LE Radio Physical Layer (RFPHY)

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

- **Revision:** RFPHY.ICS.p12
- **Revision Date:** 2025-05-06
- **Prepared By:** BTI
- **Published during TCRL:** TCRL.2025-2

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.

2 ICS declarations

2.1 Capability statement

Table 1: Bluetooth LE RF Capabilities

Item	Capability	Reference	Status
1	LE Transmitter	[1] 3	C.1
2	LE Receiver	[1] 4	C.1
3	LE Transceiver	[1] 3, 4	C.1
4	LE 2M PHY	[2] 3, 4	C.2
5	Stable Modulation Index - Transmitter	[2] 3.1.1	C.3
6	Stable Modulation Index - Receiver	[2] 3.1.1	C.4
7	LE Coded PHY	[2] 3, 4	C.2
8	Transmitting Constant Tone Extensions	[3] 5	C.10
9	2 µs Antenna Switching During Constant Tone Extension Transmission (AoD)	[3] 5	C.5
10	1 µs Antenna Switching During Constant Tone Extension Transmission (AoD)	[3] 5	C.6
11	2 µs Antenna Sampling During Constant Tone Extension Reception (AoD)	[3] 5	C.11
12	2 µs Antenna Switching and Sampling During Constant Tone Extension Reception (AoA)	[3] 5	C.7
13	1 µs Antenna Sampling During Constant Tone Extension Reception (AoD)	[3] 5	C.7
14	1 µs Antenna Switching and Sampling During Constant Tone Extension Reception (AoA)	[3] 5	C.8
15	LE Power Class 1	[1] 3	C.9
16	Channel Sounding	[4] 1	C.12

C.1: Mandatory to support at least one. Note: Selecting both RFPHY 1/1 “LE Transmitter” and RFPHY 1/2 “LE Receiver” is equivalent to selecting RFPHY 1/3 “LE Transceiver” and vice versa.

C.2: Optional IF CORE 1a/50 “Controller Core v5.0 or later”, otherwise Excluded.

C.3: Optional IF CORE 1a/50 “Controller Core v5.0 or later” AND (RFPHY 1/1 “LE Transmitter” OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

C.4: Optional IF CORE 1a/50 “Controller Core v5.0 or later” AND (RFPHY 1/2 “LE Receiver” OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

C.5: Optional IF RFPHY 1/8 “Transmitting Constant Tone Extensions”, otherwise Excluded.

C.6: Optional IF RFPHY 1/9 “2 µs Antenna Switching During Constant Tone Extension Transmission (AoD)”, otherwise Excluded.

C.7: Optional IF RFPHY 1/11 “2 µs Antenna Sampling During Constant Tone Extension Reception (AoD)”, otherwise Excluded.

C.8: Mandatory IF RFPHY 1/12 “2 µs Antenna Switching and Sampling During Constant Tone Extension Reception (AoA)” AND RFPHY 1/13 “1 µs Antenna Sampling During Constant Tone Extension Reception (AoD)”, otherwise Excluded.

C.9: Optional IF (CORE 1a/50 “Controller Core v5.0 or later” OR CORE 1c/1 “Core Specification Addendum 5”) AND (RFPHY 1/1 “LE Transmitter” OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

C.10: Optional IF CORE 1a/51 “Controller Core v5.1 or later” AND (RFPHY 1/1 “LE Transmitter” OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

C.11: Optional IF CORE 1a/51 “Controller Core v5.1 or later” AND (RFPHY 1/2 “LE Receiver” OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

C.12: Optional IF CORE 1a/60 “Controller Core v6.0 or later” AND ((RFPHY 1/1 “LE Transmitter” AND RFPHY 1/2 “LE Receiver”) OR RFPHY 1/3 “LE Transceiver”), otherwise Excluded.

Table 2: No longer used

2.2 Channel sounding capabilities

Table 3: Channel Sounding Capabilities

Prerequisite: RFPHY 1/16 “Channel Sounding”

Item	Capability	Reference	Status
1	CS Initiator	[5] 4.6.41 [6] 4.3	O
2	CS Reflector	[5] 4.6.41 [6] 4.3	O
3	No longer used	N/A	N/A
3a	2:2 Antenna Array	[4] 5.3	O
4	CS Phase-Based Measurements	[4] 6	M
5	CS Mode-1	[4] 3.4	M
6	CS Mode-2	[4] 3.4	M
7	CS Mode-3	[4] 3.4	O
8	TX/SNR	[4] 3.1.3	O
9	CS LE 2M 2BT PHY	[4] 3, 4	O
10	CS LE 2M PHY	[4] 3, 4	C.1

C.1: Optional IF RFPHY 1/4 “LE 2M PHY”, otherwise Excluded.

3 References

[1] Specification of the Bluetooth System, Physical Layer Specification (RFPHY) Volume 6, Part A, Version 4.0 or later

[2] Specification of the Bluetooth System, Physical Layer Specification (RFPHY) Volume 6, Part A, Version 5.0 or later

[3] Specification of the Bluetooth System, Physical Layer Specification (RFPHY) Volume 6, Part A, Version 5.1 or later

[4] Specification of the Bluetooth System, Physical Layer Specification (RFPHY) Volume 6, Part A, Version 6.0 or later

[5] Specification of the Bluetooth System, Link Layer Specification (LL) Volume 6, Part B, Version 6.0 or later

[6] Specification of the Bluetooth System, Channel Sounding Specification (CS) Volume 6, Part H, Version 6.0 or later

4 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	4.0.0	2009-12-15	Prepare for publication
	4.1.0r01	2013-11-11	Updated revision to 4.1.0 Updated top sheet to include version 4.1
1	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.
2	4.2.0	2014-12-04	Prepare for TCRL 2014-2 publication
	5.0.0r00	2016-06-01	Integrated changes for Core Specification 5.0 release
	5.0.0r01	2016-09-01	Issue 7534: Updated “TBD” reference in Table 1. Issue 7550: Added new reference and conditionals C.3 and C.4 to Table 1. Added new reference for Bluetooth Core Specification 5.0.
	5.0.0r01	2016-11-14	Updated to current template. Removed unnecessary parentheses and replaced with quotation marks.
3	5.0.0	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
	5.1.0r00-r01	2018-11-13 – 2018-11-27	Updated revision number to 5.1.0 to align with the adoption of Core Specification version 5.1. Updated conditionals in Table 1 for Core 5.1.
4	5.1.0	2018-12-07	Approved by BTI. Prepared for TCRL 2018-2 publication.
	5.1.1r00–r02	2019-04-24– 2019-06-12	TSE 11791 (rating 2): Updated Capability Statement table and notes and References section to address issues with the number and gain of the antennas and the length of the CTE. TSE 11957 (rating 1): Updated references section to more accurately reflect the correct Part of the spec and updated field codes to reflect resulting new numbering.
5	5.1.1	2019-08-01	Approved by BTI. Prepared for TCRL 2019-1 publication.
	p6r00–r02	2019-09-16 – 2019-11-12	TSE 12127 (rating 2): Updated Table 1 (items 1–3) and C.1–C.4 and C.6 conditionals to clarify roles after TCMT updates to take into account the PHYs for the IQ sample tests. Removed deprecated specs from 1:C.2–C.4 per integration review feedback. Revised document numbering convention, setting last release publication of 5.1.1 as p5; added publication number column to Revision History.
6	p6	2020-01-07	Approved by BTI on 2019-12-22. Prepared for TCRL 2019-2 publication.

Publication Number	Revision Number	Date	Comments
	p7r00–r01	2021-03-29 – 2021-06-11	TSE 16485 (rating 4): To address E16372 regarding Transmit Power Level for Power Class, added a reference to LL v4.2; updated table 1 with new item 15 and new conditional C.9. TSE 16697 (rating 1): Changed title of document and updated all instances of “RF PHY” and “RF-PHY” to “RFPHY” to align with new TCID structure. Minor editorials to item 14 and conditional C.8. Template-related and consistency checker editorials.
7	p7	2021-07-13	Approved by BTI on 2021-06-27. Prepared for TCRL 2021-1 publication.
	p7ed2r00	2022-02-18	TSE 18365 (rating 1): Updated “is/not supported” language in conditionals globally to align with new conventions. Made template-related editorials, including aligning the copyright page with v2 of the DNMD.
	p7, edition 2	2022-03-07	Approved by BTI on 2022-03-07. Prepared for edition 2 publication.
	p8r00–r03	2022-03-14 – 2022-04-18	TSE 18260 (rating 2): Updated row 8 and C.4 and added C.10 in Table 1. TSE 18347 (rating 2): Updated C.9 of Table 1. Performed template-related formatting fixes. Made consistency checker editorials.
8	p8	2022-06-28	Approved by BTI on 2022-05-31. Prepared for TCRL 2022-1 publication.
	p9r00–r02	2023-08-28 – 2023-11-03	TSE 23057 (rating 1): Removed Table 2, and related section header of the now-empty section. TSE 24078 (rating 2): Replaced SUM ICS references with CORE ICS references. Updated Table 1 conditionals C.2, C.3, C.4, C.9, C.10, and C.11, affecting items 1/4 – 1/8, 1/11, and 1/15. Updated the document to align with latest standards.
9	p9	2024-07-01	Approved by BTI on 2024-05-22. Prepared for TCRL 2024-1 publication.
	p10r00–r05	2024-07-03 – 2024-08-20	Incorporated CR CS_Test_CR_r16-jorg (which includes Test Issues 23205, 23293, 23331, 23332, 23361, 23362, 23363, 23364, 23365, 23378, 23379, 23381, 23382, 23384, 23404, 23419, 23422, 23424, 23425, 23500, 23501, 23502, 23503, 23504, 23506, 23594, 23693, 23694, 23696, 23701, 23706, 23711, 23732, 23736, 23737, 23738, 23776, 23842, 23923, 23993, 24023, 24033, 24043, 24049, 24133, 24135, 24137, 24138, 24139, 24141, 24142, 24143, 24146, 24147, 24149, 24150, 24151, 24153, 24177, 24181, 24231, 24232, 24330, 24331, 24332, 24410, 24411, 24418, 24419, 24478, 24483, 24515, 24531, 24599, 24601, 24602, 24614, 24618, 24619, 24621, 24623, 24624, 24625, 24627, 24630, 24639, 24645, 24646, 24655, 24656, 24657, 24659, 24660, 24669, 24681, 24717, 24769, 24776, 24789, 24808, 24809, 24838, 24844, 24850, 24867, 24868, 24893, 24894, 24895,

Publication Number	Revision Number	Date	Comments
			25028, 25029, 25040, 25042, 25053, 25055, 25111, 25112, 25120, 25139, 25140, 25141, 25142, 25143, 25148, 25149, 25150, 25157, 25166, 25209, 25240, 25278, 25282, 25299, 25428, 25443, 25479, 25498, 25511, 25512, 25525, 25585, 25617, 25632). To account for the Channel Sounding feature of Core v6.0, added references to Core Vol. 6 Part B and Vol. 4 Part E, added new items 1/16–1/27 and related conditionals C.12–C.15. Incorporated Test Issue 25785. TSE 26029 (rating 2): Updated the prerequisite for Table 3 to improve test coverage.
10	p10	2024-09-04	Approved by BTI on 2024-08-14. Prepared for TCRL 2024-2 publication.
	p11r00–r04	2024-11-01 – 2024-12-06	TSE 25993 (rating 2): Updated capability description of 3/9 and added new 3/10. TSE 26020 (rating 4): In Table 3a, added Item 3/3a and conditional C.2. TSE 26085 (rating 2): Updated C.12 in Table 1 and Table 3 prerequisite. TSE 26327 (rating 2): Removed 3/3 “CS Antenna Array”. TSE 26599 (rating 1): Updated the test doc title to better align with the associated spec. Deleted draft revision history comments prior to p0.
11	p11	2025-02-18	Approved by BTI on 2024-12-26. Prepared for TCRL 2025-1 publication.
	p12r00	2025-01-30	TSE 26947 (rating 1): Corrected reference abbreviations for RFPHY, deleted reference for LL v4.2 or later; updated 1/15 capability name to include LE and corrected its reference.
12	p12	2025-05-06	Approved by BTI on 2025-04-16. Prepared for TCRL 2025-2 publication.

Acknowledgments

Name	Company
Alexandru Andreescu	Bluetooth SIG, Inc.
Miles Smith	Nordic Semiconductor A/S
Magnus Sommansson	Qualcomm
Clive Feather	Samsung Cambridge Solution Centre