EXTRACTS FROM

EMC TEST REPORT

PARK AIR ELECTRONICS LTD.

BT6MBS TRANSCEIVER

To: PAE Test Plan 001

SEPTEMBER 2000

PROJECT FILE NUMBER: 00/1519a

Covering Radiated and Conducted Emissions

PREPARED FOR:

Park Air Electronics Ltd.
Northfields
Market Deeping
Peterborough
PE6 8UE

2. Test House Details

All of the tests described in the following report were performed at Cambridge Test and Measurement Services Limited (CTMS). The address is as follows:

Cambridge Test and Measurement Services Limited
PO Box 465
St. Andrews Road
Cambridge
CB4 1ZJ
England

Tel: (+44) (0)1223 876876
Fax: (+44) (0)1223 876851

2.1 UKAS Accreditation

Cambridge Test and Measurement Services is a UKAS Accredited test house, UKAS Testing No. 1831 and is Accredited to undertake Category 0, UKAS testing. All tests in this report are compliant with the UKAS Accreditation Standard.

3. Customer Details

This report was prepared for:

Mr Allan Horsfield
Park Air Electronics Ltd.
Northfields
Market Deeping
Peterborough
PE6 8UE

8. Summary Of Test Results

The following table shows a summary of all the test results. For more detail refer to the respective section.

8.1 Test Result Summary Table

Port	EMC Phenomena	Basic Standard	Compliance Status
Emissions			
Enclosure	Radiated Emission	EN 55022 Class B	Complied (Mode 1 & 2)
AC Mains	Conducted Emissions	EN 55022 Class B	Complied (Mode 1 & 2)
DC Mains	Conducted Emissions	EN 55022 Class B	Complied (Mode 1 & 2)
AC Mains	Harmonics	EN 61000-3-2	Complied (Mode 1)
AC Mains	Flicker	EN 61000-3-3	Complied (Mode 1)
Immunity			
Enclosure	Radio-Frequency Electromagnetic Field. Amplitude Modulated.	EN 61000-4-3	Complied (Mode 1 & 2)
.	Electrostatic Discharge	EN 61000-4-2	Complied (Mode 1 & 2)
Ports for Process, Measurement & Control Lines	Radio-Frequency Common Mode.	EN 61000-4-6	Complied (Mode 1 & 2)
	Fast Transients	EN 61000-4-4	Complied (Mode 1 & 2)
Input and Output AC Power Ports	Radio-Frequency Common Mode	EN 61000-4-6	Complied (Mode 1 & 2)
	Fast Transients	EN 61000-4-4	Complied (Mode 1 & 2)
	Surges, Line to Earth, Line to Line	EN 61000-4-5	Complied (Mode 1 & 2)
	Voltage Dips	EN 61000-4-11	Complied (Mode 1)
	Voltage Interruptions	EN 61000-4-11	Complied (Mode 1)
	Voltage Variation	EN 61000-4-11	Complied (Mode 1)
Input and Output DC Power Ports	Radio-Frequency Common Mode	EN 61000-4-6	Complied (Mode 1 & 2)
	Fast Transients	EN 61000-4-4	Complied (Mode 1 & 2)
	Surges, Line to Earth, Line to Line	EN 61000-4-5	Complied (Mode 1 & 2)
	Voltage Dips	EN 61000-4-11	Complied (Mode 1)
	Voltage Interruptions	EN 61000-4-11	Complied (Mode 1)
	Voltage Variation	EN 61000-4-11	Complied (Mode 1)

Mode 1: Transmitting full power. M = 0.80 at 1kHz. Modulation Mode 5K00A3EJN
Mode 2: Equipment is in receive mode with an on channel signal level producing 20dB SINAD level.

9. Measurements, Examination And Test Results

9.1 Radiated Emissions Transmit Mode

Port	Enclosure
Specification	EN 55022:1994
Limit	Class B
Measurement distance	10m
Temperature	22 ° C
Humidity	51%

Frequency (MHz)	Polarisation	Level (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Result
31.1340	Horizontal	27.5	30.0	2.5	Complied
30.0600	Vertical	26.5	30.0	3.5	Complied

The plots for these tests can be seen in Appendix 1.

9.1.1 Test Equipment Used For Radiated Emissions

Description	Model Number	CTMS Number
Bilog antenna	Chase CBL6141A	TMS 933
Receiver	Rhode & Schwarz ESVS10	TMS 917
Partially lined screened room	Ray Proof SR2	TMS 817
PC Controller	486, fitted with a GPIB interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Coaxial cable	40m	TMS 122
Mast	Chase CAM 6340	Not Applicable
Turntable	CTMS, WT001	Not Applicable
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Thermometer	Radio Spares TH200	TMS 907
Tape Measure, Height Gauges	Not Applicable	Not Applicable

9.1.2 Measurement Uncertainties

Measurement Uncertainty For Radiated Emissions (95% confidence)
+4.17dB / -4.21dB

9.2 Radiated Emissions Receive Mode

Port	Enclosure
Specification	EN 55022:1994
Limit	Class B
Measurement distance	10m
Temperature	22 ° C
Humidity	51%

Frequency (MHz)	Polarisation	Level (dBµV/m)	Limit (dBµV/m)	Margin (dBµV/m)	Result
31.0145	Horizontal	26.2	30.0	3.8	Complied
31.1194	Vertical	26.1	30.0	3.9	Complied
31.2020	Vertical	26.3	30.0	3.7	Complied

The plots for these tests can be seen in Appendix 1.

9.2.1 Test Equipment Used For Radiated Emissions

Description	Model Number	CTMS Number
Bilog antenna	Chase CBL6141A	TMS 933
Receiver	Rhode & Schwarz ESVS10	TMS 917
Partially lined screened room	Ray Proof SR2	TMS 817
PC Controller	486, fitted with a GPIB interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Coaxial cable	40m	TMS 122
Mast	Chase CAM 6340	Not Applicable
Turntable	CTMS, WT001	Not Applicable
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Thermometer	Radio Spares TH200	TMS 907
Tape Measure, Height Gauges	Not Applicable	Not Applicable

9.2.2 Measurement Uncertainties

Measurement Uncertainty For Radiated Emissions (95% confidence)
+4.17dB / -4.21dB

9.3 Conducted Emissions Transmit Mode

Port	AC Mains
Specification	EN 55022:1994
Limit	Class B
Measurement ports	Live and Neutral
Temperature	22˚C
Humidity	45%

Frequency (MHz)	Line	Level (dBμV)		Limit (dBμV)		Margin		Result
		QP	AVE	QP	AVE	QP	AVE	
0.174	Live	58.29	-	64.77	-	6.48	-	Complied
0.588	Live	42.56	38.45	56.00	46.00	13.44	7.55	Complied
0.588	Neutral	40.06	37.67	56.00	46.00	15.94	8.33	Complied

The plots for these tests can be seen in Appendix 1.

9.3.1 Test Equipment Used

Description	Model Number	CTMS Number
LISN	Chase MN2053	TMS 912
Transient limiter	Chase CFL9206	TMS 905
Receiver	Rhode & Schwarz ESHS10	TMS 916
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Partially lined screened room	Ray Proof SR2	TMS 817
Thermometer	Radio Spares TH200	TMS 907
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
1m Mains Lead	Not Applicable	Not Applicable

9.3.2 Measurement Uncertainties

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

9.4 Conducted Emissions Receive Mode

Port	AC Mains
Specification	EN 55022:1994
Limit	Class B
Measurement ports	Live and Neutral
Temperature	22 ° C
Humidity	45%

Frequency (MHz)	Line	Level (dBµV)		Limit (dBµV)		Margin		Result
		QP	AVE	QP	AVE	QP	AVE	
9.998	Live	30.98	28.64	60	50	29.02	21.36	Complied
9.998	Neutral	31.88	31.35	60	50	28.12	18.65	Complied

9.4.1 Test Equipment Used

Description	Model Number	CTMS Number
LISN	Chase MN2053	TMS 912
Transient limiter	Chase CFL9206	TMS 905
Receiver	Rhode & Schwarz ESHS10	TMS 916
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Partially lined screened room	Ray Proof SR2	TMS 817
Thermometer	Radio Spares TH200	TMS 907
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
1m Mains Lead	Not Applicable	Not Applicable

9.4.2 Measurement Uncertainties

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

9.5 Conducted Emissions Transmit Mode

Port	DC Port
Specification	EN 55022:1994
Limit	Class B
Measurement ports	Positive and 0V
Temperature	22 ° C
Humidity	45%

Frequency (MHz)	Line	Level (dBµV)		Limit (dBµV)		Margin		Result
		QP	AVE	QP	AVE	QP	AVE	
9.998	0V	42.89	43.21	60.00	50.00	17.11	6.79	Complied
9.998	Positive	41.96	42.26	60.00	50.00	18.04	7.74	Complied

9.5.1 Test Equipment Used

Description	Model Number	CTMS Number
LISN	Chase MN2053	TMS 912
Transient limiter	Chase CFL9206	TMS 905
Receiver	Rhode & Schwarz ESHS10	TMS 916
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Partially lined screened room	Ray Proof SR2	TMS 817
Thermometer	Radio Spares TH200	TMS 907
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
1m Mains Lead	Not Applicable	Not Applicable

9.5.2 Measurement Uncertainties

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

9.6 Conducted Emissions Receive Mode

Port	DC Port
Specification	EN 55022:1994
Limit	Class B
Measurement ports	Positive and 0V
Temperature	22 ° C
Humidity	45 %

Frequency (MHz)	Line	Level (dBµV)		Limit (dBµV)		Margin		Result
		QP	AVE	QP	AVE	QP	AVE	
9.998	0V	39.93	40.23	60.00	50.00	20.07	9.77	Complied
9.998	Positive	42.01	42.33	60.00	50.00	17.99	7.67	Complied

9.6.1 Test Equipment Used

Description	Model Number	CTMS Number
LISN	Chase MN2053	TMS 912
Transient limiter	Chase CFL9206	TMS 905
Receiver	Rhode & Schwarz ESHS10	TMS 916
Coaxial cable	4m	TMS 123
Coaxial cable	10m	TMS 116
Partially lined screened room	Ray Proof SR2	TMS 817
Thermometer	Radio Spares TH200	TMS 907
PC Controller	486, fitted with a GPIB Interface	Not Applicable
Printer	Hewlett Packard DeskJet 850C	Not Applicable
1m Mains Lead	Not Applicable	Not Applicable

9.6.2 Measurement Uncertainties

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