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Specification 5 Assessment
Alfatronix Ltd
Alfatronix PowerTector

Automotive & Equipment Section #4814
Dated: 1 May 2013

Summary Report Nr 4814

Manufacturer/Agent	Alfatronix Ltd, 29 Newtwon Business Park, Poole, Dorset, BH12 3LL, Chris Black, 01202 715517, cblack@alfatronix.co.uk
Product Name & Model	Alfatronix PowerTector: PT10, PT20, PT40, PT60, PT100, PT200
Description	A battery protector product used to prevent a load from over discharging a battery
EMC Test House	TRaC South, 74-78 Condor Close, Woolsbridge Industrial Park, Three Legged Cross, Wimborne, BH21 6SY, Nick Tanner, 01202 811700, Nick.Tanner@tracglobal.com
Test House Report Ref	
Date Tested	30 Apr 2013
AES Project Engineer	Barend Strydom
Result for TETRA band	PASS
Result for TRACKER band	PASS
Result for Analogue UHF band	PASS
Date of AES Certification	1 May 2013
Notes:	

1 Introduction

The stated equipment under test (EUT) was subjected to the agreed sequence of tests and methods based on AES Specification 5, Issue 11, dated Nov 2012, at the premises of the test house listed above. The equipment was configured and exercised as described by the manufacturer/agent to be representative of the worst case operational modes likely to be experienced in its operational use.

2 Testing Standards

The radiated test methods used during the testing of this equipment are largely similar to those specified in the e-Marking directive, also known as 2004/104/EC, and its subsequent amendments. However, there are some important differences between Spec 5 and e-Mark testing:

- the testing distance is nearer in Specification 5
- the susceptibility field strength is higher in Specification 5
- the emissions limit is lower in Specification 5

The two main tests are the radiated emissions and the radiated susceptibility tests.

Where the radiated emissions test exposes frequent and excessive emissions, a further test is performed. This is called a mutual interference test and basically attempts to quantify the affect of excessive emissions on the affected radio communication channels.

The mutual interference test involves a ‘minimum-wanted-signal’ test procedure, whereby a TETRA signal is generated and its amplitude lowered to the point where a TETRA radio receiver is just about able to decode the signal. The product under test is then switched ON and exercised in the mode in which it was found to be excessively emissive.

The amount by which the generated TETRA signal then has to be increased for the radio receiver to again be able to decode it, is recorded as the amount of blocking caused by the product.

3 Test Setup

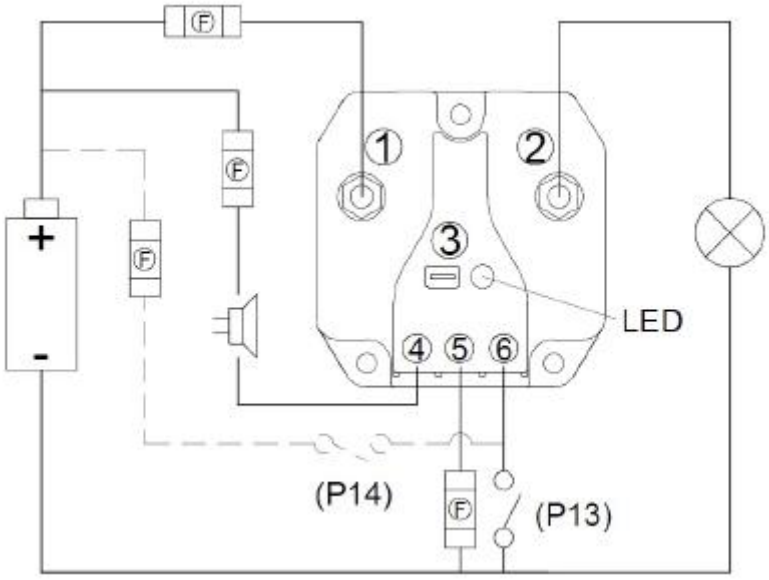
3.1 Equipment Layout

Only one component was involved, being the Powertector itself.

The following ports were present: Battery feed, Load, Ground, Alarm output, Override and Program. With the exception of the Alarm output, Override and Program ports, all other ports were used and had at least 1m of cable connected to each.

For the radiated tests a 24V lab power supply was used to deliver 45A of current. For the conducted tests a 24V battery was used.

The illustrations below show the equipment layout and connectivity during testing.



The battery feeds the input of the unit through a fuse on pin 1. The load is connected to 2. The ground line is connected via a 1A fuse to 5. Grounding of pin 6 is an optional override shutdown, while pin 4 proviodes an optional alarm output.

3.2 Modes of Operation

The product was tested in one mode of operation during all tests.

This mode of operation involved the Powertector powered and with the supply connected to the load via the internal FET (Field Effect Transistor) arrangement, while delivering a current of 45A to the load. The load comprised a high power resistive network cooled by fans.

4 Test Results

4.1 Radiated Emissions Test

Unwanted emissions of sufficient magnitude have the potential to interfere with surrounding equipment, especially considering the sensitive levels to which radio receivers operate.

In the presence of interference the TETRA radio remains mostly silent. To the user this creates the impression of no incoming calls, leaving the user unaware of any radio problems and ultimately never reporting it.

Below is a table stating the frequency bands at which this equipment was tested.

Frequency Band	From (MHz)	To (MHz)	Tested	Emissions Detected
TETRA	380	424	Yes	None
TRACKER	163	165	Yes	None
UHF analogue	450	470	Yes	None

4.2 Mutual Interference Test

No mutual interference test was necessary.

4.3 Radiated Immunity Test

Equipment may malfunction as a result of radio frequency energy radiated from surrounding systems.

This is especially likely to occur in an emergency services environment where one or more transmitting radios could expose surrounding equipment to much higher field strengths than those required for e-Mark and CE-mark compliance.

Such a malfunction not only poses a safety risk in that it could distract the driver or another road user, but it could also result in the loss of an “operational opportunity”, where for example a stolen vehicle will go undetected due to the tracking receiver being desensitised, or where a body worn video device records only distorted video and audio during the use of a nearby radio.

During the testing of this equipment the following frequency bands were covered at external field strengths of 75V/m and 40V/m. Though external field strength levels weren’t required, the manufacturer chose to test at these higher levels. No equipment malfunction was noticed.

Frequency Band	From (MHz)	To (MHz)	Tested	Susceptibility Detected
TETRA	380	424	Yes	None
UHF analogue	450	470	Yes	None

4.4 Conducted Transient Emissions

This test does not apply to portable equipment, but mainly to vehicle-installed equipment.

Equipment may give rise to transients on its power leads. These are conducted via the vehicle battery to the power leads of other systems. The transients can be conducted around the vehicle wiring harness and can be inductively or capacitively coupled into the signal and control leads of other installed systems.

Transient emissions can also cause onboard systems, such as the ABS, to fail either momentarily, or in severe cases, permanently.

It is therefore a requirement of this specification that operational equipment be designed to a standard that keeps these transient emissions within acceptable limits.

The following results apply to the equipment in question:

Equipment Supply	Tested	Unacceptable Transients
12V	No	NA
24V	Yes	None

4.5 Conducted Continuous Emissions

This test does not apply to portable equipment, but mainly to vehicle-installed equipment.

As well as transient emissions, it is possible for operational equipment to emit continuous conducted emissions (ripple) on its power supply leads. This can give rise to disruptive noise on the two-way radio and other audio related equipment.

The following results apply to the equipment in question:

Equipment Supply	Tested	Unacceptable Ripple
12V	No	NA
24V	Yes	None

5 Conclusion and recommendations

This equipment performed as expected and is therefore fully compliant with the requirements of Specification 5, Issue 11, dated Nov 2012.

END OF REPORT

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