EMC
Measurement and Test Report

For

GlobTek, Inc.

186 Veterans Dr. Northvale, NJ 07647 USA

Test Standards:	EN 60601-1-2:2007
Product Description:	Medical power supply
Tested Model:	GTM41080-1812-C1
Report No.:	STR13018169E
Tested Date:	2013-01-09 to 2013-01-17
Issued Date:	2013-01-17
Tested By:	Silin Chen / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd

TABLE OF CONTENTS

1.GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	GlobTek, Inc.
Address of applicant:	186 Veterans Dr. Northvale, NJ 07647 USA
Manufacturer:	1. GlobTek, Inc. 2. GlobTek (Suzhou) Co., Ltd
Address of manufacturer:	1. 186 Veterans Dr. Northvale, NJ 07647 USA 2. Building 4, No. 76, Jin Ling East Rd., Suzhou Industrial Park, Suzhou,JiangSu 215021, China

General Description of EUT	
Product Name:	Medical power supply
Trade Name:	GlobTek
Model No.:	GTM41080-1812-C1
Adding Model(s):	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Rated Voltage:	100-240Vac
Rated Current:	0.6A
Rated Power:	15W
Power Adaptor Model:	/
Highest Internal Frequency:	Below 108MHz

1.2 Test Standards

The following report is prepared on behalf of the GlobTek, Inc. in accordance with EN 60601-1-2, Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic compatibility – Requirements

The objective of the manufacturer is to demonstrate compliance with the standards EN 60601-1-2 for Medical electrical quipment.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standards EN 60601-1-2 for Medical electrical equipment – Part 1-2: General requirements for basic safety and essential performance – Collateral standard: Electromagnetic compatibility – Requirements and tests.

1.4 Test Facility

- **FCC – Registration No.: 994117**
  SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**
  The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**
  Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Full Load	9.6Ω Load

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
DC Cable	0.2	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
AC Cable	1.5	Unshielded	Without Core

1.6 Performance Criteria for EMS

All the test data has been collected, reduced, and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

2. SUMMARY OF TEST RESULTS

Standards	Description of Test Item	Result
EN 60601-1-2	Conducted Disturbance	Compliant
	Radiated Disturbance	Compliant
	Harmonic Current Emission	Compliant
	Voltage Fluctuation and Flicker	Compliant
	Electrostatic Discharge Immunity in accordance with IEC 61000-4-2	Compliant
	Continuous Radiated Disturbances Immunity in accordance with IEC 61000-4-3	Compliant
	Electrical Fast Transient/Burst Immunity in accordance with IEC 61000-4-4	Compliant
	Surges Immunity in accordance with IEC 61000-4-5	Compliant
	Continuous Conducted Disturbances Immunity in accordance with IEC 61000-4-6	Compliant
	Power-frequency Magnetic Fields Immunity in accordance with IEC 61000-4-8	Compliant
	Voltage Dips/Interruptions Immunity in accordance with IEC 61000-4-11	Compliant

N/A: not applicable

3. Conducted Disturbance

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

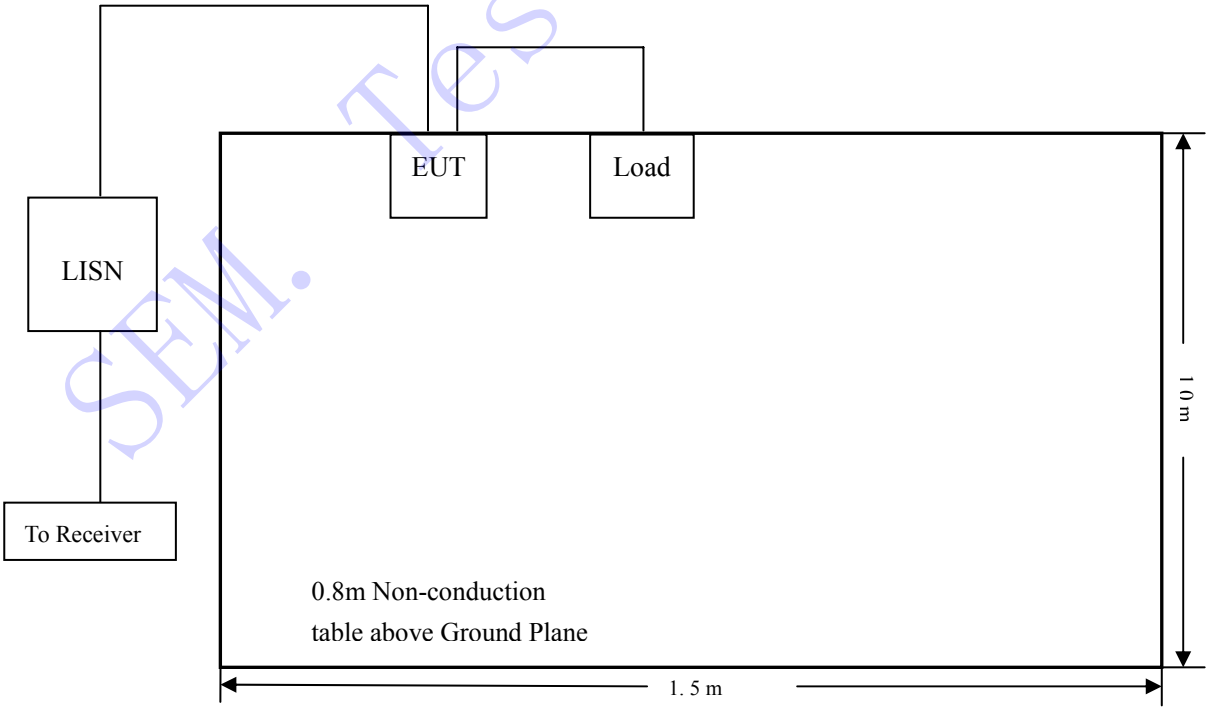
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2012-03-28	2013-03-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2012-03-28	2013-03-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2012-03-28	2013-03-27
Current Probe	FCC	F-33-4	091684	2012-03-28	2013-03-27

3.3 Test Procedure

Test is conducting under the description of EN55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	22 ° C
Relative Humidity:	55 %
ATM Pressure:	1015 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the EN 60601-1-2 Conducted margin for a Class B device, with the *worst* margin reading of:

-5.02 dBµV at **0.162 MHz** in the **Neutral** mode, **QP** detector, **0.15-30MHz**

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

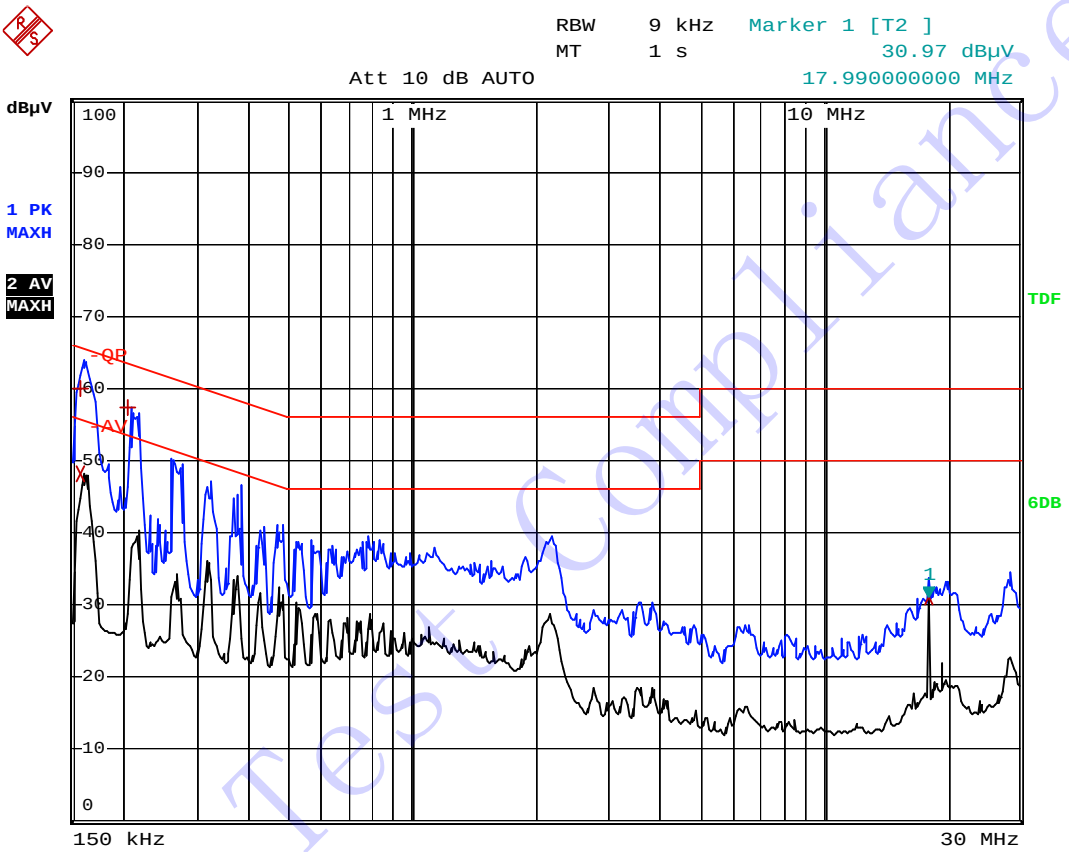
EUT: *Medical power supply*

Tested Model: *GTM41080-1812-C1*

Operating Condition: *Full Load*

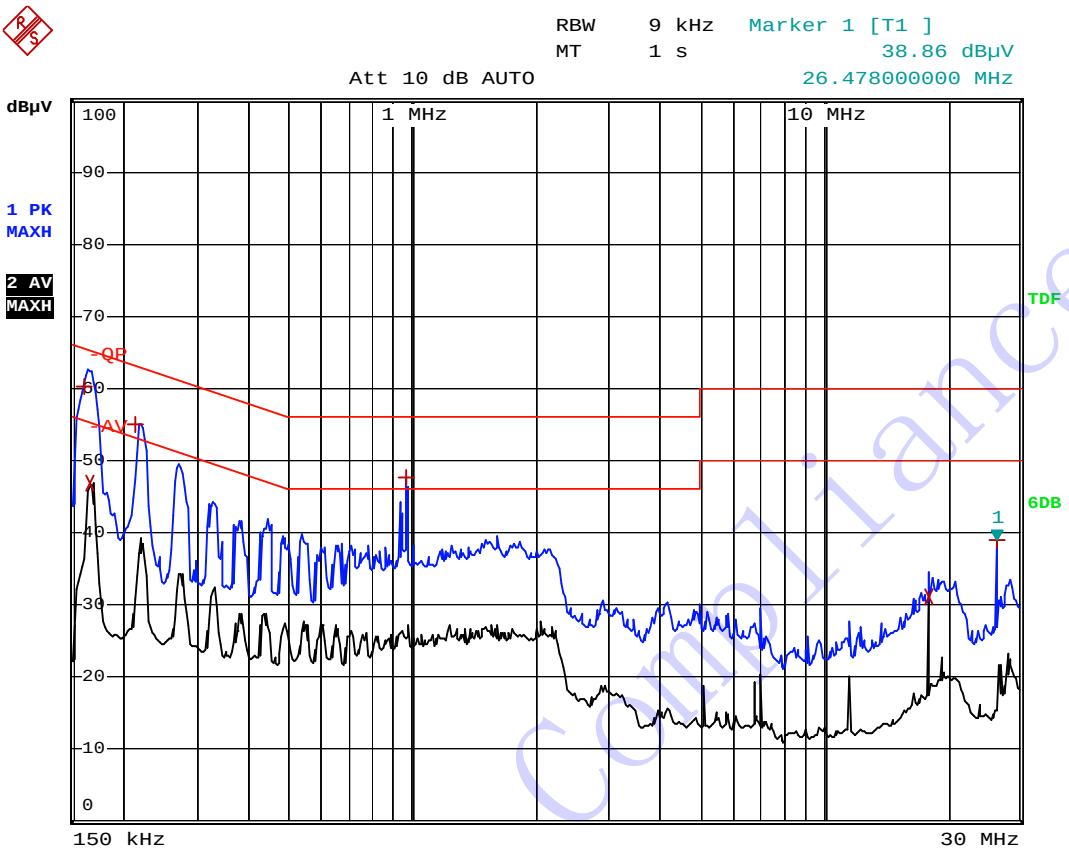
Comment: *Connected to Load*

Test Specification: *Line*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	158 kHz	48.08	-7.48
1 Quasi Peak	158 kHz	60.03	-5.53
1 Max Peak	206 kHz	57.31	-6.04
2 Average	17.99 MHz	30.97	-19.02

Test Specification: *Neutral*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	162 kHz	60.33	-5.02
2 Average	166 kHz	46.90	-8.25
1 Max Peak	214 kHz	54.92	-8.12
1 Max Peak	966 kHz	47.50	-8.49
2 Average	17.99 MHz	31.12	-18.87
1 Max Peak	26.478 MHz	38.85	-21.14

4. Radiated Disturbance

4.1 Measurement Uncertainty

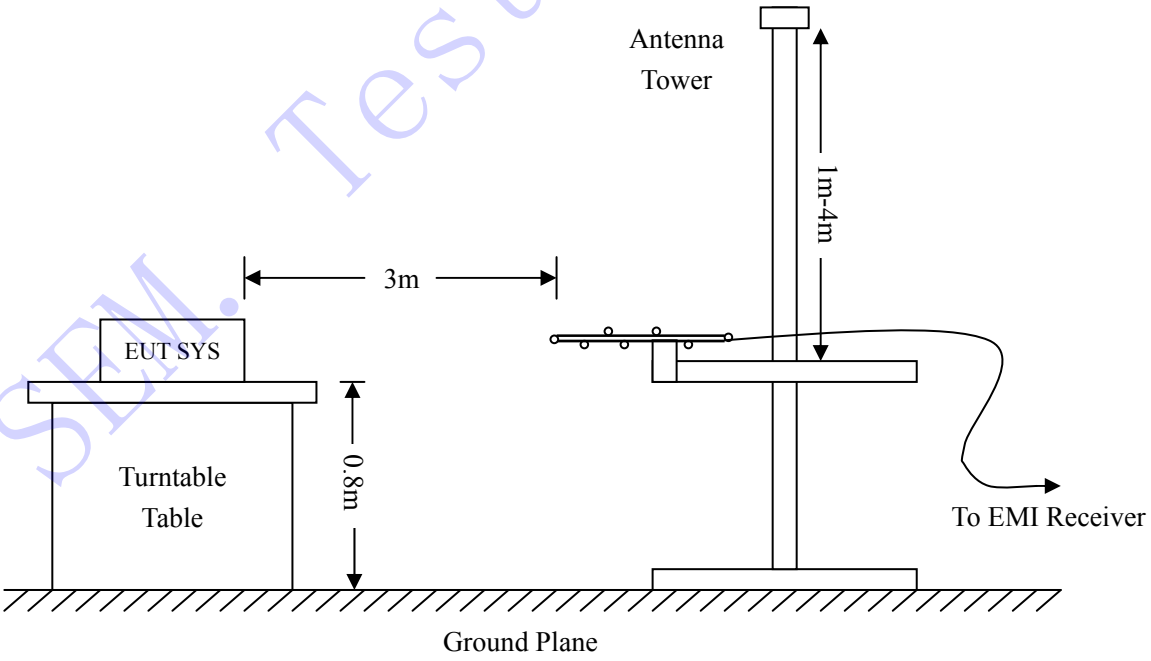
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24

4.3 Test Procedure

Test is conducting under the description of EN55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.



4.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B device. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – EN 60601-1-2 Class B Limit

4.5 Environmental Conditions

Temperature:	23° C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

4.6 Summary of Test Results/Plots

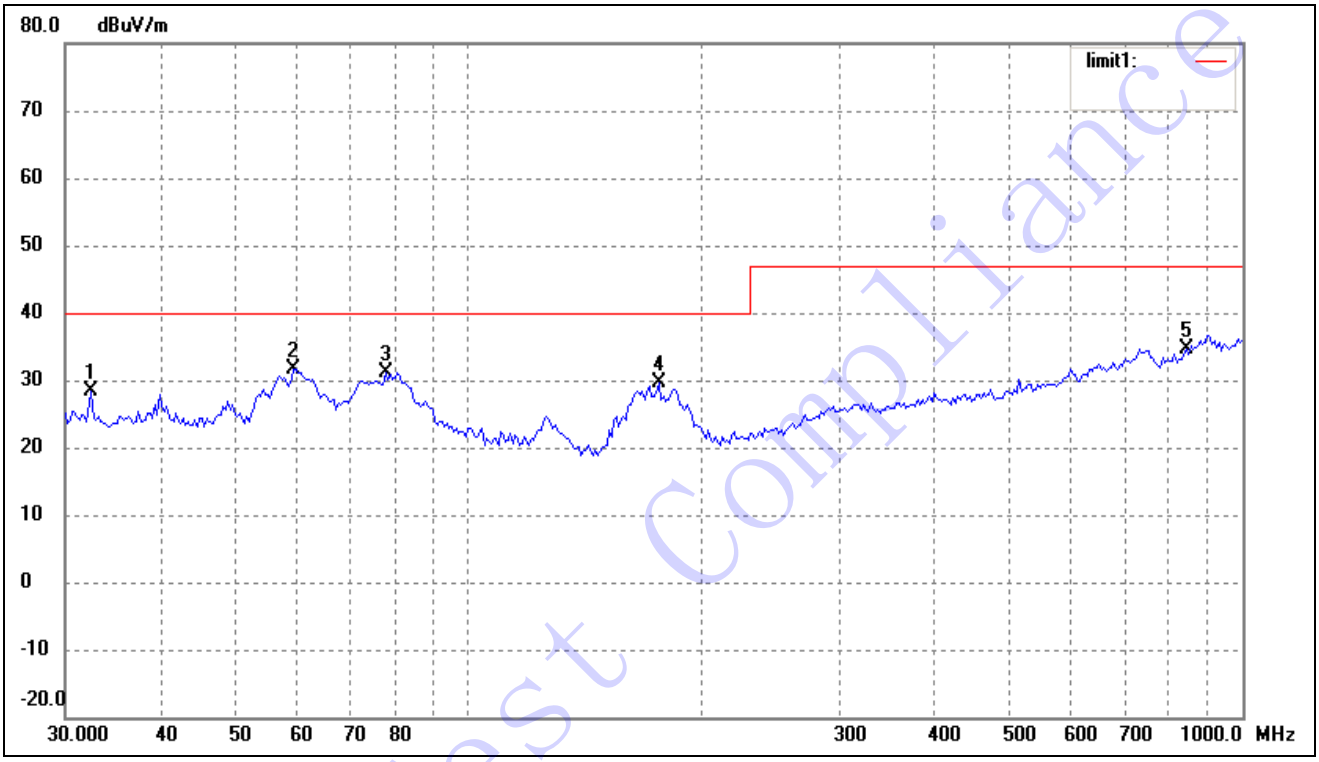
According to the data in section 4.6, the EUT complied with the EN 60601-1-2 Class B standards, and had the worst margin is:

-6.15 dbμV at **35.2512 MHz** in the, **Vertical** polarization **30 MHz to 1 GHz, 3Meters**

Plot of Radiated Emissions Test Data

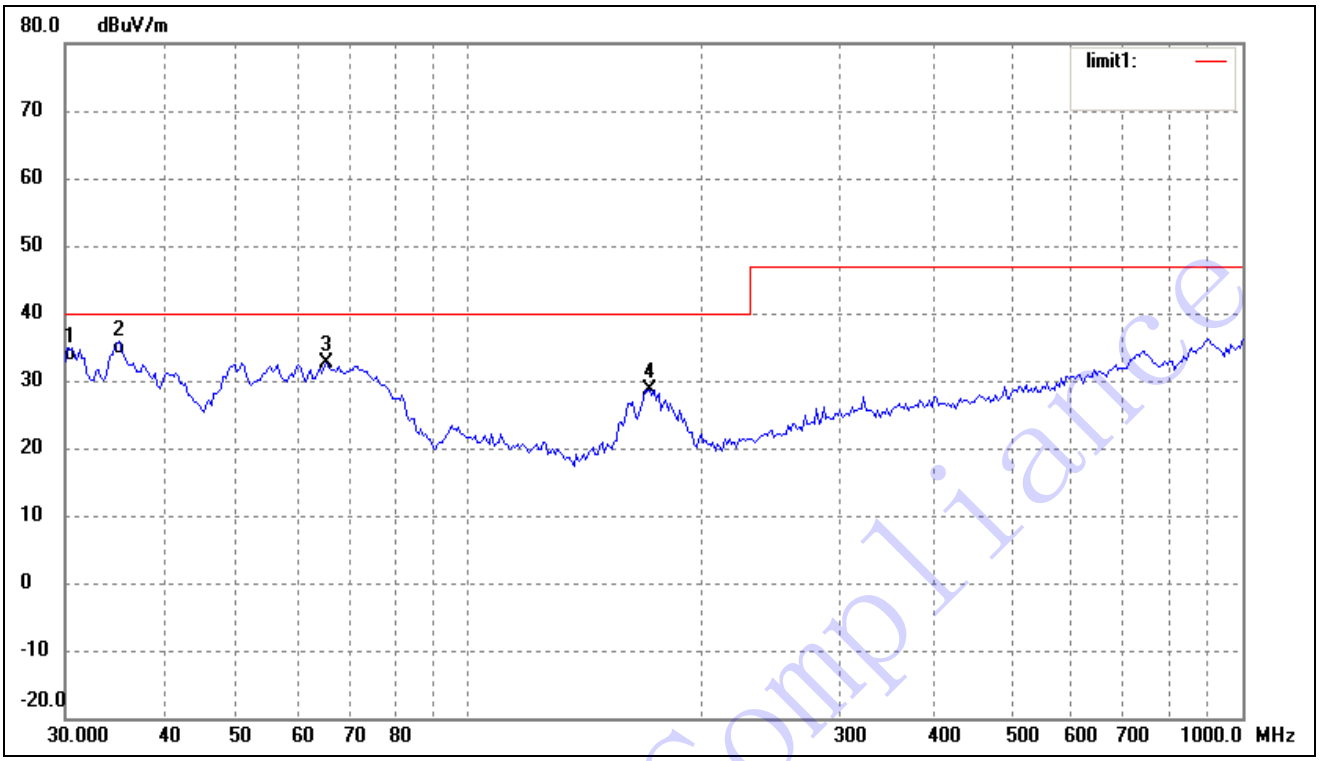
EUT: *Medical power supply*
Tested Model: *GTM41080-1812-C1*
Operating Condition: *Full Load*
Comment: *Connected to Load*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	32.4059	20.01	8.44	28.45	40.00	-11.55	0	100	peak
2	59.2325	25.82	5.76	31.58	40.00	-8.42	0	100	peak
3	77.8654	29.28	1.79	31.07	40.00	-8.93	0	100	peak
4	175.6516	25.79	3.73	29.52	40.00	-10.48	0	100	peak
5	845.0878	17.20	17.45	34.65	47.00	-12.35	0	100	peak

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	30.2111	24.76	8.07	32.83	40.00	-7.17	0	100	QP
2	35.2512	24.93	8.92	33.85	40.00	-6.15	0	100	QP
3	65.3432	28.65	4.00	32.65	40.00	-7.35	0	100	peak
4	170.7926	25.05	3.70	28.75	40.00	-11.25	0	100	peak

5. Harmonic Current Emissions

5.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Digital Power Analyzer	California Instrument	CTS	72831	2012-03-28	2013-03-27
Power Source	California Instrument	5001IX-CTS-400	60077	2012-03-28	2013-03-27

5.2 Test Procedure

Test is conducting under the description of EN61000-3-2.

5.3 Test Standards

EN61000-3-2, Clause 7.1 Limits for Class A equipment.

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	48%
ATM Pressure:	1022 mbar

5.4 Harmonic Current Emissions Test Data

According to Clause 7 of EN61000-3-2, the EUT (rated power is 15W) is less than 75W, belong to ‘equipment with a rated power of 75W or less’, therefore ‘limits are not specified in this edition of the standards’. It is deem to full fit the requirements of the standards.

Result: The EUT is compliance with the requirements of this section.

6. Voltage Fluctuation and Flicker

6.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Digital Power Analyzer	California Instrument	CTS	72831	2012-03-28	2013-03-27
Power Source	California Instrument	5001IX-CTS-400	60077	2012-03-28	2013-03-27

6.2 Test Procedure

Test is conducting under the description of EN61000-3-3.

6.3 Test Standards

EN61000-3-3, Limit : Clause 5.

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	48%
ATM Pressure:	1022 mbar

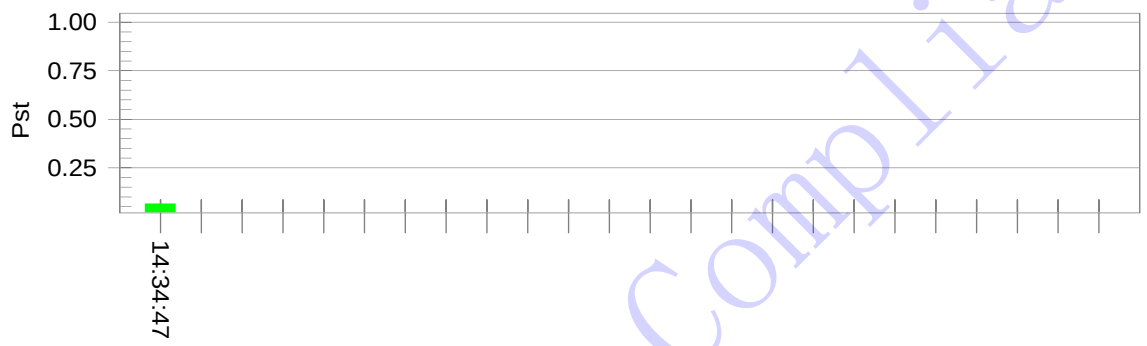
6.4 Voltage Fluctuation and Flicker Test Data

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Medical power supply **Tested by: Silin Chen**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2013-1-16 **Start time: 02:24:34 PM** **End time: 02:34:48 PM**
Test duration (min): 10 **Data file name: F-000107.cts_data**
Comment: Full Load
Customer: GlobTek

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.92**			
Highest dt (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Time(mS) > dt:	**0.0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.028**	**Test limit:**	**0.650**	**Pass**

7. Electrostatic Discharges (ESD)

7.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
ESD Generator	TESQ AG	NSG 437	161	2012-03-28	2013-03-27

7.2 Test Procedure

Test is conducting under the description of IEC61000-4-2.

Test Performance

Performance Criterion: B

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.3 Electrostatic Discharge Immunity Test Data

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test Points	Test Levels (Kv)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Slot	A	A	A	A	A	A	A	A		
DC Output Port	A	A	A	A	A	A	A	A		
AC Port	A	A	A	A	A	A	A	A		

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test Points	Test Levels (Kv)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Screw	A	A	A	A	A	A				

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

EN 61000-4-2 Test Points	Test Levels (Kv)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Front Side	A	A	A	A						
Top Side	A	A	A	A						
Back Side	A	A	A	A						
Left Side	A	A	A	A						
Right Side	A	A	A	A						

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2 Test Points	Test Levels (Kv)									
	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Front Side	A	A	A	A						
Top Side	A	A	A	A						
Back Side	A	A	A	A						
Left Side	A	A	A	A						
Right Side	A	A	A	A						

Test Result: Pass

8. Continuous Radiated Disturbances (R/S)

8.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Signal Generator	Rohde & Schwarz	SMT03	100059	2012-03-28	2013-03-27
Voltage Probe	Rohde & Schwarz	URV5-Z2	100013	2012-03-28	2013-03-27
Power Amplifier	AR	150W1000	300999	2012-03-28	2013-03-27
Power Amplifier	AR	25S1G4AM1	305993	2012-03-28	2013-03-27
Trilog Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Anechoic chamber	Albatross Projects	MCDC	----	2012-03-20	2014-03-19

8.2 Test Procedure

Test is conducting under the description of IEC61000-4-3.

Test Performance

Performance Criterion: A

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1010 mbar

8.3 Continuous Radiated Disturbances Test Data

Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth

Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-2500	3	A	A	A	A	A	A	A	A

Test Result: Pass

9. Electrical Fast Transients (EFT)

9.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Transient 2000	EMC PARTNER	TRA2000	863	2012-03-28	2013-03-27
Couple Clamp	EMC PARTNER	CN-EFT1000	513	2012-03-28	2013-03-27

9.2 Test Procedure

Test is conducting under the description of IEC61000-4-4.

Test Performance

Performance Criterion: B

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

9.3 Electrical Fast Transients Test Data

EN 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
Power Supply Power Port of EUT	L1	A	A	A	A	A	A	/	/
	L2	A	A	A	A	A	A	/	/
	PE	/	/	/	/	/	/	/	/
	L1+L2	A	A	A	A	A	A	/	/
	L1 + PE	/	/	/	/	/	/	/	/
	L2 + PE	/	/	/	/	/	/	/	/
	L1+L2+PE	/	/	/	/	/	/	/	/
Signal ports		/	/	/	/	/	/	/	/

Test Result: Pass

10. Surges

10.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Transient 2000	EMC PARTNER	TRA2000	863	2012-03-28	2013-03-27

10.2 Test Procedure

Test is conducting under the description of IEC 61000-4-5.

Test Performance

Performance Criterion: B

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

10.3 Surge Test Data

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	L-N	A	/
2	1kV	±	L-N	A	/
3	2kV	±	L-N, L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

Test Result: Pass

11. Continuous Conducted Disturbances (C/S)

11.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
CS Immunity Tester	EMTEST	CWS500	0900-03	2012-03-28	2013-03-27
Attenuator	EMTEST	MA-500	1009	2012-03-28	2013-03-27
CDN	Luthi	L-801M2/M3	2665	2012-03-28	2013-03-27

11.2 Test Procedure

Test is conducting under the description of IEC 61000-4-6.

Test Performance

Performance Criterion: A

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

11.3 Continuous Conducted Disturbances Test Data

Sweep frequency range: 150kHz~80MHz
Frequency step: 1% of fundamental
Dwell time: 1 second

Level	Voltage Level (e.m.f.) U_0	Modulation:	Pass	Fail
1	1	AM 80%, 1kHz sinewave	/	/
2	3	AM 80%, 1kHz sinewave	A	/
3	10	AM 80%, 1kHz sinewave	/	/
X	Special	/	/	/

Test Result: Pass

12. Power-Frequency Magnetic Fields (PFMF)

12.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMCPRO	KEYTEK	EMCPro	0509124	2012-03-28	2013-03-27
Coil	KEYTEK	F-1000-4-8	0533	2012-03-28	2013-03-27

12.2 Test Procedure

Test is conducting under the description of IEC 61000-4-8.

Test Performance

Performance Criterion: A

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

12.3 Power-Frequency Magnetic Field Test Data

Level	Magnetic Field Strength (r.m.s) A/m	Frequency Hz	Induction Coil Postion	Pass	Fail
1	1	50	X, Y, Z	/	/
2	3	50	X, Y, Z	A	/
3	10	50	X, Y, Z	/	/
X	Special	/		/	/

Test Result: Pass

13. Voltage Dips and Interruptions

13.1 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Transient 2000	EMC PARTNER	TRA2000	863	2012-03-28	2013-03-27

13.2 Test Procedure

Test is conducting under the description of IEC 61000-4-11.

Test Performance

Performance Criterion: B/C

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

13.3 Voltage Dips And Interruptions Test Data

U: Vlotage dips in % U_T (U_T is rated voltage for the EUT)
T: Test duration

Level	U	T	Phase Angle	N	Pass	Fail
1	>95%	10ms	0/90/180/270	3	A	/
2	60%	100ms	0/90/180/270	3	B	/
3	30%	500ms	0/90/180/270	3	B	/
4	>95%	5000ms	0/90/180/270	3	C	/

Test Result: Pass

EXHIBIT 1 - PRODUCT LABELING

Proposed CE Label Format

Specifications: Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The 'CE' marking must be affixed to the EUT or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents. The 'CE' marking must have a height of at least 5 mm. If the 'CE' marking is reduced or enlarged the proportions given in the above graduated drawing must be respected.

Proposed Label Location on EUT

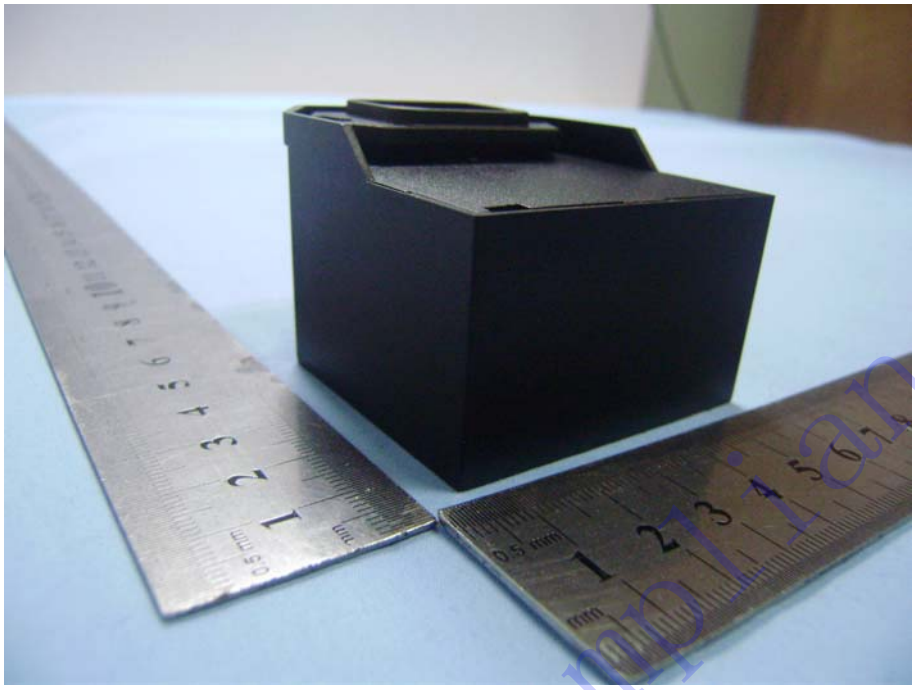
CE Label Location

EXHIBIT 2 - EUT PHOTOGRAPHS

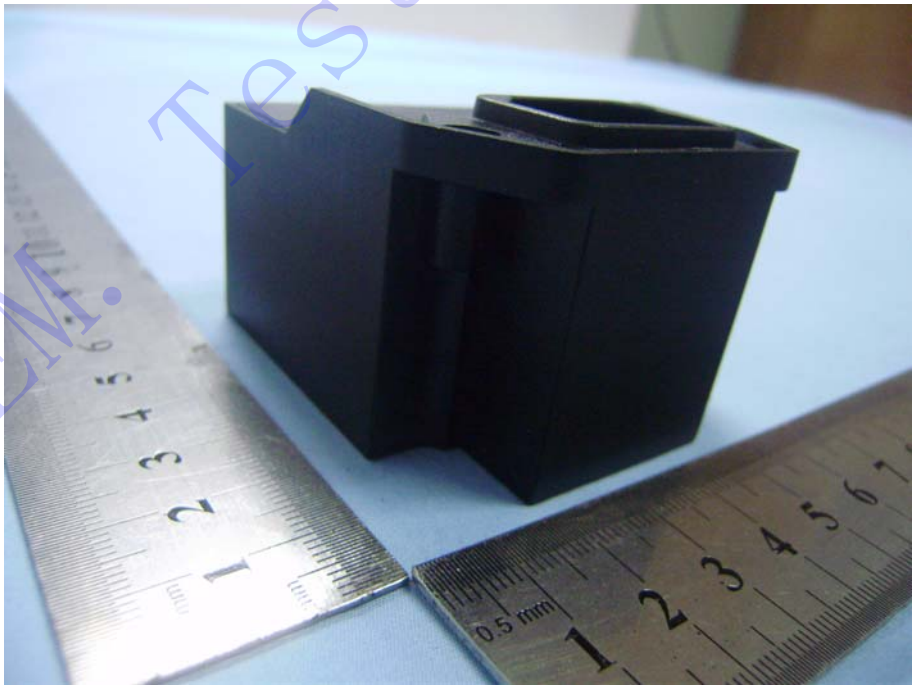
EUT View 1

EUT View 2

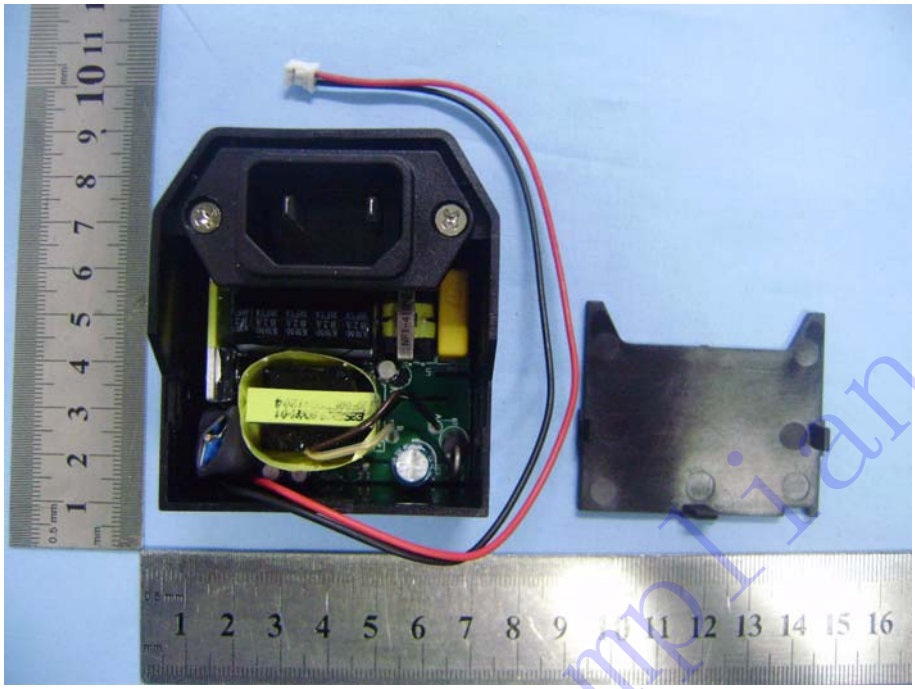
EUT View 3



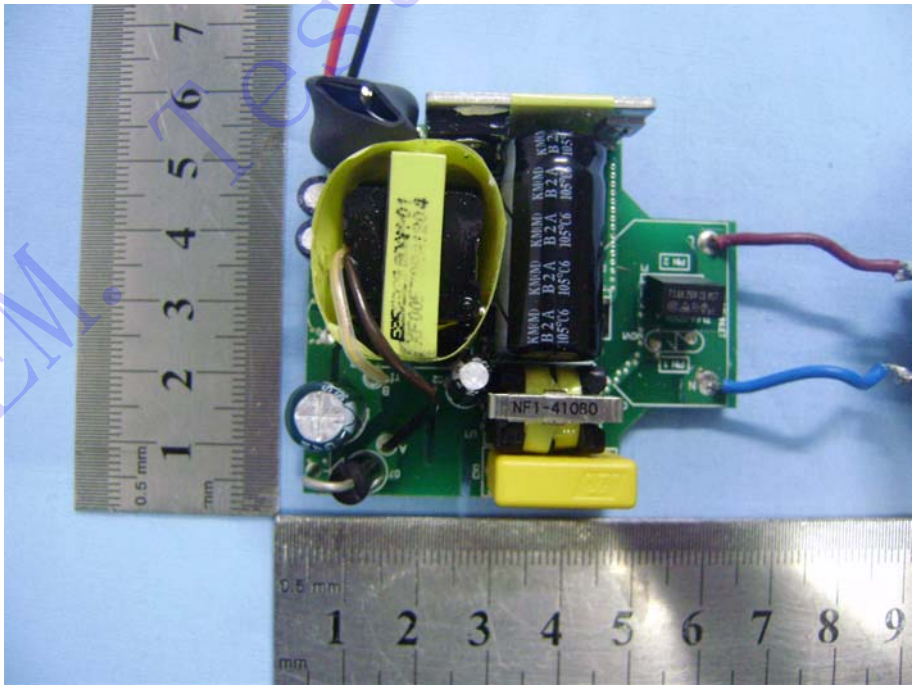
EUT View 4



EUT Housing and Board View 1



Solder Board-Component View 1



Solder Board-Component View 2

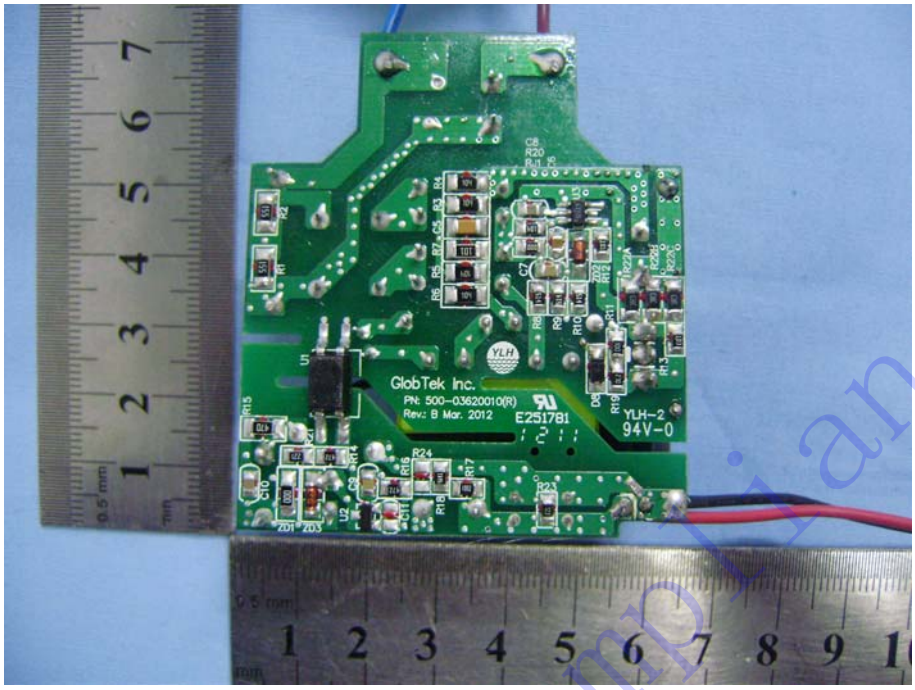
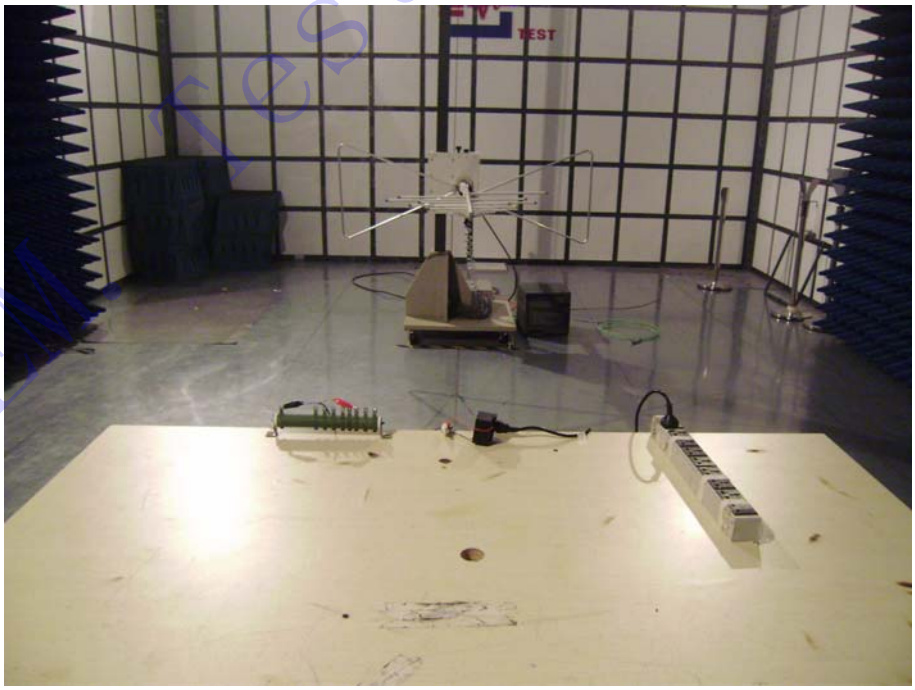


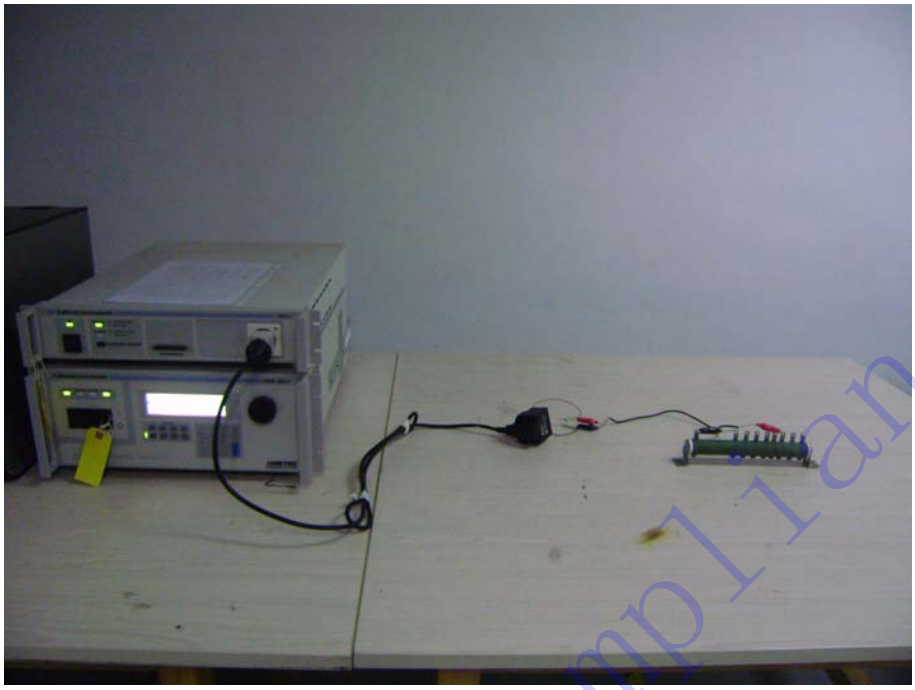
EXHIBIT 3 - TEST SETUP PHOTOGRAPHS

Conduction Emission Test View

Radiation Emission Test View

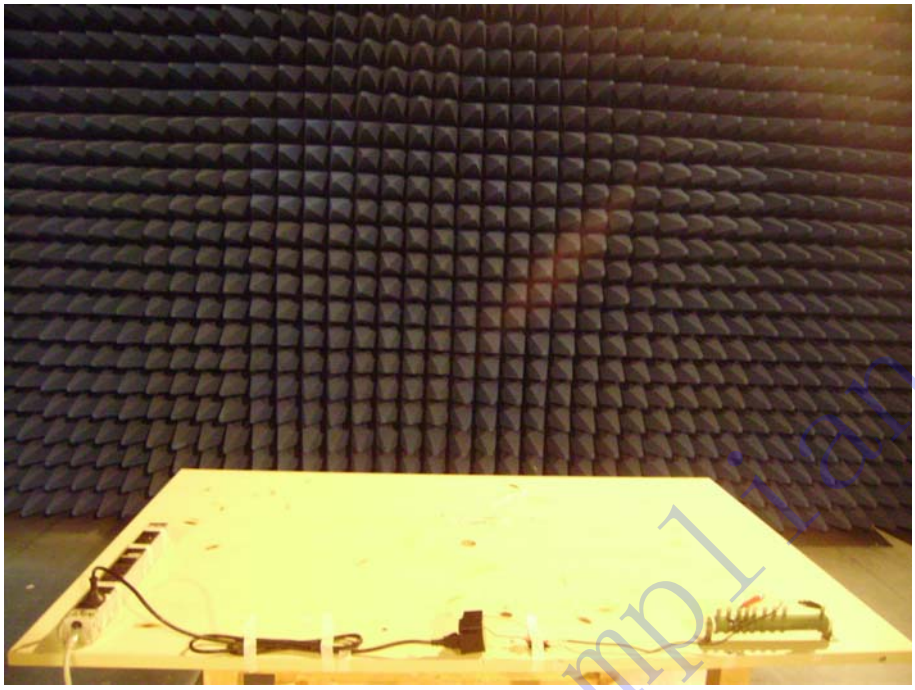


Harmonic/Flicker Test View



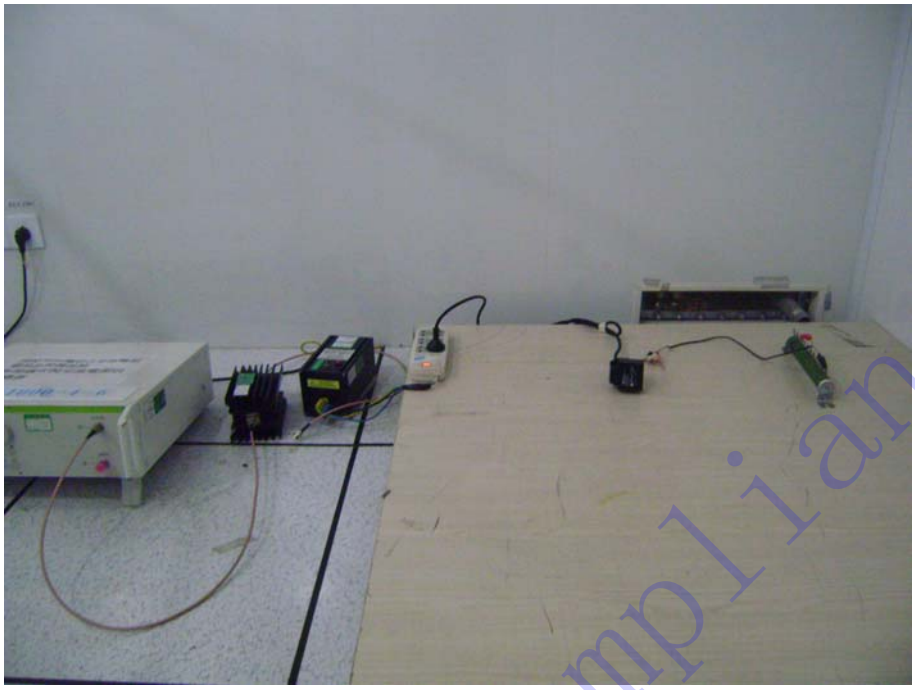
IEC61000-4-2 Test View

IEC61000-4-3 Test View



IEC61000-4-4/5/11 Test View

IEC61000-4-6 Test View



******* END OF REPORT *******