

# Technical Compliance Statement

## CE EMC Test Report

**For the following information**

**Ref. File No.: C1M1603236  
(EM981999)**

Product : Screwdrivers, Impact wrenches and driver drill

Model Number : 44514MPA

Applicant : King Tony Tools Co., Ltd.

Manufacturer : King Tony Tools Co., Ltd.

Standards :

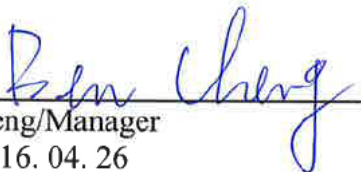
Emission: EN 61000-6-3: 2007 +A1:2011 +AC: 2012 (CISPR 22:2008)

Immunity: EN 61000-6-1:2007

(IEC 61000-4-2:2008, IEC 61000-4-3:2010, IEC 61000-4-8:2009)

We hereby certify that the above product has been tested by us with the listed standards and found in compliance with the council EMC directive 2004/108/EC. The test data & results are issued on the EMC test report no. **EM-E160191**.

Signature

  
Ben Cheng/Manager

Date: 2016. 04. 26

Test Laboratory:  
AUDIX Technology Corporation, EMC Department  
TAF Accreditation No.: 1724  
Web Site: [www.audixtech.com](http://www.audixtech.com)



The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

EMC TEST REPORT  
for  
King Tony Tools Co., Ltd.  
Screwdrivers, Impact wrenches and driver drill  
Model No.: 44514MPA

Prepared for : King Tony Tools Co., Ltd.  
No 11, 150 Alley, 516 Lane, 2 Sec.  
Hsi Nan Rd. Wu-Jih Shiang,  
Taichung Hsien Taiwan

Prepared by : AUDIX Technology Corporation  
EMC Department  
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File Number : C1M1603236 (EM981999)  
Report Number : EM-E160191  
Date of Test : 2009. 09. 28 ~ 10. 02  
Date of Report : 2016. 04. 26

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APPENDIX I (Photos of EUT)

## TEST REPORT VERIFICATION

Applicant : King Tony Tools Co., Ltd.

Manufacturer : King Tony Tools Co., Ltd.

EUT Description : Screwdrivers, Impact wrenches and driver drill

(A) Model No. : 44514MPA

(B) Serial No. : N/A

(C) Power Supply : DC 10.8V

(D) Test Voltage : DC 10.8V (Via Battery)

Measurement Standard Used:

Emission: EN 61000-6-3:2007 +A1:2011 +AC:2012 (CISPR 22:2008)

Immunity: EN 61000-6-1:2007

(IEC 61000-4-2:2008, IEC 61000-4-3:2010, IEC 61000-4-8:2009)

**(Note: The CISPR 22 emission measurement results are deemed satisfactory evidence of compliance with EN 61000-6-3 regulations)**

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device, its ensured severity levels, and performance criterion. This test report contains the measurement results, and AUDIX Technology Corporation assumes full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is technically compliant with the requirements of EN 61000-6-3 and EN 61000-6-1 standards.

This report applies to above tested sample only and shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test: 2009. 09. 28 ~ 10. 02 Date of Report : 2016. 04. 26

Producer:   
(Annie Yu/Administrator)

Signatory:   
(Ben Cheng/Manager)

# 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1. Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

<b>EMISSION (EN 61000-6-3)</b>			
<b>Description of Test Item</b>	<b>Standard</b>	<b>Limits</b>	<b>Results</b>
Conducted disturbance at main terminal	EN 61000-6-3: 2007 +A1:2011 +AC:2012	Table Clause 2.1	N/A
Conducted common mode disturbance at telecommunication port	EN 61000-6-3: 2007 +A1:2011 +AC:2012	Table Clause 4.1	N/A
Radiated disturbance (30-1000MHz)	EN 61000-6-3: 2007 +A1:2011 +AC:2012	Table Clause 1.1	PASS
Radiated disturbance (1000-6000MHz)	EN 61000-6-3: 2007 +A1:2011 +AC:2012	Table Clause 1.4	N/A
Harmonic current emissions	EN 61000-3-2:2014	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013	Section 5	N/A
<b>IMMUNITY (EN 61000-6-1)</b>			
<b>Description of Test Item</b>	<b>Basic Standard</b>	<b>Performance Criteria</b>	<b>Results</b>
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2010	A	PASS
Electrical fast transient (EFT) Power Supply Line	IEC 61000-4-4:2012	B	N/A
Electrical fast transient (EFT) Signal Port		B	N/A
Surge	IEC 61000-4-5:2005	B	N/A
Radio-frequency, Continuous conducted disturbance (Power Supply Line)	IEC 61000-4-6:2013	A	N/A
Radio-frequency, Continuous conducted disturbance (Signal Port)		A	N/A
Power frequency magnetic field	IEC 61000-4-8:2009	A	PASS
Voltage dips, 0% reduction voltage	IEC 61000-4-11:2004	B	N/A
Voltage dips, 70% reduction voltage		C	
Voltage interruptions		C	
<p>1. N/A is an abbreviation for Not Applicable.</p> <p>2. Above items not applicable in this report and regarded as compliance due to EUT uses battery operated and the EUT cannot be connected to the mains while in use.</p>			

## 1.2. Description of Performance Criteria

The variety and the diversity of the apparatus within the scope of this standard makes it difficult to define precise criteria for the evaluation of the immunity test results.

If, as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria:

### 1.2.1. Performance 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 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.

### 1.2.2. Performance 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.

### 1.2.3. Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

Description	:	Screwdrivers, Impact wrenches and driver drill
Model Number	:	44514MPA
Applicant	:	King Tony Tools Co., Ltd. No 11, 150 Alley, 516 Lane, 2 Sec. Hsi Nan Rd. Wu-Jih Shiang, Taichung Hsien Taiwan
Manufacturer	:	King Tony Tools Co., Ltd. No 11, 150 Alley, 516 Lane, 2 Sec. Hsi Nan Rd. Wu-Jih Shiang, Taichung Hsien Taiwan
Input Rating	:	DC 10.8V
Battery	:	LANCER, DC 10.8V
Date of Receipt of Sample	:	#1 2009. 09. 10 #2 2016. 04. 21
Date of Test	:	2009. 09. 28 ~ 10. 02

### 2.2. Tested Supporting System Details

#### 2.2.1. CHARGER (FOR CHARGING MODE TEST USED)

Model Number	:	UP0181A-12PA
Manufacturer	:	GRAND POWER
Output Power Cord	:	Unshielded, Undetachable, 1.0m

## 2.3. Description of Test Facility

Name of Firm	:	<b>AUDIX Technology Corporation</b> <b>EMC Department</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Facility & Location	:	<b>No. 4 Open Area Test Site</b> No. 67-4, Dingfu, Linkou Dist., New Taipei City 244, Taiwan  <b>Immunity Test Site</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

## 2.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	±3.5dB
Radiation Test	30MHz~1000MHz	±4.3dB
	1GHz~6GHz	±4.8dB
	6GHz~18GHz	±4.8dB
RF Field Strength Susceptibility Test	80MHz~200MHz	±1.7dB
	200MHz~1000MHz	±1.8dB
	1GHz~6GHz	±1.7dB

Remark : Uncertainty =  $ku_c(y)$



### **3. CONDUCTED DISTURBANCE MEASUREMENT**

The conducted disturbance are not required for EUT which only employ battery to operate and can not be connected to the mains while in use.

## 4. RADIATED DISTURBANCE MEASUREMENT

### 4.1. Test Equipment

The following test equipments are used during the radiated emission measurement:  
(At No. 4 Open Area Test Site)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY48031076	2008. 10. 16	1 Year
2.	Test Receiver	R&S	ESCI	100556	2009. 05. 25	1 Year
3.	Amplifier	HP	8447D	1937A02488	NCR	NCR
4.	Log Periodic Antenna	CHASE	UPA6109	1039	2009. 03 .20	1 Year
5.	Biconical Antenna	CHASE	VBA6106A	1231	2009. 03 .20	1 Year

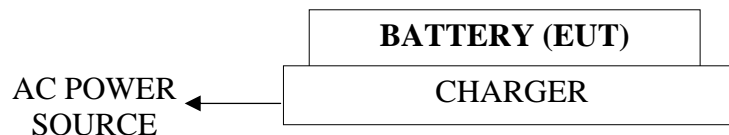
### 4.2. Block Diagram of Test Setup

#### 4.2.1. Block Diagram of connection between EUT and simulators

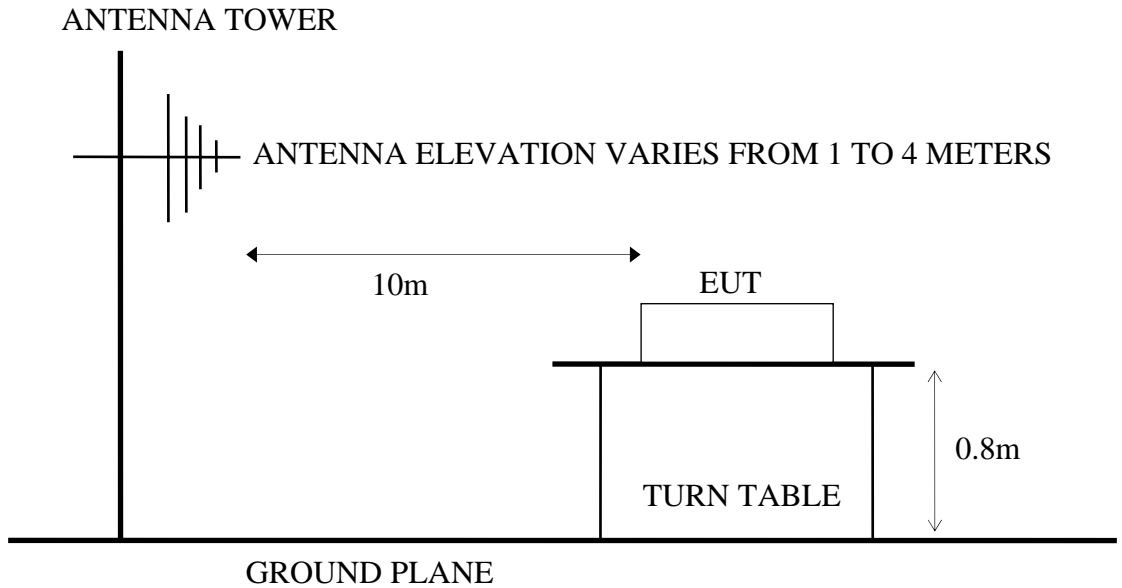
##### 4.2.1.1. Stand Alone Mode

**SCREWDRIVERS, IMPACT WRENCHES  
AND DRIVER DRILL (EUT)**

##### 4.2.1.2. Charging Mode



4.2.2. Open Area Test Site (10m) Setup Diagram



4.3. Limits for Radiated Disturbance (CISPR 22/EN 55022, Class B)

4.3.1. Limit below 1GHz

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 230	10	30
230 ~ 1000	10	37

- Note: (1) The tighter limit shall apply at the edge between two frequency bands.  
 (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the E.U.T.

4.3.2. Limit above 1GHz

Frequency (GHz)	Distance (Meters)	Average Limits (dB $\mu$ V/m)	Peak Limits (dB $\mu$ V/m)
1 ~ 3	3	50	70
3 ~ 6	3	54	74

- Note: (1) The lower limit applies at the transition frequency.  
 (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the E.U.T.

#### 4.4. Operating Condition of EUT

- 4.4.1. Set up the EUT and simulator as shown on 4.2.
- 4.4.2. To turn on the power of all equipments.
- 4.4.3. The EUT (Screwdrivers, Impact wrenches and driver drill) was on normal function during all testing.
- 4.4.4. Charging Mode: The EUT (Screwdrivers, Impact wrenches and driver drill) linked to charger and on discharging mode during the testing.

#### 4.5. Test Procedure

The EUT and its simulator were placed on a turn table which was 0.8 meter above ground. The turn table rotate 360 degrees to determine the position of the maximum emission level. EUT was set to 10 meters away from the receiving antenna which were mounted on an antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antennas (Log Periodic Antenna & Biconical Antenna) were used as a receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN 55022 (CISPR 22) regulation.

The bandwidth of the R & S Test Receiver ESCI was set at 120 kHz.

The frequency range from 30MHz to 1000MHz was checked with Peak detector and all final readings of measurement were with Quasi-Peak detector at open area test site.

#### 4.6. Radiated Disturbance Measurement Results

##### **PASSED.**

All emissions not reported below are too low against the prescribed limits.

##### **For 30-1000MHz frequency range:**

The EUT was performed during this section testing and all the test results are attached in the following list and next pages.

EUT : Screwdrivers, Impact wrenches and driver drill M/N : 44514MPA

Test Date : 2009. 09. 28      Temperature : 28      Humidity : 60%

The details of test mode is as follows :

No.	Test Mode	Operation	Reference Data No.	
			Horizontal	Vertical
1.	Stand Alone	<b>Operating (+)</b>	# 2	# 1
2.		Operating (-)	# 3	# 4
3.	Link to charger	Charging	# 6	# 5

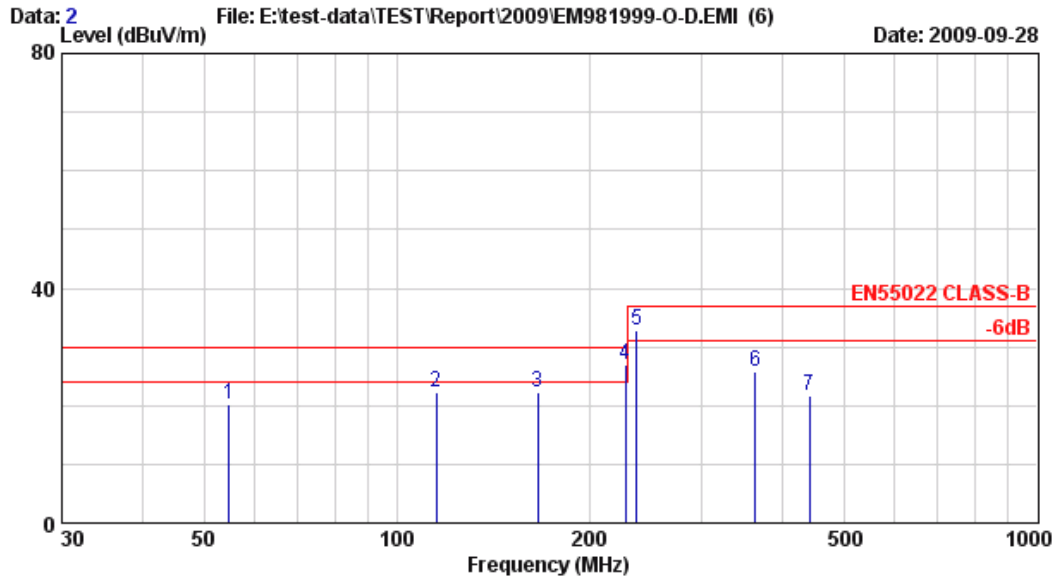
( **mode for maximum detected emission**)

**For Above 1GHz frequency range:**

Remark: Due to the EUT's highest frequency generated is less than 108MHz,  
therefore the above 1GHz frequency is no need to measure.  
(According to section 6.2 of CISPR 22:2008 standard)



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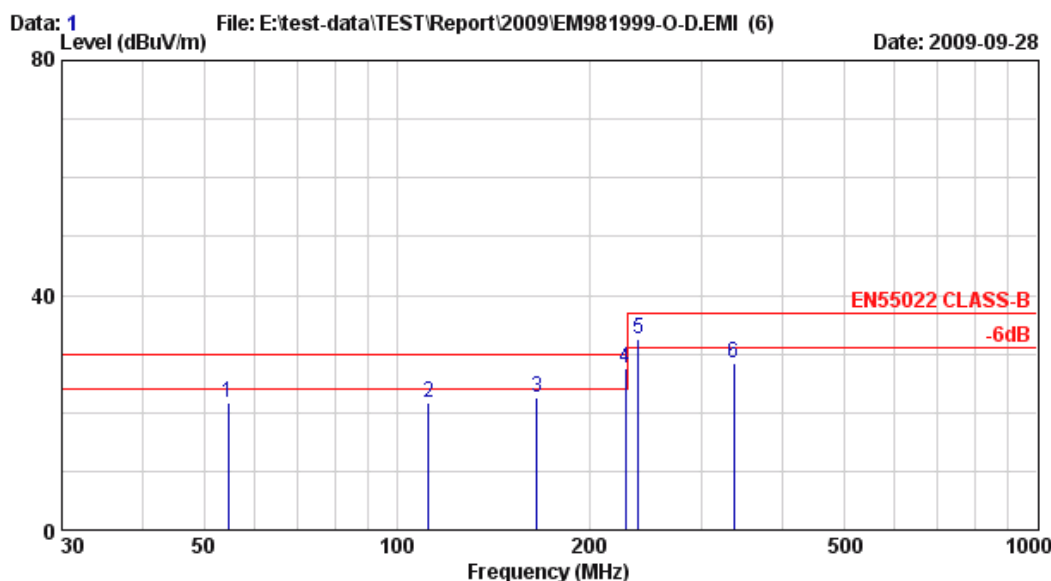
Site no. : No.4 OATS Data no. : 2  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : HORIZONTAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : DC 10.8V drill  
 Test Mode : Operating (+)  
 M/N: 44514MPA

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	54.660	14.27	0.79	5.03	20.08	30.00	9.92	
2	115.250	18.42	1.10	2.66	22.18	30.00	7.82	
3	166.250	20.59	1.37	0.32	22.27	30.00	7.73	
4	227.423	21.85	1.56	3.67	27.08	30.00	2.92 *	
5	237.250	22.25	1.61	9.01	32.87	37.00	4.13	
6	363.260	14.80	2.11	9.01	25.93	37.00	11.07	
7	441.360	16.61	2.33	2.66	21.60	37.00	15.40	

- Remarks:
- Emission Level= Antenna Factor + Cable Loss + Reading.
  - The emission levels that are 20dB below the official limit are not reported.
  - The worst emission was detected at 227.423MHz with corrected signal level of 27.08dBµV/m (limit is 30.0dBµV/m) when the antenna was at horizontal polarization and was at 4m high and the turn table was at 360°.
  - 0°was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.



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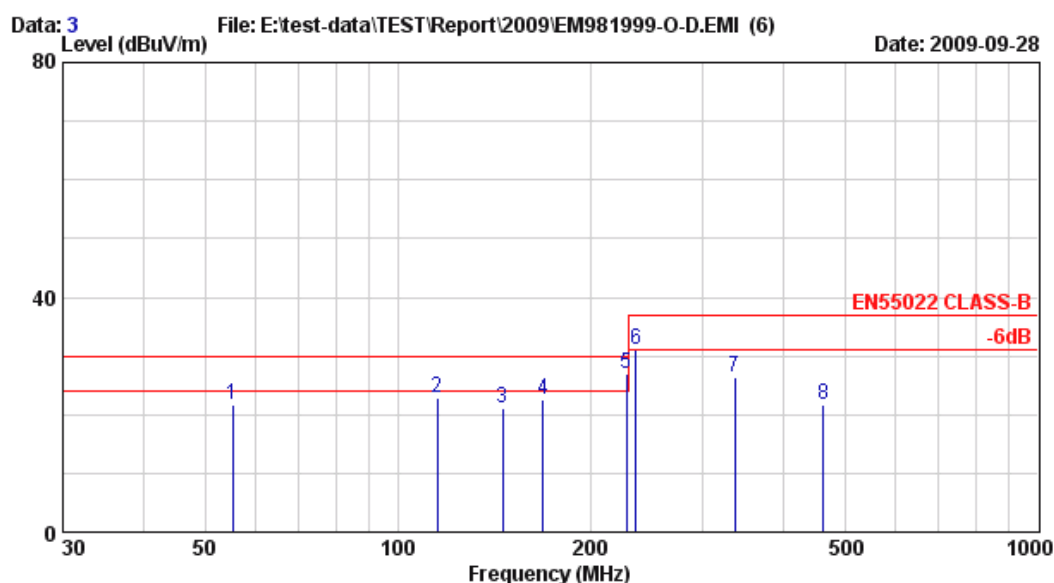
Site no. : No.4 OATS Data no. : 1  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : VERTICAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : DC 10.8V drill  
 Test Mode : Operating (+)  
 M/N: 44514MPA

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	54.575	14.27	0.79	6.76	21.81	30.00	8.19	
2	112.330	18.31	1.11	2.37	21.78	30.00	8.22	
3	165.660	20.59	1.36	0.66	22.61	30.00	7.39	
4	227.425	21.85	1.56	4.00	27.41	30.00	2.59 *	
5	238.188	22.25	1.61	8.64	32.50	37.00	4.50	
6	336.252	14.54	2.04	11.74	28.32	37.00	8.68	

- Remarks:
- Emission Level= Antenna Factor + Cable Loss + Reading.
  - The emission levels that are 20dB below the official limit are not reported.
  - The worst emission was detected at 227.425MHz with corrected signal level of 27.41dB $\mu$ V/m (limit is 30.0dB $\mu$ V/m) when the antenna was at vertical polarization and was at 1m high and the turn table was at 340°.
  - 0°was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.



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Site no. : No.4 OATS Data no. : 3  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : HORIZONTAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : DC 10.8V drill  
 Test Mode : Operating (-)  
 M/N: 44514MPA

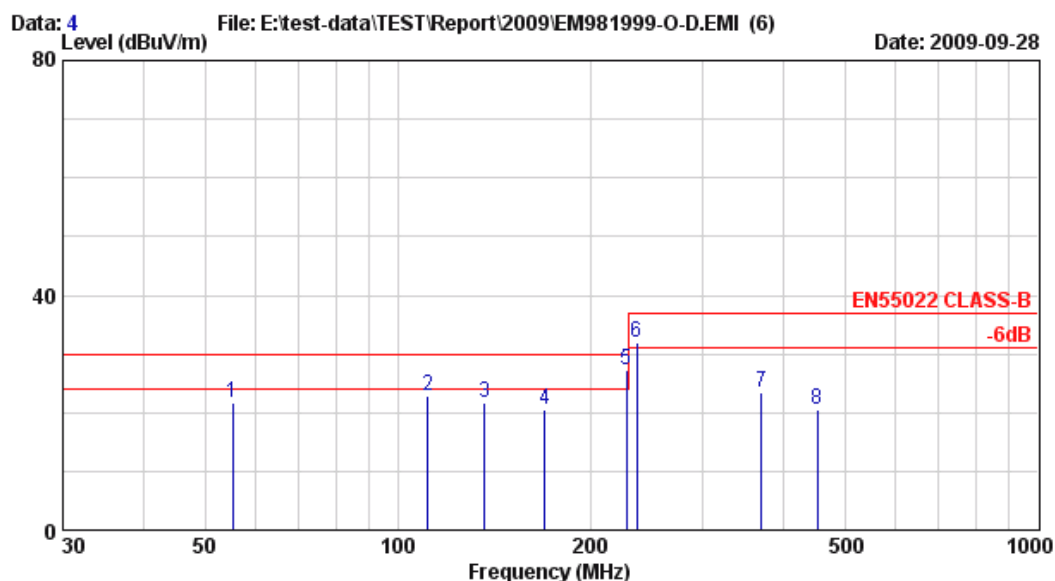
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	55.196	13.88	0.80	7.02	21.70	30.00	8.30	
2	115.404	18.42	1.10	3.28	22.80	30.00	7.20	
3	145.698	19.95	1.35	-0.29	21.01	30.00	8.99	
4	168.609	20.67	1.37	0.58	22.62	30.00	7.38	
5	227.976	21.85	1.56	3.61	27.03	30.00	2.97	
6	235.398	22.20	1.60	7.13	30.93	37.00	6.07	
7	336.686	14.54	2.04	9.87	26.45	37.00	10.55	
8	462.538	16.93	2.39	2.27	21.59	37.00	15.41	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.





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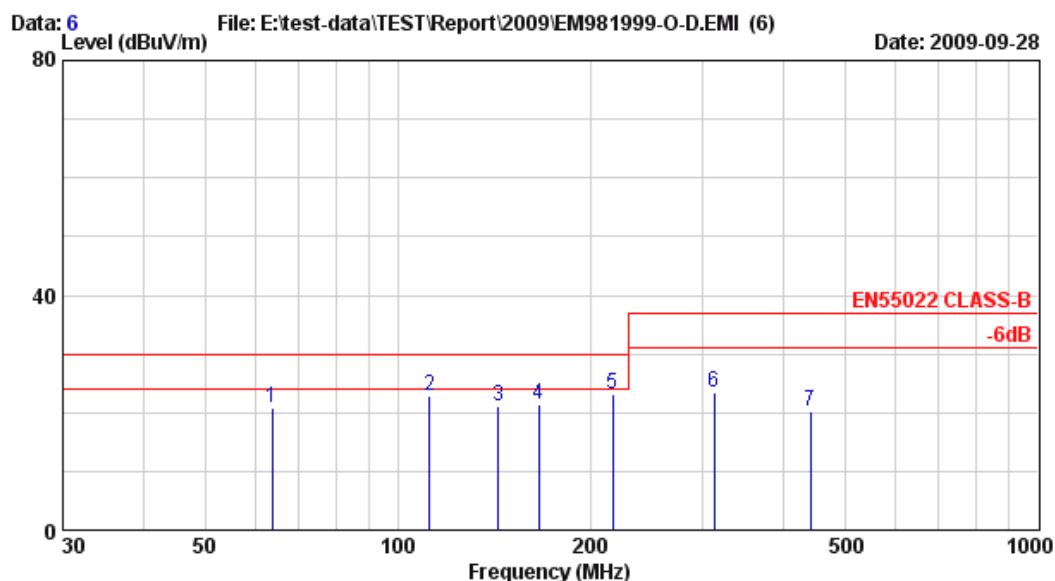
Site no. : No.4 OATS Data no. : 4  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : VERTICAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : DC 10.8V drill  
 Test Mode : Operating (-)  
 M/N: 44514MPA

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	55.212	13.88	0.80	7.14	21.82	30.00	8.18	
2	111.620	18.29	1.11	3.34	22.74	30.00	7.26	
3	136.588	19.70	1.26	0.79	21.75	30.00	8.25	
4	169.711	20.67	1.37	-1.40	20.65	30.00	9.35	
5	228.024	21.85	1.57	3.79	27.21	30.00	2.79	
6	236.698	22.22	1.60	8.14	31.96	37.00	5.04	
7	369.698	14.79	2.11	6.60	23.51	37.00	13.49	
8	452.248	16.86	2.36	1.32	20.54	37.00	16.46	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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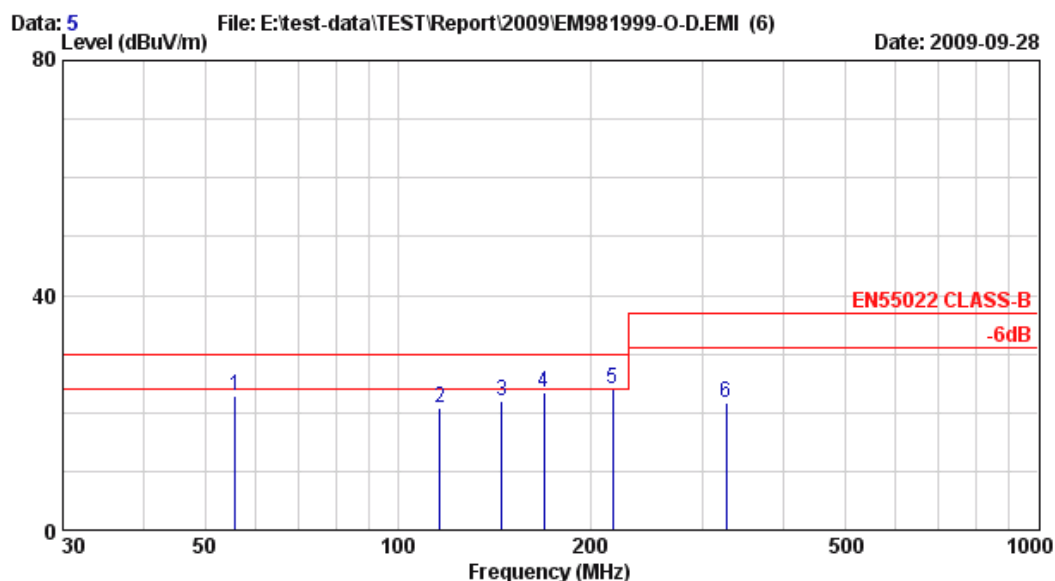
Site no. : No.4 OATS Data no. : 6  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : HORIZONTAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : 230Vac / 50Hz drill  
 Test Mode : Charging  
 M/N: 44514MPA

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	63.698	11.88	0.86	8.20	20.94	30.00	9.06	
2	112.288	18.31	1.11	3.39	22.81	30.00	7.19	
3	143.705	19.85	1.35	-0.21	20.99	30.00	9.01	
4	165.949	20.59	1.37	-0.45	21.50	30.00	8.50	
5	216.702	21.83	1.51	-0.30	23.04	30.00	6.96	
6	312.588	13.78	1.88	7.75	23.41	37.00	13.59	
7	441.258	16.61	2.32	1.28	20.21	37.00	16.79	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : No.4 OATS Data no. : 5  
 Dis. / Ant. : 10m VBA6106A/UPA6109 (08) Ant. pol. : VERTICAL  
 Limit : EN55022 CLASS-B  
 Env. / Ins. : 28°C / 60% ESCI (556) Engineer : TIM  
 EUT : Screwdrivers, Impact wrenches and driver  
 Power Rating : 230Vac / 50Hz drill  
 Test Mode : Charging  
 M/N:44514MPA

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Remark
1	55.698	13.88	0.80	8.05	22.73	30.00	7.27	
2	116.373	18.46	1.10	1.23	20.80	30.00	9.20	
3	145.288	19.95	1.35	0.57	21.87	30.00	8.13	
4	169.395	20.67	1.37	1.40	23.45	30.00	6.55	
5	216.404	21.83	1.51	0.72	24.06	30.00	5.94	
6	325.724	14.05	1.96	5.66	21.67	37.00	15.33	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 5. ELECTROSTATIC DISCHARGE IMMUNITY TEST

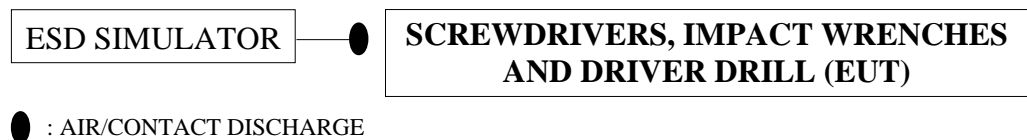
### 5.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	ESD Simulator	Keytek	MZ-15/EC	9907252	2009. 08. 28	1 Year

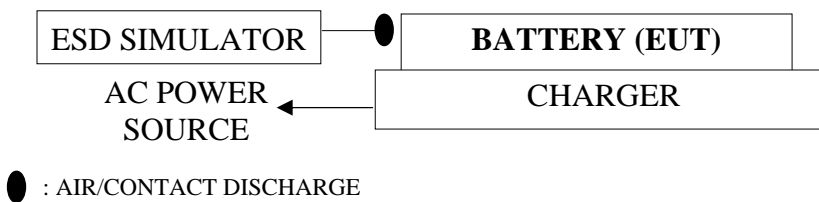
### 5.2. Block Diagram of Test Setup

#### 5.2.1. Test Setup Diagram (1)

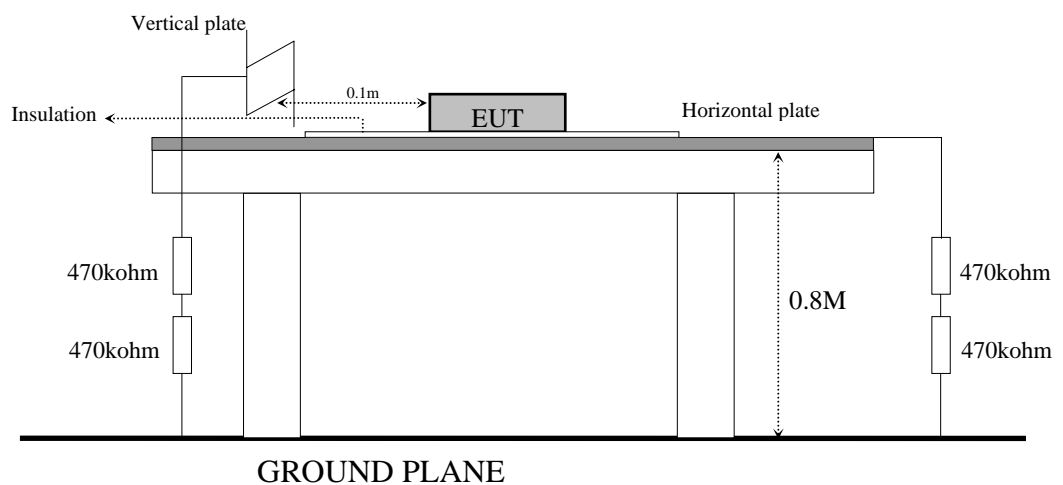
##### 5.2.1.1. Stand Alone Mode



##### 5.2.1.2. Charging Mode



#### 5.2.2. Test Setup Diagram (2)



### 5.3. Test Standard

EN 61000-6-1:2007

【IEC 61000-4-2:2008, Test Level : Contact: ±4kV, Air: ±8kV】

## 5.4. Severity Levels and Performance Criterion

### 5.4.1. 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

### 5.4.2. Performance criterion : **B**

## 5.5. Operating Condition of EUT

Same as radiated measurement which is listed in section 4.4. except the test set up replaced by section 5.2.

## 5.6. Test Procedure

### 5.6.1. Air Discharge :

This test is done on a non-conductive surfaces. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the ESD generator discharge electrode shall be removed from the EUT. The generator is then retriggered for a new single discharge and repeated 10 discharges each at positive and negative polarity for each preselected test point. This procedure shall be repeated until all the air discharge completed.

### 5.6.2. Contact Discharge :

All the procedure shall be same as 5.6.1. except that the tip of the discharge electrode shall touch the EUT conductive surfaces & repeated 25 discharges each at positive and negative polarity for each test point before the discharge switch is operated.

### 5.6.3. Indirect discharge for horizontal coupling plane :

At least 10 discharges each at positive and negative polarity shall be applied to the horizontal coupling plane, at points on each side of the EUT. The ESD generator positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

#### 5.6.4. Indirect discharge for vertical coupling plane :

At least 10 discharges each at positive and negative 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.

5.6.5. For above tests, the voltage was increased from the minimum to the selected test level.

### 5.7. Test Results

**PASSED. (Complied with Criterion A)**

EUT with following test modes was measured during this section testing and all the test results are listed in next page.

The details of test modes are as follows :

No.	Test Mode	Operation
1.	Stand Alone	Operating (+)
2.		Operating (-)
3.	Link to charger	Charging

## Electrostatic Discharge Immunity Test Results

AUDIX TECHNOLOGY CORPORATION

Applicant: <u>King Tony Tools Co., Ltd.</u> EUT: <u>Screwdrivers, Impact wrenches and driver drill, M/N 44514MPA</u> Power Supply: <u>AC 230V, 50Hz</u> Working Condition: <u>See Section 4.4.</u>		Test Date : <u>2009. 09. 30</u> Temperature : <u>27</u> Humidity : <u>45 %</u> Atmospheric pressure : <u>99 kPa</u> Test Modes: <u>See Section 5.7.</u>	
Item	Amount of Discharge for per voltage	Voltage	Results & Performance Criterion
Contact Discharge	60	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Air Discharge	20	+2kV , +4kV, +8kV -2kV, -4kV, -8kV	Pass, A Pass, A
Indirect Discharge (HCP)	20	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Indirect Discharge (VCP Front)	20	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Indirect Discharge (VCP Left)	20	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Indirect Discharge (VCP Back)	20	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Indirect Discharge (VCP Right)	20	+2kV , +4kV -2kV, -4kV	Pass, A Pass, A
Measurement Points	1. LED	Air Discharge	
	2. Screw	Contact Discharge	
	3. ~ 4. Metal	Contact Discharge	
	<b>Please refer to the Photos of ESD Test Points</b> (1). Point 1 for Air Discharge. (2). Points 2 ~4 for Contact Discharge.		
Remark: No error occurred.			

## 6. RF FIELD STRENGTH IMMUNITY TEST

### 6.1. Test Equipment

#### 6.1.1. For 80MHz ~ 1000MHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Signal Generator	R & S	2031	119530/015	2009. 07. 07	1 Year
2.	Power Amplifier	A/R	250W1000A	0329092	NCR	NCR
3.	Power Sensor	Agilent	E9327A	US40441766	2009. 01. 15	1 Year
4.	Power Monitor	Agilent	E4417A	GB41291797	2009.01. 14	1 Year
5.	Power Antenna	A & R	AT1080	13002	NCR	NCR
6.	Direction Coupler	A & R	DC6180	19323	2009. 05. 17	1 Year

#### 6.1.2. For 1GHz ~ 2.7GHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Signal Generator	R & S	2031	119530/015	2009. 07. 07	1 Year
2.	Power Amplifier	A & R	120SG3	3039655	NCR	NCR
3.	Power Antenna	A & R	AT4002A	304290	NCR	NCR
4.	Power Sensor	Agilent	E9327A	US40441766	2009. 01. 15	1 Year
5.	Power Meter	Agilent	E4417A	GB41291797	2009.01. 14	1 Year
6.	Direction Coupler	A/R	DC7144	304087	2009. 05. 17	1 Year

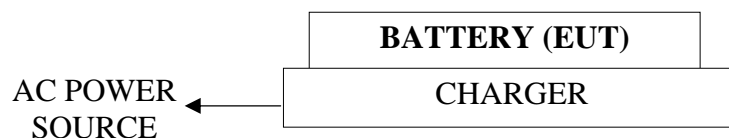
### 6.2. Block Diagram of Test Setup

#### 6.2.1. Block Diagram of connection between EUT and simulators.

##### 6.2.1.1. Stand Alone Mode

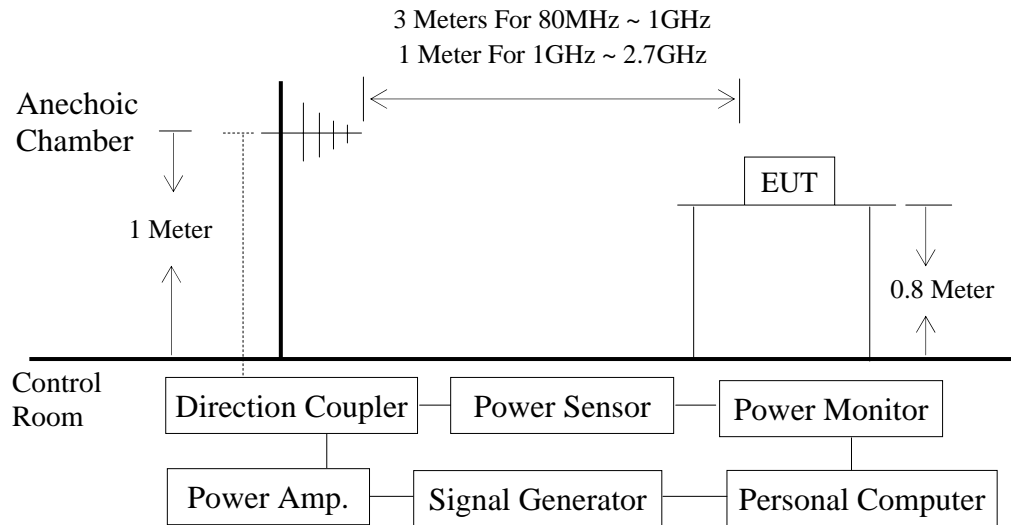
**SCREWDRIVERS, IMPACT WRENCHES  
AND DRIVER DRILL (EUT)**

##### 6.2.1.2. Charging Mode





### 6.2.2. R/S Test Setup



### 6.3. Test Standard

EN 61000-6-1:2007

【IEC 61000-4-3:2010, Test Level : 3V/m or 1V/m, 80% AM (1kHz)】

### 6.4. Severity Levels and Performance Criterion

#### 6.4.1. Severity levels

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

#### 6.4.2. Performance criterion : A

### 6.5. Operating Condition of EUT

Same as radiated measurement which is listed in section 4.4. except the test set up replaced by section 6.2.

## 6.6. Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 1 meter away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m and 1V/m measured by field sensor) around the EUT table from frequency range 80MHz to 1000MHz, 1.4GHz-2.0GHz, 2.0GHz-2.7GHz and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range 80MHz to 1000MHz, 1.4GHz-2.0GHz, 2.0GHz-2.7GHz and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

A CCD camera was put inside the chamber and through its display to monitor the EUT operational situation to judge the EUT performance criterion during measurement.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3V/m, 1V/m
2. Amplitude Modulated	1kHz, 80%AM
3. Scanning Frequency	80MHz – 1000MHz 1.4GHz – 2.0GHz 2.0GHz – 2.7GHz
4. Step Size	1% increments
5. The Rate of Sweep	0.0015 decade/s
6. Dwell Time	3 Sec.

## 6.7. Test Results

**PASSED. (Complied with Criterion A)**

EUT with following test modes was measured during this section testing and all the test results are listed in next page.

The details of test modes are as follows :

No.	Test Mode	Operation
1.	Stand Alone	Operating (+)
2.		Operating (-)
3.	Link to charger	Charging

## RF Field Strength Immunity Test Results

AUDIX TECHNOLOGY CORPORATION

Applicant: <u>King Tony Tools Co., Ltd.</u>			Test Date : <u>2009. 09. 02</u>		
EUT: <u>Screwdrivers, Impact wrenches and driver drill, M/N 44514MPA</u>			Temperature : <u>24</u>		
Power Supply: <u>AC 230V, 50Hz</u>			Humidity : <u>56 %</u>		
Working Condition: <u>See Section 4.4.</u>			Test Modes : <u>See Section 6.7.</u>		
Frequency Range (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Results	Performance Criterion
80 ~ 1000	0°	H	3V/m+Modulated	Pass	A
80 ~ 1000	90°	H	3V/m+Modulated	Pass	A
80 ~ 1000	180°	H	3V/m+Modulated	Pass	A
80 ~ 1000	270°	H	3V/m+Modulated	Pass	A
80 ~ 1000	0°	V	3V/m+Modulated	Pass	A
80 ~ 1000	90°	V	3V/m+Modulated	Pass	A
80 ~ 1000	180°	V	3V/m+Modulated	Pass	A
80 ~ 1000	270°	V	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	0°	H	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	90°	H	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	180°	H	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	270°	H	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	0°	V	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	90°	V	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	180°	V	3V/m+Modulated	Pass	A
1.4 ~ 2GHz	270°	V	3V/m+Modulated	Pass	A
2 ~ 2.7GHz	0°	H	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	90°	H	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	180°	H	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	270°	H	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	0°	V	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	90°	V	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	180°	V	1V/m+Modulated	Pass	A
2 ~ 2.7GHz	270°	V	1V/m+Modulated	Pass	A
Remark : No error occurred.					

## 7. POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

### 7.1. Test Equipment

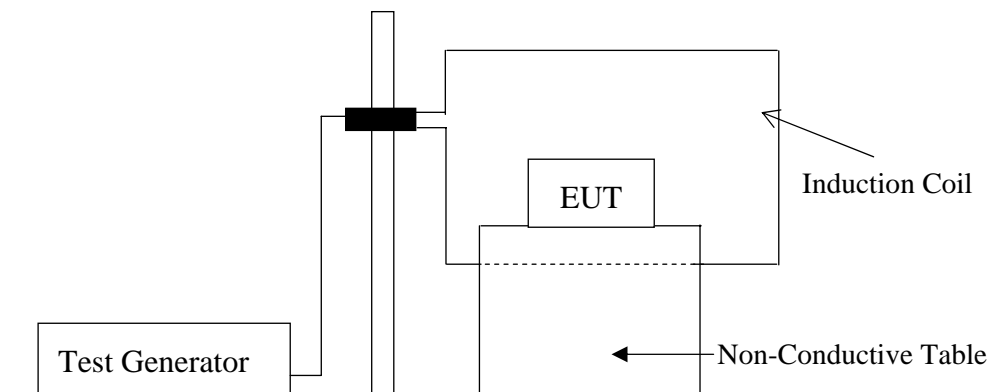
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Magnetic Field	Hafely	MAG 100.1	080015-01	2009. 06. 22	1 Year

### 7.2. Block Diagram of Test Setup

#### 7.2.1. Block Diagram of connection between EUT and simulators.

Same as section 6.2.1.

#### 7.2.2. Test Setup



### 7.3. Test Standard

EN 61000-6-1:2007

【IEC 61000-4-8:2009, Test Level : 50/60Hz, 3A/m (r.m.s.)】

### 7.4. Severity Levels and Performance Criterion

#### 7.4.1. Severity Levels

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

#### 7.4.2. Performance Criterion : A

### 7.5. Operating Condition of EUT

Same as radiated measurement which is listed in section 4.4. except the test set up replaced by section .7.2.

### 7.6. Test Procedure

The EUT placed on 1m high table that above the ground reference plane which the min. size 1m x 1m and 0.65mm thickness metallic. And subjected to the test magnetic field by using the induction coil of standard dimensions (1m x 1m). The induction coil rotated by 90 degrees in order to expose the EUT to the test field with different orientations. All cables of EUT exposed to magnetic field for 1m of their length.

### 7.7. Test Results

**PASSED. (Complied with Criterion A)**

EUT with following test modes was measured during this section testing and all the test results are listed in next page.

The details of test modes are as follows :

No.	Test Mode	Operation
1.	Stand Alone	Operating (+)
2.		Operating (-)
3.	Link to charger	Charging

## Power Frequency Magnetic Field Immunity Test Results

AUDIX TECHNOLOGY CORPORATION

Applicant: <u>King Tony Tools Co., Ltd.</u>		Test Date : <u>2009. 09. 30</u>		
EUT: <u>Screwdrivers, Impact wrenches and driver drill, M/N 44514MPA</u>		Temperature : <u>27</u>		
Power Supply: <u>AC 230V, 50Hz</u>		Humidity : <u>45 %</u>		
Working Condition: <u>See Section 4.4.</u>		Test Modes : <u>See Section 7.7.</u>		
Power Frequency Magnetic Field	Testing Duration	Coil Orientation	Test Results	Performance Criterion
50/60Hz, 3 A/m	1 Min	X-axis	<b>Pass</b>	<b>A</b>
50/60Hz, 3 A/m	1 Min	Y-axis	<b>Pass</b>	<b>A</b>
50/60Hz, 3 A/m	1 Min	Z-axis	<b>Pass</b>	<b>A</b>
Remark : No error occurred.				

## 8. PHOTOGRAPHS

### 8.1. Photos of Radiated Disturbance Measurement at Open Area Test Site

Test Mode: Stand Alone



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

Test Mode: Stand Alone, Operating (+)



SETUP WITH MAXIMUM DETECTED EMISSION AT HORIZONTAL POLARIZATION



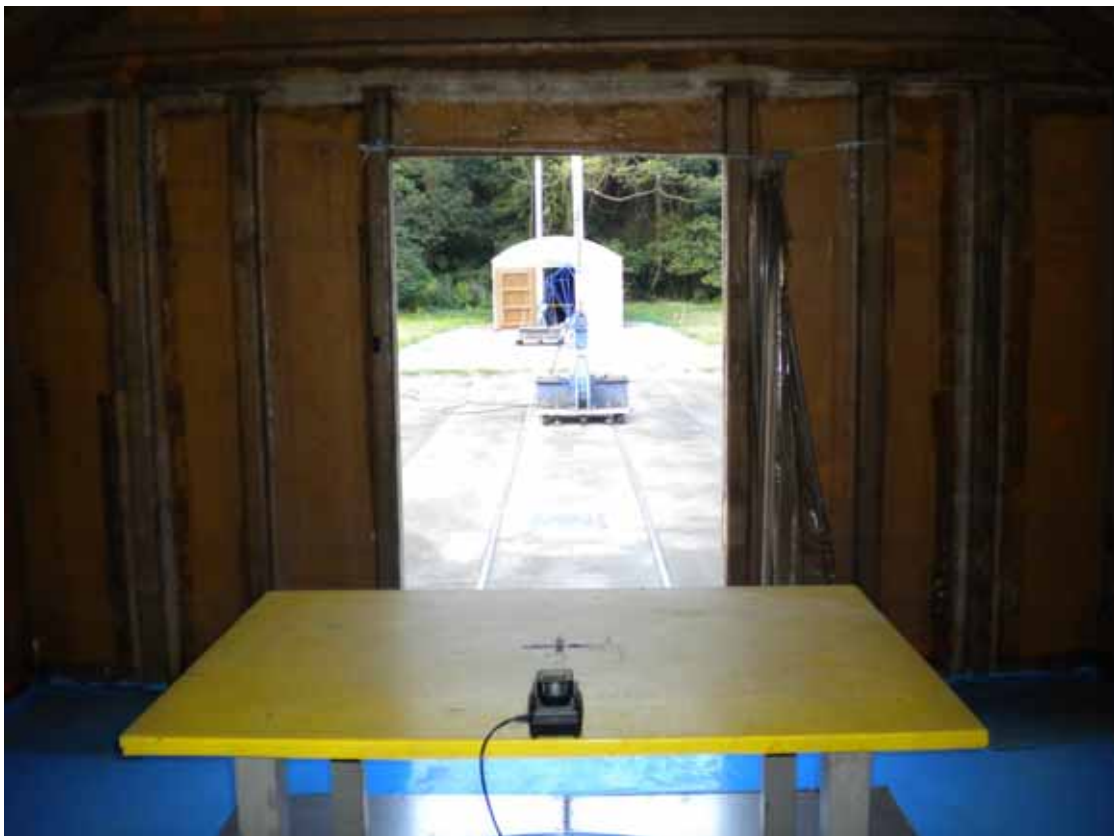
SETUP WITH MAXIMUM DETECTED EMISSION AT VERTICAL POLARIZATION



Test Mode: Link to Charger



FRONT VIEW OF RADIATED MEASUREMENT



BACK VIEW OF RADIATED MEASUREMENT

## 8.2. Photos of Electrostatic Discharge Immunity Test

Test Mode: Stand Alone

Air Discharge



HCP & VCP



Test Mode: Link to Charger  
Air Discharge



HCP & VCP



**Photo of Points (Front & Side View)**



**Photo of Points (Back & Side View)**



**Photo of Points (Side View)**



### 8.3. Photos of RF Strength Immunity Test

Test Mode: Stand Alone

Test Frequency Range: 80~1000MHz



FRONT VIEW



BACK VIEW

Test Frequency Range: 1.4GHz~2.7GHz



FRONT VIEW



BACK VIEW

Test Mode: Link to Charger  
Test Frequency Range: 80~1000MHz



FRONT VIEW



BACK VIEW



Test Frequency Range: 1.4GHz~2.7GHz



FRONT VIEW



BACK VIEW

8.4. Photo of Power Frequency Magnetic Field Immunity Test  
Test Mode: Stand Alone



Test Mode: Link to Charger



# APPENDIX I (Photos of EUT)

Total Pages: 5 Pages

Figure 1  
General Appearance (Front & Side View)



Figure 2  
General Appearance (Back & Side View)



Figure 3  
General Appearance (Bottom View, Removed Battery)



Figure 4  
Internal View (Removed Cover)



Figure 5  
Internal View



Figure 6  
Internal View

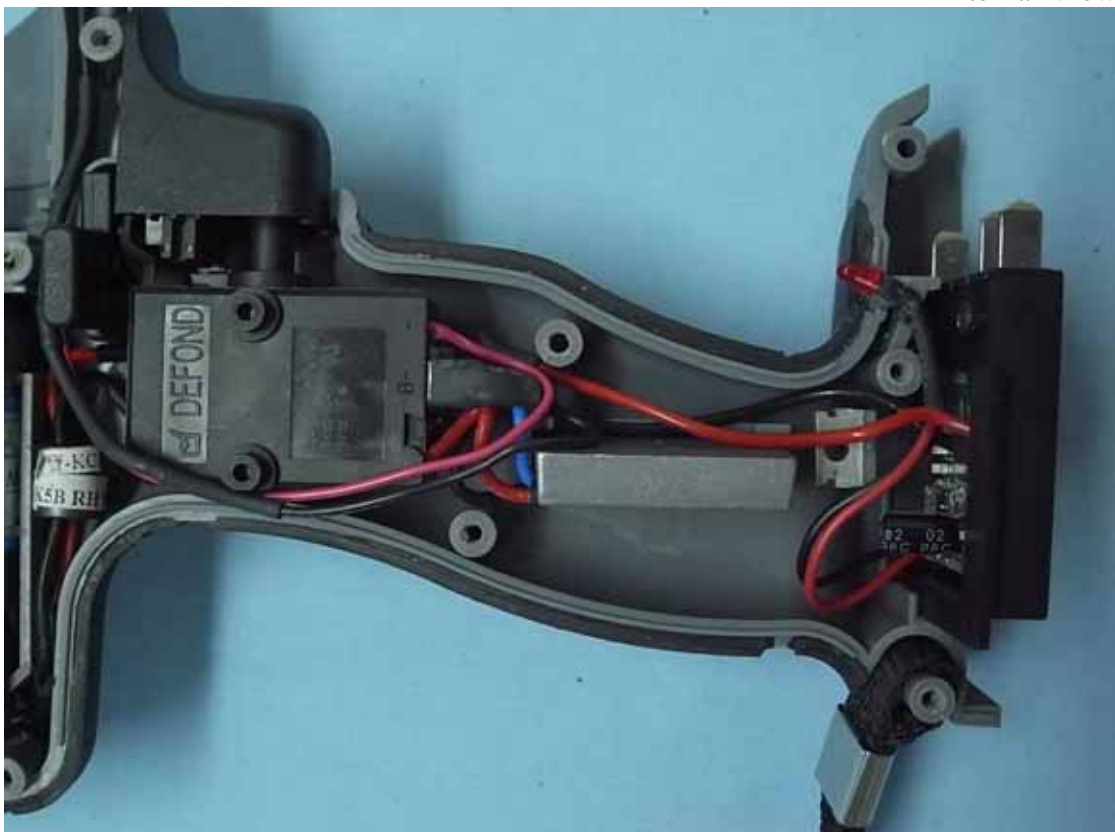


Figure 7  
Internal View (Removed Main Board)



Figure 8  
Internal View (Main Board/ Front View)



Figure 9  
Internal View (Main Board/Back View)

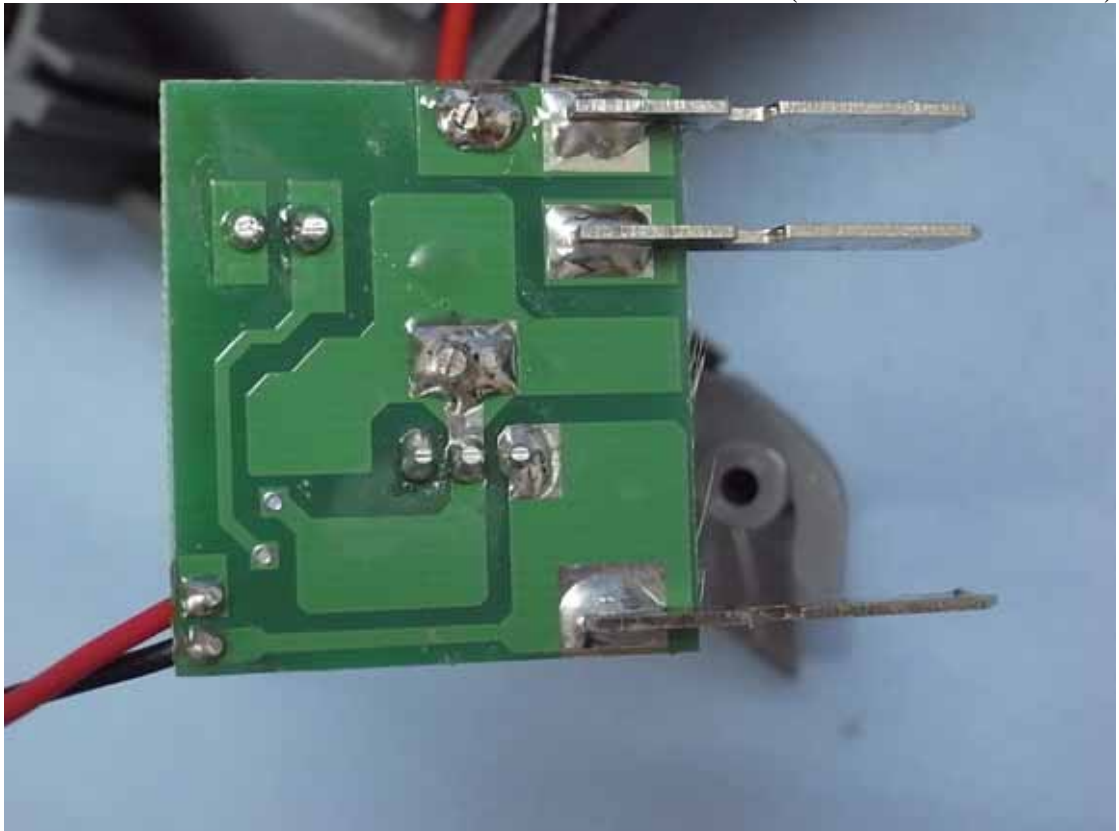


Figure 10  
Internal View (Motor)

