TEST REPORT

Automotive

Test of:	Electronic Battery Maintenance System
Model Number:	Megapulse First Aid for Batteries MK 4
SGS Reference :	AUT110790/GT/07.
VCA Reference :	EAG176084.
Applicant :	Megapulse Pty Ltd.
Test Specification:	2006/28/EC. 2006* Annex 7, 8, 9, & 10
Date of Receipt:	14th August 2007.
Date of Test(s):	20th to 24th August 2007.
Date of Issue:	24th August 2007.
Issue No:	One.
Conclusion :	The sample tested was found to comply with the standards

Tests marked: are not covered by our UKAS accreditation.*

Signature	Signature
Test Engineer	***Authorised Signatory***
~~G. Hann~~ G. Thompson	~~F. Huggins A. Reynard~~ G. Hann

SGS United Kingdom Ltd | Unit 10, Bowburn South Industrial Estate, Bowburn, Durham DH6 5AD **Tel** +44 (0)191 377 2000 **Fax** +44 (0)191 377 2020
Registered in England No. 1193985 Rossmore Business Park, Ellesmere Port, Cheshire CH65 3EN www.sgs.com

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1. Client Information

Company Name:	Megapulse Pty Ltd	
Address:	11, Fortuna Court, Eatons Hill Qld 4037, Australia	Compliance Eng, Pty Ltd Unit 1, 70 Rushdale St Knoxfield VIC 3180 Australia
Contact Name:	Ross Naddei	Andrew Burden
Telephone:	0407 254 299	+(613) 9763 3079
Facsimile:	07 3325 4200	+(613) 9763 9706

2. Equipment Under Test (EUT)

2.1 Identification of EUT

Model Number:	Megapulse First Aid for Batteries MK4.
Unique Identifier:	Not supplied by the client.
Description of EUT:	3 samples marked for 6 volts, 12 volts and 24 volt batteries. Electronic battery maintenance system/s
Supply Voltage:	6/12/24VDC
Accessories Supplied:	N/A.

3. Purpose of Tests

To perform the relevant tests and assess the product for compliance with the above specification.

4. Deviations or Exclusions from the Test Specifications

There were deviations from the test specifications.

The scope of the inspection is limited to what is specified in the clients instructions and does not include any other checks or tests.

5. Operation of the EUT During Testing

5.1 Configuration and Peripherals

No peripheral or support equipment was required for the tests.

5.2 Operating Mode and Environmental Conditions

The operating modes and environmental conditions used for each individual test are described in the test results section of this report.

6. Test Results

1 Test Specification

2004/104/EC: 2004, as amended by 2005/83/EC / 2006/28/EC.

2 Purpose of Test

To perform the relevant tests and assess the product for compliance with the above specification.

3 Methods and Procedures.

The following tests are called up by the test specification:-

Standard	Date	Description	Applicable
2004/104/EC	2004.	Narrowband Emissions.	Yes
2004/104/EC	2004	Broadband Emissions	Yes
2004/104/EC	2004	Radiated Immunity	Yes
ISO 7637 – 2 [2004/104/EC]	2004	Transient conduction along supply lines.	Yes
ISO 7637 – 2 [2004/104/EC]	2004	Voltage transient emissions	Yes

Operation of E.U.T. During Testing

Operating Environment

Power Supply: **Volts** 6/12/24DC.

Environmental conditions:-

Temperature:	°C	19
Relative Humidity:	%	47
Barometric Pressure:	mbar	1007

Configuration & Peripherals

No peripherals were attached to the EUT during testing.

Summary of Test Results

Standard	Test	Result
2004/104/EC Annex VIII	Narrowband Emissions	Complied
2004/104/EC Annex VII	Broadband Emissions	Complied
2004/104/EC Annex IX	Radiated Immunity	Complied
2004/104/EC Annex X	Transient Pulses	Complied
2004/104/EC Annex X	Transient Emissions	Complied

Result

In the configuration tested the EUT complied with the specification.

Test Results

General Comments

Details of the test methods used can be found in the SGS EMC procedures manual.

Modifications Made to the EUT.

No modifications were made to the EUT.

RADIATED EMISSIONS

OPERATING MODE

The 24 volt sample was tested after checking the 6v and 12 v samples for worst case, the EUT was connected across the vehicle battery (X2 12v batteries).

NARROWBAND & BROADBAND EMISSIONS

Tests were carried out in the vertical and horizontal antenna polarisation, for the above operating mode within an enclosed anechoic chamber.

EQUIPMENT USED.

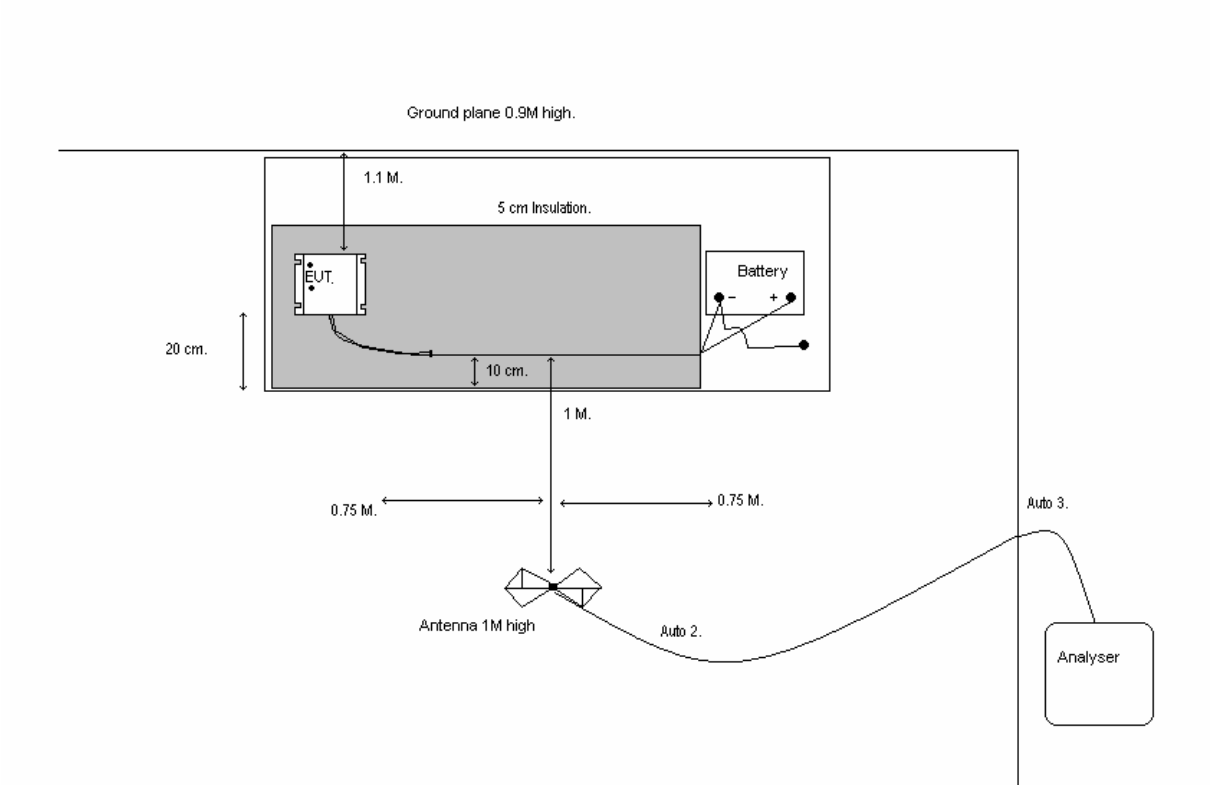
1. HP Analyser. No. 8567A, 85685A & 85650A.
2. Automotive LISN. – N/A.
3. Antennas Chase - VBA & EMCO - 3146.

PERFORMANCE CRITERIA

All emissions are at least 2 dB below the reference limits for the Vehicle Certification Agency approval.

Test Configuration Radiated Emissions:

N.B. No LISN was used in the set-up, as the product is connected directly across the vehicle battery terminals.



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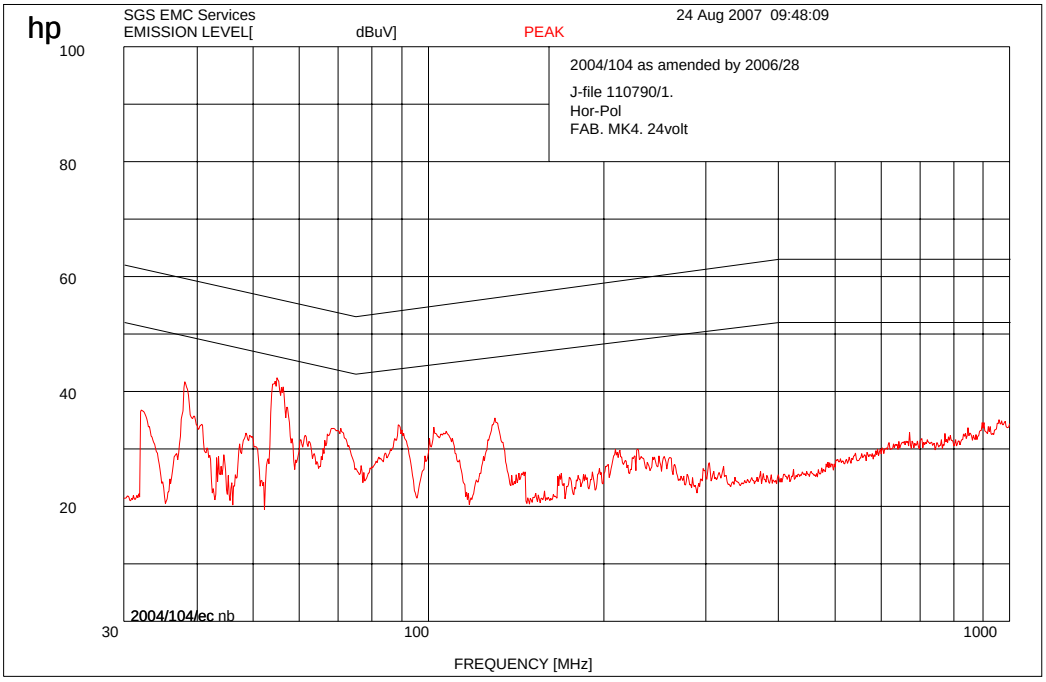
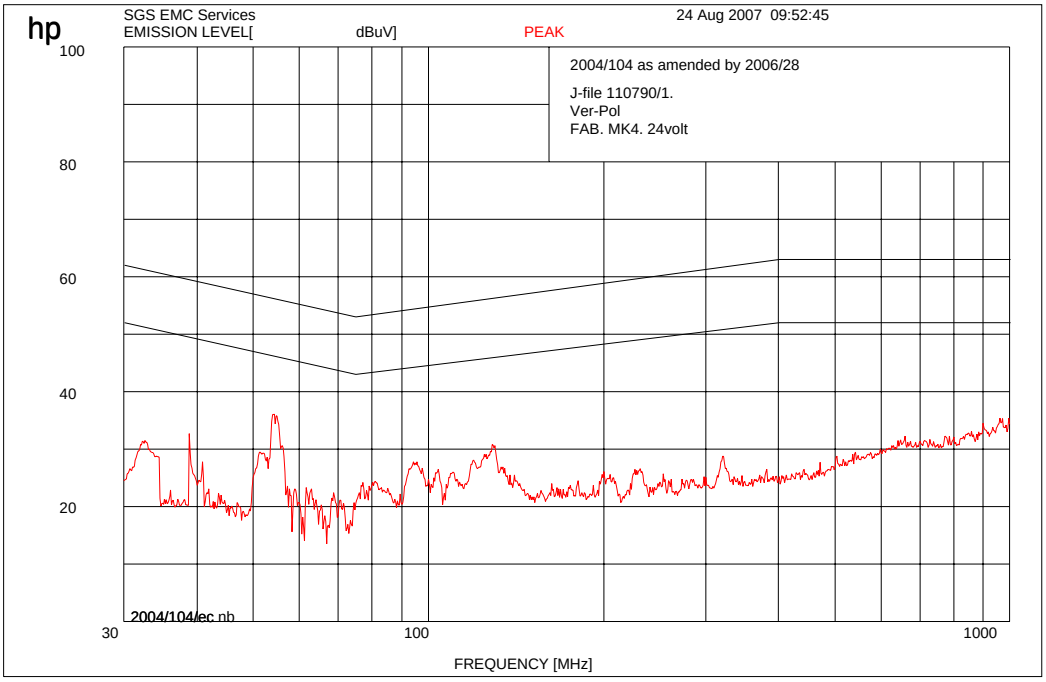

hp
SGS EMC Services
EMISSION LEVEL[dBuV]
PEAK
24 Aug 2007 09:48:09
2004/104 as amended by 2006/28
J-file 110790/1.
Hor-Pol
FAB. MK4. 24volt
100
80
60
40
20
2004/104/ec nb
30
100
1000
FREQUENCY [MHz]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PEAK
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J-file 110790/1.
Ver-Pol
FAB. MK4. 24volt
100
80
60
40
20
2004/104/ec nb
30
100
1000
FREQUENCY [MHz]

RADIATED IMMUNITY

OPERATING MODE: Sample connected across a fully charged vehicle battery. [Monitoring the "LED's" on the sample: via a camera.]

IMMUNITY TESTING

20 to 2000MHz [30 V/m]
20 to 800MHz with [1 kHz 80% AM] modulation
800 to 2000MHz with [pulsed "t on 577µsec, period 4600 µsec"] modulation
Dwell time: 3 seconds.

Tests were carried out in the above operating mode,

NB. In the anechoic chamber the antenna was in the vertical / horizontal polarisation.

EQUIPMENT USED.

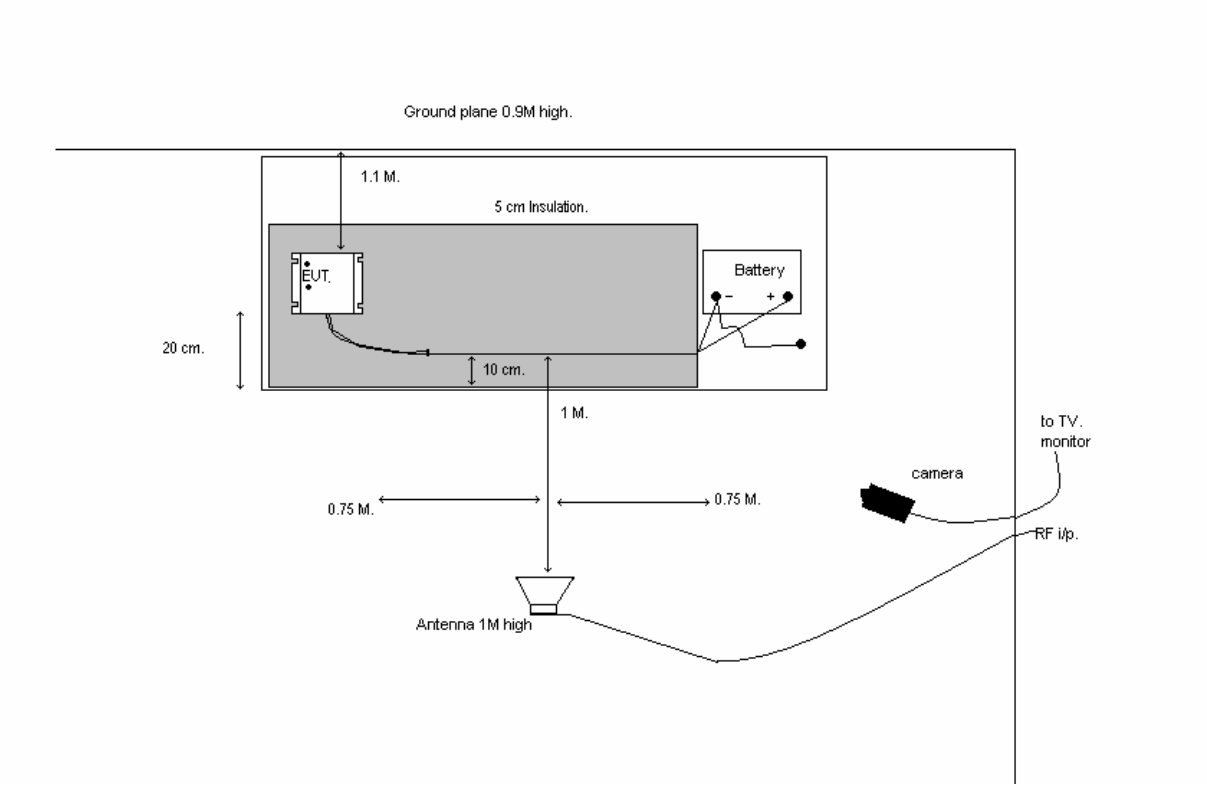
Amplifier	250L
Amplifier	500W1000A
Amplifier	200T1G3A
Signal generator	2024
Isotropic field monitor	FM Radi-Sense RI-37
Probe	FP 04 RI-37
Power Meter	NVRS
Functional Generator	TG 1010

PERFORMANCE CRITERIA

The EUT shall not exhibit any malfunction which will cause any degradation of performance which could cause confusion to other road users or any degradation in the driver's direct control of a vehicle fitted with the system which could be observed by the driver or other road user.

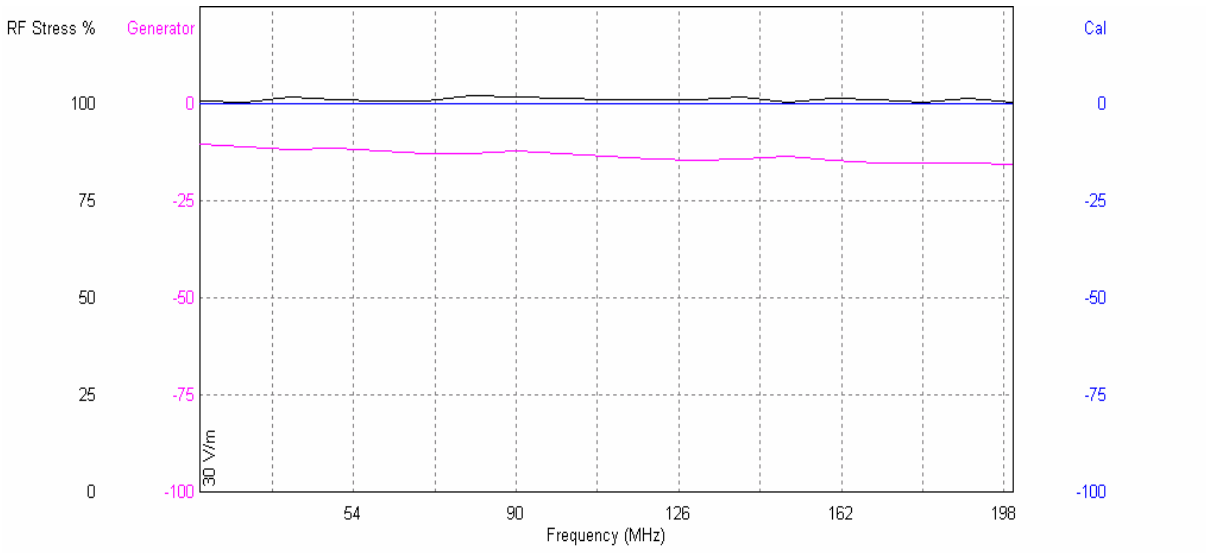
Test Configuration Radiated Immunity:

N.B. No LISN was used in the set-up, as the product is connected directly across the vehicle battery terminals.

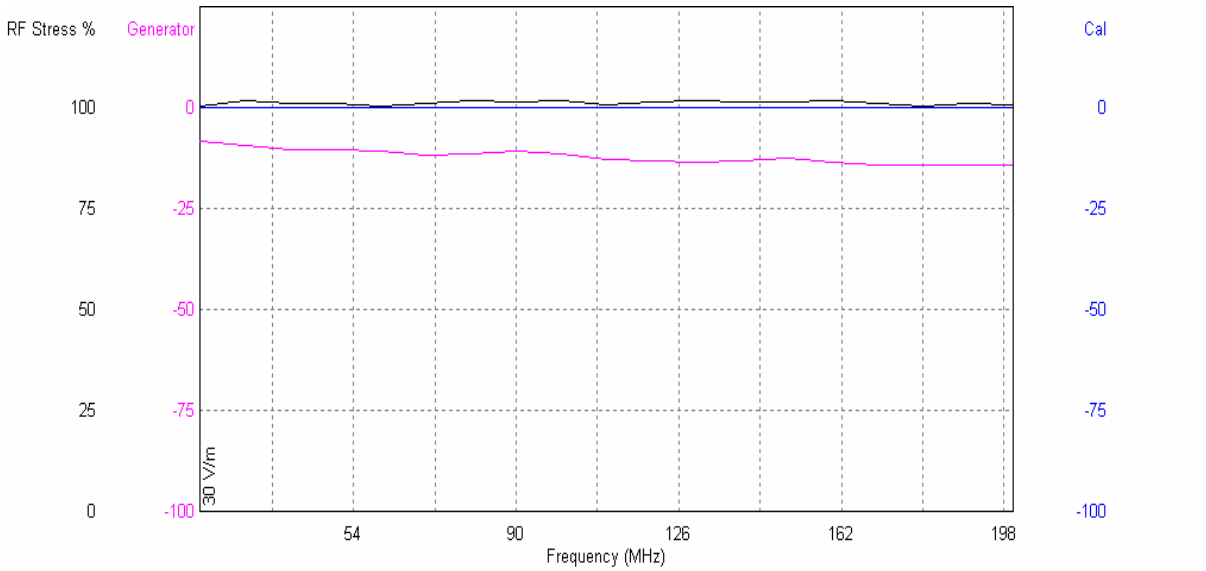


20 to 200 MHz "Free field"

CW.

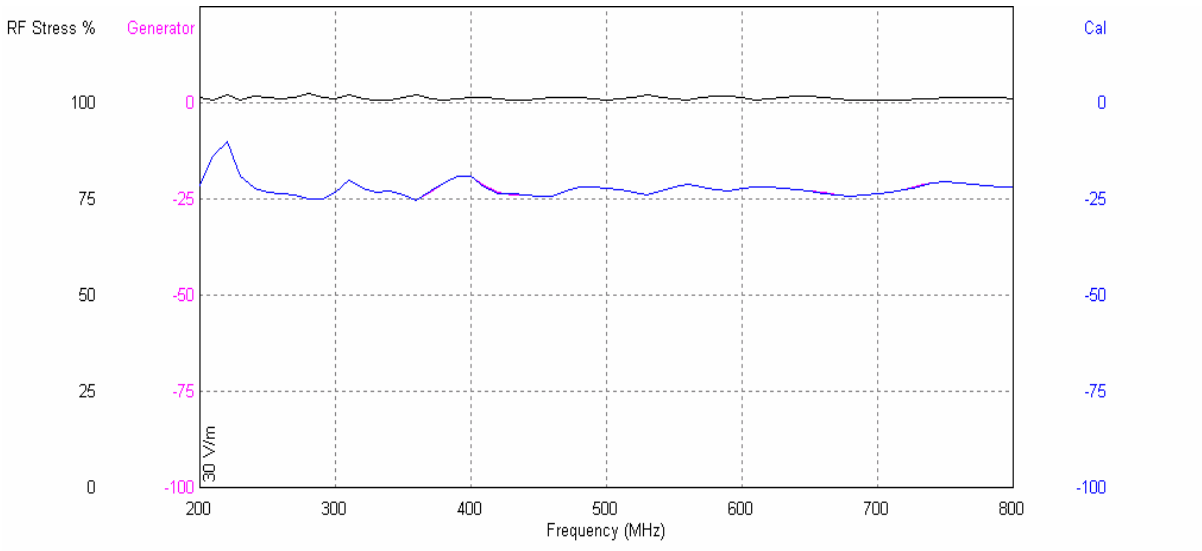


1kHz 80% AM.

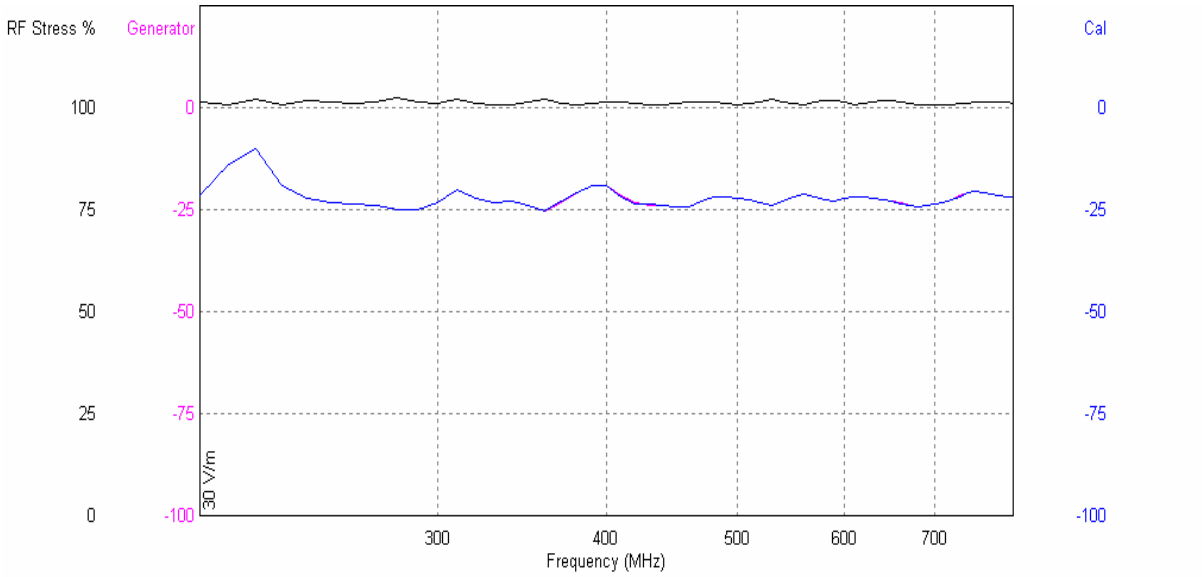


200 to 800 MHz "Free-Field"

CW.

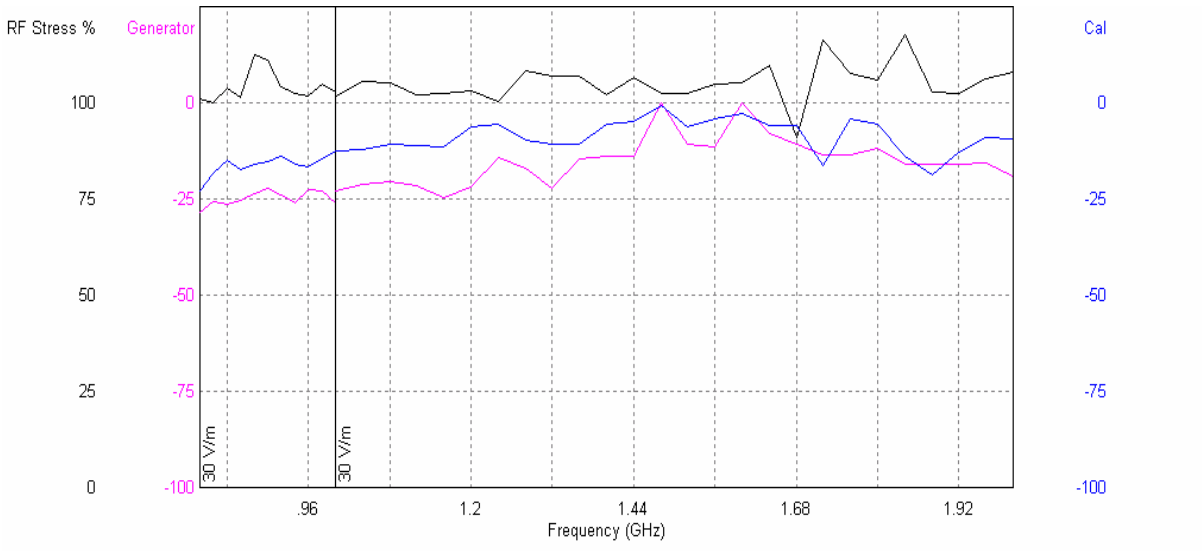


1 kHz 80% AM.

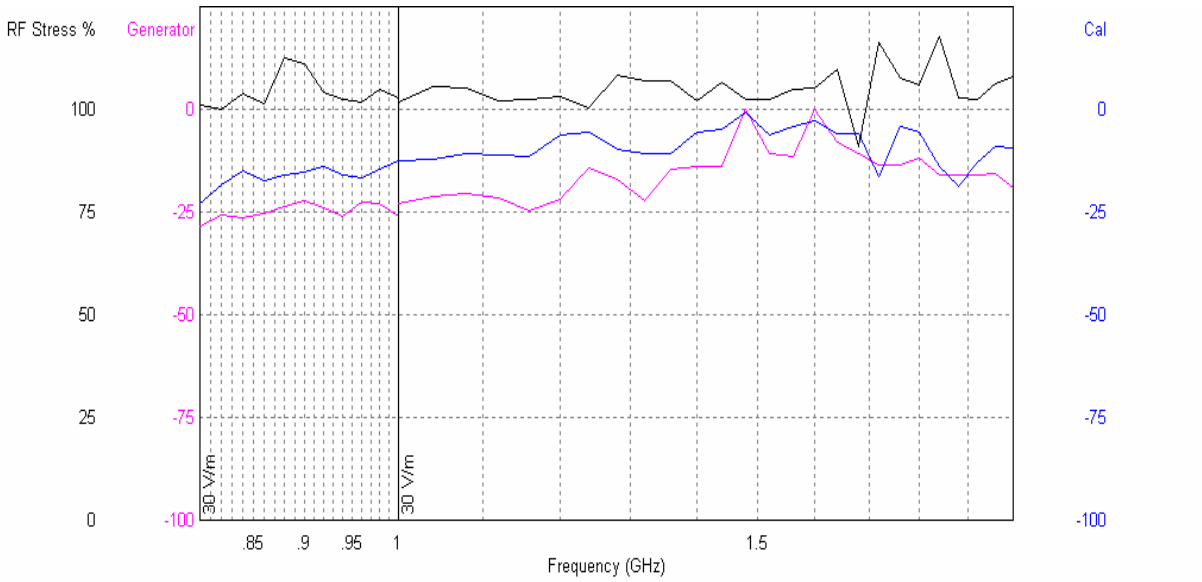


800 to 2000 MHz "Free-Field"

Pulsed Mod.



Pulsed Mod. Antenna - Pointing at the Sample.



Transient Immunity

OPERATING MODE
Both 12 v and 24v samples tested, to Pulse 4 as the pulses 1 to 3B are not applicable to the EUT.

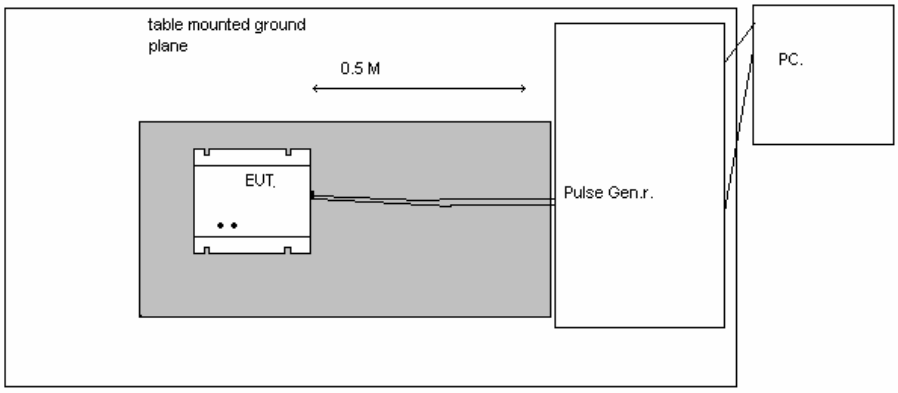
Immunity Pulses 12 & 24 volt systems

Pulse Number.	Test Level 12v	Test Level 24v	Number of pulse / time.	Pass / Fail
1.	-75V	-450V	5000	N/A
2a	+37V	+37V	5000	N/A
2b	+10V	+20V	10	N/A
3a	-112V	-150V	1 hour	N/A
3b	+75V	+150V	1 hour	N/A
4	-6V	-12V	1 pulse	A Pass

EQUIPMENT USED.

Pulse generators	NSG 5000 NSG 5001 NSG 5003 NSG 5004 NSG 5005 NSG 5201 INA 5002/5025/5026 DCS 5230, ARB 5220, CTR 5210
Oscilloscope	Agilent 54810A

Test Configuration Transient Immunity:



Test Report

AUT110790/1

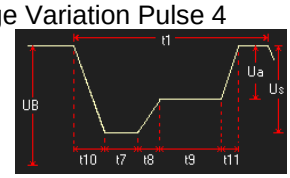
Date: 08-21-2007 **Time: 21/08/2007 07:21:05**

Company Name	Megapulse Pty Limited.
Equipment Tested :	Megapulse First Aid for Batteries MK4.
Serial Number :	12V Sample.
Test Equipment used :	Schaffner Generators.
Test Procedure Used :	ISO 7637 - 2.

Test Number 1

Test Name 12P-4.

Test Type NSG5000 Supply Voltage Variation Pulse 4



Test Status PASS (A)

Parameter	Value
Resistance(Ri)	0.01 Ohms

Voltage	
Ua	4V
Us	6V
UB	13.5V
Timing	
t10	5mS
t7	40mS
t8	40mS
t9	5S
t11	100mS
t12	1S
Battery	
Current Limit	25A
End of Test Voltage	13.5V

Comments

No changes recorded during and after the test.

General Conditions

Ambient Temperature :	18	Humidity :	59	Pressure :	1005
Tested by :	G. Hann				
Signature					

Test Report

AUT110790/1

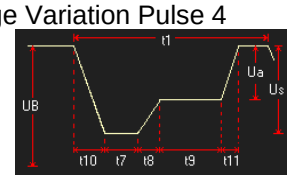
Date: 08-21-2007 **Time: 21/08/2007 07:29:21**

Company Name	Megapulse Pty Limited.
Equipment Tested :	Megapulse First Aid for Batteries MK4
Serial Number :	24V Sample.
Test Equipment used :	Schaffner Generators.
Test Procedure Used :	ISO 7637 - 2.

Test Number 1

Test Name 24P-4.

Test Type NSG5000 Supply Voltage Variation Pulse 4



Test Status PASS (A)

Parameter	Value
Resistance(Ri)	0.01 Ohms

Voltage	
Ua	8V
Us	12V
UB	27V
Timing	
t10	10mS
t7	60mS
t8	40mS
t9	5S
t11	100mS
t12	1S
Battery	
Current Limit	25A
End of Test Voltage	27V

Comments

Operated during and after the pulse.

General Conditions

Ambient Temperature :	18	Humidity :	59	Pressure :	1005
Tested by :	G. Hann.				
Signature					

Transient Emissions

OPERATING MODE

All three 6v, 12v and 24v samples tested.

Emissions Pulse maximum amplitude 12 volt systems

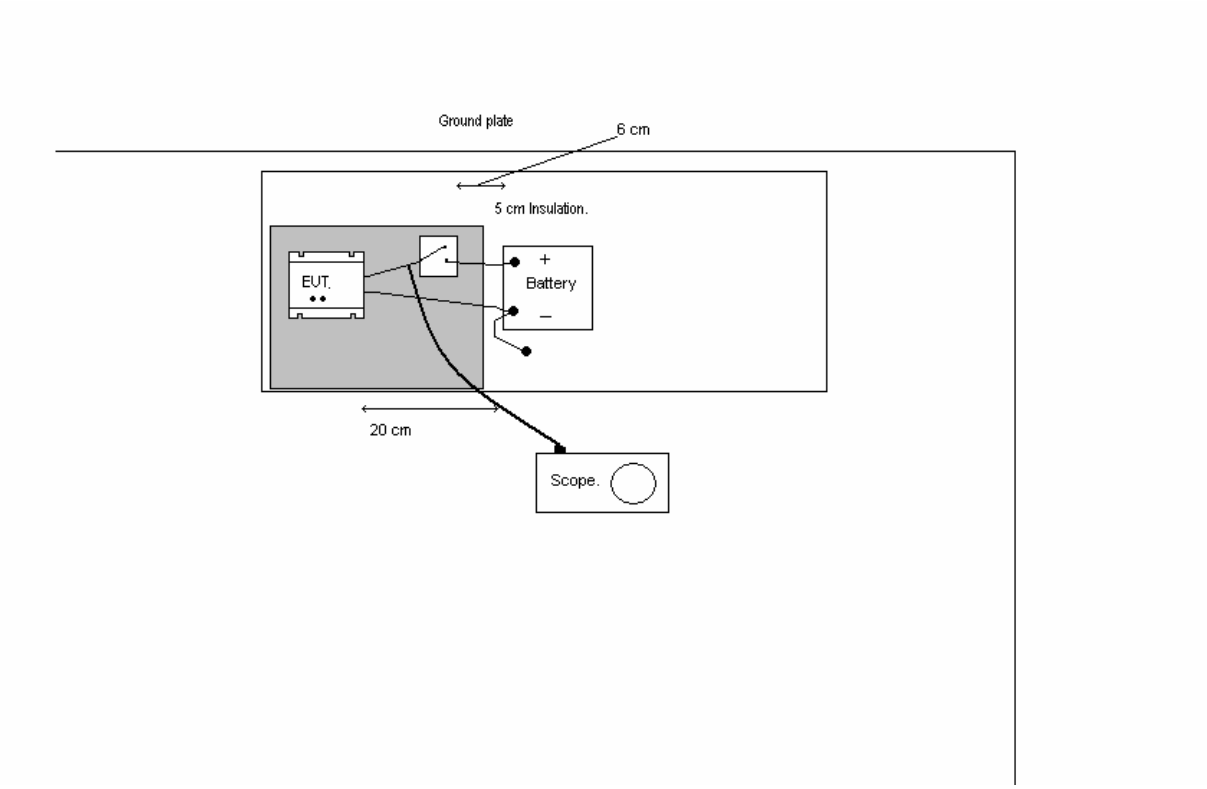
Pulse polarity.	Maximum Level	Pass / Fail
Positive	+75V	Pass
Negative	-100V	Pass

EQUIPMENT USED.

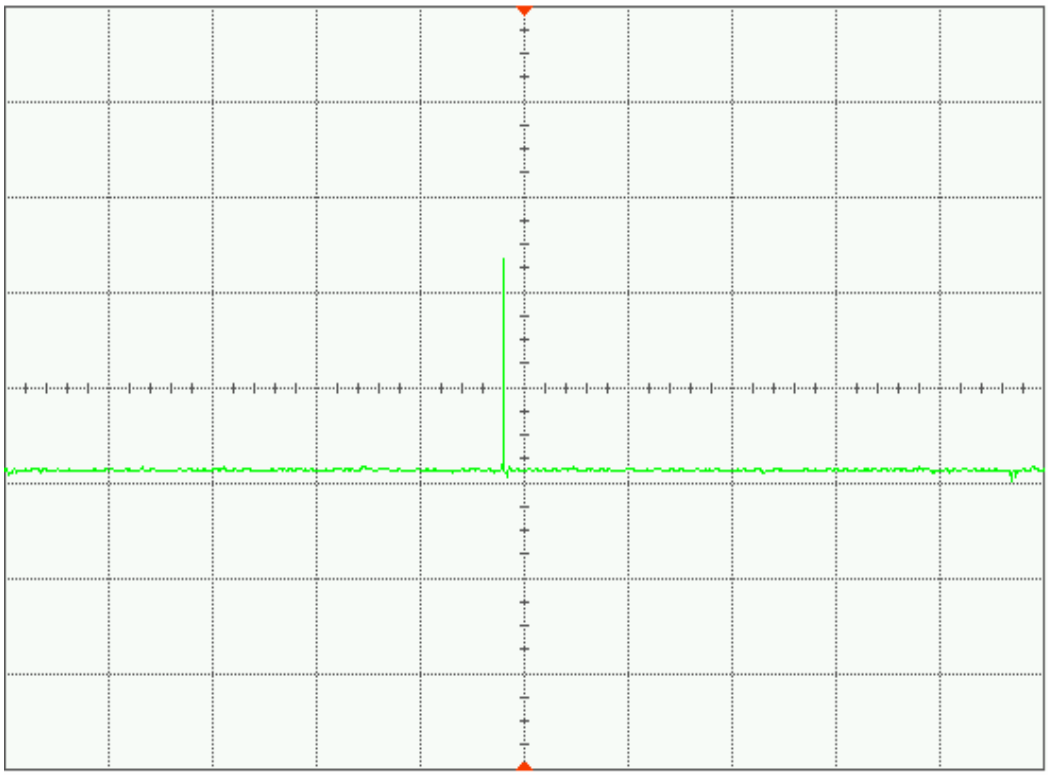
Automotive LISN – N/A.
Switch. 30 Amp Relay
R-load 40 Ohm resistor – N/A.
Oscilloscope Agilent

Test Configuration Transient Emission:

N.B. No LISN was used in the set-up, as the product is connected directly across the vehicle battery terminals.

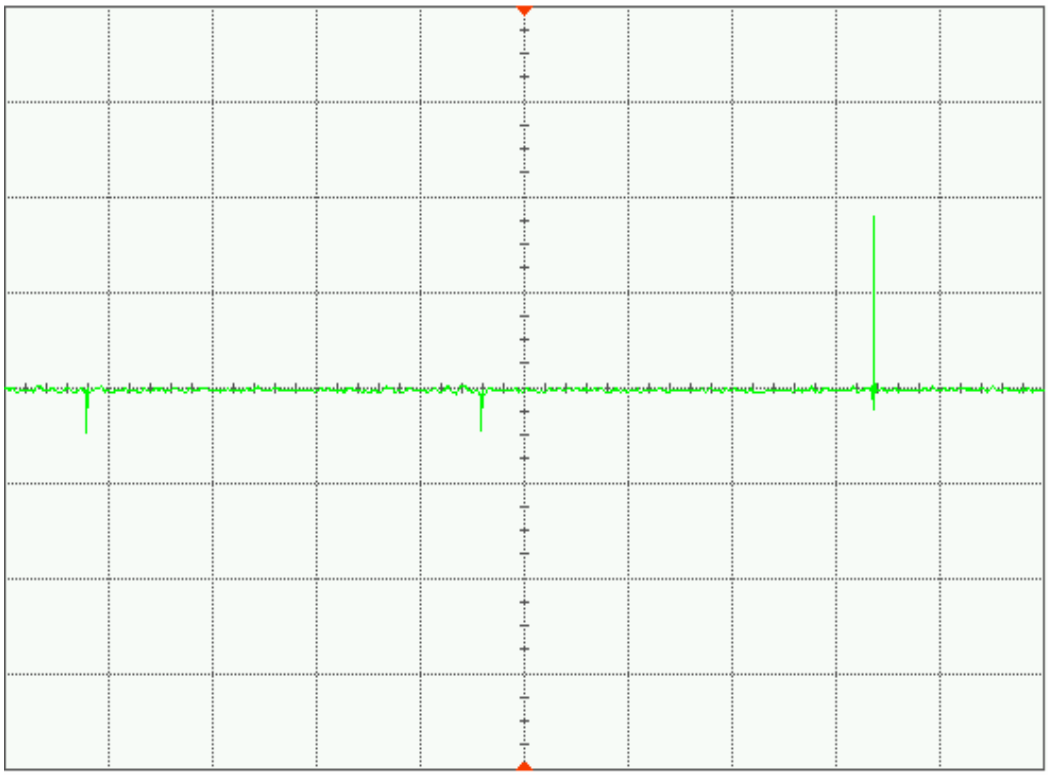


6 volts sample.



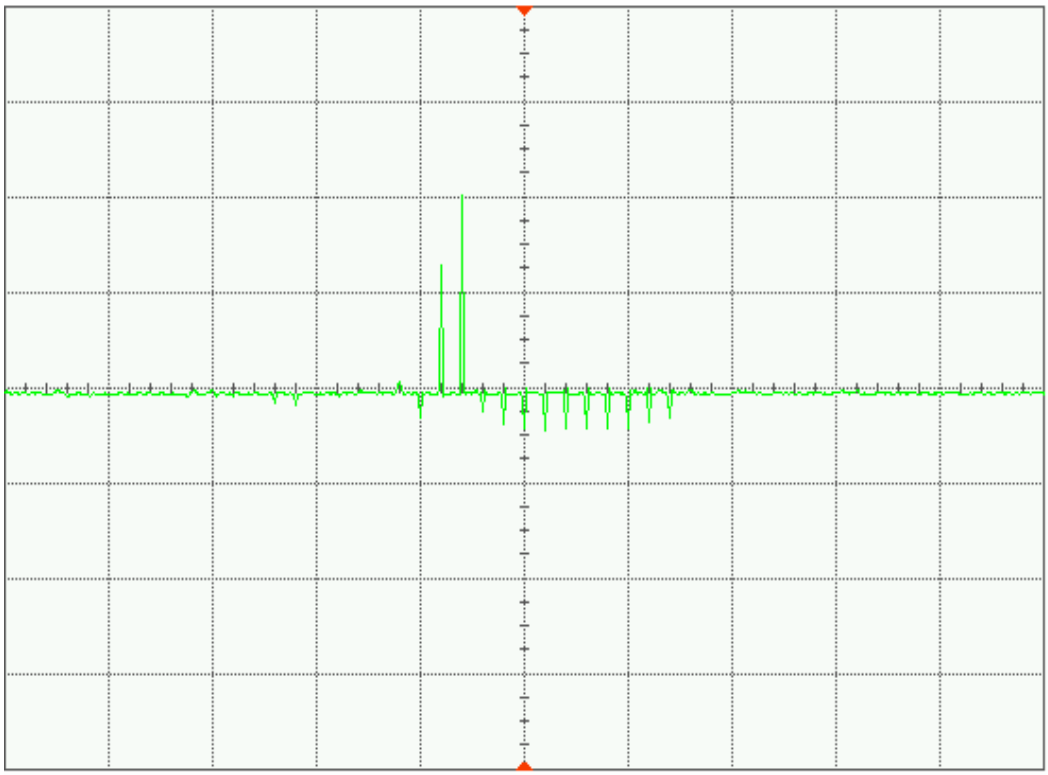
Acquisition	Sampling mode real time Memory depth automatic Memory depth 1255pts Sampling rate automatic Sampling rate 25.0 kSa/s Averaging off 9-bit BW Filter off Interpolation on
Channel 2	Scale 20.0 V/div Offset 23.6430 V BW limit off Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adaptor None Ext gain 1.00 V Ext offset 0.0 V
Time base	Scale 5.00 ms/div Position 0.0 s Reference center
Trigger	Mode edge Sweep single Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 2 Trigger level 56.2 V Slope rising

12 volts sample



Acquisition	Sampling mode real time Memory depth automatic Memory depth 1004pts Sampling rate automatic Sampling rate 5.00 kSa/s Averaging off 9-bit BW Filter off Interpolation on
Channel 2	Scale 20.0 V/div Offset 14.0927 V BW limit off Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adaptor None Ext gain 1.00 V Ext offset 0.0 V
Time base	Scale 20.0 ms/div Position 0.0 s Reference center
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 2 Trigger level 47.4 V Slope rising

24 volts sample



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Channel 2	Scale 20.0 V/div Offset 25.8427 V BW limit off Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adaptor None Ext gain 1.00 V Ext offset 0.0 V
Time base	Scale 1.00 ms/div Position 0.0 s Reference center
Trigger	Mode edge Sweep auto Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 2 Trigger level 52.6 V Slope falling

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Last Page of Report