

## 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

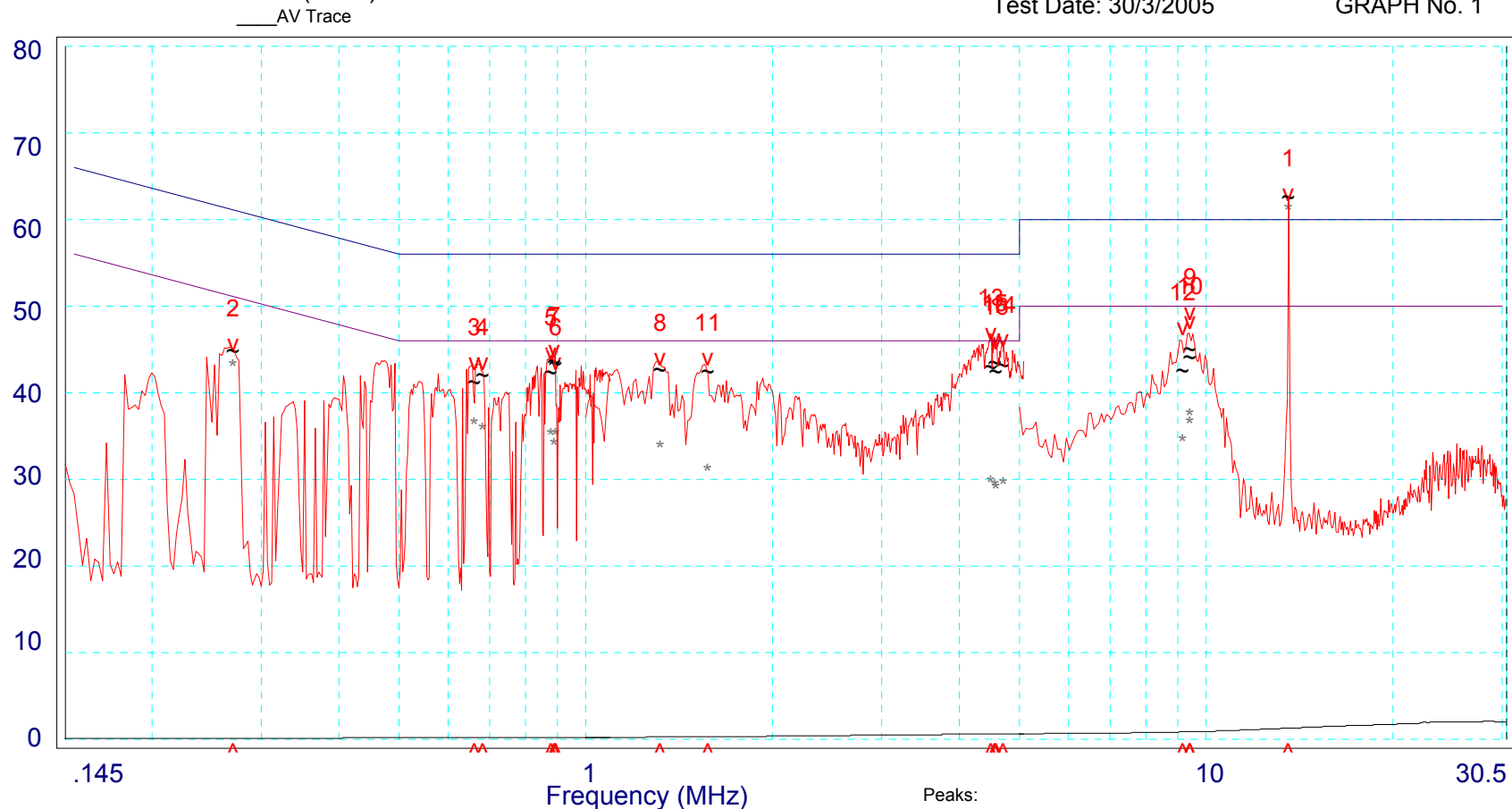
Conducted Emissions (dBuV)

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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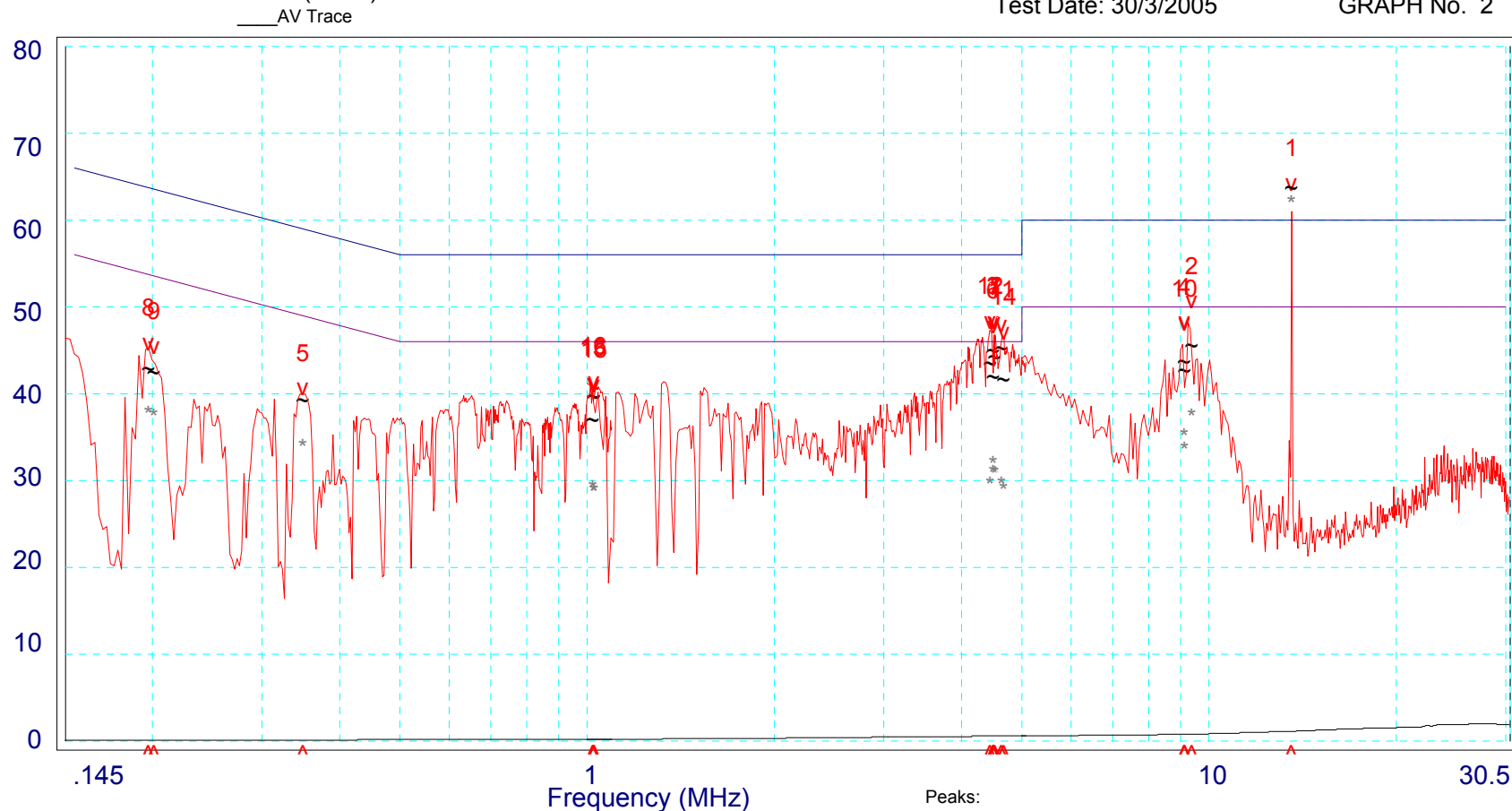
Conducted Emissions (dBuV)

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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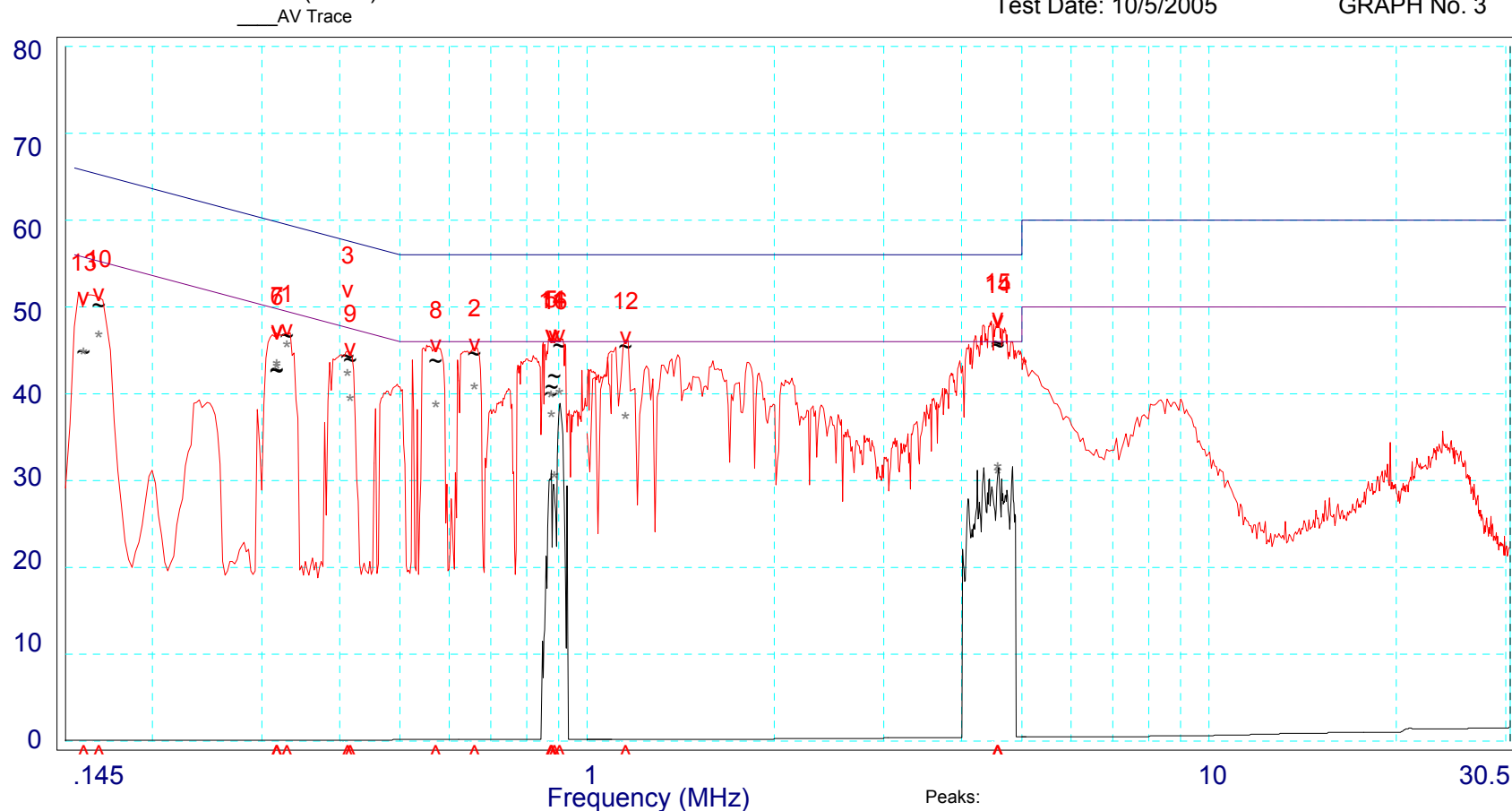
Conducted Emissions (dBuV)

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

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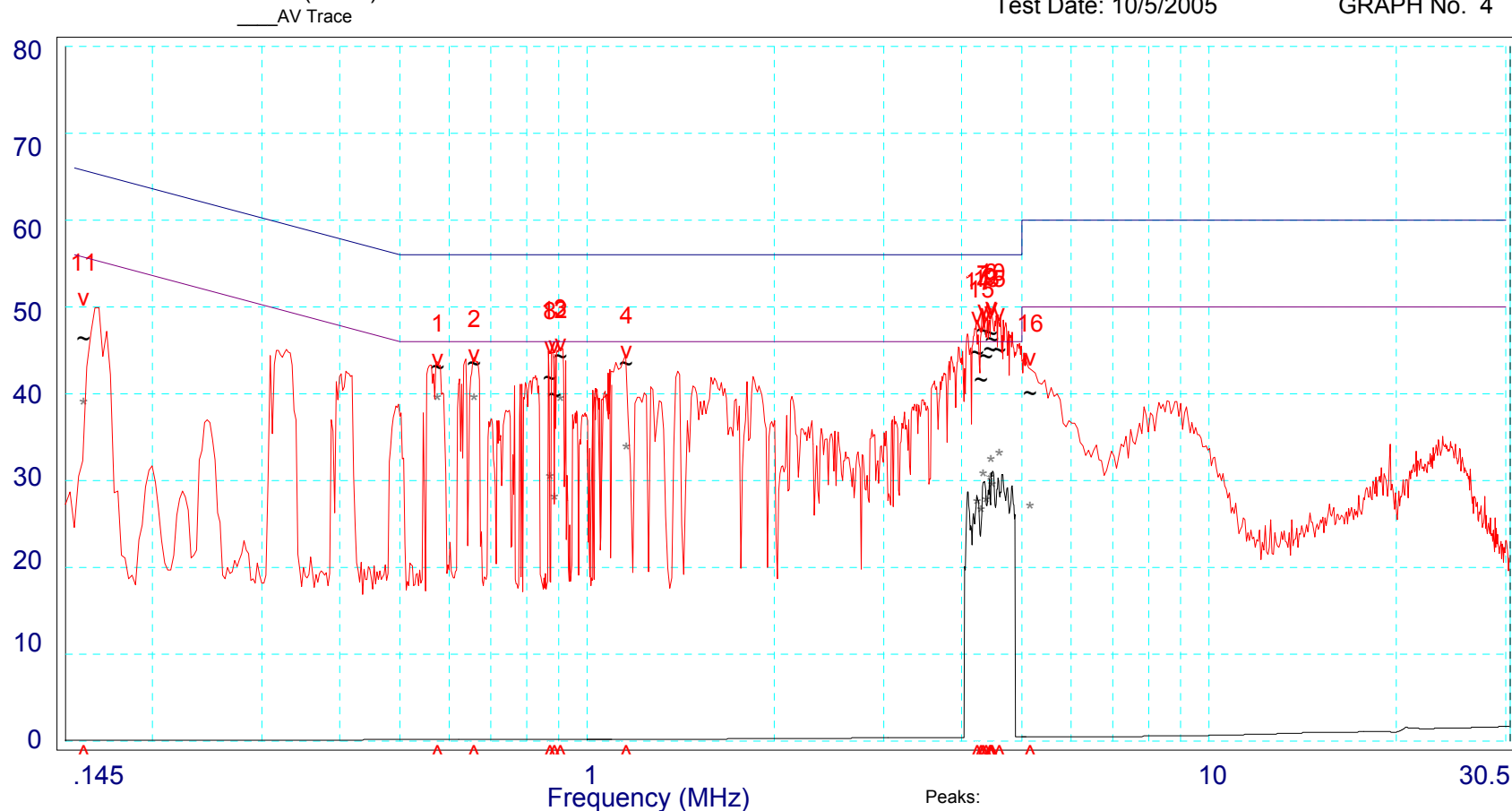
Conducted Emissions (dBuV)

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

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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 |

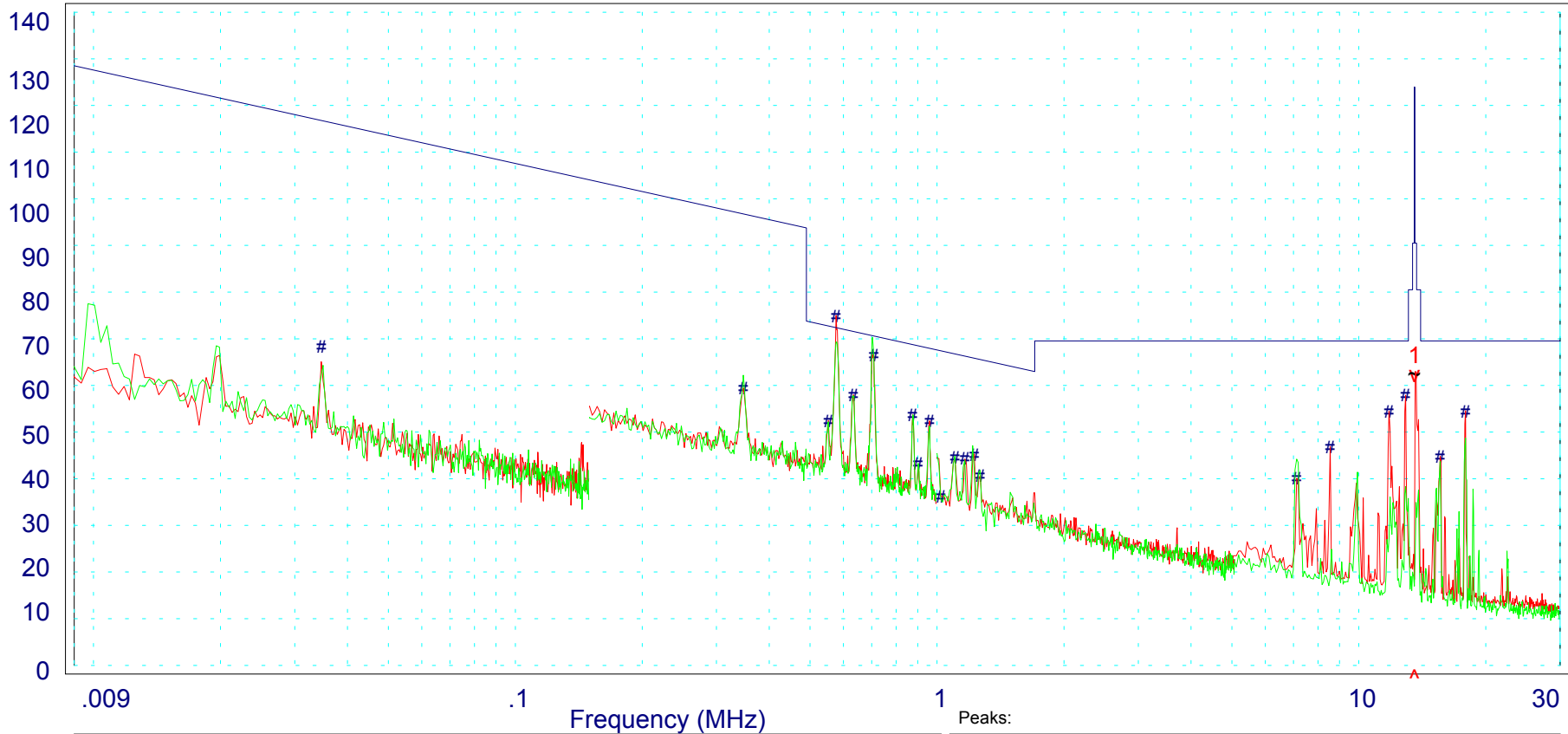
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FCC  
Radiated Emissions (dBuV/m)  
# = Ambient

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     |

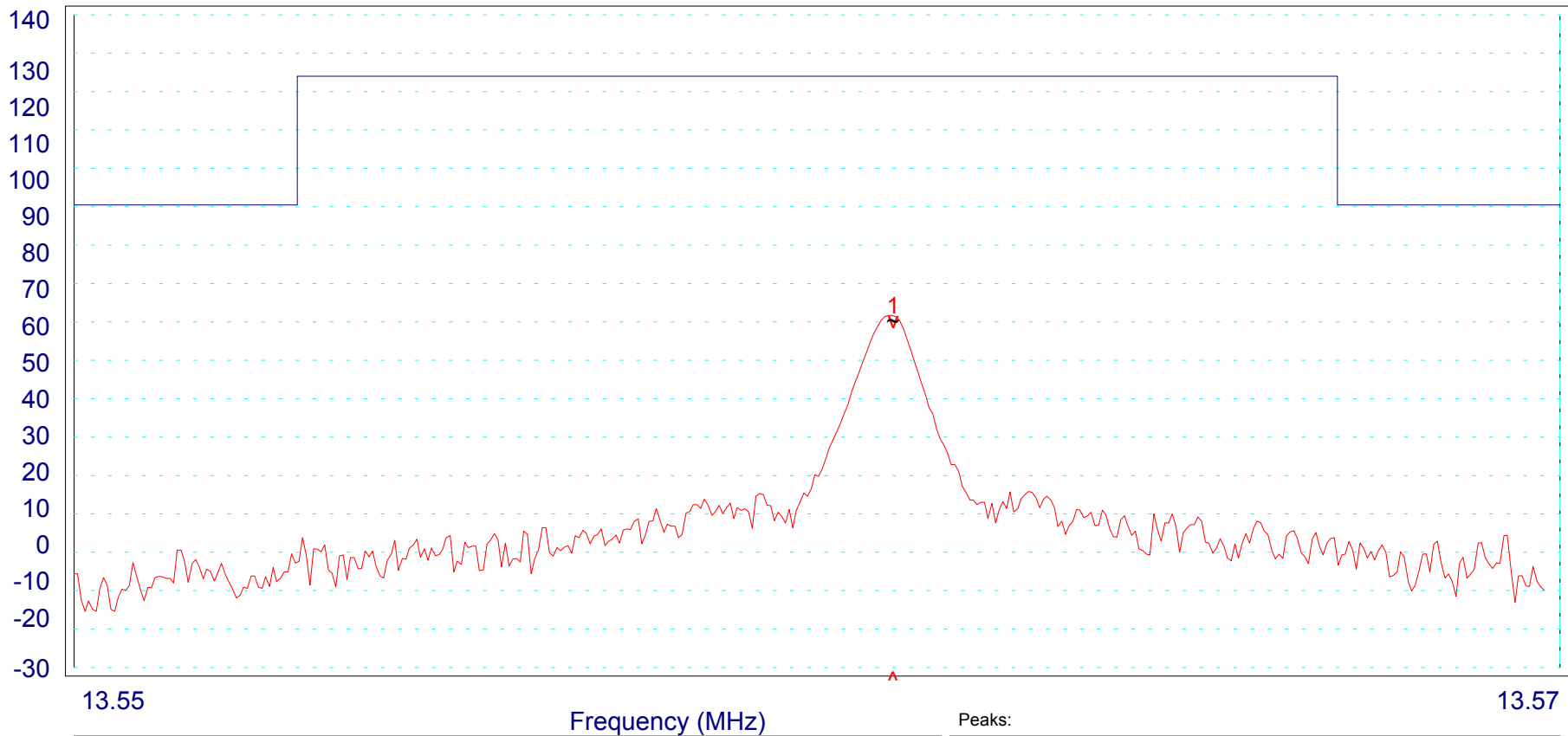
EMC Technologies Pty. Ltd. - Global Product Certification

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_3dL1 (dBuV) | 3dL1 (dB) |
| 1      | 13.56      | 61.7        | 61.5   | 124.0                | -62.5     |

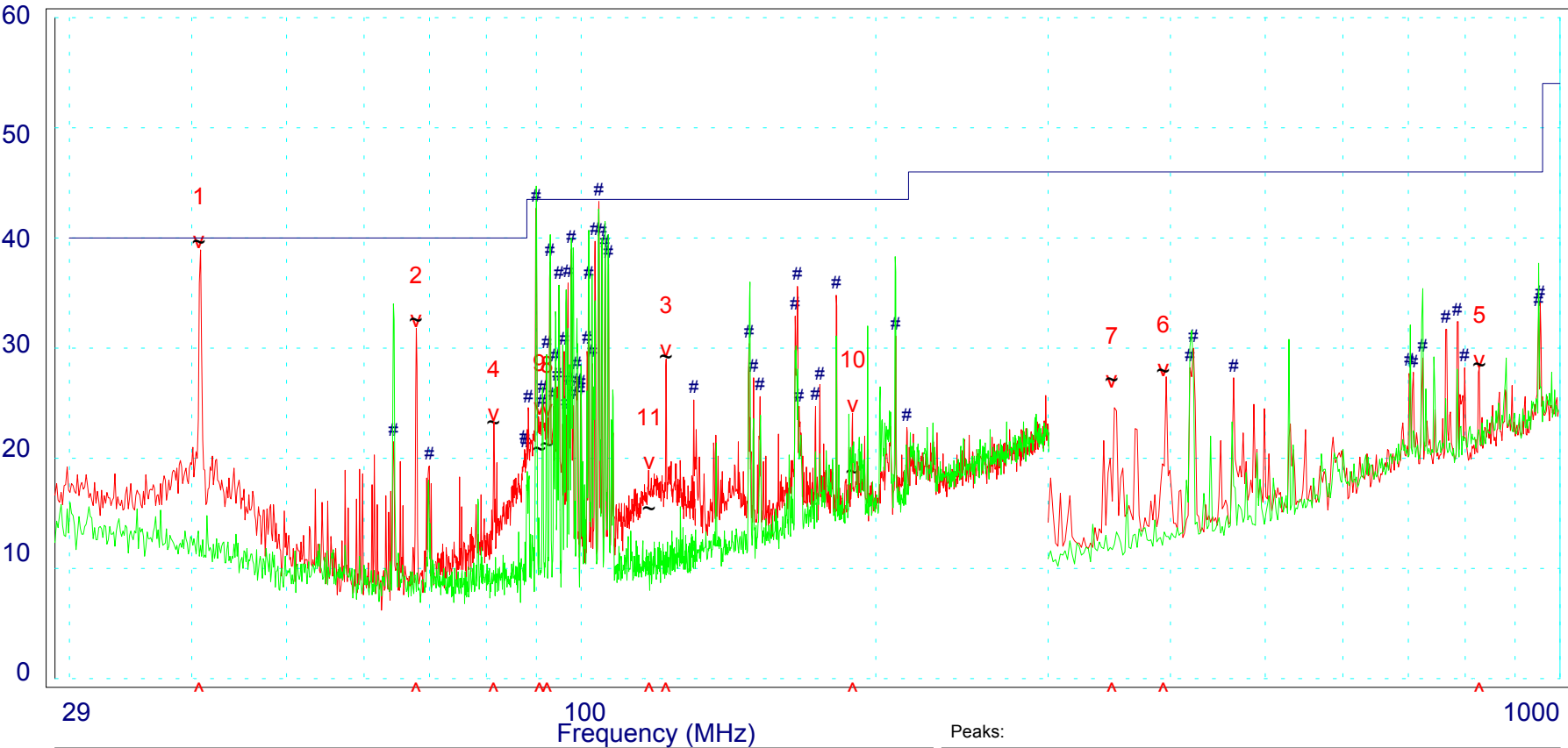
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FCC  
Radiated Emissions (dBUV/m)  
# = Ambient

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    |

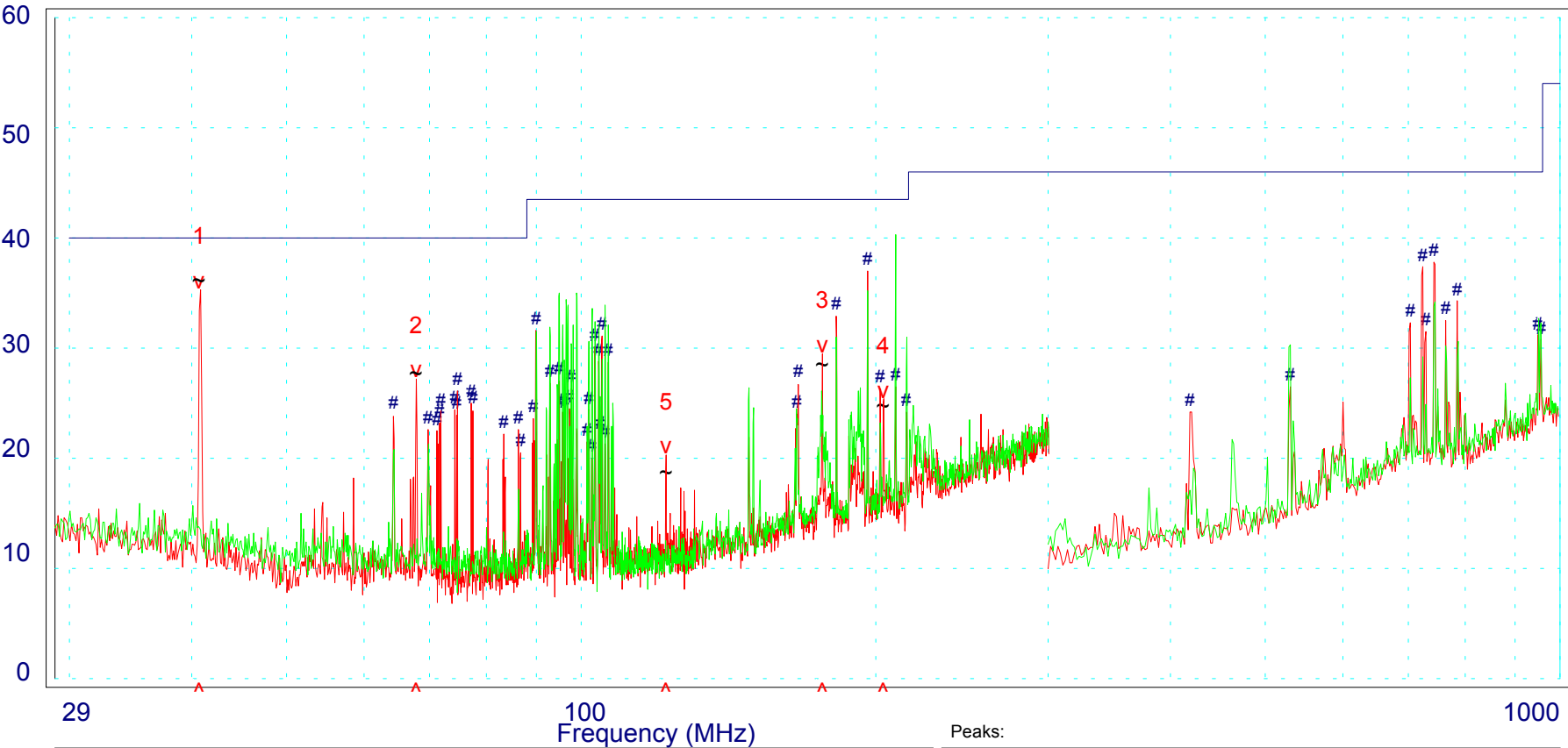
EMC Technologies Pty. Ltd. - Global Product Certification

FCC  
Radiated Emissions (dBUV/m)  
# = Ambient

Job No:T50307B

Test Date: 09-03-05

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GRAPH No. 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  
Horizontal 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      | 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    |