

APPENDIX C

LIST of GRAPHS of EMI MEASUREMENTS

Conducted EMI

- Graph 1: Active Line, 0.145 to 30.5MHz, On with card reader module & Type A card
- Graph 2: Neutral Line, 0.145 to 30.5MHz, On with card reader module & Type A card
- Graph 3: Active Line, 0.145 to 30.5MHz, Tested with resistive dummy load
- Graph 4: Neutral Line, .145 to 30.5MHz, Tested with resistive dummy load

Radiated EMI

- Graph 5: Ambient Emissions, 0.009 to 30MHz, On with card reader module & Type A card
- Graph 6: Carrier, 13.55 to 13.57 MHz, On with card reader module & Type A card
- Graph 7: Vertical Polarisation, 29 to 1000 MHz, On with card reader module & Type A card
- Graph 8: Horizontal Polarisation, 29 to 1000 MHz, On with card reader module & Type A card



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FCC

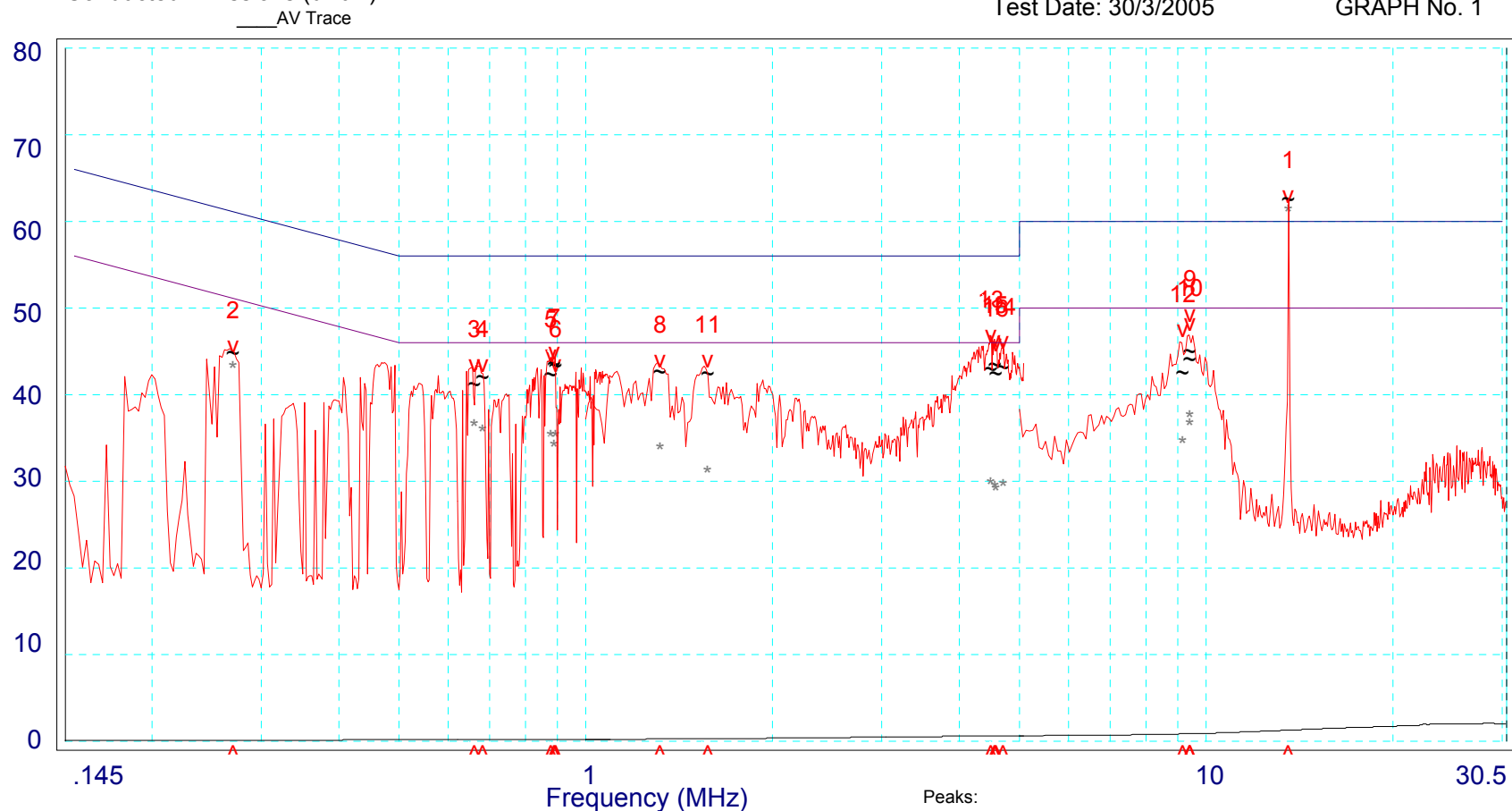
Conducted Emissions (dBuV)

Job No:T50307

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Test Date: 30/3/2005

GRAPH No. 1



ERG

3V PC Card Type II + with Contactless Reader

Model: MCR500 (Short Variant) Part No: 18252

On with card reader module & Type A card (EMCTEST running)

Limits:

FCCN_BQP FCC CLASS B QP CONDUCTED LIMITS (CISPR)

FCCN_BAV FCC CLASS B AV CONDUCTED LIMITS (CISPR)

Legend:

Active Line

Ver 5.5 Build 107

Source:

t:L0360405 c1:C0010905 c2:NONE p:NONE a:L0100305

T50307c 13 14 15

Site ID: Syd Room#2,3/87 Station Rd, Seven Hills, NSW

Test Officer:Joel Mulig

EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia
Phone +(612) 9624 2777 Fax+(612) 9838 4050

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCCN_BQPdL1 (dBuV)	(dB)	Av Val (dBuV)	FCCN_BAVdL2 (dBuV)	(dB)
1	13.56	62.7	62.1	60.0	2.1	60.4	50.0	10.4
2	0.270	45.3	44.4	61.1	-16.8	42.4	51.1	-8.7
3	0.661	43.1	40.7	56.0	-15.3	35.7	46.0	-10.3
4	0.682	43.1	41.6	56.0	-14.5	35.0	46.0	-11.0
5	0.878	44.2	41.9	56.0	-14.1	34.4	46.0	-11.6
6	0.894	43.1	42.9	56.0	-13.1	34.4	46.0	-11.6
7	0.889	44.5	43.1	56.0	-12.9	33.3	46.0	-12.7
8	1.317	43.7	42.2	56.0	-13.8	33.0	46.0	-13.0
9	9.410	48.9	44.6	60.0	-15.4	36.7	50.0	-13.3
10	9.412	47.9	43.6	60.0	-16.4	35.8	50.0	-14.2
11	1.572	43.7	42.0	56.0	-14.0	30.3	46.0	-15.7
12	9.162	47.1	42.1	60.0	-18.0	33.7	50.0	-16.3
13	4.496	46.5	42.5	56.0	-13.5	29.0	46.0	-17.0
14	4.706	45.7	42.7	56.0	-13.3	28.8	46.0	-17.2
15	4.563	45.9	43.0	56.0	-13.0	28.6	46.0	-17.4
16	4.581	45.5	41.9	56.0	-14.1	28.2	46.0	-17.8

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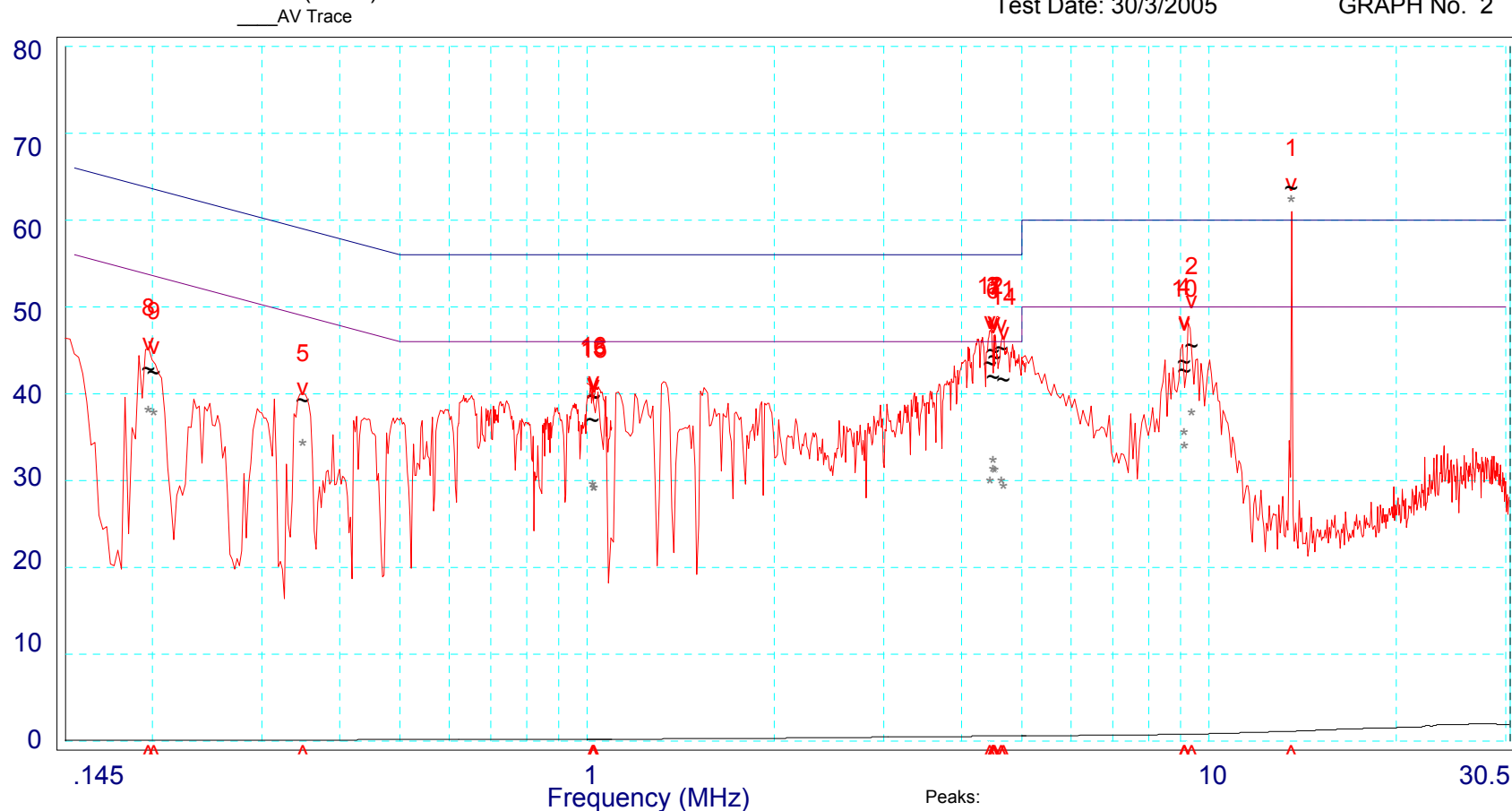
Conducted Emissions (dBuV)

Job No:T50307

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Test Date: 30/3/2005

GRAPH No. 2



ERG
3V PC Card Type II + with Contactless Reader
Model: MCR500 (Short Variant) Part No: 18252
On with card reader module & Type A card (EMCTEST running)

Limits:
FCCN_BQP FCC CLASS B QP CONDUCTED LIMITS (CISPR)
FCCN_BAV FCC CLASS B AV CONDUCTED LIMITS (CISPR)

Legend:
— Neutral Line

Ver 5.5 Build 107

Source:

t:L0360405 c1:C0010905 c2:NONE p:NONE a:L0100305
Site ID: 16/6 Gladstone Rd, Castle Hills, NSW
Test Officer: Joel Mulig

T50307c 16 17 18

EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia
Phone +(612) 9624 2777 Fax+(612) 9838 4050

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCCN_BQPdL1 (dBuV)	(dB)	Av Val (dBuV)	FCCN_BAVdL2 (dBuV)	(dB)
1	13.56	63.9	63.3	60.0	3.3	61.4	50.0	11.4
2	9.376	50.3	45.0	60.0	-15.0	36.8	50.0	-13.2
3	4.496	47.9	41.5	56.0	-14.6	31.3	46.0	-14.7
4	9.126	47.9	43.2	60.0	-16.8	34.5	50.0	-15.5
5	0.349	40.3	38.8	59.0	-20.2	33.3	49.0	-15.7
6	4.495	47.4	44.4	56.0	-11.6	30.3	46.0	-15.7
7	4.523	47.8	43.7	56.0	-12.3	30.2	46.0	-15.8
8	0.197	45.5	42.4	63.7	-21.3	37.1	53.7	-16.6
9	0.201	45.1	42.0	63.6	-21.6	36.8	53.6	-16.8
10	9.129	47.7	42.2	60.0	-17.8	33.0	50.0	-17.0
11	4.634	47.5	44.8	56.0	-11.3	29.0	46.0	-17.0
12	4.444	48.0	43.0	56.0	-13.0	28.9	46.0	-17.1
13	1.021	40.8	36.5	56.0	-19.5	28.6	46.0	-17.4
14	4.671	46.7	41.2	56.0	-14.9	28.3	46.0	-17.7
15	1.026	40.6	39.1	56.0	-16.9	28.1	46.0	-17.9
16	1.024	41.0	39.2	56.0	-16.9	28.1	46.0	-17.9

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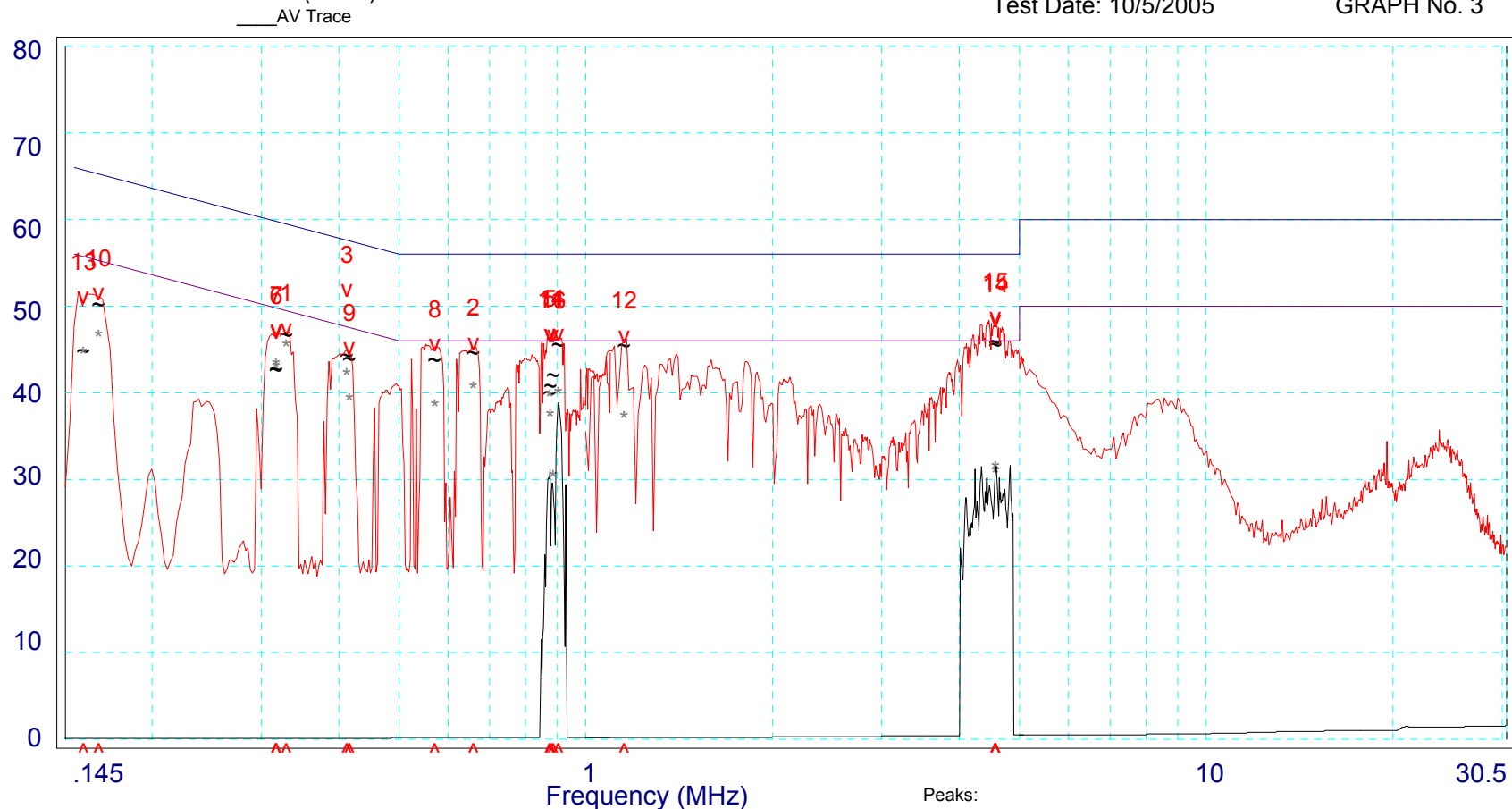
Conducted Emissions (dBuV)

Job No:T50307

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Test Date: 10/5/2005

GRAPH No. 3



ERG Transit Systems
Contactless Card Reader with Type A Card
Model: MCR500 (Short Variant) Part No: 18252
Tested with resistive dummy load

Limits:
FCCN_BQP FCC CLASS B QP CONDUCTED LIMITS (CISPR)
FCCN_BAV FCC CLASS B AV CONDUCTED LIMITS (CISPR)

Legend:
Active Line

Ver 5.5 Build 107

Source:

t:L0110306 c1:C0010905 c2:NONE p:NONE a:L0030705
Site ID: Syd Room#2,3/87 Station Rd, Seven Hills, NSW
Test Officer:Joel Mulig

T50307c 25 26 27

EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia
Phone +(612) 9624 2777 Fax+(612) 9838 4050

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCCN_BQPdL1 (dBuV)	(dB)	Av Val (dBuV)	FCCN_BAVdL2 (dBuV)	(dB)
1	0.329	47.0	46.2	59.5	-13.3	44.6	49.5	-4.9
2	0.659	45.4	44.1	56.0	-11.9	39.8	46.0	-6.2
3	0.412	51.5	43.8	57.6	-13.8	41.3	47.6	-6.3
4	0.903	46.4	45.1	56.0	-10.9	39.2	46.0	-6.8
5	0.875	46.4	39.5	56.0	-16.5	38.9	46.0	-7.1
6	0.317	46.8	42.1	59.8	-17.6	42.5	49.8	-7.3
7	0.317	46.9	42.3	59.8	-17.5	42.2	49.8	-7.6
8	0.571	45.2	43.3	56.0	-12.7	37.7	46.0	-8.3
9	0.416	44.8	43.4	57.5	-14.1	38.5	47.5	-9.0
10	0.164	51.1	49.7	65.3	-15.5	45.8	55.3	-9.5
11	0.877	46.3	40.3	56.0	-15.7	36.6	46.0	-9.4
12	1.153	46.2	45.0	56.0	-11.0	36.4	46.0	-9.6
13	0.155	50.7	44.4	65.7	-21.3	43.8	55.7	-11.9
14	4.578	48.1	45.4	56.0	-10.6	30.6	46.0	-15.4
15	4.573	48.3	45.0	56.0	-11.0	30.1	46.0	-15.9
16	0.886	46.3	41.5	56.0	-14.5	29.6	46.0	-16.4

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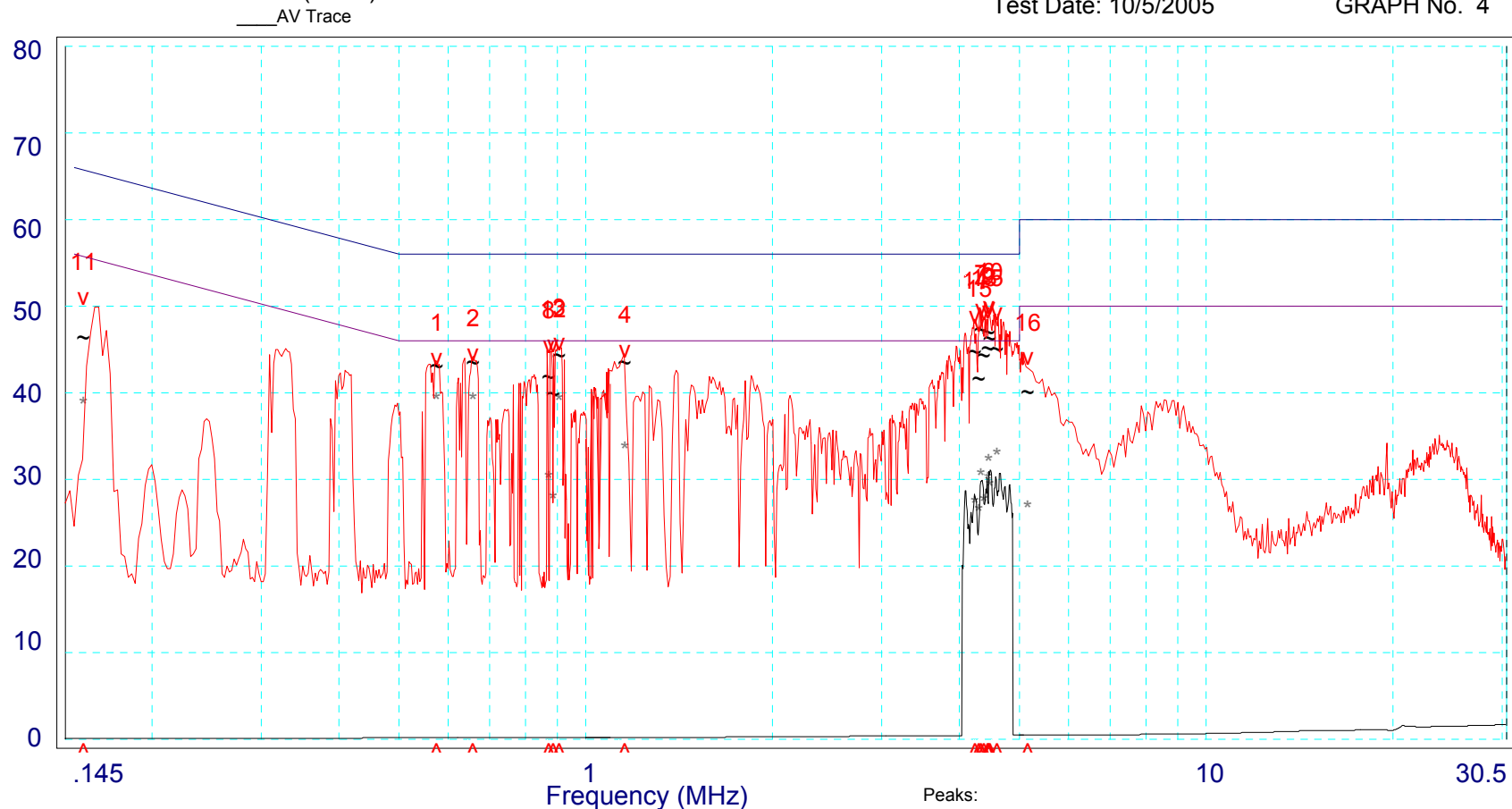
Conducted Emissions (dBuV)

Job No:T50307

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Test Date: 10/5/2005

GRAPH No. 4



ERG Transit Systems
Contactless Card Reader with Type A Card
Model: MCR500 (Short Variant) Part No: 18252
Tested with resistive dummy load

Limits:
FCCN_BQP FCC CLASS B QP CONDUCTED LIMITS (CISPR)
FCCN_BAV FCC CLASS B AV CONDUCTED LIMITS (CISPR)

Legend:
— Neutral Line

Ver 5.5 Build 107

Source:

t:L0110306 c1:C0010905 c2:NONE p:NONE a:L0030705
Site ID: Syd Room#2,3/87 Station Rd, Seven Hills, NSW
Test Officer:Joel Mulig

\T50307c 28 29 30

EMC Technologies (Sydney) 3/87 Station Rd, Seven Hills, NSW, 2147, NSW, Australia
Phone +(612) 9624 2777 Fax+(612) 9838 4050

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val (dBuV)	FCCN_BQPdL1 (dBuV)	(dB)	Av Val (dBuV)	FCCN_BAVdL2 (dBuV)	(dB)
1	0.575	43.6	42.5	56.0	-13.5	38.6	46.0	-7.4
2	0.658	44.2	43.0	56.0	-13.0	38.6	46.0	-7.4
3	0.906	45.4	43.9	56.0	-12.1	38.5	46.0	-7.5
4	1.156	44.5	43.0	56.0	-13.0	32.9	46.0	-13.1
5	4.599	48.8	44.6	56.0	-11.4	32.2	46.0	-13.8
6	4.461	49.6	46.5	56.0	-9.5	31.4	46.0	-14.6
7	4.336	49.3	46.8	56.0	-9.2	29.8	46.0	-16.2
8	0.872	45.1	41.3	56.0	-14.7	29.5	46.0	-16.5
9	4.449	49.0	44.6	56.0	-11.4	29.4	46.0	-16.6
10	4.480	49.5	45.8	56.0	-10.2	28.6	46.0	-17.4
11	0.155	50.6	45.9	65.7	-19.8	38.0	55.7	-17.7
12	0.886	45.2	39.4	56.0	-16.6	27.1	46.0	-18.9
13	4.384	48.8	43.8	56.0	-12.2	26.8	46.0	-19.2
14	4.238	48.5	44.2	56.0	-11.8	26.6	46.0	-19.4
15	4.301	47.5	41.2	56.0	-14.9	25.6	46.0	-20.4
16	5.159	43.7	39.6	60.0	-20.4	26.1	50.0	-23.9

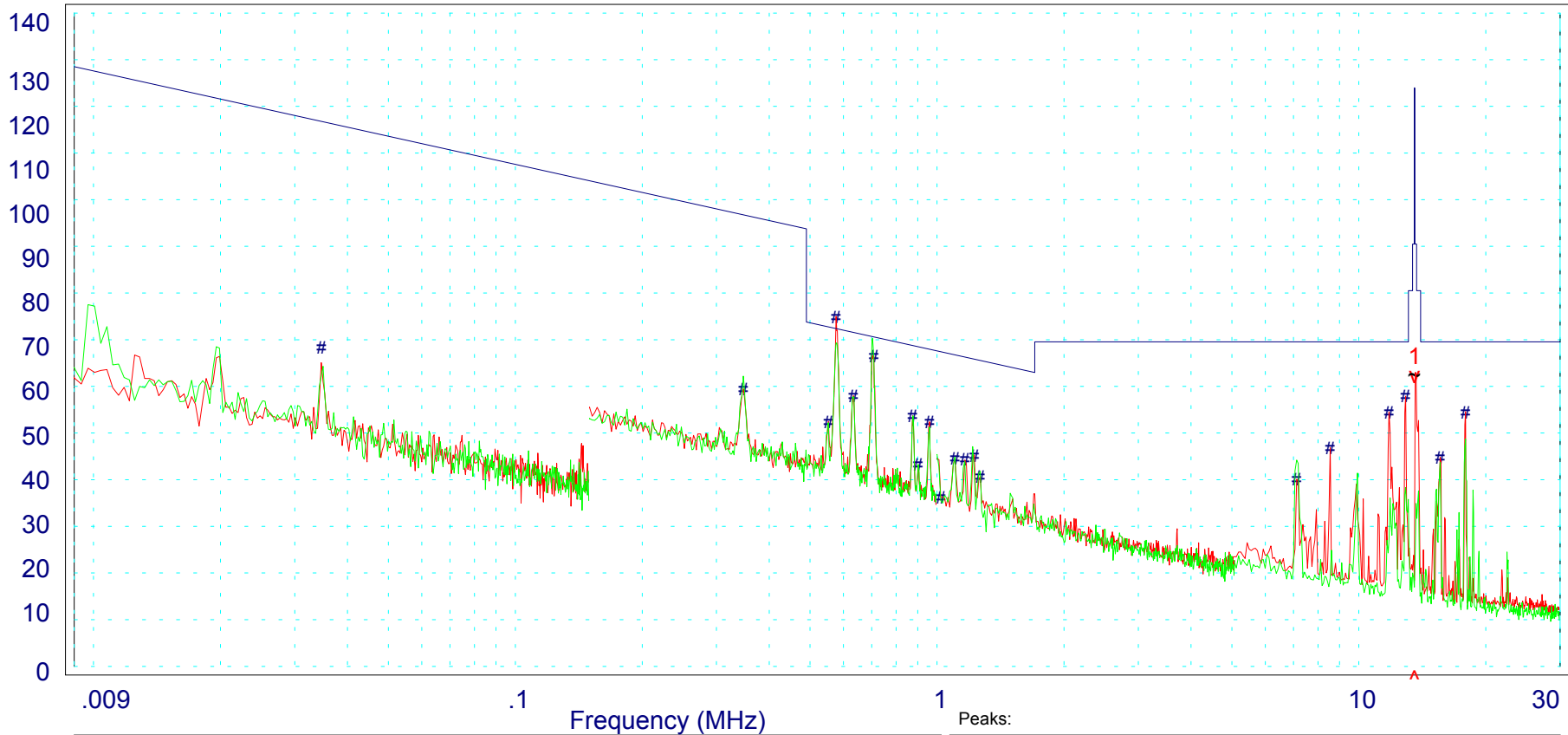
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FCC
Radiated Emissions (dBuV/m)
= Ambient

Job No:T50307B

Test Date: 09-03-05

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GRAPH No. 5



ERG Transit Systems Limited
3V PC Card Type II+ with Contactless Reader
Model: MCR500 (short variant) PartNo: 18252
On with card reader module & type A card (EMCTEST running)

Limits:
FCC_loop_3mFcc Pt15 Subpart C Section 15.209(a) 3Metre Limits

Legend:
— Ambients
— Emissions

Ver 5.5 Build 70
Colo Radiated Test Setup Active Loop
t:A0081204E c1:C0201105 c2:NONE p:NONE a:NONE
Site ID: OATS#1,1247 Upper Colo Rd. Colo, NSW
Test Officer: Bruce Holdsworth

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

Peaks:

No	Freq (MHz)	Peak (dBuV)	Qp Val	FCC_loop_3dL1 (dBuV)	3dL1 (dB)
1	13.56	63.2	63.2	124.0	-60.8

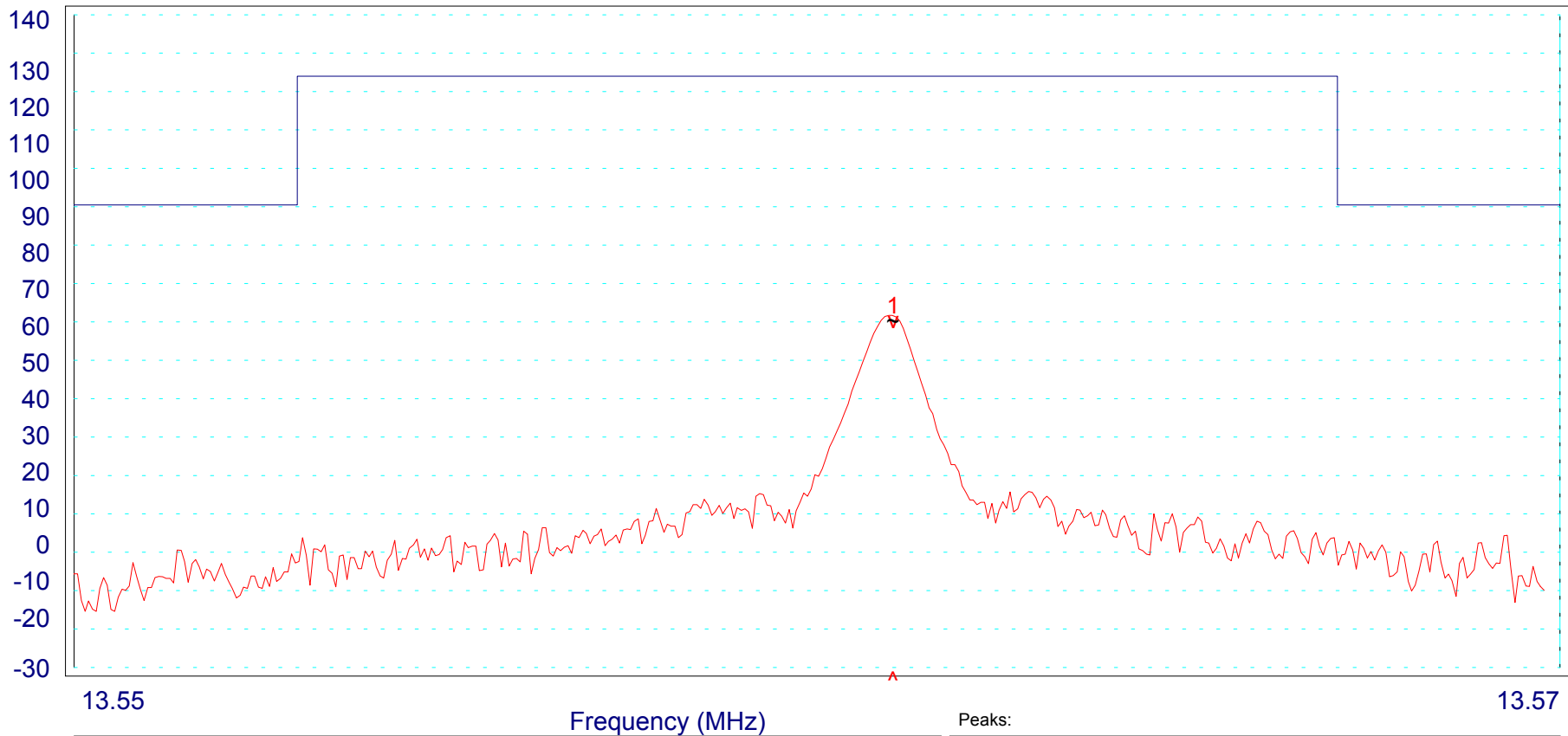
EMC Technologies Pty. Ltd. - Global Product Certification

FCC
Radiated Emissions (dBuV/m)
= Ambient

Job No:T50307B

Test Date: 09-03-05

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GRAPH No. 6



ERG Transit Systems Limited
3V PC Card Type II+ with Contactless Reader
Model: MCR500 (short variant) PartNo: 18252
On with card reader module & type A card (EMCTEST running)

Limits:
FCC_loop_3mFcc Pt15 Subpart C Section 15.209(a) 3Metre Limits

Legend:
Carrier

Ver 5.5 Build 70
Colo Radiated Test Setup Active Loop
t:A0081204E c1:C0201105 c2:NONE p:NONE a:NONE
Site ID: OATS#1,1247 Upper Colo Rd. Colo, NSW
Test Officer: Bruce Holdsworth

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

Peaks:					
No	Freq (MHz)	Peak (dBuV)	Qp Val	FCC_loop_3m (dBuV)	L1 (dB)
1	13.56	61.7	61.5	124.0	-62.5

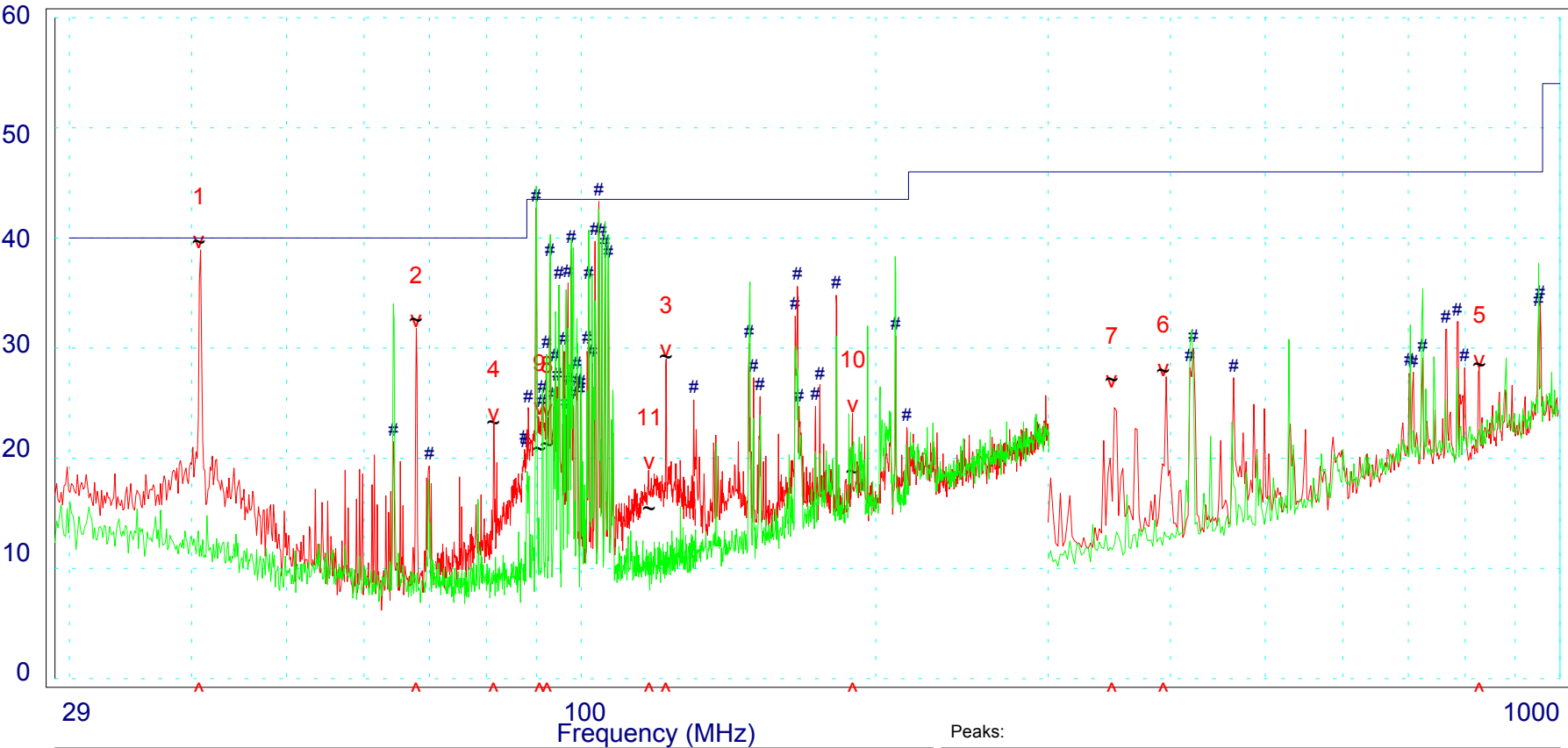
EMC Technologies Pty. Ltd. - Global Product Certification

FCC
Radiated Emissions (dBuV/m)
= Ambient

Job No:T50307B

Test Date: 09-03-05

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GRAPH No. 7



ERG Transit Systems Limited
3V PC Card Type II+ with Contactless Reader
Model: MCR500 (short variant) PartNo: 18252
On with card reader module & type A card (EMCTEST running)

Limits: FCC-B3 FCC CLASS B RAD 3M LIMITS

Legend:
— Vertical Ambients
— Vertical Emissions

Ver 5.5 Build 70
Colo Radiated Test Setup
t:A0690206 c1:C0201105 c2:NONE p:A0961105 a:NONE
Site ID: OATS#1,1247 Upper Colo Rd. Colo, NSW
Test Officer: Bruce Holdsworth

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

Peaks:					
No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC-B3 (dBuV/m)	dL1 (dB)
1	40.68	38.9	38.8	40.0	-1.2
2	67.80	31.8	31.7	40.0	-8.3
3	122.05	29.1	28.4	43.5	-15.1
4	81.37	23.3	22.4	40.0	-17.6
5	827.22	28.2	27.7	46.0	-18.3
6	393.26	27.3	27.1	46.0	-18.9
7	348.37	26.3	26.3	46.0	-19.7
8	92.28	23.7	20.4	43.5	-23.1
9	90.64	23.8	20.0	43.5	-23.5
10	189.35	24.1	18.0	43.5	-25.5
11	117.35	18.9	14.6	43.5	-28.9

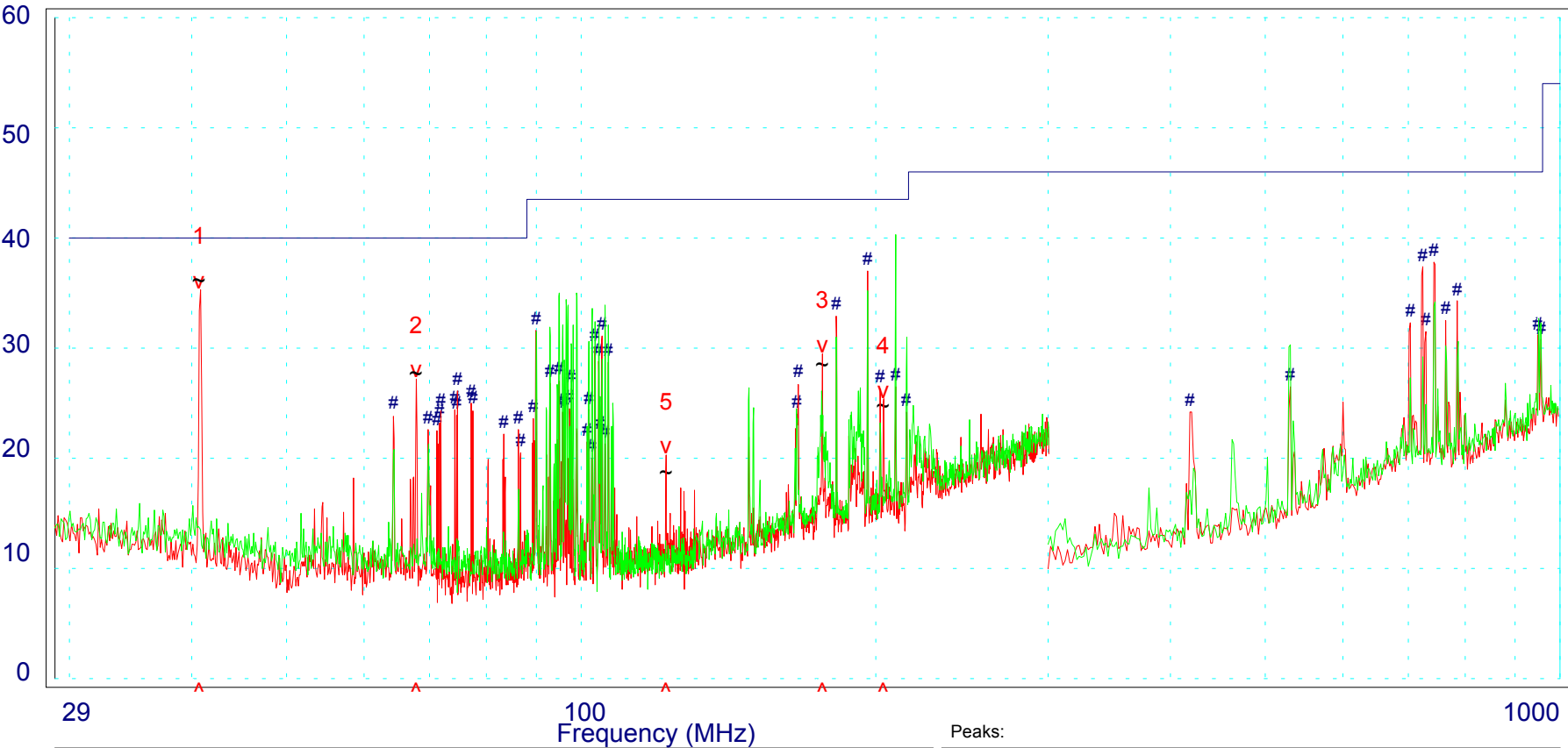
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FCC
Radiated Emissions (dBuV/m)
= Ambient

Job No:T50307B

Test Date: 09-03-05

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GRAPH No. 8



ERG Transit Systems Limited
3V PC Card Type II+ with Contactless Reader
Model: MCR500 (short variant) PartNo: 18252
On with card reader module & type A card (EMCTEST running)

Limits: FCC-B3 FCC CLASS B RAD 3M LIMITS

Legend:
Horizontal Ambients (green line)
Horizontal Emissions (red line)

Ver 5.5 Build 70
Colo Radiated Test Setup
t:A0690206 c1:C0201105 c2:NONE p:A0961105 a:NONE
Site ID: OATS#1,1247 Upper Colo Rd. Colo, NSW
Test Officer: Bruce Holdsworth

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

Peaks:

No	Freq (MHz)	Peak (dBuV/m)	Qp Val	FCC-B3 (dBuV/m)	dL1 (dB)
1	40.68	35.4	35.3	40.0	-4.7
2	67.80	27.3	26.9	40.0	-13.1
3	176.29	29.5	27.7	43.5	-15.8
4	203.41	25.4	23.9	43.5	-19.6
5	122.05	20.4	17.9	43.5	-25.6