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Notations

As presented in [Petit et al., 2001] for the Z12-T, the calibration of a geodetic system is divided in (up to) 6 different parts (Figure 1)

- X_P = Delay of the 1PPS-in with respect to the laboratory reference
- X_O = Delay of the "internal reference" with respect to the 1PPS-in

($X_P + X_o$) = REFDLY.

- X_C = antenna cable delay
- [X_D = short cable + splitter delay]

($X_C + X_D$) = CABDLY. In practice, X_D is generally not used.

- X_R = receiver internal delay, measured from the "internal reference"
- X_S = antenna delay

($X_R + X_S$) = INTDLY.

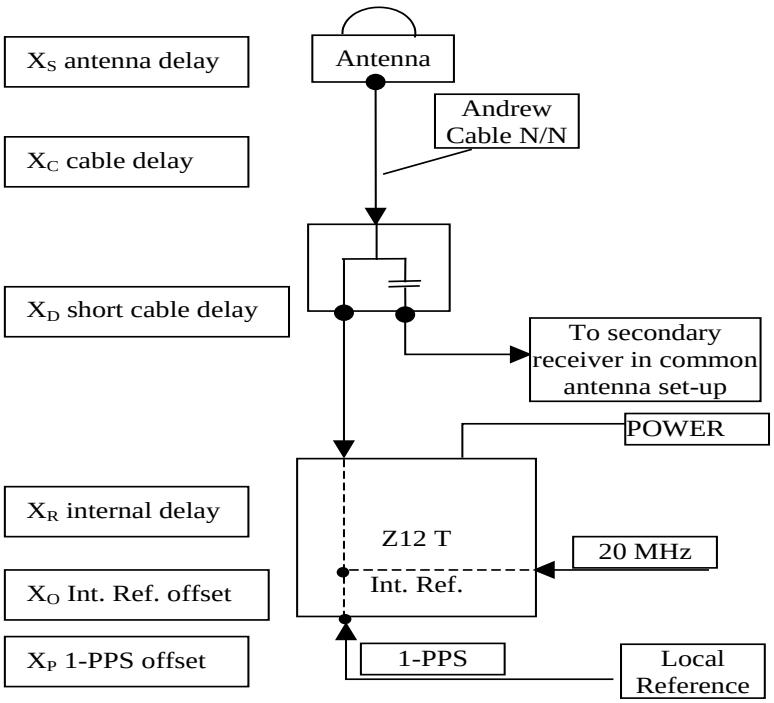


Figure 1: Definition of the different delays used in the most general set-up of a geodetic system (here shown for a Z12-T) from [Petit et al, 2001].

4/ phase 4

Laboratories: BIPM, USNO, NIST

4.1/ BIPM (19071)

Period

MJD 58554 to 58566

Delays

BP1J:

X_O = 134.07 ns	(187.95-53.88)
X_P = 47.60 ns	(BP1R+C139+BP1S+C172)
REFDLY = 181.67 ns	
CABDLY = 128.73 ns	(C138)

BP1C:

X_O = 185.34 ns	(200.82-15.48)
X_P = 52.60 ns	(BP1R+C166+BP1I+C157)
REFDLY = 237.94 ns	
CABDLY = 235.70 ns	(C131)

BP25:

REFDLY = 52.60 ns	(BP1R+C166+BP1I+C153)
CABDLY = 176.24 ns	(C208)

Setup at the BIPM

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 58554
Date and hour of the end of measurements:	MJD 58566

Information on the system

	Local:	Travelling:
4-character BIPM code	BP1J	BP1C
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx4proTR 27	Septentrio PolaRx3eTR S9000169176
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE MC 5131	Ashtech Chokering 701945-2 CR62000323008
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	47.60 ns	52.60 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	134.07 ns	185.34 ns
• Antenna cable delay:	128.73 ns	235.70 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 58554
Date and hour of the end of measurements:	MJD 58566

Information on the system

	Local:	Travelling:
4-character BIPM code	BP1J	BP25
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx4proTR 27	Mesit GTR55 1808001
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE MC 5131	Novatel GNSS-850 NMLK18070096N
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	47.60 ns	52.60 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	134.07 ns	
• Antenna cable delay:	128.73 ns	176.24 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

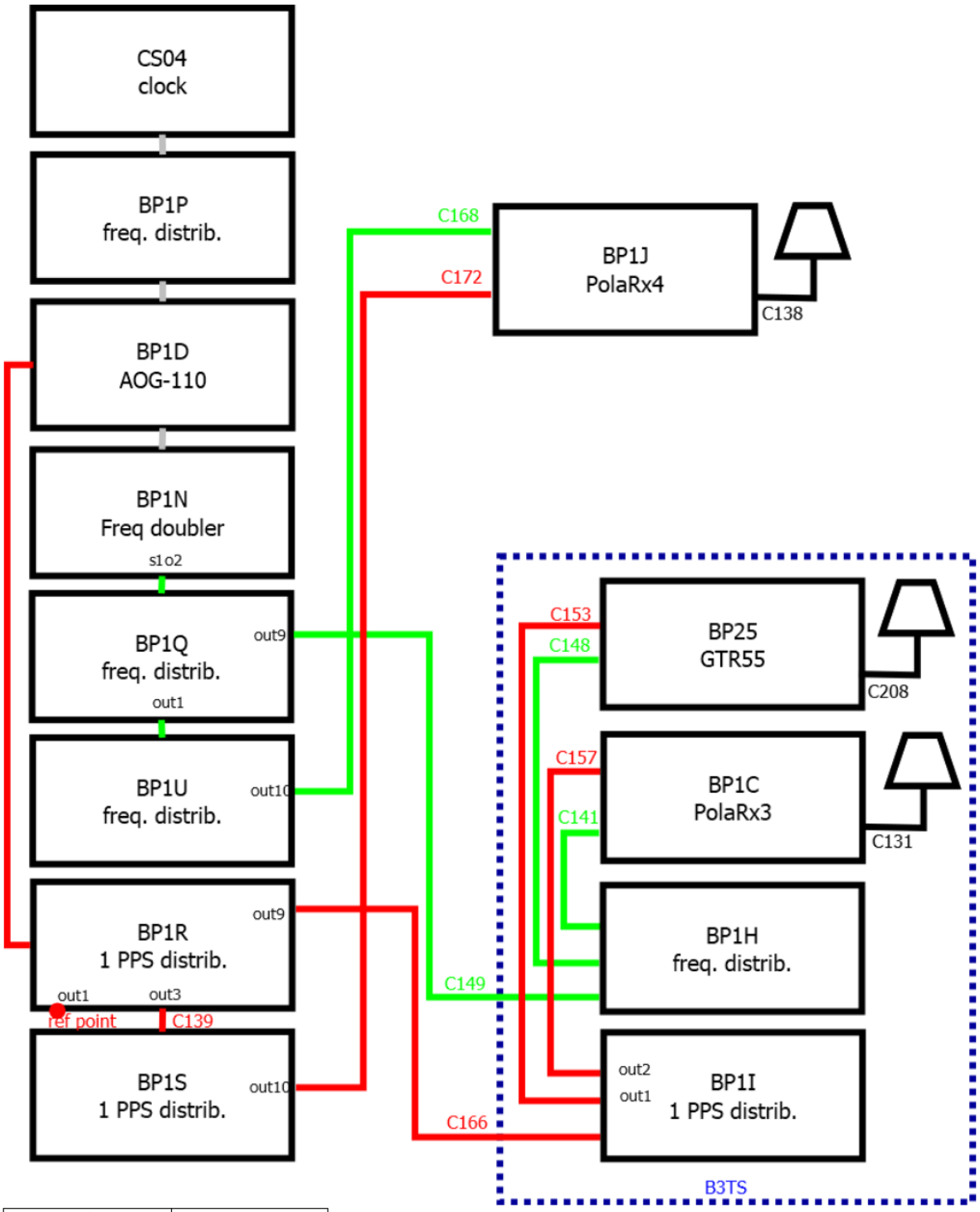
• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Diagram of the experiment set-up:



Log of Events / Additional Information :

All measurements at BIPM carried out by L. Tisserand.

Equipment used to measure delays are two Time Interval Counter (TIC), model SR620, maker Stanford Research Systems, with measurement uncertainty typically less than 0.5 ns (using external reference frequency as timebase).

TIC serial number 4680 used for local receivers.
TIC serial number 5482 used for traveling receivers.

BP1C-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 263359
Number of huge residuals = 1. New iteration
Computed code bias (P1/P2)/m = 13.436 15.176
Computed baseline (X,Y,Z)/m = -1.377 -0.160 1.545
RMS of residuals /m = 0.614

Number of phase differences to fit baseline
L1/L2 = 257673
L5 = 0
A priori baseline (X,Y,Z)/m = -1.377 -0.160 1.545
37433 clock jitters computed out of 37433 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 5.2

Iter 1 Large residuals L1= 3
Iter 1 Large residuals L2= 5
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.088 -0.052 -0.212
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = -0.083 -0.064 -0.224
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 3
Iter 2 Large residuals L2= 5
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.088 -0.052 -0.212
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = -0.083 -0.064 -0.224
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.465 -0.213 1.332
Final baseline L2 (X,Y,Z)/m = -1.460 -0.224 1.320
Final baseline L5 (X,Y,Z)/m = -1.463 -0.218 1.326

COMPUTATION OF CODE DIFFERENCES

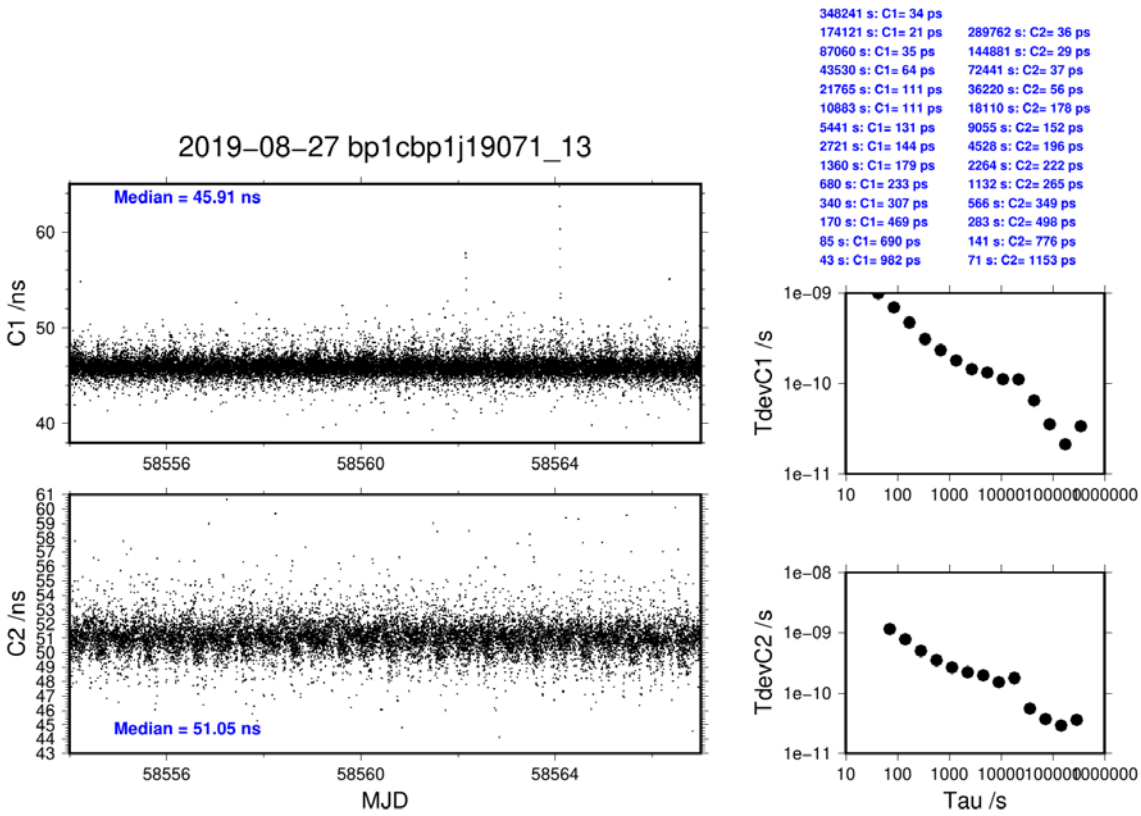
Total number of code differences = 267509

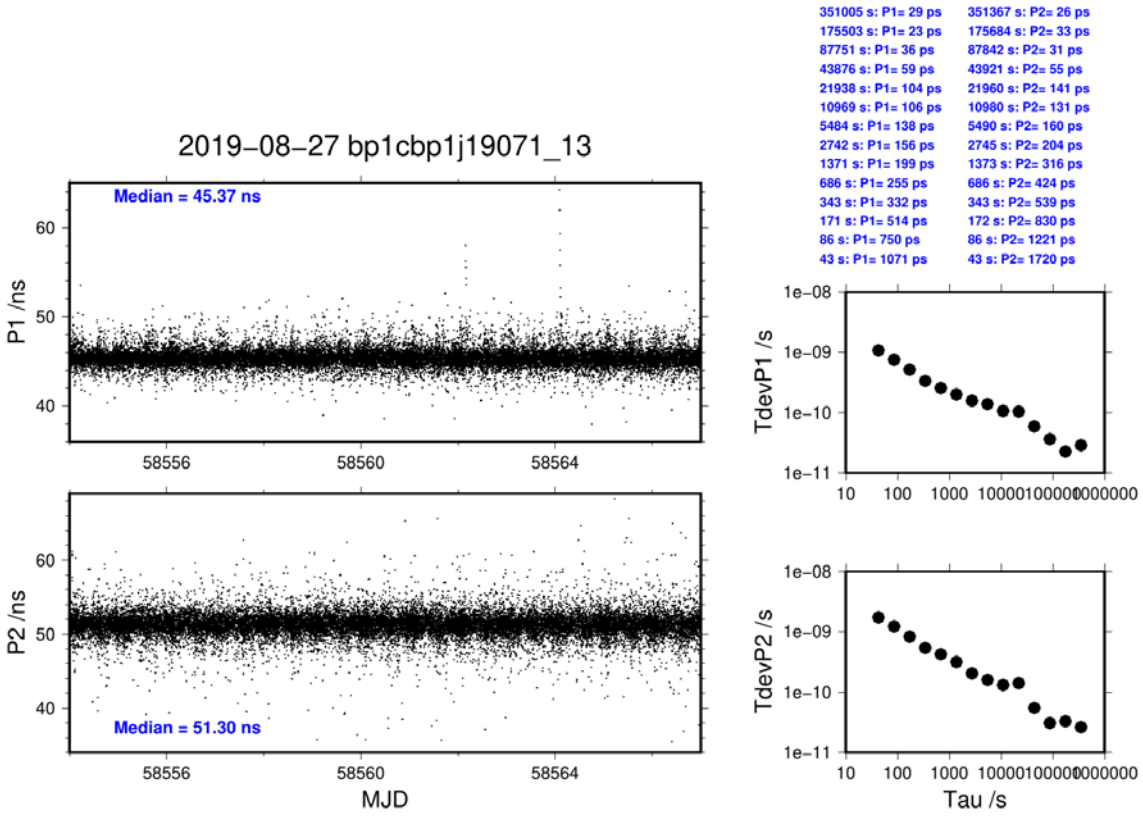
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	264667	45.963	1.882
C2	159038	51.060	2.025
P1	262538	45.416	1.930
P2	262308	51.252	2.895

Number of 300s epochs in out file = 3744

Code	#pts	median/ns	ave/ns	rms/ns
C1	26416	45.907	45.961	0.976
C2	15874	51.051	51.068	1.116
P1	26208	45.365	45.414	1.062
P2	26181	51.299	51.260	1.702




351005 s: P1= 29 ps
175503 s: P1= 23 ps
87751 s: P1= 36 ps
43876 s: P1= 59 ps
21938 s: P1= 104 ps
10969 s: P1= 106 ps
5484 s: P1= 138 ps
2742 s: P1= 156 ps
1371 s: P1= 199 ps
686 s: P1= 255 ps
343 s: P1= 332 ps
171 s: P1= 514 ps
86 s: P1= 750 ps
43 s: P1= 1071 ps
351367 s: P2= 26 ps
175684 s: P2= 33 ps
87842 s: P2= 31 ps
43921 s: P2= 55 ps
21960 s: P2= 141 ps
10980 s: P2= 131 ps
5490 s: P2= 160 ps
2745 s: P2= 204 ps
1373 s: P2= 316 ps
686 s: P2= 424 ps
343 s: P2= 539 ps
172 s: P2= 830 ps
86 s: P2= 1221 ps
43 s: P2= 1720 ps
2019–08–27 bp1cbp1j19071_13
Median = 45.37 ns
P1 /ns
Median = 51.30 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s

BP25-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 261763
Number of huge residuals = 1208. New iteration
Computed code bias (P1/P2)/m = 41.490 42.859
Computed baseline (X,Y,Z)/m = -2.407 0.843 2.072
RMS of residuals /m = 0.483

Number of phase differences to fit baseline
L1/L2 = 254927
L5 = 98276
A priori baseline (X,Y,Z)/m = -2.407 0.843 2.072
37243 clock jitters computed out of 37243 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 4.6

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 6
Iter 1 Large residuals L5= 14
Computed baseline L1 (X,Y,Z)/m = 0.085 0.031 0.010
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.097 0.028 0.028
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.094 0.035 0.033
RMS of residuals L5 /m = 0.004

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 6
Iter 2 Large residuals L5= 14
Computed baseline L1 (X,Y,Z)/m = 0.085 0.031 0.010
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.097 0.028 0.028
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.094 0.035 0.033
RMS of residuals L5 /m = 0.004

Final baseline L1 (X,Y,Z)/m = -2.323 0.874 2.082
Final baseline L2 (X,Y,Z)/m = -2.310 0.872 2.100
Final baseline L5 (X,Y,Z)/m = -2.313 0.878 2.105

COMPUTATION OF CODE DIFFERENCES

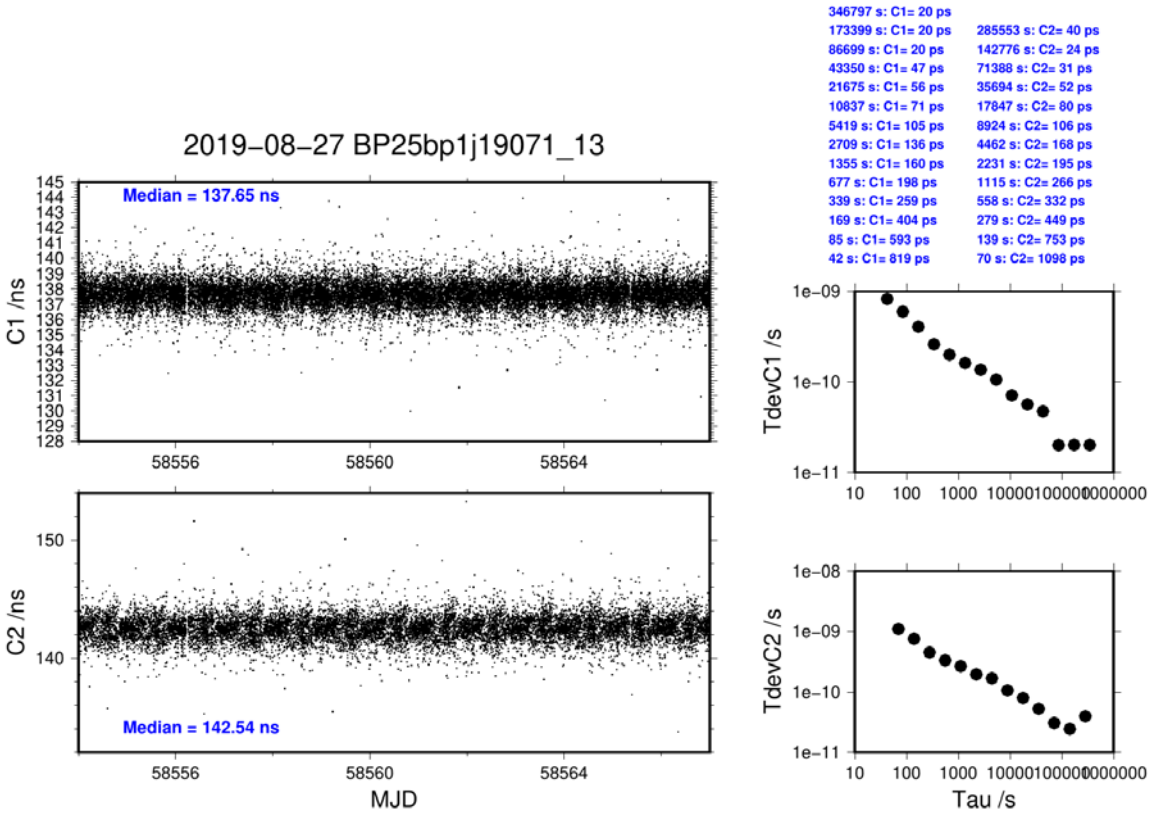
Total number of code differences = 439155

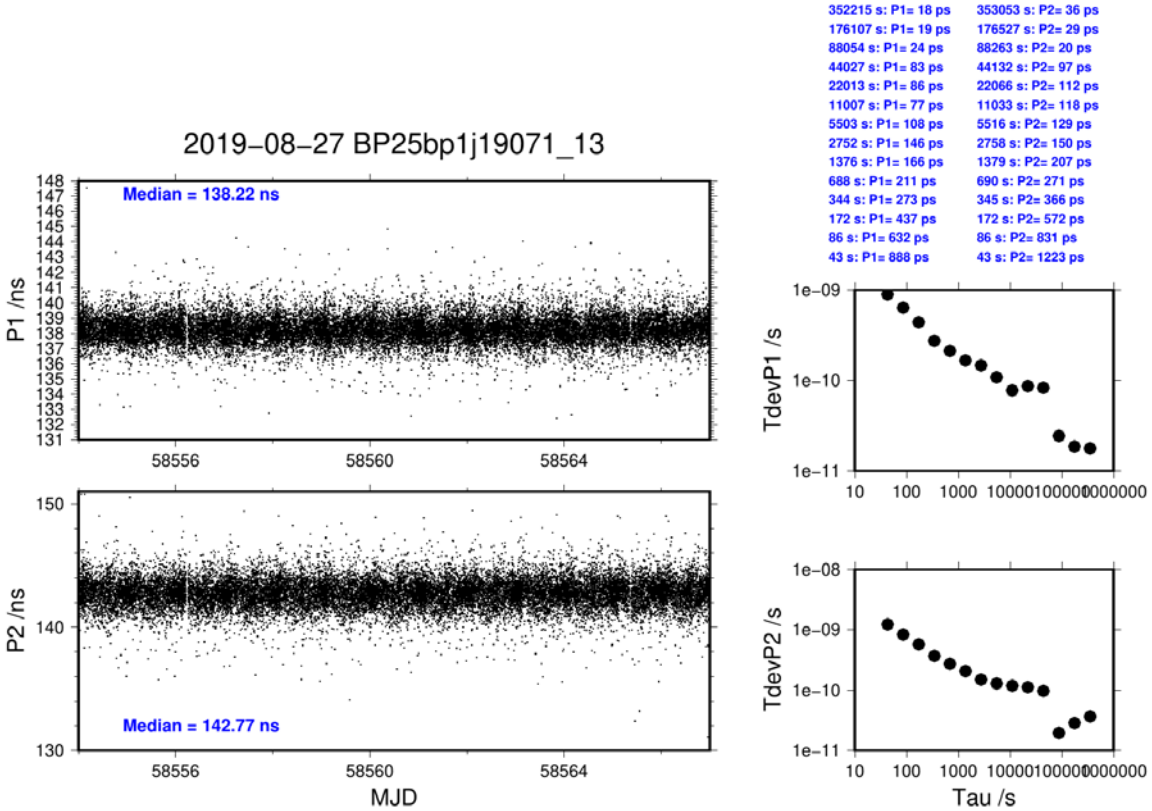
Global average of individual differences

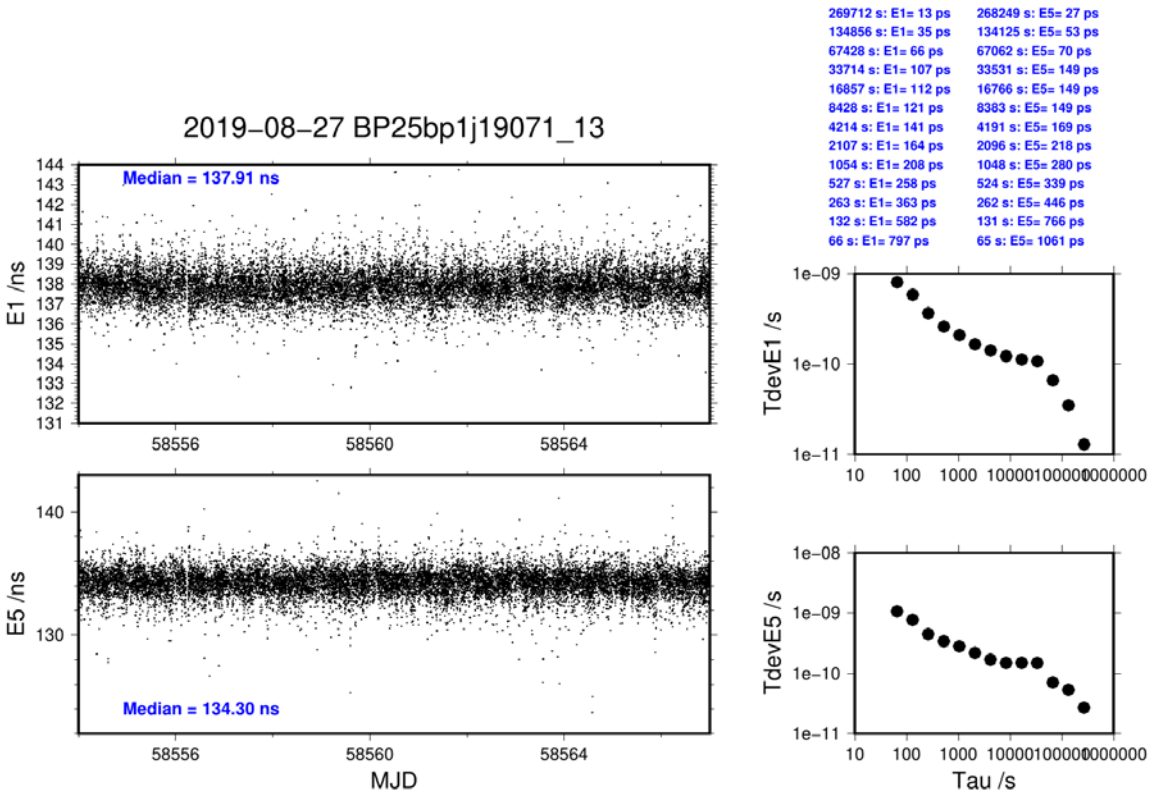
Code	#pts	ave/ns	rms/ns
C1	265350	137.642	1.429
C2	161111	142.495	1.772
P1	261638	138.228	1.500
P2	261061	142.751	1.935
E1	170786	137.922	1.351
E5	171674	134.248	1.536

Number of 300s epochs in out file = 3727

Code	#pts	median/ns	ave/ns	rms/ns
C1	26526	137.654	137.658	0.826
C2	16108	142.537	142.515	1.052
P1	26118	138.216	138.242	0.890
P2	26056	142.771	142.748	1.186
E1	17054	137.915	137.936	0.811
E5	17147	134.302	134.254	1.062




2019–08–27 BP25bp1j19071_13
Median = 138.22 ns
P1 /ns
Median = 142.77 ns
P2 /ns
MJD
352215 s: P1= 18 ps
176107 s: P1= 19 ps
88054 s: P1= 24 ps
44027 s: P1= 83 ps
22013 s: P1= 86 ps
11007 s: P1= 77 ps
5503 s: P1= 108 ps
2752 s: P1= 146 ps
1376 s: P1= 166 ps
688 s: P1= 211 ps
344 s: P1= 273 ps
172 s: P1= 437 ps
86 s: P1= 632 ps
43 s: P1= 888 ps
353053 s: P2= 36 ps
176527 s: P2= 29 ps
88263 s: P2= 20 ps
44132 s: P2= 97 ps
22066 s: P2= 112 ps
11033 s: P2= 118 ps
5516 s: P2= 129 ps
2758 s: P2= 150 ps
1379 s: P2= 207 ps
690 s: P2= 271 ps
345 s: P2= 366 ps
172 s: P2= 572 ps
86 s: P2= 831 ps
43 s: P2= 1223 ps
TdevP1 /s
TdevP2 /s
Tau /s


2019–08–27 BP25bp1j19071_13
Median = 137.91 ns
E1 /ns
Median = 134.30 ns
E5 /ns
MJD
269712 s: E1= 13 ps
134856 s: E1= 35 ps
67428 s: E1= 66 ps
33714 s: E1= 107 ps
16857 s: E1= 112 ps
8428 s: E1= 121 ps
4214 s: E1= 141 ps
2107 s: E1= 164 ps
1054 s: E1= 208 ps
527 s: E1= 258 ps
263 s: E1= 363 ps
132 s: E1= 582 ps
66 s: E1= 797 ps
268249 s: E5= 27 ps
134125 s: E5= 53 ps
67062 s: E5= 70 ps
33531 s: E5= 149 ps
16766 s: E5= 149 ps
8383 s: E5= 149 ps
4191 s: E5= 169 ps
2096 s: E5= 218 ps
1048 s: E5= 280 ps
524 s: E5= 339 ps
262 s: E5= 446 ps
131 s: E5= 766 ps
65 s: E5= 1061 ps
TdevE1 /s
TdevE5 /s
Tau /s

4.2/ USNO (19101)

Period

MJD 58584 to 58595

Delays

BP1C:

X_O = 206.10 ns (221.54-15.44)
X_P = 33.27+52.60 = 85.87 ns (cf next page)
REFDLY = 291.97 ns
CABDLY = 235.70 ns (C131)

BP25:

REFDLY = 33.27+52.60 = 85.87 ns (cf next page)
CABDLY = 176.24 ns (C208)

USN6:

TOTDLY: (from CGGTTS file gz0658.584)
-6.0 ns (GPS C1)
-8.8 ns (GPS P2)

USN7: (cf page 16)
TOTDLY = 0 ns

USN8: (cf page 16)
TOTDLY = 0 ns

USN9: (cf page 16)
TOTDLY = 0 ns

Setup at the USNO

USNO to BIPM Clock Signals (04/23/2019)

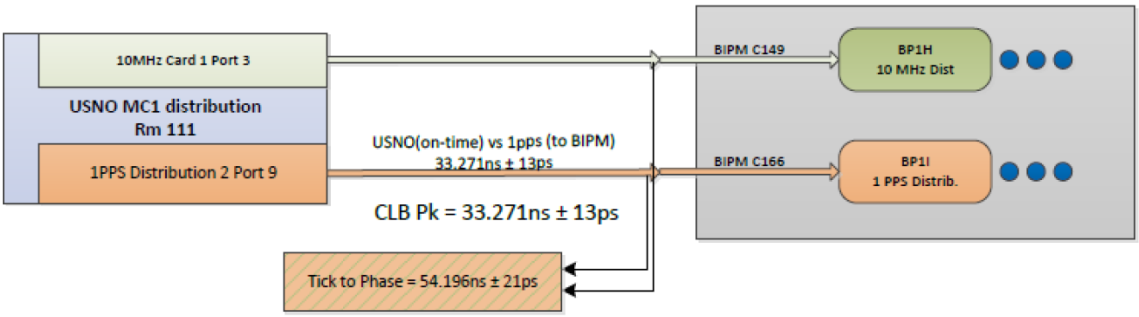


figure 1: Clock Signal connections

BP1C Antenna Position:	BP1C 04/10/2019	BP1C 04/23/2019
Ref Frame = IGS08 (EPOCH:2019.2721) X = 1112167.354(m) 0.007(m) Y = -4842853.659(m) 0.019(m) Z = 3985497.483(m) 0.010(m) OBS USED: 36355 / 36991 : 98 % FIXED AMB: 117 / 122 : 96% OVERALL RMS: 0.014(m)	**Before Operation:** mean = 15.447ns Std. dev = +5ps N = 500 **During Operation:** mean = 221.513ns Std. dev = +73ps N = 10000	**During Operation:** mean = 221.563ns Std. dev = +76ps N = 10000 **After Operation:** mean = 15.439ns Std. dev = +5ps N = 500

figure 2: BP1C Data

NOTES:

- Septentrio PolaRx5TR was used to survey position of Chokering antenna. Surveyed for 24hrs:

Ref Frame = IGS08 (EPOCH:2019.2721)
X = 1112167.354(m) 0.007(m)
Y = -4842853.659(m) 0.019(m)
Z = 3985497.483(m) 0.010(m)

- All 1pps measurements done using BIPM TIC SR620

Log of Events / Additional Information :

None of the receivers USN6-9 have any calibration values applied other than the CGGTTS data for USN6 using BIPM-supplied values.
They all reside on a Topcon CR-G5 antenna (DOMES: 40451S009).

USN6
NovAtel ProPak-V3
Serial: NAP06320017
Firmware: 3.907

USN7
Septentrio PolaRx5 TR
Serial: 3013939
Firmware: 5.1.2

USN8
Septentrio PolaRx5 TR
Serial: 3013987
Firmware: 5.2.0

USN9
NovAtel ProPak6
Serial: NMCP1339017E
Firmware: OMP060606RN0000

BP1C-USN6

COMPUTATION OF BASELINE

```
Number of codes to fit baseline and biases = 331252
Computed code bias (P1/P2)/m =     -0.408     2.060
Computed baseline (X,Y,Z)/m =     -4.804    -0.969    -0.433
RMS of residuals /m =      0.502

Number of phase differences to fit baseline
L1/L2 = 329153
L5    =      0
A priori baseline (X,Y,Z)/m =     -4.804    -0.969    -0.433
34553 clock jitters computed out of  34553 intervals
AVE jitter /ps =    0.1 RMS jitter /ps =    4.7

Iter  1 Large residuals L1=    0
Iter  1 Large residuals L2=    1
Iter  1 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.017     0.031     0.001
RMS of residuals L1 /m =      0.004
Computed baseline L2 (X,Y,Z)/m =      0.015     0.039    -0.005
RMS of residuals L2 /m =      0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Iter  2 Large residuals L1=    0
Iter  2 Large residuals L2=    1
Iter  2 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.017     0.031     0.001
RMS of residuals L1 /m =      0.004
Computed baseline L2 (X,Y,Z)/m =      0.015     0.039    -0.005
RMS of residuals L2 /m =      0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2


Final baseline L1 (X,Y,Z)/m =     -4.786    -0.937    -0.433
Final baseline L2 (X,Y,Z)/m =     -4.788    -0.930    -0.438
Final baseline L5 (X,Y,Z)/m =     -4.787    -0.934    -0.435
Final baseline E6 (X,Y,Z)/m =     -4.787    -0.934    -0.435
Final baseline E7 (X,Y,Z)/m =     -4.787    -0.934    -0.435
Final baseline E8 (X,Y,Z)/m =     -4.787    -0.934    -0.435
```

COMPUTATION OF CODE DIFFERENCES

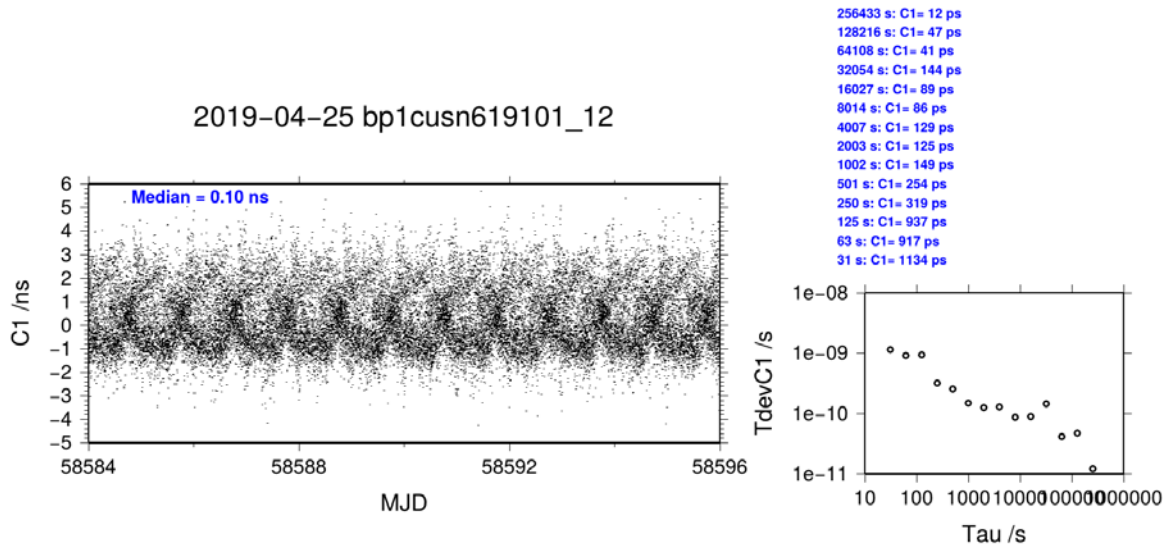
Total number of code differences = 331724

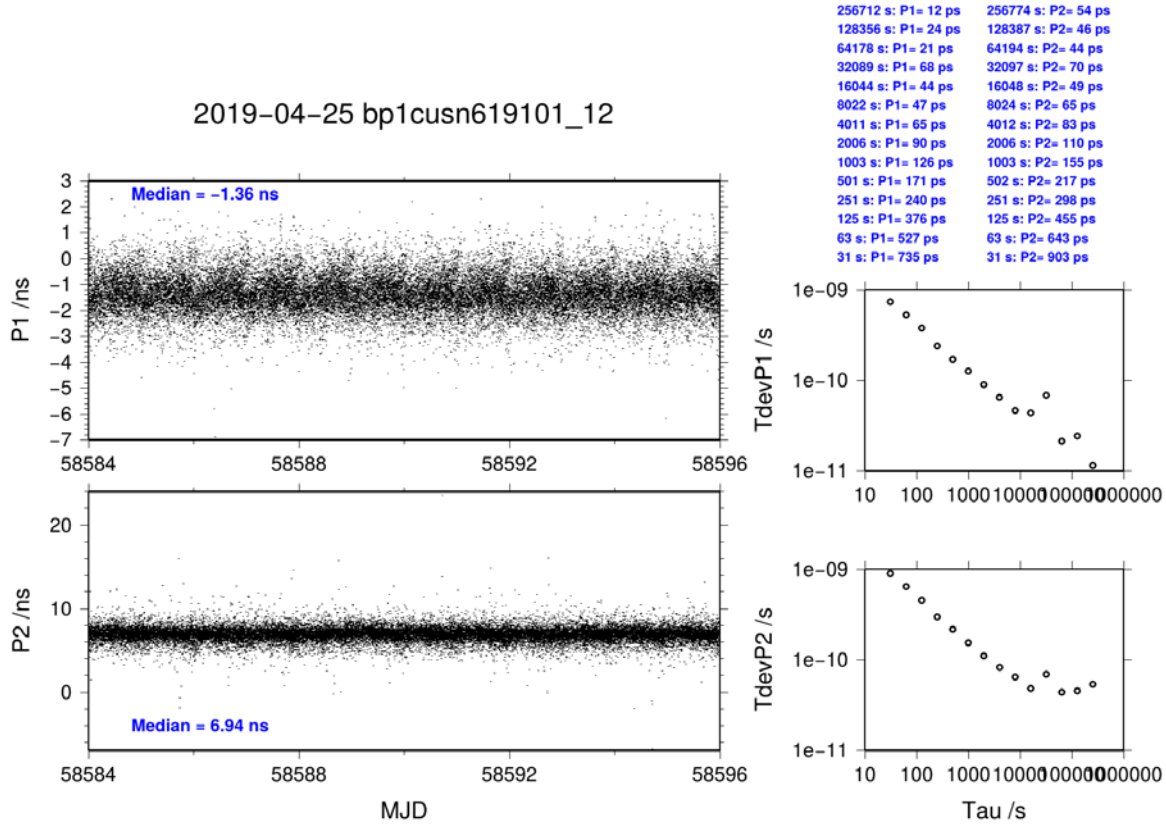
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	331588	0.299	1.892
P1	331190	-1.325	1.565
P2	331137	6.926	1.970

Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	33113	0.104	0.286	1.303
P1	33077	-1.362	-1.338	0.736
P2	33069	6.941	6.911	0.903




2019-04-25 bp1cusn619101_12
Median = -1.36 ns
Median = 6.94 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s
256712 s: P1= 12 ps
128356 s: P1= 24 ps
64178 s: P1= 21 ps
32089 s: P1= 68 ps
16044 s: P1= 44 ps
8022 s: P1= 47 ps
4011 s: P1= 65 ps
2006 s: P1= 90 ps
1003 s: P1= 126 ps
501 s: P1= 171 ps
251 s: P1= 240 ps
125 s: P1= 376 ps
63 s: P1= 527 ps
31 s: P1= 735 ps
256774 s: P2= 54 ps
128387 s: P2= 46 ps
64194 s: P2= 44 ps
32097 s: P2= 70 ps
16048 s: P2= 49 ps
8024 s: P2= 65 ps
4012 s: P2= 83 ps
2006 s: P2= 110 ps
1003 s: P2= 155 ps
502 s: P2= 217 ps
251 s: P2= 298 ps
125 s: P2= 455 ps
63 s: P2= 643 ps
31 s: P2= 903 ps

BP25-USN6

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 294738
Computed code bias (P1/P2)/m = 33.711 35.842
Computed baseline (X,Y,Z)/m = -5.279 -1.009 -0.462
RMS of residuals /m = 0.458

Number of phase differences to fit baseline
L1/L2 = 293576
L5 = 0
A priori baseline (X,Y,Z)/m = -5.279 -1.009 -0.462
34556 clock jitters computed out of 34556 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 4.4

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.014 -0.050 0.083
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.014 -0.064 0.093
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -5.265 -1.059 -0.379
Final baseline L2 (X,Y,Z)/m = -5.265 -1.073 -0.369
Final baseline L5 (X,Y,Z)/m = -5.265 -1.066 -0.374
Final baseline E6 (X,Y,Z)/m = -5.265 -1.066 -0.374
Final baseline E7 (X,Y,Z)/m = -5.265 -1.066 -0.374
Final baseline E8 (X,Y,Z)/m = -5.265 -1.066 -0.374

COMPUTATION OF CODE DIFFERENCES

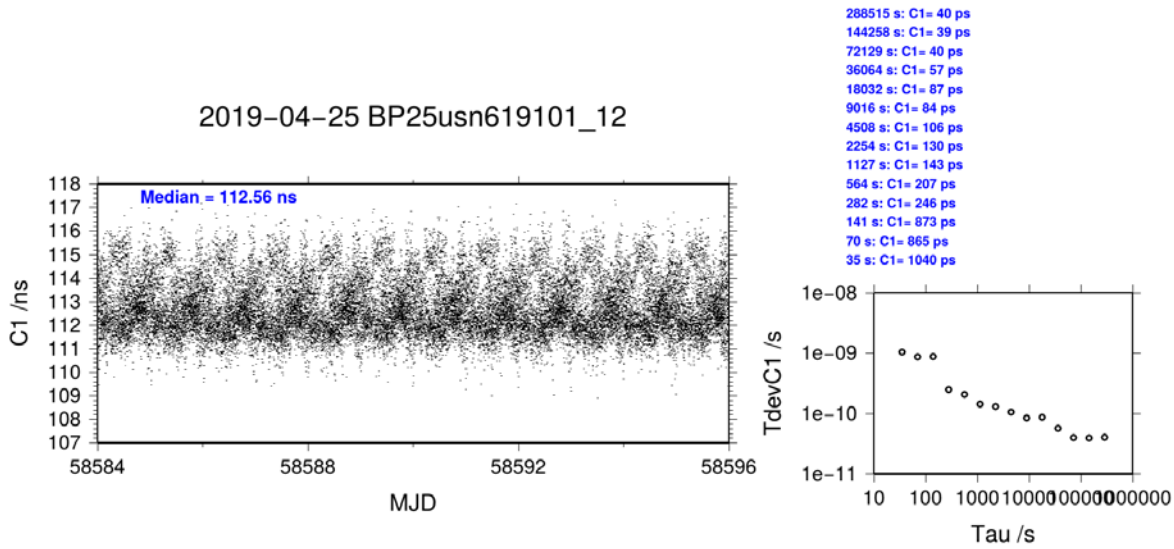
Total number of code differences = 294738

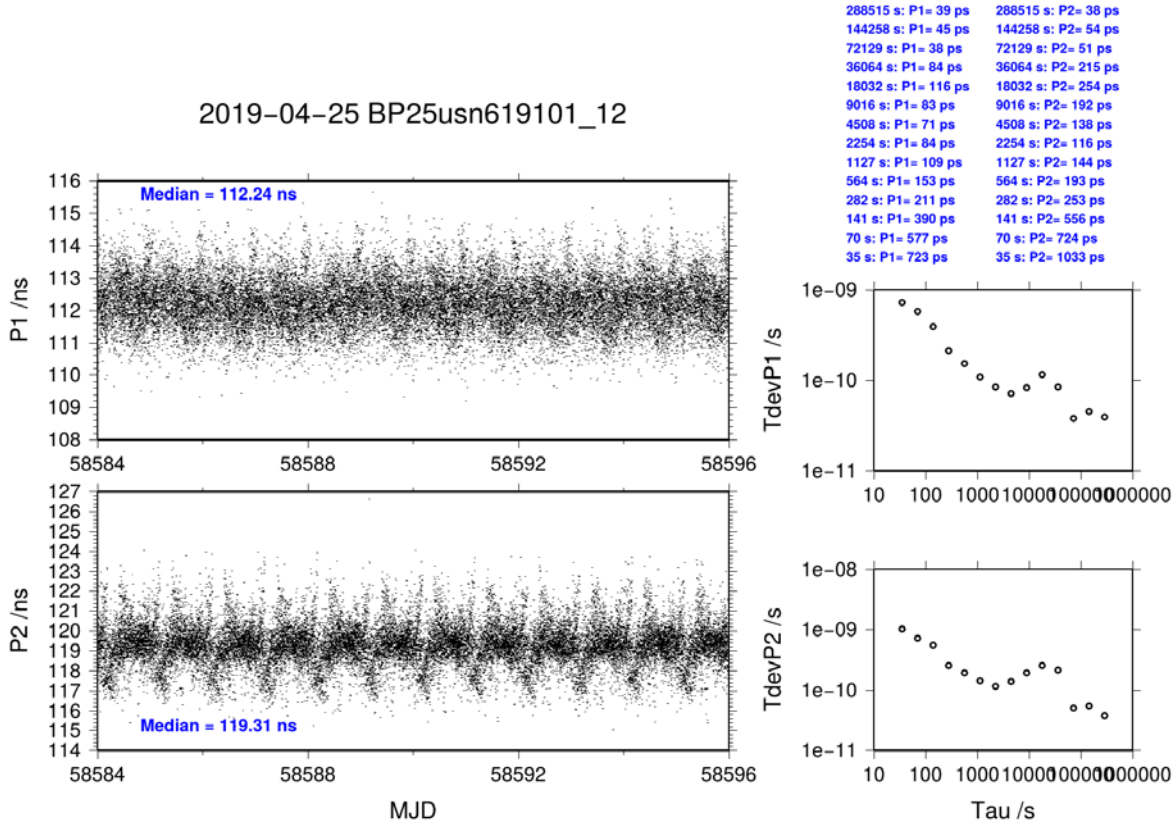
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	294675	112.799	1.639
P1	294675	112.267	1.369
P2	294675	119.337	1.744

Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	29431	112.563	112.782	1.196
P1	29431	112.242	112.249	0.756
P2	29431	119.308	119.317	1.048




2019-04-25 BP25usn619101_12
Median = 112.24 ns
Median = 119.31 ns
P1 /ns
P2 /ns
MJD
288515 s: P1= 39 ps
144258 s: P1= 45 ps
72129 s: P1= 38 ps
36064 s: P1= 84 ps
18032 s: P1= 116 ps
9016 s: P1= 83 ps
4508 s: P1= 71 ps
2254 s: P1= 84 ps
1127 s: P1= 109 ps
564 s: P1= 153 ps
282 s: P1= 211 ps
141 s: P1= 390 ps
70 s: P1= 577 ps
35 s: P1= 723 ps
288515 s: P2= 38 ps
144258 s: P2= 54 ps
72129 s: P2= 51 ps
36064 s: P2= 215 ps
18032 s: P2= 254 ps
9016 s: P2= 192 ps
4508 s: P2= 138 ps
2254 s: P2= 116 ps
1127 s: P2= 144 ps
564 s: P2= 193 ps
282 s: P2= 253 ps
141 s: P2= 556 ps
70 s: P2= 724 ps
35 s: P2= 1033 ps
TdevP1 /s
TdevP2 /s
Tau /s

BP1C-USN7

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 345151
Number of huge residuals = 50. New iteration
Computed code bias (P1/P2)/m = -64.003 -61.172
Computed baseline (X,Y,Z)/m = -4.793 -0.968 -0.425
RMS of residuals /m = 0.481

Number of phase differences to fit baseline
L1/L2 = 343317
L5 = 0
A priori baseline (X,Y,Z)/m = -4.793 -0.968 -0.425
34553 clock jitters computed out of 34553 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 4.1

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 2
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.011 0.031 -0.007
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.010 0.039 -0.012
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 2
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.011 0.031 -0.007
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.010 0.039 -0.012
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -4.782 -0.937 -0.432
Final baseline L2 (X,Y,Z)/m = -4.783 -0.930 -0.437
Final baseline L5 (X,Y,Z)/m = -4.783 -0.933 -0.435
Final baseline E6 (X,Y,Z)/m = -4.783 -0.933 -0.435
Final baseline E7 (X,Y,Z)/m = -4.783 -0.933 -0.435
Final baseline E8 (X,Y,Z)/m = -4.783 -0.933 -0.435

COMPUTATION OF CODE DIFFERENCES

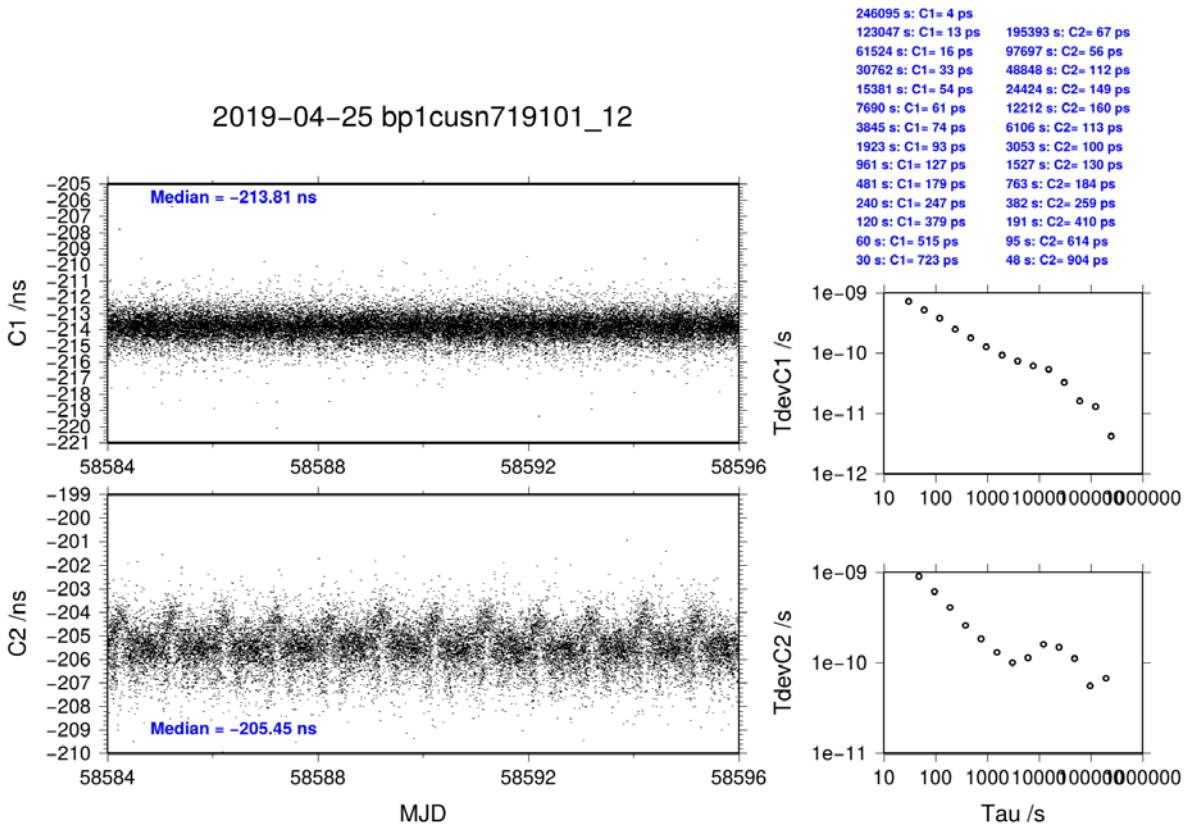
Total number of code differences = 345822

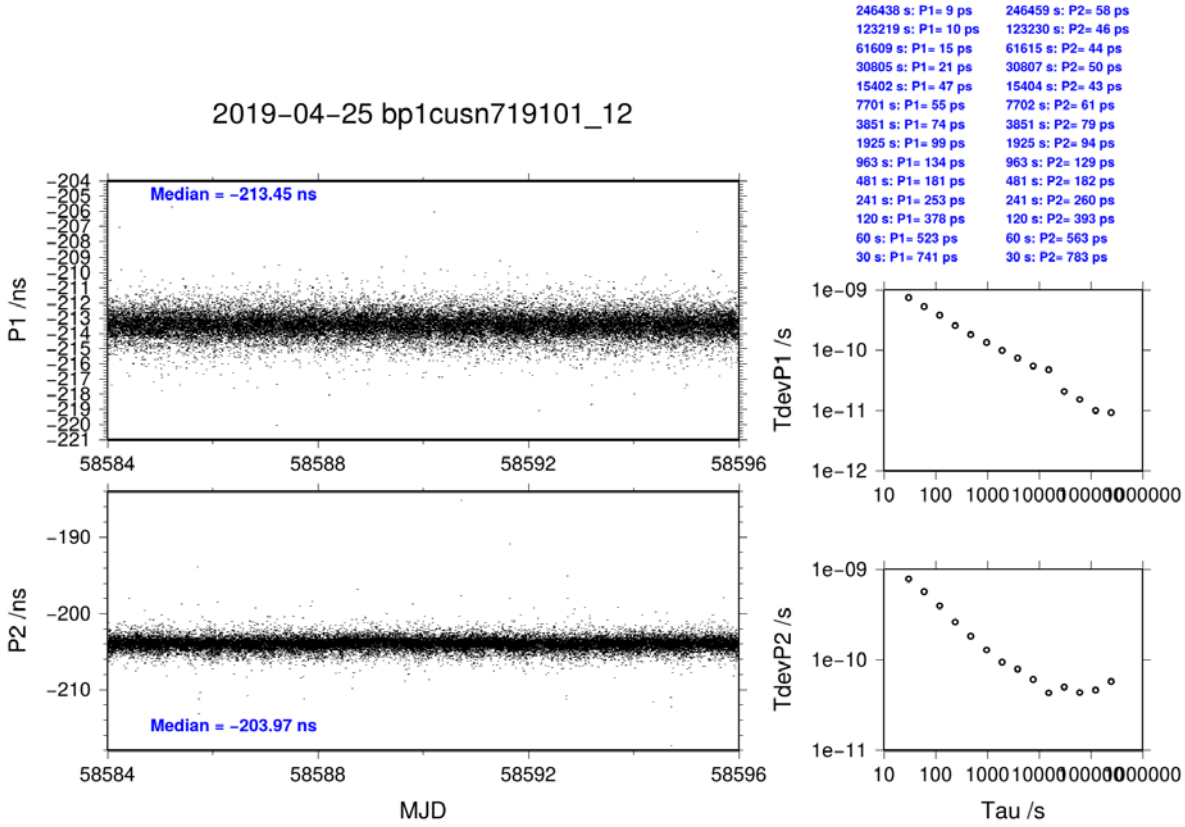
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	345551	-213.811	1.691
C2	217572	-205.443	1.862
P1	345056	-213.442	1.705
P2	345030	-203.982	1.611

Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	34504	-213.815	-213.821	0.730
C2	21729	-205.453	-205.449	0.882
P1	34456	-213.447	-213.452	0.742
P2	34453	-203.968	-203.990	0.785




2019-04-25 bp1cusn719101_12
Median = -213.45 ns
Median = -203.97 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s
246438 s: P1= 9 ps
123219 s: P1= 10 ps
61609 s: P1= 15 ps
30805 s: P1= 21 ps
15402 s: P1= 47 ps
7701 s: P1= 55 ps
3851 s: P1= 74 ps
1925 s: P1= 99 ps
963 s: P1= 134 ps
481 s: P1= 181 ps
241 s: P1= 253 ps
120 s: P1= 378 ps
60 s: P1= 523 ps
30 s: P1= 741 ps
246459 s: P2= 58 ps
123230 s: P2= 46 ps
61615 s: P2= 44 ps
30807 s: P2= 50 ps
15404 s: P2= 43 ps
7702 s: P2= 61 ps
3851 s: P2= 79 ps
1925 s: P2= 94 ps
963 s: P2= 129 ps
481 s: P2= 182 ps
241 s: P2= 260 ps
120 s: P2= 393 ps
60 s: P2= 563 ps
30 s: P2= 783 ps

BP25-USN7

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 295125
Computed code bias (P1/P2)/m = -29.880 -27.390
Computed baseline (X,Y,Z)/m = -5.272 -1.005 -0.451
RMS of residuals /m = 0.440

Number of phase differences to fit baseline
L1/L2 = 293990
L5 = 114264
A priori baseline (X,Y,Z)/m = -5.272 -1.005 -0.451
34556 clock jitters computed out of 34556 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 3.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.009 -0.053 0.072
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.009 -0.068 0.082
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.003 -0.067 0.084
RMS of residuals L5 /m = 0.004
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -5.263 -1.058 -0.379
Final baseline L2 (X,Y,Z)/m = -5.263 -1.072 -0.369
Final baseline L5 (X,Y,Z)/m = -5.269 -1.072 -0.367
Final baseline E6 (X,Y,Z)/m = -5.263 -1.065 -0.374
Final baseline E7 (X,Y,Z)/m = -5.263 -1.065 -0.374
Final baseline E8 (X,Y,Z)/m = -5.263 -1.065 -0.374

COMPUTATION OF CODE DIFFERENCES

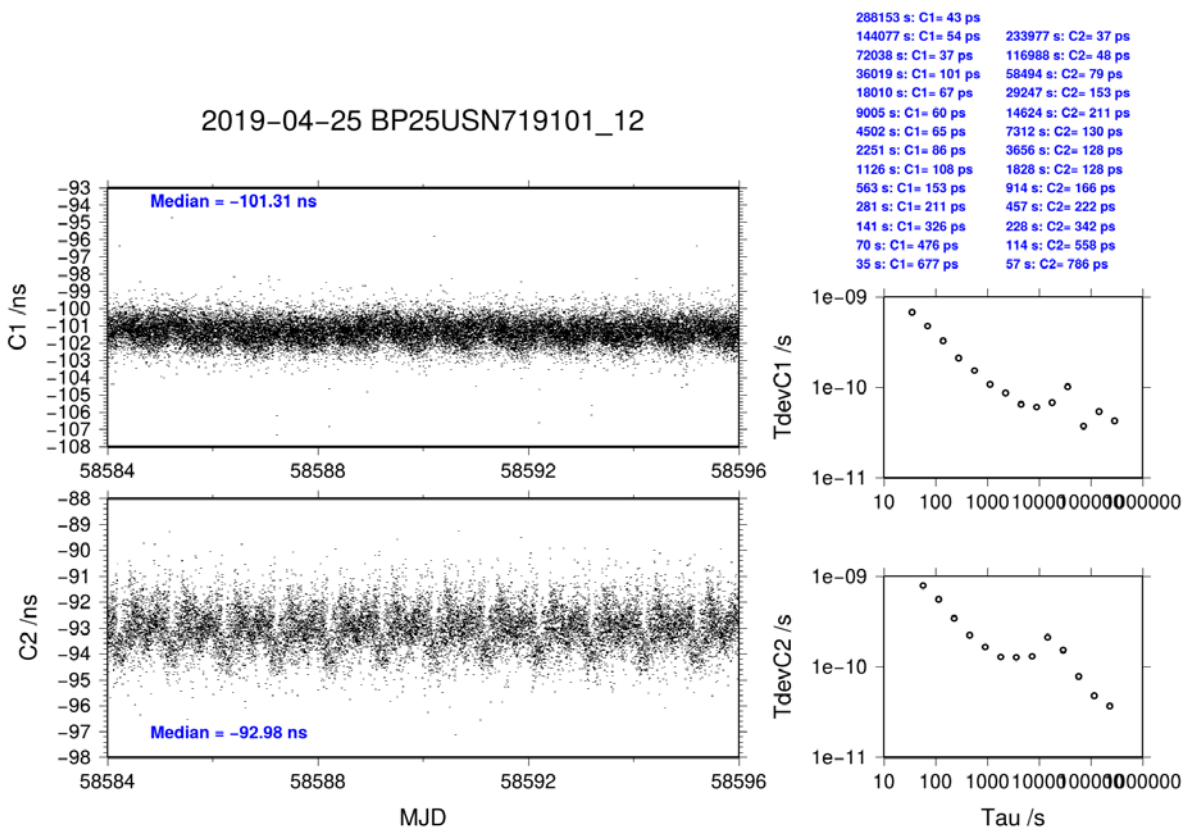
Total number of code differences = 692089

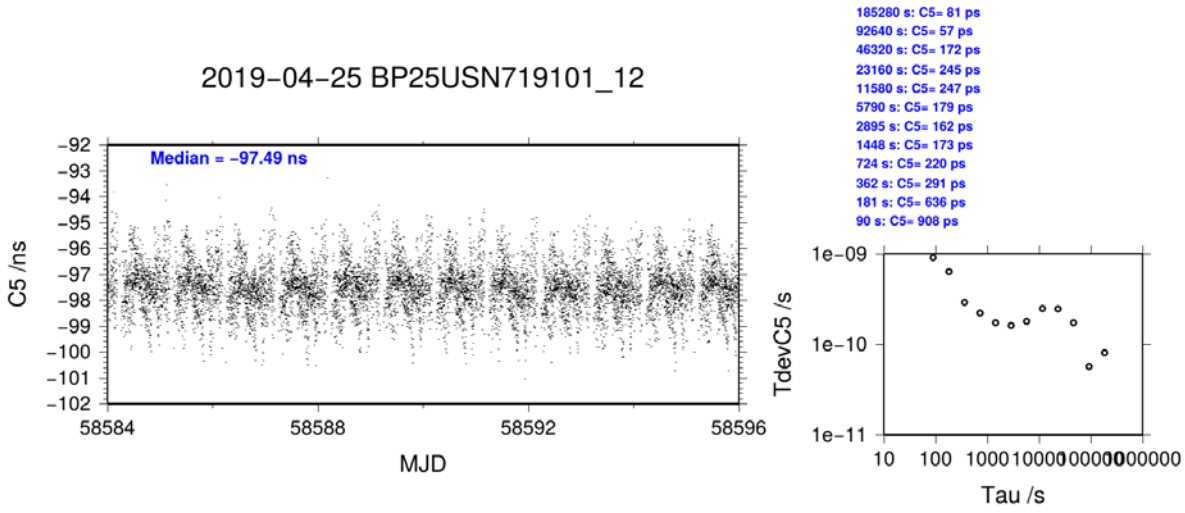
Global average of individual differences

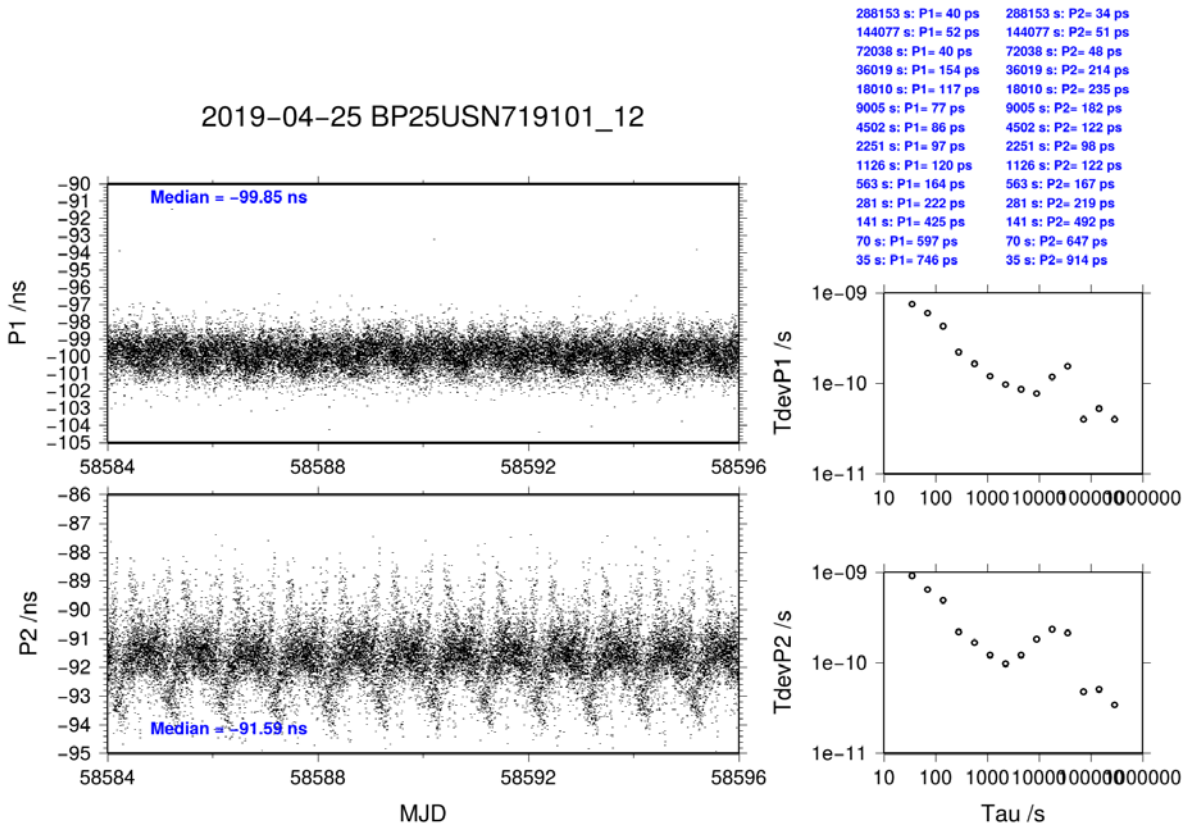
Code	#pts	ave/ns	rms/ns
C1	295062	-101.297	1.417
C2	181669	-92.970	1.516
C5	114727	-97.483	1.362
P1	295062	-99.841	1.498
P2	295062	-91.570	1.477
E1	191221	-101.645	1.188
E5	192771	-97.093	1.115

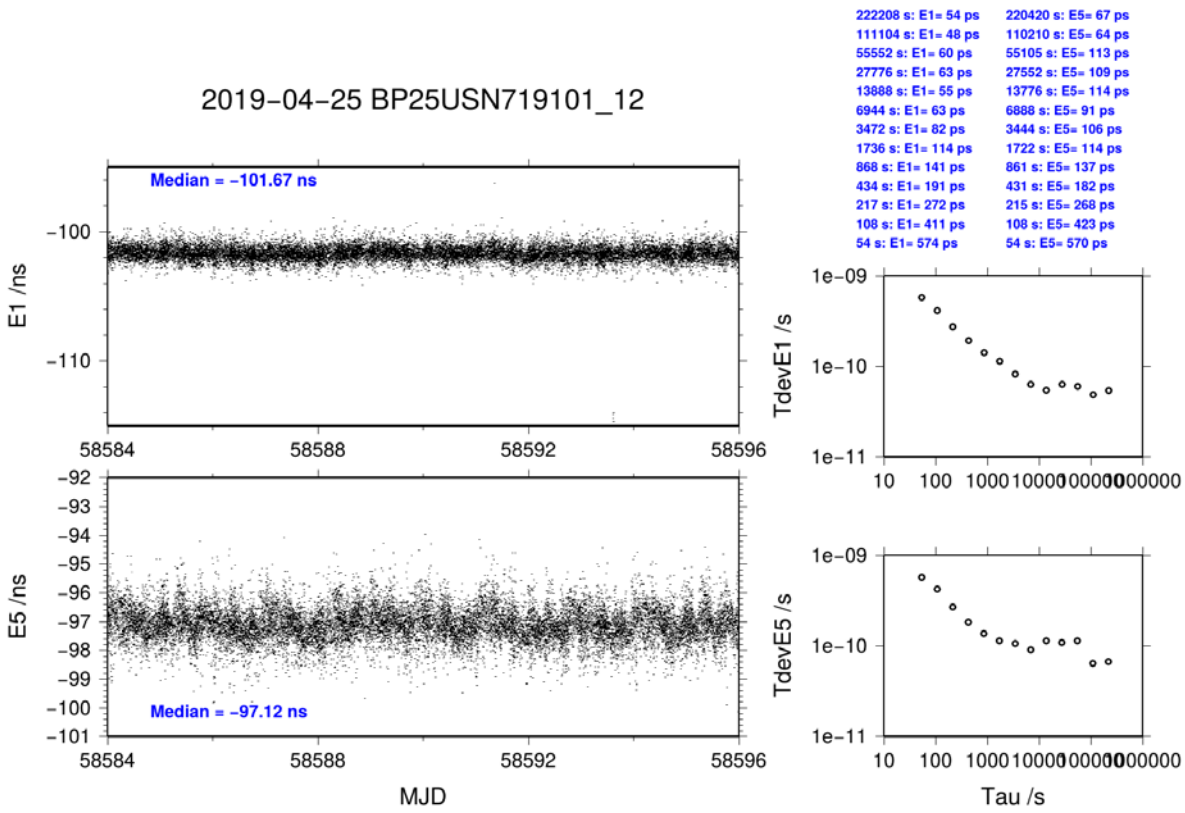
Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	29468	-101.309	-101.310	0.672
C2	18146	-92.983	-92.982	0.797
C5	11458	-97.493	-97.495	0.894
P1	29468	-99.846	-99.854	0.796
P2	29468	-91.586	-91.580	0.935
E1	19107	-101.667	-101.658	0.579
E5	19262	-97.117	-97.103	0.600




2019-04-25 BP25USN719101_12
Median = -97.49 ns
C5 /ns
MJD
185280 s: C5= 81 ps
92640 s: C5= 57 ps
46320 s: C5= 172 ps
23160 s: C5= 245 ps
11580 s: C5= 247 ps
5790 s: C5= 179 ps
2895 s: C5= 162 ps
1448 s: C5= 173 ps
724 s: C5= 220 ps
362 s: C5= 291 ps
181 s: C5= 636 ps
90 s: C5= 908 ps
TdevC5 /s
Tau /s


2019-04-25 BP25USN719101_12
Median = -99.85 ns
P1 /ns
288153 s: P1= 40 ps
144077 s: P1= 52 ps
72038 s: P1= 40 ps
36019 s: P1= 154 ps
18010 s: P1= 117 ps
9005 s: P1= 77 ps
4502 s: P1= 86 ps
2251 s: P1= 97 ps
1126 s: P1= 120 ps
563 s: P1= 164 ps
281 s: P1= 222 ps
141 s: P1= 425 ps
70 s: P1= 597 ps
35 s: P1= 746 ps
288153 s: P2= 34 ps
144077 s: P2= 51 ps
72038 s: P2= 48 ps
36019 s: P2= 214 ps
18010 s: P2= 235 ps
9005 s: P2= 182 ps
4502 s: P2= 122 ps
2251 s: P2= 98 ps
1126 s: P2= 122 ps
563 s: P2= 167 ps
281 s: P2= 219 ps
141 s: P2= 492 ps
70 s: P2= 647 ps
35 s: P2= 914 ps
TdevP1 /s
P2 /ns
Median = -91.59 ns
MJD
TdevP2 /s
Tau /s


2019-04-25 BP25USN719101_12
Median = -101.67 ns
Median = -97.12 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s
222208 s: E1= 54 ps
111104 s: E1= 48 ps
55552 s: E1= 60 ps
27776 s: E1= 63 ps
13888 s: E1= 55 ps
6944 s: E1= 63 ps
3472 s: E1= 82 ps
1736 s: E1= 114 ps
868 s: E1= 141 ps
434 s: E1= 191 ps
217 s: E1= 272 ps
108 s: E1= 411 ps
54 s: E1= 574 ps
220420 s: E5= 67 ps
110210 s: E5= 64 ps
55105 s: E5= 113 ps
27552 s: E5= 109 ps
13776 s: E5= 114 ps
6888 s: E5= 91 ps
3444 s: E5= 106 ps
1722 s: E5= 114 ps
861 s: E5= 137 ps
431 s: E5= 182 ps
215 s: E5= 268 ps
108 s: E5= 423 ps
54 s: E5= 570 ps

BP1C-USN8

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 331934
Number of huge residuals = 18. New iteration
Computed code bias (P1/P2)/m = -62.411 -59.864
Computed baseline (X,Y,Z)/m = -4.791 -0.969 -0.421
RMS of residuals /m = 0.419

Number of phase differences to fit baseline
L1/L2 = 330245
L5 = 0
A priori baseline (X,Y,Z)/m = -4.791 -0.969 -0.421
34553 clock jitters computed out of 34553 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 2
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.009 0.032 -0.011
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.008 0.039 -0.016
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 2
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.009 0.032 -0.011
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.008 0.039 -0.016
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -4.781 -0.937 -0.432
Final baseline L2 (X,Y,Z)/m = -4.783 -0.929 -0.437
Final baseline L5 (X,Y,Z)/m = -4.782 -0.933 -0.435
Final baseline E6 (X,Y,Z)/m = -4.782 -0.933 -0.435
Final baseline E7 (X,Y,Z)/m = -4.782 -0.933 -0.435
Final baseline E8 (X,Y,Z)/m = -4.782 -0.933 -0.435

COMPUTATION OF CODE DIFFERENCES

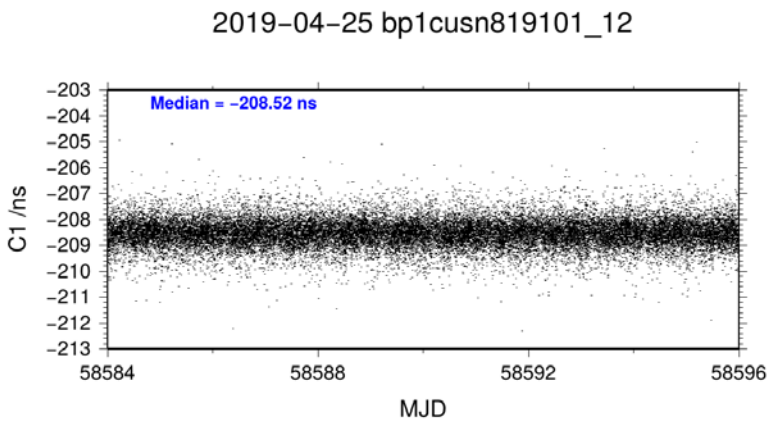
Total number of code differences = 332475

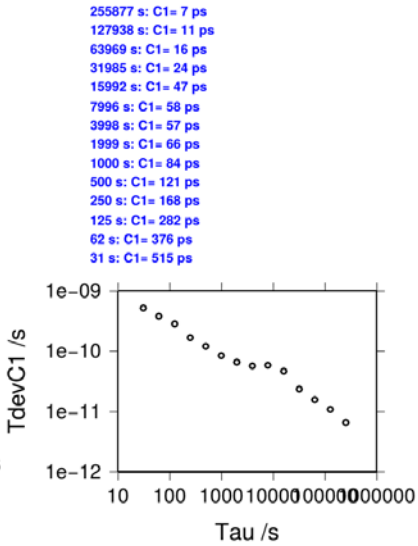
Global average of individual differences

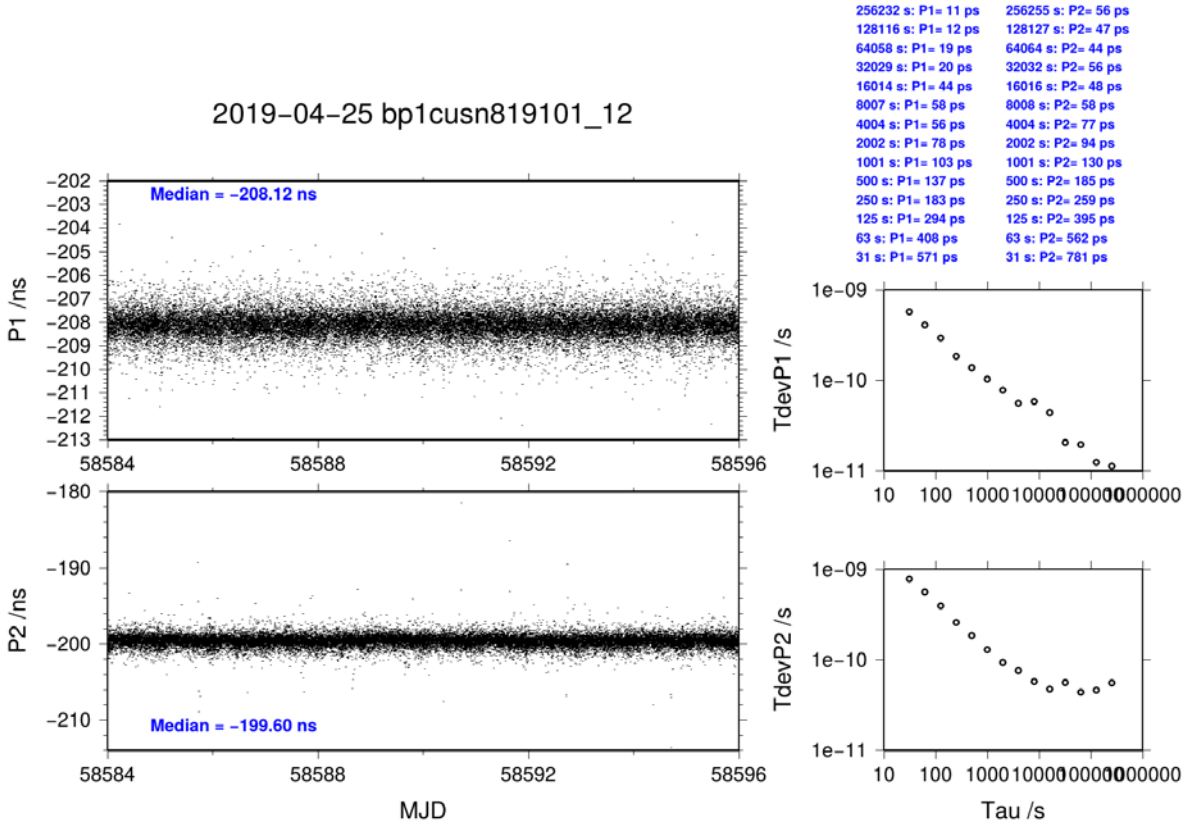
Code	#pts	ave/ns	rms/ns
C1	332337	-208.539	1.204
P1	331855	-208.128	1.242
P2	331828	-199.612	1.602

Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	33185	-208.523	-208.531	0.526
P1	33139	-208.115	-208.119	0.573
P2	33136	-199.599	-199.622	0.784






2019-04-25 bp1cusn819101_12
Median = -208.12 ns
Median = -199.60 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s
256232 s: P1= 11 ps
128116 s: P1= 12 ps
64058 s: P1= 19 ps
32029 s: P1= 20 ps
16014 s: P1= 44 ps
8007 s: P1= 58 ps
4004 s: P1= 56 ps
2002 s: P1= 78 ps
1001 s: P1= 103 ps
500 s: P1= 137 ps
250 s: P1= 183 ps
125 s: P1= 294 ps
63 s: P1= 408 ps
31 s: P1= 571 ps
256255 s: P2= 56 ps
128127 s: P2= 47 ps
64064 s: P2= 44 ps
32032 s: P2= 56 ps
16016 s: P2= 48 ps
8008 s: P2= 58 ps
4004 s: P2= 77 ps
2002 s: P2= 94 ps
1001 s: P2= 130 ps
500 s: P2= 185 ps
250 s: P2= 259 ps
125 s: P2= 395 ps
63 s: P2= 562 ps
31 s: P2= 781 ps

BP25-USN8

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 295125
Computed code bias (P1/P2)/m = -28.290 -26.082
Computed baseline (X,Y,Z)/m = -5.269 -1.007 -0.448
RMS of residuals /m = 0.377

Number of phase differences to fit baseline
L1/L2 = 293983
L5 = 114277
A priori baseline (X,Y,Z)/m = -5.269 -1.007 -0.448
34556 clock jitters computed out of 34556 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 3.7

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.007 -0.051 0.069
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.007 -0.065 0.080
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.000 -0.065 0.082
RMS of residuals L5 /m = 0.003
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -5.262 -1.058 -0.379
Final baseline L2 (X,Y,Z)/m = -5.262 -1.072 -0.369
Final baseline L5 (X,Y,Z)/m = -5.269 -1.072 -0.366
Final baseline E6 (X,Y,Z)/m = -5.262 -1.065 -0.374
Final baseline E7 (X,Y,Z)/m = -5.262 -1.065 -0.374
Final baseline E8 (X,Y,Z)/m = -5.262 -1.065 -0.374

COMPUTATION OF CODE DIFFERENCES

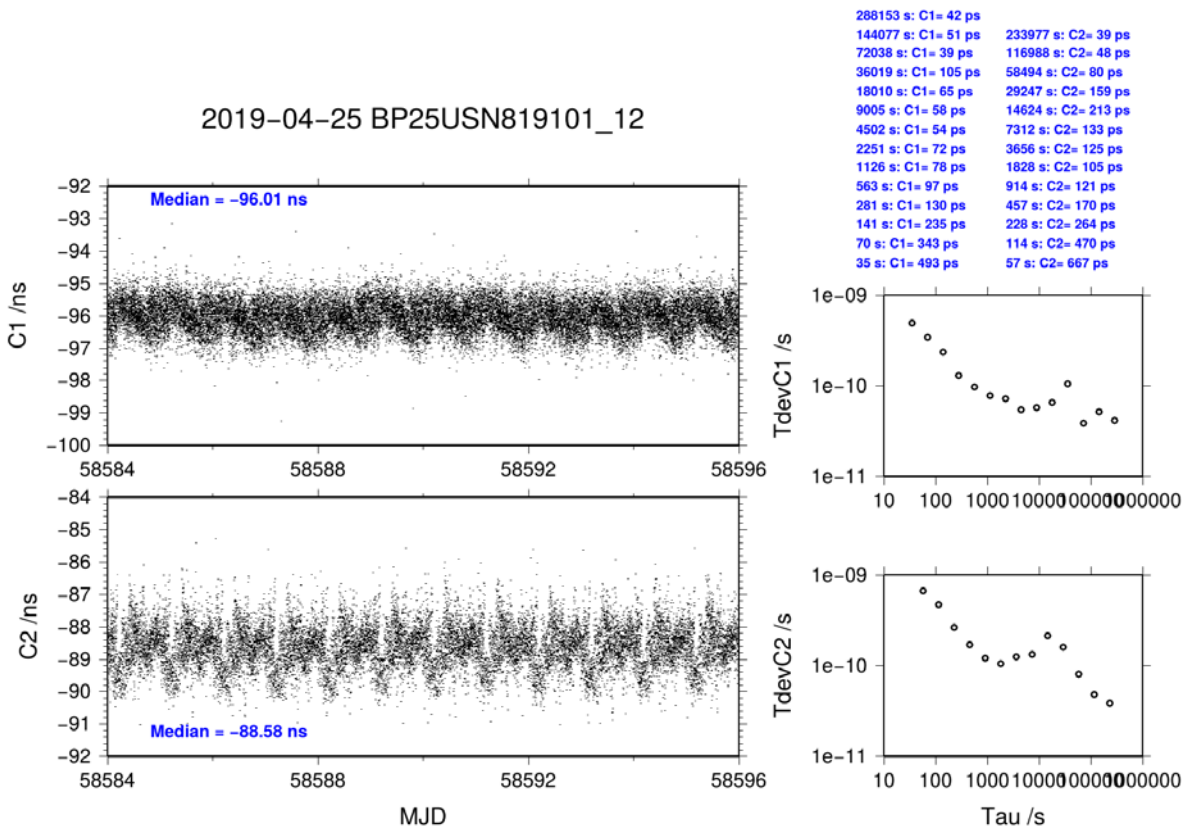
Total number of code differences = 708828

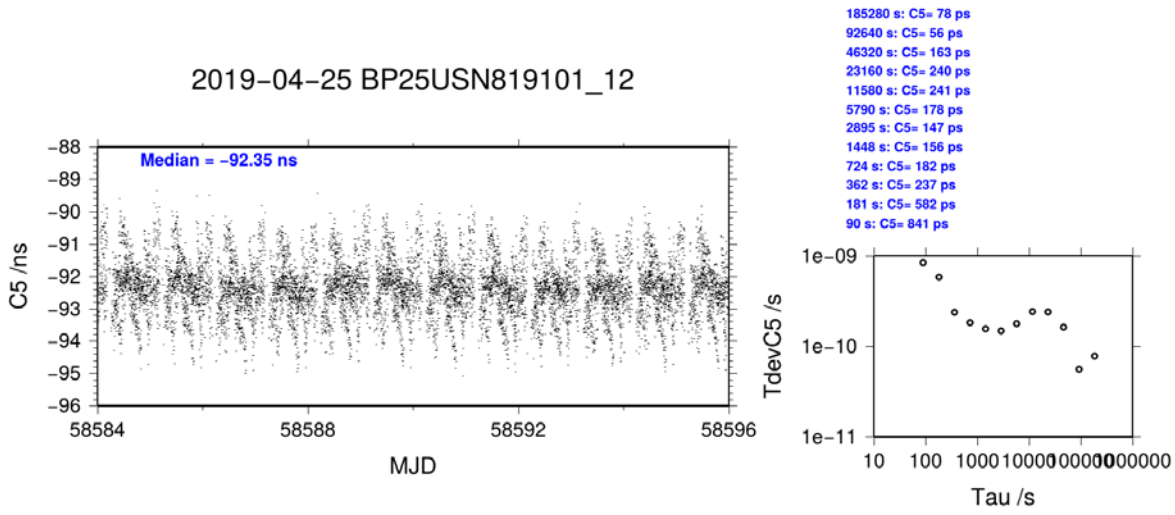
Global average of individual differences

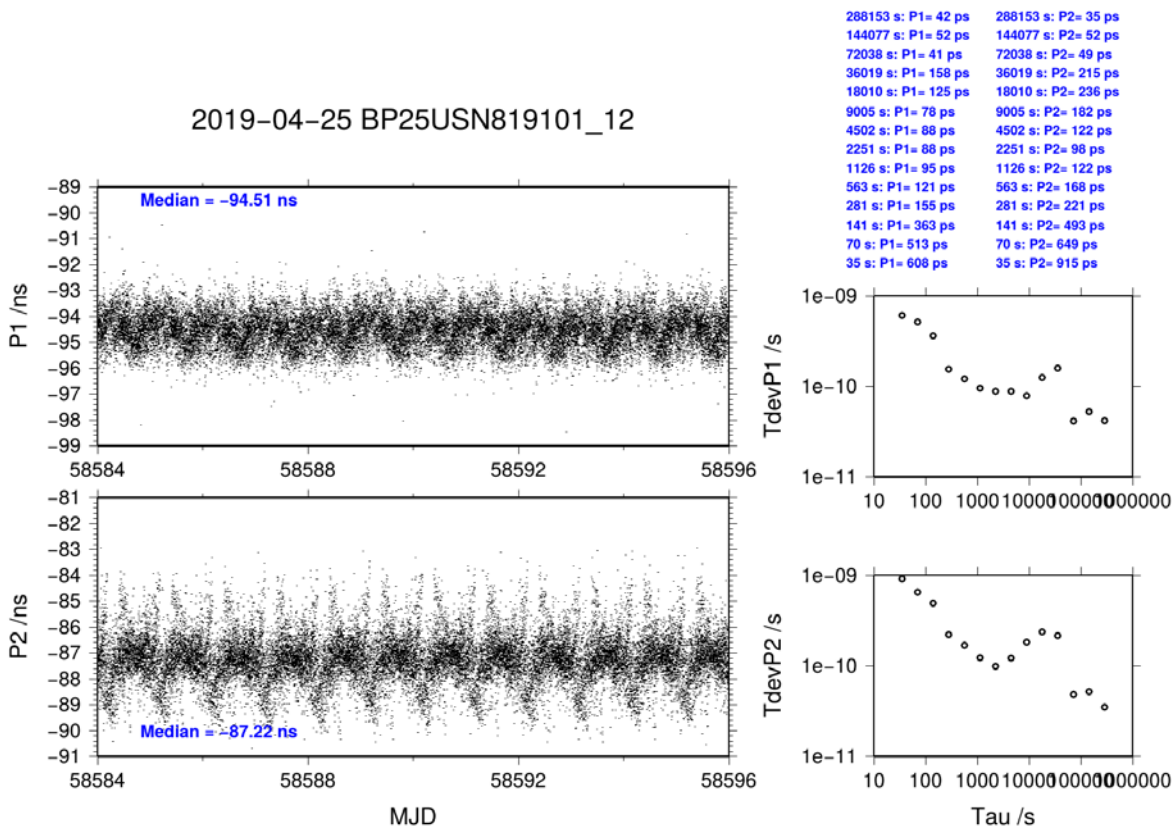
Code	#pts	ave/ns	rms/ns
C1	295062	-96.027	0.901
C2	181669	-88.587	1.107
C5	114727	-92.348	1.098
P1	295062	-94.529	1.035
P2	295062	-87.201	1.478
E1	213097	-96.378	0.733
E5	213097	-91.966	0.751

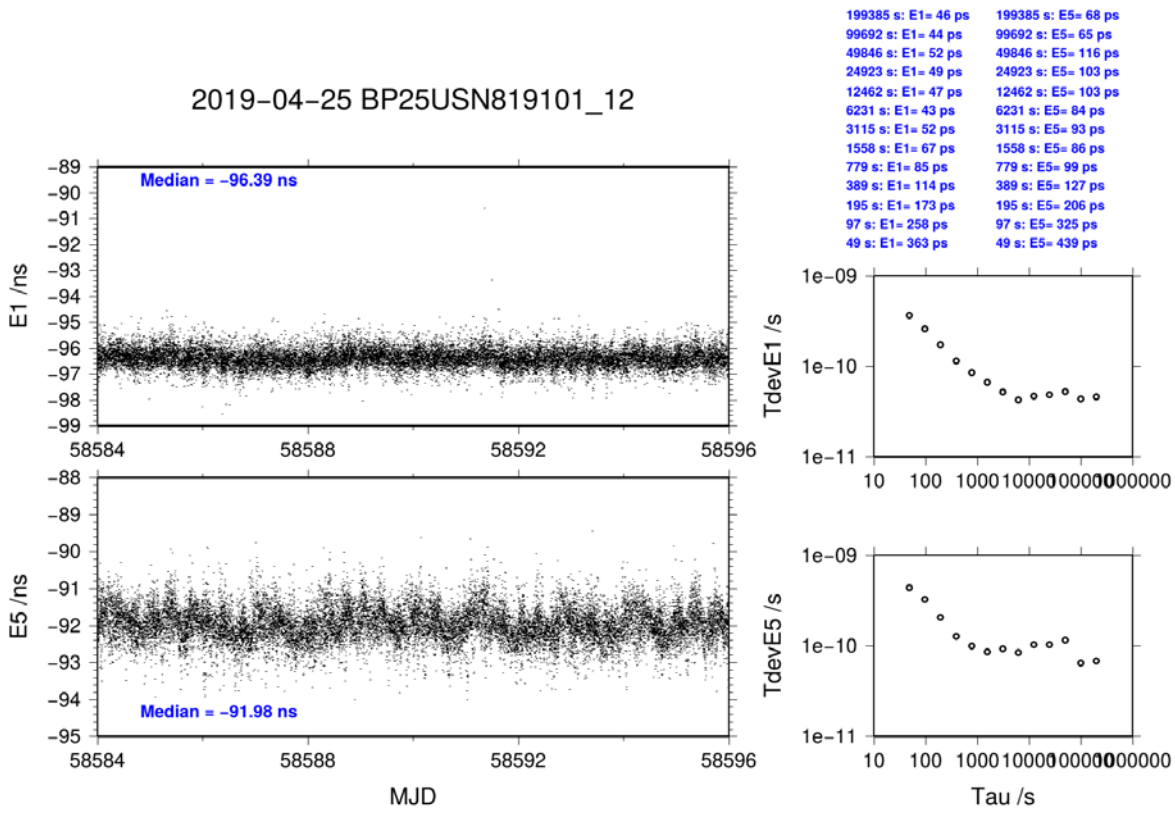
Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	29468	-96.014	-96.023	0.488
C2	18146	-88.582	-88.594	0.680
C5	11458	-92.351	-92.351	0.822
P1	29468	-94.514	-94.524	0.669
P2	29468	-87.219	-87.212	0.937
E1	21294	-96.391	-96.379	0.368
E5	21294	-91.979	-91.966	0.471




2019-04-25 BP25USN819101_12
Median = -92.35 ns
C5 /ns
MJD
185280 s: C5= 78 ps
92640 s: C5= 56 ps
46320 s: C5= 163 ps
23160 s: C5= 240 ps
11580 s: C5= 241 ps
5790 s: C5= 178 ps
2895 s: C5= 147 ps
1448 s: C5= 156 ps
724 s: C5= 182 ps
362 s: C5= 237 ps
181 s: C5= 582 ps
90 s: C5= 841 ps
TdevC5 /s
Tau /s


2019-04-25 BP25USN819101_12
Median = -94.51 ns
P1 /ns
Median = -87.22 ns
P2 /ns
MJD
288153 s: P1= 42 ps
144077 s: P1= 52 ps
72038 s: P1= 41 ps
36019 s: P1= 158 ps
18010 s: P1= 125 ps
9005 s: P1= 78 ps
4502 s: P1= 88 ps
2251 s: P1= 88 ps
1126 s: P1= 95 ps
563 s: P1= 121 ps
281 s: P1= 155 ps
141 s: P1= 363 ps
70 s: P1= 513 ps
35 s: P1= 608 ps
288153 s: P2= 35 ps
144077 s: P2= 52 ps
72038 s: P2= 49 ps
36019 s: P2= 215 ps
18010 s: P2= 236 ps
9005 s: P2= 182 ps
4502 s: P2= 122 ps
2251 s: P2= 98 ps
1126 s: P2= 122 ps
563 s: P2= 168 ps
281 s: P2= 221 ps
141 s: P2= 493 ps
70 s: P2= 649 ps
35 s: P2= 915 ps
TdevP1 /s
TdevP2 /s
Tau /s


2019-04-25 BP25USN819101_12
Median = -96.39 ns
Median = -91.98 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s
199385 s: E1= 46 ps
99692 s: E1= 44 ps
49846 s: E1= 52 ps
24923 s: E1= 49 ps
12462 s: E1= 47 ps
6231 s: E1= 43 ps
3115 s: E1= 52 ps
1558 s: E1= 67 ps
779 s: E1= 85 ps
389 s: E1= 114 ps
195 s: E1= 173 ps
97 s: E1= 258 ps
49 s: E1= 363 ps
199385 s: E5= 68 ps
99692 s: E5= 65 ps
49846 s: E5= 116 ps
24923 s: E5= 103 ps
12462 s: E5= 103 ps
6231 s: E5= 84 ps
3115 s: E5= 93 ps
1558 s: E5= 86 ps
779 s: E5= 99 ps
389 s: E5= 127 ps
195 s: E5= 206 ps
97 s: E5= 325 ps
49 s: E5= 439 ps

BP1C-USN9

COMPUTATION OF BASELINE

```
Number of codes to fit baseline and biases = 332464
Computed code bias (P1/P2)/m =    -63.049   -65.871
Computed baseline (X,Y,Z)/m =     -4.804    -0.963    -0.436
RMS of residuals /m =      0.499

Number of phase differences to fit baseline
L1/L2 =     61
L5    =     0
A priori baseline (X,Y,Z)/m =     -4.804    -0.963    -0.436
   0 clock jitters computed out of     61 intervals
AVE jitter /ps =    0.0 RMS jitter /ps =    0.0

Iter  1 Large residuals L1=   61
Iter  1 Large residuals L2=   61
Iter  1 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L1 /m =      0.000
Computed baseline L2 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L2 /m =      0.000
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Iter  2 Large residuals L1=   61
Iter  2 Large residuals L2=   61
Iter  2 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L1 /m =     -0.000
Computed baseline L2 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L2 /m =     -0.000
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2


Final baseline L1 (X,Y,Z)/m =     -4.804    -0.963    -0.436
Final baseline L2 (X,Y,Z)/m =     -4.804    -0.963    -0.436
Final baseline L5 (X,Y,Z)/m =     -4.804    -0.963    -0.436
Final baseline E6 (X,Y,Z)/m =     -4.804    -0.963    -0.436
Final baseline E7 (X,Y,Z)/m =     -4.804    -0.963    -0.436
Final baseline E8 (X,Y,Z)/m =     -4.804    -0.963    -0.436
```

COMPUTATION OF CODE DIFFERENCES

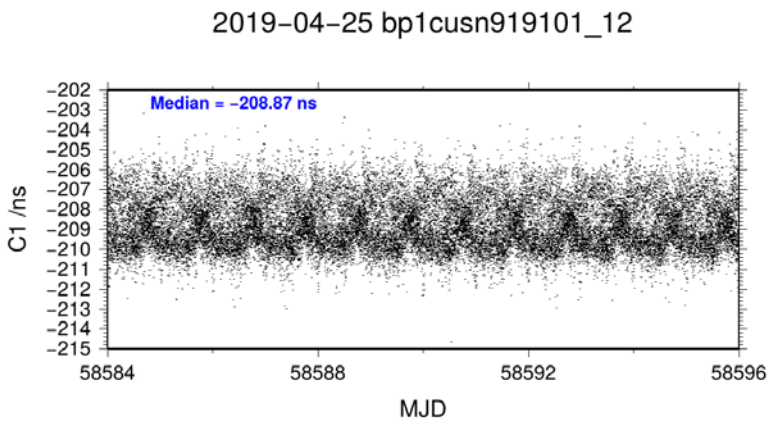
Total number of code differences = 332955

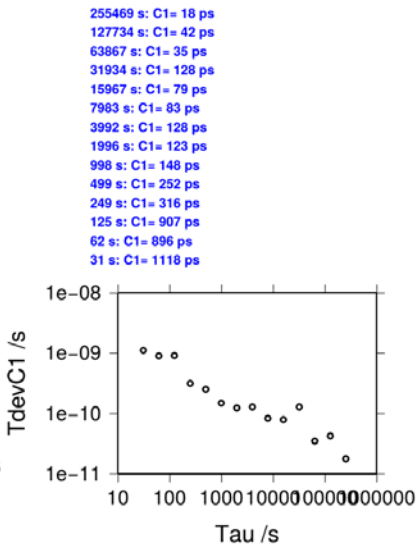
Global average of individual differences

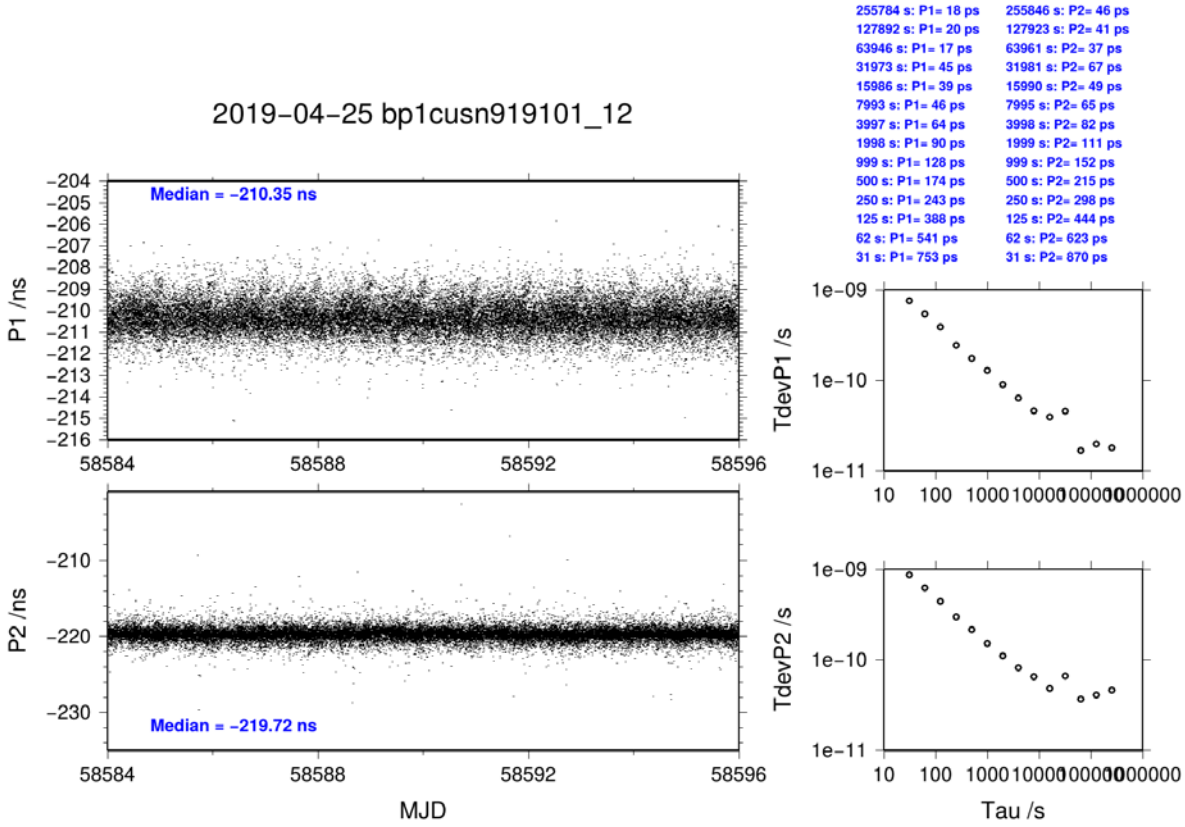
Code	#pts	ave/ns	rms/ns
C1	332819	-208.683	1.873
P1	332428	-210.309	1.574
P2	332347	-219.719	1.934

Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	33238	-208.874	-208.695	1.274
P1	33197	-210.347	-210.321	0.752
P2	33189	-219.723	-219.734	0.877






2019-04-25 bp1cusn919101_12
Median = -210.35 ns
Median = -219.72 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s
255784 s: P1= 18 ps
127892 s: P1= 20 ps
63946 s: P1= 17 ps
31973 s: P1= 45 ps
15986 s: P1= 39 ps
7993 s: P1= 46 ps
3997 s: P1= 64 ps
1998 s: P1= 90 ps
999 s: P1= 128 ps
500 s: P1= 174 ps
250 s: P1= 243 ps
125 s: P1= 388 ps
62 s: P1= 541 ps
31 s: P1= 753 ps
255846 s: P2= 46 ps
127923 s: P2= 41 ps
63961 s: P2= 37 ps
31981 s: P2= 67 ps
15990 s: P2= 49 ps
7995 s: P2= 65 ps
3998 s: P2= 82 ps
1999 s: P2= 111 ps
999 s: P2= 152 ps
500 s: P2= 215 ps
250 s: P2= 298 ps
125 s: P2= 444 ps
62 s: P2= 623 ps
31 s: P2= 870 ps

BP25-USN9

COMPUTATION OF BASELINE

```
Number of codes to fit baseline and biases = 181708
Computed code bias (P1/P2)/m =    -28.937   -32.625
Computed baseline (X,Y,Z)/m =     -5.294    -0.999    -0.466
RMS of residuals /m =      0.442

Number of phase differences to fit baseline
L1/L2 =     33
L5    =     23
A priori baseline (X,Y,Z)/m =     -5.294    -0.999    -0.466
   0 clock jitters computed out of     33 intervals
AVE jitter /ps =    0.0 RMS jitter /ps =    0.0

Iter  1 Large residuals L1=   33
Iter  1 Large residuals L2=   33
Iter  1 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L1 /m =      0.000
Computed baseline L2 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L2 /m =      0.000
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2

Iter  2 Large residuals L1=   33
Iter  2 Large residuals L2=   33
Iter  2 Large residuals L5=    0
Computed baseline L1 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L1 /m =     -0.000
Computed baseline L2 (X,Y,Z)/m =      0.000     0.000     0.000
RMS of residuals L2 /m =     -0.000
No computed baseline L5, will use L1/L2
No computed baseline E6, will use L1/L2
No computed baseline E7, will use L1/L2
No computed baseline E8, will use L1/L2


Final baseline L1 (X,Y,Z)/m =     -5.294    -0.999    -0.466
Final baseline L2 (X,Y,Z)/m =     -5.294    -0.999    -0.466
Final baseline L5 (X,Y,Z)/m =     -5.294    -0.999    -0.466
Final baseline E6 (X,Y,Z)/m =     -5.294    -0.999    -0.466
Final baseline E7 (X,Y,Z)/m =     -5.294    -0.999    -0.466
Final baseline E8 (X,Y,Z)/m =     -5.294    -0.999    -0.466
```

COMPUTATION OF CODE DIFFERENCES

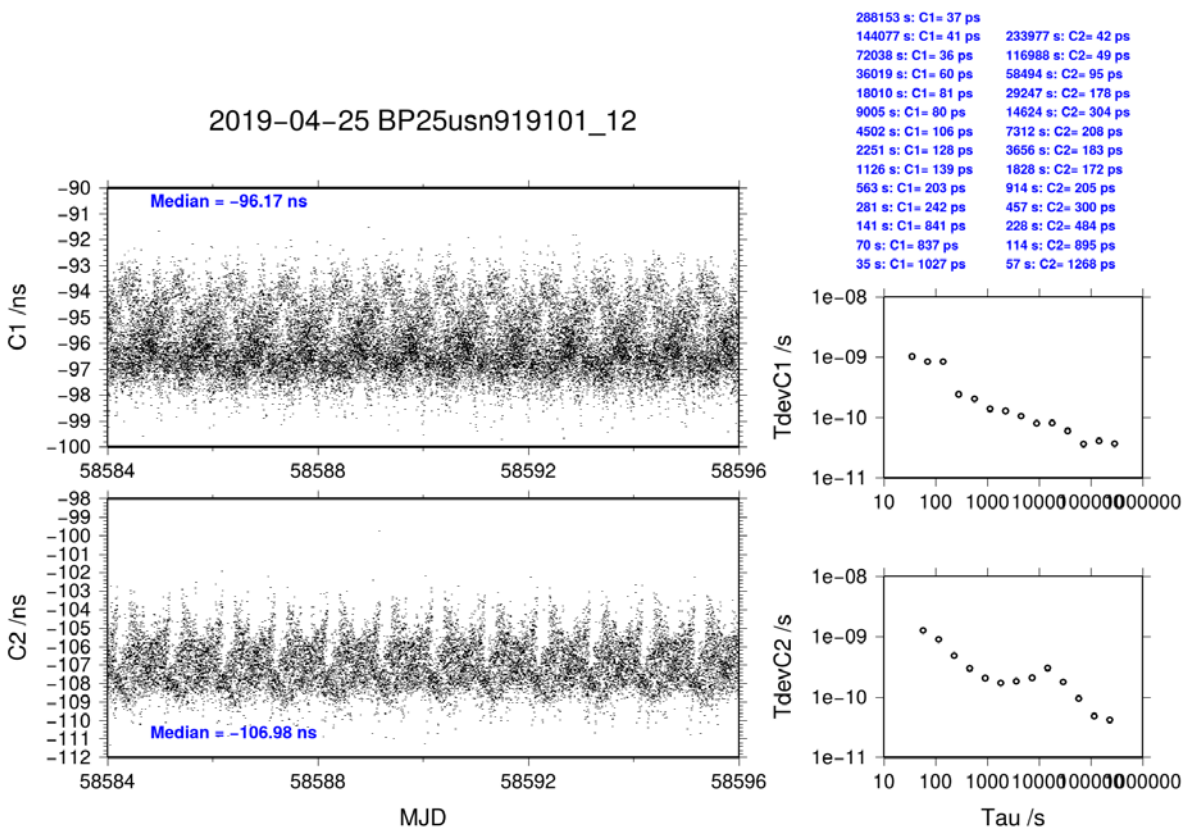
Total number of code differences = 508184

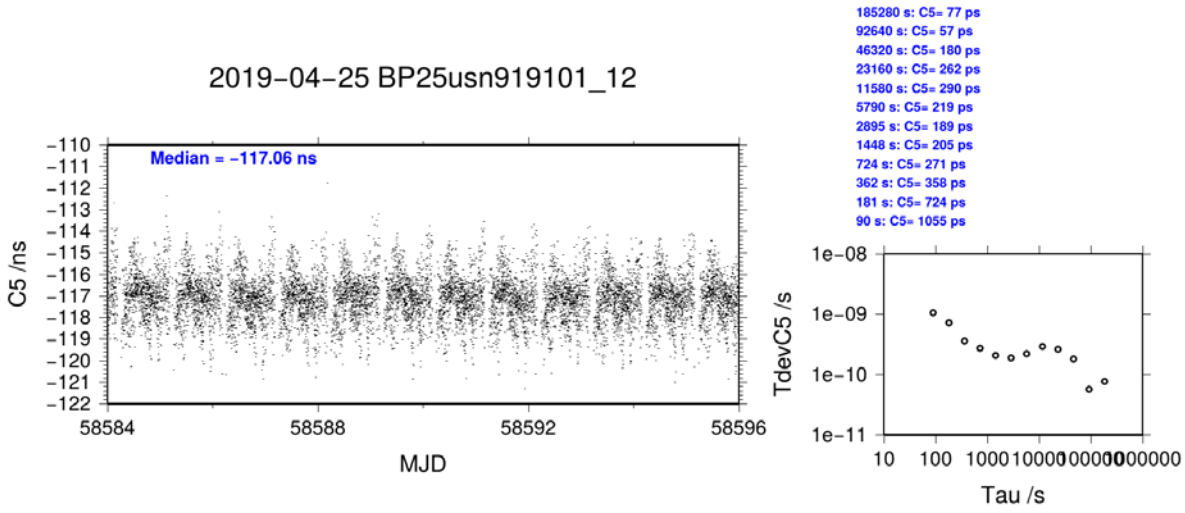
Global average of individual differences

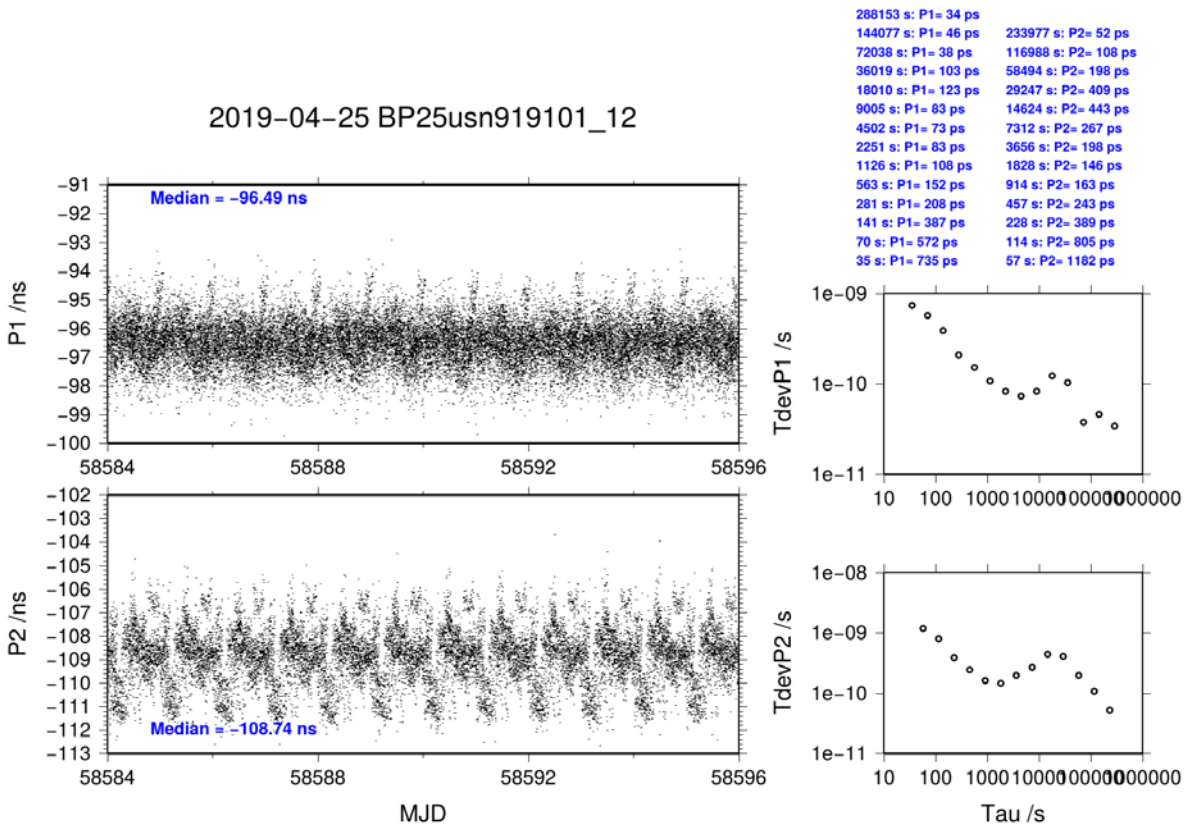
Code	#pts	ave/ns	rms/ns
C1	295060	-95.951	1.616
C2	181669	-106.881	1.840
C5	114727	-117.077	1.666
P1	295060	-96.483	1.371
P2	181669	-108.824	1.582
E1	213006	-97.714	1.189
E5	213004	-117.665	1.518

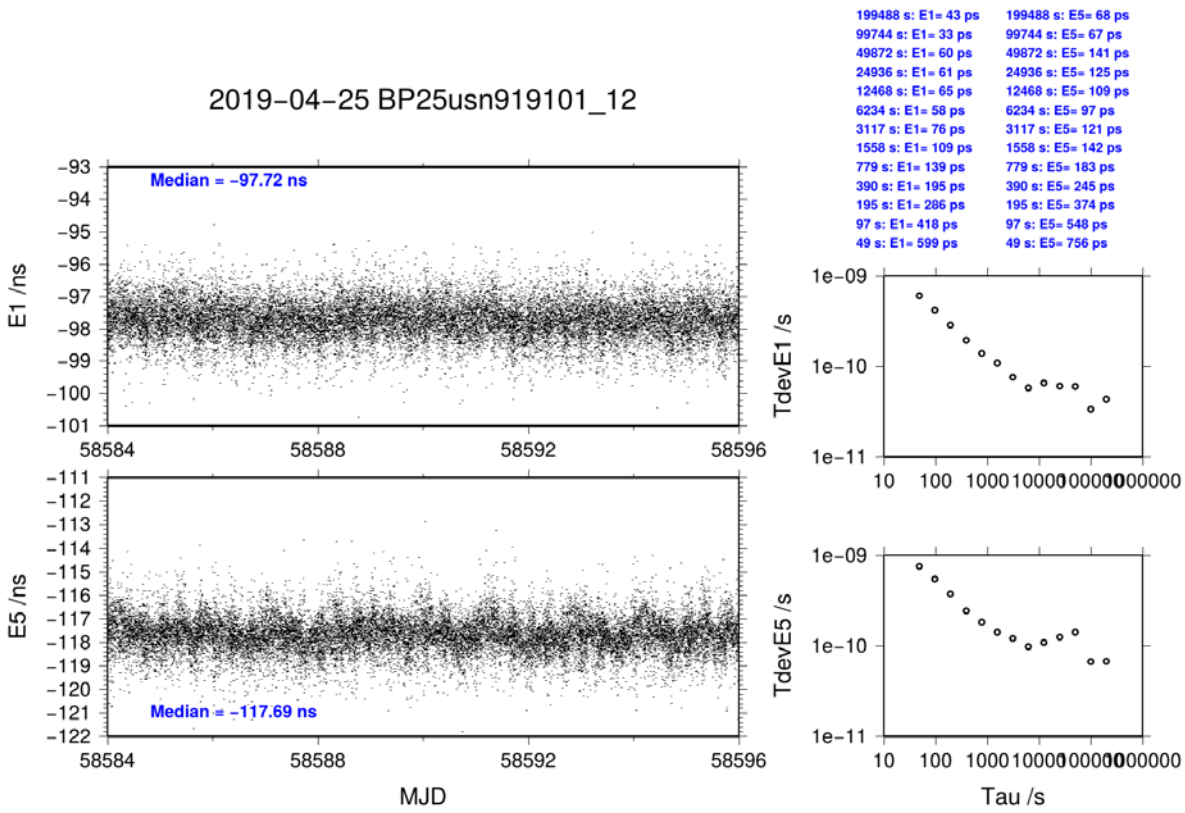
Number of 300s epochs in out file = 3456

Code	#pts	median/ns	ave/ns	rms/ns
C1	29468	-96.173	-95.970	1.164
C2	18146	-106.978	-106.899	1.229
C5	11458	-117.063	-117.096	1.034
P1	29468	-96.489	-96.501	0.758
P2	18146	-108.744	-108.836	1.207
E1	21283	-97.725	-97.729	0.595
E5	21283	-117.690	-117.687	0.782




2019-04-25 BP25usn919101_12
Median = -117.06 ns
C5 /ns
MJD
185280 s: C5= 77 ps
92640 s: C5= 57 ps
46320 s: C5= 180 ps
23160 s: C5= 262 ps
11580 s: C5= 290 ps
5790 s: C5= 219 ps
2895 s: C5= 189 ps
1448 s: C5= 205 ps
724 s: C5= 271 ps
362 s: C5= 358 ps
181 s: C5= 724 ps
90 s: C5= 1055 ps
TdevC5 /s
Tau /s


2019-04-25 BP25usn919101_12
Median = -96.49 ns
P1 /ns
Median = -108.74 ns
P2 /ns
MJD
288153 s: P1= 34 ps
144077 s: P1= 46 ps
72038 s: P1= 38 ps
36019 s: P1= 103 ps
18010 s: P1= 123 ps
9005 s: P1= 83 ps
4502 s: P1= 73 ps
2251 s: P1= 83 ps
1126 s: P1= 108 ps
563 s: P1= 152 ps
281 s: P1= 208 ps
141 s: P1= 387 ps
70 s: P1= 572 ps
35 s: P1= 735 ps
233977 s: P2= 52 ps
116988 s: P2= 108 ps
58494 s: P2= 198 ps
29247 s: P2= 409 ps
14624 s: P2= 443 ps
7312 s: P2= 267 ps
3656 s: P2= 198 ps
1828 s: P2= 146 ps
914 s: P2= 163 ps
457 s: P2= 243 ps
228 s: P2= 389 ps
114 s: P2= 805 ps
57 s: P2= 1182 ps
TdevP1 /s
TdevP2 /s
Tau /s


2019-04-25 BP25usn919101_12
Median = -97.72 ns
Median = -117.69 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s
199488 s: E1= 43 ps
99744 s: E1= 33 ps
49872 s: E1= 60 ps
24936 s: E1= 61 ps
12468 s: E1= 65 ps
6234 s: E1= 58 ps
3117 s: E1= 76 ps
1558 s: E1= 109 ps
779 s: E1= 139 ps
390 s: E1= 195 ps
195 s: E1= 286 ps
97 s: E1= 418 ps
49 s: E1= 599 ps
199488 s: E5= 68 ps
99744 s: E5= 67 ps
49872 s: E5= 141 ps
24936 s: E5= 125 ps
12468 s: E5= 109 ps
6234 s: E5= 97 ps
3117 s: E5= 121 ps
1558 s: E5= 142 ps
779 s: E5= 183 ps
390 s: E5= 245 ps
195 s: E5= 374 ps
97 s: E5= 548 ps
49 s: E5= 756 ps

4.3/ NIST (19216)

Period

MJD 58699 to 58706

Delays

BP1C:

X_O = 201.15 ns	(216.50-15.35)
X_P = 327.83+52.60 = 380.43 ns	(cf page 45)
REFDLY = 581.58 ns	
CABDLY = 235.70 ns	(C131)

BP25:

REFDLY = 327.83+52.60 = 380.43 ns	(cf page 45)
CABDLY = 176.24 ns	(C208)

NIST:

REFDLY = 65.9 ns	(cf page 45)
CABDLY = 275.5 ns	

NISG: (cf page 45)

X_O = 39.10 ns
X_P = 413.75 ns
REFDLY = 452.85 ns
CABDLY = 185.0 ns

NISS:

REFDLY = 301.0 ns	(cf page 45)
CABDLY = 298.9 ns	

NIS4 (NB02):

REFDLY = 129.4 ns	(cf page 45)
CABDLY = 298.0 ns	

Setup at the NIST

Log of Events / Additional Information :

```
================================================================
bp1c (BIPM calibrator)
----------------------------------------------------------------
1pps_in(pps dist)-1pps_out(rcvr), tare [ns]    15.353 (0.027)
delay [ns]                                    216.501 (0.069)
ref dly[ns]                                   327.83  (0.1)
================================================================
gtr55 (BIPM calibrator)
----------------------------------------------------------------
ref dly[ns]                                   327.83  (0.1)
================================================================
nist
----------------------------------------------------------------
INT DELAY P1 XR+XS (in ns)   -72.80
INT DELAY P2 XR+XS (in ns)   -72.30
ANT CAB DELAY (in ns)         275.5
CLOCK CAB DELAY XP+XO (in ns)  65.9
================================================================
nisg
----------------------------------------------------------------
cab_delay[ns]                            185.0
ref dly[ns]|from utc point               327.83 (0.1)
ref dly[ns]|local                         85.92 (0.14)
ref sly[ns]|total                        413.75 (0.17)
1pps_in(pps dist)-1pps_out(rcvr)[ns]     125.02 (0.16)
1pps|tare[ns]                             85.92 (0.14)
nisg|1ppsin to internal ref               39.10 (0.21)

REFDLY=413.75+39.10 = 452.85 (0.27) ns
================================================================
niss
----------------------------------------------------------------
INT DELAY P1 XR+XS (in ns)     44.59
INT DELAY P2 XR+XS (in ns)     45.44
ANT CAB DELAY (in ns)         298.9
CLOCK CAB DELAY XP+XO (in ns) 301.0
================================================================
nb02
----------------------------------------------------------------
INT DELAY P1 XR+XS (in ns)    -10.04
INT DELAY P2 XR+XS (in ns)    -21.22
ANT CAB DELAY (in ns)         298.0
CLOCK CAB DELAY XP+XO (in ns) 129.4
================================================================
```

BP1C-NIST

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 199167
Computed code bias (P1/P2)/m = -130.434 -129.102
Computed baseline (X,Y,Z)/m = -63.214 -39.036 -62.024
RMS of residuals /m = 0.485

Number of phase differences to fit baseline
L1/L2 = 193856
L5 = 0
A priori baseline (X,Y,Z)/m = -63.214 -39.036 -62.024
22758 clock jitters computed out of 22758 intervals
AVE jitter /ps = -0.2 RMS jitter /ps = 5.2

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 1
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.035 0.142 -0.073
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.038 0.144 -0.087
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 1
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.035 0.142 -0.073
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.038 0.144 -0.087
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -63.179 -38.894 -62.097
Final baseline L2 (X,Y,Z)/m = -63.176 -38.892 -62.111
Final baseline L5 (X,Y,Z)/m = -63.178 -38.893 -62.104

COMPUTATION OF CODE DIFFERENCES

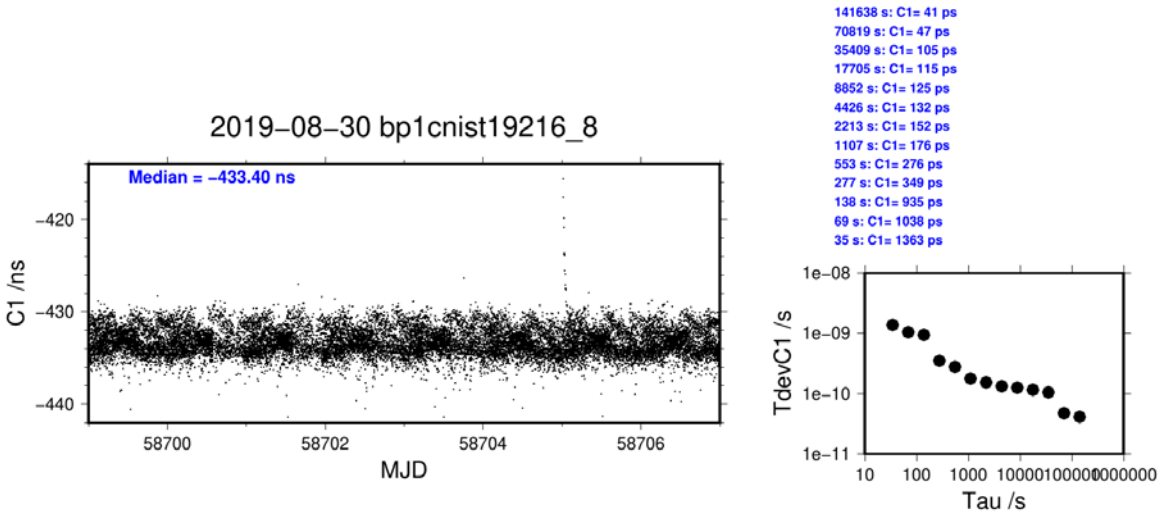
Total number of code differences = 201905

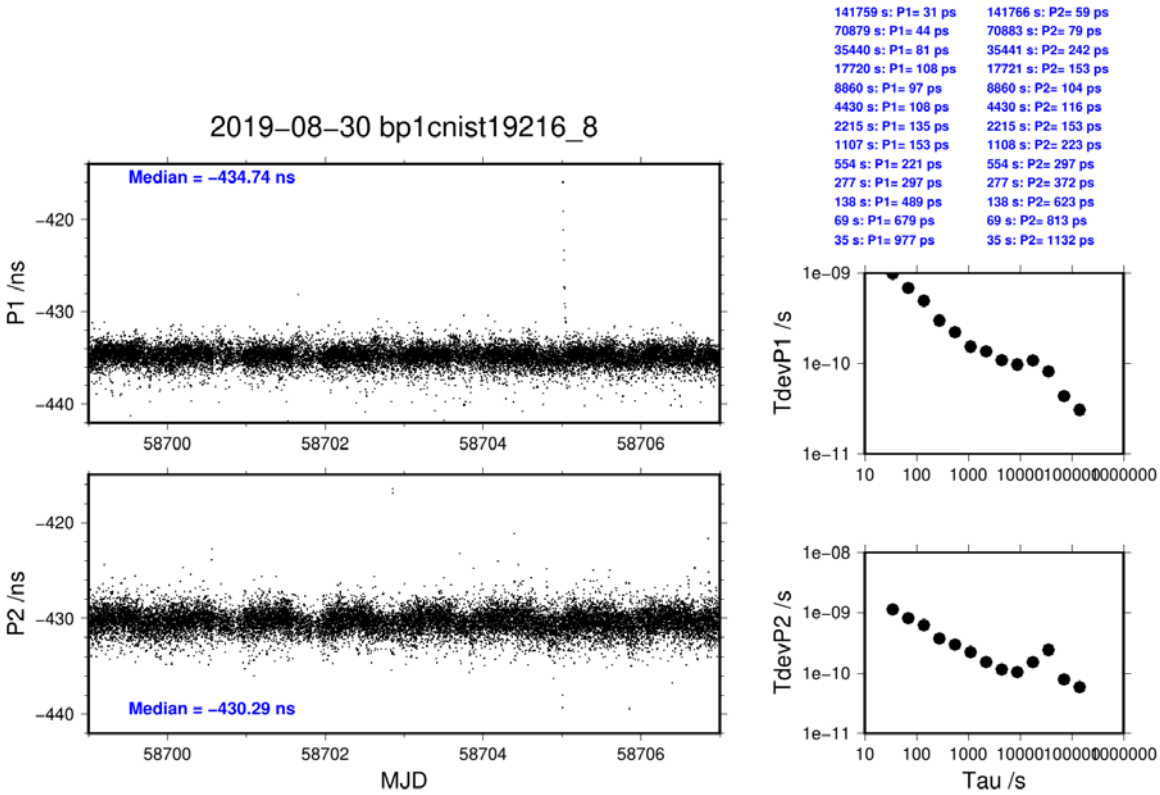
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	199224	-433.243	1.932
P1	199093	-434.781	1.611
P2	199094	-430.313	1.827

Number of 300s epochs in out file = 2304

Code	#pts	median/ns	ave/ns	rms/ns
C1	19981	-433.397	-433.241	1.446
P1	19964	-434.738	-434.778	0.968
P2	19963	-430.294	-430.319	1.179


2019–08–30 bp1cnist19216_8
Median = –433.40 ns
C1 /ns
–420
–430
–440
58700
58702
58704
58706
MJD
141638 s: C1= 41 ps
70819 s: C1= 47 ps
35409 s: C1= 105 ps
17705 s: C1= 115 ps
8852 s: C1= 125 ps
4426 s: C1= 132 ps
2213 s: C1= 152 ps
1107 s: C1= 176 ps
553 s: C1= 276 ps
277 s: C1= 349 ps
138 s: C1= 935 ps
69 s: C1= 1038 ps
35 s: C1= 1363 ps
TdevC1 /s
1e–08
1e–09
1e–10
1e–11
10
100
1000
Tau /s


2019–08–30 bp1cnist19216_8
Median = –434.74 ns
P1 /ns
–420
–430
–440
58700
58702
58704
58706
141759 s: P1= 31 ps
70879 s: P1= 44 ps
35440 s: P1= 81 ps
17720 s: P1= 108 ps
8860 s: P1= 97 ps
4430 s: P1= 108 ps
2215 s: P1= 135 ps
1107 s: P1= 153 ps
554 s: P1= 221 ps
277 s: P1= 297 ps
138 s: P1= 489 ps
69 s: P1= 679 ps
35 s: P1= 977 ps
141766 s: P2= 59 ps
70883 s: P2= 79 ps
35441 s: P2= 242 ps
17721 s: P2= 153 ps
8860 s: P2= 104 ps
4430 s: P2= 116 ps
2215 s: P2= 153 ps
1108 s: P2= 223 ps
554 s: P2= 297 ps
277 s: P2= 372 ps
138 s: P2= 623 ps
69 s: P2= 813 ps
35 s: P2= 1132 ps
TdevP1 /s
1e–09
1e–10
1e–11
10
100
1000
P2 /ns
Median = –430.29 ns
MJD
TdevP2 /s
1e–08
Tau /s

BP25-NIST

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 157787
Computed code bias (P1/P2)/m = -97.739 -96.756
Computed baseline (X,Y,Z)/m = -63.612 -39.221 -62.303
RMS of residuals /m = 0.445

Number of phase differences to fit baseline
L1/L2 = 154671
L5 = 0
A priori baseline (X,Y,Z)/m = -63.612 -39.221 -62.303
19854 clock jitters computed out of 20124 intervals
AVE jitter /ps = -0.2 RMS jitter /ps = 5.6

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.053 0.074 0.008
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.053 0.069 0.008
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -63.559 -39.147 -62.294
Final baseline L2 (X,Y,Z)/m = -63.559 -39.152 -62.295
Final baseline L5 (X,Y,Z)/m = -63.559 -39.149 -62.295

COMPUTATION OF CODE DIFFERENCES

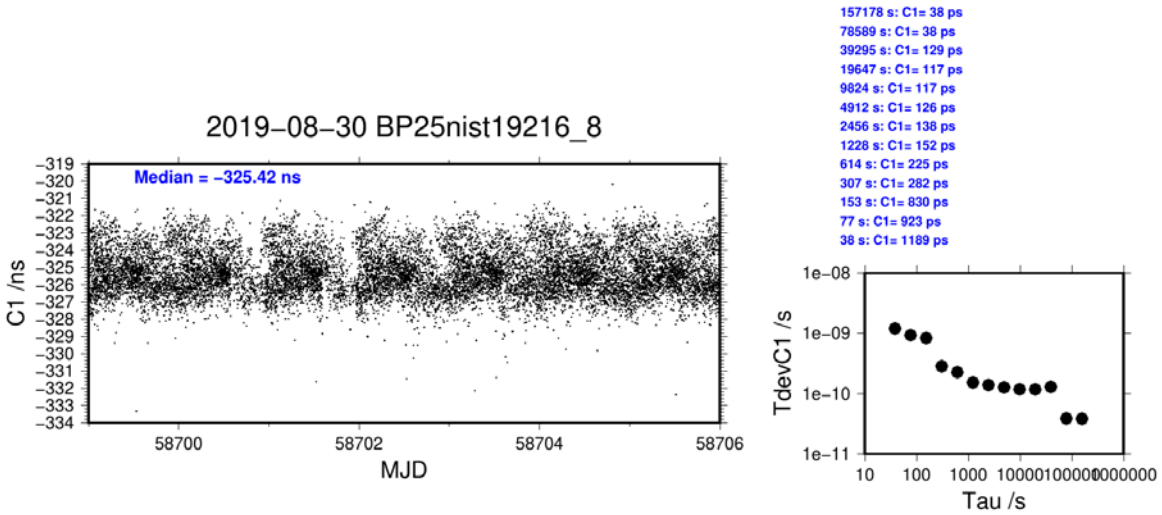
Total number of code differences = 157831

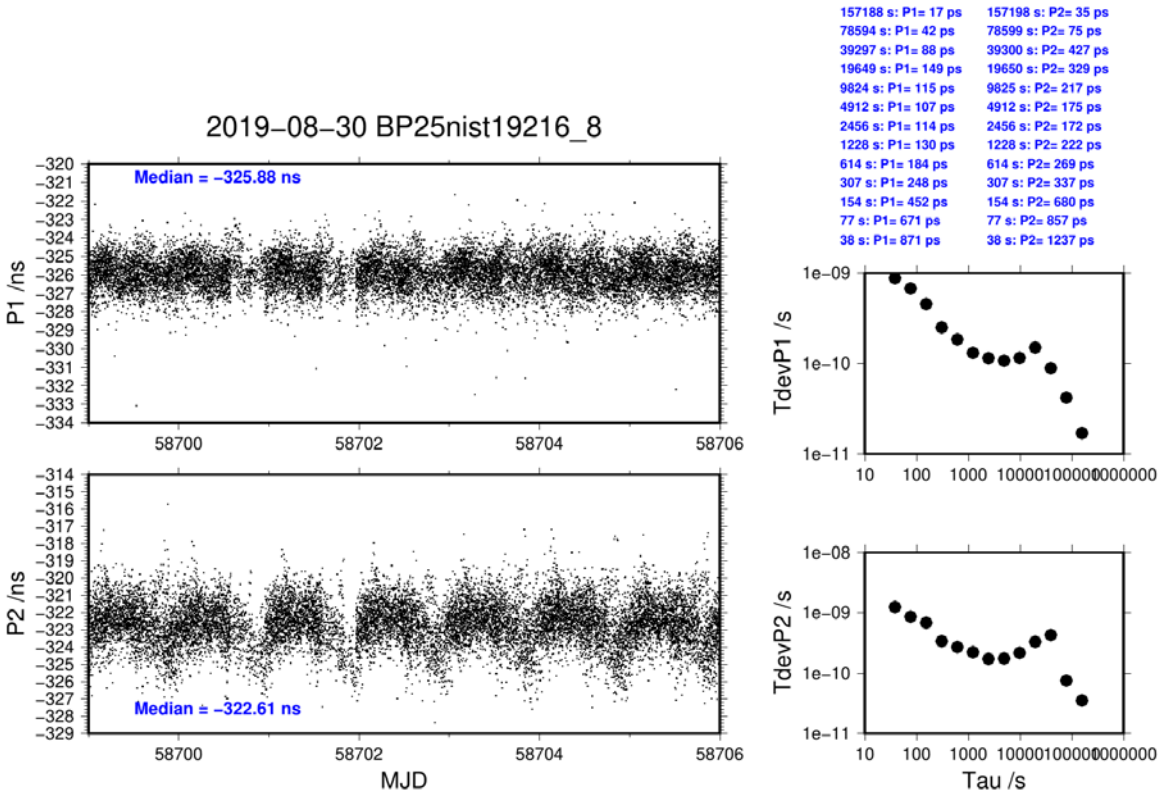
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	157776	-325.293	1.584
P1	157734	-325.898	1.321
P2	157731	-322.628	1.694

Number of 300s epochs in out file = 2016

Code	#pts	median/ns	ave/ns	rms/ns
C1	15754	-325.421	-325.293	1.270
P1	15753	-325.882	-325.898	0.894
P2	15752	-322.613	-322.633	1.306


2019–08–30 BP25nist19216_8
Median = –325.42 ns
C1 /ns
MJD
157178 s: C1= 38 ps
78589 s: C1= 38 ps
39295 s: C1= 129 ps
19647 s: C1= 117 ps
9824 s: C1= 117 ps
4912 s: C1= 126 ps
2456 s: C1= 138 ps
1228 s: C1= 152 ps
614 s: C1= 225 ps
307 s: C1= 282 ps
153 s: C1= 830 ps
77 s: C1= 923 ps
38 s: C1= 1189 ps
TdevC1 /s
Tau /s


2019–08–30 BP25nist19216_8
Median = –325.88 ns
P1 /ns
157188 s: P1= 17 ps
78594 s: P1= 42 ps
39297 s: P1= 88 ps
19649 s: P1= 149 ps
9824 s: P1= 115 ps
4912 s: P1= 107 ps
2456 s: P1= 114 ps
1228 s: P1= 130 ps
614 s: P1= 184 ps
307 s: P1= 248 ps
154 s: P1= 452 ps
77 s: P1= 671 ps
38 s: P1= 871 ps
157198 s: P2= 35 ps
78599 s: P2= 75 ps
39300 s: P2= 427 ps
19650 s: P2= 329 ps
9825 s: P2= 217 ps
4912 s: P2= 175 ps
2456 s: P2= 172 ps
1228 s: P2= 222 ps
614 s: P2= 269 ps
307 s: P2= 337 ps
154 s: P2= 680 ps
77 s: P2= 857 ps
38 s: P2= 1237 ps
TdevP1 /s
P2 /ns
Median = –322.61 ns
MJD
TdevP2 /s
Tau /s

BP1C-NISG

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 206046
Number of huge residuals = 608. New iteration
Computed code bias (P1/P2)/m = -17.818 -15.660
Computed baseline (X,Y,Z)/m = 2.760 -3.097 -3.387
RMS of residuals /m = 0.531

Number of phase differences to fit baseline
L1/L2 = 201983
L5 = 0
A priori baseline (X,Y,Z)/m = 2.760 -3.097 -3.387
22760 clock jitters computed out of 22760 intervals
AVE jitter /ps = -0.2 RMS jitter /ps = 5.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.095 -0.310 0.310
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.095 -0.303 0.296
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = 2.665 -3.407 -3.077
Final baseline L2 (X,Y,Z)/m = 2.665 -3.400 -3.091
Final baseline L5 (X,Y,Z)/m = 2.665 -3.403 -3.084

COMPUTATION OF CODE DIFFERENCES

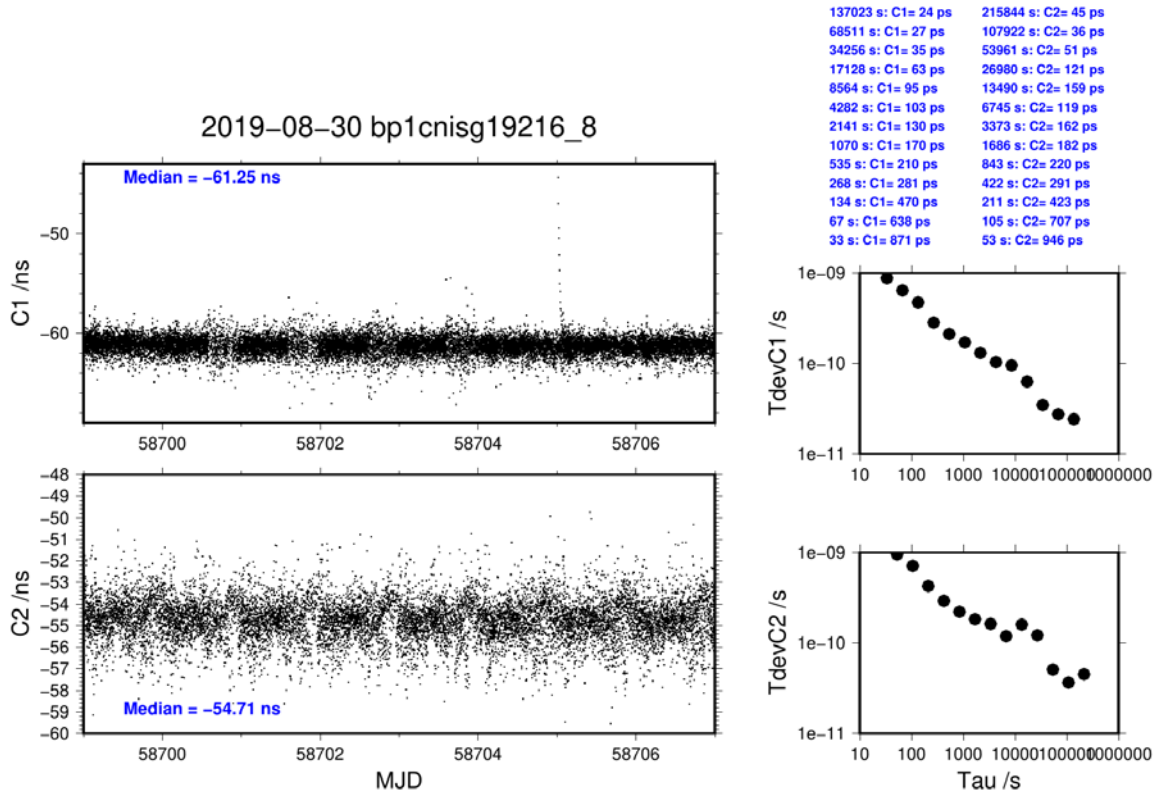
Total number of code differences = 209794

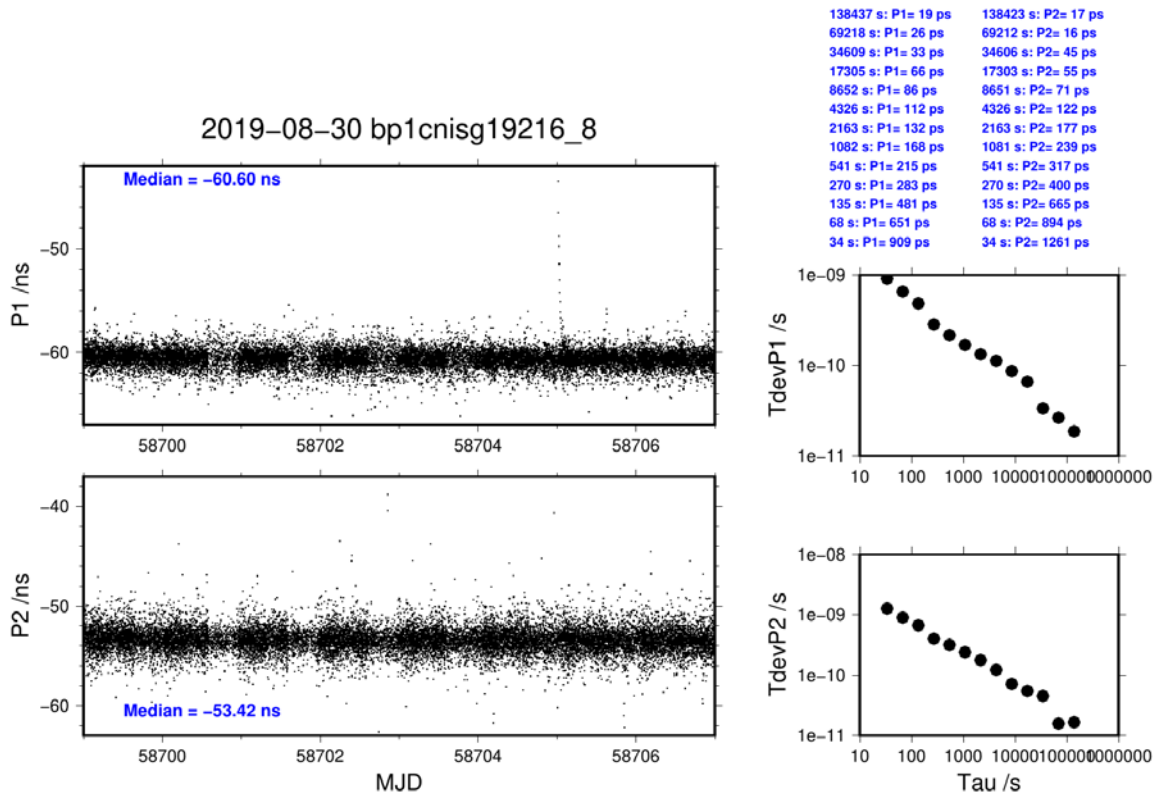
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	206300	-61.274	1.740
C2	130871	-54.741	1.758
P1	204269	-60.619	1.719
P2	204286	-53.413	1.872

Number of 300s epochs in out file = 2304

Code	#pts	median/ns	ave/ns	rms/ns
C1	20654	-61.251	-61.272	0.897
C2	13112	-54.708	-54.731	0.961
P1	20443	-60.597	-60.617	0.922
P2	20445	-53.425	-53.422	1.270


137023 s: C1= 24 ps
68511 s: C1= 27 ps
34256 s: C1= 35 ps
17128 s: C1= 63 ps
8564 s: C1= 95 ps
4282 s: C1= 103 ps
2141 s: C1= 130 ps
1070 s: C1= 170 ps
535 s: C1= 210 ps
268 s: C1= 281 ps
134 s: C1= 470 ps
67 s: C1= 638 ps
33 s: C1= 871 ps
215844 s: C2= 45 ps
107922 s: C2= 36 ps
53961 s: C2= 51 ps
26980 s: C2= 121 ps
13490 s: C2= 159 ps
6745 s: C2= 119 ps
3373 s: C2= 162 ps
1686 s: C2= 182 ps
843 s: C2= 220 ps
422 s: C2= 291 ps
211 s: C2= 423 ps
105 s: C2= 707 ps
53 s: C2= 946 ps
2019–08–30 bp1cnisg19216_8
Median = –61.25 ns
C1 /ns
Median = –54.71 ns
C2 /ns
MJD
TdevC1 /s
TdevC2 /s
Tau /s


138437 s: P1= 19 ps
69218 s: P1= 26 ps
34609 s: P1= 33 ps
17305 s: P1= 66 ps
8652 s: P1= 86 ps
4326 s: P1= 112 ps
2163 s: P1= 132 ps
1082 s: P1= 168 ps
541 s: P1= 215 ps
270 s: P1= 283 ps
135 s: P1= 481 ps
68 s: P1= 651 ps
34 s: P1= 909 ps
138423 s: P2= 17 ps
69212 s: P2= 16 ps
34606 s: P2= 45 ps
17303 s: P2= 55 ps
8651 s: P2= 71 ps
4326 s: P2= 122 ps
2163 s: P2= 177 ps
1081 s: P2= 239 ps
541 s: P2= 317 ps
270 s: P2= 400 ps
135 s: P2= 665 ps
68 s: P2= 894 ps
34 s: P2= 1261 ps
2019–08–30 bp1cnisg19216_8
Median = –60.60 ns
P1 /ns
Median = –53.42 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s

BP25-NISG

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 159111
Number of huge residuals = 2. New iteration
Computed code bias (P1/P2)/m = 14.450 16.258
Computed baseline (X,Y,Z)/m = 2.248 -3.668 -3.266
RMS of residuals /m = 0.465

Number of phase differences to fit baseline
L1/L2 = 157049
L5 = 62326
A priori baseline (X,Y,Z)/m = 2.248 -3.668 -3.266
19856 clock jitters computed out of 20126 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 5.7

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.008 0.013 0.000
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.004 0.002 0.007
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.003 0.002 0.009
RMS of residuals L5 /m = 0.004

Final baseline L1 (X,Y,Z)/m = 2.255 -3.655 -3.266
Final baseline L2 (X,Y,Z)/m = 2.252 -3.666 -3.259
Final baseline L5 (X,Y,Z)/m = 2.251 -3.666 -3.257

COMPUTATION OF CODE DIFFERENCES

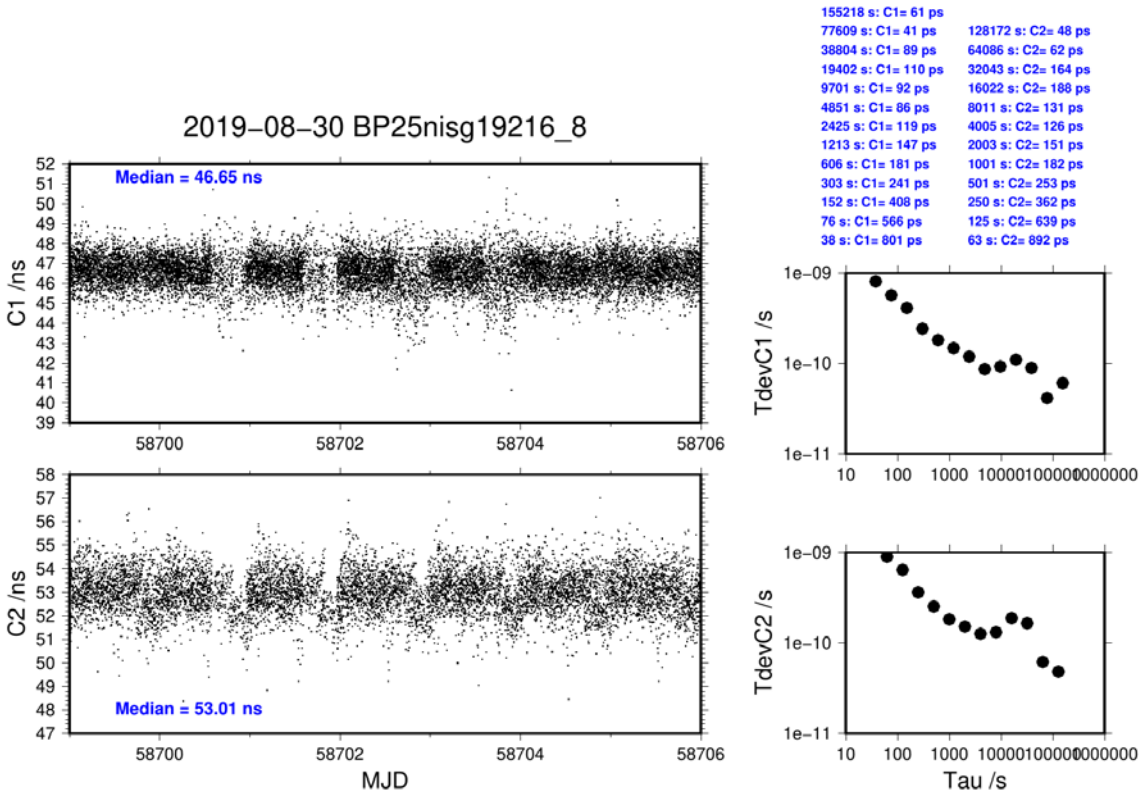
Total number of code differences = 269547

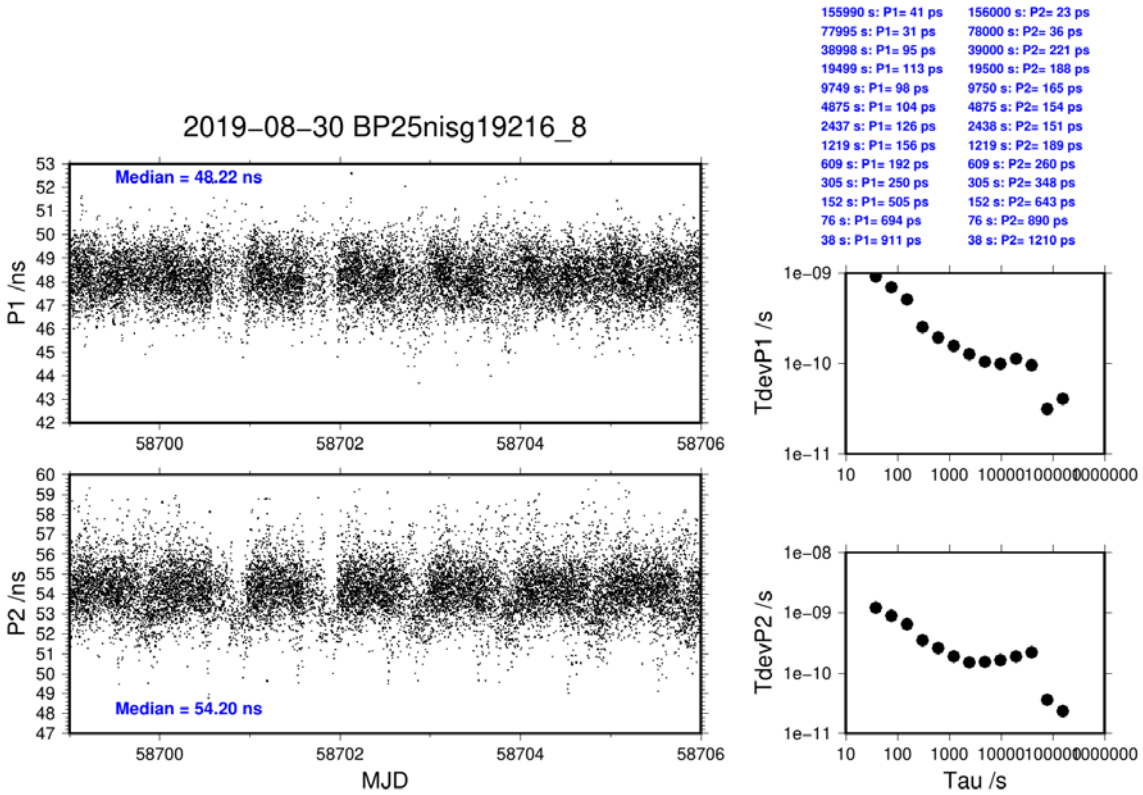
Global average of individual differences

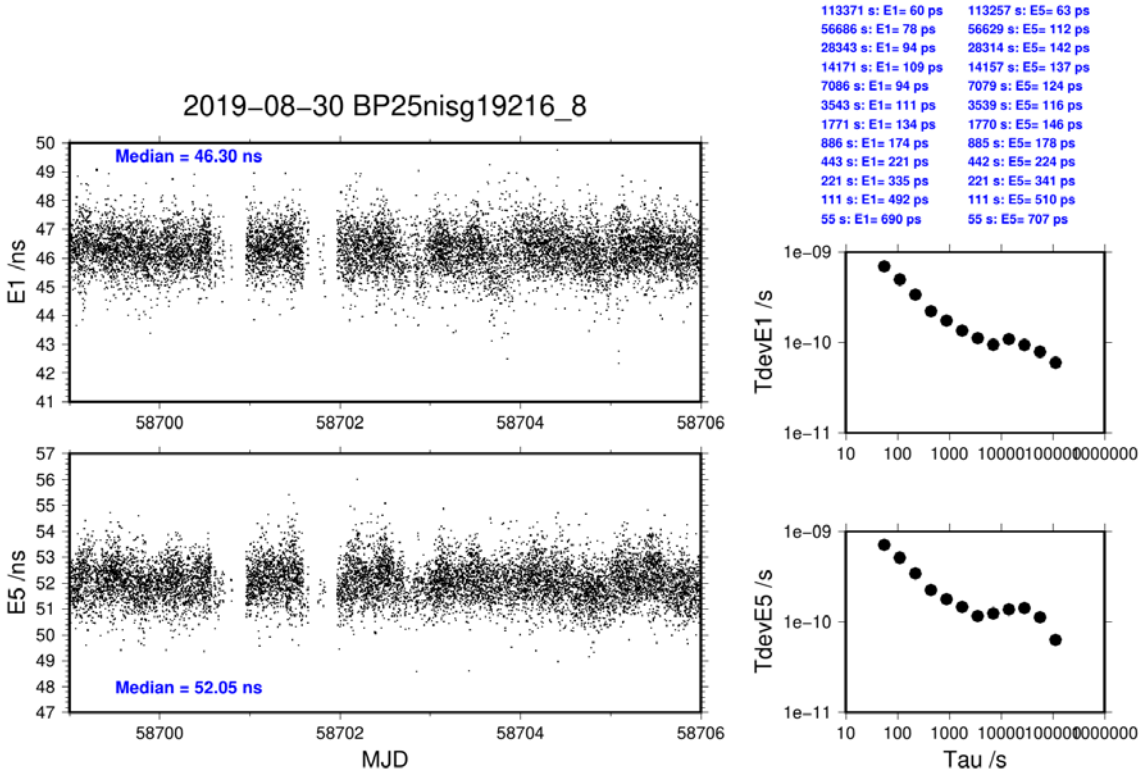
Code	#pts	ave/ns	rms/ns
C1	159865	46.617	1.427
C2	96857	53.004	1.342
P1	159042	48.227	1.503
P2	159040	54.232	1.699
E1	109288	46.296	1.118
E5	109415	52.058	0.969

Number of 300s epochs in out file = 2016

Code	#pts	median/ns	ave/ns	rms/ns
C1	15953	46.646	46.617	0.804
C2	9660	53.006	53.003	0.880
P1	15874	48.224	48.229	0.937
P2	15873	54.195	54.217	1.238
E1	10921	46.302	46.294	0.702
E5	10932	52.055	52.060	0.738


155218 s: C1= 61 ps
77609 s: C1= 41 ps
38804 s: C1= 89 ps
19402 s: C1= 110 ps
9701 s: C1= 92 ps
4851 s: C1= 86 ps
2425 s: C1= 119 ps
1213 s: C1= 147 ps
606 s: C1= 181 ps
303 s: C1= 241 ps
152 s: C1= 408 ps
76 s: C1= 566 ps
38 s: C1= 801 ps
128172 s: C2= 48 ps
64086 s: C2= 62 ps
32043 s: C2= 164 ps
16022 s: C2= 188 ps
8011 s: C2= 131 ps
4005 s: C2= 126 ps
2003 s: C2= 151 ps
1001 s: C2= 182 ps
501 s: C2= 253 ps
250 s: C2= 362 ps
125 s: C2= 639 ps
63 s: C2= 892 ps
2019–08–30 BP25nisg19216_8
Median = 46.65 ns
C1 /ns
Median = 53.01 ns
C2 /ns
MJD
TdevC1 /s
TdevC2 /s
Tau /s


155990 s: P1= 41 ps
77995 s: P1= 31 ps
38998 s: P1= 95 ps
19499 s: P1= 113 ps
9749 s: P1= 98 ps
4875 s: P1= 104 ps
2437 s: P1= 126 ps
1219 s: P1= 156 ps
609 s: P1= 192 ps
305 s: P1= 250 ps
152 s: P1= 505 ps
76 s: P1= 694 ps
38 s: P1= 911 ps
156000 s: P2= 23 ps
78000 s: P2= 36 ps
39000 s: P2= 221 ps
19500 s: P2= 188 ps
9750 s: P2= 165 ps
4875 s: P2= 154 ps
2438 s: P2= 151 ps
1219 s: P2= 189 ps
609 s: P2= 260 ps
305 s: P2= 348 ps
152 s: P2= 643 ps
76 s: P2= 890 ps
38 s: P2= 1210 ps
2019–08–30 BP25nisg19216_8
Median = 48.22 ns
P1 /ns
Median = 54.20 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


113371 s: E1= 60 ps
56686 s: E1= 78 ps
28343 s: E1= 94 ps
14171 s: E1= 109 ps
7086 s: E1= 94 ps
3543 s: E1= 111 ps
1771 s: E1= 134 ps
886 s: E1= 174 ps
443 s: E1= 221 ps
221 s: E1= 335 ps
111 s: E1= 492 ps
55 s: E1= 690 ps
113257 s: E5= 63 ps
56629 s: E5= 112 ps
28314 s: E5= 142 ps
14157 s: E5= 137 ps
7079 s: E5= 124 ps
3539 s: E5= 116 ps
1770 s: E5= 146 ps
885 s: E5= 178 ps
442 s: E5= 224 ps
221 s: E5= 341 ps
111 s: E5= 510 ps
55 s: E5= 707 ps
2019–08–30 BP25nisg19216_8
Median = 46.30 ns
E1 /ns
Median = 52.05 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

BP1C-NISS

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 191681
Number of huge residuals = 8. New iteration
Computed code bias (P1/P2)/m = -102.800 -101.290
Computed baseline (X,Y,Z)/m = -206.698 -40.683 -96.526
RMS of residuals /m = 0.607

Number of phase differences to fit baseline
L1/L2 = 209514
L5 = 0
A priori baseline (X,Y,Z)/m = -206.698 -40.683 -96.526
22743 clock jitters computed out of 22743 intervals
AVE jitter /ps = -0.5 RMS jitter /ps = 7.5

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 1
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.038 0.307 -0.141
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.042 0.319 -0.156
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 1
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.038 0.307 -0.141
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.042 0.319 -0.156
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -206.660 -40.376 -96.667
Final baseline L2 (X,Y,Z)/m = -206.656 -40.363 -96.682
Final baseline L5 (X,Y,Z)/m = -206.658 -40.370 -96.674

COMPUTATION OF CODE DIFFERENCES

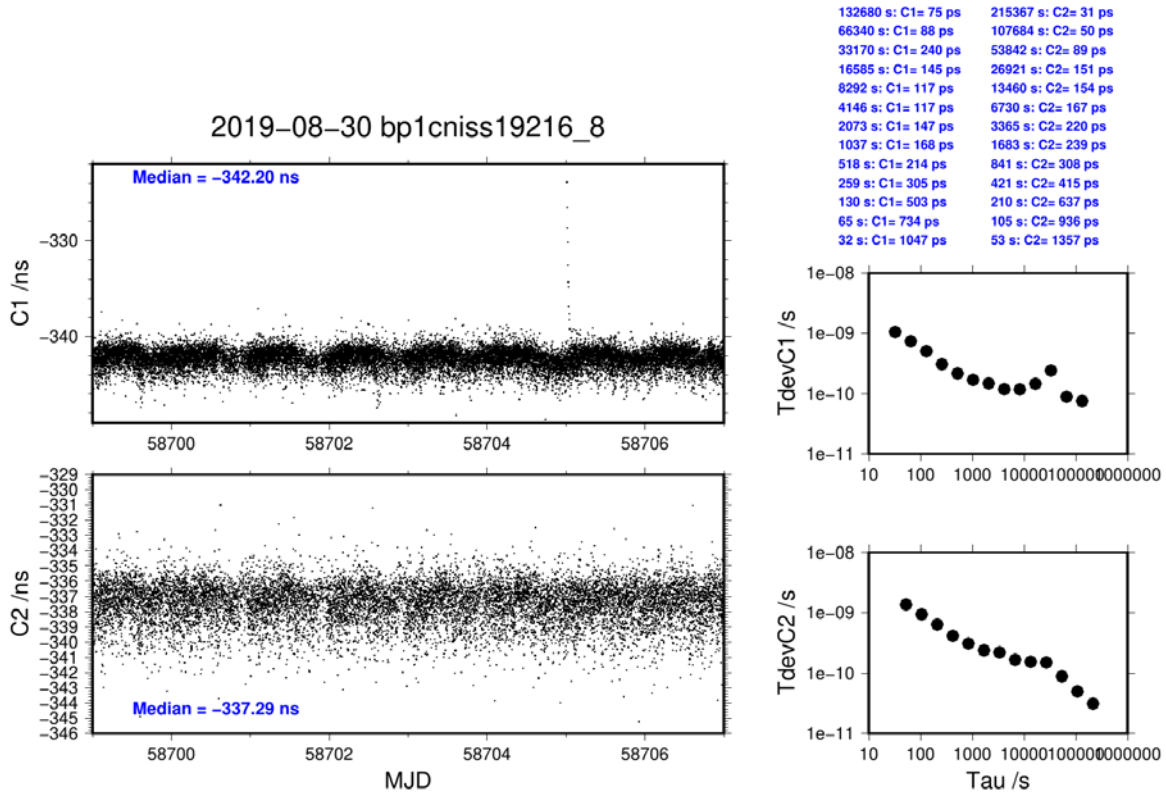
Total number of code differences = 216267

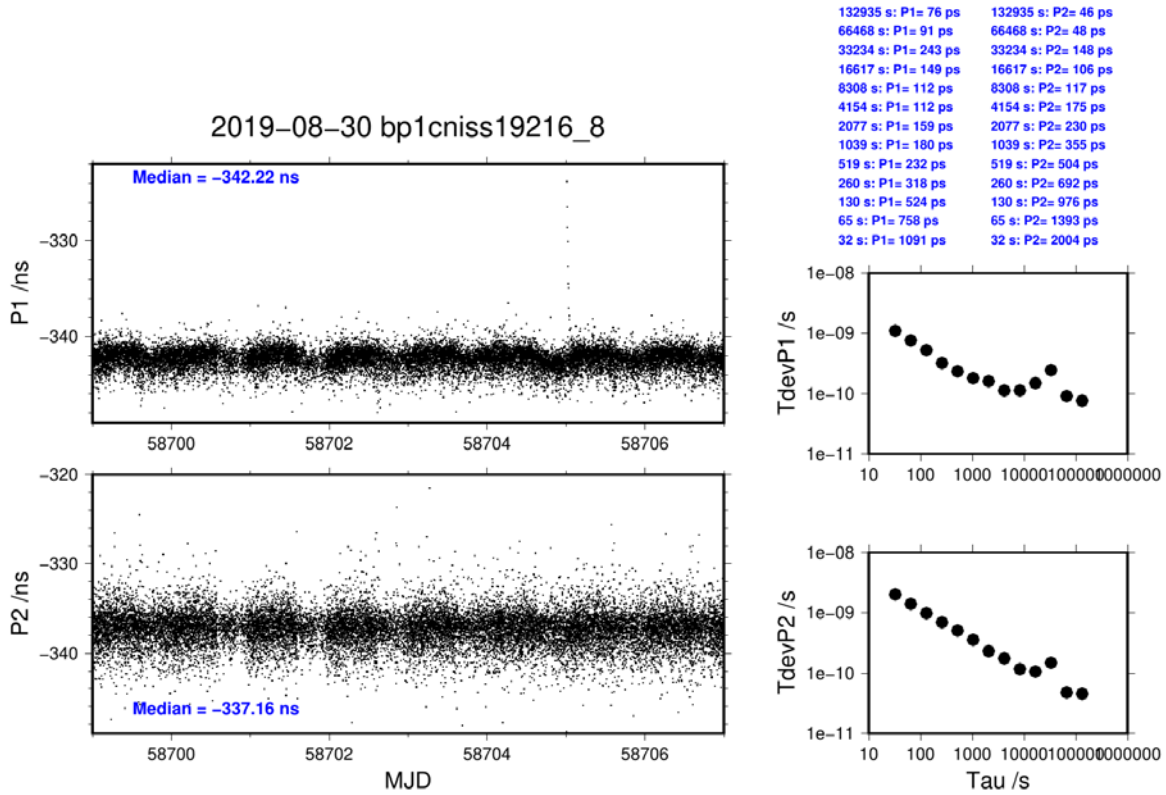
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	213095	-342.298	1.798
C2	131136	-337.449	2.280
P1	212727	-342.317	1.846
P2	212732	-337.234	3.024

Number of 300s epochs in out file = 2304

Code	#pts	median/ns	ave/ns	rms/ns
C1	21330	-342.197	-342.298	1.049
C2	13141	-337.292	-337.457	1.338
P1	21289	-342.222	-342.316	1.090
P2	21289	-337.162	-337.266	1.986


132680 s: C1= 75 ps
66340 s: C1= 88 ps
33170 s: C1= 240 ps
16585 s: C1= 145 ps
8292 s: C1= 117 ps
4146 s: C1= 117 ps
2073 s: C1= 147 ps
1037 s: C1= 168 ps
518 s: C1= 214 ps
259 s: C1= 305 ps
130 s: C1= 503 ps
65 s: C1= 734 ps
32 s: C1= 1047 ps
215367 s: C2= 31 ps
107684 s: C2= 50 ps
53842 s: C2= 89 ps
26921 s: C2= 151 ps
13460 s: C2= 154 ps
6730 s: C2= 167 ps
3365 s: C2= 220 ps
1683 s: C2= 239 ps
841 s: C2= 308 ps
421 s: C2= 415 ps
210 s: C2= 637 ps
105 s: C2= 936 ps
53 s: C2= 1357 ps
2019–08–30 bp1cniss19216_8
Median = –342.20 ns
C1 /ns
Median = –337.29 ns
C2 /ns
MJD
TdevC1 /s
TdevC2 /s
Tau /s


132935 s: P1= 76 ps
66468 s: P1= 91 ps
33234 s: P1= 243 ps
16617 s: P1= 149 ps
8308 s: P1= 112 ps
4154 s: P1= 112 ps
2077 s: P1= 159 ps
1039 s: P1= 180 ps
519 s: P1= 232 ps
260 s: P1= 318 ps
130 s: P1= 524 ps
65 s: P1= 758 ps
32 s: P1= 1091 ps
132935 s: P2= 46 ps
66468 s: P2= 48 ps
33234 s: P2= 148 ps
16617 s: P2= 106 ps
8308 s: P2= 117 ps
4154 s: P2= 175 ps
2077 s: P2= 230 ps
1039 s: P2= 355 ps
519 s: P2= 504 ps
260 s: P2= 692 ps
130 s: P2= 976 ps
65 s: P2= 1393 ps
32 s: P2= 2004 ps
2019–08–30 bp1cniss19216_8
Median = –342.22 ns
P1 /ns
Median = –337.16 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s

BP25-NISS

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 159333
Computed code bias (P1/P2)/m = -70.155 -68.976
Computed baseline (X,Y,Z)/m = -207.116 -40.908 -96.773
RMS of residuals /m = 0.591

Number of phase differences to fit baseline
L1/L2 = 156862
L5 = 0
A priori baseline (X,Y,Z)/m = -207.116 -40.908 -96.773
19842 clock jitters computed out of 20112 intervals
AVE jitter /ps = -0.5 RMS jitter /ps = 7.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.092 0.272 -0.103
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.098 0.275 -0.102
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -207.024 -40.637 -96.875
Final baseline L2 (X,Y,Z)/m = -207.019 -40.634 -96.875
Final baseline L5 (X,Y,Z)/m = -207.022 -40.635 -96.875

COMPUTATION OF CODE DIFFERENCES

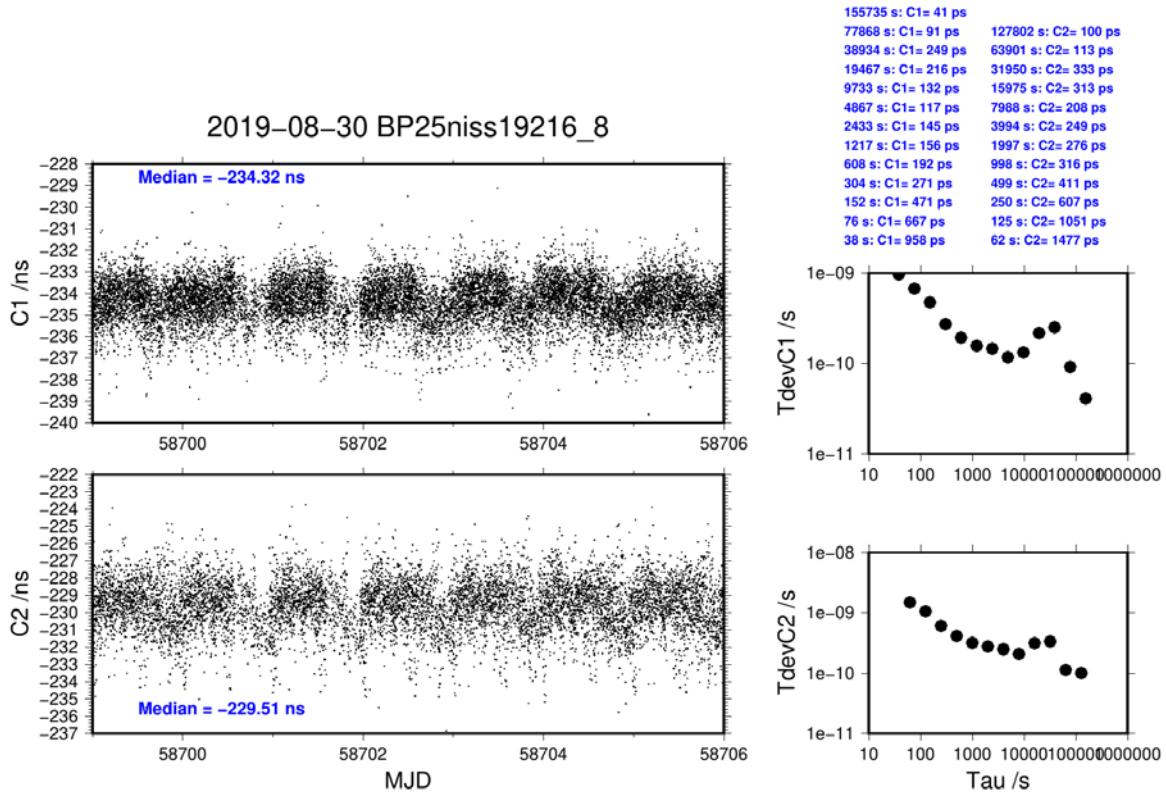
Total number of code differences = 159395

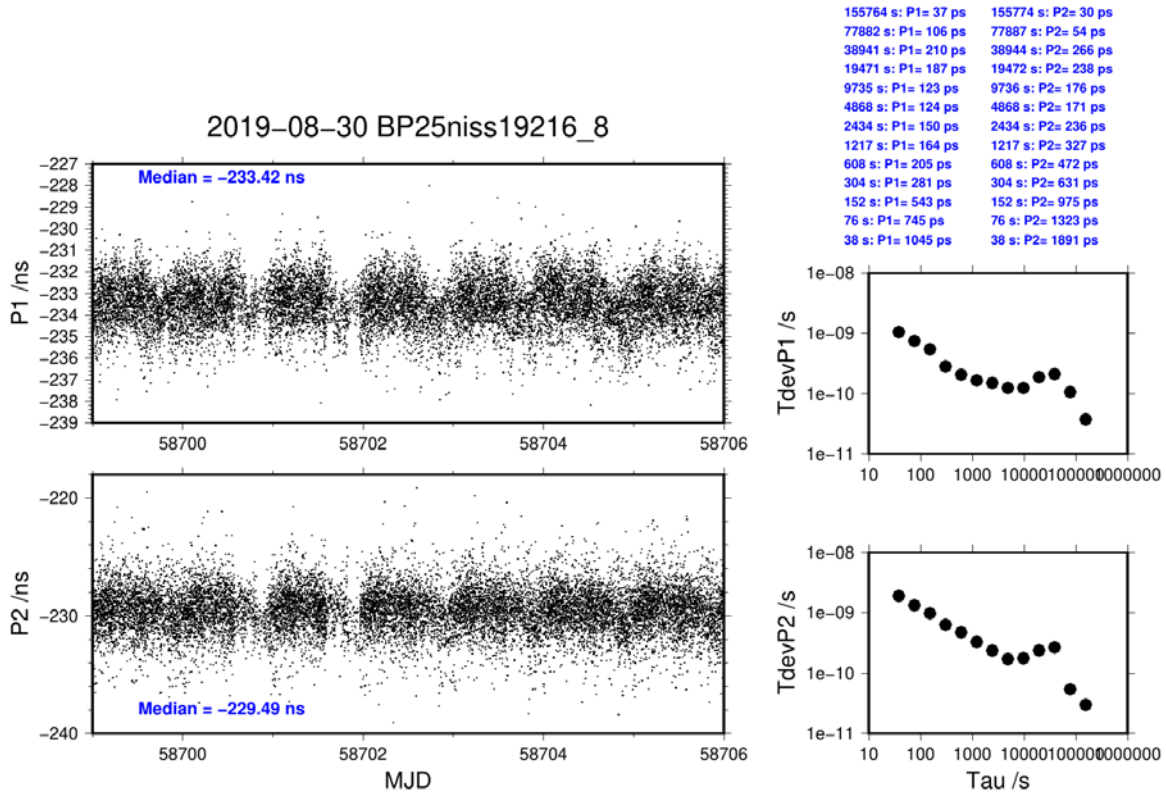
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	159334	-234.351	1.476
C2	97136	-229.567	2.028
P1	159275	-233.430	1.562
P2	159272	-229.490	2.802

Number of 300s epochs in out file = 2016

Code	#pts	median/ns	ave/ns	rms/ns
C1	15900	-234.319	-234.360	0.971
C2	9688	-229.509	-229.589	1.475
P1	15897	-233.416	-233.437	1.055
P2	15896	-229.489	-229.534	1.907


155735 s: C1= 41 ps
77868 s: C1= 91 ps
38934 s: C1= 249 ps
19467 s: C1= 216 ps
9733 s: C1= 132 ps
4867 s: C1= 117 ps
2433 s: C1= 145 ps
1217 s: C1= 156 ps
608 s: C1= 192 ps
304 s: C1= 271 ps
152 s: C1= 471 ps
76 s: C1= 667 ps
38 s: C1= 958 ps
127802 s: C2= 100 ps
63901 s: C2= 113 ps
31950 s: C2= 333 ps
15975 s: C2= 313 ps
7988 s: C2= 208 ps
3994 s: C2= 249 ps
1997 s: C2= 276 ps
998 s: C2= 316 ps
499 s: C2= 411 ps
250 s: C2= 607 ps
125 s: C2= 1051 ps
62 s: C2= 1477 ps
2019–08–30 BP25niss19216_8
Median = –234.32 ns
C1 /ns
Median = –229.51 ns
C2 /ns
MJD
TdevC1 /s
TdevC2 /s
Tau /s


155764 s: P1= 37 ps
77882 s: P1= 106 ps
38941 s: P1= 210 ps
19471 s: P1= 187 ps
9735 s: P1= 123 ps
4868 s: P1= 124 ps
2434 s: P1= 150 ps
1217 s: P1= 164 ps
608 s: P1= 205 ps
304 s: P1= 281 ps
152 s: P1= 543 ps
76 s: P1= 745 ps
38 s: P1= 1045 ps
155774 s: P2= 30 ps
77887 s: P2= 54 ps
38944 s: P2= 266 ps
19472 s: P2= 238 ps
9736 s: P2= 176 ps
4868 s: P2= 171 ps
2434 s: P2= 236 ps
1217 s: P2= 327 ps
608 s: P2= 472 ps
304 s: P2= 631 ps
152 s: P2= 975 ps
76 s: P2= 1323 ps
38 s: P2= 1891 ps
2019–08–30 BP25niss19216_8
Median = –233.42 ns
P1 /ns
Median = –229.49 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s

BP1C-NB02

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 151201
Computed code bias (P1/P2)/m = -137.175 -132.070
Computed baseline (X,Y,Z)/m = -214.926 -40.924 -98.429
RMS of residuals /m = 0.717

Number of phase differences to fit baseline
L1/L2 = 182474
L5 = 0
A priori baseline (X,Y,Z)/m = -214.926 -40.924 -98.429
20484 clock jitters computed out of 20484 intervals
AVE jitter /ps = -0.3 RMS jitter /ps = 10.7

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.076 0.272 -0.073
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = 0.080 0.285 -0.093
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -214.850 -40.652 -98.503
Final baseline L2 (X,Y,Z)/m = -214.845 -40.638 -98.522
Final baseline L5 (X,Y,Z)/m = -214.848 -40.645 -98.513

COMPUTATION OF CODE DIFFERENCES

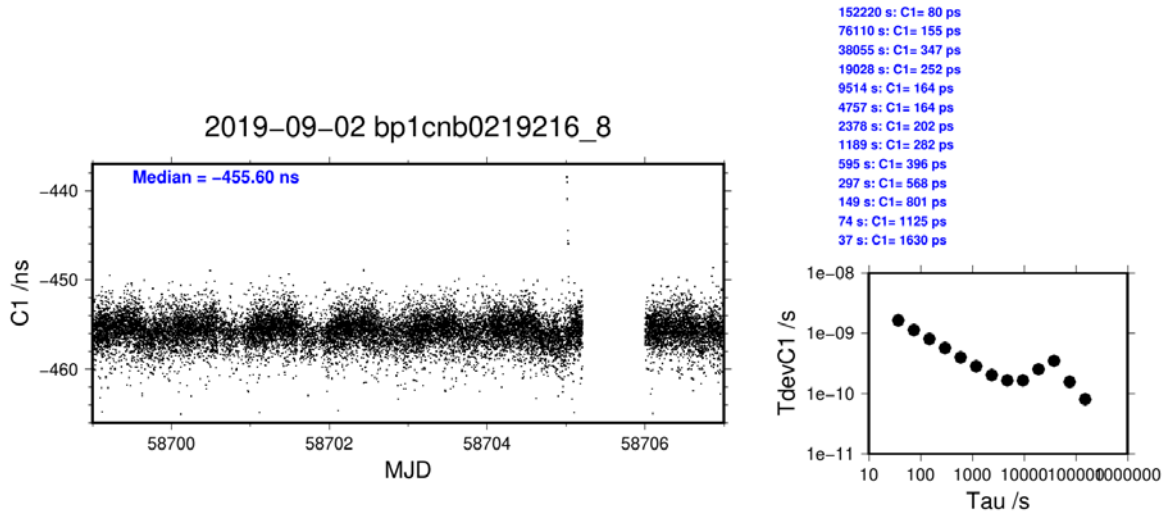
Total number of code differences = 188841

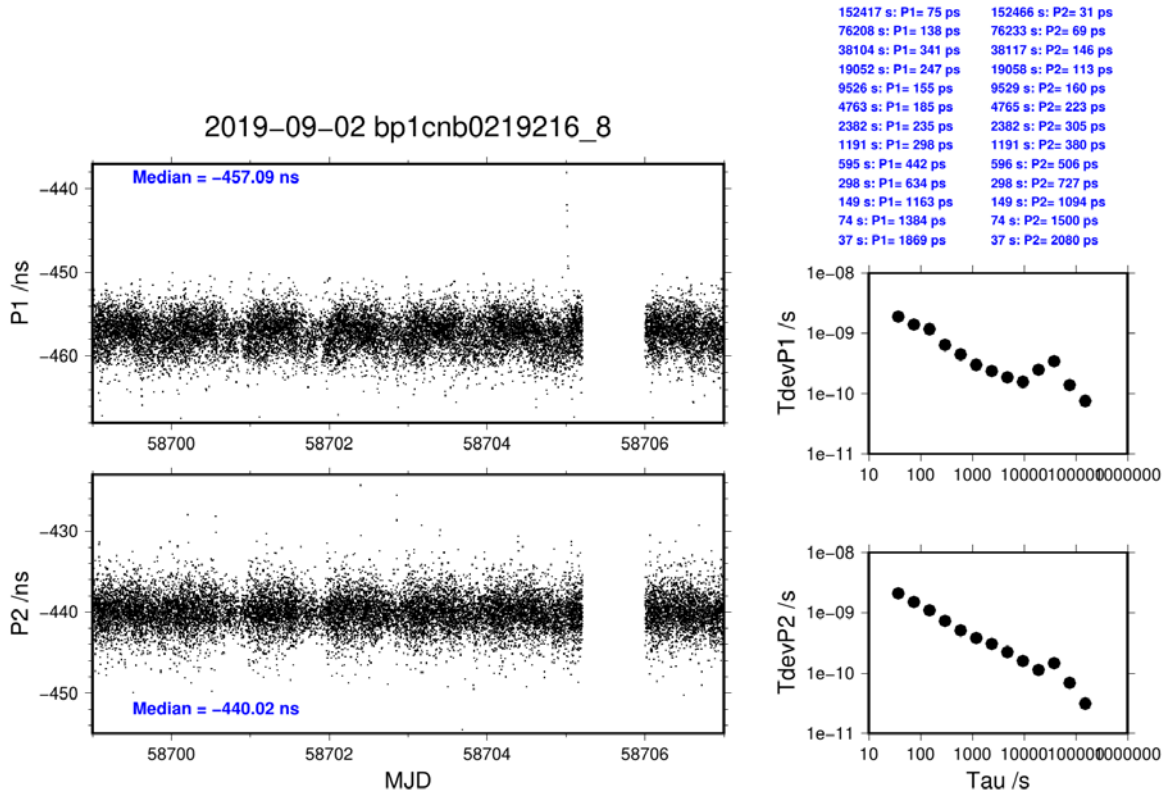
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	185714	-455.624	2.458
P1	185492	-457.160	2.699
P2	185446	-439.991	2.824

Number of 300s epochs in out file = 2077

Code	#pts	median/ns	ave/ns	rms/ns
C1	18592	-455.604	-455.652	1.653
P1	18568	-457.090	-457.188	1.989
P2	18562	-440.016	-440.021	2.120


2019–09–02 bp1cnb0219216_8
Median = –455.60 ns
C1 /ns
MJD
152220 s: C1= 80 ps
76110 s: C1= 155 ps
38055 s: C1= 347 ps
19028 s: C1= 252 ps
9514 s: C1= 164 ps
4757 s: C1= 164 ps
2378 s: C1= 202 ps
1189 s: C1= 282 ps
595 s: C1= 396 ps
297 s: C1= 568 ps
149 s: C1= 801 ps
74 s: C1= 1125 ps
37 s: C1= 1630 ps
TdevC1 /s
Tau /s


2019–09–02 bp1cnb0219216_8
Median = –457.09 ns
P1 /ns
Median = –440.02 ns
P2 /ns
MJD
152417 s: P1= 75 ps
76208 s: P1= 138 ps
38104 s: P1= 341 ps
19052 s: P1= 247 ps
9526 s: P1= 155 ps
4763 s: P1= 185 ps
2382 s: P1= 235 ps
1191 s: P1= 298 ps
595 s: P1= 442 ps
298 s: P1= 634 ps
149 s: P1= 1163 ps
74 s: P1= 1384 ps
37 s: P1= 1869 ps
152466 s: P2= 31 ps
76233 s: P2= 69 ps
38117 s: P2= 146 ps
19058 s: P2= 113 ps
9529 s: P2= 160 ps
4765 s: P2= 223 ps
2382 s: P2= 305 ps
1191 s: P2= 380 ps
596 s: P2= 506 ps
298 s: P2= 727 ps
149 s: P2= 1094 ps
74 s: P2= 1500 ps
37 s: P2= 2080 ps
TdevP1 /s
TdevP2 /s
Tau /s

BP25-NB02

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 129976
Computed code bias (P1/P2)/m = -104.574 -99.805
Computed baseline (X,Y,Z)/m = -215.384 -41.201 -98.675
RMS of residuals /m = 0.696

Number of phase differences to fit baseline
L1/L2 = 139156
L5 = 0
A priori baseline (X,Y,Z)/m = -215.384 -41.201 -98.675
17582 clock jitters computed out of 17852 intervals
AVE jitter /ps = -0.3 RMS jitter /ps = 10.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.150 0.284 -0.026
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = 0.149 0.291 -0.033
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -215.234 -40.917 -98.700
Final baseline L2 (X,Y,Z)/m = -215.235 -40.910 -98.708
Final baseline L5 (X,Y,Z)/m = -215.235 -40.913 -98.704

COMPUTATION OF CODE DIFFERENCES

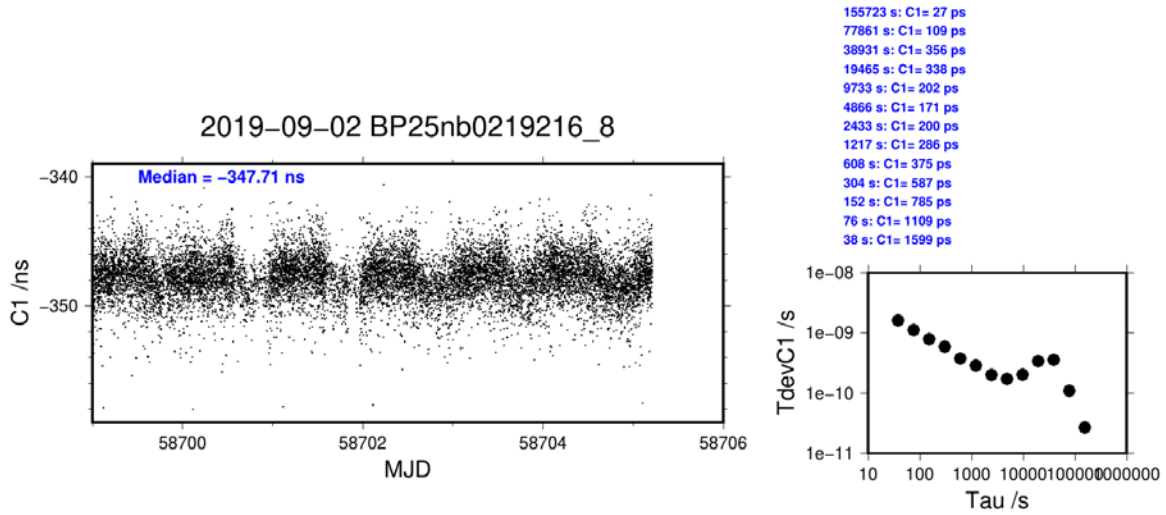
Total number of code differences = 141550

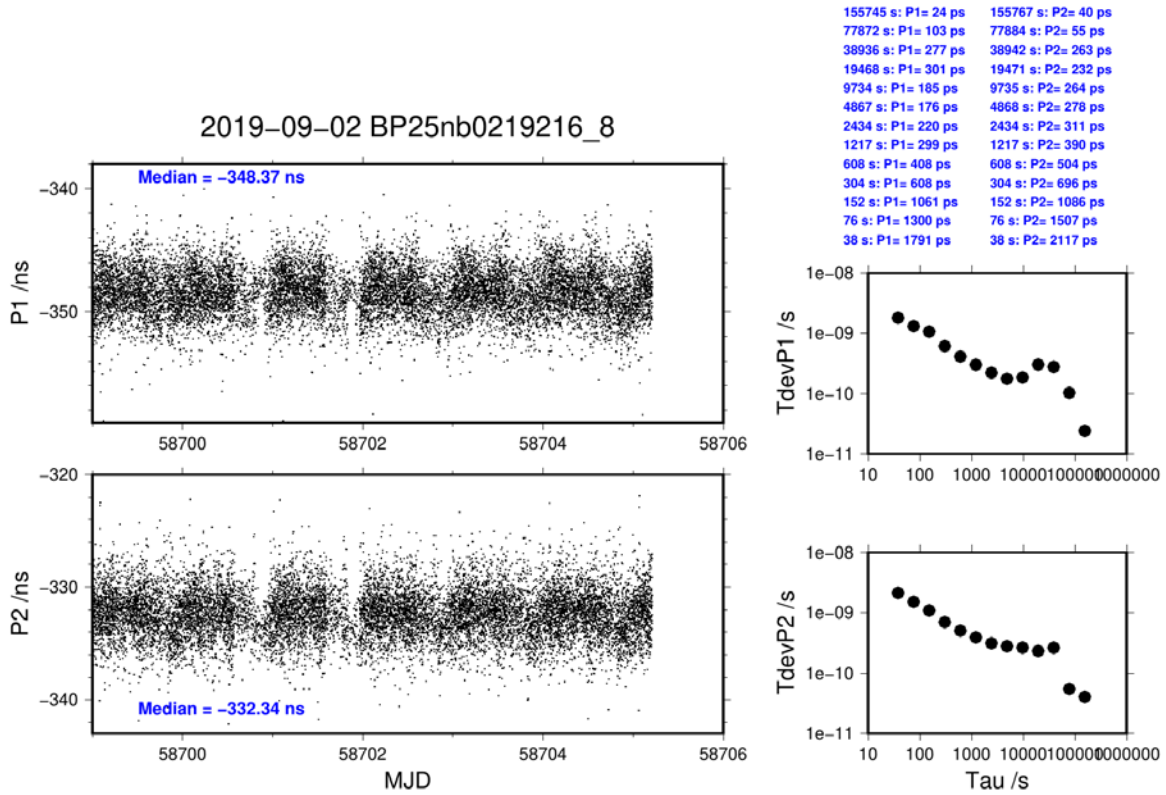
Global average of individual differences
Code #pts, ave/ns, rms/ns

Code	#pts	ave/ns	rms/ns
C1	141495	-347.717	2.282
P1	141445	-348.315	2.467
P2	141435	-332.288	2.705

Number of 300s epochs in out file = 1789

Code	#pts	median/ns	ave/ns	rms/ns
C1	14110	-347.706	-347.743	1.641
P1	14108	-348.366	-348.345	1.878
P2	14106	-332.336	-332.338	2.150


2019–09–02 BP25nb0219216_8
Median = –347.71 ns
C1 /ns
MJD
155723 s: C1= 27 ps
77861 s: C1= 109 ps
38931 s: C1= 356 ps
19465 s: C1= 338 ps
9733 s: C1= 202 ps
4866 s: C1= 171 ps
2433 s: C1= 200 ps
1217 s: C1= 286 ps
608 s: C1= 375 ps
304 s: C1= 587 ps
152 s: C1= 785 ps
76 s: C1= 1109 ps
38 s: C1= 1599 ps
TdevC1 /s
Tau /s


2019–09–02 BP25nb0219216_8
Median = –348.37 ns
P1 /ns
Median = –332.34 ns
P2 /ns
MJD
155745 s: P1= 24 ps
77872 s: P1= 103 ps
38936 s: P1= 277 ps
19468 s: P1= 301 ps
9734 s: P1= 185 ps
4867 s: P1= 176 ps
2434 s: P1= 220 ps
1217 s: P1= 299 ps
608 s: P1= 408 ps
304 s: P1= 608 ps
152 s: P1= 1061 ps
76 s: P1= 1300 ps
38 s: P1= 1791 ps
155767 s: P2= 40 ps
77884 s: P2= 55 ps
38942 s: P2= 263 ps
19471 s: P2= 232 ps
9735 s: P2= 264 ps
4868 s: P2= 278 ps
2434 s: P2= 311 ps
1217 s: P2= 390 ps
608 s: P2= 504 ps
304 s: P2= 696 ps
152 s: P2= 1086 ps
76 s: P2= 1507 ps
38 s: P2= 2117 ps
TdevP1 /s
TdevP2 /s
Tau /s

4.4/ BIPM (19259)

Period

MJD 58742 to 58748

Delays

BP1J:

X_O = 143.98 ns	(197.86-53.88)
X_P = 47.60 ns	(BP1R+C139+BP1S+C172)
REFDLY = 191.58 ns	
CABDLY = 128.73 ns	(C138)

BP1C:

X_O = 208.70 ns	(224.18-15.48)
X_P = 52.60 ns	(BP1R+C166+BP1I+C157)
REFDLY = 261.30 ns	
CABDLY = 235.70 ns	(C131)

Setup at the BIPM

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 58742
Date and hour of the end of measurements:	MJD 58748

Information on the system

	Local:	Travelling:
4-character BIPM code	BP1J	BP1C
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx4proTR 27	Septentrio PolaRx3eTR S9000169176
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE MC 5131	Ashtech Chokering 701945-2 CR62000323008
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	47.60 ns	52.60 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	143.98 ns	208.70 ns
• Antenna cable delay:	128.73 ns	235.70 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

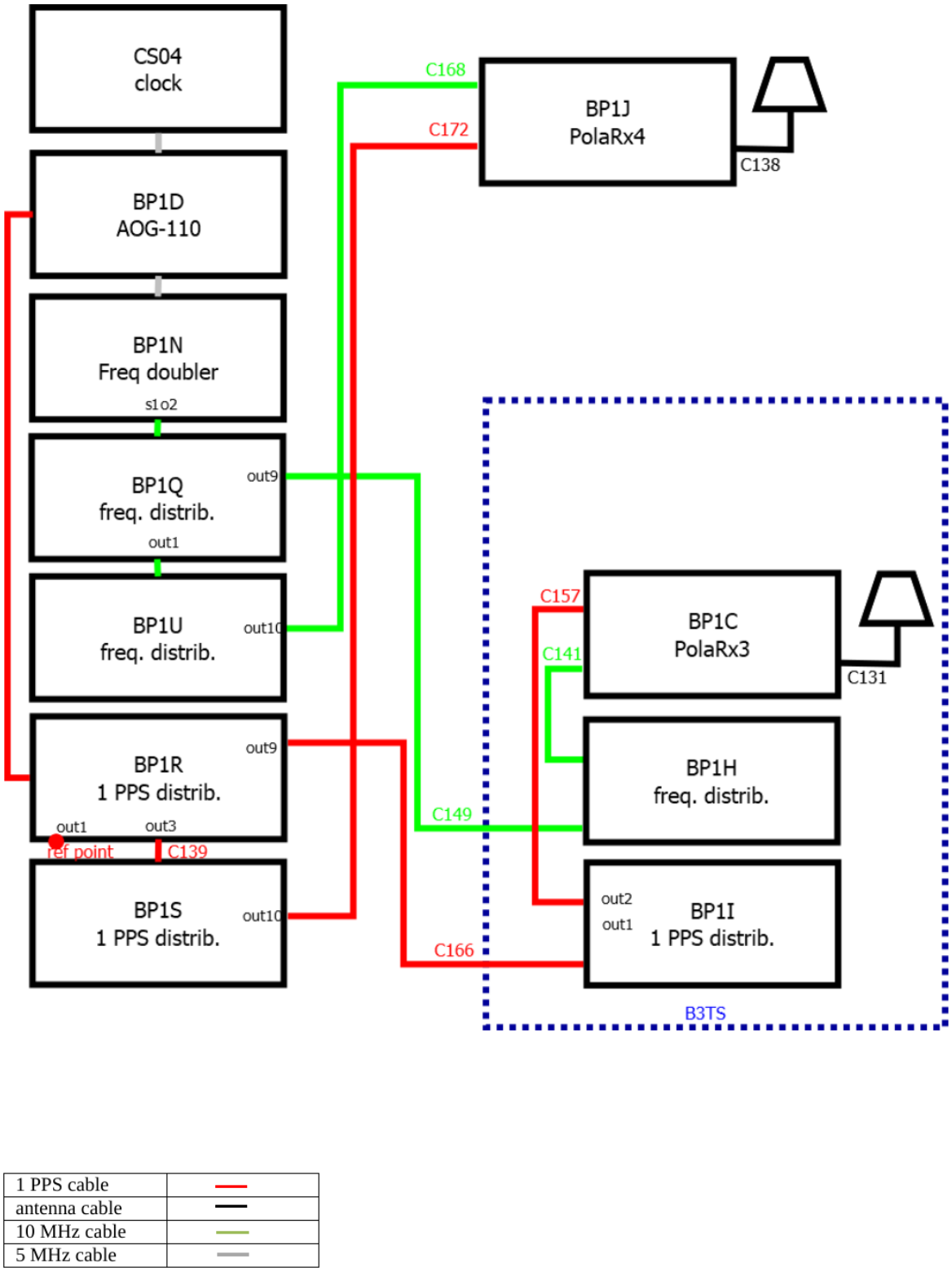
• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Diagram of the experiment set-up:



Log of Events / Additional Information :

All measurements at BIPM carried out by L. Tisserand.

Receiver BP25 was out of order.

Equipment used to measure delays are two Time Interval Counter (TIC), model SR620, maker Stanford Research Systems, with measurement uncertainty typically less than 0.5 ns (using external reference frequency as timebase).

TIC serial number 4680 used for local receivers.
TIC serial number 5482 used for traveling receivers.

BP1C-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 121600
Computed code bias (P1/P2)/m = 9.513 11.279
Computed baseline (X,Y,Z)/m = -1.465 -0.229 1.513
RMS of residuals /m = 0.551

Number of phase differences to fit baseline
L1/L2 = 117844
L5 = 0
A priori baseline (X,Y,Z)/m = -1.465 -0.229 1.513
18177 clock jitters computed out of 18177 intervals
AVE jitter /ps = 0.2 RMS jitter /ps = 6.0

Iter 1 Large residuals L1= 1
Iter 1 Large residuals L2= 7
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.007 -0.007 -0.193
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = -0.005 -0.006 -0.203
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 1
Iter 2 Large residuals L2= 7
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.007 -0.007 -0.193
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = -0.005 -0.006 -0.203
RMS of residuals L2 /m = 0.005
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.472 -0.236 1.320
Final baseline L2 (X,Y,Z)/m = -1.471 -0.235 1.310
Final baseline L5 (X,Y,Z)/m = -1.471 -0.236 1.315

COMPUTATION OF CODE DIFFERENCES

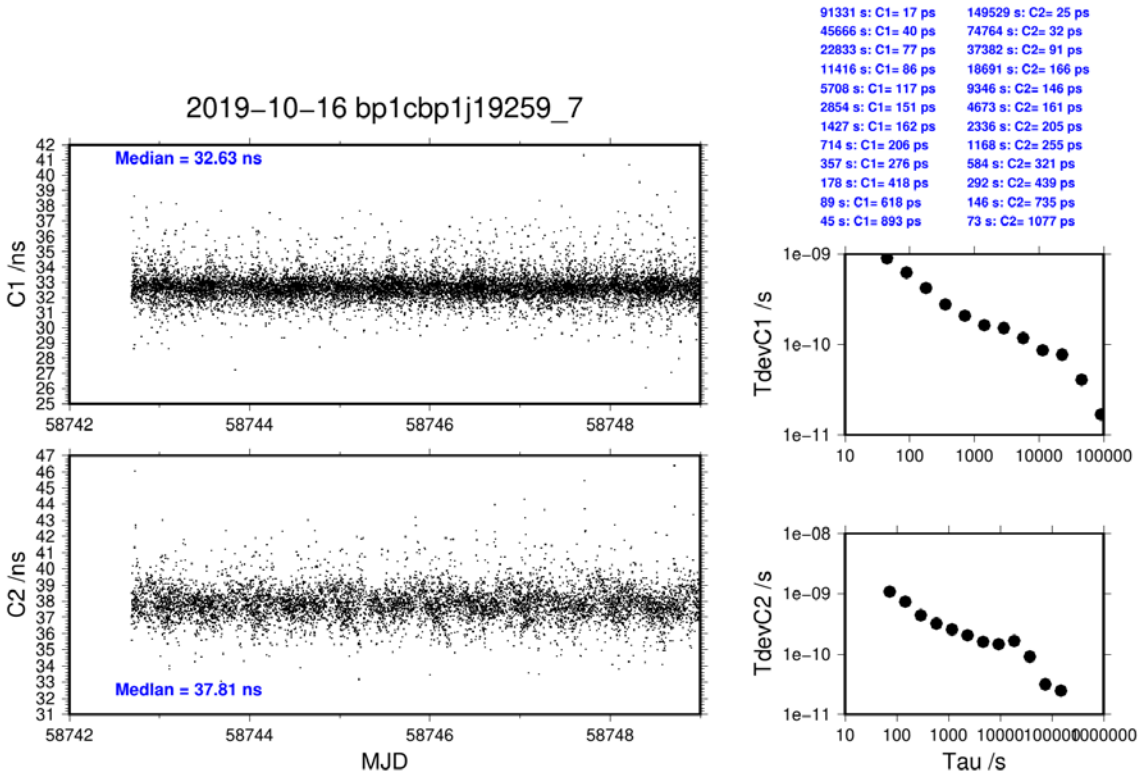
Total number of code differences = 123884

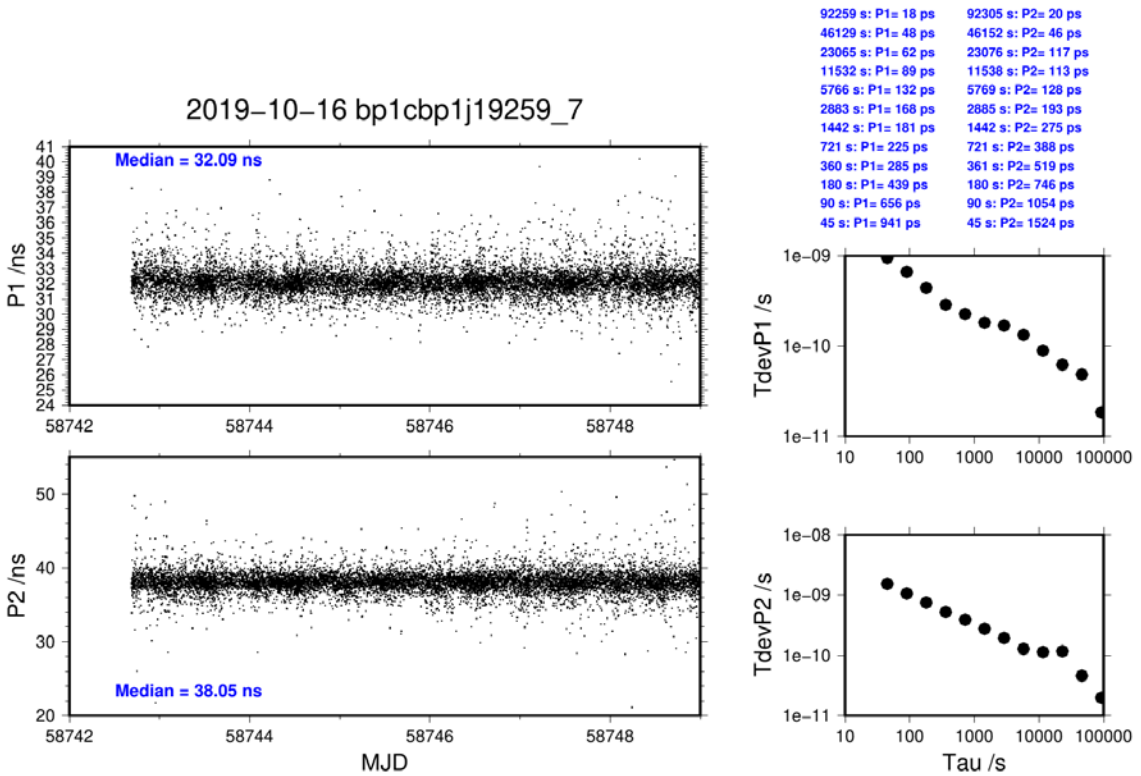
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	122315	32.669	1.711
C2	74868	37.851	1.974
P1	121128	32.125	1.718
P2	121089	38.045	2.487

Number of 300s epochs in out file = 1819

Code	#pts	median/ns	ave/ns	rms/ns
C1	12231	32.632	32.672	0.881
C2	7471	37.809	37.853	1.041
P1	12108	32.087	32.128	0.932
P2	12102	38.054	38.052	1.510


2019–10–16 bp1cbp1j19259_7
Median = 32.63 ns
C1 /ns
Median = 37.81 ns
C2 /ns
MJD
91331 s: C1= 17 ps
45666 s: C1= 40 ps
22833 s: C1= 77 ps
11416 s: C1= 86 ps
5708 s: C1= 117 ps
2854 s: C1= 151 ps
1427 s: C1= 162 ps
714 s: C1= 206 ps
357 s: C1= 276 ps
178 s: C1= 418 ps
89 s: C1= 618 ps
45 s: C1= 893 ps
149529 s: C2= 25 ps
74764 s: C2= 32 ps
37382 s: C2= 91 ps
18691 s: C2= 166 ps
9346 s: C2= 146 ps
4673 s: C2= 161 ps
2336 s: C2= 205 ps
1168 s: C2= 255 ps
584 s: C2= 321 ps
292 s: C2= 439 ps
146 s: C2= 735 ps
73 s: C2= 1077 ps
TdevC1 /s
TdevC2 /s
Tau /s


2019–10–16 bp1cbp1j19259_7
Median = 32.09 ns
P1 /ns
Median = 38.05 ns
P2 /ns
MJD
92259 s: P1= 18 ps
46129 s: P1= 48 ps
23065 s: P1= 62 ps
11532 s: P1= 89 ps
5766 s: P1= 132 ps
2883 s: P1= 168 ps
1442 s: P1= 181 ps
721 s: P1= 225 ps
360 s: P1= 285 ps
180 s: P1= 439 ps
90 s: P1= 656 ps
45 s: P1= 941 ps
92305 s: P2= 20 ps
46152 s: P2= 46 ps
23076 s: P2= 117 ps
11538 s: P2= 113 ps
5769 s: P2= 128 ps
2885 s: P2= 193 ps
1442 s: P2= 275 ps
721 s: P2= 388 ps
361 s: P2= 519 ps
180 s: P2= 746 ps
90 s: P2= 1054 ps
45 s: P2= 1524 ps
TdevP1 /s
TdevP2 /s
Tau /s