Cycling Power Profile (CPP)

Bluetooth® Implementation Conformance Statement (ICS) Proforma

- ▪ **Revision:** CPP.ICS.p5
- ▪ **Revision Date:** 2022-06-28
- ▪ **Group Prepared By:** BTI

Contents

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　Version requirements

Table 0: Major Versions (X.Y)

Item	Version	Reference	Status
1	CPP 1.0**	[1] CPP 1.0	Deprecated 2022-02-01. Withdrawn 2023-02-01.
2	CPP 1.1	[9] CPP 1.1	M

Table 0a: No Longer Used

1.3　Profile roles

Table 1: Profile Roles

Item	Role	Reference	Status
1	CP Sensor	[1] 2.1	C.1
2	Collector	[1] 2.1	C.1
3	CP Observer	[1] 2.1	C.1, C.2
4	CP Broadcaster	[1] 2.1	C.3

C.1:　Mandatory to support at least one of CPP 1/1 "CP Sensor" OR CPP 1/2 "Collector" OR CPP 1/3 "CP Observer".

C.2:　Optional IF CPP 2/2 "Profile supported over LE", otherwise Excluded.

C.3:　Optional IF CPP 1/1 "CP Sensor" AND CPP 2/2 "Profile supported over LE", otherwise Excluded.

1.4　Transport requirements

Table 2: Transport Requirements

Item	Transport	Reference	Status
1	Profile supported over BR/EDR	[1] 2.5	C.1
2	Profile supported over LE	[1] 2.5	C.1

C.1:　Mandatory to support at least one of CPP 2/1 "Profile supported over BR/EDR" OR CPP 2/2 "Profile supported over LE".

1.5　CP Sensor and CP Broadcaster roles

1.5.1　Services – CP Sensor and CP Broadcaster roles

Table 3: Services – CP Sensor and CP Broadcaster Roles

Prerequisite: CPP 1/1 "CP Sensor"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Cycling Power Service	[1] 3	M	[2] CPS
2	Cycling Power 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	[7] DIS

** Deprecated versions may not appear in Launch Studio after the deprecation date. TCRLs published after this date will not allow the use of deprecated versions.

Item	Capability	Reference	Status	Inter-Layer Dependency
6	Battery Service	[1] 3	O	[8] BAS
7	Cycling Power Measurement Broadcast Feature	[1] 5	C.2	[2] CPS 2/21

C.1: Optional IF CPP 2/2 "Profile supported over LE", otherwise Excluded.
C.2: Mandatory IF CPP 1/4 "CP Broadcaster", otherwise not defined.

1.5.2   GAP requirements – CP Sensor and CP Broadcaster roles

Table 4: GAP Requirements – CP Sensor and CP Broadcaster Roles

Prerequisite: CPP 1/1 "CP 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] 8.1	C.1	[4] GAP 25/1
3	General discoverable mode (BR/EDR)	[1] 7.3.1	C.2	[4] GAP 1/3

C.1: Mandatory IF CPP 2/2 "Profile supported over LE", otherwise not defined.
C.2: Mandatory IF CPP 2/1 "Profile supported over BR/EDR", otherwise not defined.

1.5.3   SM requirements – CP Sensor and CP Broadcaster roles

Table 5: SM Requirements – CP Sensor and CP Broadcaster Roles

Prerequisite: CPP 1/1 "CP Sensor" AND CPP 2/2 "Profile supported over LE"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	No security requirements	[1] 8.1	C.1	[5] SM 2/3
2	Unauthenticated no MITM protection	[1] 8.1	C.1	[5] SM 2/2
3	Authenticated MITM protection	[1] 8.1	C.1	[5] SM 2/1

C.1: Mandatory to support at least one of CPP 5/1 "No security requirements" OR CPP 5/2 "Unauthenticated no MITM protection" OR CPP 5/3 "Authenticated MITM protection".

1.6   Collector role

1.6.1   Service Support – Collector role

Table 6: Service Support – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status
1	Cycling Power Service	[1] 4	M
2	Device Information Service	[1] 4	O
3	Battery Service	[1] 4	O

1.6.2 Discover Services and Characteristics – Collector role

Table 7: Discover Cycling Power Service and Characteristics – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status
1	Discover Cycling Power Service	[1] 4.2	M
2	Discover Cycling Power Feature Characteristic	[1] 4.3.1	M
3	Discover Cycling Power Measurement Characteristic	[1] 4.3.1	M
4	Discover Cycling Power Measurement - Client Characteristic Configuration Descriptor	[1] 4.3.1	M
5	Discover Cycling Power Measurement - Server Characteristic Configuration Descriptor	[1] 4.3.1	C.1
6	Discover Sensor Location Characteristic	[1] 4.3.1	M
7	Discover Cycling Power Control Point Characteristic	[1] 4.3.1	M
8	Discover Cycling Power Control Point - Client Characteristic Configuration Descriptor	[1] 4.3.1	M
9	Discover Cycling Power Vector Characteristic	[1] 4.3.1	C.3
10	Discover Cycling Power Vector - Client Characteristic Configuration Descriptor	[1] 4.3.1	C.2

C.1: Optional IF CPP 2/2 "Profile supported over LE", otherwise Excluded.
C.2: Mandatory IF CPP 7/9 "Discover Cycling Power Vector Characteristic", otherwise Excluded.
C.3: Mandatory IF CPP 10/22 "Receive the Cycling Power Vector characteristic", otherwise Optional.

Table 8: Discover DIS Service – Collector Role

Prerequisite: CPP 1/2 "Collector"

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

Table 9: Discover BAS Service – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status
1	Discover Battery Service	[1] 4.2	O

1.6.3 Features – Collector role

Table 10: Feature Requirements – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status
1	Support for Force-based System	[1] 4.5, 4.7, 4.8	M
2	Support for Torque-based System	[1] 4.5, 4.7, 4.8	M
3	Support for Distributed Power Sensor System	[1] 4.4, 4.5	M
4	Support for Distributed Power Sensor System – Calculates the Total Instantaneous Power	[1] 4.5	O
5	Support for Distributed Power Sensor System – Calculates the Pedal Power Balance	[1] 4.5	O

Item	Capability	Reference	Status
6	Set Cumulative Value – Set to zero	[1] 4.7.1	O
7	Set Cumulative Value – Set to non-zero	[1] 4.7.1	O
8	Update Sensor Location	[1] 4.7.1	M
9	Request Supported Sensor Locations	[1] 4.7.1	M
10	Calculates or Displays Accumulated Torque	[1] 4.5	O
11	Calculates Instantaneous Speed	[1] 4.5	O
12	Calculates Instantaneous Cadence	[1] 4.5	O
13	Calculates or Displays Accumulated Energy	[1] 4.5	O
14	Set Crank Length	[1] 4.7.1	M
15	Request Crank Length	[1] 4.7.1	O
16	Set Chain Length	[1] 4.7.1	M
17	Request Chain Length	[1] 4.7.1	O
18	Set Chain Weight	[1] 4.7.1	M
19	Request Chain Weight	[1] 4.7.1	O
20	Set Span Length	[1] 4.7.1	M
21	Request Span Length	[1] 4.7.1	O
22	Receive the Cycling Power Vector characteristic	[1] 4.7.1	O
23	Start Offset Compensation	[1] 4.7.1	O
24	Mask Cycling Power Measurement Characteristic Content	[1] 4.7.1	O
25	Request Sampling Rate	[1] 4.7.1	C.1
26	Request Factory Calibration Date	[1] 4.7.1	O
27	Enable Cycling Power Measurement Broadcast	[1] 4.5	O
28	Enhanced Offset Compensation	[9] 4.7.1	O

C.1:   Mandatory IF CPP 10/22 "Receive the Cycling Power Vector characteristic", otherwise Excluded.

Table 11: Procedure Requirements – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status
1	Read Cycling Power Feature characteristic	[1] 4.4	M
2	Configure Cycling Power Measurement characteristic for notifications	[1] 4.5	M
3	Receive Cycling Power Measurement characteristic notifications	[1] 4.5	M
4	Configure Cycling Power Measurement characteristic for broadcast	[1] 4.5	O
5	Read Sensor Location Characteristic	[1] 4.6	M
6	Configure Cycling Power Control Point characteristic for indications	[1] 4.7	M
7	Receive Cycling Power Control Point characteristic indications	[1] 4.7.2, 4.7.3	M
8	Write to Cycling Power Control Point Characteristic	[1] 4.7	O

Item	Capability	Reference	Status
9	Cycling Power Control Point Characteristic - Set Cumulative Value Op Code	[1] 4.7.2.1	C.1
10	Cycling Power Control Point Characteristic - Update Sensor Location Op Code	[1] 4.7.2.2	M
11	Cycling Power Control Point Characteristic - Request Supported Sensor Locations Op Code	[1] 4.7.2.3	M
12	Cycling Power Control Point Characteristic – Set Crank Length Op Code	[1] 4.7.2.4	M
13	Cycling Power Control Point Characteristic – Request Crank Length Op Code	[1] 4.7.2.5	C.2
14	Cycling Power Control Point Characteristic – Set Chain Length Op Code	[1] 4.7.2.6	M
15	Cycling Power Control Point Characteristic – Request Chain Length Op Code	[1] 4.7.2.7	C.3
16	Cycling Power Control Point Characteristic – Set Chain Weight Op Code	[1] 4.7.2.8	M
17	Cycling Power Control Point Characteristic – Request Chain Weight Op Code	[1] 4.7.2.9	C.4
18	Cycling Power Control Point Characteristic – Set Span Length Op Code	[1] 4.7.2.10	M
19	Cycling Power Control Point Characteristic – Request Span Length Op Code	[1] 4.7.2.11	C.5
20	Cycling Power Control Point Characteristic – Start Offset Compensation Op Code	[1] 4.7.2.12	C.7
21	Cycling Power Control Point Characteristic – Mask Cycling Power Measurement Characteristic Content Op Code	[1] 4.7.2.13	C.8
22	Cycling Power Control Point Characteristic – Request Sampling Rate Op Code	[1] 4.7.2.14	C.9
23	Cycling Power Control Point Characteristic – Request Factory Calibration Date Op Code	[1] 4.7.2.15	C.10
24	Cycling Power Control Point Characteristic – Procedure Time Out	[1] 4.7.4	M
25	Configure Cycling Power Vector characteristic for notifications	[1] 4.8	C.6
26	Receive Cycling Power Vector characteristic notifications	[1] 4.8	C.6
27	Verify Bond Status on Reconnection	[1] 7.2.2	C.11
28	Enhanced Offset Compensation	[9] 4.7.1	C.12

C.1:   Mandatory IF CPP 10/6 "Set Cumulative Value – Set to zero" OR CPP 10/7 "Set Cumulative Value – Set to non-zero", otherwise Excluded.
C.2:   Mandatory IF CPP 10/15 "Request Crank Length", otherwise Excluded.
C.3:   Mandatory IF CPP 10/17 "Request Chain Length", otherwise Excluded.
C.4:   Mandatory IF CPP 10/19 "Request Chain Weight", otherwise Excluded.
C.5:   Mandatory IF CPP 10/21 "Request Span Length", otherwise Excluded.
C.6:   Mandatory IF CPP 10/22 "Receive the Cycling Power Vector characteristic", otherwise Excluded.
C.7:   Mandatory IF CPP 10/23 "Start Offset Compensation", otherwise Excluded.
C.8:   Mandatory IF CPP 10/24 "Mask Cycling Power Measurement Characteristic Content", otherwise Excluded.

C.9:   Mandatory IF CPP 10/25 "Request Sampling Rate", otherwise Excluded.
C.10: Mandatory IF CPP 10/26 "Request Factory Calibration Date", otherwise Excluded.
C.11: Mandatory IF CPP 13/3 "Bondable mode", otherwise Excluded.
C.12: Optional IF CPP 0/2 "CPP 1.1", otherwise Excluded.

1.6.4   GATT requirements – Collector role

Table 12: GATT Requirements – Collector Role

Prerequisite: CPP 1/2 "Collector"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	Generic Attribute Profile (GATT) Client	[1] 2.1	M	[3] GATT 1/1
2	Attribute Protocol Supported over BR/EDR (L2CAP fixed channel support)	[1] 4.2	C.1	[3] GATT 2/1
3	Attribute Protocol Supported over LE	[1] 4.2	C.2	[3] GATT 2/2
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	M	[3] GATT 3/8
10	Notifications	[1] 4.1, 4.5, 4.8, 5.2.1	M	[3] GATT 3/17
11	Write Characteristic Value	[1] 4.1, 4.7.2	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 CPP 2/1 "Profile supported over BR/EDR", otherwise not defined.
C.2:   Mandatory IF CPP 2/2 "Profile supported over LE", otherwise not defined.
C.3:   Mandatory to support at least one of CPP 12/4 "Discover All Primary Services" OR CPP 12/5 "Discover Primary Services by Service UUID".
C.4:   Mandatory to support at least one of CPP 12/6 "Discover All Characteristics of a Service" OR CPP 12/7 "Discover Characteristics by UUID".

1.6.5   GAP requirements – Collector role

Table 13: GAP Requirements – Collector Role

Prerequisite: CPP 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] 8.2	C.1	[4] GAP 35/1
3	Bondable mode	[1] 7.2	O	[4] GAP 34/2

C.1:   Mandatory IF CPP 2/2 "Profile supported over LE", otherwise not defined.

1.6.6 SM requirements – Collector role

Table 14: SM Requirements – Collector Role

Prerequisite: CPP 1/2 "Collector" AND CPP 2/2 "Profile supported over LE"

Item	Capability	Reference	Status	Inter-Layer Dependency
1	No security requirements	[1] 8.2	M	[5] SM 2/3
2	Unauthenticated no MITM protection	[1] 8.2	M	[5] SM 2/2
3	Authenticated MITM protection	[1] 8.2	M	[5] SM 2/1

1.7 CP Observer role

1.7.1 Feature – CP Observer role

Table 15: Feature Requirements – CP Observer Role

Prerequisite: CPP 1/3 "CP Observer"

Item	Capability	Reference	Status
1	Receive Cycling Power Measurement characteristic broadcast	[1] 6	M
2	Distributed Cycling Power System supported	[1] 6	O
3	Support for Distributed Power Sensor System – Calculates the Total Instantaneous Power	[1] 4.5	C.1
4	Support for Distributed Power Sensor System – Calculates the Pedal Power Balance	[1] 4.5	C.1
5	Calculates or Displays Accumulated Torque	[1] 4.5	O
6	Calculates Instantaneous Speed	[1] 4.5	O
7	Calculates Instantaneous Cadence	[1] 4.5	O
8	Calculates or Displays Accumulated Energy	[1] 4.5	O

C.1: Optional IF CPP 15/2 "Distributed Cycling Power System supported", otherwise Excluded.

2   References

[1] Cycling Power Profile Specification, Version 1.0 or later

[2] Cycling Power Service (CPS) ICS, CPS.ICS

[3] Generic Attribute Profile (GATT) ICS, GATT.ICS

[4] Generic Access Profile (GAP) ICS, GAP.ICS

[5] Security Manager (SM) ICS, SM.ICS

[6] Bluetooth Core Specification, Version 4.0 or later

[7] Device Information Service (DIS) ICS, DIS.ICS

[8] Battery Service (BAS) ICS, BAS.ICS

[9] Cycling Power Profile Specification, Version 1.1

3   Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2013-04-30	Release for publication.
	1.0.1r01	2014-09-05	TSE 5640: Removed references to CSA in the Core Specification Version table (0a) and Core Specification Reference [6].
1	1.0.1	2014-12-05	Prepared for TCRL 2014-2 publication
	1.0.2r00	2015-05-10	TSE 6379: Added items 3-8 for Observer requirements to Table 15
	1.0.2r01	2015-06-04	Deleted Section 1.2 (Global Statement of Conformance) per current ICS template standards.
2	1.0.2	2015-07-14	Prepared for TCRL 2015-1 publication
	1.0.3r00	2015-10-01	TSE 6499: Added item 13/3 for Bondable Mode in Table 13 and made item 11/27 in Table 11 dependent on it.
3	1.0.3	2015-12-22	Prepared for TCRL 2015-2 publication.
	1.1.0r00-r03	2016-01-04	Merged changes for Cycling Power Profile 1.1 into latest version and converted to a current template. Draft changes from 2015-11-02 to 2015-11-11 are listed here: Table added with prerequisite set to support CPP v1.1 with all features related to CPP v1.1 moved to this new table. Following table renumbered. Moved 'Enhanced Offset Compensation' item from table 10 to table 12; Fixed C.x condition for table 10 Added condition C.12 description under table 11
	1.1.0r00-r04	2016-02-03	Updated Table 11: Procedure Requirement capability of Collector was incorrect; it was listing Feature Requirement instead of Capability Minor editorial change (formatting, spelling and punctuation) Added "Enhance Offset Compensation" to Feature Requirements – Collector Role (Table 10) and "Procedure Rquirement" Collector Role (Table 11). Deleted "Enhanced Offset Compensation" from Distributed System Requirements – Collector Role (Table 12)
	1.1.0r00-r05	2016-04-04	Addressed BTI review comments: moved Enhanced Offset Compensation back to table 12 and removed other items from table 12 (which are now handled in the Test Case Mapping Table of CPS.TS).
	1.1.0r00-r06	2016-04-04	Removed table 12, removed unused Conditional statements.
	1.1.0r00-r07	2016-04-04	Updated all references to table 12 to 15
	1.1.0r00-r08	2016-04-06	Fixed table references

Publication Number	Revision Number	Date	Comments
4	1.1.0	2016-05-09	Prepared for publication
	1.1.0 edition 2r00	2018-11-21	Editorial changes only. Template updated. Revision History and Contributors tables moved to the end of the document.
	1.1.0 edition 2	2019-11-12	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.
	1.1.0ed3 r00–r02	2021-03-23 – 2021-05-23	TSE 16009 (rating 1): Added deprecation and withdrawal information to Table 0, removed Table 0a, and added Inter-Layer Dependency columns to Tables 3, 4, 5, 12, 13, and 14. Editorials to align with latest ICS template. Added a Publication Number column and assigned publication number 4 to the previous v1.1.0. Consistency checker fixes.
	1.1.0 edition 3	2021-05-26	Approved by BTI 2021-05-06. Prepared for edition 3 publication.
	p5r00–r02	2022-03-17 – 2022-04-21	TSE 18617 (rating 2): Updated references throughout ICS to align with "or later" convention now used. Updated the status in 4/1 and 13/1 per consistency checker. TSE 18710 (rating 1): Editorials to align the document with the latest ICS template in anticipation of a future .Z release. Aligned copyright page with v2 of the DNMD. Consistency checker update.
5	p5	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.