Environmental Sensing Service (ESS)

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

- ▪ **Revision:** ESS.ICS.p5
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- ▪ **Prepared By:** BTI
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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	ESS v1.0	[1]	M

Table 0a: X.Y.Z Versions

Item	Version	Reference	Status
1	ESS v1.0.1	[5]	O

Table 1: No longer used

2.2 Transports

Table 2: Transport Requirements

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

C.1: Excluded for this Service IF CORE 41/2 "LE Core Configuration" OR CORE 40/1 "Core-Controller".

C.2: Excluded for this Service IF CORE 41/1 "BR/EDR Core Configuration" OR CORE 40/1 "Core-Controller".

C.3: Mandatory to support at least one.

2.3 Service requirements

Table 3: Feature Requirements

Item	Capability	Reference	Status
1	Multiple Instances of same ESS Characteristic UUID	[1] 3.1, 3.2.1	O

Table 4: ESS Characteristics

Item	ESS Characteristic	Reference	Status
1	Elevation	[1] 3.1, [3], [4]	O
2	Pressure	[1] 3.1, [3], [4]	O
3	Temperature	[1] 3.1, [3], [4]	O
4	Humidity	[1] 3.1, [3], [4]	O
5	True Wind Speed	[1] 3.1, [3], [4]	O
6	True Wind Direction	[1] 3.1, [3], [4]	O
7	Apparent Wind Speed	[1] 3.1, [3], [4]	O

Item	ESS Characteristic	Reference	Status
8	Apparent Wind Direction	[1] 3.1, [3], [4]	O
9	Gust Factor	[1] 3.1, [3], [4]	O
10	Pollen Concentration	[1] 3.1, [3], [4]	O
11	UV Index	[1] 3.1, [3], [4]	O
12	Irradiance	[1] 3.1, [3], [4]	O
13	Rainfall	[1] 3.1, [3], [4]	O
14	Wind Chill	[1] 3.1, [3], [4]	O
15	Heat Index	[1] 3.1, [3], [4]	O
16	Dew Point	[1] 3.1, [3], [4]	O
17	Barometric Pressure Trend	[1] 3.1, [3], [4]	O
18	Magnetic Declination	[1] 3.1, [3], [4]	O
19	Magnetic Flux Density - 2D	[1] 3.1, [3], [4]	O
20	Magnetic Flux Density - 3D	[1] 3.1, [3], [4]	O

2.4   Characteristic requirements

Table 5: Properties of the ESS Characteristic

Item	Capability	Reference	Status
1	Read	[1] 3	M
2	Notify	[1] 3	O
3	Extended Properties	[1] 3.1.2.4.1	C.1

C.1:   Mandatory IF ESS 6/9 "Characteristic User Description descriptor is writable", otherwise Excluded.

Table 6: Characteristic Descriptors of the ESS Characteristic

Item	Capability	Reference	Status
1	ES Measurement descriptor	[1] 3.1.2.1	C.1
2	ES Trigger Setting descriptor (first instance)	[1] 3.1.2.2	C.2
3	ES Trigger Setting descriptor (second instance)	[1] 3.1.2.2	C.3
4	ES Trigger Setting descriptor (third instance)	[1] 3.1.2.2	C.4
5	ES Trigger Setting descriptors are writable	[1] 3.1.2.2	C.3
6	ES Configuration descriptor	[1] 3.1.2.3	C.6
7	ES Configuration descriptor is writable	[1] 3.1.2.3	C.5
8	Characteristic User Description descriptor	[1] 3.1.2.4	O
9	Characteristic User Description descriptor is writable	[1] 3.1.2.4	C.7
10	Characteristic User Description descriptor string length may exceed the capacity of the default ATT_MTU	[1] 3.1.2.4, 1.4	C.7
11	Valid Range descriptor	[1] 3.1.2.5	O
12	Characteristic Extended Properties descriptor	[1] 3.1.2.4.1	C.8

C.1:   Mandatory IF ESS 3/1 "Multiple Instances of same ESS Characteristic UUID", otherwise Optional.

C.2:   Mandatory IF ESS 5/2 "Notify", otherwise Excluded.

C.3:   Optional IF ESS 6/2 "ES Trigger Setting descriptor (first instance)", otherwise Excluded.

C.4:   Optional IF ESS 6/3 "ES Trigger Setting descriptor (second instance)", otherwise Excluded.

C.5:   Optional IF ESS 6/5 "ES Trigger Setting descriptors are writable", otherwise Excluded.

C.6:   Mandatory IF ESS 6/3 "ES Trigger Setting descriptor (second instance)", otherwise Excluded.

C.7:   Optional IF ESS 6/8 "Characteristic User Description descriptor", otherwise Excluded.

C.8:   Mandatory IF ESS 6/9 "Characteristic User Description descriptor is writable", otherwise Excluded.

Table 7: Features of Characteristic Descriptors of the ESS Characteristic

Item	Capability	Reference	Status
1	A change to the value of the ES Measurement Descriptor may occur on the Server	[1] 3.1.2, 3.2.1	C.1
2	A change to value of an ES Trigger Setting Descriptor on the Server may occur on the Server	[1] 3.1.2, 3.2.1	C.2
3	A change to the value of the ES Configuration Descriptor may occur on the Server	[1] 3.2	C.3
4	A change to the value of the Characteristic User Description Descriptor may occur on the Server	[1] 3.2	C.4

C.1:   Optional IF ESS 6/1 "ES Measurement descriptor", otherwise Excluded.

C.2:   Optional IF ESS 6/2 "ES Trigger Setting descriptor (first instance)", otherwise Excluded.

C.3:   Optional IF ESS 6/6 "ES Configuration descriptor", otherwise Excluded.

C.4:   Optional IF ESS 6/8 "Characteristic User Description descriptor", otherwise Excluded.

2.5   Characteristic Feature requirements

Table 8: Characteristic Feature Requirements

Item	Capability	Reference	Status
1	Descriptor Value Changed Characteristic	[1] 3.1	C.1
2	Notification to Multiple Bonded Clients	[1] 3.1.2.3.1	C.2

C.1:   Mandatory IF ESS 6/9 "Characteristic User Description descriptor is writable" OR ESS 7/1 "A change to the value of the ES Measurement Descriptor may occur on the Server" OR ESS 7/2 "A change to value of an ES Trigger Setting Descriptor on the Server may occur on the Server" OR ESS 7/3 "A change to the value of the ES Configuration Descriptor may occur on the Server" OR ESS 7/4 "A change to the value of the Characteristic User Description Descriptor may occur on the Server", otherwise Excluded.

C.2:   Optional IF ESS 5/2 "Notify", otherwise Excluded.

2.6   GATT requirements

Table 9: GATT Requirements

Item	Capability	Reference	Status	Inter-Layer Dependency
1	No longer used	N/A	N/A	N/A
1a	GATT Server over BR/EDR	[1] 1.4	C.6	[2] GATT 1a/4
1b	GATT Server over LE	[1] 1.4	C.7	[2] GATT 1a/3

Item	Capability	Reference	Status	Inter-Layer Dependency
2	Single Notification	[1] 1.4	C.1	[2] GATT 4/17
3	Indication	[1] 1.4	C.2	[2] GATT 4/18
4	Read Characteristic Descriptor	[1] 1.4	M	[2] GATT 4/19
5	Write Characteristic Descriptor	[1] 1.4	C.3	[2] GATT 4/21
6	Read Long Characteristic Descriptor	[1] 1.4	C.4	[2] GATT 4/20
7	Write Long Characteristic Descriptor	[1] 1.4	C.5	[2] GATT 4/22

C.1: Mandatory IF ESS 5/2 "Notify", otherwise not defined.

C.2: Mandatory IF ESS 8/1 "Descriptor Value Changed Characteristic", otherwise Optional.

C.3: Mandatory IF ESS 8/1 "Descriptor Value Changed Characteristic" OR ESS 9/2 "Single Notification" OR ESS 6/9 "Characteristic User Description descriptor is writable" OR ESS 6/2 "ES Trigger Setting descriptor (first instance)" OR ESS 6/6 "ES Configuration descriptor", otherwise Optional.

C.4: Mandatory IF ESS 6/8 "Characteristic User Description descriptor" AND ESS 6/10 "Characteristic User Description descriptor string length may exceed the capacity of the default ATT_MTU", otherwise Optional.

C.5: Mandatory IF ESS 6/9 "Characteristic User Description descriptor is writable" AND ESS 6/10 "Characteristic User Description descriptor string length may exceed the capacity of the default ATT_MTU", otherwise Optional.

C.6: Mandatory IF ESS 2/1 "Service supported over BR/EDR", otherwise not defined.

C.7: Mandatory IF ESS 2/2 "Service supported over LE", otherwise not defined.

2.7   SDP requirements

Table 10: SDP Requirements

Prerequisite: ESS 2/1 "Service supported over BR/EDR"

Item	Capability	Reference	Status
1	SDP record present for ESS	N/A	M

3   References

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

[2]   ICS Proforma for Generic Attribute Profile (GATT)

[3]   Permitted Characteristics (https://www.bluetooth.com/specifications/assigned-numbers)

[4]   GATT Specification Supplement (https://www.bluetooth.com/specifications/assigned-numbers)

[5]   Environmental Sensing Service 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	2016-10-05	TSE 7515: GAP 0/3 added to Table 2; References [3], [4], and [5] – v4.0.*n* support restrictions removed
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–r03	2022-03-23 – 2022-05-04	TSE 18585 (rating 2): Updated C.5 of Table 6 and C.5 of Table 9, and the status for item 5 of Table 6. TSE 18671 (rating 1): Deleted Table 1 because the Core Specification version table is no longer used. TSE 18717 (rating 1): Editorials to align the document with the latest ICS template in anticipation of a .Z release. Editorials, including assigning publication number 1 to previous v1.0.1, consistency checker fixes, and aligning the 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–r01	2022-10-28 – 2022-11-14	TSE 19191 (rating 1): In Table 4, added references to the Permitted Characteristics document and the GATT Specification Supplement. Updated the references list.
3	p3	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.
	p4r00–r02	2024-08-01 – 2024-08-20	TSE 25576 (rating 1): Per E16259, E16260, E16607, and E18749, added new X.Y.Z version as part of the .Z release. Added a reference for Environmental Sensing Service Specification, Version 1.0.1. Performed template-related and other formatting fixes.
4	p4	2024-10-08	Approved by BTI on 2024-09-11. ESS v1.0.1 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.
	p4ed2r00	2025-02-11	TSE 27073 (rating 1): Updated Table 2 status values and conditional C.1; added C.2 and C.3. Updated 9/1 to indicate it is no longer used. Added 9/1a and 9/1b. Updated 9/2. Updated Table 9 C.3 and added C.6 and C.7. Applied the latest ICS template.
	p4 edition 2	2025-03-14	Approved by BTI on 2025-03-11. Prepared for edition 2 publication.

Publication Number	Revision Number	Date	Comments
	p5r00–r01	2025-12-04 – 2025-12-31	TSE 28169 (rating 1): Updated the conditions in the transport table to make sure the layer is excluded when the design is an implementation of the Core-Controller Configuration by adding "OR CORE 40/1 "Core-Controller"" to an already excluded transport based on Core Configuration support.
5	p5	2026-02-17	Approved by BTI on 2026-01-21. Prepared for TCRL pkg102 publication.