



Resampler/Delay Tracker Hardware Testing

OMC Demo 19.6

SPO-2510 - Mid CBF AA0.5 Signal Chain Testing **SP-3277 TDC MVP1 Build 1 - Execute Test Plan (part 4)**

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Objective

SPO-2510 Mid CBF AA0.5 Signal Chain Testing

Demoing KR1: Tests executed to determine the accuracy of the resampling and delay tracking

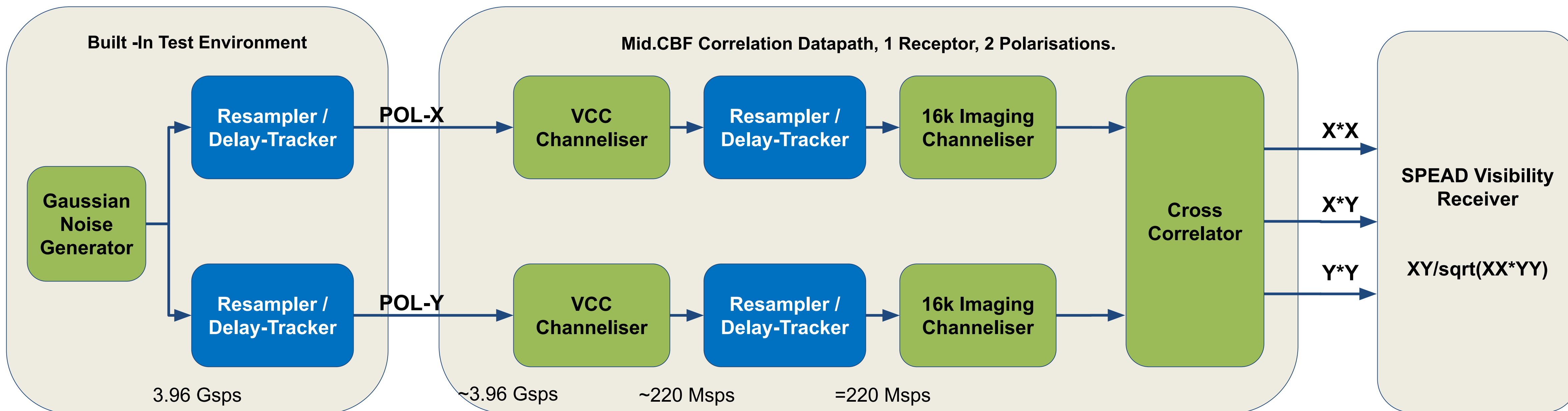


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Test Setup



Gaussian noise is duplicated to both polarisations.

Different delay models are applied in the 4 Resampler-Delay-Trackers.

Correlator computes the cross correlation between the two polarisations ($X*Y$).

Visibilities are captured and analysed to determine if the delay models are accurately applied.



What do we expect?

Two polarisation signals to be 100% correlated.

The complex cross-polarisation visibility to have a phase proportional to the relative delay and frequency:
i.e a phase ramp across the spectrum where more phase offset at higher frequencies for a constant delay.

The delay added in BITE can be reversed by delay removed in the correlator.



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Demo ...

TALON-DX-TDC-CORRB12 AA1 Correlation Release

Legend

- Packaged Data
- Streaming Samples + Metadata

TDC Band 1/2 VCC Processing

Frequency Slice Transport

TDC Band 1/2 FSP Correlation

VCC Processing

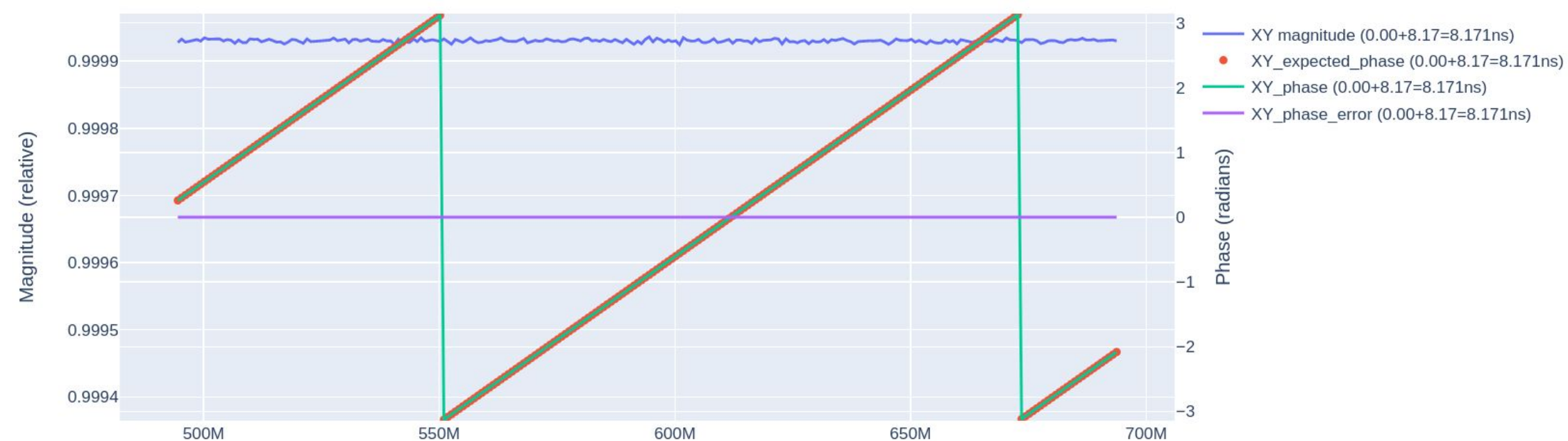
Terminal

```
dev2 minikube: 14:15-15:15 UTC (6:15am-7:15am PST)
wkamp_ext@rmdskadevdu001:~/testing/ska-mid-cbf-signal-verification$
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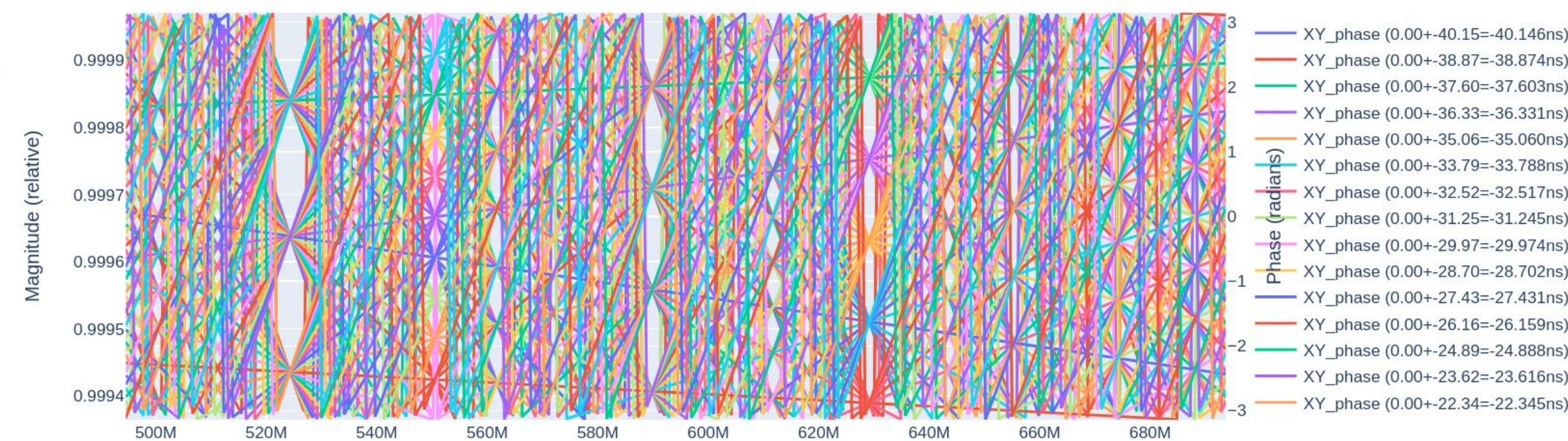


Questions?

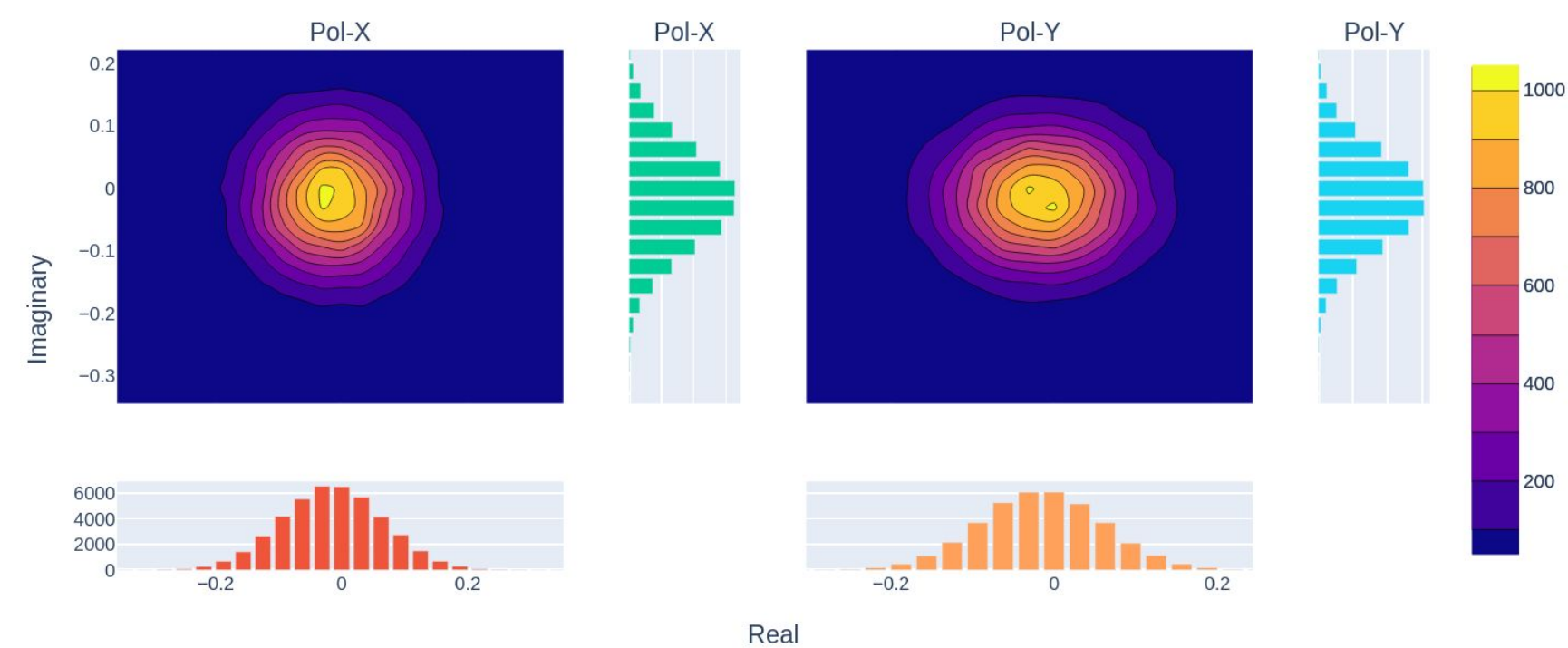
Cross-polarisation Correlation Spectrum, with 0.000 + 8.171 = 8.171 ns relative delay.



Cross-polarisation Correlation Spectrum, with ALL relative delays.

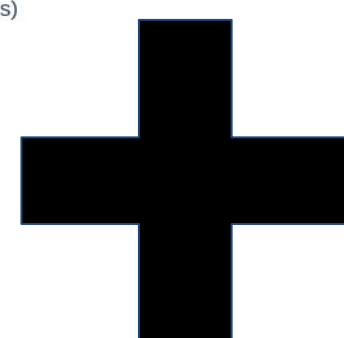
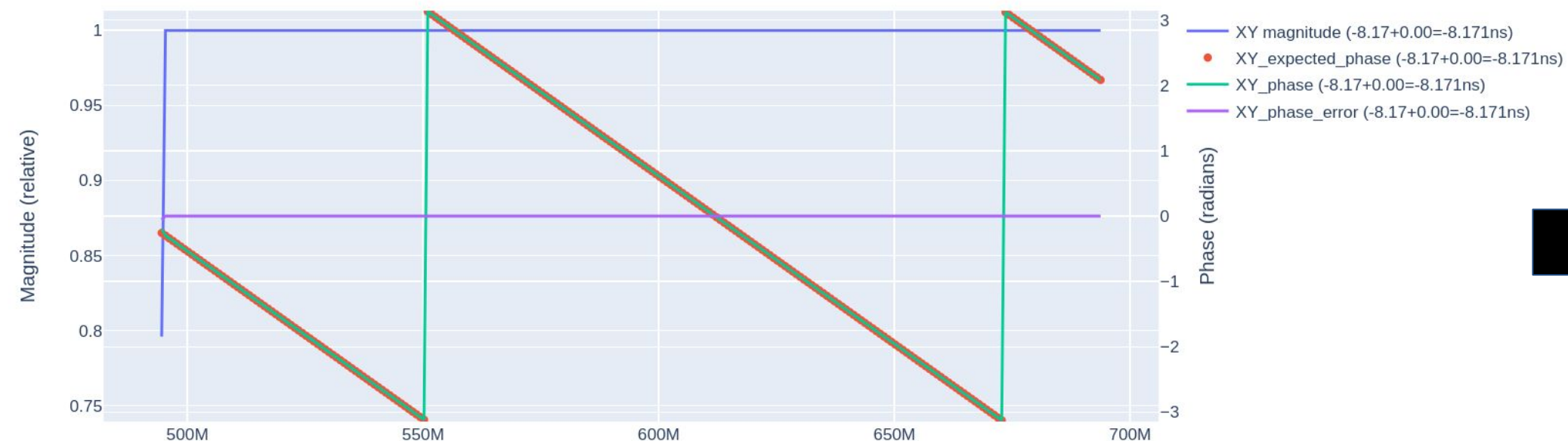


Histograms of complex signals from talon6_fsp_3_post_vcc_histogram, channel 0

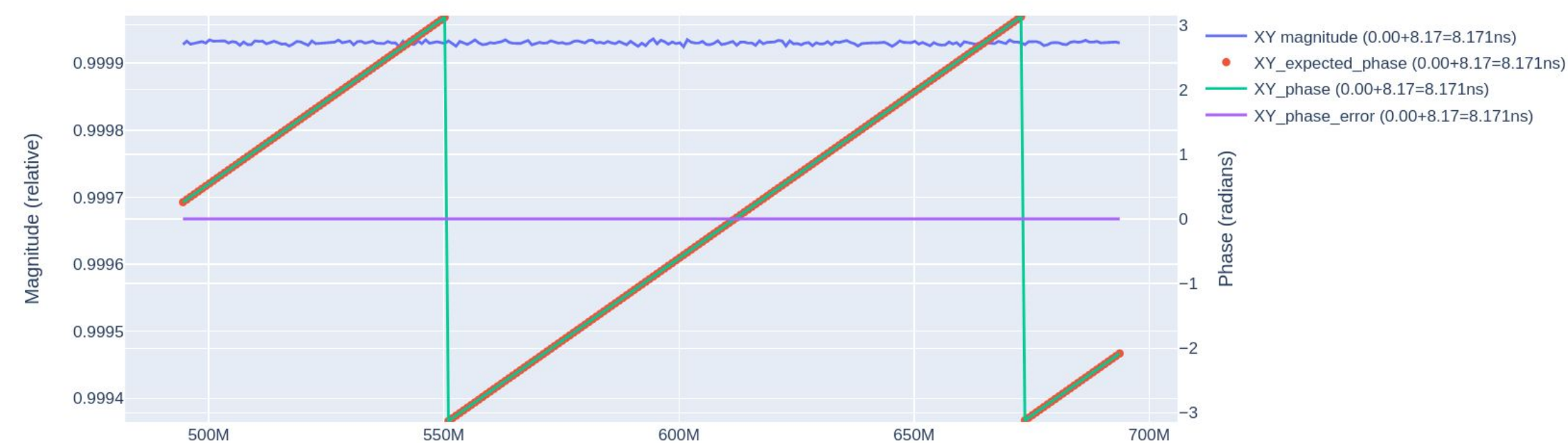


BITE Delay + Delay Tracker Delay => Corrected Delay (zero phase)

Cross-polarisation Correlation Spectrum, with $-8.171 + 0.000 = -8.171$ ns relative delay.



Cross-polarisation Correlation Spectrum, with $0.000 + 8.171 = 8.171$ ns relative delay.



Cross-polarisation Correlation Spectrum, with $-8.171 + 8.171 = 0.000$ ns relative delay.

