

# Cycling Power Service (CPS)

## **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	CPS v1.0**	[1] CPS 1.0	Deprecated 2022-02-01. Withdrawn 2023-02-01.
2	CPS v1.1	[2] CPS 1.1	M

**Table 0a: No longer used**

**Table 0b: X.Y.Z Versions**

Item	Version	Reference	Status
1	CPS v1.1.1	[4]	C.1

C.1: Optional IF CPS 0/2 “CPS v1.1”, otherwise Excluded.

### 2.2 Transports

**Table 1: Transport Requirements**

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

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

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

C.3: Mandatory to support at least one.

### 2.3 Service requirements

**Table 2: Feature Requirements**

Item	Feature	Reference	Status
1	Pedal Power Balance	[2] 3.1.1.3	O
2	Accumulated Torque	[2] 3.1.1.4	O
3	Wheel Revolution Data	[2] 3.1.1.5, 3.4.2.1	O
4	Crank Revolution Data	[2] 3.1.1.6	O
5	Extreme Magnitudes	[2] 3.1.1.7, 3.1.1.8	O
6	Extreme Angles	[2] 3.1.1.9	O
7	Top and Bottom Dead Spot Angles	[2] 3.1.1.10, 3.1.1.11	O
8	Accumulated Energy	[2] 3.1.1.12	O
9	Offset Compensation Indicator	[2] 3.1.1.13	O

\*\* Deprecated versions may not appear in the Bluetooth SIG qualification tool after the deprecation date. TCRLs published after this date will not allow the use of deprecated versions.

Item	Feature	Reference	Status
10	Offset Compensation	[2] 3.4.2.12	O
11	Cycling Power Measurement Characteristic Content Masking	[2] 3.4.2.13	O
12	Multiple Sensor Locations	[2] 3.4.2.3	O
13	Crank Length Adjustment	[2] 3.4.2.4, 3.4.2.5	O
14	Chain Length Adjustment	[2] 3.4.2.6, 3.4.2.7	O
15	Chain Weight Adjustment	[2] 3.4.2.8, 3.4.2.9	O
16	Span Length Adjustment	[2] 3.4.2.10, 3.4.2.11	O
17	Sensor Measurement Context – Force based	[2] 3.2.1.7, 3.5.1.4	C.1
18	Sensor Measurement Context – Torque based	[2] 3.2.1.8, 3.5.1.5	C.1
19	Instantaneous Measurement Direction	[2] 3.5.1.4, 3.5.1.5	O
20	Factory Calibration Date	[2] 3.4.2.15	O
21	Cycling Power Measurement Broadcast Feature	[2] 3.2.1.13	C.2
22	Enhanced Offset Compensation	[2] 3.4.2.16	O
23	Can be used in a distributed system	[2] 3.1.1	C.4
24	Not for use in a distributed system	[2] 3.1.1	C.4

C.1: Mandatory to support one and only one.

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

C.3: No longer used.

C.4: Mandatory to support one and only one.

**Table 3: Service Requirements**

Item	Feature	Reference	Status
1	Cycling Power Service	[2] 2	M
2	Cycling Power Feature Characteristic	[2] 3.1	M
3	Cycling Power Measurement Characteristic	[2] 3.2	M
4	Instantaneous Power field of Cycling Power Measurement Characteristic	[2] 3.2.1.2	M
5	Pedal Power Balance field of Cycling Power Measurement Characteristic	[2] 3.2.1.3	C.1
6	Accumulated Torque field of Cycling Power Measurement Characteristic	[2] 3.2.1.4	C.2
7	Cumulative Wheel Revolutions and Last Wheel Event Time fields of Cycling Power Measurement Characteristic	[2] 3.2.1.5	C.3
8	Cumulative Crank Revolutions and Last Crank Event Time fields of Cycling Power Measurement Characteristic	[2] 3.2.1.6	C.4
9	Maximum Magnitude and Minimum Magnitude fields of Cycling Power Measurement Characteristic	[2] 3.2.1.7	C.5
10	Maximum Angle and Minimum Angle fields of Cycling Power Measurement Characteristic	[2] 3.2.1.9	C.6

Item	Feature	Reference	Status
11	Top Dead Spot Angle field of Cycling Power Measurement Characteristic	[2] 3.2.1.9	C.7
12	Bottom Dead Spot Angle field of Cycling Power Measurement Characteristic	[2] 3.2.1.10	C.7
13	Accumulated Energy field of Cycling Power Measurement Characteristic	[2] 3.2.1.11	C.8
14	Cumulative Wheel Revolutions value can count in reverse	[2] 3.2.1.5	C.3
15	Cycling Power Measurement Characteristic Broadcast Feature	[2] 3.2.1.12	C.9
16	Sensor Location Characteristic	[2] 3.3	M
17	Cycling Power Control Point Characteristic	[2] 3.4	C.10
18	Set Cumulative Value Procedure – Set to zero	[2] 3.4.1, 3.4.2.1	C.3
19	Set Cumulative Value Procedure – Set to non-zero	[2] 3.4.1, 3.4.2.1	C.11
20	Update Sensor Location Procedure	[2] 3.4.1, 3.4.2.2	C.12
21	Request Supported Sensor Location Procedure	[2] 3.4.1, 3.4.2.3	C.12
22	Set Crank Length Procedure	[2] 3.4.1, 3.4.2.4	C.13
23	Request Crank Length Procedure	[2] 3.4.1, 3.4.2.5	C.13
24	Set Chain Length Procedure	[2] 3.4.1, 3.4.2.6	C.14
25	Request Chain Length Procedure	[2] 3.4.1, 3.4.2.7	C.14
26	Set Chain Weight Procedure	[2] 3.4.1, 3.4.2.8	C.15
27	Request Chain Weight Procedure	[2] 3.4.1, 3.4.2.9	C.15
28	Set Span Length Procedure	[2] 3.4.1, 3.4.2.10	C.16
29	Request Span Length Procedure	[2] 3.4.1, 3.4.2.11	C.16
30	Start Offset Compensation Procedure	[2] 3.4.1, 3.4.2.12	C.17
31	Mask Cycling Power Measurement Characteristic Content	[2] 3.4.1, 3.4.2.13	C.18
32	Request Sampling Rate Procedure	[2] 3.4.1, 3.4.2.14	C.19
33	Request Factory Calibration Date Procedure	[2] 3.4.1, 3.4.2.15	C.20
34	Cycling Power Vector Characteristic	[2] 3.5, 3.4.2.14	O
34a	Connection Parameter Update Request before Cycling Power Vector Notifications Start	[2] 3.5.1	C.27
35	Cumulative Crank Revolutions and Last Crank Event Time fields of Cycling Power Vector Characteristic	[2] 3.5.1.2	C.22
36	First Crank Measurement Angle field of Cycling Power Vector Characteristic	[2] 3.5.1.3	C.23
37	Instantaneous Force Magnitude Array field of Cycling Power Vector Characteristic	[2] 3.5.1.4	C.24
38	Instantaneous Torque Magnitude Array field of Cycling Power Vector Characteristic	[2] 3.5.1.4	C.25
39	SDP Record Support	[2] 4	C.21
40	Indications for changes of supported features	[4] 3, 3.1.1	C.26

C.1: Mandatory IF CPS 2/1 “Pedal Power Balance”, otherwise Excluded.

C.2: Mandatory IF CPS 2/2 “Accumulated Torque”, otherwise Excluded.



- C.3: Mandatory IF CPS 2/3 "Wheel Revolution Data", otherwise Excluded.
- C.4: Mandatory IF CPS 2/4 "Crank Revolution Data", otherwise Excluded.
- C.5: Mandatory IF CPS 2/5 "Extreme Magnitudes", otherwise Excluded.
- C.6: Mandatory IF CPS 2/6 "Extreme Angles", otherwise Excluded.
- C.7: Mandatory IF CPS 2/7 "Top and Bottom Dead Spot Angles", otherwise Excluded.
- C.8: Mandatory IF CPS 2/8 "Accumulated Energy", otherwise Excluded.
- C.9: Mandatory IF CPS 2/21 "Cycling Power Measurement Broadcast Feature", otherwise Excluded.
- C.10: Mandatory IF CPS 2/3 "Wheel Revolution Data" OR CPS 2/10 "Offset Compensation" OR CPS 2/11 "Cycling Power Measurement Characteristic Content Masking" OR CPS 2/12 "Multiple Sensor Locations" OR CPS 2/13 "Crank Length Adjustment" OR CPS 2/14 "Chain Length Adjustment" OR CPS 2/15 "Chain Weight Adjustment" OR CPS 2/16 "Span Length Adjustment" OR CPS 2/20 "Factory Calibration Date", otherwise Excluded.
- C.11: Optional IF CPS 2/3 "Wheel Revolution Data", otherwise Excluded.
- C.12: Mandatory IF CPS 2/12 "Multiple Sensor Locations", otherwise Excluded.
- C.13: Mandatory IF CPS 2/13 "Crank Length Adjustment", otherwise Excluded.
- C.14: Mandatory IF CPS 2/14 "Chain Length Adjustment", otherwise Excluded.
- C.15: Mandatory IF CPS 2/15 "Chain Weight Adjustment", otherwise Excluded.
- C.16: Mandatory IF CPS 2/16 "Span Length Adjustment", otherwise Excluded.
- C.17: Mandatory IF CPS 2/10 "Offset Compensation", otherwise Excluded.
- C.18: Mandatory IF CPS 2/11 "Cycling Power Measurement Characteristic Content Masking", otherwise Excluded.
- C.19: Mandatory IF CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.
- C.20: Mandatory IF CPS 2/20 "Factory Calibration Date", otherwise Excluded.
- C.21: Mandatory IF CPS 1/1 "Service supported over BR/EDR", otherwise Excluded.
- C.22: Mandatory IF CPS 2/4 "Crank Revolution Data" AND CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.
- C.23: Mandatory IF CPS 2/6 "Extreme Angles" AND CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.
- C.24: Mandatory IF CPS 2/17 "Sensor Measurement Context – Force based" AND CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.
- C.25: Mandatory IF CPS 2/18 "Sensor Measurement Context – Torque based" AND CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.
- C.26: Optional IF CPS 0/2 "CPS v1.1" AND NOT CPS 0b/1 "CPS v1.1.1", otherwise Mandatory.
- C.27: Optional IF CPS 3/34 "Cycling Power Vector Characteristic", otherwise Excluded.

**Table 3a: Additional Service Requirements for Cycling Power Control Point**

*Prerequisite: CPS 2/22 "Enhanced Offset Compensation"*

Item	Feature	Reference	Status
1	Enhanced Offset Compensation	[2] 3.4.1, 3.4.2.16	M



**Table 3b: Indications for changes of supported features***Prerequisite: CPS 3/40 "Indications for changes of supported features"*

Item	Feature	Reference	Status
1	Changeable Cycling Power Feature	[4] 3	O
2	Cycling Power Feature characteristic indication	[4] 3.1.1	C.1

C.1: Mandatory IF CPS 3b/1 "Changeable Cycling Power Feature" AND (CPS 6/1 "Bondable mode (BR/EDR)" OR CPS 6/2 "Bondable mode (LE)"), otherwise Excluded.

## 2.4 GATT requirements

**Table 4: GATT Requirements**

Item	Feature	Reference	Status	Inter-Layer Dependency
1	No longer used	N/A	N/A	N/A
1a	GATT Server over BR/EDR	[2] 1.4	C.2	[3] GATT 1a/4
1b	GATT Server over LE	[2] 1.4	C.3	[3] GATT 1a/3
2	Write Characteristic Value	[2] 1.4	C.1	[3] GATT 4/14
3	Single Notification	[2] 1.4	M	[3] GATT 4/17
4	Indications	[2] 1.4	C.1	[3] GATT 4/18
5	Read Characteristic Descriptors	[2] 1.4	M	[3] GATT 4/19
6	Write Characteristic Descriptors	[2] 1.4	M	[3] GATT 4/21

C.1: Mandatory IF CPS 3/17 "Cycling Power Control Point Characteristic", otherwise not defined.

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

C.3: Mandatory IF CPS 1/2 "Service supported over LE", otherwise not defined.

## 2.5 SDP requirements

**Table 5: SDP Requirements***Prerequisite: CPS 1/1 "Service supported over BR/EDR"*

Item	Feature	Reference	Status
1	SDP record present for CPS	[2] 4	M
2–3	No longer used	N/A	N/A

## 2.6 GAP requirements

**Table 6: GAP Requirements**

Item	Feature	Reference	Status	Inter-Layer Dependency
1	Bondable mode (BR/EDR)	[1] 3	O	[5] GAP 1/7
2	Bondable mode (LE)	[1] 3	O	[5] GAP 24/2
3	Bonding procedure	[1] 3	C.1	[5] GAP 24/3

C.1: Mandatory IF CPS 6/2 "Bondable mode (LE)", otherwise not defined.



## 3 References

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- [1] Cycling Power Service Specification, Version 1.0 or later
- [2] Cycling Power Service Specification, Version 1.1 or later
- [3] ICS Proforma for Generic Attribute Profile (GATT)
- [4] Cycling Power Service Specification, Version 1.1.1
- [5] ICS Proforma for Generic Access Profile (GAP)

## 4 Revision history and acknowledgments

### Revision History

Publication Number	Revision Number	Date	Comments
0	1.0.0	2013-04-30	Release for publication.
	1.0.1r00	2014-04-11	TSE 5566: Updated Table 3, C.21. Editorial Corrections: <ul style="list-style-type: none"> <li>- Replaced fields for table numbering with text.</li> <li>- Made Boolean statements in conditionals all capitals (IF, AND, OR)</li> <li>- Added item description in parenthesis following the item.</li> </ul>
1	1.0.1	2014-07-07	TCRL 2014-1 Publication
	1.0.2r00	2014-09-05	TSE 5643: Removed references to CSA in the Core Specification Version table (0a) and Core Specification Reference [2]. TSE 5788: Removed duplicate conditionals in Table 3, C.9 and C.12. Updated status for items with C.9 and C.12 to C.3. Renumbered all conditionals following C.9.
2	1.0.2	2014-12-05	Prepare for TCRL 2014-2 publication
	1.1.0r00	2015-11-02	Modified for Cycling Power Service V1.1 Added specific reference to each version of Cycling Power Service Specification (v1.0 and V1.0) and link tests to corresponding version(s)
	1.1.0r01	2015-01-20	Converted to current document template.
	1.1.0r02	2016-02-15	Minor editorial changes.
	1.1.0r03	2016-04-04	Updated Cross References Changed prerequisite for table 3a.
3	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.
	1.1.0ed3r00–r02	2021-03-23 – 2021-04-26	TSE 16010 (rating 1): Added deprecation and withdrawal information to Table 0, deleted Table 0a, and added Inter-Layer Dependency columns to Tables 4 and 5 (and minor consistency fixes). Added a Publication Number column and assigned publication number 3 to the previous v1.1.0. Added consistency checker fixes.
	1.1.0 edition 3	2021-05-21	Approved by BTI on 2021-05-06. Prepared for edition 3 publication.

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	p4r00–r01	2022-03-17 – 2022-03-24	TSE 18712 (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. Performed template-related formatting fixes. Consistency checker update.
4	p4	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p5r00–r04	2023-09-04 – 2023-09-25	TSE 17237 (rating 4): Per E16586, added new Item 3/40 and Table 3b. Added new Item 0b/1 for CPS v1.1.1 and new conditional C.1 in Table 0 for CPS v1.1. Added a new Table 6 for GAP inter-layer dependencies. Added a reference for Cycling Profile Service Specification v1.1.1. Updated the acknowledgments. TSE 23660 (rating 2): Updated the section headings for the Versions and Transports sections. In Table 2, updated the status for Item 22; updated C.1, C.2, and C.4; and marked C.3 as no longer used. In Table 4, marked Item 1 as no longer used, added new Items 1a and 1b, and added C.2 and C.3. Deleted the ILD column from Table 5, updated Item 1, and marked Items 2 and 3 as no longer used. Updated the references. Editorials to align the document with the latest ICS template. Removed D&W language and cleaned up conditionals in Tables 0 and 0b.
5	p5	2024-07-01	Approved by BTI on 2024-04-21. Prepared for TCRL 2024-1 publication.
	p6r00–01	2024-10-01 – 2024-12-02	TSE 23395 (rating 3): Added Item 34a and conditional C.27 to Table 3.
6	p6	2025-02-18	Approved by BTI on 2024-12-23. Prepared for TCRL 2025-1 publication.
	p7r00	2025-04-29	TSE 27319 (rating 1): Updated the Status value for CPS 1/1 and CPS 1/2, added conditions C.1 and C.2, and renumbered C.1 as C.3.
7	p7	2025-07-08	Approved by BTI on 2025-06-15. Prepared for TCRL pkg100 publication.

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