

	Report No: R2810 Issue No: 2	FCC ID : YISACTIVE10	
Test No: T3612		Test Report	Page: 1 of 18



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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

**Satmap Systems Ltd**

**Active 10**

**dated**

**9th August 2010**

### Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	09/08/10		Initial release		
2	26/10/10	8	Cal interval added	DS	DB

Based on report template:  
v090319

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dB Technology (Cambridge) Ltd.*

	Report No: <b>R2810</b> Issue No: <b>2</b>	<b>FCC ID : YISACTIVE10</b>	
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Equipment Under Test (EUT):

Active 10

Test Commissioned by:

Satmap Systems Ltd  
Fountains House  
Cleeve Road  
Leatherhead  
Surrey  
KT22 7LX

Representative:

Mike Beadman

Test Started:

15th June 2010

Test Completed:

2nd July 2010

Test Engineer:

Stephen Browning

Date of Report:

9th August 2010

Written by: Stephen Browning

Checked by: Dave Smith

Signature:



Signature:



Date: 9th August 2010

Date: 9th August 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.**

## Test Standards Applied

<b>CFR 47 : 2009</b> <b>Class B</b>	<i>Code of Federal Regulations: Pt 15 Subpart B- Radio Frequency Devices - Unintentional Radiators</i>
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## Emissions Test Results Summary

<b>CFR 47 : 2009</b>					<b>PASS</b>
<b>Test</b>	<b>Port</b>	<b>Method</b>	<b>Limit</b>	<b>PASS/FAIL</b>	<b>Notes</b>
Conducted Emissions	ac power	ANSI C63.4:2003	FCC_B	PASS	
Radiated Emissions		ANSI C63.4:2003	FCC_B	PASS	

specs\_fccv100412

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## 1 EUT Details

### 1.1 General

The EUT was a SatMap active10 navigation device. It is a portable GPS device which is powered from an internal battery pack. It can be plugged into a PC via USB for both charging the internal battery and transferring route information. The EUT had a plastic enclosure. It included microprocessor circuitry with a maximum frequency of 266MHz.

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	Satmap Systems Ltd	active10	EUT	0702043	
2	Dell	Precision M65	Laptop PC	714-0699	#1
3	Dell	DA90PS2-00	19.5V In-line PSU	843-0X09	#2
4	D-Link	DES-1005D	Ethernet Switch	B21B44B001162	#1
5	DVE	DV-751AUK	7.5V 1A Plug-top PSU	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	Production unit as supplied on 25th June 2010. No modifications were made during the course of testing.	

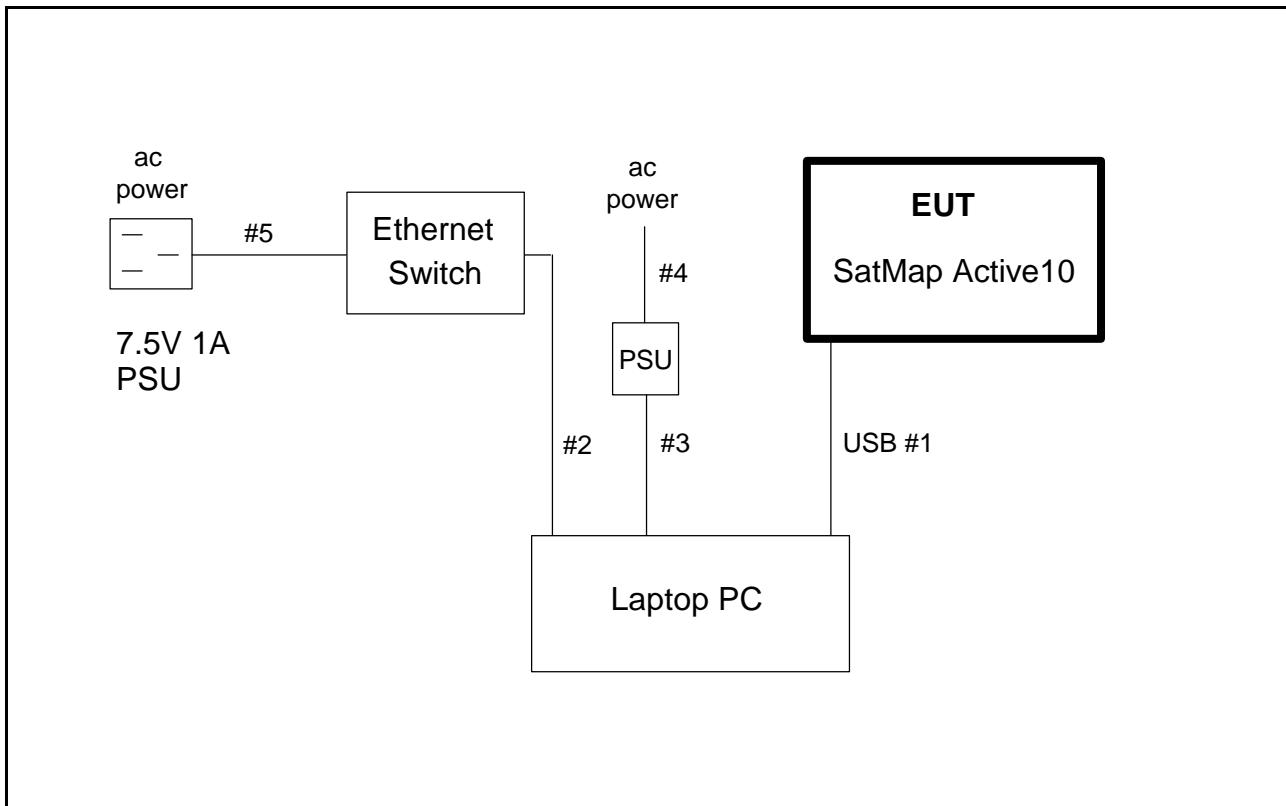
### 1.3 EUT Operating Modes

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 charging via USB to a laptop computer. Computer ethernet port connected to switch. Satsync application running which obtains EUT status data via the USB.

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**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.

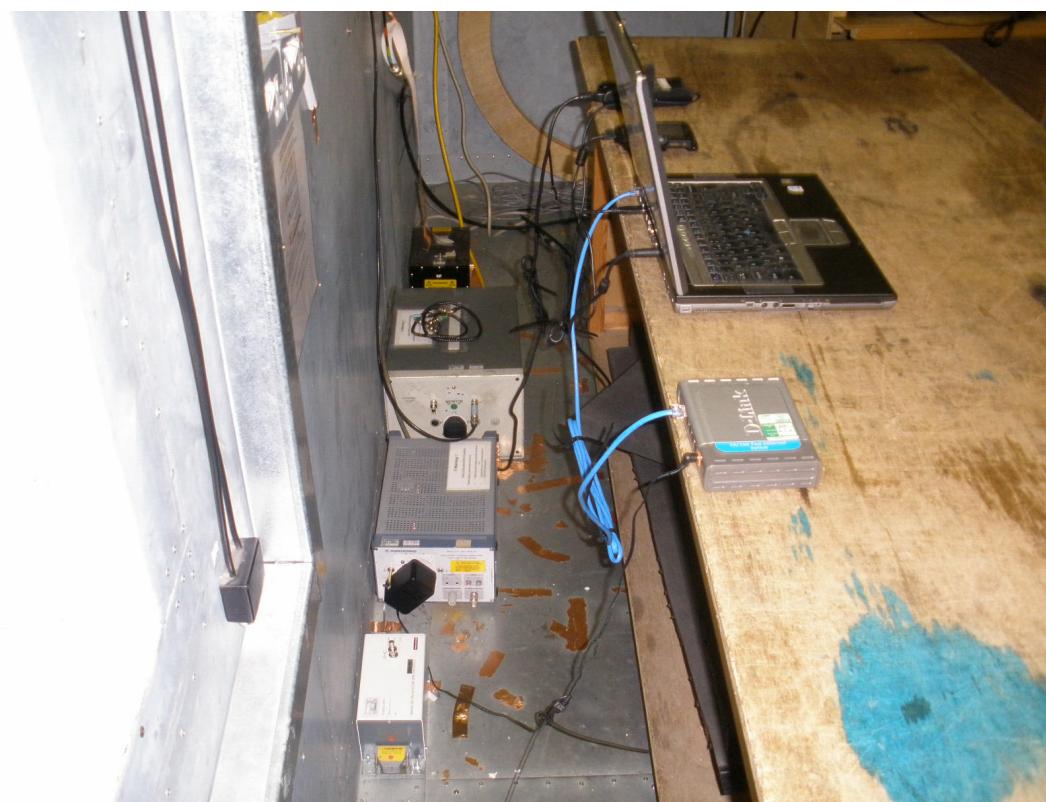
From	To	Cable Type	Length	Notes
Laptop	EUT	USB with integral Ferrite	1m	#1
Laptop	Ethernet Switch	Cat5 UTP	2m	#2
Laptop	PSU	3 core Dell Custom	2m	#3
PSU	ac supply	3 core	1m	#4
Ethernet Switch	Plug-top PSU	2 core	2m	#5

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



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



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**Photograph 3 Radiated Emissions - Connected to PC - Front**



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



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## 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	Cal Date
A19	EMCO 3115 DR Guide (1-18GHz)	2431	08/10/2008
A23	EMCO 3115 DR Guide (1-18GHz)	9507-4525	06/11/2008
A24	Chase X-wing BiLog CBL6144 26MHz-3GHz	27590	26/01/2009
A5	Chase BiLog CBL6111A	1760	21/01/2010
L1	EMCO 3825/2 LISN	1358	05/11/2009
L2	R&S ESH3-Z5 LISN	843862/009	05/11/2009
PRE7	LUCIX 0.1GHz to 20GHz	24485	06/05/2010
R1	CHASE LHR 7000	1056	02/01/2010
R7	R&S ESVD	841729/003	20/11/2009
R8	Agilent E7405A Spectrum Analyser	MY44212494	15/09/2009

Calibration interval for all items is 12 months - except for items A19, A23 and A24 which have a 24 month interval.

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### 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:

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

Example:

$$@2.98\text{MHz} \quad \text{Final Level} = 17.1 + 10.1 = 27.2 \text{ dBuV}$$

#### 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:

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

Example:

$$@30.621\text{MHz} \quad \text{Final Level} = 9.8 + 18.5 = 28.3 \text{ dBuV/m}$$

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## 4 Test Results

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

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## 4.1 Conducted Emissions (Power) - Results

Factor Set 1:	L1_10A	I2_CBL005_CBL039	-	-
Factor Set 2:	-	-	-	-
Factor Set 3:	-	-	-	-
Test Equipment:	R1 L1 L2			

### Conducted Emissions (Power)

<i>Company:</i>		<b>Satmap Systems Ltd</b>		<i>Product:</i>		<b>Active 10</b>							
<i>Date:</i>		<b>02/07/10</b>		<i>Test Eng:</i>		<b>Stephen Browning</b>							
<i>Ports:</i>		ac power											
<i>Test:</i>		ANSI C63.4:2003		using limits of		FCC B		=CISPR22(B)					
<i>Ports:</i>													
<i>Test:</i>				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 FCC(B) dBuV	Margin FCC(B) dB	Notes	
1	1	0	L	1	2.980	qp	17.1	10.1	27.2	56.0	28.8		
1	1	0	L	1	2.980	av	9.0	10.1	19.1	46.0	26.9		
1	1	0	L	1	3.136	qp	18.0	10.2	28.2	56.0	27.8		
1	1	0	L	1	3.136	av	8.9	10.2	19.1	46.0	26.9		
1	1	0	L	1	23.130	qp	23.3	10.4	33.7	60.0	26.3		
1	1	0	L	1	23.130	av	20.5	10.4	30.9	50.0	19.1		
2	1	0	N	1	2.968	qp	16.0	10.1	26.1	56.0	29.9		
2	1	0	N	1	2.968	av	6.9	10.1	17.0	46.0	29.0		
2	1	0	N	1	3.171	qp	16.7	10.2	26.9	56.0	29.1		
2	1	0	N	1	3.171	av	9.0	10.2	19.2	46.0	26.8		
2	1	0	N	1	23.130	qp	23.2	10.4	33.6	60.0	26.4		
2	1	0	N	1	23.130	av	20.5	10.4	30.9	50.0	19.1		
<b>Results</b>					<b>Minimum Margin PASS/FAIL</b>			<b>19.1</b>	<b>dB</b>				
<b>Notes</b>		<b>Comments and Observations</b>											
		Results of scans shown in plots 1 and 2.  Measurement made on Laptop PSU ac power port @115V											

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## 4.2 Radiated Emissions Results - 30MHz to 275MHz

Factor Set 1:	A5_FS_10B	-	-	RG214_25m_09B	1 m cable
Factor Set 2:	A23_3m_09B	-	-	RG214_25m_09B	1 m cable
Factor Set 3:	-	-	-	-	-
Test Equipment:	R7 A5 A23				

### Radiated Emissions

<i>Company:</i>		<i>Product:</i> <b>Active 10</b>																			
<i>Date:</i> <b>25/06/10</b>		<i>Test Eng:</i> Stephen Browning																			
<i>Ports:</i>																					
<i>Test:</i> ANSI C63.4:2003 using limits of <b>FCC B</b>																					
<i>Ports:</i>																					
<i>Test:</i> 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 FCC_B dBuV/m	Margin FCC_B dB	Notes								
1	1	0	3	1	30.621	V	9.8	18.5		28.3	40.0	11.7									
1	1	0	3	1	30.621	H	5.7	18.5		24.2	40.0	15.8									
1	1	0	3	1	79.986	V	20.6	8.5		29.1	40.0	10.9									
1	1	0	3	1	79.986	H	8.6	8.5		17.1	40.0	22.9									
1	1	0	3	1	160.364	V	15.9	12.2		28.1	43.5	15.4									
1	1	0	3	1	160.364	H	13.2	12.2		25.4	43.5	18.1									
1	1	0	3	1	166.272	V	15.6	11.7		27.3	43.5	16.2									
1	1	0	3	1	166.272	H	12.9	11.7		24.6	43.5	18.9									
1	1	0	3	1	250.006	V	16.7	15.0		31.7	46.0	14.3									
1	1	0	3	1	250.006	H	22.7	15.0		37.7	46.0	8.3									
1	1	0	3	1	266.012	V	24.1	16.1		40.2	46.0	5.8									
1	1	0	3	1	266.012	H	23.0	16.1		39.1	46.0	6.9									
<b>Results</b>																					
<b>Minimum Margin</b> <b>PASS/FAIL</b>																					
<b>Notes</b>		<b>Comments and Observations</b>																			
		Results of scan shown in plot 3.																			

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### 4.3 Radiated Emissions Results - 275MHz to 2GHz

Factor Set 1:	A5_FS_10B	-	-	RG214_25m_09B	1 m cable
Factor Set 2:	A23_3m_09B	-	-	RG214_25m_09B	1 m cable
Factor Set 3:	-	-	-	-	-
Test Equipment:	R7 A5 A23				

#### Radiated Emissions

<b>Company:</b> Satmap Systems Ltd							<b>Product:</b> Active 10									
<b>Date:</b> 25/06/10							<b>Test Eng:</b> Stephen Browning									
<b>Ports:</b>																
<b>Test:</b> ANSI C63.4:2003 using limits of FCC B																
<b>Ports:</b>																
<b>Test:</b> 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 FCC_B dBuV/m	Margin FCC_B dB	Notes			
2	1	0	3	1	500.003	V	12.6	22.2		34.8	46.0	11.2				
2	1	0	3	1	500.003	H	12.1	22.2		34.3	46.0	11.7				
2	1	0	3	1	531.991	V	19.5	23.1		42.6	46.0	3.4				
2	1	0	3	1	531.991	H	22.0	23.1		45.1	46.0	0.9				
2	1	0	3	1	797.942	V	11.3	28.1		39.4	46.0	6.6				
2	1	0	3	1	797.942	H	11.5	28.1		39.6	46.0	6.4				
2	1	0	3	1	931.698	V	5.0	31.1		36.1	46.0	9.9				
2	1	0	3	1	931.698	H	2.9	31.1		34.0	46.0	12.0				
3	1	0	3	2	1662.500	V	14.0	35.2		49.2	54.0	4.8	pk			
3	1	0	3	2	1662.500	H	15.0	35.2		50.2	54.0	3.8	pk			
3	1	0	3	2	1662.500	V	1.2	35.2		36.4	54.0	17.6	av			
3	1	0	3	2	1662.500	H	1.2	35.2		36.4	54.0	17.6	av			
<b>Results</b>							<b>Minimum Margin</b> <b>PASS/FAIL</b>				<b>0.9 dB</b> <b>PASS</b>					
<b>Notes</b>		Comments and Observations														
		Results of scans shown in plots 4 and 5.														

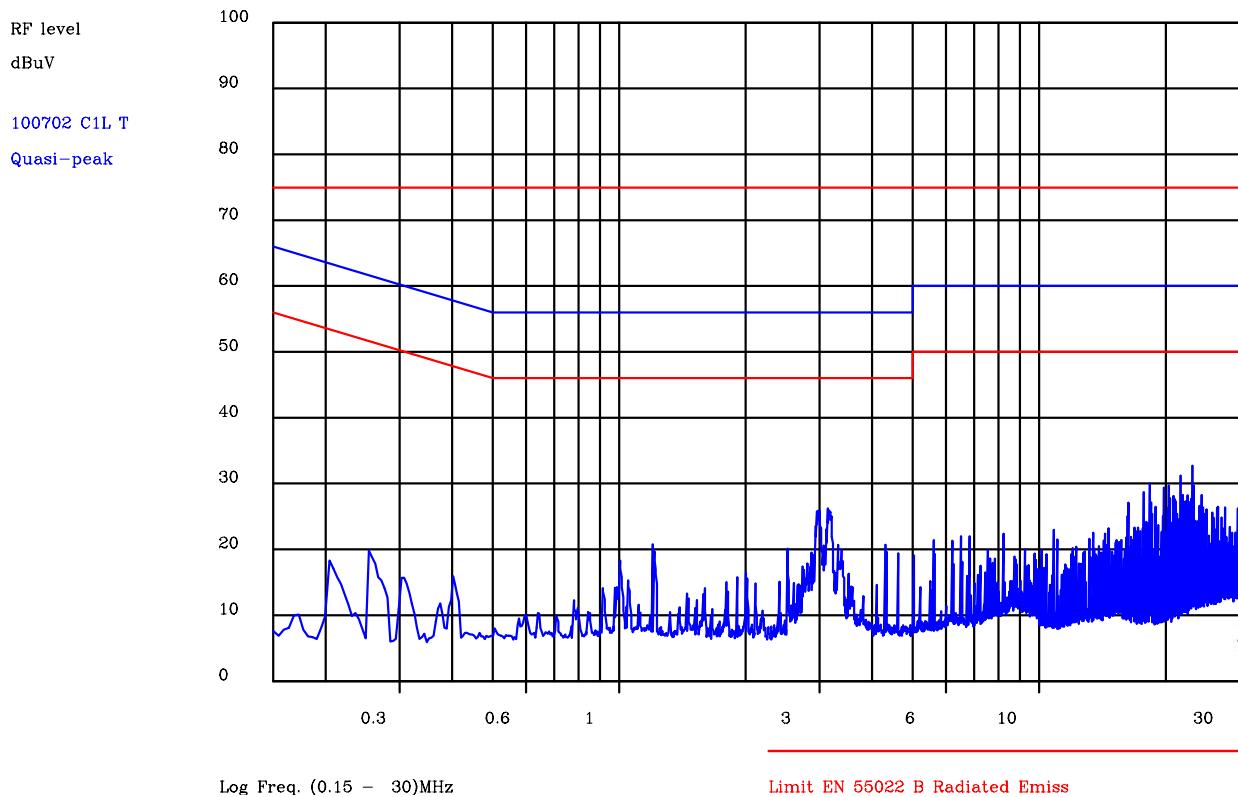
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Chase EMS 6.21

Notes

Analyse 100702 C1L T3612 CDP SatMap Active10 pc 115V

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



### PLOT 1 Conducted Emissions - PC power - Live

Company:	Satmap Systems Ltd.	Product:	Active10
Date:	02 Jul 10	Test Engineer:	Stephen Browning
Test:	FCC pt 15	Limit:	FCC (B) QP
Notes:			
Measured on PC power supply at 115V.			
Equip:R1,L1, L2, AB002			
Line:	Live	Attenuator:	10dB PAD
Detector:	QuasiPeak		Operating Mode: 1
LISN:	EMCO	Filename:	Mod. State: 0
			C07024F4.plt

### Frequency List ( MHz )

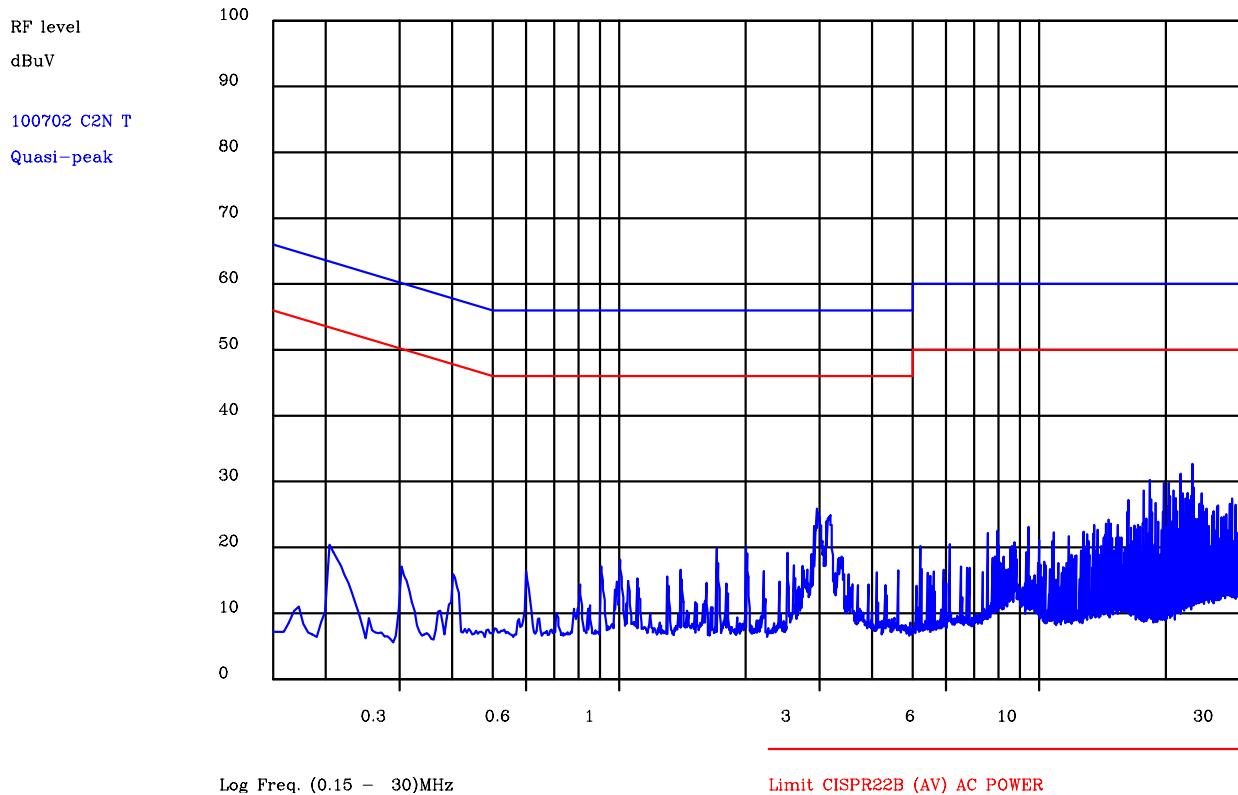

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Chase EMS 6.21

Notes

Analyse 100702 C2N T3612 CDP SatMap Active10 pc 115V

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

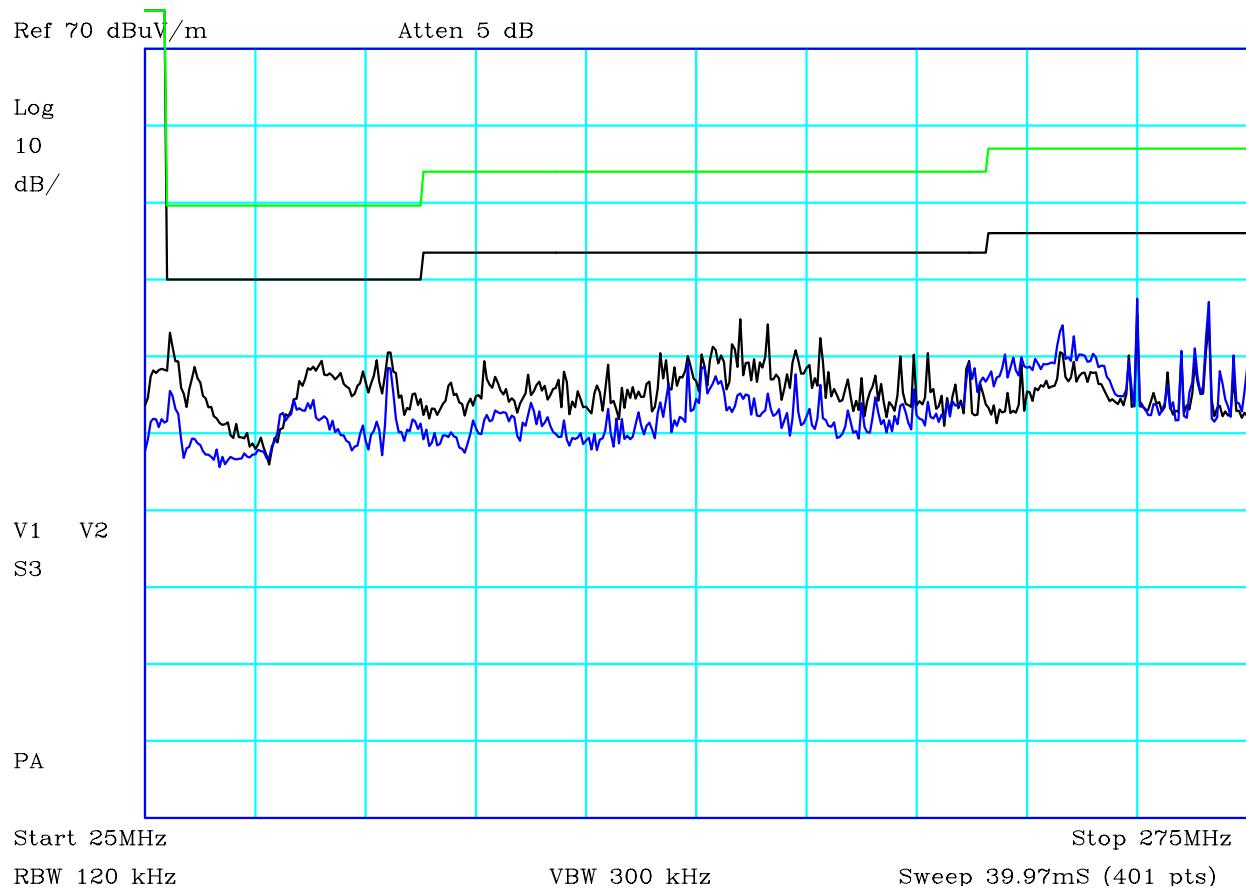


## PLOT 2 Conducted Emissions - PC power - Neutral

Company:	Satmap Systems Ltd.	Product:	Active10
Date:	02 Jul 10	Test Engineer:	Stephen Browning
Test:	FCC pt 15	Limit:	FCC (B) QP
Notes:			
Measured on PC power supply at 115V.			
Equip:R1,L1, L2, AB002			
Line:	Neutral	Attenuator:	10dB PAD
Detector:	QuasiPeak		Operating Mode: 1
LISN:	EMCO	Filename:	Mod. State: 0
C0702504.plt			

### Frequency List ( MHz )

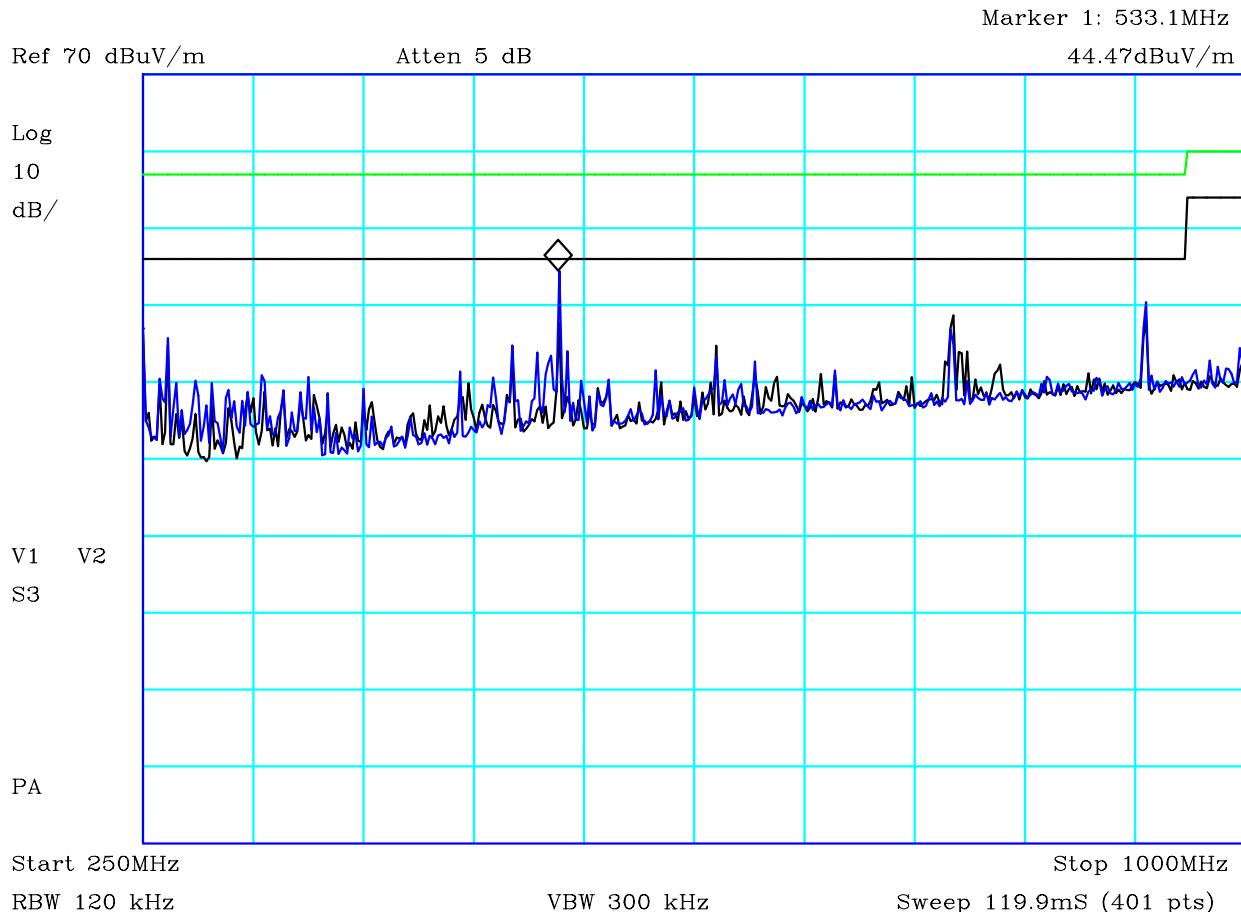

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### PLOT 3 Radiated Emissions - Connected to PC - 25MHz to 275MHz

Company:	Satmap Systems Ltd.	Product:	Active10
Date:	25/06/2010	Test Eng:	Stephen Browning
Method:		Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(GRN)	FCC(A)@3m
Limit3:		Limit4:	
Vertical : Black Trace, Horizontal : Blue Trace. R9.2 EUT connected via USB to Dell Precision laptop. Satmap Admin Application running on Laptop. D-Link switch present.			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H0525742

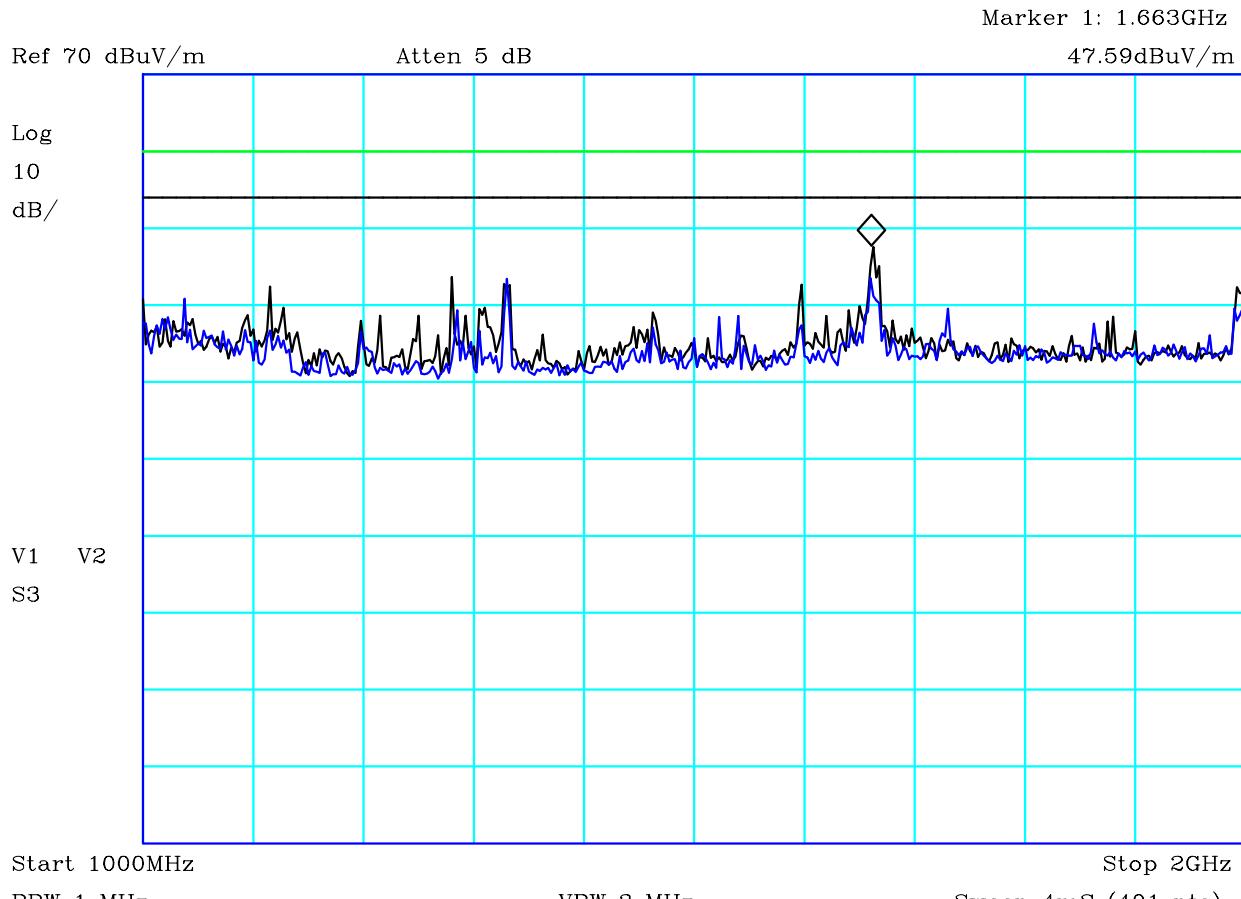
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#### PLOT 4 Radiated Emissions - Connected to PC - 250MHz to 1GHz

Company:	Satmap Systems Ltd.	Product:	Active10
Date:	25/06/2010	Test Eng:	Stephen Browning
Method:		Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(GRN)	FCC(A)@3m
Limit3:		Limit4:	
Vertical : Black Trace, Horizontal : Blue Trace. R9.2 EUT connected via USB to Dell Precision laptop. Satmap Admin Application running on Laptop. D-Link switch present.			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H0525758

	Report No: <b>R2810</b> Issue No: <b>2</b>	<b>FCC ID : YISACTIVE10</b>		
Test No: <b>T3612</b>	<b>Test Report</b>		Page: <b>18 of 18</b>	



### PLOT 5 Radiated Emissions - Connected to PC - 1GHz to 2GHz

Company:	Satmap Systems Ltd.	Product:	Active10
Date:	25/06/2010	Test Eng:	Stephen Browning
Method:		Method:	
Limit1:(BLK)	FCC(B)@3m	Limit2:(GRN)	FCC(A)@3m
Limit3:		Limit4:	
Vertical : Black Trace, Horizontal : Blue Trace. R9.2 EUT connected via USB to Dell Precision laptop. Satmap Admin Application running on Laptop. D-Link switch present.			
Facility:	Anech_2	Height	1m
Distance	3m	Polarisation	V+H
Angle	0-360	File:	H05257FD