



# TEST REPORT

**Report No.** : SGS-R13-0613-EN  
**Applicant** : GROUND Co., Ltd.  
**Address** : #209, 52 Suntechcity2, Sagimakgol-ro,  
 Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea  
**Product** : Third Generation Digital Lightning Protection  
 Grounding Device  
**Model** : TM-34-20-50M  
**Environment** : Temp. (23 ± 3) °C, Humidity (37 ± 5) % R.H.  
**Test Date** : May 24, 2013  
**Standard** : MIL-STD-810G: 2008 Method 514.6 (Table 514.6C-VI)  
**Test Result** : Refer to the attached document  
**Use of report** : Validation

This is certified that the above mentioned products have been tested for the sample provided by client.

<b>Confirmation</b>	<b>Tested by</b>	<b>Approved by</b>
	Name : Cha, Minha 	Name : Kim, Dong-kyun 

- ※ The test results is based on the test conducted on the test sample, which was requested by the client.
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May 30, 2013

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## Summary of Test Results

Third Generation Digital Lightning Protection Grounding Device / TM-34-20-50M	
TEST ITEM	TEST RESULT
Vibration Test	No abnormal was found.

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## 1. Overview

As requested by the client, this test was conducted on test sample according to the test specification presented by the client.

## 2. Product

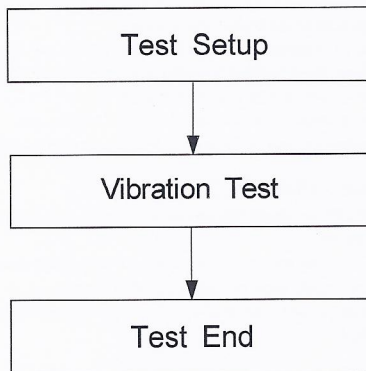
### 2.1 Description

- 1) Applicant : GROUND Co., Ltd
- 2) Manufacturer : GROUND Co., Ltd
- 3) Product : Third Generation Digital Lightning Protection Grounding Device
- 4) Model : TM-34-20-50M
- 5) Serial No. : G50TM0000036

### 2.2 Photograph



### 3. Test Process



### 4. Test Condition & Test Result

Refer to each test report (Next page)

#### 4.1 Vibration Test

<b>Applicant</b>	GROUND Co., Ltd	<b>Dept. in charge</b>	Reliability Test Team
<b>Product</b>	Third Generation Digital Lightning Protection Grounding Device	<b>Tester</b>	Cha, Min-ha (+82-31-548-0725)
<b>Model</b>	TM-34-20-50M	<b>Date</b>	May 24, 2013
<b>Serial No.</b>	G50TM0000036		
<b>Standard</b>	MIL-STD-810G: 2008 Method 514.6 (Table 514.6C-VI)	<b>Page</b>	9

##### (1) Test Conditions

- 1) Test type : Random
- 2) Frequency : (5 ~500) Hz
- 3) Acceleration : Z axis - 21.952 m/s<sup>2</sup> r.m.s. (2.24 g<sub>n</sub> r.m.s.)  
 X axis - 15.504 m/s<sup>2</sup> r.m.s. (1.48 g<sub>n</sub> r.m.s.)  
 Y axis - 18.208 m/s<sup>2</sup> r.m.s. (1.96 g<sub>n</sub> r.m.s.)
- 4) Test time : Total 6 h (2 h in each axis)
- 5) Test axis : Vertical (Z), Transverse (X), Longitudinal (Y)
- 6) Check time : Before and After the test
- 7) Sample condition : Unpackaged product / Non-operation
- 8) Sample quantity : 1 EA

(2) Environment Conditions : Temperature (23 ± 3) °C, Humidity (37 ± 5) % R.H.

##### (3) Test Method

- 1) Perform a visual inspection and an operational check for the specimen.
- 2) Fix the specimen on the vibration table.
- 3) Operate the vibration tester.
- 4) Repeat from steps 2) to step 3) for each required axis.
- 5) Perform a final visual inspection an operational check for the specimen.

## (4) PSD Levels &lt; Z &gt;

Frequency [Hz]	PSD Levels [ $g_n^2$ / Hz]
5	0.175 9
8	0.512 0
11	0.066 0
12	0.058 5
13	0.034 8
15	0.144 1
16	0.123 7
20	0.024 1
23	0.053 6
26	0.012 4
27	0.011 8
30	0.033 1
34	0.008 6
39	0.034 7
43	0.007 3
45	0.014 1
49	0.008 4
52	0.008 9
57	0.004 5

## &lt; Z &gt;

Frequency [Hz]	PSD Levels [ $g_n^2$ / Hz]
67	0.016 0
80	0.003 7
90	0.007 7
93	0.005 3
98	0.006 5
99	0.006 3
111	0.004 6
123	0.006 9
128	0.005 5
164	0.003 1
172	0.003 5
215	0.013 3
264	0.005 6
276	0.009 6
292	0.003 2
348	0.004 4
417	0.003 1
500	0.000 8
2.24 $g_n$ r.m.s. = 21.952 $m/s^2$ r.m.s.	

## &lt; X &gt;


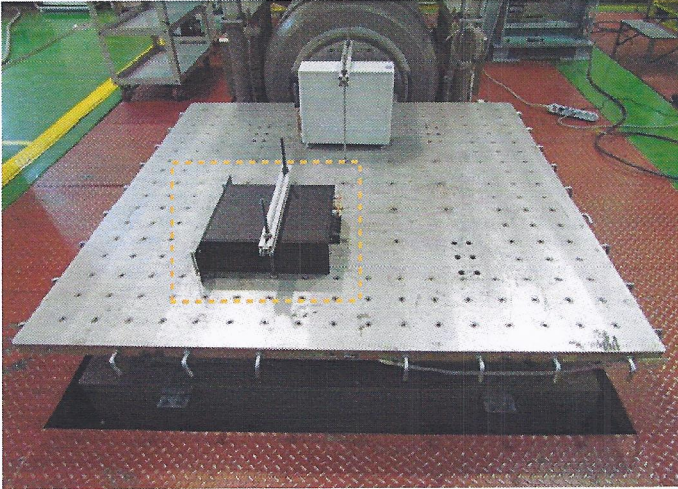
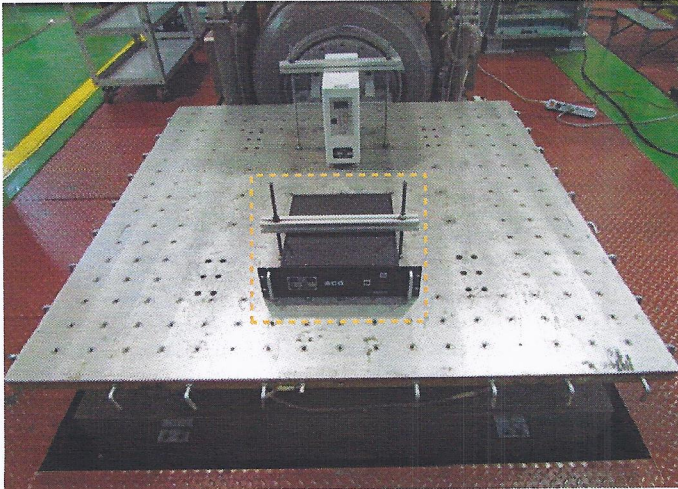
Frequency [Hz]	PSD Levels [ $g_n^2$ / Hz]
5	0.099 8
7	0.079 9
9	0.111 5
10	0.057 7
14	0.029 4
15	0.065 1
16	0.064 6
17	0.043 6
18	0.039 3
19	0.062 2
24	0.010 0
37	0.004 5
38	0.006 5
44	0.003 3
55	0.002 4
57	0.004 2
59	0.001 9
76	0.001 2
79	0.002 1
83	0.001 0
114	0.000 6
135	0.001 7
142	0.001 0
158	0.001 8
185	0.001 0
191	0.000 7
206	0.000 8
273	0.003 5
300	0.001 6
364	0.007 4
374	0.002 2
395	0.003 1
500	0.001 2
1.48 $g_n$ r.m.s. = 14.504 $m/s^2$ r.m.s.	

< Y >

Frequency [Hz]	PSD Levels [g <sub>n</sub> <sup>2</sup> / Hz]	Frequency [Hz]	PSD Levels [g <sub>n</sub> <sup>2</sup> / Hz]
5	0.044 1	69	0.003 0
7	0.039 0	77	0.000 7
8	0.057 6	85	0.001 5
9	0.043 0	90	0.001 2
10	0.029 3	97	0.001 5
13	0.022 1	104	0.003 6
15	0.055 8	114	0.004 0
16	0.058 5	122	0.001 5
18	0.016 0	132	0.001 3
20	0.009 9	206	0.003 3
23	0.045 2	247	0.022 6
25	0.011 0	257	0.004 1
35	0.003 6	264	0.005 4
37	0.009 8	276	0.004 0
40	0.004 0	303	0.007 3
41	0.004 4	332	0.009 2
45	0.02 3	353	0.017 2
47	0.004 7	382	0.007 1
50	0.001 6	428	0.015 7
54	0.001 7	500	0.001 6
64	0.001 0	1.90 g <sub>n</sub> r.m.s. = 18.620 m/s <sup>2</sup> r.m.s.	



### (4) Test Photograph

Test axis	Test photograph
Vertical (Z)	
Transverse (X)	
Longitudinal (Y)	

## (5) Test Equipment

Description	Manufacturer and Model	Serial Number	The due date of next Calibration	Calibration Laboratory
Vibration Tester	Shinken/G-0310L	SG-4763	May 16, 2014	SICT
Vibration Tester	Shinken/G-5250NS	SG-4764	May 16, 2014	SICT
Accelerometer	Fujisera/S41SCB	0107	May 16, 2014	SICT

## (6) Test Result

Check List	Test Result
1. Visual inspection - Mechanical damage such as deformation, separation, loosening of screw, crack, etc.	No abnormal was found.
2. Performance check - Power ON/OFF - LED light	See result photograph (11 page)

※ Result Photograph



(Before the test)



(After the test)



(Before the test)



(After the test)

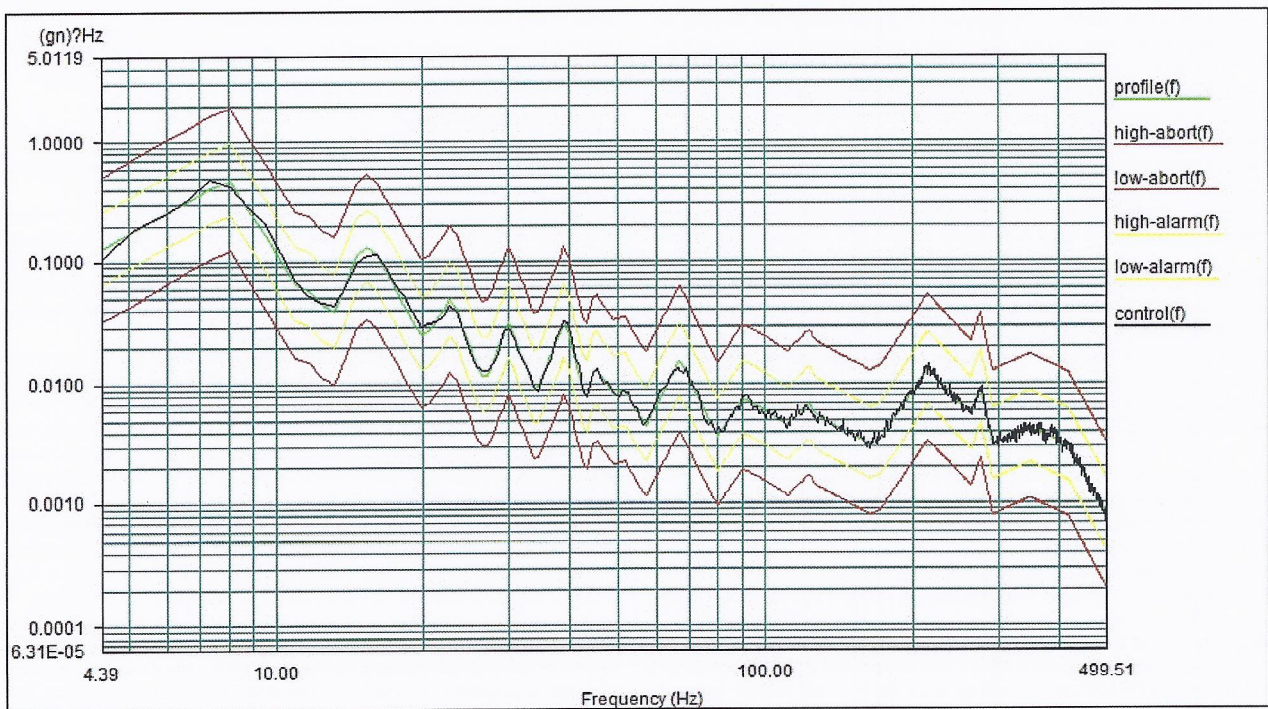
※ Appendix 1. Vibration data

Project File Name: MIL-STD-810G .prj

Profile Name: Vibration Test (Z axis)

Test Type: Random

Run Folder: \Run May 24, 2013



Level: 100 %

Control RMS: 2.280636 gn

Full Level Elapsed Time: 01:59:59

Lines: 800

Frame Time: 1.365333 Seconds

Demand RMS: 2.254850 gn

Remaining Time: 00:00:00

DOF: 154

dF: 0.732422 Hz

Data saved at 06:28:56 PM, Friday, May 24, 2013

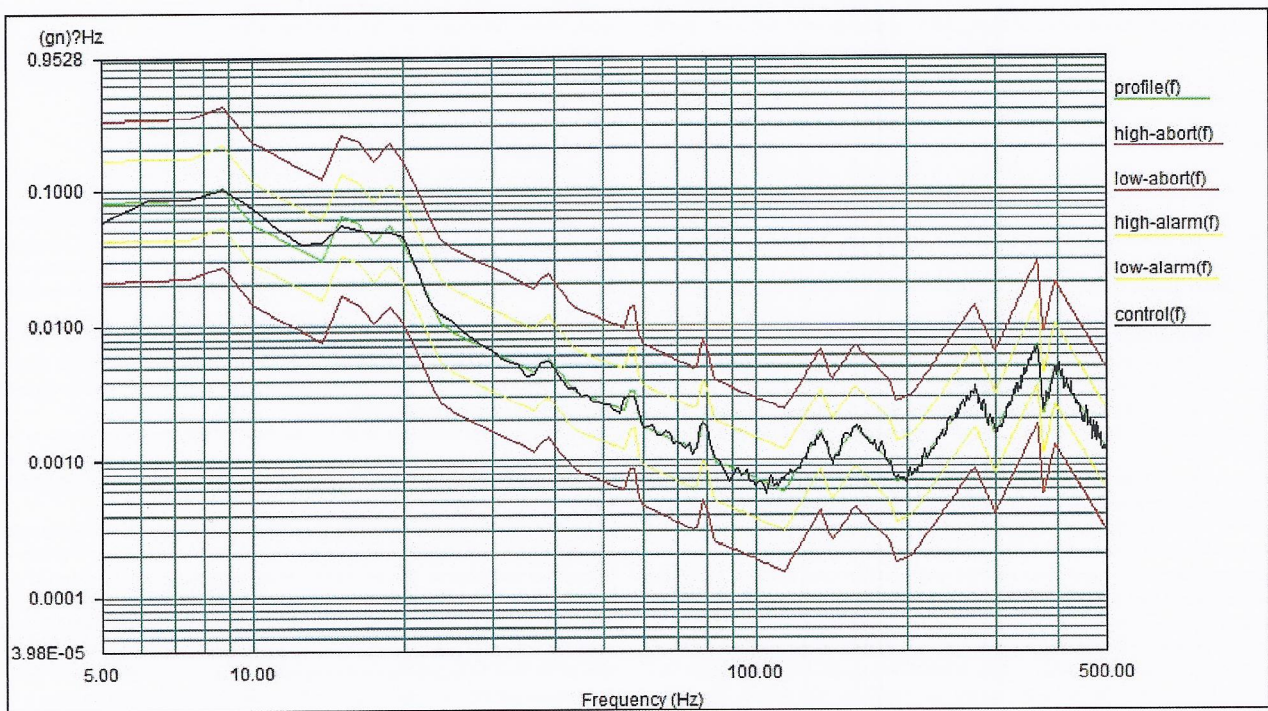
Report created at 06:28:59 PM, Friday, May 24, 2013

Project File Name: MIL-STD-810G .prj

Profile Name: Vibration Test (X axis)

Test Type: Random

Run Folder: \Run May 24, 2013



Level: 0 dB

Control RMS: 1.492004 gn

Full Level Elapsed Time: 01:59:57

Lines: 800

Frame Time: 0.800000 Seconds

Demand RMS: 1.471470 gn

Remaining Time: 00:00:00

DOF: 154

dF: 1.250000 Hz

Data saved at 03:35:55 PM, Friday, May 24, 2013

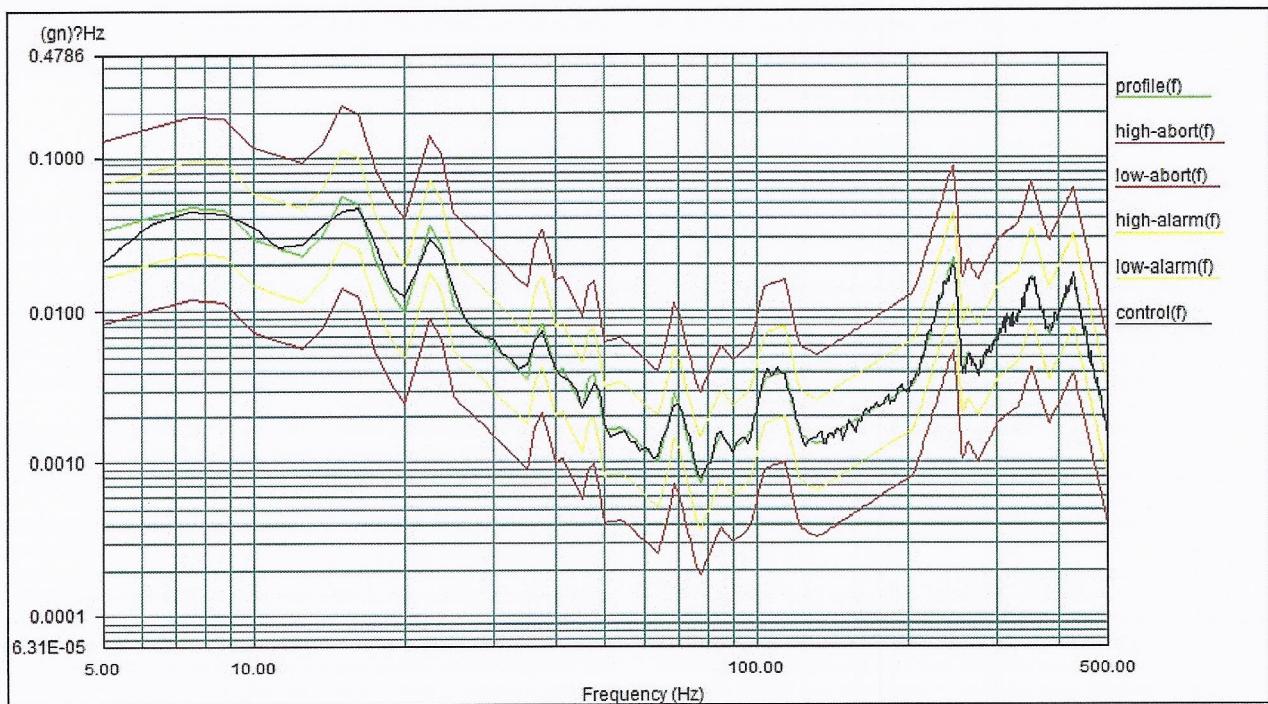
Report created at 03:36:01 PM, Friday, May 24, 2013

Project File Name: MIL-STD-810G .prj

Profile Name: Vibration Test (Y axis)

Test Type: Random

Run Folder: \Run May 24, 2013



Level: 0 dB

Control RMS: 1.907421 gn

Full Level Elapsed Time: 01:59:54

Lines: 800

Frame Time: 0.800000 Seconds

Demand RMS: 1.898276 gn

Remaining Time: 00:00:00

DOF: 154

dF: 1.250000 Hz

Data saved at 01:21:05 PM, Friday, May 24, 2013

Report created at 01:21:13 PM, Friday, May 24, 2013