

## TTF - Module Conditioning

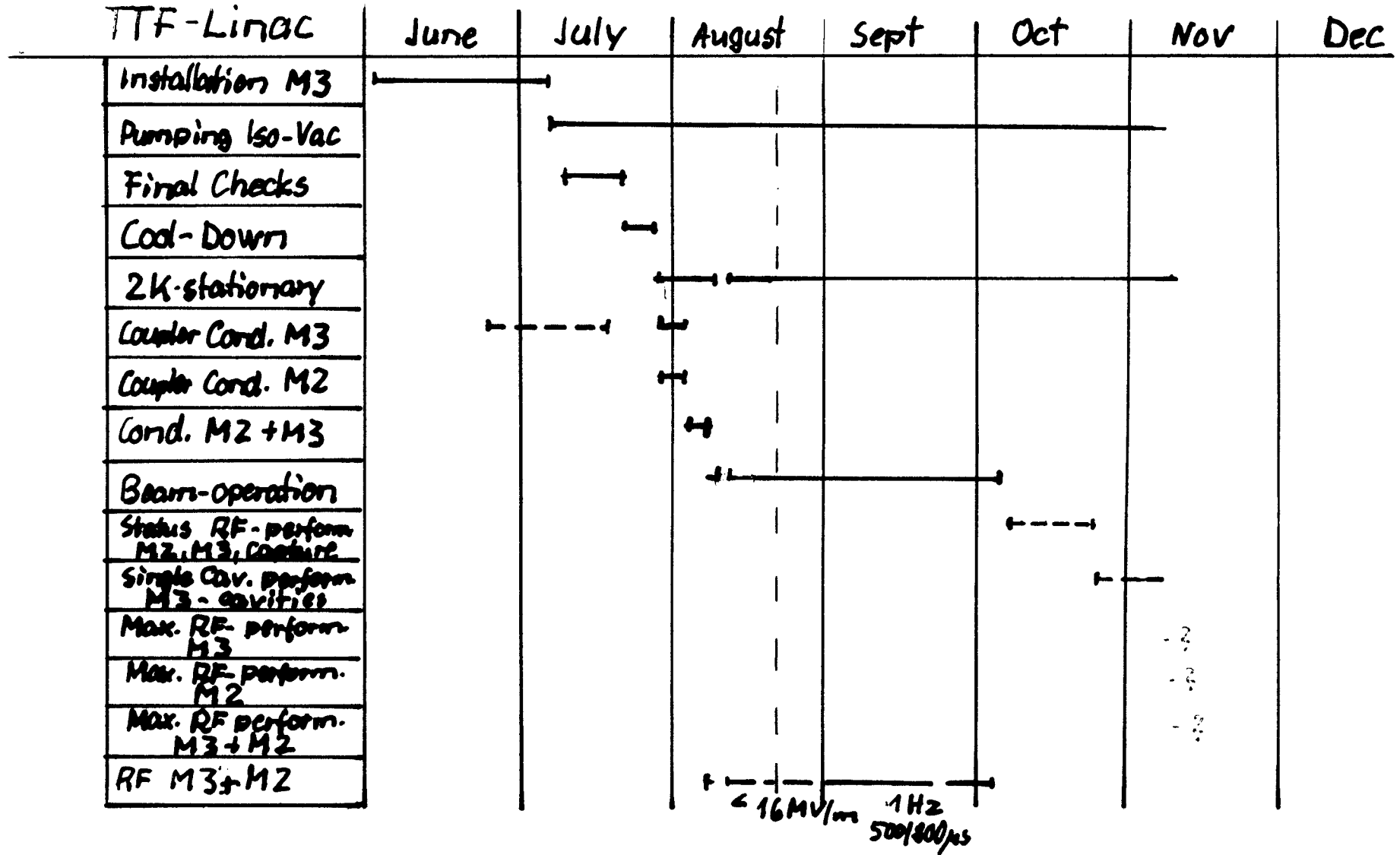
- Overview RF-Operation since June 99
- Status RF-Performances Module 2  
from last Linac-Run (Eacc, q-cryo)
- Status and Expectation for Modules 2 and 3  
before start of the Processing-Program
- First Results
- Conclusion / Summary

TTF-MHF DESY

TTF-MKS DESY

TESLA-Meeting  
Nov. 8-10, 1999  
Argonne

1999

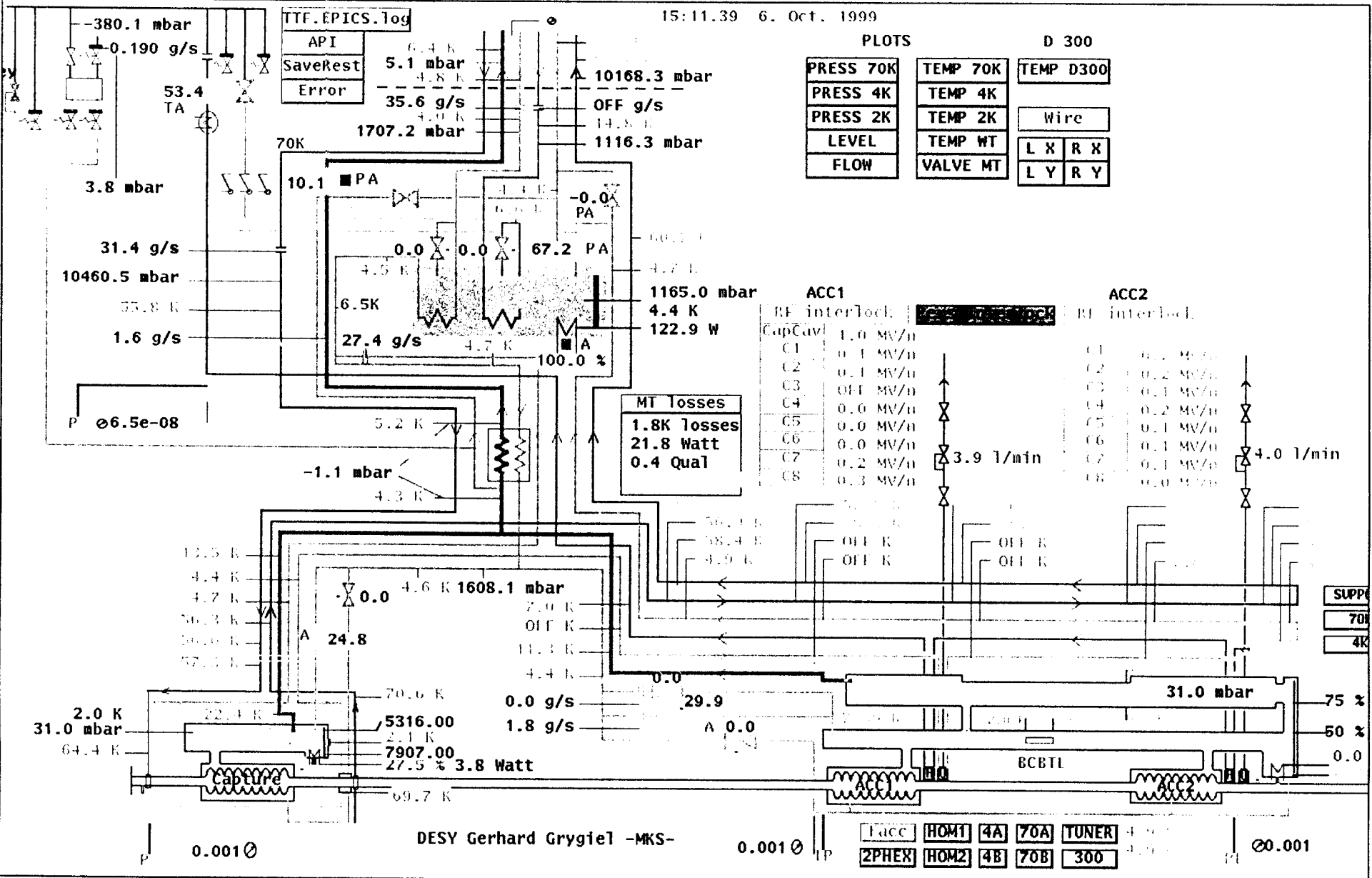


TTF.EPICS.log  
 API  
 SaveRest  
 Error

PLOTS

D 300

PRESS 70K	TEMP 70K	TEMP D300
PRESS 4K	TEMP 4K	
PRESS 2K	TEMP 2K	Wire
LEVEL	TEMP WT	L X R X
FLOW	VALVE MT	L Y R Y



1 acc HOM1 4A 70A TUNER  
 2PHER HOM2 4B 70B 300



## Measured Cryo-Loads in TFE-Linac

Status: 8-Oct-99 R. Lange-MKS-

Capture until March 97  
 Capture/Module 1 until Sept. 98  
 Capt/M1/BCBTL/M2 until March 99  
 Capt/M3/BCBTL/M2 since July 99

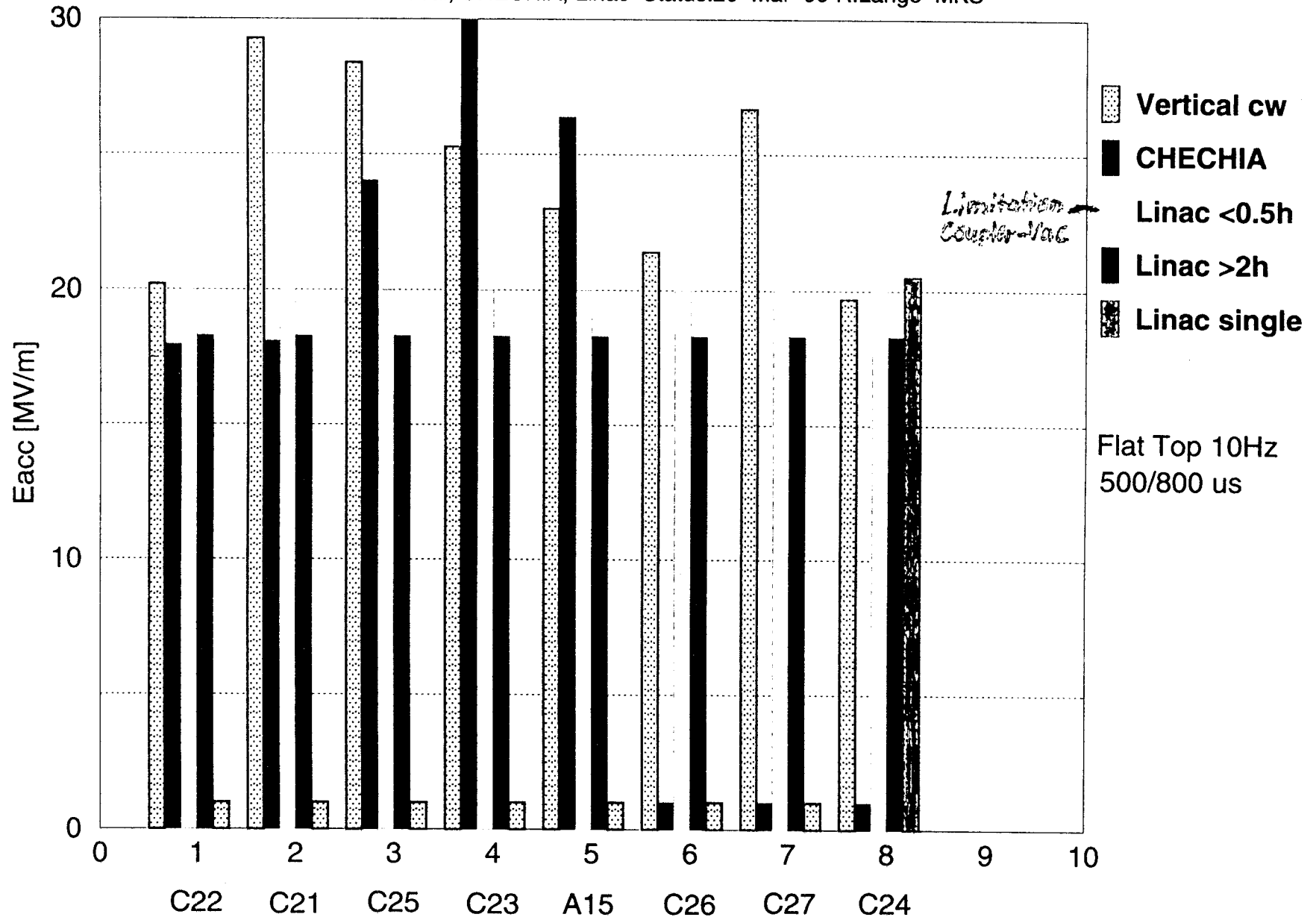
	Module 1	Module 2	Module 3	BCBTL	Capt	Total Linac (from out refrigerator)
<b>40/80K-Area</b>						
-design static	115.0 W	115.0 W	115.0 W	35.0 W		
-estimate static 52.8+24.0	76.8 W	76.8 W	76.8 W	24.0 W		
-measured static 47.2+34.3	81.5 W	77.9 W	-	19.0 W	46.8 W	1123 W
	-	*75.0 W	*72.0 W	*21.0 W	47.0 W	1115 W
-meas. static+RF	not	?	?	static	?	?
<b>4.4 K-Area</b>						
-design static	21.0 W	21.0 W	21.0 W	1.5 W		
-estimate static	13.9 W	13.9 W	13.9 W	1.0 W		
-measured static	15.9 W	13.0 W	-	<1.0 W	3.9 W	260 W + 1.4 g/s (2K, HOM-Abs,Leads)
	-	*41.0 W	*48.0 W	*3.0 W	4.0 W	360 W + 1.6 g/s ( " )
-meas. static+RF	not	?	?	static	?	?
<b>2.0 K-Area</b>						
-design static	4.2 W	4.2 W	4.2 W	<1.0 W		
-estimate static	2.8 W	2.8 W	2.8 W	<0.7 W		
-measured static	5.0 W	4.0 W	-	~0.5 W	5.5 W	19.5 W (15.0 W + 4.5 W heater capture)
	-	*(~5.0 W)	*(~5.0 W)	*(~1.0 W)	5.5 W	21.0 W (16.5 W + 4.5 W heater capture)
-meas.static+RF	not	see ..	?	static	see..	19.5 W + Rf-Loads see details

\*Big helium leak in 2K-area of module 3 ==>Isolation-Vacuum ~ 1E-4 mbar!!!

?To be done! (only results from CHECHIA-Tests -->within calculated values)

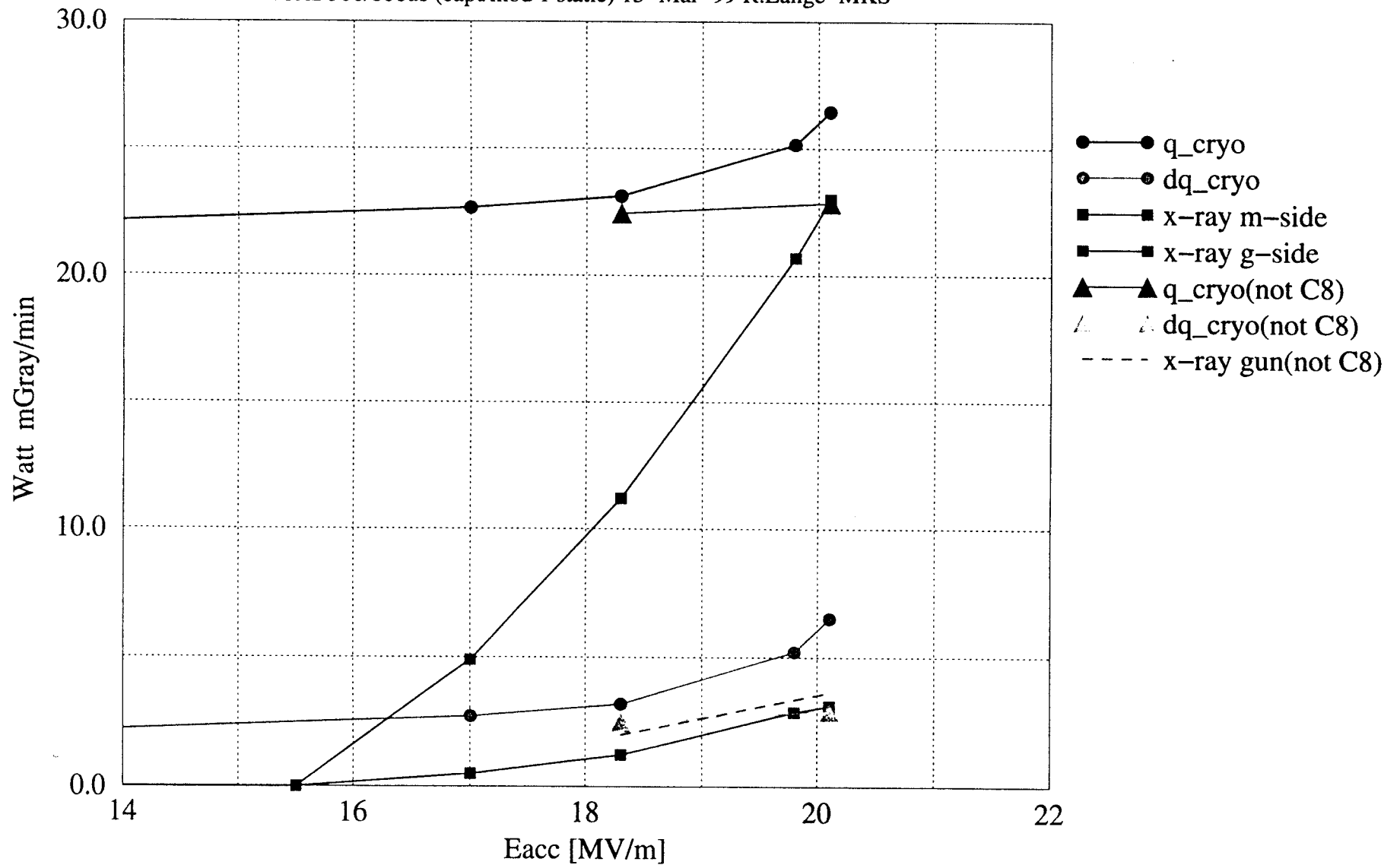
# TTF-Module 2 Cavities

Max. Gradients in Vertical, CHECHIA, Linac Status:20-Mar-99 R.Lange-MKS-



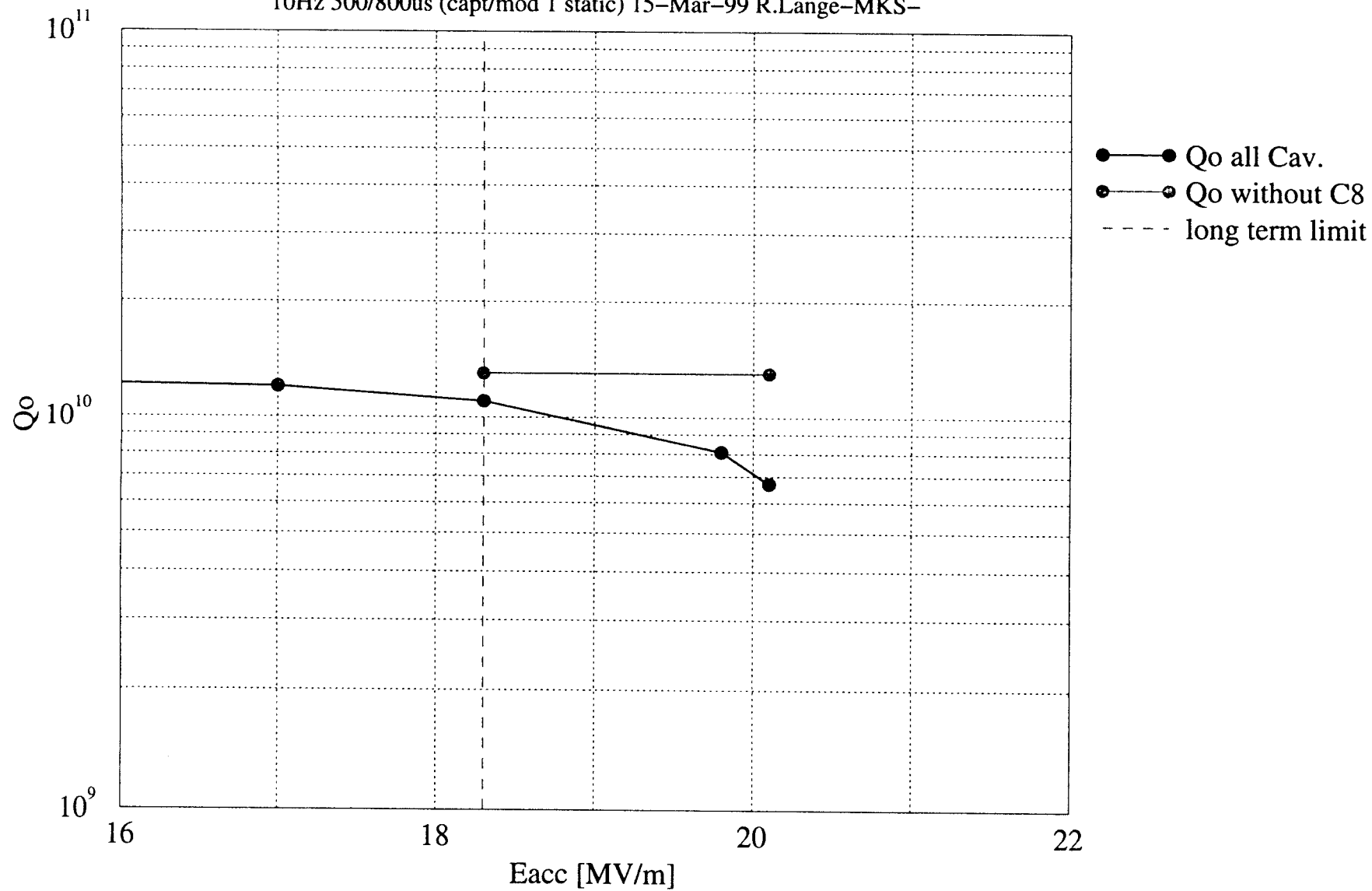
# q\_cryo/Eacc-Measurements Module 2

10Hz 500/800us (capt/mod 1 static) 15-Mar-99 R.Lange-MKS-



# Qo/Eacc-Measurements Module 2

10Hz 500/800us (capt/mod 1 static) 15-Mar-99 R.Lange-MKS-





## Status - 17-Aug-99

Check RF for beam experiments

- Module 2 8 cavities on resonance

- Module 3 7 cavities on resonance

G3 wire failure in tuning-system

→ 15 cavities on resonance. 15 MV/m 1 Hz 500/800 μs

add. cryo-load RF < 0.4 W ~  $Q_0 > 10^{10}$

## Status 25-Oct-99

CHECK max. Eacc before single cavity processing

- Module 3 8 cavities on resonance

1 Hz 500/800 μs max. 19 MV/m

Limitations: Coupler-Vacuum

G8 Quench

10 Hz 500/800 μs max. 12 MV/m

Limitations: Coupler-Vacuum

- Module 2 8 cavities on resonance

1 Hz 500/800 μs max. 18 MV/m

Limitations: Coupler-Vacuum

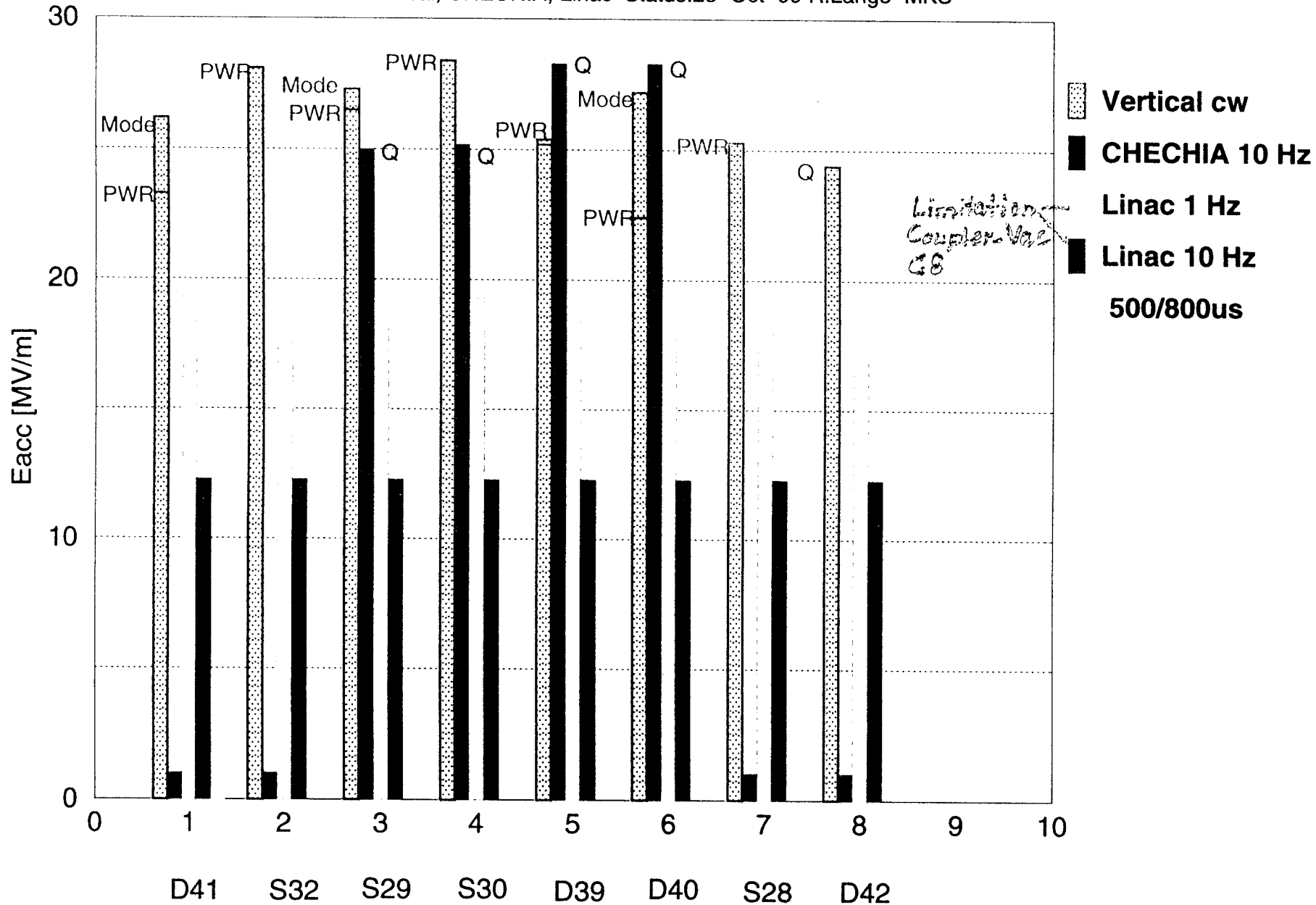
- Capture

10 Hz 300/800 μs max. 14.4 MV/m

Limitations: X-RAY

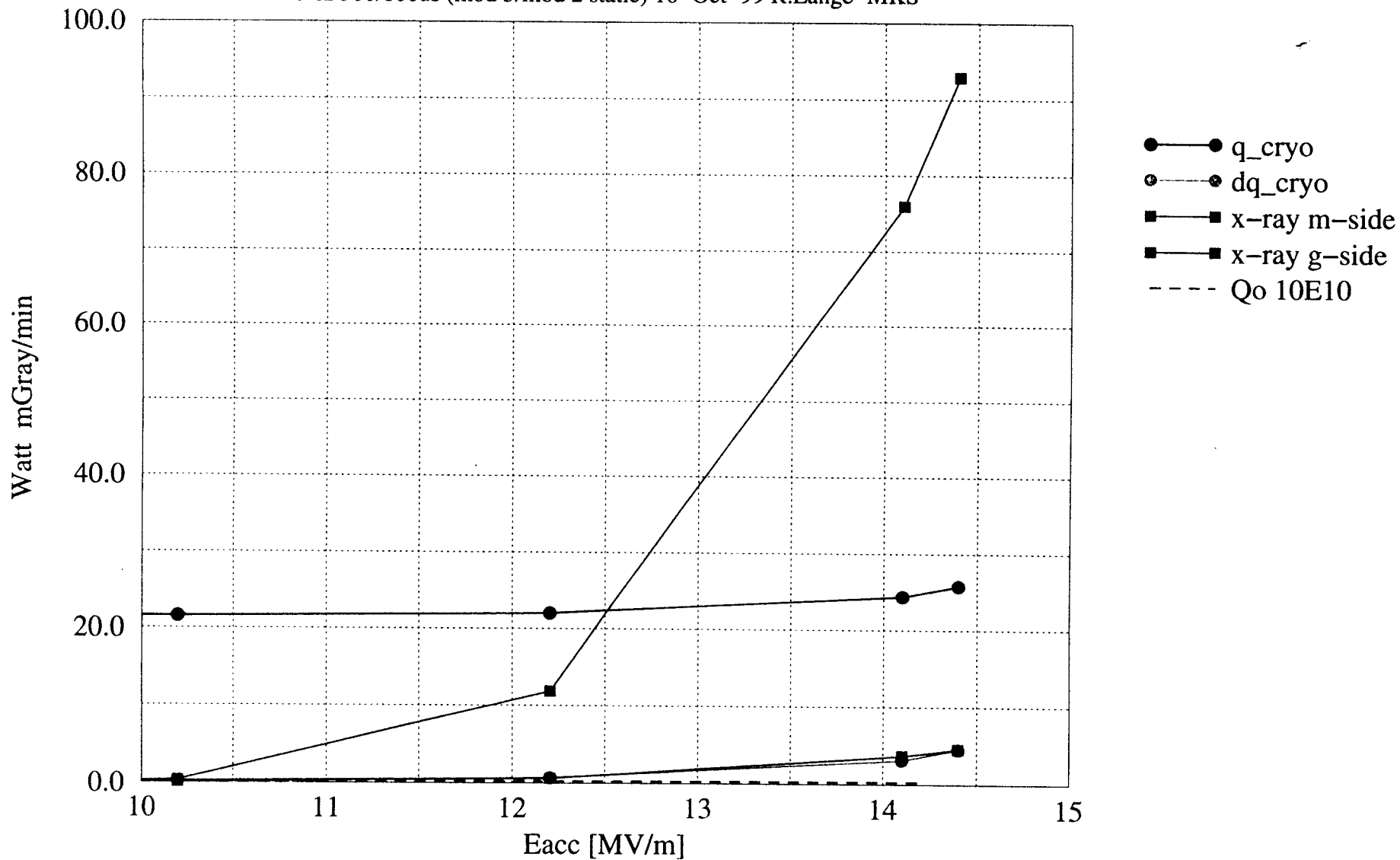
# TTF-Module 3 Cavities

Max. Gradients in Vertical, CHECHIA, Linac Status:25-Oct-99 R.Lange-MKS-



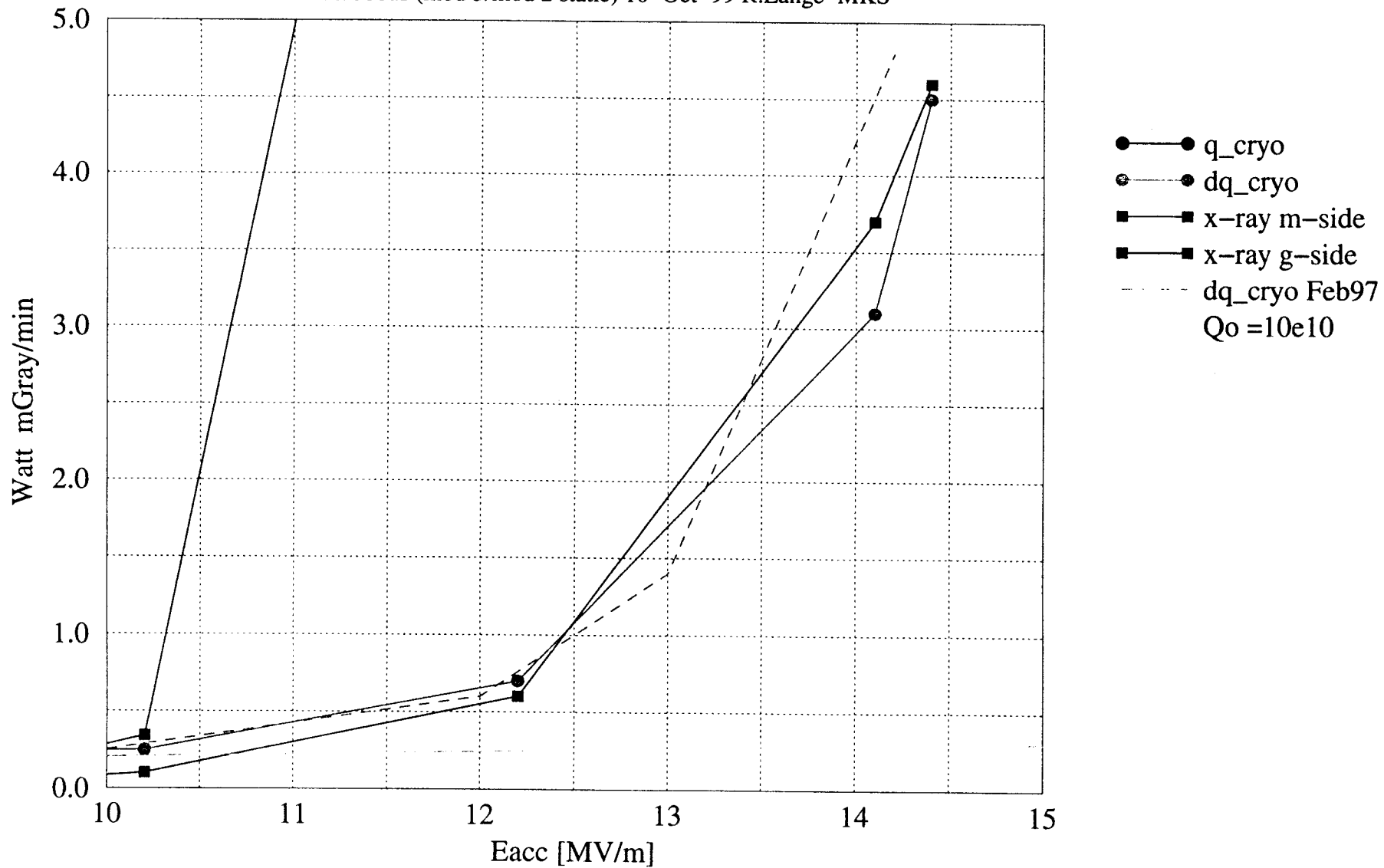
# q\_cryo/Eacc-Measurements Capture (C19)

10Hz 300/800us (mod 3/mod 2 static) 10-Oct-99 R.Lange-MKS-



# q\_cryo/Eacc-Measurements Capture (C19)

10Hz 300/800us (mod 3/mod 2 static) 10-Oct-99 R.Lange-MKS-



Measured Cryo-Loads(static+RF) and X-rays for Capture (C19)

Status:8-Oct-99 R. Lange -MKS-

RF: 10Hz Flat Top 300/800 $\mu$ s Heater-Capture:4.5 Watt

Note:C19 was a very good cavity-->last performance in CHECHIA ~18 MV/m q\_cryo~0.27W Qo >10E10

First measurement: 21-Feb-97

Accuracy: 0.1 Watt

Eacc [MV/m]	Eacc <sup>2</sup>	X-ray_mod [mGray/min]	X-ray_gun [mGray/min]	q_cryo [Watt]	dq_cryo [Watt]	Qo
0.	0.	0.	0.	10.0	0.00	-
9.7	94.1	0.014	0.14	10.20	0.20	4.9x10E9
12.0	144.0	0.040	0.40	10.60	0.60	3.2x10E9
13.0	169.0	0.159	1.60	11.40	1.40	1.3x10E9
14.2	201.6	0.800	5.00	14.90	4.90	4.3x10E8

Second measurement: 5-Oct-99 (together with module 3 static and module 2 static)

Accuracy: 0.1 Watt

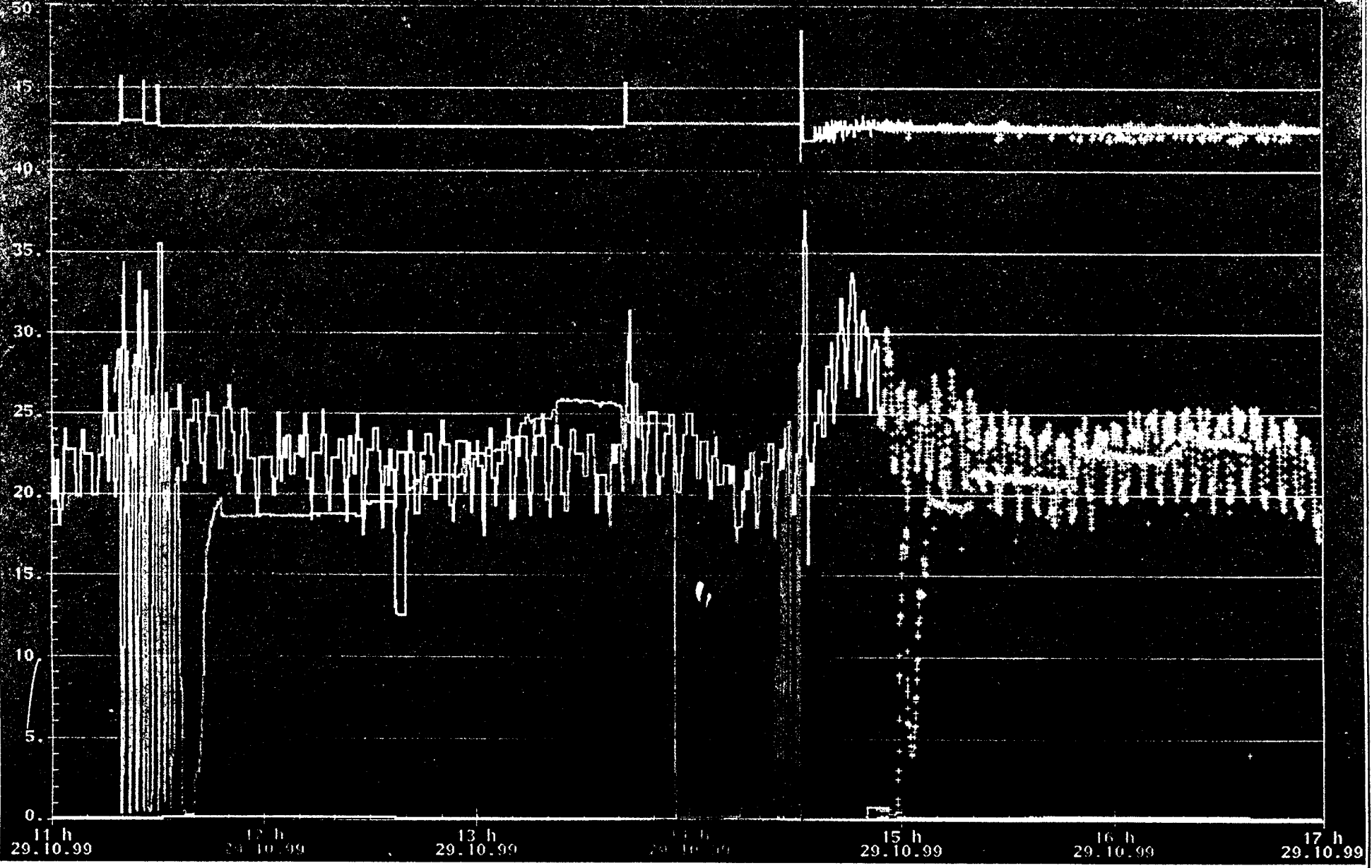
0.	0.	0.	0.	21.30	0.00	-
10.2	104.0	0.100	0.34	21.55	0.25	
12.2	148.8	0.600	11.90	22.00	0.70	
14.1	198.8	3.700	77.00	24.40	3.10	
14.4	207.4	4.700	94.00	25.80	4.50	

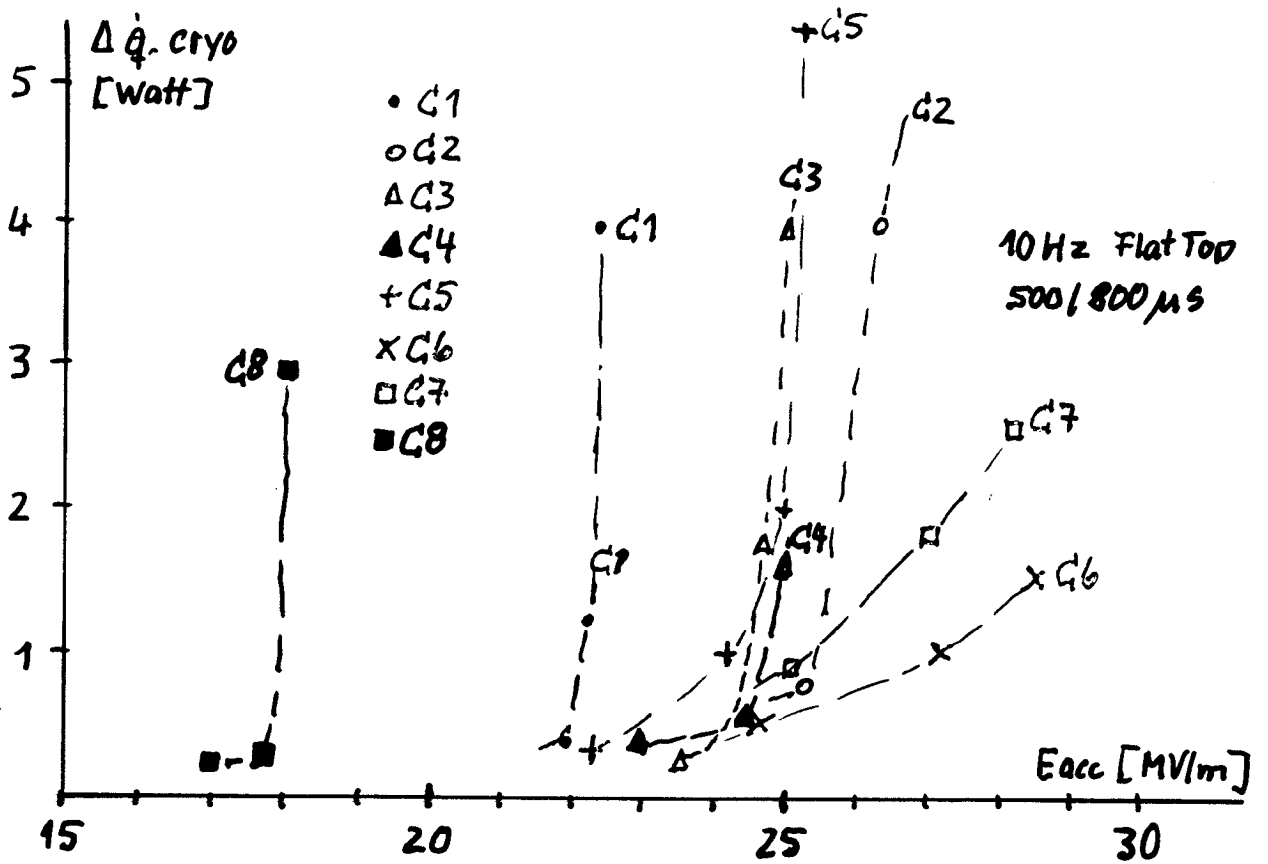
TTF.RF/ADC/ACC1.C7/CH02.AMPL

[MV/m]  
[Pa]  
[Watt]  
[MV/m]

TTF.RF/ADC/ACC1.C6/CH02.AMPL  
TTF.KRYO\_MO/LEVEL/E\_CAF/LEVEL  
TTF.KRYO\_MO/CALCULATOR/MT-1.SK.O/CALC  
TTF.RF/ADC/ACC1.C7/CH02.AMPL

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Cav.	Rep. Rate Hz	max. Eacc MV/m	$\Delta q_{\text{cryo}}$ watt	Quench MV/m
1	1	22.4	0.5	22.6
	10	22.4	4.0	22.5
2	1	27.2	0.8	27.4
	10	27.0	7.0	27.2
3	1	25.4	0.3	25.6
	10	25.0	3.0	25.3
4	1	25.5	5.9	25.6
	10	25.0	1.6	25.2
5	1	26.5	1.4	27.0
	10	25.2	5.4	25.5
6	1	29.0	0.5	29.5
	10	28.6	1.5	29.2
7	1	28.8	1.0	29.0
	10	28.2	2.5	28.5
8	1	18.6	6.0	19.0
	10	18.0	3.0	18.5

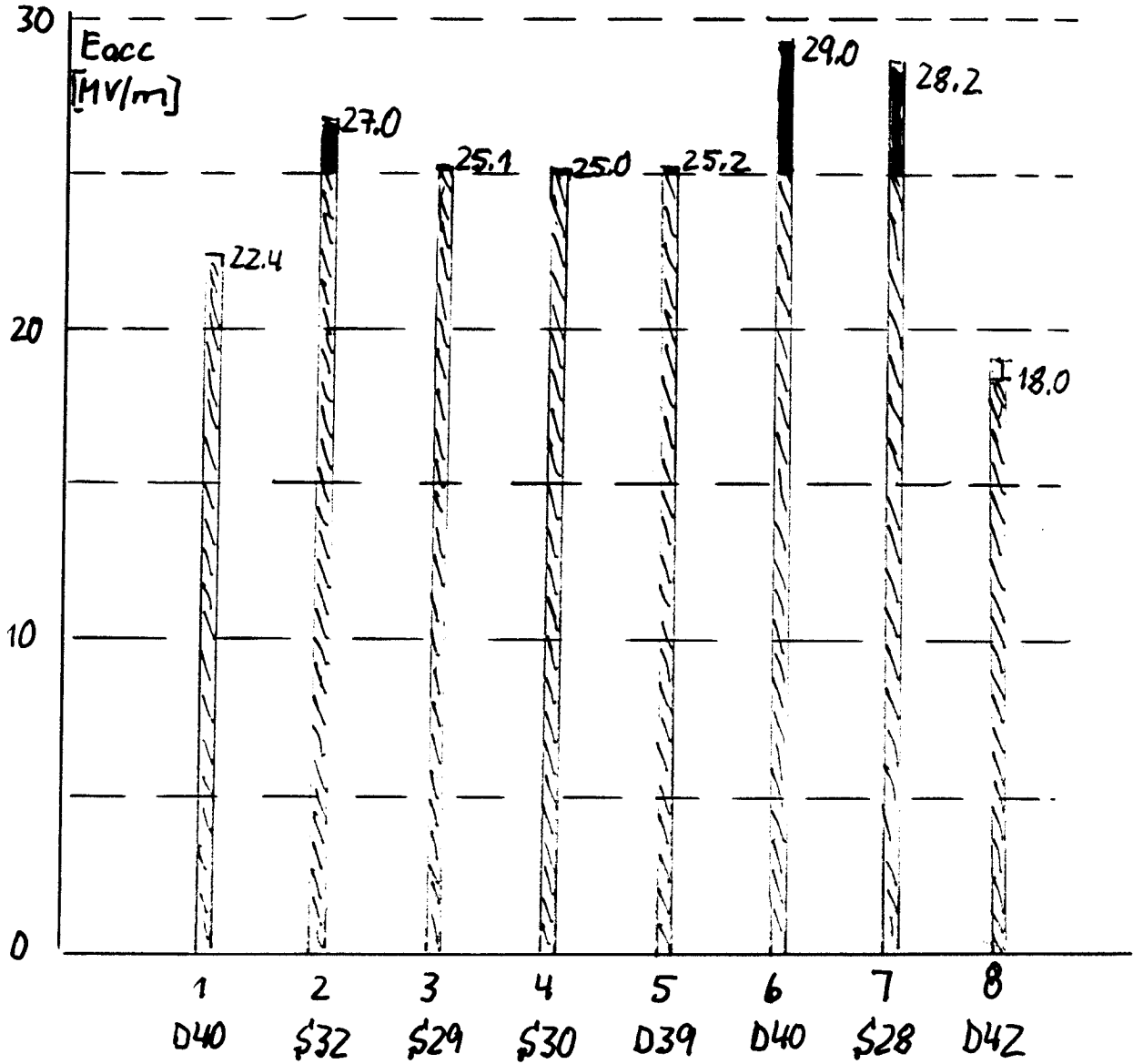
Single cavity test  
Module 3

status: 6-Nov-99

# Module 3 Cavities after single-test

Status: 6-Nov-99

10Hz 500/800µs



⇒ good news: 6 of 8 cavities  $\geq 25$  MV/m

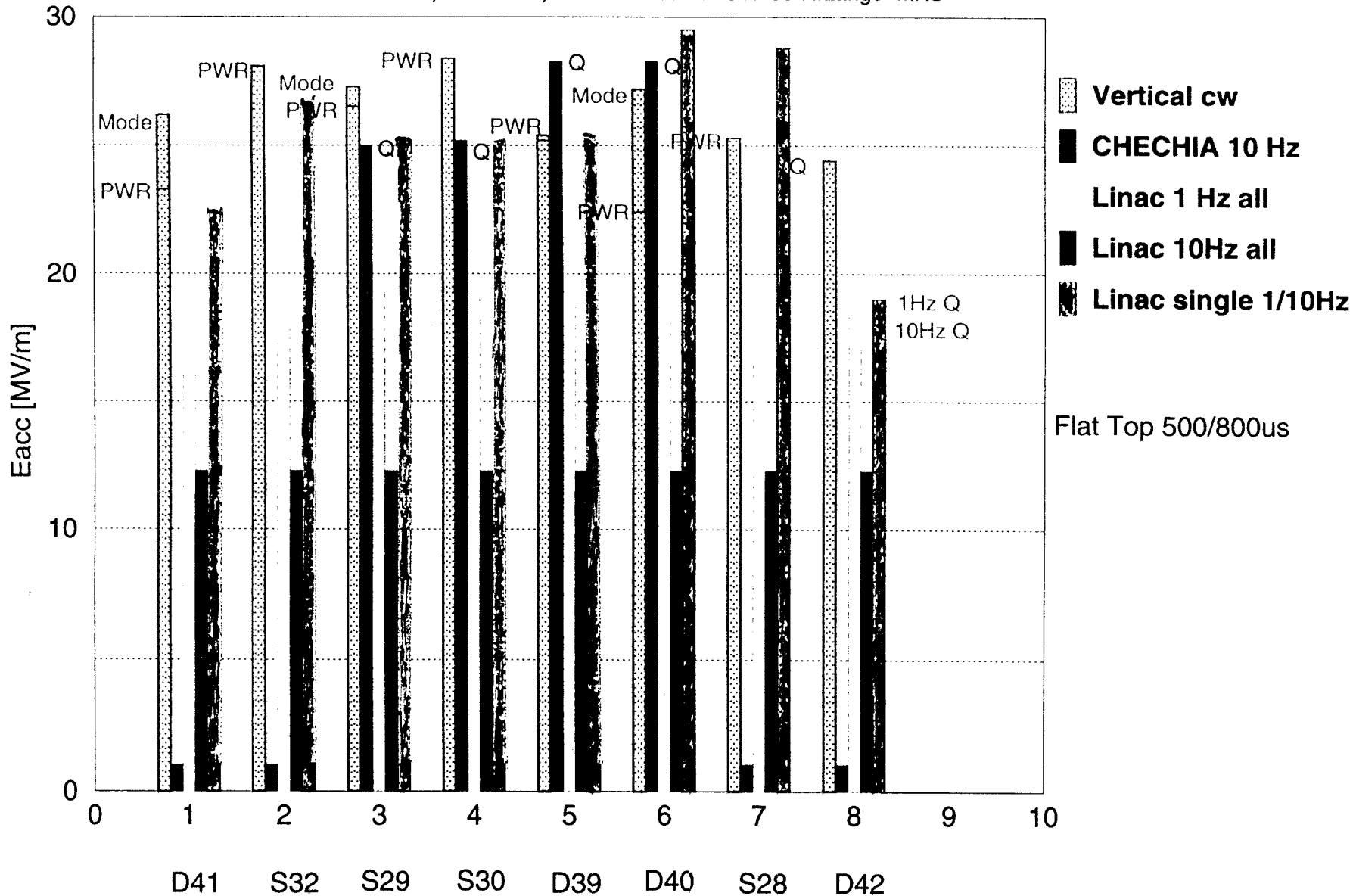
but news: 2 of 8 cavities  $< 25$  MV/m



# TTF-Module 3 Cavities

6-Nov-99

Max. Gradients in Vertical, CHECHIA, Linac Status: 29-Oct-99 R.Lange-MKS-



## Summary

- Module 2: will be operationable at 20MV/m
- Module 3: 6 of 8 cavities  $\geq$  25MV/m  
2 of 8 cavities  $<$  25MV/m

$\Rightarrow$  We have to understand why we could not transfer vertical-test-results to module 3 for these two cavities G1 and G8

What has still to be done:

- Long term tests with highest possible gradients for module 2 and 3 with cryo-load measurements  
for 2k-area  
4k-area  
40/80k-area