

**KOREA TESTING &
RESEARCH INSTITUTE**

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Certificate No: CUS2015-1913

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1. Client

- o Name : GROUND Co.,Ltd
- o Address : 950, Deokgeum-ro, Geumwang-eup, Eumseong-gun, Chungcheongbuk-do, Republic of Korea
- o Date of Receipt : May. 13, 2015

2. Use of Report : Quality Control



3. Test sample : Third Generation Digital Lightning Protection Grounding Device

4. Date of Test : May. 13, 2015 ~ May. 13, 2015

5. Test method used : MIL-STD-810G : 2008 [Method 514.6]

6. Testing Environment : Temperature : (22.0 ± 3.0) °C, Humidity : (50 ± 20) % R.H.,

7. Test Results : See test results

Affirmation	Tested by	Technical Manager
	Name : Jung Jin Woo 	Name : Choi Ki Bo 

Note :

1. The test result of this test report only limited in the sample and sample name presented by the client and do not guarantee the all products of the client. You can check website (www.ktr.or.kr) or QR code to verify the certificate of authenticity.
2. This test report shall be used only within the purpose of its defined usage and shall not be used for public relation, advertisement and suit.
3. This test report is only valid when printed on KTR original report paper with hologram and re-issued by KTR. Written test result on copy of report and electric file is only for referece.

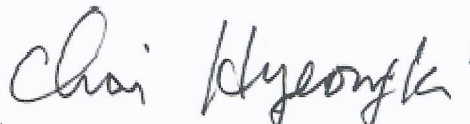
The above testing certificate is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

May. 26, 2015

Korea Testing & Research Institute

Accredited by KOLAS, republic of KOREA

President





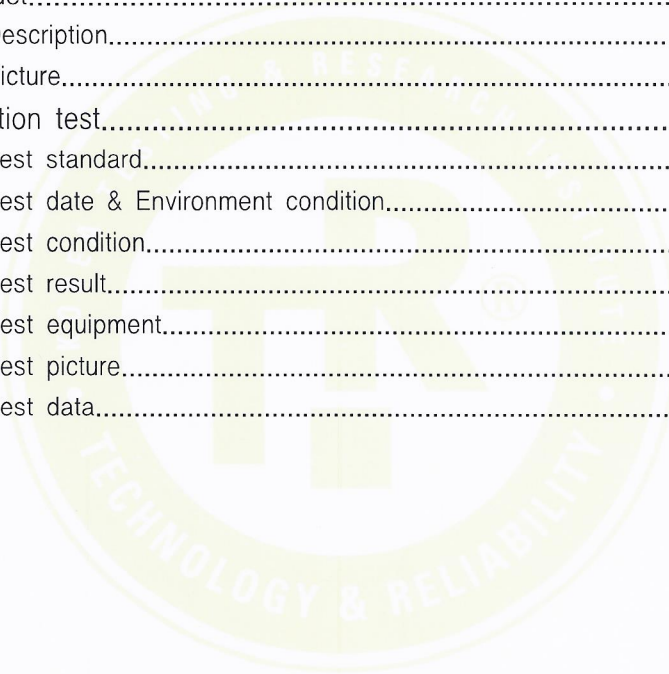
QR code for forgery

KTR-QI-Yi0053-F03(00)

Test Results

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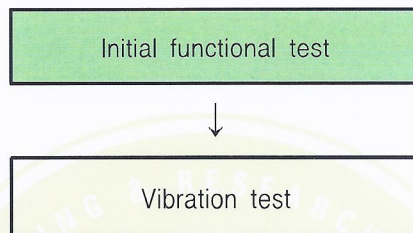


Test Results

1. Test summary

1.1 Test overview : This test was conducted on test sample according to the test specification presented by the client.

1.2 Test process



1.3 Summary of Test Result

Test Clause	Test standard	Test results
Vibration test	MIL-STD-810G : 2008 [Method 514.6C-3]	No abnormal was found

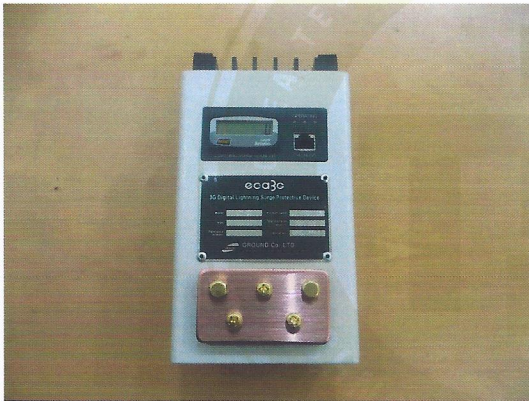
Test Results

2. Product

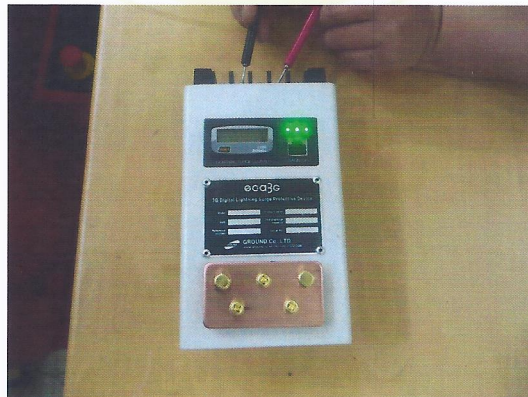
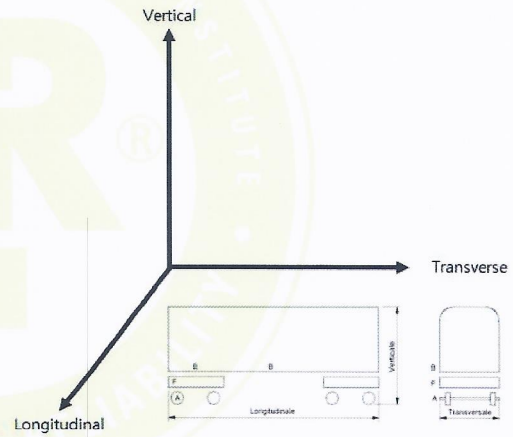
2.1 Description

Client : GROUND Co., Ltd
Manufacturer : GROUND Co., Ltd
Product : Third Generation Digital Lightning Protection Grounding Device
Model : LP-3P
Serial No. : AEKELP3P0910
Input voltage : AC 220 V
Sample quantity : 1 EA

2.2 Picture



LP-3P



Functional Test

Test Results

3. Vibration test

3.1 Test standard : MIL-STD-810G : 2008 [Method 514.6C-3]

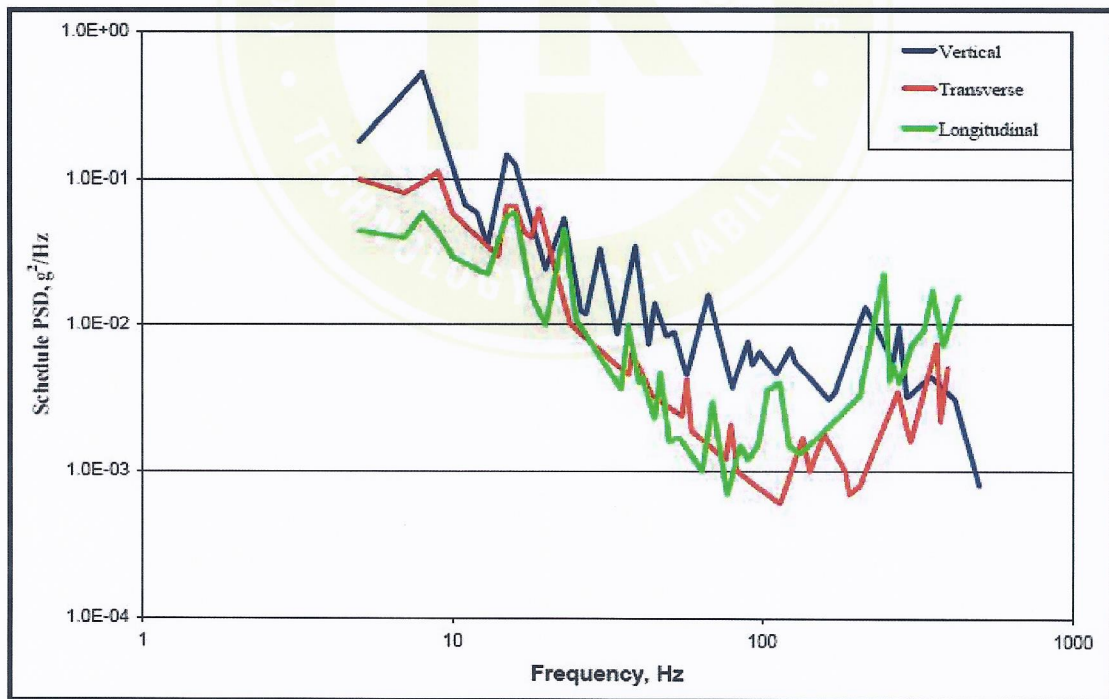
3.2 Test date & Environment condition

Test date : May. 13, 2015

Environment condition : Temp : (22.0 ± 3.0) °C, Hum : (50 ± 20) % R.H., Press : -

3.3 Test condition

Clause	Contents
Test status of products	<input checked="" type="checkbox"/> Non-operation <input type="checkbox"/> Operation
Test time	<input checked="" type="checkbox"/> Vertical : 2 h <input checked="" type="checkbox"/> Transverse : 2 h <input checked="" type="checkbox"/> Longitudinal : 2 h
Final measurements	<input checked="" type="checkbox"/> Visual inspection : Mechanical damage, loosening of screw, etc.
	<input checked="" type="checkbox"/> Functional test : Lighting check



<Vibration Test Profile>

Test Results

Vertical		Transverse		Longitudinal	
Frequency (Hz)	PSD (g^2/Hz)	Frequency (Hz)	PSD (g^2/Hz)	Frequency (Hz)	PSD (g^2/Hz)
5	0.175 9	5	0.099 8	5	0.044 1
8	0.512 0	7	0.079 9	7	0.039 0
11	0.066 0	9	0.111 5	8	0.057 6
12	0.058 5	10	0.057 7	9	0.043 0
13	0.034 8	14	0.029 4	10	0.029 3
15	0.144 1	15	0.065 1	13	0.022 1
16	0.123 7	16	0.064 6	15	0.055 8
20	0.024 1	17	0.043 6	16	0.058 5
23	0.053 6	18	0.039 3	18	0.016 0
26	0.012 4	19	0.062 2	20	0.009 9
27	0.011 8	24	0.010 0	23	0.045 2
30	0.033 1	37	0.004 5	25	0.011 0
34	0.008 6	38	0.006 5	35	0.003 6
39	0.034 7	44	0.003 3	37	0.009 8
43	0.007 3	55	0.002 4	40	0.004 0
45	0.014 1	57	0.004 2	41	0.004 4
49	0.008 4	59	0.001 9	45	0.002 3
52	0.008 9	76	0.001 2	47	0.004 7
57	0.004 5	79	0.002 1	50	0.001 6
67	0.016 0	83	0.001 0	54	0.001 7
80	0.003 7	114	0.000 6	64	0.001 0
90	0.007 7	135	0.001 7	69	0.003 0
93	0.005 3	142	0.001 0	77	0.000 7
98	0.006 5	158	0.001 8	85	0.001 5
99	0.006 3	185	0.001 0	90	0.001 2
111	0.004 6	191	0.000 7	97	0.001 5
123	0.006 9	206	0.000 8	104	0.003 6
128	0.005 5	273	0.003 5	114	0.004 0
164	0.003 1	300	0.001 6	122	0.001 5
172	0.003 5	364	0.007 4	132	0.001 3
215	0.013 3	374	0.002 2	206	0.003 3
264	0.005 6	395	0.005 1	247	0.022 6
276	0.009 6	500	0.001 2	257	0.004 1
292	0.003 2	r.m.s. = 1.48 g		264	0.005 4
348	0.004 4			276	0.004 0
417	0.003 1			303	0.007 3
500	0.000 8			332	0.009 2
r.m.s. = 2.24 g				353	0.017 2
				382	0.007 1
				428	0.015 7
				500	0.001 6
				r.m.s. = 1.90 g	

Test Results

3.4 Test result

Vibration direction	Visual inspection	Functional test
Longitudinal	No abnormal was found	Normal Operation
Transverse	No abnormal was found	Normal Operation
Vertical	No abnormal was found	Normal Operation

3.5 Test equipment

Equipments	Model No.	Manufacturer	Calibration Date	Calibration Institutions
Vibrator	V8-440/LPT900&SPA56K	LDS	2015.02.13	SICT
Sensor	353B03(LW174613)	PCB	2014.08.13	KTL



Test Results

3.6 Test picture



<Longitudinal>



<Transverse>

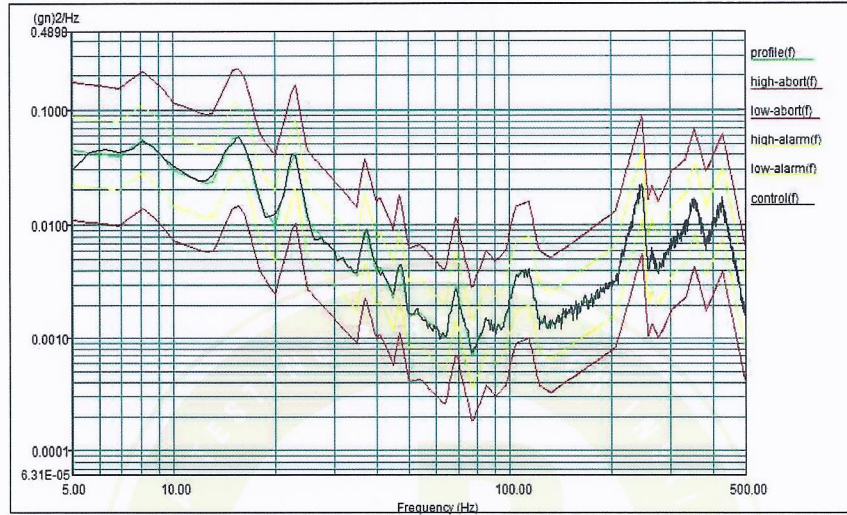


<Vertical>

Test Results

3.7 Test data

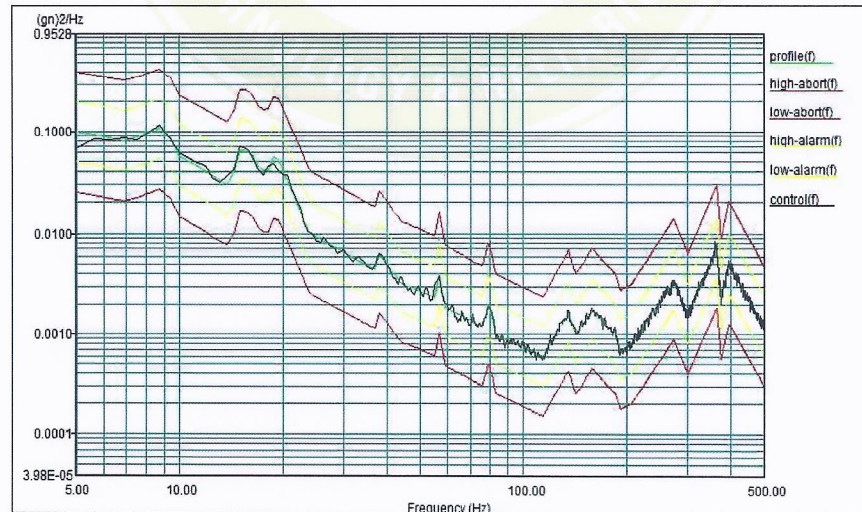
DUT:
 Serial Number:
 Project File Name: x축.pri
 Profile Name: Default Test Type: Random Run Folder: RunFolder May 13, 2015 11-38-09



Level: 100 %
 Control RMS: 1.901519 gn Full Level Elapsed Time: 02:00:00 Lines: 800 Frame Time: 1.600000 Seconds
 Demand RMS: 1.898630 gn Remaining Time: 00:00:00 DOF: 154 dE: 0.625000 Hz

<Vibration test data(Longitudinal)>

DUT:
 Serial Number:
 Project File Name: y축(RANDOM).pri
 Profile Name: Default Test Type: Random Run Folder: RunFolder May 13, 2015 13-54-37



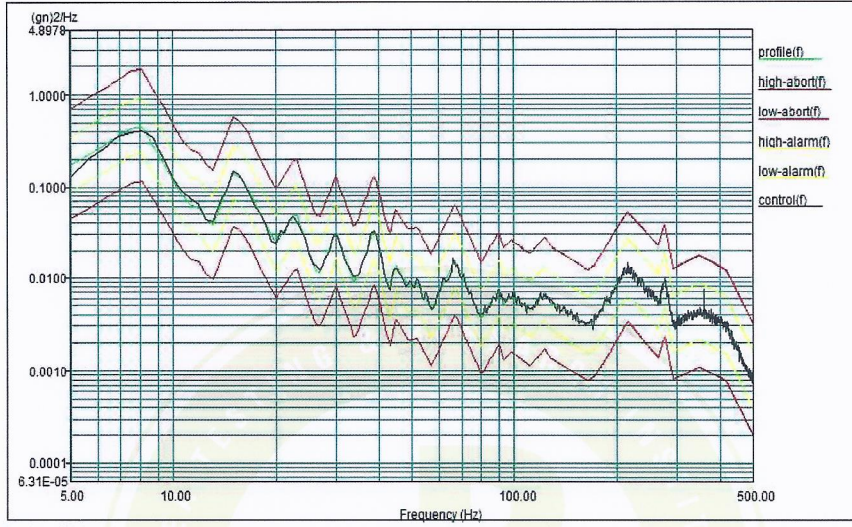
Level: 100 %
 Control RMS: 1.467062 ga Full Level Elapsed Time: 02:00:00 Lines: 800 Frame Time: 1.600000 Seconds
 Demand RMS: 1.467653 ga Remaining Time: 00:00:00 DOF: 154 dE: 0.625000 Hz

<Vibration test data(Transverse)>

Test Results

3.7 Test data

DUT:
Serial Number:
Project File Name: vertical.gvj
Profile Name: Default Test Type: Random Run Folder: RunFolder May 13, 2015 16-42-50



Level: 100 %
Control RMS: 2.239168 gn Full Level Elapsed Time: 02:00:00 Lines: 800 Frame Time: 1.600000 Seconds
Demand RMS: 2.241849 gn Remaining Time: 00:00:00 DOF: 154 dF: 0.625000 Hz

<Vibration test data(Vertical)>