	Report No: <b>R2753</b> Issue No: <b>1</b>	<b>FCC ID: X92TL1000</b>	
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 1 of 19



**dB Technology**

|----- ( Cambridge Ltd. ) -----|

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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

**TJB Systems Ltd**

**TL1000 Trip Logik Logger**

dated


**7th April 2010**

### Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	07/04/10		Initial release		

Based on report template:  
v090319

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	Report No: <b>R2753</b>	FCC ID: X92TL1000	
	Issue No: <b>1</b>		
Test No: <b>T3150</b>	Test Report		Page: 2 of 19

Equipment Under Test (EUT): TL1000 Trip Logik Logger

Test Commissioned by: TJB Systems Ltd  
53 Oakleigh Gardens  
Whetstone  
London  
N20 9AB

Representative: Tim Box

Test Started: 6th April 2010


Test Completed: 7th April 2010

Test Engineer: Dave Smith

Date of Report: 7th April 2010

Written by: Dave Smith

Checked by: Derek Barlow


Signature: 

Signature: 

Date: 7th April 2010

Date: 7th April 2010

**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.**

	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 3 of 19

## Test Standards Applied

CFR 47 : 2009      *Code of Federal Regulations: Pt 15 Subpart B- Radio Frequency Devices -*  
Class B              *Unintentional Radiators*


## Emissions Test Results Summary

CFR 47 : 2009

PASS


Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions CFR47: 15.107	ac power	ANSI C63.4:2003	FCC_B	PASS	
Radiated Emissions CFR47: 15:109		ANSI C63.4:2003	CISPR22(B)	PASS	

specs\_fccv080911

	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 4 of 19

## Contents

<b>1 EUT Details</b>	<b>5</b>
1.1 General	5
1.2 Modifications to EUT and Peripherals	5
1.3 EUT Operating Modes	6
<i>Figure 1 General Arrangement of EUT and Peripherals - Connected to PC</i>	7
1.4 Details of Interconnecting Cables	7
<i>Photograph 1 Conducted Emissions - PC Power - Front</i>	8
<i>Photograph 2 Conducted Emissions - PC Power - Back</i>	8
<i>Photograph 3 Conducted Emissions - PC Power - Back</i>	9
<i>Photograph 4 Radiated Emissions - Connected to PC - Front</i>	10
<i>Photograph 5 Radiated Emissions - Connected to PC - Back</i>	10
<i>Photograph 6 Radiated Emissions - Connected to PC - Back</i>	11
<b>2 Test Equipment</b>	<b>12</b>
<b>3 Test Methods</b>	<b>13</b>
3.1 Conducted Emissions - ac power	13
3.2 Radiated Emissions	13
<b>4 Test Results</b>	<b>14</b>
4.1 Conducted Emissions (Power) - Results	15
4.2 Radiated Emissions Results	16
<i>PLOT 1 Conducted Emissions - PC power - Live</i>	17
<i>PLOT 2 Conducted Emissions - PC power - Neutral</i>	18
<i>PLOT 3 Radiated Emissions - Connected to PC - 25MHz to 275MHz</i>	19
<i>PLOT 4 Radiated Emissions - Connected to PC - 25MHz to 275MHz</i>	20

	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 5 of 19

## 1 EUT Details

### 1.1 General

The EUT was a TL1000 Trip Logik Logger. It is a GPS device which is usually powered via a PSU that plugs into a vehicle 12V DC supply. It can be removed and the logged GPS data can be retrieved via a USB link to a PC. In this configuration power is provided by the USB interface. The EUT had a plastic enclosure. It included microprocessor circuitry with a maximum frequency of 48 MHz.

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	TJB Systems Ltd	TL1000	GPS logger	TL1000000000 1153	
2	Acer	TravelMate 5720	Laptop PC	LXTKD0Z43983 814036200	#1
3	Liteon	PA-1650-02	PSU 19V 3.42A	8824569706	#2
4	D Link	DES 1005-D	Ethernet switch	B21B44B000635	#1
5	Joden	JOD-48B-09	Switch PSU 7.5V 1A	none	#2

- #1 FCC Declaration of Conformity  
#2 Power supply - only requires FCC Verification

### 1.2 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 supplied 6th April 2010. No modifications were made during the course of testing.	

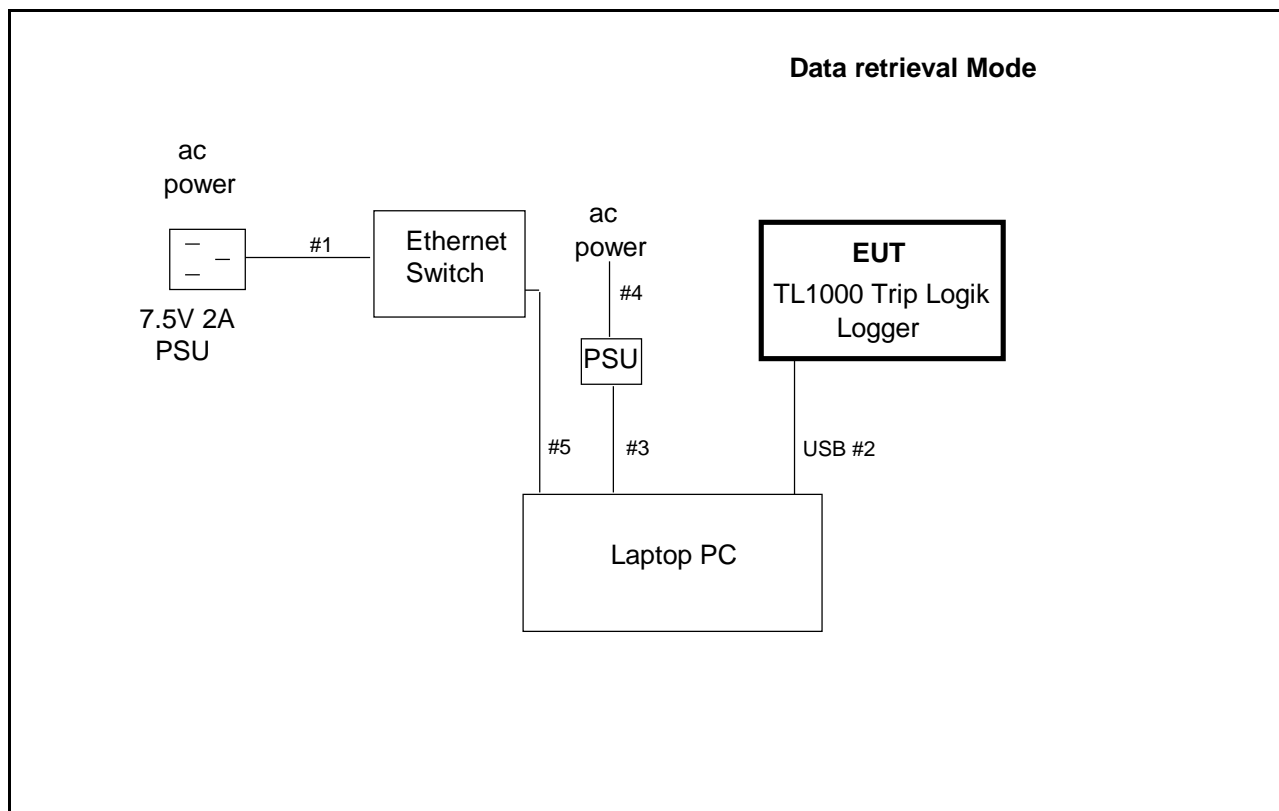
	Report No: <b>R2753</b> Issue No: <b>1</b>	<b>FCC ID: X92TL1000</b>	
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 6 of 19

### 1.3 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	EUT connected and powered via USB to a laptop computer. Computer ethernet port connected to switch. Script running which obtains the EUT status data via the USB.


**Figure 1 General Arrangement of EUT and Peripherals - Connected to PC**



#### 1.4 Details of Interconnecting Cables

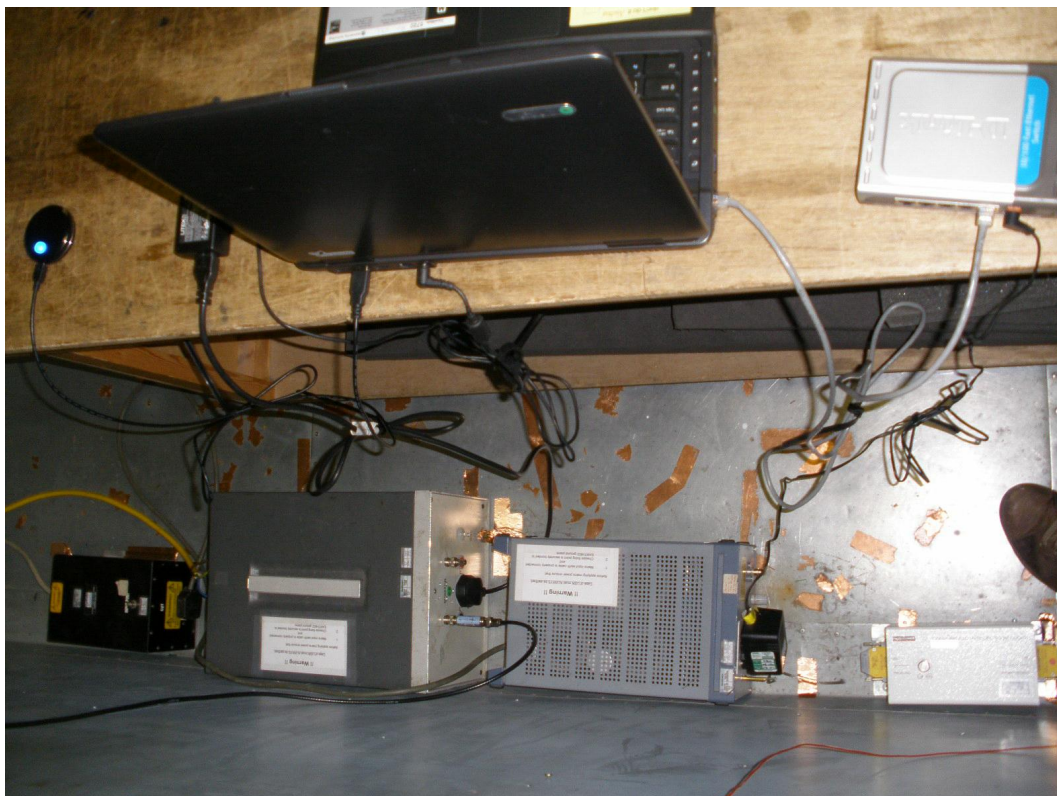
The following table lists details of the cables connected to the EUT.

From	To	Cable Type	Length	Ref.
Ethernet Switch	PSU	2 wire unscreened	1.9m	#1
EUT	Laptop	screened USB	1.5	#2
Laptop	Laptop PSU	2 wire unscreened	1.8m	#3
Laptop PSU	Mains	3 wire unscreened	1.6m	#4
Laptop	Ethernet Switch	Ethernet UTP	1.9m	#5

	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: <b>8 of 19</b>




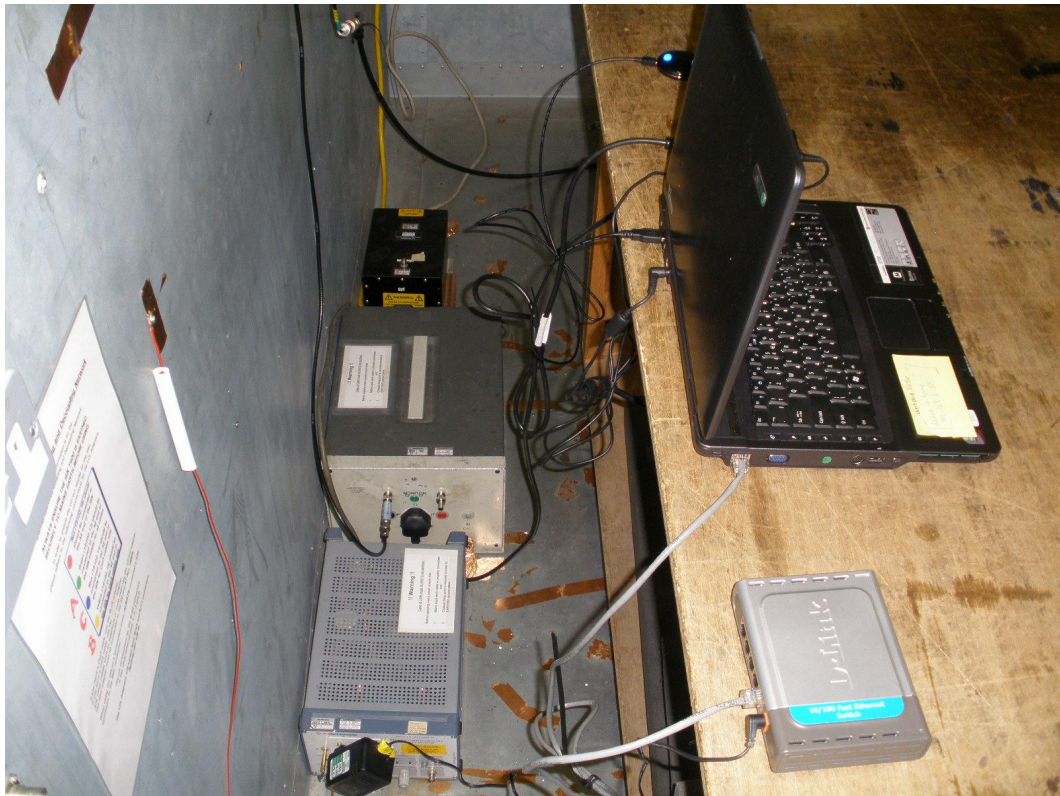
**Photograph 1 Conducted Emissions - PC Power - Front**



**Photograph 2 Conducted Emissions - PC Power - Back**

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	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: <b>9 of 19</b>




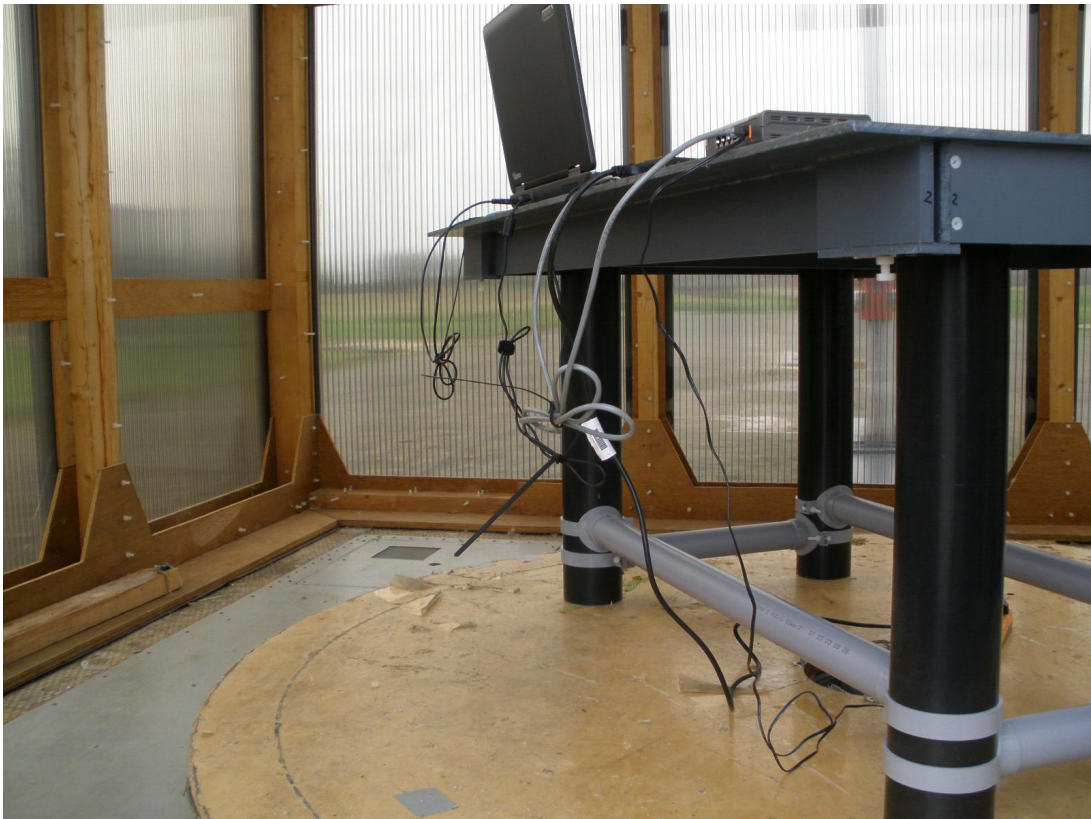
**Photograph 3 Conducted Emissions - PC Power - Back**



**Photograph 4 Radiated Emissions - Connected to PC - Front**

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	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 10 of 19




**Photograph 5 Radiated Emissions - Connected to PC - Back**



**Photograph 6 Radiated Emissions - Connected to PC - Back**



	Report No: <b>R2753</b> Issue No: <b>1</b>	<b>FCC ID: X92TL1000</b>	
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 12 of 19

### 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.

Sample calculation:

$$\begin{array}{lclcl} \text{Final Level} & = & \text{Receiver Reading} & + & \text{Combined Cable \& Attenuator Correction Factor} \\ (\text{dBuV}) & & (\text{dBuV}) & & (\text{dB}) \end{array}$$

Example:

$$\text{@182kHz} \quad \text{Final Level} = 42.1 + 10.1 = 52.2 \text{ dBuV}$$

#### 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. Cables are moved to identify the arrangement that gives highest emission levels.


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.

Sample calculation:

$$\begin{array}{lclcl} \text{Final Level} & = & \text{Receiver Reading} & + & \text{Combined Antenna \& Cable Correction Factor} \\ (\text{dBuV/m}) & & (\text{dBuV}) & & (\text{dB 1/m}) \end{array}$$


Example:

$$\text{@60.12MHz} \quad \text{Final Level} = 15.0 + 6.2 = 21.2 \text{ dBuV}$$

	Report No: <b>R2753</b> Issue No: <b>1</b>	<b>FCC ID: X92TL1000</b>	
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 13 of 19

## 4 Test Results

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


	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 14 of 19

#### 4.1 Conducted Emissions (Power) - Results

Factor Set 1:	L1_10A	I2_CBL005_CBL039	-	-
Factor Set 2:	-	-	-	-
Factor Set 3:	-	-	-	-
Test Equipment: R1 L1 CSET001				

##### Conducted Emissions (Power)

Company: TJB Systems Ltd										Product: TL1000 Trip Logik Logger			
Date: 07/04/2010										Test Eng: Dave Smith			
Ports: ac power													
Test: ANSI C63.4:2003										using limits of FCC_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	0.182	qp	42.1	10.1	52.2	64.4	12.2		
1	1	0	L	1	0.182	av	30.5	10.1	40.6	54.4	13.8		
1	1	0	L	1	0.243	qp	33.3	10.1	43.4	62.0	18.6		
1	1	0	L	1	0.243	av	20.9	10.1	31.0	52.0	21.0		
2	1	0	N	1	0.183	qp	42.6	10.1	52.7	64.3	11.7		
2	1	0	N	1	0.183	av	31.8	10.1	41.9	54.3	12.5		
2	1	0	N	1	0.243	qp	33.1	10.1	43.2	62.0	18.8		
2	1	0	N	1	0.243	av	21.8	10.1	31.9	52.0	20.1		
Results										Minimum Margin PASS/FAIL			11.7 dB PASS
Notes	Comments and Observations												
Results of scans shown in plots 1 and 2.													
Measurement made on Laptop PSU ac power port @115V.													

	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 15 of 19

## 4.2 Radiated Emissions Results

Factor Set 1:	A5_FS_09A	-	-	CBL015_09C	1 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment: R7 A5 CSET005					

### Radiated Emissions

Company: TJB Systems Ltd						Product: TL1000 Trip Logik Logger							
Date: 06/04/2010						Test Eng: Dave Smith							
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
3	1	0	10	1	60.120	V	15.0	6.2		21.2	30.0	8.8	
3	1	0	10	1	60.120	H	2.2	6.2		8.4	30.0	21.6	
3	1	0	10	1	71.990	V	13.3	6.9		20.2	30.0	9.8	
3	1	0	10	1	71.990	H	5.7	6.9		12.6	30.0	17.4	
3	1	0	10	1	100.000	V	14.2	11.5		25.7	30.0	4.3	
3	1	0	10	1	100.000	H	14.0	11.5		25.5	30.0	4.5	
3	1	0	10	1	144.000	V	2.4	13.2		15.6	30.0	14.4	
3	1	0	10	1	144.000	H	2.5	13.2		15.7	30.0	14.3	
3	1	0	10	1	200.000	V	15.0	10.4		25.4	30.0	4.6	
3	1	0	10	1	200.000	H	13.3	10.4		23.7	30.0	6.3	
3	1	0	10	1	211.580	V	15.1	11.1		26.2	30.0	3.8	
3	1	0	10	1	211.580	H	10.4	11.1		21.5	30.0	8.5	
3	1	0	10	1	233.230	V	11.8	12.4		24.2	37.0	12.8	
3	1	0	10	1	233.230	H	10.0	12.4		22.4	37.0	14.6	
3	1	0	10	1	250.000	V	12.0	15.0		27.0	37.0	10.0	
3	1	0	10	1	250.000	H	16.4	15.0		31.4	37.0	5.6	
4	1	0	10	1	299.990	V	6.4	16.1		22.5	37.0	14.5	
4	1	0	10	1	299.990	H	16.0	16.1		32.1	37.0	4.9	
4	1	0	10	1	494.000	V	6.8	22.2		29.0	37.0	8.0	
4	1	0	10	1	494.000	H	1.1	22.2		23.3	37.0	13.7	
4	1	0	10	1	799.950	V	-1.0	28.5		27.5	37.0	9.5	
4	1	0	10	1	799.950	H	-0.4	28.5		28.1	37.0	8.9	
Results						Minimum Margin PASS/FAIL					3.8 dB PASS		
Notes		Comments and Observations											
		Results of scans shown in plots 3 and 4.											

Chase EMS 6.21

Notes

Analyse 100407 C1L 115V

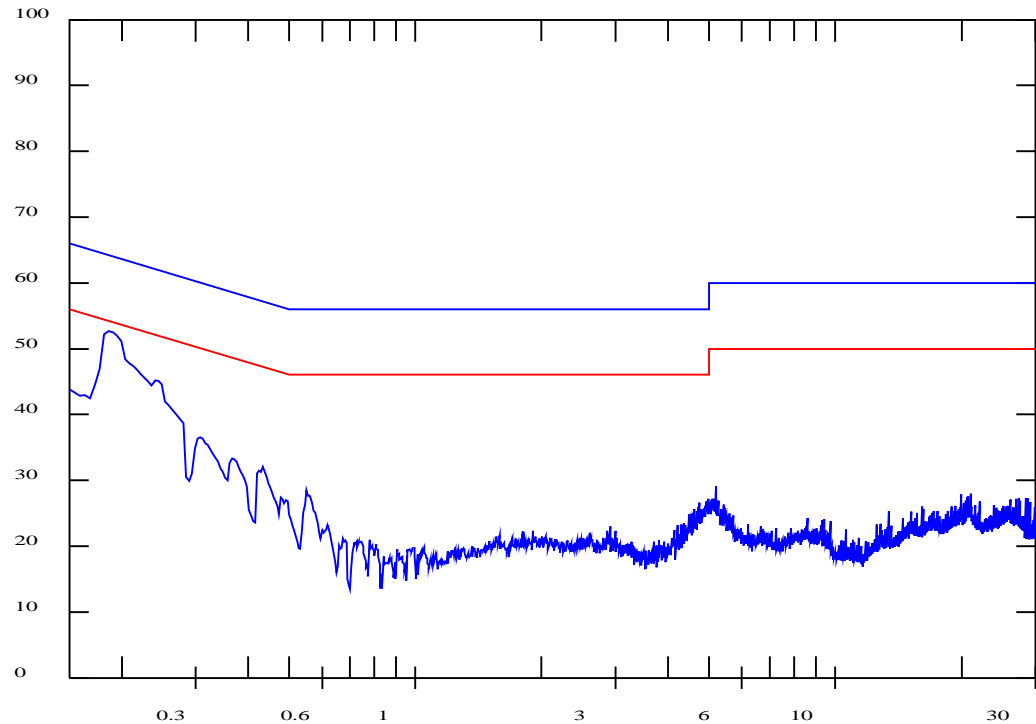
Test: 150kHz-30MHz (L1+CSET001) dBuV

RF level

dBuV

100407 C1L 1

Quasi-peak




Log Freq. (0.15 - 30)MHz

Limit CISPR22B (AV) AC POWER

## PLOT 1 Conducted Emissions - PC power - Live

Company:	TJB System Ltd	Product:	TL1000
Date:	07 Apr 10	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (B) QP
Notes:			
Measured on PC power supply.			
Equip:R1,L1,,AB002			
Line:	Live	Attenuator:	10dB PAD
Detector:	QuasiPeak	Operating Mode:	1
LISN:	EMCO	Mod. State:	0
		Filename:	C040740E.plt

## Frequency List ( MHz )

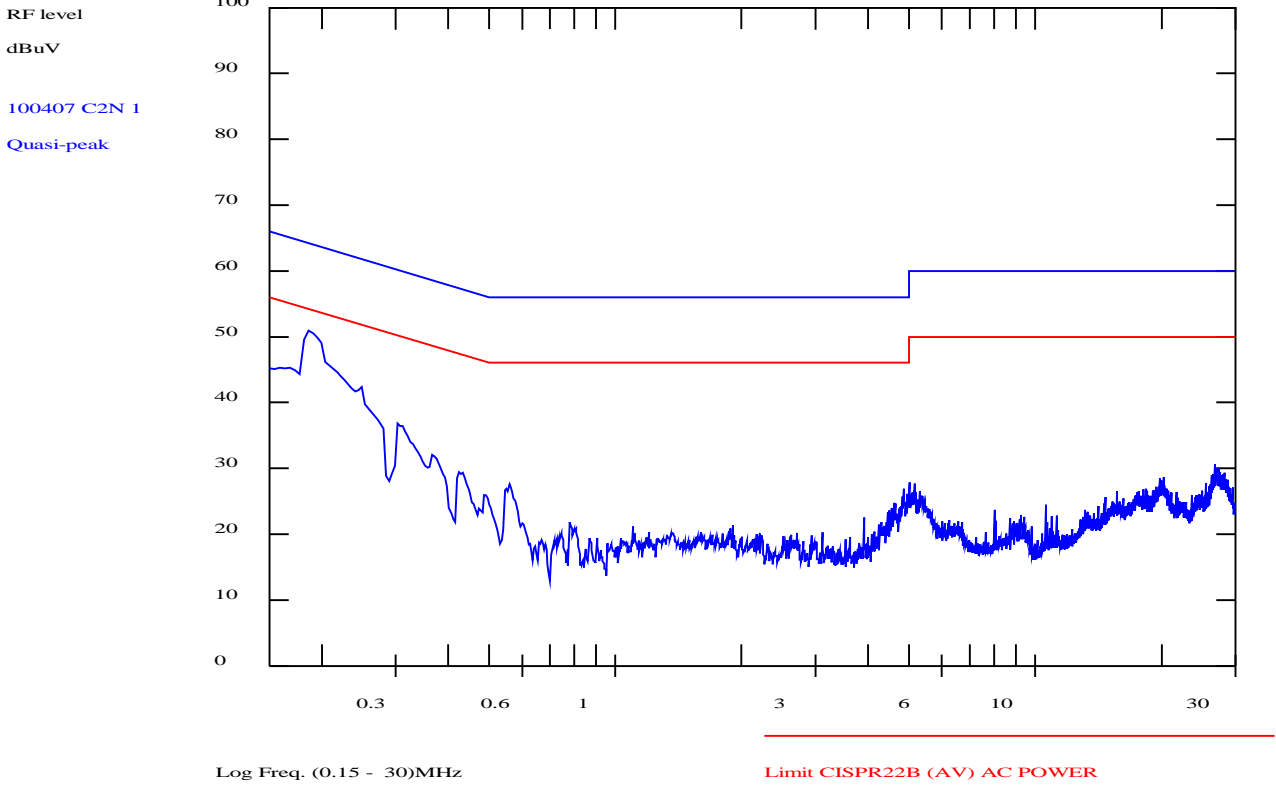

	Report No: <b>R2753</b>	FCC ID: X92TL1000	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	Test Report	Page: 17 of 19

Chase EMS 6.21

Notes

Analyse 100407 C2N 115V


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

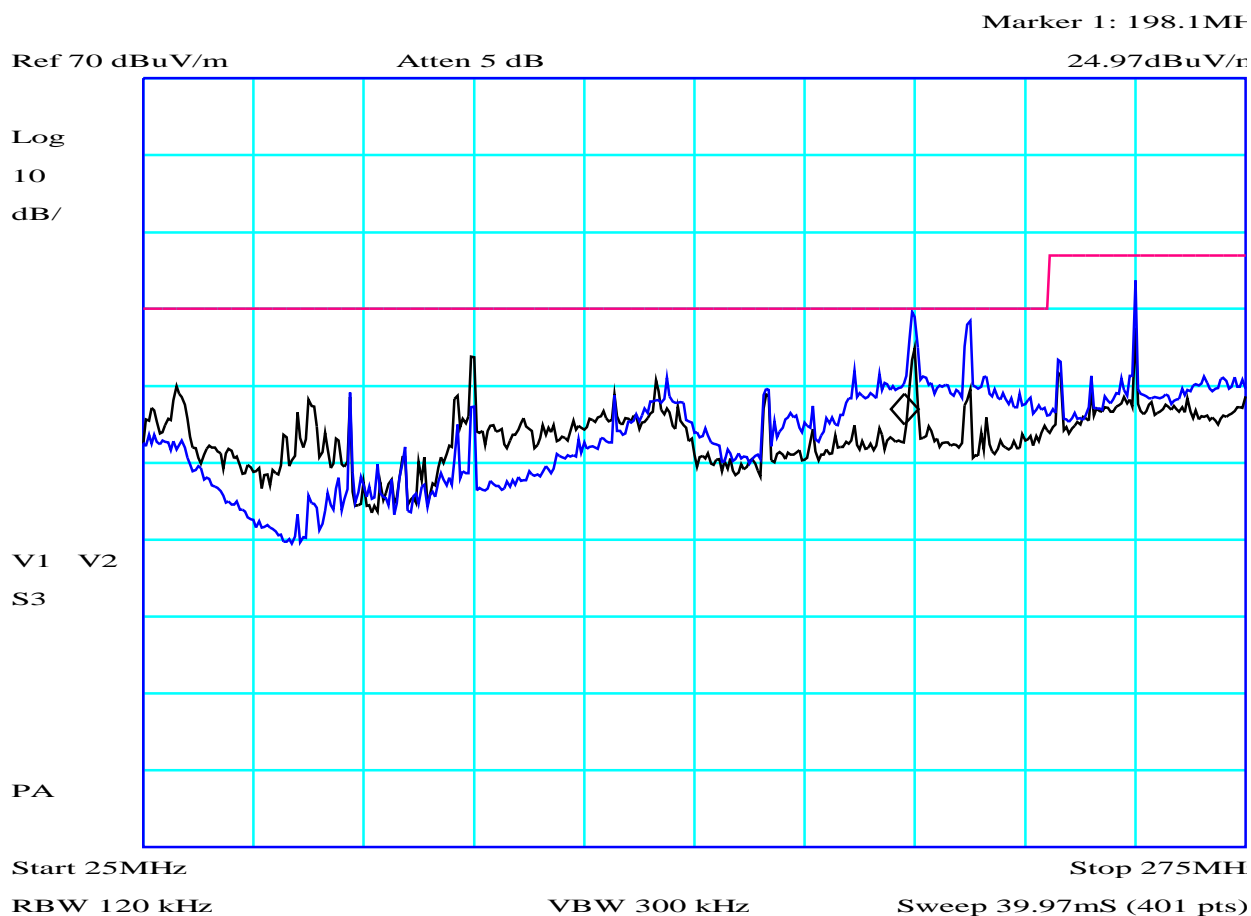


PLOT 2 Conducted Emissions - PC power - Neutral

Company:	TJB System Ltd	Product:	TL1000
Date:	07 Apr 10	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (B) QP
Notes:			
Measured on PC power supply.			
Equip:R1,L1,,AB002			
Line:	Neutral	Attenuator:	10dB PAD
Detector:	QuasiPeak	Operating Mode:	1
LISN:	EMCO	Mod. State:	0
Filename:	C0407420.plt		

Frequency List ( MHz )


	Report No: <b>R2753</b>	<b>FCC ID: X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: 18 of 19




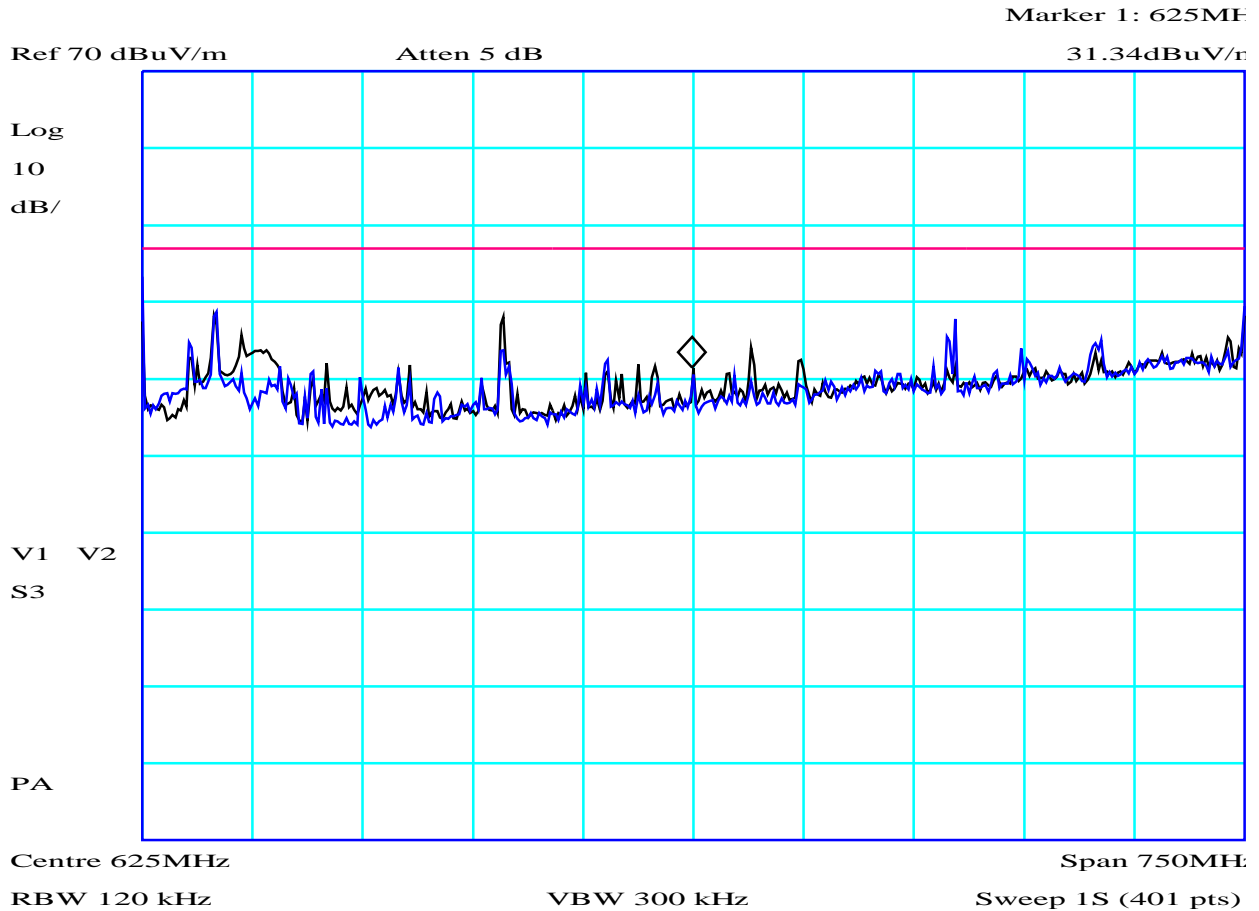
CF1:A5\_FS\_100208 CF2:CBL002\_CBL003\_090306

### PLOT 3 Radiated Emissions - Connected to PC - 25MHz to 275MHz

Company:	TJB Systems Ltd	Product:	TL1000
Date:	06/04/2010	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	CISPR22_B@3m	Limit2:	
Limit3:		Limit4:	
Black: Vertical Blue: Horizontal			
Facility:	Anech_1	Height	1m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H03065C1
		Mode:	1
		Modification State:	0

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	Report No: <b>R2753</b>	FCC ID: <b>X92TL1000</b>	
	Issue No: <b>1</b>		
	Test No: <b>T3150</b>	<b>Test Report</b>	Page: <b>19 of 19</b>



CF1:A5\_FS\_100208 CF2:CBL002\_CBL003\_090306

#### PLOT 4 Radiated Emissions - Connected to PC - 25MHz to 275MHz

Company:	TJB Systems Ltd	Product:	TL1000
Date:	06/04/2010	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	CISPR22_B@3m	Limit2:	
Limit3:		Limit4:	
<p>Black: Vertical Blue: Horizontal</p>			
Facility:	Anech_1	Height	1m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H03065D7
Mode:	1	Modification State:	0