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EMC COMPLIANCE REPORT

In accordance with
AS/NZS CISPR 22: 2002

MEGAPULSE PTY LTD

48V MEGAPULSE MKII BATTERY CONDITIONER

REPORT TL4498A

JULY 2004



NATA Accredited Laboratory
Number: 3540

This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its scope of accreditation. This document may not be reproduced except in full.



Certificate of Compliance

RFI Industries Test Report: TL4498A
Issue Date: July 2004

Test Sample: 48V Megapulse MKII Battery Conditioner
Model No: Not Specified
Serial No: J4803051000

Client Details: Mr. Ross Naddei,
Megapulse Pty Ltd,
11 Fortuna Court,
Eaton's Hill,
Queensland, 3153

Phone:(07) 3325 4200
Fax: (07) 3325 4199

Test Specification: AS/NZS CISPR 22: 2002
Information technology equipment –
Radio disturbance characteristics –
Limits and methods of measurements.

Summary: Mains Terminal Disturbance Voltage Measurement **Not Applicable**
Telecommunication Port Disturbance Voltage Measurement **Not Applicable**
Electromagnetic Radiation Measurements **Class B - Complied**

Test Date(s): 28th and 29th of June 2004

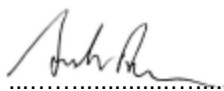
**Test House:
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The 48V Megapulse MKII Battery Conditioner, complied with the Electromagnetic radiation requirements of AS/NZS CISPR 22: 2002, Information technology equipment - Radio disturbance characteristics – Limits and methods of measurements.



Jeremy Poynter
(Test Officer)



Andrew Burden
(EMC Engineering Manager)

28-07-04

Date



EMC COMPLIANCE REPORT FOR MEGAPULSE PTY LTD

1. INTRODUCTION

Electromagnetic radiation emission measurements were performed on the 48V Megapulse MKII Battery Conditioner, in accordance with the requirements of AS/NZS CISPR 22: 2002.

2. SUMMARY OF RESULTS

Worst-case emissions are tabled as follows:

| Test | Configuration | Delta Limit |
|---------------------------|---------------------|----------------------------------|
| Electromagnetic radiation | Horizontal/Vertical | Peak Emissions >10dB below limit |

3. TEST SAMPLE, MODIFICATIONS and CONFIGURATION

3.1 Test Sample

The product, as supplied by the client, is described as follows:

48V Megapulse MKII Battery Conditioner.
Model No: Not specified
Serial No: J4803051000

This product shall be referred to as EUT.

3.2 Modifications

No modifications were performed on the above sample.

3.3 Configuration

The EUT was tested in nominal operating mode. All measurements were performed at 48VDC supply voltage via 300mm leads from four 12VDC automotive batteries in series. Battery interconnecting lead lengths was kept to a minimum.

(Refer to Appendix B for battery configuration photo)

4. TEST FACILITY AND EQUIPMENT

4.1 Test Facility

Electromagnetic radiation pre-scan emission measurements were performed at RFI Industries EMC Laboratories, located at 52 Holloway Drive Bayswater, Victoria, Australia.

Compliance Electromagnetic radiation emission measurements were performed at an Open Area Test Site, located at 290 Majors Line road Tooborac, near Heathcote, 100km north of Melbourne, Victoria, Australia.

4.2 Test Equipment

Refer to Appendix A for the measurement instrument list.

5. REFERENCE STANDARDS

AS/NZS CISPR 22: 2002

Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.

6. ELECTROMAGNETIC RADIATION DISTURBANCE

6.1 Test Procedure

A pre-scan of electromagnetic radiation emissions was performed (prior to compliance measurements) at a test distance of 3m inside a semi-anechoic chamber at RFI Industries EMC Laboratories in Bayswater, in order to characterise the emission profile.

Electromagnetic radiation emissions were measured 10 metres away from the EUT at the Open Area Test Site.

For both horizontal and vertical antenna polarisations, the peak detector was set to MAX-HOLD and the range selected continuously scanned. The antenna height was varied from 1 to 4 metres and the turntable slowly rotated, in order to find the worst-case emission arrangement.

Plots of the accumulated measurement data for both horizontal and vertical antenna polarisations, including all transducer correction factors were produced.

(Refer to photographs in Appendix B for views of the test configurations)

6.2 Test Results

Electromagnetic radiation emissions were below the specified limit for quasi-peak measurements.

Tabled below are results of the quasi peak measurements, performed at spot frequencies where the peak emission was close to, or exceeded the applicable limit line.

| Frequency (MHz) | Peak Emission (dBmV/m) | Result Quasi-peak (dBmV/m) | Limit Quasi-peak (dBmV/m) | Delta limit (dB) |
|----------------------------------|------------------------|----------------------------|---------------------------|------------------|
| Emissions > 10dB below the limit | | | | |

Table 1: Vertical (Refer to graph 1 Appendix C)

| Frequency (MHz) | Peak Emission (dBmV/m) | Result Quasi-peak (dBmV/m) | Limit Quasi-peak (dBmV/m) | Delta limit (dB) |
|----------------------------------|------------------------|----------------------------|---------------------------|------------------|
| Emissions > 10dB below the limit | | | | |

Table 2: Horizontal (Refer to graph 2 Appendix C)

Notice should be taken of the measurement uncertainty of:

± 5.54dB at 30 to 300MHz

± 6.25dB at 300 to 1000MHz

| Climatic Conditions | |
|---------------------|--------|
| Room Temperature: | 11.6°C |
| Humidity: | 78% |

7. CONCLUSION

The 48V Megapulse MKII Battery Conditioner, complied with the Electromagnetic Radiation Emission Requirements of AS/NZS CISPR 22: 2002.

APPENDIX A

TEST EQUIPMENT

(Electromagnetic Radiation Emission Measurements)

| INV | EQUIPMENT | Make | Model No | Serial No | Calibration | | Equip Used |
|-----|----------------------|--------------------|-------------|------------|-------------|------|------------|
| | | | | | Date | Type | |
| 81 | Spectrum Analyser | Hewlett Packard | HP8593A | 3009A00398 | Sep. 04 | E | ◆ |
| 555 | Spectrum Analyser | Hewlett Packard | HP8591E | 3230A00565 | Sep. 04 | E | |
| 17 | EMI Receiver | Electro Metrics | EMC-30 MKIV | 350 | Dec. 05 | E | ◆ |
| 359 | Transient Limiter | Hewlett Packard | HP11947A | 3107A01833 | On Use | I | |
| 312 | Pre Amplifier | Amplifier Research | LN1000 | 16565 | Jan.05 | I | ◆ |
| 313 | Pre Amplifier | Amplifier Research | LN1000 | 16566 | Dec. 05 | I | |
| 355 | High Pass Filter | Solar Electronics | 7801-100 | 947214 | On Use | I | |
| 43 | LISN | EMCO | 3825/2R | 1179 | Jan. 05 | E | |
| 47 | LISN | EMCO | 3850/2 | 9105 1005 | Sep. 04 | E | |
| 48 | LISN | EMCO | 3850/2 | 9105 1006 | Feb. 04 | E | |
| 525 | Signal Generator | Hewlett Packard | HP8648A | 3642U01815 | On Use | I | |
| 66 | Power Splitter | Hewlett Packard | 11667A | A16126 | On Use | I | ◆ |
| 163 | Biconical Antenna | Electro Metrics | BIA-30C | 3110 | Jul. 04 | I | ◆ |
| 187 | Log Periodic Antenna | EMCO | 3146 | 2630 | Sep. 04 | I | ◆ |

V: Verification of operation against an internal reference
I: Internal calibration against a NATA traceable standard
E: External calibration by a NATA endorsed facility
O: External calibration by an International facility

APPENDIX B

PHOTOGRAPHS

| Photograph No. | Photograph Description |
|----------------|---|
| 1 | Electromagnetic Radiated Emission Test Configuration. |
| 2 | Electromagnetic Radiated Emission Test Configuration Close Up. |
| 3 | Battery Configuration. |
| 4 | Interconnecting Lead Close Up. |
| 5 | EUT Close Up Front View. |
| 6 | EUT Close Up Rear View. |
| 7 | EUT Close Up Internal View. (Image can not be shown due to patent protection) |



Photo 1. Electromagnetic Radiated Emission Test Configuration.



Photo 2. Electromagnetic Radiated Emission Test Configuration Close Up.



Photo 3. Battery Configuration.

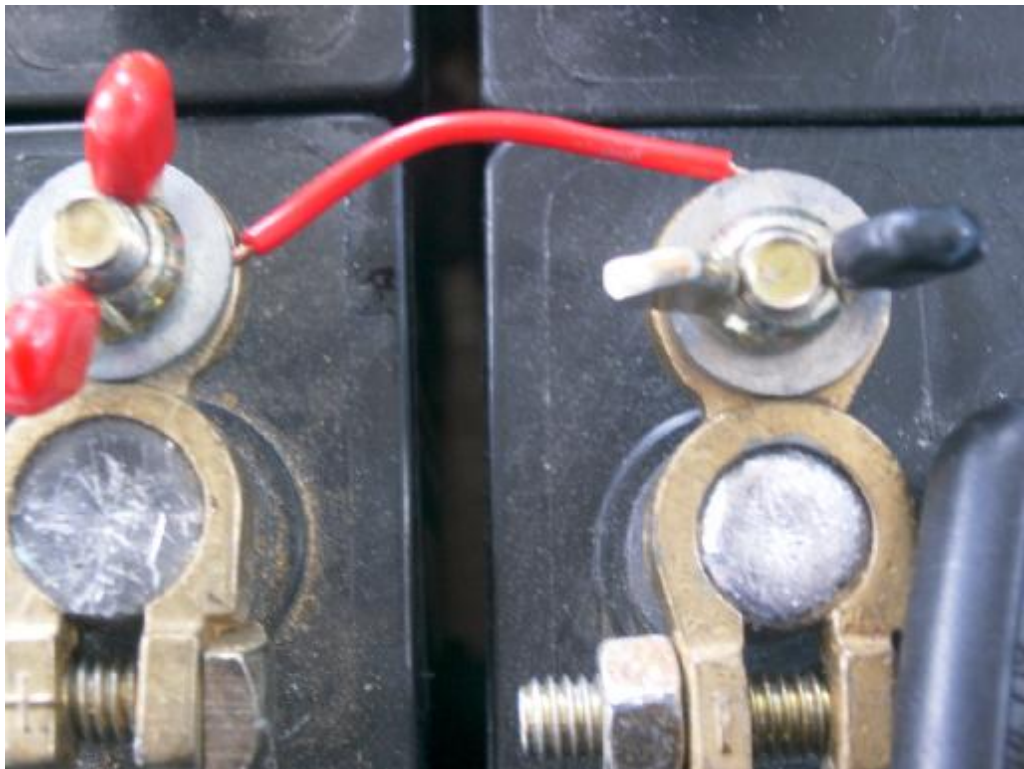


Photo 4. Interconnecting Lead Close Up.



Photo 5. EUT Close Up Front View.



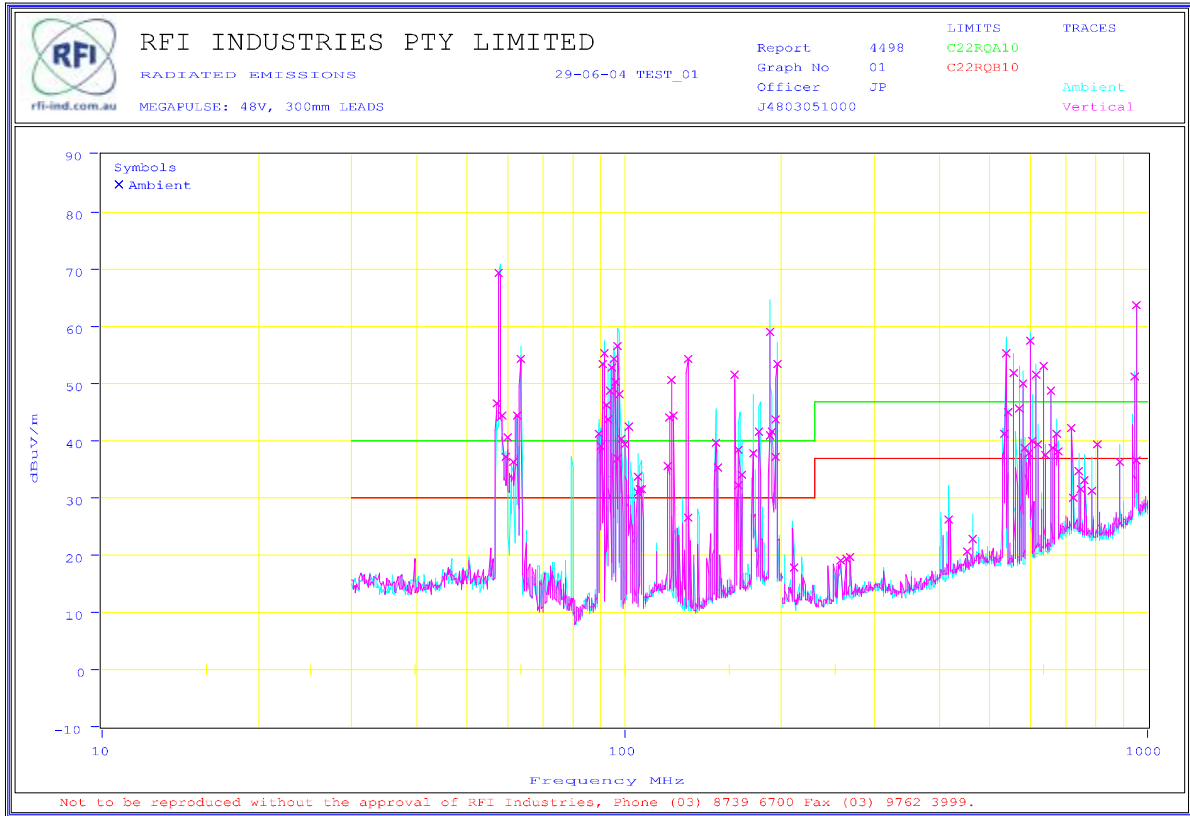
Photo 6. EUT Close Up Rear View.

Photo 7. EUT Close Up Internal View. (Image can not be shown due to patent protection)

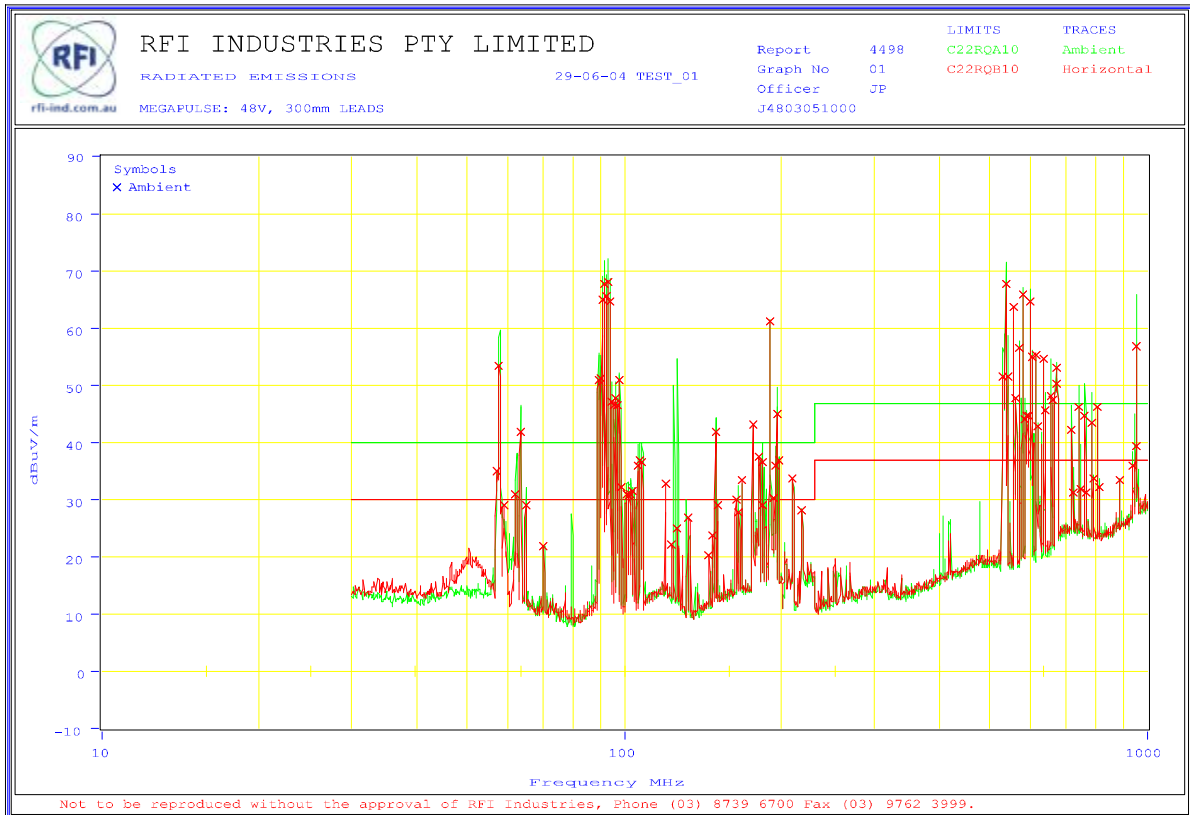
APPENDIX C

ELECTROMAGNETIC RADIATION EMISSION MEASUREMENTS GRAPHS

| Graph No. | Graph Description |
|-----------|---------------------------------|
| 1 | Vertical Antenna Polarization |
| 2 | Horizontal Antenna Polarization |



Graph 1 – Vertical Antenna Polarisation.



Graph 2 – Horizontal Antenna Polarisation.