

## Broadcom OneSync Performance, ITU-T G.8273.2 BC and G.8273.4 PTS Slave Clock

This report contains the 1588 performance data for the Broadcom OneSync device. The presented results include a subset of Boundary Clock (BC) results for ITU-T G.8273.2 Full Time support, and a subset of Slave Clock (SC) results for ITU-T G.8273.4 Partial Time Support (PTS). The Renesas 1588 servo was used for all performance tests.

### Contents

<b>1. Results Summary .....</b>	<b>4</b>
<b>2. Test Configuration.....</b>	<b>5</b>
<b>3. G.8273.2: Noise Generation – 1PPS.....</b>	<b>6</b>
3.1 ONEPPS Analysis .....	7
3.2 FILTEREDTIMEERROR Analysis .....	8
3.3 CTE Analysis .....	9
3.4 DTE Analysis .....	10
3.5 DTEHF Analysis .....	11
3.6 DTEMTIE Analysis .....	12
3.7 DTETDEV Analysis.....	13
<b>4. G.8273.2: Noise Generation – PTP .....</b>	<b>14</b>
4.1 TIMEERROR Analysis.....	15
4.2 FILTEREDTIMEERROR Analysis .....	16
4.3 CTE Analysis .....	17
4.4 DTE Analysis .....	18
4.5 DTEHF Analysis .....	19
4.6 DTEMTIE Analysis .....	20
4.7 DTETDEV Analysis.....	21
<b>5. G.8273.2: Noise Generation – No SyncE – 1PPS .....</b>	<b>22</b>
5.1 ONEPPS Analysis .....	23
5.2 FILTEREDTIMEERROR Analysis .....	24
5.3 CTE Analysis .....	25
5.4 DTE Analysis .....	26
5.5 DTEHF Analysis .....	27
5.6 DTEMTIE Analysis .....	28
5.7 DTETDEV Analysis.....	29
<b>6. G.8273.2: Noise Generation – No SyncE – PTP .....</b>	<b>30</b>
6.1 TIMEERROR Analysis.....	31
6.2 FILTEREDTIMEERROR Analysis .....	32
6.3 CTE Analysis .....	33
6.4 DTE Analysis .....	34
6.5 DTEHF Analysis .....	35
6.6 DTEMTIE Analysis .....	36
6.7 DTETDEV Analysis.....	37

<b>7.</b>	<b>G.8273.2: Holdover – 1PPS</b> .....	<b>38</b>
7.1	ONEPPS Analysis .....	39
7.2	MTIE Analysis.....	40
<b>8.</b>	<b>G.8273.2: Holdover – PTP</b> .....	<b>41</b>
8.1	TIMEERROR Analysis.....	42
8.2	DTE Analysis .....	43
8.3	DTEMTIE Analysis .....	44
<b>9.</b>	<b>G.8273.2: Holdover – No SyncE – 1PPS</b> .....	<b>45</b>
9.1	ONEPPS Analysis .....	46
9.2	MTIE Analysis.....	47
<b>10.</b>	<b>G.8273.2: Holdover – No SyncE – PTP</b> .....	<b>48</b>
10.1	TIMEERROR Analysis.....	49
10.2	DTE Analysis .....	50
10.3	DTEMTIE Analysis .....	51
<b>11.</b>	<b>G.8273.2: PTP to 1PPS Noise Transfer</b> .....	<b>52</b>
11.1	ONEPPS Analysis .....	53
11.2	PTPNoiseTransfer Analysis.....	54
<b>12.</b>	<b>G.8273.2: PTP to PTP Noise Transfer</b> .....	<b>55</b>
12.1	TIMEERROR Analysis.....	56
12.2	PTPNoiseTransfer Analysis.....	57
<b>13.</b>	<b>G.8273.2: SyncE to 1PPS Noise Transfer</b> .....	<b>58</b>
13.1	ONEPPS Analysis .....	59
13.2	SyncENoiseTransfer Analysis .....	60
<b>14.</b>	<b>G.8273.2: SyncE to PTP Noise Transfer</b> .....	<b>61</b>
14.1	ONEPPS Analysis .....	62
14.2	SyncENoiseTransfer Analysis .....	63
<b>15.</b>	<b>G.8273.2: Noise Tolerance – 1PPS</b> .....	<b>64</b>
15.1	ONEPPS Analysis .....	65
<b>16.</b>	<b>G.8273.2: Noise Tolerance – PTP</b> .....	<b>66</b>
16.1	TIMEERROR Analysis.....	67
<b>17.</b>	<b>G.8273.4 PTS: Noise Generation</b> .....	<b>68</b>
17.1	ONEPPS Analysis .....	69
17.2	CTE Analysis .....	70
17.3	DTE Analysis .....	71
17.4	DTEHF Analysis .....	72
<b>18.</b>	<b>G.8273.4 PTS: Holdover</b> .....	<b>73</b>
18.1	TIE Analysis.....	74
<b>19.</b>	<b>G.8261: Test Case 15 – Network Traffic Model B</b> .....	<b>75</b>
19.1	ONEPPS Analysis .....	76
19.2	MTIE Analysis.....	77
19.3	TDEV Analysis.....	78
<b>20.</b>	<b>G.8261: Test Case 16 – Network Traffic Model B</b> .....	<b>79</b>

20.1	ONEPPS Analysis .....	80
20.2	MTIE Analysis.....	81
<b>21.</b>	<b>TDEV Analysis .....</b>	<b>82</b>
<b>22.</b>	<b>Configuration Files.....</b>	<b>83</b>
22.1	PCM4L Json Files .....	83
22.1.1	G.8273.4 PTS.....	83
22.1.2	G.8273.2 FTS.....	86
22.2	PTP4L Config Files.....	88
22.2.1	G.8275.2 Unicast Slave Clock.....	88
22.2.2	G.8275.1 Multicast Boundary Clock .....	89
22.3	TCS/Bin Files.....	90
<b>23.</b>	<b>Revision History .....</b>	<b>90</b>

## 1. Results Summary

Standard	Test Case	Results
G.8273.2	Noise Generation – 1PPS	Pass
G.8273.2	Noise Generation – PTP	Pass
G.8273.2	Noise Generation – No SyncE – 1PPS	Pass
G.8273.2	Noise Generation – No SyncE – PTP	Pass
G.8273.2	Holdover – 1PPS	Pass
G.8273.2	Holdover – PTP	Pass
G.8273.2	Holdover – No SyncE – 1PPS	Pass
G.8273.2	Holdover – No SyncE - PTP	Pass
G.8273.2	PTP to 1PPS Noise Transfer	Pass
G.8273.2	PTP to PTP Noise Transfer	Pass
G.8273.2	SyncE to 1PPS Noise Transfer	Pass
G.8273.2	SyncE to PTP Noise Transfer	Pass
G.8273.2	Noise Tolerance – 1PPS	Pass
G.8273.2	Noise Tolerance – PTP	Pass
G.8273.4 PTS	Noise Generation	Pass
G.8273.4 PTS	Holdover	Pass
G.8261	Test Case 15 - Network Traffic Model B	Pass
G.8261	Test Case 16 - Network Traffic Model B	Pass

## 2. Test Configuration

Device Under Test	Broadcom OneSync
Oscillator	STP3384LF
1pps Source	Symmetricom TP5000
Software Version	Pipeline 151653 (Master Branch 4.3)
Instrument	Paragon Neo
Instrument Serial Number	00036081
Ethernet Interface	Optical
CAT Version	28.10.22111.2025 [S] (C)

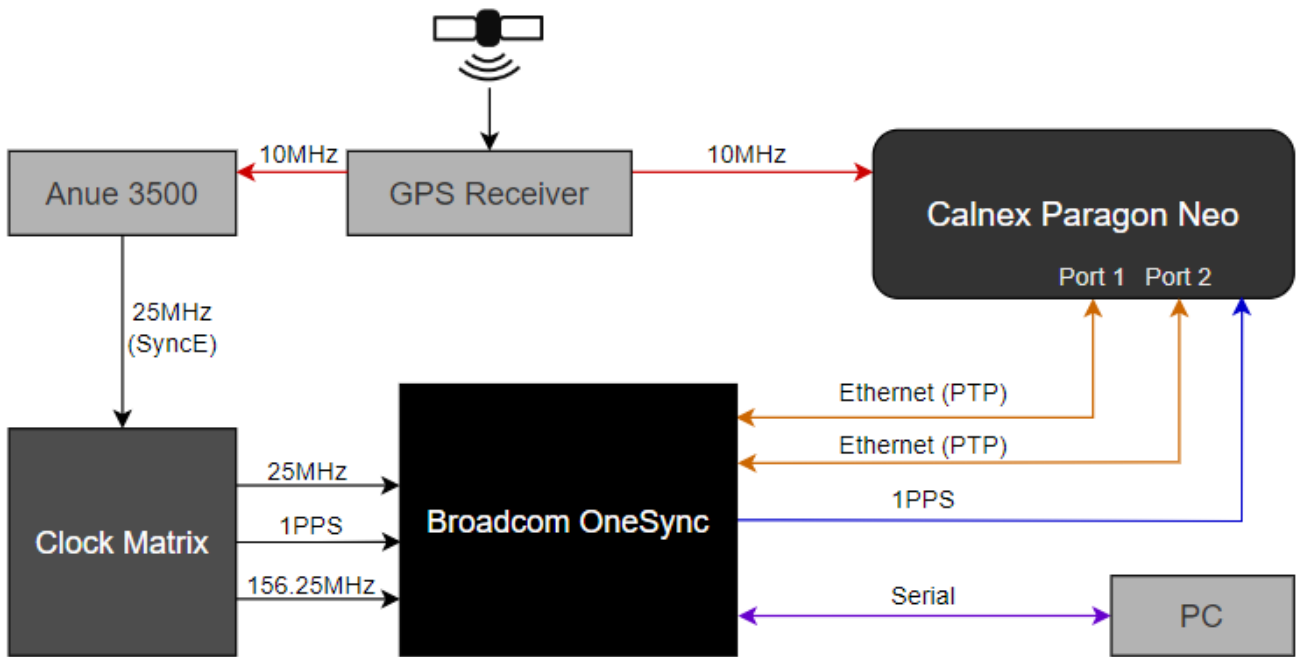


Figure 1. Equipment Configuration

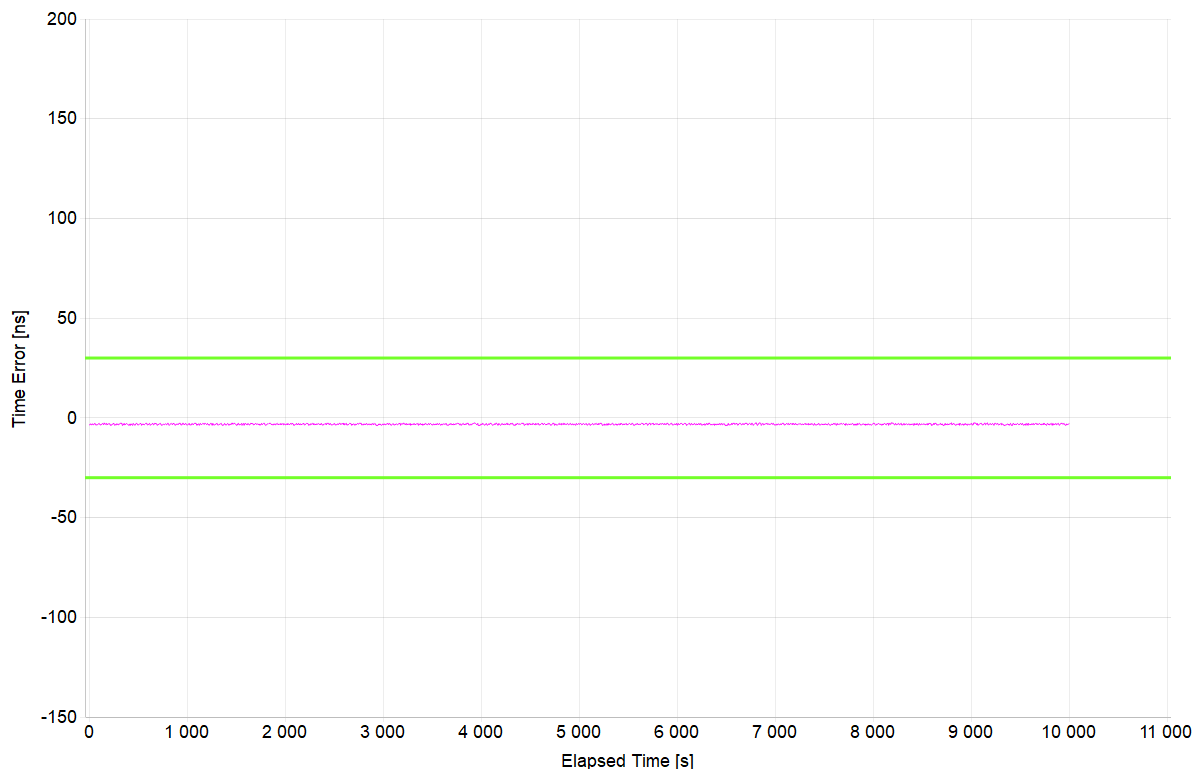
### 3. G.8273.2: Noise Generation – 1PPS

<b>Test Description</b>	Noise Generation 1PPS
<b>Report Date</b>	23-02-13_08-16-51
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 5:49:51 PM
<b>Test Duration</b>	02:46:40
<b>Time to Phase Lock (s)</b>	18

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	0.03μs
<b>Mask ONEPPS Result</b>	<b>Pass</b>
<b>Mask FILTEREDTIMEERROR</b>	0.005μs
<b>Mask FILTEREDTIMEERROR Result</b>	<b>Pass</b>
<b>Mask CTE</b>	0.01μs
<b>Mask CTE Result</b>	<b>Pass</b>
<b>Mask DTE</b>	0.01μs
<b>Mask DTE Result</b>	<b>Pass</b>
<b>Mask DTEHF</b>	0.07μs
<b>Mask DTEHF Result</b>	<b>Pass</b>
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Provisional Class D Dynamic TE LF Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>
<b>Mask DTETDEV</b>	G.8273.2 T-BC Provisional Class D Dynamic TE LF Const. Temp.
<b>Mask DTETDEV Result</b>	<b>Pass</b>

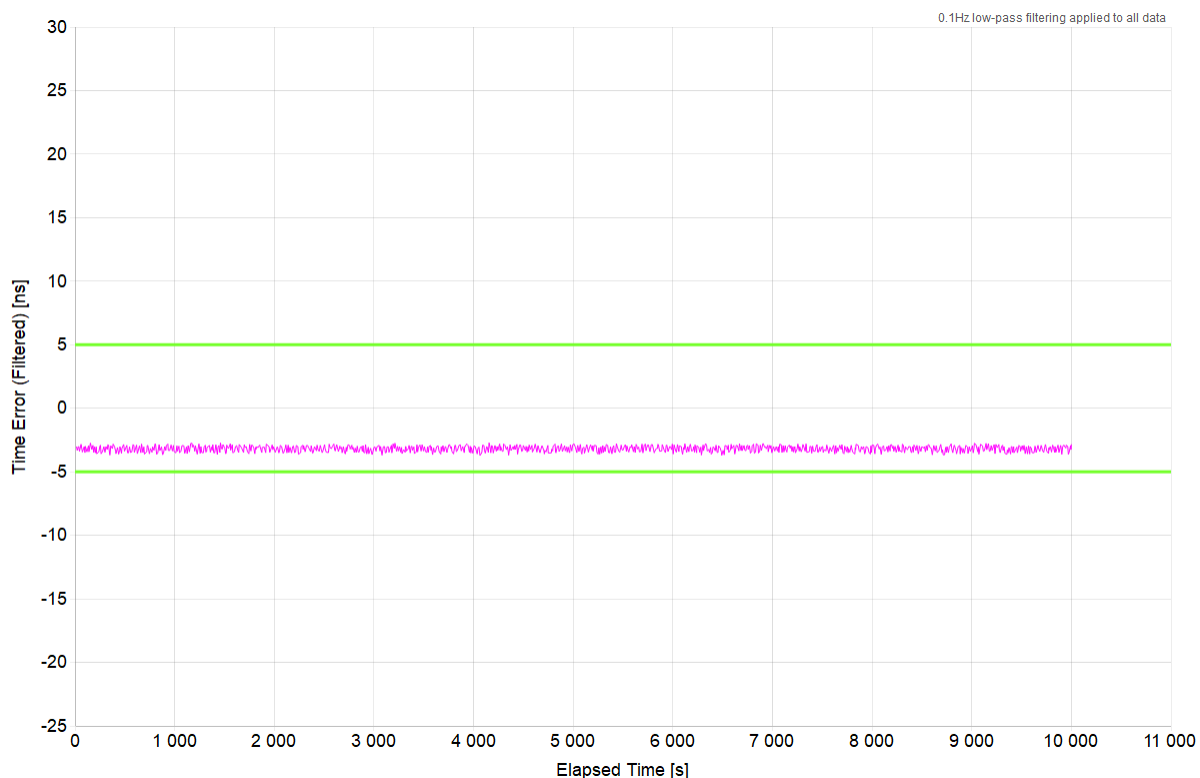
### 3.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	-3.513ns



<b>Mean [ns]</b>	-3.183
<b>Min [ns]</b>	-3.763
<b>Max [ns]</b>	-2.513
<b>Max-Min [ns]</b>	1.25

### 3.2 FILTEREDTIMEERROR Analysis

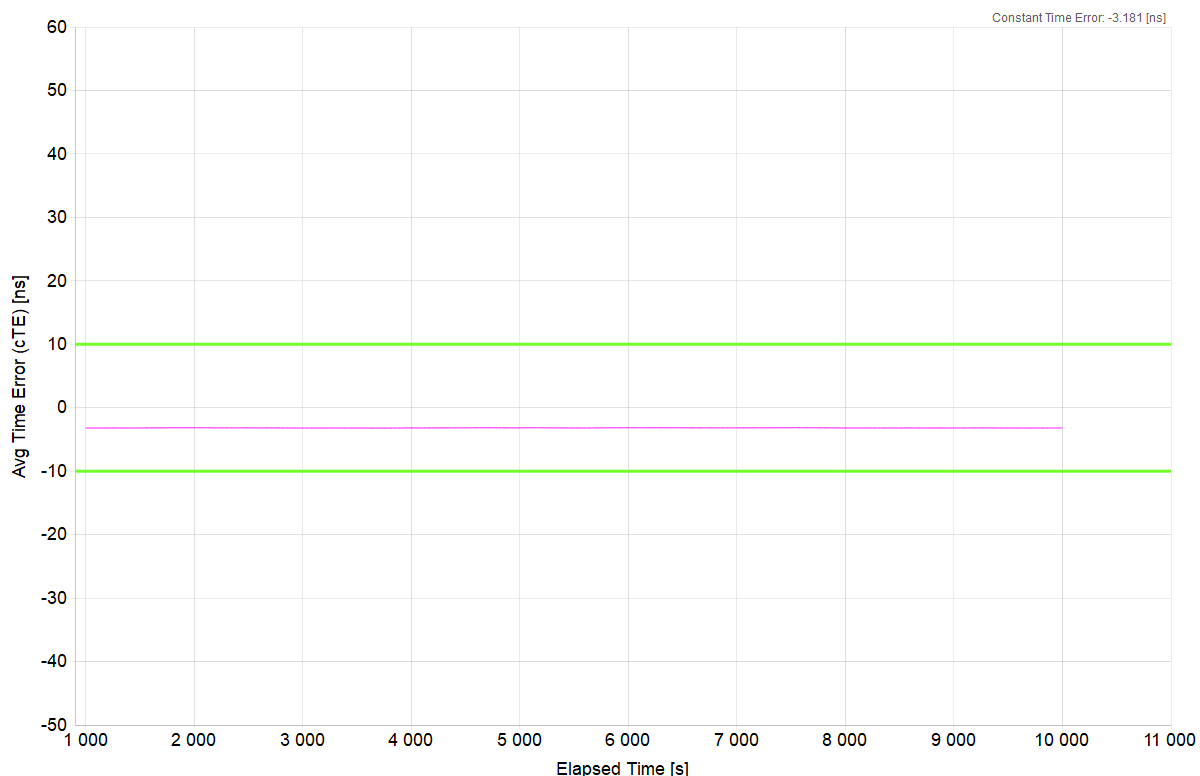


<b>Mean [ns]</b>	-3.183
<b>Min [ns]</b>	-3.718
<b>Max [ns]</b>	-2.72
<b>Max-Min [ns]</b>	0.998



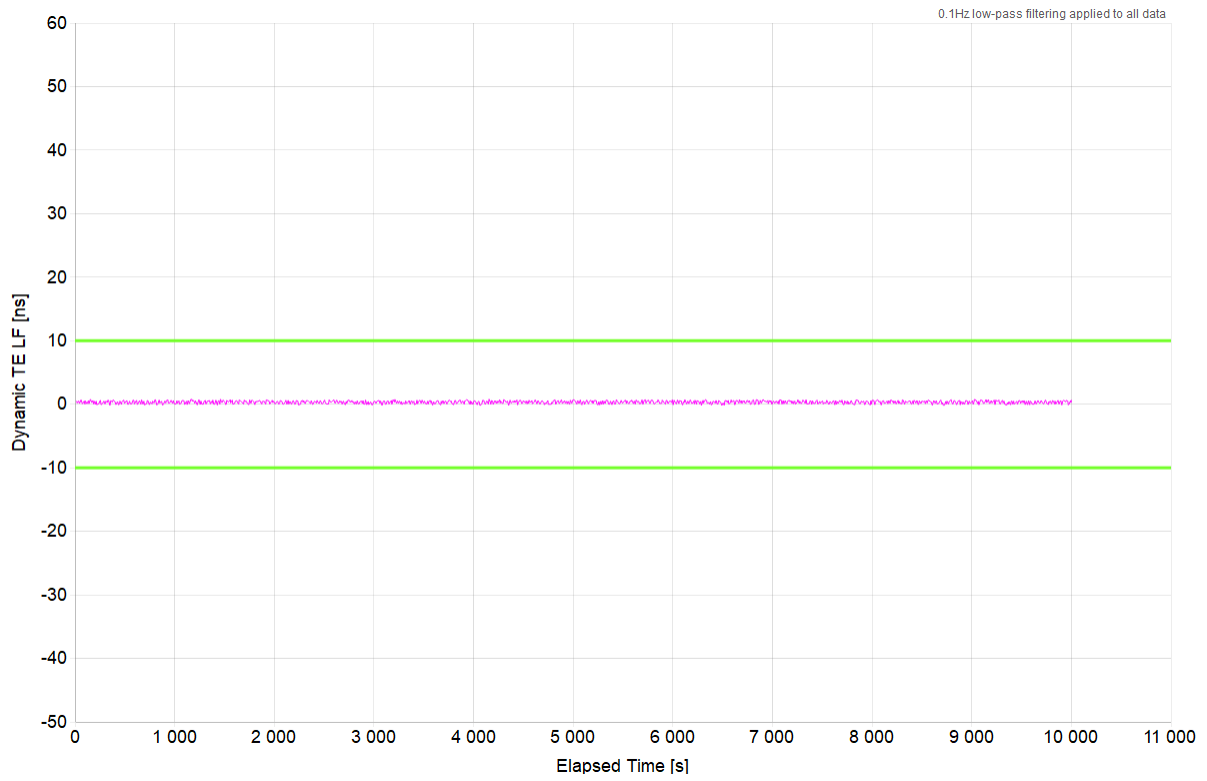
### 3.3 CTE Analysis

<b>Averaging Time (s)</b>	1000
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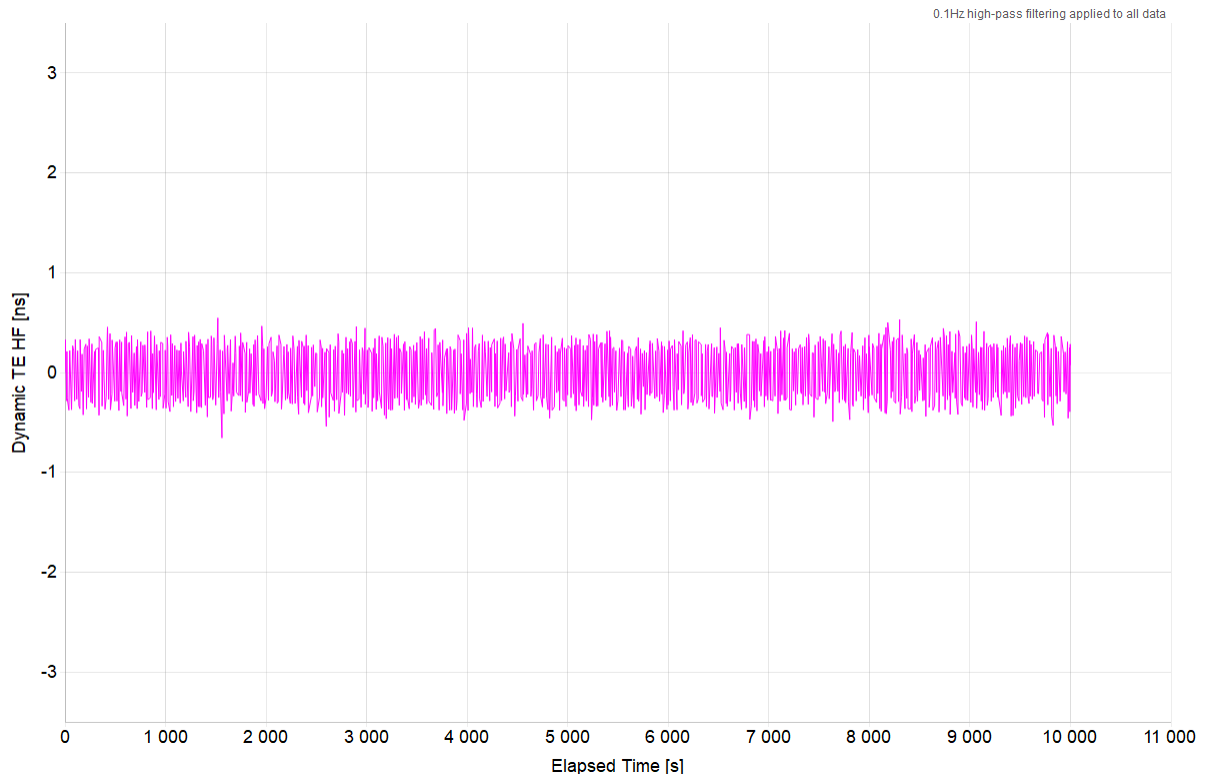
<b>Constant Time Error [ns]</b>	-3.181
<b>Min [ns]</b>	-3.213
<b>Max [ns]</b>	-3.147
<b>Max-Min [ns]</b>	0.067

### 3.4 DTE Analysis



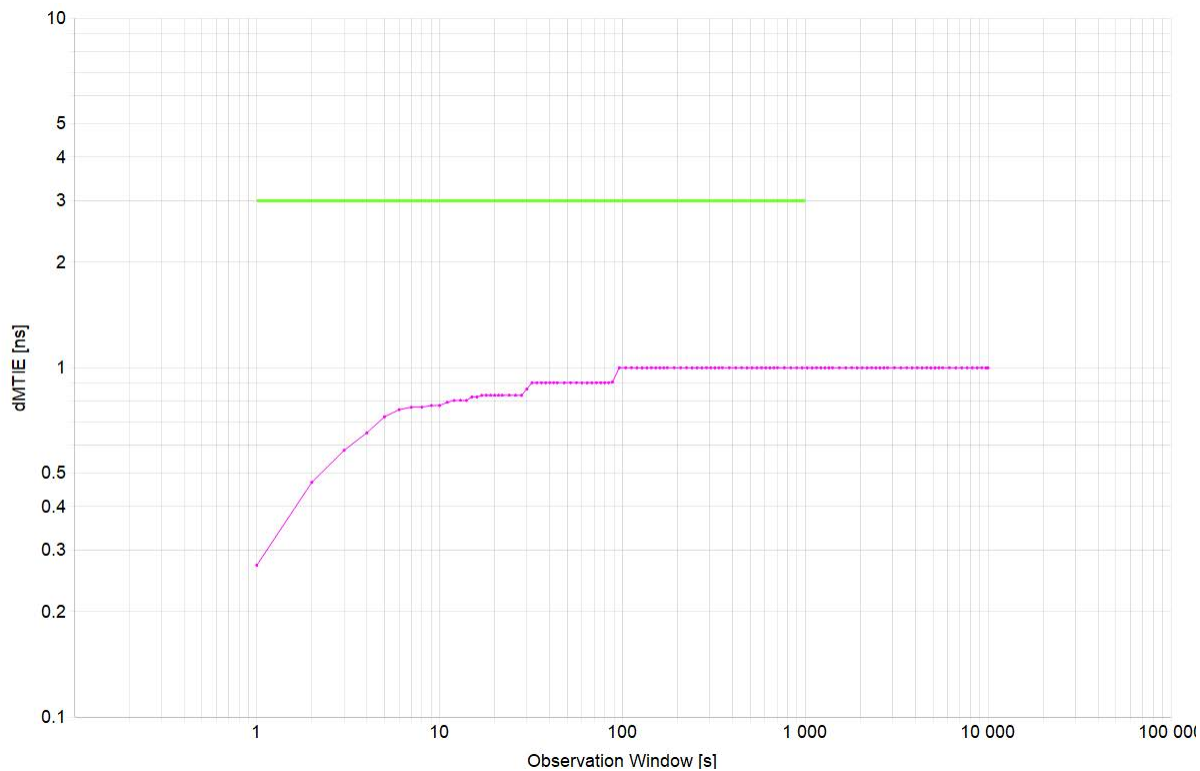
<b>Mean [ns]</b>	0.33
<b>Min [ns]</b>	-0.205
<b>Max [ns]</b>	0.793
<b>Max-Min [ns]</b>	0.998

### 3.5 DTEHF Analysis



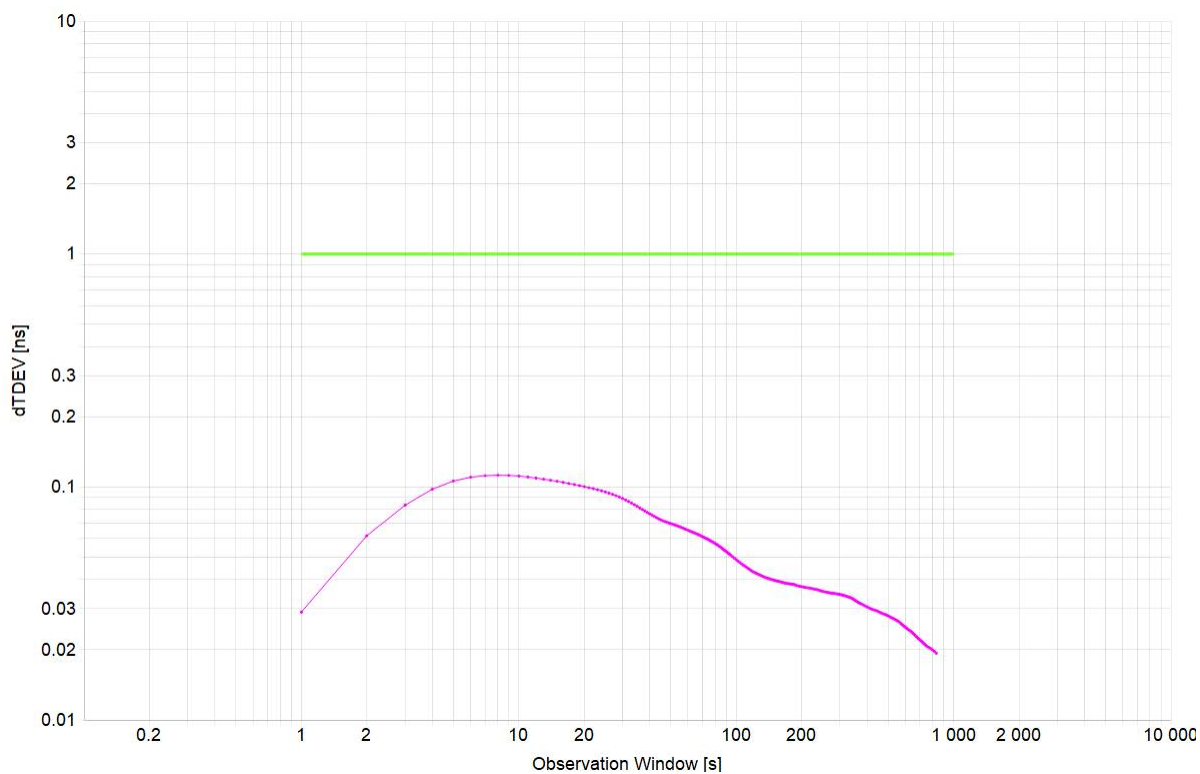
<b>Mean [ns]</b>	0
<b>Min [ns]</b>	-0.656
<b>Max [ns]</b>	0.546
<b>Max-Min [ns]</b>	1.202

### 3.6 DTEMTIE Analysis



<b>Min [ns]</b>	0.272
<b>Max [ns]</b>	0.998
<b>Max-Min [ns]</b>	0.726

### 3.7 DTETDEV Analysis



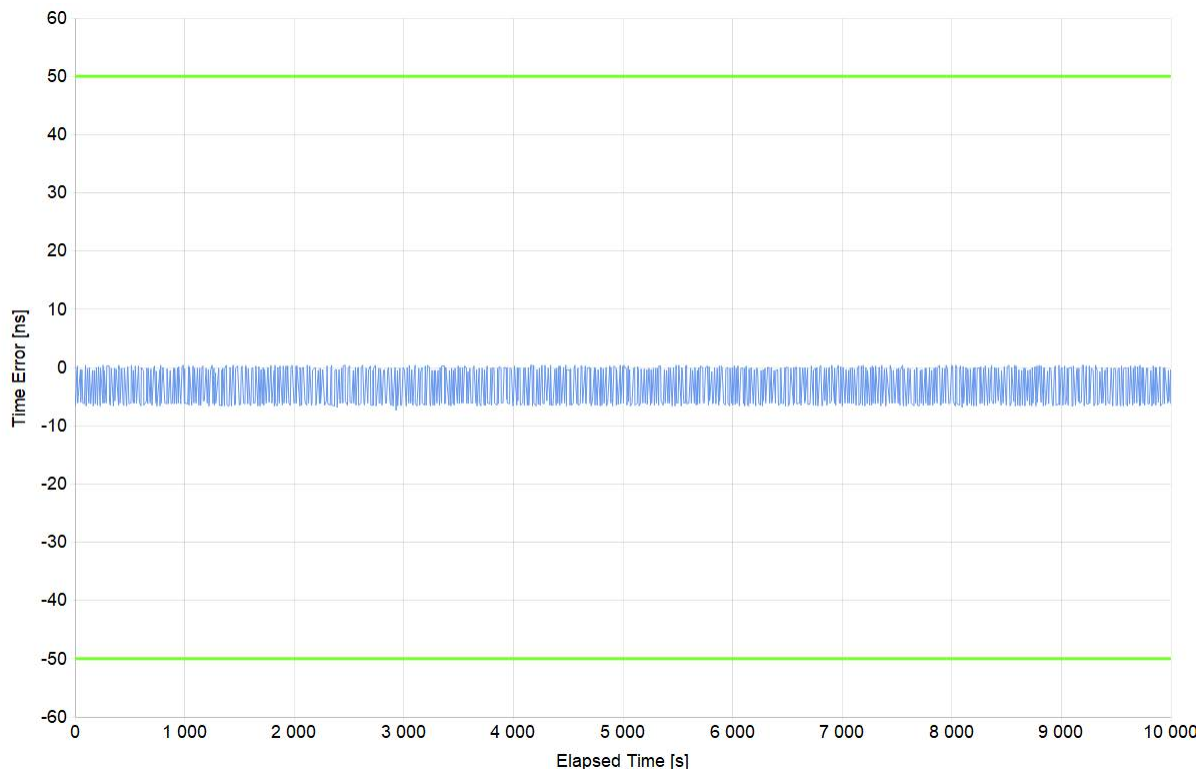
<b>Min [ns]</b>	0.019
<b>Max [ns]</b>	0.112
<b>Max-Min [ns]</b>	0.093

## 4. G.8273.2: Noise Generation – PTP

<b>Test Description</b>	Noise Generation - PTP
<b>Report Date</b>	23-02-10_13-07-16
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 5:49:51 PM
<b>Test Duration</b>	02:46:40
<b>Time to Phase Lock (s)</b>	18

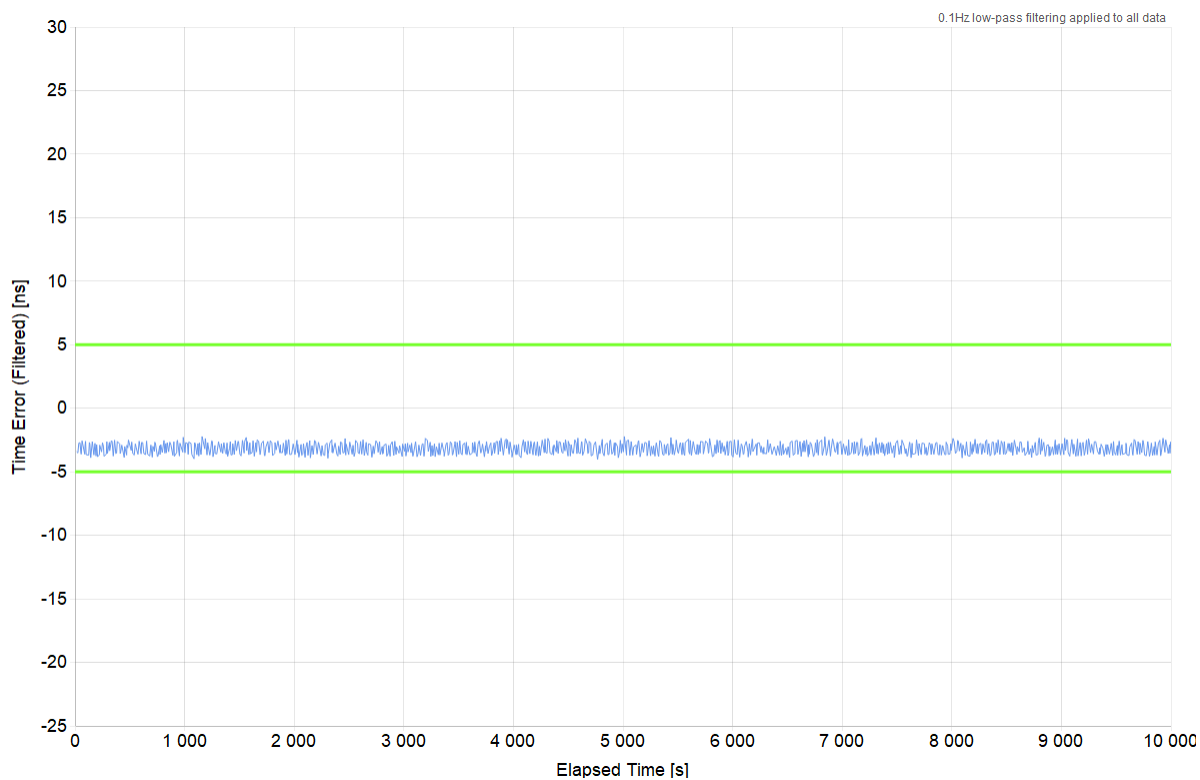
<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	0.05 $\mu$ s
<b>Mask TIMEERROR Result</b>	<b>Pass</b>
<b>Mask FILTEREDTIMEERROR</b>	0.005 $\mu$ s
<b>Mask FILTEREDTIMEERROR Result</b>	<b>Pass</b>
<b>Mask CTE</b>	0.01 $\mu$ s
<b>Mask CTE Result</b>	<b>Pass</b>
<b>Mask DTE</b>	0.01 $\mu$ s
<b>Mask DTE Result</b>	<b>Pass</b>
<b>Mask DTEHF</b>	0.07 $\mu$ s
<b>Mask DTEHF Result</b>	<b>Pass</b>
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Class C Dynamic TE LF Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>
<b>Mask DTETDEV</b>	G.8273.2 T-BC Class C Dynamic TE LF Const. Temp.
<b>Mask DTETDEV Result</b>	<b>Pass</b>

## 4.1 TIMEERROR Analysis



<b>Pk-Pk [ns]</b>	7.75
<b>Mean [ns]</b>	-3.183
<b>Min [ns]</b>	-7.363
<b>Max [ns]</b>	0.387

## 4.2 FILTEREDTIMEERROR Analysis

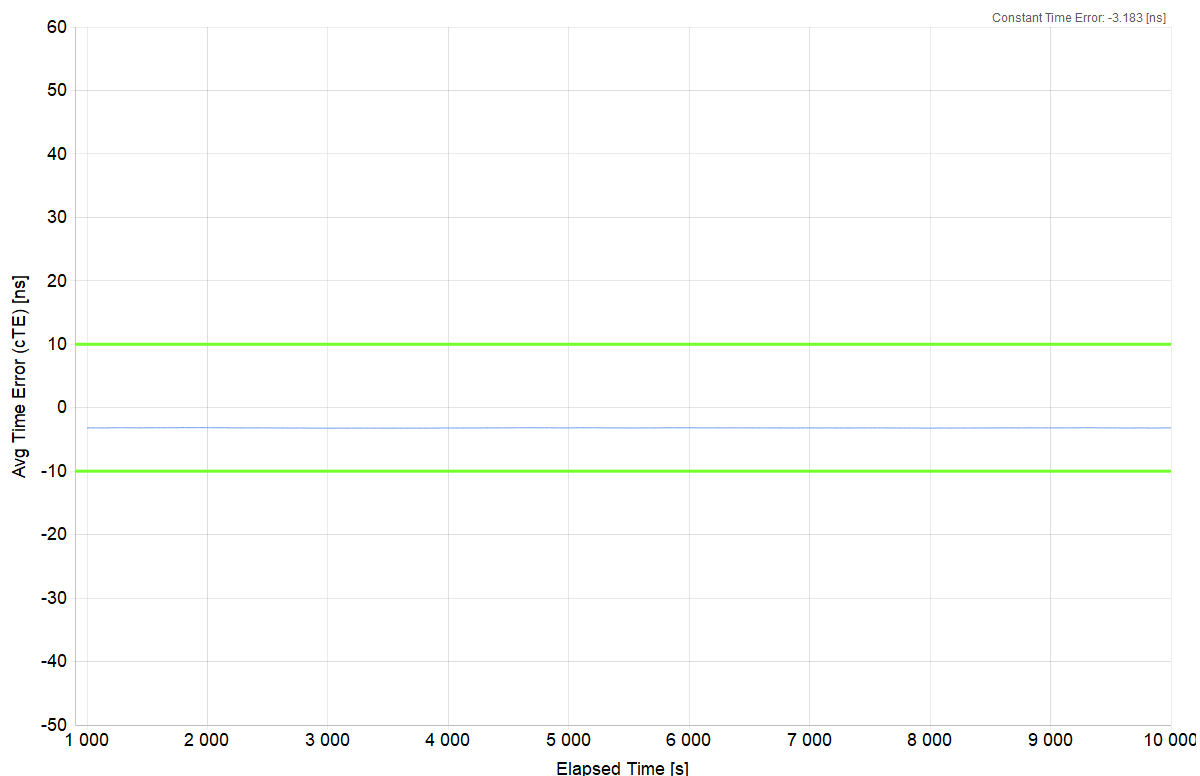


<b>Mean [ns]</b>	-3.183
<b>Min [ns]</b>	-4.024
<b>Max [ns]</b>	-2.222
<b>Max-Min [ns]</b>	1.802



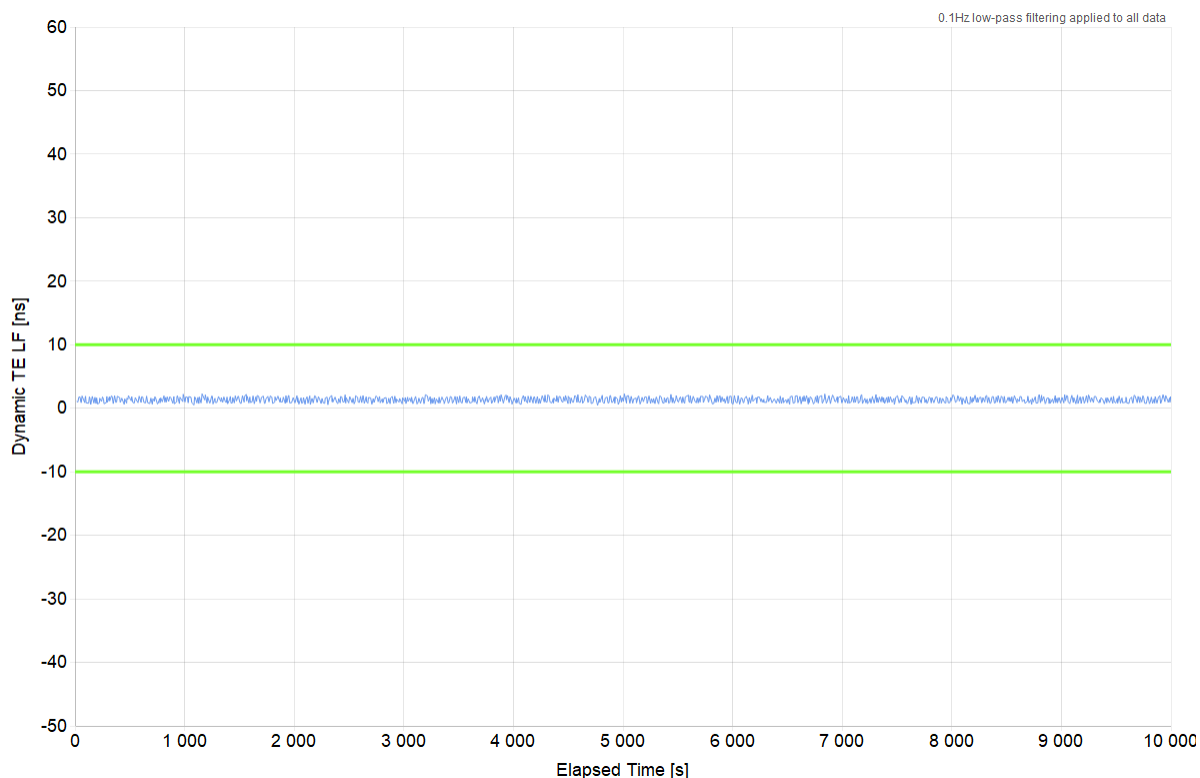
### 4.3 CTE Analysis

<b>Averaging Time (s)</b>	1000
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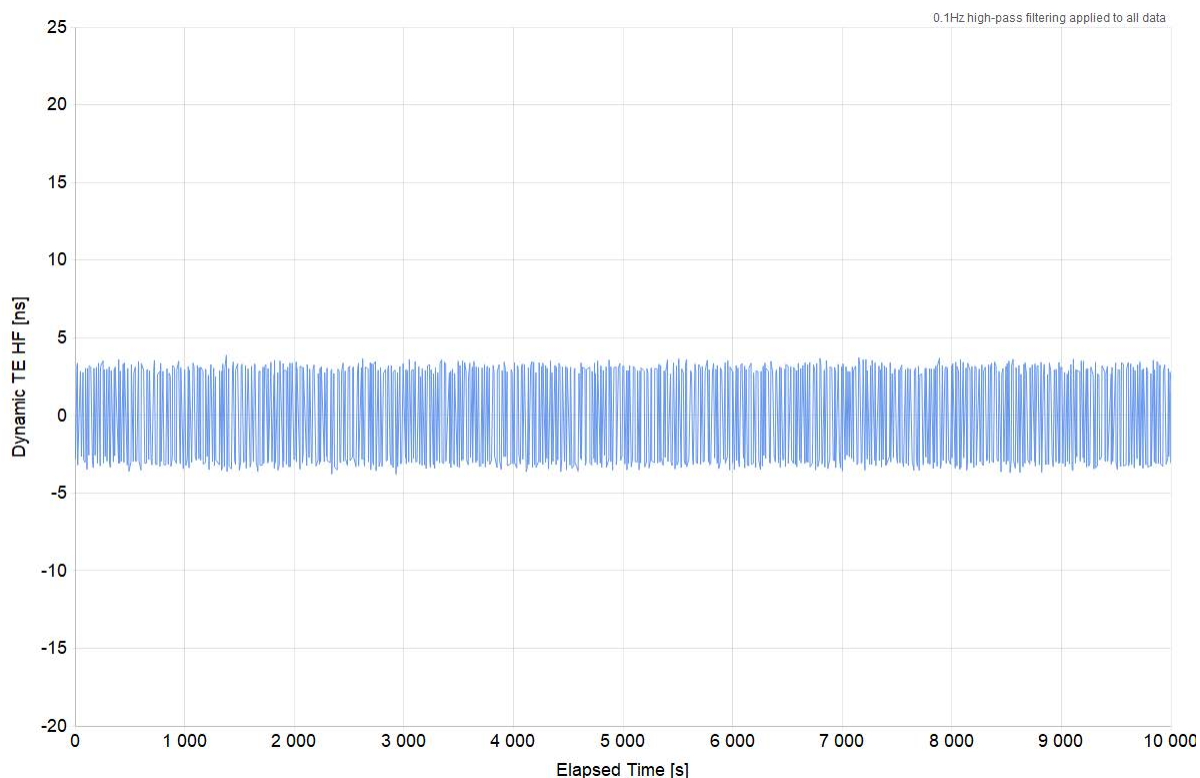
<b>Constant Time Error [ns]</b>	-3.183
<b>Min [ns]</b>	-3.228
<b>Max [ns]</b>	-3.137
<b>Max-Min [ns]</b>	0.091

## 4.4 DTE Analysis



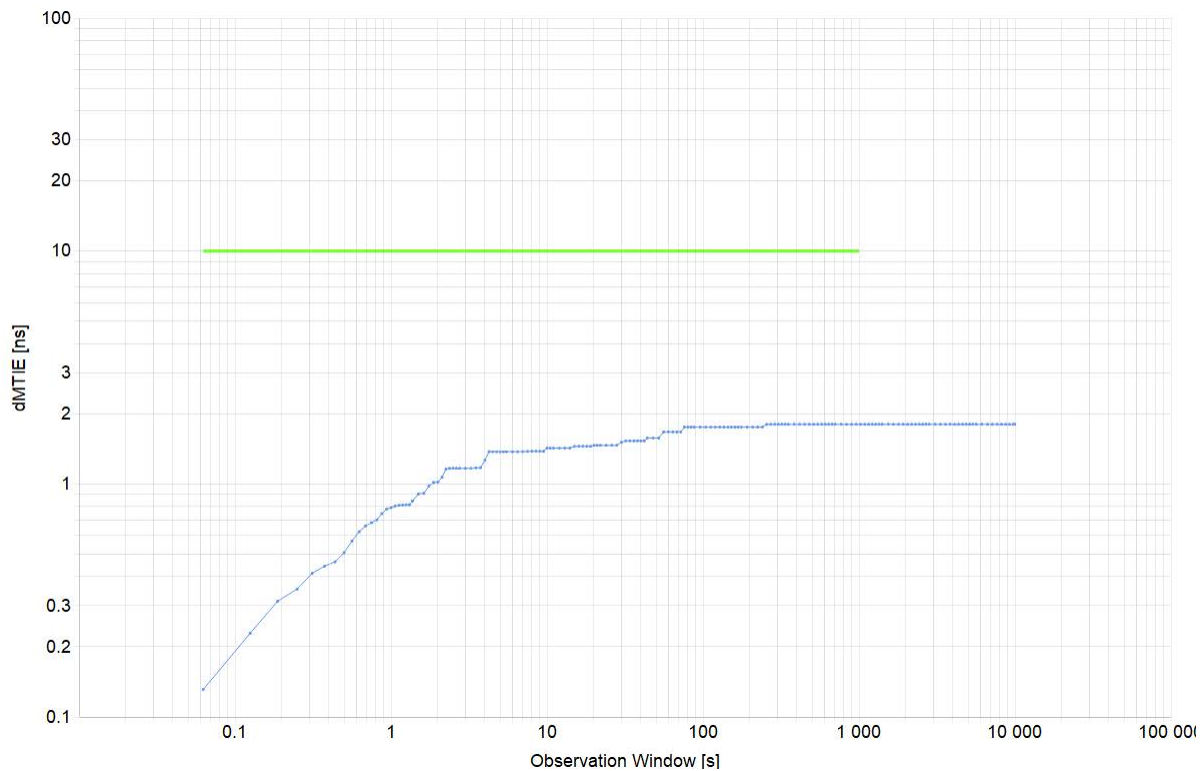
<b>Mean [ns]</b>	1.306
<b>Min [ns]</b>	0.464
<b>Max [ns]</b>	2.267
<b>Max-Min [ns]</b>	1.802

## 4.5 DTEHF Analysis



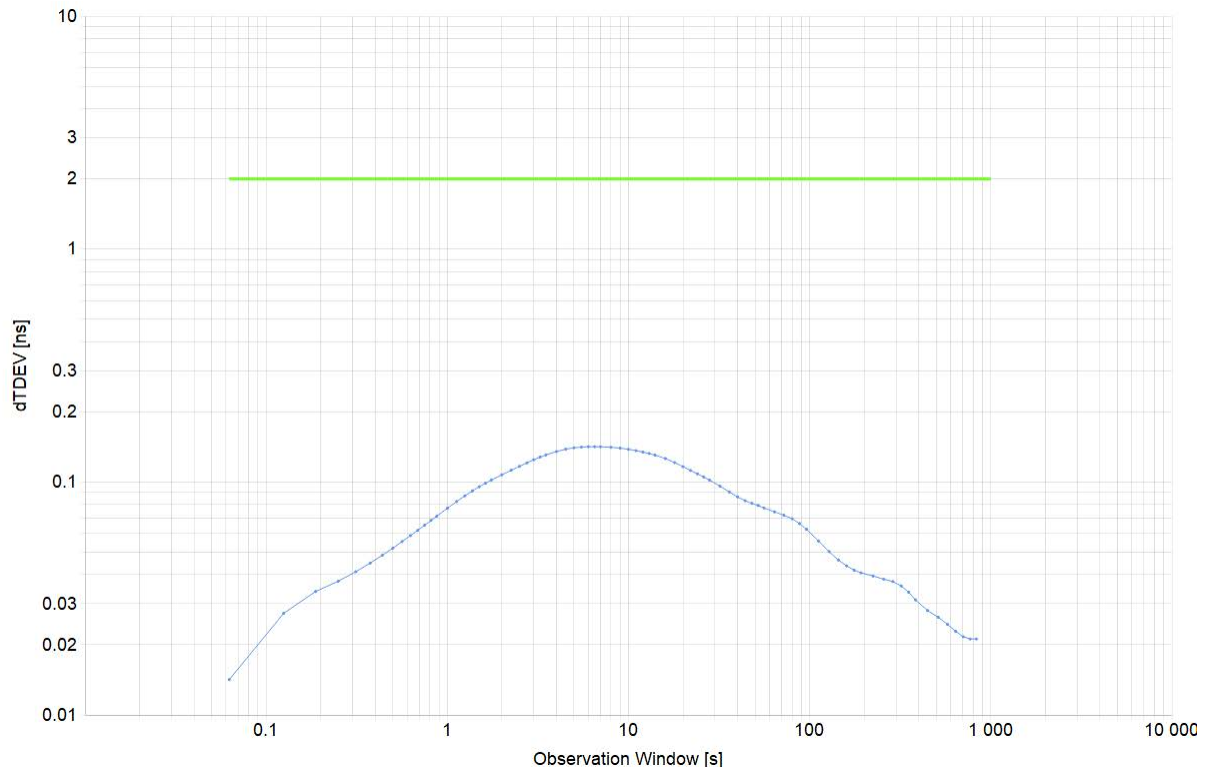
<b>Pk-Pk [ns]</b>	7.666
<b>Mean [ns]</b>	0
<b>Min [ns]</b>	-3.791
<b>Max [ns]</b>	3.875

## 4.6 DTEMTIE Analysis



<b>Min [ns]</b>	0.131
<b>Max [ns]</b>	1.802
<b>Max-Min [ns]</b>	1.671

## 4.7 DTETDEV Analysis



<b>Min [ns]</b>	0.014
<b>Max [ns]</b>	0.142
<b>Max-Min [ns]</b>	0.128

## 5. G.8273.2: Noise Generation – No SyncE – 1PPS

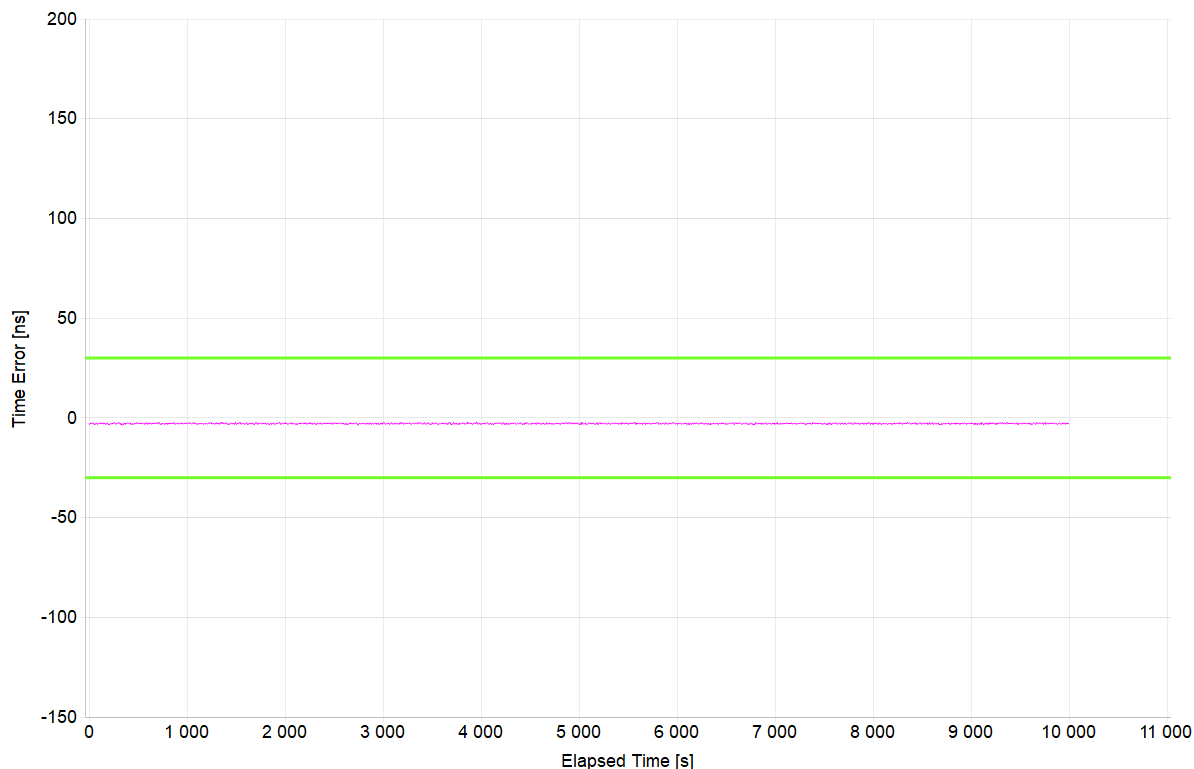
<b>Test Description</b>	Noise Generation – No SyncE – 1PPS
<b>Report Date</b>	23-02-10_13-07-16
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 9:59:48 PM
<b>Test Duration</b>	02:46:40
<b>Time to Phase Lock (s)</b>	19

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	0.03μs
<b>Mask ONEPPS Result</b>	<b>Pass</b>
<b>Mask FILTEREDTIMEERROR</b>	0.005μs
<b>Mask FILTEREDTIMEERROR Result</b>	<b>Pass</b>
<b>Mask CTE</b>	0.01μs
<b>Mask CTE Result</b>	<b>Pass</b>
<b>Mask DTE</b>	0.01μs
<b>Mask DTE Result</b>	<b>Pass</b>
<b>Mask DTEHF</b>	0.07μs
<b>Mask DTEHF Result</b>	<b>Pass</b>
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Provisional Class D Dynamic TE LF Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>
<b>Mask DTETDEV</b>	G.8273.2 T-BC Provisional Class D Dynamic TE LF Const. Temp.
<b>Mask DTETDEV Result</b>	<b>Pass</b>

1. SyncE was disabled using a parameter in the PCM4L Json file to set the SyncE clock category below the desired threshold:  
`physicalPllClockCategory = 4,`  
`physicalPllClockCategoryThreshold = 1,`

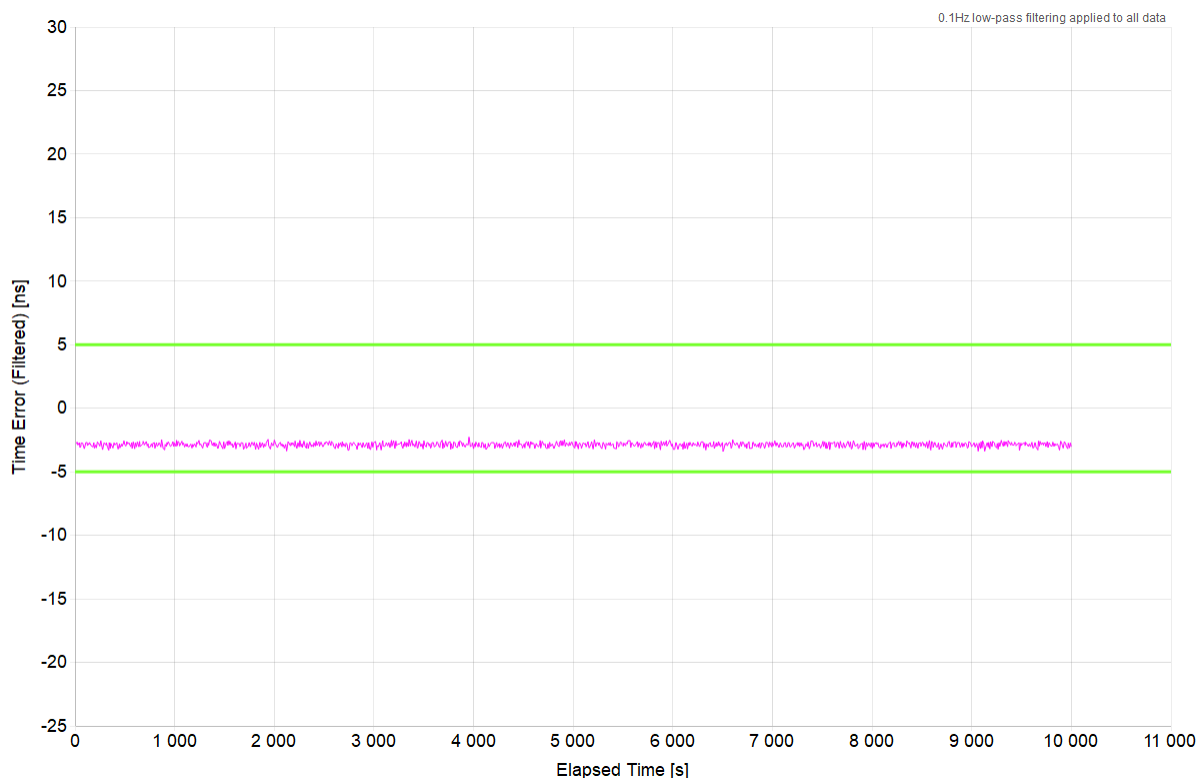
## 5.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	-2.803ns



<b>Mean [ns]</b>	-2.863
<b>Min [ns]</b>	-3.553
<b>Max [ns]</b>	-2.053
<b>Max-Min [ns]</b>	1.5

## 5.2 FILTEREDTIMEERROR Analysis

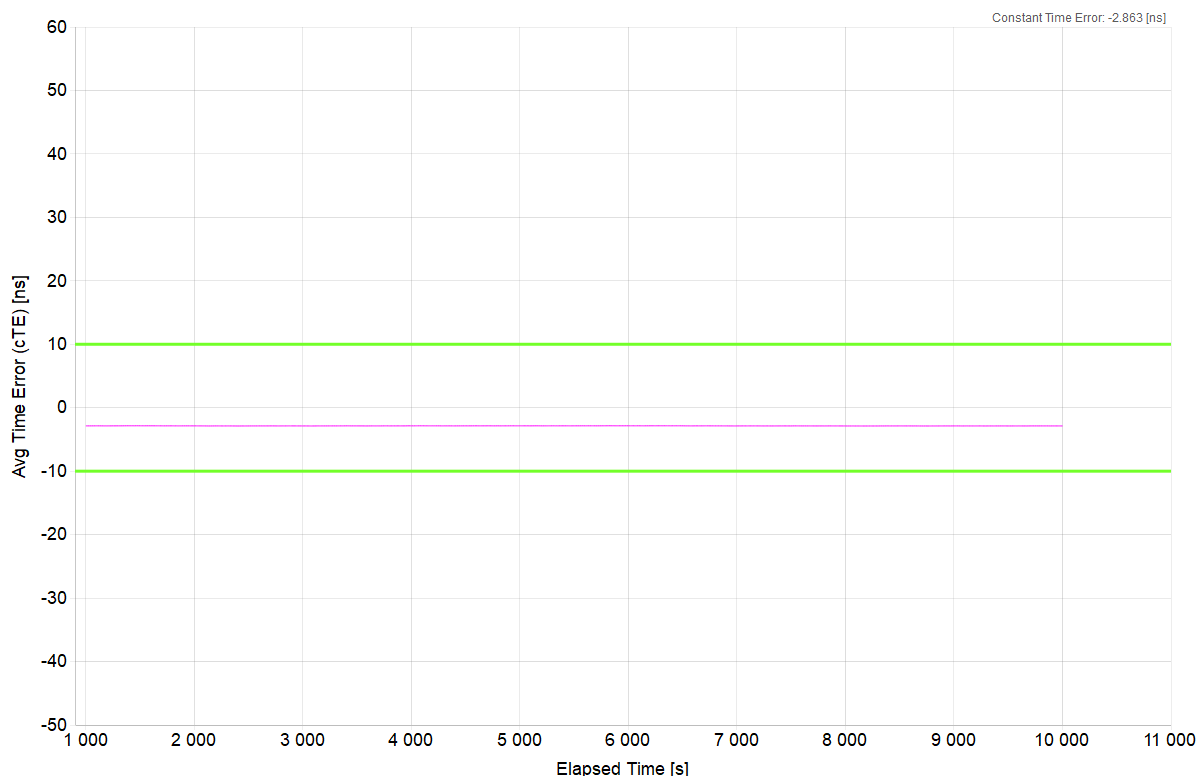


<b>Mean [ns]</b>	-2.863
<b>Min [ns]</b>	-3.403
<b>Max [ns]</b>	-2.268
<b>Max-Min [ns]</b>	1.136



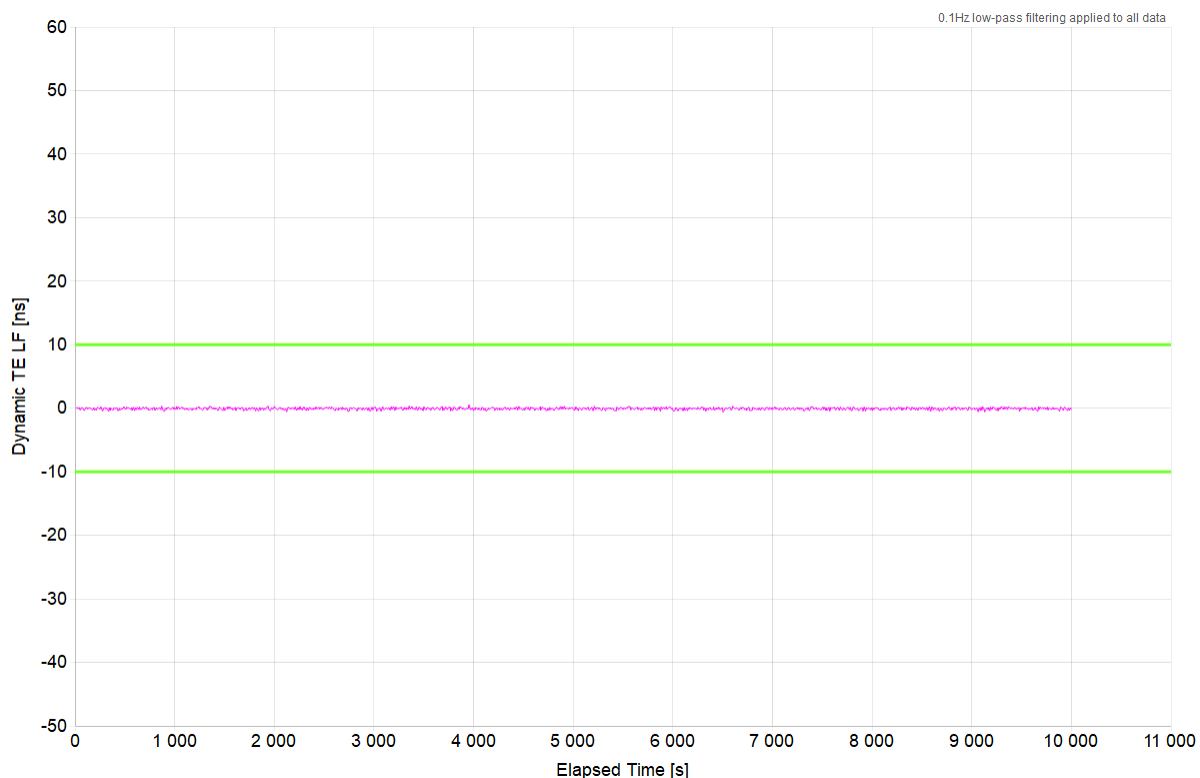
### 5.3 CTE Analysis

<b>Averaging Time (s)</b>	1000
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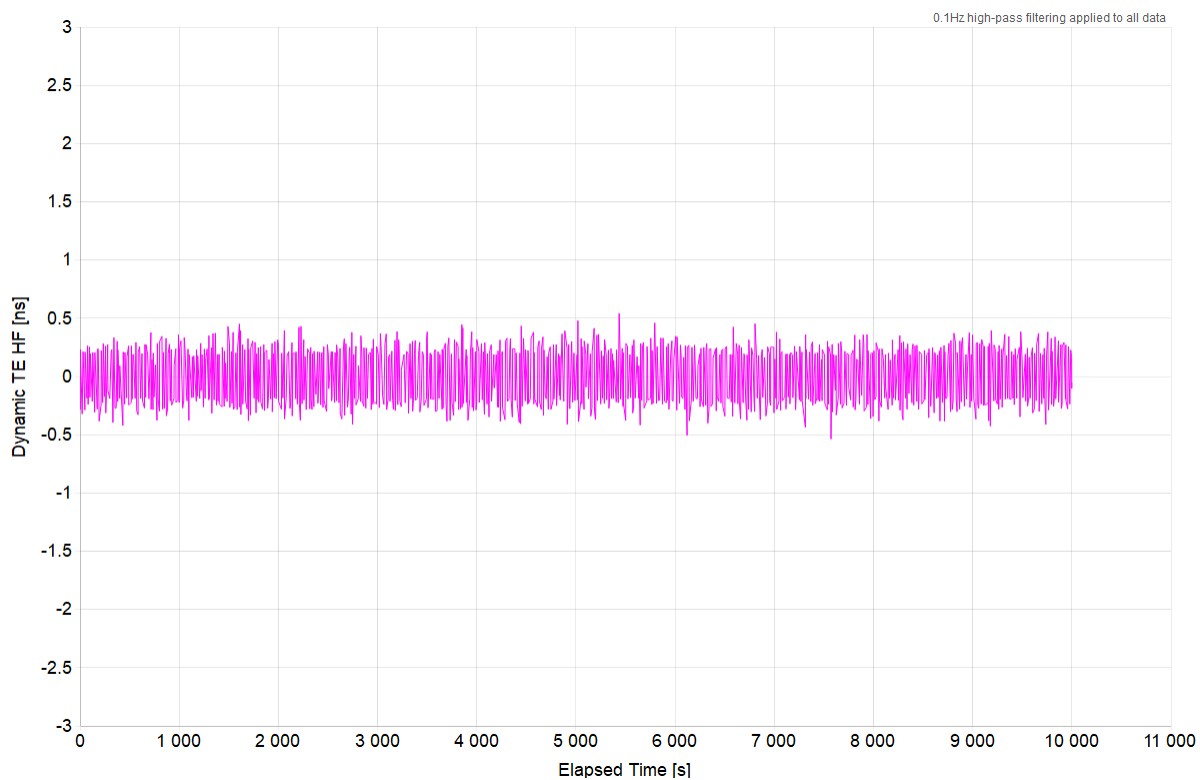
<b>Constant Time Error [ns]</b>	-2.863
<b>Min [ns]</b>	-2.88
<b>Max [ns]</b>	-2.844
<b>Max-Min [ns]</b>	0.036

## 5.4 DTE Analysis



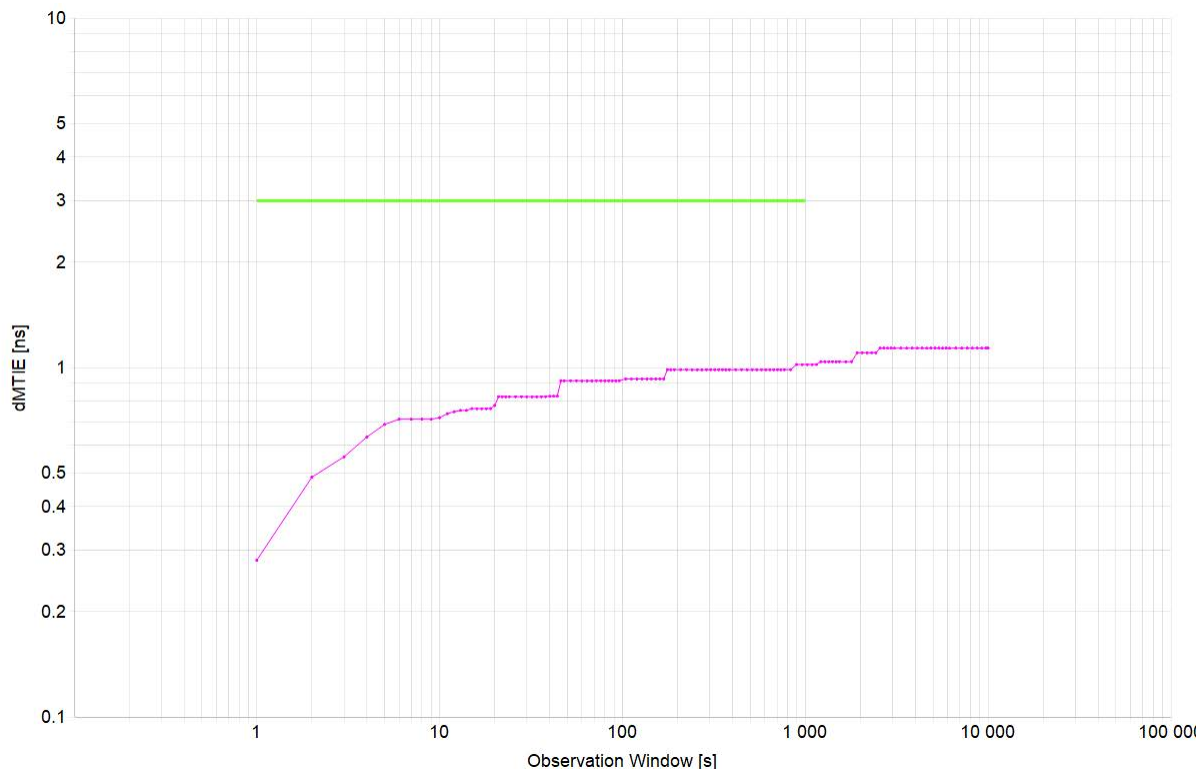
<b>Mean [ns]</b>	-0.06
<b>Min [ns]</b>	-0.6
<b>Max [ns]</b>	0.535
<b>Max-Min [ns]</b>	1.136

## 5.5 DTEHF Analysis



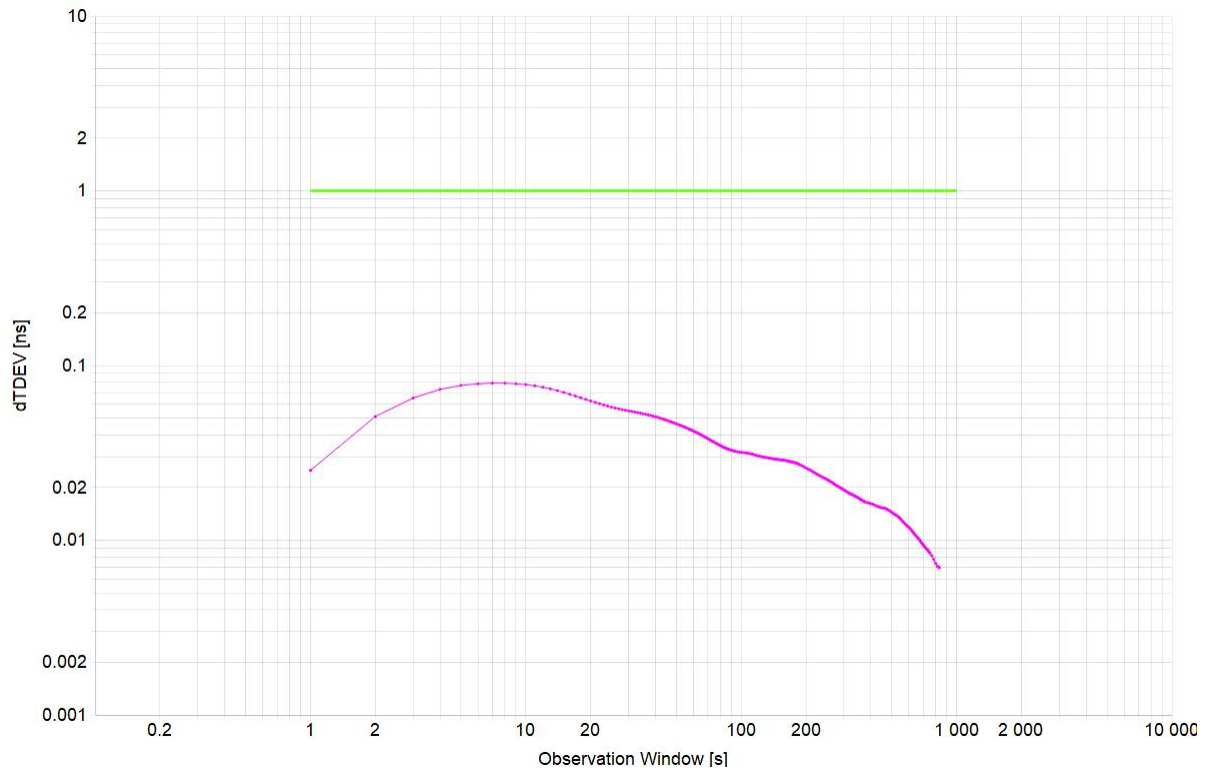
<b>Mean [ns]</b>	0
<b>Min [ns]</b>	-0.537
<b>Max [ns]</b>	0.542
<b>Max-Min [ns]</b>	1.079

## 5.6 DTEMTIE Analysis



<b>Min [ns]</b>	0.281
<b>Max [ns]</b>	1.136
<b>Max-Min [ns]</b>	0.855

## 5.7 DTETDEV Analysis



<b>Min [ns]</b>	0.007
<b>Max [ns]</b>	0.079
<b>Max-Min [ns]</b>	0.072

## 6. G.8273.2: Noise Generation – No SyncE – PTP

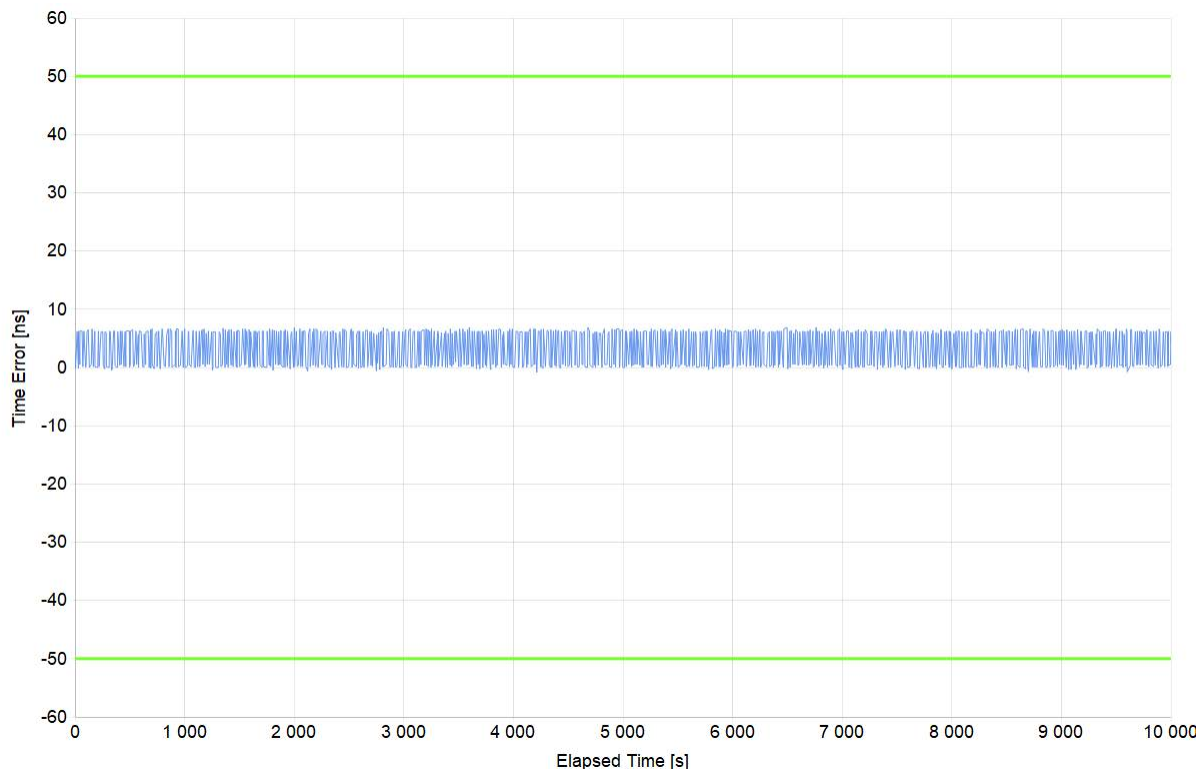
<b>Test Description</b>	Noise Generation – No SyncE - PTP
<b>Report Date</b>	23-02-10_13-07-16
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 9:59:48 PM
<b>Test Duration</b>	02:46:39
<b>Time to Phase Lock (s)</b>	19

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	0.05 $\mu$ s
<b>Mask TIMEERROR Result</b>	<b>Pass</b>
<b>Mask FILTEREDTIMEERROR</b>	0.005 $\mu$ s
<b>Mask FILTEREDTIMEERROR Result</b>	<b>Pass</b>
<b>Mask CTE</b>	0.01 $\mu$ s
<b>Mask CTE Result</b>	<b>Pass</b>
<b>Mask DTE</b>	0.01 $\mu$ s
<b>Mask DTE Result</b>	<b>Pass</b>
<b>Mask DTEHF</b>	0.07 $\mu$ s
<b>Mask DTEHF Result</b>	<b>Pass</b>
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Class C Dynamic TE LF Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>
<b>Mask DTETDEV</b>	G.8273.2 T-BC Class C Dynamic TE LF Const. Temp.
<b>Mask DTETDEV Result</b>	<b>Pass</b>

1. SyncE was disabled using a parameter in the PCM4L Json file to set the SyncE clock category below the desired threshold:  

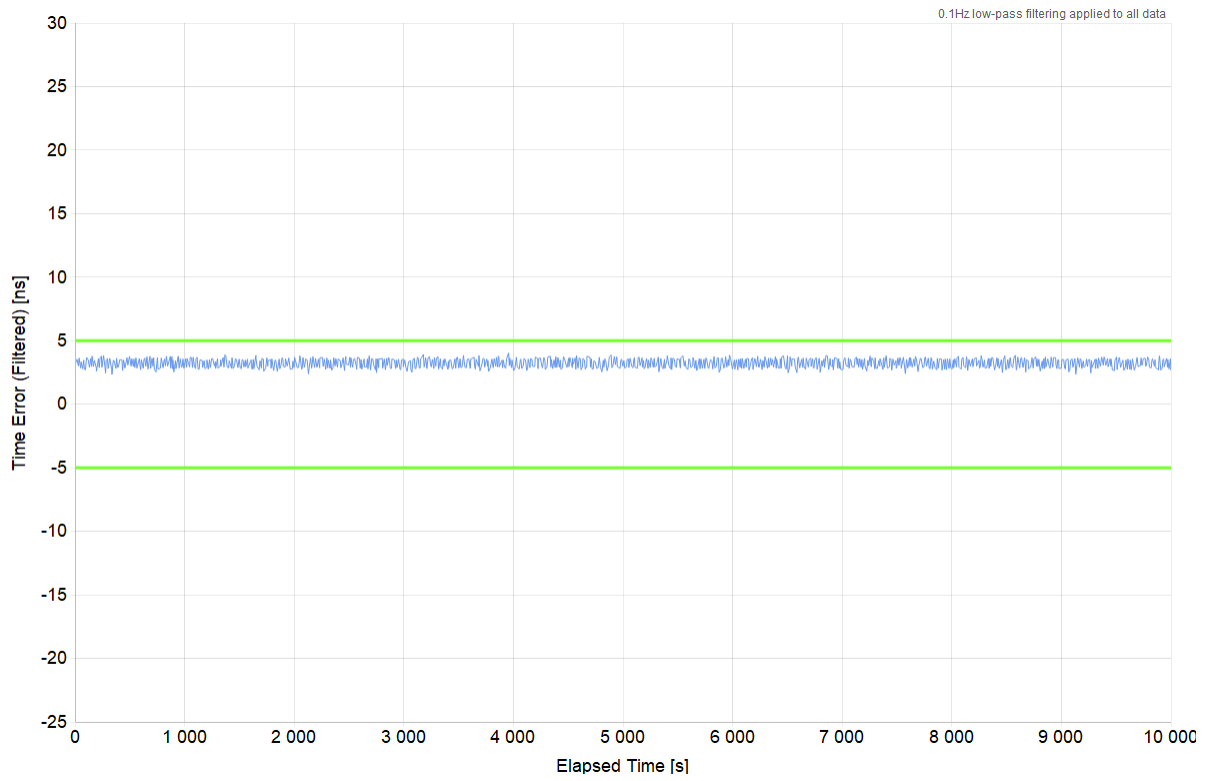
```
physicalPllClockCategory = 4,  
physicalPllClockCategoryThreshold = 1,
```

## 6.1 TIMEERROR Analysis



<b>Pk-Pk [ns]</b>	7.75
<b>Mean [ns]</b>	3.228
<b>Min [ns]</b>	-0.875
<b>Max [ns]</b>	6.875

## 6.2 FILTEREDTIMEERROR Analysis

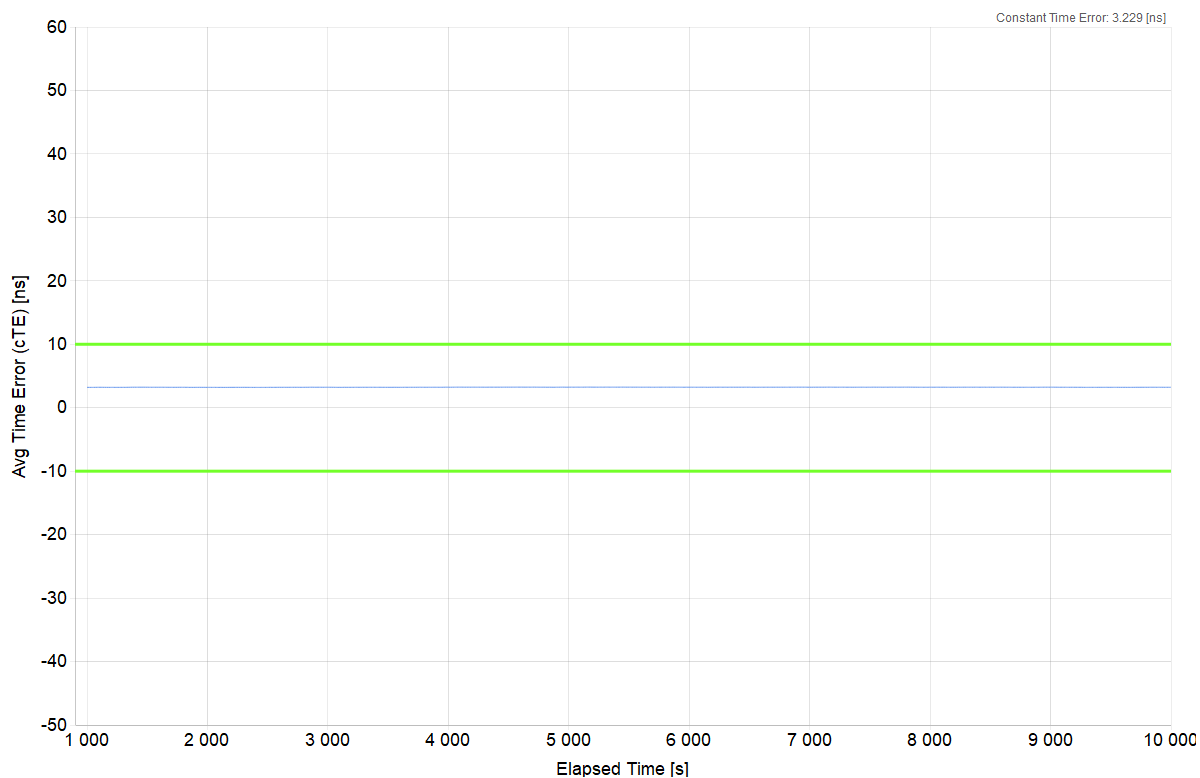


<b>Mean [ns]</b>	3.228
<b>Min [ns]</b>	2.341
<b>Max [ns]</b>	4.031
<b>Max-Min [ns]</b>	1.69



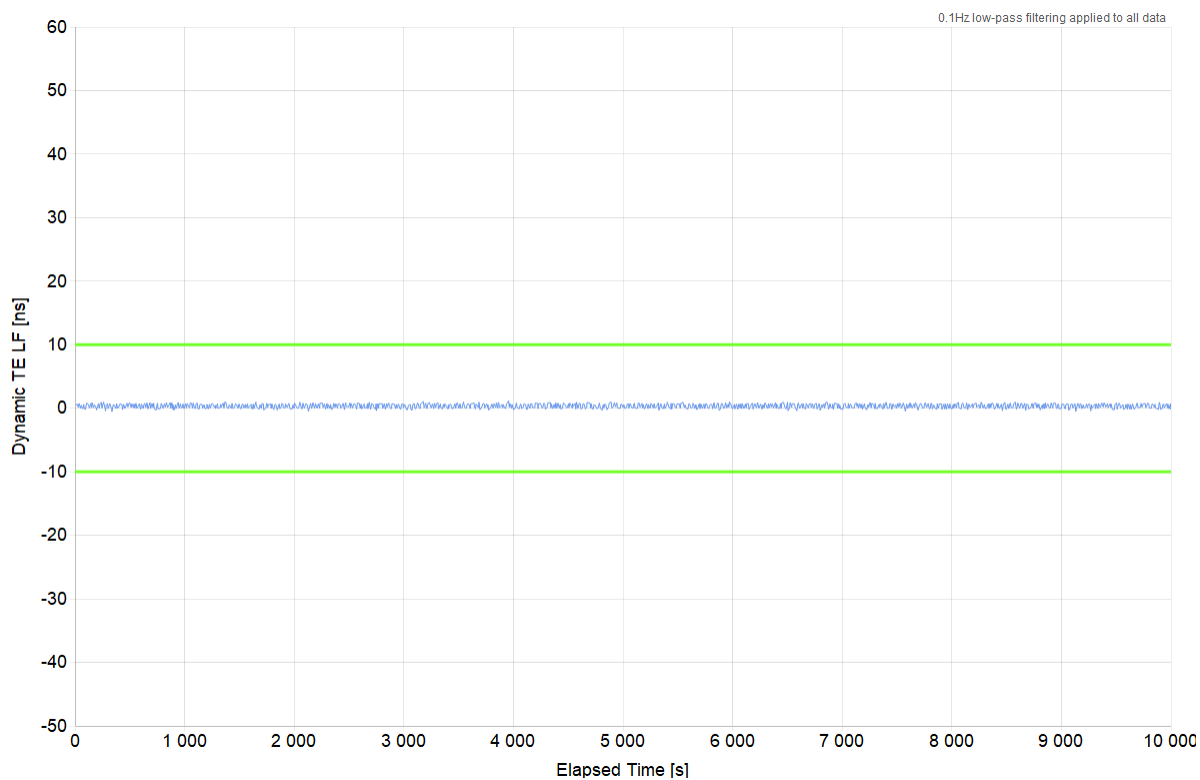
### 6.3 CTE Analysis

<b>Averaging Time (s)</b>	1000
---------------------------	------



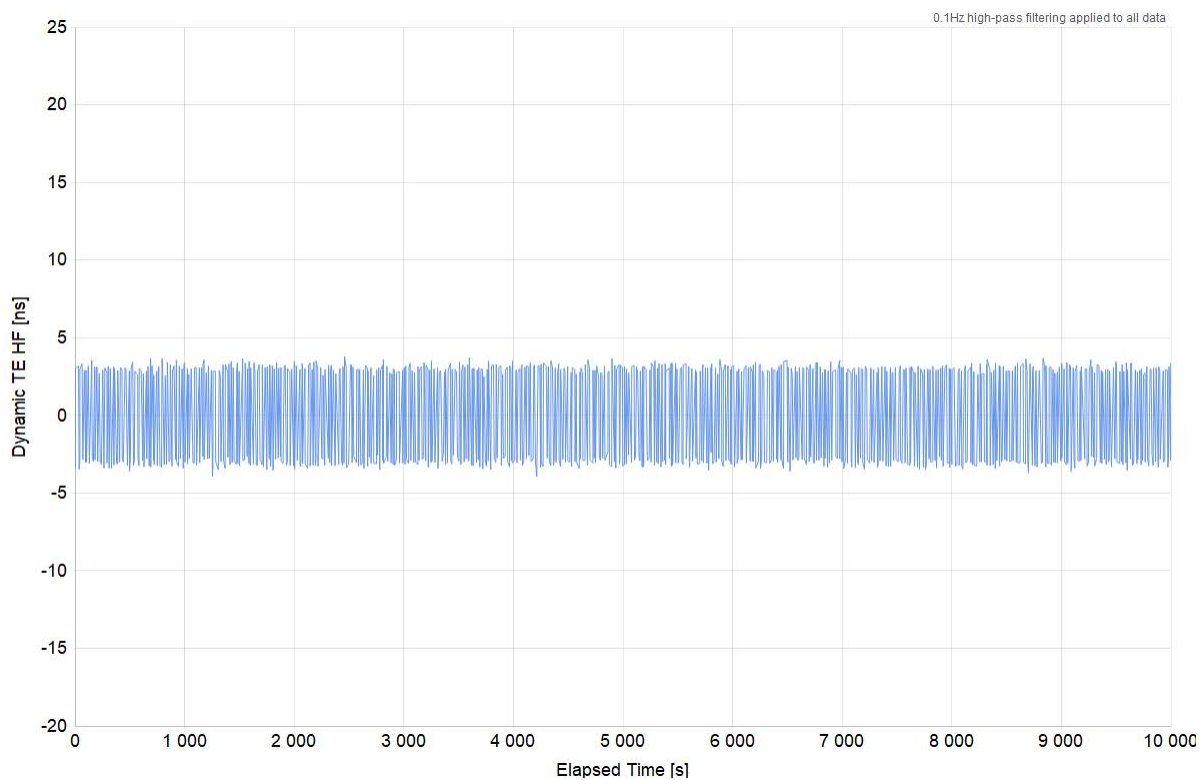
<b>Constant Time Error [ns]</b>	3.229
<b>Min [ns]</b>	3.205
<b>Max [ns]</b>	3.249
<b>Max-Min [ns]</b>	0.044

## 6.4 DTE Analysis



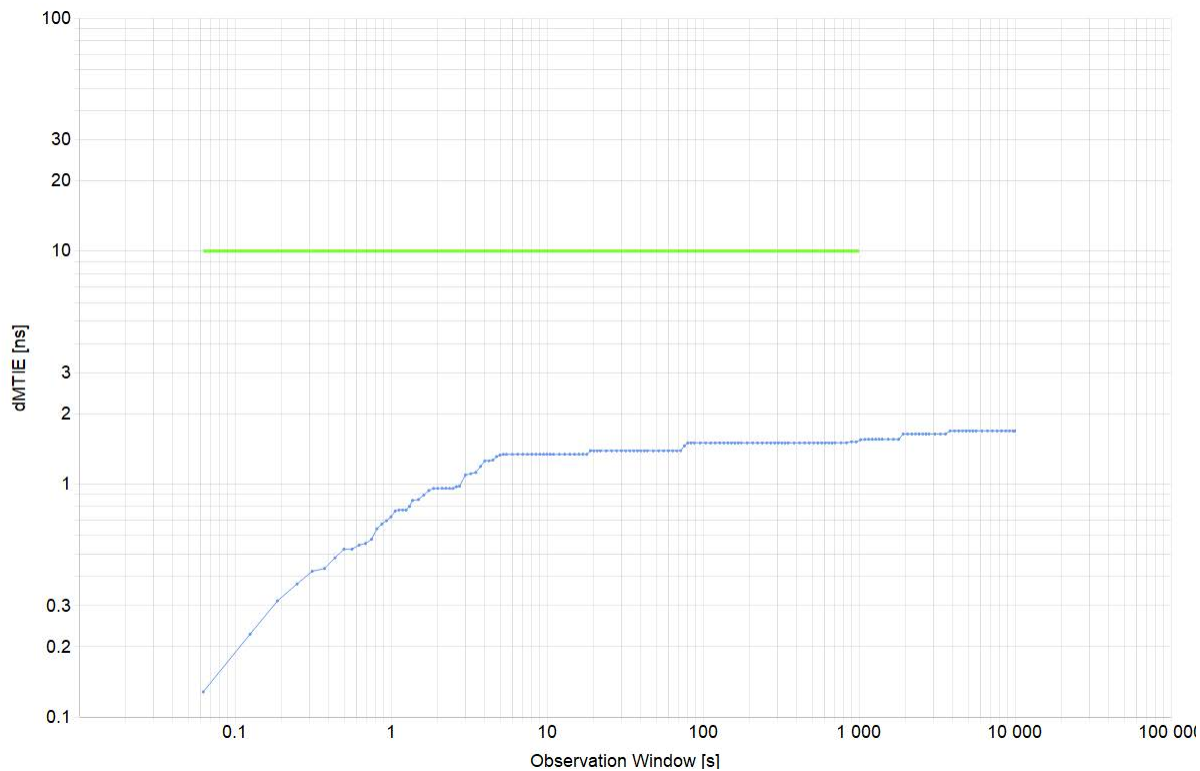
<b>Mean [ns]</b>	0.353
<b>Min [ns]</b>	-0.534
<b>Max [ns]</b>	1.156
<b>Max-Min [ns]</b>	1.69

## 6.5 DTEHF Analysis



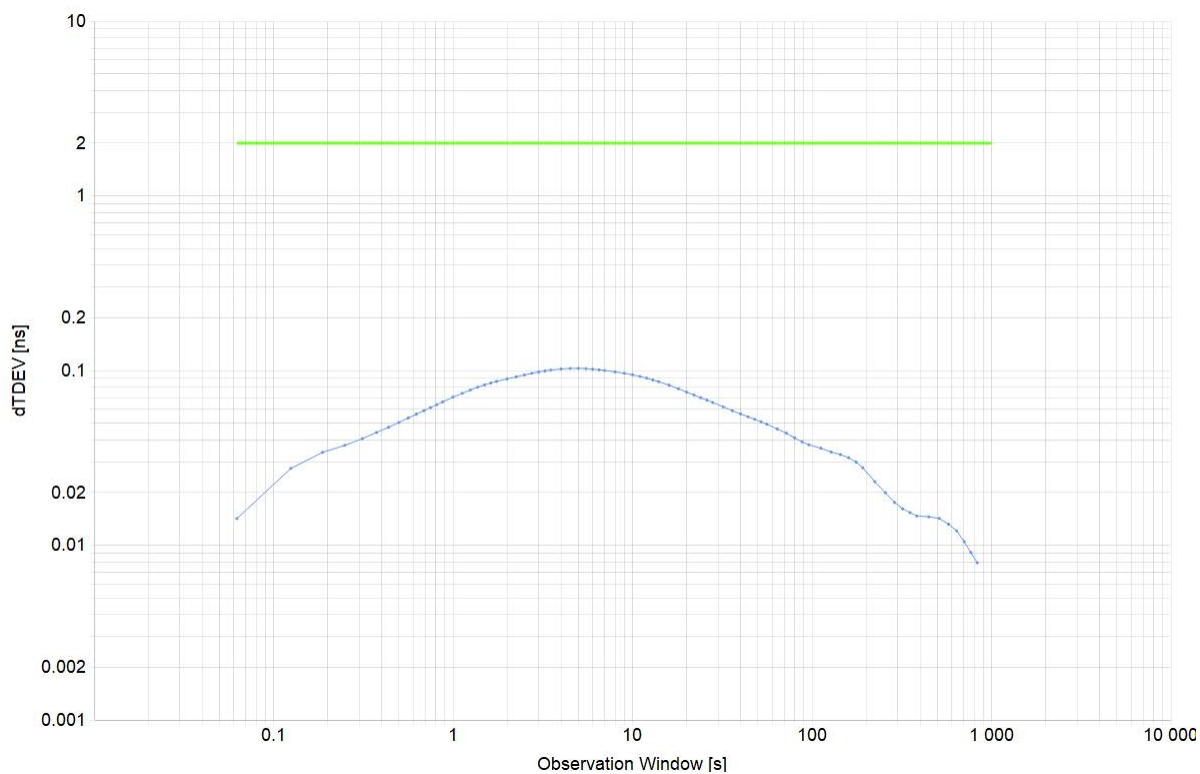
<b>Pk-Pk [ns]</b>	7.74
<b>Mean [ns]</b>	0
<b>Min [ns]</b>	-3.943
<b>Max [ns]</b>	3.797

## 6.6 DTEMTIE Analysis



<b>Min [ns]</b>	0.128
<b>Max [ns]</b>	1.69
<b>Max-Min [ns]</b>	1.562

## 6.7 DTETDEV Analysis



<b>Min [ns]</b>	0.008
<b>Max [ns]</b>	0.103
<b>Max-Min [ns]</b>	0.095

## 7. G.8273.2: Holdover – 1PPS

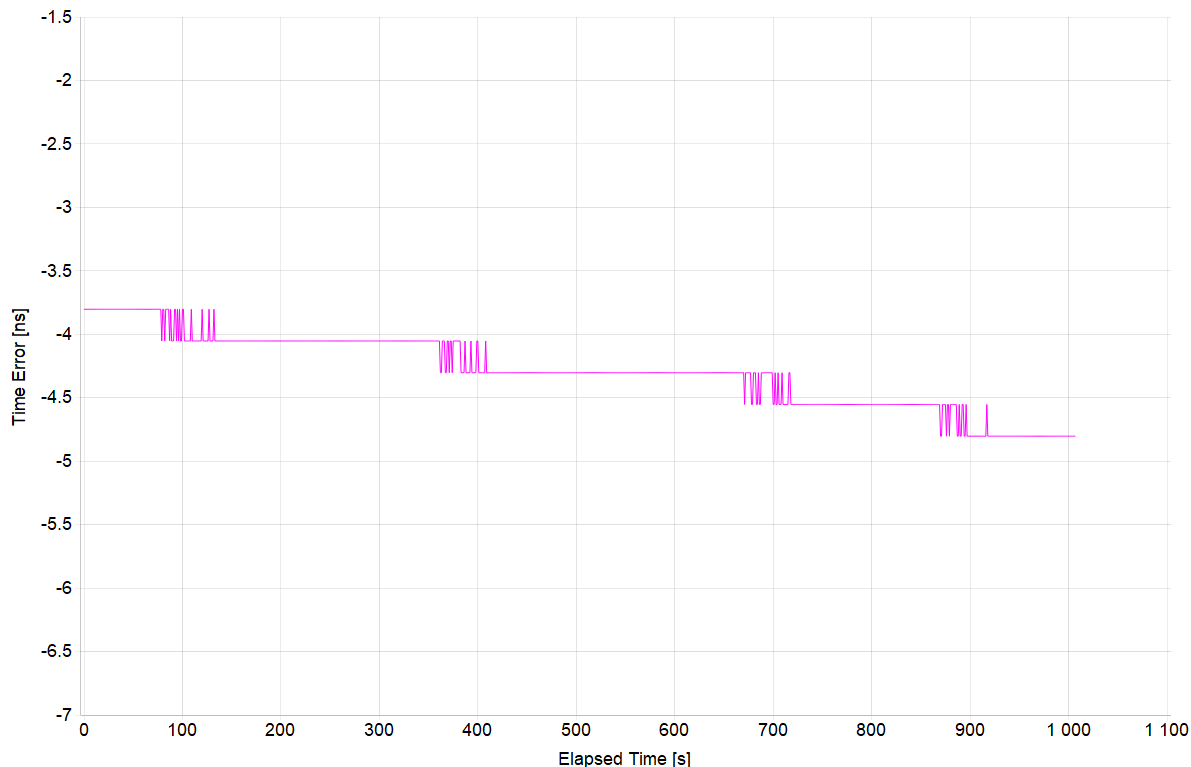
<b>Test Description</b>	Holdover – 1PPS
<b>Report Date</b>	23-02-10_13-07-16
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-08 10:39:11 AM
<b>Test Duration</b>	00:16:47
<b>Time to Phase Lock (s)</b>	23

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	-
<b>Mask ONEPPS Result</b>	No Mask
<b>Mask MTIE</b>	G.8273.2 T-BC Class B Time Holdover Const. Temp.
<b>Mask MTIE Result</b>	<b>Pass</b>

1. Settling time = 1500s.

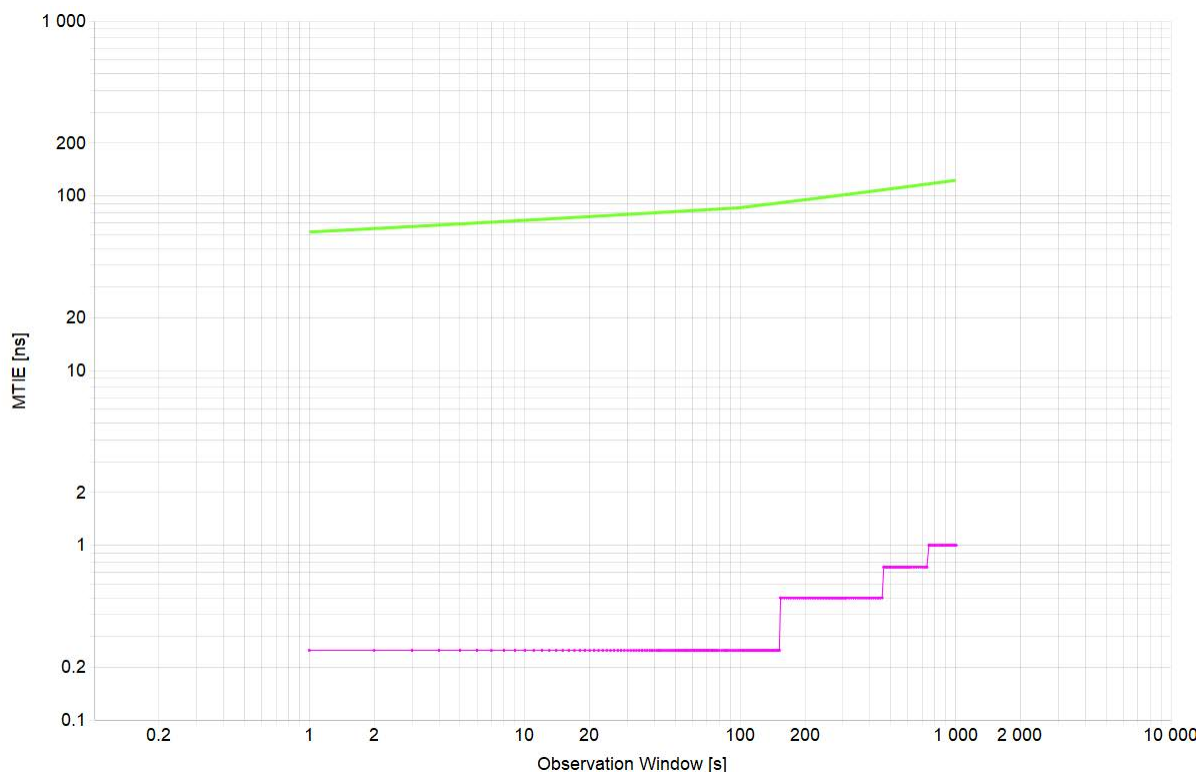
## 7.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	-3.803ns



<b>Mean [ns]</b>	-4.291
<b>Min [ns]</b>	-4.803
<b>Max [ns]</b>	-3.803
<b>Max-Min [ns]</b>	1

## 7.2 MTIE Analysis



<b>Min [ns]</b>	0.25
<b>Max [ns]</b>	1
<b>Max-Min [ns]</b>	0.75



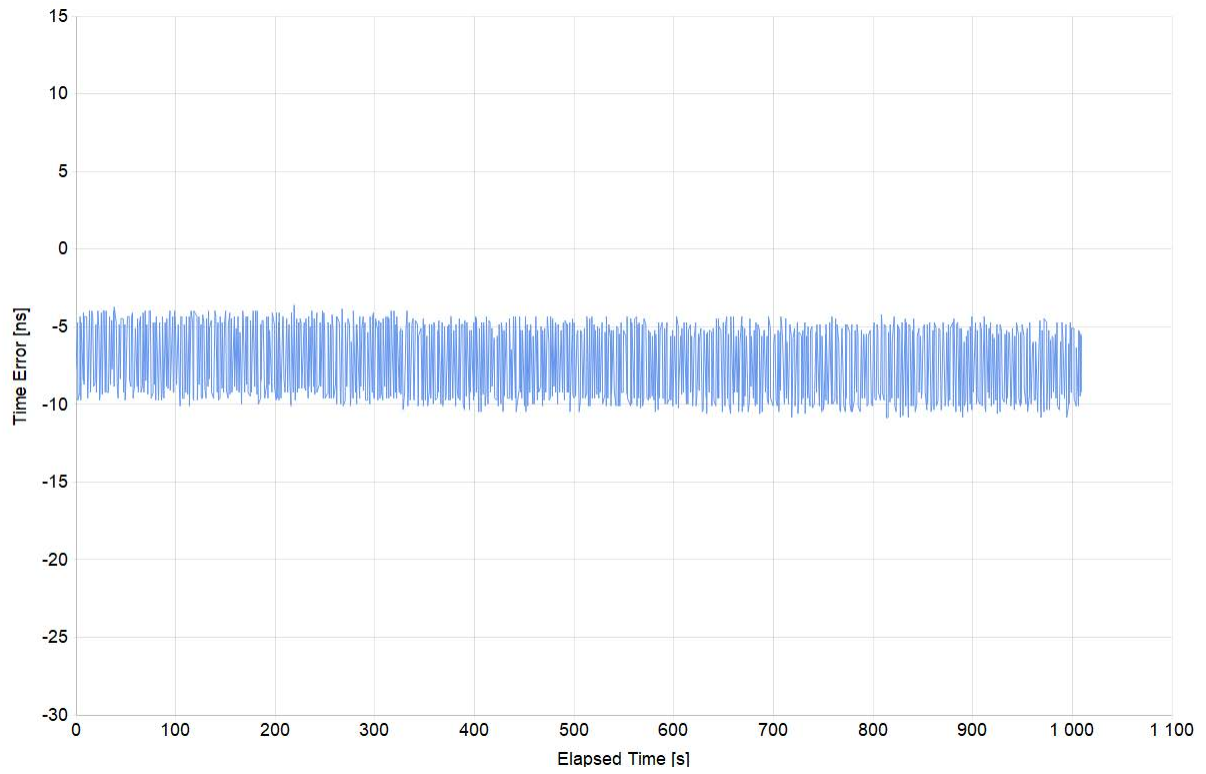
## 8. G.8273.2: Holdover – PTP

<b>Test Description</b>	Holdover – PTP
<b>Report Date</b>	23-02-10_14-57-59
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-08 10:39:11 AM
<b>Test Duration</b>	00:16:48
<b>Time to Phase Lock (s)</b>	23

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	-
<b>Mask TIMEERROR Result</b>	No Mask
<b>Mask DTE</b>	-
<b>Mask DTE Result</b>	No Mask
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Class B Time Holdover Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>

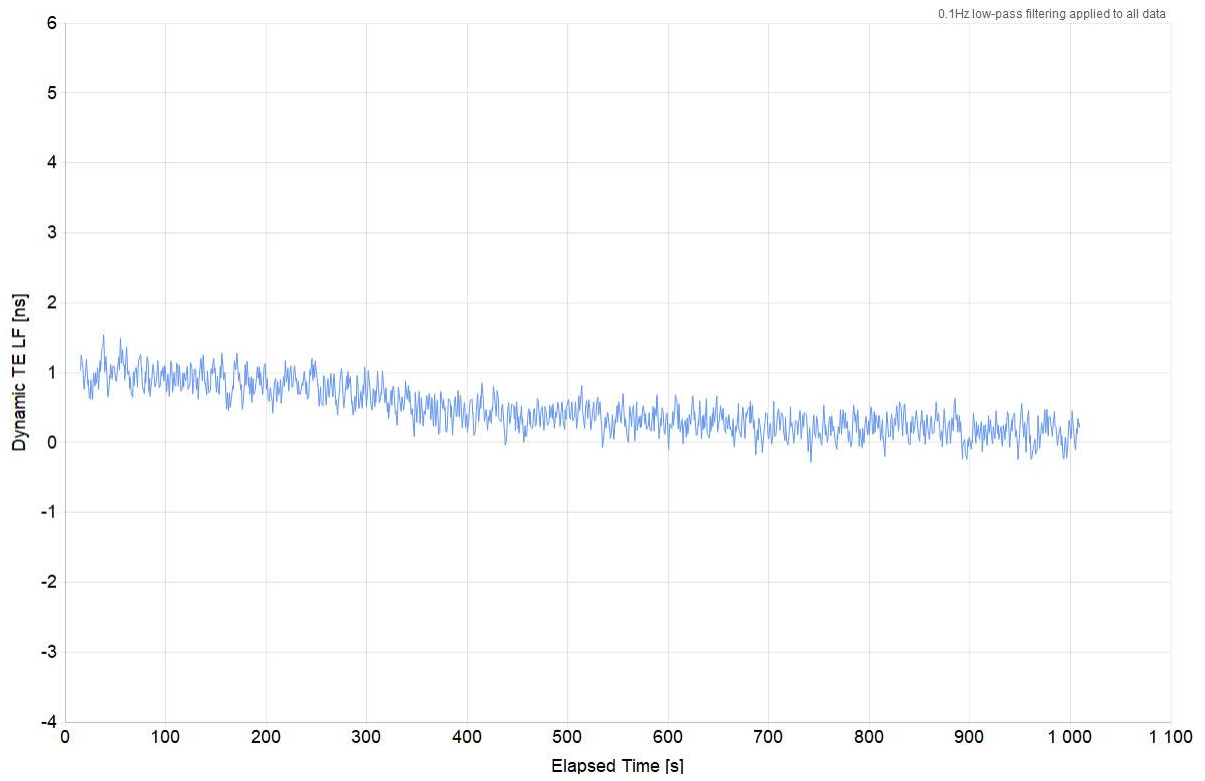
1. Settling time = 1500s.

## 8.1 TIMEERROR Analysis



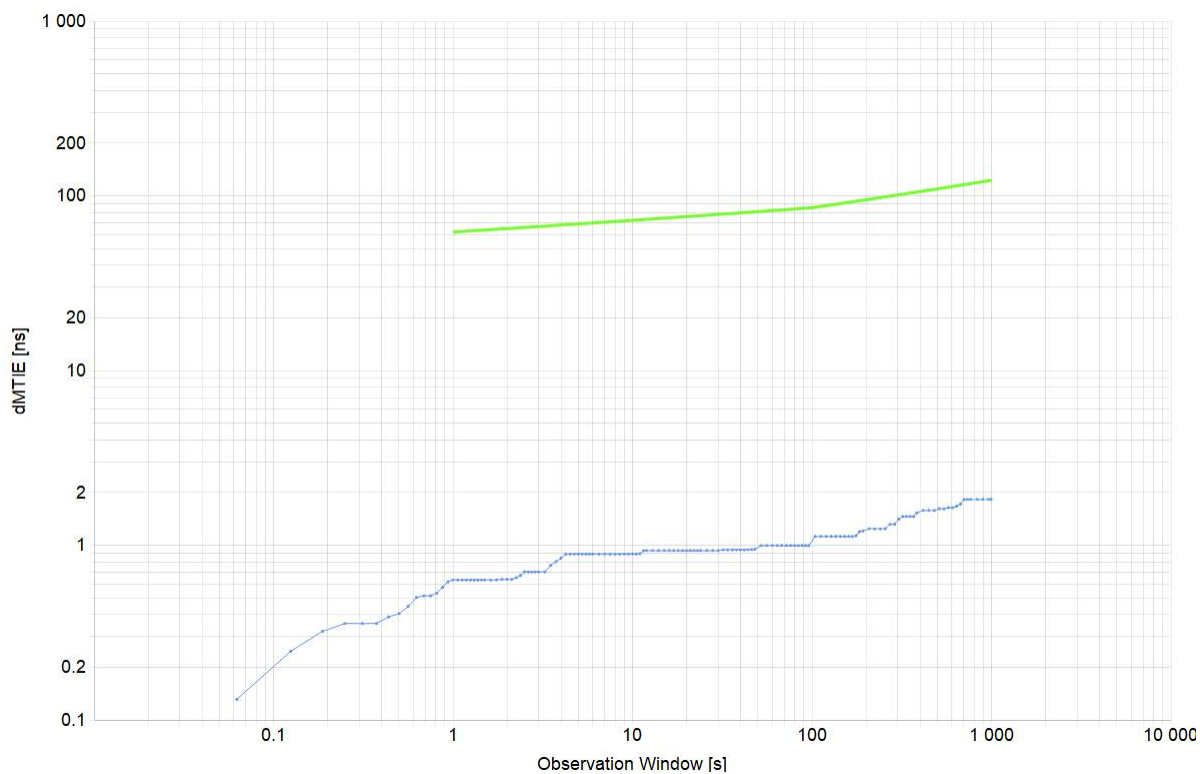
<b>Pk-Pk [ns]</b>	7.25
<b>Mean [ns]</b>	-7.256
<b>Min [ns]</b>	-10.857
<b>Max [ns]</b>	-3.607

## 8.2 DTE Analysis



<b>Mean [ns]</b>	0.47
<b>Min [ns]</b>	-0.285
<b>Max [ns]</b>	1.54
<b>Max-Min [ns]</b>	1.825

### 8.3 DTEMTIE Analysis



<b>Min [ns]</b>	0.131
<b>Max [ns]</b>	1.825
<b>Max-Min [ns]</b>	1.694

## 9. G.8273.2: Holdover – No SyncE – 1PPS

<b>Test Description</b>	Holdover – No SyncE – 1PPS
<b>Report Date</b>	23-02-10_14-57-59
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-08 11:24:42 AM
<b>Test Duration</b>	00:16:46
<b>Time to Phase Lock (s)</b>	24

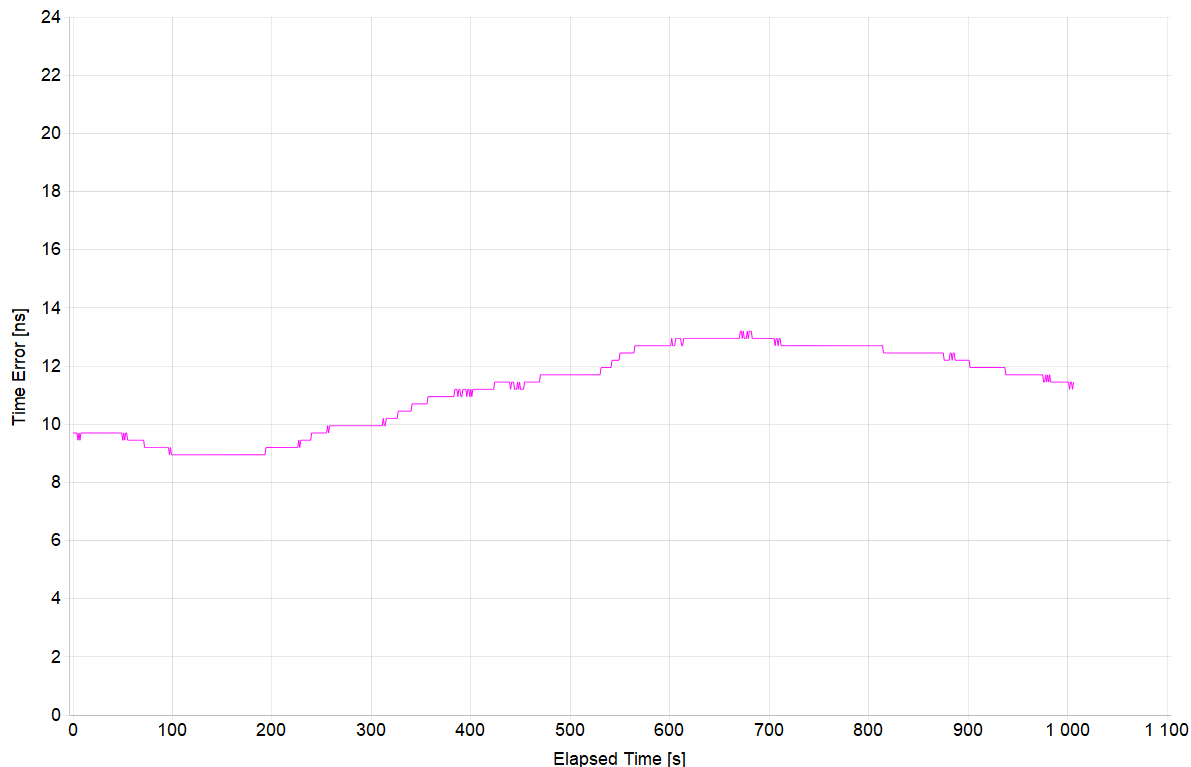
<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	-
<b>Mask ONEPPS Result</b>	No Mask
<b>Mask MTIE</b>	G.8273.2 T-BC Class B Time Holdover Const. Temp.
<b>Mask MTIE Result</b>	<b>Pass</b>

1. Settling time = 1500s.
2. SyncE was disabled using a parameter in the PCM4L Json file to set the SyncE clock category below the desired threshold:  

```
physicalPllClockCategory = 4,  
physicalPllClockCategoryThreshold = 1,
```

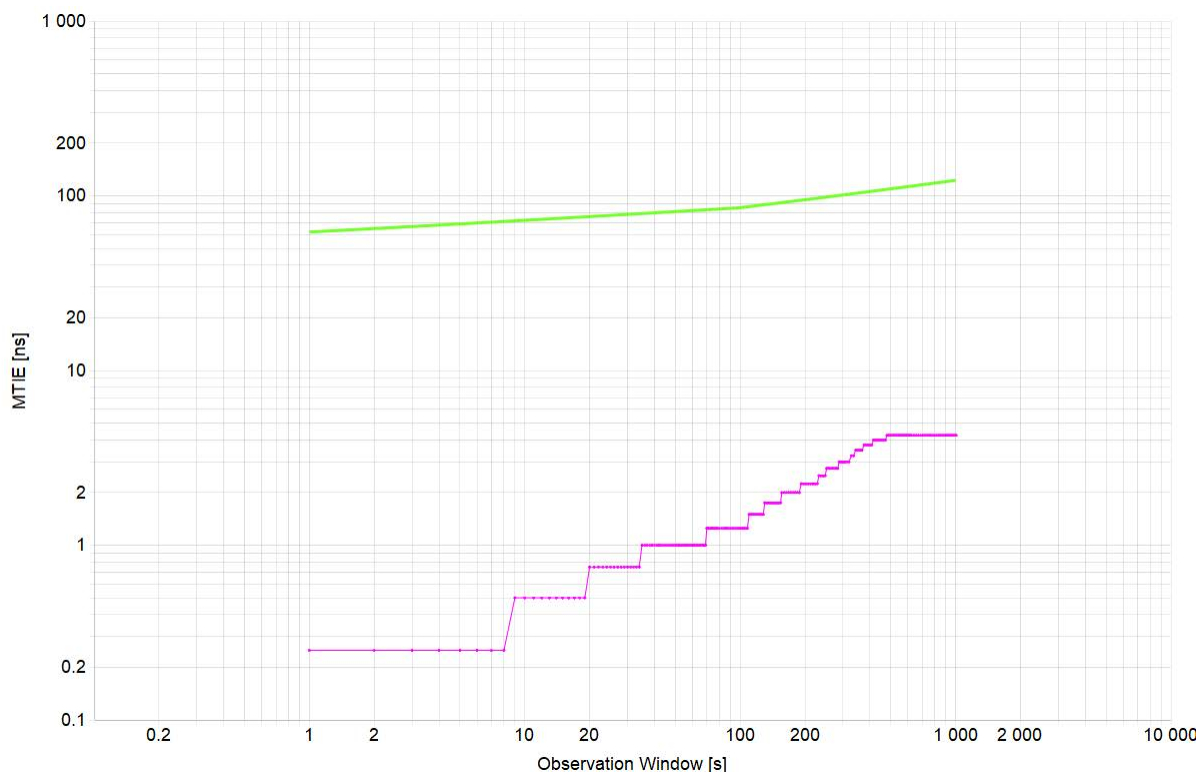
## 9.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	9.697ns



<b>Mean [ns]</b>	11.225
<b>Min [ns]</b>	8.947
<b>Max [ns]</b>	13.197
<b>Max-Min [ns]</b>	4.25

## 9.2 MTIE Analysis



<b>Min [ns]</b>	0.25
<b>Max [ns]</b>	4.25
<b>Max-Min [ns]</b>	4

## 10. G.8273.2: Holdover – No SyncE – PTP

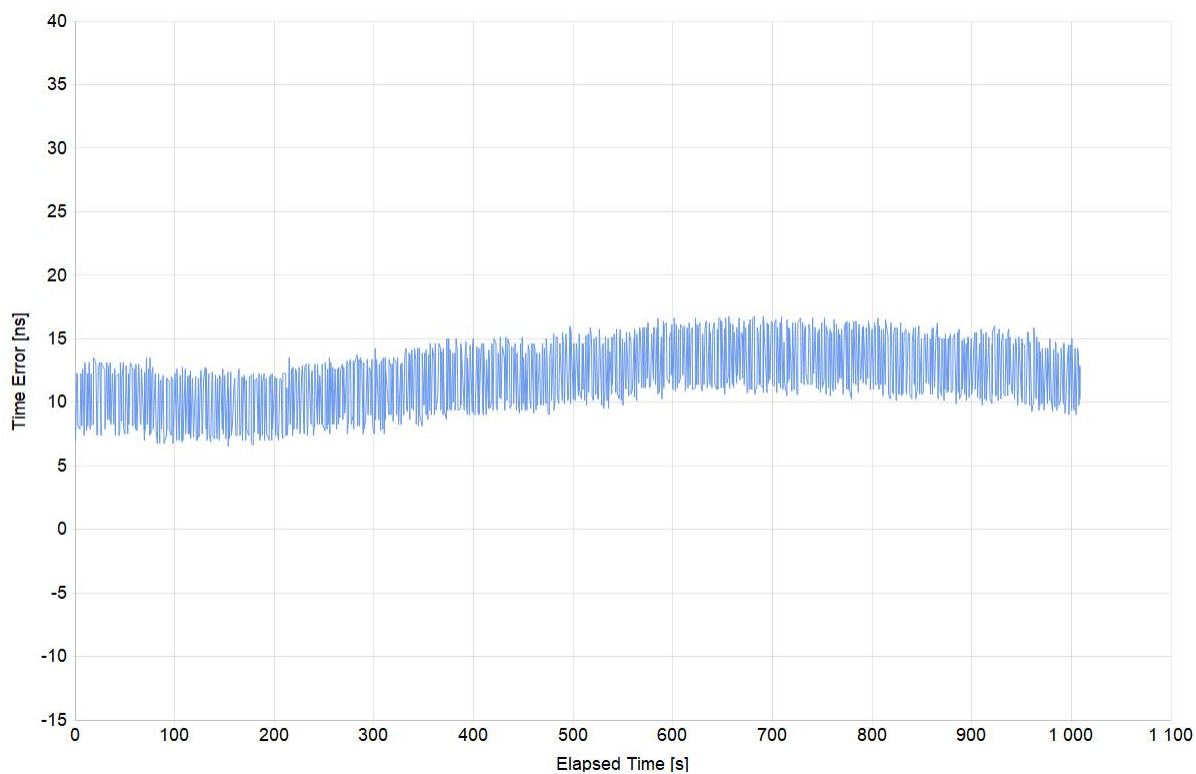
<b>Test Description</b>	Holdover – No SyncE – PTP
<b>Report Date</b>	23-02-10_14-57-59
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-08 11:24:42 AM
<b>Test Duration</b>	00:16:48
<b>Time to Phase Lock (s)</b>	24

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	-
<b>Mask TIMEERROR Result</b>	No Mask
<b>Mask DTE</b>	-
<b>Mask DTE Result</b>	No Mask
<b>Mask DTEMTIE</b>	G.8273.2 T-BC Class B Time Holdover Const. Temp.
<b>Mask DTEMTIE Result</b>	<b>Pass</b>

1. Settling time = 1500s.
2. SyncE was disabled using a parameter in the PCM4L Json file to set the SyncE clock category below the desired threshold:  
physicalPllClockCategory = 4,  
physicalPllClockCategoryThreshold = 1,

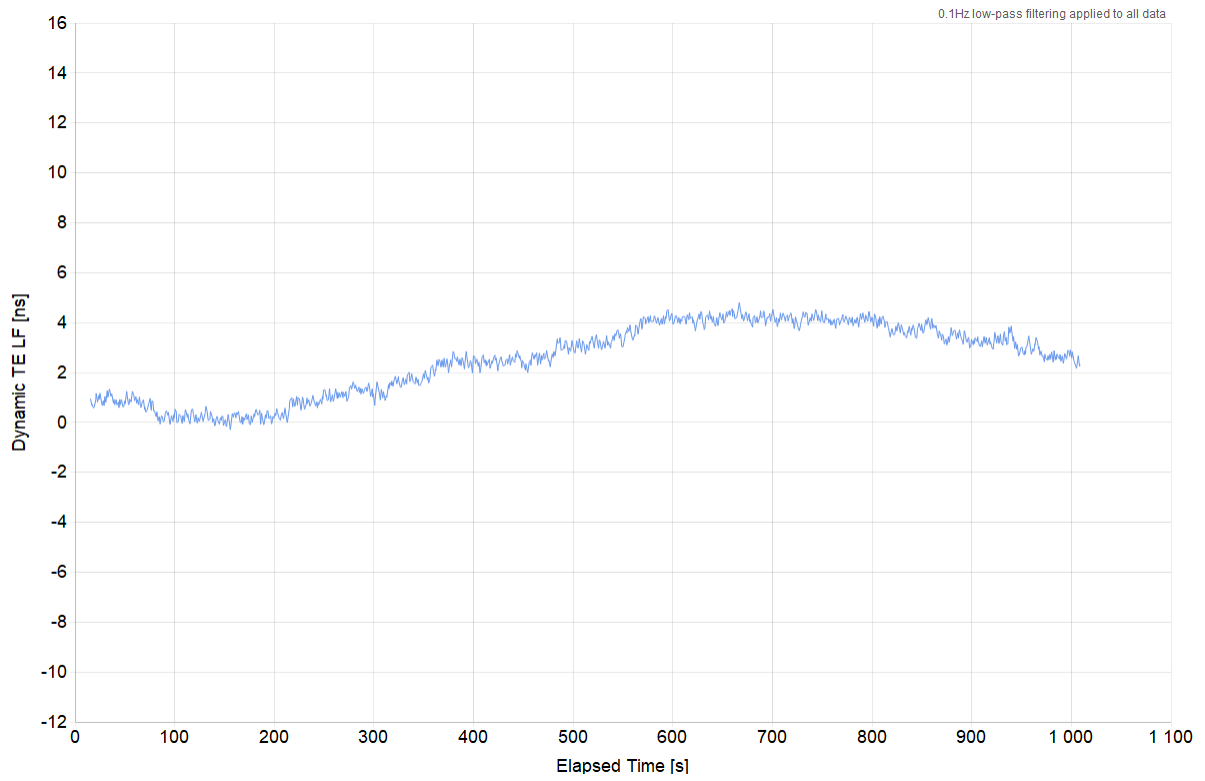


## 10.1 TIMEERROR Analysis



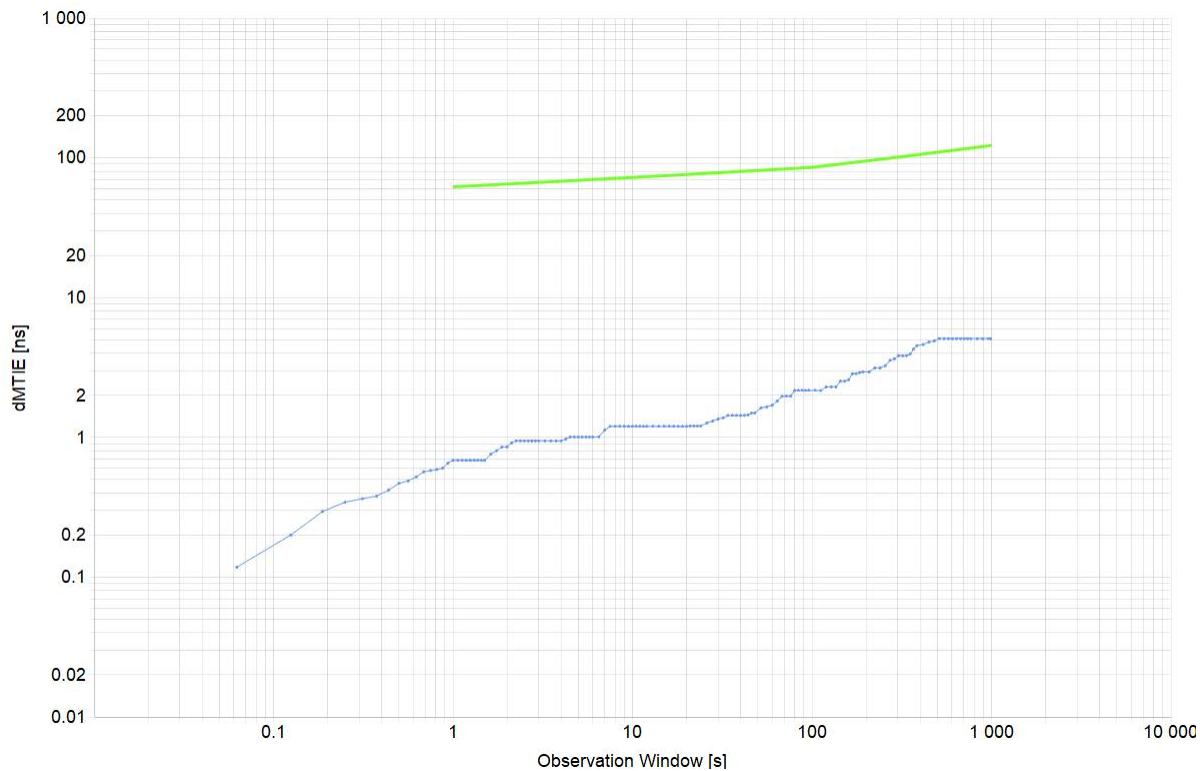
<b>Pk-Pk [ns]</b>	10.25
<b>Mean [ns]</b>	11.995
<b>Min [ns]</b>	6.504
<b>Max [ns]</b>	16.754

## 10.2 DTE Analysis



<b>Mean [ns]</b>	2.515
<b>Min [ns]</b>	-0.293
<b>Max [ns]</b>	4.801
<b>Max-Min [ns]</b>	5.094

### 10.3 DTEMTIE Analysis



<b>Min [ns]</b>	0.118
<b>Max [ns]</b>	5.094
<b>Max-Min [ns]</b>	4.976

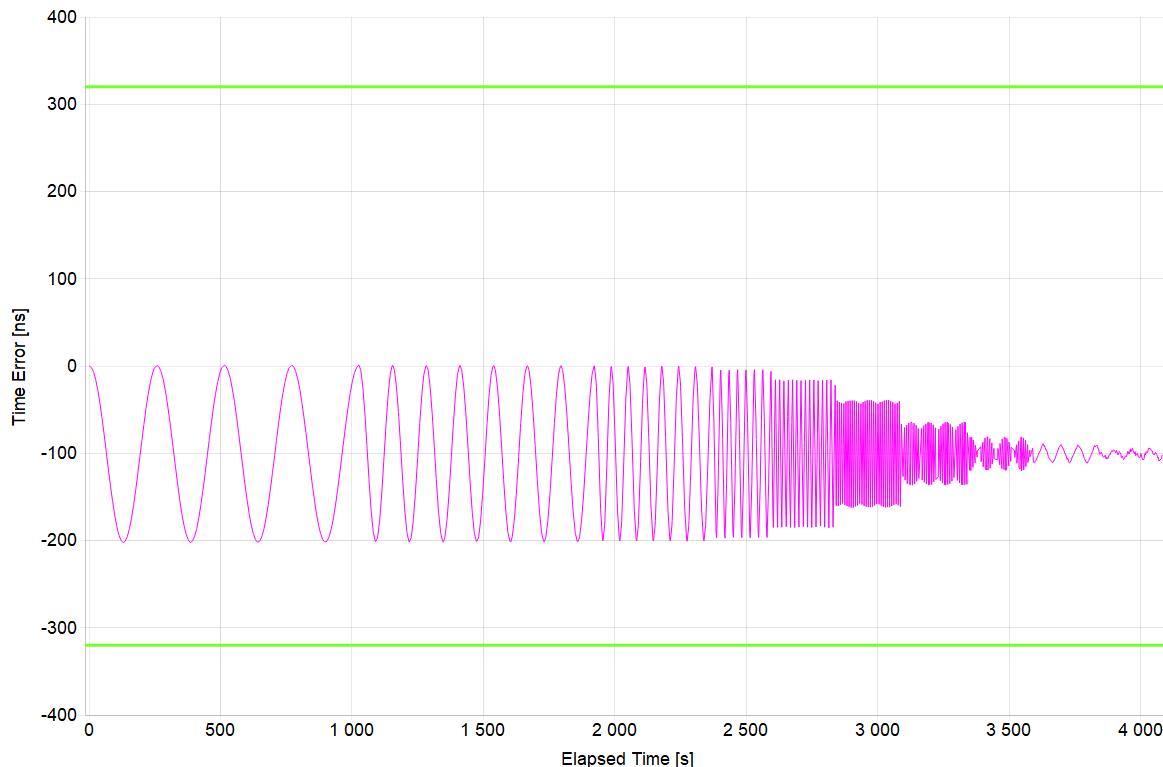
## 11. G.8273.2: PTP to 1PPS Noise Transfer

<b>Test Description</b>	PTP to 1PPS Noise Transfer
<b>Report Date</b>	23-02-10_14-57-59
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 4:12:57 PM
<b>Test Duration</b>	01:12:11
<b>Time to Phase Lock (s)</b>	18

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	0.32 $\mu$ s
<b>Mask ONEPPS Result</b>	<b>Pass</b>
<b>Mask PTPNoiseTransfer</b>	G.8273.2 Class A,B T-BCs Noise Transfer
<b>Mask PTPNoiseTransfer Result</b>	<b>Pass</b>

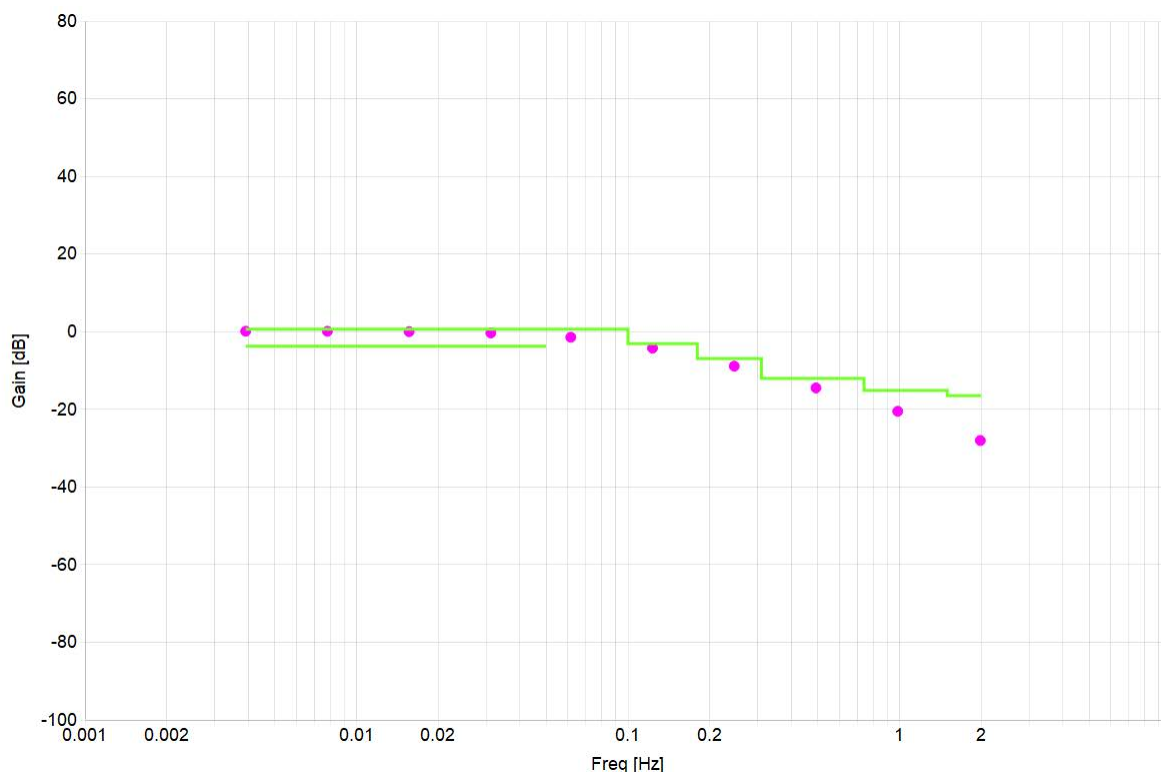
### 11.1 ONEPPS Analysis

Offset Removal Applied	Off
Zero Offset	-0.303ns



Mean [ns]	-100.888
Min [ns]	-202.303
Max [ns]	0.947
Max-Min [ns]	203.25

## 11.2 PTPNoiseTransfer Analysis



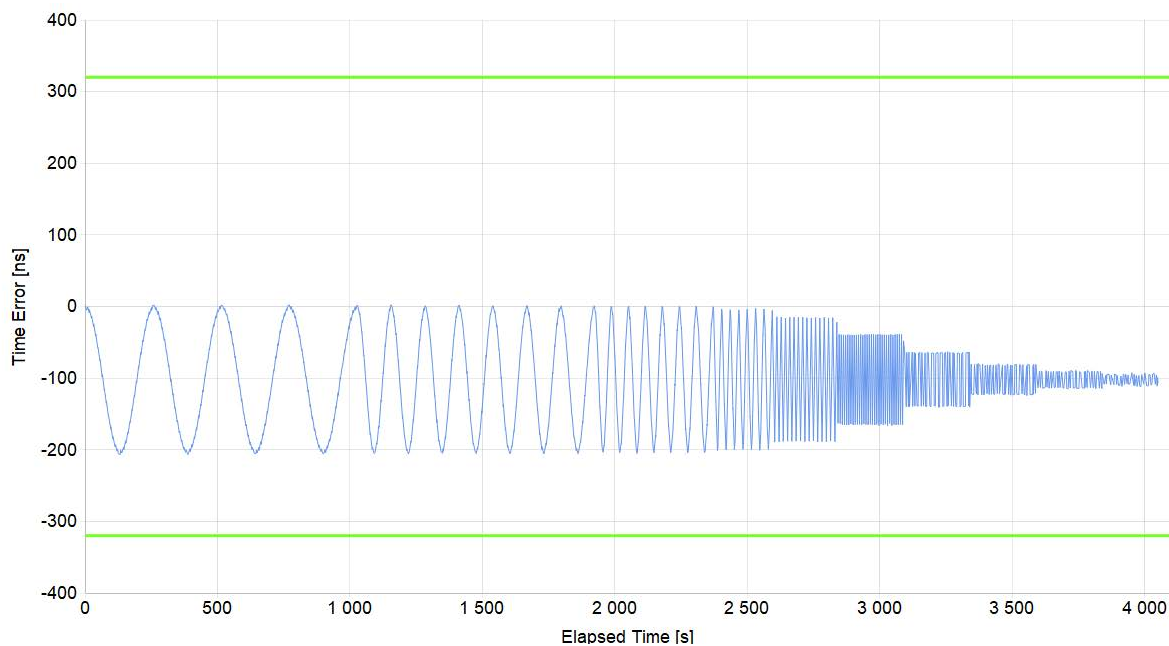
Point #	Freq (Hz)	Ampl (ns)	Duration (s)	Pk-Pk Output (ns)	Gain (dB)	Upper Pk-Pk Limit (ns)	Lower Pk-Pk Limit (ns)
1	0.00390625	200	1024.00	202.43	0.10	215	130
2	0.0078125	200	896.00	201.96	0.08	215	130
3	0.015625	200	448.00	200.03	0.00	215	130
4	0.03125	200	224.00	192.29	-0.34	215	130
5	0.0615625	200	243.65	169.38	-1.44	215	-
6	0.123125	200	251.78	122.78	-4.24	140	-
7	0.24625	200	251.78	71.89	-8.89	90	-
8	0.4925	200	249.75	37.68	-14.50	50	-
9	0.985	200	249.75	18.84	-20.52	35	-
10	1.985	200	249.87	7.93	-28.04	30	-

## 12. G.8273.2: PTP to PTP Noise Transfer

<b>Test Description</b>	PTP to PTP Noise Transfer
<b>Report Date</b>	23-02-10_15-26-39
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 4:12:57 PM
<b>Test Duration</b>	01:12:13
<b>Time to Phase Lock (s)</b>	18

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	0.32 $\mu$ s
<b>Mask TIMEERROR Result</b>	<b>Pass</b>
<b>Mask PTPNoiseTransfer</b>	G.8273.2 Class A,B T-BCs Noise Transfer
<b>Mask PTPNoiseTransfer Result</b>	<b>Pass</b>

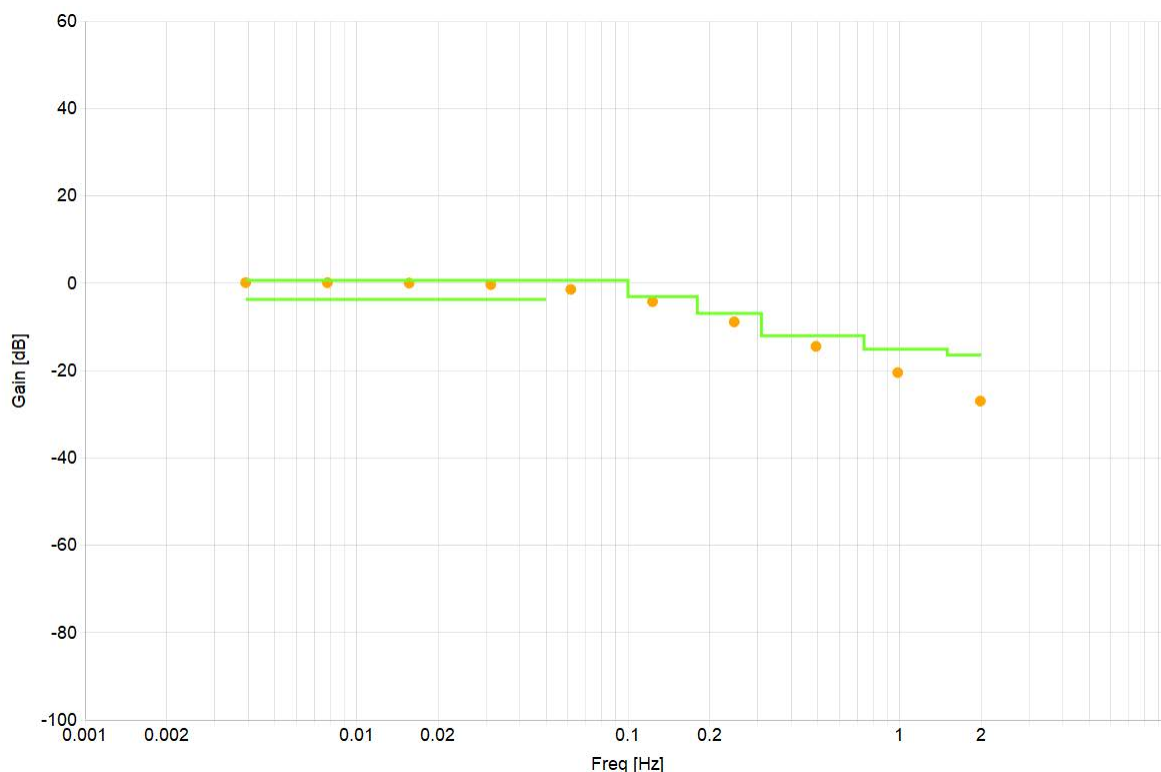
## 12.1 TIMEERROR Analysis



<b>Pk-Pk [ns]</b>	209.375
<b>Mean [ns]</b>	-102.315
<b>Min [ns]</b>	-206.871
<b>Max [ns]</b>	2.504



## 12.2 PTPNoiseTransfer Analysis



Point #	Freq (Hz)	Ampl (ns)	Duration (s)	Pk-Pk Output (ns)	Gain (dB)	Upper Pk-Pk Limit (ns)	Lower Pk-Pk Limit (ns)
1	0.00390625	200	1024.00	202.42	0.10	215	130
2	0.0078125	200	896.00	202.01	0.09	215	130
3	0.015625	200	448.00	200.08	0.00	215	130
4	0.03125	200	224.00	192.15	-0.35	215	130
5	0.0615625	200	243.65	169.20	-1.45	215	-
6	0.123125	200	251.78	122.78	-4.24	140	-
7	0.24625	200	251.78	71.95	-8.88	90	-
8	0.4925	200	249.75	37.76	-14.48	50	-
9	0.985	200	249.75	18.92	-20.48	35	-
10	1.985	200	249.87	8.93	-27.00	30	-

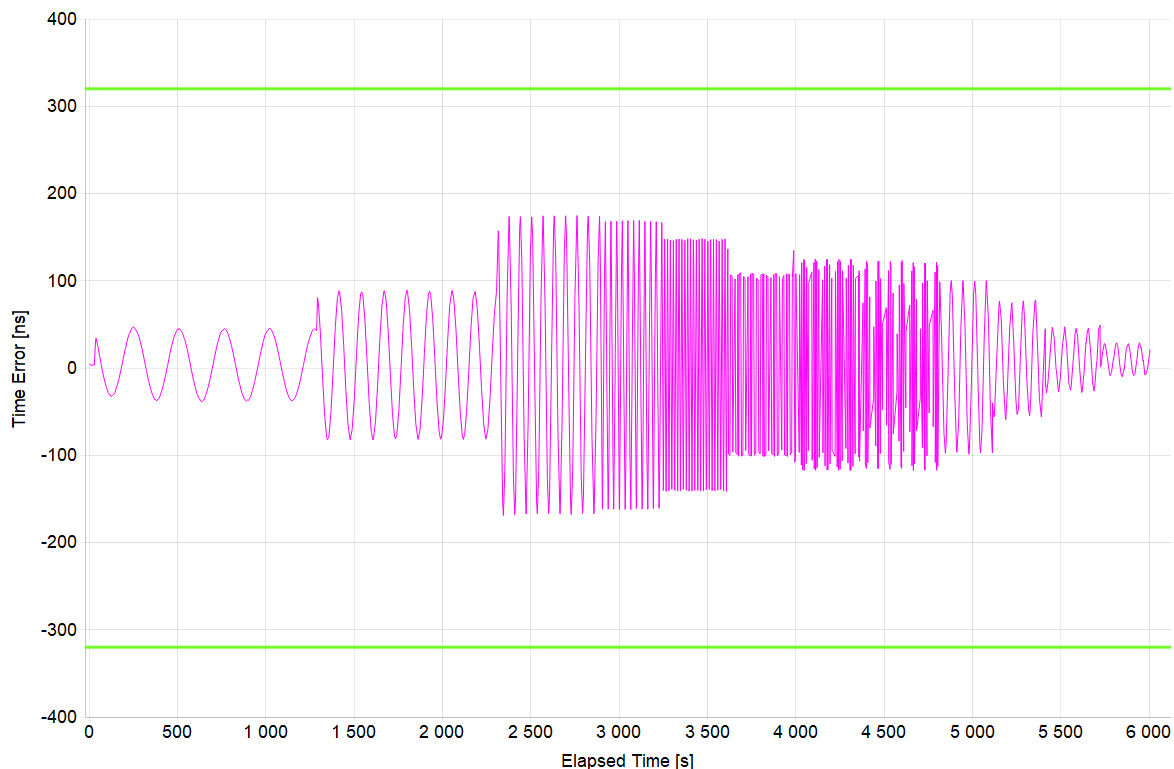
### 13. G.8273.2: SyncE to 1PPS Noise Transfer

<b>Test Description</b>	SyncE to 1PPS Noise Transfer
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 2:19:48 PM
<b>Test Duration</b>	01:40:02
<b>Time to Phase Lock (s)</b>	20

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	0.32 $\mu$ s
<b>Mask ONEPPS Result</b>	<b>Pass</b>

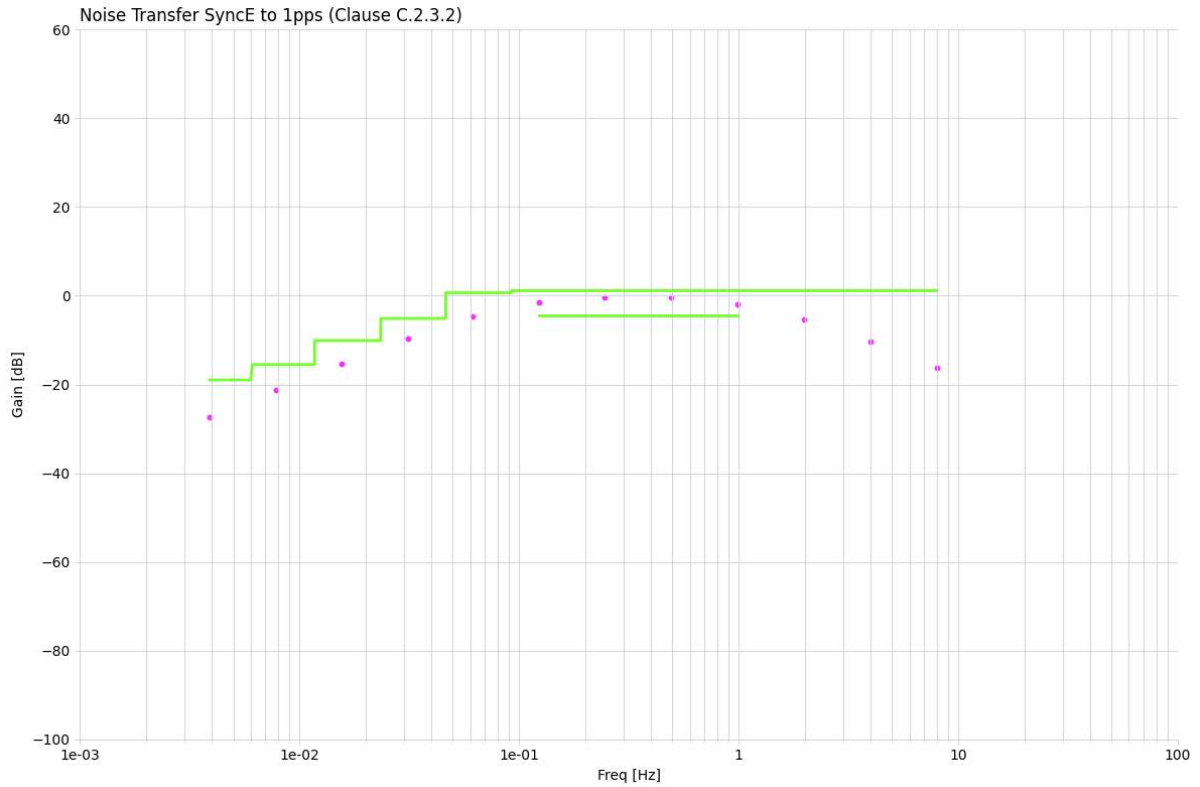
### 13.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	4.697ns



<b>Mean [ns]</b>	4.228
<b>Min [ns]</b>	-169.053
<b>Max [ns]</b>	174.697
<b>Max-Min [ns]</b>	343.75

### 13.2 SyncNoiseTransfer Analysis



Point #	Freq (Hz)	Ampl (ns)	Duration (s)	Pk-Pk Output (ns)	Gain (dB)	Upper Pk-Pk Limit (ns)	Lower Pk-Pk Limit (ns)
1	0.00391	2000	1023.02	85.75	-27.35	225	-
2	0.00781	2000	896.29	171.75	-21.32	340	-
3	0.01563	2000	447.86	342.75	-15.32	630	-
4	0.03125	1000	224.00	331.5	-9.59	565	-
5	0.06156	500	243.66	289.75	-4.73	545	-
6	0.12313	250	251.77	210.25	-1.50	285	150
7	0.24625	250	251.78	242.5	-0.26	285	150
8	0.4925	250	249.75	240.75	-0.33	285	150
9	0.985	250	249.75	199.0	-1.98	285	150
10	1.985	250	249.87	136.0	-5.29	285	-
11	3.985	250	249.94	75.25	-10.43	285	-
12	7.985	250	249.97	39.0	-16.14	285	-

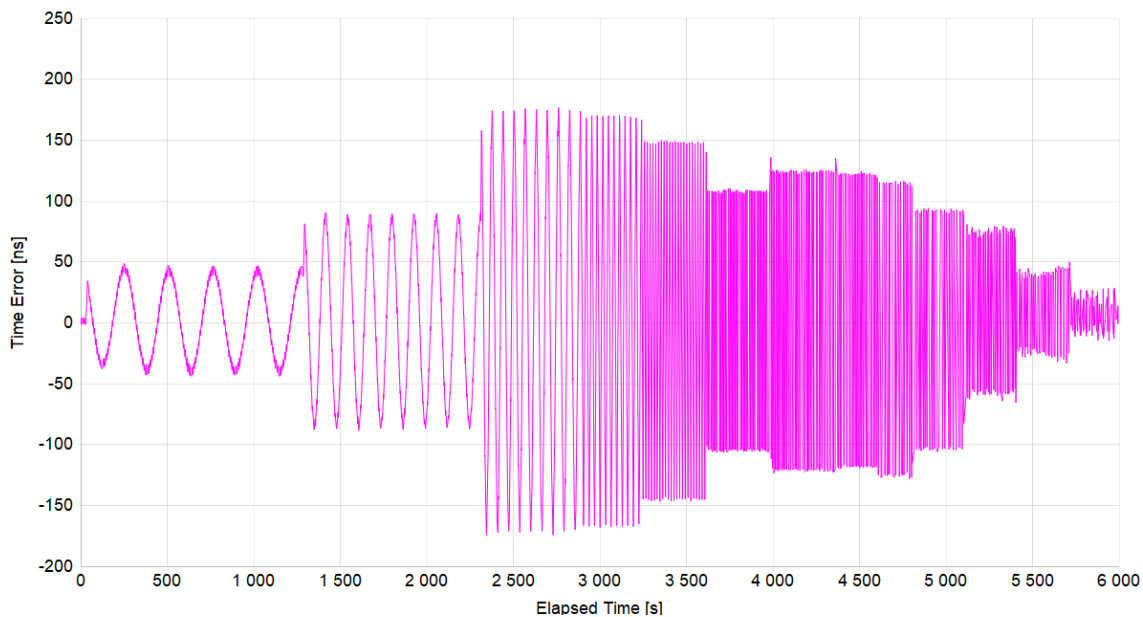
## 14. G.8273.2: SyncE to PTP Noise Transfer

<b>Test Description</b>	SyncE to PTP Noise Transfer
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-07 2:19:48 PM
<b>Test Duration</b>	01:40:02
<b>Time to Phase Lock (s)</b>	20

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	0.32μs
<b>Mask ONEPPS Result</b>	<b>Pass</b>

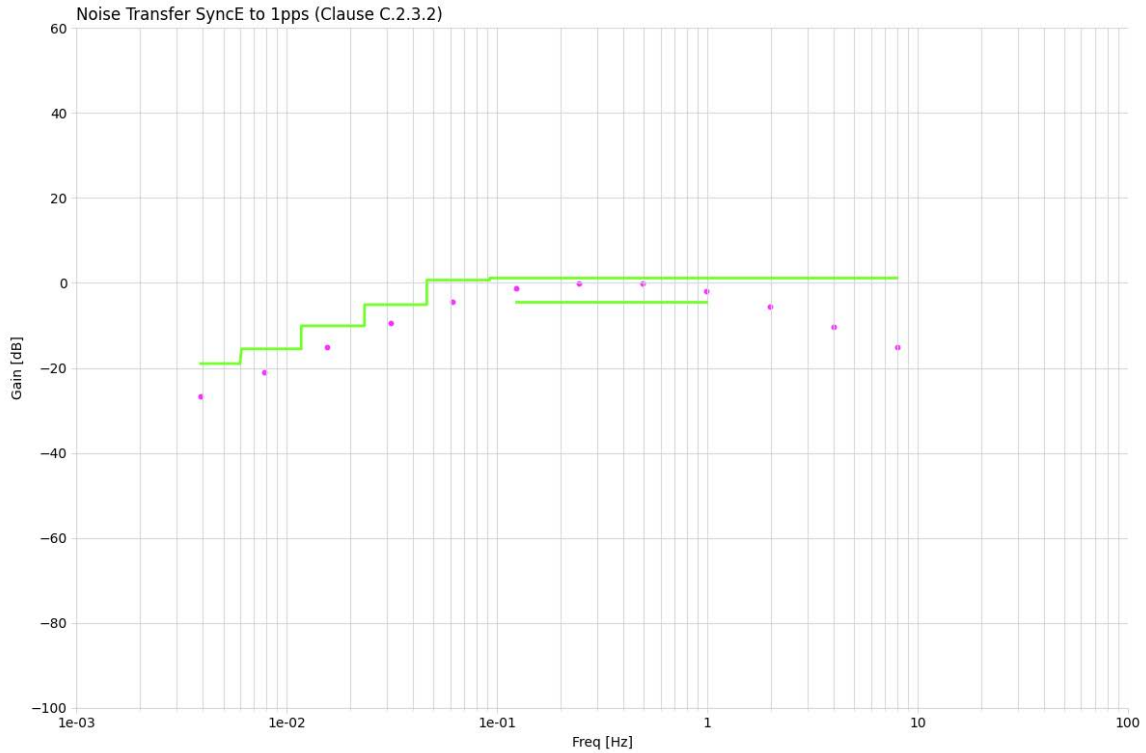
## 14.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	1.137



<b>Mean [ns]</b>	1.158
<b>Min [ns]</b>	-174.363
<b>Max [ns]</b>	176.637
<b>Max-Min [ns]</b>	351

## 14.2 SyncNoiseTransfer Analysis



Point #	Freq (Hz)	Ampl (ns)	Duration (s)	Pk-Pk Output (ns)	Gain (dB)	Upper Pk-Pk Limit (ns)	Lower Pk-Pk Limit (ns)
1	0.00391	2000	1023.02	92.5	-26.70	225	-
2	0.00781	2000	896.29	179.0	-20.96	340	-
3	0.01563	2000	447.86	351.0	-15.11	630	-
4	0.03125	1000	224.00	338.63	-9.41	565	-
5	0.06156	500	243.66	296.75	-4.53	545	-
6	0.12313	250	251.77	217.0	-1.22	285	150
7	0.24625	250	251.78	248.38	-0.06	285	150
8	0.4925	250	249.75	243.75	-0.22	285	150
9	0.985	250	249.75	200.25	-1.93	285	150
10	1.985	250	249.87	132.75	-5.50	285	-
11	3.985	250	249.94	75.88	-10.36	285	-
12	7.985	250	249.97	43.5	-15.18	285	-

## 15. G.8273.2: Noise Tolerance – 1PPS

<b>Test Description</b>	Noise Tolerance – 1PPS
<b>Report Date</b>	23-02-13_08-23-03
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-10 2:08:04 PM
<b>Test Duration</b>	12:45:24
<b>Time to Phase Lock (s)</b>	20

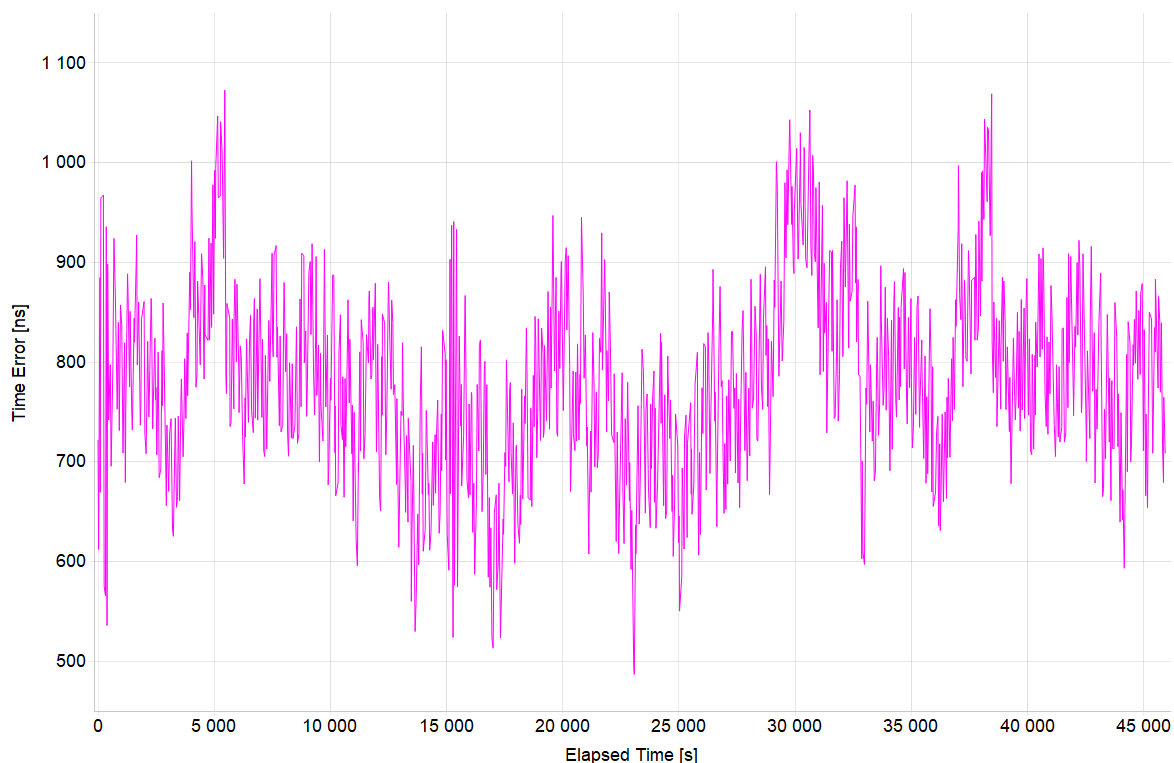
<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	-
<b>Mask ONEPPS Result</b>	No Mask

1. Passing criteria for this test is tolerance of input noise on the SyncE and PTP sources while not causing any alarms, reference switching or holdover. No reference switching, holdover nor alarms occurred during this test.



## 15.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	721.947ns



<b>Mean [ns]</b>	780.697
<b>Min [ns]</b>	486.697
<b>Max [ns]</b>	1072.697
<b>Max-Min [ns]</b>	586

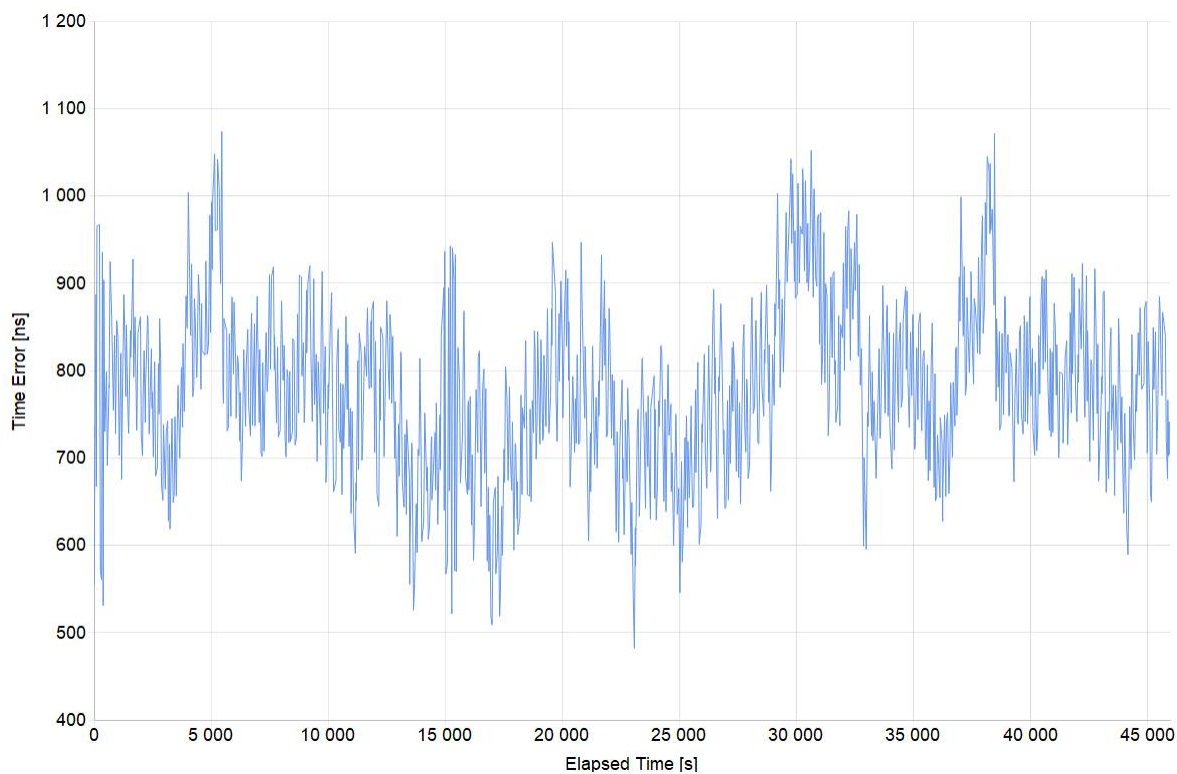
## 16. G.8273.2: Noise Tolerance – PTP

<b>Test Description</b>	Noise Tolerance – PTP
<b>Report Date</b>	23-02-13_08-23-03
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-10 2:08:04 PM
<b>Test Duration</b>	12:45:27
<b>Time to Phase Lock (s)</b>	20

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIMEERROR</b>	-
<b>Mask TIMEERROR Result</b>	No Mask

1. Passing criteria for this test is tolerance of input noise on the SyncE and PTP sources while not causing any alarms, reference switching or holdover. No reference switching, holdover nor alarms occurred during this test.

## 16.1 TIMEERROR Analysis



<b>Pk-Pk [ns]</b>	591.375
<b>Mean [ns]</b>	778.95
<b>Min [ns]</b>	482.008
<b>Max [ns]</b>	1073.382

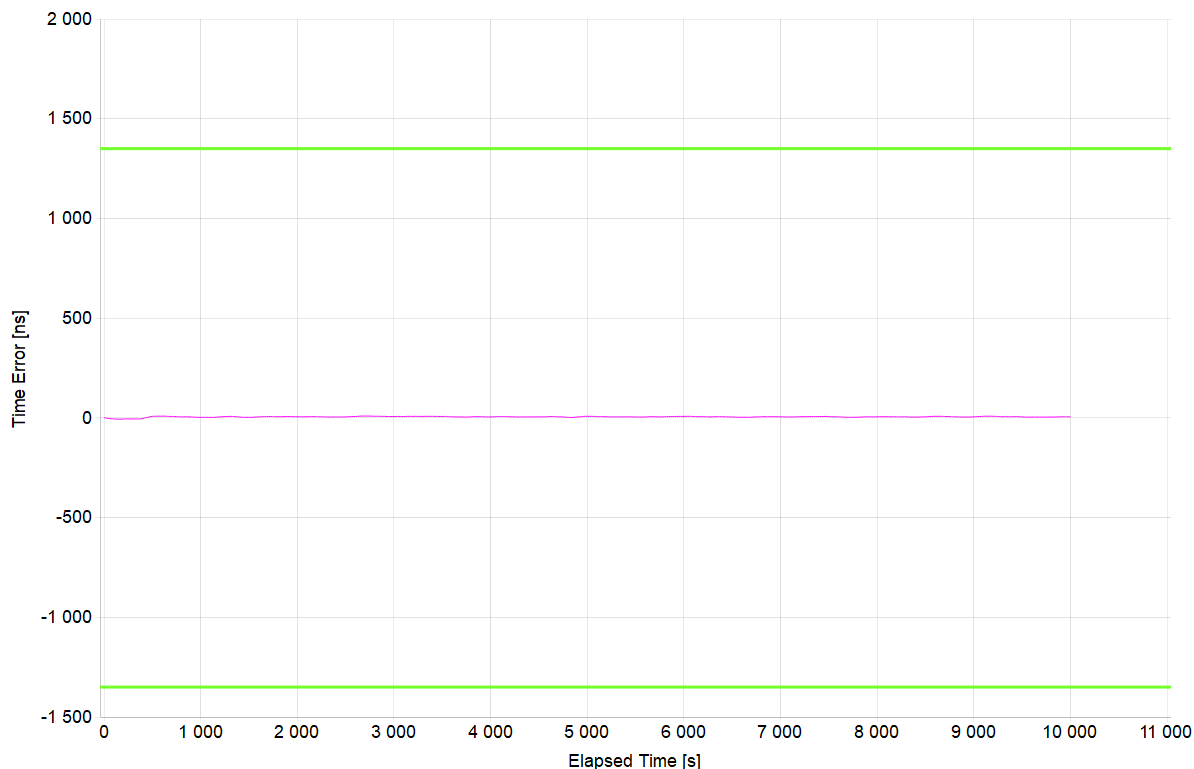
## 17. G.8273.4 PTS: Noise Generation

<b>Test Description</b>	Noise Generation
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-09 10:21:33 PM
<b>Test Duration</b>	02:46:40
<b>Time to Phase Lock (s)</b>	70

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	1.35 $\mu$ s
<b>Mask ONEPPS Result</b>	<b>Pass</b>
<b>Mask CTE</b>	0.02 $\mu$ s
<b>Mask CTE Result</b>	<b>Pass</b>
<b>Mask DTE</b>	0.2 $\mu$ s
<b>Mask DTE Result</b>	<b>Pass</b>
<b>Mask DTEHF</b>	-
<b>Mask DTEHF Result</b>	No Mask

## 17.1 ONEPPS Analysis

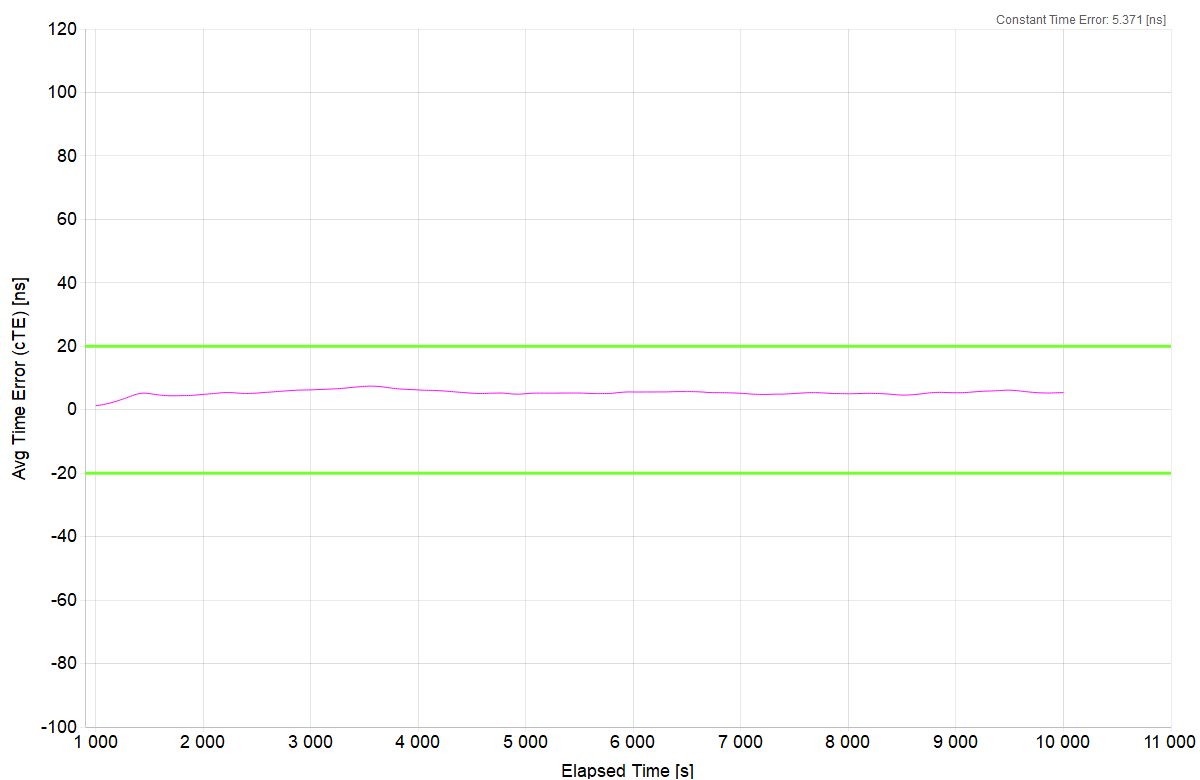
<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	0.697ns



<b>Mean [ns]</b>	5.023
<b>Min [ns]</b>	-6.803
<b>Max [ns]</b>	8.947
<b>Max-Min [ns]</b>	15.75

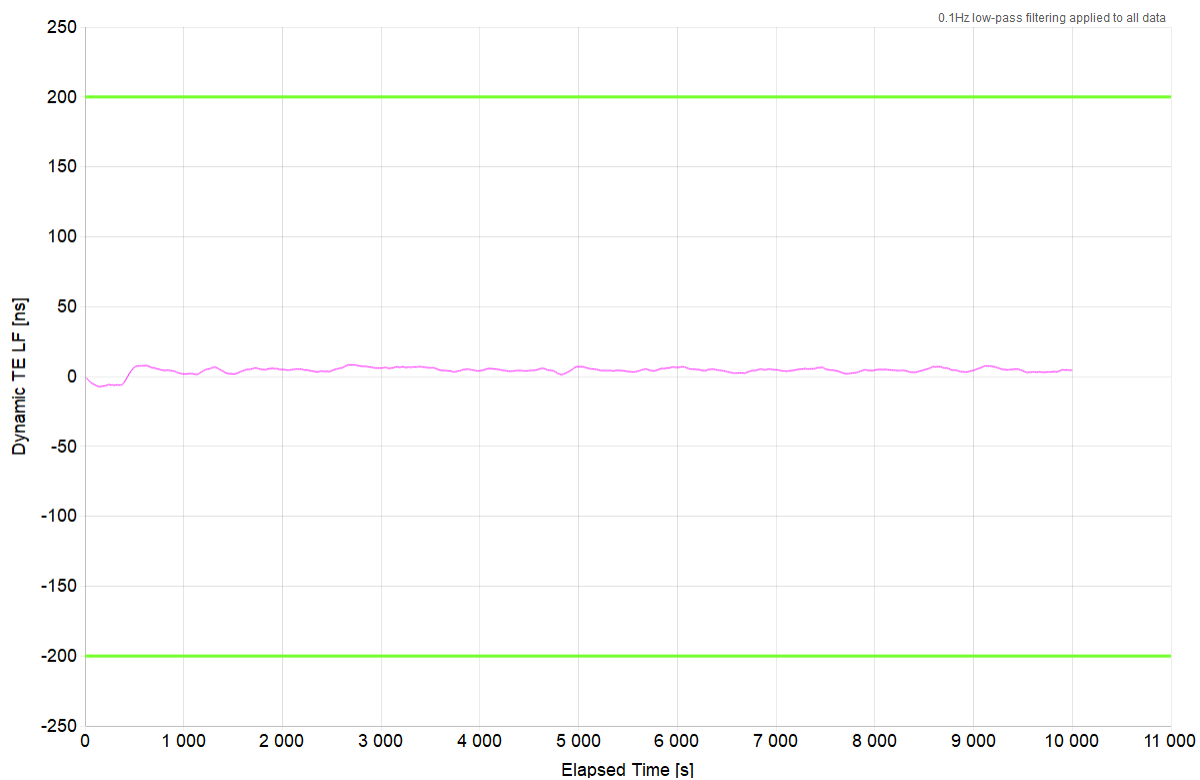
## 17.2 CTE Analysis

<b>Averaging Time (s)</b>	1000
---------------------------	------



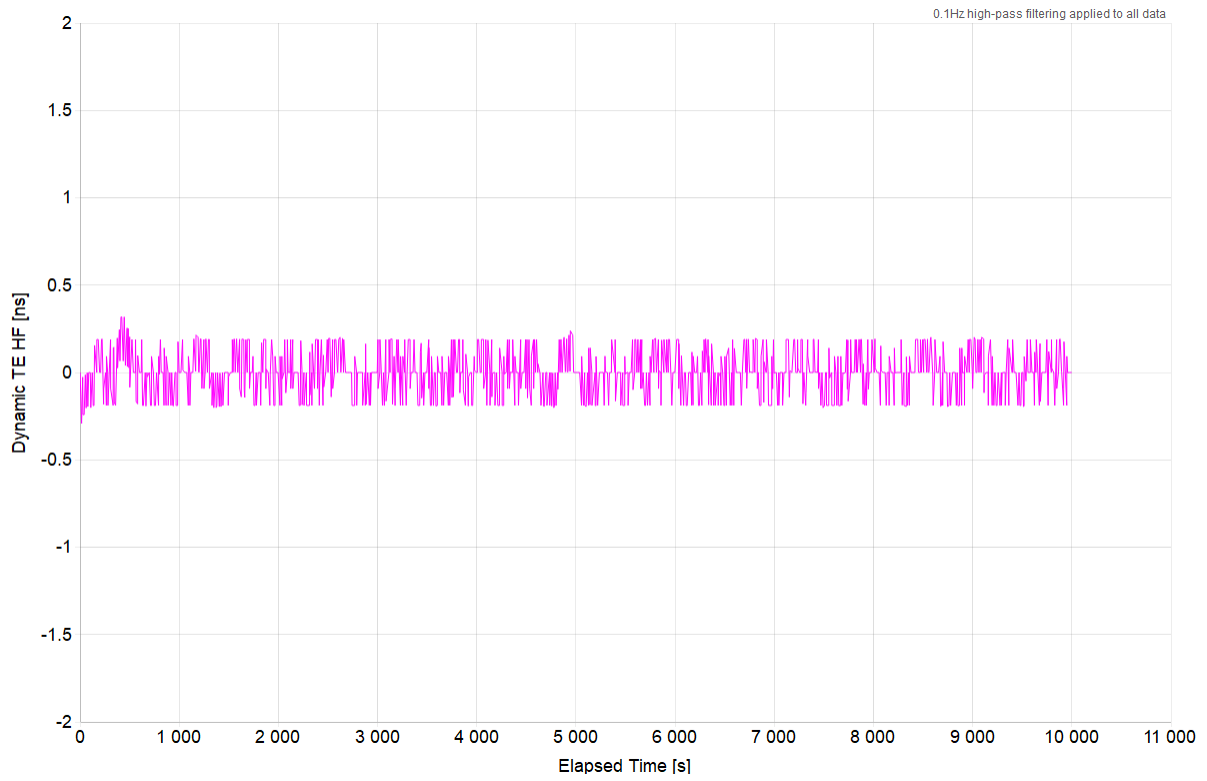
<b>Constant Time Error [ns]</b>	5.371
<b>Min [ns]</b>	1.299
<b>Max [ns]</b>	7.434
<b>Max-Min [ns]</b>	6.135

### 17.3 DTE Analysis



<b>Mean [ns]</b>	4.332
<b>Min [ns]</b>	-7.434
<b>Max [ns]</b>	8.25
<b>Max-Min [ns]</b>	15.684

## 17.4 DTEHF Analysis



<b>Mean [ns]</b>	0.001
<b>Min [ns]</b>	-0.292
<b>Max [ns]</b>	0.318
<b>Max-Min [ns]</b>	0.61



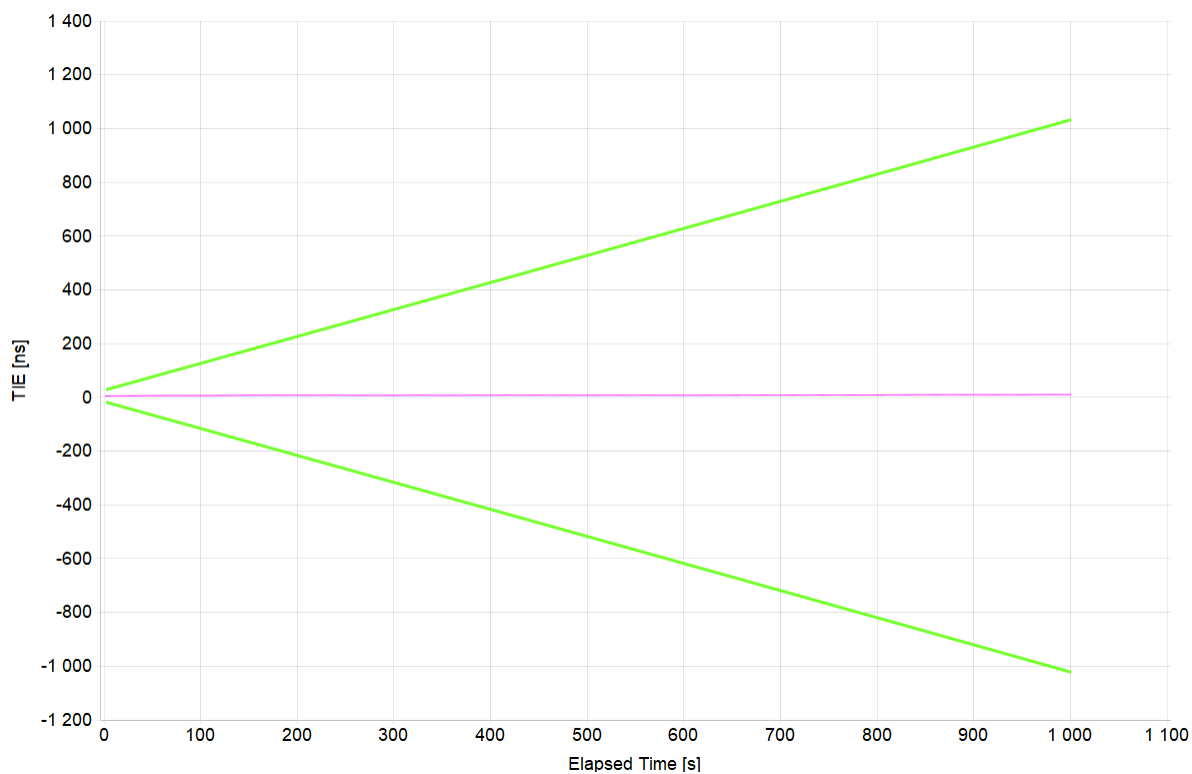
## 18. G.8273.4 PTS: Holdover

<b>Test Description</b>	Holdover
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-09 10:21:33 PM
<b>Test Duration</b>	00:16:40
<b>Time to Phase Lock (s)</b>	N/A

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask TIE</b>	G.8273.4 PTS Holdover (Oscillator) Const. Temp.
<b>Mask TIE Result</b>	<b>Pass</b>

1. This test is a continuation of the previous Noise Generation test. This allows for an appropriate amount of settling time before collecting holdover data (10 000s). The results are split because holdover requires a different mask than noise generation.

## 18.1 TIE Analysis



<b>Mean [ns]</b>	8.075
<b>Min [ns]</b>	5.197
<b>Max [ns]</b>	10.447
<b>Max-Min [ns]</b>	5.25

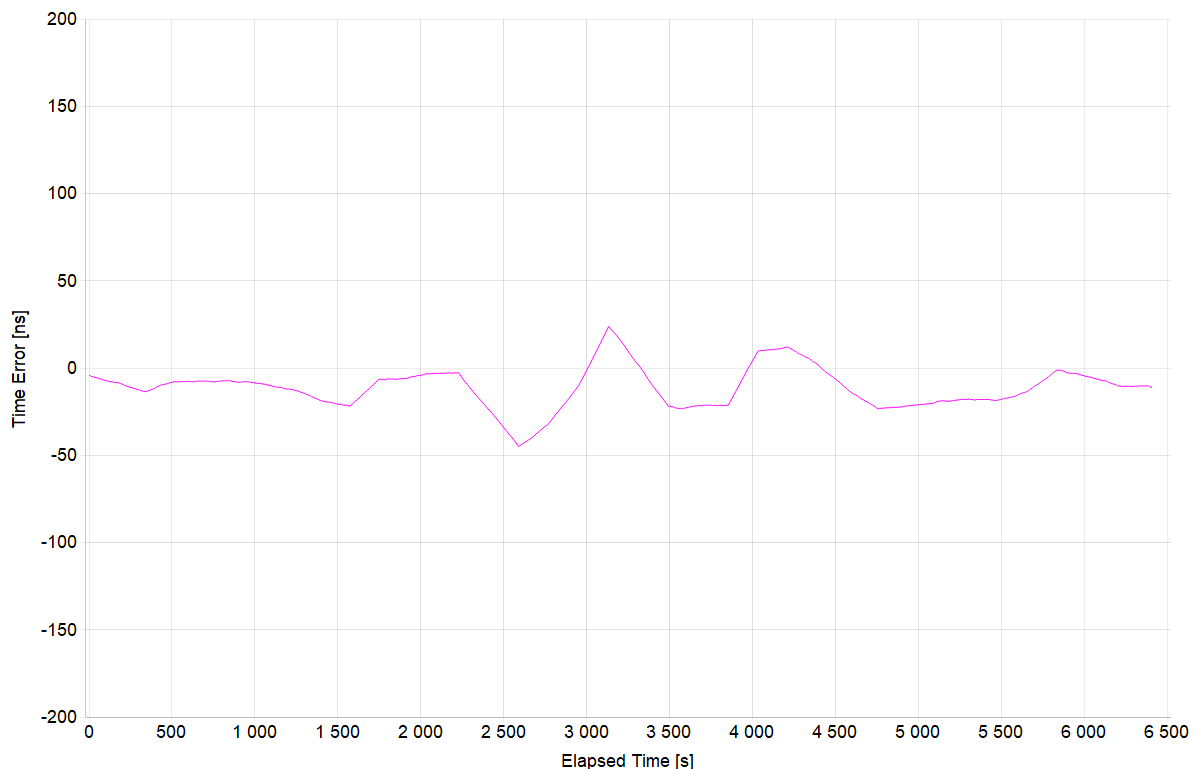
## 19. G.8261: Test Case 15 – Network Traffic Model B

<b>Test Description</b>	Test Case 15 - Network Traffic Model B
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-09 2:50:41 PM
<b>Test Duration</b>	01:46:50
<b>Time to Phase Lock (s)</b>	379

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	-
<b>Mask ONEPPS Result</b>	No Mask
<b>Mask MTIE</b>	G.8261 EEC Opt. 1 Wander Limit
<b>Mask MTIE Result</b>	<b>Pass</b>
<b>Mask TDEV</b>	G.8261 EEC Opt. 1 Wander Limit
<b>Mask TDEV Result</b>	<b>Pass</b>

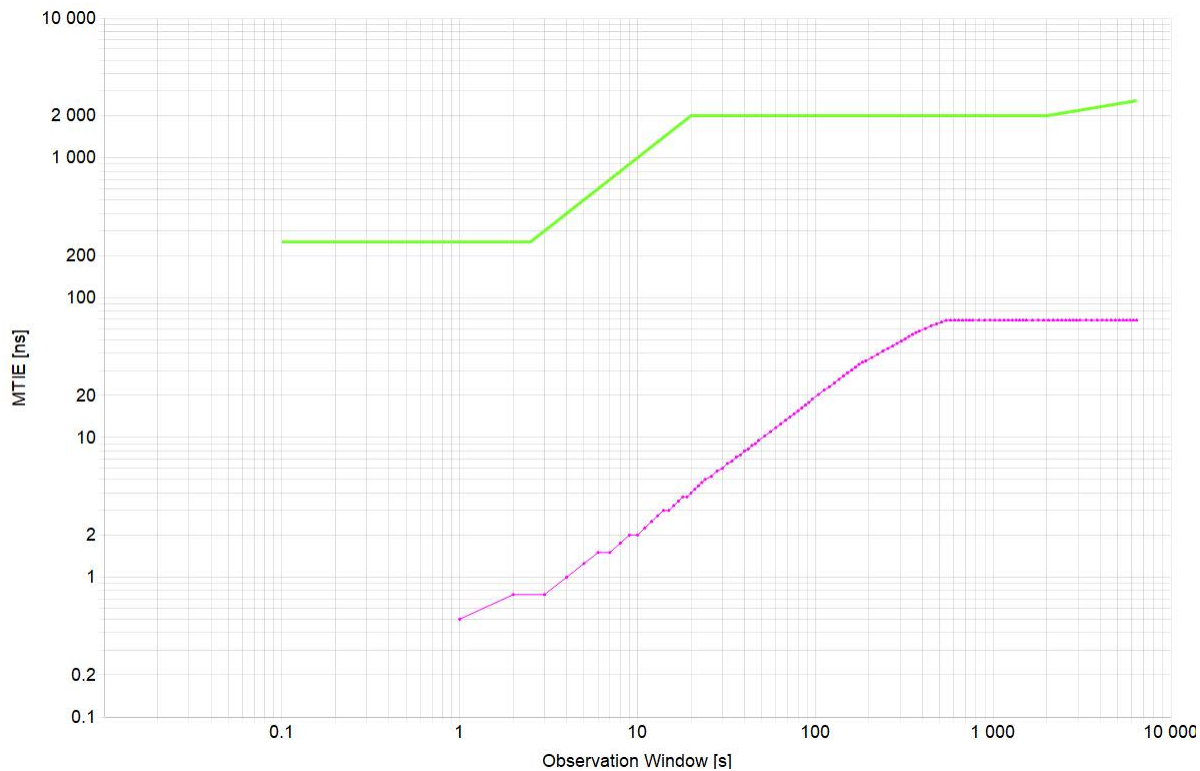
## 19.1 ONEPPS Analysis

<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	-4.303ns



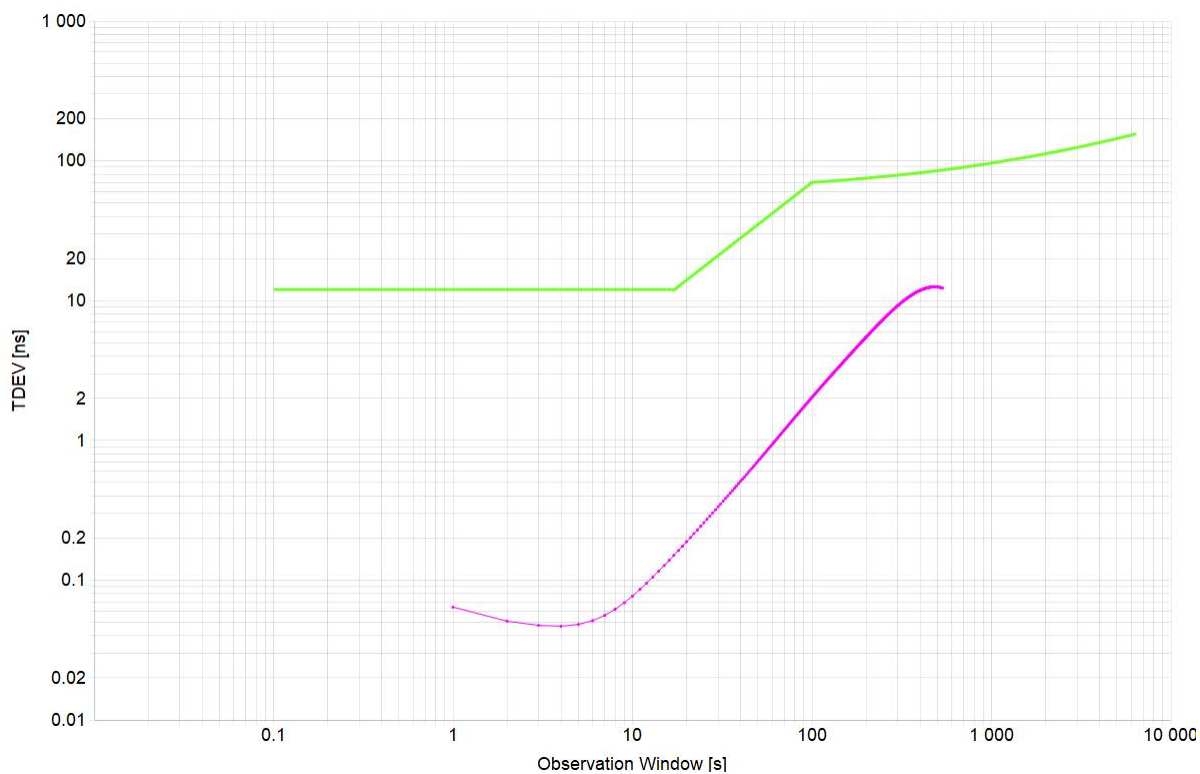
<b>Mean [ns]</b>	-11.281
<b>Min [ns]</b>	-45.053
<b>Max [ns]</b>	23.697
<b>Max-Min [ns]</b>	68.75

## 19.2 MTIE Analysis



<b>Min [ns]</b>	0.5
<b>Max [ns]</b>	68.75
<b>Max-Min [ns]</b>	68.25

### 19.3 TDEV Analysis



<b>Min [ns]</b>	0.047
<b>Max [ns]</b>	12.539
<b>Max-Min [ns]</b>	12.493

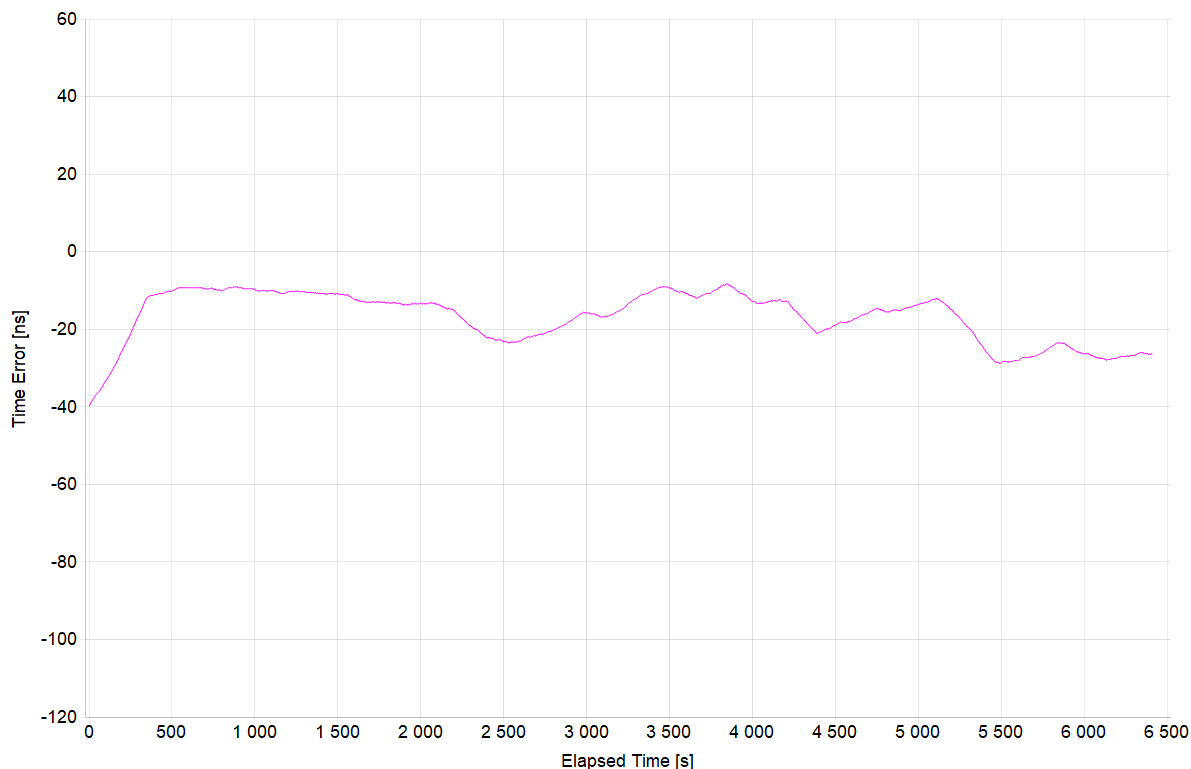
## 20. G.8261: Test Case 16 – Network Traffic Model B

<b>Test Description</b>	Test Case 16 - Network Traffic Model B
<b>Report Date</b>	23-02-10_15-40-56
<b>Packet Rate (pkt/s)</b>	16
<b>Beginning of Test</b>	2023-02-10 9:18:11 AM
<b>Test Duration</b>	01:46:50
<b>Time to Phase Lock (s)</b>	381

<b>All Mask Results</b>	<b>Pass</b>
<b>Mask ONEPPS</b>	-
<b>Mask ONEPPS Result</b>	No Mask
<b>Mask MTIE</b>	G.8261 EEC Opt. 1 Wander Limit
<b>Mask MTIE Result</b>	<b>Pass</b>
<b>Mask TDEV</b>	G.8261 EEC Opt. 1 Wander Limit
<b>Mask TDEV Result</b>	<b>Pass</b>

## 20.1 ONEPPS Analysis

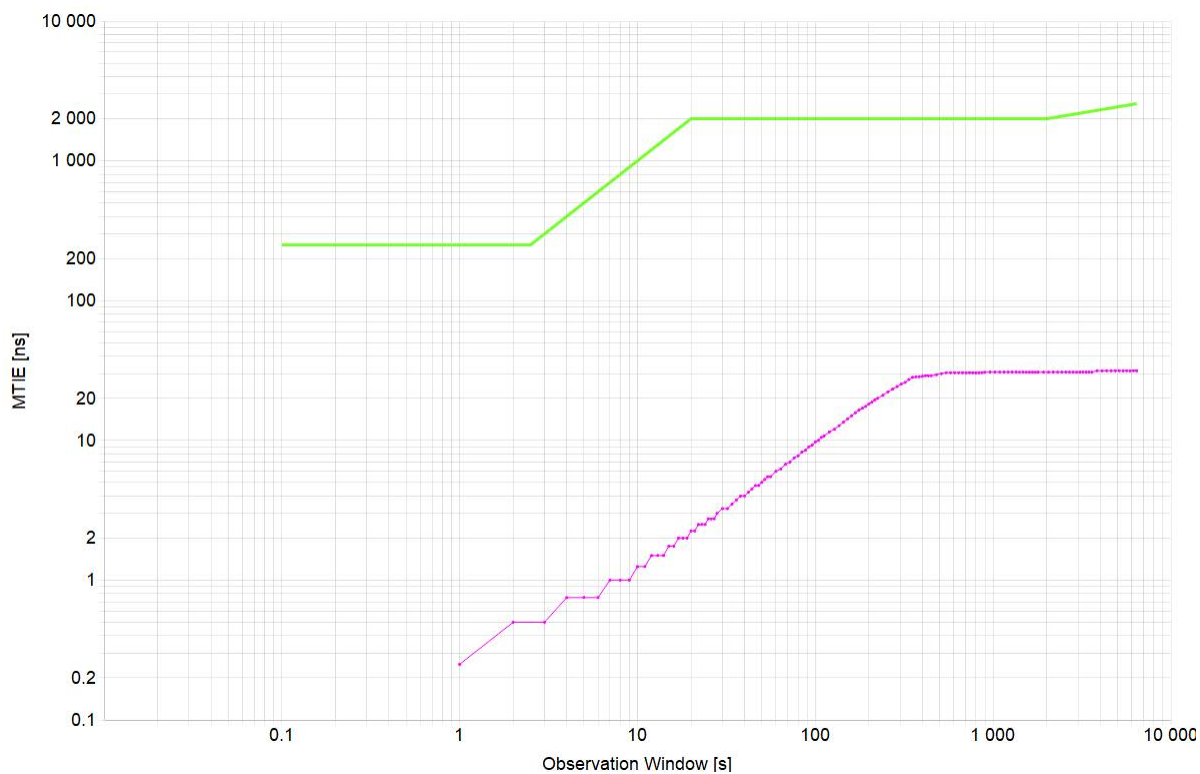
<b>Offset Removal Applied</b>	Off
<b>Zero Offset</b>	-39.803ns



<b>Mean [ns]</b>	-16.805
<b>Min [ns]</b>	-39.803
<b>Max [ns]</b>	-8.303
<b>Max-Min [ns]</b>	31.5

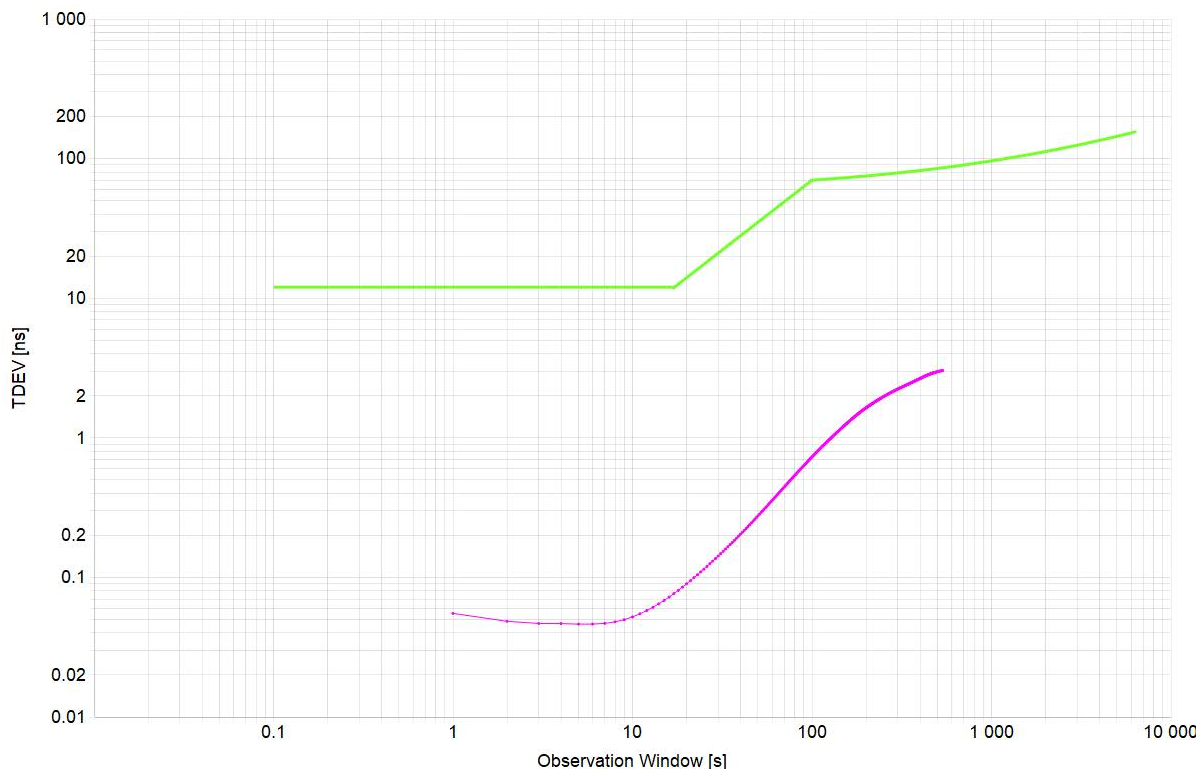


## 20.2 MTIE Analysis



<b>Min [ns]</b>	0.25
<b>Max [ns]</b>	31.5
<b>Max-Min [ns]</b>	31.25

## 21. TDEV Analysis



<b>Min [ns]</b>	0.046
<b>Max [ns]</b>	3.031
<b>Max-Min [ns]</b>	2.985

## 22. Configuration Files

### 22.1 PCM4L Json Files

#### 22.1.1 G.8273.4 PTS

```
{
  "versionId": "0.0",
  "testModeEnable": 0,
  "referenceTrackerType": "AdaptiveTime",
  "mgmtIpAddress": "127.0.0.1",

  "remoteUdsAddress": "/var/run/ptp4l",
  "localUdsAddress": "/var/run/pcm4l",

  "stepWindowSeconds": 1,

  "phc4lConfig":
  {
    "dcoDevice": "/dev/ptp2",
    "tsDevice":
      [
        {
          "tsDeviceName": "/dev/ptp1",
          "tsDevicePinIndex": -1,
          "tsDeviceExtttsChannel": 3,
          "tsDeviceExtttsCorrectionNs": -63
        }
      ],
    "charDevice": "/dev/rsmu0",

    "phaseSnapDelaySeconds": 3
  },

  "deviceConfig":
  {
    "oscillatorType": "MiniOcxo",
    "dpll1588Instance": 2,
    "tsDeviceAlignmentDisable": 0,
    "qualificationTimeoutSeconds": 900,
    "holdover":
    {
      "holdoverType": "Software",
      "holdoverLossPhysicalOosEnable": 0,
      "holdoverTimeoutSeconds": 1000,
      "unqualifiedTimeoutSeconds": 10000,
      "outOfSpecUserDefinedFrequencyOffsetEnable": 0,
      "outOfSpecUserDefinedFrequencyOffsetPpb": 0
    }
  },

  "profileConfig":
  {
```

```

    "physicalPllClockCategory": 4,
    "physicalPllClockCategoryThreshold": 2,
    "physicalPllInstance": 1,
    "physicalPllWaitToRestoreTimeoutValue": 10
},

"loggerConfig":
{
    "timestampType": "System",
    "stdoutLog":
    {
        "enable": 0,
        "selectionMask": "0000000000111111",
        "_description_": "      | | | | | | | | | | 0: Sync error          ",
        "_description_": "      | | | | | | | | | | 1: Sync warning          ",
        "_description_": "      | | | | | | | | | | 2: Sync analysis          ",
        "_description_": "      | | | | | | | | | | 3: Error                  ",
        "_description_": "      | | | | | | | | | | 4: Warning                 ",
        "_description_": "      | | | | | | | | | | 5: Debug                   ",
        "_description_": "      | | | | | | | | | | 7: Timestamp                "
    },

    "externalFdLog":
    {
        "enable": 0,
        "selectionMask": "0000000000011111",
        "_description_": "      | | | | | | | | | | 0: Sync error          ",
        "_description_": "      | | | | | | | | | | 1: Sync warning          ",
        "_description_": "      | | | | | | | | | | 2: Sync analysis          ",
        "_description_": "      | | | | | | | | | | 3: Error                  ",
        "_description_": "      | | | | | | | | | | 4: Warning                 ",
        "_description_": "      | | | | | | | | | | 5: Debug                   ",
        "_description_": "      | | | | | | | | | | 7: Timestamp                "
    },

    "logFile1":
    {
        "enable": 1,
        "fileName": "first_log_file.txt",
        "selectionMask": "0000000000011111",
        "purge": 1,
        "maxFileSize": 1000000,
        "archives": 2
    },

    "syslog":
    {
        "enable": 0,
        "selectionMask": "0000000000011111",
        "ipAddress": "10.64.10.45",
        "udpPort": 514
    }
},

```

```
"instanceConfig":
[
  {
    "instanceEnable": 1,
    "correctionFieldEnable": 1,
    "lostMasterTimeoutMilliseconds": 2000,

    "trackerConfig":
    {
      "floorDelayEstimateSeconds": -1.0,
      "willCorrectFrequencyAtFirstSnap": 0,
      "minExpProportionForMinTracking": 0.12,

      "stationarityBounds":
      {
        "measureLower": 0.4,
        "measureUpper": 2.5
      },

      "maxNumberOfPhaseSnap": 1,
      "doubleDcoThresholdNanoseconds": 600,
      "phaseSnapThresholdSeconds": 0.00001,
      "rerouteFloorDelayThresholdSeconds": 0.000002,
      "rerouteAbnormalTodChangePpb": 20,
      "highPrecisionFrequencyCorrectionTimeMinutes": 6,

      "pdvThreshold":
      {
        "downlink": -20,
        "uplink": -20
      },

      "pdvThresholdExceededHysteresis":
      {
        "downlink": 1,
        "uplink": 1
      },

      "snapTransitionTimestamps": 4,

      "dcoLoopFilter":
      {
        "minResponseTimeSeconds": 100,
        "maxFfoCorrection": 5,
        "integralBranchGain": 0.2,
        "bandwidthScalar": 0.5
      },

      "desiredPrecisionSeconds": 0.0000001,
      "frequencyLockThresholdPpb": 15.0,
      "timeLockThresholdNanoseconds": 2450,
      "ffoSlopeLimitPpbPerSecond": -1
    }
  }
]
```

```

    }
  }
]
}

```

### 22.1.2 G.8273.2 FTS

```

{
  "versionId": "0.0",
  "testModeEnable": 0,
  "referenceTrackerType": "WritePhase",
  "remoteUdsAddress": "/var/run/ptp4l",
  "localUdsAddress": "/var/run/pcm4l",

  "stepWindowSeconds": 1,

  "phc4lConfig":
  {
    "dcoDevice": "/dev/ptp2",
    "tsDevice":
    [
      {
        "tsDeviceName": "/dev/ptp1",
        "tsDevicePinIndex": -1,
        "tsDeviceExtttsChannel": 3,
        "tsDeviceExtttsCorrectionNs": -63
      }
    ],
    "charDevice": "/dev/rsmu0",

    "phaseSnapDelaySeconds": 3,
    "tsCalibrationEnable": 0
  },

  "deviceConfig":
  {
    "oscillatorType": "Ocxo",
    "dpll1588Instance": 2,
    "tsDeviceAlignmentDisable": 0,
    "holdover":
    {
      "holdoverType": "HardwareEnhanced",
      "holdoverLossPhysicalOosEnable": 0,
      "holdoverTimeoutSeconds": 1000,
      "holdoverQualificationSeconds": 100,
      "unqualifiedTimeoutSeconds": 10000,
      "outOfSpecUserDefinedFrequencyOffsetEnable": 0,
      "outOfSpecUserDefinedFrequencyOffsetPpb": 0
    }
  },

  "profileConfig":
  {

```

```

    "physicalPllClockCategory": 1, Note: Changed to 4 to test without SyncE
    "physicalPllClockCategoryThreshold": 1,
    "physicalPllInstance": 1,
    "physicalPllWaitToRestoreTimeoutValue": 10
  },

  "loggerConfig":
  {
    "stdoutLog":
    {
      "enable": 0,
      "selectionMask": "0000000000011111",
      "_description_": "       | | | | | | |__ 0: Sync error          ",
      "_description_": "       | | | | | | |__ 1: Sync warning          ",
      "_description_": "       | | | | | | |__ 2: Sync analysis          ",
      "_description_": "       | | | | | | |__ 3: Error                  ",
      "_description_": "       | | | | | | |__ 4: Warning                ",
      "_description_": "       | | | | | | |__ 5: Debug                  ",
      "_description_": "       | | | | | | |__ 7: Timestamp              "
    },

    "externalFdLog":
    {
      "enable": 0,
      "selectionMask": "0000000000011111",
      "_description_": "       | | | | | | |__ 0: Sync error          ",
      "_description_": "       | | | | | | |__ 1: Sync warning          ",
      "_description_": "       | | | | | | |__ 2: Sync analysis          ",
      "_description_": "       | | | | | | |__ 3: Error                  ",
      "_description_": "       | | | | | | |__ 4: Warning                ",
      "_description_": "       | | | | | | |__ 5: Debug                  ",
      "_description_": "       | | | | | | |__ 7: Timestamp              "
    },

    "logFile1":
    {
      "enable": 1,
      "fileName": "first_log_file.txt",
      "selectionMask": "0000000000011111"
    }
  },

  "instanceConfig":
  [
    {
      "correctionFieldEnable": 1,
      "lostMasterTimeoutMilliseconds": 2000,
      "manageClockClassExtendedEnable" : 0,

      "trackerConfig":
      {
        "phaseSnapThresholdSeconds": 0.00001,
        "floorDelayEstimateSeconds": -1.0,
        "timeLockThresholdNanoseconds": 250,

```

```
        "willCorrectFrequencyAtFirstSnap": 1,  
        "frequencyLockThresholdPpb": 16.0,  
        "lockFilterWindowLengthSeconds": 1.0  
    }  
}  
]  
}
```

## 22.2 PTP4L Config Files

### 22.2.1 G.8275.2 Unicast Slave Clock

```
[global]  
domainNumber      44  
  
twoStepFlag       0  
  
# Announce messages  
announceReceiptTimeout  2  
logAnnounceInterval     1  
  
# Sync/Delay_Req/Delay_Resp messages  
# ex. 0 = 1 PPS, -3 = 8 PPS, -4 = 16 PPS  
logSyncInterval         -4  
logMinDelayReqInterval -4  
  
slaveOnly      1  
masterOnly     0  
  
clockClass     255  
clockAccuracy  0xFE  
timeSource     0xA0  
maxStepsRemoved 255  
  
offsetScaledLogVariance 0xffff  
  
G.8275.defaultDS.localPriority 128  
G.8275.portDS.localPriority    128  
  
priority1      128  
priority2     255  
  
dataset_comparison      G.8275.x  
transportSpecific       0  
  
clock_type      OC  
delay_mechanism E2E  
  
#  
# Send timestamps to pcm41  
#  
free_running      1  
slave_event_monitor  /var/run/pcm41
```



```
tsproc_mode          raw
tx_timestamp_timeout 5
sanity_freq_limit    0

network_transport    UDPv4

hybrid_e2e           1
inhibit_multicast_service 1
unicast_listen       1
unicast_req_duration 300

[unicast_master_table]
table_id             1
logQueryInterval    2
UDPv4                10.64.10.1

[vnptp1]
unicast_master_table 1
```

## 22.2.2 G.8275.1 Multicast Boundary Clock

```
[global]
domainNumber 24

twoStepFlag 0

# Announce messages
announceReceiptTimeout 3
logAnnounceInterval -3

# Sync/Delay_Req/Delay_Resp messages - 16 packets-per-second, -4 = 16 PPS
logSyncInterval -4
logMinDelayReqInterval -4

#
# step_window is in units of sync packets
#
# 3 seconds:
# @ 16 PPS, set to 48
# @ 1 PPS, set to 3
step_window 48

clockClass 255
clockAccuracy 0xFE
timeSource 0xa0
maxStepsRemoved 255

offsetScaledLogVariance 0xffff

G.8275.defaultDS.localPriority 128
G.8275.portDS.localPriority 128
```

```

priority1      128
priority2      255

dataset_comparison      G.8275.x
transportSpecific      0

network_transport      L2

clock_type      BC
delay_mechanism      E2E
#
# Send timestamps to pcm41
#
free_running      1
slave_event_monitor      /var/run/pcm41
tsproc_mode      raw
tx_timestamp_timeout      5
sanity_freq_limit      0

tsproc_mode      raw
ptp_dst_mac      01:1B:19:00:00:00

[vnptp0]
[vnptp1]
    
```

## 22.3 TCS/Bin Files

Standard	TCS/Bin Files
G.8273.2 FTS	8A34001_knetsync_todsync_en_v2_synce2.bin
G.8273.4 PTS	8A34001_knetsync_todsync_en_v2_wf.bin

## 23. Revision History

Revision	Date	Description
1.00	May 10, 2023	Initial release.

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