EMC
Measurement and Test Report

For

GlobTek, Inc.

186 Veterans Dr. Northvale, NJ 07647 USA

Test Standards:	EN 50498:2010
Product Description:	DC/DC CONVERTER
Tested Model:	GTD93035L6013.2-F
Report No.:	STR15058062E
Tested Date:	2015-05-11 to 2015-05-25
Issued Date:	2015-05-25
Tested By:	Rode Liu / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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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:	DC/DC CONVERTER
Trade Name:	GlobTek
Model No.:	GTD93035L6013.2-F
Adding Model(s):	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Rated Voltage:	Input: DC 9-60V Output: DC 13.2V
Rated Current:	Input: 9.0A Output: 4.54A
Rated Power:	/

1.2 Test Standards

The following report is prepared on behalf of GlobTek, Inc. in accordance with EN 50498, electronmagnetic compatibility (EMC) – product family standard for aftermarket electronic equipment in vehicles.

The objective of the manufacturer is to demonstrate compliance with EN 50498, electronmagnetic compatibility (EMC) – product family standard for aftermarket electronic equipment in vehicles.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, 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 EN 50498, electronmagnetic compatibility (EMC) – product family standard for aftermarket electronic equipment in vehicles, and ISO 7637-2.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology 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 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology 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 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd 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	Charging（DC/DC CONVERTER:DC 12V）	Connected to the load
TM2	Charging（DC/DC CONVERTER:DC 24V）	Connected to the load

EUT Cable List and Details

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

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Battery x 2	/	12V	/

Special Cable List and Details

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

2. SUMMARY OF TEST RESULTS

Standards	Description of Test Item	Result
EN 50498	Broadband Radiated Disturbances	Compliant
	Narrowband Radiated Disturbances	Compliant
	Conducted Transient Disturbances	Compliant
	Conducted Transient Immunity	Compliant

3. Broadband/Narrowband Radiated Disturbances

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 ± 5.10 dB.

3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-05-24	2016-05-23
Horn Antenna	ETS	3117	00086197	2015-05-24	2016-05-23

3.3 Test Procedure

Test is conducting under the description of §6.5 Specification concerning broadband electromagnetic interference generated by ESAs and §6.6 Specifications concerning narrowband electromagnetic interference generated by ESAs of EMC directive 2004/104/EC.

3.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 30 MHz
Stop Frequency..... 1000 MHz
Sweep Speed ..... Auto
RBW..... 100 kHz (for Broadband)
VBW ..... 120 kHz (for Broadband)
RBW..... 10 kHz (for Narrowband)
VBW ..... 30 kHz (for Narrowband)

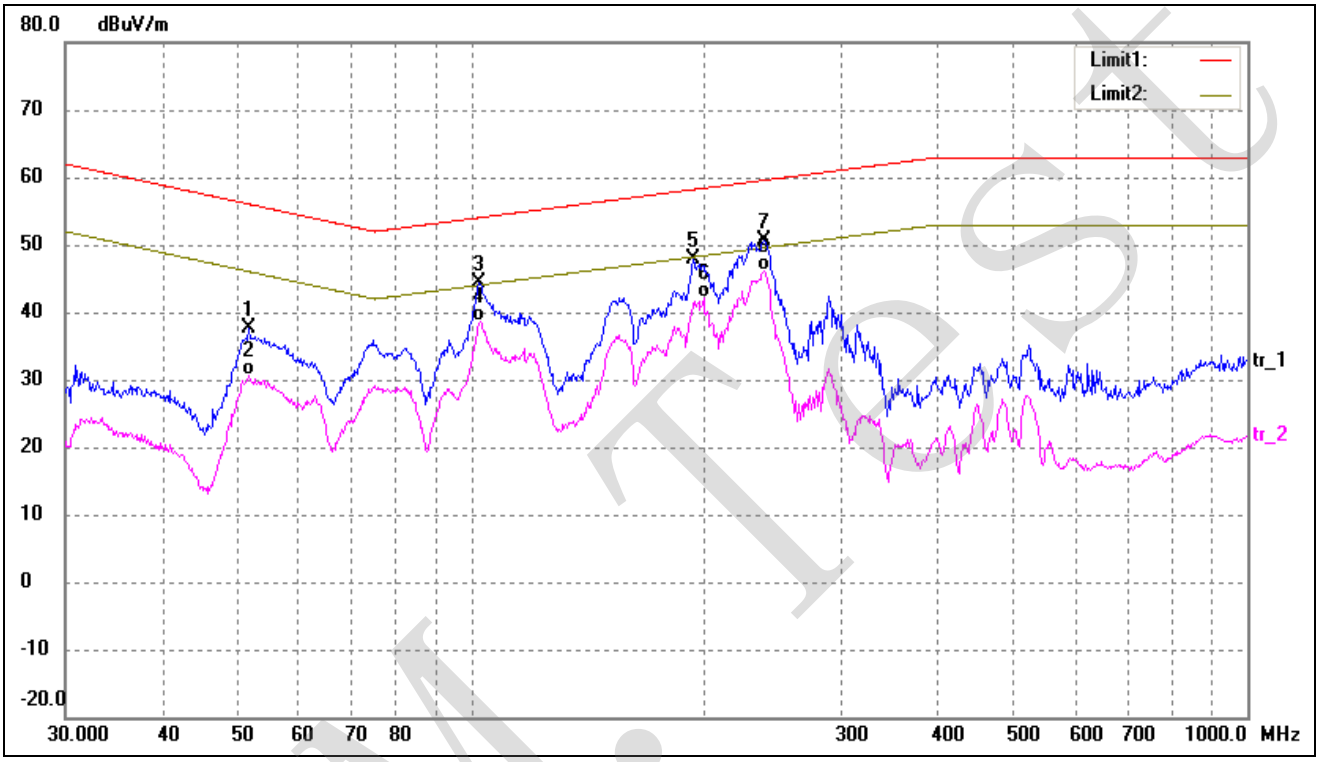
3.5 Test Results

-3.51 dB at **238.3102 MHz** in the **Horizontal** polarization, **TM1** Mode, **30 MHz to 1 GHz, 3Meters**

Plot of Radiated Emissions Test Data

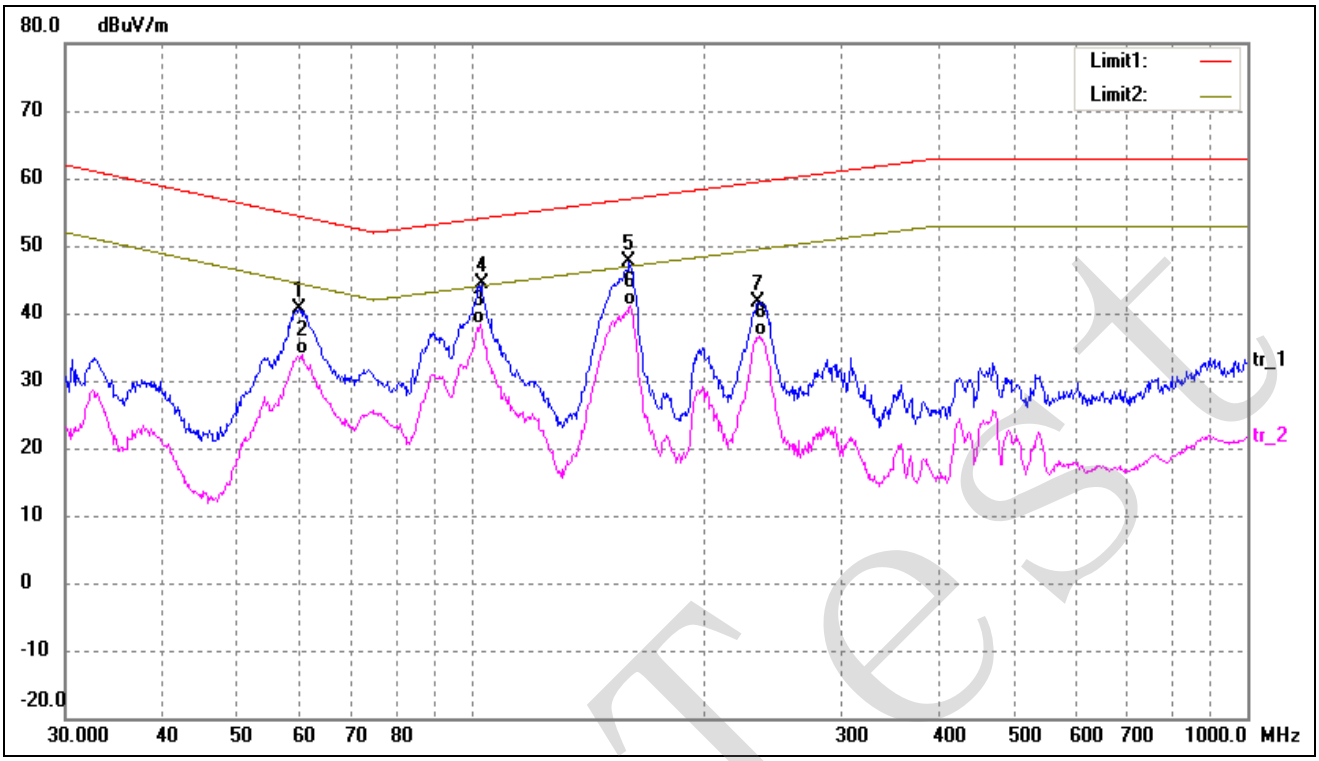
EUT: *DC/DC CONVERTER*
Tested Model: *GTD93035L6013.2-F*
Operating Condition: *TM1*
Comment: *DC 12V*

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	51.6616	30.31	7.29	37.60	56.07	-18.47	0	100	peak
2	51.6616	23.42	7.29	30.71	46.07	-15.36	0	100	AVG
3	102.3597	38.45	5.88	44.33	54.04	-9.71	0	100	peak
4	102.7192	32.77	5.85	38.62	44.07	-5.45	0	100	AVG
5	193.0945	44.61	3.35	47.96	58.21	-10.25	0	100	peak
6	199.2855	38.38	3.64	42.02	48.42	-6.40	0	100	AVG
7	238.3102	44.33	6.23	50.56	59.60	-9.04	0	100	peak
8	238.3102	39.86	6.23	46.09	49.60	-3.51	0	100	AVG

Test Specification: *Vertical*

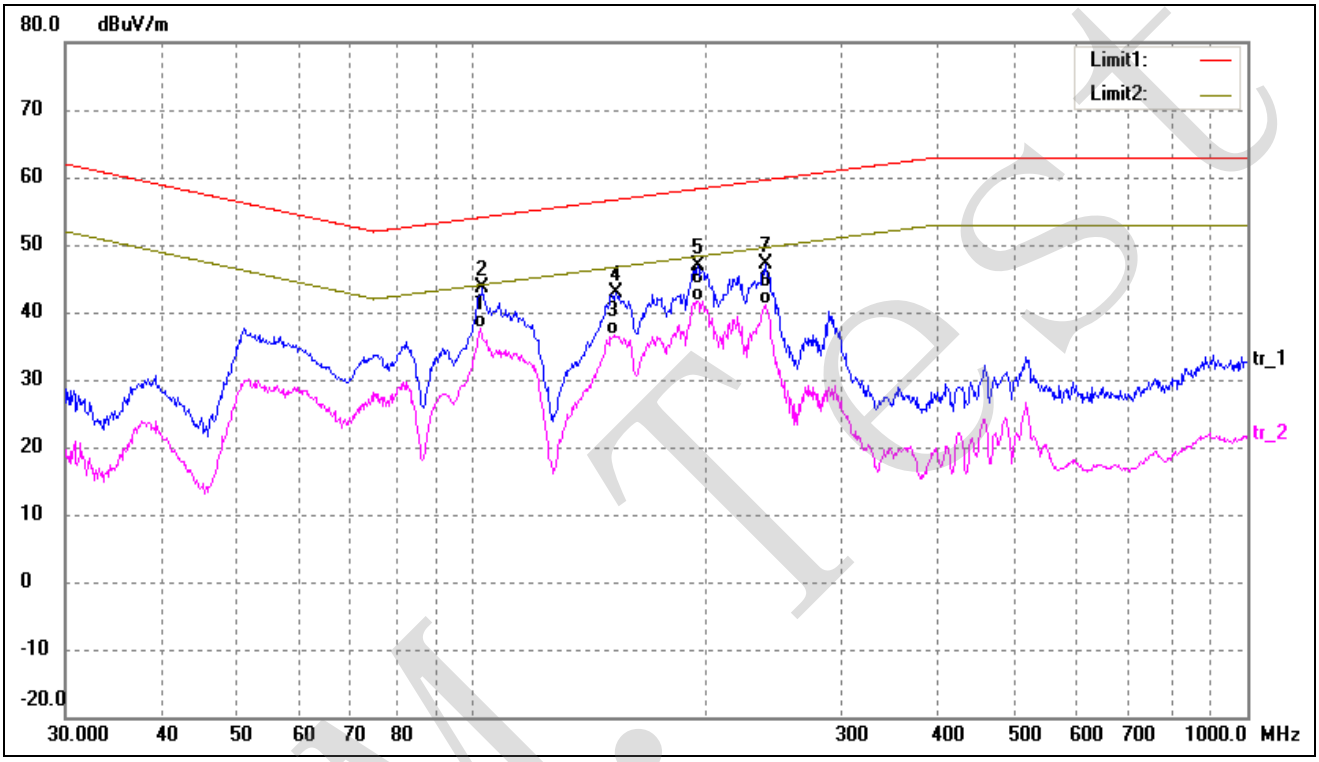


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	60.0691	33.17	7.34	40.51	54.42	-13.91	0	100	peak
2	60.7044	26.76	7.01	33.77	44.31	-10.54	0	100	AVG
3	102.7192	32.42	5.85	38.27	44.07	-5.80	0	100	AVG
4	103.0800	38.51	5.81	44.32	54.09	-9.77	0	100	peak
5	159.7844	45.09	2.62	47.71	56.97	-9.26	0	100	peak
6	160.3457	38.40	2.62	41.02	46.99	-5.97	0	100	AVG
7	234.1684	35.77	5.98	41.75	59.48	-17.73	0	100	peak
8	234.9909	30.62	6.02	36.64	49.50	-12.86	0	100	AVG

Plot of Radiated Emissions Test Data

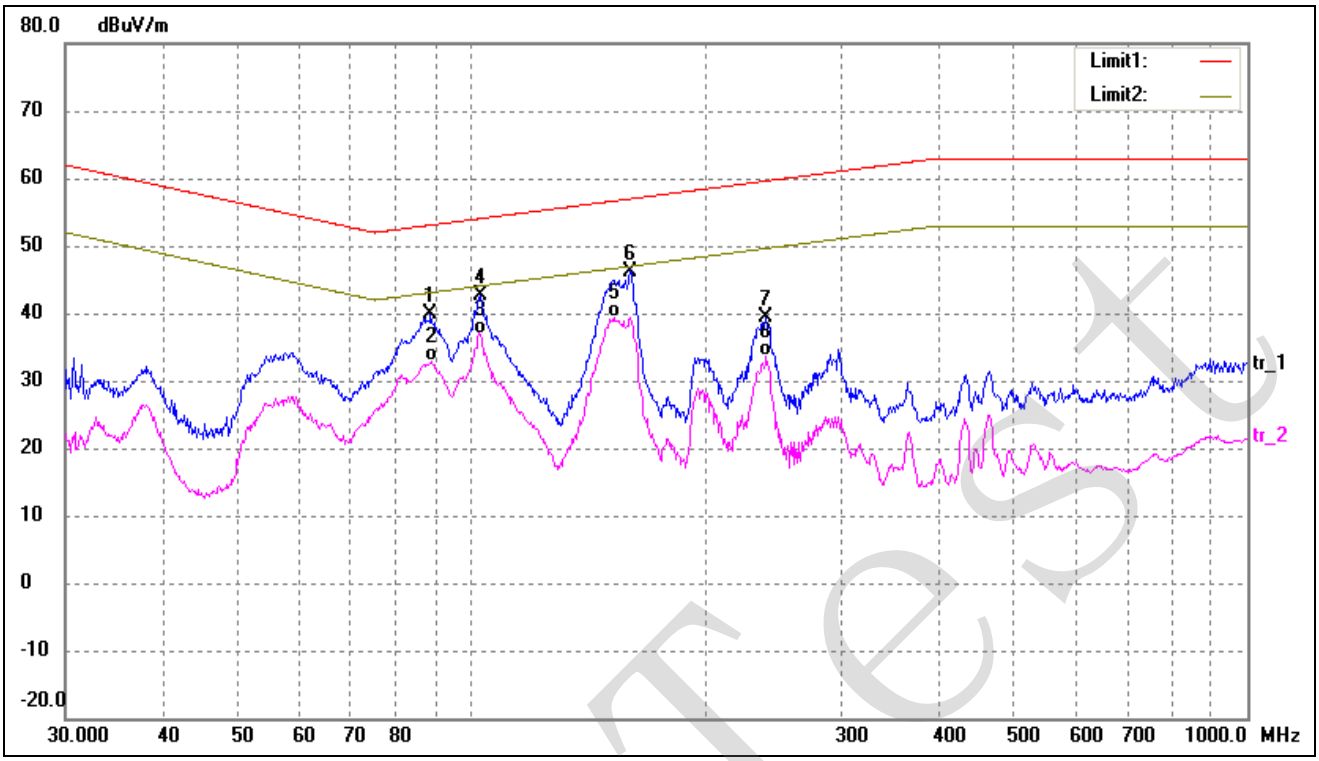
EUT: *DC/DC CONVERTER*
Tested Model: *GTD93035L6013.2-F*
Operating Condition: *TM2*
Comment: *DC 24V*

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	102.7192	31.81	5.85	37.66	44.07	-6.41	0	100	AVG
2	103.4421	37.90	5.77	43.67	54.11	-10.44	0	100	peak
3	152.6641	34.20	2.53	36.73	46.67	-9.94	0	100	AVG
4	153.7385	40.26	2.54	42.80	56.72	-13.92	0	100	peak
5	195.8220	43.32	3.47	46.79	58.31	-11.52	0	100	peak
6	195.8220	38.26	3.47	41.73	48.31	-6.58	0	100	AVG
7	239.1473	40.78	6.28	47.06	59.62	-12.56	0	100	peak
8	239.1473	34.84	6.28	41.12	49.62	-8.50	0	100	AVG

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	88.6525	36.69	3.26	39.95	53.10	-13.15	0	100	peak
2	88.9639	29.55	3.35	32.90	43.12	-10.22	0	100	AVG
3	102.3597	31.12	5.88	37.00	44.04	-7.04	0	100	AVG
4	102.7192	36.66	5.85	42.51	54.07	-11.56	0	100	peak
5	152.6641	36.86	2.53	39.39	46.67	-7.28	0	100	AVG
6	160.3457	43.63	2.62	46.25	56.99	-10.74	0	100	peak
7	239.9874	33.11	6.33	39.44	59.64	-20.20	0	100	peak
8	239.9874	27.18	6.33	33.51	49.64	-16.13	0	100	AVG

4. Conducted Transient Disturbances

4.1 Test Equipment

Item	Model	Manufacturer	Description	Cal. Date	Due. Date
1	DL9140	Yokogawa	Digital Oscilloscope	2014-05-28	2015-05-27
2	ESH3-Z6	AMN	Rohde & Schwarz	2014-05-28	2015-05-27
3	NSG 417	Switch simulator	Schaffner	2014-05-28	2015-05-27

4.2 Test Procedure

Test is conducting under the description of ISO/DIS 7637-2

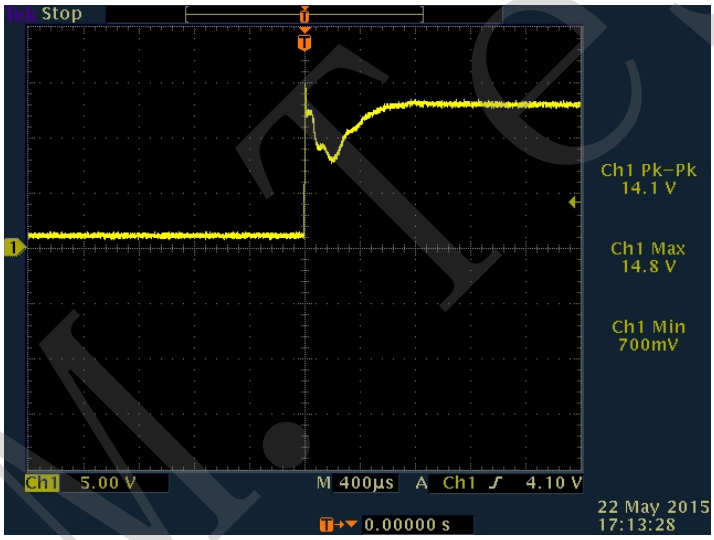
4.3 Test Data/Plots

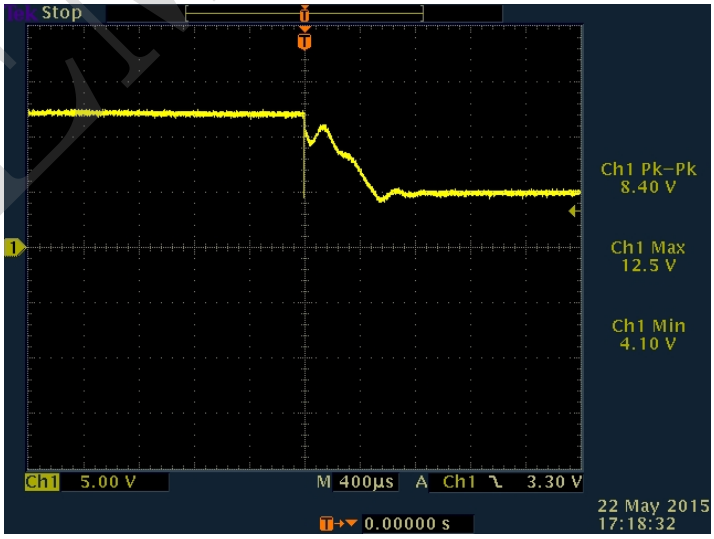
Applicant:	**GlobTek, Inc.**	**Manufacturer:**	**1. GlobTek, Inc. 2. GlobTek (Suzhou) Co., Ltd**
Type / Model:	**GTD93035L6013.2-F**	**Serial Number:**	**-**
Report Number:	**STR15058062**	**Athmospheric pressure:**	**992 – 1008 hPa**
Temperature:	**21 – 23.5 ℃**	**Humidity:**	**40-60%**
Test according to:	**2004/104/EC**		
Engineer:	**Rode**	**Operation mode:**	**off**
Test Place:	**Shield room B**	**Date of test:**	**25.05.2015**

Limits for the classification of 12V equipment *(Grenzwrte fur die klassifizierung von 12V Geraten)*

Polarity	Limits for class III equipment	Max. measured voltage	Test Result:
Positive	**+75V**	**+14.8V**	**Passed**
Negative	**-100V**	**-12.5V**	**Passed**

Remarks:





5. Conducted Transient Immunity

5.1 Test Equipment

Item	Model	Manufacturer	Description	Cal. Date	Due. Date
1	EFT 200	EM TEST	ISO 7637 test system	2014-05-28	2015-05-27
2	MPG 200	EM TEST	ISO 7637 test system	2014-05-28	2015-05-27
3	LD 200	EM TEST	ISO 7637 test system	2014-05-28	2015-05-27
4	CAN 200	EM TEST	ISO 7637 test system	2014-05-28	2015-05-27
5	VDS 200	EM TEST	ISO 7637 test system	2014-05-28	2015-05-27

5.2 Test Procedure

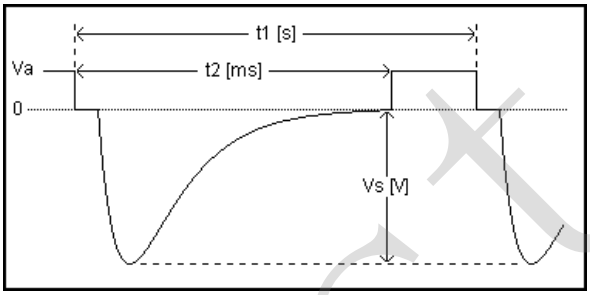
Test is conducting under the description of ISO/DIS 7637-2

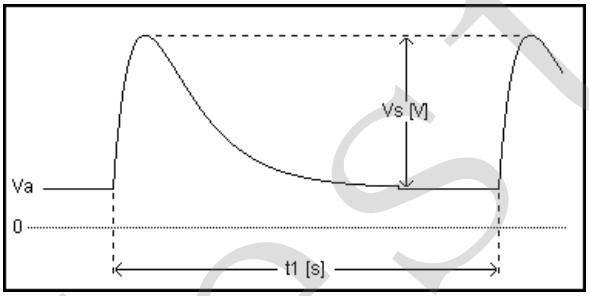
5.3 Test Data/Plots

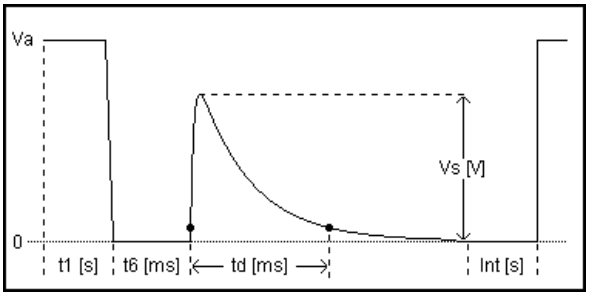
Transients and Surges in the Vehicle Environment

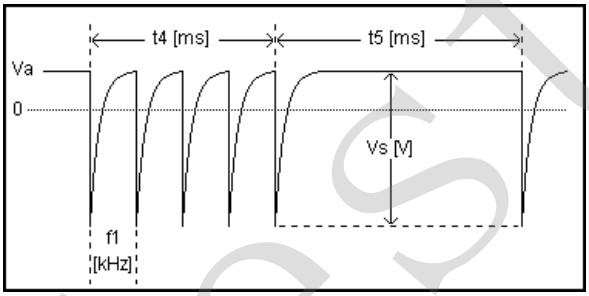
Test Method:	ISO 7637-2
Test date:	2015-May-25
Test Level:	Pluse 1, 2a, 2b, 3a and 3b and 4.
Polarity:	Positive & Negative
EUT Operation:	Test in FM receiving mode and Cassette playing mode
Ambient:	Temp.: 21 °C, Humid.: 53% Press.: 1011 mbar
Status:	Test in FM receiving mode and Cassette playing mode
Test Procedure:	Compliance test was performed in mode 1)
Equipment Used:	Refer to section 5 for details.
Test Procedure:	ISO/DIS 7637-2 : Pulse 1

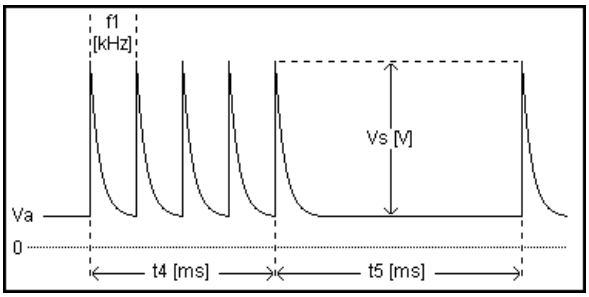
Test generator:	MPG200B		Software No.:	000262	
			Serial No.:	0501-03	
Coupling network:	CNA200		Serial No.:	0701-05	
Va (Alternator):	13.2	V	Current limit:	10	D
Test setup:					
Vs:	-75	V			
t1:	0.5	s			
t2:	200	ms			
Impedance:	10	Ohm	Connection:	+/-	
Events:	10				
Test duration:	5 s				



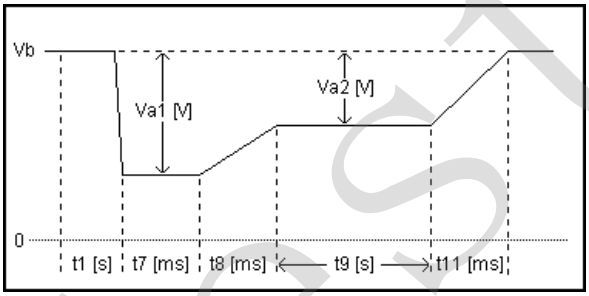
Test Procedure			ISO/DIS 7637-2 : Pulse 2a		
Test generator:	MPG200B		Software No.:	000262	
			Serial No.:	0501-03	
Coupling network:	CNA200		Serial No.:	0701-05	
Va (Alternator):	13.2	V	Current limit:	10	D
Test setup:					
Vs:	+37	V			
t1:	0.5	s			
Impedance:	2	Ohm	Connection:	+/-	
Events:	10				
Test duration:	5 s				

Test Procedure			ISO/DIS 7637-2.2 : Pulse 2b		
Test generator:	VDS200B PF		Software No.:	000243	
			Serial No.:	1101-01	
Coupling network:	CNA200		Serial No.:	0701-05	
Va (Alternator):	13.2	V	Current limit:	15	D
Test setup:					
Vs:	10.0	V			
t1:	0.5	s			
t6:	1	ms			
td:	1000	ms			
Int:	0.5	s			
Ri:	0.05	Ohm			
Events:	10				
Test duration:	38 s				

Test Procedure			ISO/DIS 7637-2.2 : Pulse 3a		
Test generator:	EFT200A		Software No.:	000240	
			Serial No.:	1001-04	
Coupling network:	CNA200		Serial No.:	0701-05	
Va (Alternator):	13.2	V	Current limit:	10	D
Test setup:					
Vs:	-112	V			
f1:	10	kHz			
t4:	10	ms			
t5:	90	ms			
Coupling:	+				
Test duration:	20	m	Time between Tests:	1	s

Test Procedure			GM 9105 P : Pulse 3b		
Test generator:	EFT200A		Software No.:	000240	
			Serial No.:	1001-04	
Coupling network:	CNA200		Serial No.:	0701-05	
Va (Alternator):	13.2	V	Current limit:	10	D
Test setup:					
Vs:	+100	V			
f1:	10	kHz			
t4:	10	ms			
t5:	90	ms			
Coupling:	+				
Test duration:	20	m	Time between Tests:	1	s

Test Procedure			ISO/DIS 7637-2.2 : Pulse 4	
Test generator:	VDS200B PF		Software No.:	000243
			Serial No.:	1101-01
Coupling network:	CNA200		Serial No.:	0701-05
Vb (Battery):	13.2	V	Current limit:	10 D
Test setup:				
Va1:	-6.0	V		
Va2:	-2.5	V		
t1:	1.0	s		
t7:	15	ms		
t8:	50	ms		
t9:	0.5	s		
t11:	5	ms		
Events:	10			
Test duration:	19 s			



Test Results

Test Level, Us (V)	Requirement	Pulse No. or test time	Result / Observations
-75	Pulse 1	10 with 2.5s interval	D
+37	Pulse 2a	10 with 2.5s interval	A
+10V	Pulse 2b	10 with 2.5s interval	D
-112	Pulse 3a	20 minutes	A
+75	Pulse 3b	20 minutes	A
-6	Pulse 4	5 with 60 seconds cycle	D

EXHIBIT 1 - PRODUCT LABELING

Proposed CE Label Format

CE

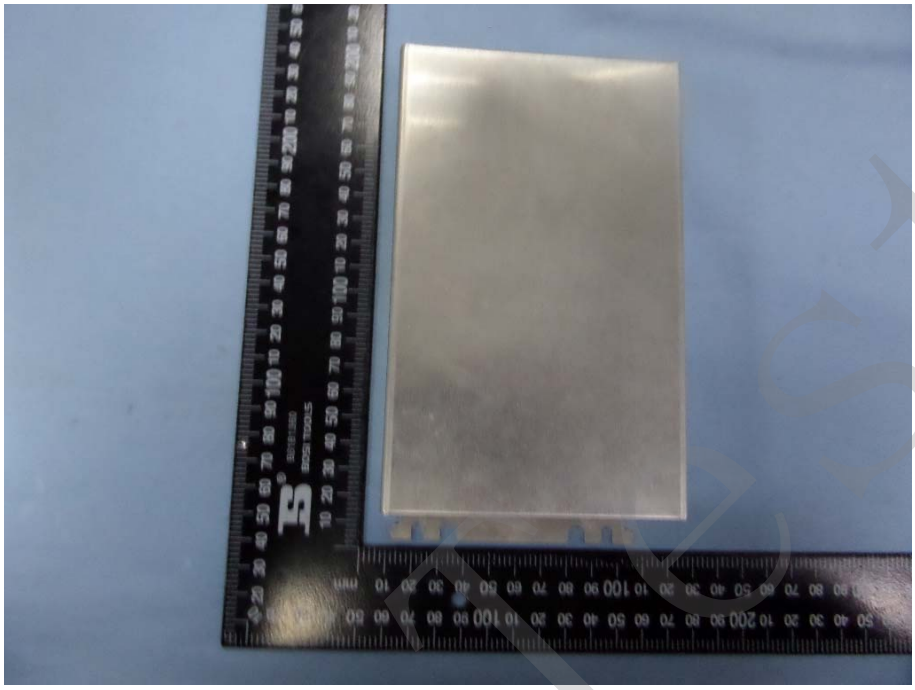
Specifications: Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The 'CE' marking must be affixed to the EUT or to its data plate. Where this is not possible 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

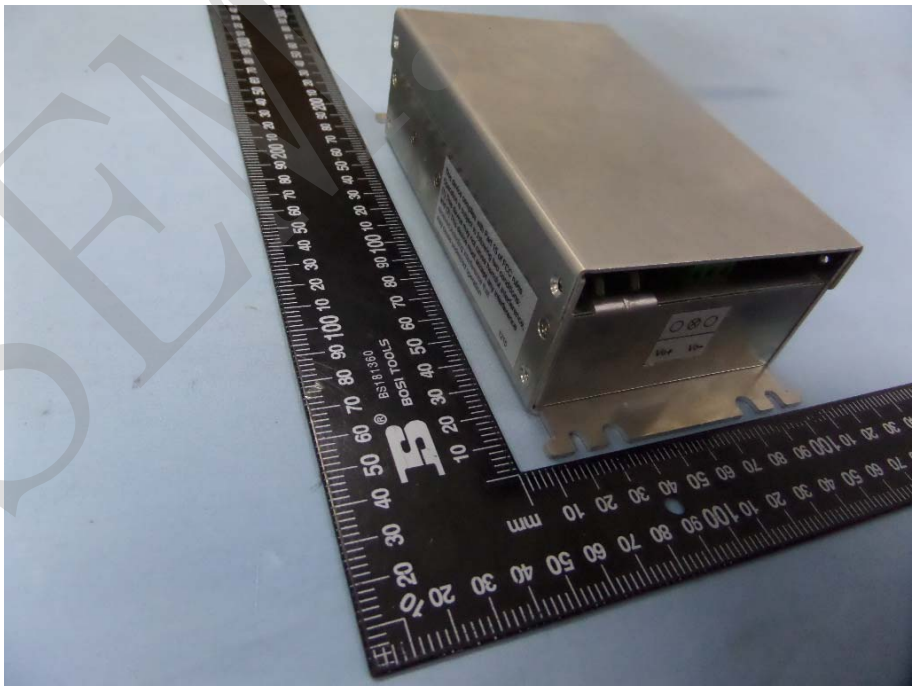
CE Label Location

EXHIBIT 2 - EUT PHOTOGRAPHS

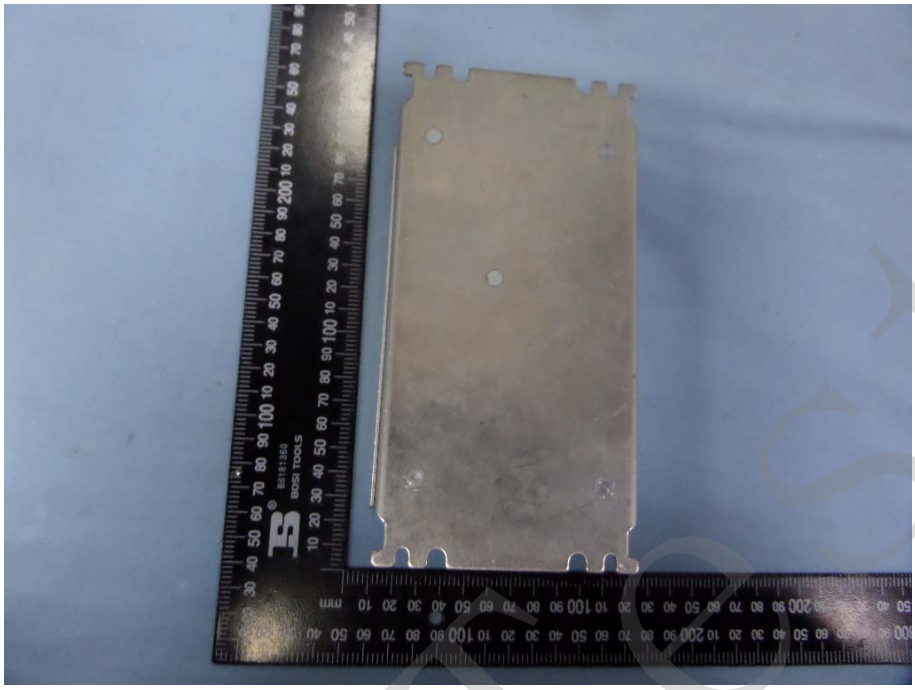
EUT View 1



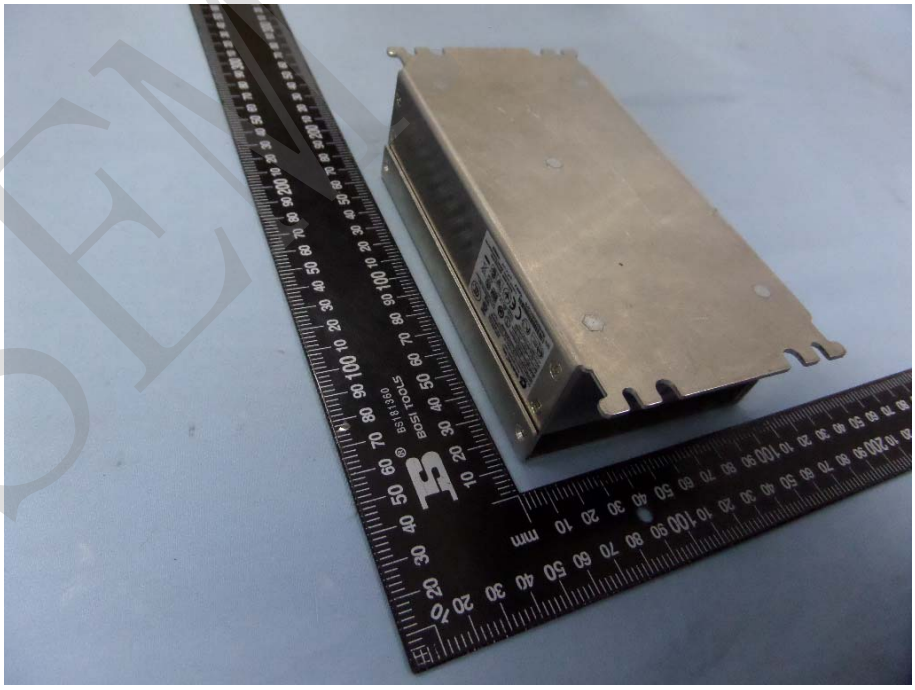
EUT View 2



EUT View 3



EUT View 4



EUT Housing and Board View

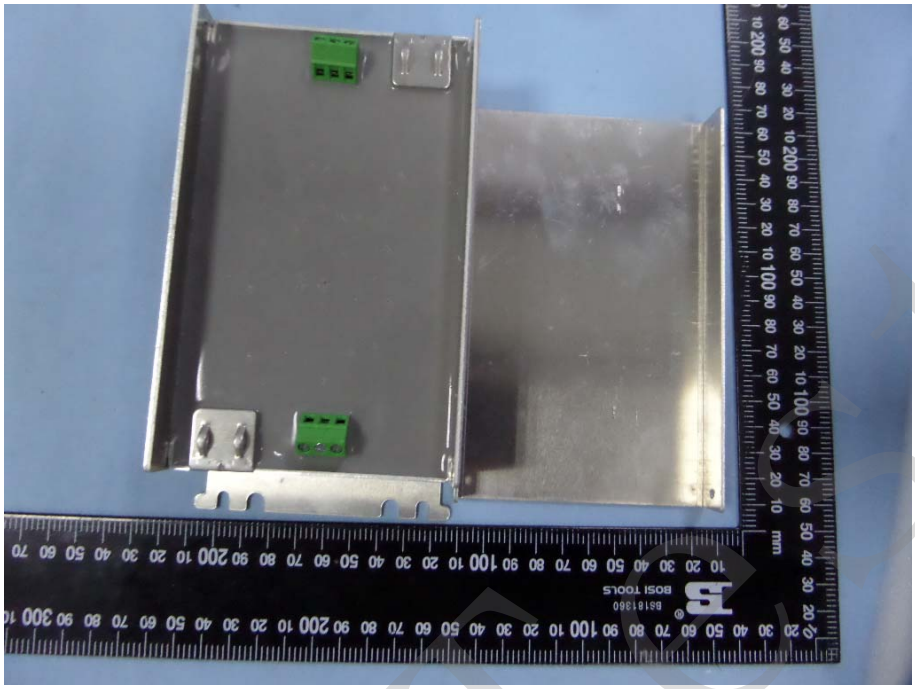
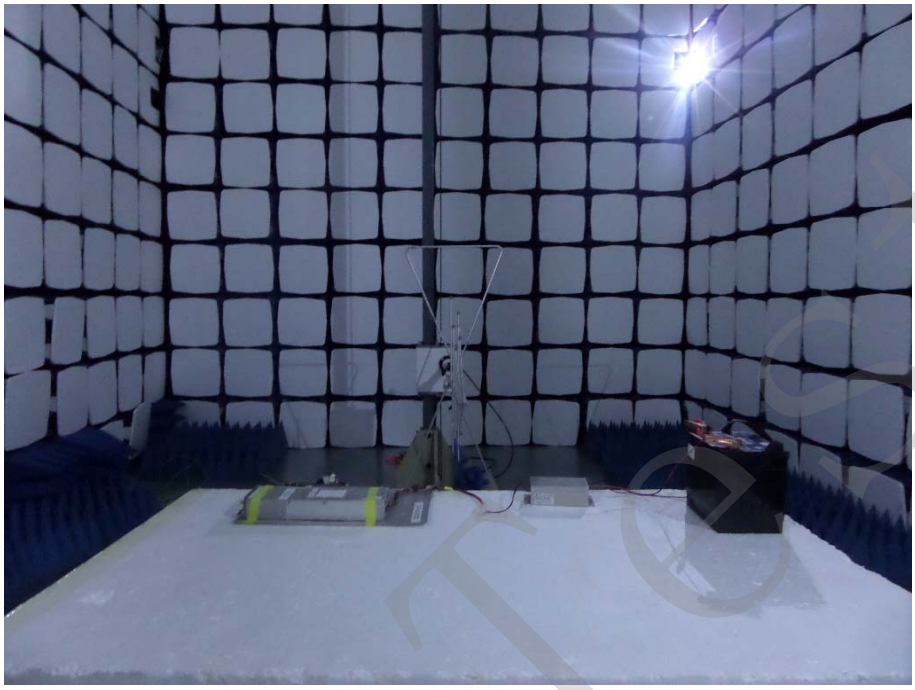


EXHIBIT 3 - TEST SETUP PHOTOGRAPHS

Narrowband/Broadband Emission Front View



Conducted Transient Disturbances

Conducted Transient Immunity

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