

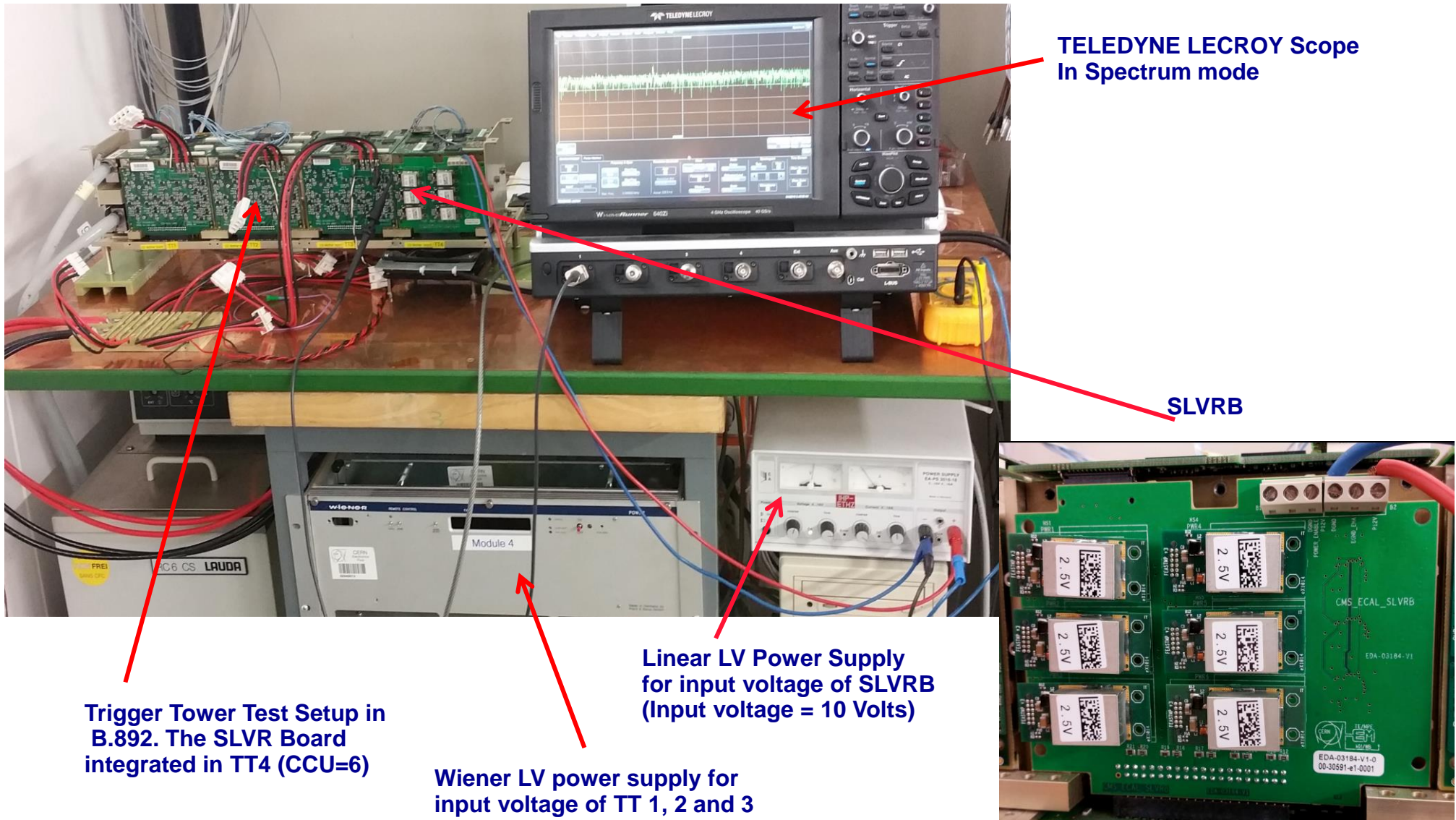
**Test CMS ECAL SLVRB
Design by M. Hansen**

**Function of the SLVR Board
Integrated into the ECAL TT Electronics**

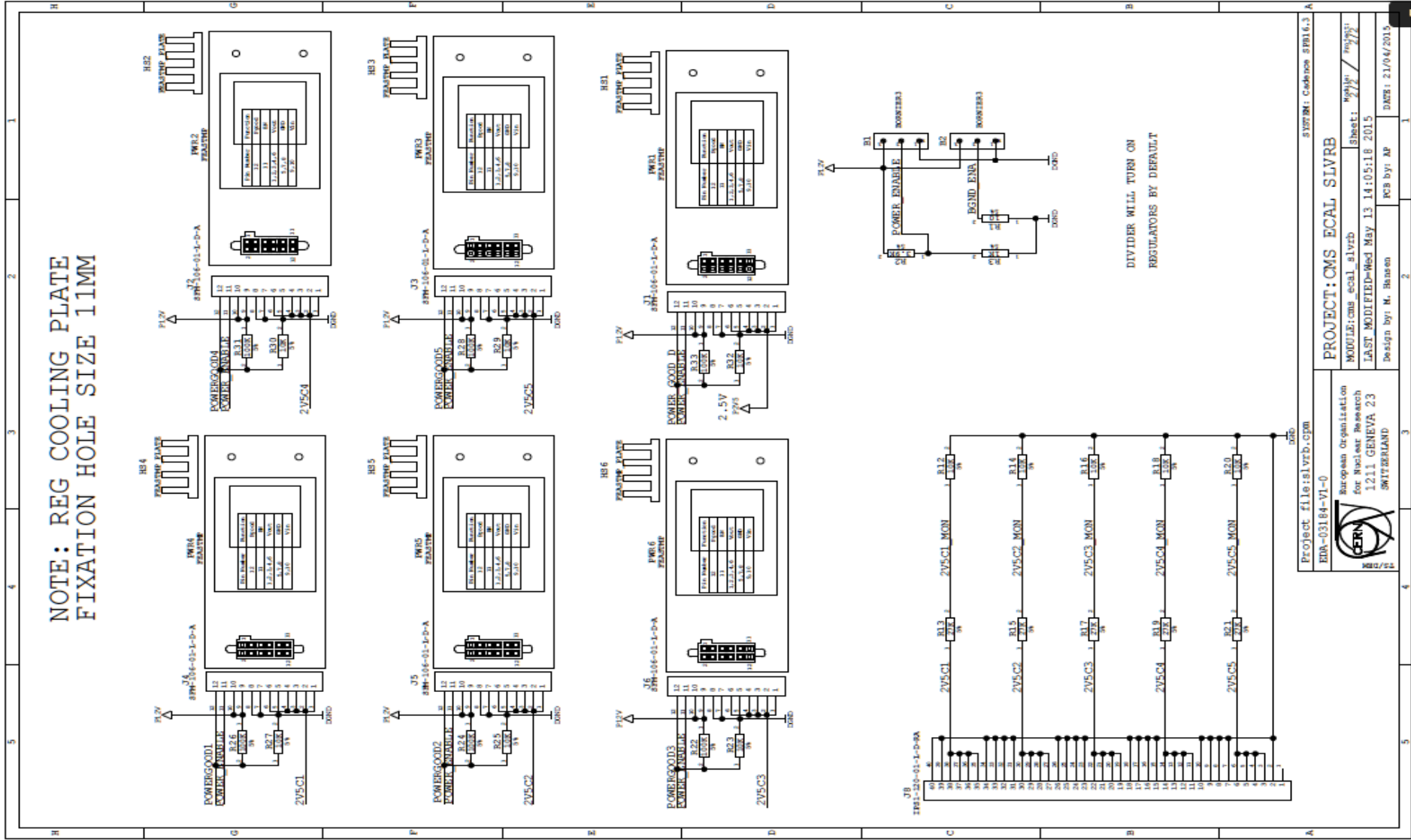
B.Betev, W. Luster mann

Institute for Particle Physics, ETH Zürich

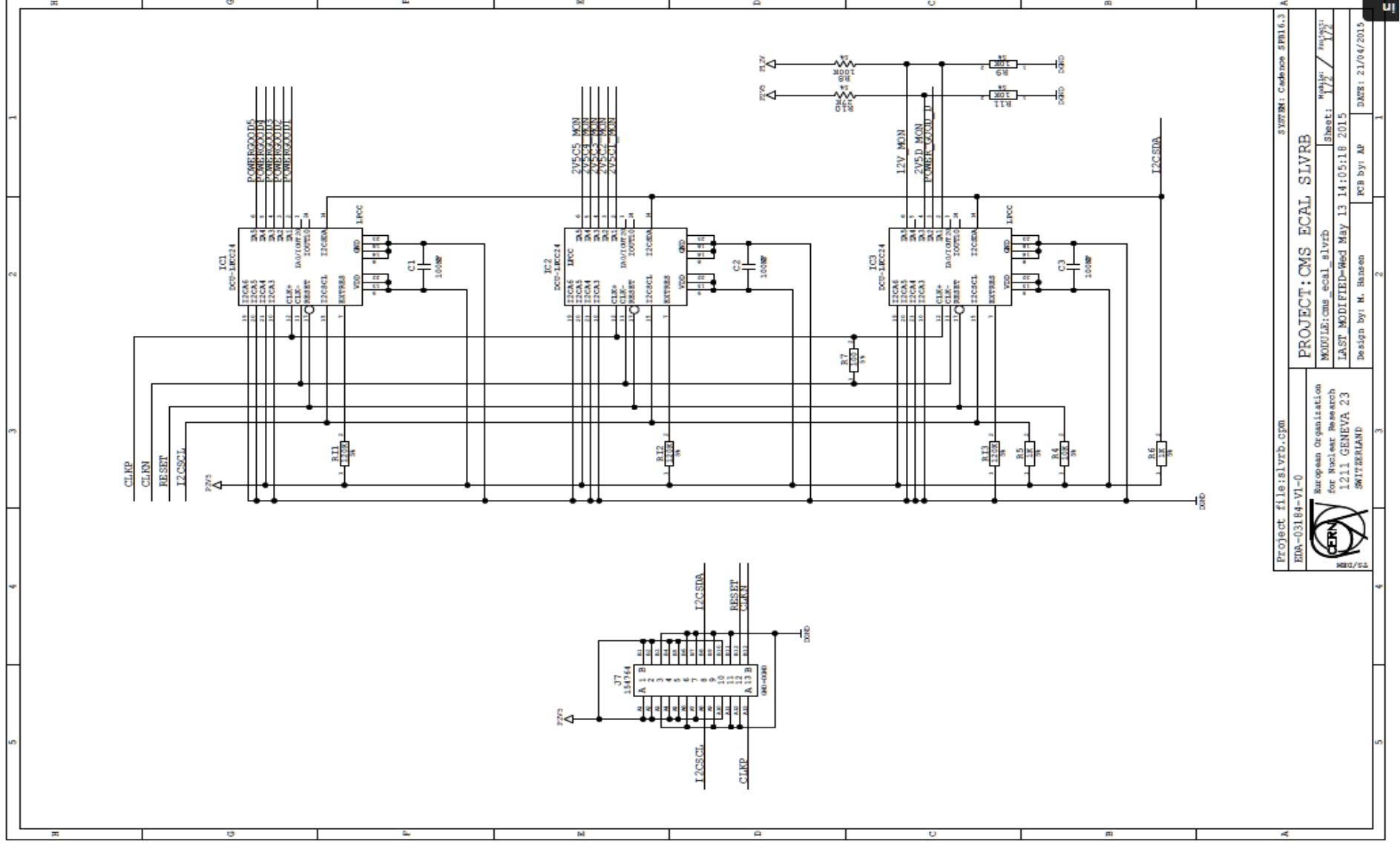
Test Setup with CMS ECAL SLVRB




CMS ECAL SLVRB Schema (1)



CMS ECAL SLVRB Schema (2)



Project: file:slvr_b.cpm		SYSTEM: Cadence SPB16.3	
EDA-03184-V1-0		PROJECT: CMS ECAL SLVRB	
 European Organisation for Nuclear Research 1211 GENEVA 23 SWITZERLAND		MODULE: cms_ecal_slvr_b Sheet: 1/1 LAST MODIFIED: Wed May 13 14:05:18 2015 Design by: M. Hansen PCB by: AP DATE: 21/04/2015	

Comment on installation and running

The integration of the CMS ECAL SLVRB in the Trigger Tower test setup was without problems.

The cooling of the board is by fan, installed below the board.

Input Voltage 10.0 V (linear LV Power supply)
Current drawn by all 5 VFE boards and FE card (CCU=6) is 4.01A

The setting for the original barrel LVR board at P5 is:
Input Voltage 4.2 V (Wiener LV PS – Switching type)
Current drawn by all 5 VEF boards and FE card is 12.8 A

No problems taking data using the ECAL DAQ and function manager code.

Pedestal and test-pulse runs were taken with original LVR board in the TT4 (CCU=6) and with the new CMS ECAL SLVRB.

TELEDYNE Lecroy Scope was used for Fourier Spectrum Analysis.

Pedestal data

Pedestal data taken with SLVRB

Ch	Gain 1		Gain 6		Gain 12		St.
	Ped	RMS	Ped	RMS	Ped	RMS	
106	198.6	.6	196.4	.6	209.4	1	0
107	194.6	.6	207.5	.7	203.3	1	0
108	197.4	.6	206.2	.7	208.7	.9	0
109	209.8	.6	196.7	.7	192.4	.9	0
110	212.2	.5	200.4	.7	196.1	1	0
126	189	.5	208.9	.7	205.5	1	0
127	205	.5	211.7	.7	208.7	.9	0
128	193.9	.6	211.5	.7	210.8	.9	0
129	193	.6	201.4	.7	193	1	0
130	197.4	.5	195.8	.8	207	1	0
146	191	.6	189.7	.7	198	1	0
147	196.7	.6	196.9	.7	205.2	1	0
148	207.5	.6	205.1	.7	205.8	1	0
149	203.1	.6	209.2	.7	206.2	1	0
150	200.1	.7	198.1	.8	196.5	.9	0
166	203.8	.6	199.7	.7	193.4	1	0
167	204.9	.5	208.3	.6	195.6	.9	0
168	190.9	.6	195.8	.7	211.2	1	0
169	197.4	.6	201.1	.7	195.1	.9	0
170	191.6	.6	193.5	.7	197.9	.9	0
186	206.7	.6	188.8	.6	196.8	1	0
187	193.1	.5	202.1	.7	186.2	.9	0
188	185.4	.6	190.4	.7	184.9	.9	0
189	190.5	.6	185.5	.7	197.2	1	0
190	203.8	.6	191.6	.7	182.9	1	0
Mean:	198.3	0.58	199.7	0.70	199.5	0.96	

Pedestal data taken with original LVRB

Ch	Gain 1		Gain 6		Gain 12		St.
	Ped	RMS	Ped	RMS	Ped	RMS	
106	196.5	.6	194.1	.7	208.5	1	0
107	192.2	.6	205.8	.7	202.6	1	0
108	195.1	.5	204	.7	207.7	1	0
109	207.9	.6	195.4	.7	192.1	1	0
110	210	.6	199.3	.7	195.7	1	0
126	190.7	.6	208.9	.6	203.8	1	0
127	206.4	.6	212.3	.7	206.9	.9	0
128	195.7	.6	211	.7	209.8	1	0
129	194	.6	204.6	.7	195.3	1	0
130	198.7	.6	194.9	.7	205.1	.9	0
146	193.2	.6	190.4	.7	196	1	0
147	199.1	.6	198.2	.8	208.2	.9	0
148	208.8	.5	204.5	.7	203.5	1	0
149	204.8	.6	208.9	.7	205.8	1	0
150	202	.6	198.6	.7	192.6	1	0
166	204.4	.6	198.1	.7	190.8	1	0
167	207.5	.5	210.4	.7	195.9	.9	0
168	192.8	.5	196.2	.7	211.5	.9	0
169	198	.5	200.6	.7	191.9	1	0
170	192.8	.6	192.8	.7	197.6	1	0
186	210.5	.6	192.9	.7	200.9	1	0
187	197.7	.6	207.9	.8	192.3	1	0
188	190.3	.6	194.7	.7	190.5	1	0
189	195.2	.6	191.2	.7	203.6	.9	0
190	209.7	.6	197.4	.7	191.4	1	0
Mean:	199.8	0.58	200.5	0.70	200.0	0.96	

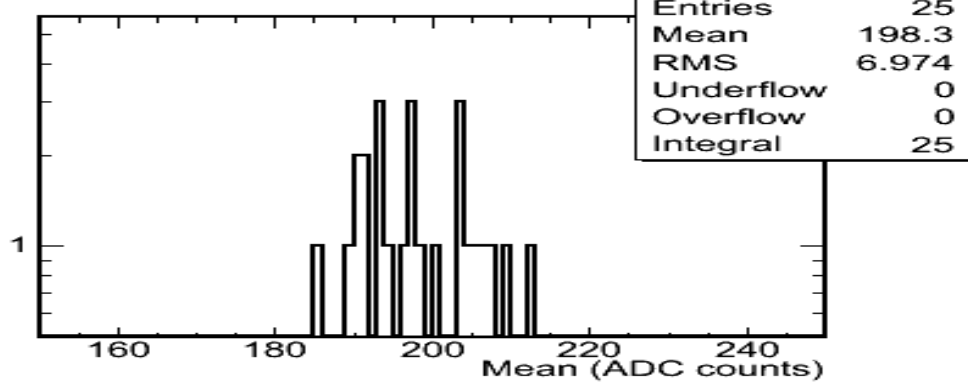
The G12 mean value of the noise for the TT, powered by SLVRB is even better than the noise of the TT, powered by the standard LVRB. The RMS = 0.96 ADC counts correspond to energy resolution of ~35 MeV.

Pedestal TT with CCU ID=6

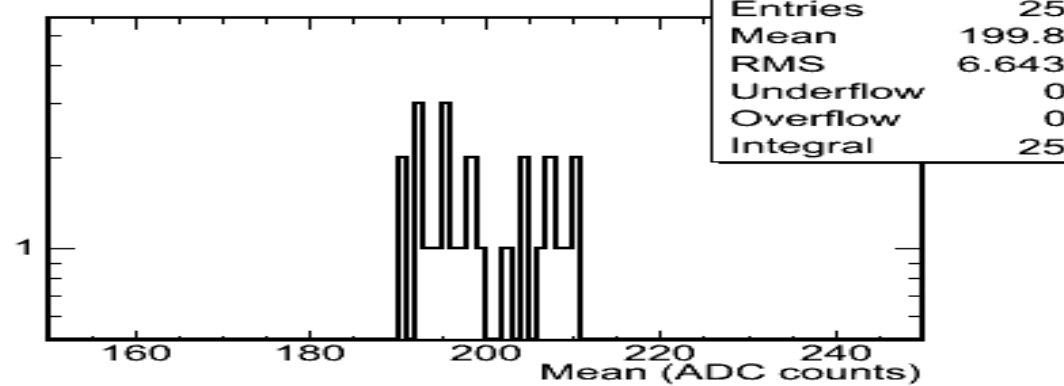
new SLVR

old LVR

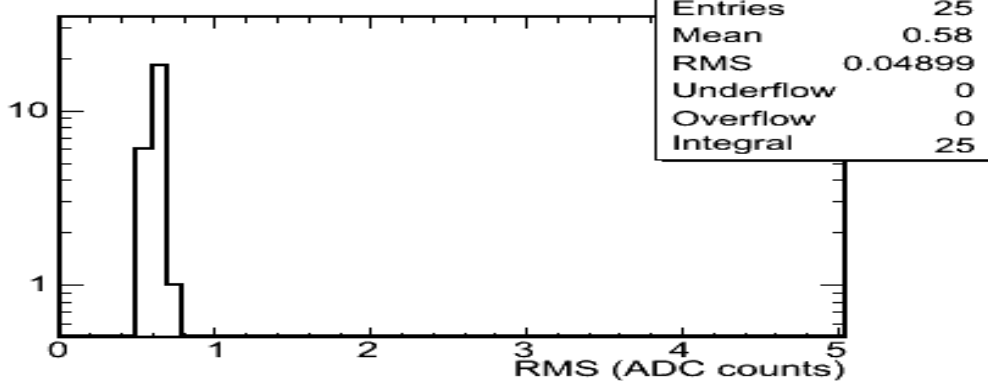
Pedestal mean, Gain 1



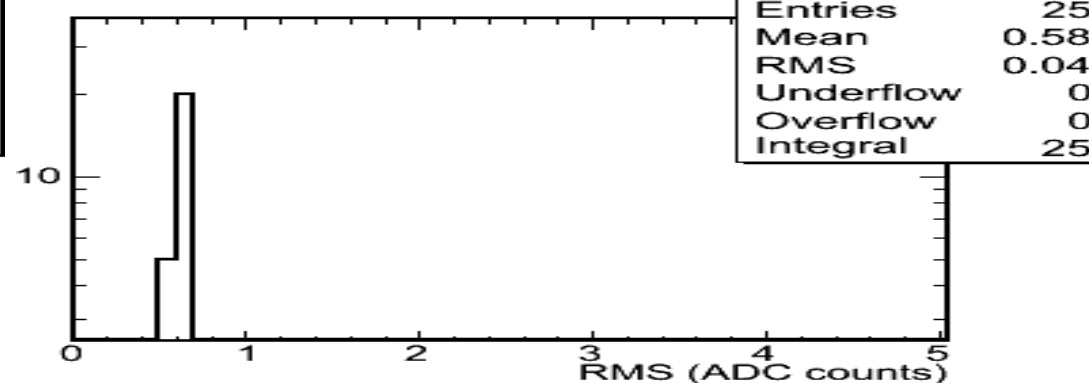
Pedestal mean, Gain 1



Pedestal RMS, Gain 1



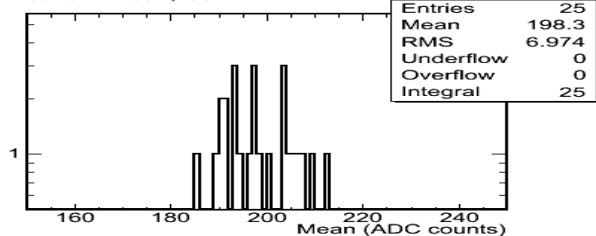
Pedestal RMS, Gain 1



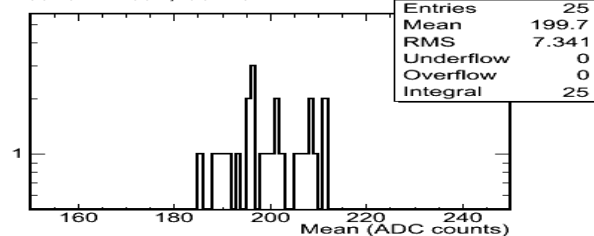
Pedestal TT with CCU ID=6

Pedestal data using Magnus SLVRB

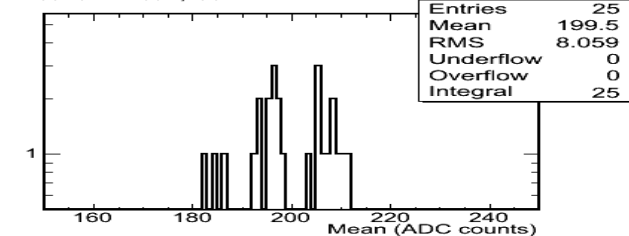
Pedestal mean, Gain 1



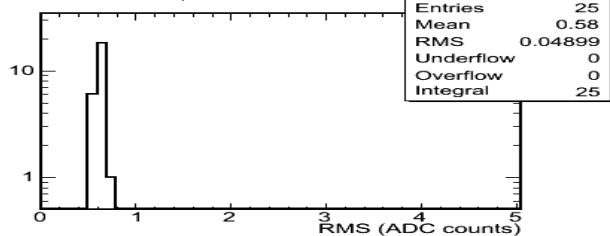
Pedestal mean, Gain 6



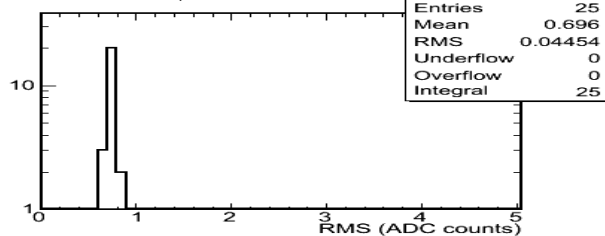
Pedestal mean, Gain 12



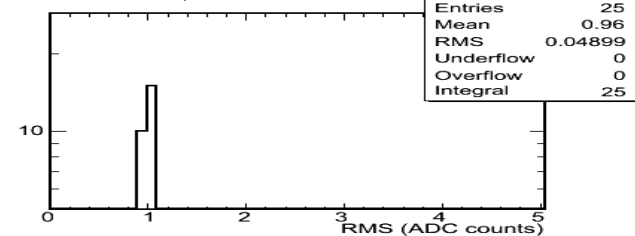
Pedestal RMS, Gain 1



Pedestal RMS, Gain 6

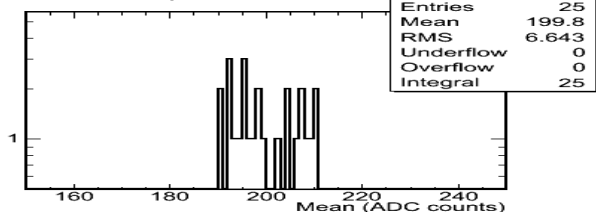


Pedestal RMS, Gain 12

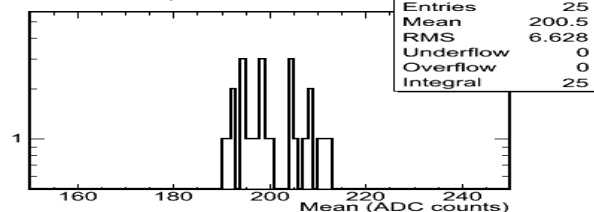


Pedestal data using Standard LVRB

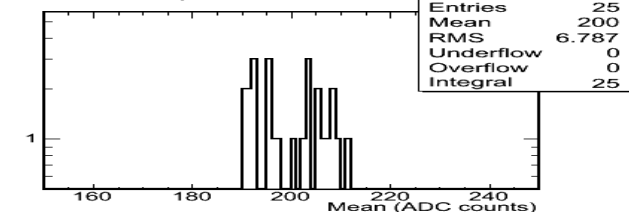
Pedestal mean, Gain 1



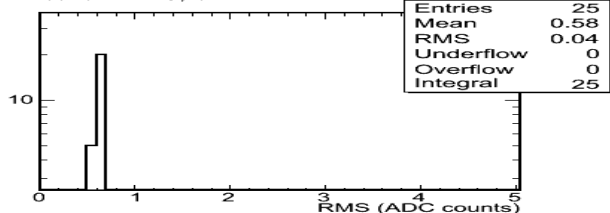
Pedestal mean, Gain 6



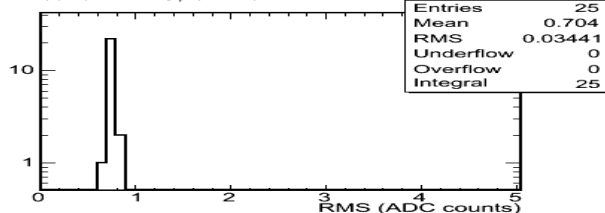
Pedestal mean, Gain 12



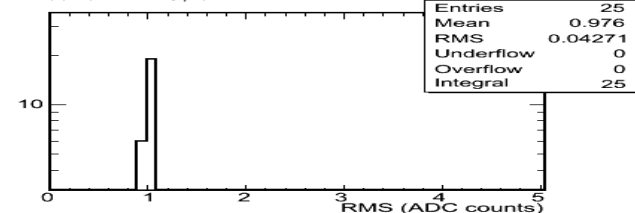
Pedestal RMS, Gain 1



Pedestal RMS, Gain 6

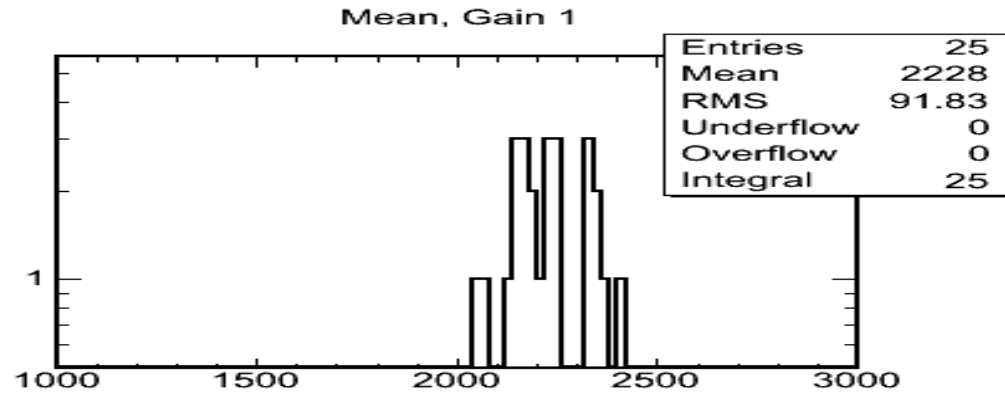


Pedestal RMS, Gain 12

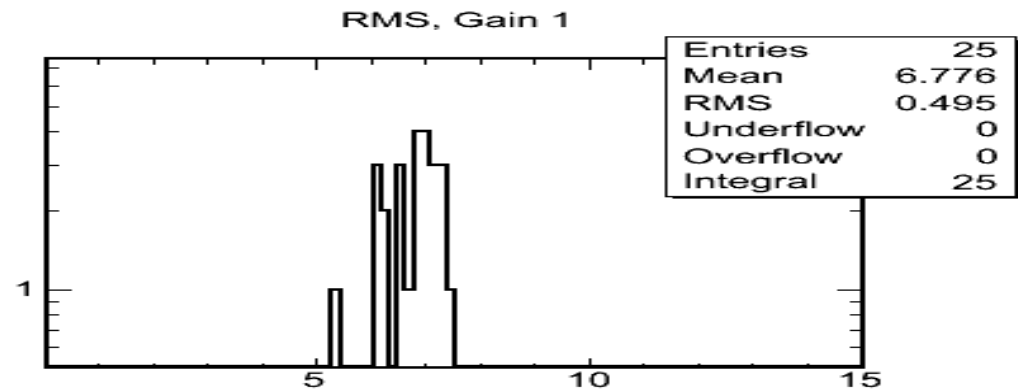
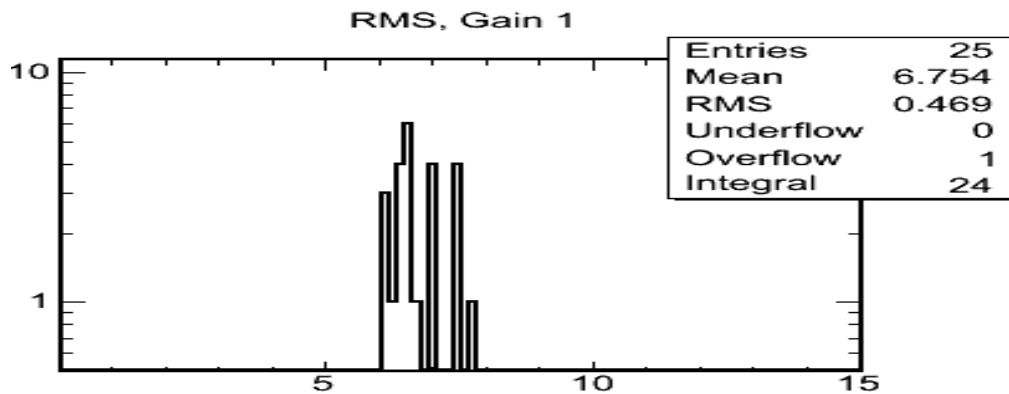
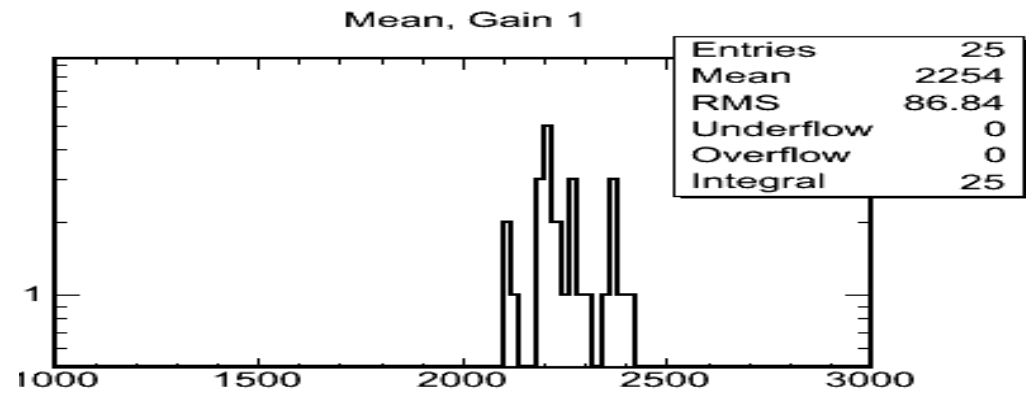


Test-pulse TT with CCU ID=6

new SLVR

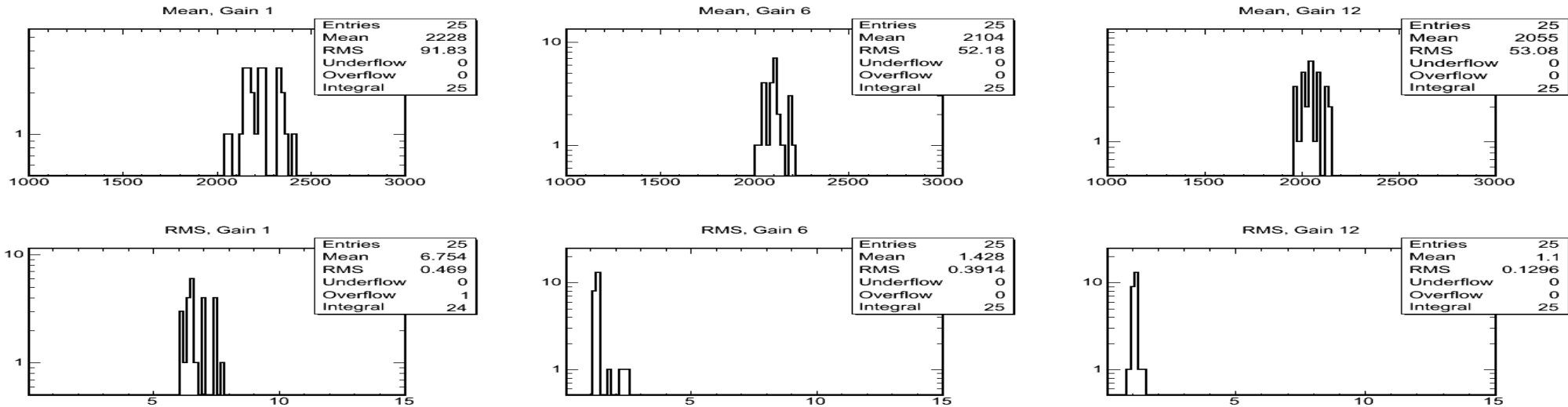


old LVR

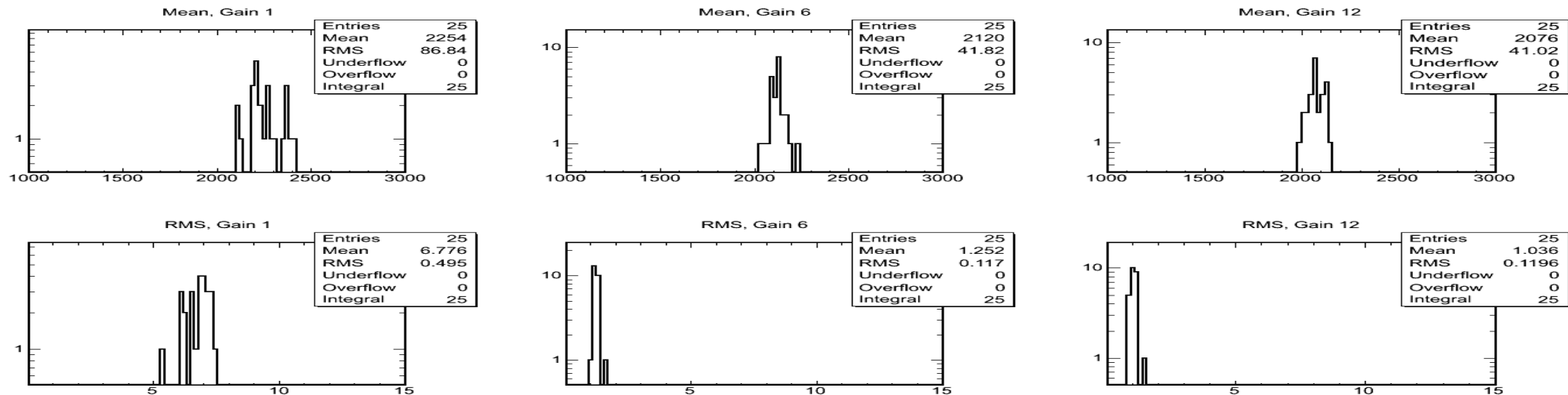


Test-pulse TT with CCU ID=6

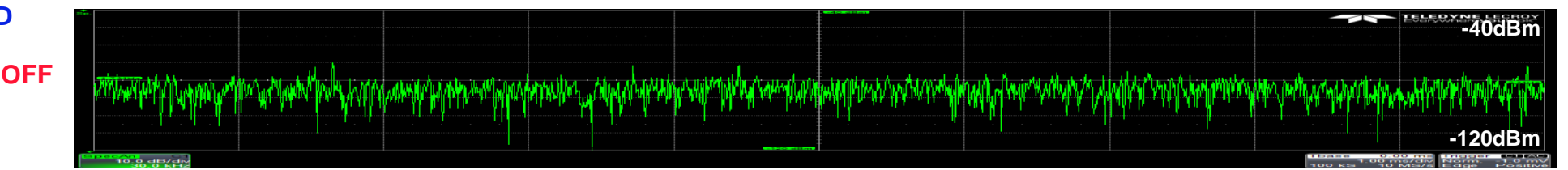
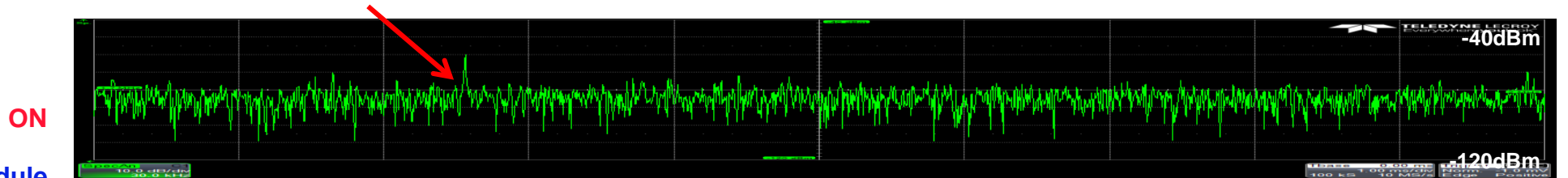
TT Test_pulse data using Magnus SLVRB



TT Test_pulse data using Standard LVRB



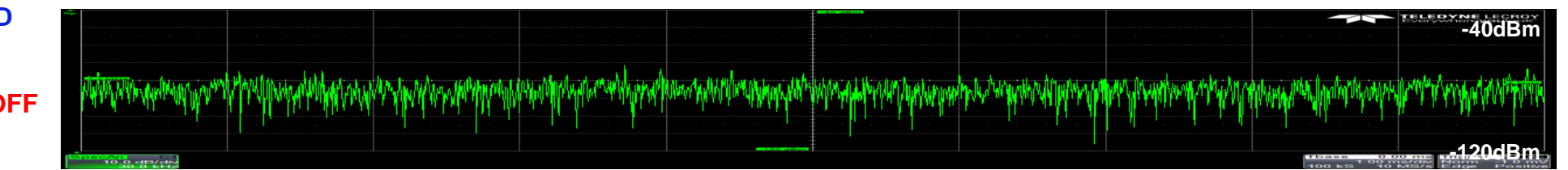
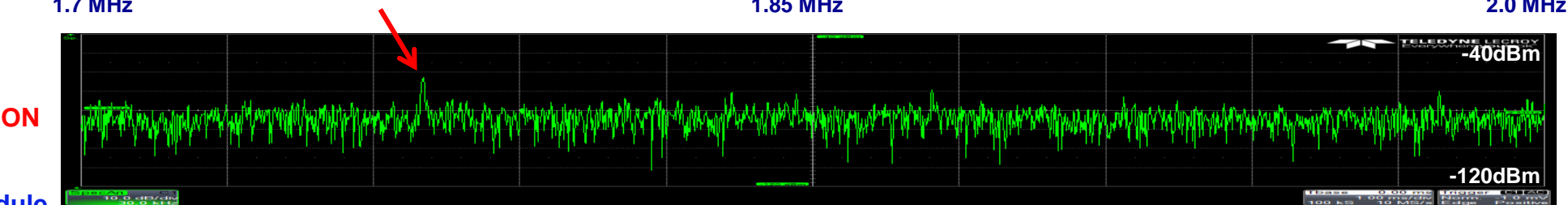
Noise Spectrum from FEAST Chips 3 and 4



1.7 MHz

1.85 MHz

2.0 MHz



Noise Spectrum from FEAST Chips 5 and 6

