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Customer Name:	**REOU - EL**
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Carmel Environmental Tests Laboratories

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a. DOCUMENT HISTORY

The following table records information regarding released editions of this document and briefly describes their file location, purpose and changes made to them.

Edition Id	Release Date	Responsible Author	Purpose and Description of Changes
--	16.07.2014	Maor Itzcovitz	**Purpose:** Release **Changes:**

b. DOCUMENT APPROVALS

This edition has been approved by:

	Name	Title	Signature	Date
Author	Maor Itzcovitz	Technical Writer		**16.07.2014**
Approved	Dov Carmeli	COO		**16.07.2014**

c. DISTRIBUTION LIST

Organizational Unit	Title	Title	Title	Title

d. OPEN ISSUES

This part of the document control section is used to record and track open issues and/or unresolved questions. As the development of this document proceeds, these issues and questions should be resolved and then removed from the list.

No.	Subject/Section	Description
1.		
2.		

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1. INTRODUCTION

1.1. Purpose

The purpose of this document is to verify that the **TOUGH RACK 19** meets all requirements as per the applicable documents.

1.2. Scope

The scope of this Environmental Test Report includes the environmental test results as specified by the customer and by the related resources.

1.3. Glossary

Abbreviation / Acronym / Term	Explanation / Description
ETR	Environmental Test Report
ETS	European Telecommunication Standard
ID	IDentifier
iDDE	Integrated Document Development Environment
IEC	International Electro technical Commission
NA	Not Applicable
NC	Not Controlled
PSD	Power Spectral Density
TBD	To Be Defined
UUT	Unit Under Test

1.4. Applicable Documents

This section contains a list of resources (e.g., documents, files, tools) referenced by or related to this document. All documents' revisions are the latest known on the date of the contract signing.

- MIL-167-1A

1.5. Executive Summary

The following table summarizes the tests that have been performed in Carmel Environmental Test Laboratories.

REOU - EL performed the functional tests and they are responsible for the results.

No.	Test Name	Pass/Fail
1.	Sinusoidal Vibration Test	Pass

Statement of Compliance with Test Requirements
We, Carmel Environmental Test Laboratories, declare under our sole responsibility that the **TOUGH RACK 19** was tested to comply with the requirements of the applicable environmental test specification.

1.6. Laboratory Accreditation

Carmel Environmental Test Laboratories Ltd. Is accredited Laboratory by the American Association for Laboratory Accreditation – A2LA (see Accreditation in the final page of this report).

A2LA logo in the front page is applicable only to the tests under the scope of Carmel Environmental Test Laboratories accreditations.
Carmel Environmental Test Laboratories has A2LA accreditation to ISO/IEC 17025:2005 for test types as listed in the following link:

http://www.a2la.org/scopepdf/2881-01.pdf

2. MIL-STD 167-1A VIBRATION TEST

2.1. Unit Under Test Overview

Test Date	13-16.07.2014
Customer Representative	Uri Levi
Customer	REOU - EL
Unit Name	TOUGH RACK 19
PN	N.A
SN	N.A
Item Manufacturer	REOU - EL

2.2. Technical Source

- MIL-167-1A

2.3. Test Instrumentation

Instrumentation Name	Manufacturer / Model	S.N	Calibration Expired Date
Electrodynamics Vibration System	L.D.S - Model: 964-LS	528	30 November 2014
Vibration Control System	Unholtz Dickie Model: Ud Vwin	10008616	30 September 2014
Control Accelerometer	Endevco Model 256HX-100	12154	30 April 2015
Control Accelerometer	Endevco Model 256HX-100	12156	30 April 2015
Control Accelerometer	Endevco Model 256HX-100	12157	30 April 2015
Control Accelerometer	Endevco Model 256HX-100	12159	30 April 2015
Monitor Accelerometer	Endevco Model 256HX-100	12162	30 April 2015
Monitor Accelerometer	Endevco Model 256HX-100	12164	30 April 2015

2.4. Test Description

2.4.1. Exclusions from the Test Method

Not applicable.

2.4.2. Exploratory - Test Procedure

Item Position	Rigidly attached to the vibration exciter
Vibration Axes	3(X, Y, Z)
Frequency Range	4-33 Hz

Perform resonance frequency search from 4 Hz to 33 Hz with the amplitudes of 0.01±0.002 " by using a sinusoidal sweep excitation. The change in discrete frequency intervals shall be 1 Hz and maintained for 15 seconds at each discrete frequency. The critical frequencies shall be identified.
This test is applicable for all 3 axes.
The specimen shall be switched off during this test.

2.4.3. Variable - Test Procedure

Item Position	Rigidly attached to the vibration exciter
Vibration Axes	3(X, Y, Z)
Frequency Range	4-33 Hz

Perform variable frequency test from 4 Hz to 33 Hz with the amplitudes shown in Table 1 by using a sinusoidal sweep excitation. The change in discrete frequency intervals shall be 1 Hz and maintained for 5 minutes at each discrete frequency.
This test is applicable for all 3 axes.
During this test, the specimen shall be switched on.

Table single amplitude (inch)	Frequency range (Hz)
0.030 ±0.006	4 to 15
0.020 ±0.004	16 to 25
0.010 ±0.002	26 to 33

Table 1 - Displacement for Variable Frequency and ENDURANCE Tests

2.4.4. Endurance - Test Procedure

Perform endurance test at resonance frequencies identified in exploratory test with the amplitudes shown in Table 1 by using a sinusoidal sweep excitation. If there is more than 4 resonance frequencies identified for a particular axis, test engineer may consider selecting just 4 most meaningful frequencies. If no resonance is observed, the test shall be performed at 33 Hz. Duration of endurance test is given at Table 2.
This test is applicable for all 3 axes.

Number of identified resonance frequencies	Test time at each resonance freq.	Total test time
1	120 minutes	120 minutes
2	60 minutes	
3	40 minutes	
4	30 minutes	

Table 2 – Time Duration of Endurance Test

2.4.5. Test Inspection

Visual Test	• Performed by customer representative during and at the end of the test.

2.5. Test Results

In visual inspection at completion of the test, no external damage observed.
The customer representatives, during and at the end of the test, have conducted visual tests.
Test Result: **Pass**

2.6. Test Pictures



Figure 2.1 - UUT Mounted on Electrodynamics Shaker (X Axis)



Figure 2.2 - UUT Mounted on Electrodynamics Shaker (Y Axis)



Figure 2.3 – UUT Mounted on Electrodynamics Shaker (Z Axis)

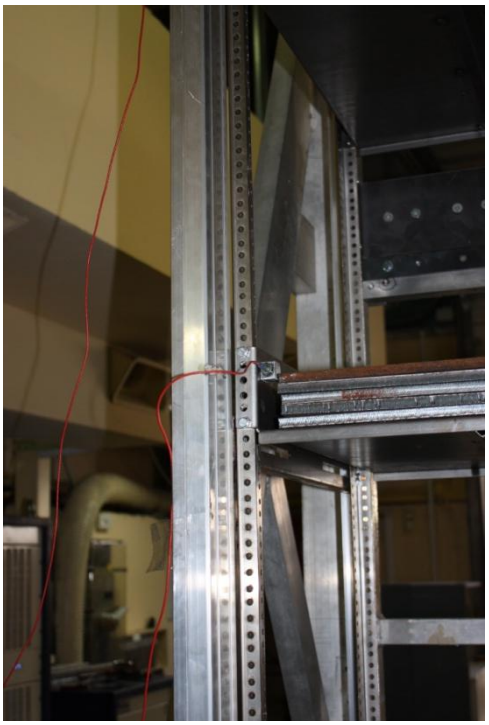


Figure 2.4 - Accelerometer on Middle of UUT

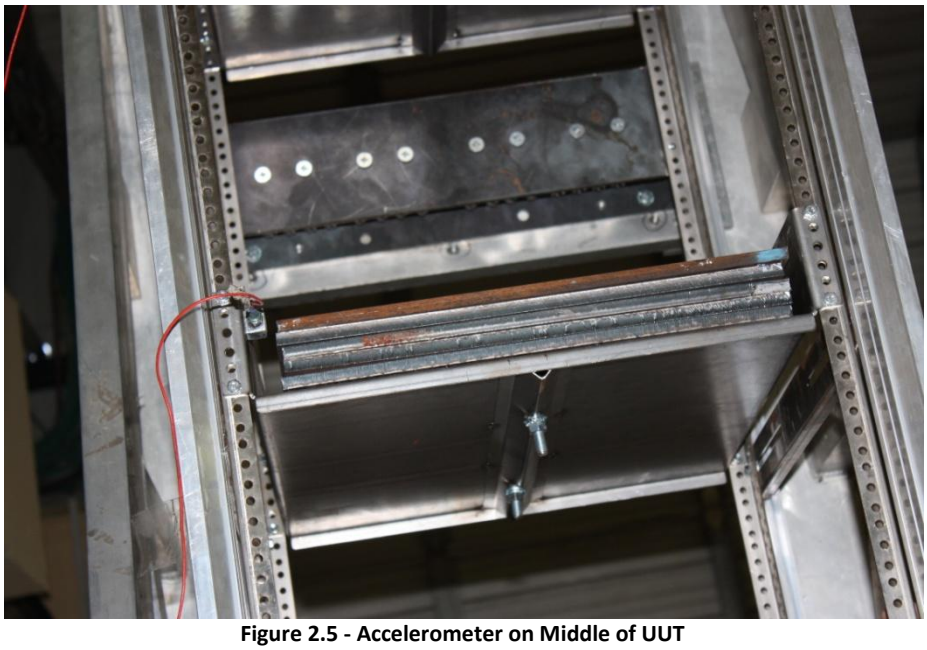


Figure 2.5 - Accelerometer on Middle of UUT

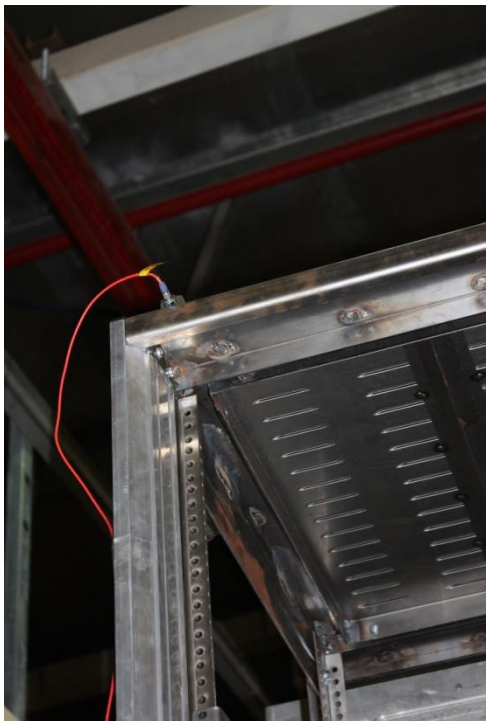


Figure 2.6 - Accelerometer on Top of UUT

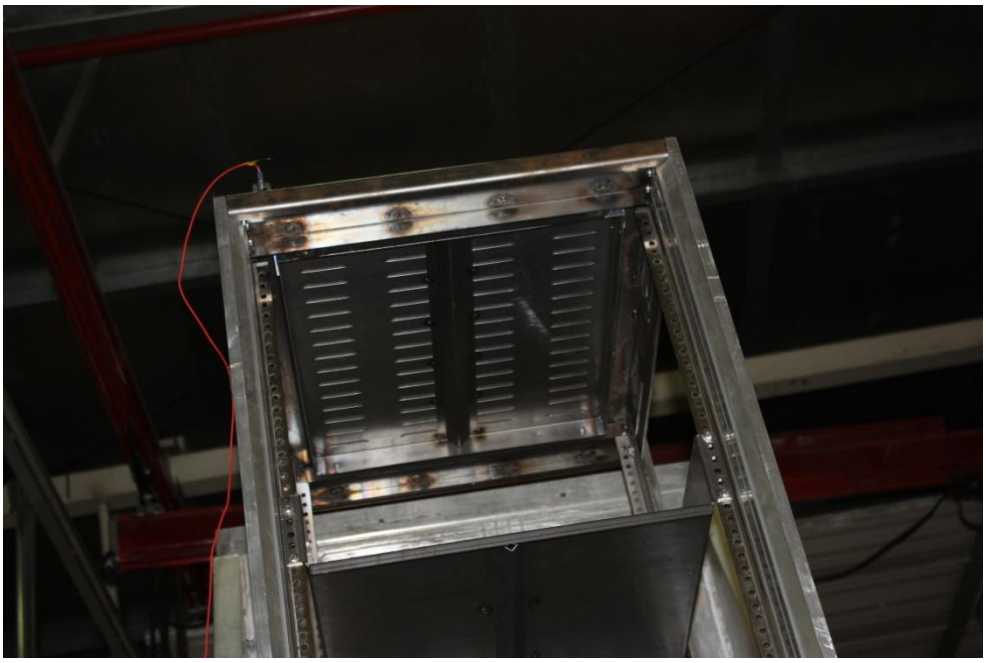
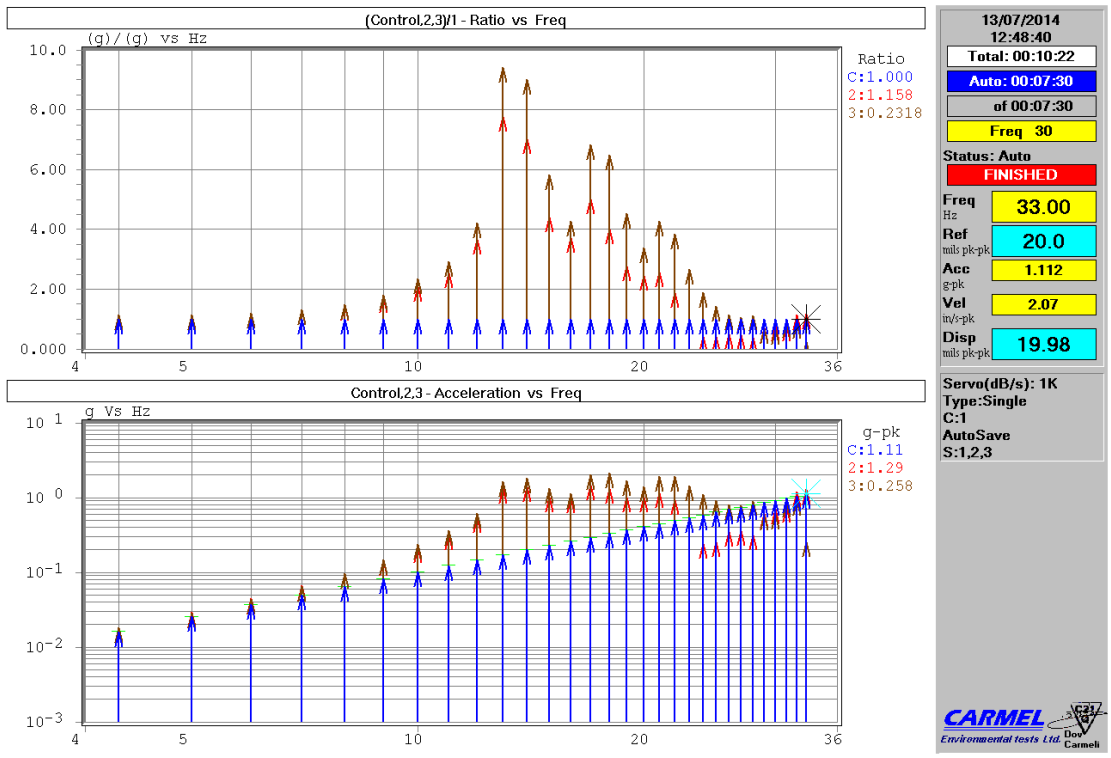


Figure 2.7 - Accelerometer on Top of UUT

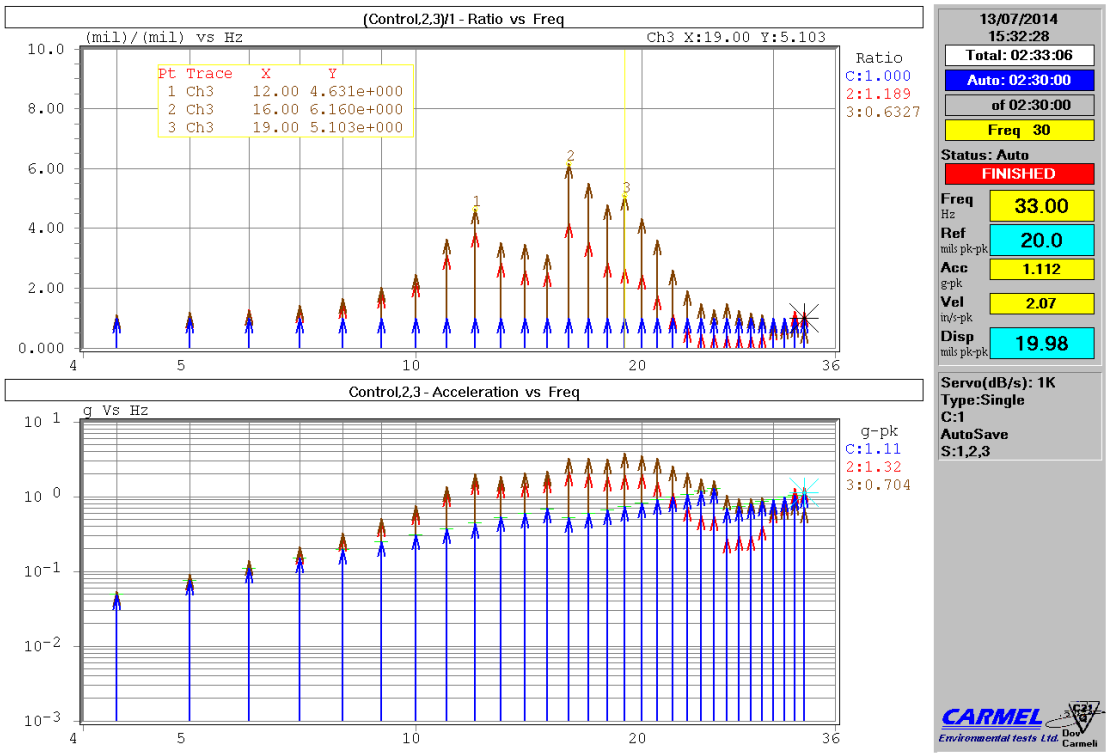
2.7. Product Response Graphs

2.7.1. X-Axis

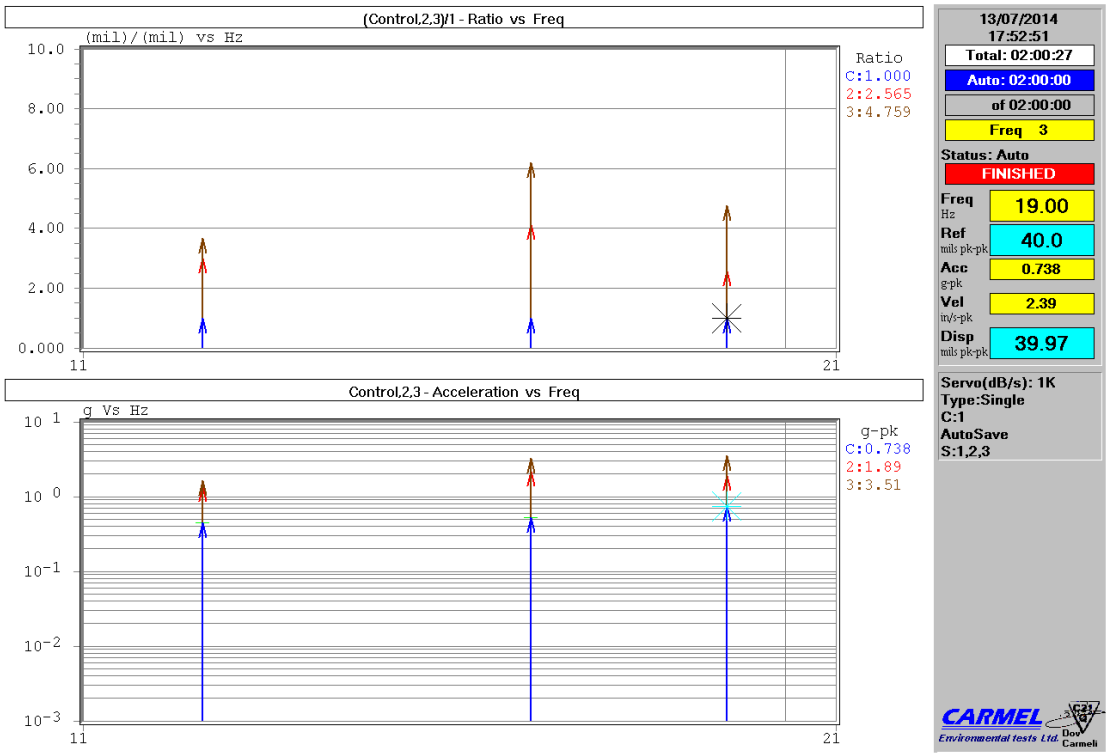
SETUP NAME: mil 167-1A - EXPLORATORY
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
rack
X-AXIS
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 13/07/2014 12:34:36
RUN NAME: run4
SAVE NUMBER: 1



SETUP NAME: Mil 167-1A Variable Freq - 33Hz Max
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
Rack
X-AXIS
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 13/07/2014 12:49:04
RUN NAME: run2
SAVE NUMBER: 1

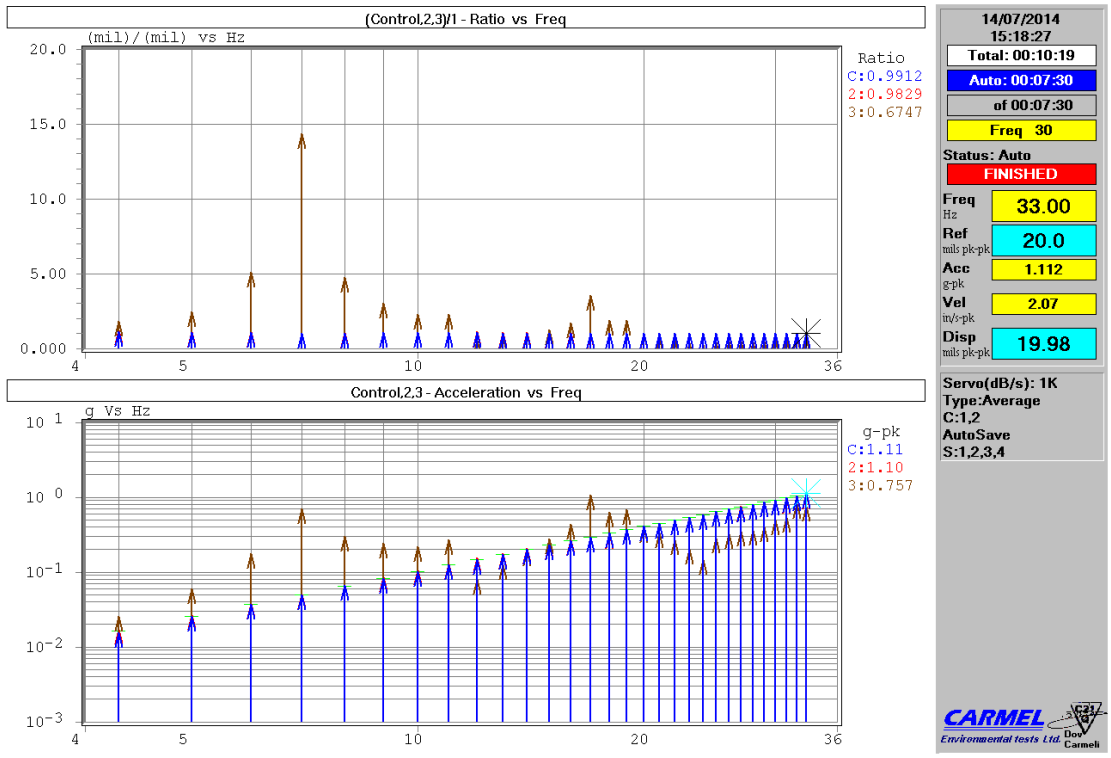


SETUP NAME: mil 167 - Endurance
SETUP DESC: MIL 167 - Test
SETUP COMMENTS:
Reou - el
rack
X-AXIS
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 13/07/2014 15:42:30
RUN NAME: run9
SAVE NUMBER: 1

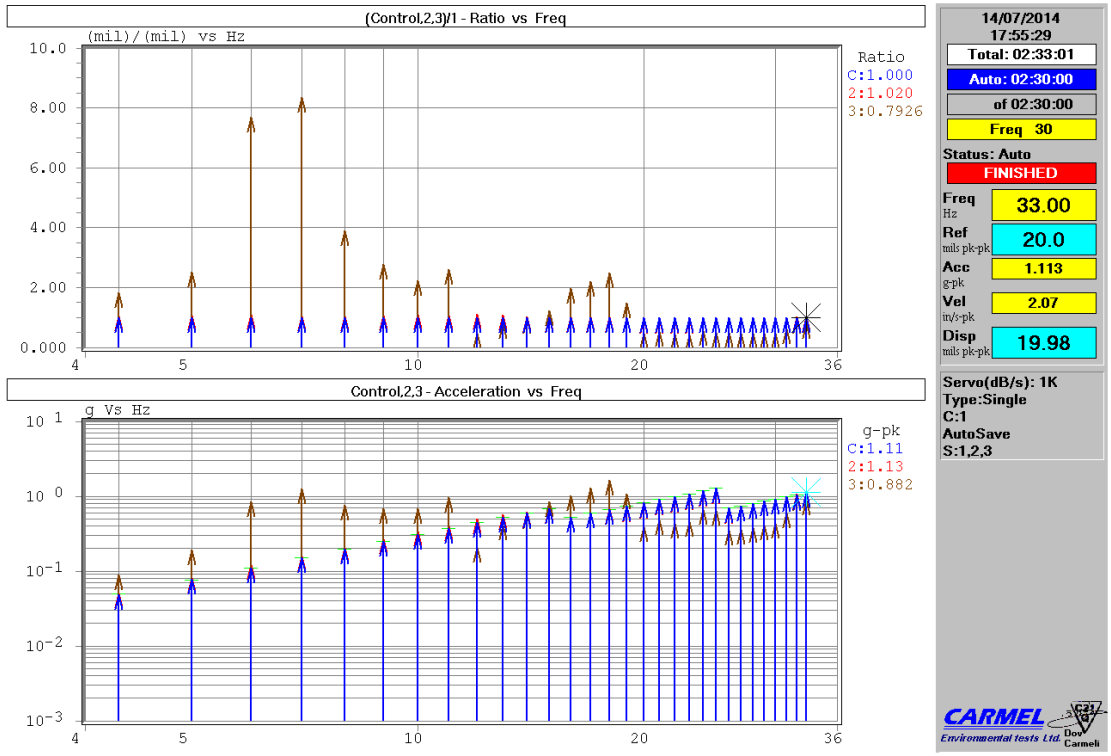


2.7.2. Y-Axis

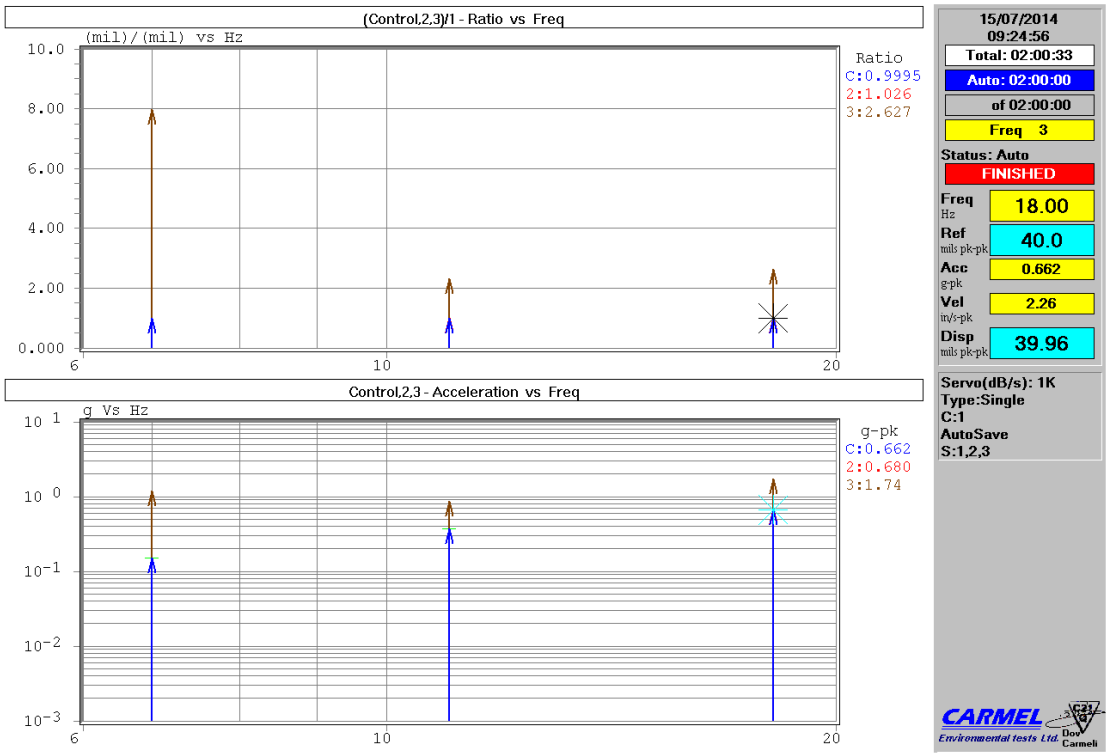
SETUP NAME: mil 167-1A - EXPLORATORY
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
rack
Y-AXIS
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 14/07/2014 15:01:09
RUN NAME: run8
SAVE NUMBER: 1



SETUP NAME: Mil 167-1A Variable Freq - 33Hz Max
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
rack
Y-axis
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 14/07/2014 15:20:09
RUN NAME: run3
SAVE NUMBER: 1

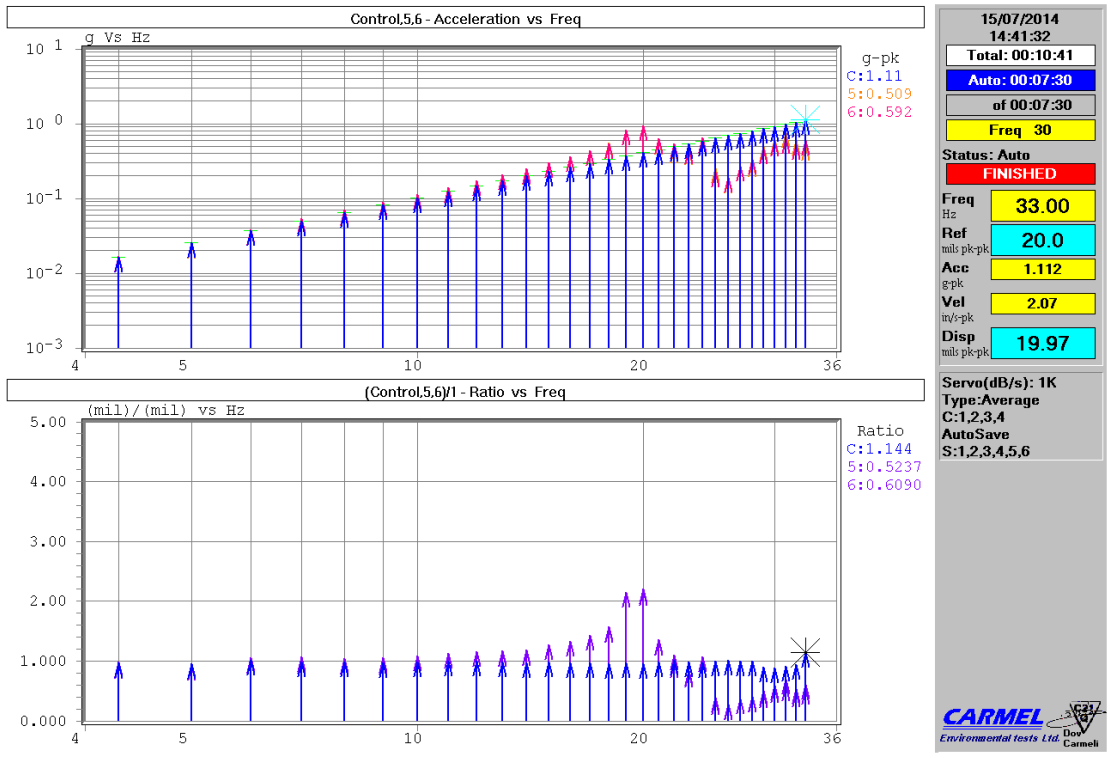


SETUP NAME: mil 167 - Endurance
SETUP DESC: MIL 167 - Test
SETUP COMMENTS:
Reou - el
rack
Y-AXIS
CH#2 – ON MIDDLE
CH#3 – ON TOP
SETUP LAST CHANGED: 15/07/2014 07:20:16
RUN NAME: run10
SAVE NUMBER: 1

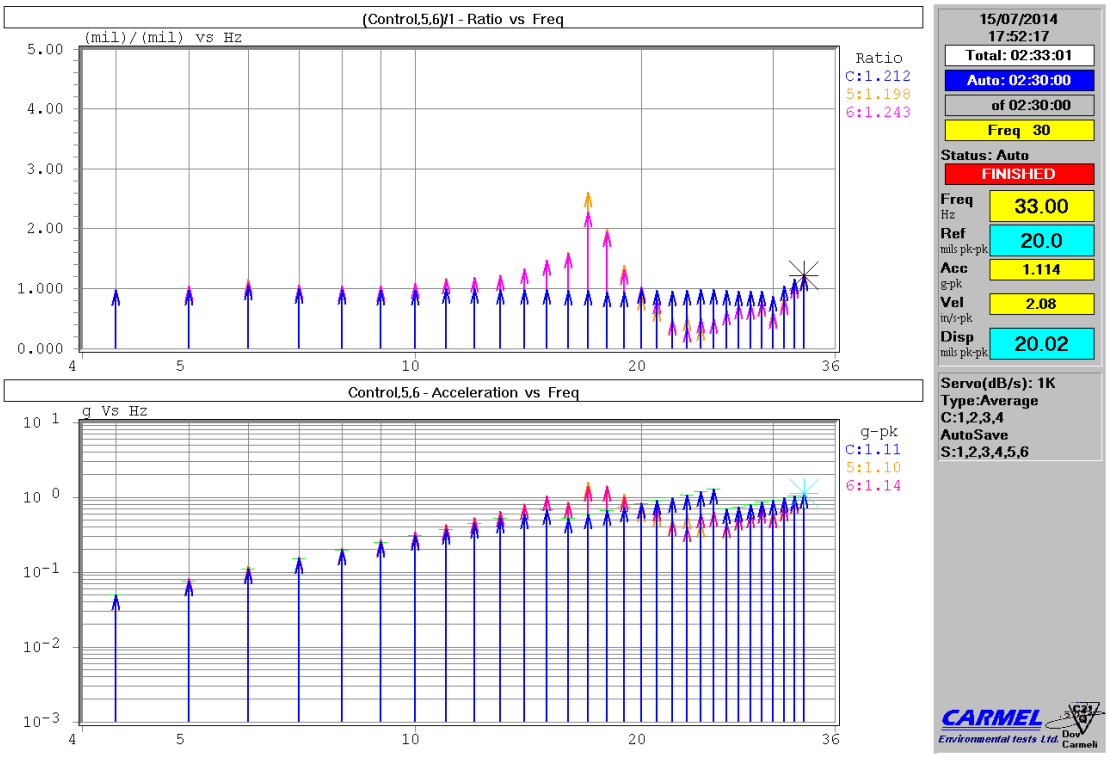


2.7.3. Z-Axis

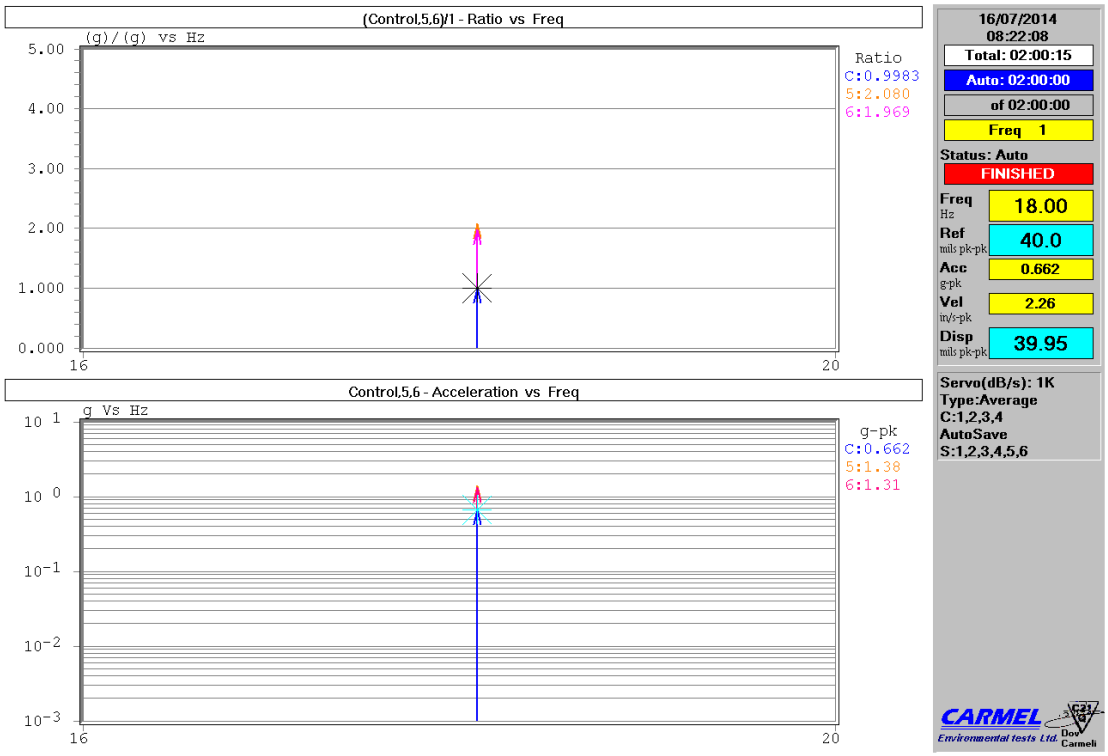
SETUP NAME: mil 167-1A - EXPLORATORY
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
rack
Z-AXIS
CH#5 – ON MIDDLE
CH#6 – ON TOP
SETUP LAST CHANGED: 15/07/2014 14:21:55
RUN NAME: run9
SAVE NUMBER: 1



SETUP NAME: Mil 167-1A Variable Freq - 33Hz Max
SETUP DESC: MIL 167 - Variable Freq. Test
SETUP COMMENTS:
Reou - el
rack
Z-axis
CH#5 – ON MIDDLE
CH#6 – ON TOP
SETUP LAST CHANGED: 15/07/2014 17:44:39
RUN NAME: run1
SAVE NUMBER: 1



SETUP NAME: mil 167 - Endurance
SETUP DESC: MIL 167 - Test
SETUP COMMENTS:
Reou - el
rack
Z-AXIS
CH#5 – ON MIDDLE
CH#6 – ON TOP
SETUP LAST CHANGED: 15/07/2014 18:09:15
RUN NAME: run12
SAVE NUMBER: 1





American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

CARMEL-ENVIRONMENTAL TESTS LTD.

Petach Tikva,

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 25th day of March 2014.

President & CEO
For the Accreditation Council
Certificate Number 2881.01
Valid to March 31, 2016

For the types of tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.