Environmental Sensing Profile (ESP)

***Bluetooth*® Implementation Conformance Statement (ICS) Proforma**

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Contents

1 General principles

1.1 Implementation Under Test (IUT) identification

Using the Bluetooth SIG qualification tool, the implementer is expected to declare details about what will be implemented.

1.2 Enforcement of inter-layer dependencies

This ICS includes one or more tables with inter-layer dependencies (ILDs). ILDs are used for specification requirements that are dependent on other supporting specifications. ILDs can refer to an individual ICS item in a separate layer (individual ILD), or it can refer to the full layer (full-layer ILD).

ILDs residing in an X2Core layer will be enforced from the Bluetooth SIG qualification tool in the following conditions, depending on where the referred ILD is residing:

Referred ILD resides in	Individual ILD	Full-layer ILD
Controller layer	Core-Complete configuration, or Referred layer is supported	N/A
Lower HCI layer	HCI is supported	N/A
Upper HCI layer	Core-Host configuration, or UHCI is supported	N/A
Host layer	Core-Host configuration, or Core-Complete configuration, or Referred layer is supported	N/A
X2Core layer	Core-Host configuration, or Core-Complete configuration, or Referred layer is supported	Core-Host configuration, or Core-Complete configuration

Table 1.1: Enforcement of an ILD within the Bluetooth SIG qualification tool

2 ICS declarations

2.1 Versions

Table 0: X.Y Versions

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

Table 0a: X.Y.Z Versions

Item	Version	Reference	Status
1	ESP v1.0.1	[9]	O

Table 1: No longer used

2.2 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.

2.3 Transports

Table 3: Transport Requirements

Item	Transport	Reference	Status
1	Profile supported over BR/EDR	[1] 1.5	C.1, C.3
2	Profile supported over LE	[1] 1.5	C.2, C.3

C.1: Excluded for this Profile IF CORE 41/2 “LE Core Configuration”.

C.2: Excluded for this Profile IF CORE 41/1 “BR/EDR Core Configuration”.

C.3: Mandatory to support at least one.

2.4 Environmental Sensor role

2.4.1 Services (Environmental Sensor)

Table 4: Service Requirements (Environmental Sensor)

Prerequisite: ESP 2/1 “Environmental Sensor”

Item	Service / Capability	Reference	Status	Inter-Layer Dependency
1	Environmental Sensing Service	[1] 3	M	[2] ESS

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

2.4.2 GAP requirements (Environmental Sensor)

Table 5: GAP Requirements (Environmental Sensor)

Prerequisite: ESP 2/1 "Environmental Sensor"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Peripheral	[1] 2.4	C.3	[4] GAP 5/3
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 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 IF ESP 3/2 "Profile supported over LE", otherwise not defined.

Table 6: No longer used

2.5 Collector role

2.5.1 Service Support (Collector)

Table 7: Service Support (Collector)

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

Item	Service	Reference	Status
3	Discover Battery Service	[1] 4	O

2.5.2 Services and Characteristics (Collector)

Table 8: Discover Environmental Sensing Service and Attributes (Collector)

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)

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

2.5.3 Features (Collector)

Table 10: Feature Requirements (Collector)

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)

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

Item	Capability	Reference	Status
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
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)

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.

2.5.4 GATT requirements (Collector)

Table 13: GATT Requirements (Collector)

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
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	Single Notification	[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 IF ESP 3/2 "Profile supported over LE", otherwise not defined.

C.4: Mandatory to support at least one.

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.

2.5.5 GAP requirements (Collector)

Table 14: GAP Requirements (Collector)

Prerequisite: ESP 2/2 "Collector"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Central	[1] 2.4	C.1	[4] GAP 5/4
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

Item	Capability	Reference	Status	Inter-Layer Dependency
4	Unauthenticated Pairing (LE security mode 1 level 2)	[1] 6.1	C.3	[4] GAP 35/8
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 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

3 References

[1] Environmental Sensing Profile Specification, Version 1.0 or later

[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/)

[9] Environmental Sensing Profile Specification, Version 1.0.1

4 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	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. 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. TSE 18716 (rating 1): Editorials to align the document with the latest ICS template in anticipation of a future .Z release. Editorials, including consistency checker fixes, assigning publication number 2 to previous v1.0.2, and aligning copyright page with v2 of the DNMD.
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	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. TSE 19192 (rating 1): Added two references and cited them in Table 11. Performed template-related formatting fixes.
3	p3	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.

Publication Number	Revision Number	Date	Comments
	p4r00–r01	2024-08-01 – 2024-08-19	TSE 25575 (rating 1): Per E15786, E16272, and E18748, added new X.Y.Z version as part of the .Z release. Added a reference for Environmental Sensing Profile Specification, Version 1.0.1. Performed template-related formatting fixes.
4	p4	2024-10-08	Approved by BTI on 2024-09-11. ESP v1.0.1 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.
	p5r00–r01	2025-05-07 – 2025-05-09	TSE 27371 (rating 1): In Table 3, updated the Status value for ESP 3/1 and ESP 3/2, added conditions C.1 and C.2, and renumbered C.1 as C.3. Incorporated editorials to align the document with the latest ICS template, including updates to Section 1 and the addition of a section heading for the ICS declarations section.
5	p5	2025-07-08	Approved by BTI on 2025-06-15. Prepared for TCRL pkg100 publication.
	p6r00	2025-07-18	TSE 27550 (rating 1): Updated ILD in ESP 5/1 and ESP 14/1.
6	p6	2025-11-04	Approved by BTI on 2025-10-02. Prepared for TCRL publication.

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