



Original Equipment Ltd

'Cooler Save'

Generic Emissions Test

The unit under test is a delayed start timer intended to control power to refrigeration/freezer equipment, primarily aimed at licensed premises.

The equipment is housed in two small IP rated plastic boxes approx 100x100x60 mm which are permanently connected together via cables which run through plastic glands.

The 'control' unit houses a commercial timer module (smiths ?) which incorporates a small lcd display, a number of buttons to set timer/clock functions and an indicator lamp to indicate when the timer is in its 'on' mode. This unit is permanently wired connected to the 'Relay' unit.

The 'relay' unit contains the power switching relays, and drivers. A captive mains supply cable is fitted to this together with three captive cables which each terminate in a multi way 13a extension block. When the timer 'on' period is initiated or the over ride button is pressed, power is applied successively to each of the three multi way power sockets in turn, a sounder operates on the timer unit during the switching cycle which ends when power has been successfully connected to all three blocks. The power switching cycle takes approx 8 seconds to complete (power on), power off does not incorporate a delay function.

Each unit has its electronics built on commercial grade fr pcbs, an unusual point is that the low voltage power for the timer appears to be derived from a capacitor (x2 type) and series resistor arrangement feeding the rectifier; there does not appear to be any other form of isolation between the incoming mains supply and the dc supply, there is also no on-board mains fuse.

This equipment will be tested to parts of the Generic Specification (EN 50 081 & EN 50 082) covering both radiated & conducted emissions as well as parts of the Generic Immunity Standard

Radiated Emissions

a)The following is a measurement of background Radiated emissions measured within the emc test cabin using the installed Wayne Kerr / York electromagnetics "Easy" equipment.



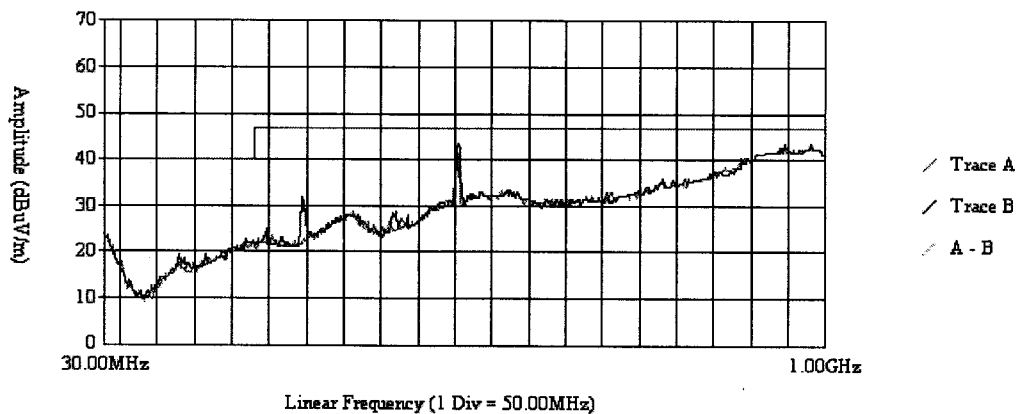
EMC Test Laboratory Report



Report No UKAE 150(b)

UK Electronics Ltd

23th January 2008



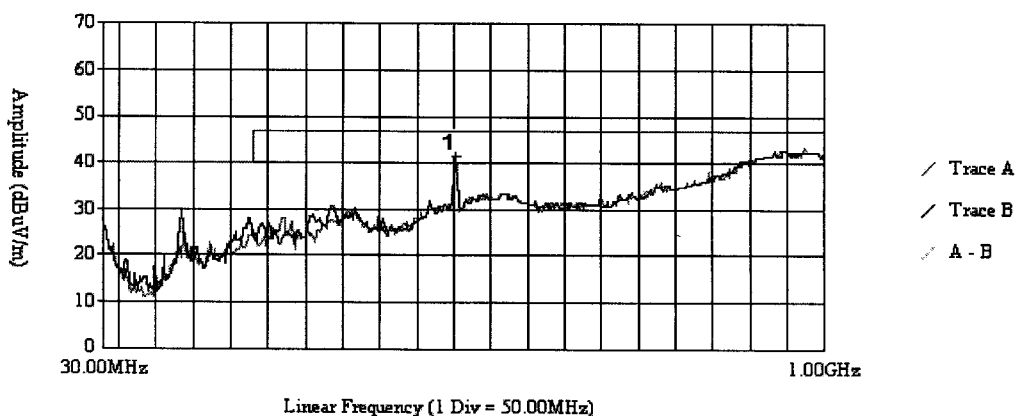
Standard:-

EN50081-1 (Generic) Radiated Class B 3m RBW 2MHz

Comments:-

Session 3/3/2008 12:20:34 PM Polarisation(A) = Vertical Atten(A) = -20dB Polarisation(B) = Horizontal Atten(B) = -20dB

b) The following is a measurement of radiated emissions taken as (a) above but with the equipment under test powered via the emc cabin's filtered mains supply and placed on a plastic table. This was located over an earthed ground plane and situated approx 3 metres from the antenna. The unit was in its 'timer off' state.



Standard:-

EN50081-1 (Generic) Radiated Class B 3m RBW 2MHz

Comments:-

Session 3/3/2008 12:20:34 PM Polarisation(A) = Vertical Atten(A) = -20dB Polarisation(B) = Horizontal Atten(B) = -20dB

PeakTable:-

1. (502.00MHz,41dBuV/m) Trace A Marked Peak Marginal(Off QP Limit by 5dB)

Peak noted '1' appears to be extraneous (although this is below the limit level anyway).



EMC Test Laboratory Report

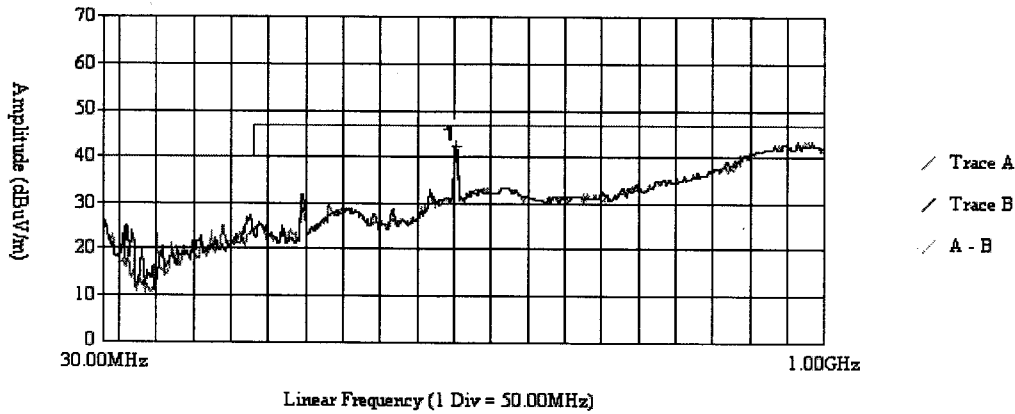


Report No UKAE 150(b)

UK Electronics Ltd

23th January 2008

c) As in 'b' except with unit in 'timer on ' mode, 60w lamps connected to mains outputs as load.



Standard:-

EN50081-1 (Generic) Radiated Class B 3m RBW 2MHz

Comments:-

Session 3/3/2008 12:20:34 PM Polarisation(A) = Vertical Atten(A) = -20dB Polarisation(B) = Horizontal Atten(B) = -20dB

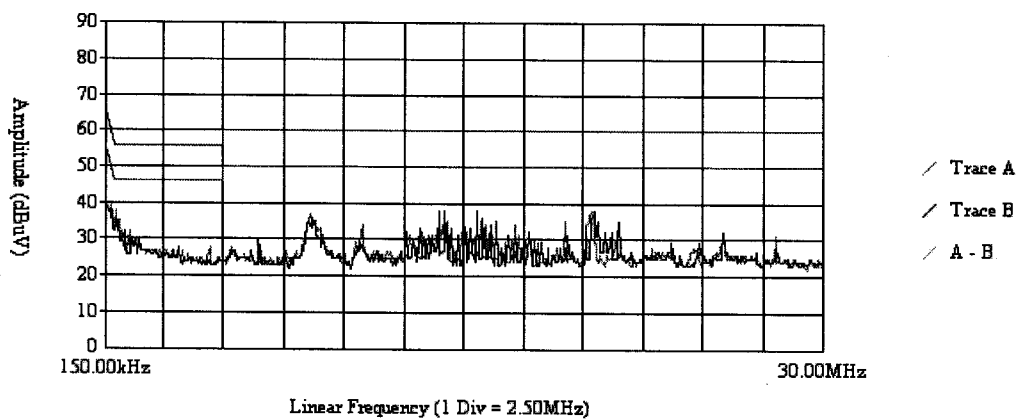
PeakTable:-

1. (502.00MHz,42dBuV/m) Trace B Marked Peak Marginal(Off QP Limit by 4dB)

Peak noted '1' appears to be extraneous (although this is below the limit level anyway).

Conclusions

The equipment performed satisfactorily during the radiated emissions tests applied, there are some emissions noted on the conducted emission traces between approx 8Mhz and 28Mhz which are probably due to the unconventional power circuit employed, at present, it is not believed this will present a significant problem .



Standard:-



EMC Test Laboratory Report



Report No UKAE 150(b)

UK Electronics Ltd

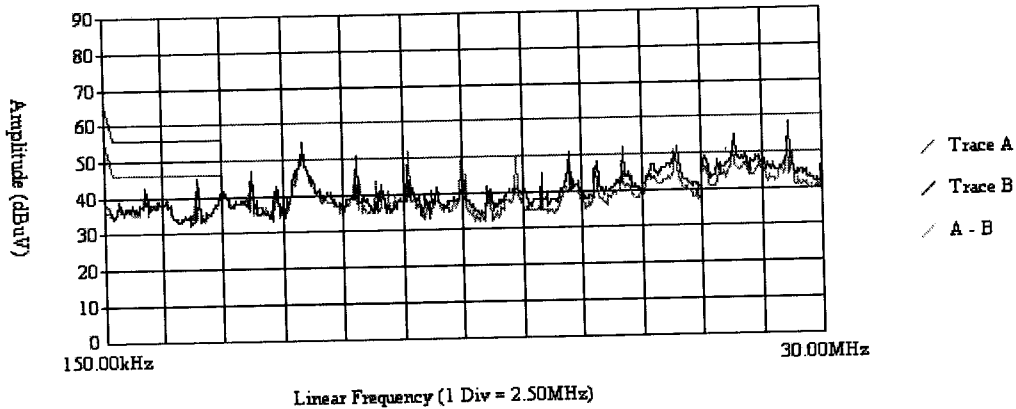
23th January 2008

EN50081-1 (Generic) Conducted Class B RBW 120kHz

Comments:-

Session 3/3/2008 12:45:23 PM Conductor(A) = Live Atten(A) = 0dB Conductor(B) = Neutral
Atten(B) = 0dB

b) Measurement made with unit connected via Lism, in 'timer off' mode.



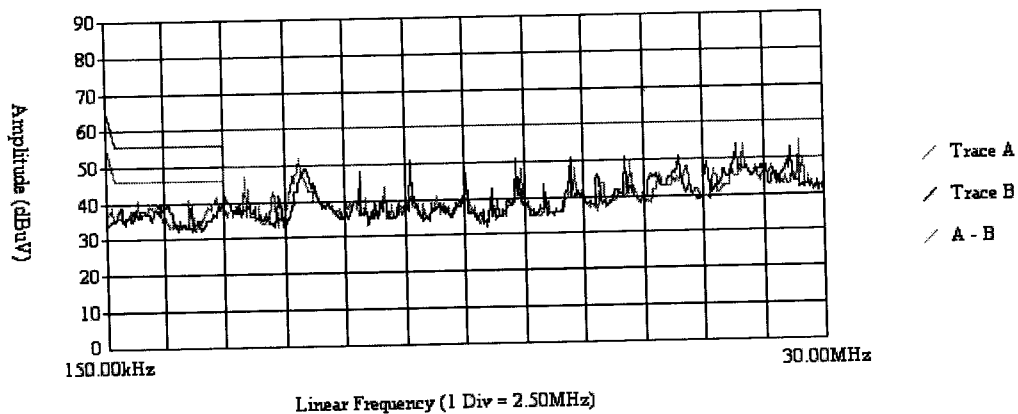
Standard:-

EN50081-1 (Generic) Conducted Class B RBW 120kHz

Comments:-

Session 3/3/2008 12:45:23 PM Conductor(A) = Live Atten(A) = 0dB Conductor(B) = Neutral
Atten(B) = 0dB

c) As in 'b' above except with unit in 'timer on' mode.



Standard:-

EN50081-1 (Generic) Conducted Class B RBW 120kHz

Comments:-

Session 3/3/2008 12:45:23 PM Conductor(A) = Live Atten(A) = 0dB Conductor(B) = Neutral
Atten(B) = 0dB



EMC Test Laboratory Report



Report No UKAE 150(b)

UK Electronics Ltd

23th January 2008

Conclusions

The equipment performed satisfactorily during the radiated emissions tests applied, there are some emissions noted on the conducted emission traces between approx 8Mhz and 28Mhz which are probably due to the unconventional power circuit employed, at present, it is not believed this will present a significant problem .

Generic Immunity Tests

Introduction

The generic immunity tests available consist of three main parts, Fast transients, Voltage dips and Esd, the first two being applied to the units mains supply whilst the latter is applied to various external parts of the unit.

In order to clarify the operation of the unit during these tests, the IEC 1000-4 reference table has been used to quantify the results obtained, this is shown below.

The unit was powered up in 'timer off mode', as previously used in the Radiated emissions tests, this test mode was employed for all subsequent immunity testing, the over ride button was used both during and at the conclusion of each test to demonstrate correct operation of the unit and correct switching of the outputs.

IEC 1000-4 Reference Table

'A' - Normal operation within specified parameters

'B' - Temporary loss of function or performance which is self-recoverable (ie, self resetting)

'C' - Temporary loss of function or performance which requires user intervention (ie, power reset)

'D' - Permanent loss of function or performance which is not recoverable (ie, physical damage)

Fast Transients -Direct (mains supply)

Electrical fast transients as per IEC 801 part4. These were applied using the Seward Mace unit to the unit's mains supply for a duration of 1 minute each in both differential & common mode at 0.5Kv in both positive & negative polarities.

The unit was assessed both during and at the end of each part of the test for functionality.

Test Applied	Result
L (+)	A
L (-)	A
N (+)	A
N (-)	A
L&N (+)	A
L&N (-)	A

Test result corresponds to [A] on IEC 1000-4 table.



EMC Test Laboratory Report



Report No UKAE 150(b)

UK Electronics Ltd

23th January 2008

Fast Transients -Indirect (Capacitive Clamp)

Electrical fast transients as per IEC 801 part4. These were applied using the Seward Mace indirectly to the EUT via a capacitive clamp, this consists of a 1 metre long assembly which comprises of a metal base with a hinged metal top plate. The two sides are electrically insulated and interference pulses generated by the Mace are applied via a short cable to both plates of the fixture.

Equipment cables of the unit under test are then run along the length of the fixture. The transient tests are then run and the equipment under test (EUT) is evaluated both during the test and at its conclusion to assess its performance.

The test is intended to simulate interference which may be absorbed from adjacent (power) cables in an installation situation.

Test result corresponds to [A] on IEC 1000-4 table

Voltage Dips

Supply dips applied as per the previous tests to IEC 61000-4-11 at the level of 30% of supply voltage for a duration of 25 cycles.

The unit was assessed both during and at the end of the test for functionality.

No adverse effects were noted during these tests. Test result corresponds to [A] on IEC 1000-4 table.

Esd

Applied using Seward Mace unit applied indirectly to the EUT at 8Kv in both positive & negative polarities. Unit located on an insulating sheet located over an earthed metal plate, to which the H.V discharges were made.

Additional tests were made by directly discharging the Mace probe to exposed screws.

The unit was assessed both during and at the end of each part of the test for functionality.

No adverse effects were noted during these tests

Test result therefore corresponds to [A] on IEC 1000-4 table.

conclusions

The unit performed satisfactorily during the Immunity tests.



EMC Test Laboratory Report



Report No UKAE 150(b)

UK Electronics Ltd

23th January 2008

Overall Conclusions

No significant problems were noted during either Generic Emissions or Immunity testing.

The only points of note being:

- a) Higher than anticipated emissions noted during the conducted emissions test.
- b) There is no provision for a mains fuse on board which makes the plug fuse the only protection

Tests performed by:

A. Evans,
Test Engineer,
U. K. Electronics Ltd

Test Date: 3rd March 2008.