EMC Technologies Pty Ltd
A.C.N. 057 105 549
57 Assembly Drive
Tullamarine Victoria Australia 3043

Ph: + 613 9335 3333
Fax: + 613 9338 9260
email: melb@emctech.com.au

EMI TEST REPORT
for
CERTIFICATION of
FCC PART 15.225 TRANSMITTER

FCC ID:	PDEMEDIOL120
Manufacturer:	Gemplus Tag Australia Pty Ltd
Test Sample:	Medio L120 Long Range Reader
Report Number:	M000840FCC-R (Replacement for Report M000840FCC)
Issue Date:	17 January 2000

This document must not be copied or reproduced, except in full without the written permission of the Manager, EMC Technologies Pty Ltd. Copyright is owned by EMC Technologies Pty Ltd.

5292

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.

EMI TEST REPORT
FOR
CERTIFICATION OF FCC PART 15.225 TRANSMITTER

FCC ID: PDEMEDIOL120

EMC Technologies Report Number: M000840FCC-R
Date: 17 January 2001

CONTENTS

1. SUMMARY of TEST RESULTS

2. GENERAL INFORMATION

3. RADIATED EMI RESULTS

4. CONDUCTED EMI RESULTS

5. FREQUENCY TOLERANCE

6. CONCLUSION

APPENDIX A. MEASUREMENT INSTRUMENTATION DETAILS

APPENDIX B. TEST SAMPLE PHOTOGRAPHS

APPENDIX C. TEST SAMPLE SCHEMATIC

APPENDIX D. TEST SAMPLE PCB LAYOUTS

APPENDIX E. TEST SAMPLE PCB OVERLAYS

APPENDIX F. LABELLING - DRAWING AND LOCATION

APPENDIX G. GRAPHS of EMI MEASUREMENT

APPENDIX H. USER INSTRUCTIONS (MANUAL)

EMI TEST REPORT FOR CERTIFICATION OF FCC PART 15.225 TRANSMITTER

Report Number:	M000840FCC-R
Test Sample:	Long Range Reader
Model Number:	Medio L120
Serial Number:	AC0030100162
Part Number:	HWP100543
FCC ID:	PDEMEDIOL120
Manufacturer:	Gemplus Tag Australia
Tested for:	Gemplus Tag Australia First Floor, 99 Frome Street Adelaide SA 5000 Australia PO Box 99 Rundle Mall, SA 5000 Australia
Phone:	+ 61 8 8223 5802
Fax:	+ 61 8 8223 3720
Responsible Party:	Alfio Grasso Engineering Manager Gemplus Tag Australia
Equipment Type:	Intentional Radiator, Low Power Transmitter
Test Standards:	FCC Part 15 Section 225 Intentional Radiators. ANSI C63.4-1992 OET Bulletin No. 63
Test Dates:	1st to 14th September 2000
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

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.
This document shall not be reproduced, except in full.

5292

EMI TEST REPORT FOR CERTIFICATION
of
FCC PART 15.225 TRANSMITTER

Medio L120 Long Range Reader

1.0 SUMMARY of RESULTS

This report details the results of EMI tests and measurements performed on the Medio L120 Long Range Reader in accordance with the Federal Communications Commission (FCC) regulations as detailed in Title 47 CFR, Part 15 Rules for intentional radiators. All results, and photographs of the EUT are detailed in this report. The EUT complied with requirements for fundamental frequencies and spurious emissions of section 15.225.

Carrier Signal Field Strength:	Complied, margin of	8.2 dB
Out of Band Emissions:	Complied, margin of	2.3* dB
Conducted Emissions:	Complied, margin of	1.0* dB
Frequency Tolerance:	Complied	

The measurement procedure was in accordance with ANSI C63.4-1992, and OET Bulletin No. 63. The instrumentation conformed to these requirements.

* Refer to Secion 6.0 Conclusion

2.0 GENERAL INFORMATION

2.1 General Description of Test Setup

Test Sample:	Long Range Reader
Model Number:	Medio L120
Serial Number:	AC003010162
Part Number:	HWP100543
FCC ID:	PDEMEDIOL120
Equipment Type:	Intentional Radiator, Low Power transmitter

2.2 Technical Specifications

Refer to Appendix H for user instructions (manual)

2.3 Test sampe configurations

The EUT was connected to HP Vectra PC via a 2m shielded RS232 cable. Monitor, mouse, keyboard and printer were connected to the PC. For the purpose of the test, an SMA-BNC antenna terminal connector was used.

The EUT was configured to continuously transmit during the tests. Testing were performed twice: once with the EUT's small antenna and once with its large antenna. The antennas were oriented to

maximise the emissions. Initial tests were first performed with the antennas flat on the table. The worst case was found to be with the transmitt antenna in the upright (vertical) position.

2.4 Test Sample Functional Description

Refer to Appendix H for user instructions (manual)

2.5 Support Equipment

Host PC: HP Vectra VE
Model: DTPC-17
Serial No. SG94072639

Monitor Lymic (Radiated Tests)
Serial No: 700601117
FCC ID: I8TKY145V34D

Monitor View Master 15A (Conducted Tests)
Model: 215ADX
Serial No: A350FE82216
FCC ID: IRH215ADX

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

Mouse: Microsoft
Serial No: 00621183
FCC ID: C3KKS8

Printer: DI Conix (Radiated Tests)
Model: 150
Serial: AB6044883
FCC ID: E759WG-RBCN150

Printer: HP Deskjet 829 Cxi (Conducted Tests)
Model: C4531A
Serial: SG72K1K110
FCC ID: B94C4531X

2.6 Test Procedure

Radiated emissions measurements were performed in accordance with the procedures of ANSI C63.4-1992 Radiated emission pre-scan tests from 9 kHz to 30 MHz were initially performed in the semi-anechoic chamber at an EUT distance of 3 metres. Final measurements were performed at 10 metres at the OATS. Tests in the range 30 – 1000 MHz were performed at an EUT distance of 10 metres at the OATS. OET Bulletin 63 was used for reference.

2.7 Test Facility

FCC Registration
Radiated Emission measurements in the ranges 9 kHz – 30 MHz (H-Field) and 30 MHz - 1000 MHz (E-Field) were performed at EMC Technologies open area test site (OATS) situated at Lerderderg Gorge, near the town of Bacchus Marsh, Victoria, Australia. Radiate Emission pre-scanning and 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 24, 1999, **FCC Registration Number 90560**.

EMC Technologies Pty. Ltd. is also accredited by NATA (National Association of Testing Authorities) for most parts of FCC Part 15. NATA has Mutual Recognition Agreement (MRA) with A2LA and NVLAP.

2.8 Units of Measurements

Radiated Emissions
Measurements are reported in units of dB relative to one microvolt per metre (dBμV/m). The measurement distance was 10 metres from the EUT for both ranges: 30 – 1000 MHz and 9 kHz–30 MHz.

Conducted Emissions
Measurements are reported in units of dB relative to 1 microVolt. (dBμV)

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 Agilent Technologies Australia Limited. All equipment calibration is traceable to Australia national standards at the National Measurements Laboratory (NML). The Loop Antenna and reference Dipole antennas were calibrated by NML and the working antennas (biconical, 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.

2.10 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 AM, HF, FM radio, VHF and UHF television bands. Radiated pre-scan measurements were performed in the semi-anechoic enclosure to check for possible masking of radiated emissions at the frequencies where the OATS ambient signals exceeded the test limit.

3.0 RADIATED EMISSION MEASUREMENTS

3.1 Test Procedure

The EUT was set up on the table top at a total height of 80 cm above the ground plane and operated in accordance with section 2 of this report. Investigative tests were first performed with the EUT Loops placed flat on the table and then in the upright (vertical) position. Final measurements were performed with the EUT Loop antenna in the upright position. The EMI Receiver was operated under software control via the PC Controller.

3.1.1 30 – 1000 MHz Range

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 receiver antenna heights. Each significant peak was then investigated and maximised by rotating the turntable and scanning the height of the receiver 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 receive antenna polarisation.

3.1.2 0.009 – 30 MHz Range

The 0.009 MHz to 30 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. The receive loop antenna was set to 1m above the ground plane 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. The orientation of the receive loop antenna was varied to ensure that the emissions were maximised.

3.2 Plotting of Measurement Data for Radiated Emissions

3.2.1 30 – 1000 MHz

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 hand side of the graph. For radiated EMI, each numbered peak is listed as a frequency, peak field strength, Quasi-peak field strength, limit, antenna height 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 AFTER the MAX-HOLD trace has been stored. This will be apparent when the peaks list at the foot of the graphs shows the quasi peak level higher than the peak level.

3.2.2 0.009 – 30 MHz Range

The stored measurement data was combined to form a single graph which comprised of all the frequency sub-ranges over the range 0.009 -30 MHz. The H-fields were measured at the OATS and the plot shown is from the Semi-Anechoic Chamber pre-scan. The worst case radiated EMI *peak* measurements as recorded using the Max-Hold data are presented as the **RED** trace. The fundamental frequency was measurements were performed at the OATS.

3.3 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 dBmV/m

3.4 Radiated Field Strength Measurement Results

9 kHz to 30 MHz Field Strength Measurements at the OATS at 10m

Tx Antenna	Frequency MHz	Peak Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Small Antenna	13.56	81.8	90	-8.2
Large Antenna	13.56	79.0	90	-11.0

The measurement uncertainty was 3.7 dB. Refer to graphs 11 and 12 in Appendix G. The out of band emissions between 0.009 – 30MHz were measured at the at the OATS. Refer to graphs 9 and 10 in Appendix G.

30 – 1000 MHz Field Strength Emissions – Small EUT Loop Antenna

Rx Antenna Polarisation	Frequency MHz	Quasi-Peak Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Horizontal	171.80	30.4	33.5	- 3.1*
Vertical	78.29	26.2	30.0	- 3.8
Vertical	78.35	23.5	30.0	- 6.5
Vertical	77.01	21.3	30.0	- 8.7
Vertical	705.34	26.9	36.0	- 9.1

*Notice of this reading should be taken with a measurement uncertainty of 3.7 dB.

Refer to graphs 5, 6 and 11 in Appendix G.

30-1000 MHz Field Strength Emissions – Large Loop Antenna

Rx Antenna Polarisation	Frequency MHz	Quasi-Peak Level dBmV/m	Limit @ 10m dBmV/m	Result ±dB
Vertical	56.06	27.7	30.0	- 2.3*
Vertical	32.02	26.8	30.0	- 3.2*
Horizontal	88.00	26.7	30.0	- 3.3*
Vertical	78.29	24.5	30.0	- 5.5
Horizontal	88.05	27.0	33.5	- 6.5

*Notice of these readings should be taken with a measurement uncertainty of 3.7 dB.

Refer to graphs 7, 8 and 12 in Appendix G

Summary of Results

The highest radiated spurious emission was 2.3 dB below the limit at 56.06 MHz for Vertical Polarisation. The fundamental frequency was 8.2 dB below the specified limit at 13.56 MHz for the large Tx Loop.

4.0 CONDUCTED EMISSIONS RESULTS

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 0.45 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. The EUT transmit loop antennas were moved to maximise emissions. 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.

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 values were also plotted on the graph.

4.5 Measurement Data-Conducted Emissions

Small Antenna

Frequency MHz	Line Act/Neutral	Rx Level dBmV	Corrected Level dBmV	Limit dBmV	Result ± dB
13.56	Neutral	45.7	46.2	48.0	- 1.8 *
13.56	Active	45.8	45.9	48.0	- 2.0
16.00	Active	42.3	42.6	48.0	- 5.4
16.00	Neutral	42.4	42.6	48.0	- 5.4
12.44	Neutral	41.4	41.6	48.0	- 6.4
15.41	Active	39.7	40.6	48.0	- 7.4

*Notice of this reading should be taken with a measurement uncertainty of 2.0 dB.

The highest conducted emission level was 46.2 dBµV at 13.56 MHz. Refer to graphs 1 and 2 in Appendix G.

Large Antenna

Frequency MHz	Line Act/Neutral	Rx Level dBmV	Corrected Level dBmV	Limit dBmV	Result ± dB
13.56	Active	46.9	47.0	48.0	- 1.0 *
13.56	Neutral	46.9	46.9	48.0	- 1.1 *
16.00	Active	42.0	42.7	48.0	- 5.3
16.00	Neutral	42.0	42.6	48.0	- 5.4
15.41	Neutral	40.0	40.5	48.0	- 7.5
15.41	Active	40.2	40.5	48.0	- 7.5

*Notice of these readings should be taken with a measurement uncertainty of 2.0 dB.

The highest conducted emission level was 47.0 dBµV at 13.56 MHz.
Refer to graphs 3 and 4 in Appendix G.

4.6 Results of Conducted Emission Measurement

The EUT complied with the FCC Part 15 Class B limits with a worst case margin of 1.0 dB.

5.0 FREQUENCY TOLERANCE

The frequency tolerance of the carrier signal was within 0.01% of the operating frequency over the temperature variation of –20 degrees C to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at the temperature of 20 degrees C.

The maximum frequency tolerance over the temperature variation of –20 to +50 degrees was 149 Hz for large antenna and 137 Hz for small antenna.

The maximum frequency tolerance for a variation in the primary supply voltage from 85% to 115% was 50 Hz for large antenna and 50 Hz for small antenna.

The EUT complied with the frequency tolerance of the carrier signal with a worst case of 0.0011%

6.0 CONCLUSION

The MedioL120 Long Range Reader, FCC ID: PDEMEDIOL120 complied with the requirements of the FCC Parts 2 and 15 Rules for low power transmitter tested in accordance with 15.225. The results were as follows:

Carrier Signal Field Strength:	Complied, worst case margin of 8.2 dB.
Out of Band Emissions:	Complied, worst case margin of 2.3* dB.
Conducted Emissions:	Complied, worst case margin of 1.0* dB.
Frequency Tolerance:	Complied.

The recorded levels of radiated and conducted EMI were within the measurement uncertainty of 3.7 dB and 2.0 dB respectively.

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	HP8574B CISPR Receiver Sn.3146A01297 including MIL-STD-462 Bandwidths	08/02/00	08/02/01	1 YEAR *2
	HP 8546A Sn. 3549A00290 EMI Receiver	24/08/00	24/08/01	1 YEAR *2
	HP 8593EM s/n 3412A00105	27/03/00	27/03/01	1 YEAR *2
ANTENNAS	EMCO 93110B BICONICAL	08/01/00	08/01/01	I YEAR *3
	20 - 300MHz Sn. 9804-3094			
	EMCO 3146A LOG PERIODIC	24/02/00	24/02/01	1 YEAR *3
	300 -1000MHz Sn. 9208-1205			
	EMCO 6502 ACTIVE LOOP	02/12/99	02/12/00	1 YEAR *1
	0.009 – 30MHz Sn. 9108-2660			
LISN	EMCO 3825/2 50Ù / 50 ìH	20/05/99	20/05/02	3 YEARS *1
	0.009 – 30MHzSn.9506-2379			

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 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			*3
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)	31/07/00	31/07/01	1 Year *3

APPENDIX B1
PHOTOGRAPHS OF TEST SETUP

Radiated Emissions Test-Setup: Small Antenna

APPENDIX B2
PHOTOGRAPHS OF TEST SETUP

Radiated Emissions Test-Setup: Large Antenna

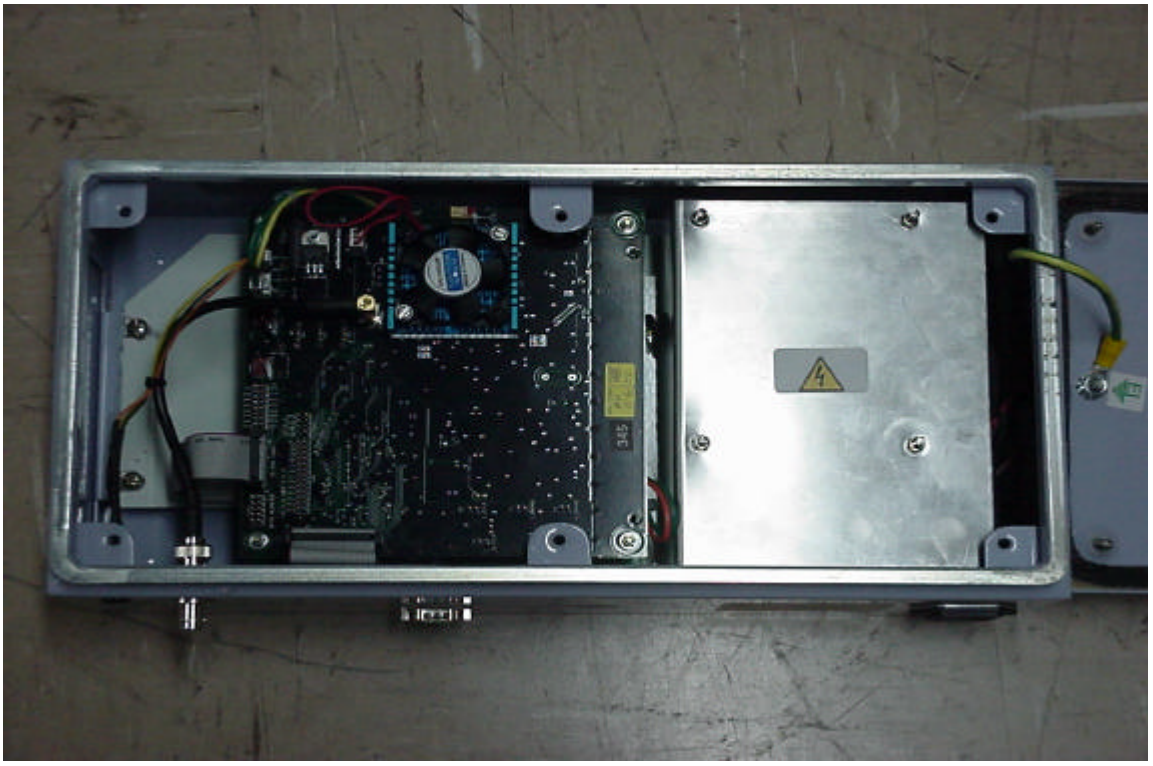
APPENDIX B3
PHOTOGRAPHS OF TEST SAMPLE

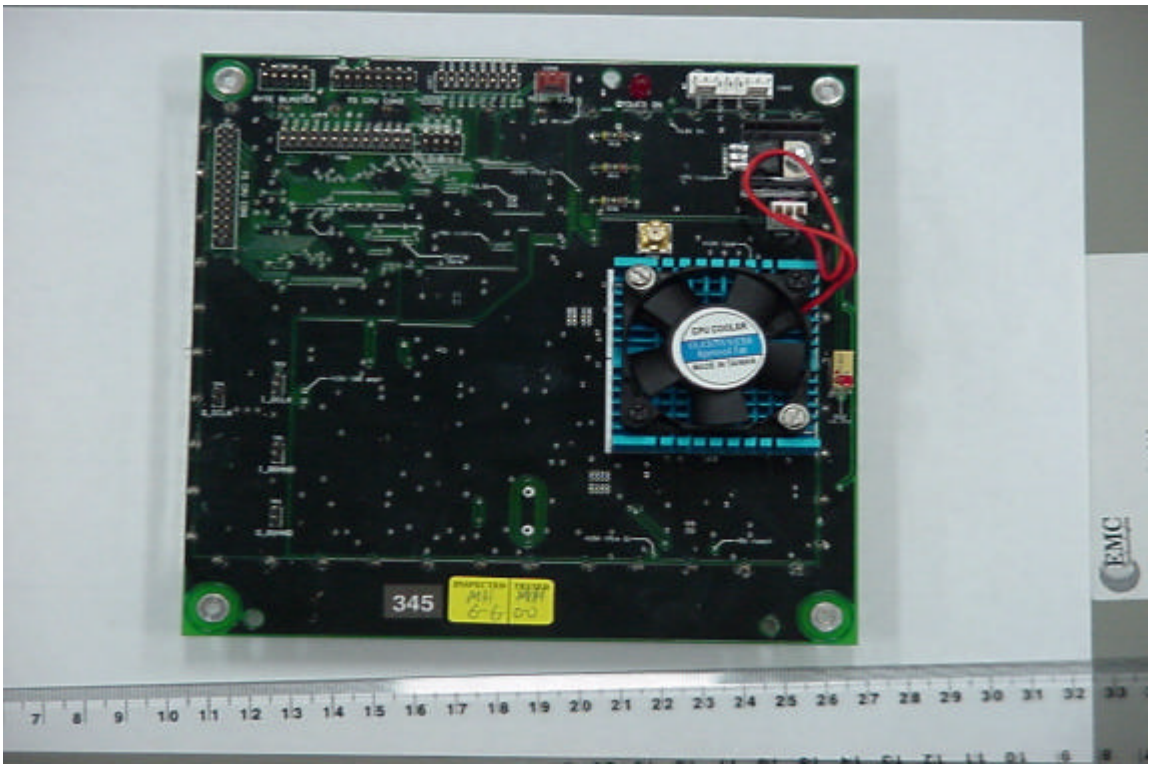
Conducted Emissions Test-Setup: Small Antenna

Conducted Emissions Test-Setup: Large Antenna

APPENDIX B4
PHOTOGRAPHS OF TEST SAMPLE

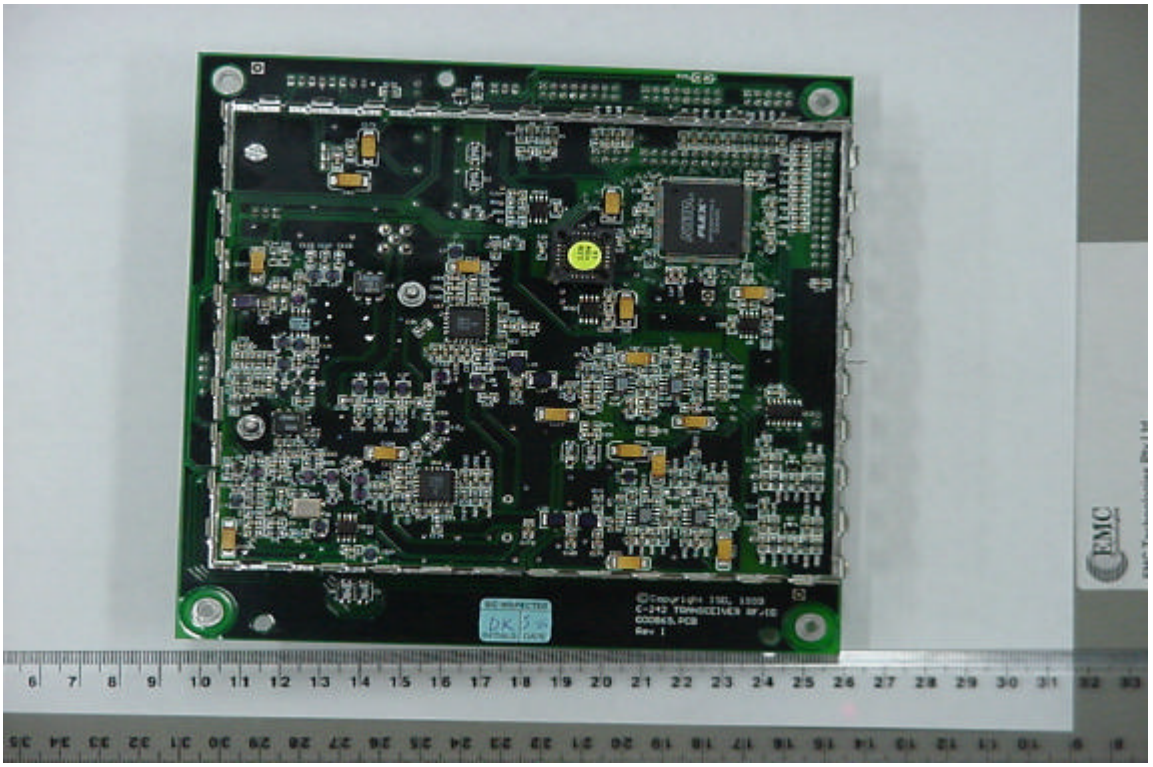
Internal Photos

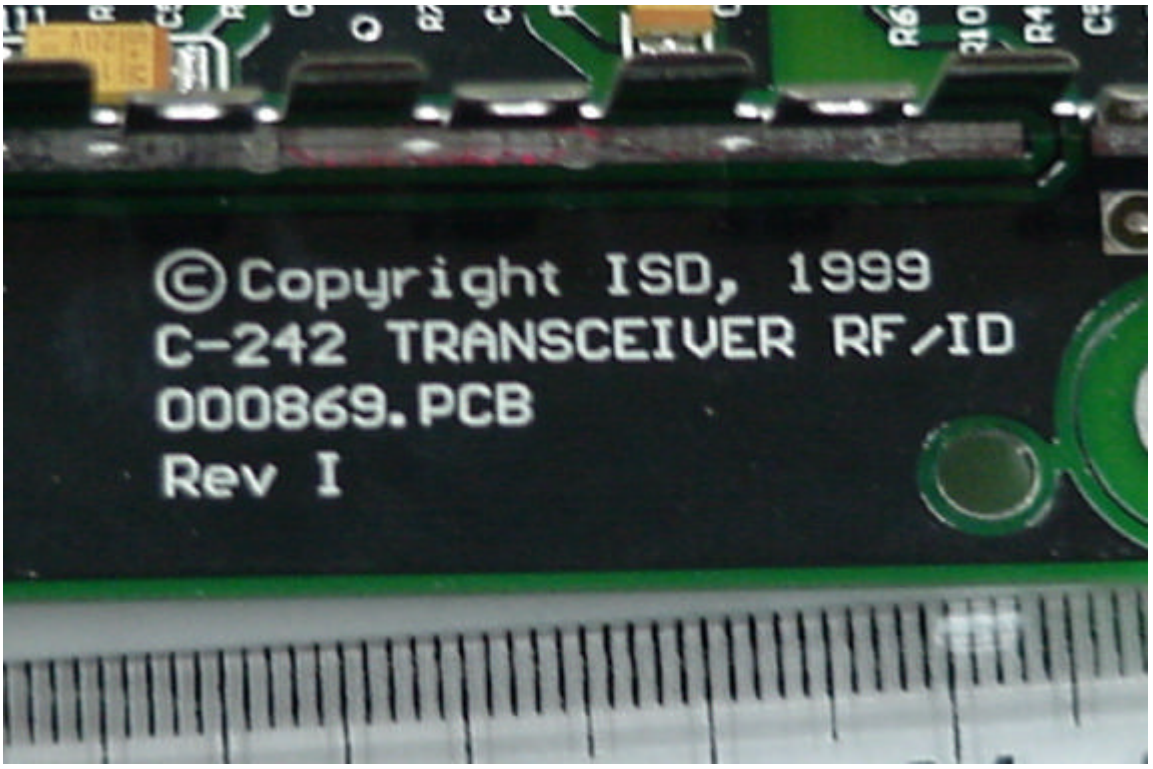




APPENDIX B5
PHOTOGRAPHS OF TEST SAMPLE

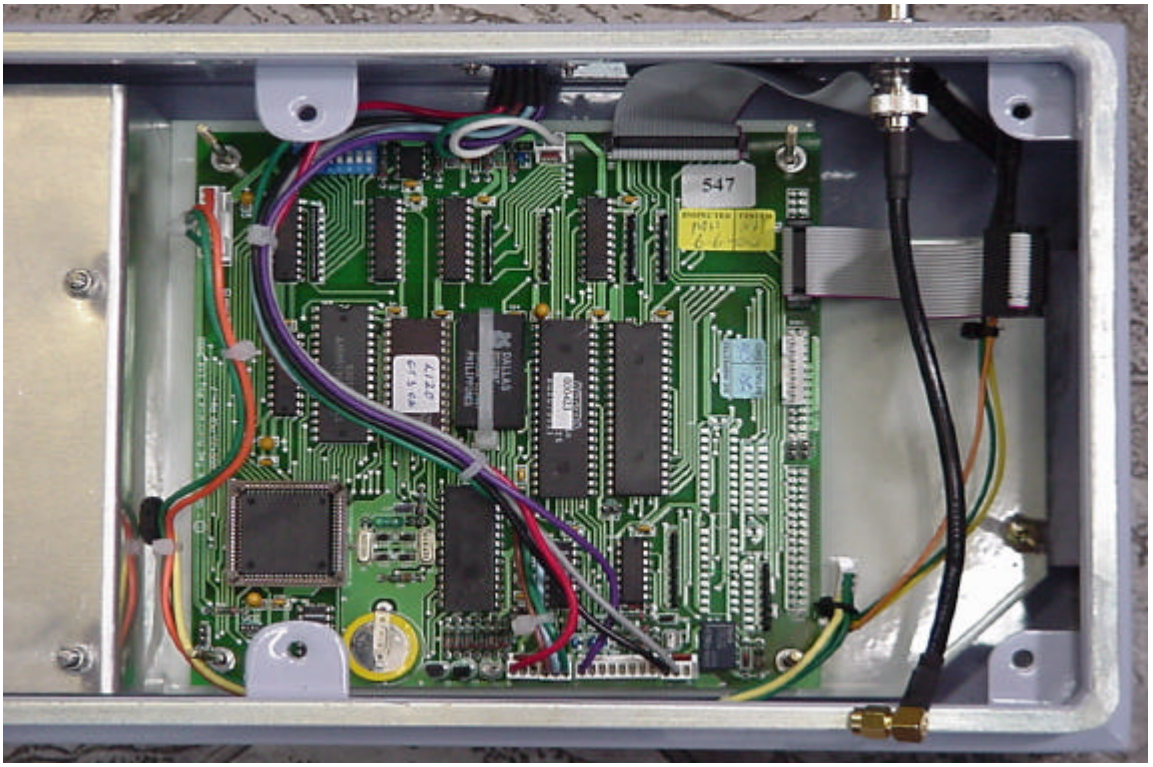
Internal Photos

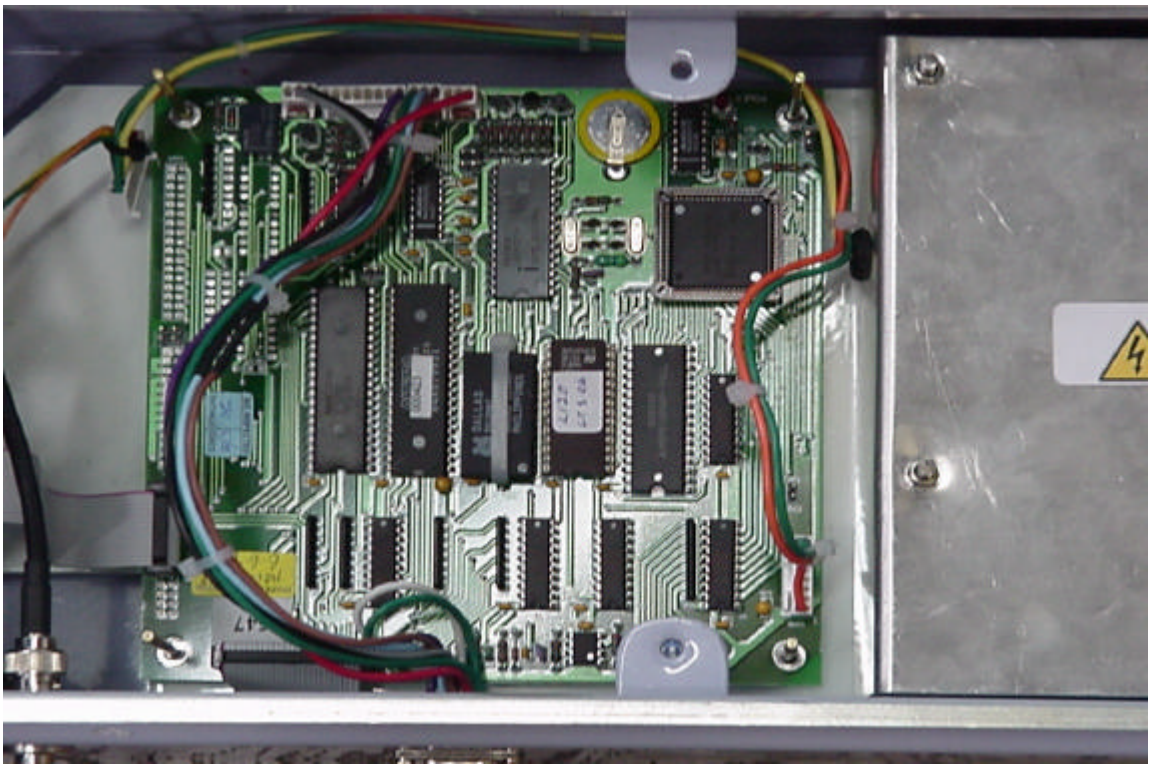




APPENDIX B6
PHOTOGRAPHS OF TEST SAMPLE

Internal Photos





APPENDIX C

TEST SAMPLE SCHEMATICS

SUBMITTED AS ATTACHMENT

APPENDIX D

TEST SAMPLE PCB LAYOUTS

SUBMITTED AS ATTACHMENT

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.
This document shall not be reproduced, except in full.

APPENDIX E

TEST SAMPLE PCB OVERLAYS

SUBMITTED AS ATTACHMENT

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.
This document shall not be reproduced, except in full.

5292

APPENDIX F

FCC ID LABELLING

SUBMITTED AS ATTACHMENT

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.
This document shall not be reproduced, except in full.

5292

APPENDIX G

GRAPHS OF EMI MEASUREMENTS

CONDUCTED EMI 0.45 - 30 MHz

Graph 1	Active Line	Small Antenna
Graph 2	Neutral Line	Small Antenna
Graph 3	Active Line	Large Antenna
Graph 4	Neutral Line	Large Antenna

RADIATED EMI 30 - 1000 MHz

Graph 5:	Vertical Polarisation	Small Antenna
Graph 6:	Horizontal Polarisation	Small Antenna
Graph 7:	Vertical Polarisation	Large Antenna
Graph 8:	Horizontal Polarisation	Large Antenna

OUT of BAND EMISSIONS at the CARRIER SIGNAL FREQUENCY

Graph 9:	Small Antenna (13.52 – 13.6 MHz)
Graph 10:	Large Antenna (13.52 – 13.6 MHz)

RADIATED EMI 0.009 - 30 MHz (LOOP ANTENNA)

Graph 11:	Small Antenna
Graph 12:	Large Antenna

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B

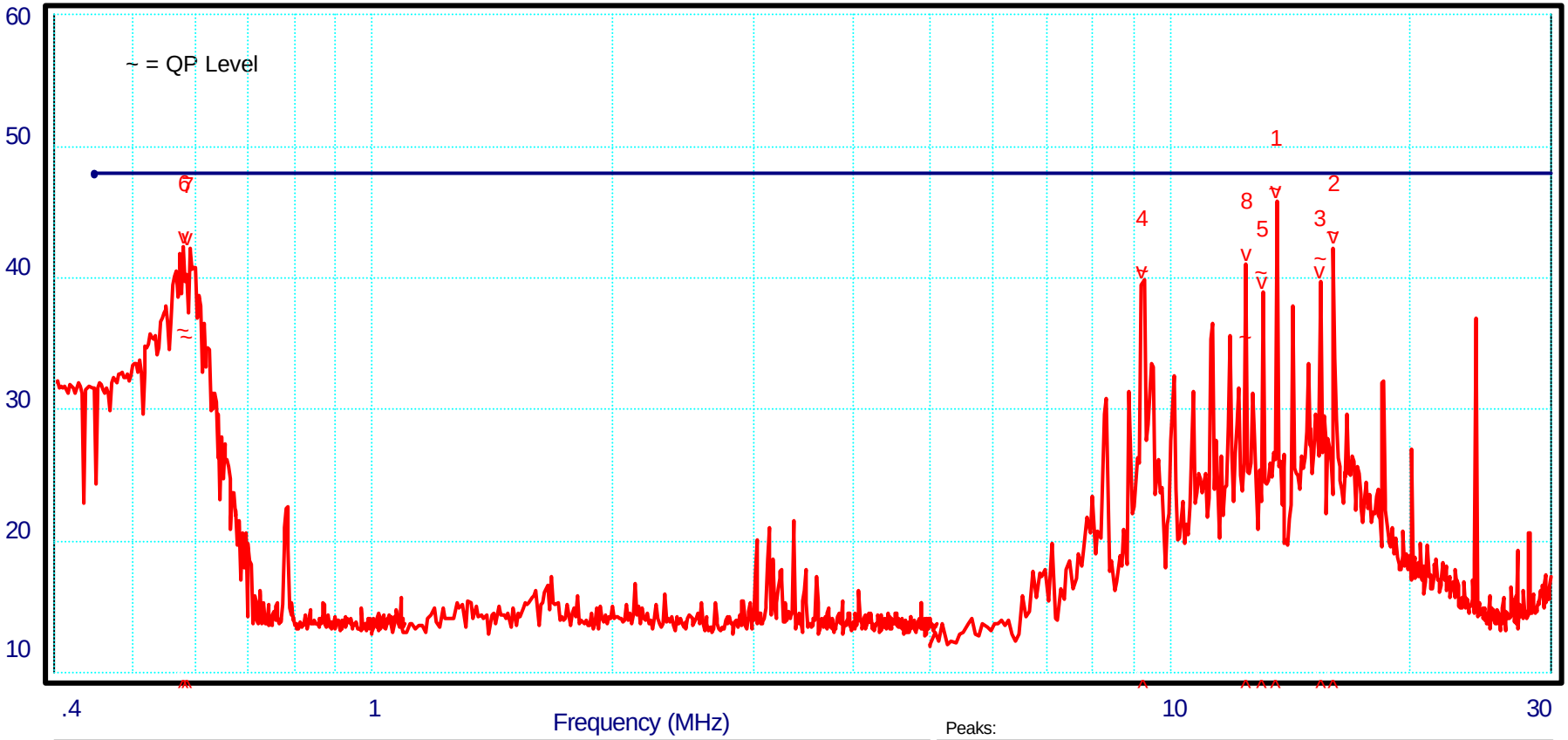
Project No:M000840

\\server\plotting\pcf\0840f_1.pcf

Conducted Emissions dBuV Peak

Test Date: 14-9-2000

GRAPH No. 1



GEMPLUS TAG AUSTRALIA PTY. LTD.

Small Antenna

Limits:

FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:

Active Line

Source:

analdata 106107120

Equipment: HP8574B TST 99B

Transducers: C190997 L0150502 NOPREAMP

Site ID: Melb Room#3

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	13.56	45.8	45.9	48.0	-2.1			
2	16.00	42.3	42.6	48.0	-5.4			
3	15.41	39.7	40.6	48.0	-7.4			
4	9.22	39.7	39.7	48.0	-8.3			
5	13.04	38.9	39.6	48.0	-8.4			
6	.58	42.3	35.2	48.0	-12.8			
7	.59	42.2	34.7	48.0	-13.3			
8	12.45	41.1	34.7	48.0	-13.3			

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

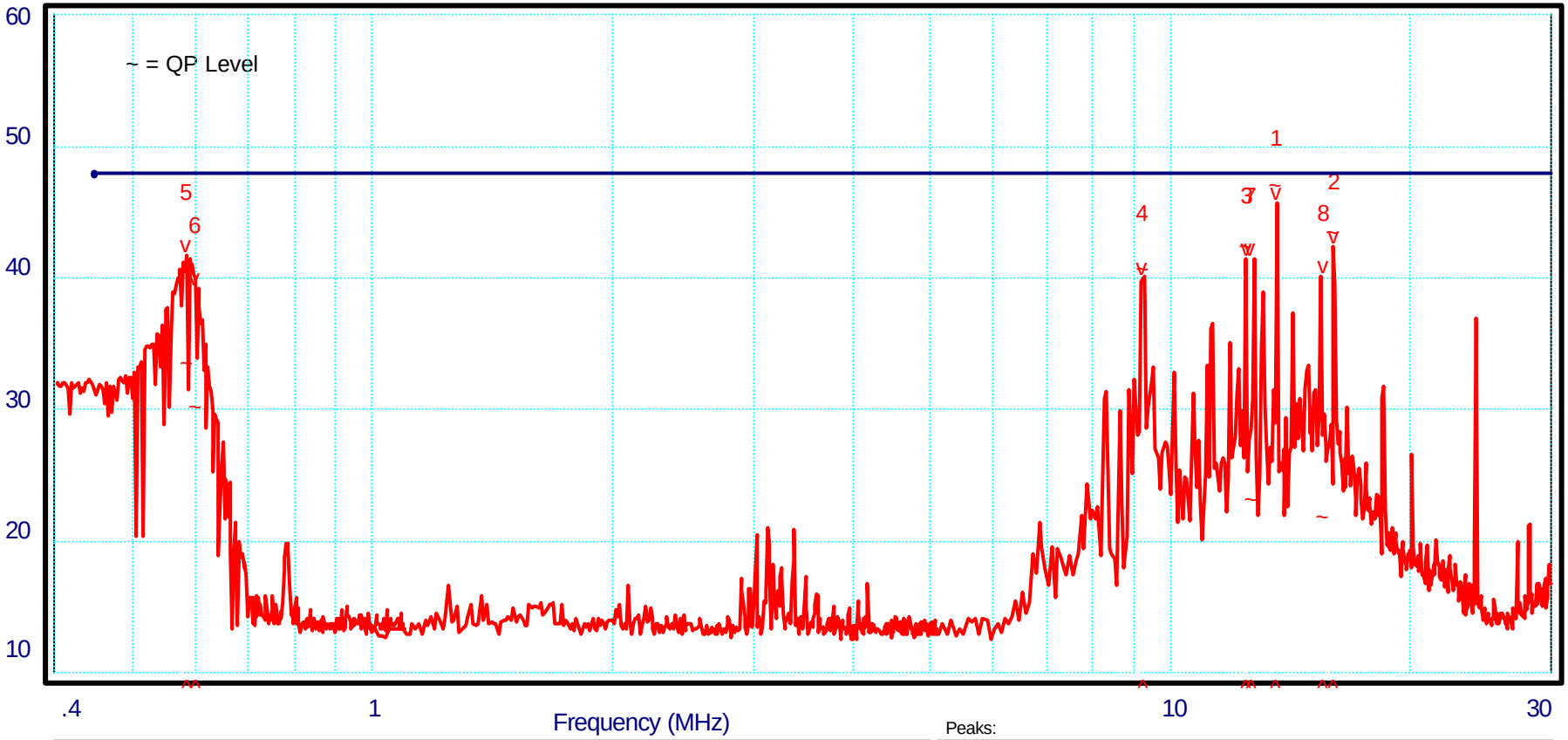
Project No:M000840

\\server\plotting\pcf\0840f_2.pcf

Conducted Emissions dBuV Peak

Test Date: 14-9-2000

GRAPH No. 2



GEMPLUS TAG AUSTRALIA PTY. LTD.

Small Antenna

Limits:

FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:

Neutral Line

Source:

analdata 109111119

Equipment: HP8574B TST 99B

Transducers: C190997 L0150502 NOPREAMP

Site ID: Melb Room#3

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	13.56	45.7	46.2	48.0	-1.8			
2	16.00	42.4	42.6	48.0	-5.4			
3	12.44	41.4	41.6	48.0	-6.4			
4	9.22	40.0	39.9	48.0	-8.1			
5	.58	41.7	32.7	48.0	-15.3			
6	.60	39.1	29.4	48.0	-18.6			
7	12.60	41.4	22.4	48.0	-25.6			
8	15.55	40.1	21.0	48.0	-27.0			

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

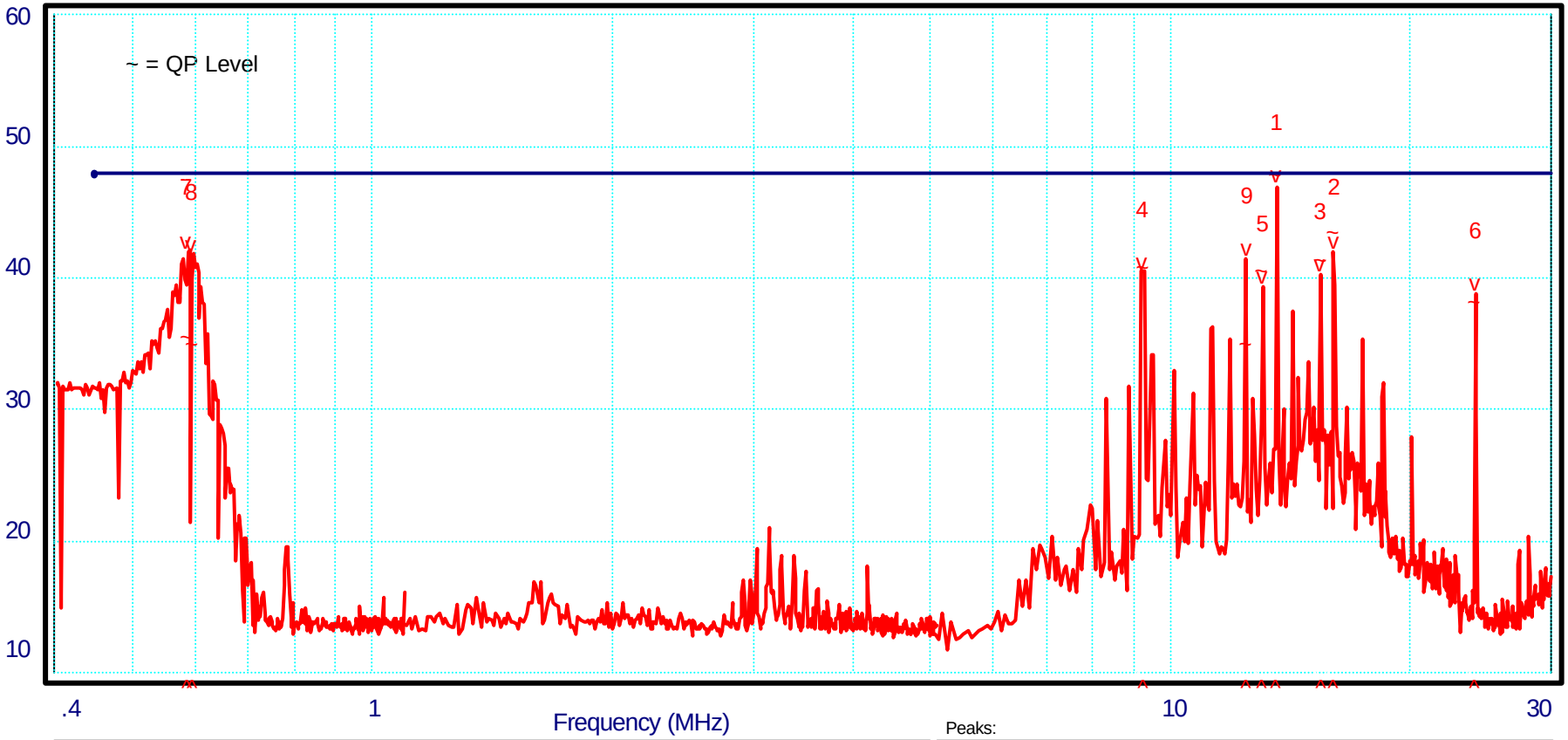
Project No:M000840

\\server\plotting\pcf\0840f_3.pcf

Conducted Emissions dBuV Peak

Test Date: 14-9-2000

GRAPH No. 3



GEMPLUS TAG AUSTRALIA PTY. LTD.

Large Antenna

Limits:

FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:

Active Line

Source:

analdata 116117121

Equipment: HP8574B TST 99B

Transducers: C190997 L0150502 NOPREAMP

Site ID: Melb Room#3

Test Officer:Chieu Huynh

Peaks:

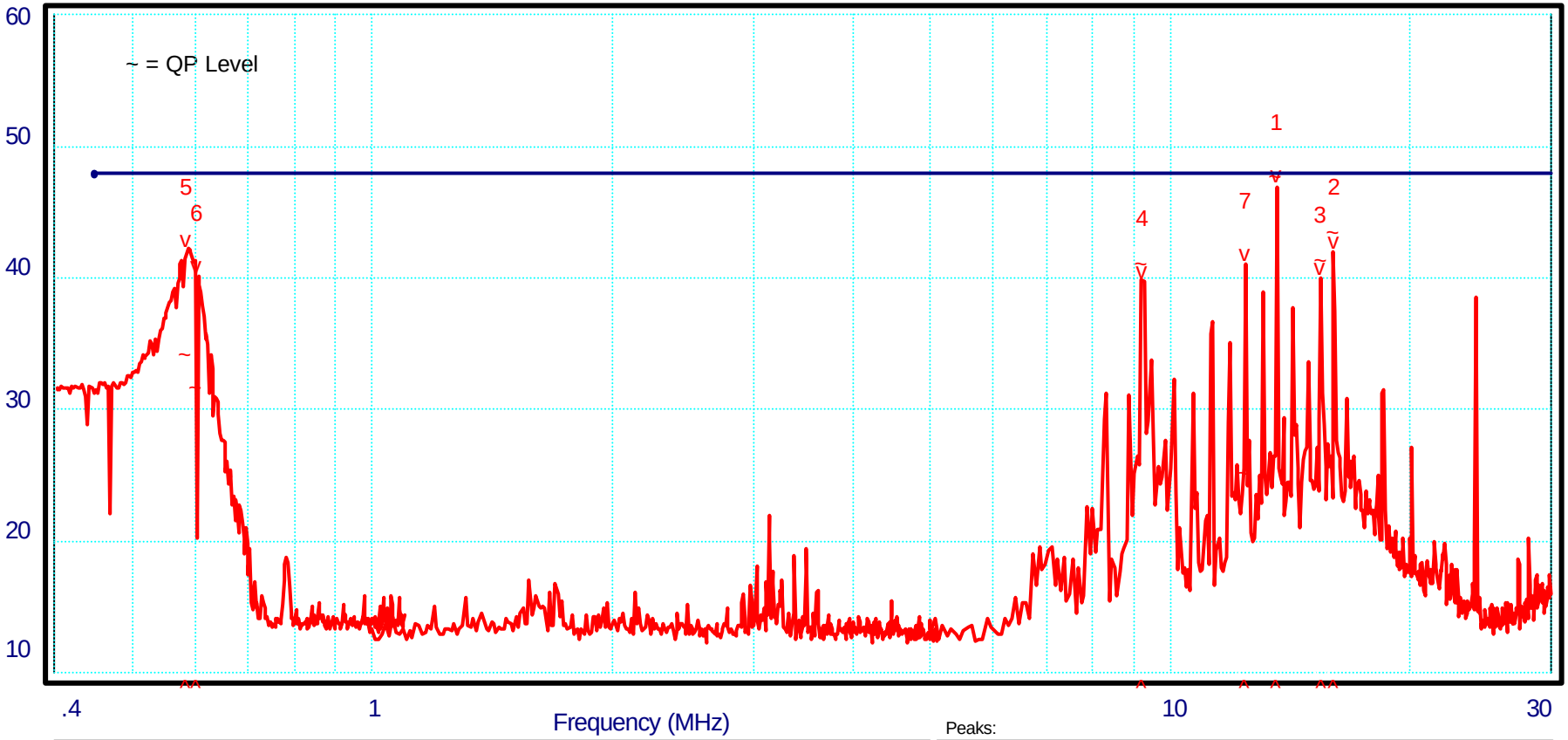
No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	13.56	46.9	47.0	48.0	-1.0			
2	16.00	42.0	42.7	48.0	-5.3			
3	15.41	40.2	40.5	48.0	-7.5			
4	9.22	40.4	40.0	48.0	-8.0			
5	13.04	39.3	39.7	48.0	-8.3			
6	24.05	38.7	37.3	48.0	-10.7			
7	.59	42.0	34.7	48.0	-13.3			
8	.59	41.7	34.2	48.0	-13.8			
9	12.45	41.4	34.1	48.0	-13.9			

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:M000840 — \\server\plotting\pcf\0840f_4.pcf

Conducted Emissions dBuV Peak — Test Date: 14-9-2000 — GRAPH No. 4



GEMPLUS TAG AUSTRALIA PTY. LTD.

Large Antenna

Limits:
FCC_BQP FCC CLASS B CONDUCTED QP LIMITS

Legend:
Neutral Line

Source:
analdata 113114122

Equipment: HP8574B TST 99B
Transducers: C190997 L0150502 NOPREAMP
Site ID: Melb Room#3
Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCC_BQP (dBuV)	dL1 (dB)	Av Val (dBuV)	(dBuV)	dL2 (dB)
1	13.56	46.9	46.9	48.0	-1.1			
2	16.00	42.0	42.6	48.0	-5.4			
3	15.41	40.0	40.5	48.0	-7.5			
4	9.22	39.7	40.2	48.0	-7.8			
5	.58	42.1	33.3	48.0	-14.7			
6	.60		30.8	48.0	-17.2			
7	12.38	41.1	24.3	48.0	-23.7			

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

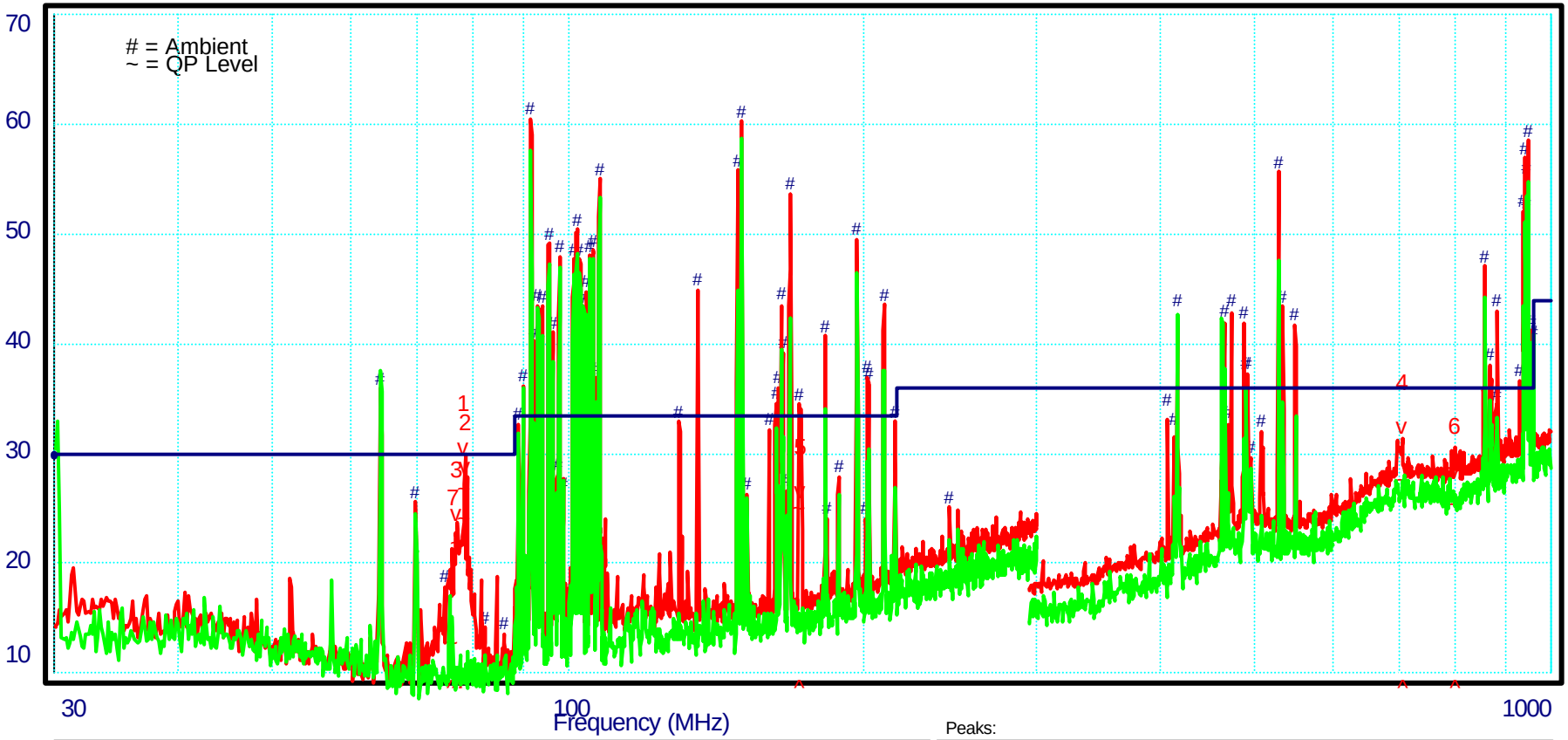
Project No:M000840

\\server\plotting\pcf\0840f_5.pcf

Electric Field Strength dBuV/m Peak

Test Date: 1-9-2000

GRAPH No. 5



GEMPLUS TAG AUSTRALIA PTY. LTD.

Small Antenna

Limits:

FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:

Vertical Ambients

Vertical Emissions

Source:

Equipment: HP8546A TST 99B analdata 34 35 36 37 30 31

Transducers: LCABLE a1100201 A1360100 NOPREAMP analdata 23 24 26 27 32 33

Site ID: Lerderderg OATS1

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	78.29	30.0	26.2	30.0	-3.8
2	78.35	28.3	23.5	30.0	-6.5
3	77.01	23.9	21.3	30.0	-8.7
4	705.34	31.9	26.9	36.0	-9.1
5	171.81	26.0	24.4	33.5	-9.1
6	797.73	27.8	24.8	36.0	-11.2
7	76.24	21.3	12.1	30.0	-17.9

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

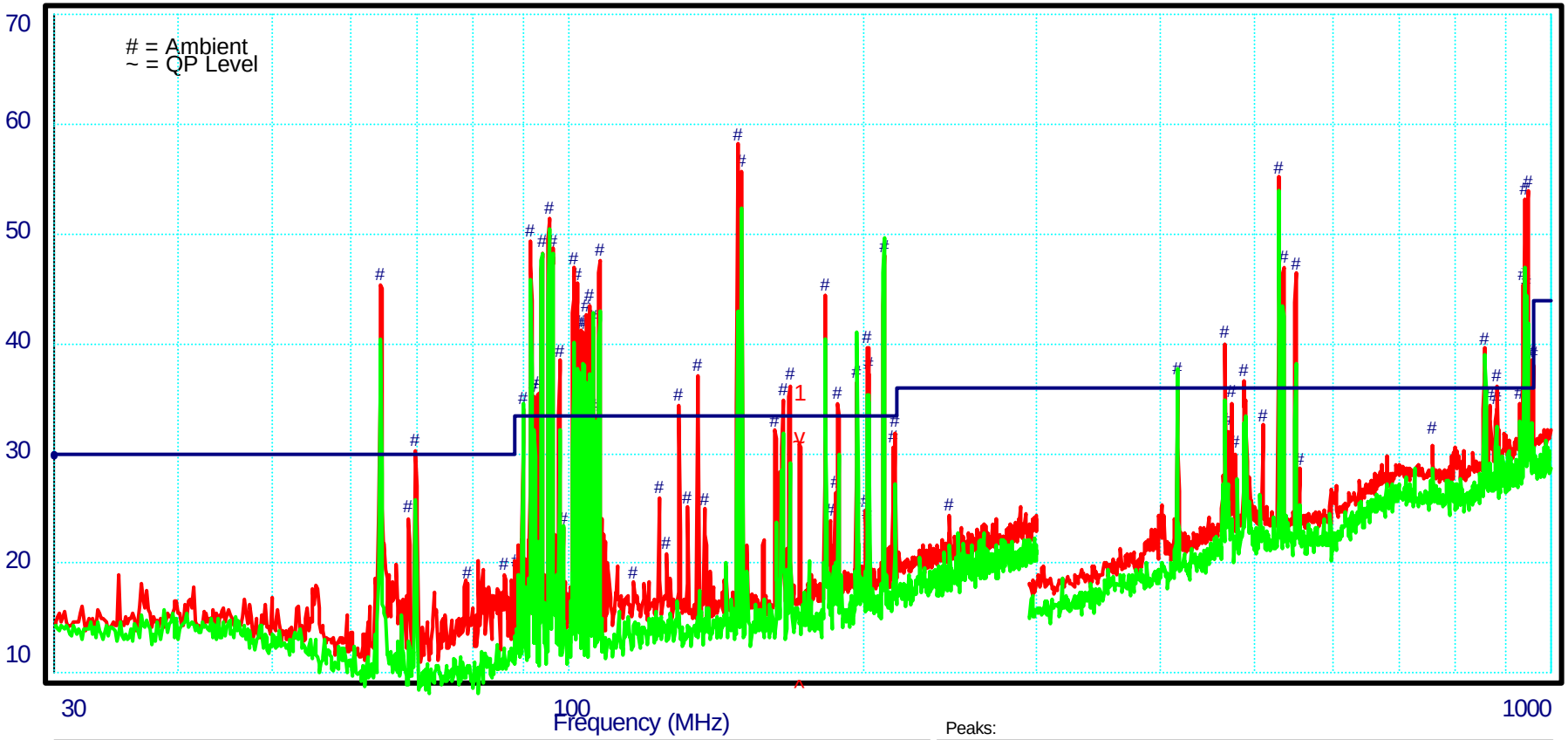
Project No:M000840

\\server\plotting\pcf\0840f_6.pcf

Electric Field Strength dBuV/m Peak

Test Date: 1-9-2000

GRAPH No. 6



GEMPLUS TAG AUSTRALIA PTY. LTD.

Small Antenna

Limits:

FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:

Horizontal Ambients

Horizontal Emissions

Equipment: HP8546A TST 99B

Transducers: LCABLE a1100201 A1360100 NOPREAMP

Site ID: Lerderderg OATS1

Test Officer:Chieu Huynh

Source:						
analdata	38	39	40	41	32	33
analdata	28	29	30	31	34	35

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	171.80	30.9	30.4	33.5	-3.1

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

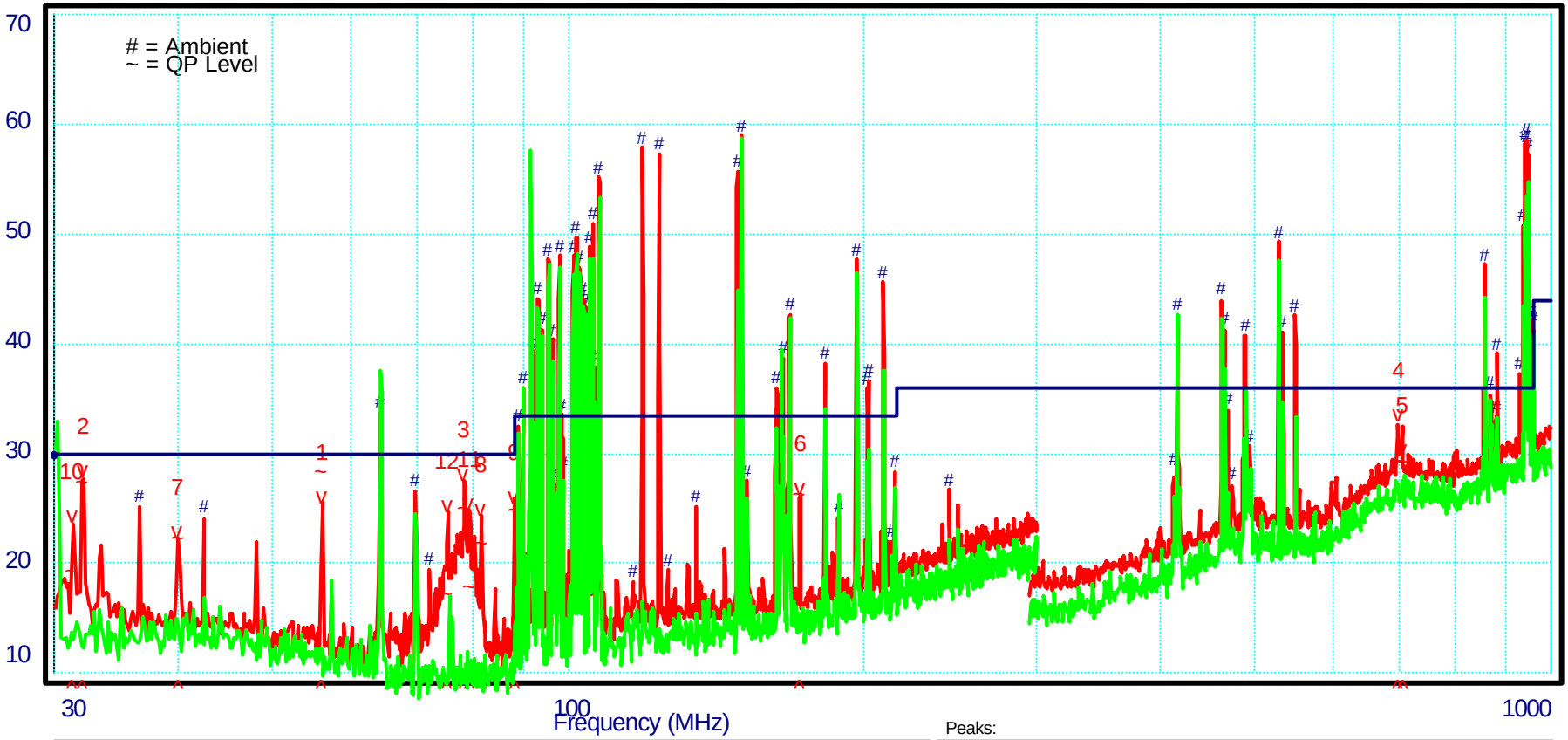
Project No:M000840

\\server\plotting\pcf\0840f_7.pcf

Electric Field Strength dBuV/m Peak

Test Date: 8-9-2000

GRAPH No. 7



GEMPLUS TAG AUSTRALIA PTY. LTD.

Large Antenna

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

Legend:
Vertical Ambients
Vertical Emissions

Source:
analdata 34 35 36 37 30 31
analdata 43 44 45 46 53 54

Equipment: HP8546A TST 99B
Transducers: LCABLE a1100201 A1360100 NOPREAMP
Site ID: Lerderderg OATS1
Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	56.06	25.6	27.7	30.0	-2.3
2	32.02	27.9	26.8	30.0	-3.2
3	78.29	27.5	24.5	30.0	-5.5
4	699.21	33.0	28.7	36.0	-7.3
5	706.15	29.8	28.7	36.0	-7.3
6	171.80	26.3	25.7	33.5	-7.8
7	40.03	22.4	21.7	30.0	-8.3
8	81.43	24.4	21.3	30.0	-8.7
9	88.04	25.6	24.3	33.5	-9.2
10	31.26	23.8	18.7	30.0	-11.3
11	79.14	24.9	17.3	30.0	-12.7
12	75.17	24.7	16.6	30.0	-13.4

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

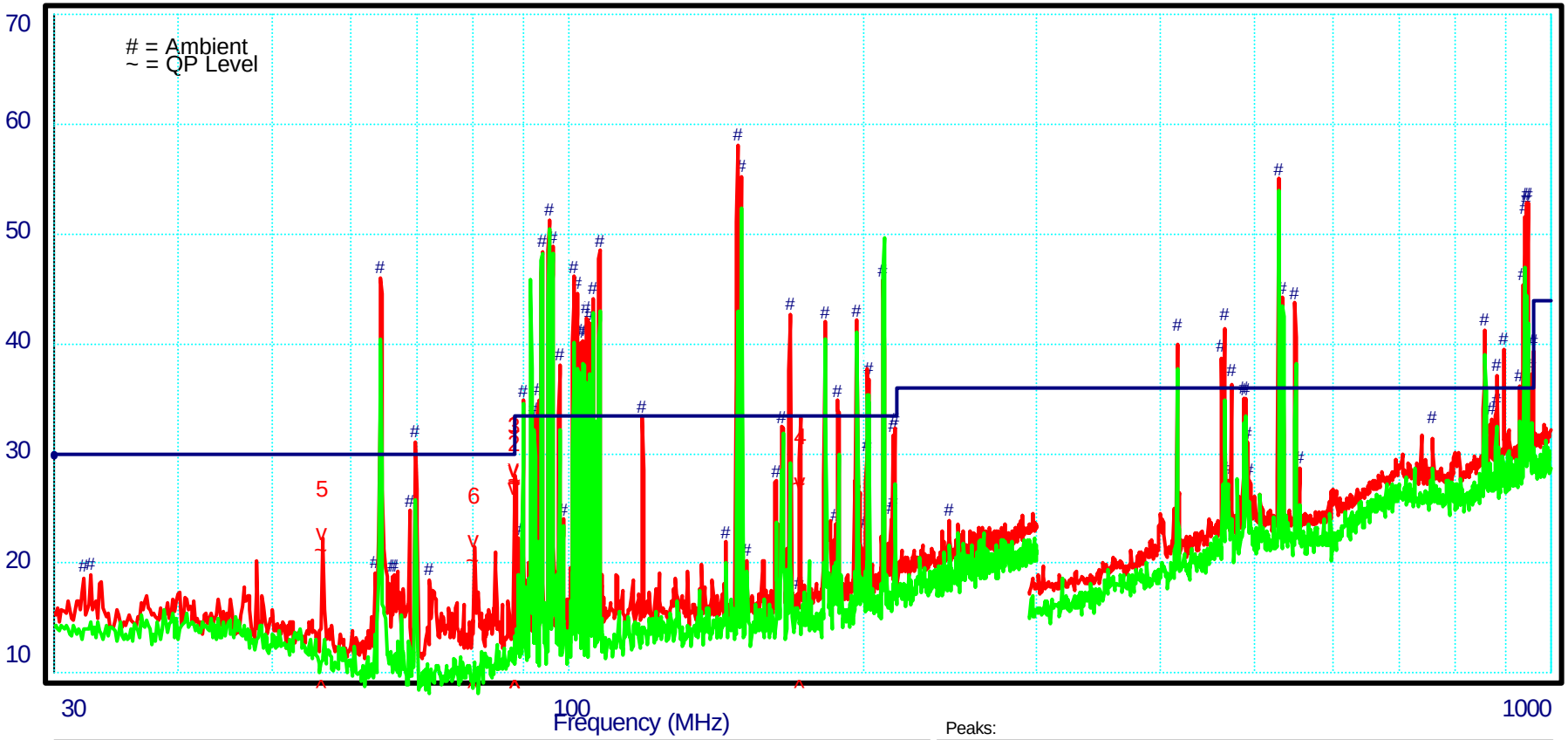
Project No:M000840

\\server\plotting\pcf\0840f_8.pcf

Electric Field Strength dBuV/m Peak

Test Date: 8-9-2000

GRAPH No. 8



GEMPLUS TAG AUSTRALIA PTY. LTD.

Large Antenna

Limits:

FCCB-10 FCC CLASS B RAD 10M LIMITS

Legend:

Horizontal Ambients

Horizontal Emissions

Source:

Equipment: HP8546A TST 99B analdata 38 39 40 41 32 33

Transducers: LCABLE a1100201 A1360100 NOPREAMP analdata 47 48 49 50 51 52

Site ID: Lerderderg OATS1

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCCB-10 (dBuV/m)	dL1 (dB)
1	88.00	28.1	26.7	30.0	-3.3
2	88.05	26.3	27.0	33.5	-6.5
3	88.01	28.0	26.8	33.5	-6.7
4	171.82	26.9	26.6	33.5	-6.9
5	56.03	22.2		30.0	-9.4
6	79.99	21.6	19.6	30.0	-10.4

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

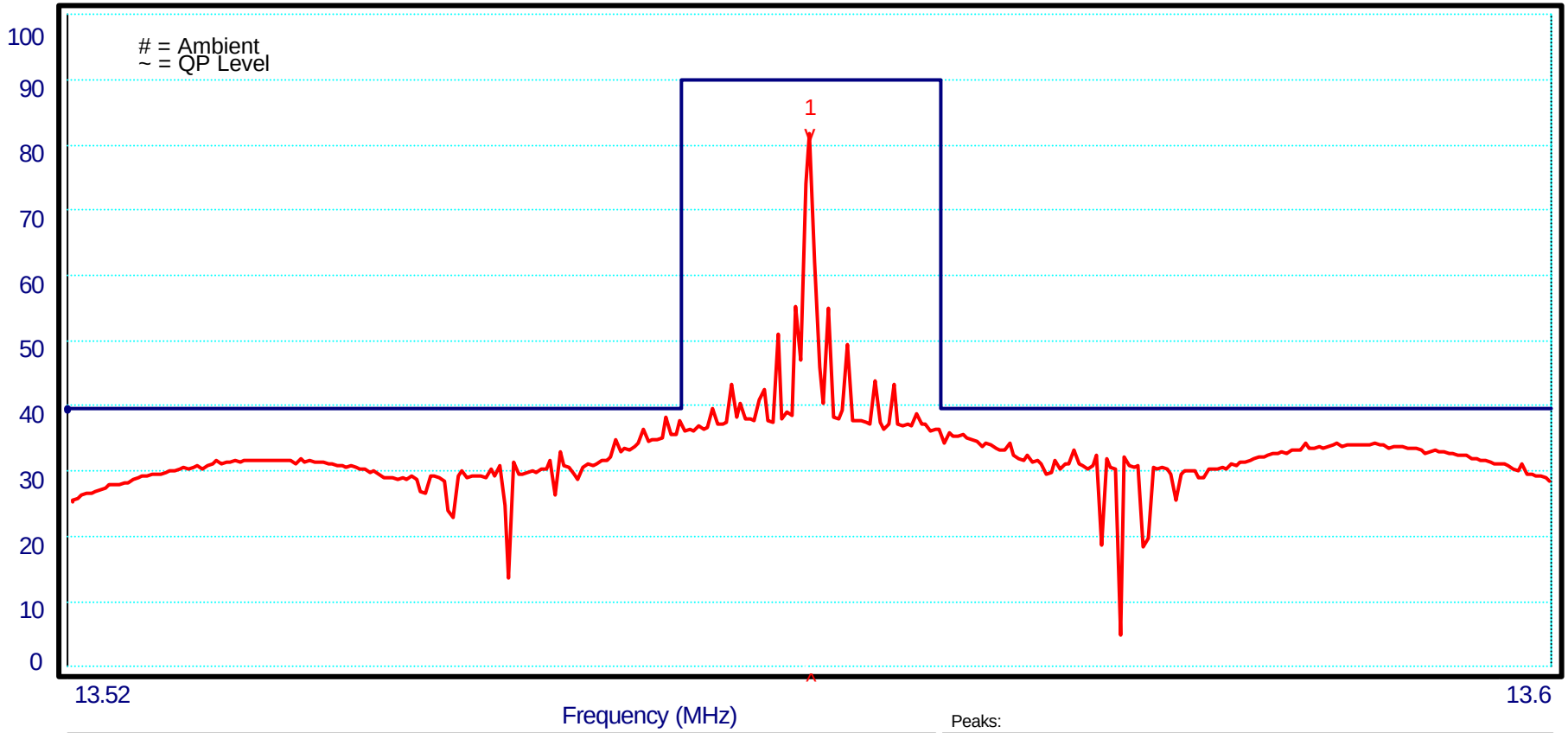
Project No:M000840

\\server\plotting\pcf\0840f_9.PCF

Electric Field Strength dBuV/m Peak

Test Date: 1-9-2000

GRAPH No. 9



GEMPLUS TAG AUSTRALIA PTY. LTD.

Out of Band Emissions for 13.56 MHz - Using Loop Antenna

Small Antenna

Limits:

FCC15225 FCC PART 15.225 10mtr TX LMTS FOR 13.5 MHz

Legend:

__ EUT on

Source:

analdata 40

Equipment: HP8546A TST 99B

Transducers: LCABLE 6502_e NOPREAMP

Site ID: Lerderderg OATS1

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC15225 (dBuV/m)	dL1 (dB)
1	13.56	82.0	81.8	90.0	-8.2

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

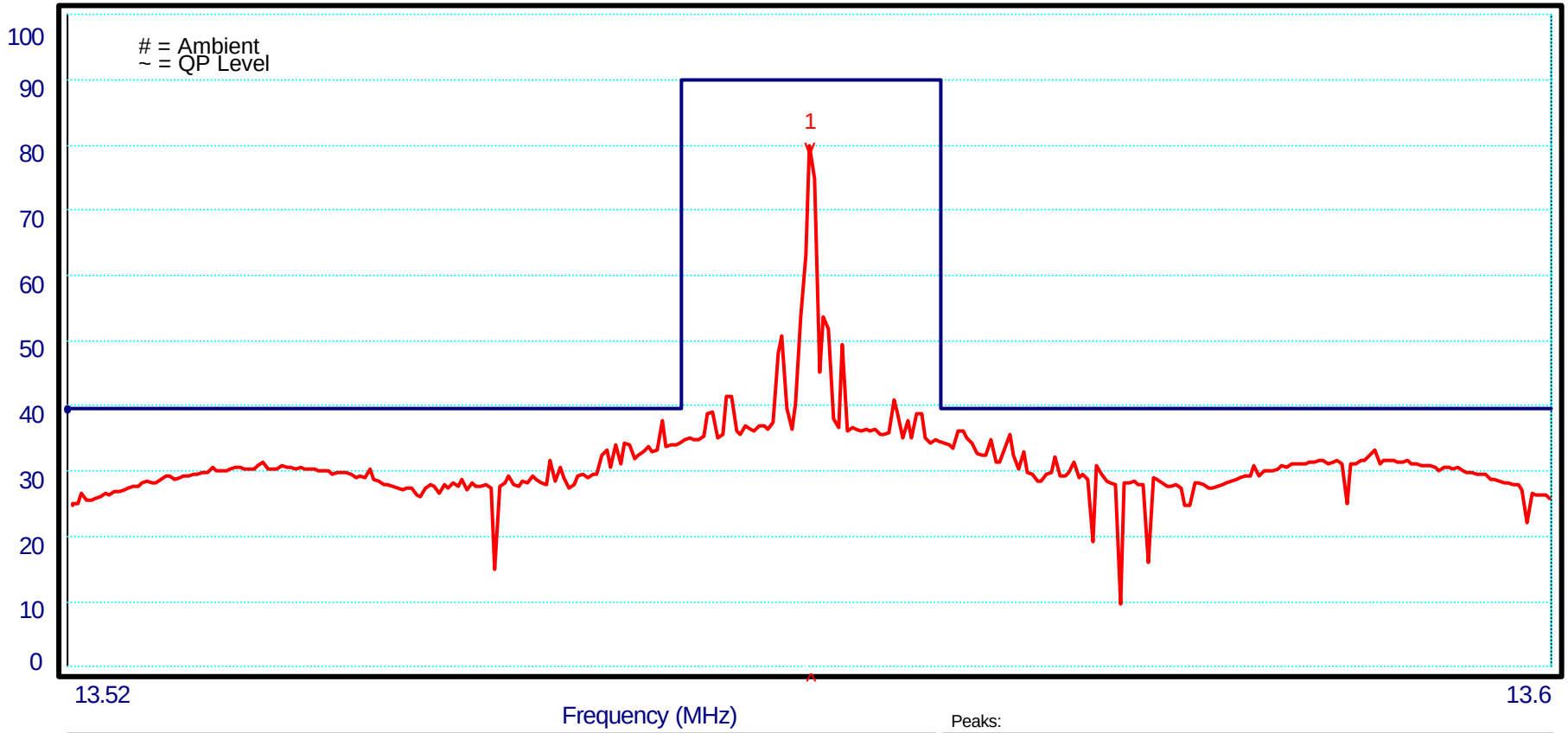
Project No:M000840

\\server\plotting\pcf\0840f_10.PCF

Electric Field Strength dBuV/m Peak

Test Date: 1-9-2000

GRAPH No. 10



GEMPLUS TAG AUSTRALIA PTY. LTD.

Out of Band Emissions for 13.56 MHz - Using Loop Antenna

Large Antenna

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC15225 (dBuV/m)	dL1
1	13.56	80.0	79.0	90.0	-11.0

Limits:

FCC15225 FCC PART 15.225 10mtr TX LMTS FOR 13.5 MHz

Legend:

EUT on

Source:

analdata 58

Equipment: HP8546A TST 99B

Transducers: LCABLE 6502_e NOPREAMP

Site ID: Lerderderg OATS1

Test Officer:Chieu Huynh

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

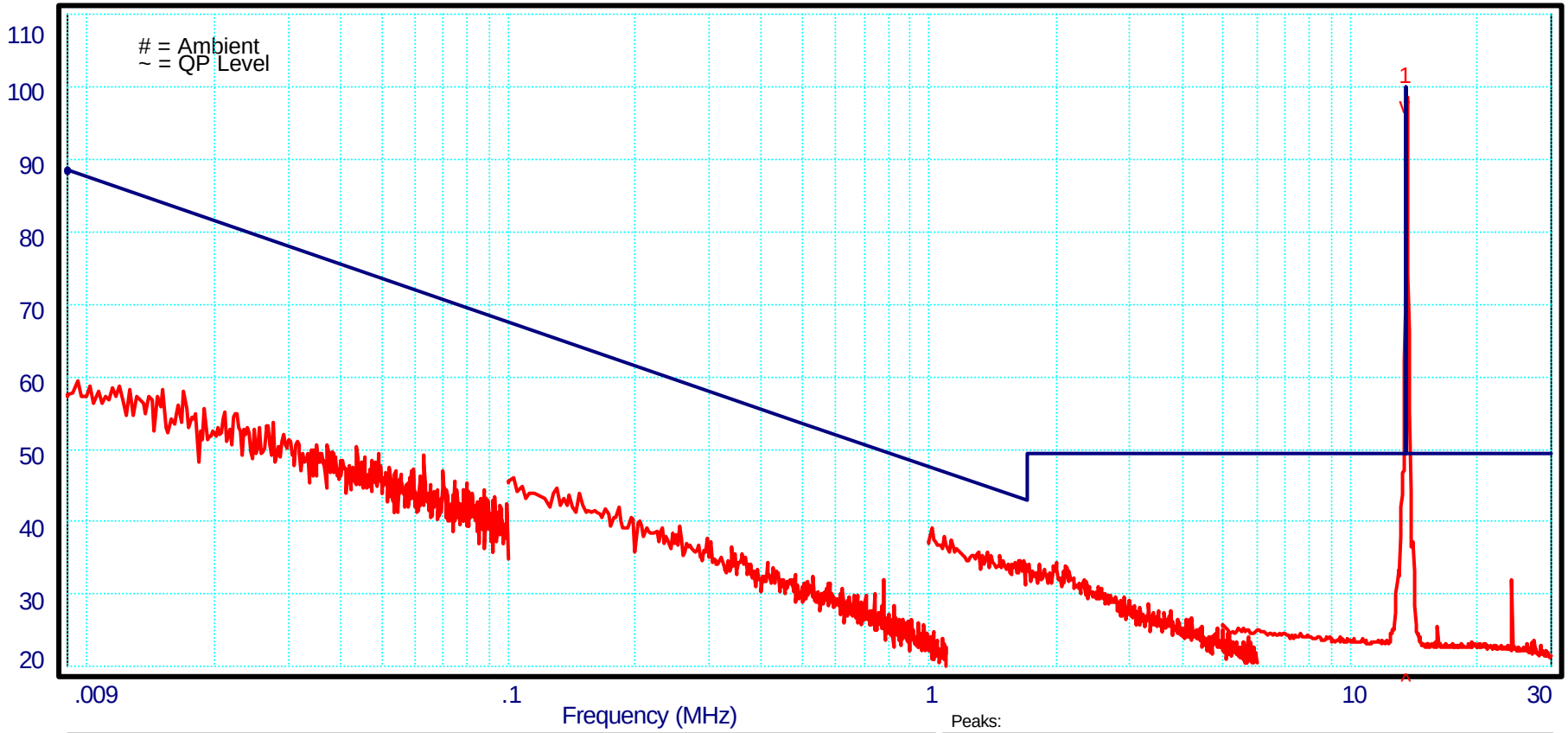
Project No:M000840

\\server\plotting\pcf\0840f_11.PCF

Electric Field Strength dBuV/m Peak

Test Date: 9-9-2000

GRAPH No. 11



GEMPLUS TAG AUSTRALIA PTY. LTD.

Out of Band Emissions - Using Loop Antenna

Small Antenna

Limits:

FCC225SP FCC PART 15.225 3mtr Tx & out of band LMTS FOR 13.5 MHz

Legend:

EUT on

Source:

analdata 85 87 88 89

Equipment: HP8546A TST 99B

Transducers: C151C162 6502_E NOPREAMP

Site ID: Melb Room#4

Test Officer:Chieu Huynh

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC225SP (dBuV/m)	dL1 (dB)
1	13.56	97.5	96.1	100.0	-3.9

Melbourne- 57 Assembly Drv Tullamarine, 3043, Vic, Australia Ph+(613) 9335 3333 Fax+(613) 9338 92[illegible]0

Sydney---- 16,6 Gladstone Rd Castle Hill, 2154, NSW, Australia Ph+(612) 9899 4599 Fax+(612) 9899 40[illegible]9

EMC Technologies Pty. Ltd. - Global Product Certification

FCC Class B

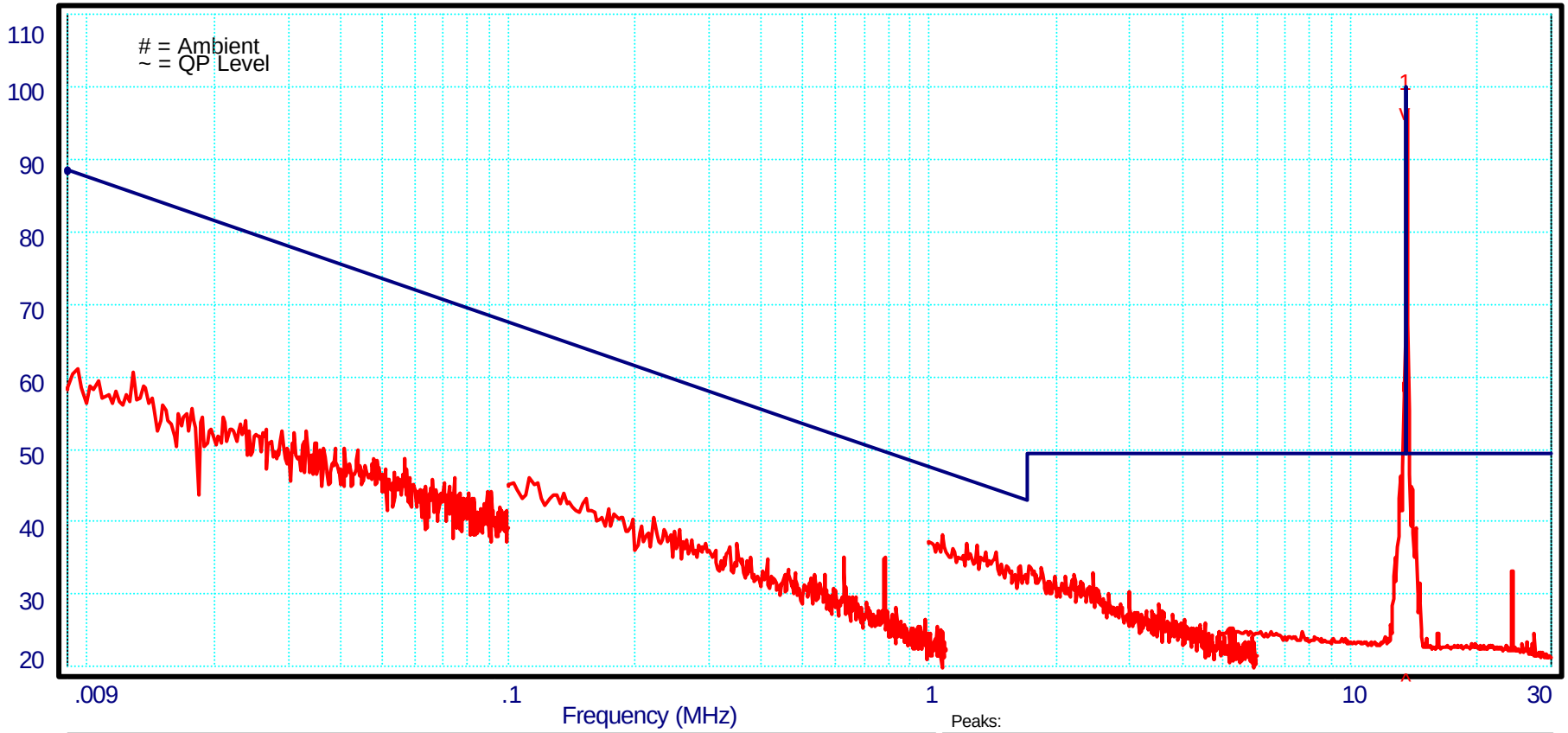
Project No:M000840

\\server\plotting\pcf\0840f_12.PCF

Electric Field Strength dBuV/m Peak

Test Date: 9-9-2000

GRAPH No. 12



GEMPLUS TAG AUSTRALIA PTY. LTD.

Out of Band Emissions - Using Loop Antenna

Large Antenna

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC225SP (dBuV/m)	dL1 (dB)
1	13.56	96.6	94.4	100.0	-5.6

Limits:

FCC225SP FCC PART 15.225 3mtr Tx & out of band LMTS FOR 13.5 MHz

Legend:

__ EUT on

Source:

analdata 70 78 72 73

Equipment: HP8546A TST 99B

Transducers: C151C162 6502_e NOPREAMP

Site ID: Melb Room#4

Test Officer:Chieu Huynh

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 H

USER INSTRUCTIONS (Manual)

SUBMITTED AS ATTACHMENTS 1 AND 2

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.
This document shall not be reproduced, except in full.

5292