APPENDIX E TO APPENDIX I ARE UPLOADED SEPERATELY UNDER EXHIBITS

EMI TEST REPORT
FOR
CERTIFICATION
TO
FCC PART 15.101 SCANNING RECEIVER

FCC ID: HNL-WRN

Manufacturer: Robotron Pty. Ltd.
Test Sample: WiNRADiO
Model: WR3700i
Report Number: M990943F

Issue Date: 7th October 1999

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation for FCC Part 15.

Reg. 5292

EMI TEST REPORT FOR CERTIFICATION TO FCC PART 15.101 Scanning Receiver

FCC ID: HNL-WRN

CERTIFICATION of COMPLIANCE with FCC PART 15 REGULATIONS.
EMC Technologies Report Number: M990943F
Issue Date: 7th October 1999

CONTENTS

EMI TEST REPORT FOR CERTIFICATION
TO
FCC PART 15.101 Scanning Receiver

Report Number:	M990943F
Test Sample:	WiNRADiO
Model:	WR3700i
FCC ID:	HNL-WRN
Manufacturer:	Robotron Pty. Ltd. 222 St. Kilda Road St. Kilda 3182 Australia
Phone:	+613 9525 5300
Fax:	+613 9525 3560
Contact:	Milan Hudecek Managing Director
Equipment Type:	Unintentional radiator, Scanning Radio Receiver
Test Standards:	FCC Part 15 Section 101, Receivers. ANSI C63.4-1992 OET Bulletin No. 63, October 1993
Tested for:	Robotron Pty. Ltd.
Test Dates:	20th September to 1st October 1999
Test Officer:	Praveen Rao
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: _____

Praveen Rao
Laboratory Manager
EMC Technologies Pty Ltd

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation for FCC Part 15.

Reg. 5292

EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15.101 REQUIREMENTS
on the
WiNRADiO 3700i SCANNING RECEIVER

1.0 SUMMARY of RESULTS

This report details the results of EMI tests and measurements performed on **WiNRADiO 3700i Scanning Receiver** in accordance with the Federal Communications Commission (FCC) regulations as detailed in **Title 47 CFR, Part 15 Rules for Scanning receivers.**
WR1000i (FCC Approved, FCC ID: HNL- WINRADIO) is the basic model and the WR3700i is a modified version. The Equipment Under Test (EUT) was tested in three configurations for radiated emissions and one configuration for conducted emissions. The EUT complied with the following requirements:

FCC Pt 15.107(a) Conducted EMI class B limits: Complied, margin of 5.9 dB

FCC Pt 15.109(a) Radiated EMI Class B limits: Complied, margin of 0 dB

The measurement procedure used was in accordance with ANSI C63.4-1992, and OET Bulletin No. 63. The instrumentation conformed to the requirements of ANSI C63.2-1987.

2.0 GENERAL INFORMATION

2.1 General Description of Test Setup

Test Sample:	WiNRADiO SCANNING RECEIVER
Model:	WR3700i
FCC ID:	HNL-WRN
Equipment Type:	Unintentional Radiator, Scanning Receiver
Cables Connected to EUT:	Headphones/speaker, antenna ports. (All standard cables supplied with the kit)

2.2 Technical Specifications

	WR3700I
Type	***Triple Superheterodyne***
Frequency Range	***0.15 – 4000 MHz***
Modes	***AM, FM-N, FM-W, SSB/CW***
Tuning Steps	***100Hz to 1 MHz(100Hz for SSB)***
IF Shift	***-***
Audio Output	***200mW into 8 Ohm load***
Antenna	***50 Ohm BNC***
PCBs	***WA0201 Receiver Card*** ***WA0304 External Backplane*** ***WA0102 Crystal Switch*** ***WA0107 BFO Card*** ***WA0103 Mixer Card*** ***WA0110 DSP Card***

PC Power Supply :115VAC, 60Hz:
Microprocessor: MC68HC805 (Masked Programmed)
The Crystal Frequencies and local Oscillator frequency chart is listed in **Appendix G**

2.3 Test Sample Functional Description

The WR-3700i-DSP superheterodyne receiver is very similar to the WR1000i (basic model) and WR-3100i (advanced version) receivers, previously certified by the FCC (FCC ID HNL-WINRADIO)

This is a PC-based receiver, where the receiver board is mounted on an ISA control board ("backplane"). A DSP module is also mounted on the ISA backplane, providing additional digital signal processing capability.

The control board is based on a Motorola 68HC708 CPU running with a 4MHz crystal (50 ppm accuracy). The DSP board is based on the ADSP 2105 CPU using 10 MHz crystal (50 ppm accuracy).

The receiver board used in the WR-3700i-DSP is similar to the WR-3100i, with the following main differences:
1. Additional front-end filtering
2. Improved impedance matching of mixers
3. Improved AGC
4. Two additional IF bandwidth added (5.5 kHz and 50 kHz) for FM
5. A down-converter added for frequency extension to 4.0 GHz
6. The frequency plan has been changed to provide a better image and spurious signal rejection.

The full frequency range of the receiver is 0.15 to 4,000 MHz; except for cellular bands 824-849 and 869-894 MHz. Operating modulation modes cover AM, CW, LSB, USB, FM and narrow FM (for more detailed technical specifications, please find preliminary product brochure attached).

Crystals used in the receiver are:
25.600 MHz 10ppm
47.375 MHz 10ppm
57.607 MHz 10ppm
57.620 MHz 10ppm

Crystal used in the down-converter is:
10.000 MHz 10ppm

The EUT is powered internally from the PC bus. The system is completed with special software designed to run on windows, which provides a flexible and intuitive interface for the user.

The receivers are masked for the frequency bands allocated to the Domestic Public Cellular Radio Telecommunications Service in accordance with Section 15.121 of the FCC rules. Refer **APPENDIX F** for description of masking method.

2.4 Modifications of Test Sample

Reduce coupling of amplifier that follows the LO by reducing the capacitor value to 2.2pF, replacing 10pF.

2.5 Support Equipment

Host PC: HP Vectra XM 5/100	**Keyboard:** IBM 82G2383
Model: Series 3	**Model:** M
Serial No. FR53950387	**Serial No.** P82G2383
FCC ID: B94VECTRAXM5	**FCC ID:** IYL60G3571
Monitor: LYMIC MPRII	**Mouse:** IBM
Model: BMC-14SV4	**Model:** 06H4600
Serial No: 700001117	**Serial No.:** 23-057884
FCC ID: I8TKY14SV34D	**FCC ID:** DZL210429
Printer: DI Conix	**Printer:** HP Deskjet 820Cxi
Model: 150	**Model:** C4531A
Serial: AB6044883	**FCC ID:** B94C4531X
FCC ID: E759WG-RBCN150	

2.6 Test Sample operating Conditions during the tests

The EUTs were tested in accordance with section 15.31(m) of the FCC rules for a frequency range more than 10 MHz. The top, middle and the bottom frequencies of the operating range were individually set for every test. All cables were connected to the EUT. In accordance with section 15.109(f) and 15.111(a) of the FCC rules, both external Antennae (low band and high band) were connected for Radiated and conducted emissions tests

2.7 Test Procedure

Emission measurements were performed in accordance with the procedures of ANSI C63.4-1992. Radiated emission tests were performed at an EUT distance of 10 metres.
OET Bulletin 63 dated October 1993 was used for reference.

2.8 Test Facility

- **FCC Registration**

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

The above site has been fully described in a report submitted to the FCC office, and accepted in a letter dated 24th June 1999 FCC Registration Number 90560

- **NATA Accreditation**

EMC Technologies is accredited to FCC part 15 by the **National Association of Testing Authorities (NATA).**

NATA has a Mutual recognition agreement (MRA) with NVLAP and A2LA.

2.9 Test Equipment Calibration

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

3.0 CONDUCTED EMISSION MEASUREMENTS: MAINS SUPPLY

3.1 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 0.45 MHz to 30 MHz frequency range was sub-divided into sub-ranges to ensure that all short duration peaks were captured.

3.2 Peak Maximising Procedure

The various operating modes of the system were investigated as described in section 2.4 of this report. 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 was then invoked to measure the actual Quasi-Peak level of the most significant peaks which were detected.

3.3 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:

$$V_{EMI} = V_{Rx} + L_{BPF}$$

Where: V_{EMI} = the Measured EMI voltage in dBµV to be compared to the limit.

V_{Rx} = the Voltage in dBµV read directly at the EMI receiver.

L_{BPF} = The insertion loss in dB of the cables and the limiter and Pass Filter.

3.4 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 values were also plotted on the graph.

3.5 Measurement Data-Conducted Emissions

Table I

Summary of Conducted Emissions Measurement Data

Frequency MHz	Line	Rx Level dBmV	Limit dBmV	Result ± dB
7.74	Active	42.1	48.0	-5.9
1.52	Neutral	40.8	48.0	-7.2
7.68	Active	40.7	48.0	-7.3
7.62	Neutral	40.1	48.0	-7.9
7.68	Neutral	40.1	48.0	-7.9
2.87	Active	38.9	48.0	-9.1

Refer to graphs 7 and 8 in Appendix C for plots of the conducted EMI measurements.
The measurement uncertainty was 2.0 dB.

3.6 Results of Conducted Emission Measurement

All 3 frequency settings were tested as described in section 2.6 of this report and worst case emissions recorded. The highest conducted emission level was 42.1 dBμV at 7.74 MHz. The EUT complied with the FCC Part 15 Class B limits with a worst case margin of 5.9 dB.

WR3700i : Refer APPENDIX C1

Graph 7: Active Line, 0.45 to 30 MHz.
Graph 8: Neutral Line, 0.45 to 30 MHz.

4.0 RADIATED EMISSION MEASUREMENTS

4.1 Test Procedure 30-1000 MHz

Measurements are reported in units of dB relative to one microvolt per metre (dBμV/m) at a distance of 10 metres from the EUT.

The EUT was set up on the table top (placed flat on the 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 Portable PC Controller through the IEEE.488 Interface Bus Card Adapter. The 30 MHz to 1000 MHz 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. 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 by scanning the height of the antenna between 1 to 4 metres with the Quasi-Peak detector ON. 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 polarity.

The tests were performed with the receiver tuned to three different frequencies(Band edges and middle band frequencies). All three test results are reported.

4.2 Test Procedure. 1000 - 5500 MHz

An EMCO 3115 Dual ridged guide horn antenna (1-18GHz) and a mini-circuit ZHL-42 preamplifier (0.7 - 4.2 GHz @ 30 dB gain) were used in conjunction with a HP8546 EMI Receiver (9 kHz – 6.5 GHz) to perform these measurements. Each of the harmonics between 1000 MHz and 5500 MHz were measured individually, for all three band frequencies in both vertical and horizontal polarisation. The EUT was rotated through 360° and the antenna height was varied from 1 metre to 4 metres to maximise the measured level. The results are shown on Tables V to VIII.

4.3 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. 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.

4.4 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 dBmV/m

4.5 Ambients at OATS

The OATS site 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.

4.6 Radiated Field Strength Measurement Results, 30 – 1000 MHz

The receivers were tuned to three frequencies as per section 15.31(m) and results obtained for the frequency range 30 MHz to 1000 MHz. Most of the emissions measured were due to the Support PC. Special emphasis was given to identifying the Local Oscillator frequencies of the receivers and their harmonics.

Result: The highest radiated emission for WR 3700i was 0.0 dB below the limit at 360.03 MHz (Refer graphs 1 to 6 in Appendix C). The measurement uncertainty was 3.7 dB.

Highest Worst Case Emissions of the whole system are listed in the Tables below

4.6.1 Configuration #1: Tuned to150 kHz: Bottom End Frequency

Table II

WR 3700i	Frequency MHz	Rx QP Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Horizontal Polarisation	360.01	36.0	36.0	0.0
Vertical Polarisation	440.03	35.6	36.0	-0.4
Horizontal Polarisation	440.04	35.1	36.0	-0.9
Vertical Polarisation	360.01	34.1	36.0	-1.9
Vertical Polarisation	520.01	33.3	36.0	-2.7
Horizontal Polarisation	640.09	33.2	36.0	-2.8

4.6.2 Configuration #2: Tuned to 1461.325 MHz: Midband Frequency

Table III

WR 3700i	Frequency MHz	Rx QP Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Horizontal Polarisation	360.03	36.0	36.0	0.0
Vertical Polarisation	440.04	36.0	36.0	-0.4
Horizontal Polarisation	440.03	35.1	36.0	-0.9
Vertical Polarisation	360.01	34.6	36.0	-1.4
Vertical Polarisation	520.00	33.9	36.0	-2.1
Horizontal Polarisation	520.04	33.7	36.0	-2.3

4.6.3 Configuration #3: Tuned to 3956.325 MHz: Top End Frequency

Table IV

WR 3700i	Frequency MHz	Rx QP Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Vertical Polarisation	520.05	35.9	36.0	-0.1
Vertical Polarisation	600.02	35.7	36.0	-0.3
Horizontal Polarisation	520.05	35.7	36.0	-0.3
Horizontal Polarisation	600.05	34.9	36.0	-1.1
Horizontal Polarisation	440.06	34.5	36.0	-1.5
Vertical Polarisation	360.00	34.1	36.0	-1.9

4.7 Radiated Field Strength Measurement Results, 1000 – 5500 MHz

In accordance with section 15.33 (b3), the reciever was tested up to the second harmonic of the highest local oscillator frequency (2.7 GHz).
The receiver consists of the main tuner operating for the frequency range 150 kHz to 1500 MHz and a down convertor board operating in two bands to cover the frequency range of 1500 MHz to 4000 MHz. The LO frequency shifts in accordance with the tuned frequency. The down convertor has two bands.
Band 1 : 1500 to 2600 MHz with a fixed LO of 2.7GHz and
Band 2 : 2600 MHz to 4000 MHz with a fixed LO of 2.5 GHz.
Details of LO are provided in Appendix G section.

The following tables show results of all LO and Harmonic frequencies within the range of 1000 MHz and 5500 MHz. All measurements were performed at 3 metres test distance.
All measured levels are Average values.

TABLE V : Main Tuner Board, Vertical Polarisation

TUNED FREQUENCY	LO FREQUENCY	Harmonic Frequency	Harmonic Measured Average levels dBmV/m	Limits dBmV/m @ 3mtrs	Margin ±dB
150 kHz	556.475 MHz	1112.95 MHz	48	54	-6.0 dB
799.995 MHz	1049.12	2098.22 MHz	45 / 46	54	-9 / -8 dB
1.499 MHz	942.675 MHz	1885.33 MHz	45	54	-9.0 dB

TABLE VI : Main Tuner Board, Horizontal Polarisation

TUNED FREQUENCY	LO FREQUENCY	Harmonic Frequency	Harmonic Measured Average levels dBmV/m	Limits dBmV/m @ 3mtrs	Margin ±dB
150 kHz	556.475 MHz	1112.95 MHz	45	54	-9.0
799.995 MHz	1049.12 MHz	2098.22 MHz	46 /47	54	-8 / -7 dB
1.499 MHz	942.675 MHz	1885.33 MHz	45.2	54	-8.8 dB

TABLE VII : Down Convertor Board, Vertical Polarisation

TUNED FREQUENCY MHz	LO FREQUENCY MHz	Harmonic Frequency MHz	Harmonic Measured Average levels dBmV/m	Limits dBmV/m @ 3mtrs	Margin ±dB
3956.325	2499.72	4999.46	52.25 / 46	54	-1.8 / -8 dB
1900.000	2699.73	5399.50	53.96 / 47	54	0 / -7 dB

TABLE VIII : Down Convertor Board, Horizontal Polarisation

TUNED FREQUENCY MHz	LO FREQUENCY MHz	Harmonic Frequency MHz	Harmonic Measured Average levels dBmV/m	Limits dBmV/m @ 3mtrs	Margin ±dB
3956.325	2499.72	4999.46	47.5 / 47	54	-6.5 / -7
1900.000	2699.73	5399.50	52.9 / 46	54	-1.1 / -8

5.0 CONCLUSION

The WR 3700i receiver (FCC ID: HNL-WRN), complied with the requirements of the FCC Parts 2 and 15 Rules for Unintentional radiators : scanning receivers The results were as follows:

FCC Pt 15.107(a) Conducted EMI class B limits: Complied, margin of 5.9 dB

FCC Pt 15.109(a) Radiated EMI Class B limits: Complied, margin of 0.0 dB

APPENDIX A

MEASUREMENT INSTRUMENTATION DETAILS

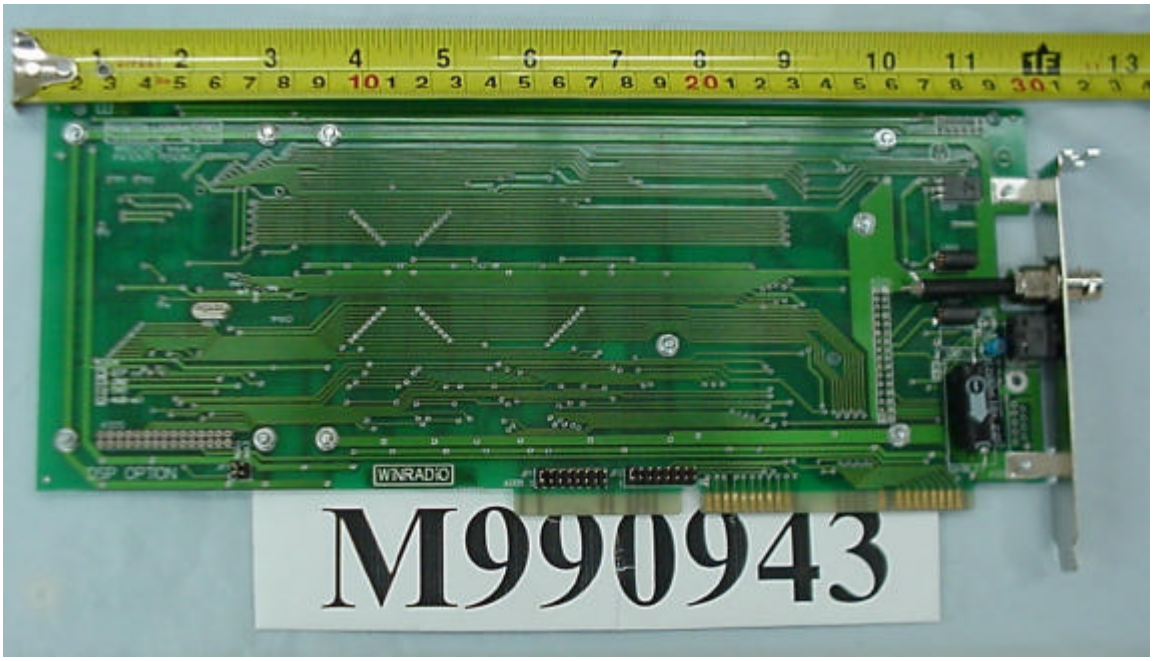
EQUIPMENT TYPE	MAKE/MODEL SERIAL NUMBER	LAST CAL. DD/MM/YY	DUE DATE DD/MM/YY	CAL. INTERVAL
EMI RECEIVER	HP8546A CISPR Receiver Sn.354900290	12/08/99	12/08/00	1 YEAR *2
LISN:	EMCO 3825/2 Sn. 1967	01/10/96	01/10/99	3 YEARS *1
ANTENNAS	EMCO 93110B BICONICAL	06/01/99	06/01/00	I YEAR *3
	20 - 300MHz S/N 9803-3077			
	EMCO 93146 LOG PERIODIC	06/01/99	06/01/00	1 YEAR *3
	300 -1000MHz S/N 9803-5033			
	EMCO 3115 HORN 1-18GHz Sn. 3282	14/10/98	14/10/99	1 YEAR *3
RF PRE-AMPLIFIER	MINI CIRCUITS 1-4GHz Model No. ZHL-42 Sn. 0831901	03/12/98	03/12/99	1 YEAR *3

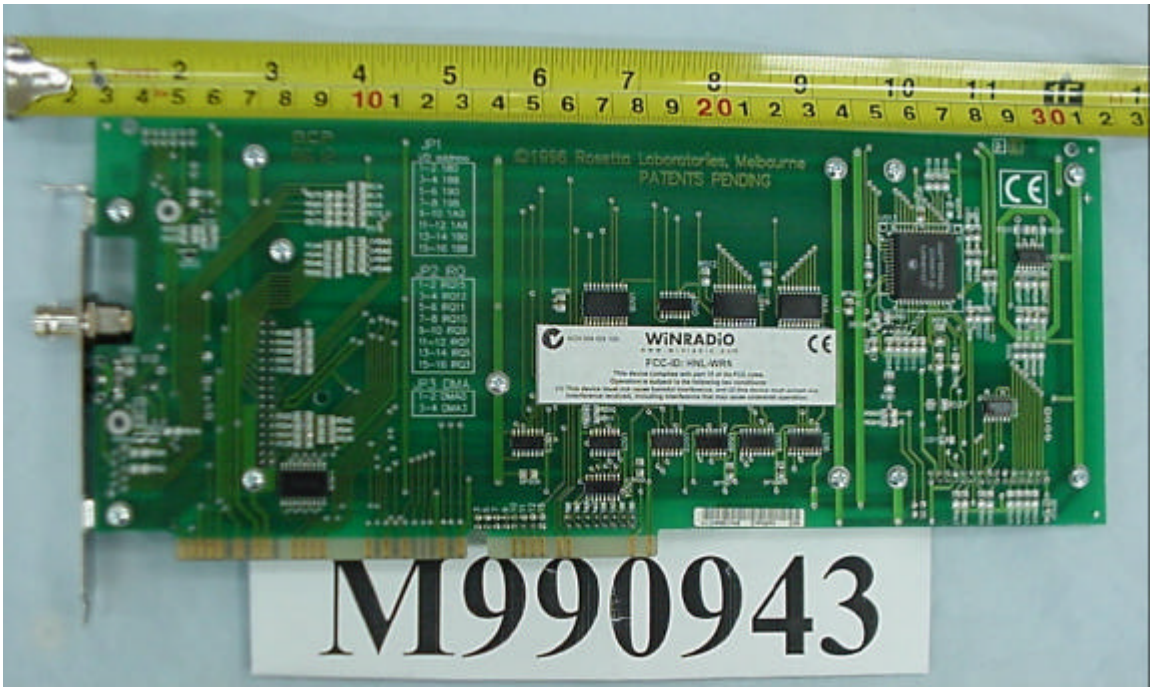
Note *1. National Measurements Laboratory calibration.
Note *2. NATA calibration by Hewlett-Packard (Aust) Ltd
Note *3. In-house calibration. Refer to Quality Manual.
Note *4 Calibration not required

TEST SITES

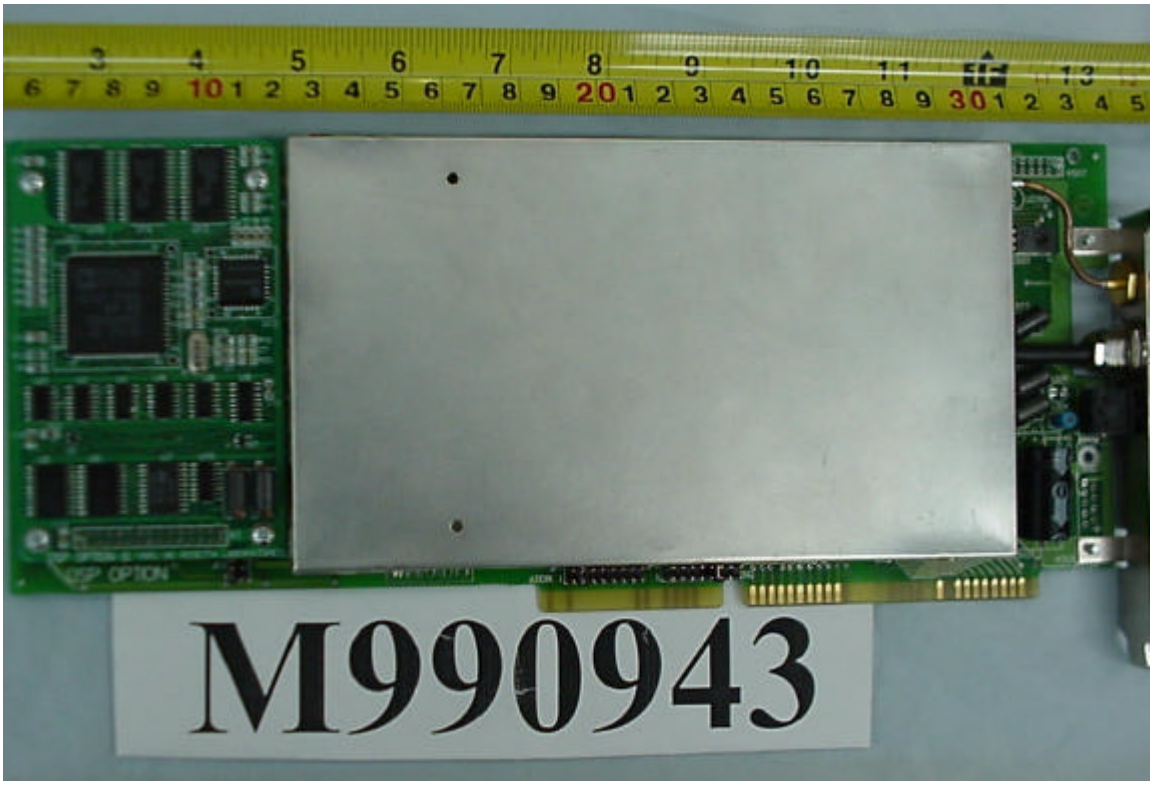
Shielded Room Test Laboratory	**Melbourne** 11m x 8m x 4m Test Chamber 8.8m x 5.8m x 3.1m Test Chamber 3.4m x 6.1m x 2.5m Test Chamber 3.4m x 7.3m x 7.5m Test Chamber			Not required
Open Area Test Site	**Melbourne** 3/10 Metre site. 1-4 metre antenna mast. 1.2 metre/400 kG Turntable. (Situated at Lerderderg Gorge, near Baccus Marsh, Victoria)	25-07-99	25-07-00	1 Year

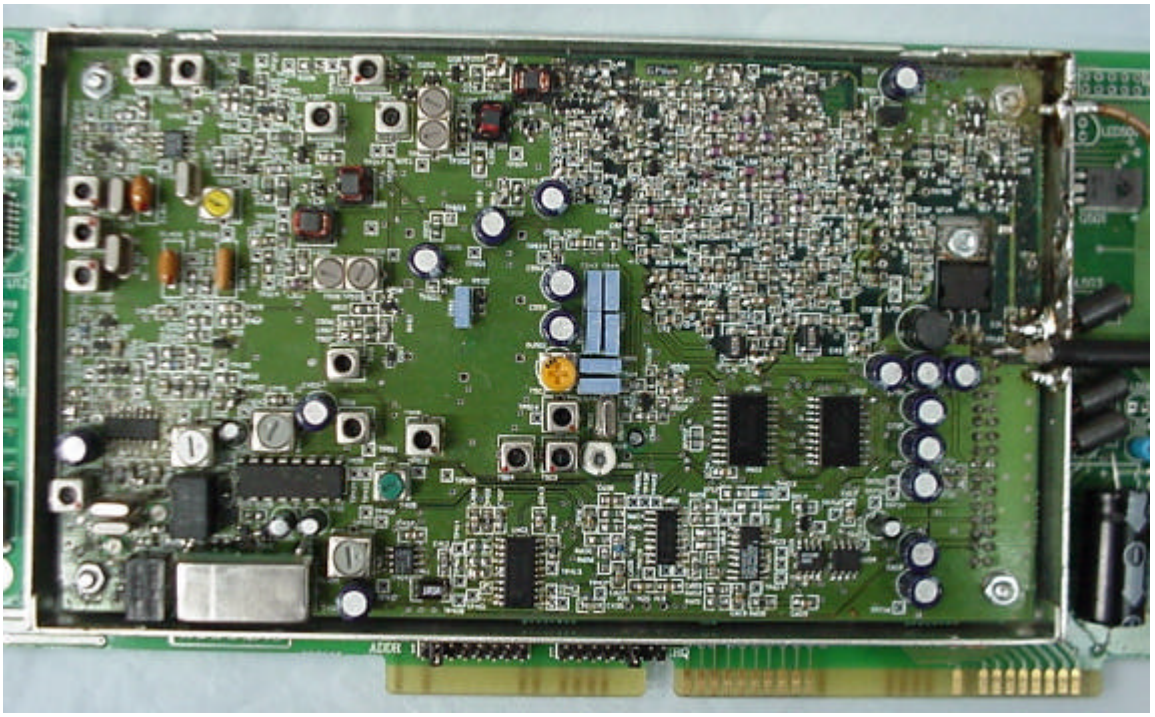
APPENDIX B1
WR3700i
PHOTOGRAPHS OF TEST SAMPLE



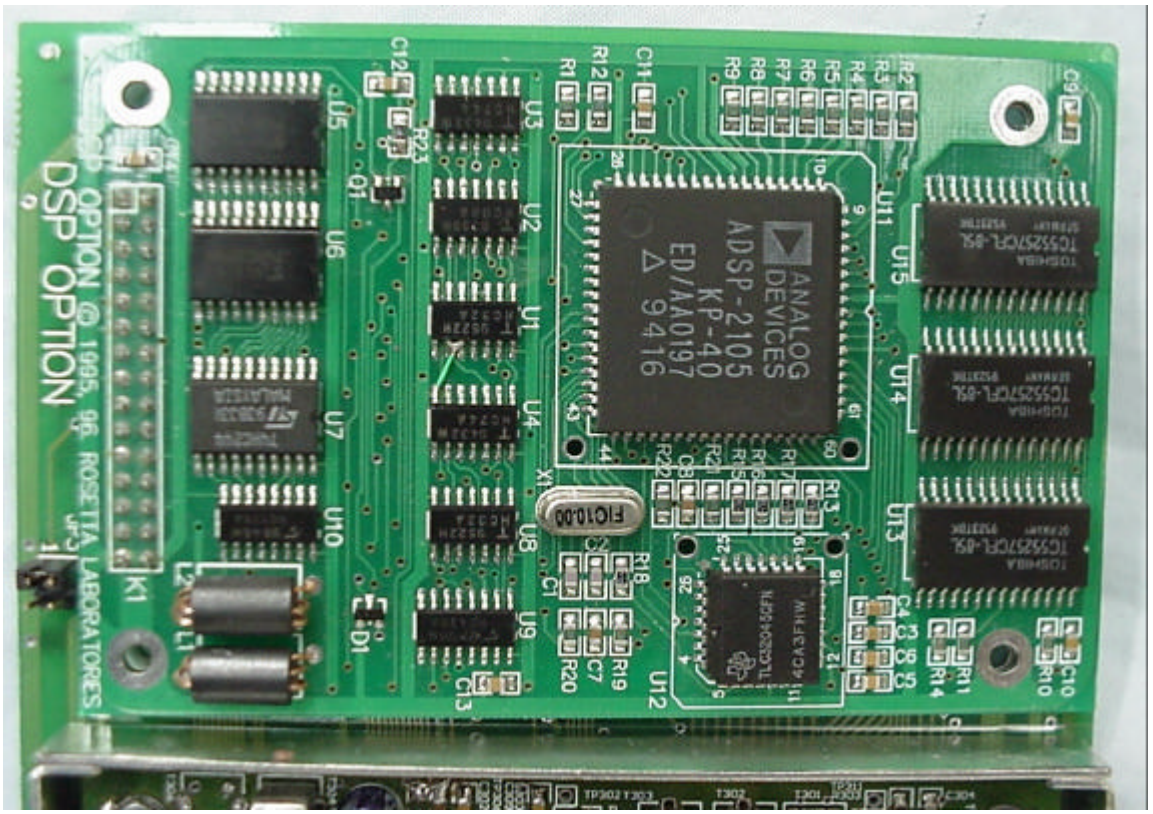


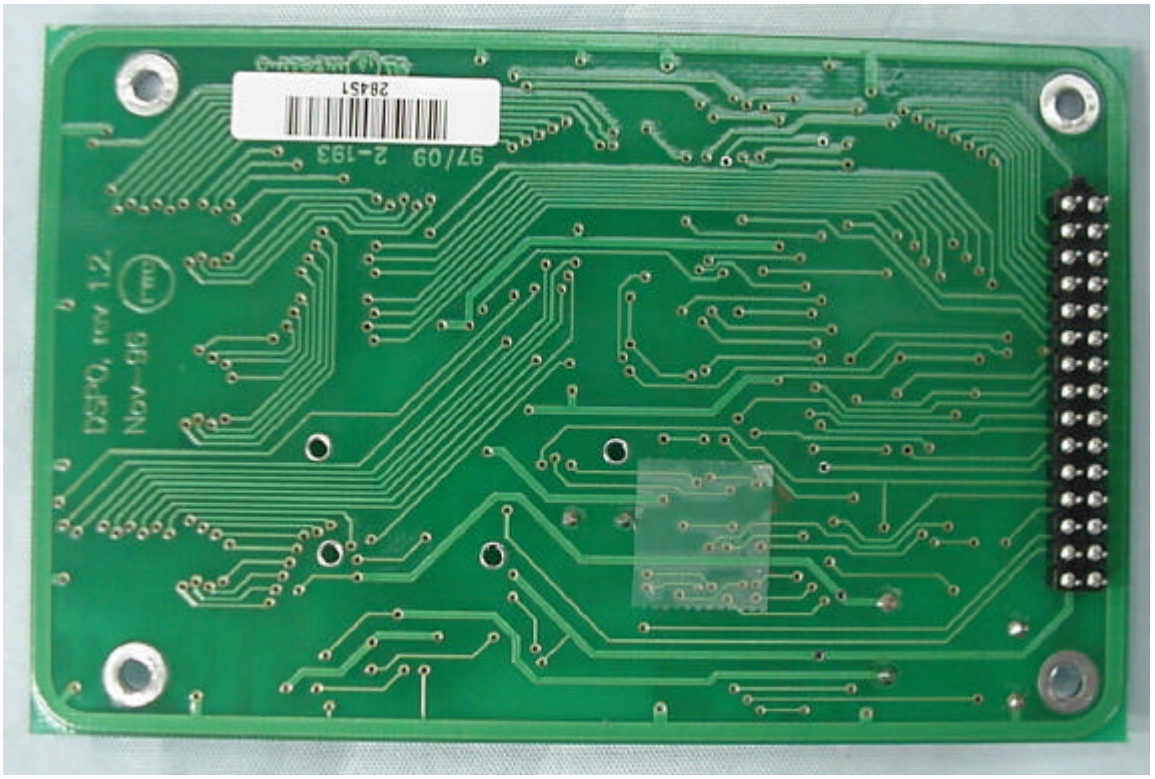
APPENDIX B2
WR3700i
PHOTOGRAPHS OF TEST SAMPLE



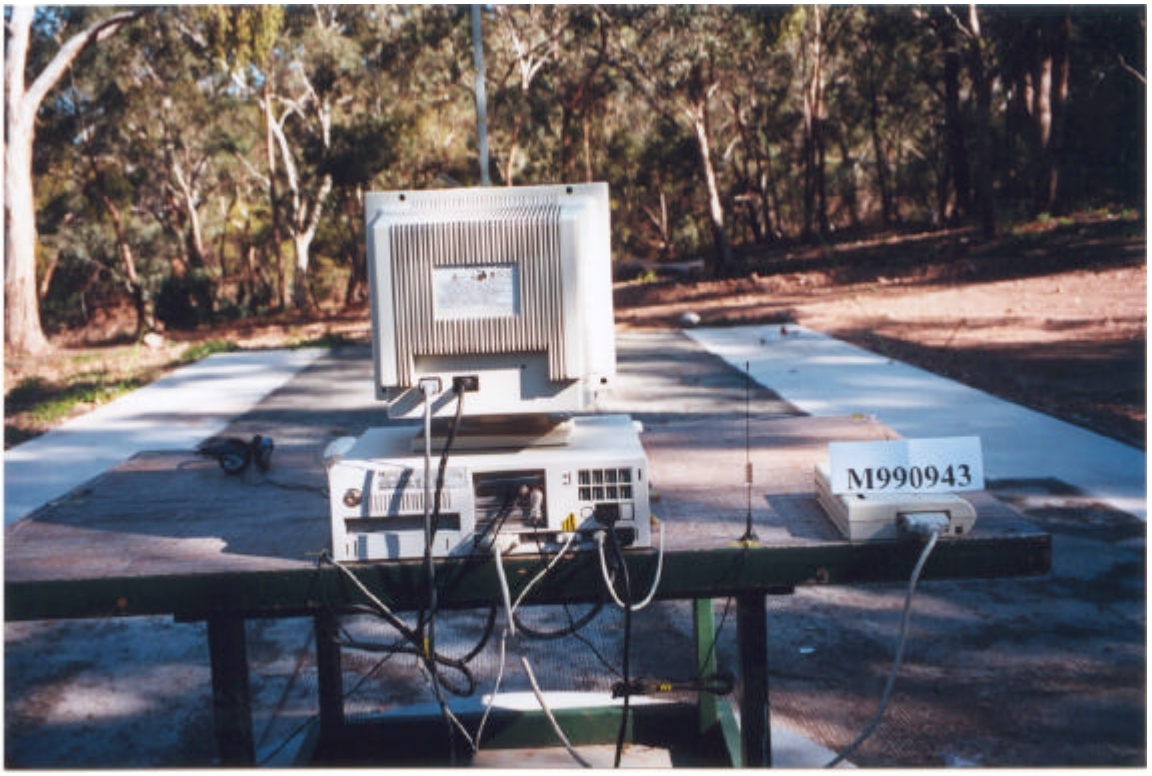


APPENDIX B3
WR3700i
PHOTOGRAPHS OF TEST SAMPLE





APPENDIX B4
WR3700i
PHOTOGRAPHS OF TEST SETUP



APPENDIX B5
WR3700i
PHOTOGRAPHS OF TEST SETUP

APPENDIX C1

GRAPHS OF EMI MEASUREMENTS FOR WR 3700i

RADIATED EMI : 30 MHz to 1000 MHz

Configuration #1:	**Tuned to 150 kHz (Bottom End Frequency)**	
Graph 1:	Vertical polarisation	30 MHz to 1000 MHz
Graph 2:	Horizontal Polarisation	30 MHz to 1000 MHz
Configuration #2:	**Tuned to 1461.325 MHz (Midband Frequency)**	
Graph 3:	Vertical polarisation	30 MHz to 1000 MHz
Graph 4:	Horizontal Polarisation	30 MHz to 1000 MHz
Configuration #3:	**Tuned to 3956.325 MHz (Top End Frequency)**	
Graph 5:	Vertical polarisation	30 MHz to 1000 MHz
Graph 6:	Horizontal Polarisation	30 MHz to 1000 MHz

CONDUCTED EMI MAINS CABLE : 0.4 MHz to 30 MHz

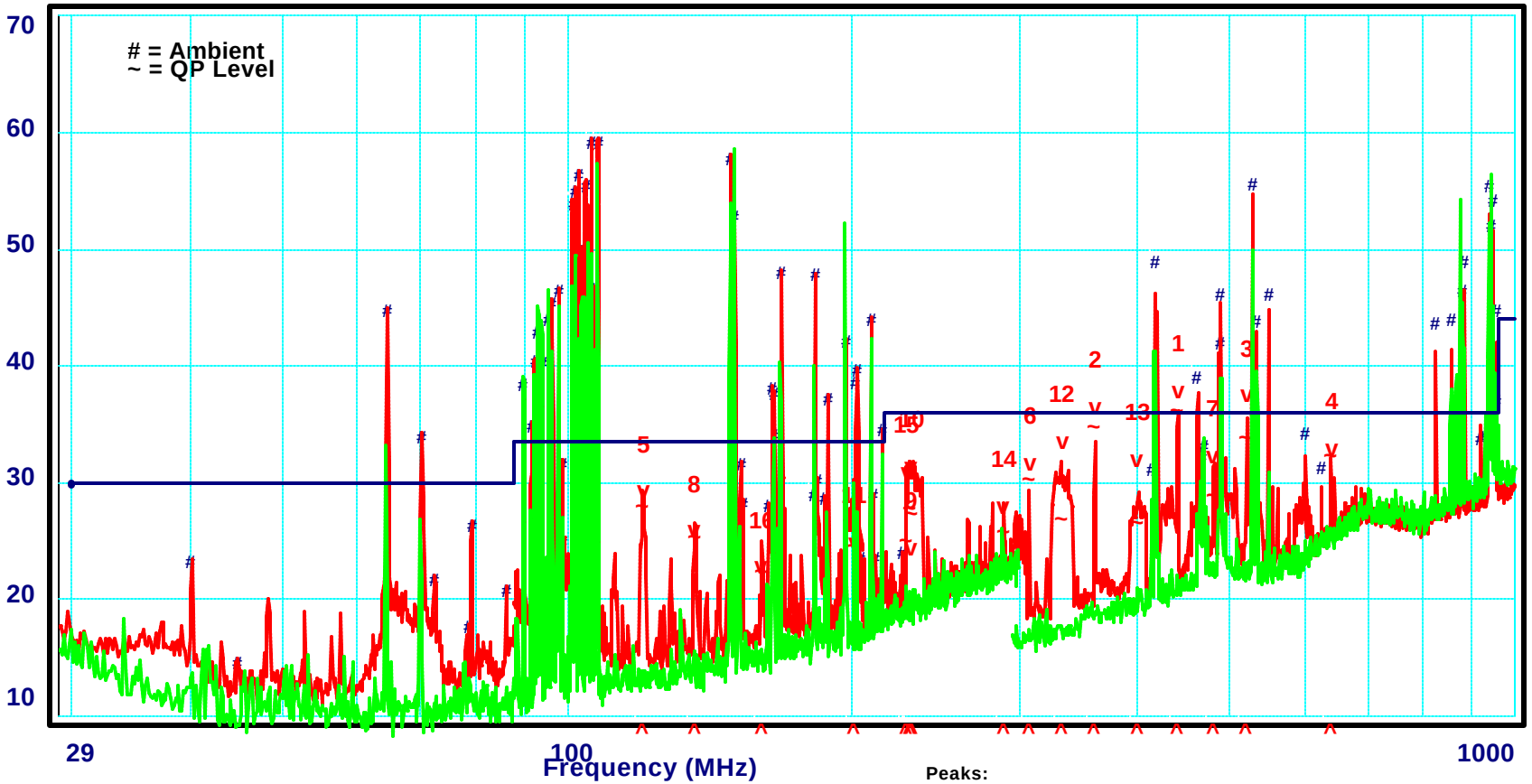
Graph 7: Active Line

Graph 8: Neutral Line

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B — **Project No:M990943** — **90943_1.PCF**

Electric Field Strength dBuV/m Peak — **Test Date: 29-09-99** — **GRAPH No. 1**



Robotron

WR3700i Tuned To 150 kHz (Bottom Edge frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Vertical Ambients
Vertical Emissions

Source:

Equipment: HP8546A TST 99B — analdata — 43 44 45 46 18 19
Transducers: LCABLE a1103009 A1360100 NOPREAMP — analdata — 33 34 35 36 49 50
Site ID: Lerderderg OATS2
Test Officer:Chieu Huynh

Peaks:

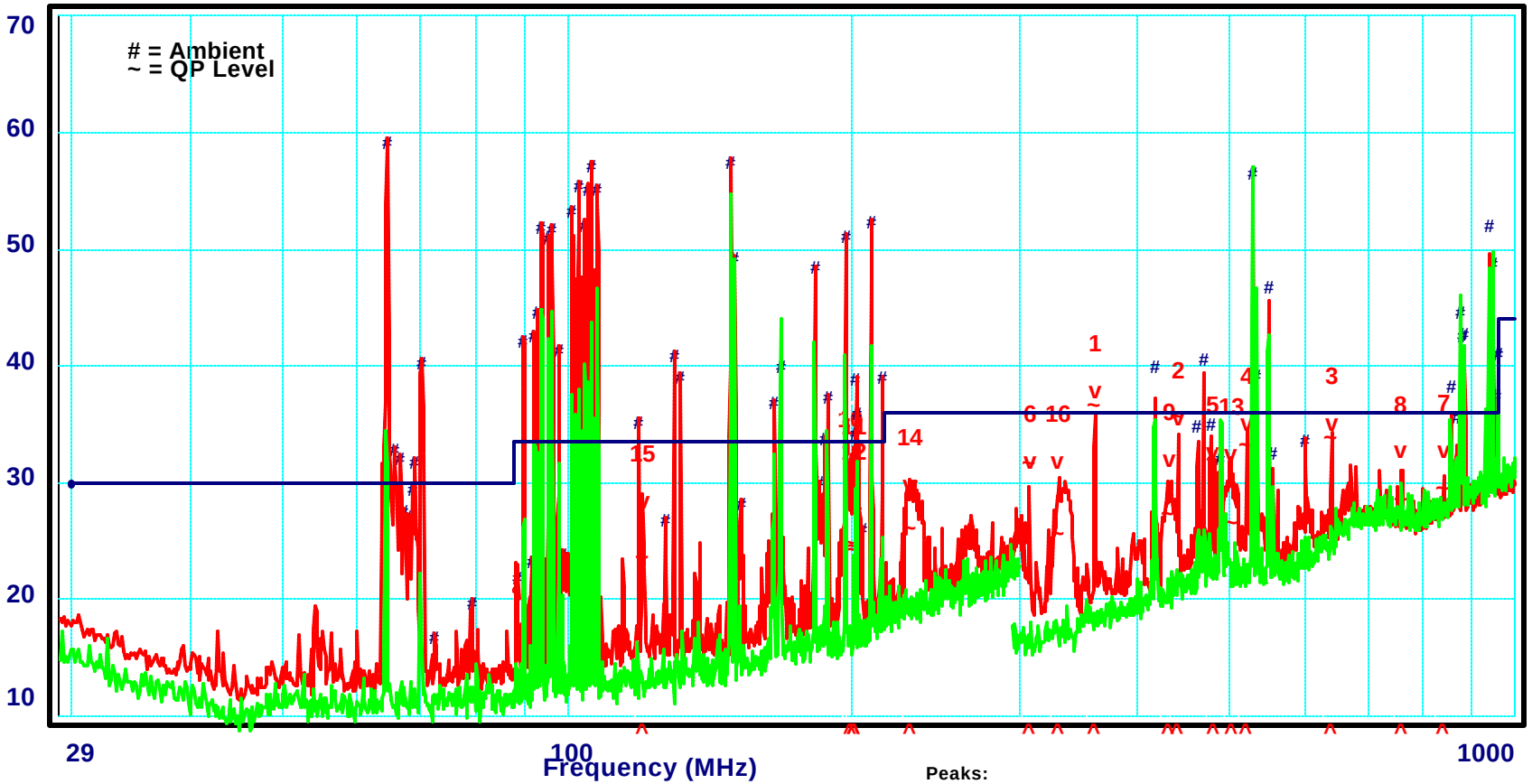
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	440.03	37.2	35.6	36.0	-.4
2	360.01	35.8	34.1	36.0	-1.9
3	520.01	36.9	33.3	36.0	-2.7
4	640.08	32.3	31.7	36.0	-4.3
5	120.18	28.7	27.3	33.5	-6.2
6	307.18	31.0	29.6	36.0	-6.4
7	480.05	31.7	28.3	36.0	-7.7
8	136.20	25.3	24.7	33.5	-8.8
9	229.75	23.8	27.2	36.0	-8.8
10	230.41	30.8	26.7	36.0	-9.3
11	200.72	24.3	24.0	33.5	-9.5
12	332.77	33.0	26.2	36.0	-9.8
13	399.37	31.4	26.0	36.0	-10.0
14	288.43	27.3	25.2	36.0	-10.8
15	228.16	30.3	24.4	36.0	-11.6
16	161.02	22.2	21.8	33.5	-11.7

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B **Project No:M990943** **90943_2.PCF**

Electric Field Strength dBuV/m Peak **Test Date: 29-09-99** **GRAPH No. 2**



Robotron

WR3700i Tuned To 150 kHz (Bottom Edge frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Horizontal Ambients
Horizontal Emissions

Source:

Equipment: HP8546A TST 99B	analdata	22 23 24 25 20 21
Transducers: LCABLE a1103009 A1360100 NOPREAMP	analdata	37 38 39 40 56 57
Site ID: Lerderderg OATS2		
Test Officer:Chieu Huynh		

Peaks:

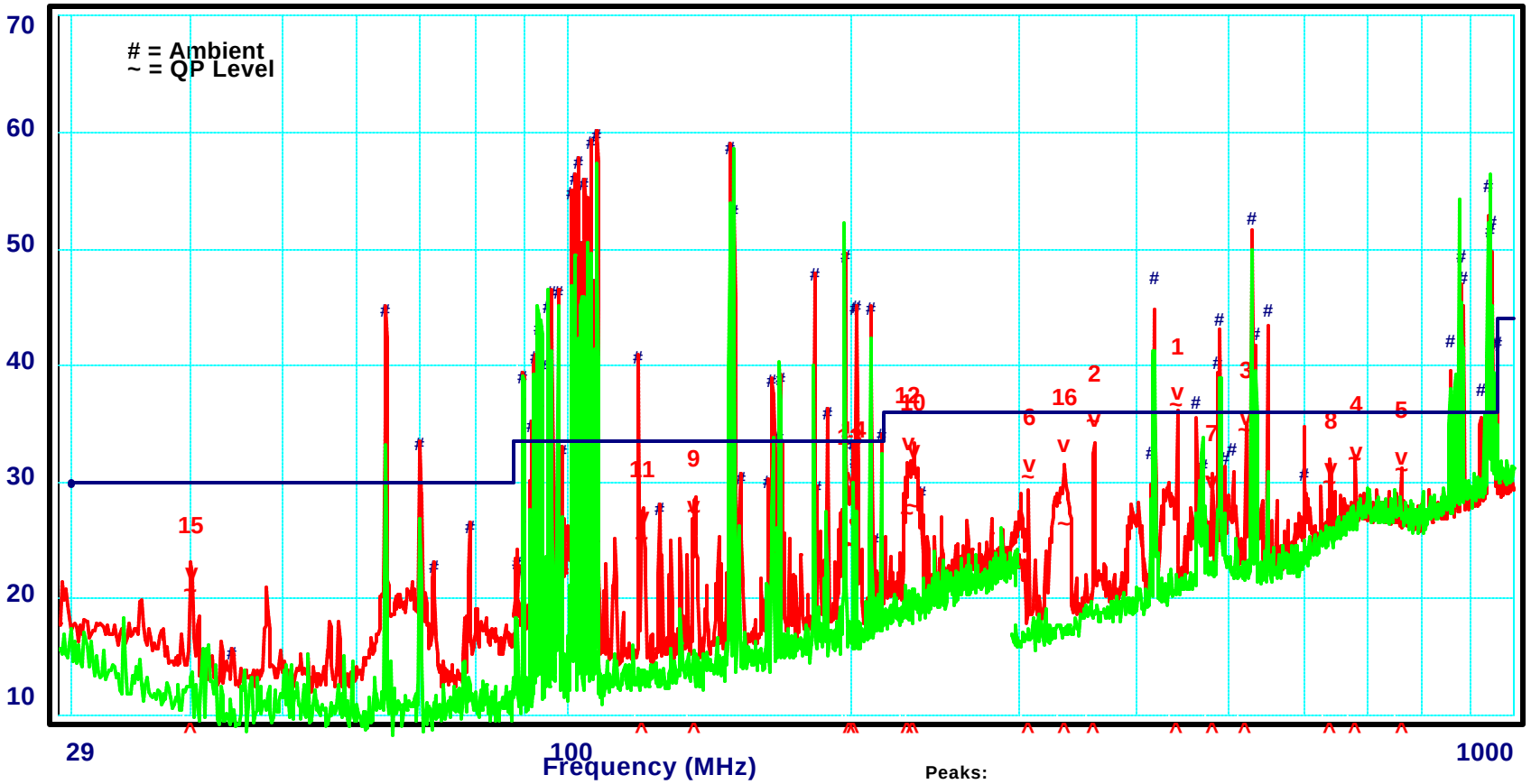
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	360.01	37.2	36.0	36.0	.0
2	440.04	35.0	35.1	36.0	-.9
3	640.09	34.4	33.2	36.0	-2.8
4	520.06	34.4	32.6	36.0	-3.4
5	480.04	32.0	31.4	36.0	-4.6
6	307.20	31.3	31.0	36.0	-5.0
7	840.09	32.1	28.9	36.0	-7.1
8	758.29	32.1	27.9	36.0	-8.1
9	430.56	31.4	26.7	36.0	-9.3
10	198.55	30.7	24.2	33.5	-9.3
11	200.79	30.2	24.0	33.5	-9.5
12	200.44	28.1	23.7	33.5	-9.8
13	501.02	31.9	25.9	36.0	-10.1
14	229.57	29.2	25.5	36.0	-10.5
15	120.18	27.8	23.0	33.5	-10.5
16	368.92	31.3	25.0	36.0	-11.0

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B — **Project No:M990943** — **90943_3.PCF**

Electric Field Strength dBuV/m Peak — **Test Date: 29-09-99** — **GRAPH No. 3**



Robotron

WR3700i Tuned To 1461.325 MHz (Midband frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Vertical Ambients
Vertical Emissions

Source:

Equipment: HP8546A TST 99B — analdata — 43 44 45 46 18 19
Transducers: LCABLE a1103009 A1360100 NOPREAMP — analdata — 45 46 47 48 52 53
Site ID: Lerderderg OATS2
Test Officer:Chieu Huynh

Peaks:

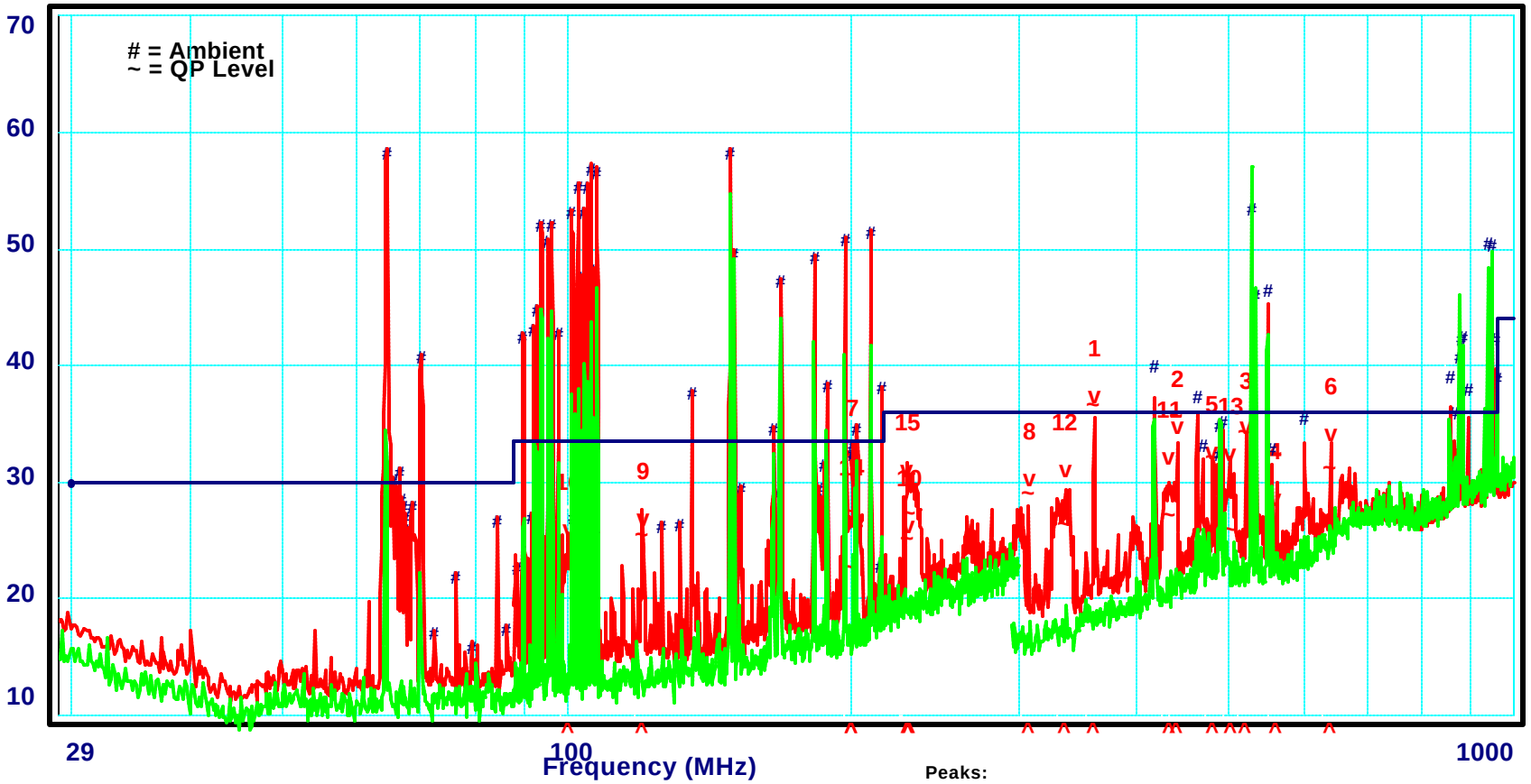
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	440.04	37.0	36.0	36.0	.0
2	360.01	34.7	34.6	36.0	-1.4
3	520.00	35.0	33.9	36.0	-2.1
4	680.04	32.0	31.4	36.0	-4.6
5	760.06	31.6	30.5	36.0	-5.5
6	307.19	31.0	29.9	36.0	-6.1
7	480.04	29.6	29.6	36.0	-6.4
8	640.05	30.6	29.4	36.0	-6.6
9	136.20	27.4	26.9	33.5	-6.6
10	232.27	32.1	27.4	36.0	-8.6
11	120.14	26.5	24.6	33.5	-8.9
12	229.08	32.8	26.7	36.0	-9.3
13	198.60	29.3	24.1	33.5	-9.4
14	200.28	29.8	24.0	33.5	-9.5
15	40.06	21.7	20.1	30.0	-9.9
16	880.08	32.6	25.8	36.0	-10.2

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B **Project No:M990943** **90943_4.PCF**

Electric Field Strength dBuV/m Peak **Test Date: 29-09-99** **GRAPH No. 4**



Robotron

WR3700i Tuned To 1461.325 MHz (Midband frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Horizontal Ambients
Horizontal Emissions

Source:

Equipment: HP8546A TST 99B
Transducers: LCABLE a1103009 A1360100 NOPREAMP
Site ID: Lerderderg OATS2
Test Officer:Chieu Huynh

analdata 22 23 24 25 20 21
analdata 41 42 43 44 54 55

Peaks:

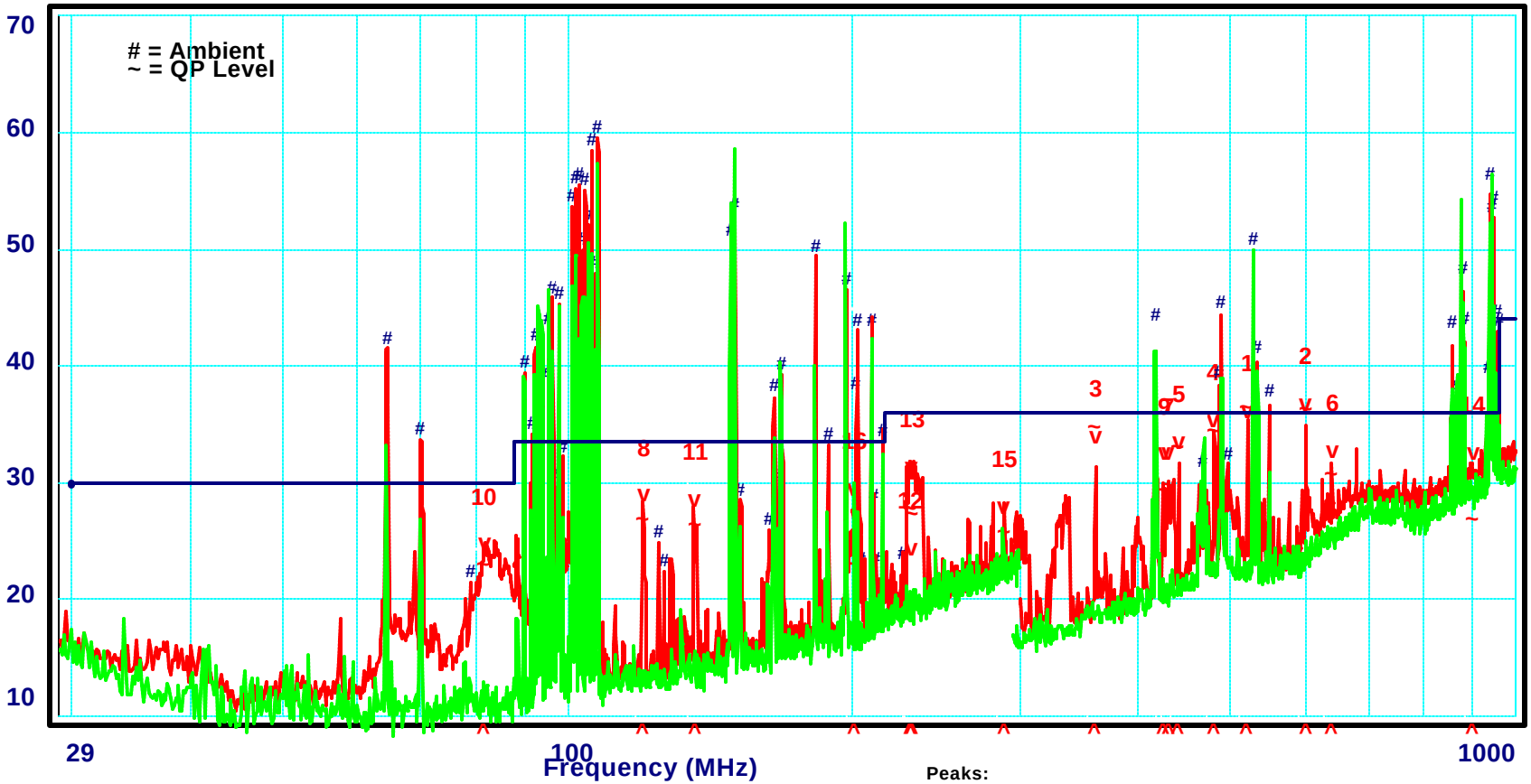
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	360.03	36.8	36.0	36.0	.0
2	440.03	34.2	35.1	36.0	-.9
3	520.04	34.1	33.7	36.0	-2.3
4	560.05	28.0	31.9	36.0	-4.1
5	480.04	32.1	31.5	36.0	-4.5
6	640.03	33.5	30.6	36.0	-5.4
7	200.05	31.7	26.9	33.5	-6.6
8	307.19	29.7	28.5	36.0	-7.5
9	120.01	26.3	24.8	33.5	-8.7
10	229.67	25.6	26.7	36.0	-9.3
11	431.85	31.5	26.6	36.0	-9.4
12	335.81	30.5	25.8	36.0	-10.2
13	500.89	31.9	25.3	36.0	-10.7
14	199.56	26.6	22.1	33.5	-11.4
15	228.43	30.5	24.6	36.0	-11.4
[illegible]	[illegible]	25.4	22.0	33.5	-11.5

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B **Project No:M990943** **90943_5.PCF**

Electric Field Strength dBuV/m Peak **Test Date: 29-09-99** **GRAPH No. 5**



Robotron

WR3700i Tuned To 3956.325 MHz (top end frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Vertical Ambients
Vertical Emissions

Source:

Equipment: HP8546A TST 99B — analdata — 43 44 45 46 18 19
Transducers: LCABLE2 a1103009 A1360100 NOPREAMP — analdata — 64 65 66 36 62 63
Site ID: Lerderderg OATS2
Test Officer:Chieu Huynh

Peaks:

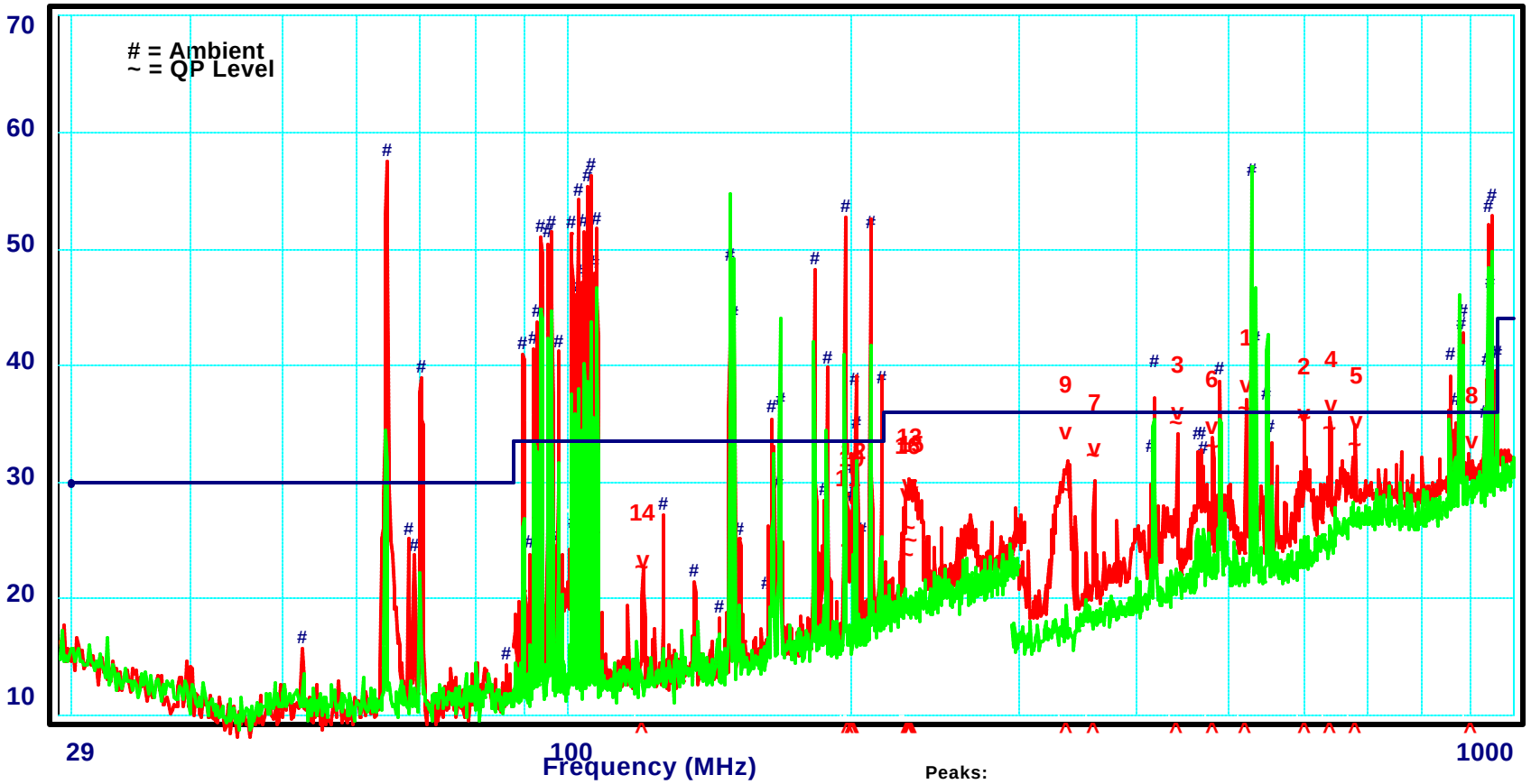
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	520.05	35.6	35.9	36.0	-.1
2	600.02	36.2	35.7	36.0	-.3
3	360.00	33.4	34.1	36.0	-1.9
4	480.07	34.7	33.9	36.0	-2.1
5	439.99	32.9	32.5	36.0	-3.5
6	640.07	32.1	30.2	36.0	-5.8
7	430.00	31.9	29.2	36.0	-6.8
8	120.11	28.4	26.3	33.5	-7.2
9	425.11	31.9	28.7	36.0	-7.3
10	81.59	24.2	22.4	30.0	-7.6
11	136.16	28.0	25.8	33.5	-7.7
12	229.75	23.8	27.2	36.0	-8.8
13	230.41	30.8	26.7	36.0	-9.3
14	900.00	32.1	26.2	36.0	-9.8
15	288.43	27.3	25.2	36.0	-10.8
[illegible]	[illegible]	28.9	22.4	33.5	-11.1

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B **Project No:M990943** **90943_6.PCF**

Electric Field Strength dBuV/m Peak **Test Date: 29-09-99** **GRAPH No. 6**



Robotron

WR3700i Tuned To 3956.325 MHz (top end frequency)

Limits:
FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:
Horizontal Ambients
Horizontal Emissions

Source:

Equipment: HP8546A TST 99B analdata 22 23 24 25 20 21
Transducers: LCABLE2 a1103009 A1360100 NOPREAMP analdata 68 69 70 40 60 61
Site ID: Lerderderg OATS2
Test Officer:Chieu Huynh

Peaks:

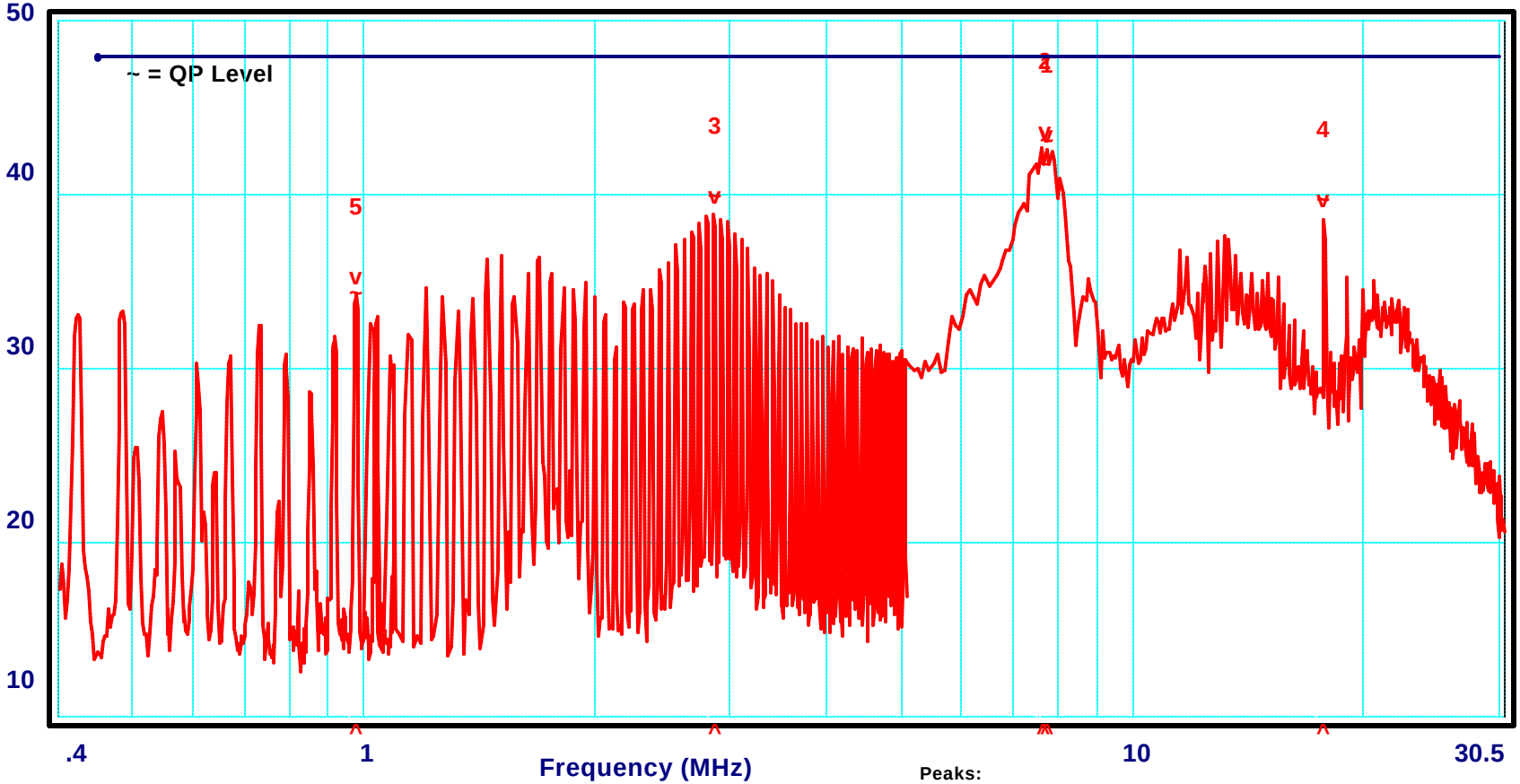
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	520.05	37.7	35.7	36.0	-.3
2	600.05	35.3	34.9	36.0	-1.1
3	440.06	35.5	34.5	36.0	-1.5
4	640.09	35.9	34.0	36.0	-2.0
5	680.05	34.6	32.6	36.0	-3.4
6	479.99	34.2	32.5	36.0	-3.5
7	360.00	32.2	31.7	36.0	-4.3
8	900.00	32.9	28.8	36.0	-7.2
9	336.50	33.7	28.7	36.0	-7.3
10	199.27	27.4	24.7	33.5	-8.8
11	198.17	25.7	23.9	33.5	-9.6
12	200.44	28.1	23.7	33.5	-9.8
13	229.57	29.2	25.5	36.0	-10.5
14	120.16	22.7	22.1	33.5	-11.4
15	230.90	28.5	24.4	36.0	-11.6
16	232.60	28.4	23.1	36.0	-12.9

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B — **Project No:M990943** — **90943_7.PCF**

Conducted Emissions dBuV Peak — **Test Date: 20-09-99** — **GRAPH No. 7**



Robotron

WR3700i

Limits:
FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:
Active Line

Source:
analdata 1 2 3

Equipment: HP8574B TST 99B
Transducers: C070997 L0150502 NOPREAMP
Site ID: Melb Room#1
Test Officer: Praveen Rao

Peaks:

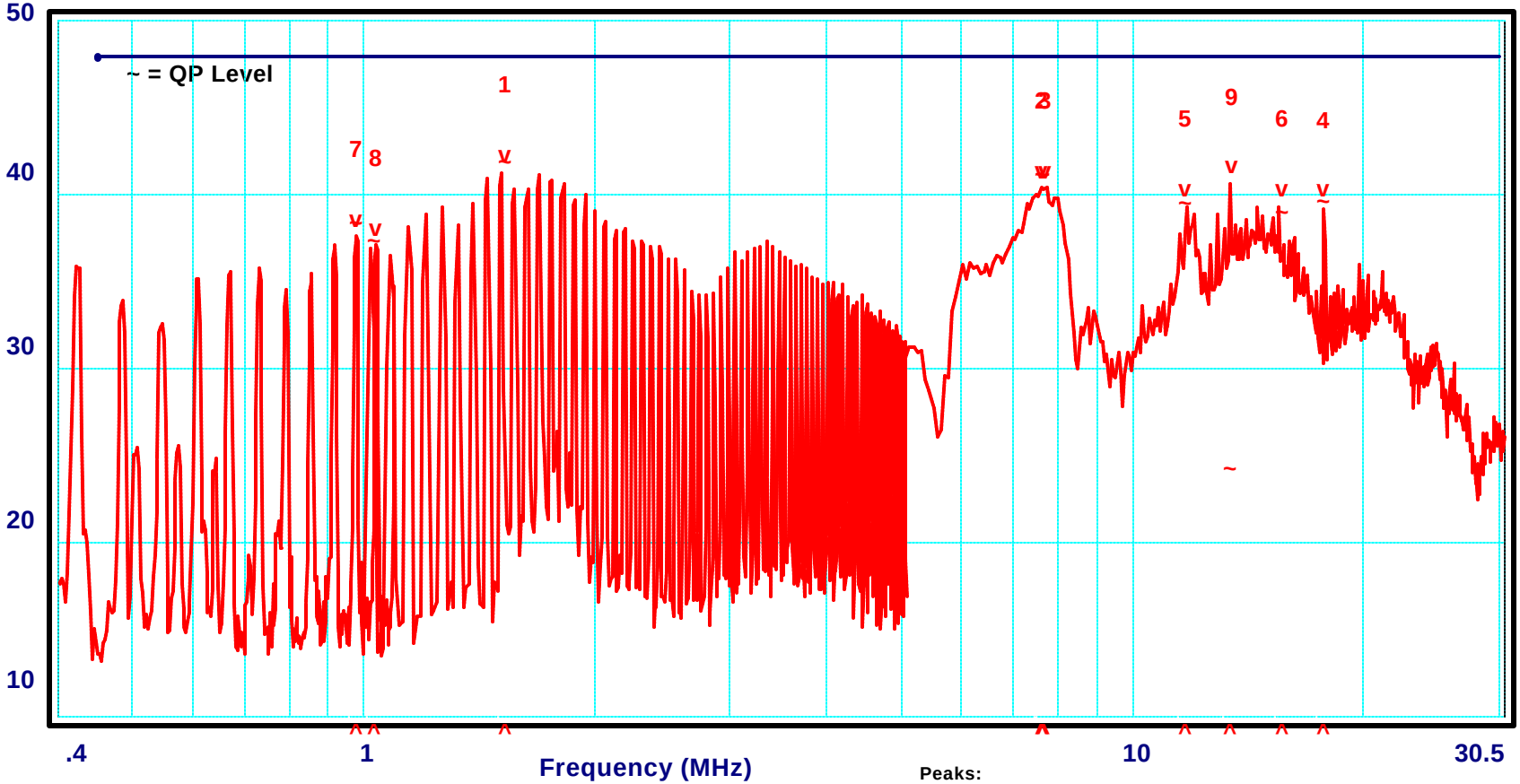
No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	7.74	42.4	42.1	48.0	-5.9			
2	7.68	42.6	40.7	48.0	-7.3			
3	2.87	38.9	38.9	48.0	-9.1			
4	17.70	38.6	38.7	48.0	-9.3			
5	.98	34.3	33.3	48.0	-14.7			

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B — **Project No:M990943** — **90943_8.PCF**

Conducted Emissions dBuV Peak — **Test Date: 20-09-99** — **GRAPH No. 8**



Robotron

WR3700i

Limits:
FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:
Neutral Line

Source:
analdata 4 5 6

Equipment: HP8574B TST 99B
Transducers: C070997 L0150502 NOPREAMP
Site ID: Melb Room#1
Test Officer: Praveen Rao

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	1.52	41.2	40.8	48.0	-7.2			
2	7.62	40.3	40.1	48.0	-7.9			
3	7.68	40.3	40.1	48.0	-7.9			
4	17.70	39.2	38.5	48.0	-9.5			
5	11.70	39.3	38.4	48.0	-9.6			
6	15.66	39.3	37.9	48.0	-10.1			
7	.98	37.6	37.3	48.0	-10.7			
8	1.03	37.0	36.3	48.0	-11.7			
9	13.42	40.6	23.2	48.0	-24.8			

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 9260
Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 4019

APPENDIX D

FCC ID LABELLING

APPENDIX E

USER INSTRUCTIONS

UPLOADED UNDER EXHIBITS

APPENDIX F

Mobile Telephone Band Exclusion

UPLOADED UNDER EXHIBITS

APPENDIX G

Local Oscillator Frequencies

UPLOADED UNDER EXHIBITS

APPENDIX H

TEST SAMPLE CIRCUIT COMPONENT LISTING

UPLOADED UNDER EXHIBITS

APPENDIX I

TEST SAMPLE CIRCUIT ASSEMBLY DIAGRAMS

UPLOADED UNDER EXHIBITS