Hi-Cal Update

Palestine Integration

20-6-2016

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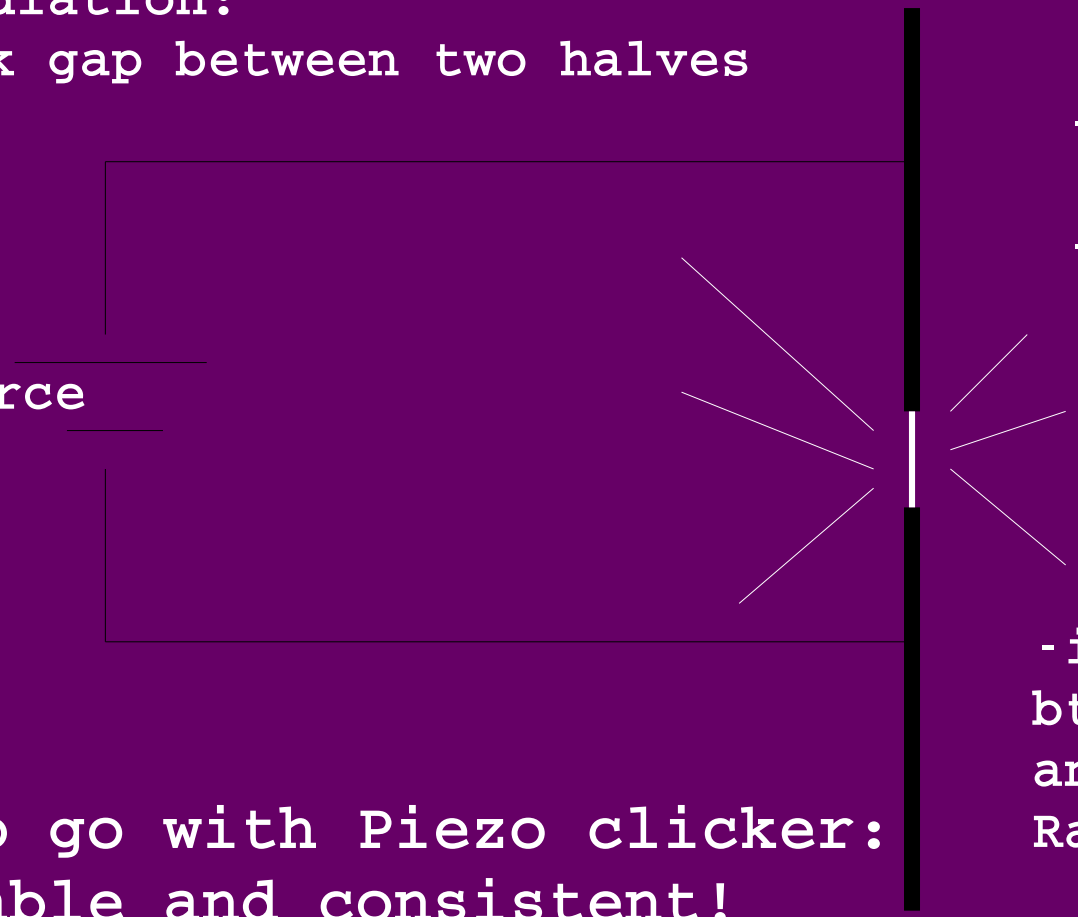
Outline

- Duration tests-no degradation of piezo
- Antenna design finalized, transmission tests
- Pressure Vessel construction

Reminder-HV discharge model

Optimal radiation:
Short spark gap between two halves of antenna



-highest amplitude

-most broadband

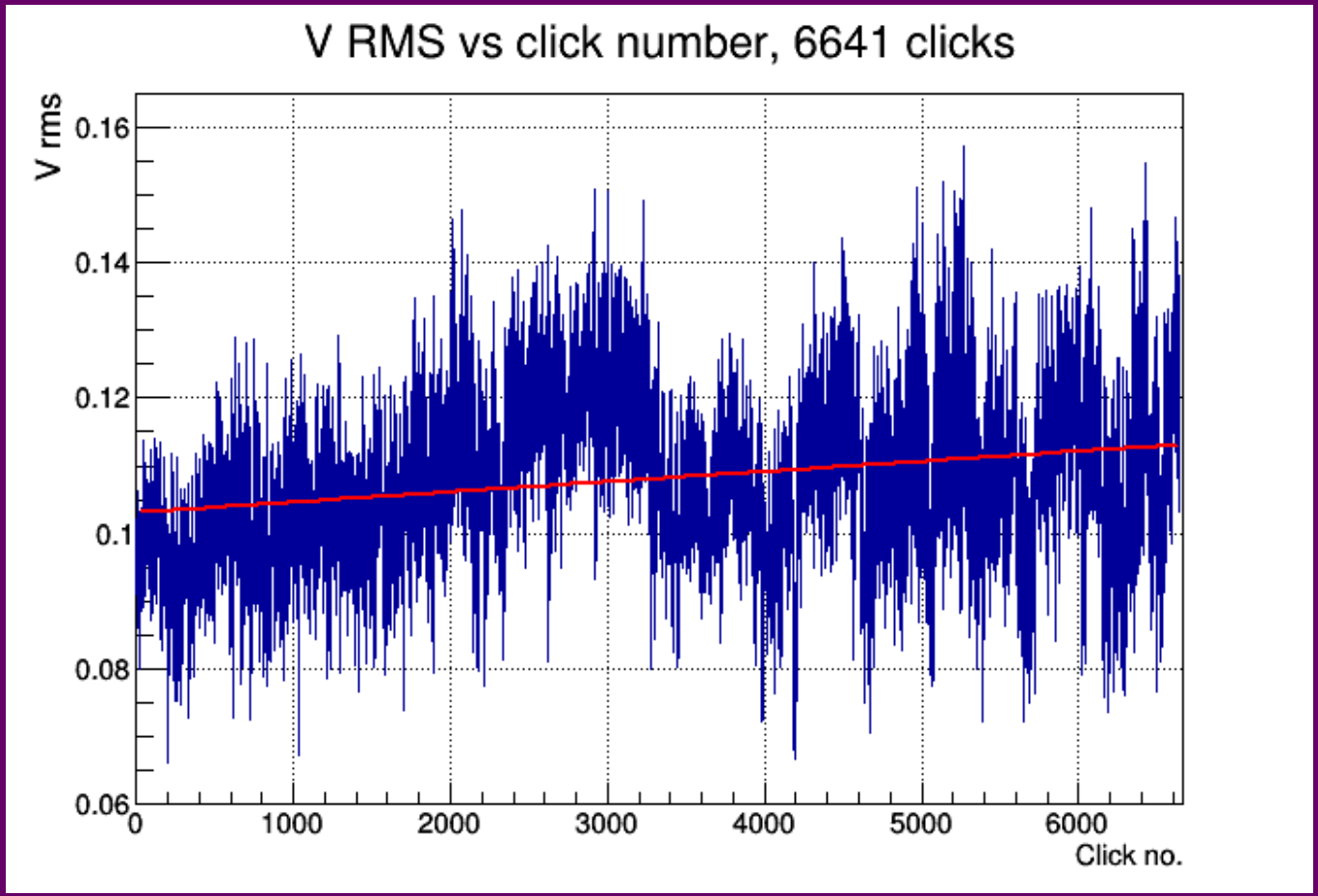
-inverse relationship btwn spark gap size and efficiency of Radiation!

Decided to go with Piezo clicker:
More reliable and consistent!

Duration Tests

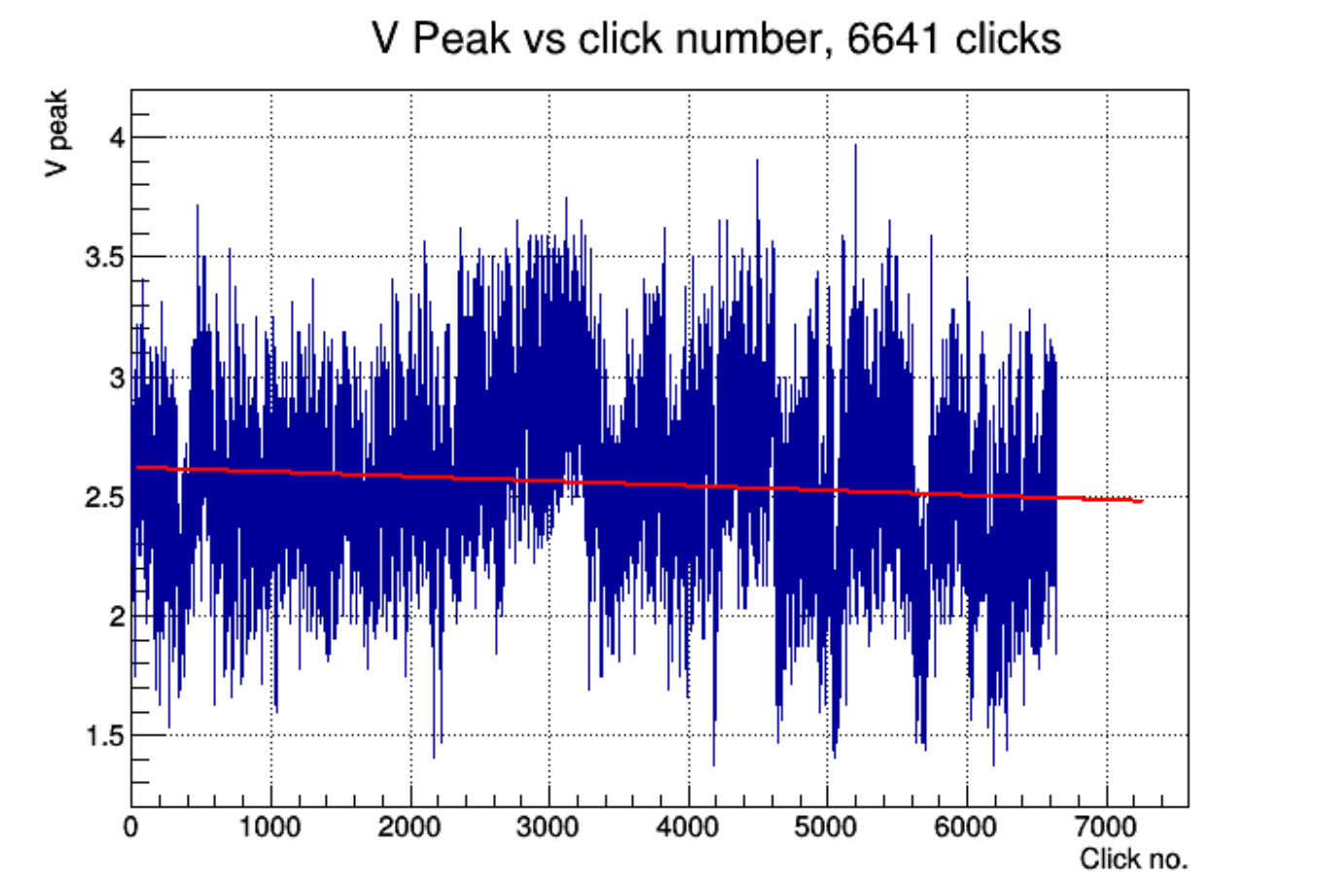
- Piezo elements do not degrade.
- Uncontrolled breakdown caused last year's fluctuation in output amplitude
- Controlling spark gap keeps output uniform for thousands of consecutive clicks.

Duration Tests



Slight upward trend over time. Taken over two days-just background noise condition of lab, probably.

Duration Tests

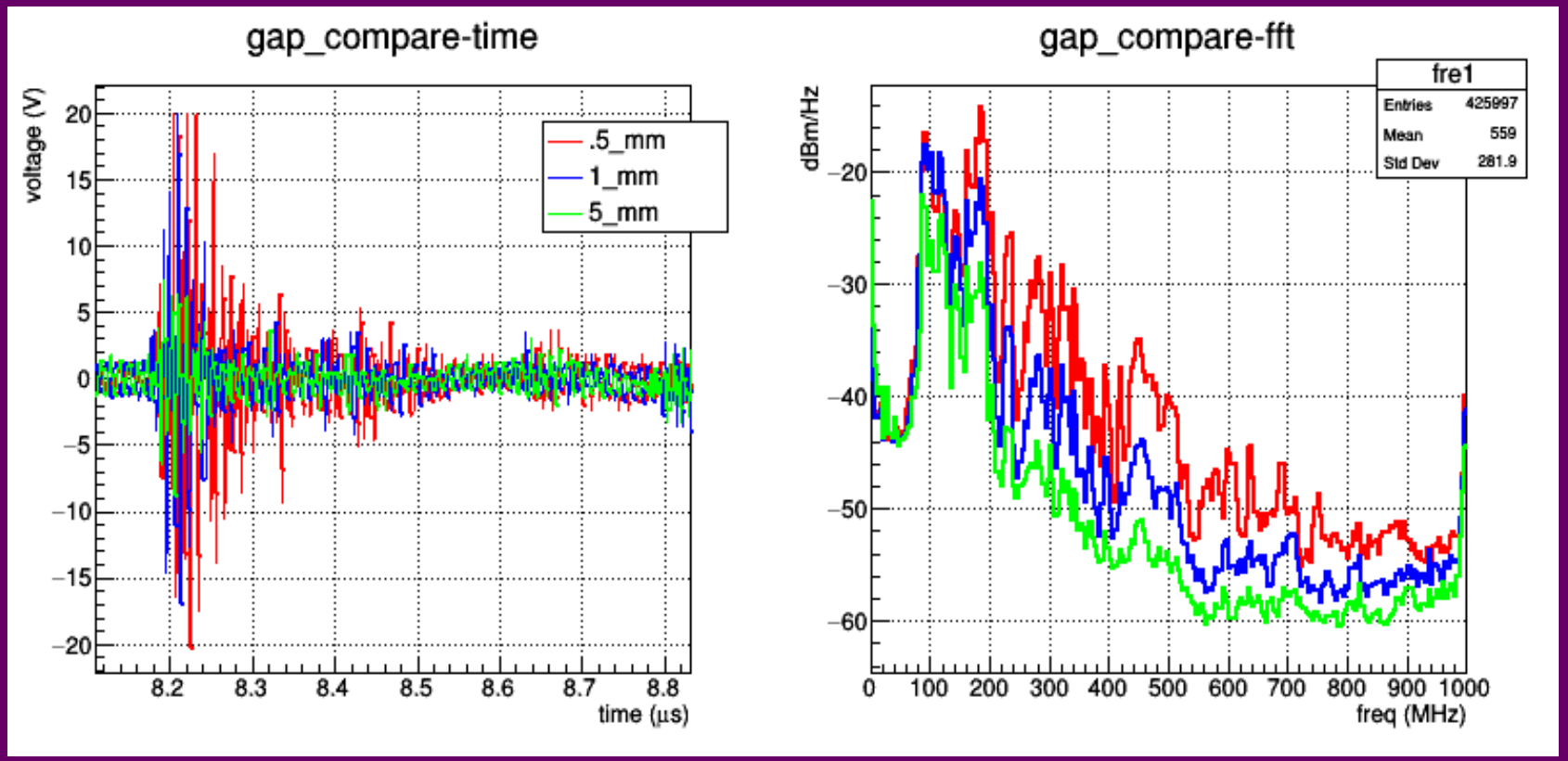


Very slight downward trend to peak voltage: Must increase number of consecutive test days.

This clicker has been clicked 50,000+ times.

Spark Gap

By tuning the spark gap we can control the discharge. Inverse relationship between gap width and radiating efficiency. These traces taken into broadband LPDA.



Antenna

Bi-Cone design

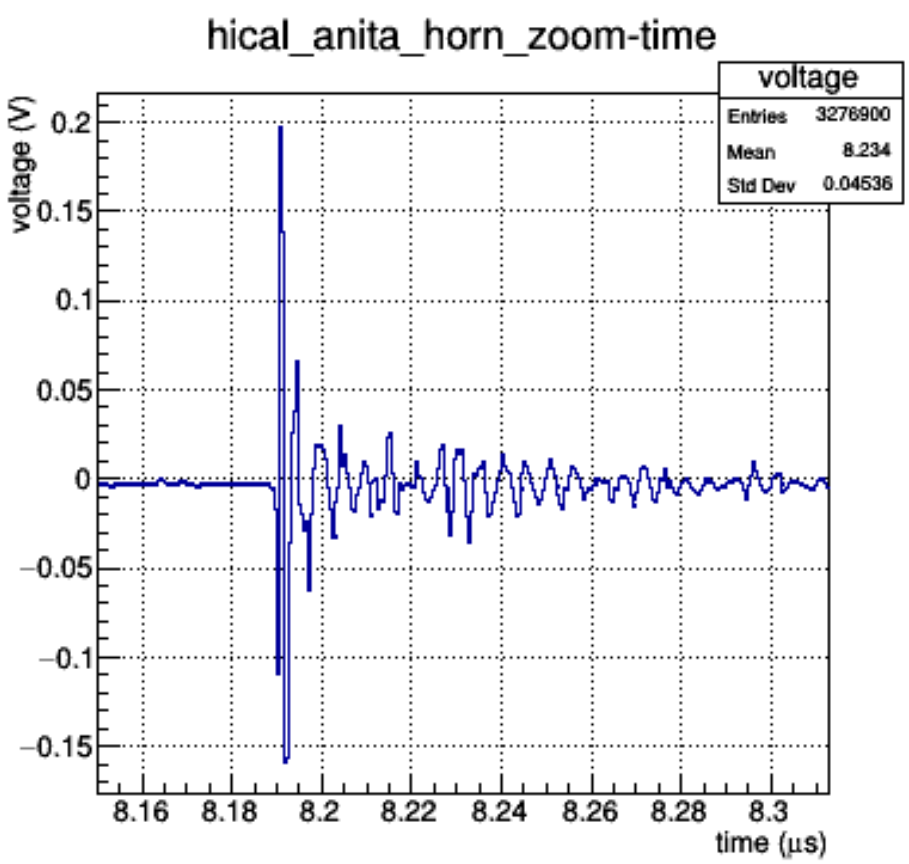
Weight: 112.5 g
(savings of ~1.2kg over last year's dipole)

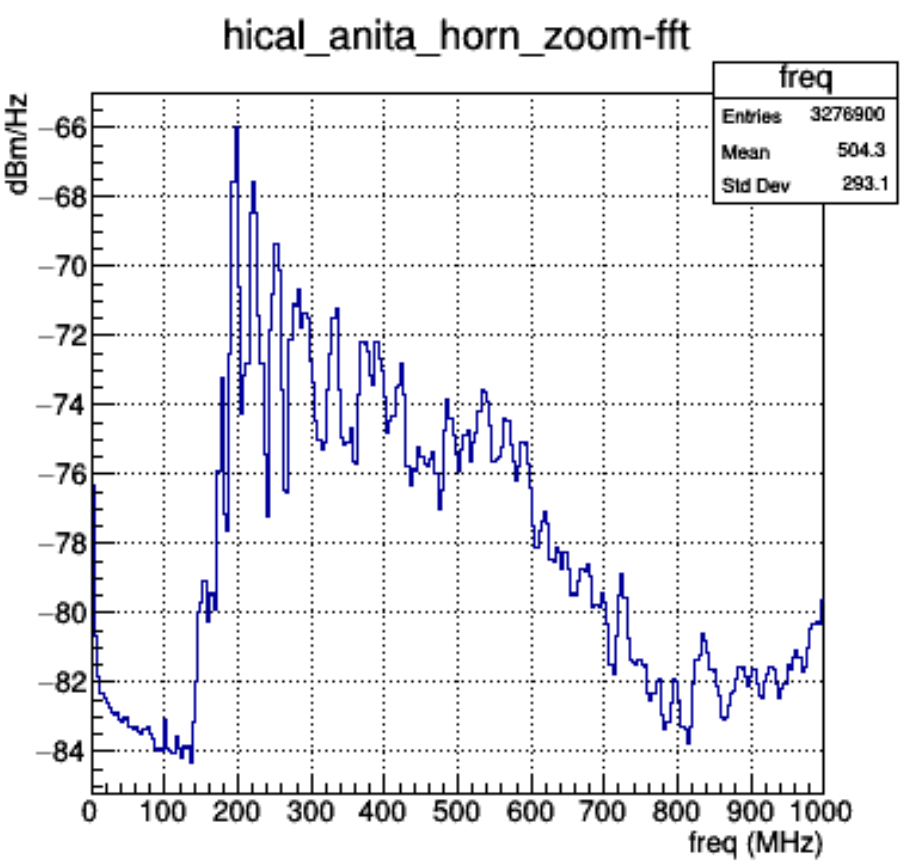
Antenna

ANITA horn test

Broadband response

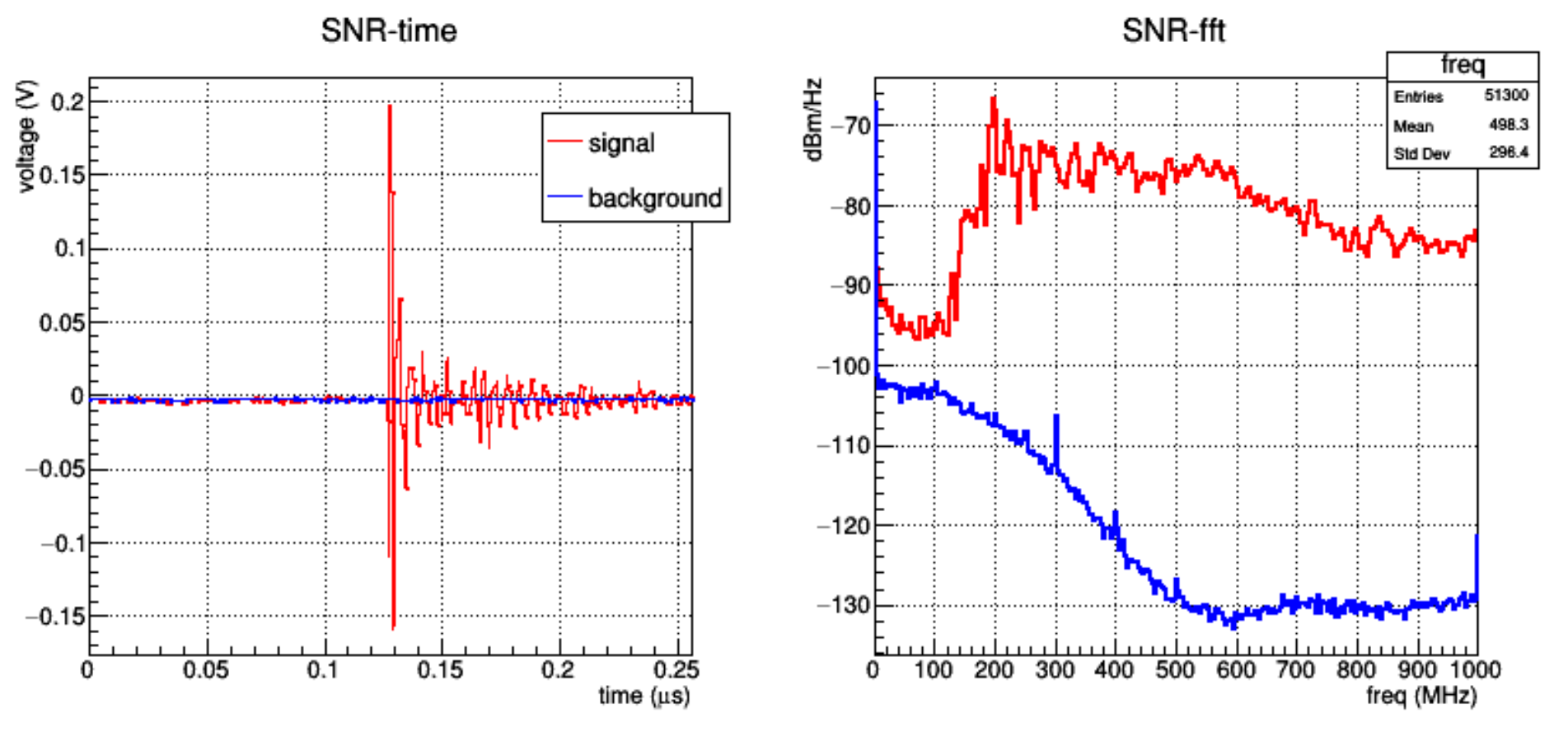
Nice broadband response into the ANITA horn, unamplified.
This test across ~60m in the CSBF courtyard.





High SNR

SNR comparison, background sample versus triggered pulse, same test location.



Pressure Vessel

Weight:
1.12 kg

Goals:
-light weight
-simple open/close for testing

Design:
-ABS plastic, as last year's.
-no mounting hardware, nylon webbing holds it together

TO-DO

- Pressure test PV design
  - (tomorrow 6/21)
- Extend duration test to 5+ days
- Repeat transmission test into ANITA horn with faster scope (to get high frequency info)