

Measurement results with libera single pass H instrument

Summary

- Why did IPNO choose to test libera single pass H instrument?
- Libera single pass H results in CW and pulsed modes
- Libera single pass H further results
- What does libera single pass H delivers vs what does IPNO expect

Specifications of Recent Accelerators

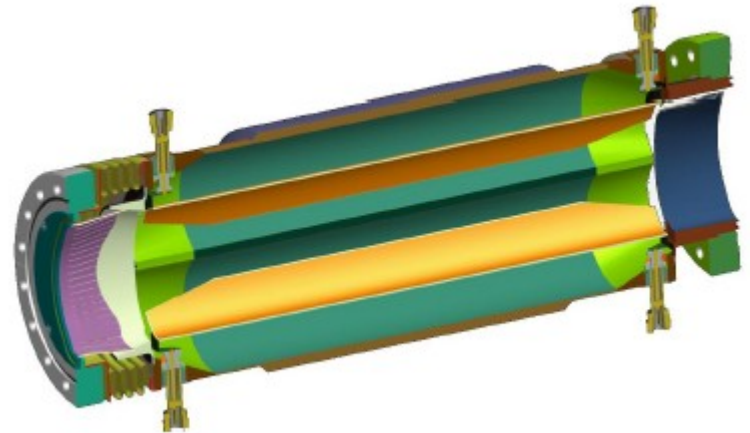
accelerator	Position resolution	Phase resolution	Beam current	Beam refresh rate
ESS	100 μ m	1 deg	50mA	14Hz
SPIRAL2	100 μ m	1 deg	150 μ A to 5mA	Up to 1KHz
SNS				
Linac 4				

Mechanics

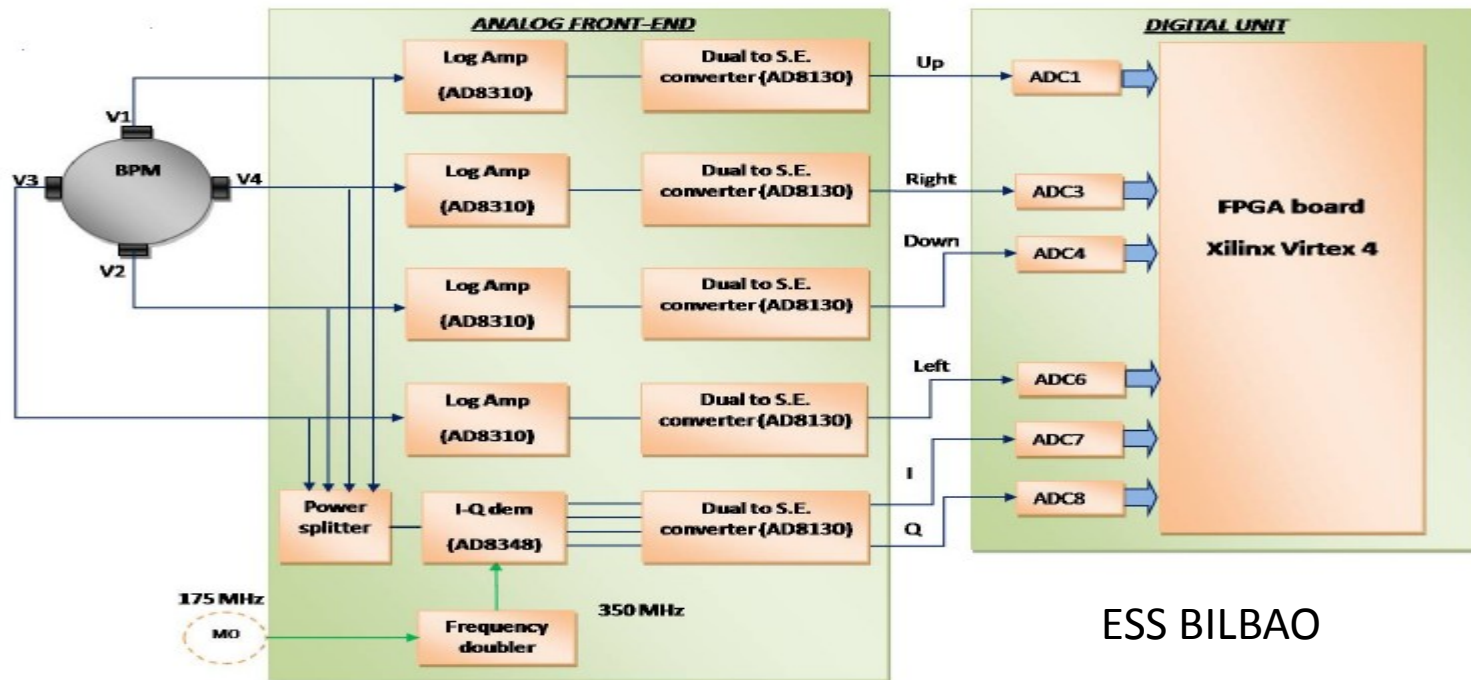
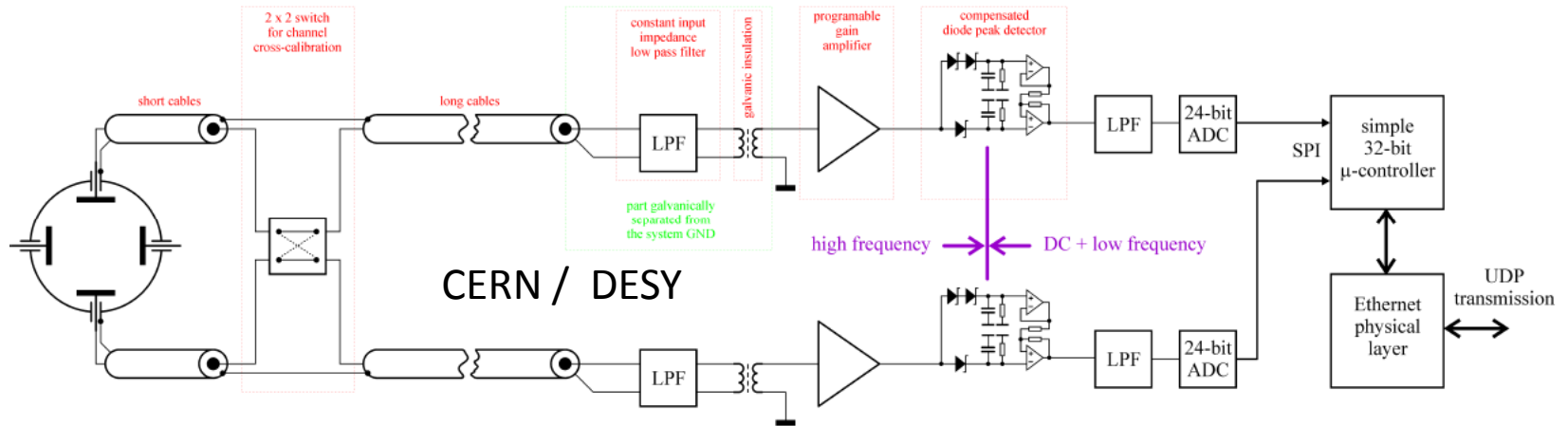
Pick up electrodes



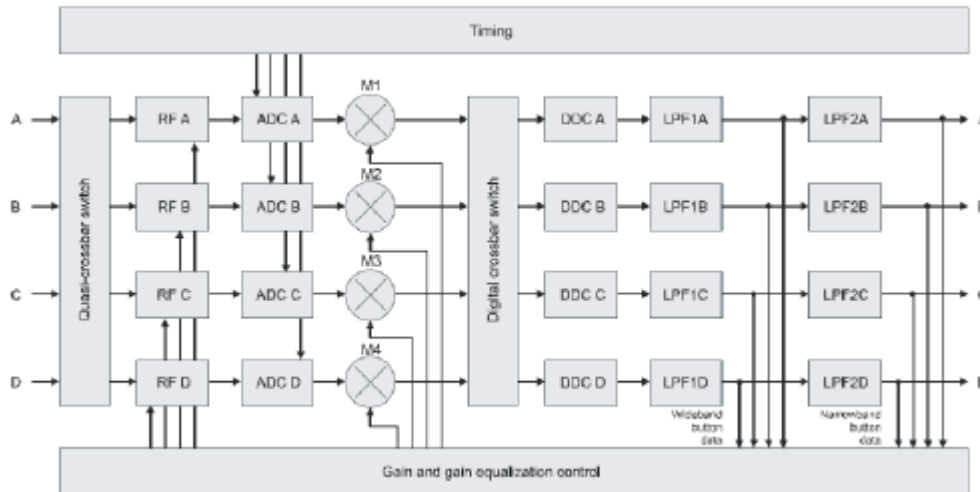
Stripline BPM



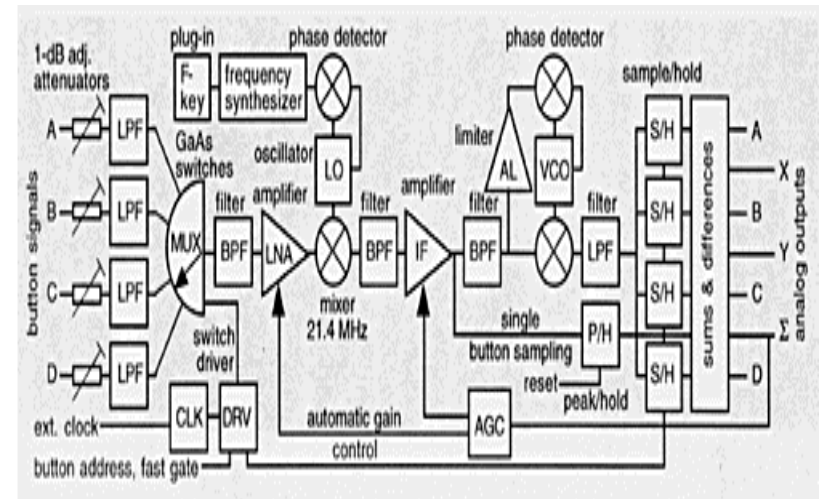
Home Made BPM electronics



Commercial BPM electronics



Itech

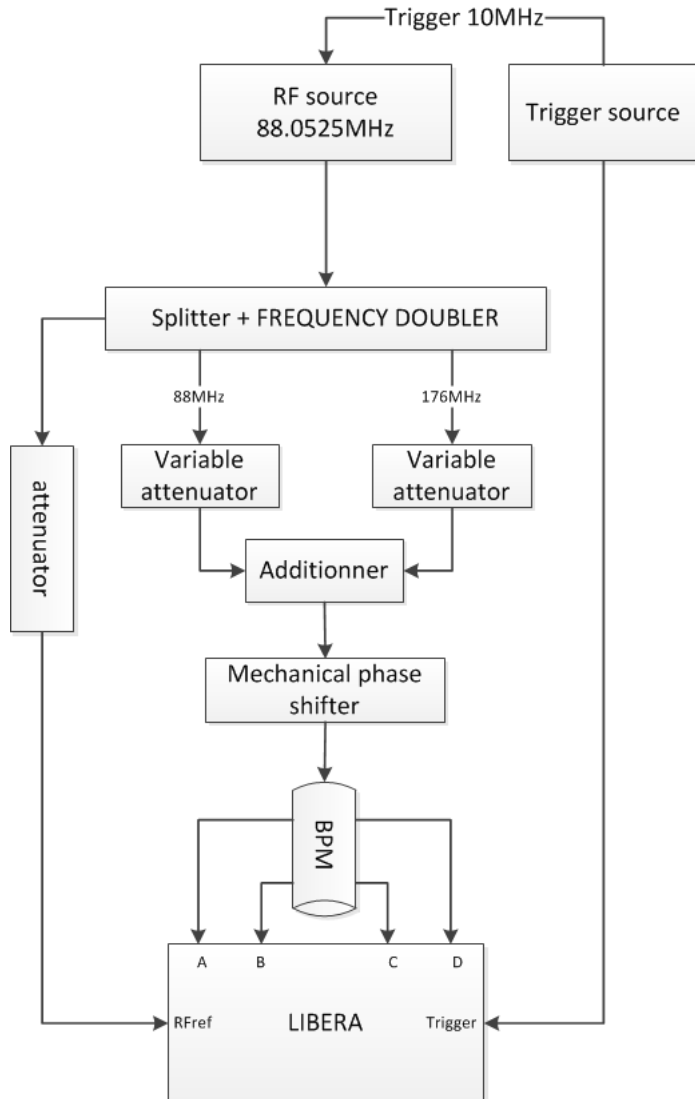


Bergoz

LSPH test goals

- Measurement stability over Beam intensity
- Measurement stability over Beam position
- Measurement stability over trigger frequency
- Additional points:
 - Interlock
 - Two BPM acquisition card
 - Longterm drift
 - Beam transverse form (ellipticity)

LSPH CW mode test configuration



Materials:

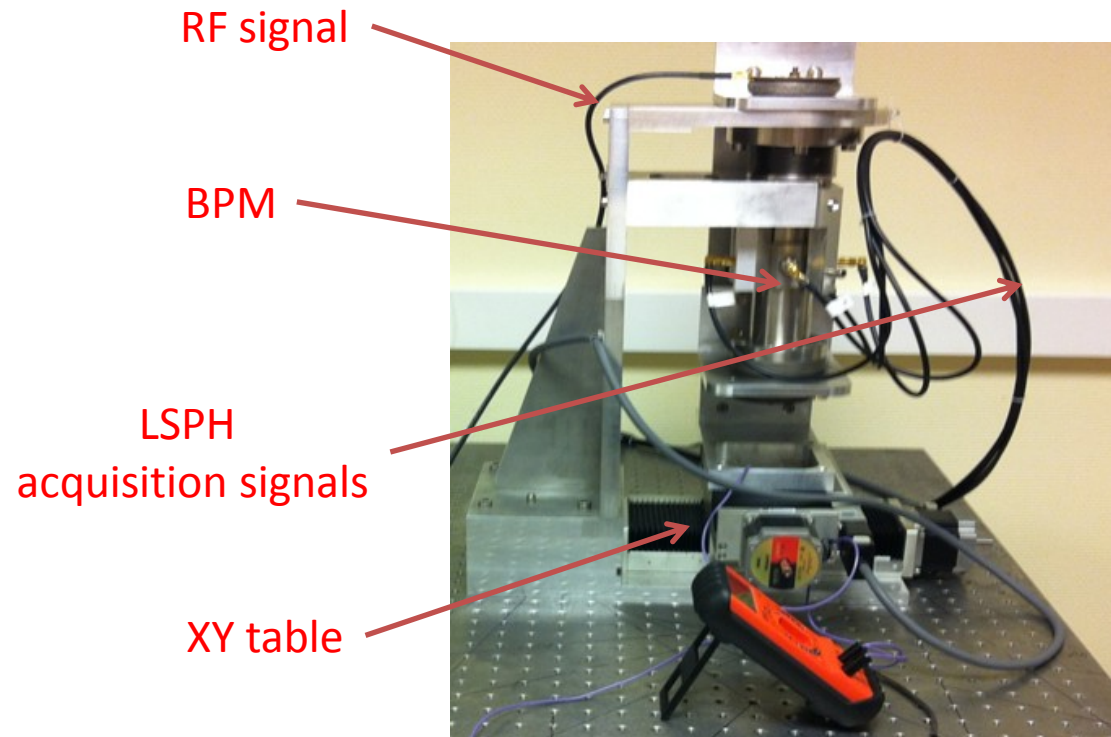
RF power generator: Agilent 8648C (-90dBc at 100Hz)

Trigger source: Agilent 33250A

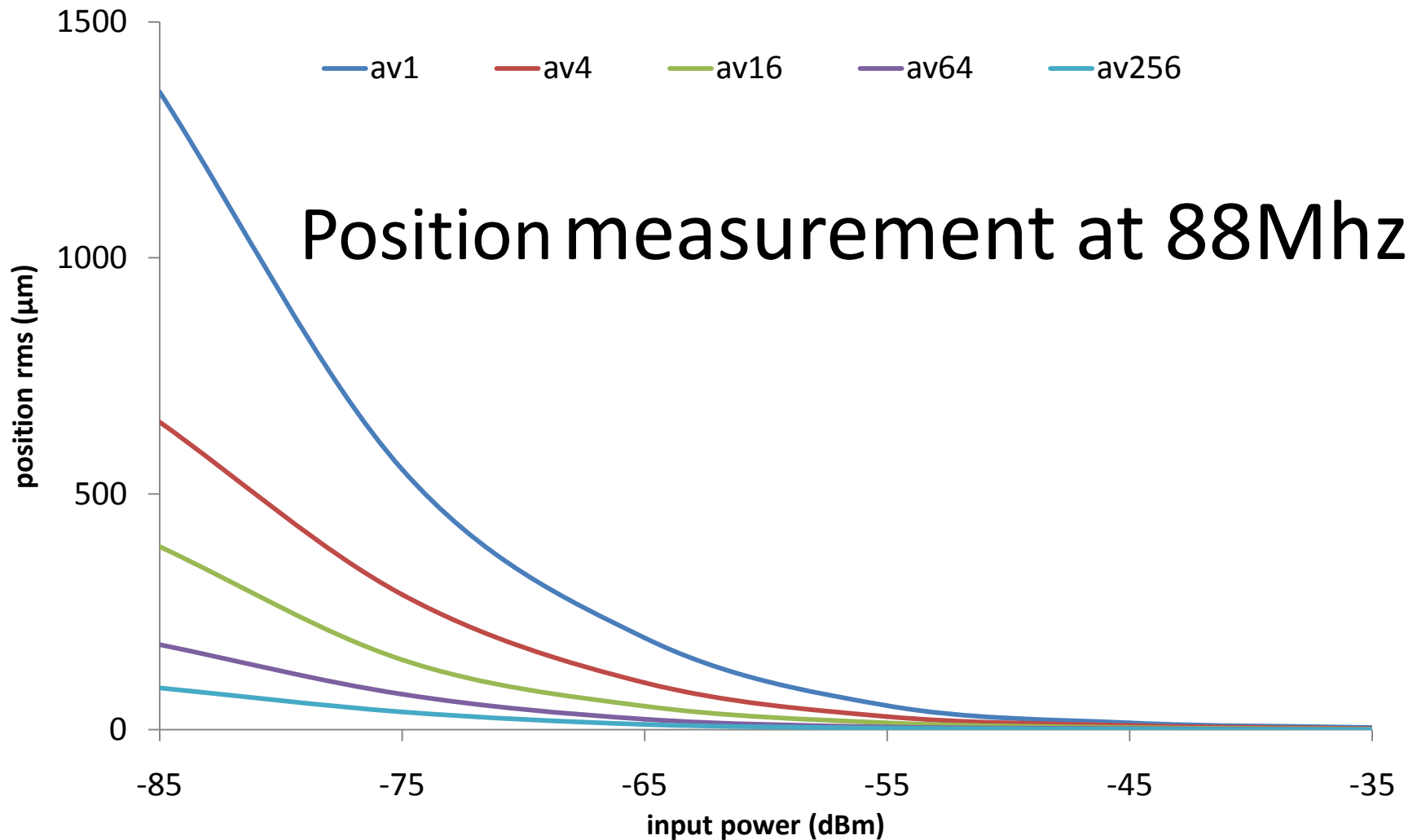
BPM: 48mm diameter, large angular electrodes

BPM Sensitivity = 1,36dB/mm at 88MHz

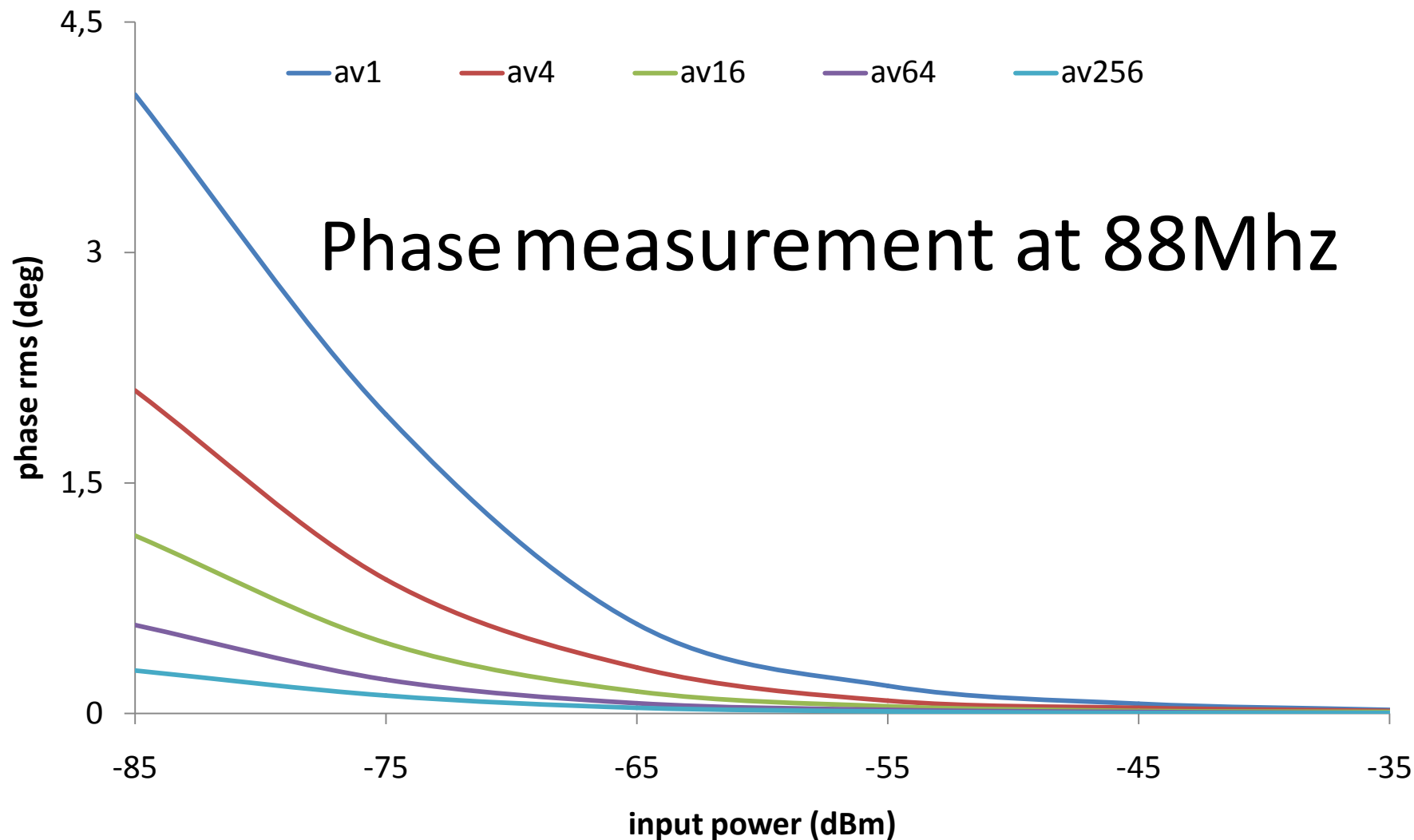
XY table : down to 1 μ m step in both axes



Measurement over beam intensity



Measurement over beam intensity



CW mode measures summary

Position resolution=100 μ m, phase resolution=1deg

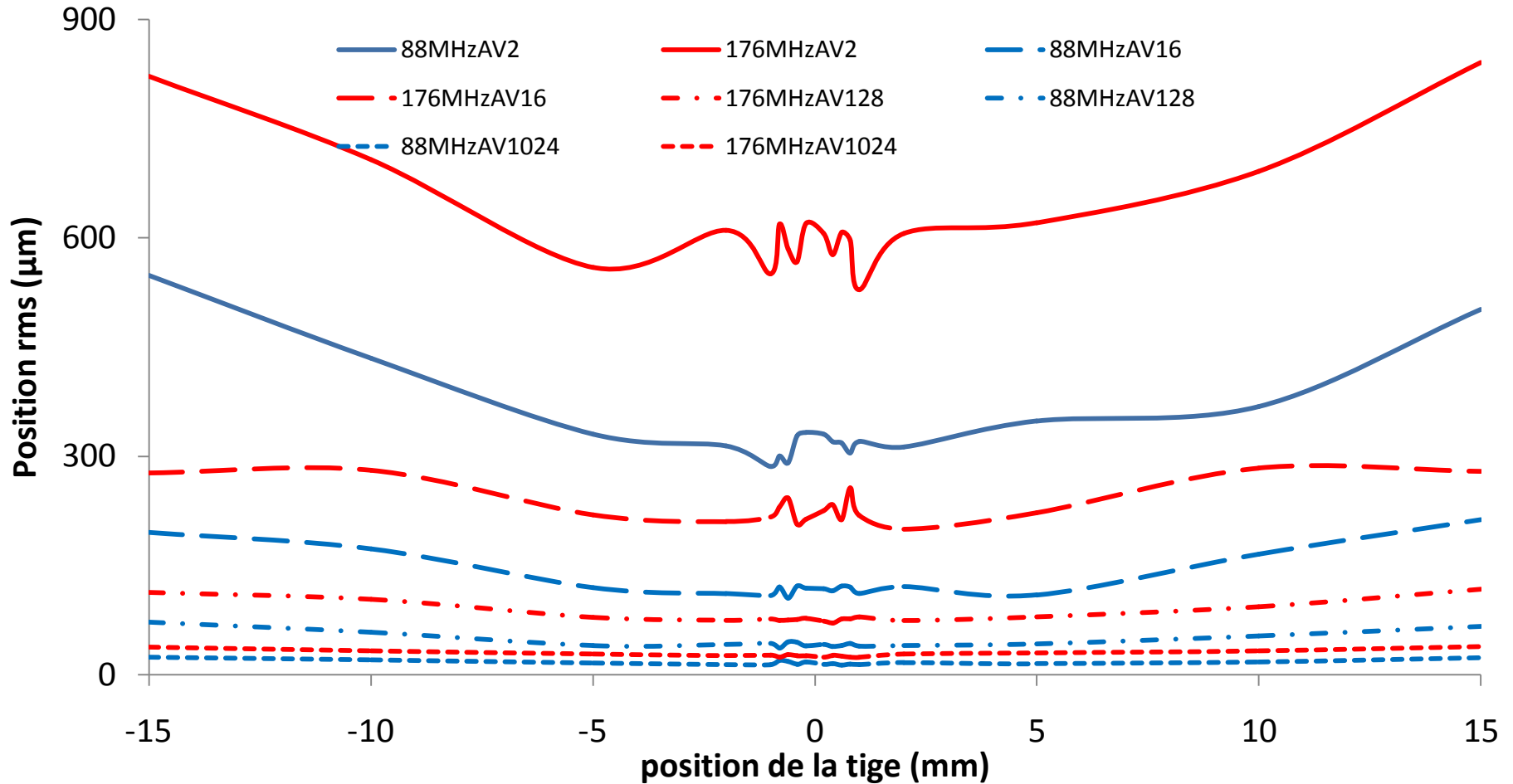
Average over	Sample time (μ s)	Input power limit (dBm)	Beam intensity limit (mA)
2	2	-55	0.8
32	32	-68	0.15
256	256	-82	0.02
1024	1024	-92	0.01

Measurement tone = 88MHz

Average over	Sample time (μ s)	Input power limit (dBm)	Beam intensity limit (mA)
2	2	-53	0.8
32	32	-62	0.26
256	256	-68	0.1
1024	1024	-89	0.01

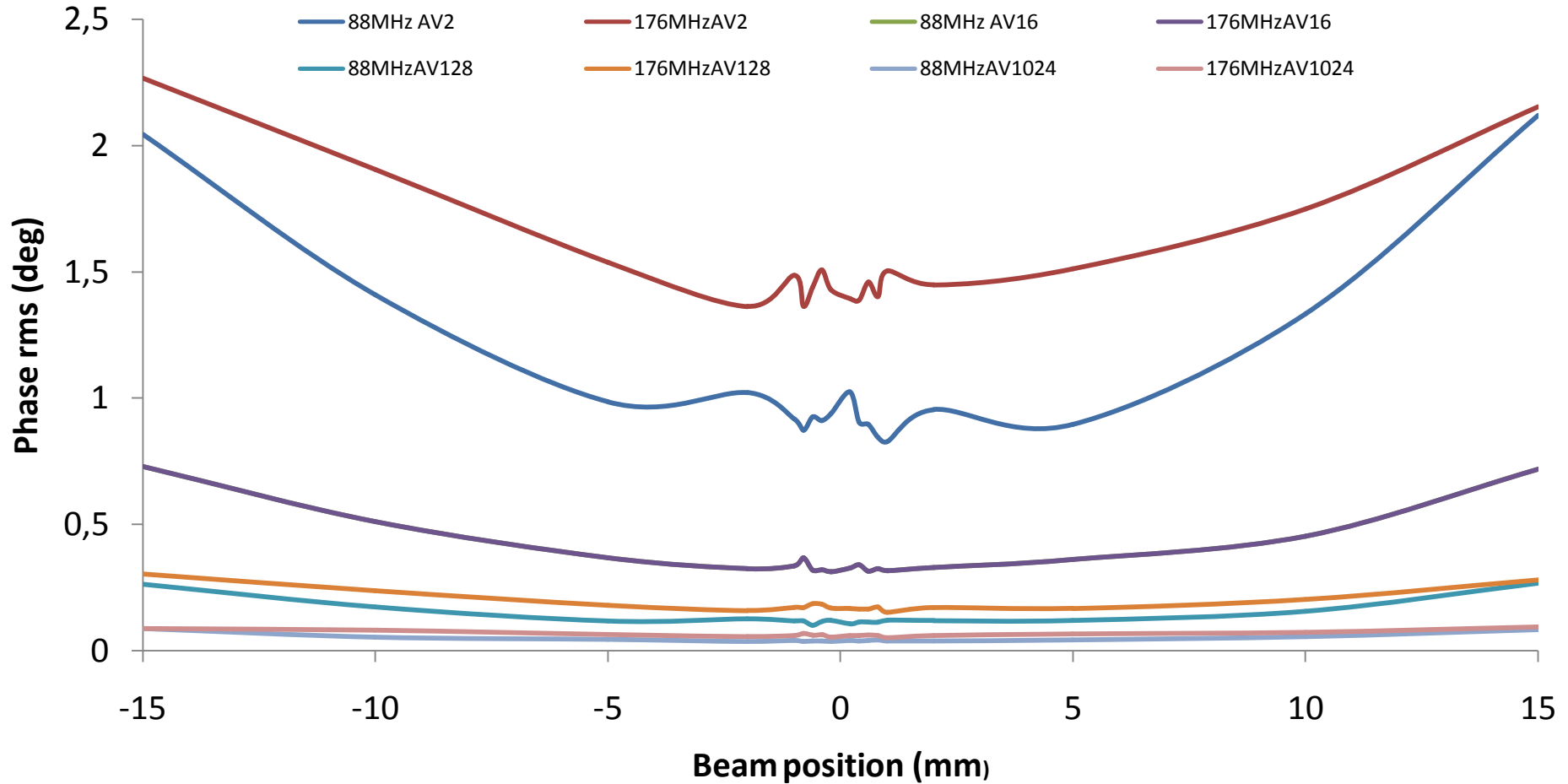
Measurement tone = 176MHz

Measurement over beam position



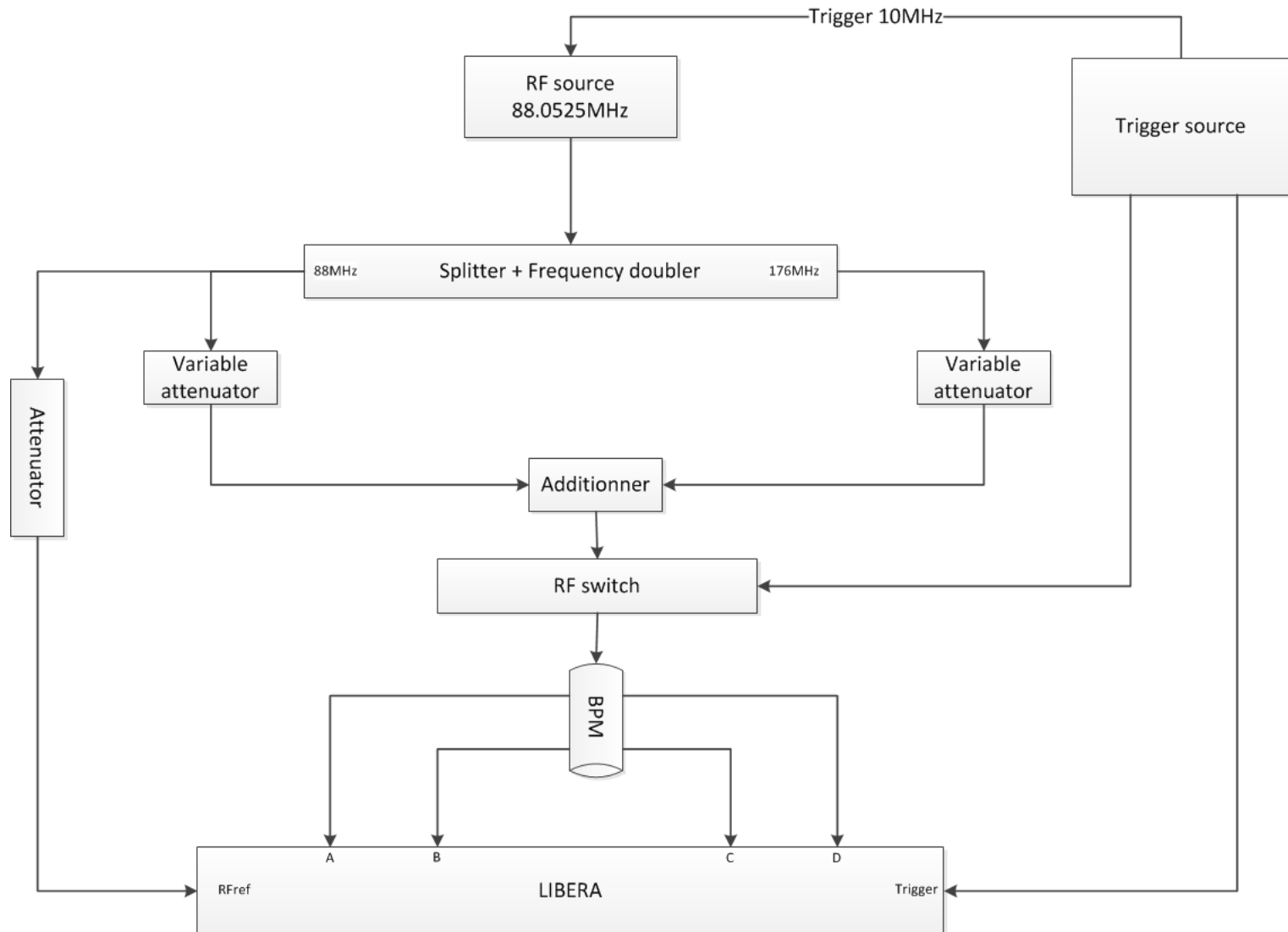
Power input = -65dBm corresponding to beam current = 200 μA

Measurement over beam position



Power input = -65dBm corresponding to beam current = 200 μ A

LSPH pulsed mode test configuration



Pulsed mode measures summary

Position resolution=100 μ m, phase resolution=1deg

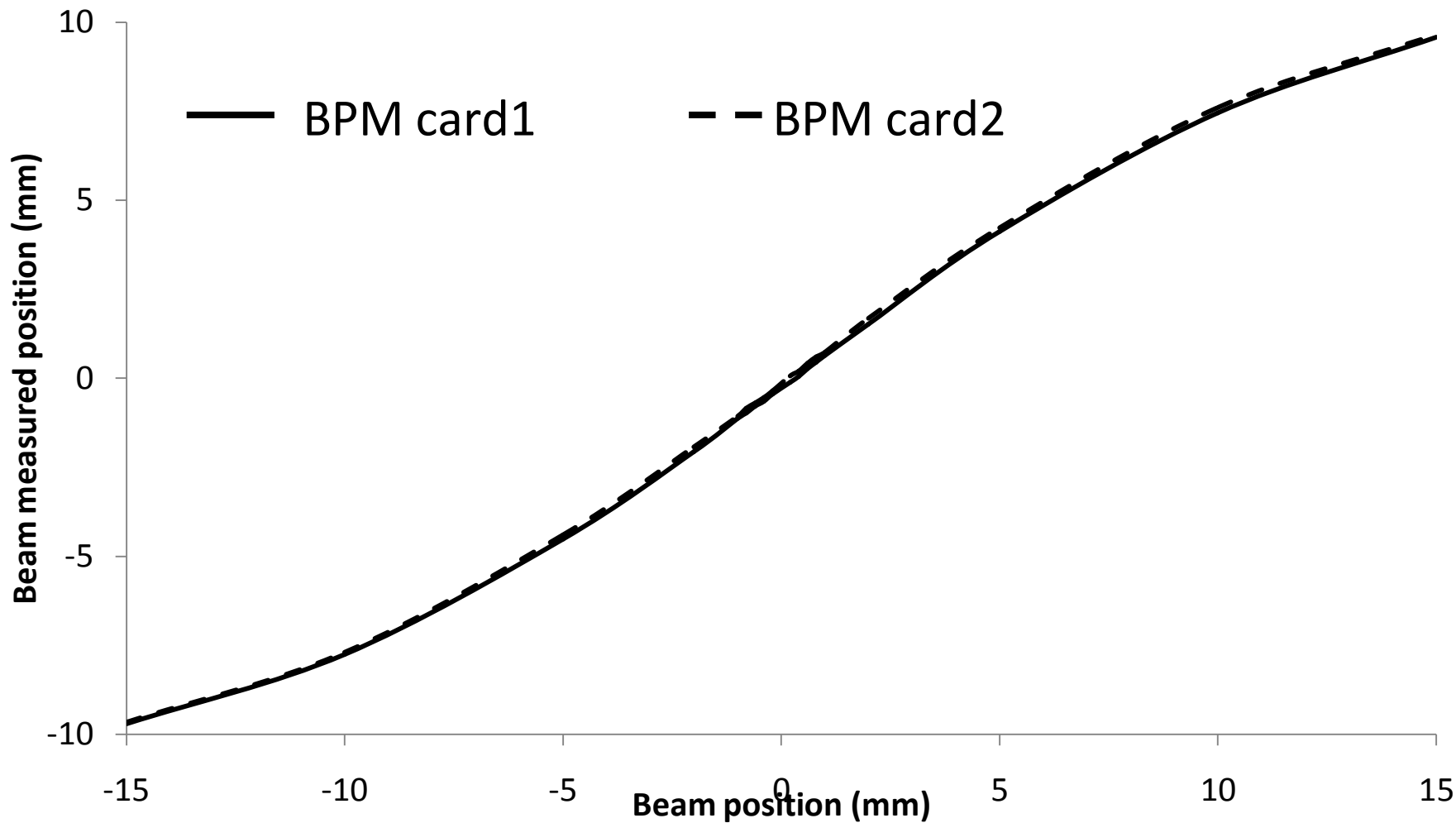
Average over	Sample time (μ s)	Input power limit (dBm)	Beam intensity limit (mA)
2	2	-53	0.4
32	32	-67	0.17
256	256	-82	0.02
1024	1024	-91	0.02

Measurement tone = 88MHz

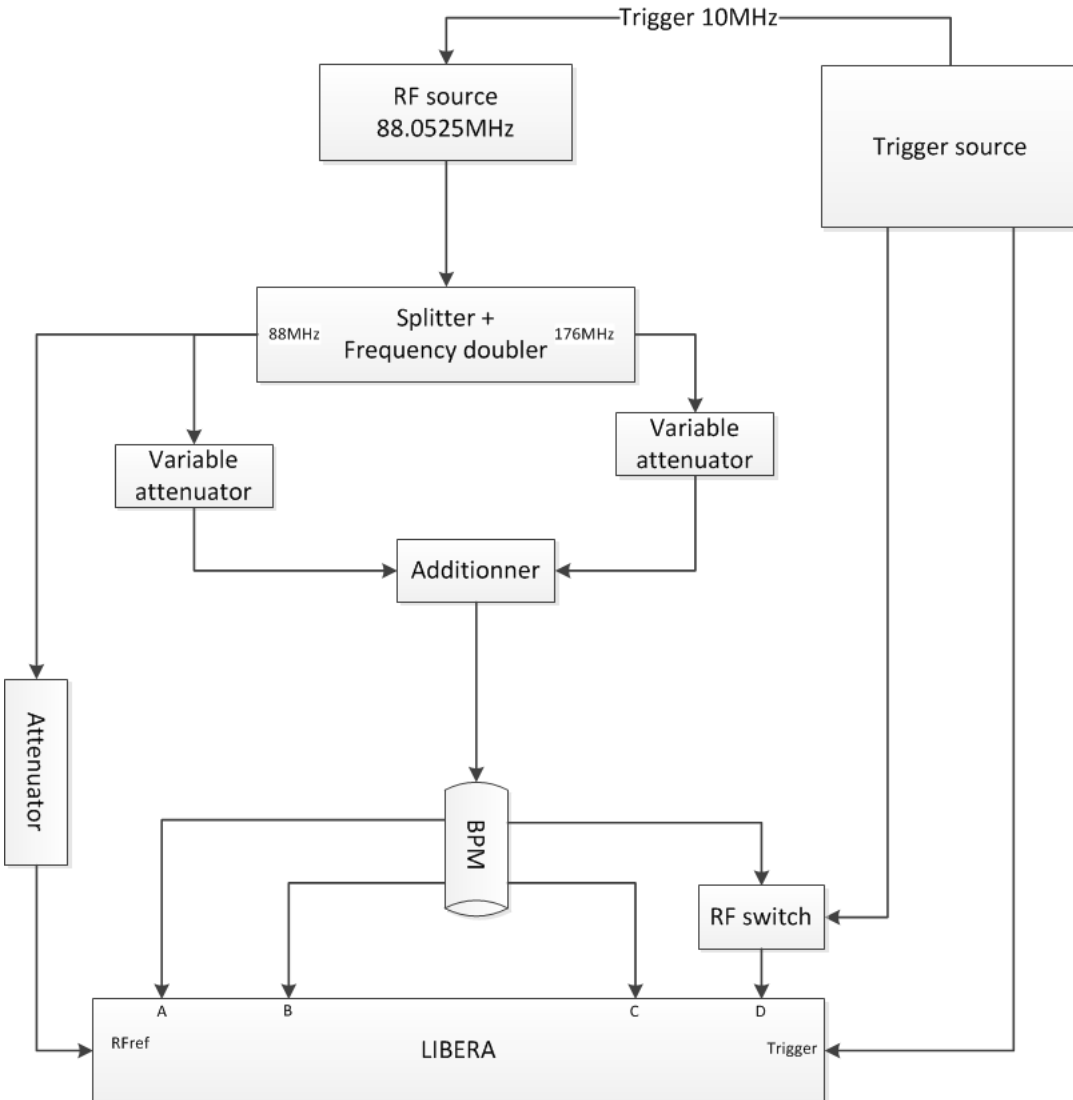
Average over	Sample time (μ s)	Input power limit (dBm)	Beam intensity limit (mA)
2	2	-55	0.8
32	32	-61	0.26
256	256	-69	0.1
1024	1024	-90	0.01

Measurement tone = 176MHz

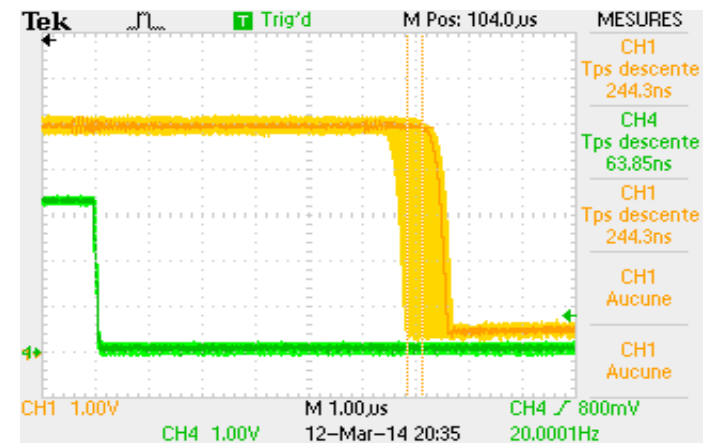
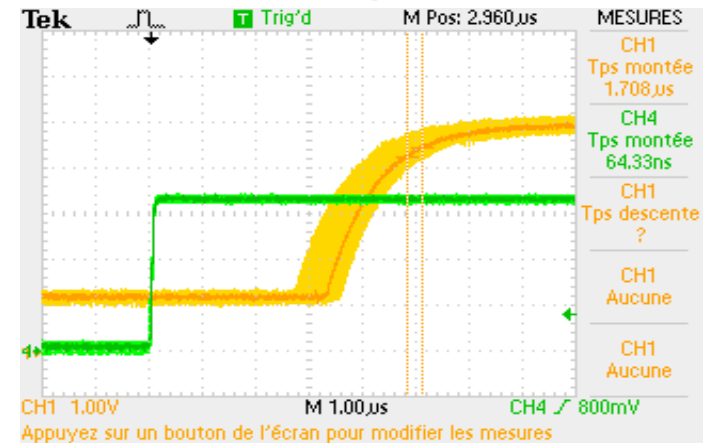
Additional tests: Two cards test



Additional tests: Interlock



RF switch signal
Interlock signal



6μs delay?

Additional tests

- Trigger frequency: measurements stable up to a trigger frequency of 300Hz
- Trigger pulse: measurements stable down to a trigger pulse of 1 μ s
- Longterm drift: (more tests to carry on)
- Ellipticity factor measurement (more tests to carry on)

test	freq=88MHz,Pin=-35dBm,AV=16		freq=176MHz,Pin=-35dBm,AV=16	
Wire form	Circular (5mm diameter)	Elliptic (5mm by 2mm)	Circular (5mm diameter)	Elliptic (5mm by 2mm)
Q	-0,39	-0,58	-0,01	-0,31
rms(%)	-1,84	-1,32	-14,16	-4,56

**THANK YOU FOR
YOUR ATTENTION**