

Location and Navigation Profile (LNP)

Bluetooth® Implementation Conformance Statement (ICS) Proforma

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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	LNP v1.0	[1]	M

Table 0a: No longer used

Table 0b: X.Y.Z Versions

Item	Version	Reference	Status
1	LNP v1.0.1	[7]	O

2.2 Roles

Table 1: Role Requirements

Item	Transport	Reference	Status
1	LN 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 2: Transport Requirements

Item	Transport	Reference	Status
1	Profile supported over BR/EDR	[1] 2.5	C.1, C.3
2	Profile supported over LE	[1] 2.5	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 LN Sensor role

2.4.1 Services – LN Sensor Role

Table 3: Services – LN Sensor Role

Prerequisite: LNP 1/1 “LN Sensor”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Location and Navigation Service	[1] 3	M	[2] LNS 3/1

Item	Capability	Reference	Status	Inter-Layer Dependency
2	Location and Navigation Service UUID in AD in GAP Discoverable Mode	[1] 3.1.1.1	C.1	N/A
3	Local Name in AD or Scan Response	[1] 3.1.1.2	C.1	N/A
4	Appearance in AD or Scan Response	[1] 3.1.1.4	C.1	N/A
5	Device Information Service	[1] 3	O	[5] DIS 2/1
6	Battery Service	[1] 3	O	[6] BAS 2/1

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

2.4.2 GAP requirements – LN Sensor Role

Table 4: GAP Requirements – LN Sensor Role

Prerequisite: LNP 1/1 “LN Sensor”

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Peripheral	[1] 2.4	C.1	[4] GAP 5/3 OR GAP 38/3
2	LE security mode 1	[1] 6.1	C.1	[4] GAP 25/1
3	General discoverable mode (BR/EDR)	[1] 7.1	C.2	[4] GAP 1/3
4	No security requirements	[1] 6.1	C.3	[4] GAP 27b/4
5	Unauthenticated no MITM protection	[1] 6.1	C.3	[4] GAP 27b/3
6	Authenticated MITM protection	[1] 6.1	C.3	[4] GAP 27b/2

C.1: Mandatory IF LNP 2/2 “Profile supported over LE”, otherwise not defined.

C.2: Mandatory IF LNP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

C.3: Mandatory to support at least one IF LNP 2/2 “Profile supported over LE”, otherwise not defined.

Table 5: No longer used

2.5 Collector role

2.5.1 Service Support – Collector Role

Table 6: Service Support – Collector Role

Prerequisite: LNP 1/2 “Collector”

Item	Capability	Reference	Status
1	Discover Location and Navigation Service	[1] 4	M
2	Discover Device Information Service	[1] 4	O
3	Discover Battery Service	[1] 4	O

2.5.2 Discover Services and Characteristics – Collector Role

Table 7: Discover Location and Navigation Services and Characteristics – Collector Role

Prerequisite: LNP 1/2 “Collector”

Item	Capability	Reference	Status
1	Discover Location and Navigation Service	[1] 4.2	M
2	Discover LN Feature characteristic	[1] 4.3.1	M
2a	Discover LN Feature - Client Characteristic Configuration Descriptor	[7] 4.4	C.3
3	Discover Location and Speed characteristic	[1] 4.3.1	M
4	Discover Location and Speed - Client Characteristic Configuration Descriptor	[1] 4.3.1	M
5	Discover Position Quality characteristic	[1] 4.3.1	O
6	Discover LN Control Point characteristic	[1] 4.3.1	O
7	Discover LN Control Point - Client Characteristic Configuration Descriptor	[1] 4.3.1	C.1
8	Discover Navigation characteristic	[1] 4.3.1	O
9	Discover Navigation - Client Characteristic Configuration Descriptor	[1] 4.3.1	C.2

C.1: Mandatory IF LNP 7/6 “Discover LN Control Point characteristic”, otherwise Excluded.

C.2: Mandatory IF LNP 7/8 “Discover Navigation characteristic”, otherwise Excluded.

C.3: Optional IF LNP 0/1 “LNP v1.0” AND NOT LNP 0b/1 “LNP v1.0.1”, otherwise Mandatory.

Table 8: Discover Device Information Service - Collector Role

Prerequisite: LNP 1/2 “Collector”

Item	Capability	Reference	Status
1	Discover Device Information Service	[1] 4.2	O

Table 9: Discover Battery Service - Collector Role

Prerequisite: LNP 1/2 “Collector”

Item	Capability	Reference	Status
1	Discover Battery Service	[1] 4.2.3	O

2.5.3 Features – Collector Role

Table 10: Feature Requirements – Collector Role

Prerequisite: LNP 1/2 “Collector”

Item	Capability	Reference	Status
1	Support for Instantaneous Speed	[1] 4.5, 4.7	O
2	Support for Total Distance	[1] 4.5, 4.7	O
3	Support for Location	[1] 4.5, 4.7	O
4	Support for Elevation	[1] 4.5, 4.7	O
5	Support for Heading	[1] 4.5, 4.7, 4.8	C.1
6	Support for Rolling Time	[1] 4.5, 4.7	O
7	Support for UTC Time	[1] 4.5, 4.7	O
8	Support for Bearing	[1] 4.8	C.2
9	Support for Remaining Distance	[1] 4.8	C.3
10	Support for Remaining Vertical Distance	[1] 4.8	C.3
11	Support for Estimated Time Of Arrival	[1] 4.8	C.3
12	Support for Number of Satellites in Solution	[1] 4.6	C.4
13	Support for Number of Satellites in View	[1] 4.6	C.4
14	Support for Time to First Fix	[1] 4.6	C.4
15	Support for Estimated Horizontal Position Error	[1] 4.6	C.4
16	Support for Estimated Vertical Position Error	[1] 4.6	C.4
17	Support for Horizontal Dilution of Precision	[1] 4.6	C.4
18	Support for Vertical Dilution of Precision	[1] 4.6	C.4
19	Calculates or Displays Total Distance	[1] 4.5	O
20	Calculates or Displays Rolling Time	[1] 4.5	O
21	Set Cumulative Value – Set to zero	[1] 4.7.2.1	O
22	Set Cumulative Value – Set to non-zero	[1] 4.7.2.1	O
23	Mask Location and Speed Characteristic Content	[1] 4.7.2.2	O
24	Navigation Control	[1] 4.7.2.3	C.2
25	Request Number of Routes	[1] 4.7.2.4	C.2
26	Request Name of Route	[1] 4.7.2.5	C.2
27	Select Route	[1] 4.7.2.6	C.2
28	Set Fix Rate	[1] 4.7.2.7	O
29	Set Elevation	[1] 4.7.2.8	O

C.1: Mandatory IF LNP 7/8 “Discover Navigation characteristic”, otherwise Optional.

C.2: Mandatory IF LNP 7/8 “Discover Navigation characteristic”, otherwise Excluded.

C.3: Optional IF LNP 7/8 “Discover Navigation characteristic”, otherwise Excluded.

C.4: Optional IF LNP 7/5 “Discover Position Quality characteristic”, otherwise Excluded.

Table 11: Features – Collector Role*Prerequisite: LNP 1/2 “Collector”*

Item	Capability	Reference	Status
1	Read LN Feature characteristic	[1] 4.4	M
2	Configure Location and Speed characteristic for notifications	[1] 4.5	M
3	Receive Location and Speed characteristic notifications	[1] 4.5	M
4	Configure Navigation characteristic for notifications	[1] 4.8	C.1
5	Receive Navigation characteristic notifications	[1] 4.8	C.2
6	Read Position Quality characteristic	[1] 4.6	O
7	Configure LN Control Point characteristic for indications	[1] 4.7	C.3
8	Receive LN Control Point characteristic indications	[1] 4.7.2, 4.7.3	C.4
9	Write to LN Control Point characteristic	[1] 4.7	C.4
10	LN Control Point Characteristic - Set Cumulative Value Op Code	[1] 4.7.2.1	C.5
11	LN Control Point Characteristic - Mask Location and Speed Characteristic Content	[1] 4.7.2.2	C.6
12	LN Control Point Characteristic - Navigation Control	[1] 4.7.2.3	C.7
13	LN Control Point Characteristic - Request Number of Routes	[1] 4.7.2.4	C.8
14	LN Control Point Characteristic - Request Name of Route	[1] 4.7.2.4	C.9
15	LN Control Point Characteristic - Select Route	[1] 4.7.2.6	C.10
16	LN Control Point Characteristic - Set Fix Rate	[1] 4.7.2.7	C.11
17	LN Control Point Characteristic - Set Elevation	[1] 4.7.2.8	C.12
18	LN Control Point Characteristic – Procedure Time Out	[1] 4.7.4	M
19	Verify Bond Status on Reconnection	[1] 5	M
20	Configure characteristic for indications to determine supported features	[7] 4.4	C.13

- C.1: Mandatory IF LNP 7/8 “Discover Navigation characteristic”, otherwise Excluded.
- C.2: Mandatory IF LNP 11/4 “Configure Navigation characteristic for notifications”, otherwise Excluded.
- C.3: Mandatory IF LNP 11/4 “Configure Navigation characteristic for notifications”, otherwise Optional.
- C.4: Mandatory IF LNP 11/7 “Configure LN Control Point characteristic for indications”, otherwise Excluded.
- C.5: Mandatory IF LNP 10/2 “Support for Total Distance”, otherwise Excluded.
- C.6: Mandatory IF LNP 10/23 “Mask Location and Speed Characteristic Content”, otherwise Excluded.
- C.7: Mandatory IF LNP 10/24 “Navigation Control”, otherwise Excluded.
- C.8: Mandatory IF LNP 10/25 “Request Number of Routes”, otherwise Excluded.
- C.9: Mandatory IF LNP 10/26 “Request Name of Route”, otherwise Excluded.
- C.10: Mandatory IF LNP 10/27 “Select Route”, otherwise Excluded.
- C.11: Mandatory IF LNP 10/28 “Set Fix Rate”, otherwise Excluded.
- C.12: Mandatory IF LNP 10/29 “Set Elevation”, otherwise Excluded.
- C.13: Optional IF LNP 0/1 “LNP v1.0” AND NOT LNP 0b/1 “LNP v1.0.1”, otherwise Mandatory.

Table 11a: Determining Supported Features – Configure Characteristic for Indications*Prerequisite: LNP 11/20 “Configure characteristic for indications to determine supported features”*

Item	Capability	Reference	Status
1	Configure and receive LN Feature characteristic indications	[7] 4.4	C.1
2	Read LN Feature characteristic on reconnection	[7] 4.4	C.1

C.1: Mandatory to support at least one IF LNP 13/6 “Bondable mode (BR/EDR)” OR LNP 13/7 “Bondable mode (LE)”, otherwise Excluded.

2.5.4 GATT requirements – Collector role

Table 12: GATT Requirements – Collector Role*Prerequisite: LNP 1/2 “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] 4.1	M	[3] GATT 3/7
9	Read Characteristic Value	[1] 4.1	M	[3] GATT 3/8
10	Single Notification	[1] 4.1, 4.5, 4.6, 5.2.1	M	[3] GATT 3/17
11	Write Characteristic Value	[1] 4.1, 4.8.2	M	[3] GATT 3/14
12	Read Characteristic Descriptors	[1] 4.1	M	[3] GATT 3/19
13	Write Characteristic Descriptors	[1] 4.1	M	[3] GATT 3/21

C.1: Mandatory IF LNP 2/1 “Profile supported over BR/EDR”, otherwise not defined.

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

C.3: Mandatory to support at least one.

C.4: Mandatory to support at least one.

2.5.5 GAP requirements – Collector Role

Table 13: GAP Requirements – Collector Role*Prerequisite: LNP 1/2 “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	[4] GAP 35/1

Item	Capability	Reference	Status	Inter-Layer Dependency
3	No security requirements	[1] 6.1	C.1	[4] GAP 37b/4
4	Unauthenticated no MITM protection	[1] 6.1	C.1	[4] GAP 37b/3
5	Authenticated MITM protection	[1] 6.1	C.1	[4] GAP 37b/2
6	Bondable mode (BR/EDR)	[1] 6.2	O	[4] GAP 1/7
7	Bondable mode (LE)	[1] 6.2	O	[4] GAP 34/2

C.1: Mandatory IF LNP 2/2 “Profile supported over LE”, otherwise not defined.

Table 14: No longer used

3 References

- [1] Location and Navigation Profile Specification, Version 1.0 or later
- [2] ICS Proforma for Location and Navigation Service (LNS)
- [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] Location and Navigation Profile Specification, Version 1.0.1

4 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2013-04-12	Release for publication.
	1.0.1r00	2014-10-16	Updated for Brand & Copyright. TSE 5644: Removed references to CSA in the Core Specification Version table (0a) and Core Specification Reference [6].
1	1.0.1	2014-12-05	Prepare for TCRL 2014-2 publication.
	1.0.2r00	2016-11-01	TSE 8018: Updated References and template.
2	1.0.2	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	1.0.2 edition 2r00	2018-11-26	Editorial changes only. Template updated. Revision History and contributors moved to the end of the document.
	1.0.2 edition 2	2020-01-07	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.
	p3r00–r02	2022-03-23 – 2022-05-02	TSE 18595 (rating 2): Updated the status for item 1 in Table 4 and items 1 and 2 in Table 13. Added C.1 to Table 13 and updated the prerequisite for Table 14. TSE 18673 (rating 1): Deleted Table 0a because it is no longer used. TSE 18720 (rating 1): Editorials to align the document with the latest ICS template in anticipation of a future .Z release. Editorials, including assigning publication number 2 to previous v1.0.2, consistency checker fixes, and aligning the copyright page with v2 of the DNMD.
3	p3	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p4r00–r01	2023-10-05 – 2023-12-08	TSE 23175 (rating 2): Resolved GAP and SM inter-layer dependencies. Updated conditional C.1 for Tables 1 and 2. In Table 4, added Items 4–6 and C.3. Marked Tables 5 and 14 as no longer used. Updated the Capability value for Items 1–3 in Table 6. In Table 12, marked Item 1 as no longer used, updated the Capability and ILD values for Items 2 and 3, and updated C.3 and C.4. In Table 13, added Items 3–5. Made editorial edits to align the document with the latest ICS template, including updates to section and table titles. Updated the references.
4	p4	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.

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	p5r00–r02	2024-08-02 – 2024-08-21	TSE 25579 (rating 1): Per E15799, E17188, E18752, added new X.Y.Z version as part of the .Z release. Added a reference for Location and Navigation Profile Specification, Version 1.0.1. Performed template-related formatting fixes. TSE 17241 (rating 4): Per E17188, added new items LNP 7/2a, LNP 11/20, LNP 13/6, LNP 13/7, and Table 11a.
5	p5	2024-10-08	Approved by BTI on 2024-09-11. LNP v1.0.1 adopted by the BoD on 2024-10-01. Prepared for TCRL 2024-2-addition publication.
	p5ed2r00–r01	2025-07-08 – 2025-07-15	TSE 27374 (rating 1): Updated the Status for LNP 2/1 and LNP 2/2, added conditions C.1 and C.2, and renumbered the previous C.1 as C.3.
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