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1 Cover Page

TEST REPORT

Application No.:	SHEM1304000586EB
Applicant:	GOLDEN MOTOR TECHNOLOGY CO., LTD
Manufacturer:	Not supplied by the client.
Factory:	Not supplied by the client.
Product Name:	HUB MOTOR
Model No.:	MINI PIE MOTOR
Standards:	EN 61000-6-3:2007+A1:2011 EN 61000-6-1:2007
Date of Receipt:	April 12, 2013
Date of Test:	April 19, 2013 to April 26, 2013
Date of Issue:	April 28, 2013
Test Result:	**Pass***

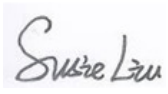
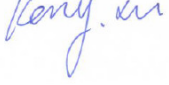
* In the configuration tested, the EUT (Equipment under test) complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

Tony Wu
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		April 27, 2013		Original

Authorized for issue by:				
Engineer		Terry Hou **Print Name**		 **Date: (April 26, 2013)**
Clerk		Susie Liu **Print Name**		 **Date: (April 27, 2013)**
Reviewer		Keny Xu **Print Name**		 **Date: (April 28, 2013)**

3 Test Summary

ELECTROMAGNETIC INTERFERENCE (EMI)				
Test	**Test Requirement**	**Test Method**	**Class / Severity**	**Result**
Radiated Emission, 30MHz to 1GHz	EN 61000-6-3:2007+ A1:2011	CISPR 16-2-3:2006	Table 1 Column 3 of EN61000-6-3	PASS
Electromagnetic Susceptibility (EMS)				
Test	**Test Requirement**	**Test Method**	**Class / Severity**	**Result**
ESD	EN 61000-6-1:2007	EN 61000-4-2:2009	Contact ± 4 kV Air ± 8 kV	PASS
Radiated Immunity	EN 61000-6-1:2007	EN 61000-4-3:2006 +A1:2008+A2:2010	(80MHz to 1GHz, 1.4GHz to 2GHz) 3 V/m, 80%, 1kHz Amp. Mod. (2GHz to 2.7GHz) 1V/m, 80%, 1kHz Amp. Mod.	PASS
Power frequency magnetic fields	EN 61000-6-1:2007	EN 61000-4-8:2010	50/60Hz,3A/m	N/A**

Remark :
N/A: Not applicable.

Note:**The Power-frequency magnetic field test will not apply to the equipment containing no components susceptible to magnetic fields, such as Hall elements or magnetic field sensors, according to EN 61000-6-1.

4 Contents

5 General Information

5.1 Client Information

Applicant:	GOLDEN MOTOR TECHNOLOGY CO., LTD
Address of Applicant:	Block 8, Modern Industrial Center, 801 Changwu Middle Road, Changzhou, Jiangsu, China 213164
Manufacturer:	Not supplied by the client.
Address of Manufacturer:	Not supplied by the client.
Factory:	Not supplied by the client.
Address of Factory:	Not supplied by the client.

5.2 General Description of E.U.T.

Product Name:	HUB MOTOR
Model No.:	MINI PIE MOTOR

5.3 Details of E.U.T.

Power Supply:		DC 36V
Cable Type:	DC Cable	About 0.50m Length (2 Wires)
Function:		Running mode
Running mode:		Keep the motor running continuously.

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Monitoring of EUT for All Immunity Test

Audio:	None
Visual:	Working status of the EUT.

5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

5.9 Test Facility

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: **R-3868** and **C-4336** respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

5.10 Measurement Uncertainty

According to CISPR 16-4-2.

Test Item	Frequency Range	Measurement Uncertainty	U_{cispr}
Conducted Emission at mains port using AMN	9kHz-150kHz	3.2dB	3.8dB
Conducted Emission at mains port using AMN	150kHz-30MHz	2.6dB	3.4dB
Conducted Emission at mains port using VP	9kHz-30MHz	3.9dB	2.9dB
Conducted Emission at telecommunication port using AAN	150kHz-30MHz	4.5dB	5.0dB
Radiated Emission	30MHz-1000MHz	4.3dB	6.3dB
Radiated Emission	1GHz-18GHz	4.5dB	5.2dB(1GHz-6GHz)
			5.5dB(6GHz-18GHz)
Disturbance Power	30MHz-300MHz	2.6dB	4.5dB
Remark: AMN – Artificial Mains Network VP – Voltage Probe ANN – Asymmetric Artificial Network			

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6 Equipment list

Radiated Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2012-05-15	2013-05-14
2	Antenna	SCHWARZBECK	VULB9168	9168-313	2013-03-07	2014-03-06
3	CONTROLLER	INNCO	CO200	474	/	/
4	Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2013-03-07	2014-03-06
5	Antenna	SCHWARZBECK	BBHA9170	9170-373	2013-03-07	2014-03-06
6	Low nosie amplifier	LNA6900	TESEQ	71033	2013-02-23	2014-02-22

Electrostatic Discharge Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Electrostatic Discharge Simulator	TESEQ	NSG 437	468	2012-08-13	2013-08-12

Radiated Immunity

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Single Generator	Rohde & Schwarz	SMR40	100555	2012-04-12	2013-04-11
2	Calibrated Stacked Lagarithmic-Periodic Test-Antenna	SCHWARIBFCK	STLP 9128D	9128 D 055	2012-11-13	2013-11-12
3	Stacked DoubleLog-Per. Antenna	SCHWARIBFCK	STLP 9149	9149-187	2012-11-13	2013-11-12
4	Power Amplifiers	MILMEGA	80RF1000-250	1053058	2012-11-29	2013-11-28
5	Power Amplifiers	MILMEGA	AS0840-55-55	1053059	2012-11-23	2013-11-22
6	Power Meter	Rohde & Schwarz	NRP	101641	2013-02-23	2014-02-22
7	Electromagnetic Field Probe	ETS-Lindgren	HI-6105	D445 050 S	2012-10-17	2013-10-16

General Equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Digital pressure meter	YONGZHI	DYM3-01	101012	2012-01-16	2014-01-15
2	Digital Multimeter	FLUKE	17B	10560713	2013-01-07	2014-01-06
3	Temperature& humidity recorder	ShangHai weather meter work	ZJ 1-2B	0804081 0802150 0805177	2012-08-27	2013-08-26

7 Emission Test Results

7.1 Radiated Emissions, 30MHz to 1GHz

Test Requirement: EN 61000-6-3

Test Method: CISPR 16-2-3

Test Date: April 26, 2013

Test voltage: DC 36V

Frequency Range: 30MHz to 1GHz

Measurement Distance: 3m

Detector: Peak for pre-scan (120kHz resolution bandwidth)

Quasi-Peak if maximised peak within 6dB of limit

Limit:

For 3m

Frequency range MHz	**Quasi-peak limits** dB (μV/m)
30 to 230	40
230 to 1000	47
At transitional frequencies the lower limit applies.	

7.1.1 E.U.T. Operation

Operating Environment:

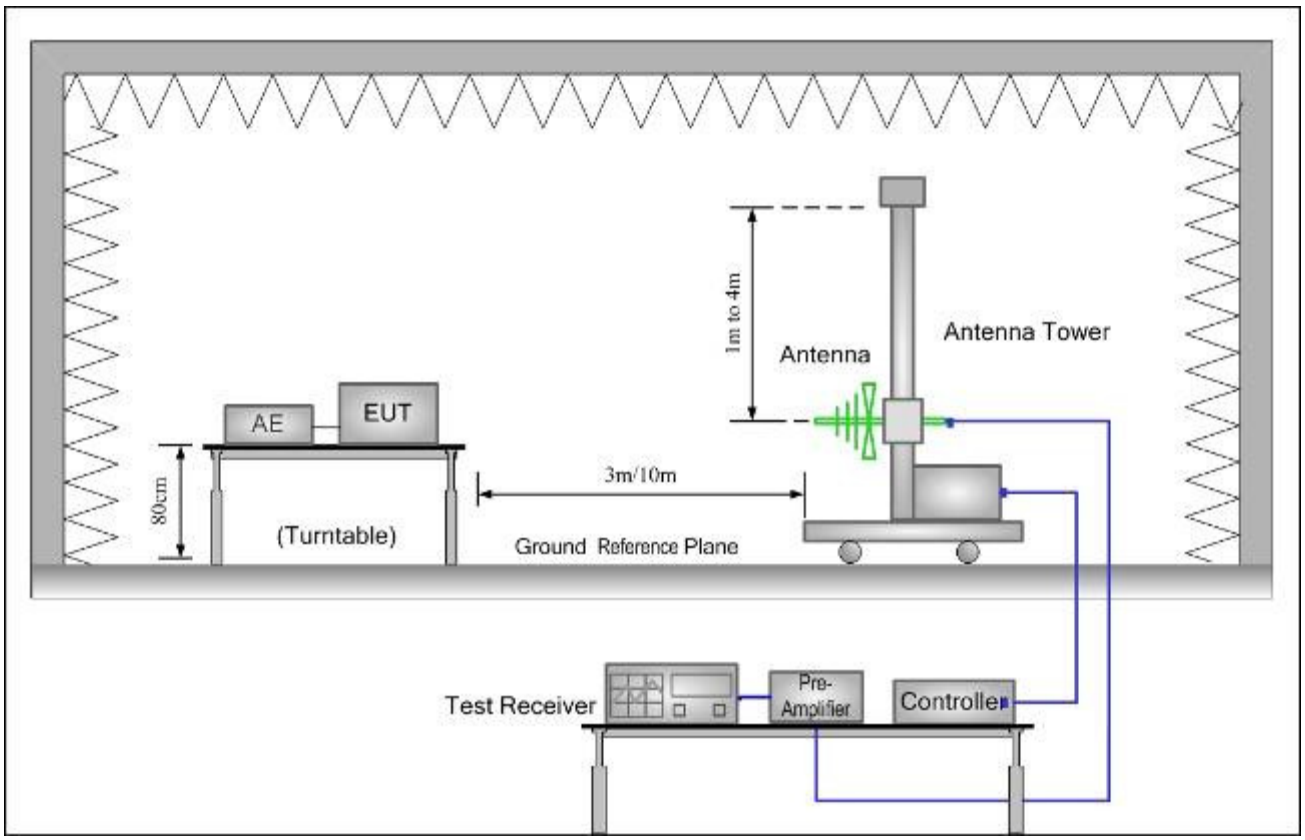
Temperature: 20.3°C Humidity:50.0% RH Atmospheric Pressure:102.4 kPa

Test mode: Running mode

Pre-scan was performed with peak detected on all ports, Quasi-peak measurements was performed at the frequencies at which maximum peak emission level were detected.
Please see the attached Quasi-peak test results.

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

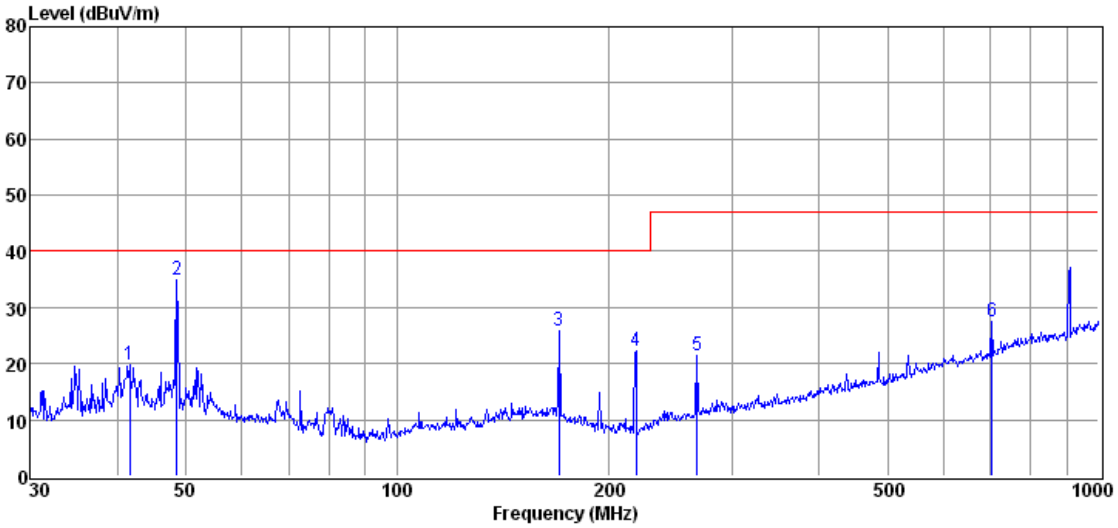
7.1.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement, the physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

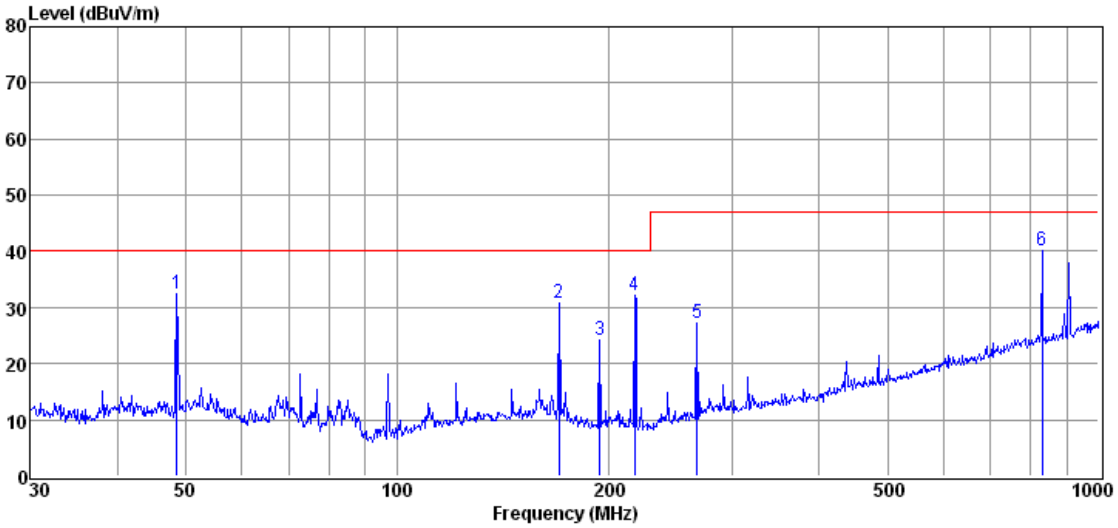
7.1.3 Measurement Data

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
1	41.57	30.77	13.24	24.70	0.57	19.88	40.00	-20.12	QP
2	48.50	46.16	12.89	24.70	0.64	34.99	40.00	-5.01	QP
3	170.20	36.78	12.28	24.60	1.36	25.82	40.00	-14.18	QP
4	219.08	36.18	9.11	24.60	1.60	22.29	40.00	-17.71	QP
5	267.55	32.91	11.34	24.50	1.81	21.56	47.00	-25.44	QP
6	704.23	27.86	20.52	24.10	3.16	27.44	47.00	-19.56	QP

Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
1	48.50	43.58	12.89	24.70	0.64	32.41	40.00	-7.59	QP
2	170.20	41.84	12.28	24.60	1.36	30.88	40.00	-9.12	QP
3	194.45	37.89	9.52	24.60	1.48	24.29	40.00	-15.71	QP
4	218.31	45.97	9.12	24.60	1.59	32.08	40.00	-7.92	QP
5	267.55	38.45	11.34	24.50	1.81	27.10	47.00	-19.90	QP
6	830.40	38.16	22.44	23.90	3.51	40.21	47.00	-6.79	QP

8 Immunity Test Results

8.1 Performance Criteria Description in Clause 4 of EN 61000-6-1

Criterion A:
The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion B:
The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criterion C:
Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

8.2 Electrostatic Discharge (ESD)

Test Requirement:	EN 61000-6-1	
Test Method:	EN 61000-4-2	
Test Date:	April 19, 2013	
Test voltage:	DC 36V	
Discharge Impedance:	330 Ω / 150 pF	
Discharge Voltage:	Air Discharge:	8 kV
	Contact Discharge:	4 kV
	VCP / HCP:	4 kV
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 10 times at each test point	
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	

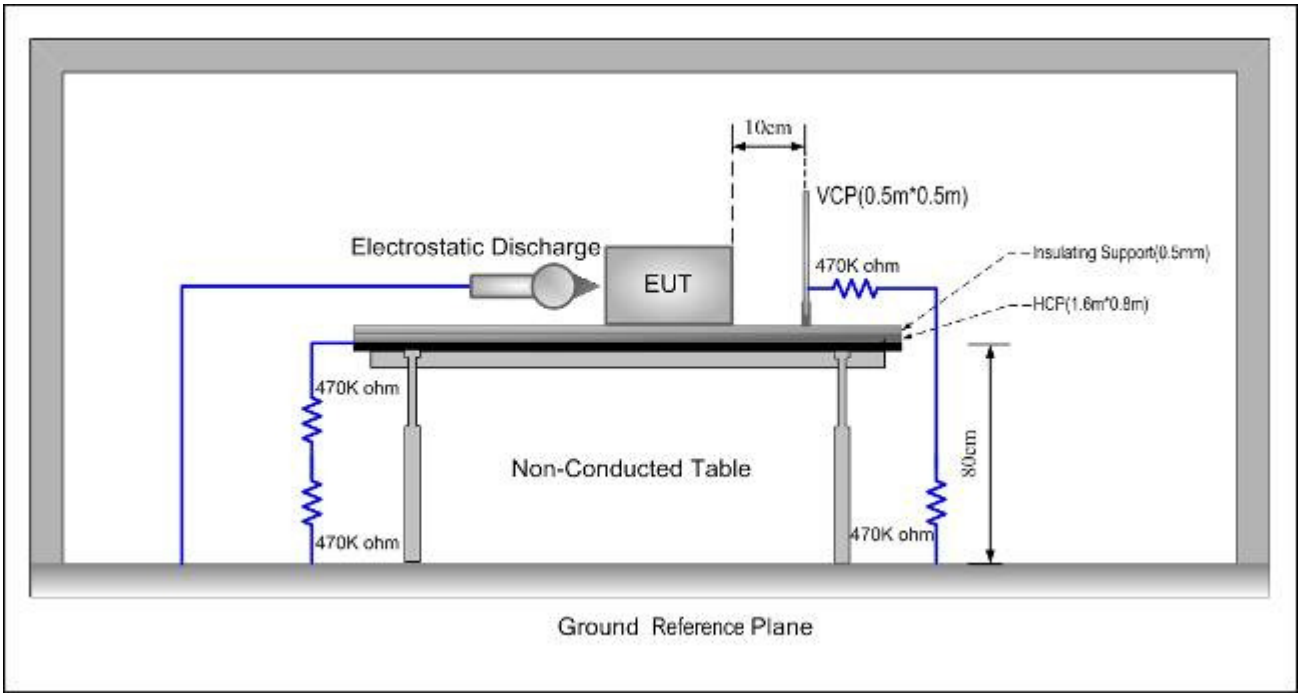
8.2.1 E.U.T. Operation

Operating Environment:

Temperature: 21.0°C Humidity:45.0% RH Atmospheric Pressure:101.4 kPa

Test mode: Running mode

8.2.2 Test Setup and Procedure



1. Contact discharge was applied only to conductive surfaces of the EUT. Air discharge was applied only to non-conducted surfaces of the EUT.
2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane(GRP).
3. A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size while HCP were constructed from the same material type and thinness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface excepted the GRP, HCP and VCP was greater than 1m.
4. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
5. After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances were used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

8.2.3 Test Results

Direct Application Test Results

Observations: Test Point: 1. All insulated enclosure & seams.
2. All accessible metal parts of the enclosure with discharge resistor used.

Direct Application			Test Results	
Discharge Level (kV)	**Polarity (+/-)**	**Test Point**	**Contact Discharge**	**Air Discharge**
8	+/-	1	N/A	A
4	+/-	2	A	N/A

Indirect Application Test Results

Observations: Test Point: 1. All sides.

Indirect Application			Test Results	
Discharge Level (kV)	**Polarity (+/-)**	**Test Point**	**Horizontal Coupling**	**Vertical Coupling**
4	+/-	1	A	A

Results: Pass

Test phenomenon description for the EUT:

1. The EUT working is normal, Before the conditioning.
2. No any change in status of the EUT was observed, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

N/A: Not Applicable (not required by Standard).

8.3 Radiated Immunity

Test Requirement:	EN 61000-6-1
Test Method:	EN 61000-4-3
Test Date:	April 26, 2013
Test voltage:	DC 36V
Frequency Range:	80MHz to 1GHz,1.4GHz to 2.0GHz, 2.0GHz to 2.7GHz
Antenna Polarization:	Horizontal & Vertical
Test level:	3 V/m & 3V/m & 1 V/m
Modulation:	80% 1kHz Amplitude Modulated

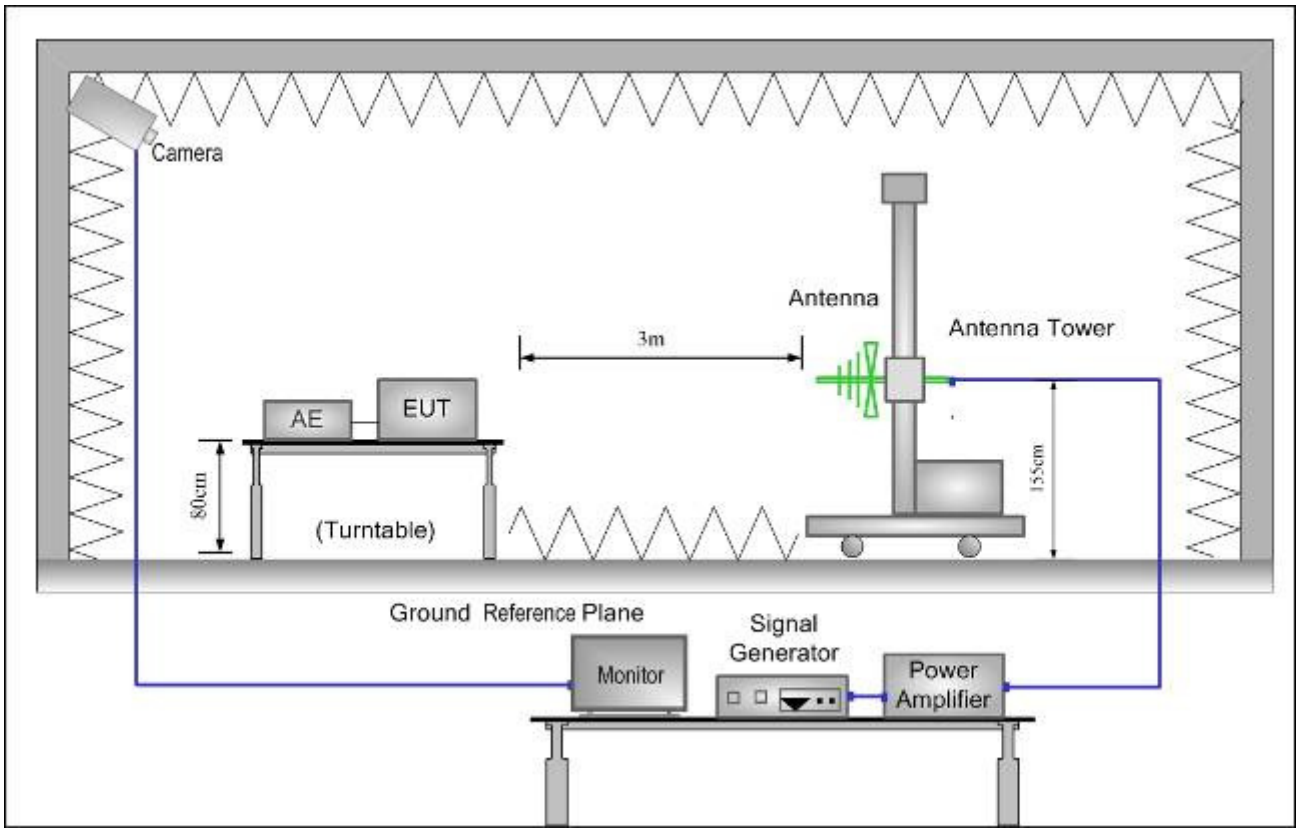
8.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.3°C Humidity:50.0% RH Atmospheric Pressure:102.4 kPa

Test mode: Running mode

8.3.2 Test Setup and Procedure



1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.
3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).
4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceeded 1% of the preceding frequency value.
5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.
6. The test normally was performed with the generating antenna facing each side of the EUT.
7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or an audio monitor were used to monitor the performance of the EUT.

8.3.3 Test Results:

Frequency	Level	Modulation	Dwell Time	Test Mode	Antenna Polarization	EUT Face	Result / Observations
80MHz-1.0GHz 1.4GHz-2.0GHz	3 V/m	1 kHz, 80% Amp. Mod, 1 % increment	3s	Running mode	V	Front	A
					H		A
					V	Rear	A
					H		A
					V	Left	A
					H		A
2.0GHz -2.7GHz	1 V/m				V	Right	A
					H		A
					V	Top	N/A
					H		N/A
					V	Bottom	N/A
					H		N/A

Remarks:

Front: the front of the EUT faces to transmitting antenna (refer to Radiated Immunity test setup photo)

Test phenomenon description for the EUT:

1. The EUT working is normal, Before the conditioning.
2. No any change in status of the EUT was observed, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

N/A: Not applicable.

The EUT does meet the Radiated Immunity requirements of Standard.

9 Photographs

9.1 Radiated Emission Test Setup

9.2 ESD Test Setup

9.3 Radiated Immunity Test Setup

10 EUT Constructional Details

10.1 Exterior of EUT

--End of Report--