

Attribute Protocol (ATT)

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 Roles

Table 1: Role Requirements

Item	Role	Reference	Status
1	Attribute Protocol Client	[1] 2	O
2	Attribute Protocol Server	[1] 2	M

2.2 Transports

Table 2: Transport Requirements

Item	Transport	Reference	Status
1	Unenhanced ATT bearer over BR/EDR	[1] 2	C.1, C.4
2	Unenhanced ATT bearer over LE	[1] 2	C.2, C.4
3	No longer used	N/A	N/A
3a	Enhanced ATT bearer over LE	[2] 2, 3.2.11	C.5
3b	Enhanced ATT bearer over BR/EDR	[2] 2, 3.2.11	C.3, C.4

C.1: Optional IF CORE 20/2 “BR/EDR Host Layers”, otherwise Excluded.

C.2: Mandatory IF CORE 20/4 “LE Host Layers” AND ATT 7/1 “LE Connections”, otherwise Excluded.

C.3: Optional IF CORE 2a/52 “Host Core v5.2 or later” AND CORE 20/2 “BR/EDR Host Layers”, otherwise Excluded.

C.4: Mandatory to support at least one.

C.5: Optional IF CORE 2a/52 “Host Core v5.2 or later” AND ATT 2/2 “Unenhanced ATT bearer over LE”, otherwise Excluded.

Note: In Core versions prior to v5.2, there was only one type of ATT bearer, which is now called the “Unenhanced ATT bearer”.

2.3 Attribute Protocol Messages

2.3.1 Attribute Client

Table 3: Attribute Protocol Client Messages

Prerequisite: ATT 1/1 “Attribute Protocol Client”

Item	Capability	Reference	Status
1	Attribute Error Response	[1] 3.4.1.1	M
2	Exchange MTU Request	[1] 3.4.2.1	O
3	Exchange MTU Response	[1] 3.4.2.2	C.1
4	Find Information Request	[1] 3.4.3.1	O
5	Find Information Response	[1] 3.4.3.2	C.9
6	Find by Type Value Request	[1] 3.4.3.3	O
7	Find by Type Value Response	[1] 3.4.3.4	C.2
8	Read by Type Request	[1] 3.4.4.1	O
9	Read by Type Response	[1] 3.4.4.2	C.3



Item	Capability	Reference	Status
10	Read Request	[1] 3.4.4.3	O
11	Read Response	[1] 3.4.4.4	C.10
12	Read Blob Request	[1] 3.4.4.5	O
13	Read Blob Response	[1] 3.4.4.6	C.4
14	Read Multiple Request	[1] 3.4.4.7	O
15	Read Multiple Response	[1] 3.4.4.8	C.5
16	Read by Group Type Request	[1] 3.4.4.9	O
17	Read by Group Type Response	[1] 3.4.4.10	C.6
18	Write Request	[1] 3.4.5.1	O
19	Write Response	[1] 3.4.5.2	C.7
20	Write Command	[1] 3.4.5.3	O
21	Signed Write Command	[1] 3.4.5.4	O
22	Prepare Write Request	[1] 3.4.6.1	O
23	Prepare Write Response	[1] 3.4.6.2	C.8
24	Execute Write Request	[1] 3.4.6.3	C.8
25	Execute Write Response	[1] 3.4.6.4	C.8
26	Handle Value Notification	[1] 3.4.7.1	C.22
27	Handle Value Indication	[1] 3.4.7.2	O
28	Handle Value Confirmation	[1] 3.4.7.3	C.24
29	No longer used	N/A	N/A
30	Read Multiple Variable Length Request	[2] 3.4.4.11	C.22
31	Read Multiple Variable Length Response	[2] 3.4.4.12	C.26
32	Handle Value Multiple Notification	[2] 3.4.7.4	C.22

- C.1: Mandatory IF ATT 3/2 “Exchange MTU Request”, otherwise Excluded.
- C.2: Mandatory IF ATT 3/6 “Find by Type Value Request”, otherwise Excluded.
- C.3: Mandatory IF ATT 3/8 “Read by Type Request”, otherwise Excluded.
- C.4: Mandatory IF ATT 3/12 “Read Blob Request”, otherwise Excluded.
- C.5: Mandatory IF ATT 3/14 “Read Multiple Request”, otherwise Excluded.
- C.6: Mandatory IF ATT 3/16 “Read by Group Type Request”, otherwise Excluded.
- C.7: Mandatory IF ATT 3/18 “Write Request”, otherwise Excluded.
- C.8: Mandatory IF ATT 3/22 “Prepare Write Request”, otherwise Excluded.
- C.9: Mandatory IF ATT 3/4 “Find Information Request”, otherwise Excluded.
- C.10: Mandatory IF ATT 3/10 “Read Request”, otherwise Excluded.
- C.11–C.21: No longer used.
- C.22: Mandatory IF ATT 2/3a “Enhanced ATT bearer over LE” OR ATT 2/3b “Enhanced ATT bearer over BR/EDR”, otherwise Optional.
- C.23: No longer used.
- C.24: Mandatory IF ATT 3/27 “Handle Value Indication”, otherwise Excluded.
- C.25: No longer used.
- C.26: Mandatory IF ATT 3/30 “Read Multiple Variable Length Request” OR ATT 2/3a “Enhanced ATT bearer over LE” OR ATT 2/3b “Enhanced ATT bearer over BR/EDR”, otherwise Optional.

2.3.2 Attribute Server

Table 4: Attribute Protocol Server Messages

Prerequisite: ATT 1/2 “Attribute Protocol Server”

Item	Capability	Reference	Status
1	Attribute Error Response	[1] 3.4.1.1	M
2	Exchange MTU Request	[1] 3.4.2.1	O
3	Exchange MTU Response	[1] 3.4.2.2	C.19
4	Find Information Request	[1] 3.4.3.1	M
5	Find Information Response	[1] 3.4.3.2	M
6	Find by Type Value Request	[1] 3.4.3.3	M
7	Find by Type Value Response	[1] 3.4.3.4	M
8	Read by Type Request	[1] 3.4.4.1	M
9	Read by Type Response	[1] 3.4.4.2	M
10	Read Request	[1] 3.4.4.3	M
11	Read Response	[1] 3.4.4.4	M
12	Read Blob Request	[1] 3.4.4.5	C.6
13	Read Blob Response	[1] 3.4.4.6	C.1
14	Read Multiple Request	[1] 3.4.4.7	O
15	Read Multiple Response	[1] 3.4.4.8	C.2
16	Read by Group Type Request	[1] 3.4.4.9	M
17	Read by Group Type Response	[1] 3.4.4.10	M
18	Write Request	[1] 3.4.5.1	C.6
19	Write Response	[1] 3.4.5.2	C.3
20	Write Command	[1] 3.4.5.3	C.6
21	Signed Write Command	[1] 3.4.5.3	O
22	Prepare Write Request	[1] 3.4.6.1	C.6
23	Prepare Write Response	[1] 3.4.6.2	C.4
24	Execute Write Request	[1] 3.4.6.3	C.4
25	Execute Write Response	[1] 3.4.6.4	C.4
26	Handle Value Notification	[1] 3.4.7.1	C.6
27	Handle Value Indication	[1] 3.4.7.2	O
28	Handle Value Confirmation	[1] 3.4.7.3	C.5
29– 30	No longer used	N/A	N/A
31	Read Multiple Variable Length Request	[2] 3.4.4.11	C.6
32	Read Multiple Variable Length Response	[2] 3.4.4.12	C.16
33	Handle Value Multiple Notification	[2] 3.4.7.4	C.6

- C.1: Mandatory IF ATT 4/12 “Read Blob Request”, otherwise Excluded.
 C.2: Mandatory IF ATT 4/14 “Read Multiple Request”, otherwise Excluded.
 C.3: Mandatory IF ATT 4/18 “Write Request”, otherwise Excluded.
 C.4: Mandatory IF ATT 4/22 “Prepare Write Request”, otherwise Excluded.



- C.5: Mandatory IF ATT 4/27 “Handle Value Indication”, otherwise Excluded.
- C.6: Mandatory IF ATT 2/3a “Enhanced ATT bearer over LE” OR ATT 2/3b “Enhanced ATT bearer over BR/EDR”, otherwise Optional.
- C.7–C.15: No longer used.
- C.16: Mandatory IF ATT 4/31 “Read Multiple Variable Length Request” OR ATT 2/3a “Enhanced ATT bearer over LE” OR ATT 2/3b “Enhanced ATT bearer over BR/EDR”, otherwise Optional.
- C.17–C.18: No longer used.
- C.19: Mandatory IF ATT 4/2 “Exchange MTU Request”, otherwise Excluded.

Table 5: No longer used

2.4 L2CAP requirements

Table 6: L2CAP Requirements

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Enhanced Credit Based Flow Control Mode – LE	[2] 2, 3.2.11	C.1	[3] L2CAP 2/48b
2	Enhanced Credit Based Flow Control Mode – BR/EDR	[2] 2, 3.2.11	C.2	[3] L2CAP 2/48a

C.1: Mandatory IF ATT 2/3a “Enhanced ATT bearer over LE”, otherwise not defined.

C.2: Mandatory IF ATT 2/3b “Enhanced ATT bearer over BR/EDR”, otherwise not defined.

2.5 GAP requirements

Table 7: GAP Requirements

Item	Capability	Reference	Status	Inter-Layer Dependency
1	LE Connections	[5] 2.2.2	C.1	N/A
2	Peripheral	[5] 2.2.2	O	[4] GAP 5/3
3	Central	[5] 2.2.2	O	[4] GAP 5/4

C.1: Mandatory IF ATT 7/2 “Peripheral” OR ATT 7/3 “Central”, otherwise Excluded.

3 References

- [1] Specification of the Bluetooth System, Volume 3, Part F (Attribute Protocol), Version 4.0 or later
- [2] Specification of the Bluetooth System, Volume 3, Part F (Attribute Protocol), Version 5.2 or later
- [3] ICS Proforma for Logical Link Control and Adaptation Protocol (L2CAP)
- [4] ICS Proforma for Generic Access Profile (GAP)
- [5] Specification of the Bluetooth System, Volume 3, Part C (Generic Access Profile), Version 4.2 or later

4 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	4.0.0	2010-06-30	Publication.
	4.0.1r0	2011-04-14	TSE 4331: Add row 29 to Table 3 for Client Timeout and Table 4 for Server Timeout
1	4.0.1	2011-07-15	Prepare for publication.
	4.0.2r0	2011-09-12	TSE 4263: Table 2: Clarify descriptions and add C.1 and C.2
	4.0.2r1	2011-10-21	TSE 4559 Table 1. Client is optional; server is mandatory
	4.0.2r2	2012-02-08	TSE 4502: Update Table 3
2	4.0.2	2012-03-30	Prepare for publication.
	4.1.0r01	2013-11-11	Updated revision to 4.1.0 Updated top sheet to include version 4.1
3	4.1.0	2013-12-03	Prepare for Publication
	4.2.0r00	2014-11-17	Revved version to align with Core Specification Version 4.2 Release.
	4.2.0r01	2014-11-20	Updated title to say "4.2"
	4.2.0r02	2014-11-23	Alicia's review, updated status to align with 4.2.
4	4.2.0	2014-12-03	Prepare for TCRL 2014-2 publication
	4.2.1r00	2016-03-04	TSE 6651: Section 1.2 deleted. For Tables 3 & 4, statuses updated. For Tables 3 & 4, conditional statements added.
5	4.2.1	2016-07-13	Prepared for TCRL 2016-1 publication.
	5.0.0r00	2016-10-17	TSE 7573 (erratum 5610): Added item 4/30 – Execute Write Request with no pending prepared write values
	5.0.0r01	2016-11-08	Updated to current template. Removed unnecessary parentheses and replaced with quotation marks.
6	5.0.0	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	5.1.0r00	2018-11-13	Updated revision number to 5.1.0 to align with the adoption of Core Specification version 5.1
7	5.1.0	2018-12-07	Approved by BTI. Prepared for TCRL 2018-2 publication.
	5.1.1r00-r01	2019-04-15– 2019-05-27	TSE 11795 (rating 1): Updated item 1 in Table 2 to reflect that there is no fixed channel on BR-EDR.
8	5.1.1	2019-08-01	Approved by BTI. Prepared for TCRL 2019-1 publication.

Publication Number	Revision Number	Date	Comments
	p9r00–r04	2019-08-19 – 2019-11-12	<p>Added test groups to accommodate adoption of Core Specification V5.2 with regard to EATT CR r07. Added item 3 and note C.3 to Table 2; added items 31–33 and notes C.25–C.27 to Table 3 and updated notes C.1, C.11, C.19, and C.22; added items 31–33 and notes C.15–C.18 to Table 4 and updated notes C.6, C.8–C.12 and status of items 2 and 3; updated references section with new Core Specification.</p> <p>TSE 12421 (rating 1): Updated conditionals in Tables 3 and 4 to make wording more consistent with conventions.</p> <p>TSE 12753 (rating 1): Updated conditionals C.3 in Table 2 and C.14 in Table 4 to fix SUM.ICS references per TSE 12647.</p> <p>TSE 12739 (rating 2): Changed conditional C.1 for Table 2 from Mandatory to Optional.</p> <p>Updated .X and “Milan” references to valid numbers. Revised document numbering convention, setting last release publication of 5.1.1 as p8; added publication number column to Revision History.</p>
9	p9	2020-01-07	Approved by BTI on 2019-12-22. Prepared for TCRL 2019-2 publication.
	p10r00–r02	2020-02-25 – 2020-11-12	<p>TSE 13343 (rating 2): Updated conditionals in Table 3 and updated item 3 and conditionals in Table 4 to address issue with exchange MTU features being excluded if legacy ATT protocol based on L2CAP channel with a fixed CID is supported.</p> <p>TSE 14883 (rating 2): Corrected C.3 in Table 2 after the additions from TSE 13111. Added items 2/3a and 2/3b to align with GATT ICS changes from TSE 13111. Added a reference to the GATT Specification. Consistency Checker fixes and minor editorials.</p>
10	p10	2020-12-22	Approved by BTI on 2020-12-03. Prepared for TCRL 2020-1 publication.
	p11r00–r03	2022-09-29 – 2022-12-06	<p>TSE 20593 (rating 3): Resolved GATT inter-layer dependencies by simplifying the EATT conditions in Table 2, removing references to GATT, and removing Table 5.</p> <p>TSE 20622 (rating 3): Added Table 6 for L2CAP Requirements and a reference item for the L2CAP ICS.</p> <p>TSE 22224 (rating 3): Updated naming of 2/1, 2/2, 2/3a, and 2/3b; set 2/3 to “No longer used”; and updated Table 2’s C.2, C.3, C.4, C.5, deleted C.6, and added a note about Core versioning. Updated Table 3’s C.22, C.25, and C.26. Updated Table 4’s C.6 and C.16. Added a new GAP Requirements table as Table 7. Added references for the GAP ICS and Core v4.2. Editorials to align with the latest ICS template. Editorials to align with the latest ICS template.</p>

Publication Number	Revision Number	Date	Comments
11	p11	2023-02-07	Approved by BTI on 2022-12-28. Prepared for TCRL 2022-2 publication.
	p12r00–r01	2023-09-25 – 2023-10-30	TSE 24068 (rating 1): Replaced SUM ICS references with CORE ICS references. Updated Table 2 conditionals C.1–C.3 and C.5 (affecting 2/1, 2/2, 2/3a, and 2/3b) and Table 4 conditional C.14 (affecting 4/30). Updated document to align with latest standards.
12	p12	2024-07-01	Approved by BTI on 2024-05-22. Prepared for TCRL 2024-1 publication.
	p13r00–r01	2024-07-16 – 2024-07-19	TSE 25734 (rating 1): Removed ATT 4/30 and associated C.14. Removed unused reference per consistency check.
13	p13	2024-09-04	Approved by BTI on 2024-08-14. Prepared for TCRL 2024-2 publication.
	p14r00	2024-10-24	TSE 26012 (rating 1): Updated the references in Table 7 to point to GATT rather than Volume 0 Part B; updated the Core v4.2 reference accordingly.
14	p14	2025-02-18	Approved by BTI on 2024-12-26. Prepared for TCRL 2025-1 publication.
	p15r00	2025-07-18	TSE 27575 (rating 1): Updated the ILDs for ATT 7/2 and ATT 7/3.
15	p15	2025-11-04	Approved by BTI on 2025-10-05. Prepared for TCRL pkg101 publication.

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