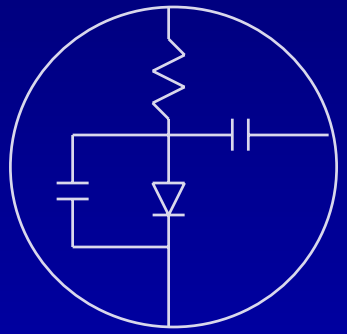
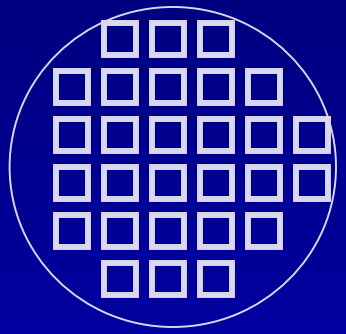



The Impact of Vibration to CRes Performance

Al Wegleitner and D. Clark
Texas Instruments, Dallas, TX

June 6th 2005

Outline

- Background – the journey
- Problem Statement
- Measurement/Methodology
- Key Findings
- Solution's
- Acknowledgments

Objective

- Review vibration measurement methodologies
- Show the effects of vibration on CRes
- Review the potential sources of vibration that effect CRes
- Review factory design procedures needed to manage vibration
- Share key learning's – the journey

Background

- Factory Expansion Phase 1 – just completed
- Phase 1 factory was experiencing significant CRes yield loss issues between testers and devices
- Phase 2 to begin ~ 100 new systems to install/qualify over 4 months

Problem Statement

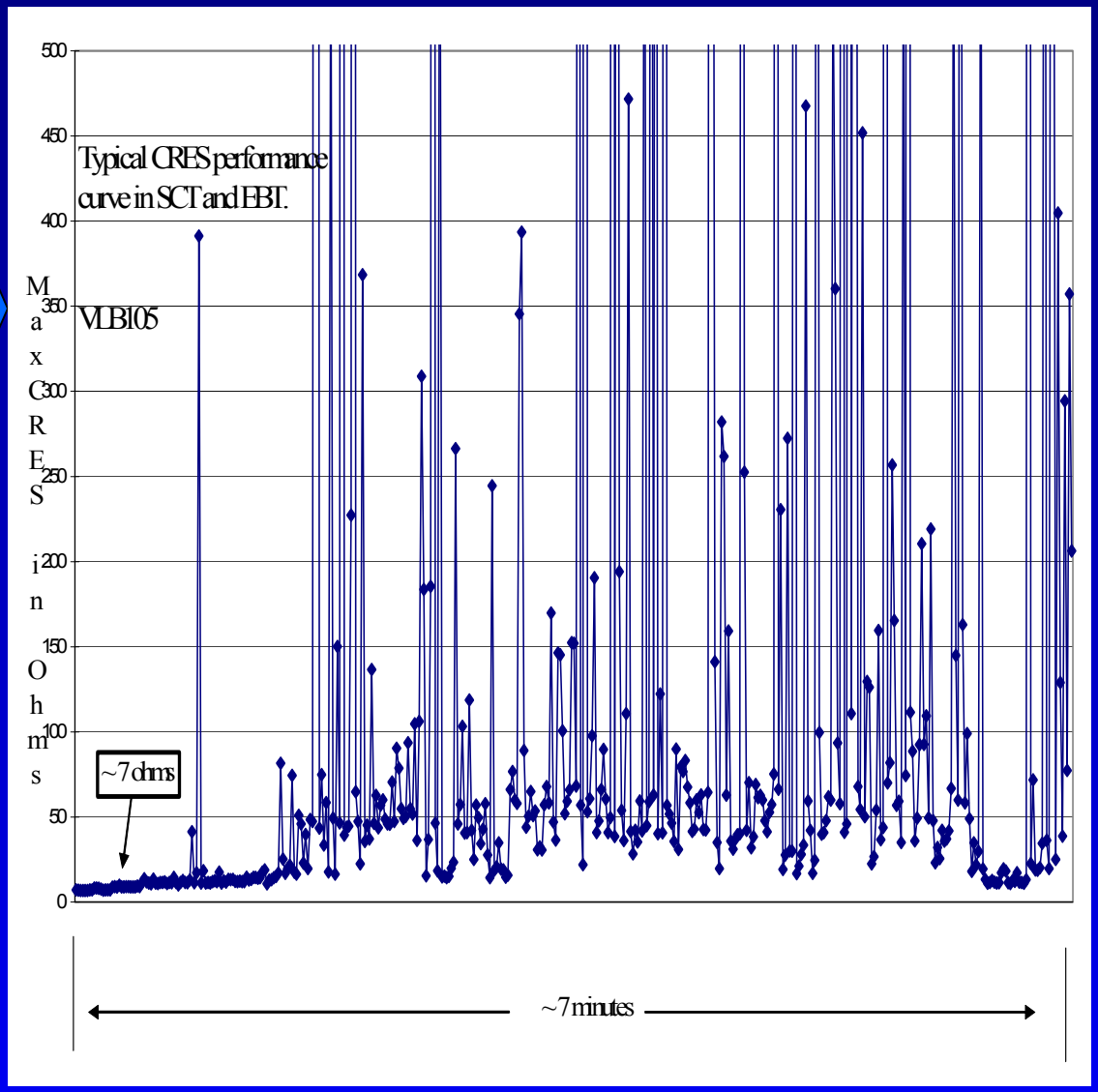
- Phase 1 factory was experiencing significant CRes yield loss issues between testers and devices
- CRes fails were causing significant delays in new equipment quals/releases with potential output ramp concerns
- Traditional CRes solutions were ineffective

CRes Sources

Probe

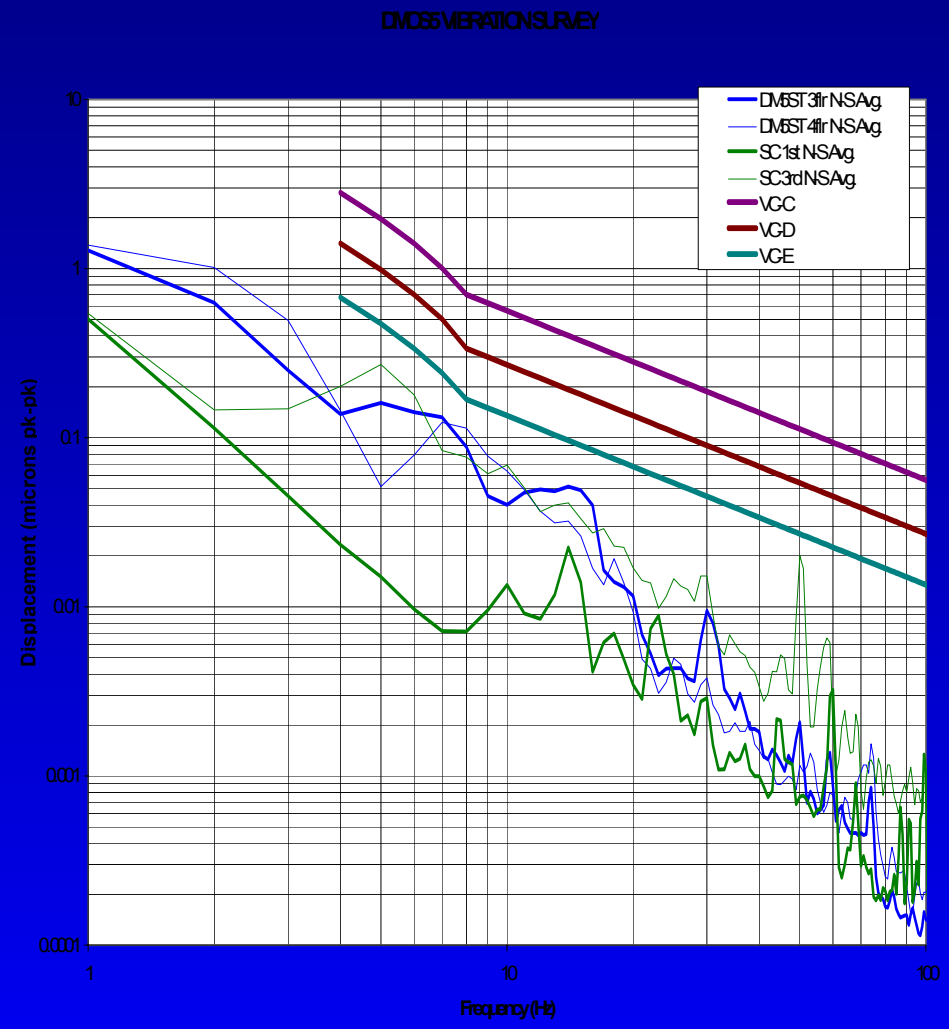
- ~~Bond Pad Surface~~
- ~~Test Program~~
- ~~Diode Structure~~
- ~~PC Planarity~~
- ~~Cleaning Frequency~~
- ~~Debris Field~~
- ~~Test Head Level~~
- ~~Z-Axis Travel~~
- ~~Chuck Speed~~
- Muffin Fans
- Air Handlers
- Raised Floor
- Equipment Density

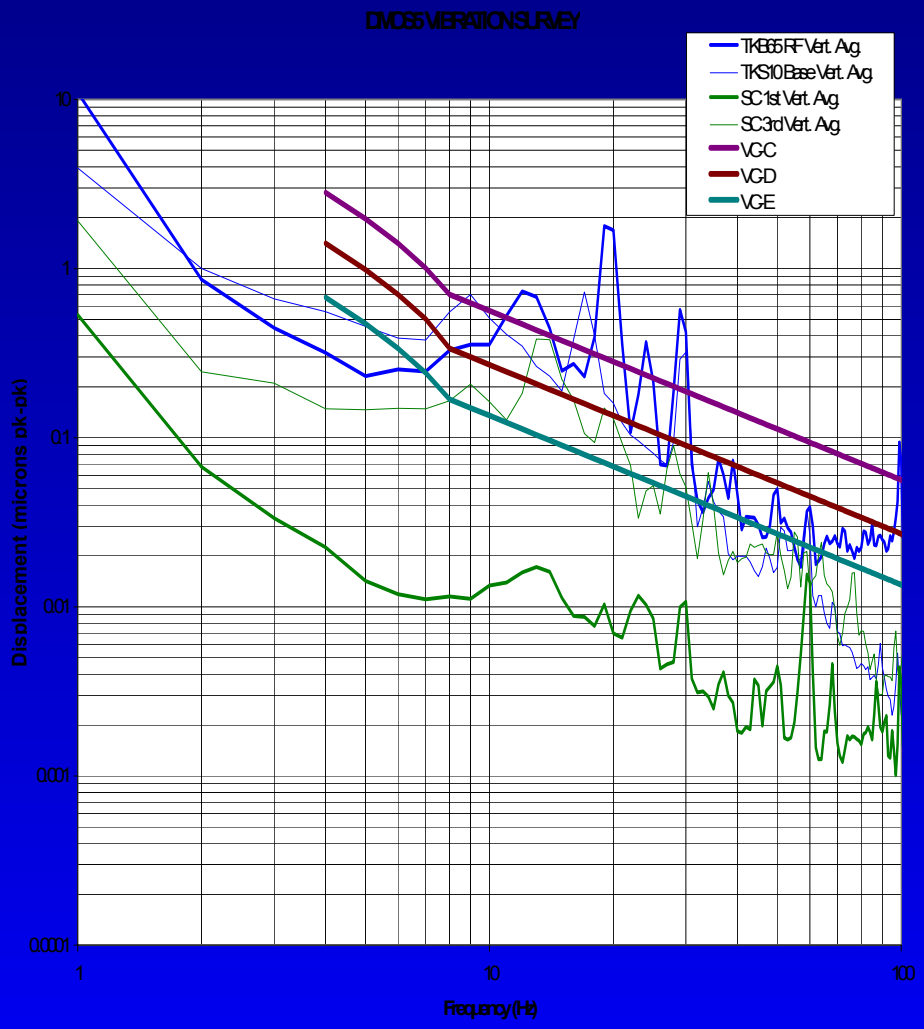
Conditions that effect CRes



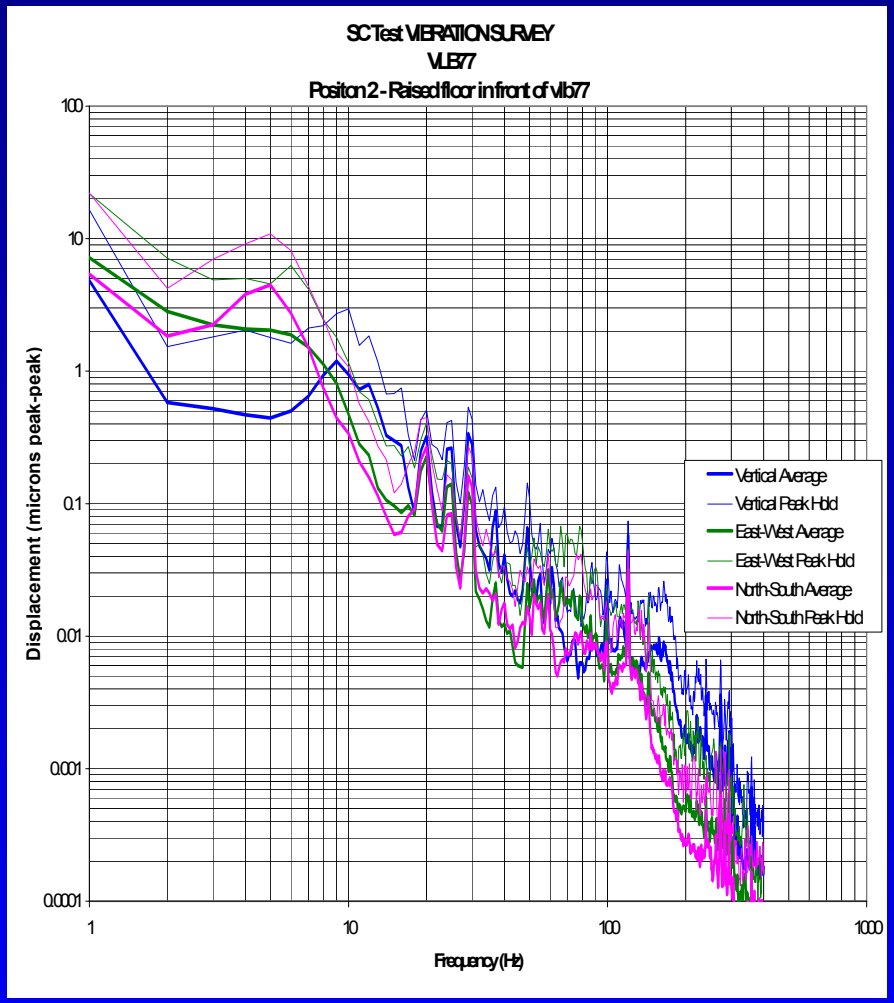
Equipment Density

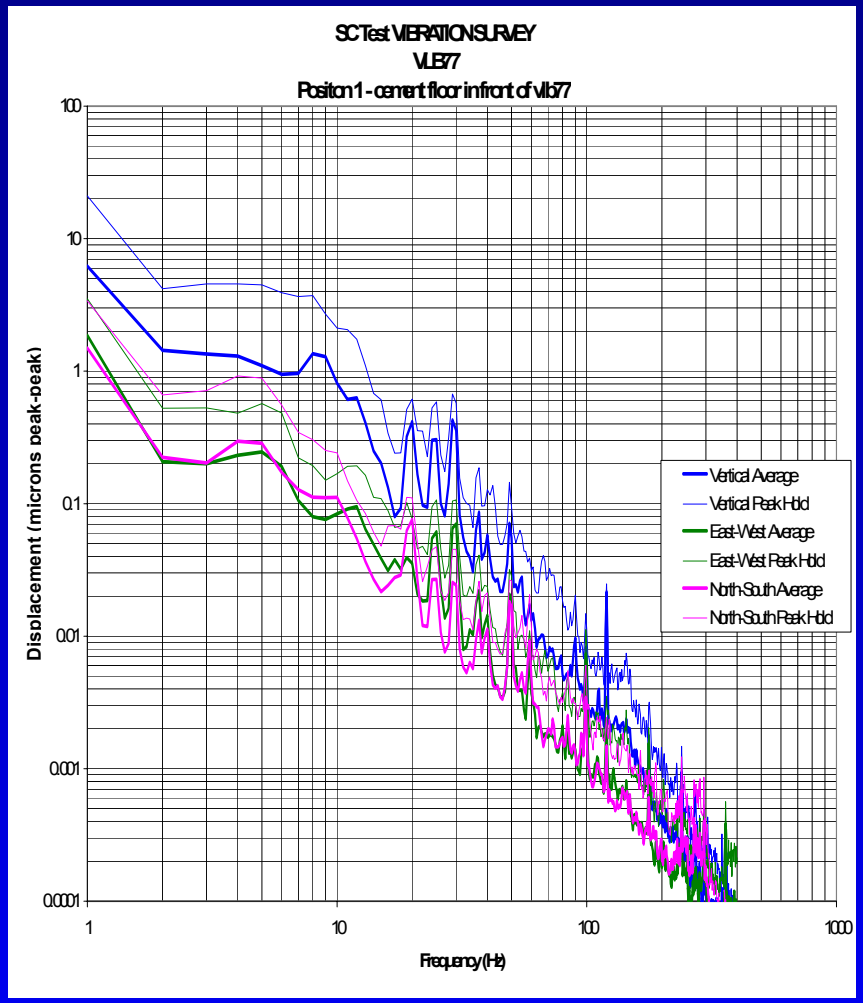
Vibration Site Survey



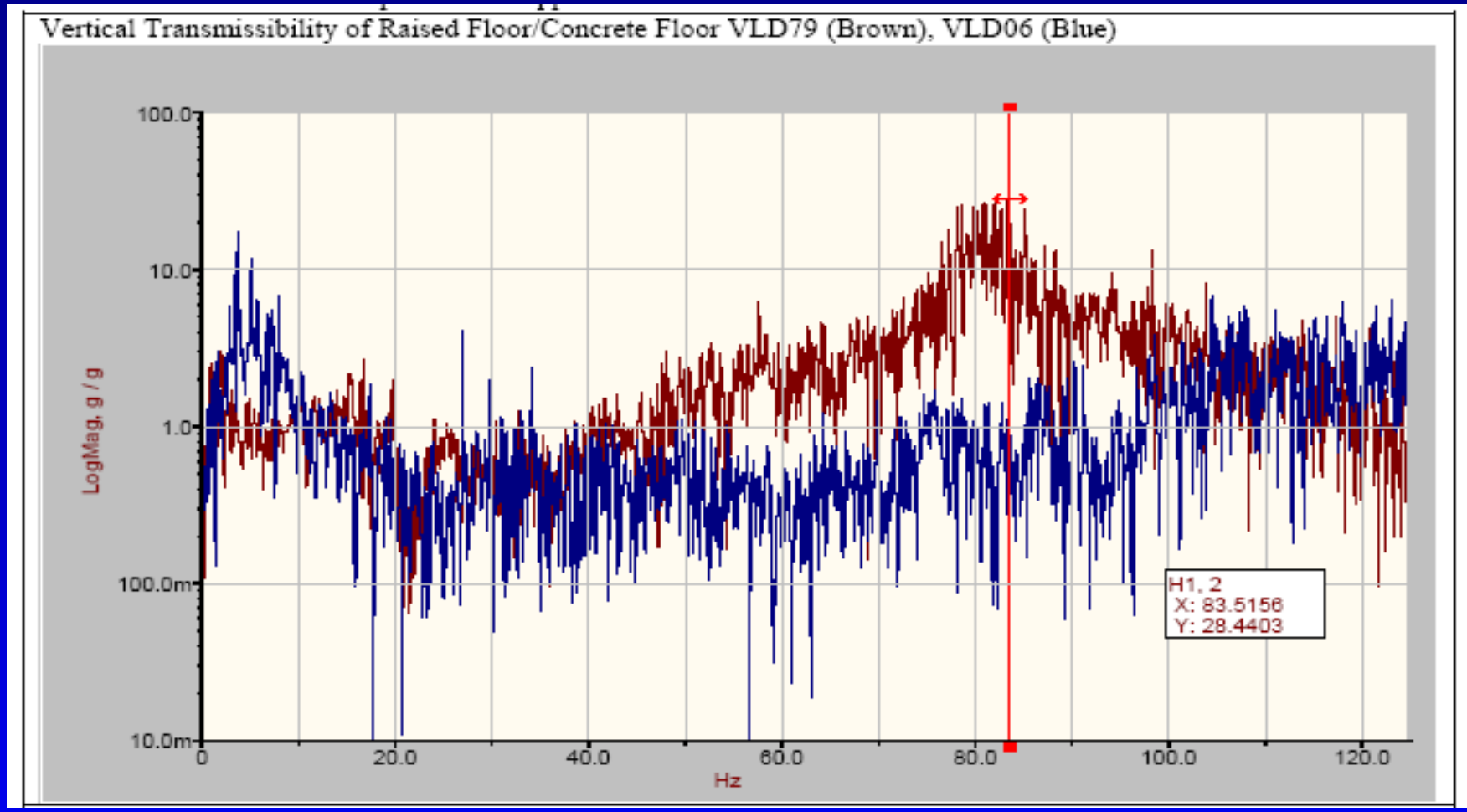


Raised Floor vs Concrete

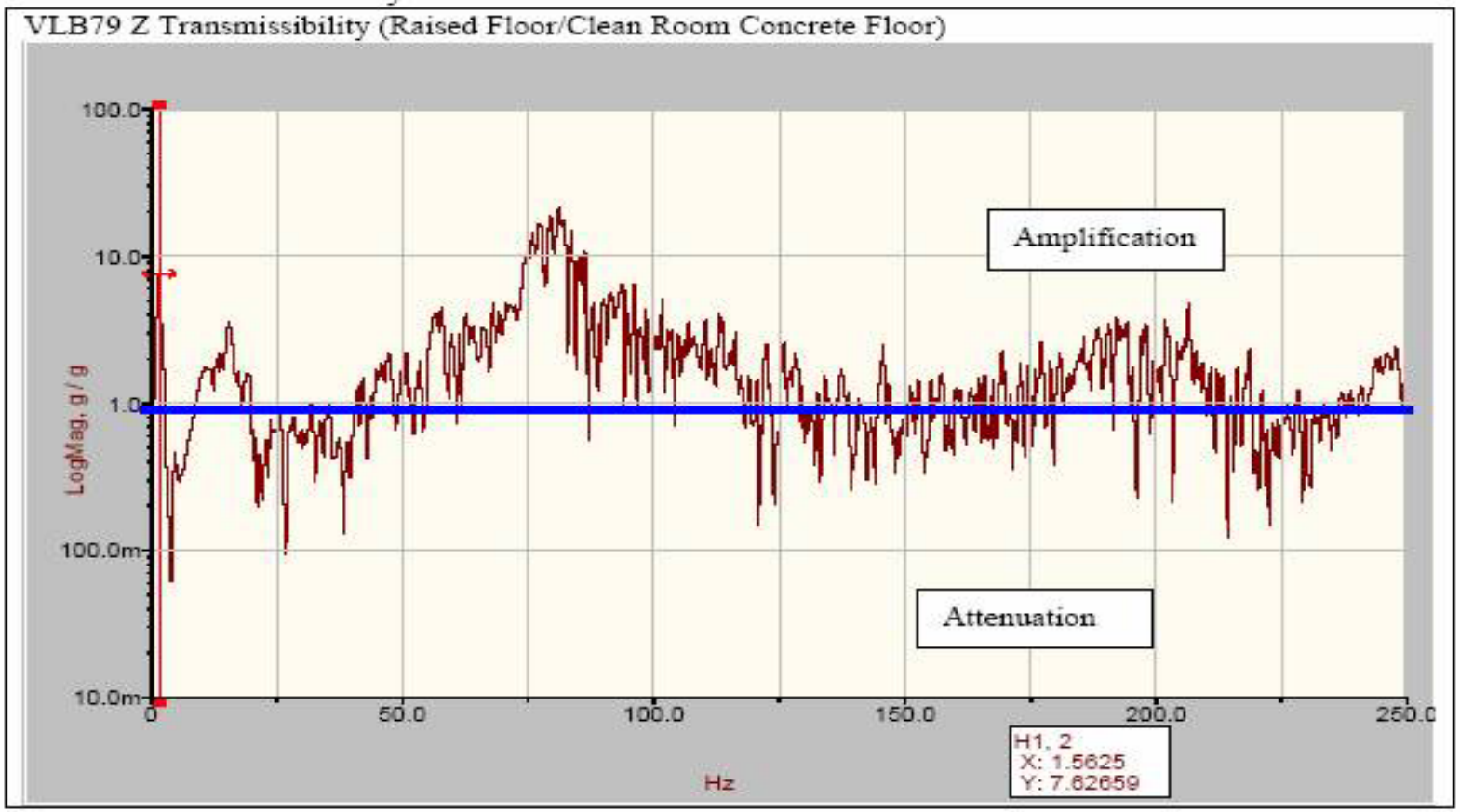




Phase 1 vs Phase 2 Floor Design

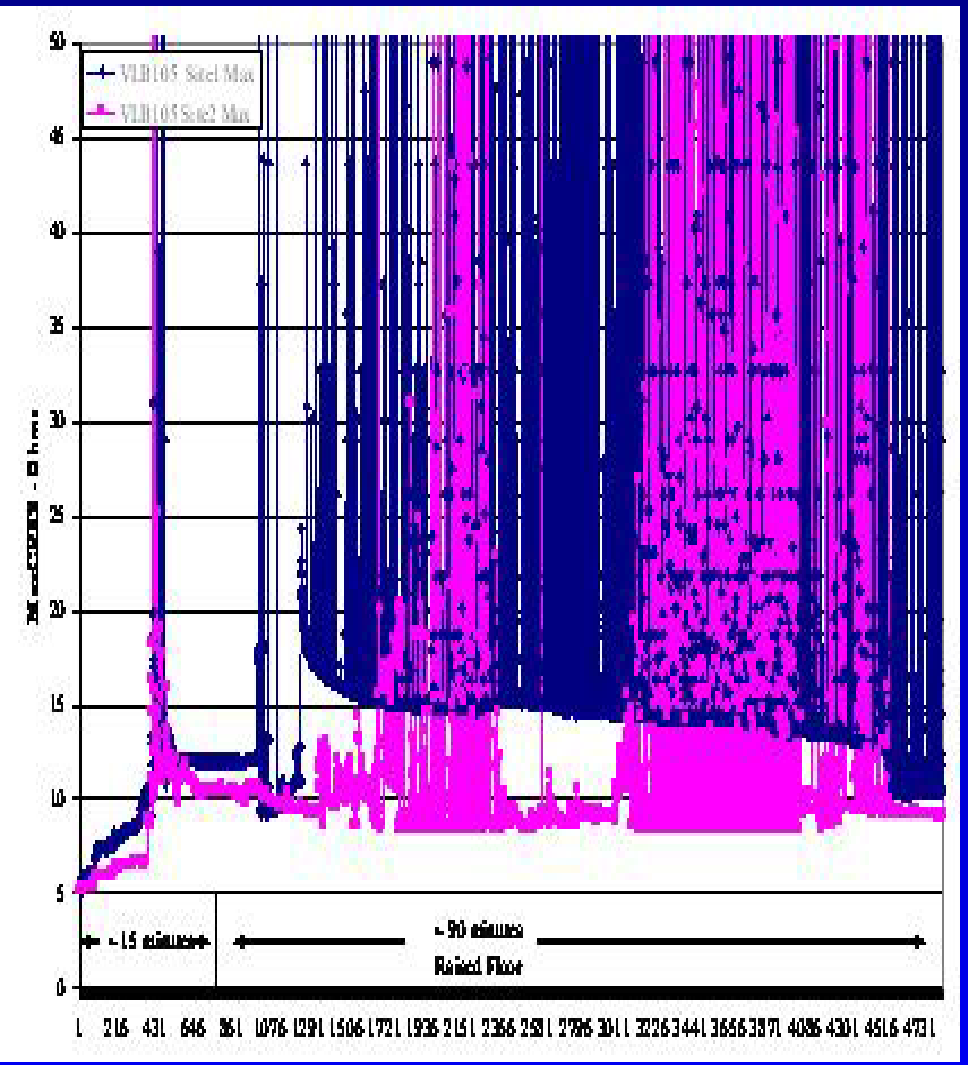


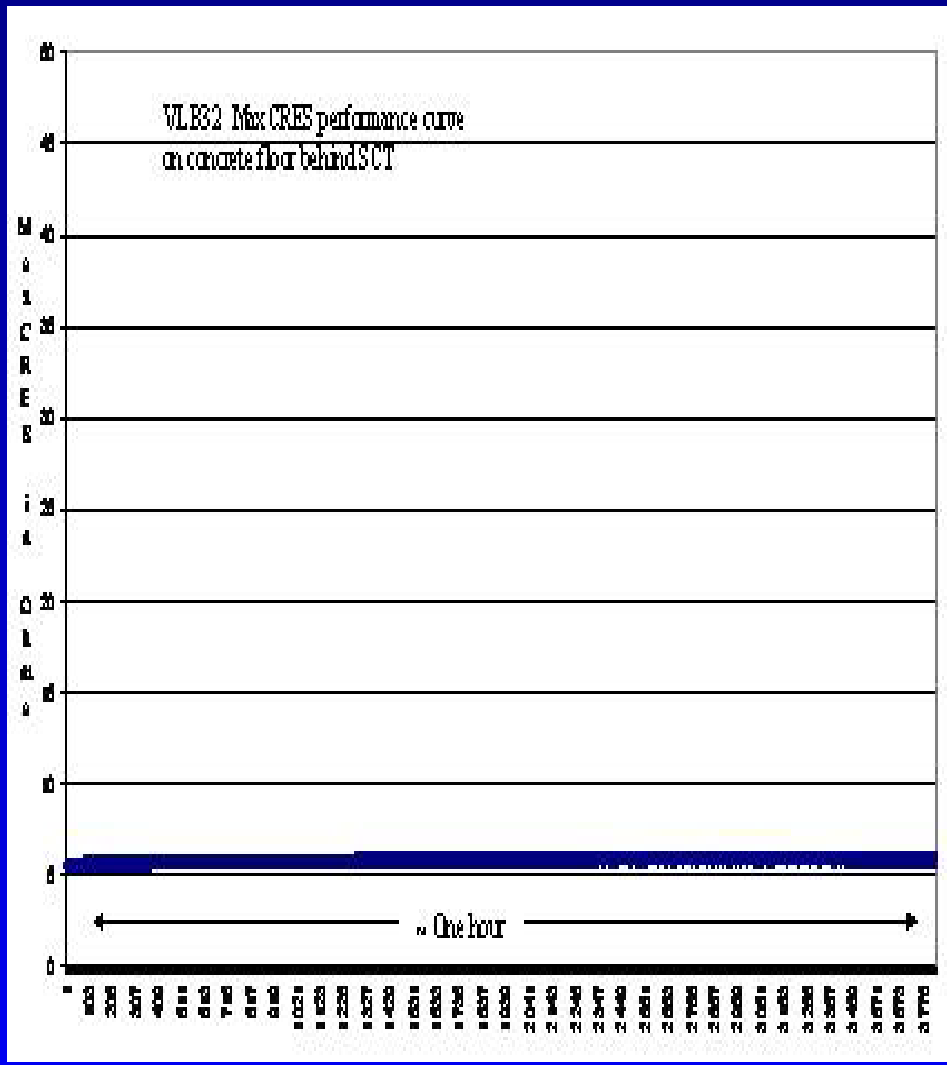
Concrete vs Raised Floor Design



As can be seen from the transmissibility at low frequency, the raised floor causes high vibration.

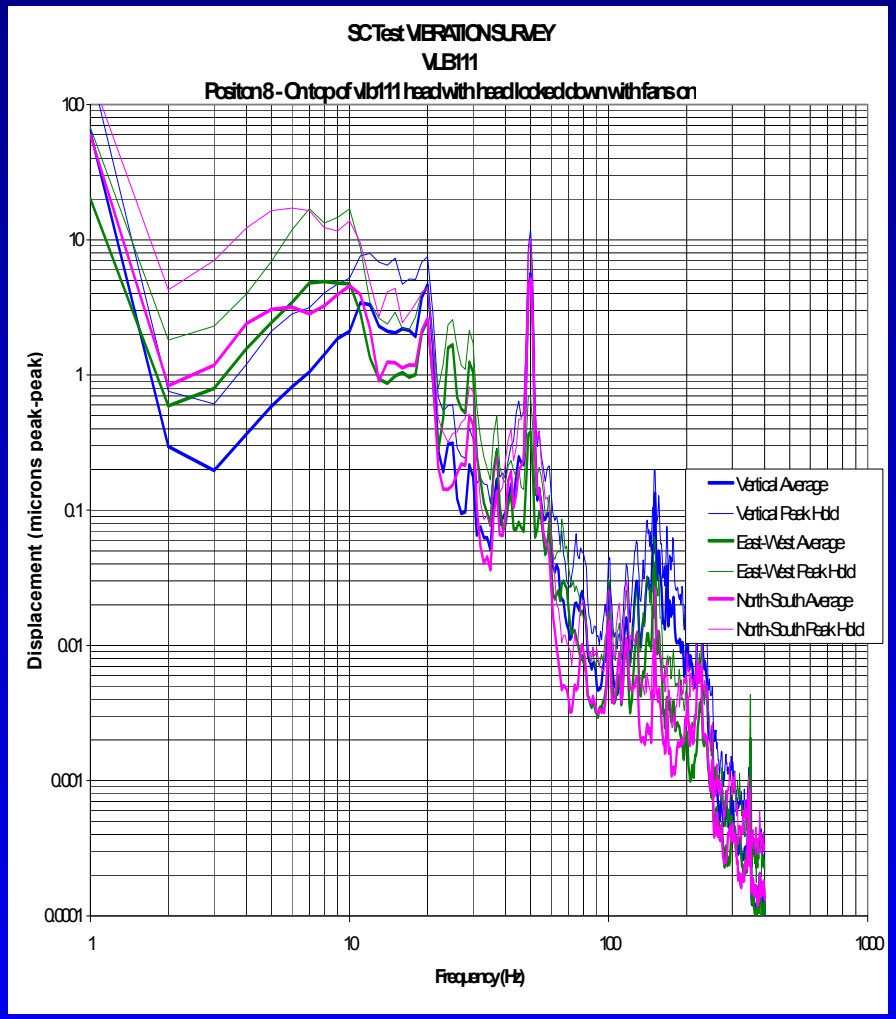
CRes Raised Floor vs Concrete

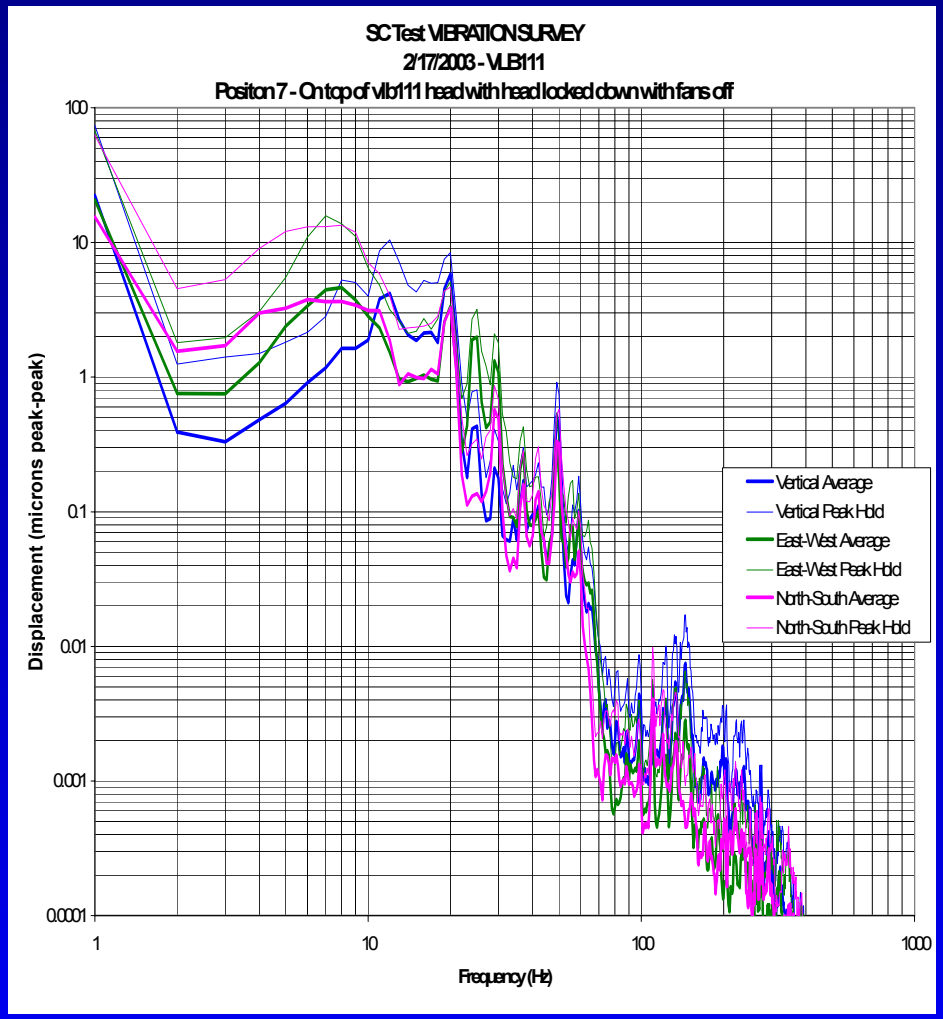




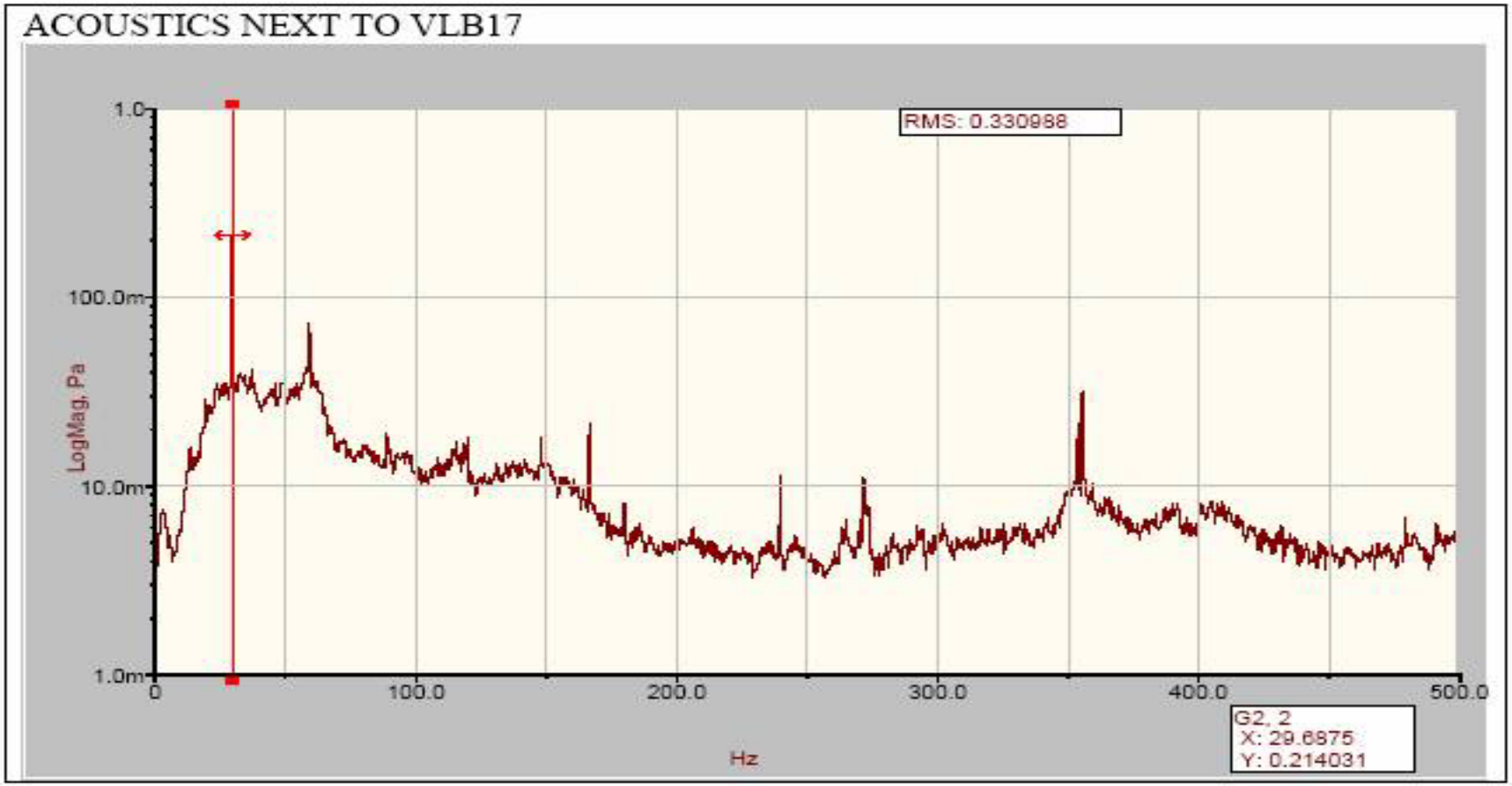
Concrete Floor Isolation Control

Test Head Fans Powered On/Off

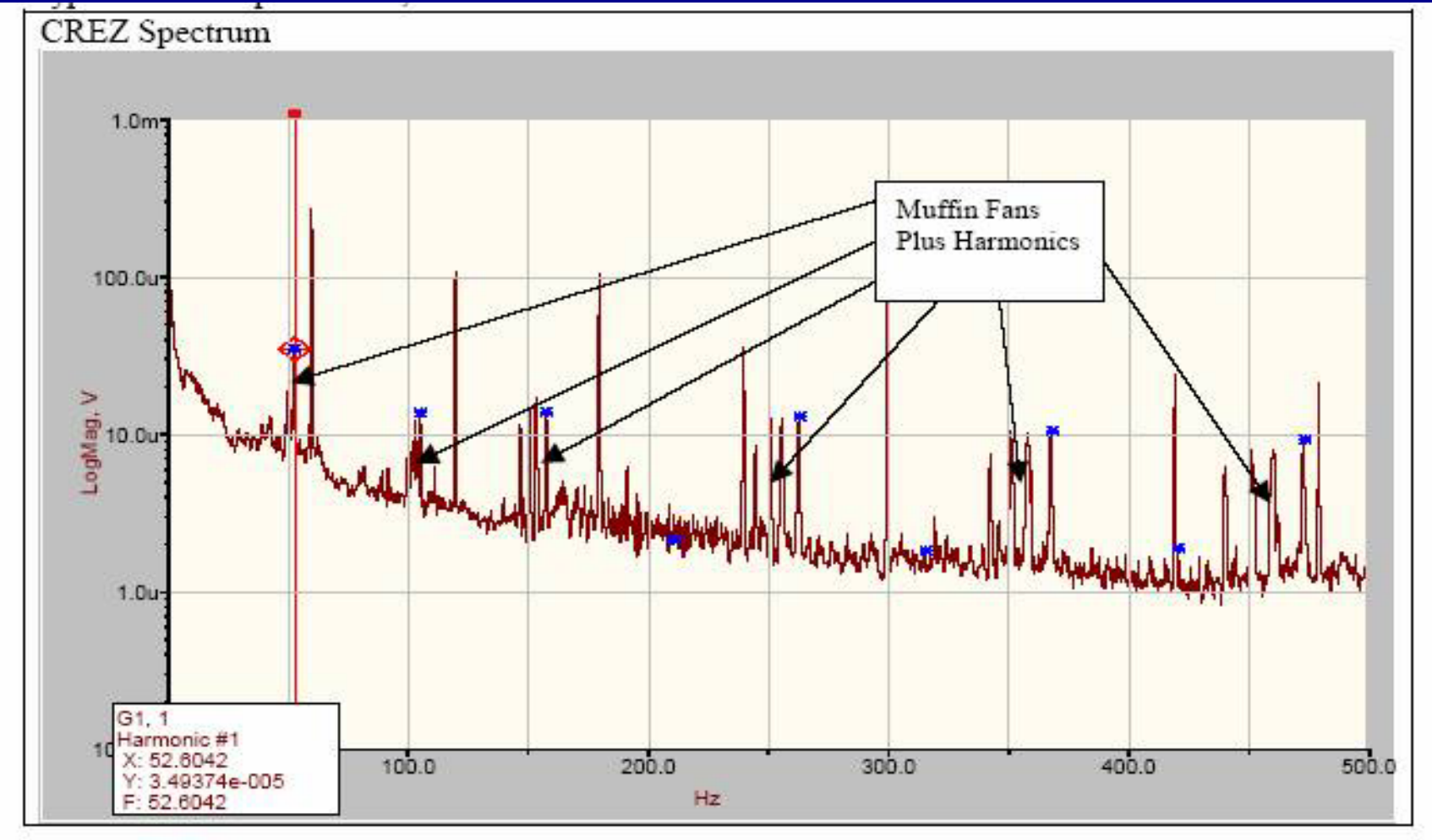




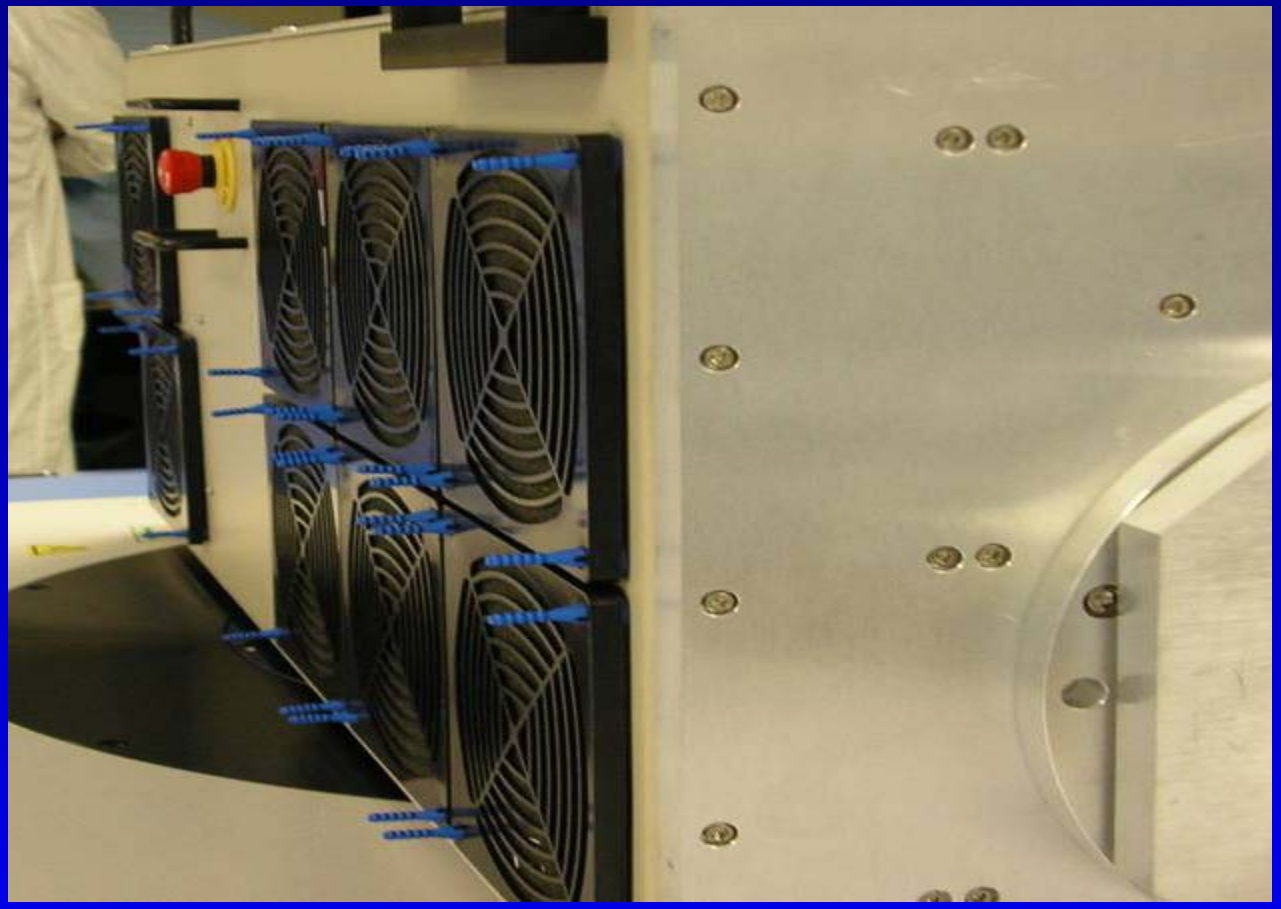
Acoustic Vibration Sources



Test Head Cooling Fans

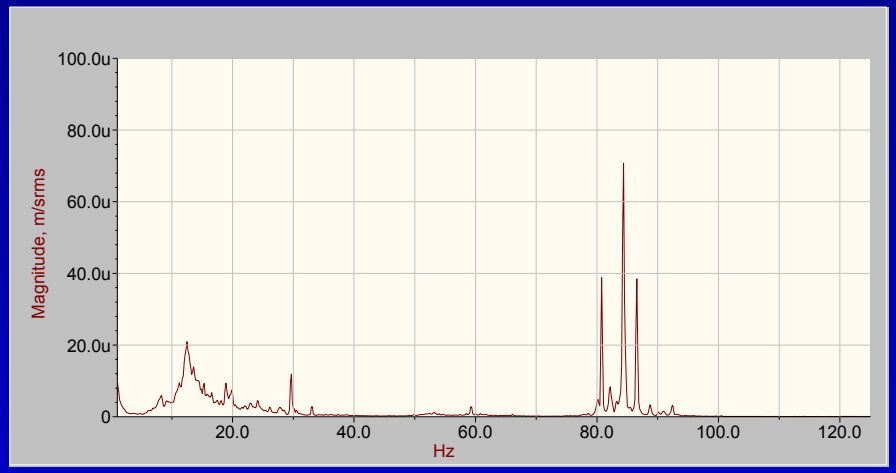


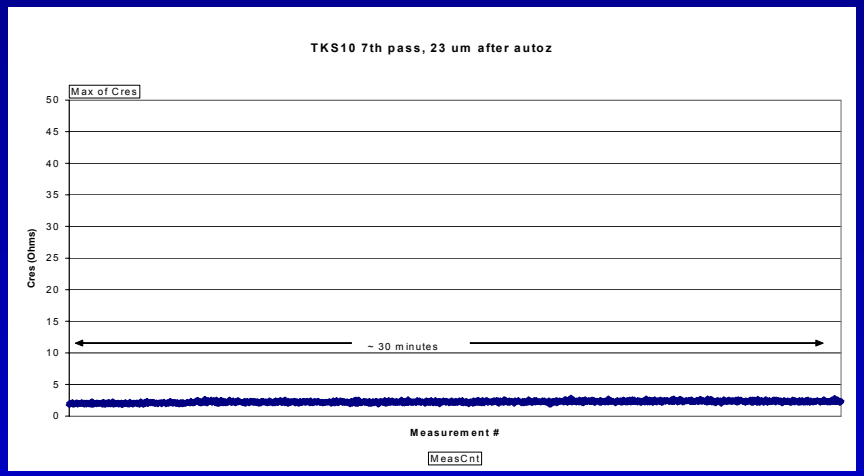
Test Head Cooling Fan Isolation

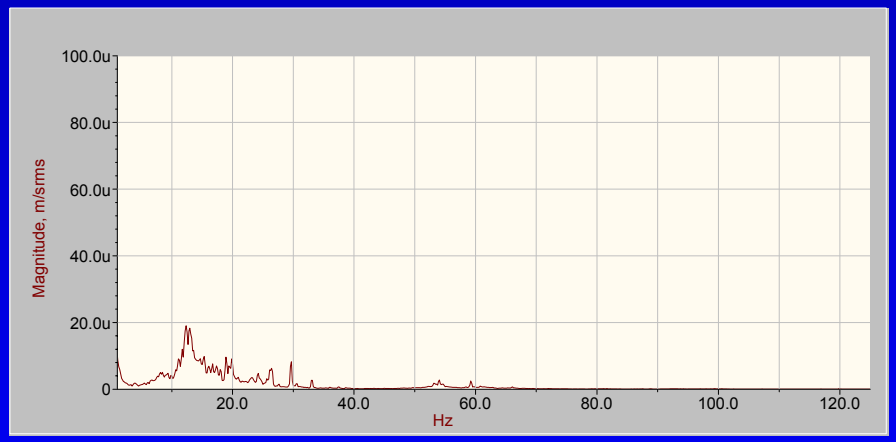


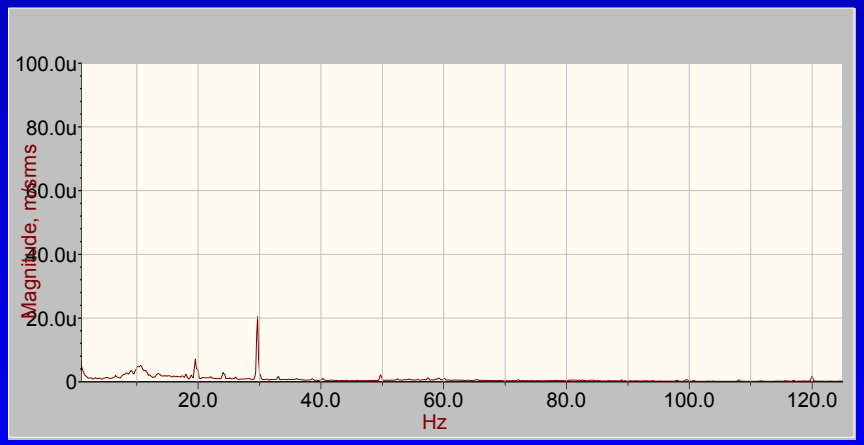
Steel Base Plate

Fan/Air Handler/Pedestal Change

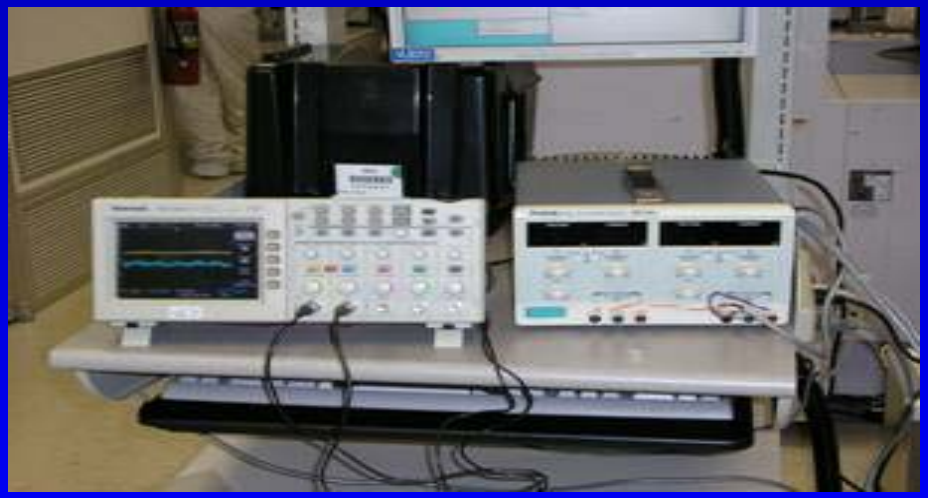


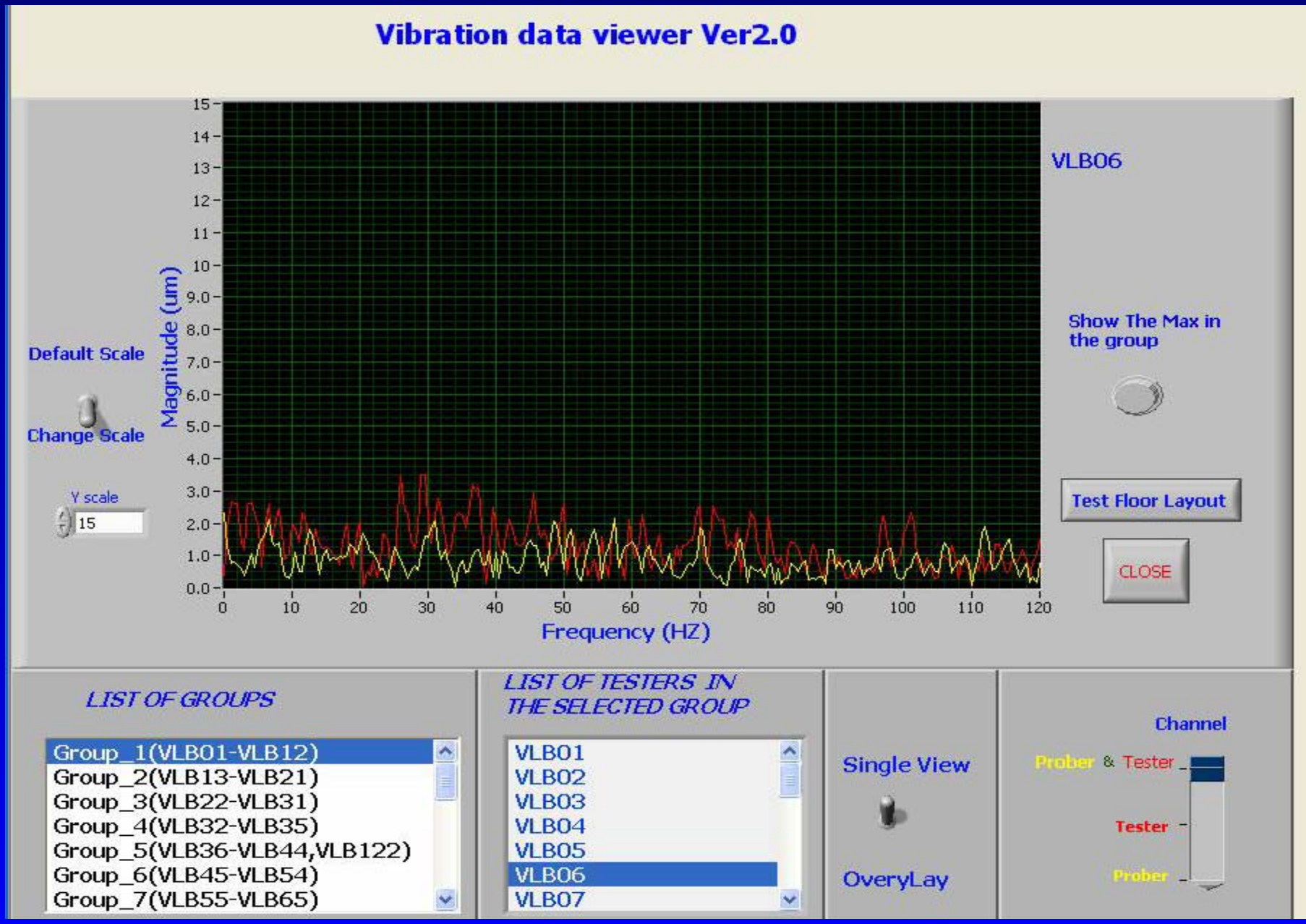


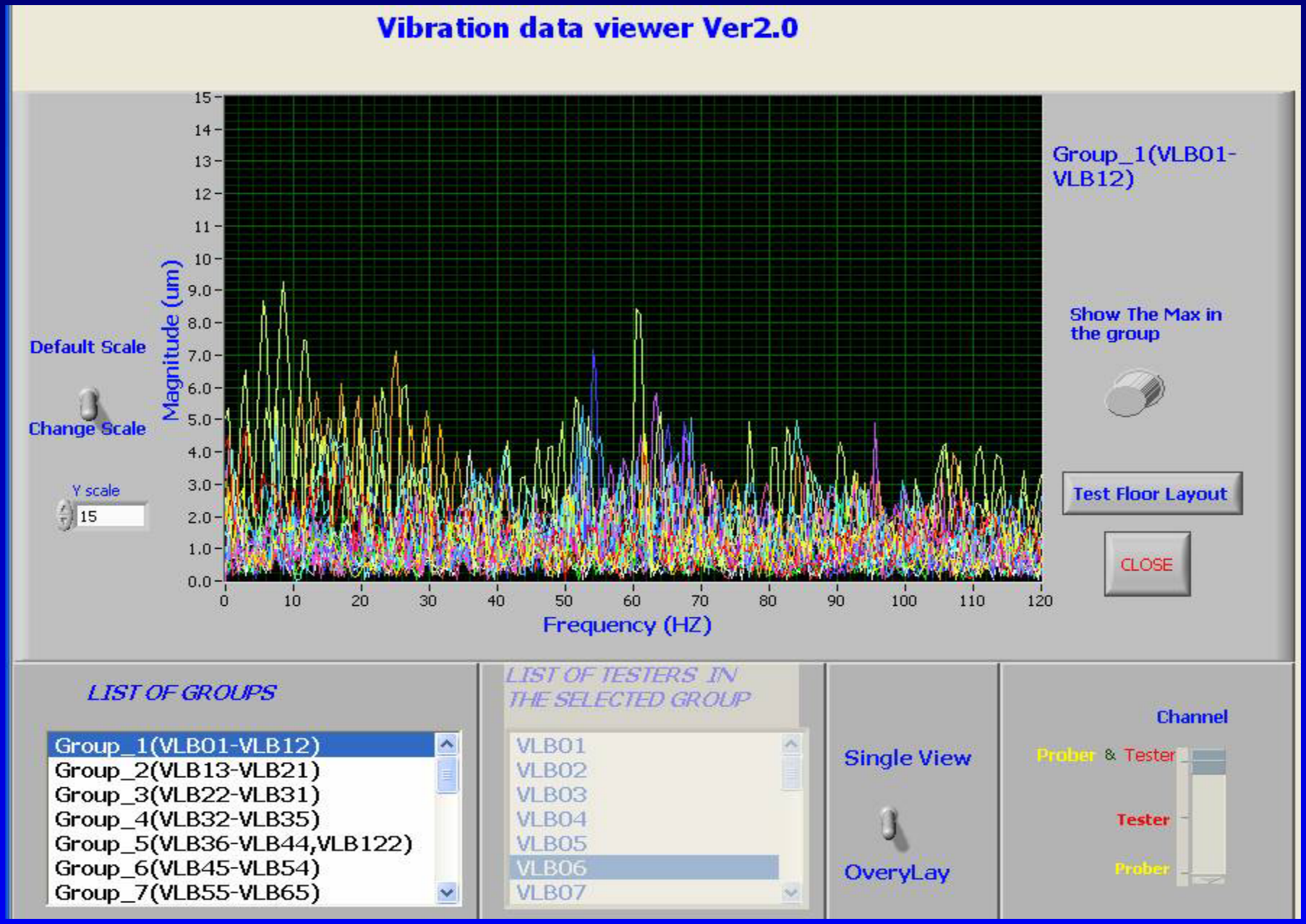




Instrumentation Placement X,Y,Z




Vibration data viewer Ver2.0
VLB06
Default Scale
Change Scale
Y scale
15
Magnitude (um)
Frequency (HZ)
Show The Max in the group
Test Floor Layout
CLOSE
LIST OF GROUPS
Group_1(VLB01-VLB12)
Group_2(VLB13-VLB21)
Group_3(VLB22-VLB31)
Group_4(VLB32-VLB35)
Group_5(VLB36-VLB44,VLB122)
Group_6(VLB45-VLB54)
Group_7(VLB55-VLB65)
LIST OF TESTERS IN THE SELECTED GROUP
VLB01
VLB02
VLB03
VLB04
VLB05
VLB06
VLB07
Single View
OveryLay
Channel
Prober & Tester
Tester
Prober


Vibration data viewer Ver2.0
Magnitude (um)
Frequency (HZ)
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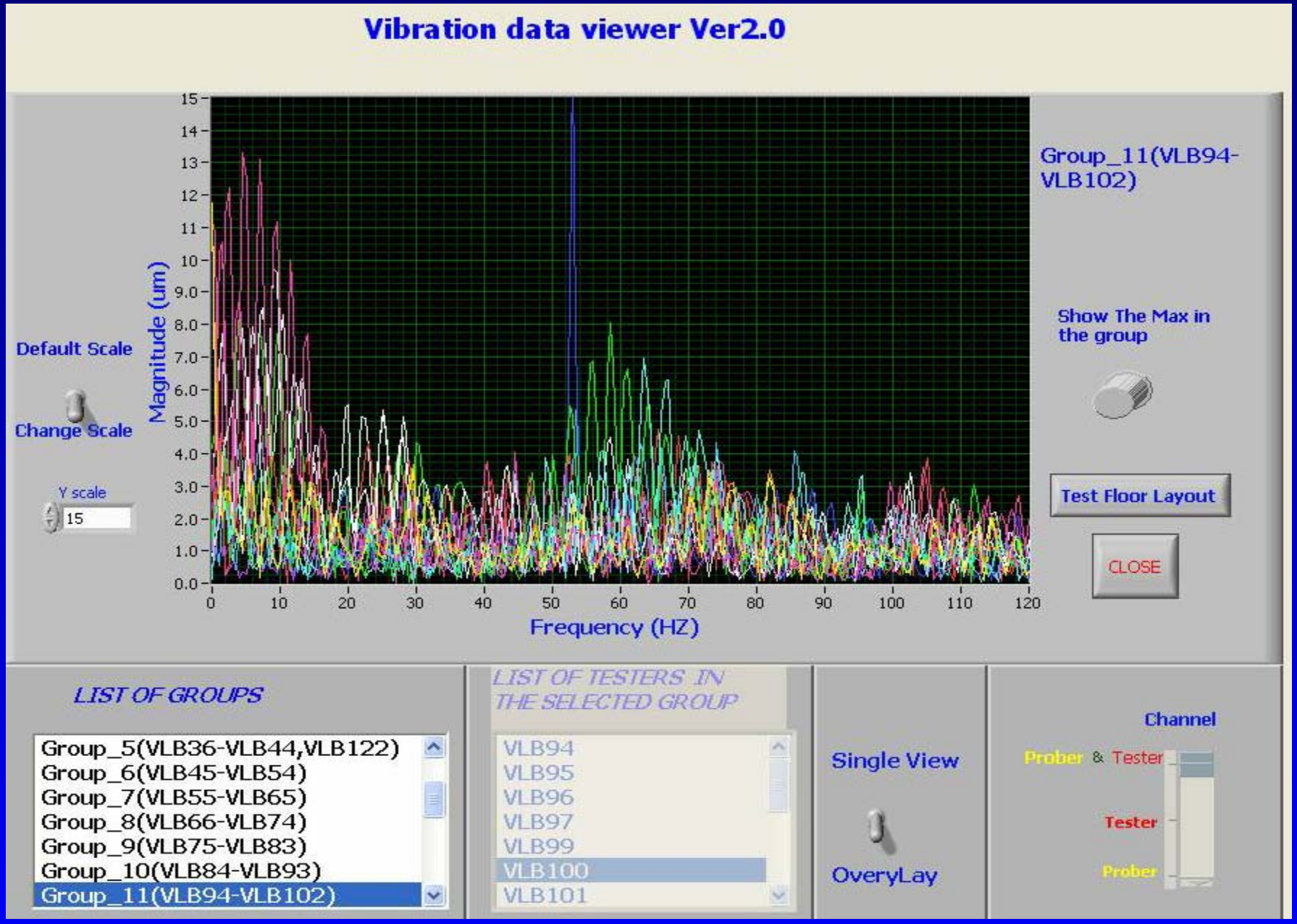
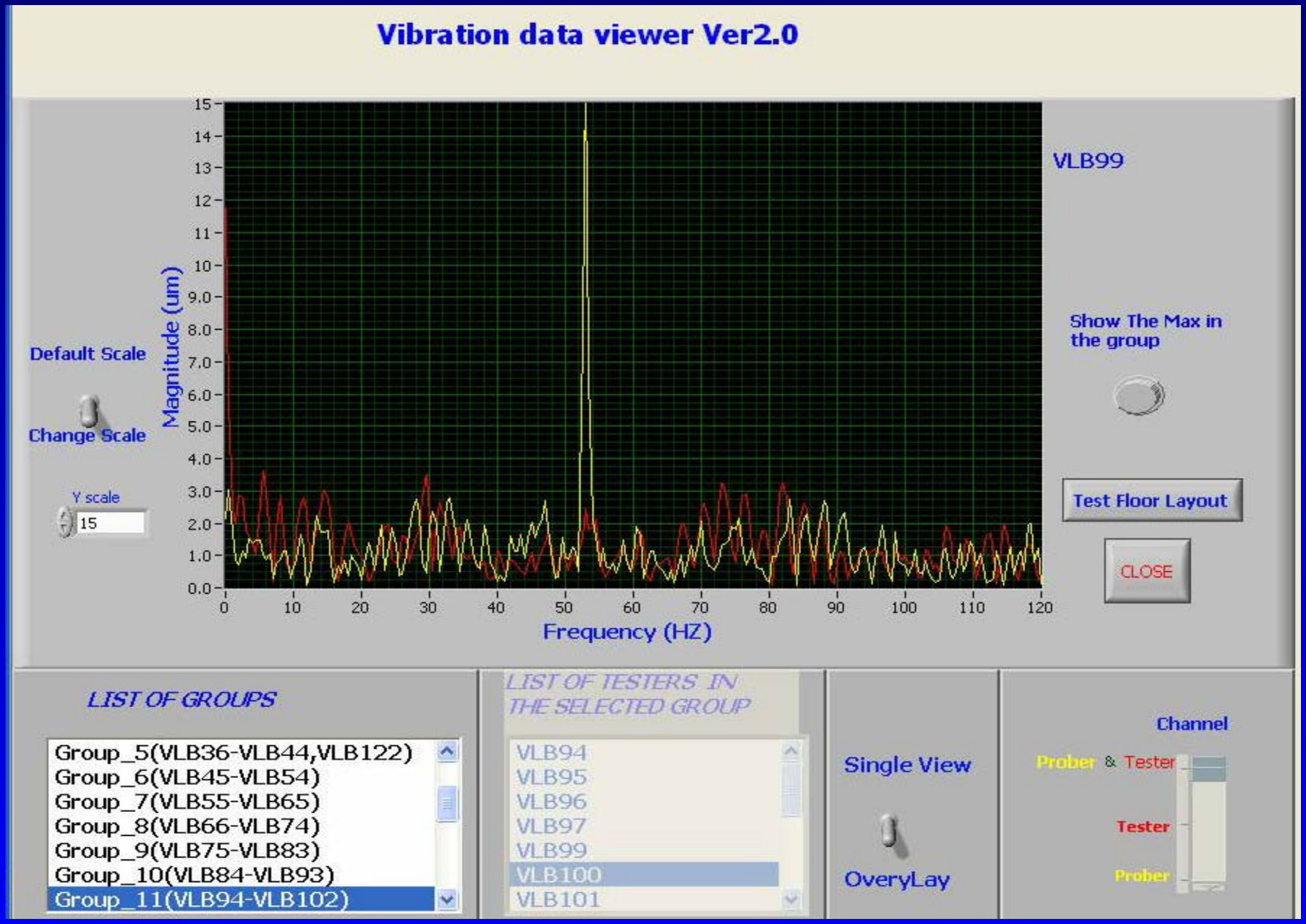
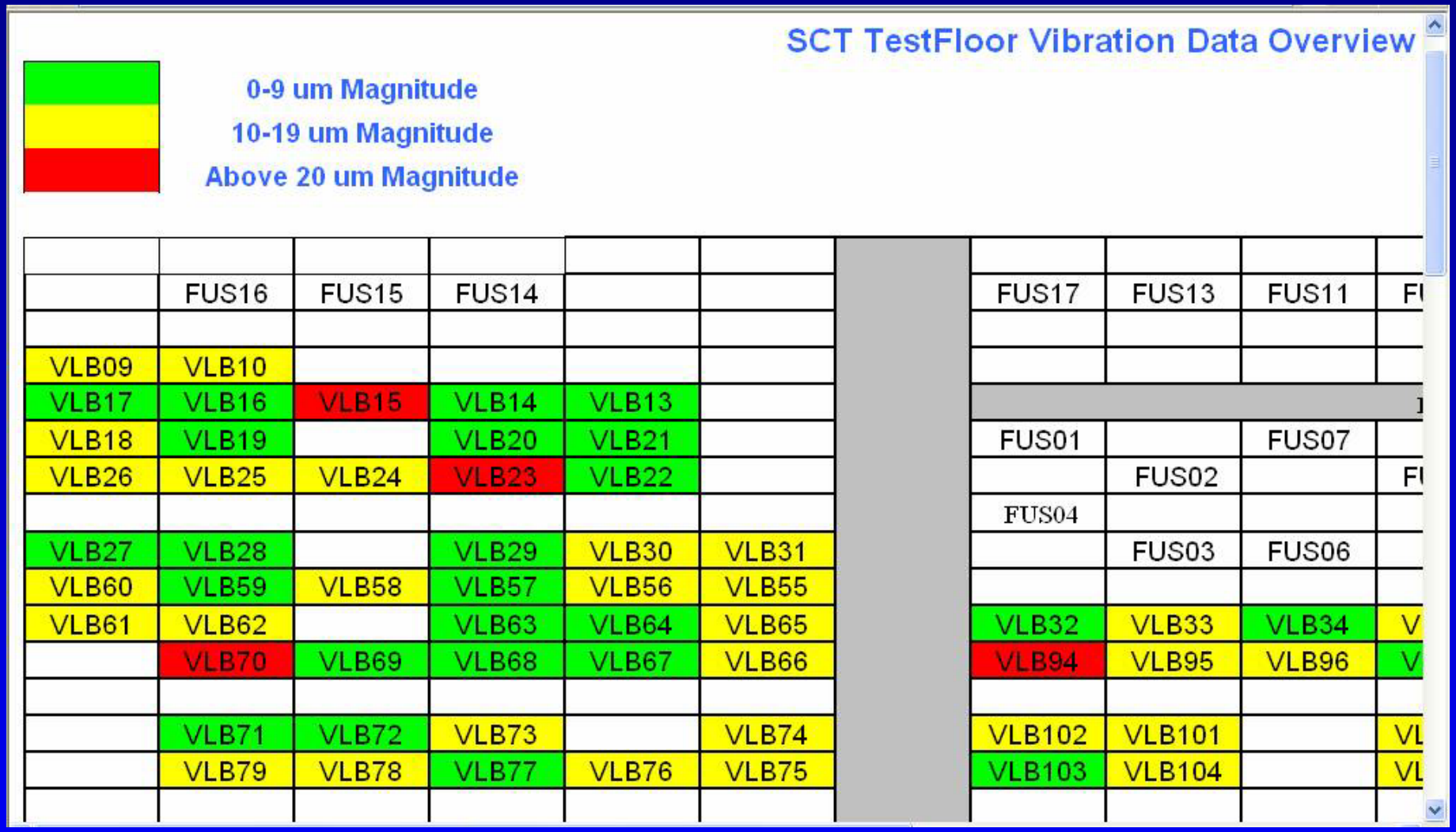
Single View
OveryLay
Channel
Prober & Tester
Tester
Prober


Vibration data viewer Ver2.0
Magnitude (um)
Frequency (HZ)
Group_11(VLB94-VLB102)
Default Scale
Change Scale
Y scale
15
Show The Max in the group
Test Floor Layout
CLOSE
LIST OF GROUPS
Group_5(VLB36-VLB44,VLB122)
Group_6(VLB45-VLB54)
Group_7(VLB55-VLB65)
Group_8(VLB66-VLB74)
Group_9(VLB75-VLB83)
Group_10(VLB84-VLB93)
Group_11(VLB94-VLB102)
LIST OF TESTERS IN THE SELECTED GROUP
VLB94
VLB95
VLB96
VLB97
VLB99
VLB100
VLB101
Single View
OveryLay
Channel
Prober & Tester
Tester
Prober


Vibration data viewer Ver2.0
Magnitude (um)
Frequency (HZ)
VLB99
Default Scale
Change Scale
Y scale
15
Show The Max in the group
Test Floor Layout
CLOSE
LIST OF GROUPS
Group_5(VLB36-VLB44,VLB122)
Group_6(VLB45-VLB54)
Group_7(VLB55-VLB65)
Group_8(VLB66-VLB74)
Group_9(VLB75-VLB83)
Group_10(VLB84-VLB93)
Group_11(VLB94-VLB102)
LIST OF TESTERS IN THE SELECTED GROUP
VLB94
VLB95
VLB96
VLB97
VLB99
VLB100
VLB101
Single View
OveryLay
Channel
Prober & Tester
Tester
Prober

Vibration Floor Survey



Key Learning's

- Vibration Sources Influence CRes
  - Air Handlers Balance - VFD
  - Test Head Cooling Fans – Balance/Replace
  - Adjacent Equipment – Spacing/Zones
  - Raised Floor Construction – Steel Plates/Pedestals
  - Indexing Speed - Reduced

Acknowledgements

- Doug Clark
- Frank Mesa
- David Meyers
- Kelly Daughtery
- Joseph Perry
- Troy Esrey
- Robert Davis
- Maverick Brown
- Fakradin Abdushukur

Thanks For Listening – Enjoy the Conference