Synchronization Test Report

T-GM with GNSS

Table of Contents

1. Summary

1.1. Test Suite: Environment

hostname	fiesta
started	2023-11-03 11:06:35+00:00
duration (s)	0.0
test cases	13
test error	0
test failure	0
test success	13

case	result
RHOCP version	success
PTP Operator version	success
gpsd version	success
NIC model	success
ice driver version	success
NIC firmware version	success
GNSS device model	success
GNSS device firmware version	success
GNSS protocol version	success
G.8272 environment status gnss device-detected wpc	success
G.8272 environment status gnss antenna-connected wpc	success
G.8272 environment status gnss gpsfix-valid wpc	success
G.8272 environment status ptp-operator	success

1.2. Test Suite: T-GM Tests

hostname	fiesta
started	2023-11-03T11:07:12+00:00
duration (s)	2000.0222
test cases	20
test error	6
test failure	2
test success	12

case	result
G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-A	success
G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-B	success
G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-A	success
G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-B	success
G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-A	success
G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-B	success
G.8272 time-error-in-locked-mode PHC-to-SYS RAN	success
G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-A	success
G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-B	failure
G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-A	success
G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-B	failure
G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-A	success
G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-B	success
G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-A	**error**
G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-B	**error**
G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-A	**error**
G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-B	**error**
G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-A	**error**
G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-B	**error**
PTP Hardware Clock (PHC) Clock State Transitions	success

2. Test Results

2.1. Test Suite: Environment

2.1.1. RHOCP version

test specification	RHOCP version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/RHOCP/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 1. analysis

expected	4.14.0-0
version	4.14.1

2.1.2. PTP Operator version

test specification	PTP Operator version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/openshift/ptp-operator/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 2. analysis

expected	4.14.0-0
version	4.14.0-202310201027

2.1.3. gpsd version

test specification	gpsd version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/gpsd/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 3. analysis

expected	3.25
version	3.25 (revision 3.25)

2.1.4. NIC model

test specification	NIC model
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/model/nic/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 4. analysis

deviceId	0x1593
vendorId	0x8086

2.1.5. ice driver version

test specification	ice driver version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/ice-driver/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 5. analysis

expected	1.11.0
version	5.14.0-284.36.1.rt14.321.el9_2.

2.1.6. NIC firmware version

test specification	NIC firmware version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/nic-firmware/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 6. analysis

expected	4.20
version	4.40 0x8001beb0 1.3492.0

2.1.7. GNSS device model

test specification	GNSS device model
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/model/gnss/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 7. analysis

module	ZED-F9T

2.1.8. GNSS device firmware version

test specification	GNSS device firmware version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/gnss-firmware/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 8. analysis

expected	2.20
version	TIM 2.20

2.1.9. GNSS protocol version

test specification	GNSS protocol version
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/environment/version/gnss-protocol/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 9. analysis

expected	29.20
version	29.20

2.1.10. G.8272 environment status gnss device-detected wpc

test specification	G.8272 environment status gnss device-detected wpc
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/environment/status/gnss/device-detected/wpc/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 10. analysis

paths	/dev/gnss0

2.1.11. G.8272 environment status gnss antenna-connected wpc

test specification	G.8272 environment status gnss antenna-connected wpc
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/environment/status/gnss/antenna-connected/wpc/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-


```
{
    "analysis": {
        "blocks": [
            {
                "blockId": 0,
                "power": 1,
                "status": 2,
                "timestamp": "2023-11-03T11:07:09.5073Z"
            },
            {
                "blockId": 1,
                "power": 1,
                "status": 2,
                "timestamp": "2023-11-03T11:07:09.5073Z"
            }
        ]
    },
    "duration": 0,
    "reason": "",
    "result": true,
    "timestamp": "2023-11-03 11:06:35+00:00"
}
```

2.1.12. G.8272 environment status gnss gpsfix-valid wpc

test specification	G.8272 environment status gnss gpsfix-valid wpc
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/environment/status/gnss/gpsfix-valid/wpc/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-

Table 11. status

GPSFix	3
flags	0xdd
timestamp	2023-11-03T11:07:09.1552Z

2.1.13. G.8272 environment status ptp-operator

test specification	G.8272 environment status ptp-operator
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/environment/status/ptp-operator/
timestamp	2023-11-03 11:06:35+00:00
duration (s)	0
result	success
reason	-


```
{
    "analysis": {
        "fetchError": null,
        "profiles": [
            {
                "ts2phcConf": "[nmea]\nts2phc.master 1\n[global]\nuse_syslog  0\nverbose 1\nlogging_level 7\nts2phc.pulsewidth 100000000\n#GNSS module s /dev/ttyGNSS* -al use
_0\n#cat /dev/ttyGNSS_1700_0 to find available serial port\n#example value of gnss_serialport is /dev/ttyGNSS_1700_0\nts2phc.nmea_serialport /dev/gnss0\nleapfile
/usr/share/zoneinfo/leap-seconds.list\n[ens6f0]\nts2phc.extts_polarity rising\nts2phc.extts_correction 0\n"
            }
        ]
    },
    "duration": 0,
    "reason": "",
    "result": true,
    "timestamp": "2023-11-03 11:06:35+00:00"
}
```

2.2. Test Suite: T-GM Tests

2.2.1. G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-A

test specification	G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/DPLL-to-PHC/PRTC-A/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

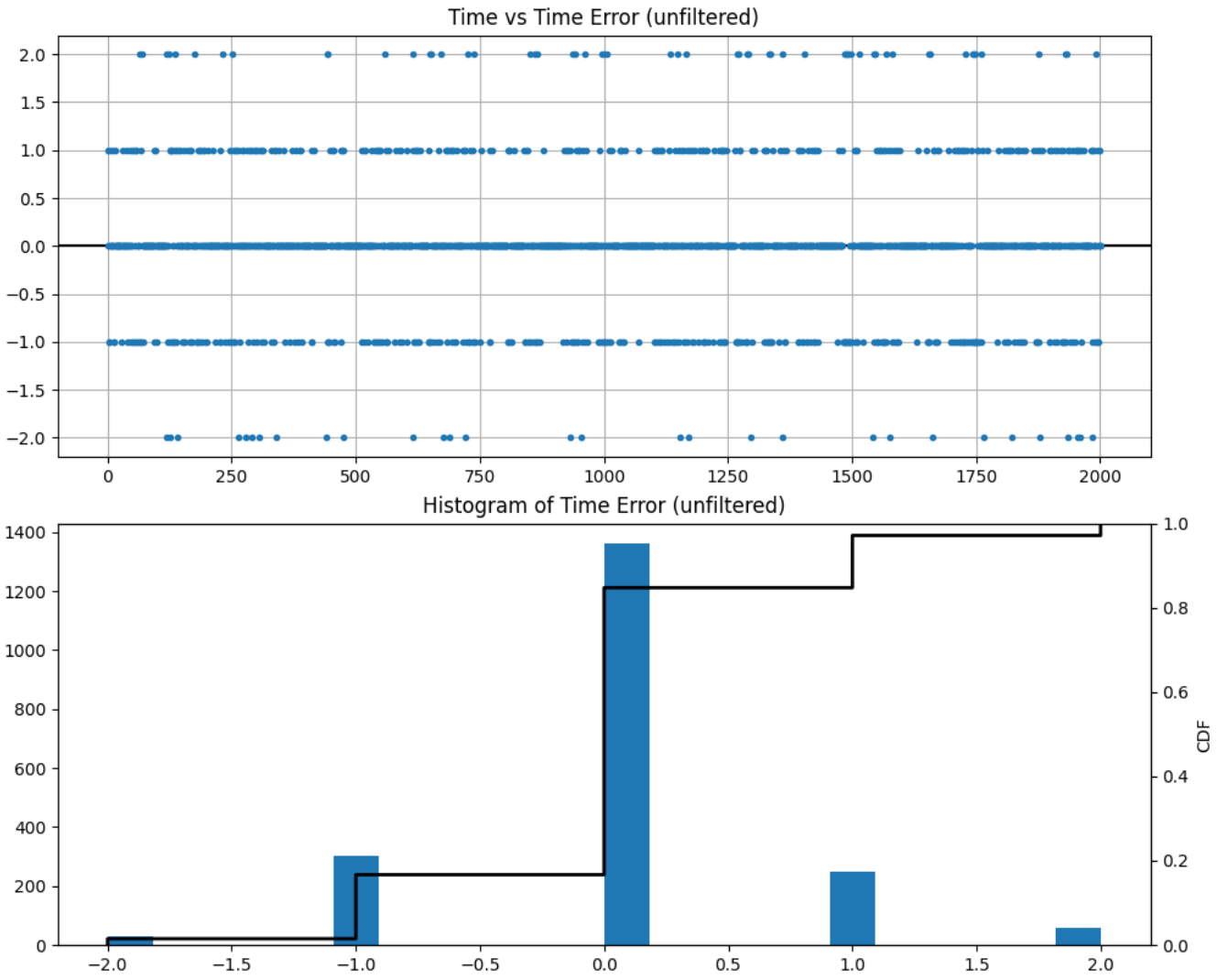

Figure 1. DPLL-to-PHC Time Error (unfiltered)

Table 12. terror

max	2
mean	-0.001
min	-2
range	4
stddev	0.664
units	ns
variance	0.442

2.2.2. G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-B

test specification	G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/DPLL-to-PHC/PRTC-B/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

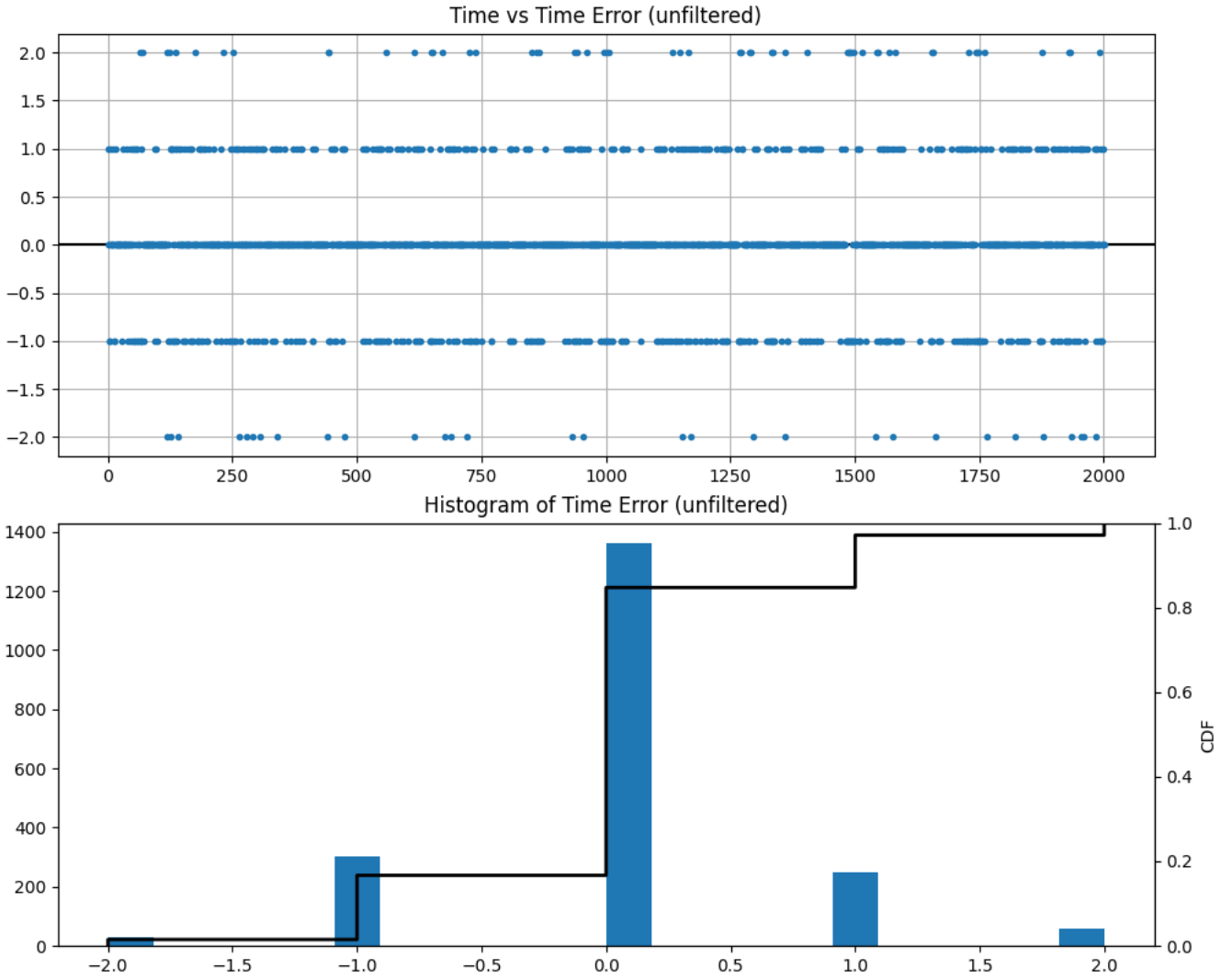

Figure 2. DPLL-to-PHC Time Error (unfiltered)

Table 13. terror

max	2
mean	-0.001

min	-2
range	4
stddev	0.664
units	ns
variance	0.442

2.2.3. G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-A

test specification	G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/DPLL-to-PHC/PRTC-A/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

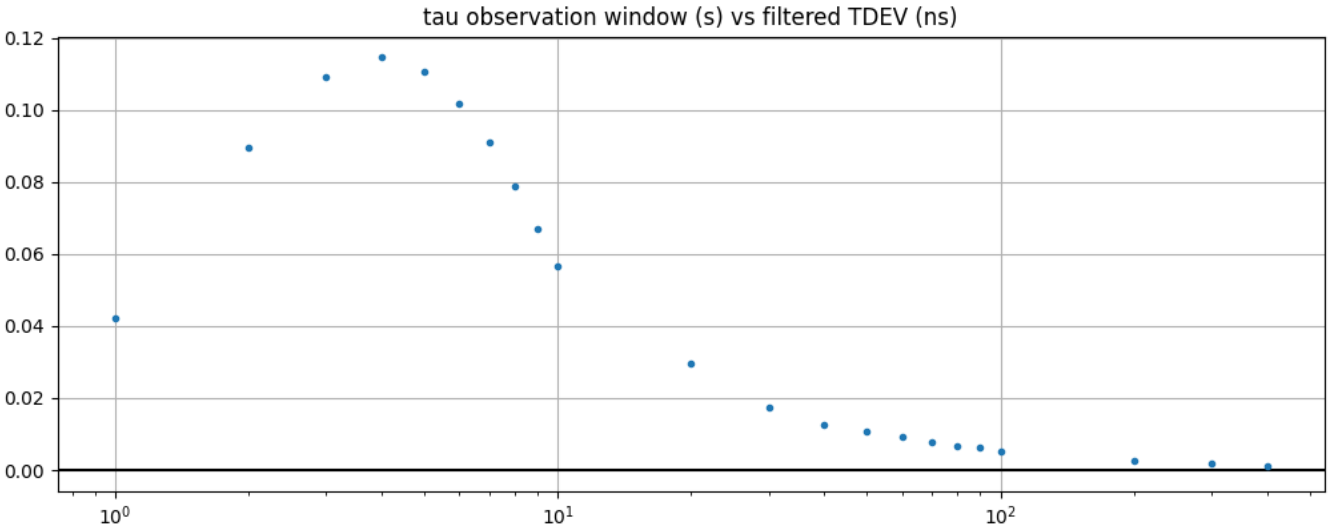

Figure 3. DPLL-to-PHC TDEV (filtered)

Table 14. tdev

max	0.115
mean	0.044
min	0.001
range	0.114
stddev	0.042
units	ns
variance	0.002

2.2.4. G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-B

test specification	G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/DPLL-to-PHC/PRTC-B/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

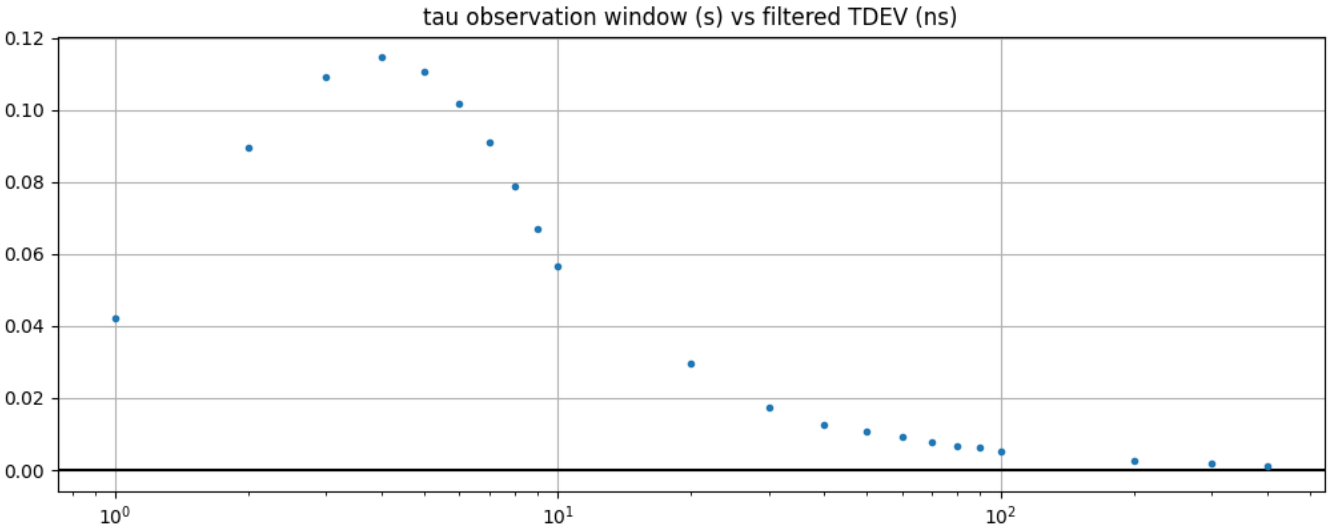

Figure 4. DPLL-to-PHC TDEV (filtered)

Table 15. tdev

max	0.115
mean	0.044
min	0.001
range	0.114
stddev	0.042
units	ns
variance	0.002

2.2.5. G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-A

test specification	G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/DPLL-to-PHC/PRTC-A/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

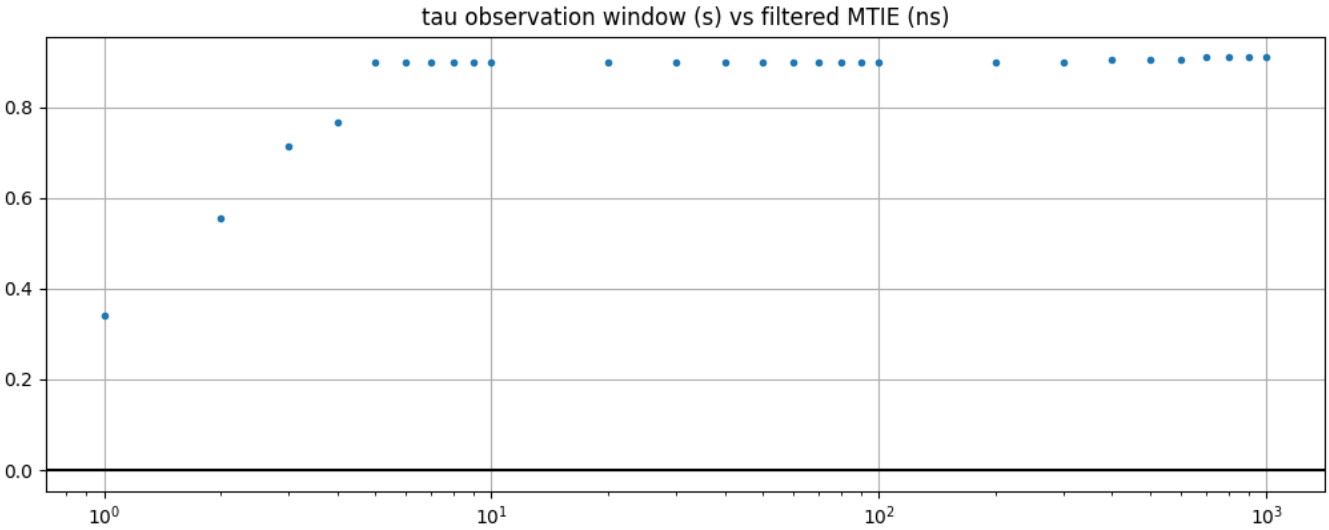

Figure 5. DPLL-to-PHC MTIE (filtered)

Table 16. mtie

max	0.911
mean	0.857
min	0.342
range	0.57
stddev	0.124
units	ns
variance	0.015

2.2.6. G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-B

test specification	G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/DPLL-to-PHC/PRTC-B/
timestamp	38641.456
duration (s)	1701.0
result	success
reason	-

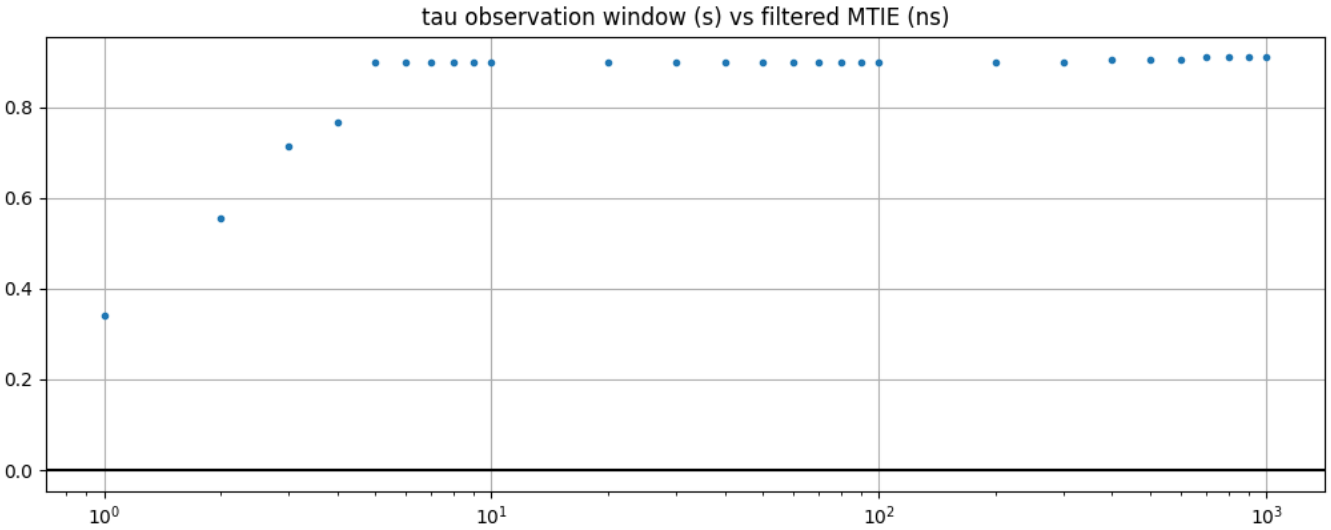

Figure 6. DPLL-to-PHC MTIE (filtered)

Table 17. mtie

max	0.911
mean	0.857
min	0.342
range	0.57
stddev	0.124
units	ns
variance	0.015

2.2.7. G.8272 time-error-in-locked-mode PHC-to-SYS RAN

test specification	G.8272 time-error-in-locked-mode PHC-to-SYS RAN
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/PHC-to-SYS/RAN/
timestamp	38641.507
duration (s)	1701.811
result	success
reason	-

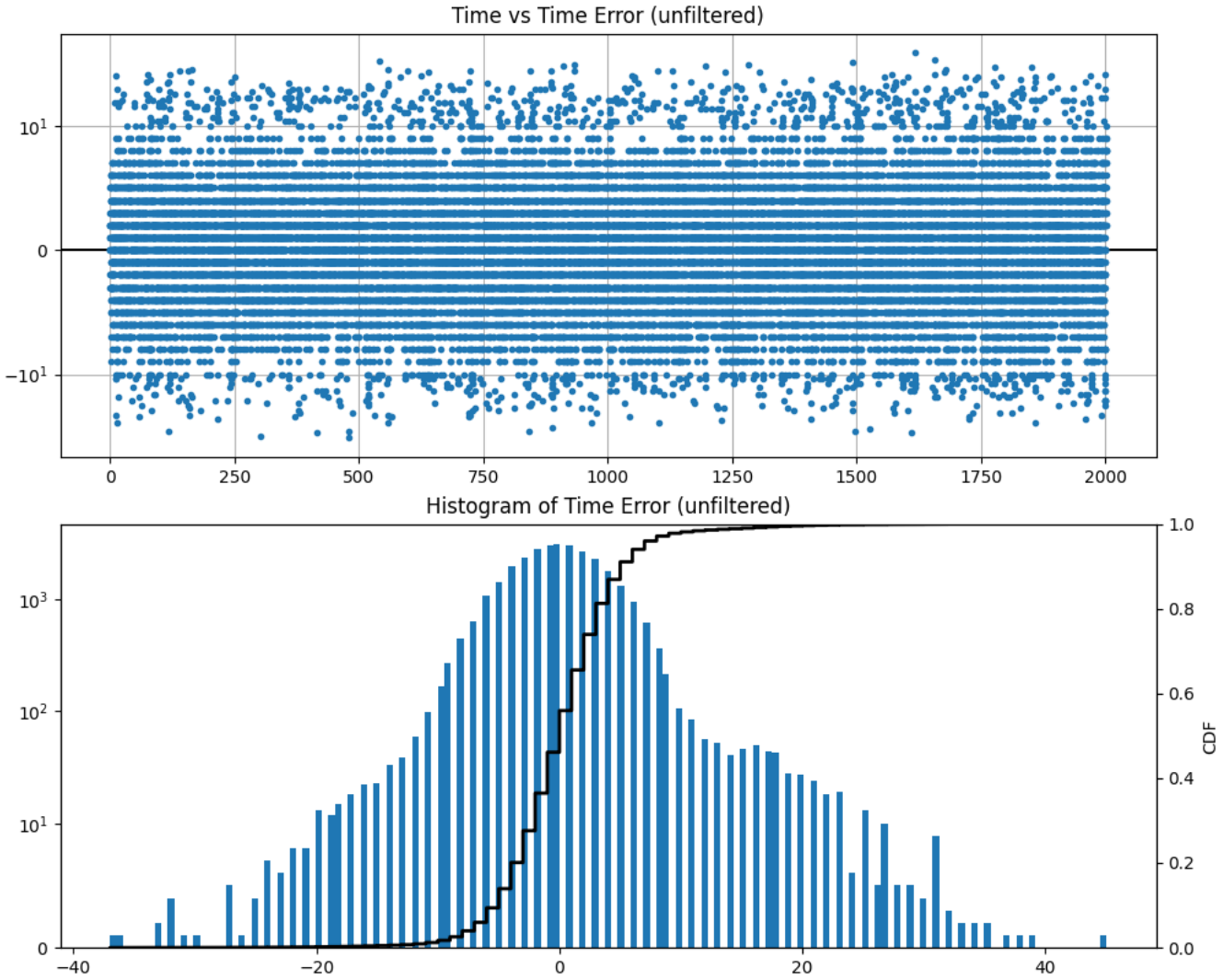

Figure 7. PHC-to-SYS Time Error (unfiltered)

Table 18. terror

max	45
mean	0.001

min	-37
range	82
stddev	4.852
units	ns
variance	23.546

2.2.8. G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

test specification	G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-A/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	success
reason	-

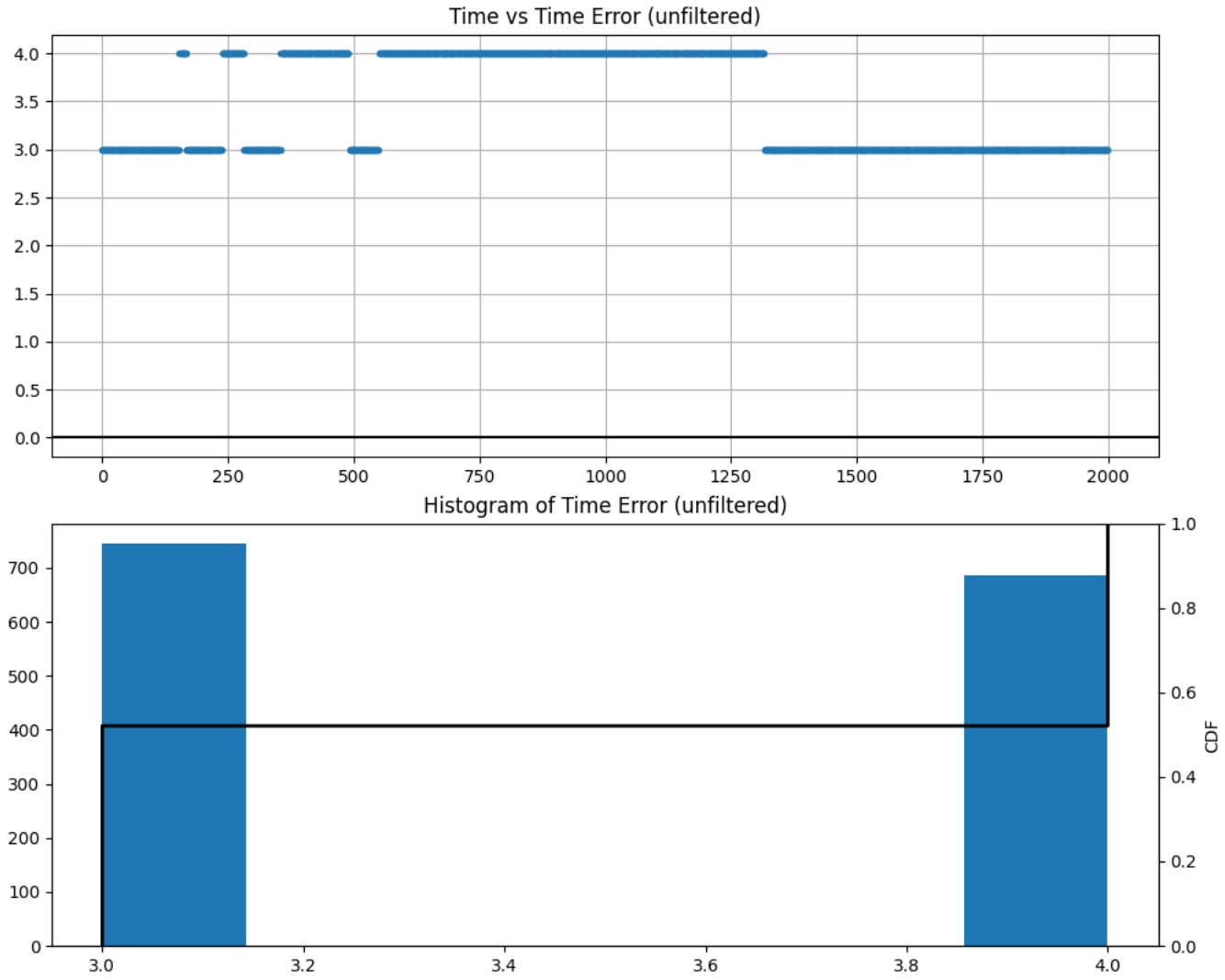

Figure 8. Constellation-to-GNSS-receiver Time Error (unfiltered)

Table 19. terror

max	4

mean	3.531
min	3
range	1
stddev	0.499
units	ns
variance	0.249

2.2.9. G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

test specification	G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-B/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	failure
reason	unacceptable time error

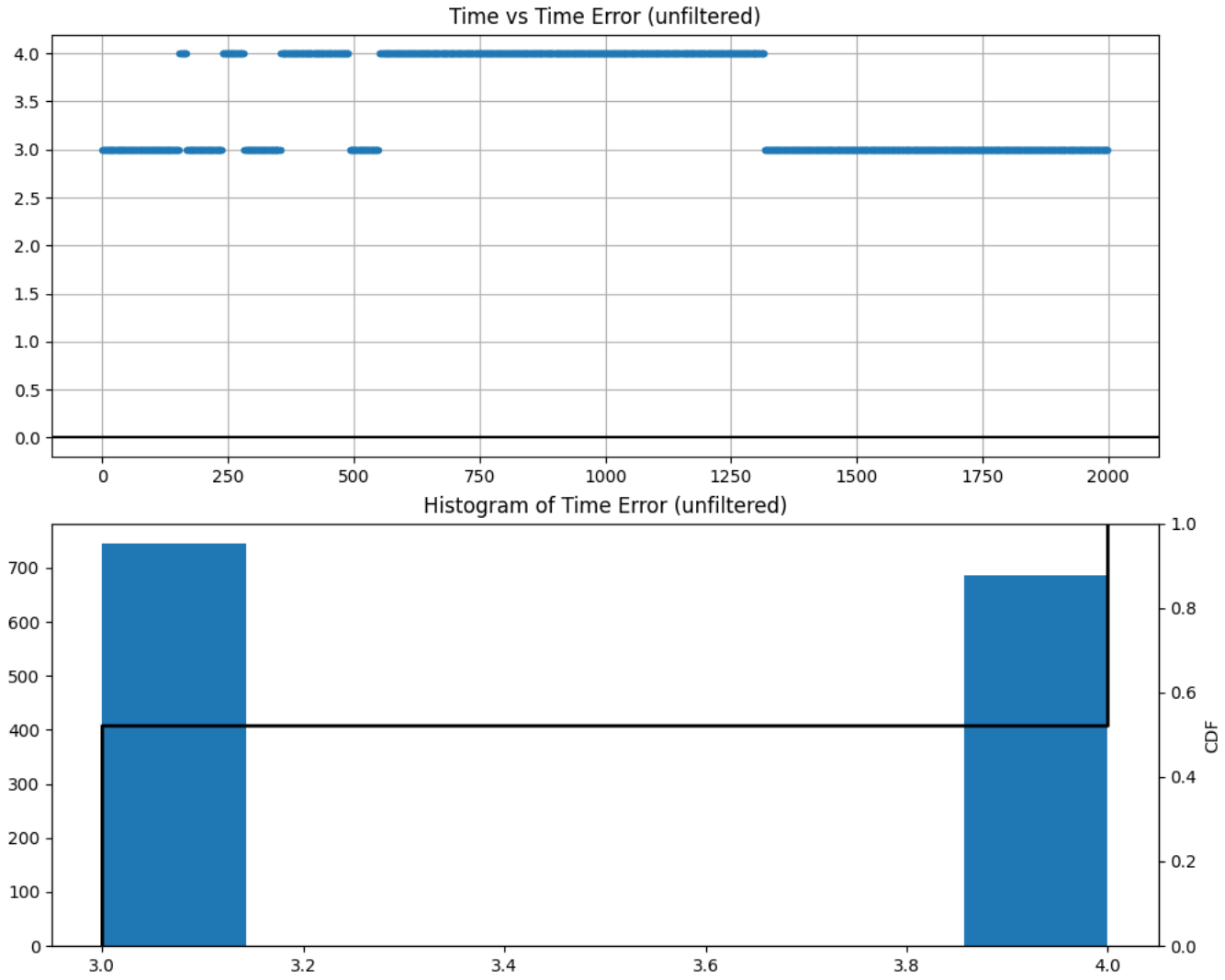

Figure 9. Constellation-to-GNSS-receiver Time Error (unfiltered)

Table 20. terror

max	4

mean	3.531
min	3
range	1
stddev	0.499
units	ns
variance	0.249

2.2.10. G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

test specification	G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-A/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	success
reason	-

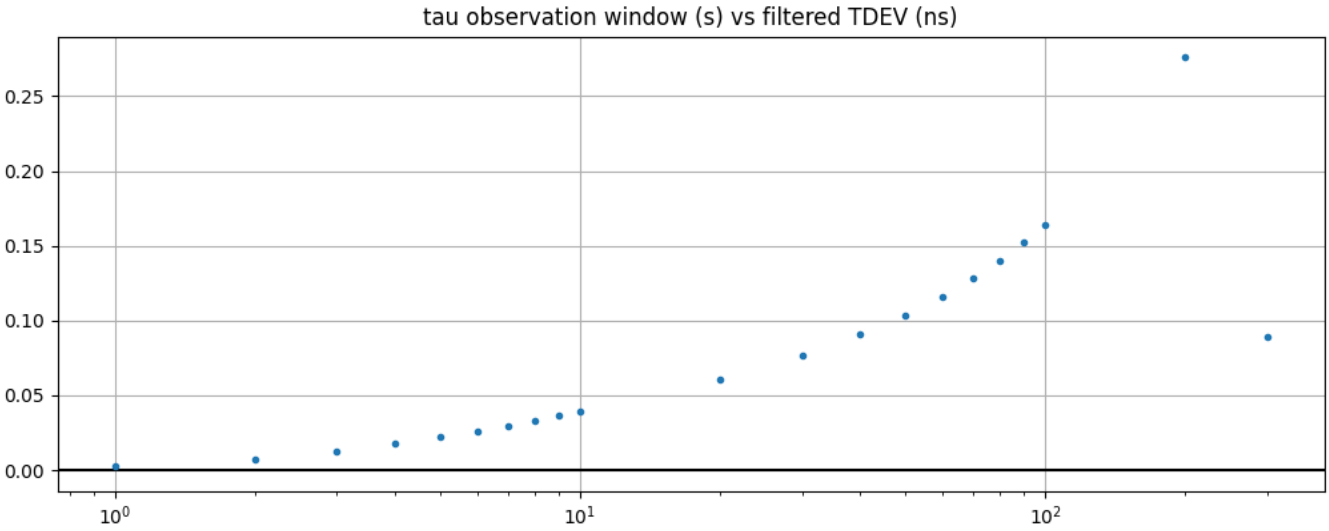

Figure 10. Constellation-to-GNSS-receiver TDEV (filtered)

Table 21. tdev

max	0.276
mean	0.077
min	0.002
range	0.274
stddev	0.067
units	ns
variance	0.004

2.2.11. G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

test specification	G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-B/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	failure
reason	unacceptable time deviation

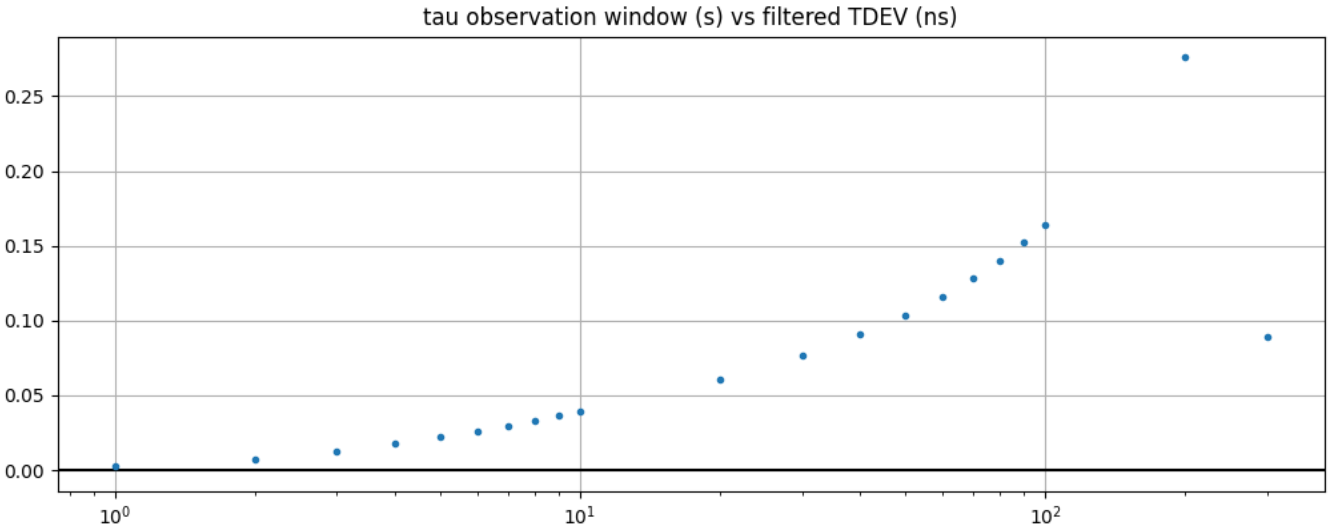

Figure 11. Constellation-to-GNSS-receiver TDEV (filtered)

Table 22. tdev

max	0.276
mean	0.077
min	0.002
range	0.274
stddev	0.067
units	ns
variance	0.004

2.2.12. G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

test specification	G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-A/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	success
reason	-

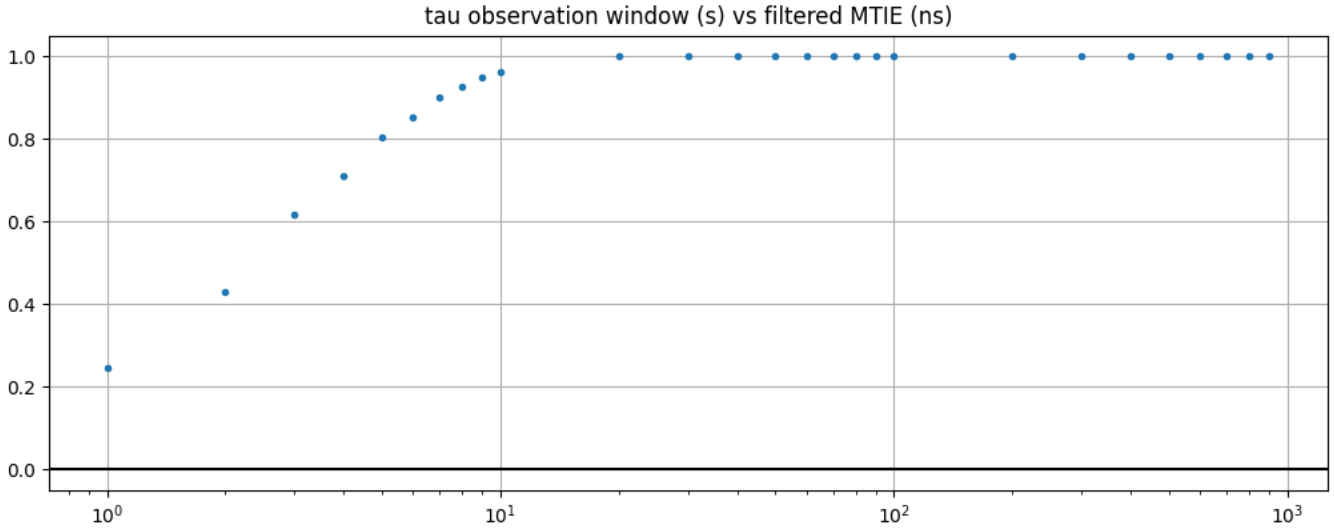

Figure 12. Constellation-to-GNSS-receiver MTIE (filtered)

Table 23. mtie

max	1.0
mean	0.903
min	0.245
range	0.755
stddev	0.188
units	ns
variance	0.035

2.2.13. G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

test specification	G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/Constellation-to-GNSS-receiver/PRTC-B/
timestamp	2023-11-03T11:12:15+00:00
duration (s)	1697.0222
result	success
reason	-

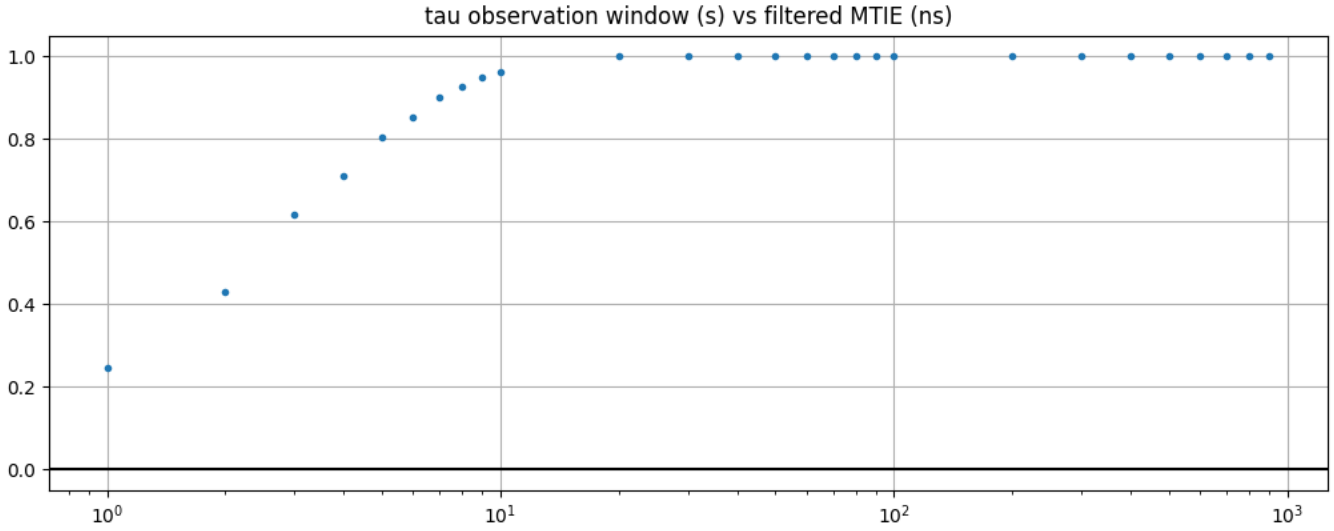

Figure 13. Constellation-to-GNSS-receiver MTIE (filtered)

Table 24. mtie

max	1.0
mean	0.903
min	0.245
range	0.755
stddev	0.188
units	ns
variance	0.035

2.2.14. G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-A

test specification	G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/1PPS-to-DPLL/PRTC-A/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.15. G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-B

test specification	G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/time-error-in-locked-mode/1PPS-to-DPLL/PRTC-B/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.16. G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-A

test specification	G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/1PPS-to-DPLL/PRTC-A/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.17. G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-B

test specification	G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-TDEV-in-locked-mode/1PPS-to-DPLL/PRTC-B/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.18. G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-A

test specification	G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-A
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/1PPS-to-DPLL/PRTC-A/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.19. G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-B

test specification	G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-B
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/wander-MTIE-in-locked-mode/1PPS-to-DPLL/PRTC-B/
timestamp	*not recorded*
duration (s)	*not recorded*
result	**error**
reason	no data

2.2.20. PTP Hardware Clock (PHC) Clock State Transitions

test specification	PTP Hardware Clock (PHC) Clock State Transitions
test identifier	https://github.com/redhat-partner-solutions/vse-sync-test/tree/main/tests/sync/G.8272/phc/state-transitions/
timestamp	2023-11-03T11:07:12+00:00
duration (s)	1999.4990172
result	success
reason	-

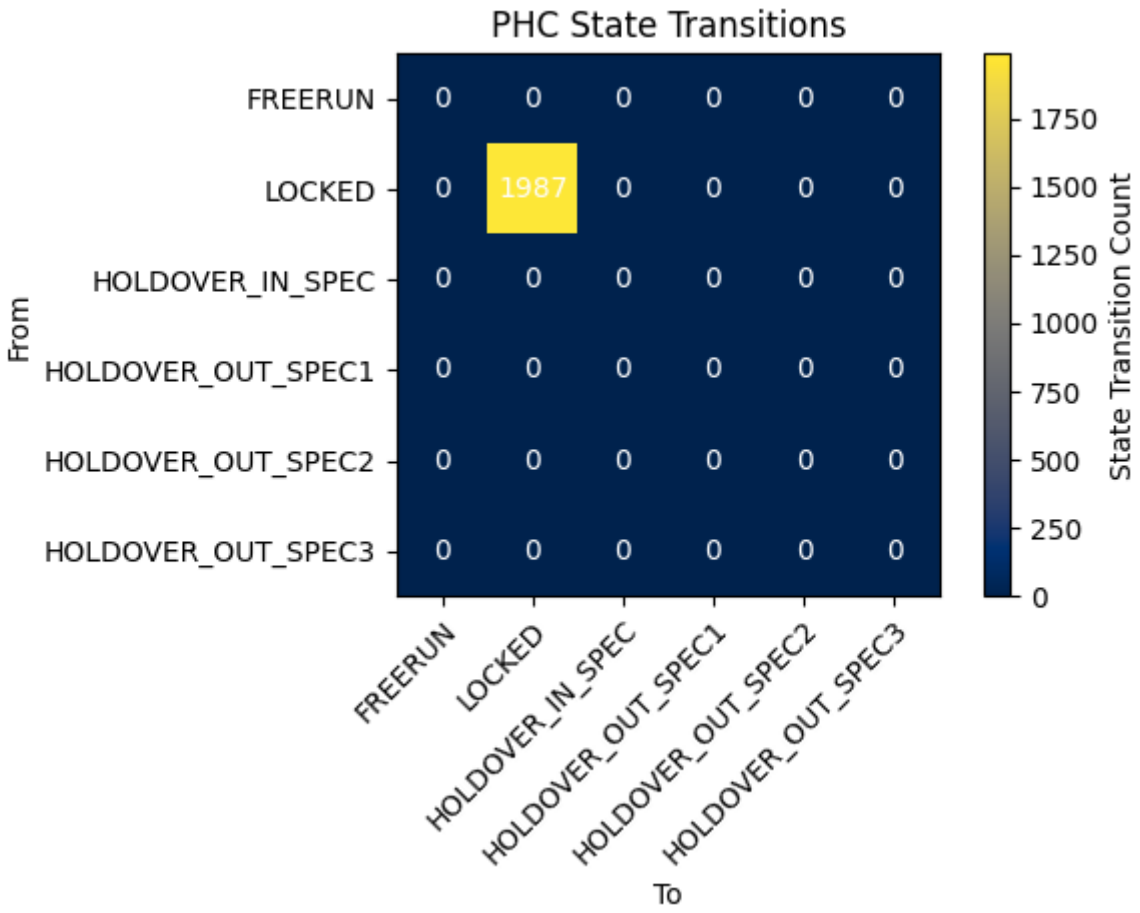

Figure 14. PHC State Transitions

Table 25. analysis

total_transitions	0

Table 26. clock_class_count

FREERUN	{'count': 0, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 0}}
HOLDOVER_IN_SPEC	{'count': 0, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 0}}
HOLDOVER_OUT_SPEC1	{'count': 0, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 0}}
HOLDOVER_OUT_SPEC2	{'count': 0, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 0}}
HOLDOVER_OUT_SPEC3	{'count': 0, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 0}}
LOCKED	{'count': 1987, 'transitions': {'FREERUN': 0, 'HOLDOVER_IN_SPEC': 0, 'HOLDOVER_OUT_SPEC1': 0, 'HOLDOVER_OUT_SPEC2': 0, 'HOLDOVER_OUT_SPEC3': 0, 'LOCKED': 1987}}

Appendix A: Test Specifications

A.1. Test Suite: Environment

A.1.1. RHOCP version

This test ensures that the Red Hat OpenShift Container Platform (RHOCP) version running in the System Under Test (SUT) is exactly the version expected.

A.1.1.1. Goal

Verify that the SUT is running a specific RHOCP version.

A.1.1.2. Scope

- Environment verification

A.1.1.3. Out of scope

- *empty*

A.1.1.4. Acceptance criteria

1. The RHOCP version is exactly the version specified in the test configuration

A.1.1.5. Test procedure

1. Gather the RHOCP version running in the SUT
2. Verify the version meets acceptance criteria

A.1.2. PTP Operator version

This test ensures that the PTP Operator version running in the System Under Test (SUT) is exactly the version expected.

A.1.2.1. Goal

Verify that the SUT is running a specific PTP Operator version.

A.1.2.2. Scope

- Environment verification

A.1.2.3. Out of scope

- *empty*

A.1.2.4. Acceptance criteria

1. The PTP Operator version is exactly the version specified in the test configuration

A.1.2.5. Test procedure

1. Gather the PTP Operator version running in the SUT
2. Verify the version meets acceptance criteria

A.1.3. gpsd version

This test ensures that the `gpsd` version running in the System Under Test (SUT) is exactly the version expected.

A.1.3.1. Goal

Verify that the SUT is running a specific `gpsd` version.

A.1.3.2. Scope

- Environment verification

A.1.3.3. Out of scope

- *empty*

A.1.3.4. Acceptance criteria

1. The `gpsd` version is exactly the version specified in the test configuration

A.1.3.5. Test procedure

1. Gather the `gpsd` version running in the SUT
2. Verify the version meets acceptance criteria

A.1.4. NIC model

This test ensures that the Network Interface Card (NIC) model in the System Under Test (SUT) is the expected model.

A.1.4.1. Goal

Verify that the SUT has a specific NIC model.

A.1.4.2. Scope

- Environment verification

A.1.4.3. Out of scope

- *empty*

A.1.4.4. Acceptance criteria

1. The NIC model is exactly the model specified in the test configuration

A.1.4.5. Test procedure

1. Gather the NIC model in the SUT
2. Verify the model meets acceptance criteria

A.1.5. ice driver version

This test ensures that the Intel ice driver version running in the System Under Test (SUT) is exactly the version expected.

A.1.5.1. Goal

Verify that the SUT is running a specific ice driver version.

A.1.5.2. Scope

- Environment verification

A.1.5.3. Out of scope

- *empty*

A.1.5.4. Acceptance criteria

1. The ice driver version is exactly the version specified in the test configuration

A.1.5.5. Test procedure

1. Gather the ice driver version running in the SUT
2. Verify the version meets acceptance criteria

A.1.6. NIC firmware version

This test ensures that the Network Interface Card (NIC) firmware version running in the System Under Test (SUT) is exactly the version expected.

A.1.6.1. Goal

Verify that the SUT is running a specific NIC firmware version.

A.1.6.2. Scope

- Environment verification

A.1.6.3. Out of scope

- *empty*

A.1.6.4. Acceptance criteria

1. The NIC firmware version is exactly the version specified in the test configuration

A.1.6.5. Test procedure

1. Gather the NIC firmware version running in the SUT
2. Verify the version meets acceptance criteria

A.1.7. GNSS device model

This test ensures that the GNSS device model in the System Under Test (SUT) is the expected model.

A.1.7.1. Goal

Verify that the SUT has a specific GNSS device model.

A.1.7.2. Scope

- Environment verification

A.1.7.3. Out of scope

- *empty*

A.1.7.4. Acceptance criteria

1. The GNSS device model is exactly the model specified in the test configuration

A.1.7.5. Test procedure

1. Gather the GNSS device model in the SUT
2. Verify the model meets acceptance criteria

A.1.8. GNSS device firmware version

This test ensures that the GNSS device firmware version running in the System Under Test (SUT) is exactly the version expected.

A.1.8.1. Goal

Verify that the SUT is running a specific GNSS device firmware version.

A.1.8.2. Scope

- Environment verification

A.1.8.3. Out of scope

- *empty*

A.1.8.4. Acceptance criteria

1. The GNSS device firmware version is exactly the version specified in the test configuration

A.1.8.5. Test procedure

1. Gather the GNSS device firmware version running in the SUT
2. Verify the version meets acceptance criteria

A.1.9. GNSS protocol version

This test ensures that the protocol version of the GNSS device running in the System Under Test (SUT) is exactly the version expected.

A.1.9.1. Goal

Verify that the GNSS device in the SUT is using a specific protocol version.

A.1.9.2. Scope

- Environment verification

A.1.9.3. Out of scope

- *empty*

A.1.9.4. Acceptance criteria

1. The GNSS protocol version is exactly the version specified in the test configuration

A.1.9.5. Test procedure

1. Gather the GNSS protocol version running in the SUT
2. Verify the version meets acceptance criteria

A.1.10. G.8272 environment status gnss device-detected wpc

To run the tests focused on the characterization of T-GM performance, it is needed to satisfy that the environment is ready at Hardware level and Software level. This test focuses on ensuring the the GNSS device is in valid state to run the specific T-GM performance tests.

It is critical to note that the results of this test are only for ensuring the validation of the test environment and the System Under Test (SUT).

A.1.10.1. Goal

Verify that the status of the GNSS receiver device is acceptable to trigger the performance characterization of the T-GM.

A.1.10.2. Scope

- Independent Validation of test Environment
- T-GM clocks
- GNSS receiver validation

A.1.10.3. Out of scope

- T-BC clocks
- T-TSC clocks

A.1.10.4. Acceptance criteria

1. GNSS receiver state is valid for T-GM.

A.1.10.5. Test procedure

1. The procedure leverages specific collector tooling to gather the GNSS receiver state.
2. Verify gathered data meets acceptance criteria.

A.1.11. G.8272 environment status gnss antenna-connected wpc

To run the tests focused on the characterization of T-GM performance, it is needed to satisfy that the environment is ready at Hardware level and Software level. This test focuses on ensuring the GPS antenna connected to the GNSS receiver is in valid state to run the specific T-GM performance tests.

It is critical to note that the results of this test are only for ensuring the validation of the test environment and the System Under Test (SUT).

A.1.11.1. Goal

Verify that the status of the GPS antenna is acceptable to trigger the performance characterization of the T-GM.

A.1.11.2. Scope

- Independent Validation of test Environment
- T-GM clocks
- GPS antenna status validation

A.1.11.3. Out of scope

- T-BC clocks
- T-TSC clocks

A.1.11.4. Acceptance criteria

1. GPS antenna state is valid for T-GM.

A.1.11.5. Test procedure

1. The procedure leverages specific collector tooling to gather the GPS antenna status.
2. Verify gathered data meets acceptance criteria.

A.1.12. G.8272 environment status gnss gpsfix-valid wpc

To run the tests focused on the characterization of T-GM performance, it is needed to satisfy that the environment is ready at Hardware level and Software level. This test focuses on ensuring the quality of the signal arriving to the GNSS receiver is in valid state to run the specific T-GM performance tests.

It is critical to note that the results of this test are only for ensuring the validation of the test environment and the System Under Test (SUT).

A.1.12.1. Goal

Verify that the quality of the signal arriving to the GNSS receiver is acceptable to trigger the performance characterization of the T-GM.

A.1.12.2. Scope

- Independent Validation of test Environment
- T-GM clocks
- GNSS receiver accuracy validation

A.1.12.3. Out of scope

- T-BC clocks
- T-TSC clocks

A.1.12.4. Acceptance criteria

1. GNSS receiver quality signal (gpsFix) is valid for T-GM.

A.1.12.5. Test procedure

1. The procedure leverages specific collector tooling to gather the quality signal of the data arriving to the GNSS reciver.
2. Verify gathered data meets acceptance criteria.

A.1.13. G.8272 environment status ptp-operator

To run the tests focused on the characterization of T-GM performance, it is needed to satisfy that the environment is ready at Hardware level and Software level. This test focuses on ensuring the PTP operator is in valid state to run the specific T-GM performance tests.

It is critical to note that the results of this test are only for ensuring the validation of the test environment and the System Under Test (SUT).

A.1.13.1. Goal

Verify that the status of the PTP operator is acceptable to trigger the performance characterization of the T-GM.

A.1.13.2. Scope

- Independent Validation of test Environment
- T-GM clocks
- PTP operator status validation

A.1.13.3. Out of scope

- T-BC clocks
- T-TSC clocks

A.1.13.4. Acceptance criteria

1. PTP operator state is valid for T-GM.

A.1.13.5. Test procedure

1. The procedure leverages specific collector tooling to gather PTP operator status.
2. Verify gathered data meets acceptance criteria.

A.2. Test Suite: T-GM Tests

A.2.1. G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-A

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-A under normal, locked conditions. This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the time error observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.1.1. Goal

Verify that the unfiltered time error introduced between DPLL and PHC under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-A.

A.2.1.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.1.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.1.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.1.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.2. G.8272 time-error-in-locked-mode DPLL-to-PHC PRTC-B

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-B under normal, locked conditions. This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the time error observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.2.1. Goal

Verify that the unfiltered time error introduced between DPLL and PHC under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-B.

A.2.2.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.2.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.2.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.2.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.3. G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-TDEV, i.e., wander expressed in time deviation or TDEV, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.3.1. Goal

Verify that the TDEV introduced between DPLL and PHC under normal, locked operating conditions is not greater than 100% of the overall TDEV requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the minimum test window period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.3.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.3.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.3.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 100% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.3.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.4. G.8272 wander-TDEV-in-locked-mode DPLL-to-PHC PRTC-B

G.8272 Section 6.2 Table 4 specifies requirements on the accuracy of the wander-TDEV, i.e. wander expressed in time deviation or TDEV, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.4.1. Goal

Verify that the TDEV introduced between DPLL and PHC under normal, locked operating conditions is not greater than 100% of the overall TDEV requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. Note that the minimum test window period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.4.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.4.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.4.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 100% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.4.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.5. G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-MTIE, i.e., wander expressed in maximum time interval error or MTIE, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.5.1. Goal

Verify that the MTIE introduced between DPLL and PHC under normal, locked operating conditions is not greater than 100% of the overall MTIE requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.5.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.5.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.5.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 100% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.5.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.6. G.8272 wander-MTIE-in-locked-mode DPLL-to-PHC PRTC-B

G.8272 Section 6.2 Table 4 specifies requirements on the accuracy of the wander-MTIE, i.e. wander expressed in maximum time interval error or MTIE, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from DPLL to PHC. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.6.1. Goal

Verify that the MTIE introduced between DPLL and PHC under normal, locked operating conditions is not greater than 100% of the overall MTIE requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.6.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.6.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.6.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 100% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.6.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `ts2phc` log data

3. Verify log data meets acceptance criteria

A.2.7. G.8272 time-error-in-locked-mode PHC-to-SYS RAN

This test focuses on one observation point in this system: the internal path from PHC to System Clock (SYS). The purpose of this test is to identify when the time error observed at this point is considered unacceptable for RAN workloads.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.7.1. Goal

Verify that the unfiltered time error introduced between PHC and SYS under normal, locked operating conditions is not greater than the overall time error allowed by RAN applications.

A.2.7.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.7.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.7.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than the overall time error requirement
2. The time error is locked for the test window
3. The test window is at least 1000 seconds long

A.2.7.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `phc2sys` log data
3. Verify log data meets acceptance criteria

A.2.8. G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-A under normal, locked conditions. This test focusses on one observation point in this system: the input received at the GNSS receiver from the configured GNSS constellation (or constellations). The purpose of this test is to identify when the time error observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.8.1. Goal

Verify that the unfiltered time error observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-A.

A.2.8.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.8.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.8.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The GNSS receiver is locked to the configured GNSS constellation (or constellations) for the test window
3. The test window is at least 1000 seconds long

A.2.8.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `GNSS` log data
3. Verify log data meets acceptance criteria

A.2.9. G.8272 time-error-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-B under normal, locked conditions. This test focusses on one observation point in this system: the input received at the GNSS receiver from the configured GNSS constellation (or constellations). The purpose of this test is to identify when the time error observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.9.1. Goal

Verify that the unfiltered time error observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-B.

A.2.9.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.9.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.9.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The GNSS receiver is locked to the configured GNSS constellation (or constellations) for the test window
3. The test window is at least 1000 seconds long

A.2.9.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `GNSS` log data
3. Verify log data meets acceptance criteria

A.2.10. G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-TDEV, i.e., wander expressed in time deviation or TDEV, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.10.1. Goal

Verify that the filtered TDEV observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall TDEV requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the minimum test window period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.10.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.10.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.10.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 10% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.10.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6

2. Capture at least 1000 seconds of GNSS log data
3. Verify log data meets acceptance criteria

A.2.11. G.8272 wander-TDEV-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

G.8272 Section 6.2 Table 4 specifies requirements on the accuracy of the wander-TDEV, i.e. wander expressed in time deviation or TDEV, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the input received at the GNSS receiver from the configured GNSS constellation. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.11.1. Goal

Verify that the filtered TDEV observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall TDEV requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. Note that the minimum measurement period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.11.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.11.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.11.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 10% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.11.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6

2. Capture at least 1000 seconds of `ts2phc` log data
3. Verify log data meets acceptance criteria

A.2.12. G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-MTIE, i.e., wander expressed in maximum time interval error or MTIE, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.12.1. Goal

Verify that the filtered MTIE observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall MTIE requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.12.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.12.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.12.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 10% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.12.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6

2. Capture at least 1000 seconds of GNSS log data
3. Verify log data meets acceptance criteria

A.2.13. G.8272 wander-MTIE-in-locked-mode Constellation-to-GNSS-receiver PRTC-B

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-MTIE, i.e., wander expressed in maximum time interval error or MTIE, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.13.1. Goal

Verify that the filtered MTIE observed at the GNSS receiver under normal, locked operating conditions is not greater than 10% of the overall MTIE requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.13.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.13.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.13.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 10% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.13.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6

2. Capture at least 1000 seconds of GNSS log data
3. Verify log data meets acceptance criteria

A.2.14. G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-A

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-A under normal, locked conditions. This test focusses on one observation point in this system: the internal path between the 1PPS input to the DPLL and the 1PPS output from the DPLL. The purpose of this test is to identify when the time error of the phase offset observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.14.1. Goal

Verify that the unfiltered time error of the 1PPS DPLL under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-A.

A.2.14.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.14.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.14.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The 1PPS DPLL is in `locked and holdover acquired` state for the test window
3. The test window is at least 1000 seconds long

A.2.14.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `DPLL` log data
3. Verify log data meets acceptance criteria

A.2.15. G.8272 time-error-in-locked-mode 1PPS-to-DPLL PRTC-B

G.8272 Section 6.1 specifies requirements on the accuracy of the time output of PRTC-B under normal, locked conditions. This test focusses on one observation point in this system: the internal path between the 1PPS input to the DPLL and the 1PPS output from the DPLL. The purpose of this test is to identify when the time error of the phase offset observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.15.1. Goal

Verify that the unfiltered time error of the 1PPS DPLL under normal, locked operating conditions is not greater than 10% of the overall time output accuracy requirement for PRTC-B.

A.2.15.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.15.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.15.4. Acceptance criteria

1. All samples in the test window have an unfiltered time error of less than 10% of overall time output accuracy requirement
2. The 1PPS DPLL is in `locked and holdover acquired` state for the test window
3. The test window is at least 1000 seconds long

A.2.15.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6.1
2. Capture at least 1000 seconds of `DPLL` log data
3. Verify log data meets acceptance criteria

A.2.16. G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-TDEV, i.e., wander expressed in time deviation or TDEV, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.16.1. Goal

Verify that the TDEV of the 1PPS DPLL under normal, locked operating conditions is not greater than 100% of the overall TDEV requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the minimum test window period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.16.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.16.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.16.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 100% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.16.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `DPLL` log data

3. Verify log data meets acceptance criteria

A.2.17. G.8272 wander-TDEV-in-locked-mode 1PPS-to-DPLL PRTC-B

G.8272 Section 6.2 Table 4 specifies requirements on the accuracy of the wander-TDEV, i.e. wander expressed in time deviation or TDEV, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-TDEV will be denoted by TDEV from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the TDEV observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.17.1. Goal

Verify that the TDEV of the 1PPS DPLL under normal, locked operating conditions is not greater than 100% of the overall TDEV requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. Note that the minimum test window period for TDEV is twelve times the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.17.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.17.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.17.4. Acceptance criteria

1. All filtered TDEV samples during each observation interval are less than 100% of overall TDEV accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.17.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `DPLL` log data

3. Verify log data meets acceptance criteria

A.2.18. G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-A

G.8272 Section 6.2 Table 3 specifies requirements on the accuracy of the wander-MTIE, i.e., wander expressed in maximum time interval error or MTIE, for PRTC-A under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.18.1. Goal

Verify that the MTIE of the 1PPS DPLL under normal, locked operating conditions is not greater than 100% of the overall MTIE requirement for PRTC-A. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.18.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.18.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.18.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 100% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.18.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `DPLL` log data

3. Verify log data meets acceptance criteria

A.2.19. G.8272 wander-MTIE-in-locked-mode 1PPS-to-DPLL PRTC-B

G.8272 Section 6.2 Table 4 specifies requirements on the accuracy of the wander-MTIE, i.e. wander expressed in maximum time interval error or MTIE, for PRTC-B under normal, locked conditions. (For the sake of simplicity wander-MTIE will be denoted by MTIE from here on.) This test focusses on one observation point in this system: the internal path from the 1PSS input to the DPLL an the 1PPS output from the DPLL. The purpose of this test is to identify when the MTIE observed at this point is considered independently unacceptable.

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.19.1. Goal

Verify that the MTIE of the 1PPS DPLL under normal, locked operating conditions is not greater than 100% of the overall MTIE requirement for PRTC-B. An observation interval of 10000 seconds covers practically all masks. Note that the test window period for MTIE is equivalent to the maximum observation interval in accordance with ITU-T recommendation G.811.

A.2.19.2. Scope

- Ignore samples in an initial transient window
- Verify samples in the test window

A.2.19.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.19.4. Acceptance criteria

1. All filtered MTIE samples during each observation interval are less than 100% of overall MTIE accuracy requirement
2. The time output is locked for the test window
3. The test window is at least 1000 seconds long

A.2.19.5. Test procedure

1. Establish normal, locked conditions per G.8272 Section 6
2. Capture at least 1000 seconds of `DPLL` log data

3. Verify log data meets acceptance criteria

A.2.20. PTP Hardware Clock (PHC) Clock State Transitions

It is critical to note that the results of this test are only valid when both the test environment and the System Under Test (SUT) have been independently validated. While requirements on their acceptability are not defined here, it is noted that they include timestamping accuracy.

A.2.20.1. Goal

Verify that the T-GM observed clock class transitions according to the following diagram:

```
flowchart TB
    A(FREERUN) --> B(LOCKED)
    A --> A
    B --> C(HOLDOVER_IN_SPEC)
    B --> B
    C --> D(HOLDOVER_OUT_OF_SPEC)
    D --> D
    C -->B
    D --> B
```

A.2.20.2. Scope

- T-GM Clock class state transitions

A.2.20.3. Out of scope

- Independent validation of the test environment
- Independent validation of the SUT
- Provision SUT

A.2.20.4. Acceptance criteria

1. PTP Hardware Clock (PHC) announced `clockClass` states are valid as per G.8275.1 section 6.4 Table 3 and `clockClass` state transitions follow the diagram above

A.2.20.5. Test procedure

1. Capture at least 1000 seconds of T-GM `clockClass` announcements
2. Gather the values identifying the announced T-GM `clockClass` for each sample of log data
3. Ensure that `clockClass` transitions between consecutive samples meet the acceptance criteria