RTI From Radiation to Information

APPLICATION NOTE

Piranha on DynaRad HF-110A & Source Ray SR-130 Mobile Systems

This Application Note describes how to measure kV with the Piranha on DynaRAD HF-110A and Source Ray SR-130 mobile systems. The recommendations are also applicable in situations where the x-ray generator does not have sharp kV edges (rise time/deceleration time??)

Introduction

Measuring tube voltage non-invasively on x-ray generators in the absence of sharp edges (fast rise time, see figure 1) can be difficult. We used RTI Barracuda with High speed sampling 'enabled' to look at the true waveform of this generator. These measurements helped us to determine that apart from a low rise time no other significant factors are affecting the beam quality.

Measurements

Barracuda & HF-110A Generator

RTI Barracuda was used with High Speed Sampling enabled. Several exposures were taken to observe the ripple in the radiation output. Due to the design of this portable generator no high voltage divider could be used to measure kV invasively.

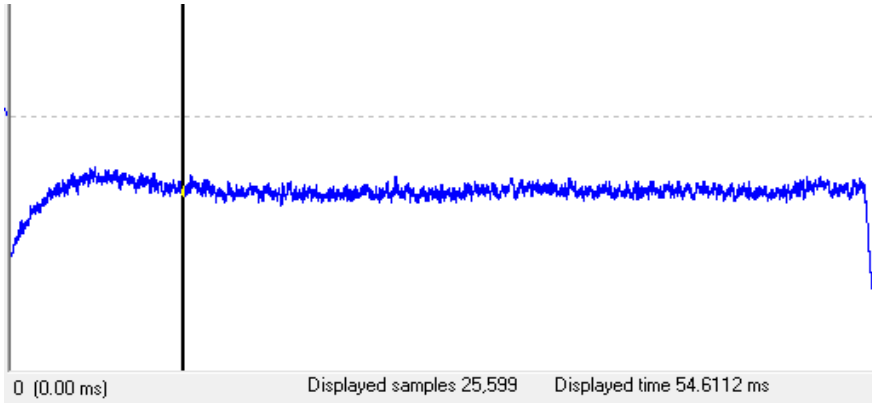
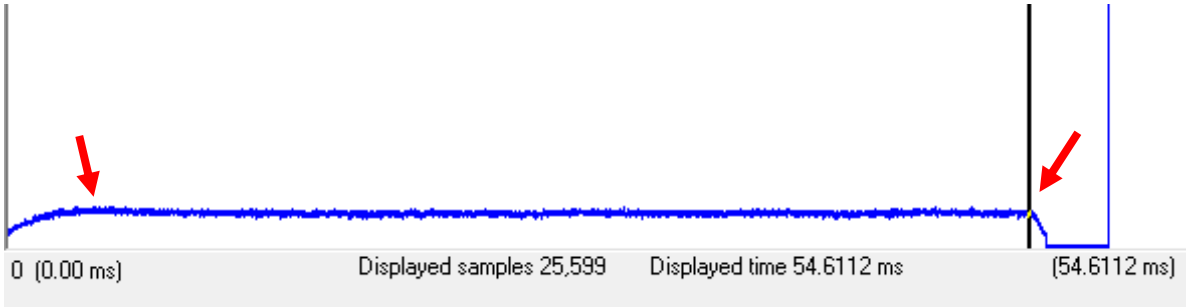


Figure 1. Tube voltage measured at 80kVp; 50 msec. The measurement was taken with MPD set to 100 kHz bandwidth. It takes about 9 ms for the radiation to stabilize.

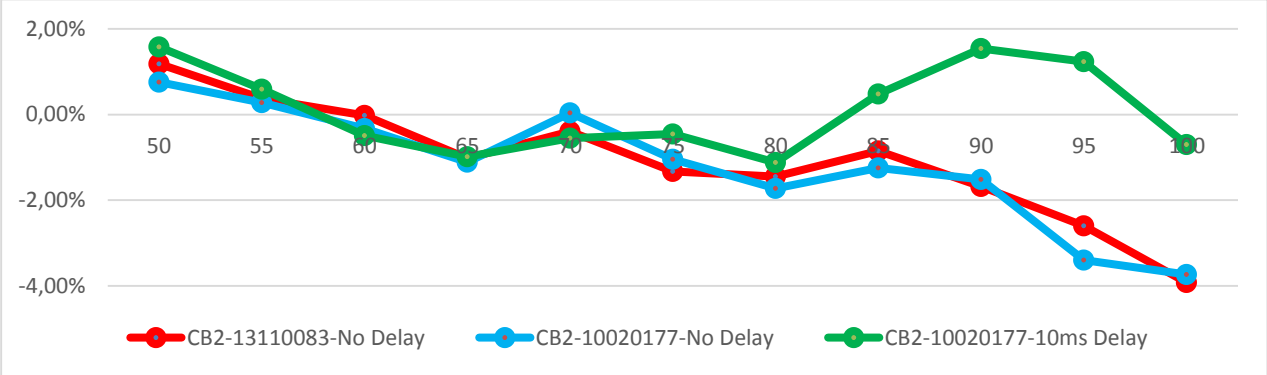
Multiple measurements were taken to see the front and end of the waveform. The figure below shows the slow rise and slow drop of the waveform at 100 kV and 50 ms exposure.



Piranha & HF-110A Generator

Two different Piranhas were used to measure on HF-110A generator. Due to this slow rise we measured kV using RTI Ocean software with /without 'Delay' and 'Window' settings.

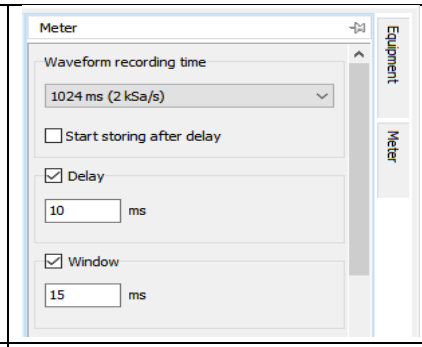
The figure below shows that adding a delay of 10ms improves the kVp accuracy greatly. This becomes marked when exposure length is around 50ms



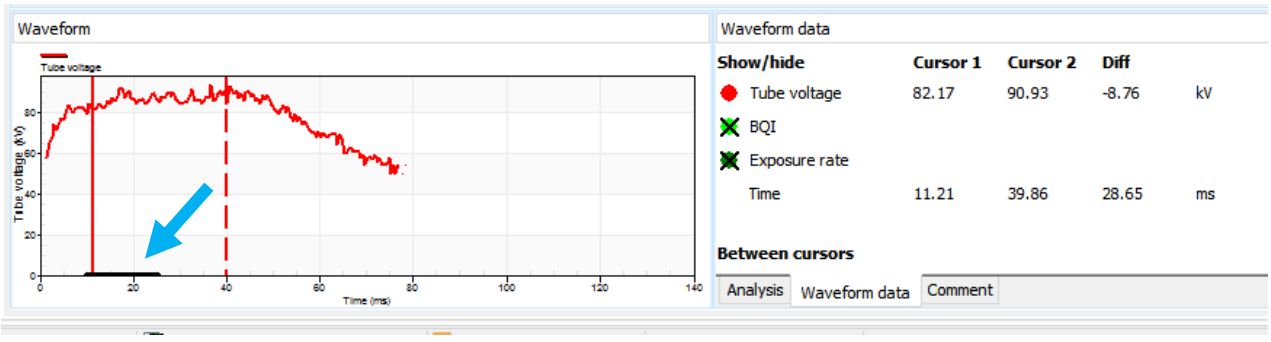
Recommendation

RTI recommends that when measuring on HF-110A or similar generators the following settings must be applied in RTI Ocean software [Delay = 10 ms ; Window = 15ms].

Ocean Quick Check[Meter Settings]



Ocean Connect/Professional



Ocean waveform after applying the settings

Conclusion

When measuring on these systems using Piranha, extra care must be given to analyze the waveform obtained using Ocean software. This waveform will help to determine the settings required to measure accurate kV readings.

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