Conformance Test Specification for Marlin Proximity Specification

Version 1.0
Final

Source	Marlin Developer Community
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Refer to Notices on page 2 for important legal information

Notice

Intellectual Property

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Contents

1 Introduction

1.1 Document Organization

This document describes the Conformance Test Specification for anchor and target implementations of the Marlin Proximity Specification [PROX]. It is organized as follows:

- (this) introduction, overview, conformance conventions and references
- Sections for each of the Conformance Test Items. These are:
  - Conformance Test Items for Proximity Check per Connection Type
  - Conformance Test Items for Proximity Check Protocol over UDP
  - Conformance Test Items for Octopus Binding

1.2 Overview

This document describes the Conformance Test Specification for anchor and target implementations of the Marlin Proximity Specification [PROX]. The goal for this specification is to help ensure interoperability between independent implementations of anchor and target by testing functions specified in [PROX]. In other words, this Conformance Test Specification does not ensure 100% coverage of the specification. It is expected that the tests are expanded upon as implementers verify interoperability with each other.

1.3 Conformance Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this specification are to be interpreted as described in IETF RFC 2119 [RFC 2119].

1.4 References

Normative References

[PROX]	Marlin - Proximity Specification, Version 1.0
[RFC 2119]	S. Bradner, *RFC 2119 - Key words for use in RFCs to Indicate Requirement Levels*, IETF, March 1997, http://www.ietf.org/rfc/rfc2119.txt

2 Conformance Test Items for Proximity Check per Connection Type

This section describes the REQUIRED common test items for Proximity Check per Connection Type.

2.1 Proximity Check per Connection Type

The following function SHALL be tested for all valid connection types in an implementation:

- From section 2 of [PROX], when two implementations are connected through IP, the proximity check SHALL be done by using the Proximity Check Protocol over UDP.
- From section 2 of [PROX], when two implementations are connected through USB, the proximity check SHALL always be considered valid without measurement.
- From section 2 of [PROX], in all other cases, the proximity check SHALL be considered failure.

The Conformance Test SHALL confirm the specifications above in all implementations.

3 Conformance Test Items for Proximity Check Protocol over UDP

This section describes the REQUIRED common test items for Proximity Check Protocol over UDP.

3.1 Generation of R

The following function SHALL be tested:

- From section 2.1.3 of [PROX], generate a set R of Q pairs of random numbers.

The Conformance Test SHALL confirm the specifications above in both anchor and target.

3.2 Message

The following message parameters SHALL be tested:

- From section 2.1.4 of [PROX], TargetSetupRequest Message includes TargetSessionId, TargetPort, SetupDelay and LoopDelay.
- From section 2.1.4 of [PROX], TargetSetupResponse Message includes AnchorSessionId, Q, S, AnchorPort and TerminationTimeout. Q MUST NOT exceed 254.
- From section 2.1.4 of [PROX], ChallengeRequest Message includes TargetSessionId (established during the setup step), i, and R_{2*i}.
- From section 2.1.4 of [PROX], ChallengeResponse Message includes AnchorSessionId (established during the setup step), i, and R_{2*i+1}.
- From section 2.1.4 of [PROX], when the anchor terminates the loop, it MUST send at least one special “Termination” ChallengeRequest UDP datagram.
- From section 2.1.4 of [PROX], “Termination” ChallengeRequest Message includes TargetSessionId (established during the setup step), i, and R_{2*i}. The value of ‘i’ is equal to 255 and the bytes for the ‘R_{2*i}’ field are all set to 0.
- From section 2.1.4 of [PROX], all datagrams processed during the RTT measurement loop MUST match the TargetSessionId or AnchorSessionId that were established during the setup phase; all other datagrams MUST NOT be considered part of the session

The Conformance Test SHALL confirm the specifications above in both anchor and target.

3.3 Obeying Timing Parameters

The following function SHALL be tested:

- From section 2.1.6 of [PROX], wait at least SetupDelay between the transmission of the TargetSetupResponse reply and the transmission of the first ChallengeRequest datagram.
- From section 2.1.6 of [PROX], wait at least LoopDelay between two consecutive ChallengeRequest messages while in the RTT measurement loop.
- From section 2.1.6 of [PROX], a valid under-threshold RTT measurement MUST be 7 milliseconds or less.

The Conformance Test SHALL confirm the specifications above in the anchor.

3.4 Security Considerations

The following Security Policy SHALL be tested:

- From section 2.1.7 of [PROX], the anchor MUST choose the seed S with a non-guessable secure random or pseudo-random number generator.
- From section 2.1.7 of [PROX], the RTT measurement loop MUST NOT be repeated with the same value of i during a protocol session.
- From section 2.1.7 of [PROX], the protocol MUST be aborted if any unexpected message is received by either party, including:
  - ✧ If the target receives an incorrect value for R_{2*i} in step c.
  - ✧ If Q is larger than the maximum allowed value.
  - ✧ If i is repeated in the loop
  - ✧ If i exceeds Q

The Conformance Test SHALL confirm the specifications above in both anchor and target.

3.5 Security Policy

The following Security Policy SHALL be tested:

- From section 2.1.8 of [PROX], the TargetSetupRequest Message MUST follow the ‘Integrity Only’ policy.
- From section 2.1.8 of [PROX], the TargetSetupResponse Message MUST follow the ‘Confidentiality Only’ policy.
- From section 2.1.8 of [PROX], the identifier for this protocol’s security policy is “urn:marlin: proximityoverudp:1-0:nemo:services:proximity-check:policy:1”.

The Conformance Test SHALL confirm the specifications above in target.

3.6 Message Encodings

The following Message Encodings SHALL be tested:

- From section 2.1.9 of [PROX], the TargetChallengeRequest and TargetChallengeResponse messages use the XML schema in namespace “urn:marlin:proximityoverudp:1-0:nemo:services:schemas”.
- The ChallengeRequest and ChallengeResponse messages use the byte sequence defined in section 2.1.9 of [PROX]

The Conformance Test SHALL confirm the specifications above in both anchor and target.

4 Conformance Test Items for Octopus Binding

This section describes the REQUIRED test items for Octopus Binding.

4.1 ProximityRequired Constraint

The following SHALL be tested:

- From section 3.1 of [PROX], the ESB containing the ProximityRequired Constraint MUST be handled.

The Conformance Test SHALL confirm the specifications above in all implementations supporting Octopus Binding.

4.2 Control Context

The following SHALL be tested:

- From section 3.2 of [PROX], when a running control signals that it requires a proximity measurement by carrying a ProximityRequired constraint, in a NEMO protocol session, the host application SHALL reveal the date of the last valid proximity check between the host and the session's peer NEMO node in the context of that running control on Sink/Proximity/LastProbe.

The Conformance Test SHALL confirm the specifications above in all implementations supporting Octopus Binding.