table 10: Feature Requirements – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status
1	Service AD Type Feature	[1] 5.2.2	C.1

C.1: Optional IF ESP 3/2 “Profile supported over LE”, otherwise Excluded.

Table 11: Supported Environmental Measurements – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status
1	Elevation	[1] 4.4, [7], [8]	O
2	Pressure	[1] 4.4, [7], [8]	O
3	Temperature	[1] 4.4, [7], [8]	O
4	Humidity	[1] 4.4, [7], [8]	O
5	True Wind Speed	[1] 4.4, [7], [8]	O
6	True Wind Direction	[1] 4.4, [7], [8]	O
7	Apparent Wind Speed	[1] 4.4, [7], [8]	O
8	Apparent Wind Direction	[1] 4.4, [7], [8]	O
9	Gust Factor	[1] 4.4, [7], [8]	O



Item	Capability	Reference	Status
10	Pollen Concentration	[1] 4.4, [7], [8]	O
11	UV Index	[1] 4.4, [7], [8]	O
12	Irradiance	[1] 4.4, [7], [8]	O
13	Rainfall	[1] 4.4, [7], [8]	O
14	Wind Chill	[1] 4.4, [7], [8]	O
15	Heat Index	[1] 4.4, [7], [8]	O
16	Dew Point	[1] 4.4, [7], [8]	O
17	Barometric Pressure Trend	[1] 4.4, [7], [8]	O
18	Magnetic Declination	[1] 4.4, [7], [8]	O
19	Magnetic Flux Density - 2D	[1] 4.4, [7], [8]	O
20	Magnetic Flux Density - 3D	[1] 4.4, [7], [8]	O

Table 12: Procedure Requirements – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status
1	Read ESS Characteristic	[1] 4.4	M
2	Read ES Measurement Descriptor	[1] 4.4.1	O
3	Read ES Trigger Setting Descriptor(s)	[1] 4.4.2	O
4	Write ES Trigger Setting Descriptor(s)	[1] 4.4.2	O
5	Write ES Trigger Setting Descriptor(s) for values other than 0x00 (Trigger Inactive)	[1] 4.4.2	O
6	Read ES Configuration Descriptor	[1] 4.4.2	C.1
7	Write ES Configuration Descriptor	[1] 4.4.2	C.2
8	Receive ESS Characteristic notifications	[1] 4.4.2	C.2
9	Read Characteristic User Description Descriptor	[1] 4.4.3	O
10	Write Characteristic User Description Descriptor	[1] 4.4.3	O
11	Read Valid Range Descriptor	[1] 4.4.4	O
12	Receive Descriptor Value Changed characteristic indications	[1] 4.5	O

C.1: Mandatory IF ESP 12/3 “Read ES Trigger Setting Descriptor(s)”, otherwise Optional.

C.2: Mandatory IF ESP 12/5 “Write ES Trigger Setting Descriptor(s) for values other than 0x00 (Trigger Inactive)”, otherwise Optional.

1.6.4 GATT Requirements – Collector role

Table 13: GATT Requirements – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	No longer used	N/A	N/A	N/A
2	GATT Client over BR/EDR	[1] 4.2	C.1	[3] GATT 1a/2



Item	Capability	Reference	Status	Inter-Layer Dependency
3	GATT Client over LE	[1] 4.2	C.2	[3] GATT 1a/1
4	Discover All Primary Services	[1] 4.2	C.3	[3] GATT 3/2
5	Discover Primary Services by Service UUID	[1] 4.2	C.3	[3] GATT 3/3
6	Discover All Characteristics of a Service	[1] 4.3.1	C.4	[3] GATT 3/5
7	Discover Characteristics by UUID	[1] 4.3.1	C.4	[3] GATT 3/6
8	Discover All Characteristic Descriptors	[1] 4.3.1	M	[3] GATT 3/7
9	Read Characteristic Value	[1] 4.1, 4.4	M	[3] GATT 3/8
10	Notifications	[1] 4.1, 4.4.2	C.5	[3] GATT 3/17
11	Write Characteristic Value	[1] 4.1	O	[3] GATT 3/14
12	Read Characteristic Descriptors	[1] 4.1, 4.4	M	[3] GATT 3/19
13	Write Characteristic Descriptors	[1] 4.1, 4.4.2, 4.4.3	M	[3] GATT 3/21
14	Read Long Characteristic Descriptors	[1] 4.1	C.7	[3] GATT 3/20
15	Write Long Characteristic Descriptors	[1] 4.1	C.8	[3] GATT 3/22

C.1: Mandatory IF ESP 3/1 “Profile supported over BR/EDR”, otherwise not defined.

C.2: Mandatory IF ESP 3/2 “Profile supported over LE”, otherwise not defined.

C.3: Mandatory to support at least one of ESP 13/4 “Discover All Primary Services” OR ESP 13/5 “Discover Primary Services by Service UUID” IF ESP 3/2 “Profile supported over LE”, otherwise not defined.

C.4: Mandatory to support at least one of ESP 13/6 “Discover All Characteristics of a Service” OR ESP 13/7 “Discover Characteristics by UUID”.

C.5: Mandatory IF ESP 12/8 “Receive ESS Characteristic notifications” OR ESP 9/2 “Receive Battery Level characteristic notifications”, otherwise not defined.

C.6: No longer used.

C.7: Mandatory IF ESP 12/9 “Read Characteristic User Description Descriptor”, otherwise not defined.

C.8: Mandatory IF ESP 12/10 “Write Characteristic User Description Descriptor”, otherwise not defined.

1.6.5 GAP Requirements – Collector role

Table 14: GAP Requirements – Collector Role

Prerequisite: ESP 2/2 “Collector”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Central	[1] 2.4	C.1	[4] GAP 5/4 or GAP 38/4
2	LE security mode 1	[1] 6.2	C.1, C.3	[4] GAP 35/1
3	Initiation of general inquiry	[1] 7.2	C.2	[4] GAP 3/1
4	Unauthenticated Pairing (LE security mode 1 level 2)	[1] 6.1	C.3	[4] GAP 35/8

Item	Capability	Reference	Status	Inter-Layer Dependency
5	Authenticated Pairing (LE security mode 1 level 3)	[1] 6.1	C.3, C.4	[4] GAP 35/7
6	LE security mode 1 level 4	[1] 6.1	C.3	[4] GAP 35/9

- C.1: Mandatory IF ESP 3/2 "Profile supported over LE", otherwise not defined.
- C.2: Mandatory IF ESP 3/1 "Profile supported over BR/EDR", otherwise not defined.
- C.3: Mandatory to support at least one of ESP 14/2 "LE security mode 1" OR ESP 14/4 "Unauthenticated Pairing (LE security mode 1 level 2)" OR ESP 14/5 "Authenticated Pairing (LE security mode 1 level 3)" OR ESP 14/6 "LE security mode 1 level 4" IF ESP 3/2 "Profile supported over LE", otherwise not defined.
- C.4: Mandatory IF ESP 12/10 "Write Characteristic User Description Descriptor", otherwise not defined.

Table 15: No longer used

2 References

- [1] Environmental Sensing Profile Specification, Version 1.0
- [2] ICS Proforma for Environmental Sensing Service (ESS)
- [3] ICS Proforma for Generic Attribute Profile (GATT)
- [4] ICS Proforma for Generic Access Profile (GAP)
- [5] ICS Proforma for Device Information Service (DIS)
- [6] ICS Proforma for Battery Service (BAS)
- [7] Permitted Characteristic (<https://www.bluetooth.com/specifications/assigned-numbers/>)
- [8] GATT Specification Supplement (<https://www.bluetooth.com/specifications/assigned-numbers/>)

3 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2014-11-25	Prepare for Publication
	1.0.1r00	2016-07-29	TSE 7387: In Table 5, "GAP 1/3" changed to "GAP 1/2"
1	1.0.1	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.1 edition 2r00	2018-11-21	Editorial changes only. Template updated. Revision History and Contributors tables moved to the end of the document.
	1.0.1 edition 2	2019-12-03	Updated copyright page and confidentiality markings to support new Documentation Marking Requirements, performed minor formatting updates, and accepted all tracked changes to prepare for edition 2 publication.
	p2r00–r02	2022-03-23 – 2022-04-22	<p>TSE 18586 (rating 2): Deleted Table 1, C.6 for Table 13, and item 4 for Table 15 because they are no longer used. Updated the status for item 1 and added C.3 for Table 5. Updated the status for item 11 for Table 13 and for items 1 and 3 in Table 14. Added C.2 for Table 14. Updated the prerequisite and the capability for item 1 for Table 15.</p> <p>TSE 18618 (rating 1): Updated the heading for Section 1.6.2. Updated the capability for items 1 and 2 in Table 9. Corrected an error in C.5 for Table 13.</p> <p>TSE 18716 (rating 1): Editorials to align the document with the latest ICS template in anticipation of a future .Z release.</p> <p>Editorials, including consistency checker fixes, assigning publication number 2 to previous v1.0.2, and aligning copyright page with v2 of the DNMD.</p>
2	p2	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p3r00–r04	2022-10-03 – 2022-11-22	<p>TSE 19157 (rating 3): In Table 5, updated the status for Item 2 and removed C.1 because it is no longer used. In Table 6, added Item 4 and updated C.1. In Table 15, added Item 5 and updated C.1.</p> <p>TSE 19192 (rating 1): Added two references and cited them in Table 11.</p> <p>Performed template-related formatting fixes.</p>
3	p3	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.

Acknowledgments

Name	Company
Laurence Richardson	Cambridge Silicon Radio
Tatsuo Arai	Casio
Robert Hughes	Intel