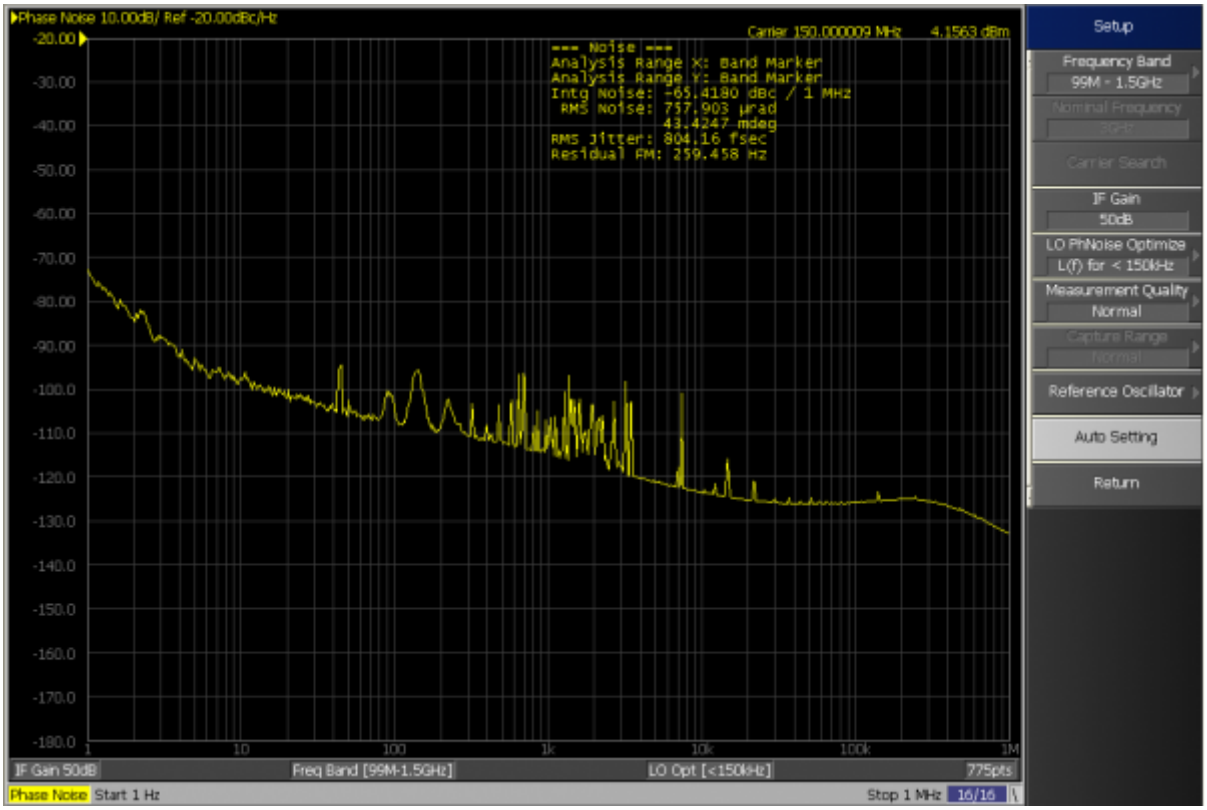
Overview

The BPM system is an accurate and fully programmable solution which provides information on the horizontal and vertical position, beam intensity and beam phase.
It has been developed within the IFMIF project to monitor the beam along the different cavities included in the accelerator (RFQ, MEBT and SRF). It is controlled by an EPICS IOC interface in order to ease its integration in an EPICS control system. Finally, it is compatible with White Rabbit Protocol to retrieve time and the reference frequency using optical fiber network. It supports:
– Continuous and pulse mode monitoring.
– Autocalibration mode.
– Algorithms for transverse positions, beam intensity and beam phase (for TOF estimation).
– Integration time configurable.
– Post mortem analysis with selectable event triggers and configurable capture parameters. Matlab, python, CSS/BOY libraries for post processing.
– White Rabbit Synchronization: clock RMS jitter < 1ps & sub-nanosecond accuracy.



Highligts

– ADCs: Four channels for BPM (top, bottom, left, right).

Operation frequency:

– Possibility of operating at 175MHz nominal or 352MHz (second harmonic).
– Position precision: < 10 µm.
– Position accuracy: < 100 µm.
– Phase precision: < 0.1° (1.6 ps at 175 MHz / 0.8 ps at 350 MHz).
– Phase accuracy: < 1° (16 ps at 175 MHz / 8 ps at 350 MHz).
– Operation modes: Continuous, pulsed and autocalibration.
– Integration time: From 1µ to 1ms.

Post mortem:

– Selectable trigger.
– Selectable signals for capture.
– Sampling rate up to 100MHz.
– Capture length up to hours.
– Matlab, Python, CSS/BOY libraries for post processing.

Interface: CSS interface through EPICs variables.

Resources

More images: