

Low Power RF Tests (2) in S1-G





Low power rf tests in S1-G

July, 2010

Mon	Tue	Wed	Thu	Fri	Sat	Sun
28	29	30	1	2	3	4
5	3. Low Power RF Test INFN (Carlo Pagani) / FNAL			8	9	10
12	Heat Load Meas. at 2K		Calib. Meas. at 2K by Heater		17	18
19	4. Low Power RF Test (spare)			22	23	24
Holiday				Warm up		
26	27	28	29	30	31	1

Cryomodule-A

- . Stroke and hysteresis of piezo tuner
- . Single pulse response of piezo tuner
- . Stability of frequency
- . Reproducibility
- . Mechanical vibration

Cryomodule-A&C

- . HOM external Q

Cryomodule-A&C

- . Multi-pulse response of piezo tuner
- . Mechanical vibration
- . Damping of mechanical vibration modes

Measurement time at 2 K ;
Tue. – Fri. for 4 days
13:00 ~ 19:00 for 6 h
24 h per week



Blade Tuner for FNAL Cavities



C2/ACC011 cavity

**Blade tuner does not work.
One piezo does not go $> +110V$.**



Blade Tuner for FNAL Cavities

Present Status tuner drive for "Saclay I tuner system"

Nut:
Stainless Steel = StainSt
Balinit C: WC/C or Balinit A: TiN(old)

Gear box ball bearings:
Coating not necessary, additional WS₂

Drop rod material:
CuBe without coating (last delivery with WS₂)

Sanyo motor ball bearings:
WS₂
Phyton motor (delivery complete):
Don't bearings change and coating

Drop rod ball bearings:
WS₂

Harmonic Drive
Type HDUC 14-88-BLS

Flex spline:
StainSt-304 L
Balinit C or Balinit A (old)

Wave generator:
StainSt-304 L
WS₂

Circular spline:
StainSt-304 L
Balinit C or Balinit A (old)

All other parts without coating

Thickness:		
Balinit A (TiN)	2 - 4 μm	Balzer → coating
Balinit C (WC/C)	2 - 3 μm	Balzer → coating
Lamcoat = WS ₂ (Wolframdisulfid)	0,5 - 1,5 μm	PVD-Beschichtungsservices → spraying

type 3-735
2/11A
264/SEP
3-735-1

WS 5C

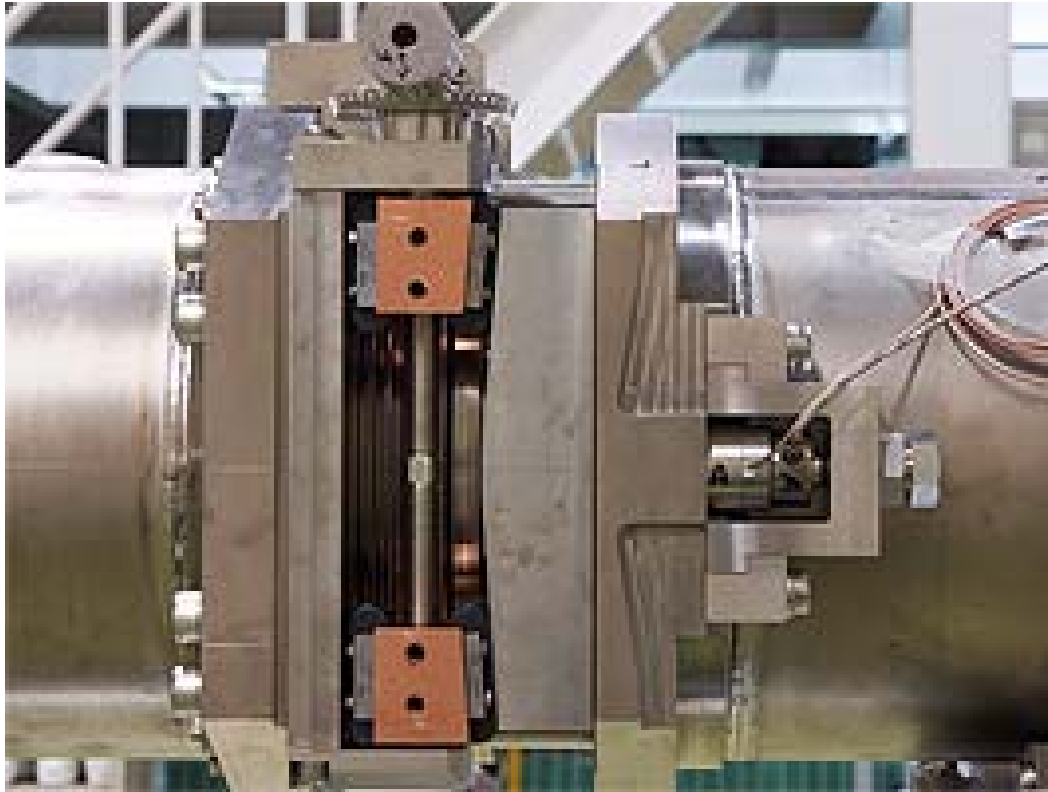
Tuner drive coating / 31-Oct-2006

K. Jensch - MGS1-





Slide-Jack Tuner for KEK Cavities



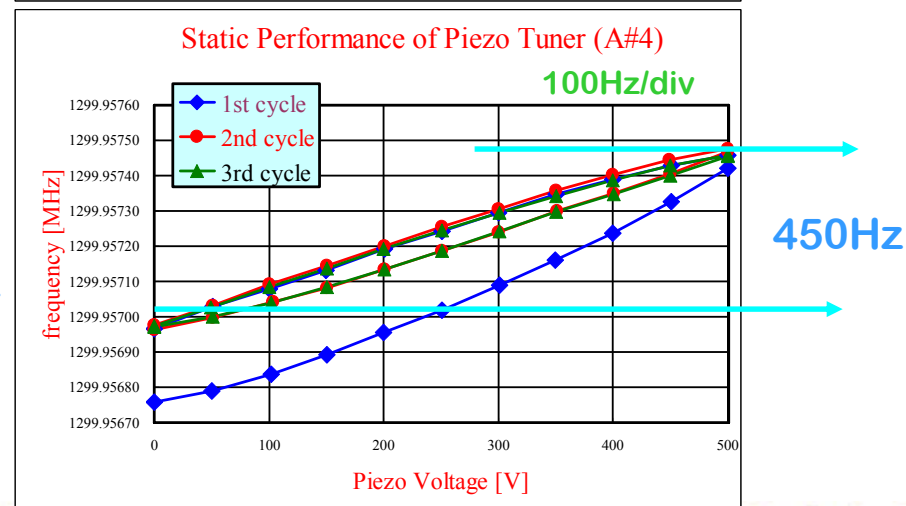
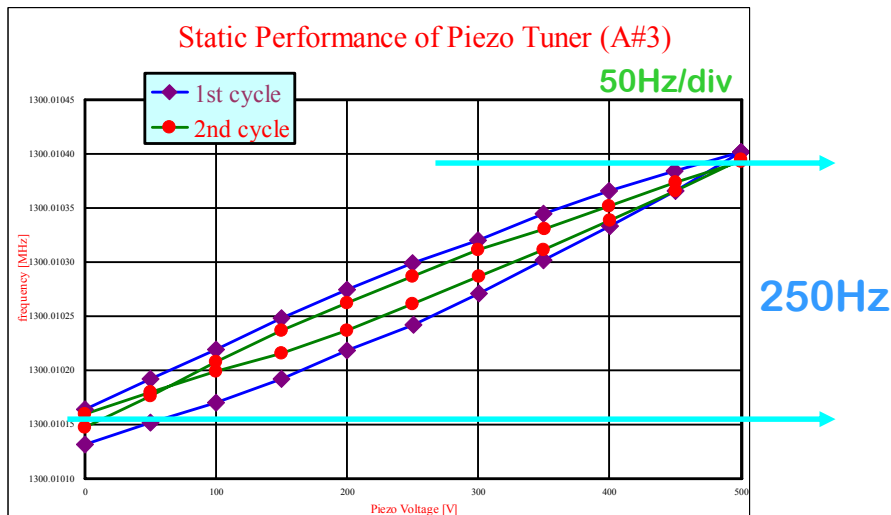
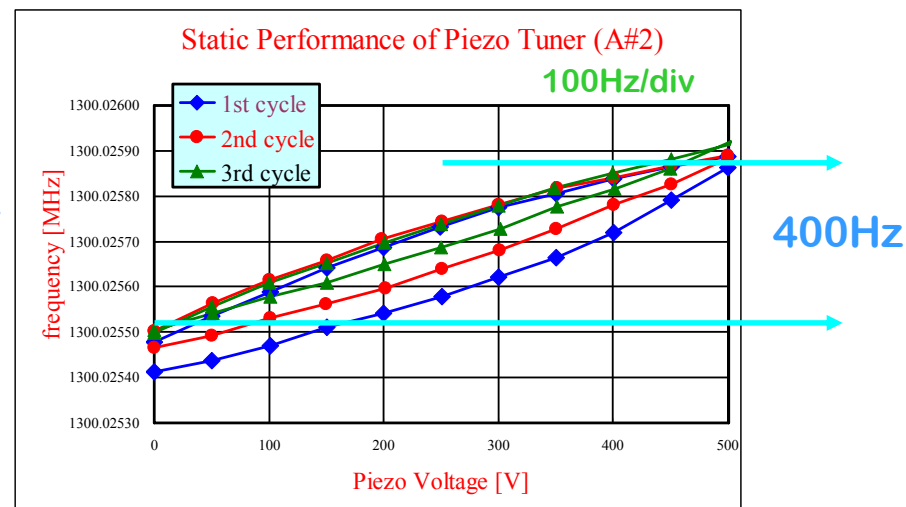
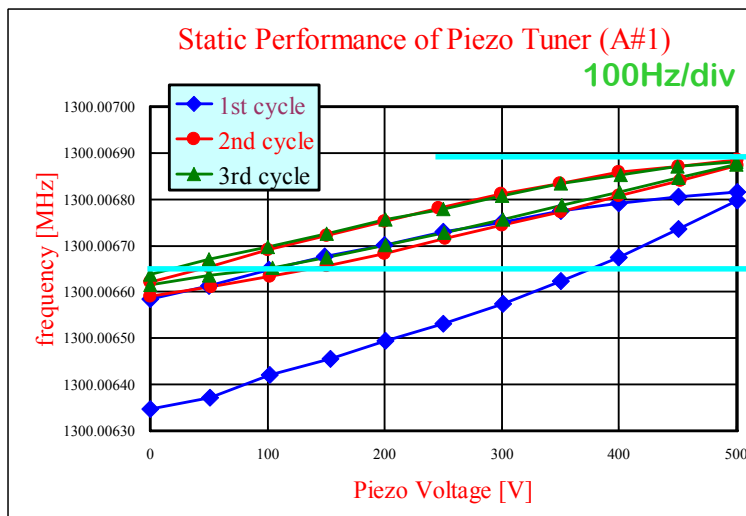
A4/MHI-09 cavity

Slide-Jack tuner does not work.



Hysteresis of Piezo Tuner (Cryo-A)

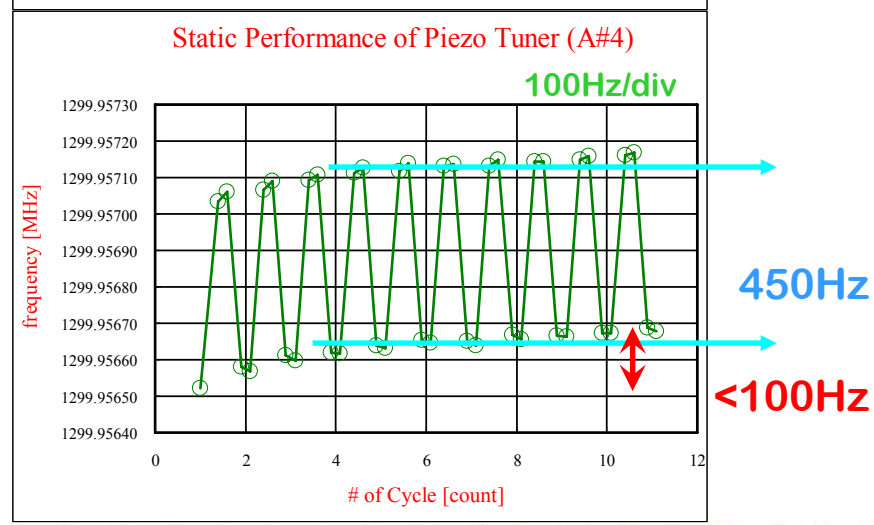
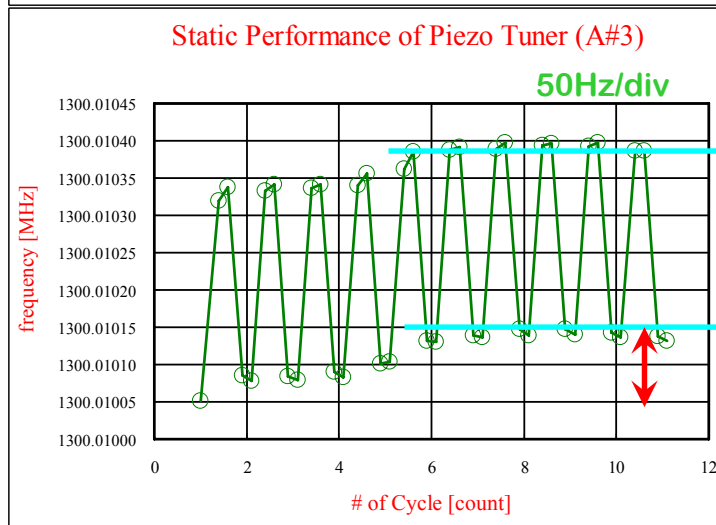
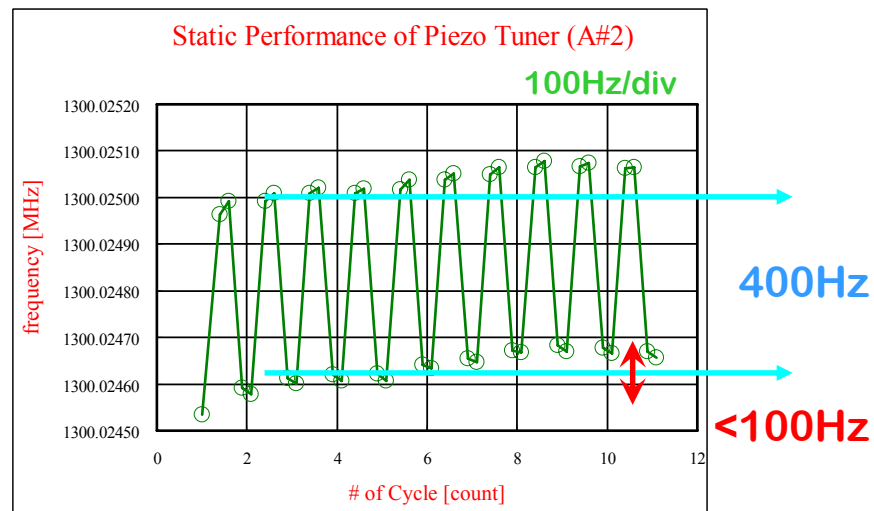
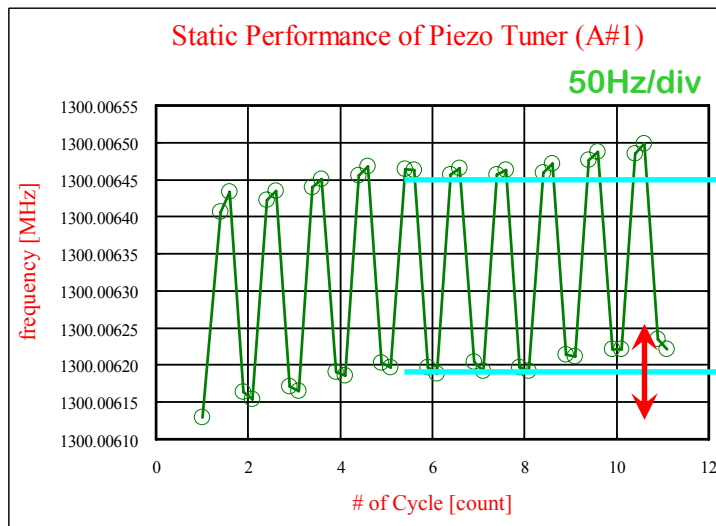
Network Analyzer ($V_{\text{piezo}} = 0 \sim +500\text{V}$)





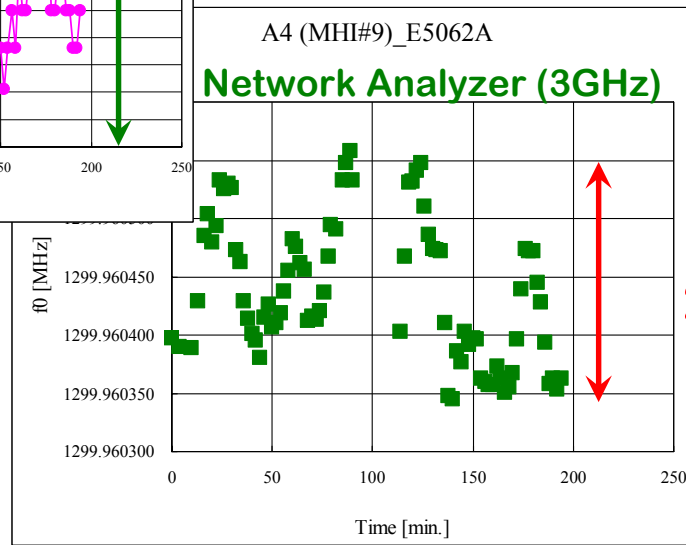
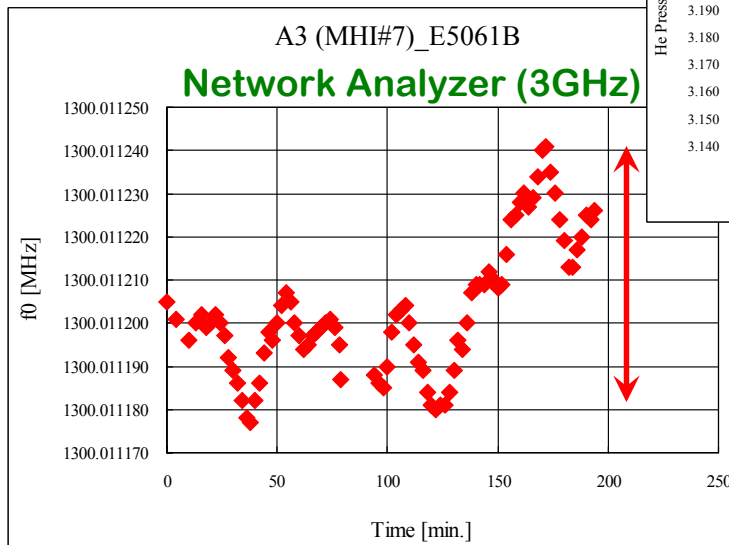
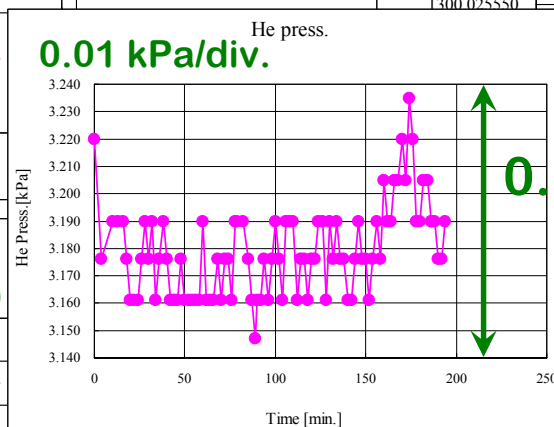
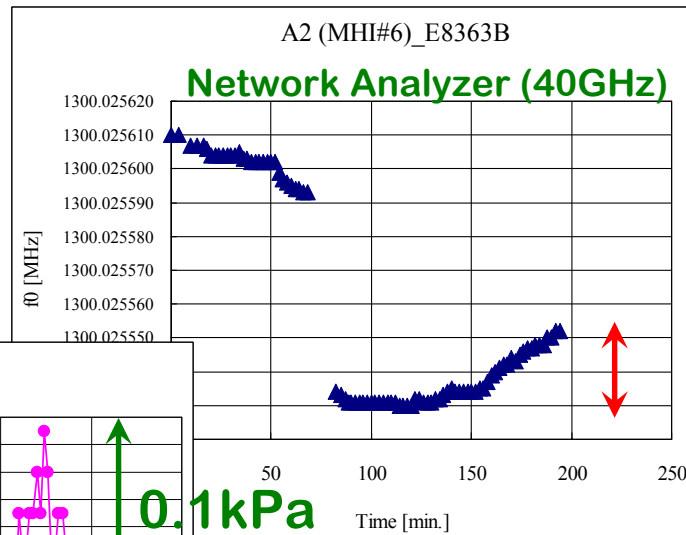
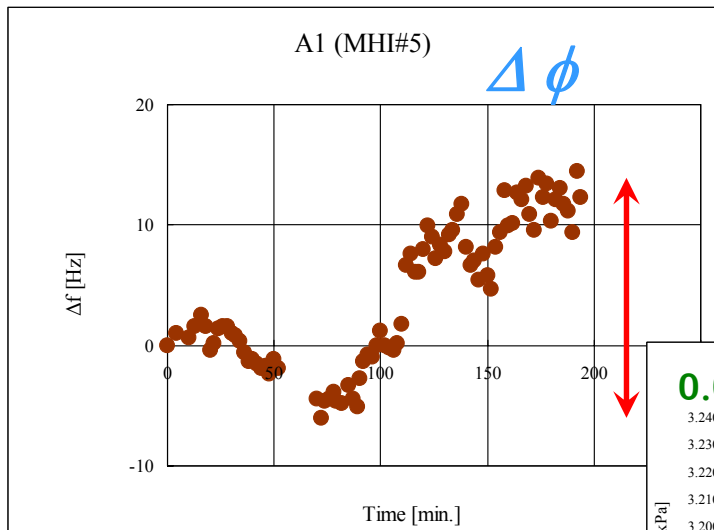
Reproducibility of Piezo Tuner (Cryo-A)

Network Analyzer (10 cycles, $V_{\text{piezo}} = 0 \sim +500\text{V}$)





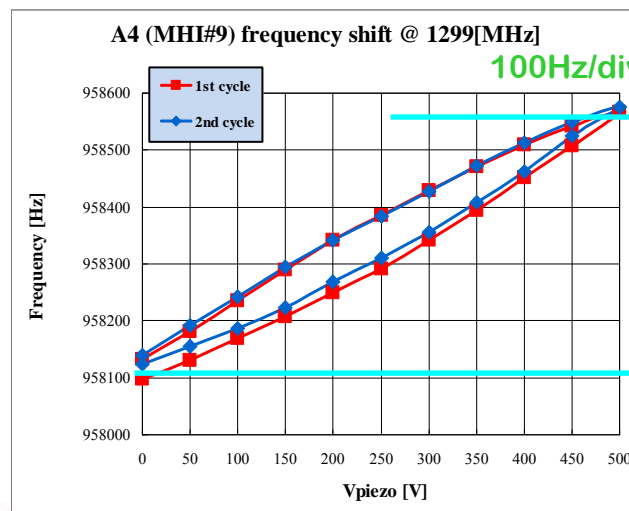
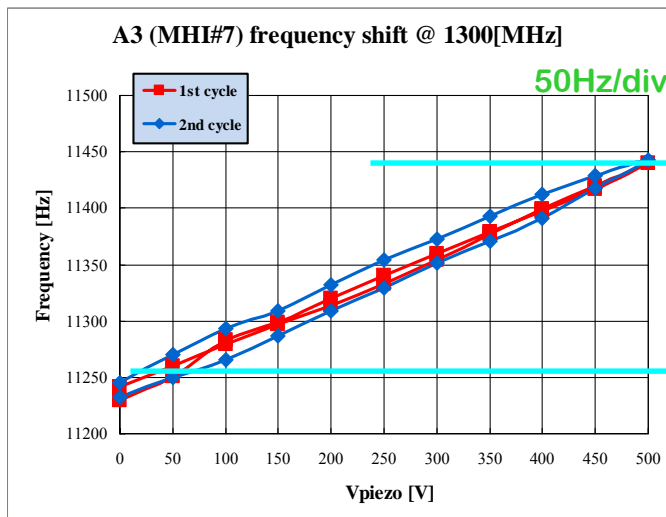
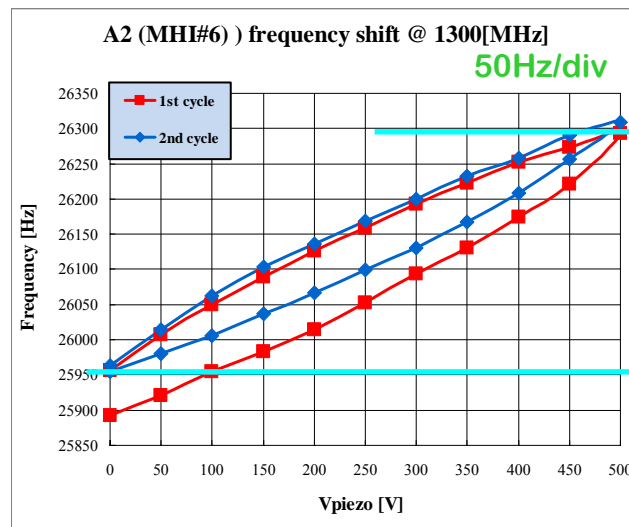
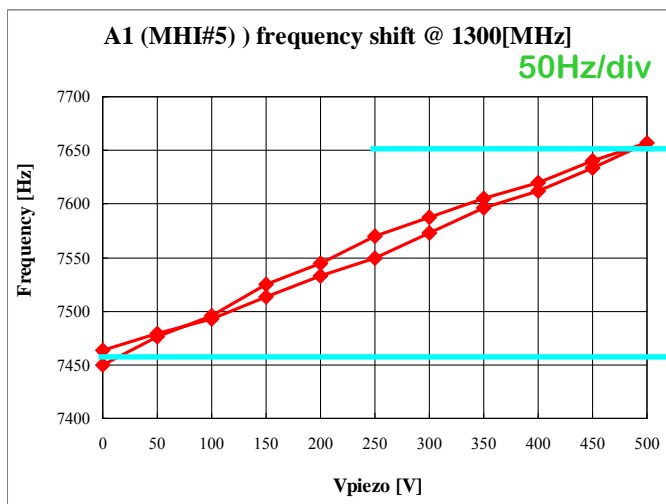
Stability of Frequency (Cryo-A)





Hysteresis of Piezo Tuner (Cryo-A)

50W RF Amp. + PLL ($V_{\text{piezo}} = 0 \sim +500\text{V}$)

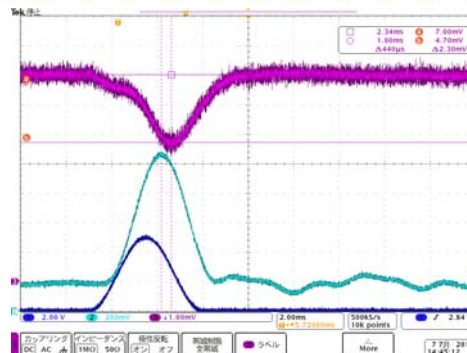




Pulse Response by Pezo Tuner (Cryo-A)

Single Pulse Response

(parameters ; frequency
; amplitude
; delay time)

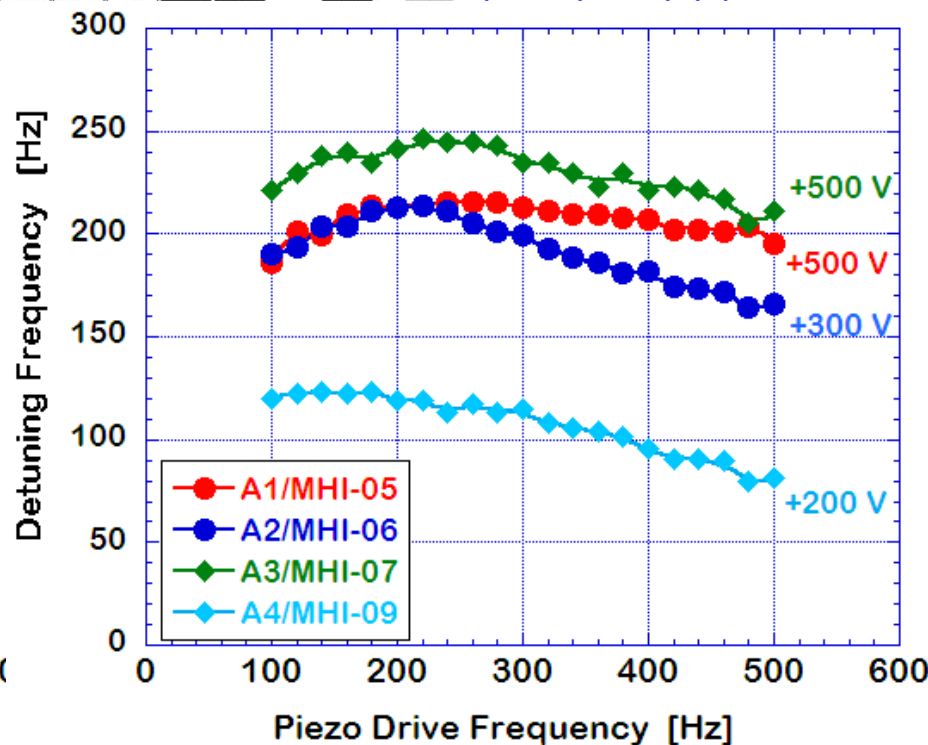
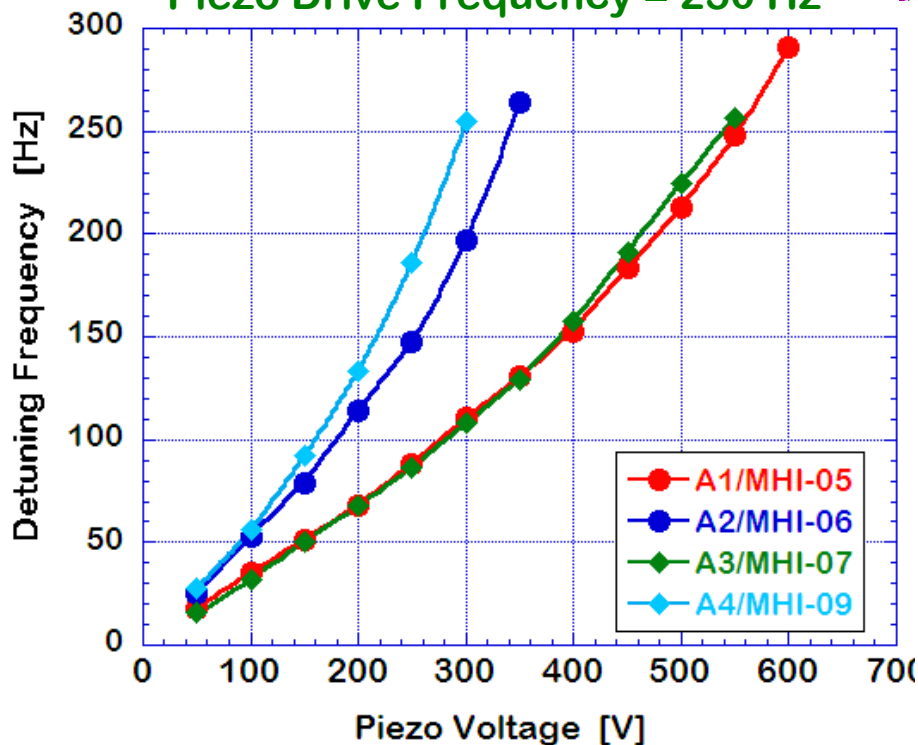


Pt

$\Delta\phi$

Piezo Drive Pulse
(freq., Vpp)

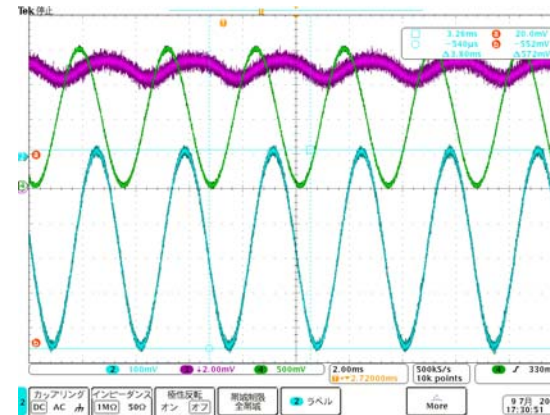
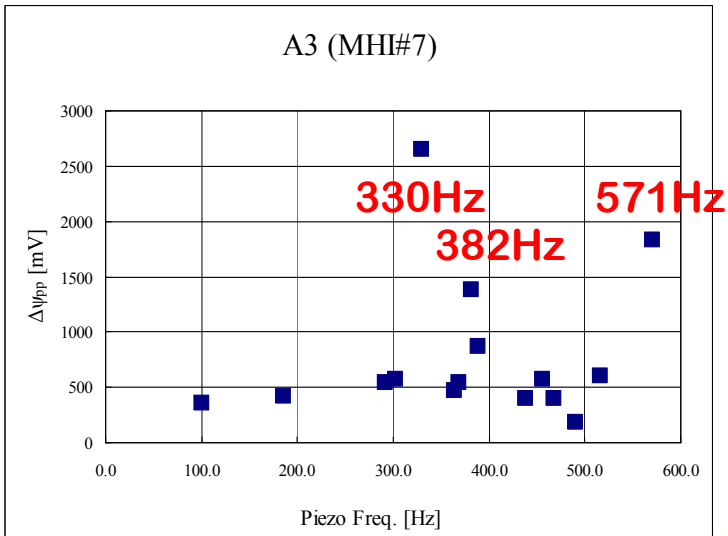
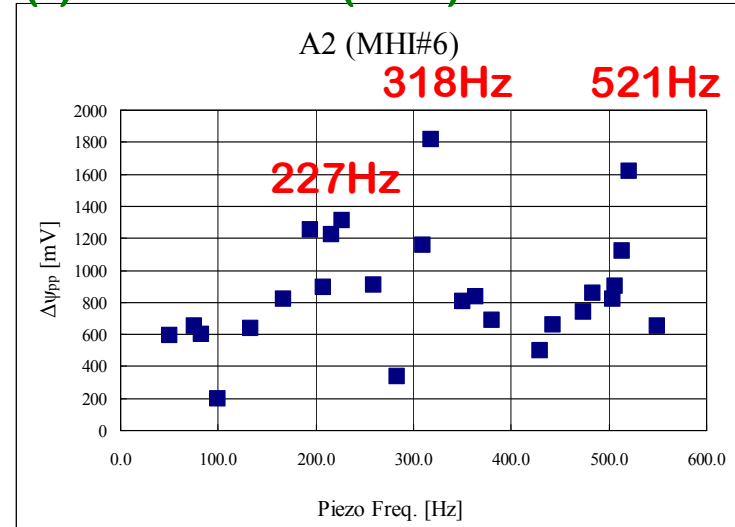
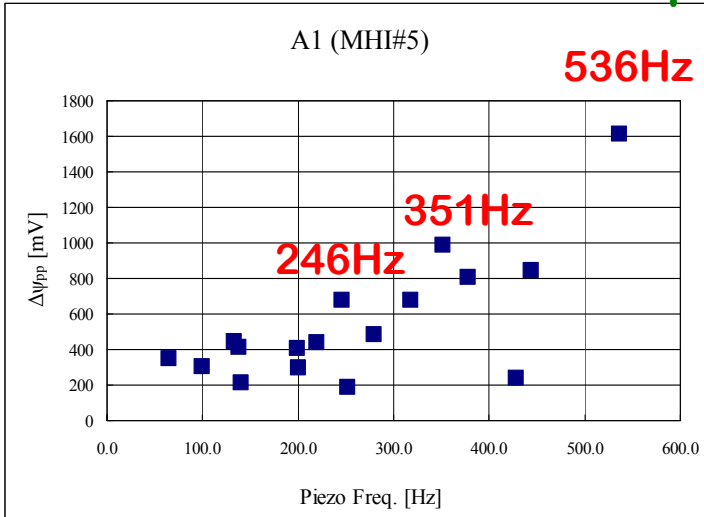
Piezo Drive Frequency = 250 Hz





Mechanical Vibration Modes (Cryo-A)

300W RF Amp., $V_{pp}(f) = +200V$ (CW)



Pt

$V_{pp}(f)$
= 0 - 200V

$\Delta\phi$

54, 204, 376, 548 Hz in Simulation

