TEST REPORT ON
Park Air

VHF AM Receiver

FCC Procedures
Part 15

TEST REPORT NUMBER
CTMS 2000/1221
January 2000

Prepared for:

Park Air Electronics Ltd.
Bleheim Way,
Northfields,
Market Deeping,
Peterborough,
Lincolnshire
PE6 8UE

This results in this report refer to the tested unit only

Certificate of Application

Cambridge Test and Measurement Services Ltd., certifies that the product tested was fully compliant with the requirements of Parts 15 of the FCC Code of Regulations 47CFR, the results of which are contained in this test report No: CTMS 2000/1221B

I certify that the application was prepared under my supervision and that to the best of my knowledge and belief, the facts set forth in this application and technical data, are true and correct.

Signature :

Date : 9/2/2000

Name : David Fisher

Title : Radio Technical Manager

I certify that to the best of my knowledge and belief, the facts set forth in this application and accompanying technical data, are true and correct.

Signature :

Date : 9/2/2000

Name : Alan Parrish

Title : Director.

General Test Information

Date Test Sample Received	:	18th January 2000
Date Testing Started	:	19th January 2000
Date Testing Finished	:	20th January 2000
Equipment Serial Number	:	2003
CTMS Project Number	:	2000/1221
Test Engineer	:	M. Billis

Report Copy No

Contents list and Information

2.1033 **Application for Certification**

For use in accordance with FCC Rules and Regulations 47 CFR parts 2 and parts 15.

2.1033 (b) (1)	Name of applicant	:	Park Air Electronics Ltd.
	Address of applicant	:	Bleheim Way, Northfields, Market Deeping,
Contact :	Mr. A. Horsfield		Peterborough, Lincolnshire PE6 8UE
2.1033 (b) (2)	FCC Identifier	:	C8L B6100
	Model Type Number	:	T6R/B6100
2.1033 (b) (3)	Installation and operating instructions	:	User Guide, see exhibit D
2.1033 (b) (4)	Brief description of circuit function & antenna	:	see exhibit D & E
2.1033 (b) (5)	Block diagram of frequency of oscillators	:	see exhibit D & E
2.1033 (b) (6)	Report of measurements		
15	Subpart A General		
15.31	Measurement standards (OATS)	:	Page 5
15.33	Frequency range of radiated measurements:		Page 6
15.35	Measurement detector and bandwidths	:	Page 6
15	Subpart B Unintentional Radiators		
15.107	Conducted Limits	:	Pages 7 & 8
15.109	Radiated emission limits	:	Page 9
15.111	Antenna power conducted limits (receivers)	:	Page 10
2.1033 (7)	Photograph of identification plate / label	:	Pages 11 - 17

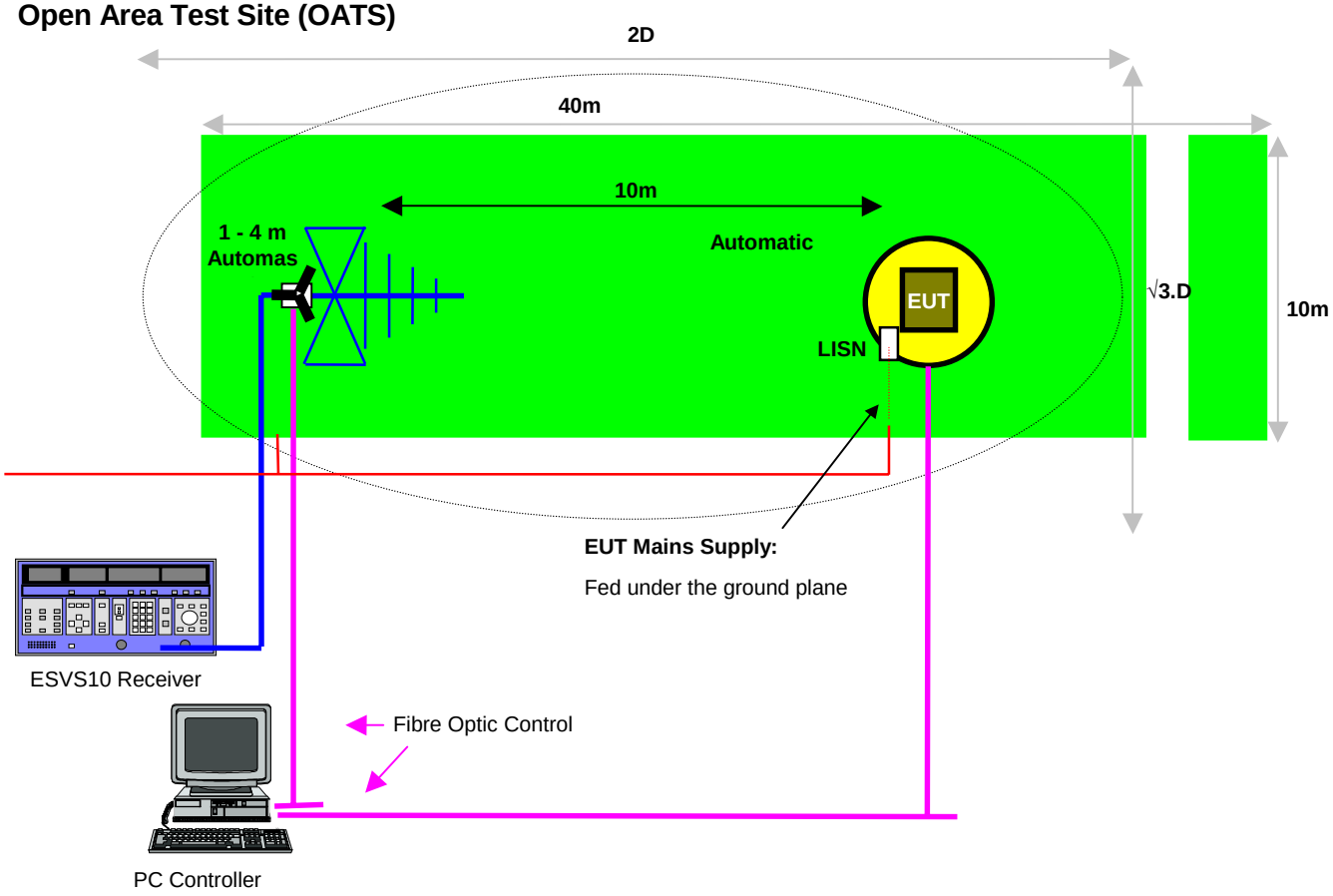
General Information and Attachments :

Company Accreditations & Credentials	:	Page 18

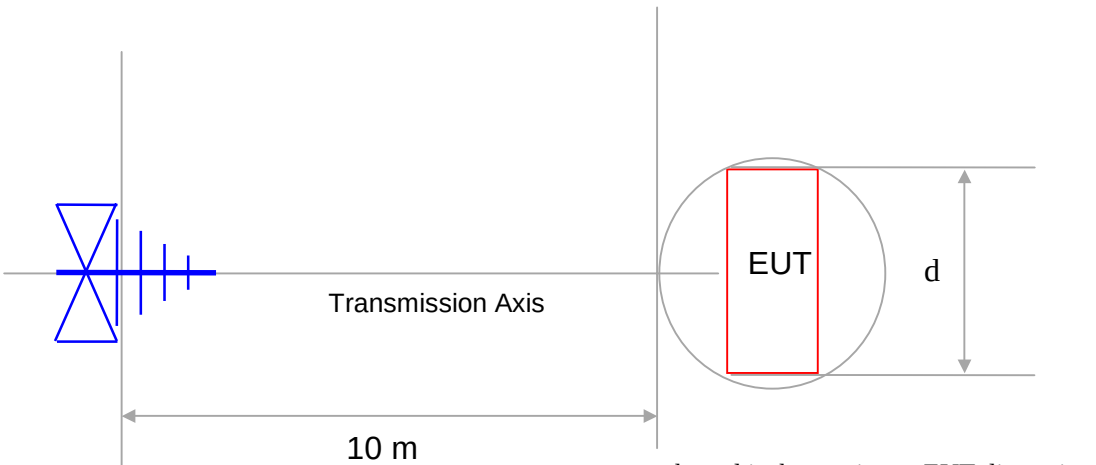
15.31 Measurement standards

The measurement facilities at Cambridge Test and Measurement Services LTD, are in accordance with ANCI C63.4 and lodged with the FCC under rule 2.948, a letter from the FCC recognising compliance with the requirements was dated March 02,1999 with the registration number 93385.

Open Area Test Site (OATS)



Equipment Test Set Up



Antenna to EUT Distance

where d is the maximum EUT dimension

Frequency spectrum to be investigated - 47 CFR 15.33

The level of frequency search was from the lowest radio frequency generated to the 10th Harmonic of the fundamental frequency, the highest carrier frequency.

Measurement detector and bandwidths 47 CFR 15.35

Measurements below 1000 MHz are taken using a quasi-peak detector which has been calibrated to the requirements of CISPR 16-1.

For frequencies above 1000MHz a minimum resolution bandwidth of 1MHz was employed.

General Test Conditions

Laboratory environment .

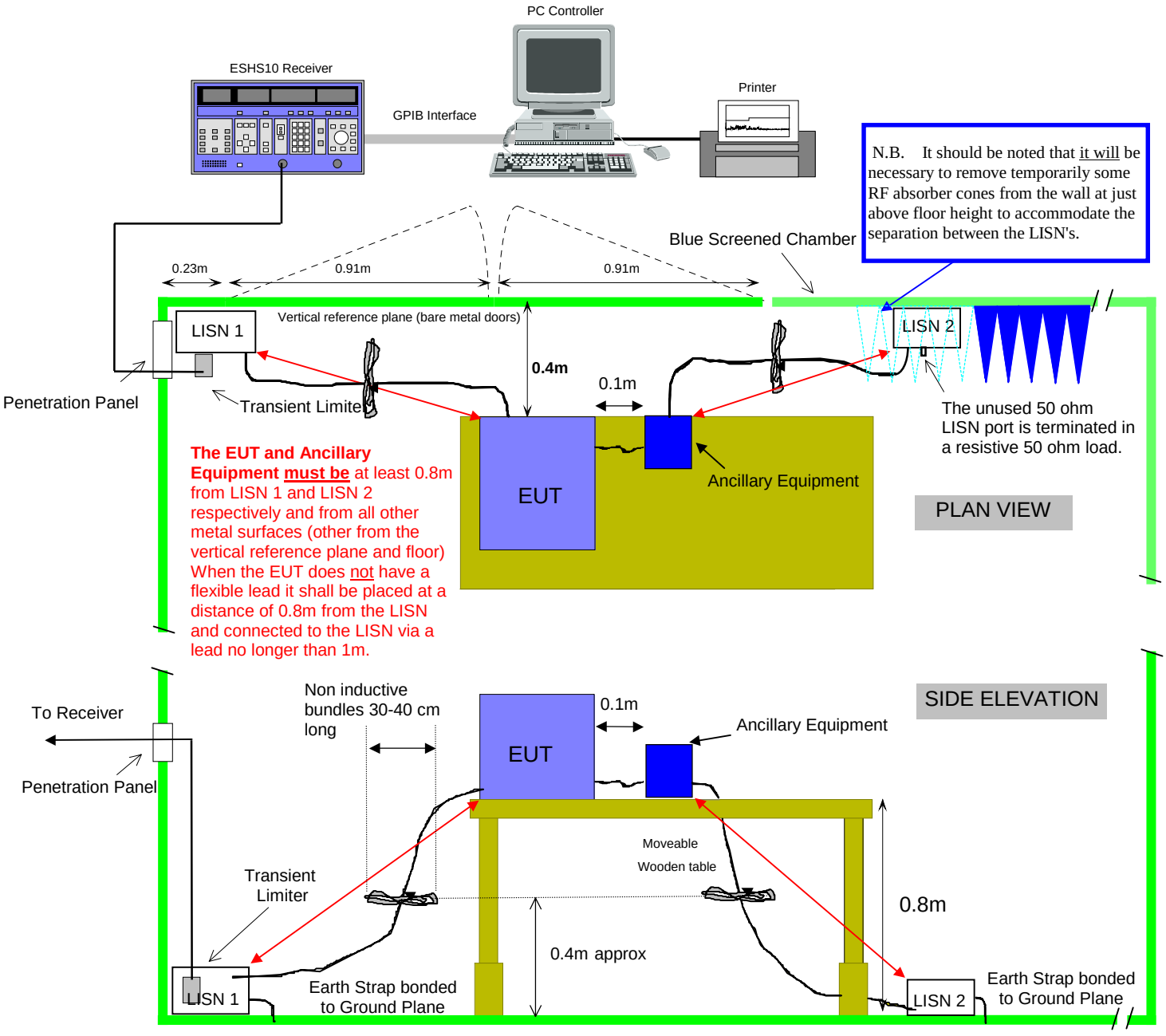
Ambient Temperature : 23 °C

Relative Humidity : 22 %

Open Area test Site : 12 °C

Conducted Limits 47 CFR 15.107

ANSI C63.4-1 1992: This EMC Work Instruction defines the test procedures and test equipment configurations to be used by engineers when measuring Conducted Emissions to ANSI C63.4-1 1992 and CISPR 16:1987. Both LISN's are bonded to the ground plane and positioned relative to the EUT and ancillary equipment as fig 5, below, and as per ANSI C63.4-1992, fig 9(a). It should be noted that all the procedural notes within **(a) EN55022:1994/ CISPR 22:1993** should be followed in addition to the above.



The EUT and Ancillary Equipment must be at least 0.8m from LISN 1 and LISN 2 respectively and from all other metal surfaces (other from the vertical reference plane and floor)
When the EUT does not have a flexible lead it shall be placed at a distance of 0.8m from the LISN and connected to the LISN via a lead no longer than 1m.

Figure 5: Test Configuration for tabletop Equipment - as per ANSI-C63.4-1992, fig 9(a)

Conducted Limits 47 CFR 15.107 - Results

Port	AC Mains
Limit	Class B
Measurement Ports	Live and Neutral
Frequency Range	450KHz - 30 MHz
Temperature	22°C

Frequency (MHz)	Line	Level (µV) Average detector	Limit (µV)	Remarks
0.15	Live	43.15	250.0	Complied
0.262	Live	76	250.0	Complied
0.398	Live	25	250.0	Complied
0.526	Live	31.6	250.0	Complied
0.662	Live	14.7	250.0	Complied
0.262	Neutral	61.5	250.0	Complied
0.39	Neutral	17.8	250.0	Complied
0.526	Neutral	33.5	250.0	Complied
0.654	Neutral	37.0	250.0	Complied

Test instruments used :

Description	Model Number	CTMS Number	Cal Date
LISN	Chase MN2053	TMS EMC 912	15/3/00
Transient limiter	Chase CFL9206	TMS EMC 905	20/10/00
Receiver	Rhode and Schwarz ESHS10	TMS EMC 916	19/7/00
Coaxial cables	Not Applicable	TMS 123	26/10/00
Coaxial cables	Not Applicable	TMS 116	26/10/00
Partially lined screened room	Ray Proof SR2	TMS EMC 817	Not Applicable
PC Controller	486, fitted with a GPIB interface	Not Applicable	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable	Not Applicable
1m Mains Lead	Not Applicable	Not Applicable	Not Applicable

Measurement Uncertainties

Measurement Uncertainty For Conducted Emissions (95% confidence) : +2.12dB / -2.13dB

Radiated emission limits- 47 CFR 15.109

The receiver (the EUT) was placed on a wooden table with cables suitably dressed. The antenna was connected to a dummy, non-radiating, load of normal impedance matching that of the receiver. At a distance of 30 (10m) feet from the EUT the radiated field for each spurious radiation was detected and measured on a calibrated receiver which was fed from a calibrated log-periodic antenna.

The antenna was oriented in horizontal polarisation plane and was raised and lowered so as to ensure the maximum level of the spurious emission was detached.

The EUT was rotated through 360°, the emission levels for each spurious were observed on the receiver and recorded .

The test above was repeated with the receiving antenna in the vertical polarisation plane.

For each of the emissions detected the EUT was switched off to determine the emission was that of the EUT.

Results in accordance with Part 15.109 Emission Limits

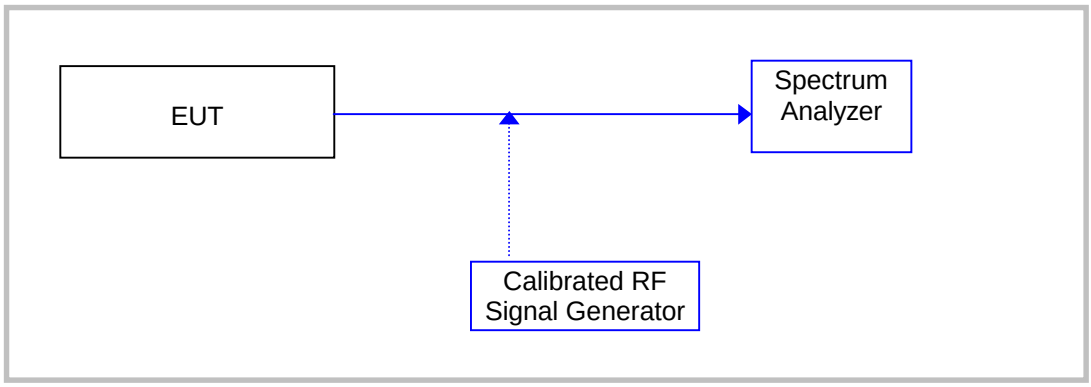
		Level of emissions					
Frequency	**Identity**	**Level detected on receiver dB/uV**	**Antenna 'k' factor (conversion to uV/m)**	**Level in uV/m @ 10m**	**Correction to 3m**	**Spec uV/m at 3 meters**	
						MHz	uV/m
	All greater than 20dB within specification limit					30-88	100
						88-216	150
						216-960	200
						> 960	500

Antenna power conducted limits for receivers - 47 CFR 15.111

The receiver is operated under standard test conditions and the antenna port was connected to a spectrum analyzer. The spurious emissions were observed and recorded.

A calibrated RF signal generator replaced the EUT and the level of the signal generator was adjusted to achieve the same level as that measured on the spectrum analyzer. The level on the signal generator was recorded as being the level of the spurious emission measured by the substitution method. This method was used to as to ensure any unknown characteristics of the connecting cable were taken into account.

(Calibrated items are indicated in Blue)



Test instruments used :

RF Signal Generator :
Spectrum Analyzer : Anritsu Type MS 2602A

Note: Emissions 20dB below limit are not required to be listed

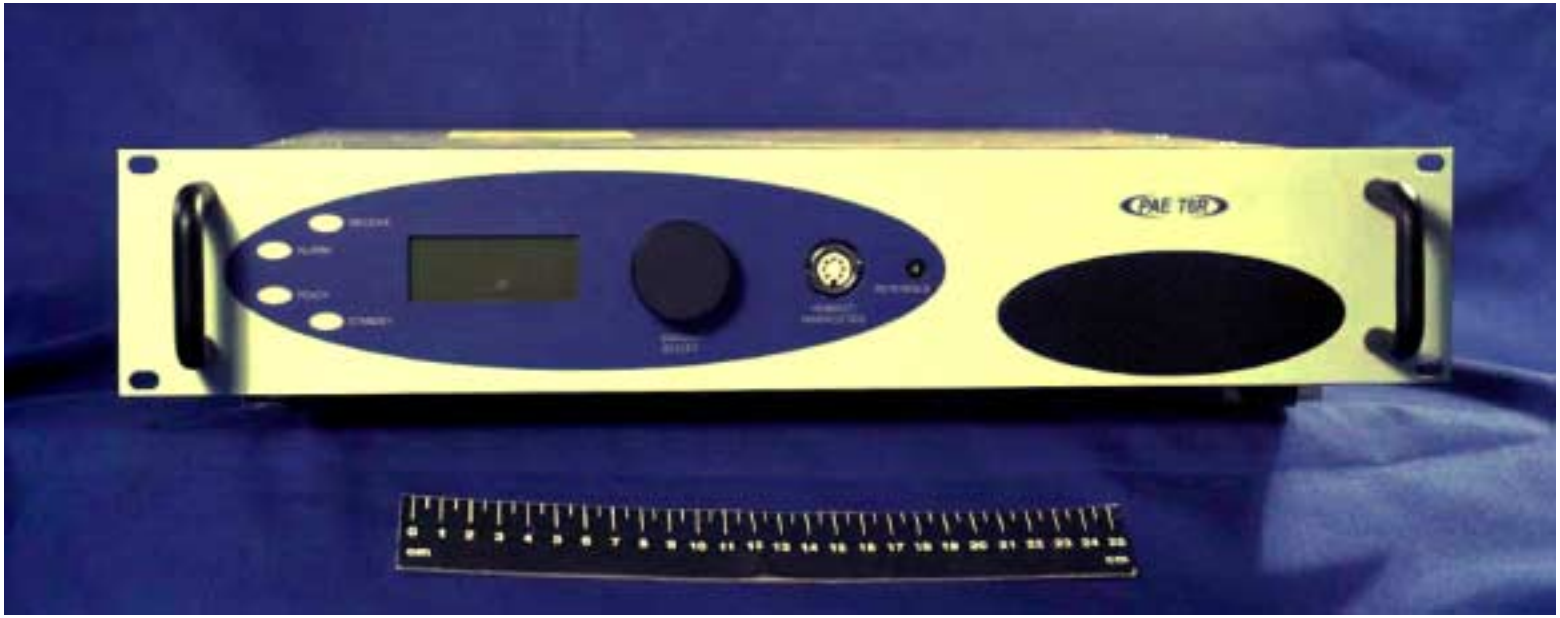
Carrier Frequency : 127.5 MHz
Local Oscillator Frequency: 148.9 MHz

Results in accordance with Part 15.111

Frequency (MHz)	Identity	Level dBm	Specification Level 2 nanowatts (- 57dBm) limit	Remarks
148.9	LO	-73.3	- 57dBm	All greater than 20dB within Specification Limit.
744.5	5 x LO	-78.7	- 57dBm	
1340.1	9 x LO	-88.25	- 57dBm	

SECTION 3

PHOTOGRAPHS OF EQUIPMENT

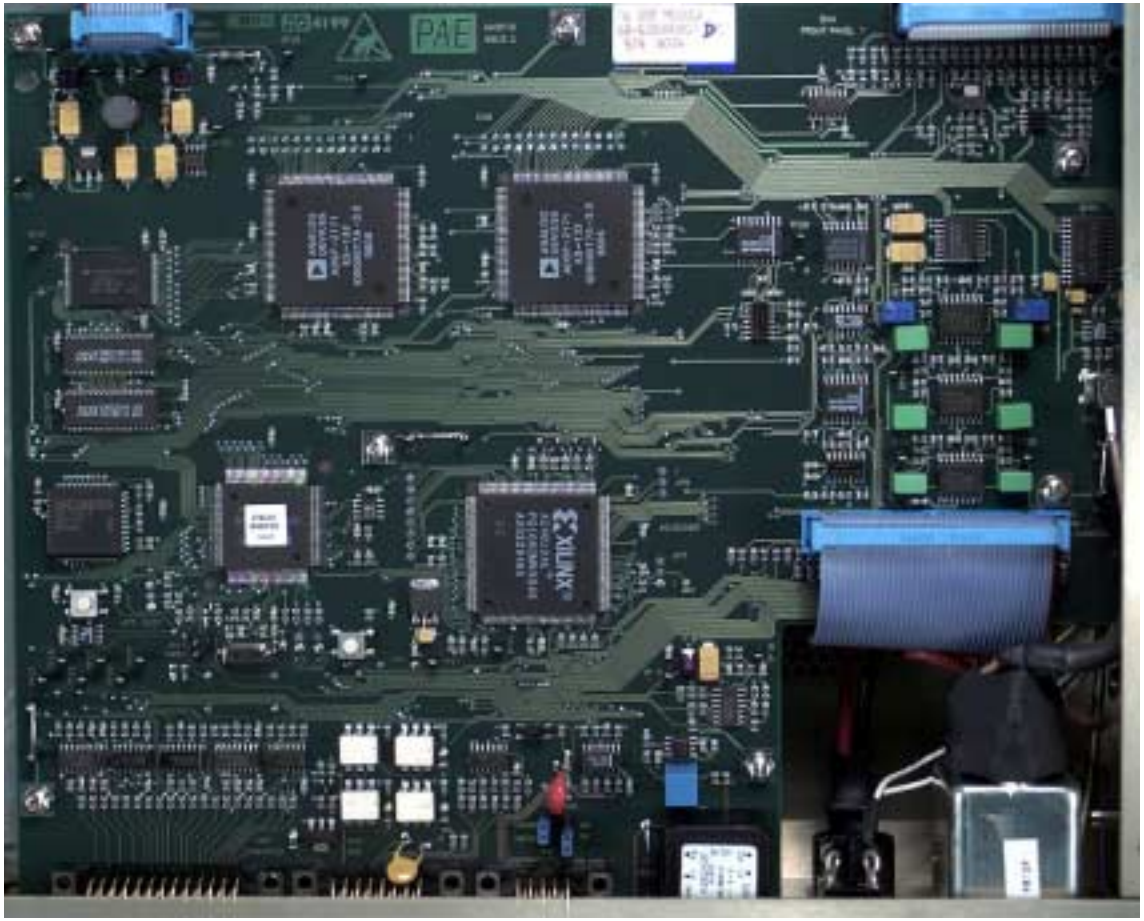


T6R/B6100 Receiver Front View

T6R/B6100 Receiver Back View

T6R/B6100 Receiver
RF PCB View

T6R/B6100 Receiver
DSP PCB View



T6R/B6100 Receiver
Power Supply
PCB View

AC Input

Labels

Model Number

CTMS LTD, Company Accreditations & Credentials

Appendix