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This test report is according to:

EN 61000-6-4: 2007 Electromagnetic compatibility (EMC) – Generic standards – Emission standard for industrial environment
EN 61000-6-2: 2005 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environment

1. Product Information

Test Model Name: MME812
Ratings: AC340-440V 50/60HZ
Serial Number: 782140T2013553
Product description: Ontrac Intelligence Electric Actuator

2. Test date & Address

Date of Test: June 10. 2020 – June 13. 2020
Date of Report: June 13. 2020
Address: 3F, North 2 Suite, No. 334 Jinhu Road 201206 Shanghai China

3. Standard:

EN 61000-6-4: 2007
EN 61000-6-2: 2005
EN 61000-3-2: 2006 + A1: 2009 + A2:2009
EN61000-3-3: 2008

4. Teat Result: Positive

Compiled by	Supervised by	Approved by
Yang Ming/Test Engineer	Liu Chao/Technical Mgr	Scott Li/GM

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1. Summary of Standard and Results

EMMISSION (EN 61000-6-4: 2007

Description of Test Item	Standard	Result
Conducted disturbance at mains terminals	EN 55011: 2009	Pass
Radiated disturbance	EN 55011: 2009	Pass
Harmonic current emissions	EN 61000-3-2: 2006+A1: 2009+A2: 2009	Pass
Voltage fluctuations & flicker	EN 61000-3-3: 2008	Pass

IMMUNITY (EN 61000-6-2: 2005

Description of Test Item	Standard	Result
Electrostatic discharge (ESD)	EN 61000-4-2: 2009	Pass
Radio-frequency. Continuous radiated disturbance	EN 61000-4-3: 2006+A1: 2008	Pass
Electrical fast transient (EFT)	EN 61000-4-4: 2004+A1: 2010	Pass
Surge (Input a.c. power ports)	EN 61000-4-5: 2006	Pass
Surge (Telecommunication ports)	EN 61000-4-5: 2006	Pass
Radio-frequency. Continuous conducted disturbance	EN 61000-4-6: 2009	Pass
Power frequency magnetic field	EN 61000-4-8: 2010	Pass
Voltage dips. >95% reduction	EN 61000-4-11: 2004	Pass
Voltage interruptions	EN 61000-4-11: 2004	Pass
Voltage dips. 30% reduction	EN 61000-4-11: 2004	Pass

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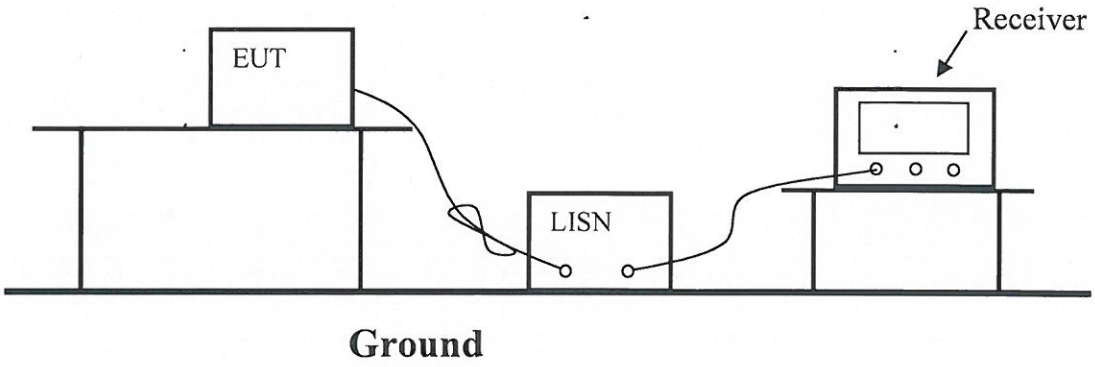
2. Power Line Conducted Emission Measurement

2.1 Block Diagram of Test Setup



2.2 Test Standard: EN 5501: 2009

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

2.3 Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided 50-ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55011 regulations during conducted emission measurement.
The bandwidth of the field strength meter is set at 9kHz in 150kHz~30MHz and 200Hz in 9kHz~150kHz.
The frequency range from 150kHz to 30MHz is investigated

2.4 Test Result: Pass

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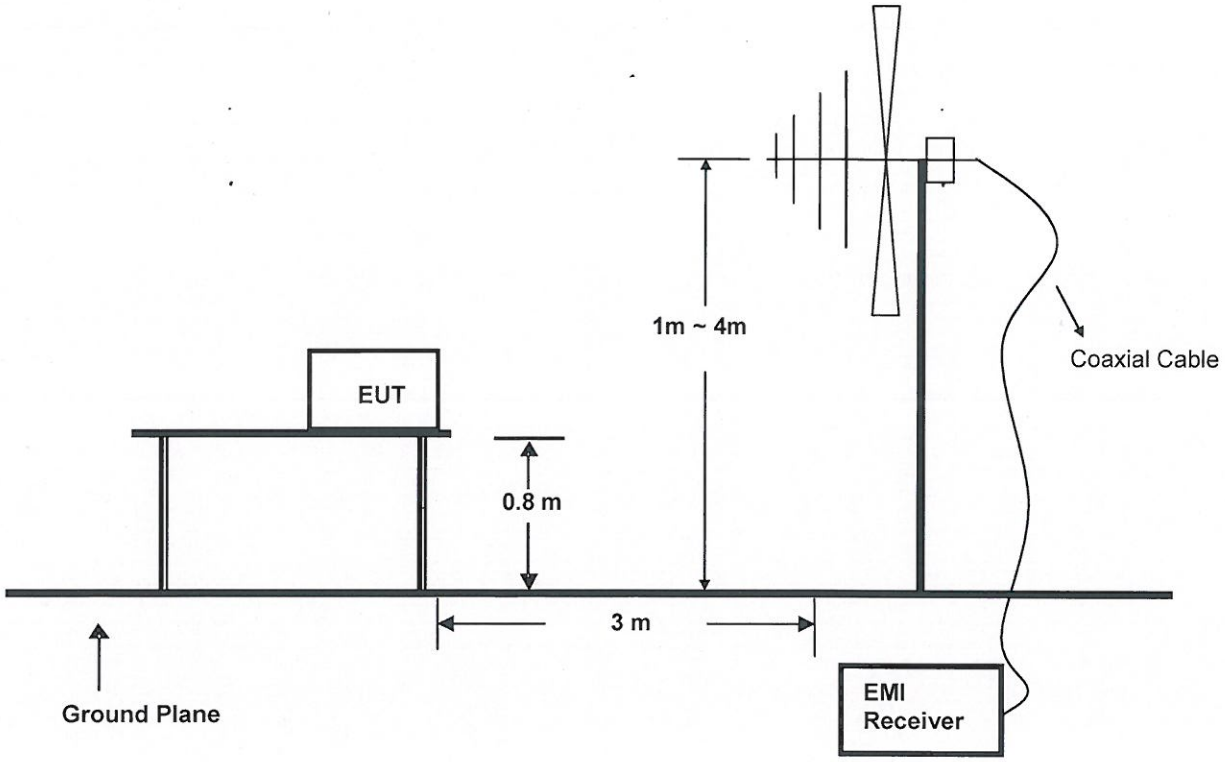
3. Radiated Emission Measurement

3.1 Block Diagram of Test Setup



3.2 Measuring Standard: EN 55011: 2009

3.3 Radiated Emission Limits

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

3.4 Test Procedure

The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. By-log antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The bandwidth of the Receiver is set at 120kHz.
The frequency range from 30MHz to 1000MHz is investigated.

3.5 Test Result: Pass

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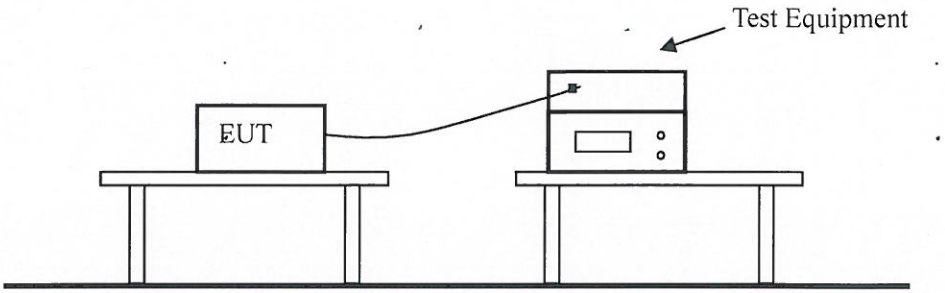
4. Harmonic Current Emission Measurement

4.1 Block Diagram of Test Setup



4.2 Test Standard: EN 61000-3-2: 2006+A1: 2009+A2: 2009

4.3 Test Result

E.U.T. : Pass;

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 150%:	
Order (n):	None

Power Source: Pass

First dataset out of limit:	
DS (time):	None
Harmonic(s) out of limit:	
Order (n):	None

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Average harmonic current results

Hn	Ieff [A]	Ieff [%]	Limit [A]	Result
1	68.718E-3	100.000		
2	674.010E-6	0.981	1.08	PASS
3	30.919E-3	44.994	2.30	PASS
4	1.744E-3	2.538	430.00E-3	PASS
5	26.214E-3	38.147	1.14	PASS
6	664.419E-6	0.967	300.00E-3	PASS
7	9.697E-3	14.111	770.00E-3	PASS
8	664.428E-6	0.967	230.00E-3	PASS
9	2.931E-3	4.265	400.00E-3	PASS
10	766.682E-6	1.116	184.00E-3	PASS
11	4.070E-3	5.923	330.00E-3	PASS
12	705.110E-6	1.026	153.33E-3	PASS
13	2.792E-3	4.063	210.00E-3	PASS
14	844.529E-6	1.229	131.43E-3	PASS
15	1.424E-3	2.072	150.00E-3	PASS
16	801.006E-6	1.166	115.00E-3	PASS
17	1.595E-3	2.321	132.35E-3	PASS
18	995.910E-6	1.449	102.22E-3	PASS
19	777.036E-6	1.131	118.42E-3	PASS
20	763.853E-6	1.112	92.00E-3	PASS
21	982.314E-6	1.429	160.71E-3	PASS
22	983.664E-6	1.431	83.64E-3	PASS
23	1.047E-3	1.524	146.74E-3	PASS
24	824.077E-6	1.199	76.66E-3	PASS
25	1.098E-3	1.598	135.00E-3	PASS
26	751.602E-6	1.094	70.77E-3	PASS
27	0.998E-3	1.453	124.99E-3	PASS
28	784.223E-6	1.141	65.71E-3	PASS
29	1.096E-3	1.595	116.39E-3	PASS
30	754.799E-6	1.098	61.33E-3	PASS
31	888.883E-6	1.294	108.87E-3	PASS
32	792.443E-6	1.153	57.50E-3	PASS
33	930.402E-6	1.354	102.27E-3	PASS
34	733.239E-6	1.067	54.12E-3	PASS
35	740.197E-6	1.077	96.44E-3	PASS
36	824.281E-6	1.200	51.11E-3	PASS
37	657.073E-6	0.956	91.21E-3	PASS
38	704.489E-6	1.025	48.42E-3	PASS
39	713.781E-6	1.039	86.53E-3	PASS
40	759.874E-6	1.106	46.00E-3	PASS

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Maximum harmonic current results

Hn	Ieff [A]	Ieff [%]	Limit [A]	Result
1	70.668E-3	100.000		
2	757.447E-6	1.072	1.62	PASS
3	32.064E-3	45.372	3.45	PASS
4	1.955E-3	2.766	645.00E-3	PASS
5	26.937E-3	38.118	1.71	PASS
6	832.054E-6	1.177	450.00E-3	PASS
7	10.113E-3	14.311	1.15	PASS
8	826.050E-6	1.169	345.00E-3	PASS
9	3.464E-3	4.902	600.00E-3	PASS
10	839.598E-6	1.188	276.00E-3	PASS
11	4.311E-3	6.100	495.00E-3	PASS
12	801.711E-6	1.134	229.99E-3	PASS
13	2.939E-3	4.158	315.00E-3	PASS
14	1.017E-3	1.439	197.15E-3	PASS
15	1.675E-3	2.370	225.00E-3	PASS
16	927.851E-6	1.313	172.50E-3	PASS
17	1.831E-3	2.591	198.52E-3	PASS
18	1.121E-3	1.587	153.33E-3	PASS
19	1.026E-3	1.452	177.63E-3	PASS
20	919.320E-6	1.301	138.00E-3	PASS
21	1.338E-3	1.893	160.71E-3	PASS
22	1.096E-3	1.551	125.46E-3	PASS
23	1.279E-3	1.810	146.74E-3	PASS
24	929.094E-6	1.315	114.99E-3	PASS
25	1.316E-3	1.862	135.00E-3	PASS
26	922.229E-6	1.305	106.16E-3	PASS
27	1.167E-3	1.651	124.99E-3	PASS
28	901.988E-6	1.276	98.57E-3	PASS
29	1.214E-3	1.718	116.39E-3	PASS
30	915.613E-6	1.296	92.00E-3	PASS
31	1.087E-3	1.538	108.87E-3	PASS
32	932.515E-6	1.320	86.25E-3	PASS
33	1.149E-3	1.627	102.27E-3	PASS
34	862.854E-6	1.221	81.18E-3	PASS
35	976.156E-6	1.381	96.44E-3	PASS
36	952.313E-6	1.348	76.66E-3	PASS
37	741.728E-6	1.050	91.21E-3	PASS
38	804.307E-6	1.138	72.63E-3	PASS
39	801.341E-6	1.134	86.53E-3	PASS
40	878.403E-6	1.243	69.00E-3	PASS

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Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.73	100.301		
2	37.36E-3	0.016	0.2	PASS
3	95.93E-3	0.042	0.9	PASS
4	45.02E-3	0.020	0.2	PASS
5	63.66E-3	0.028	0.4	PASS
6	38.40E-3	0.017	0.2	PASS
7	85.61E-3	0.037	0.3	PASS
8	31.95E-3	0.014	0.2	PASS
9	53.09E-3	0.023	0.2	PASS
10	12.86E-3	0.006	0.2	PASS
11	71.23E-3	0.031	0.1	PASS
12	16.23E-3	0.007	0.1	PASS
13	66.15E-3	0.029	0.1	PASS
14	19.69E-3	0.009	0.1	PASS
15	68.33E-3	0.030	0.1	PASS
16	34.77E-3	0.015	0.1	PASS
17	114.04E-3	0.050	0.1	PASS
18	20.70E-3	0.009	0.1	PASS
19	33.26E-3	0.014	0.1	PASS
20	24.53E-3	0.011	0.1	PASS
21	82.06E-3	0.036	0.1	PASS
22	19.67E-3	0.009	0.1	PASS
23	59.45E-3	0.026	0.1	PASS
24	19.16E-3	0.008	0.1	PASS
25	49.16E-3	0.021	0.1	PASS
26	19.65E-3	0.009	0.1	PASS
27	70.88E-3	0.031	0.1	PASS
28	15.28E-3	0.007	0.1	PASS
29	21.11E-3	0.009	0.1	PASS
30	15.47E-3	0.007	0.1	PASS
31	63.17E-3	0.027	0.1	PASS
32	12.54E-3	0.005	0.1	PASS
33	26.56E-3	0.012	0.1	PASS
34	18.81E-3	0.008	0.1	PASS
35	53.42E-3	0.023	0.1	PASS
36	16.36E-3	0.007	0.1	PASS
37	43.47E-3	0.019	0.1	PASS
38	18.44E-3	0.008	0.1	PASS
39	31.57E-3	0.014	0.1	PASS
40	18.93E-3	0.008	0.1	PASS

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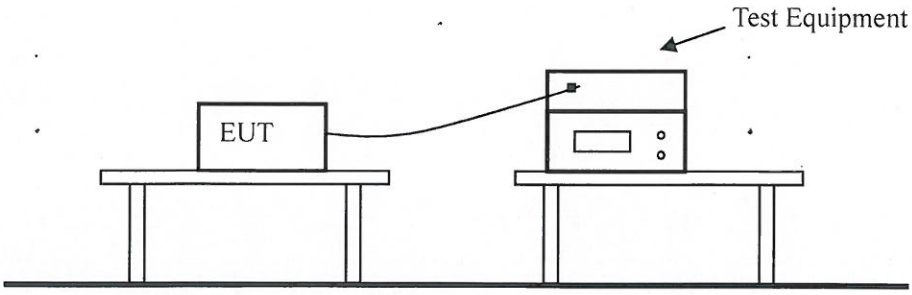
5. Voltage Fluctuation and Flicker Measurement

5.1 Block Diagram of Test Setup



5.2 Measuring Standard: EN 61000-3-3: 2008

5.3 Test Results

Maximum Flicker Results

	EUT values	Limit	Result
Pst	0.624	1.00	PASSED
dc [%]	0.799	3.30	PASSED
dmax [%]	0.180	4.00	PASSED
dt [s]	0.036	0.50	PASSED

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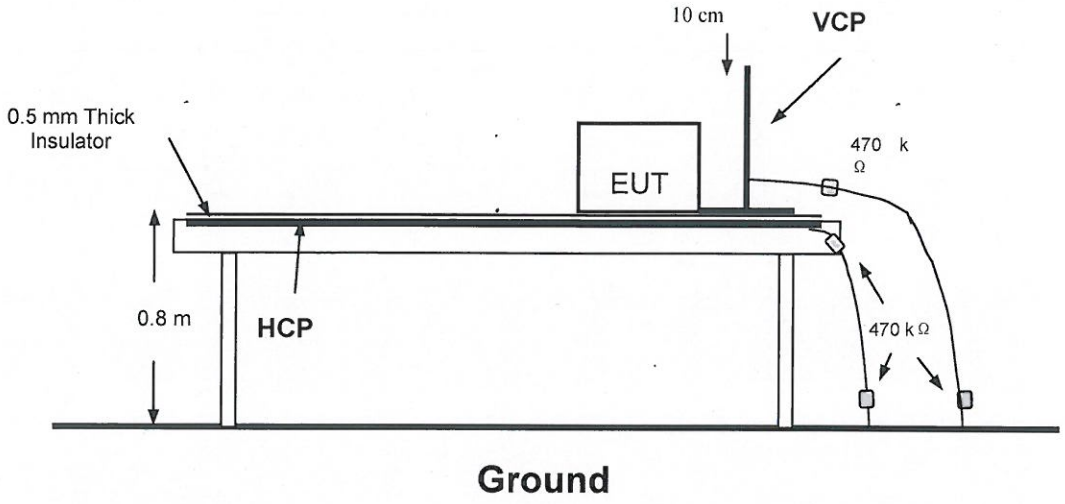
6. Electrostatic Discharge Immunity Test

6.1 Block Diagram of Teat Setup



6.2 Test Standard

EN 61000-6-2: 2005 (EN 61000-4-2: 2009,
Severity Level: 3/Air Discharge: ±8KV, Level: 3/Contact Discharge: ±4KV)

6.3 Severity Levels

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

6.4 Test Procedure

6.4.1 Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT.
After each discharge, the discharge electrode shall be removed from the EUT.
The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

6.4.2 Contact Discharge

All the procedure shall be same as Section 8.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

6.4.3 Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

6.4.4 Indirect Discharge For Vertical Plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

6.5 Test Result: Pass

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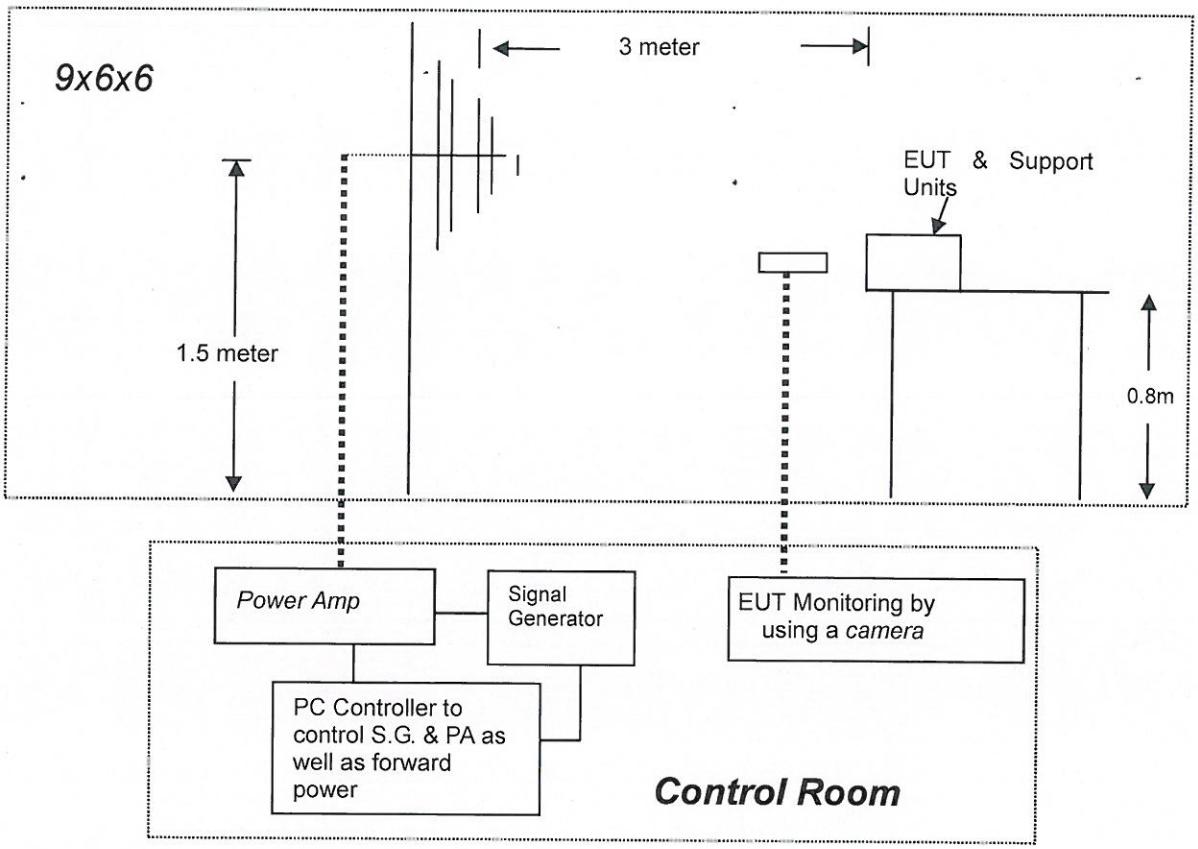
7. RF Field Strenght Susceptibility Test

7.1 Block Diagram of Test



7.2 Test Standard

EN 61000-6-2: 2005

(EN 61000-4-3: 2006+A1: 2008 Severity Level: 3, 10V/m)

7.3 Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

7.4 Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD Recording is used to monitor its screen. All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	10V/m (Severity Level 3)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80-1000MHz
4. Sweep time of radiated	0.0015 Decade/s
5. Dwell Time	3 Sec.

7.5 Test Result: Pass

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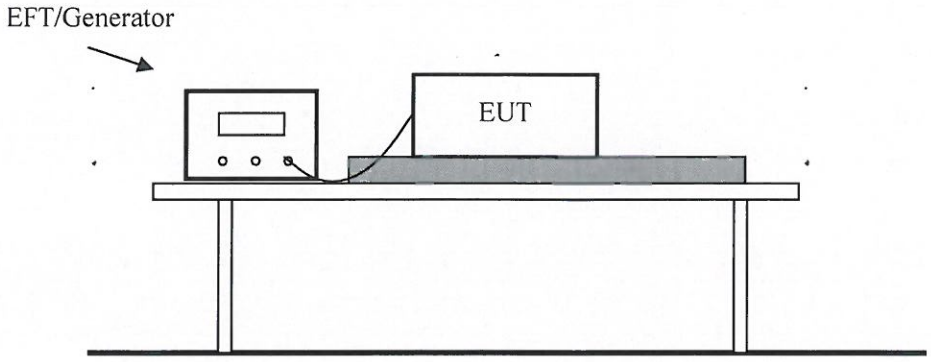
8. Electrical Fast Transient/Burst Immunity test

8.1 Block Diagram of Test Setup



8.2 Test Standard

EN61000-6-2: 2005
(EN61000-4-4: 2004+A1: 2010, Severity Level, Level 3: 2KV)

8.3 Severity Levels

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 KV	0.25 KV
2.	1 KV	0.5 KV
3.	2 KV	1 KV
4.	4 KV	2 KV
X	Special	Special

8.4 test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

For input and output AC power ports

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

8.5 Test Result: Pass

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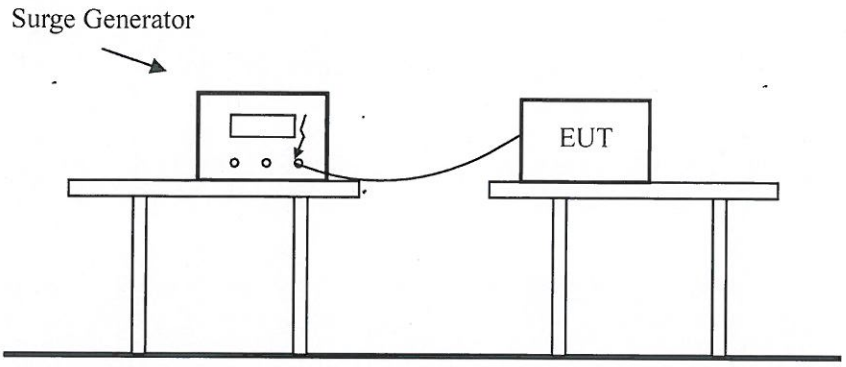
9. Surge Immunity Test

9.1 Block Diagram of Test Setup



9.2 Test Stanard

EN 61000-6-2: 2005
(EN 61000-4-5: 2006. Severity Level: Line to Line: Level: 2, 1.0KV, Line to Earth: Level 3, 2.0KV)

9.3 Severity Levels

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
.4	4.0
*	Special

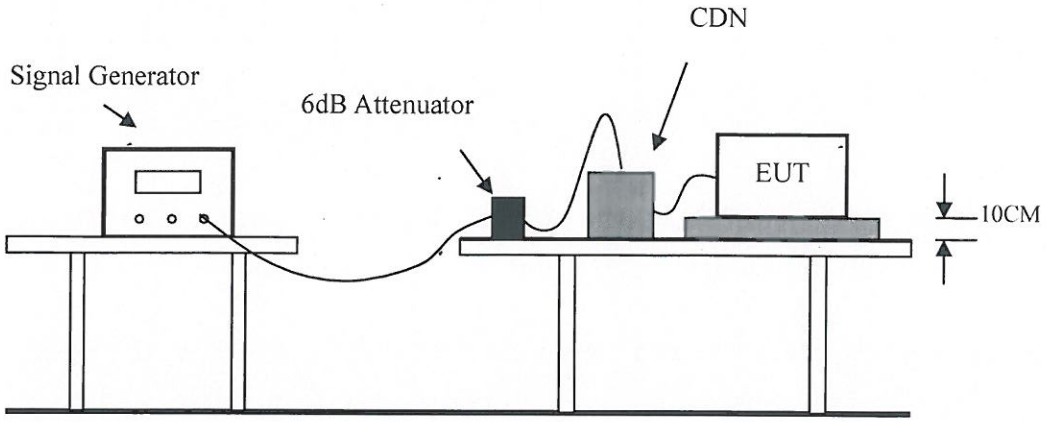
9.4 Test Procedure

1) Set up the EUT and test generator as shown on Section 11.1.
2) For line to line coupling mode, provide a 1.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
3) For line to earth coupling mode, provide a 2.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
4) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
5) Different phase angles are done individually.
6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

9.5 Test Result: Pass

10 Injected Currents Susceptibility Test

10.1 Block Diagram of Test Setup



10.2 Test Stanard

EN 61000-6-2: 2005
(EN 61000-4-6: 2009, Severity Level: Level 3, 10V (rms), (0.15MHz - 80MHz)

10.3 Severity Levels

Level	Field Strength V
1	1
2	3
3	10
X	Special

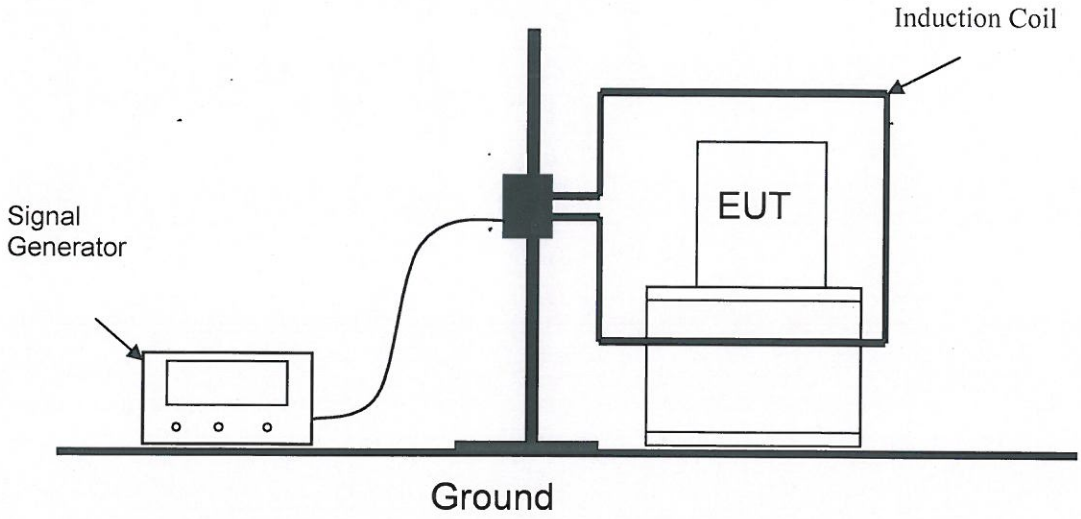
10.4 Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 12.1.
2) Let the EUT work in test mode and measure it.
3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4) The disturbance signal described below is injected to EUT through CDN.
5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
6) The frequency range is swept from 150kHz to80MHz using 10V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
7) The rate of sweep shall not exceed $1.5*10^{-3}$decades/s. where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

10.5 Test Result: Pass

11. Magnetic Field Susceptibility Test

11.1 Block Diagram of Test Setup



11.2 Test Standard

EN 61000-6-2: 2006
(EN 61000-4-8: 2010, Severity Level: Level 4, 30A/m)

11.3 Severity Level

Level	Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

11.4 Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table, 0.8 m above the ground. Both horizontal and vertical polarization of the induction coil is set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.

11.5 Test result: Pass

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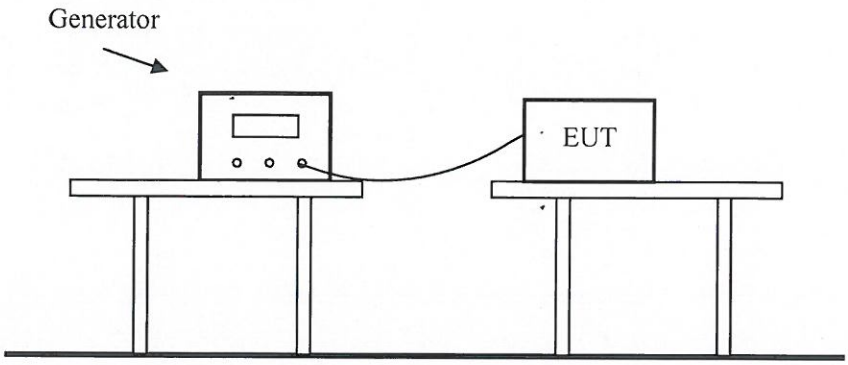
12. Voltage Dips and Interruptions Test

12.1 Block Diagram of Test Setup



12.2 Teat Standard: EN 61000-6-2: 2005

12.3 Severity Level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
70	30	25
0	100	250

12.4 Test Procedure

1) Set up the EUT and test generator as shown on Section 14.1.
2) The interruptions are introduced at selected phase angles with specified duration.
3) Record any degradation of performance.

12.5 Test Result: Pass