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) ℃, 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.

Confirmation	**Tested by** **Name : Cha, Min-ha**	**Approved by** **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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SGS Korea Co.,Ltd. 398-1, Gomae-dong, Giheung-gu,Yongin-si, Gyeonggi-do, Korea t +82 (0)31 240 6606 f +82 (0)31 240 6629 www.kr.sgs.com

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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

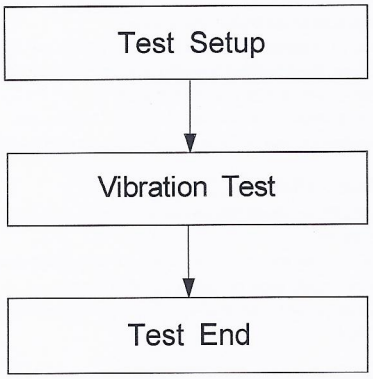
2.1 Description

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

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

(1) Test Conditions

1) Test type : Random
2) Frequency : (5 ~500) Hz
3) Acceleration : Z axis - 21.952 m/s^2 r.m.s. (2.24 g_n r.m.s.)
   X axis - 15.504 m/s^2 r.m.s. (1.48 g_n r.m.s.)
   Y axis - 18.208 m/s^2 r.m.s. (1.96 g_n 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) ℃, 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

< Z >

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
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.	

< X >

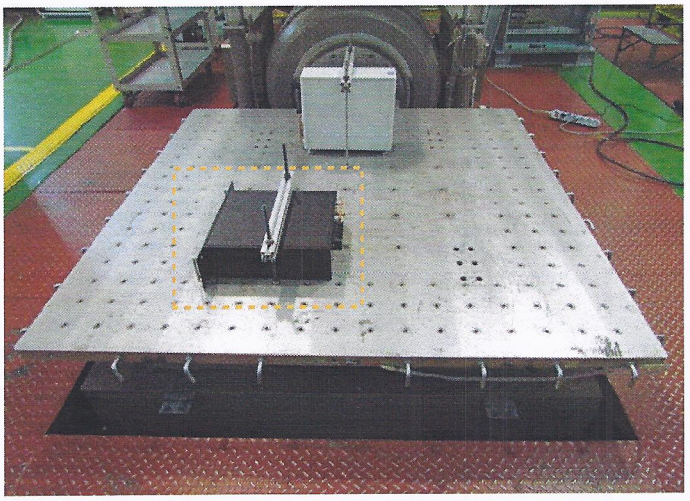
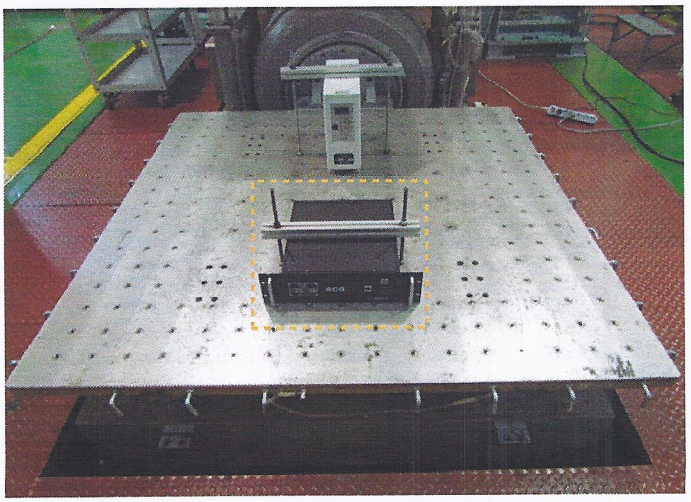
Frequency [Hz]	PSD Levels [g_n^2 / Hz]
5	0.099 8
7	0.079 9
9	0.111 5
10	0.057 7
14	0.029 4
15	0.065 1
16	0.064 6
17	0.043 6
18	0.039 3
19	0.062 2
24	0.010 0
37	0.004 5
38	0.006 5
44	0.003 3
55	0.002 4
57	0.004 2
59	0.001 9
76	0.001 2
79	0.002 1
83	0.001 0
114	0.000 6
135	0.001 7
142	0.001 0
158	0.001 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_n^2 / Hz]
5	0.044 1
7	0.039 0
8	0.057 6
9	0.043 0
10	0.029 3
13	0.022 1
15	0.055 8
16	0.058 5
18	0.016 0
20	0.009 9
23	0.045 2
25	0.011 0
35	0.003 6
37	0.009 8
40	0.004 0
41	0.004 4
45	0.02 3
47	0.004 7
50	0.001 6
54	0.001 7
64	0.001 0

Frequency [Hz]	PSD Levels [g_n^2 / Hz]
69	0.003 0
77	0.000 7
85	0.001 5
90	0.001 2
97	0.001 5
104	0.003 6
114	0.004 0
122	0.001 5
132	0.001 3
206	0.003 3
247	0.022 6
257	0.004 1
264	0.005 4
276	0.004 0
303	0.007 3
332	0.009 2
353	0.017 2
382	0.007 1
428	0.015 7
500	0.001 6
1.90 g_n r.m.s. = 18.620 m/s^2 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)



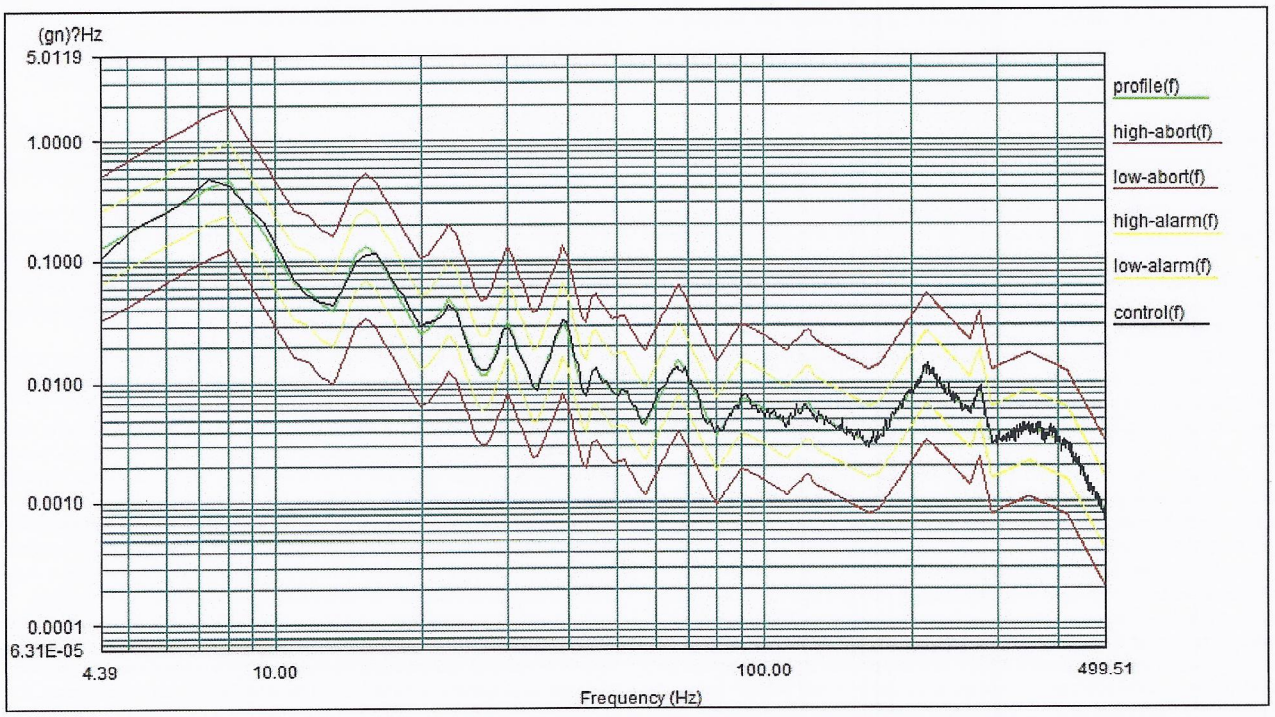
(Before the test)



(After the test)

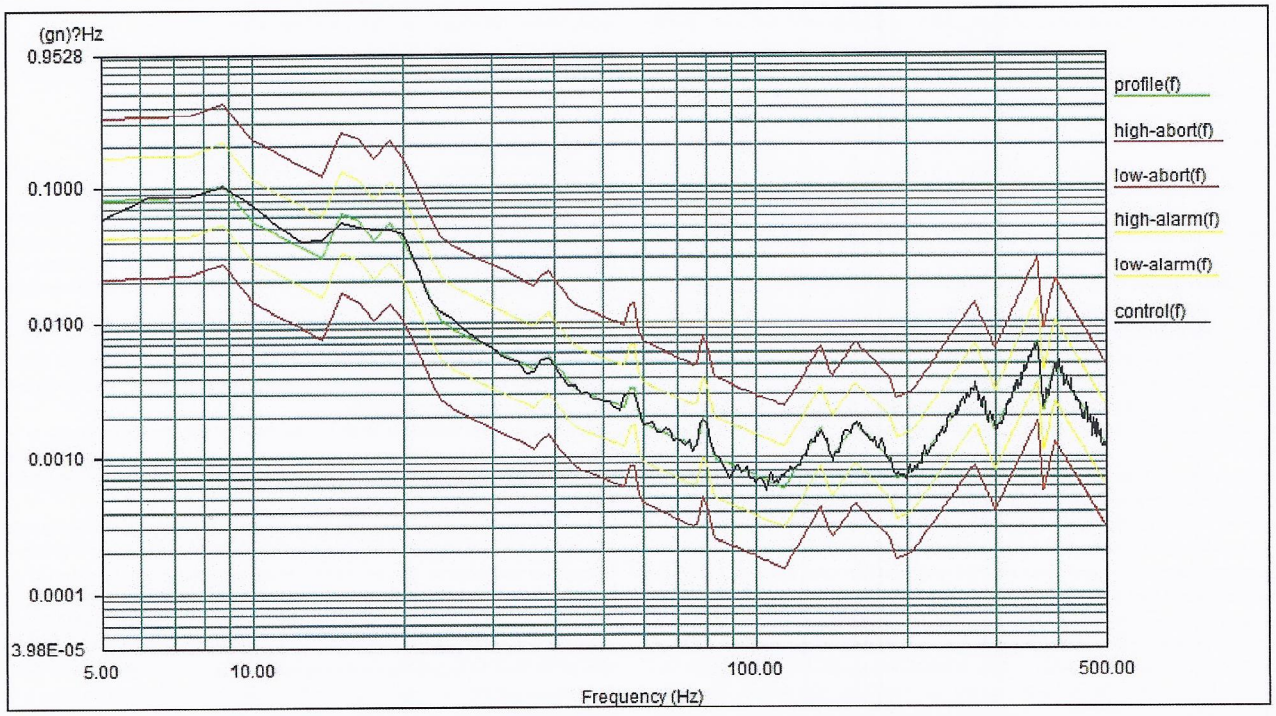
※ Appendix 1. Vibration data

Project File Name: MIL-STD-810G .prj
Profile Name: Vibration Test (Z axis)
Test Type: Random
Run Folder: .\Run May 24, 2013



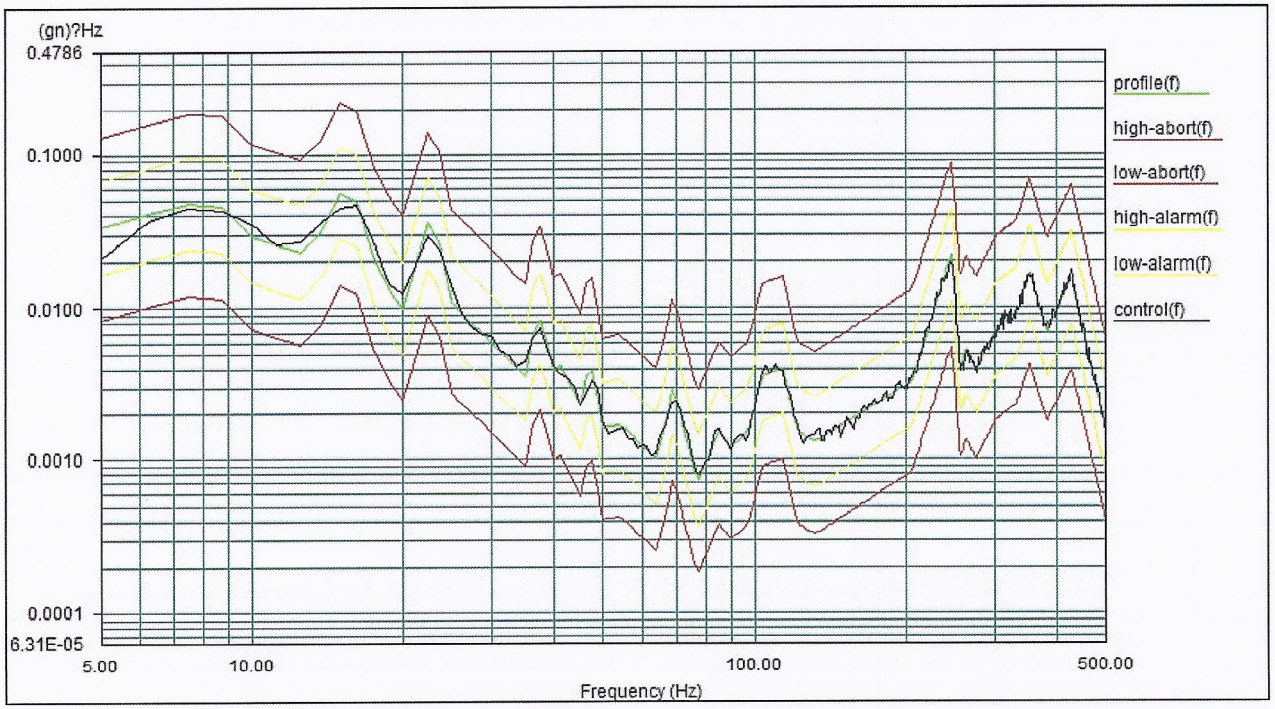
Level: 100 %
Control RMS: 2.280636 gn
Full Level Elapsed Time: 01:59:59
Lines: 800
Frame Time: 1.365333 Seconds
Demand RMS: 2.254850 gn
Remaining Time: 00:00:00
DOF: 154
dF: 0.732422 Hz
Data saved at 06:28:56 PM, Friday, May 24, 2013
Report created at 06:28:59 PM, Friday, May 24, 2013

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
Lines: 800
Remaining Time: 00:00:00
Control RMS: 1.492004 gn
Frame Time: 0.800000 Seconds
DOF: 154
Full Level Elapsed Time: 01:59:57
Demand RMS: 1.471470 gn
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
Lines: 800
Remaining Time: 00:00:00
Control RMS: 1.907421 gn
Frame Time: 0.800000 Seconds
DOF: 154
Full Level Elapsed Time: 01:59:54
Demand RMS: 1.898276 gn
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