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EMI TEST REPORT
for
CERTIFICATION to
FCC PART 15.101 & FCC PART 15.121

FCC ID:	**HNL-WRG3P**
Manufacturer:	Rosetta Laboratories Pty Ltd
Test Sample:	WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral
Tested for:	Robotron Pty Ltd
Report Number:	M021010C
Issue Date:	18th November 2002

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NATA Accredited Laboratory Number: 5292

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of
WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral
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Report Number:	**M021010C**
Test Sample:	WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral
Model Number:	G3 Series
Serial Number:	TB4
FCC ID:	**HNL-WRG3P**
Manufacturer:	Rosetta Laboratories Pty Ltd (Division of Robotron Pty Ltd)
Tested for: **Address:** **Phone:** **Fax:**	Robotron Pty Ltd 15 Stamford Road, Oakleigh, VIC 3166 Australia +613 9568 2568 +613 9568 1377
Responsible Party:	Milan Hudecek
Equipment Type:	Unintentional Radiator (Receiver, Computer Peripheral)
Test Standards:	FCC Part 15 Section 101 Unintentional Radiators FCC Part 15 Section 121 Scanning Receivers FCC Part 15 Section 107 Conducted limits FCC Part 15 Section 109 Radiated limits ANSI C63.4-1992 OET Bulletin No. 63
Test Dates:	16th - 18th October 2002
Test Officer:	**Chieu Huynh**
Attestation:	*I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing.*
Authorised Signature:	**Chris Zombolas** **EMC Technologies Pty Ltd**

EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15.101 & FCC PART 15.121
on the
WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral

1. INTRODUCTION

This report details the results of EMI tests and measurements performed on the WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral in accordance with the Federal Communications Commission (FCC) regulations as detailed in Title 47 CFR, Part 15.101 Rules for unintentional radiators and Title 47 CFR, Part 15.121 for scanning receivers.
The results and technical details of the test sample are detailed in this report. The test sample was found to comply with the conducted and radiated emission requirements of Part 15.107 and Part 15.109 respectively.

1.1 Summary of Results

Part 15.107 Conducted Emissions:

Config #1: (Bottom Band - 9 kHz)	Complies Class B limit, margin of 5.2 dB
Config #2: (Middle Band - 90 MHz)	Complies Class B limit, margin of 5.1 dB
Config #3: (Top Band - 180 MHz)	Complies Class B limit, margin of 5.1 dB

Part 15.109 Radiated Emissions:

Config #1: (Bottom Band - 9 kHz)	Complies Class B limit, margin of 4.0 dB
Config #2: (Middle Band - 90 MHz)	Complies Class B limit, margin of 4.2 dB
Config #3: (Top Band - 180 MHz)	
30 - 1000 MHz	Complies Class B limit, margin of 4.5 dB
1- 2 GHz	Complies Class B limit, margin of > 10 dB

The measurement procedure used was in accordance with ANSI C63.4-1992 and OET Bulletin No. 96-43. The instrumentation conformed to the requirements of ANSI C63.2-1987.

1.2 Modifications

No modifications were required.

2. GENERAL INFORMATION

2.1 Product Specifications

Test Sample: WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral
Tested for: Robotron Pty Ltd
Manufacturer: Rosetta Laboratories Pty Ltd (Division of Robotron Pty Ltd)
Model Number: G3
Serial Number: TB4
FCC ID: HNL-WRG3P

Equipment Type: Unintentional Radiator (Scanning Receiver, Computer Peripheral)

2.2 Test Sample Operational Description

(Information supplied by Client)

This is a PC-controlled Software-Defined Receiver, where the incoming frequency (9 kHz to 180 MHz), is first up-converted to 45 MHz IF, and then down-converted to 12 kHz IF, after which it is further processed (demodulated) entirely in software. The demodulator software can run either on the inbuilt DSP, or optionally directly on the PC (after being digitized by the PC sound card).

There is also a separate path for wide FM signals, which are downconverted from 45 MHz to 10.7 MHz, and demodulated conventionally, in hardware.

There are 6 main functional modules:

1. The **RF module** which contains switchable front-end filters, an attenuator and an amplifier
2. The **IF1 module** which contains a mixer and the 45 MHz first IF.
3. The **IF2 module** which contains a 45.012 MHz local oscillator and 12 kHz second IF.
4. The **PLL module** which provides variable frequency 45.009 to 225 MHz used for the first IF mixer.
5. The **WBFM module** which contains a 34.3 MHz local oscillator, mixer, 10.7 MHz IF and FM discriminator for wide-band FM modulation processing.
6. The **PCI backplane** which contains the control CPU, PCI interface, master reference oscillator (20 MHz) and two DSPs (the first is provided for demodulation, the second one is provided for decoding).

2.3 Technical Specifications

Type:	Dual Conversion Superheterodyne
Frequency Range:	0.009 - 180 MHz
Modes:	AM, AMN, AMS, LSB, USB, CW, FM
Tuning Steps:	1 Hz
IF Shift:	3 kHz
Audio Output:	Line Output to Sound Card or 200 mW @ 8 Ω
Antenna:	50 Ω, SMA Connector
Dynamic Range:	90 dB
IP3:	+5 dBm
PCBs:	-------
Power Supply:	PCI-BUS, +5, +12, -12 VDC
Microprocessor:	PIC 16F 877-20
Typical Sensitivity:	1 uV (AM), 0.3uV (LSB, USB), 1uV (FM)

Oscillator Frequencies:
The master reference crystal oscillator is 20 MHz. From the first reference oscillator, two VCO/PLL oscillators are derived:
First IF: 45.009 to 225 MHz
Second IF: 45.012 MHz
There is also a secondary crystal oscillator 34.3 MHz which is used by the WBFM module.

2.4 Test sample configuration

The EUT was installed in the host Personal Computer (PC). The monitor, mouse, keyboard, printer, modem and speakers were connected to the host PC.
The following cables were connected to the EUT: Receiving Antenna, Ref Clock IN, Ref Clock OUT and cable to host PC sound card.
Three frequency bands were tested: Bottom band, Middle band and Top band (30 - 1000 MHz and 1 - 2 GHz).
Refer to Appendix B - Test Setup Photographs.

2.5 Test Sample Block Diagram

Refer to Appendix C - Test Sample Block Diagram

2.6 Test Sample Support Equipment

Host PC: HP Vectra Vei8 (Pentium III Processor)
Model No: DTPC-17
Serial No: SG94072639

Monitor # 1: Videocom (for conducted emissions)
Model No. DCM-1588VA E
FCC ID: H79DCM-1588

Monitor # 2: Tatung (for radiated emissions)
Model No. CMITMC5
Serial No. 23490103
FCC ID: BJMCM15MC

Mouse: A4 TECH
Model No: OK-250

Keyboard: Hewlett Packard
Model No. SK-2502C
Serial No. M990901523

Printer: DICONIX
Model No. 150
FCC ID: E759WG-RBCN150

Modem: AVTEK
Model No: MEGAPLUSFAX V.32

Speakers: POLK Audio (China)

2.7 Test Procedure

Emissions measurements were performed in accordance with the procedures of ANSI C63.4-1992. Radiated emissions tests were performed at a distance of 3 metres from the EUT. OET Bulletin 63 dated October 1993 was used for reference.

2.8 Test Facility

2.8.1 General

Radiated Emission measurements were performed at EMC Technologies open area test site (OATS) situated at Lerderderg Gorge, near the township of Bacchus Marsh in Victoria, Australia. Conducted emission measurements were performed at EMC Technologies' laboratory in Tullamarine, Victoria Australia.

The above sites have been fully described in a report submitted to the FCC office, and accepted in a letter dated June 14, 2002, **FCC Registration Number 90560**.

2.8.2 NATA Accreditation

EMC Technologies is accredited in Australia to test to the following standards by the National Association of Testing Authorities (NATA).

"FCC Part 15 unintentional and intentional emitters in the frequency range 9kHz to 18 GHz excluding TV receivers (15.117 and 15.119), TV interface devices (15.115), cable ready consumer electronic equipment (15.118), cable locating equipment (15.213) and unlicensed national information infrastructure devices (Sub part E)."

The current full scope of accreditation can be found on the NATA website: www.nata.asn.au
It also includes a large number of emission, immunity, SAR, EMR and Safety standards.

NATA is the Australian national laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO17025 requirements. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires fully documented test procedures, continued calibration of all equipment to the National Standard at the National Measurements Laboratory (NML) and an internal quality system to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A^2LA).

2.9 Units of Measurements

2.9.1 Conducted Emissions

Measurements are reported in units of dB relative to one microvolt. (dBμV).

2.9.2 Radiated Emissions

Measurements are reported in units of dB relative to one microvolt per metre (dBμV/m).

2.10 Test Equipment Calibration

All measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Agilent Technologies (Australia) Pty Ltd or the National Measurement Laboratory (NML). All equipment calibration is traceable to Australia national standards at the National Measurements Laboratory. The reference antenna calibration was performed by NML and the working antennas (biconical and log-periodic) calibrated by the NATA approved procedures. The complete list of test equipment used for the measurements, including calibration dates and traceability is contained in Appendix A of this report.

2.11 Ambients at OATS

The Open Area Test Site (OATS) is an area of low background ambient signals. No significant broadband ambients are present however commercial radio and TV signals exceed the limit in the FM radio, VHF and UHF television bands. Radiated prescan measurements were performed in the shielded enclosure to check for possible radiated emissions at the frequencies where the OATS ambient signals exceeded the test limit.

3.0 TEST CONFIGURATION

Refer to Appendix B for photographs of the tested system.

4.0 CONDUCTED EMISSION MEASUREMENTS

4.1 Test Procedure

The arrangement specified in ANSI C63.4-1992 was adhered to for the conducted EMI measurements. The EUT was placed in the RF screened enclosure and a CISPR EMI Receiver as defined in ANSI C63.2-1987 was used to perform the measurements.

The EMI Receiver was operated under program control using the Max-Hold function and automatic frequency scanning, measurement and data logging techniques. The specified 0.15 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured.

4.2 Peak Maximising Procedure

The various operating modes of the system were investigated. For each of the sub-ranges, the EMI receiver was set to continuous scan with the Peak detector set to Max-Hold mode. The Quasi-Peak detector and the Average detector were then invoked to measure the actual Quasi-Peak and Average level of the most significant peaks, which were detected.

4.3 Calculation of Voltage Levels

The voltage levels were automatically measured in software and compared to the test limit. The method of calculation was as follows:

VEMI = VRx + LBPF

Where: **VEMI =** the Measured EMI voltage in dBµV to be compared to the limit.
VRx = the Voltage in dBµV read directly at the EMI receiver.
LBPF = the insertion loss in dB of the cables and the Limiter and Pass Filter.

4.4 Plotting of Conducted Emission Measurement Data

The measurement data pertaining to each frequency sub-range were then concatenated to form a single graph of (peak) amplitude versus frequency. This was performed for both Active and Neutral lines and the composite graph was subsequently plotted. A list of the highest relevant peaks and the respective Quasi-Peak and Average values were also plotted on the graph.

4.5 Results of Conducted Emission Measurement

4.5.1 Configuration 1: Bottom Band - 9 kHz

Frequency MHz	Line	Measured QP Level dBµV	QP Limit dBµV	∆QP ±dB	Measured AV Level dBµV	AV Limit dBµV	∆AV ±dB
1.39	Active	42.3	56.0	- 13.7	40.8	46.0	- 5.2
0.92	Active	41.6	56.0	- 14.4	39.9	46.0	- 6.1
1.97	Active	42.1	56.0	- 13.9	39.8	46.0	- 6.2
0.81	Active	41.1	56.0	- 14.9	39.6	46.0	- 6.4
3.59	Active	41.7	56.0	- 14.3	39.2	46.0	- 6.8
0.23	Active	50.7	62.4	- 11.7	45.4	52.4	- 7.0
0.23	Neutral	51.7	62.4	- 10.7	44.8	52.4	- 7.6

The worst case conducted EMI occurred at 1.39 MHz and complied with the quasi peak and average limits by margins of 13.7 dB and 5.2 dB respectively. Refer to graphs 1 and 2 in Appendix G for plots of the conducted EMI measurements. The measurement uncertainty was ±2.0 dB.

4.5.2 Configuration 2: Middle Band - 90 MHz

Frequency MHz	Line	Measured QP Level dBμV	QP Limit dBμV	ΔQP ±dB	Measured AV Level dBμV	AV Limit dBμV	ΔAV ±dB
1.39	Active	42.5	56.0	- 13.5	40.9	46.0	- 5.1
0.81	Active	41.4	56.0	- 14.6	40.0	46.0	- 6.0
1.97	Active	42.2	56.0	- 13.8	39.7	46.0	- 6.3
3.01	Active	42.4	56.0	- 13.6	39.6	46.0	- 6.4
0.92	Active	41.2	56.0	- 14.8	39.6	46.0	- 6.4
3.59	Active	42.2	56.0	- 13.8	39.5	46.0	- 6.5
4.17	Active	41.2	56.0	- 14.8	38.9	46.0	- 7.1
2.43	Active	41.6	56.0	- 14.4	38.8	46.0	- 7.2
0.23	Neutral	51.7	62.4	- 10.7	45.0	52.4	- 7.4

The worst case conducted EMI occurred at 1.39 MHz and complied with the quasi peak and average limits by margins of 13.5 dB and 5.1 dB respectively. Refer to graphs 3 and 4 in Appendix G for plots of the conducted EMI measurements. The measurement uncertainty was ±2.0 dB.

4.5.3 Configuration 3: Top Band - 180 MHz

Frequency MHz	Line	Measured QP Level dBμV	QP Limit dBμV	ΔQP ±dB	Measured AV Level dBμV	AV Limit dBμV	ΔAV ±dB
1.39	Active	42.5	56.0	- 13.5	40.9	46.0	- 5.1
0.81	Active	41.3	56.0	- 14.7	40.0	46.0	- 6.0
2.55	Active	42.1	56.0	- 13.9	39.7	46.0	- 6.3
3.59	Active	42.2	56.0	- 13.8	39.5	46.0	- 6.5
3.12	Active	41.8	56.0	- 14.2	39.5	46.0	- 6.5
0.23	Active	50.3	62.5	- 12.2	45.4	52.5	- 7.1
4.17	Active	41.1	56.0	- 14.9	38.8	46.0	- 7.2
0.23	Neutral	51.3	62.5	- 11.2	44.8	52.5	- 7.7

The worst case conducted EMI occurred at 1.39 MHz and complied with the quasi peak and average limits by margins of 13.5 dB and 5.1 dB respectively. Refer to graphs 5 and 6 in Appendix G for plots of the conducted EMI measurements. The measurement uncertainty was ±2.0 dB.

5.0 RADIATED EMISSION MEASUREMENTS

5.1 Test Procedure

The EUT was set up on the table top (placed on turntable) of total height 80 cm above the ground plane, and operated as described in section 2 of this report. The EMI Receiver was operated under software control via the PC Controller through the IEEE.488 Interface Bus Card Adaptor. The test frequency range was sub-divided into smaller bands with sufficient frequency resolution to permit reliable display and identification of possible EMI peaks while also permitting fast frequency scan times. A calibrated Biconical antenna was used for measurements between 30 MHz to 232 MHz and a calibrated Logperiodic antenna used for measurements between 230 MHz to 1000 MHz. A calibrated EMCO 3115 Horn antenna was used for measurements between 1 to 2 GHz.

Testing was performed at a distance of 3 metres for the frequency ranges 30 to 1000 MHz, and 1 to 2 GHz.

The EUT was slowly rotated with the Peak Detector set to Max-Hold. This was performed for two antenna heights. Each significant peak was then investigated and maximised with the Quasi-Peak detector. The measurement data for each frequency range was automatically corrected by the software for cable losses, antenna factors and preamplifier gain and all data was then stored on disk in sequential data files. This process was performed for both horizontal and vertical antenna polarisations.

5.2 Plotting of Measurement Data for Radiated Emissions

The stored measurement data was combined to form a single graph which comprised of all the frequency sub-ranges over the range 30-1000 MHz and 1 - 2 GHz. The accumulated EMI (EUT ON) was plotted as the Red trace while the Ambient signals (AMBIENT) were plotted as Green trace. The worst case radiated EMI *peak* measurements as recorded using the Max-Hold data are presented as the upper or **RED** trace while the respective ambient signals are presented as the lower or **GREEN** trace. Occasionally, an intermittent ambient arose during the EUT ON measurement (RED trace) and could not be captured when the Ambient trace was being stored. The ambient peaks of significant amplitude with respect to the limit are tagged with the "**#**" symbol while EMI peaks are identified with a numeral. Ambient peaks that were present during the EUT ON measurement (RED trace) and not captured during the AMBIENT measurement were also tagged with the "**#**" symbol.

The highest recorded EMI signals are shown on the Peaks List on the bottom right side of the graph. For radiated EMI, each numbered peak is listed as a frequency, peak field strength, quasi-peak field strength and the margin relative to the limit in dB. A negative margin is the deviation of the recorded value below the limit.

At times, the quasi peak level may appear to be higher than the peak level. This happens because the individual peak is further maximised with the QP detector. This will be apparent when the peaks list at the foot of the graphs shows the quasi peak level higher than the peak level.

5.3 Calculation of Field Strength

The field strength was calculated automatically by the software using all the pre-stored calibration data. The method of calculation is shown below:

E = V + AF - G + L

Where:

E = Radiated Field Strength in dBµV/m.
V = EMI Receiver Voltage in dBµV. (measured value)
AF = Antenna Factor in dB(m^{-1}). (stored as a data array)
G = Preamplifier Gain in dB. (stored as a data array)
L = Cable insertion loss in dB. (stored as a data array of Insertion Loss versus frequency)

- **Example Field Strength Calculation**

Assuming a receiver reading of 34.0 dBµV is obtained at 90 MHz, the Antenna Factor at that frequency is 9.2 dB. The cable loss is 1.9 dB while the preamplifier gain is 20 dB. The resulting Field Strength is therefore as follows:

34.0 + 9.2 + 1.9 - 20 = 25.1 dBµV/m

5.4 Radiated EMI Results

5.4.1 Configuration 1: Bottom Band - 9 kHz

Frequency MHz	Polarisation	QP Measured dBµV	QP Limit dBµV	∆QP ± dB
32.04	Vertical	36.0	40.0	- 4.0
81.92	Horizontal	35.7	40.0	- 4.3
806.3	Vertical	41.2	46.0	- 4.8
131.07	Vertical	38.5	43.5	- 5.0
806.27	Horizontal	40.4	46.0	- 5.6
63.64	Horizontal	33.9	40.0	- 6.1
63.63	Vertical	32.8	40.0	- 7.2
87.44	Horizontal	32.3	40.0	- 7.7

Result : The highest radiated emission peak complied with FCC Class B limit by a margin of 4.0 dB at 32.04 MHz. The measurement uncertainty for radiated EMI was 3.7 dB. Refer to graphs 7 & 8, Appendix G.

5.4.2 Configuration 2: Middle Band - 90 MHz

Frequency MHz	Polarisation	QP Measured dBµV	QP Limit dBµV	∆QP ± dB
32.12	Vertical	35.8	40.0	- 4.2
806.25	Vertical	41.8	46.0	- 4.2
31.94	Vertical	35.7	40.0	- 4.3
36.87	Vertical	35.3	40.0	- 4.7
171.82	Horizontal	37.2	43.5	- 6.3
80.42	Horizontal	32.9	40.0	- 7.1
157.5	Horizontal	36.3	43.5	- 7.2
48.28	Vertical	32.4	40.0	- 7.6

Result : The highest radiated emission peak complied with FCC Class B limit by a margin of 4.2 dB at 32.12 MHz. The measurement uncertainty for radiated EMI was 3.7 dB. Refer to graphs 9 & 10, Appendix G.

5.4.3 Configuration 3: Top Band - 180 MHz

5.4.3.1 Frequency Band: 30 – 1000 MHz

Frequency MHz	Polarisation	QP Measured dBμV	QP Limit dBμV	ΔQP ± dB
806.27	Vertical	41.5	46.0	- 4.5
36.87	Vertical	35.2	40.0	- 4.8
32.03	Vertical	35.2	40.0	- 4.8
80.35	Horizontal	34.9	40.0	- 5.1
87.35	Horizontal	34.1	40.0	- 5.9
65.54	Vertical	33.7	40.0	- 6.3
171.82	Horizontal	36.9	43.5	- 6.6
157.5	Horizontal	36.5	43.5	- 7.0

Result : The highest radiated emission peak complied with FCC Class B limit by a margin of 4.5 dB at 806.27 MHz. The measurement uncertainty for radiated EMI was 3.7 dB. Refer to graphs 11 & 12, Appendix G.

5.4.3.2 Frequency Band: 1 – 2 GHz

All recorded emissions complied with the FCC Class B average limit by a margin of greater than 10 dB. The measurement uncertainty for radiated emissions was 3.7 dB.
Refer to graphs 13 & 14, Appendix G.

6.0 COMPLIANCE STATEMENT

The WiNRADiO G3 Series Receiver (180 MHz), Computer Peripheral, tested on behalf of Robotron Pty Ltd complied with the requirements of the FCC Part 15.101 Rules for unintentional radiators and FCC Part 15.121 Rules for Scanning Receivers, (Class B Receiver, Computer Peripheral).

The compliance margins were as follows:

Part 15.107 Conducted Emissions:
Config #1: (Bottom Band - 9 kHz) Complies Class B limit, margin of 5.2 dB
Config #2: (Middle Band - 90 MHz) Complies Class B limit, margin of 5.1 dB
Config #3: (Top Band - 180 MHz) Complies Class B limit, margin of 5.1 dB

Part 15.109 Radiated Emissions:
Config #1: (Bottom Band - 9 kHz) Complies Class B limit, margin of 4.0 dB
Config #2: (Middle Band - 90 MHz) Complies Class B limit, margin of 4.2 dB
Config #3: (Top Band - 180 MHz)
30 - 1000 MHz Complies Class B limit, margin of 4.5 dB
1- 2 GHz Complies Class B limit, margin of > 10 dB

APPENDIX A

MEASUREMENT INSTRUMENTATION DETAILS

EQUIPMENT TYPE	MAKE/MODEL SERIAL NUMBER	LAST CAL. DD/MM/YY	DUE DATE DD/MM/YY	CAL. INTERVAL
EMI RECEIVER	HP 8546A Sn. 3549A00290 EMI Receiver	12/12/01	12/12/02	1 YEAR *2
SPECTRUM ANALYSER	HP 8574B System Components	12/01/02	12/01/03	1 YEAR *2
ANTENNAS	EMCO 93110B BICONICAL	07/08/02	07/08/03	1 YEAR *3
	20 - 300 MHz Sn. 9804-3092			
	EMCO 93146A LOG PERIODIC	26/07/02	26/07/03	1 YEAR *3
	300 -1000MHz Sn. 5033			
	EMCO 3115 Double Ridged Horn Antenna	24/01/02	24/01/03	1 YEAR *3
	1-18 GHz Sn.3823			
LISN	EMCO 3825/2 50ohm / 50 microH	10/04/02	10/04/03	1 YEAR *3
	0.009 – 30MHz Sn.9607-2567			

Note *1. National Measurements Laboratory calibration.
Note *2. NATA calibration by Agilent Technologies (Aust) Pty Ltd
Note *3. In-house calibration. Refer to Quality Manual.

TEST SITES

Shielded Room Test Laboratory	**Melbourne** 11m x 8m x 4m Chamber-semi-anechoic 8.8m x 5.8m x 3.1m Test Chamber 3.4m x 6.1m x 2.5m Test Chamber 3.4m x 7.3m x 7.5m Test Chamber			*1
Open Area Test Site	**Melbourne** 3/10 Metre site. 1-4 metre antenna mast. 1.2 metre/400 kg Turntable. (Situated at Lerderderg Gorge, near Bacchus Marsh, Victoria)	05/01/02	05/01/03	1 Year *1

Note *1. In-house calibration. Refer to Quality Manual.

APPENDIX B

TEST SAMPLE PHOTOGRAPHS

SUBMITTED AS ATTACHMENT

APPENDIX C

TEST SAMPLE BLOCK DIAGRAM

SUBMITTED AS ATTACHMENT

APPENDIX D

FCC ID LABELING

SUBMITTED AS ATTACHMENT

APPENDIX E

TEST SAMPLE SCHEMATICS

SUBMITTED AS ATTACHMENT

APPENDIX F

PCB LAYOUTS

SUBMITTED AS ATTACHMENT

APPENDIX G

GRAPHS OF EMI MEASUREMENTS

SUBMITTED AS ATTACHMENT

APPENDIX H

USER MANUAL

SUBMITTED AS ATTACHMENT