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REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:
TWENTY PENCE TEST SITE

Twenty Pence Road,
Cottenham,
Cambridge
U.K.
CB24 8PS

on

Cambridge Visual Networks Ltd

CODAlink 1

dated

12th March 2008

Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	12/03/08		Initial release		
2	26/03/08	All	FCC version	DB	DS

Based on report template:
v071019

Equipment Under Test (EUT): CODAlink 1

Test Commissioned by: Cambridge Visual Networks Ltd
61 Selwyn Road
Cambridge
CB3 9EA

Representative: Quentin Stafford-Fraser

Test Started: 7th March 2008

Test Completed: 7th March 2008

Test Engineer: Peter Barlow

Date of Report: 12th March 2008

Written by: Peter Barlow **Checked by:** Derek Barlow

Signature: **Signature:**

Date: 12th March 2008 **Date:** 12th March 2008

dB Technology can only report on the specific unit(s) tested at its site. The responsibility for extrapolating this data to a product line lies solely with the manufacturer.

Test Standards Applied

CFR 47 : 2007 Class B	***Code of Federal Regulations: Pt 15 Subpart B- Radio Frequency Devices - Unintentional Radiators***

Emissions Test Results Summary

CFR 47 : 2007 **PASS**

Test	Port	Method	Limit	PASS/FAIL	*Notes*
Conducted Emissions	ac power	ANSI C63.4:2003	CISPR22(B)	PASS	
Radiated Emissions		ANSI C63.4:2003	CISPR22(B)	PASS	

specs_fccv070115

Contents

1 EUT Details

1.1 General

The EUT was a Cambridge Visual Networks Ltd, CODAlink 1 ethernet network adapter for displays. The EUT allows VGA connected monitors to be plugged into ethernet networks. It included microprocessor circuitry with a maximum frequency of 133MHz. The EUT had local PS/2 mouse and keyboard ports. The EUT was tested with no keyboard or mouse connected at the manufacturer's request.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
1	Cambridge Visual Networks Ltd	CODAlink 1	EUT	Prototype	
2	mpw	SA070507	EUT 5V ac adaptor	N/A	
3	Samsung	Sync master 172T	LCD VGA monitor	M017HMEW401439K	
4	Samsung	AP04214-UV	AC adaptor	0302026739AA	
5	Sony Vaio	VGN-B3XP	Laptop PC	281852505300545	
6	Sony	VGP-AC16V8	16V AC adaptor	147886031 0016351	

1.2 Details of Interconnecting Cables

The following table lists details of the cables connected to the EUT.

From	To	Cable Type	Length	Notes
EUT (DC port)	PSU	2-core unscreened with integral ferrite at EUT end	1.8m	
EUT (Ethernet port)	Laptop	CAT5 FTP (screened)	3m	
EUT (VGA port)	Monitor	Screened VGA with 2x integral ferrites one at each end	1.8m	
Monitor	PSU	2-core with integral ferrite at monitor	1.8m	
Monitor PSU	Mains	Standard 3-core IEC	1.8m	
Laptop	PSU	2-core	1.6m	
Laptop PSU	Mains	2-core	1m	

1.3 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

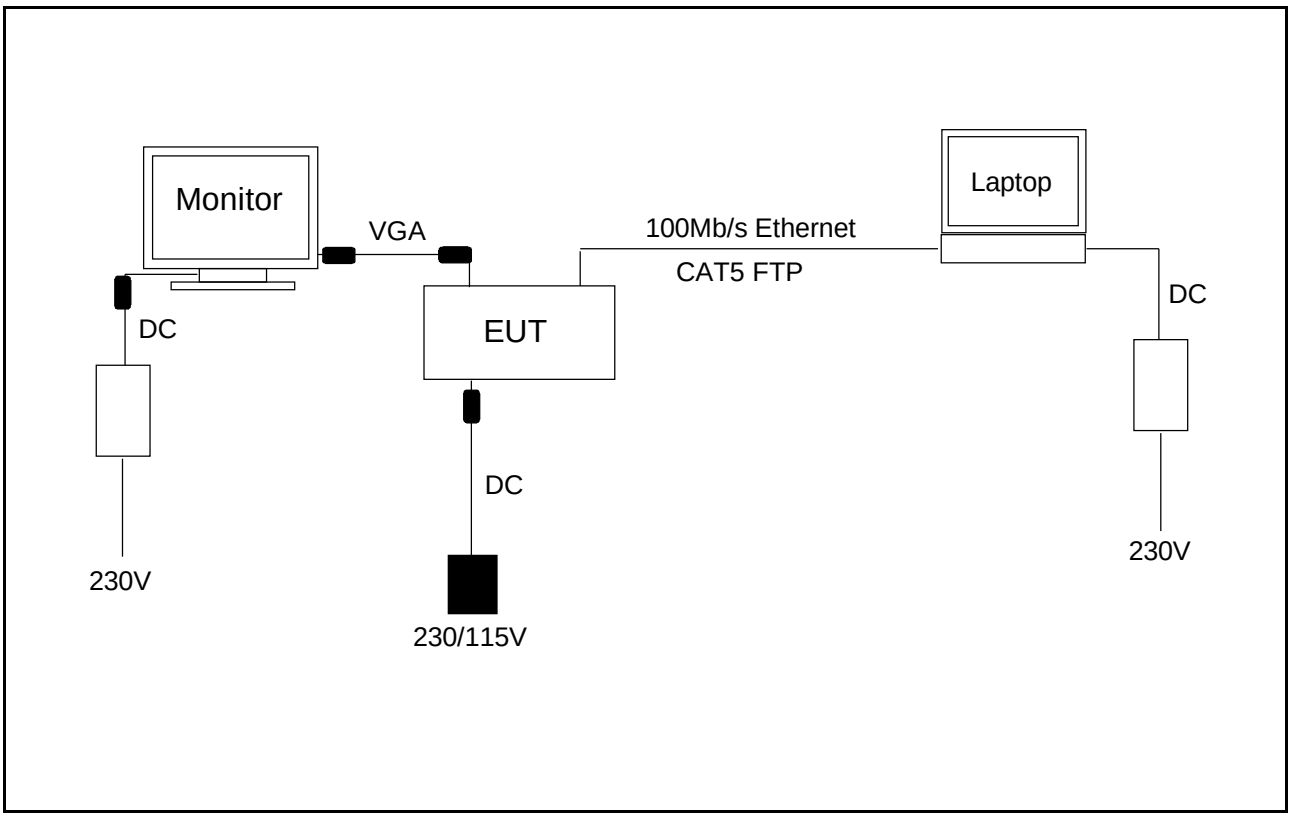
Mod No:	Details	Implemented for
0	As received 07/03/2008 with screened (CAT5 FTP) ethernet lead.	Radiated_Emissions

1.4 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

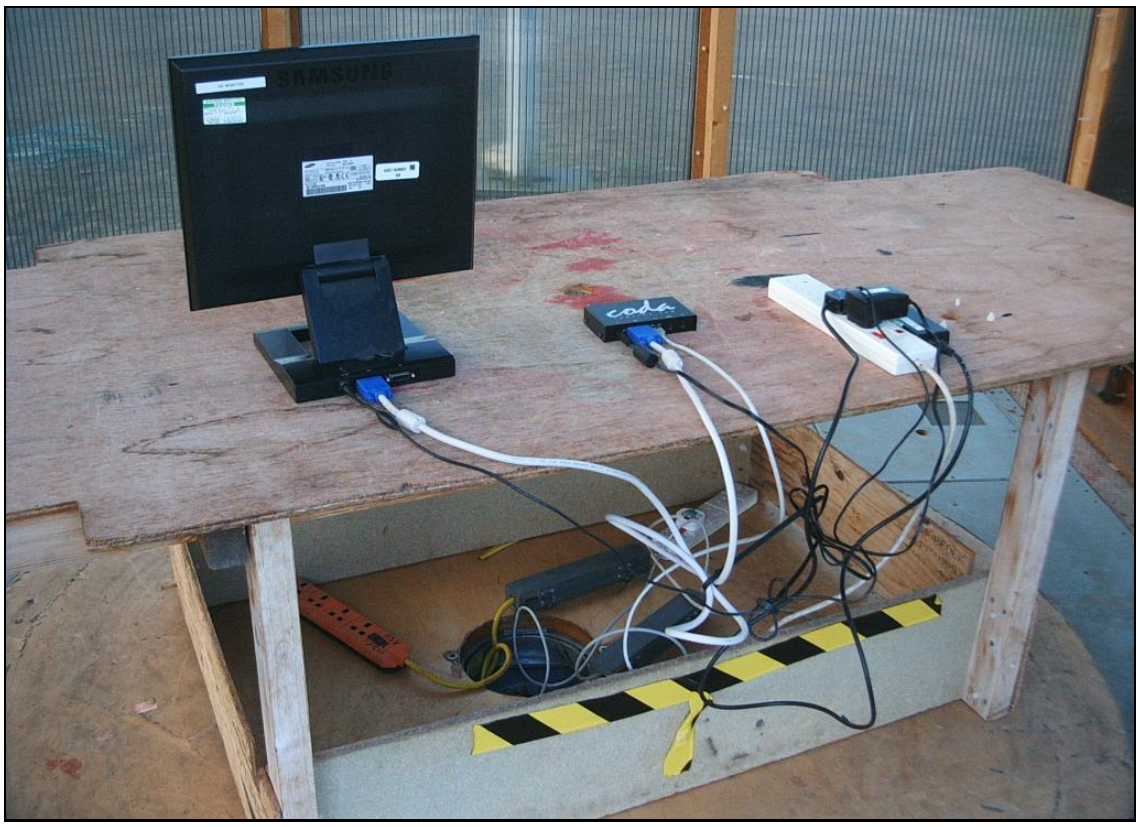
Operating Mode	Details
1	Laptop providing video over ethernet cable. The video consists of a window with a Scrolling H test running. The video format was 1280 x 1024 @ 75Hz. No keyboard or mouse was connected to the EUT. The video was then diplayed on the local VGA Monitor which was connected to the EUT's VGA output port.

Figure 1 General Arrangement of EUT and Peripherals



Photograph 1 Arrangement of EUT and Peripherals for Radiated Emissions

Photograph 2 Arrangement of EUT and Peripherals for Radiated Emissions



Photograph 3 Arrangement of EUT and Peripherals for Conducted Emissions

Photograph 4 Arrangement of EUT and Peripherals for Conducted Emissions

Photograph 5 Arrangement of EUT and Peripherals for Conducted Emissions

2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Details	Serial Number
A12	Chase Bilog CBL6111A	1012
A5	Chase Bilog CBL6111A	1760
L1	EMCO 3825/2 LISN	1358
L2	R&S ESH3-Z5 LISN	843862/009
R1	CHASE LHR 7000	1056
R5	HP 8595E Spec. Analyser	3412A00701
R5B	dB Technology Pre-amp	dB001
R7	R&S ESVD	280576.333333333

3 Test Methods

3.1 Conducted Emissions - ac power

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Bench top EUTs and peripheral equipment are normally placed on a 0.8m high non-conducting bench, positioned 0.4m from one of the metallic walls of a screened room. Floor standing EUTs are normally placed 0.1m above the metallic floor of the screened room. Mains leads are bundled so as not to exceed 1m.

The EUT is powered using a 50ohm/50uH Line Impedance Stabilisation Network (LISN). Peripherals are powered using a second a 50ohm/50uH LISN. These LISNs are bonded to the screened room floor.

With the correct supply voltage applied to the EUT scans are performed on both the live and neutral line outputs of the LISN using quasi-peak detection over the specified frequency range. The results of these scans are shown in the plots section at the end of the report.

Significant emissions identified by the scans are measured and the results tabulated. The table of results is shown in the conducted emissions results section.

3.2 Radiated Emissions

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of 3m. Scans are performed over the frequency range specified in the test standard with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using a CISPR16 quasi-peak receiver. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

4.1 Conducted Emissions (Power) - Results - 115V ac power

Factor Set 1:	L1_07B	CSET001_07D	-	-
Factor Set 2:	-	-	-	-
Factor Set 3:	-	-	-	-
Test Equipment:				

Conducted Emissions (Power)

Company:	Cambridge Visual Networks Ltd	*Product:*	CODAlink 1
Date:	07/03/08	*Test Eng:*	Peter Barlow
Ports:	ac power		
Test:	ANSI C63.4:2003 using limits of		CISPR22(B)
Ports:			
Test:	using limits of		

Plot	Op Mode	Mod State	Line (L/N)	Fact Set	Freq. MHz	Det qp/ av	Rec. Level dBuV	Corr'n Factor dB	Total Level dBuV	Limit CISPR22(B) dBuV	Margin CISPR22(B) dB	Notes
1	1	0	L	1	0.199	qp	43.7	10.0	53.7	63.7	10.0	115V ac power
1	1	0	L	1	0.199	av	35.7	10.0	45.7	53.7	8.0	115V ac power
1	1	0	L	1	14.953	qp	33.6	10.6	44.2	60.0	15.8	115V ac power
1	1	0	L	1	14.953	av	29.2	10.6	39.8	50.0	10.2	115V ac power
2	1	0	N	1	0.202	qp	46.7	10.0	56.7	63.5	6.9	115V ac power
2	1	0	N	1	0.202	av	38.2	10.0	48.2	53.5	5.4	115V ac power
2	1	0	N	1	14.760	qp	31.5	10.6	42.1	60.0	17.9	115V ac power
2	1	0	N	1	14.760	av	27.0	10.6	37.6	50.0	12.4	115V ac power

Results	Minimum Margin	5.4 dB	
	PASS/FAIL	PASS	

Notes	Comments and Observations
	Results of scans shown in plots 1 and 2.

4.2 Radiated Emissions Results

Factor Set 1:	A5_FS_07B	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R7 A5 CSET005				

Radiated_Emissions

Company: Cambridge Visual Networks Ltd *Product:* CODAlink 1

Date: 07/03/08 *Test Eng:* Peter Barlow

Ports:

Test: ANSI C63.4:2003 using limits of CISPR22(B)

Ports:

Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit CISPR22(B) dBuV/m	Margin CISPR22(B) dB	Notes
4	1	0	10	1	708.713	H	5.4	26.7		32.1	37.0	4.9	
4	1	0	10	1	708.713	V	3.4	26.7		30.1	37.0	6.9	
3	1	0	10	1	116.900	H	5.3	13.4		18.7	30.0	11.3	
3	1	0	10	1	116.900	V	11.5	13.4		24.9	30.0	5.1	
3	1	0	10	1	101.146	H	3.6	11.7		15.3	30.0	14.7	
3	1	0	10	1	101.146	V	11.4	11.7		23.1	30.0	6.9	
3	1	0	10	1	32.630	H	-3.8	17.7		13.9	30.0	16.1	
3	1	0	10	1	32.630	V	6.5	17.7		24.2	30.0	5.8	

Results	Minimum Margin PASS/FAIL	4.9 dB PASS	

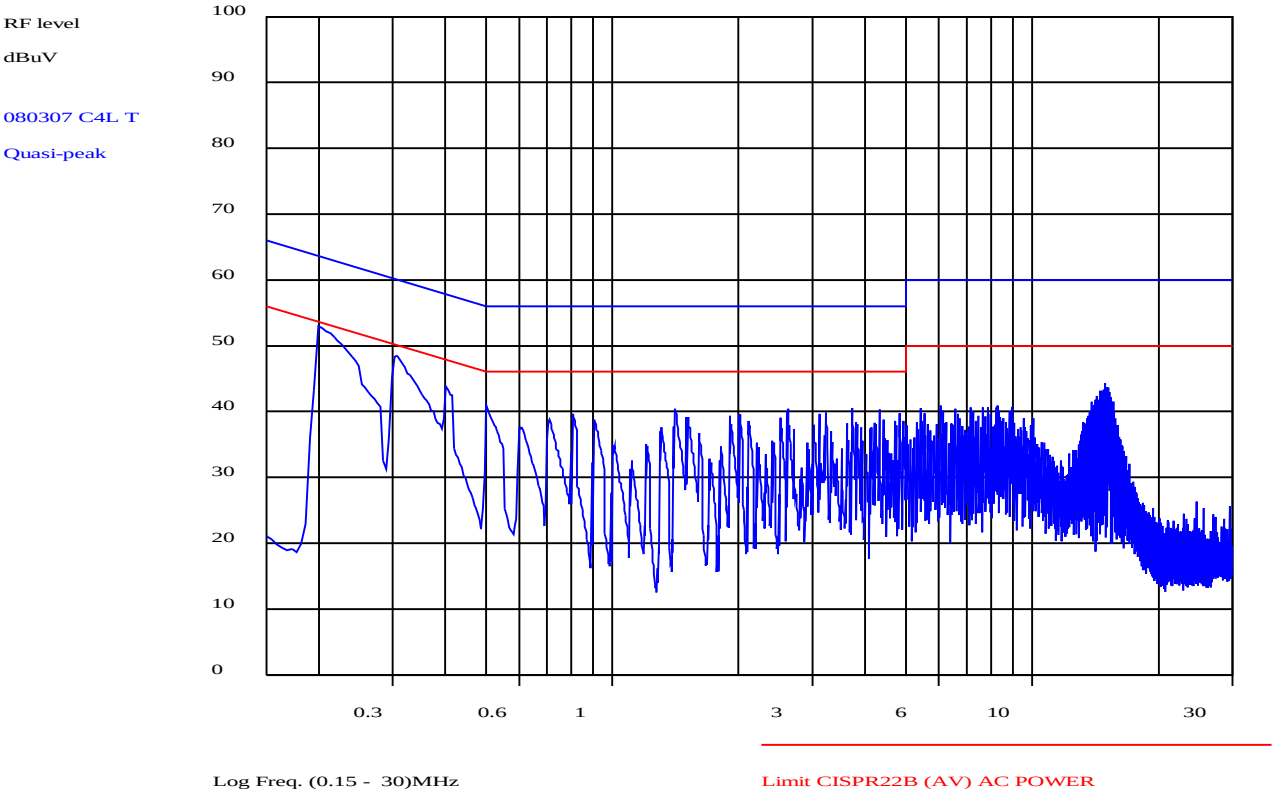
Notes	Comments and Observations
	Results of scans shown in plots 3 to 6.

Chase EMS 6.21

Notes

Analyse 080307 C4L T2609 115V ac power

Test: 150kHz-30MHz (L1+CSET001) dBuV



PLOT 1 Conducted Emissions - Neutral Line

Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	26 Mar 08	Test Engineer:	Peter Barlow
Test:	FCC pt 15	Limit:	CISPR (B)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop via CDN9.
EUT connected to local monitor via VGA. Monitor (L2) EUT PSU (L1).
Equip:R1,L1,L2,,AB002,CBL005,CBL007, CDN9.

Line:	Neutral	Attenuator:	10dB PAD	Operating Mode:	1
Detector:	QuasiPeak			Mod. State:	0
LISN:	EMCO	Filename:	C8326835.plt		

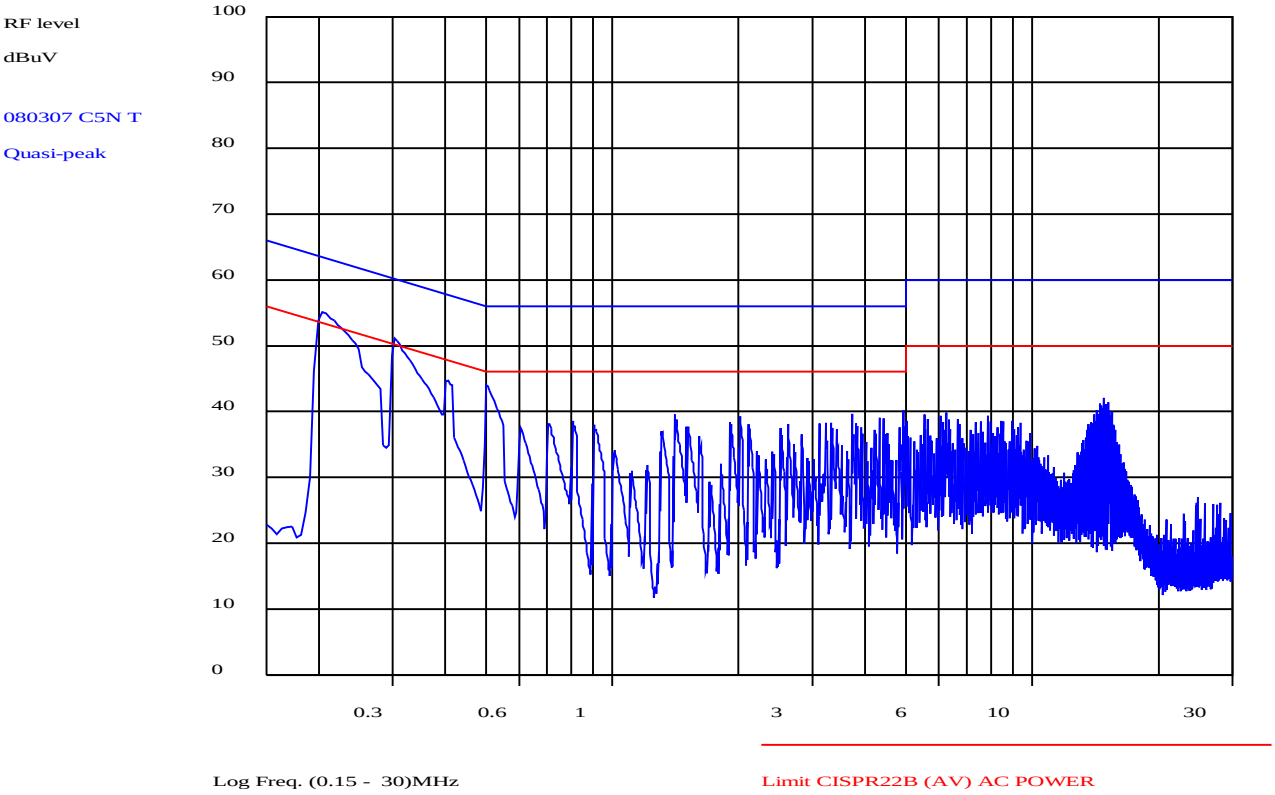
Frequency List (MHz)

Chase EMS 6.21

Notes

Analyse 080307 C5N T2609 115V ac power

Test: 150kHz-30MHz (L1+CSET001) dBuV



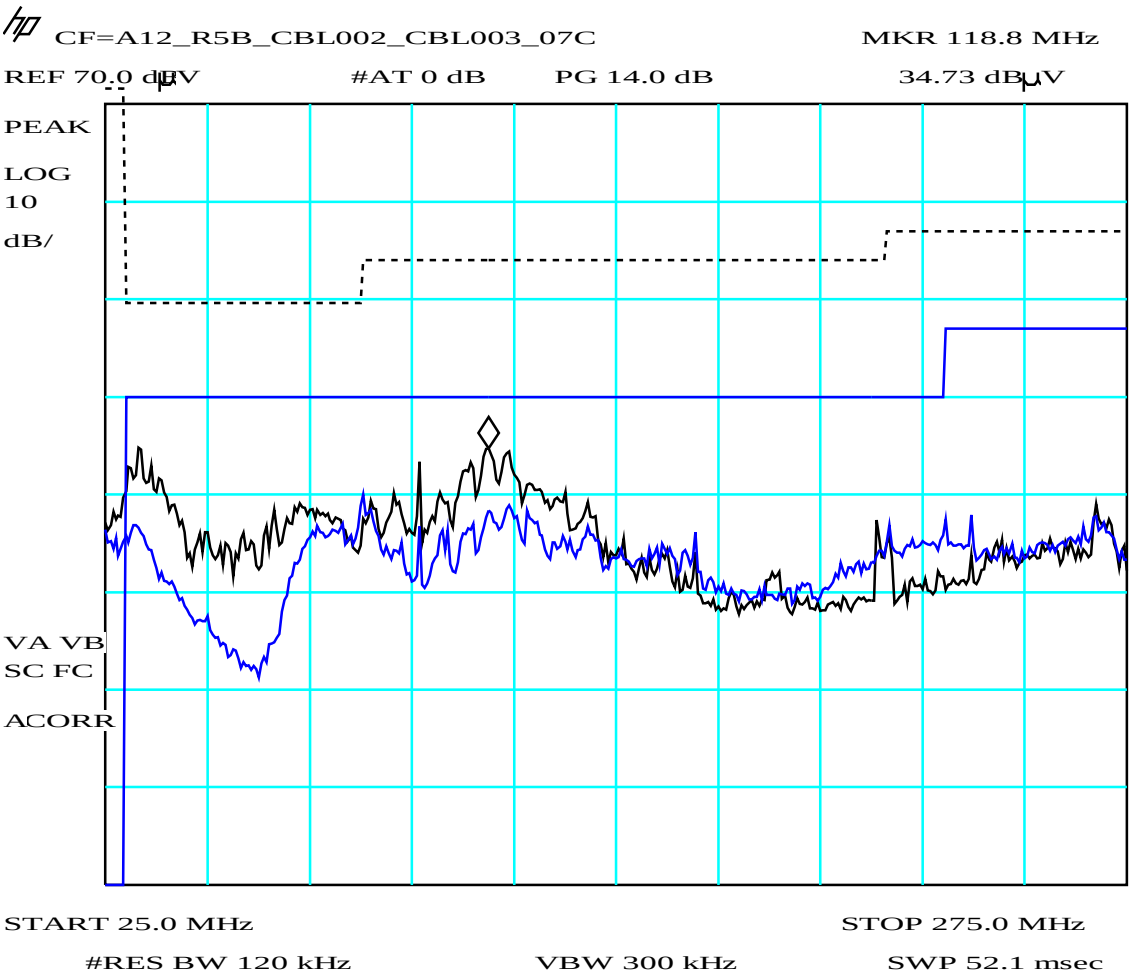
PLOT 2 Conducted Emissions - Live Line

Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	26 Mar 08	Test Engineer:	Peter Barlow
Test:	FCC pt 15	Limit:	CISPR (B)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop via CDN9.
EUT connected to local monitor via VGA. Monitor (L2) EUT PSU (L1).
Equip:R1,L1,L2,,AB002,CBL005,CBL007, CDN9.

Line:	Neutral	Attenuator:	10dB PAD	Operating Mode:	1
Detector:	QuasiPeak			Mod. State:	0
LISN:	EMCO	Filename:	C8326838.plt		

Frequency List (MHz)



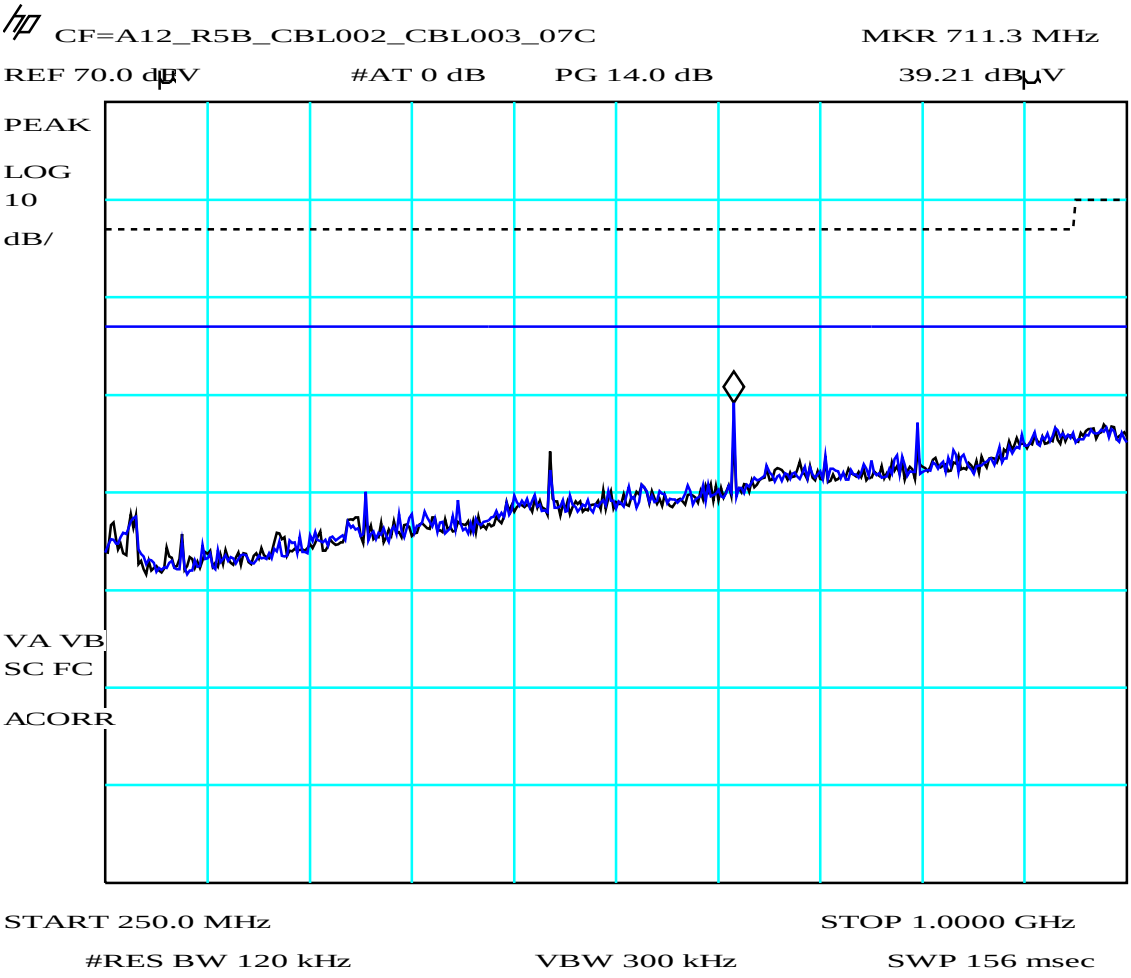
PLOT 3 Radiated Emissions - 25MHz to 275MHz

Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	07 Mar 08	Test Engineer:	Peter Barlow
Test:	CISPR22	Limit:	CISPR (B) & FCC (A)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop outside of chamber. EUT connected to local monitor via VGA. Monitor and EUT PSU's on the bench.
Vertical = Black Trace, Horizontal = Blue Trace

Polarisation:	V + H	Orientation:	0 - 360°	Operating Mode:	1
Distance:	3m	Antenna:	Bilog	Mod. State:	0
Height:	1m	Filename:	H830740A.plt		

Frequency List (MHz)



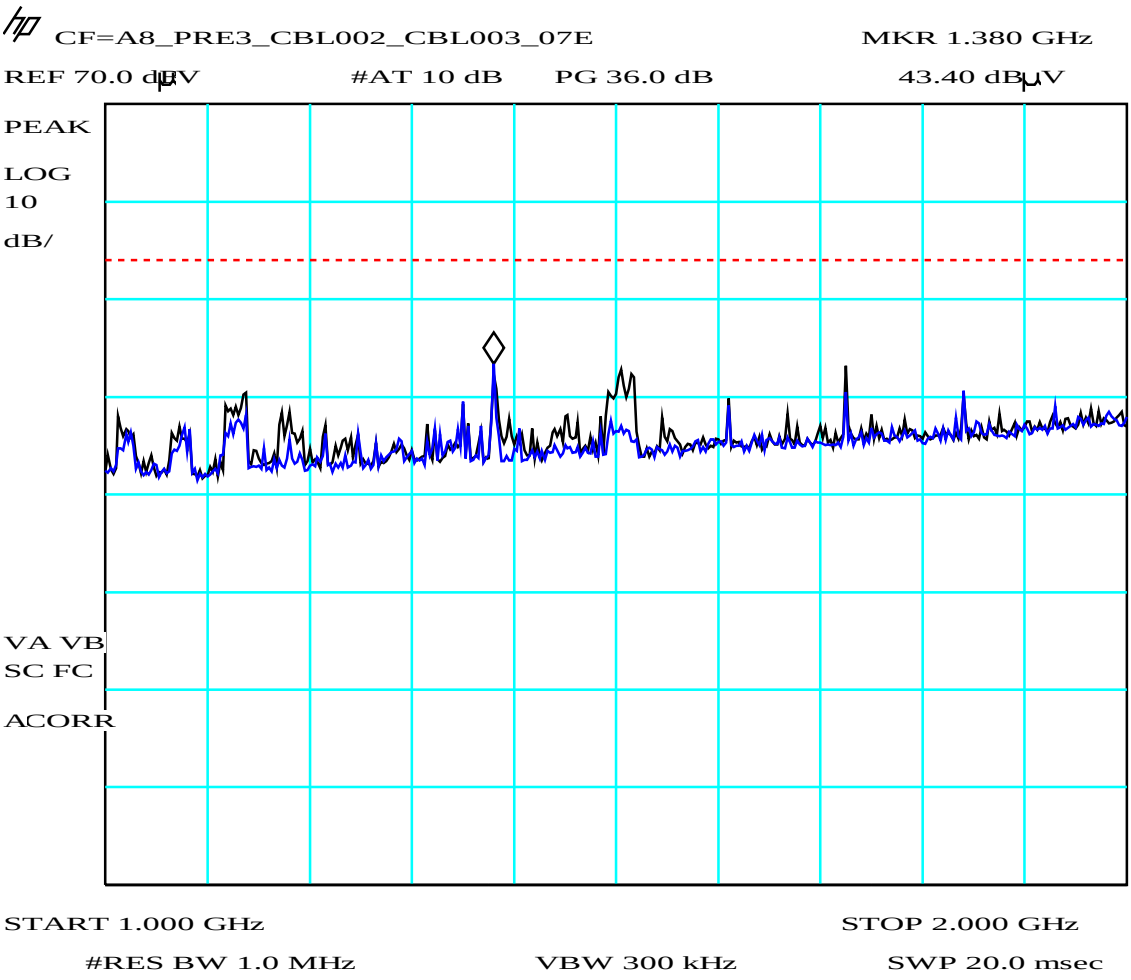
PLOT 4 Radiated Emissions - 250MHz to 1GHz

Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	07 Mar 08	Test Engineer:	Peter Barlow
Test:	CISPR22	Limit:	CISPR (B) & FCC (A)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop outside of chamber. EUT connected to local monitor via VGA. Monitor and EUT PSU's on the bench.
Vertical = Black Trace, Horizontal = Blue Trace

Polarisation:	V + H	Orientation:	0 - 360°	Operating Mode:	1
Distance:	3m	Antenna:	Bilog	Mod. State:	0
Height:	1m	Filename:	H830740F.plt		

Frequency List (MHz)



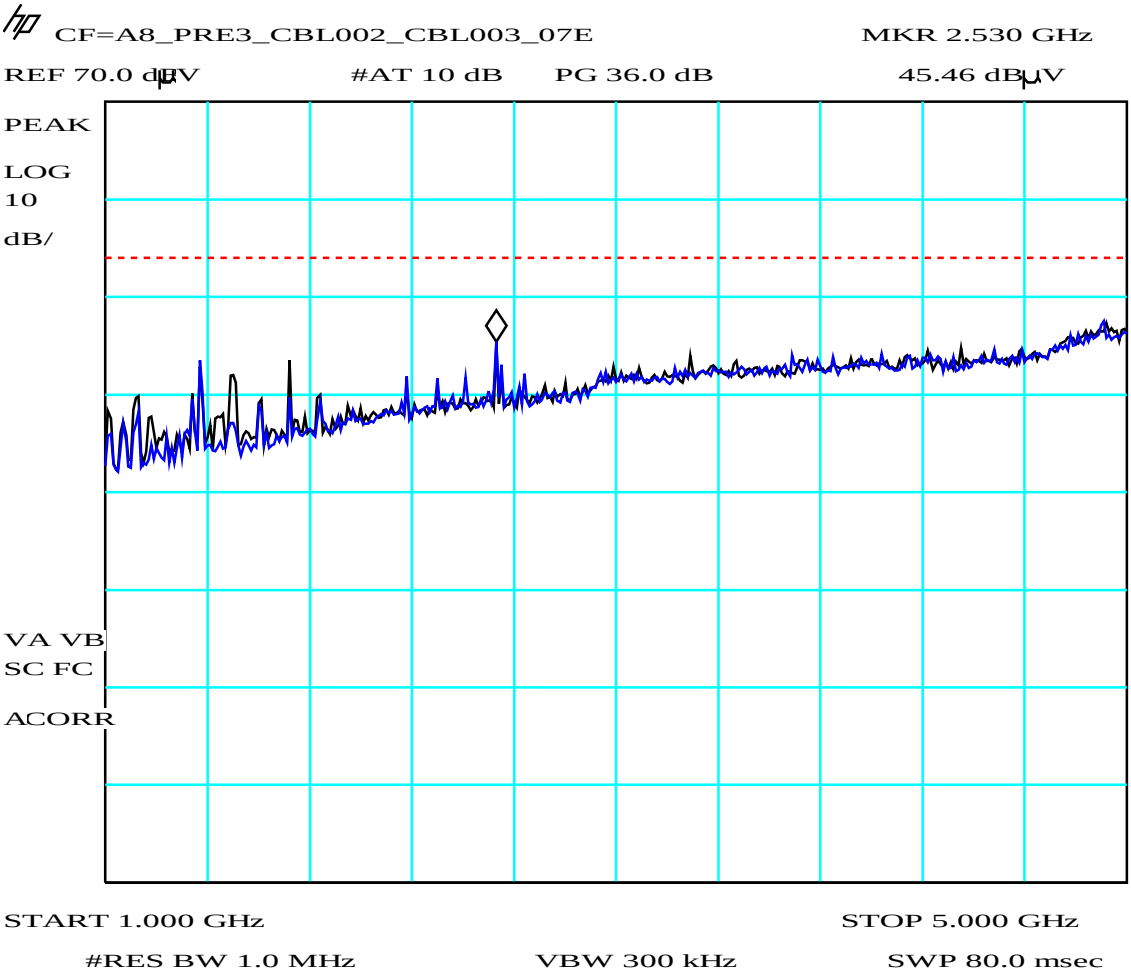
PLOT 5 Radiated Emissions - 1GHz to 2GHz

Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	07 Mar 08	Test Engineer:	Peter Barlow
Test:	FCC pt 15	Limit:	FCC(B)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop outside of chamber. EUT connected to local monitor via VGA. Monitor and EUT PSU's on the bench.
Vertical = Black Trace, Horizontal = Blue Trace

Polarisation:	V + H	Orientation:	0 - 360°	Operating Mode:	1
Distance:	3m	Antenna:	DRG	Mod. State:	0
Height:	1m	Filename:	H830743D.plt		

Frequency List (MHz)



PLOT 6 Radiated Emissions - 1GHz to 5GHz

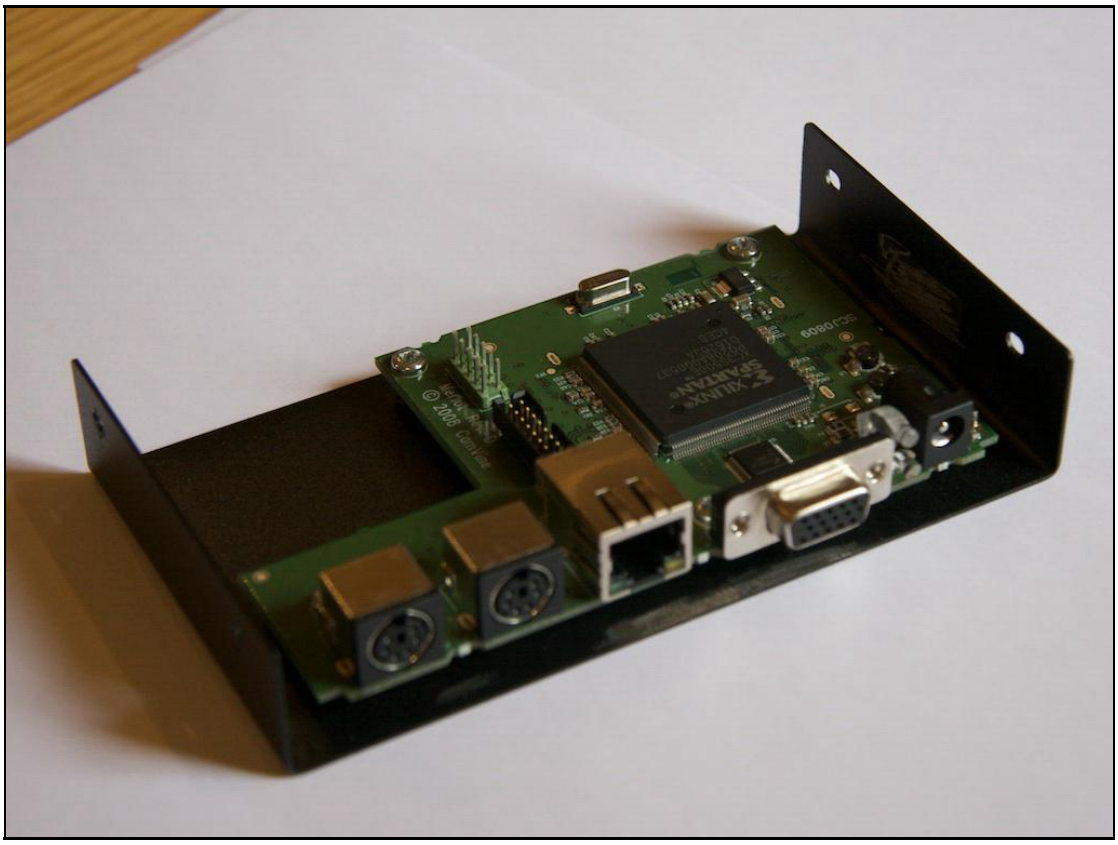
Company:	Cambridge Visual Networks	Product:	CODAlink 1
Date:	07 Mar 08	Test Engineer:	Peter Barlow
Test:	FCC pt 15	Limit:	FCC(B)

Notes:
Op.Mode: Scrolling H test. No keyboard or mouse. 1280 * 1024 @ 75Hz.
Rev D board - issue 1 case. Screened ethernet cable connected to laptop outside of
chamber. EUT connected to local monitor via VGA. Monitor and EUT PSU's on the bench.
Vertical = Black Trace, Horizontal = Blue Trace

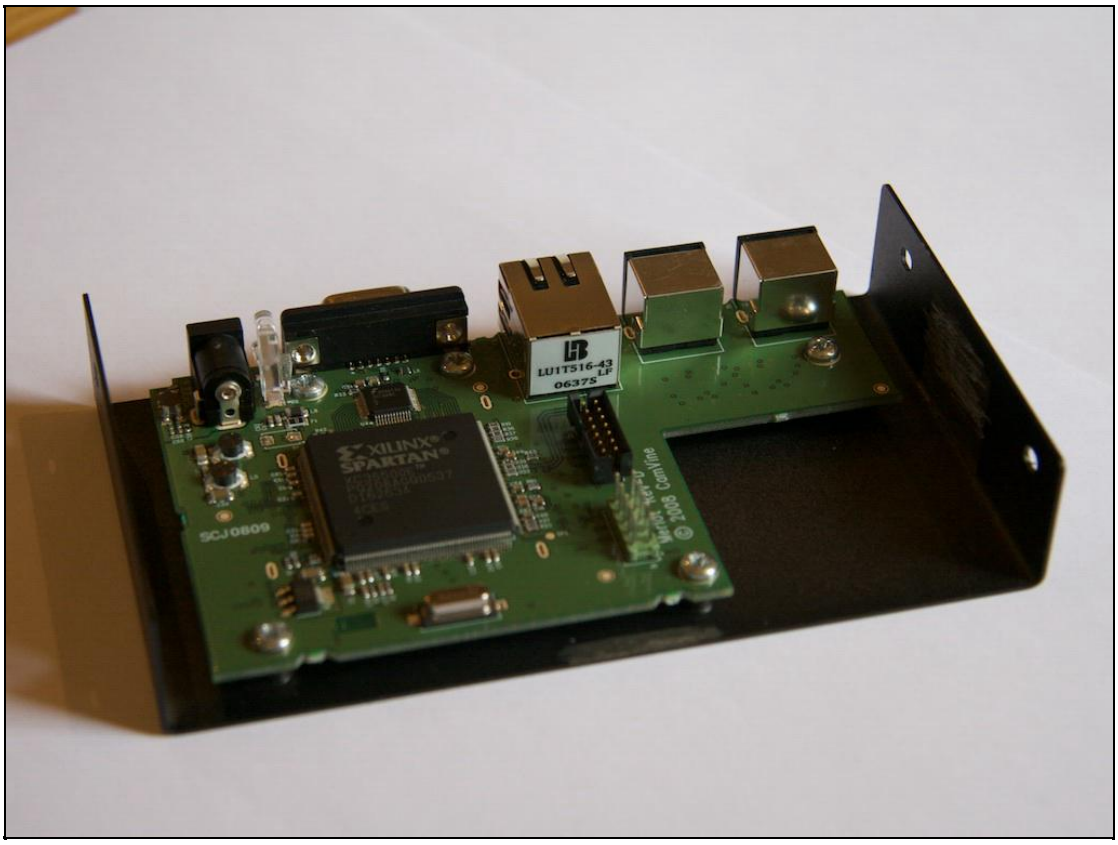
Polarisation:	V + H	Orientation:	0 - 360°	Operating Mode:	1
Distance:	3m	Antenna:	DRG	Mod. State:	0
Height:	1m	Filename:	H8307438.plt		

Frequency List (MHz)

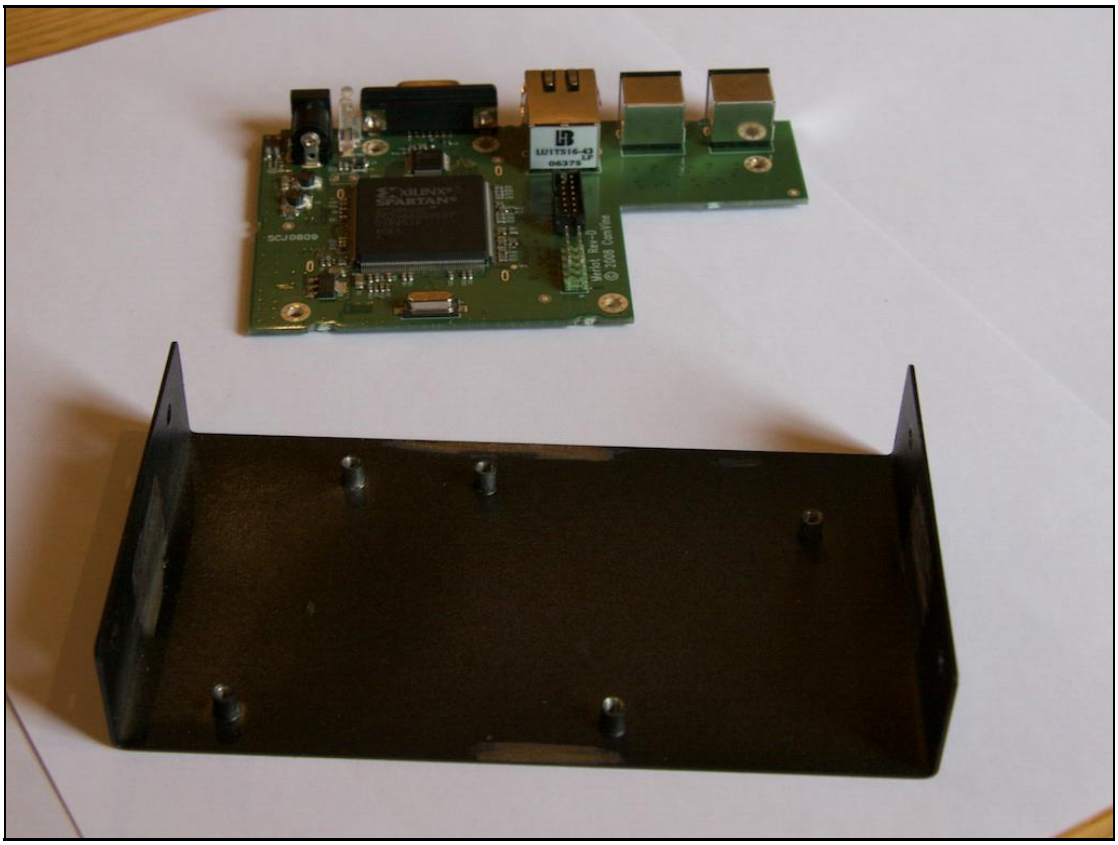
Photograph 6 EUT PCB Front



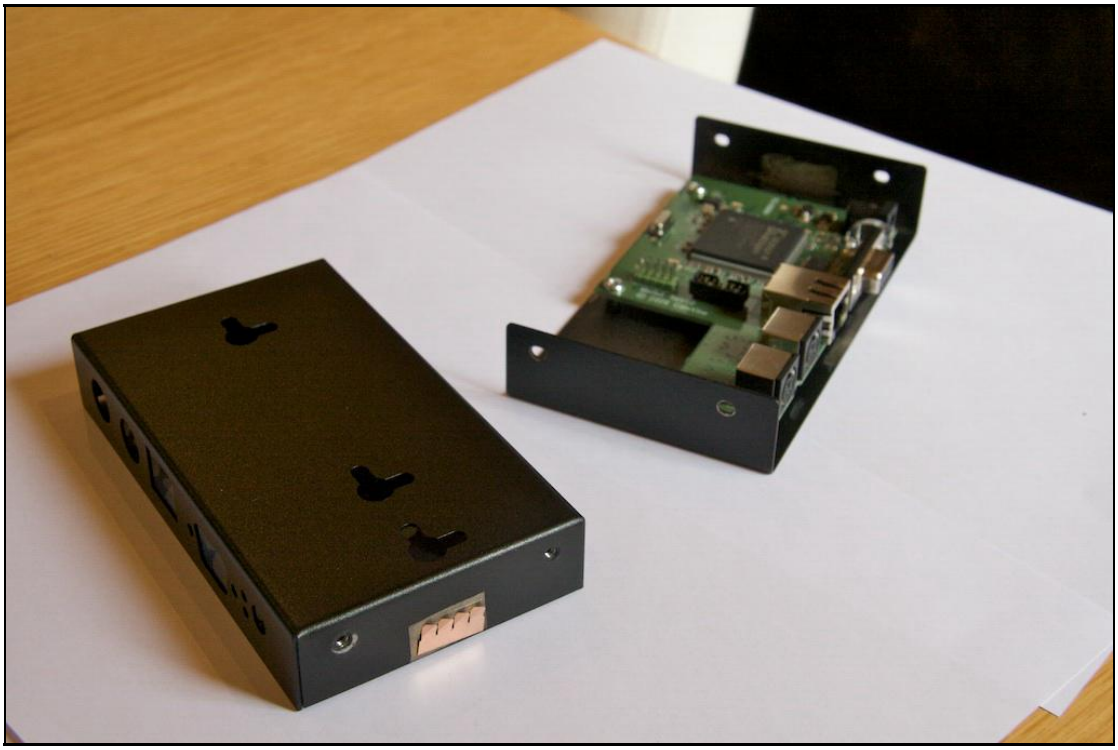
Photograph 7 EUT PCB Rear



Photograph 8 EUT Enclosure Bottom



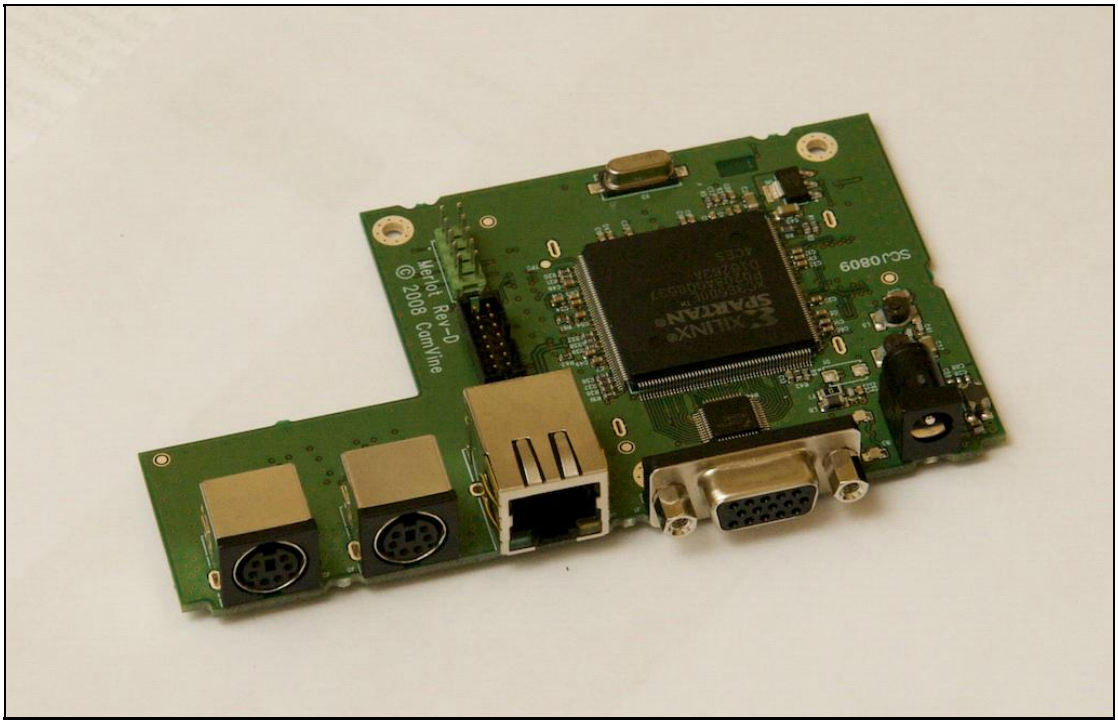
Photograph 9 EUT Enclosure Bottom



Photograph 10 EUT AC adapter

Photograph 11 EUT External Front

Photograph 12 EUT PCB Top



Photograph 13 EUT PCB Bottom