

**RADIATED EMISSIONS**

**DATA**

**FOR**

**KYOCERA WIRELESS  
10300 Campus Point Drive  
San Diego, CA 92121**

**Prepared by**

**TÜV AMERICA  
10040 Mesa Rim Road  
San Diego, CA 92121-2912**

Measurement Requirements (CFR 47 Part 22, Paragraph 22.917(b)(2), and Part 24, Paragraph 24.238(a))

The following measurements were performed by TÜV America. To the best of my knowledge these tests were conducted in accordance with the procedures outlined in Part 2 of the Commission's Rules and Regulations. The data presented below demonstrates compliance with the appropriate technical standards.



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Floyd R. Fleury  
EMC Manager

## Emissions Test Conditions: SPURIOUS RADIATED EMISSIONS

Roof (small open area test site)

The *Spurious Radiated Emissions* measurements were performed using the following equipment:

### Test Equipment Used:

| Model No.            | Prop. No. | Description               | Manufacturer          | Serial No. | Cal Date |
|----------------------|-----------|---------------------------|-----------------------|------------|----------|
| HP8566B              | 407       | Spectrum Analyzer         | Hewlett Packard       | 2311A02209 | 12/02    |
| HP8566B              | 743       | Spectrum Analyzer         | Hewlett Packard       | 2618A02913 | 11/02    |
| Cable 1              | 731       | 30' Cable                 | United Microwave Prod | --         | NCR*     |
| Cable 2              | 756       | 10" Cable                 | United Microwave Prod | --         | NCR*     |
| Cable 3              | 6788      | 3" Cable                  | United Microwave Prod | --         | NCR*     |
| Cable 4              | 6790      | 40' Cable                 | United Microwave Prod | --         | NCR*     |
| HP8350B              | 6707      | Sweep Signal Generator    | Hewlett Packard       | 2328A00112 | NCR*     |
| AMF-5D-010180-35-10P | 719       | Amplifier                 | Miteq                 | 549460     | NCR*     |
| 3115                 | 453       | Antenna, Horn             | Electro Mechanics Co  | 3564       | 01/03    |
| 3115                 | 251       | Antenna, Horn             | Electro Mechanics Co  | 2595       | 12/02    |
| 8481A                | 726       | Power Sensor              | Hewlett Packard       | 1926A27528 | 12/02    |
| HP436A               | 775       | Power Meter               | Hewlett Packard       | 1918A05312 | 09/02    |
| FF6549-2             | 783       | 2000 MHz High Pass Filter | Sage                  | 008        | NCR*     |
| FF6549-1             | 778       | 900 MHz High Pass Filter  | Sage                  | 005        | NCR*     |

**Remarks:** (\*) No Calibration Required.

No emissions other than intentional emissions evident between 30 MHz to 1000 MHz.

## **Technical Documentation**

**Test Data Sheets**

**and**

**Test Setups**

**Kyocera Substitution SC301623**

4/3/03

Location: Roof Site

| Frequency<br>MHz | target<br>level<br>dBuV/m | Horn<br>Gain<br>dBi | cable<br>loss<br>dB | Signal<br>Generator<br>dBm | Total<br>(EIRP)<br>dBm | Spec<br>dBm | Margin<br>Subst.<br>dBm |
|------------------|---------------------------|---------------------|---------------------|----------------------------|------------------------|-------------|-------------------------|
| 3817.5           | 64.4                      | 7.8                 | 8.1                 | -37.8                      | -38.1                  | -13         | -25.1                   |
| 5726.25          | 58.5                      | 8.7                 | 10.4                | -36.8                      | -38.5                  | -13         | -25.5                   |

**Substitution Procedure:**

1. Select emissions that pass with less than 20 dB margin, note the Target level -- reading on spectrum analyzer.
2. Duplicate this targeted reading with Signal Generator, allowing for antenna horn gain and cable insertion loss.
3. Compare calculated power output to specification.

Input level and cable insertion losses verified with Power Meter #775: HP437A, cal. Date due: 09/11/03

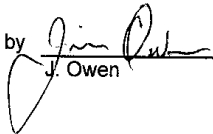
Power Sensor #726, Cal. Date due 12-12-03.

Location: TUV 3-meter roof site

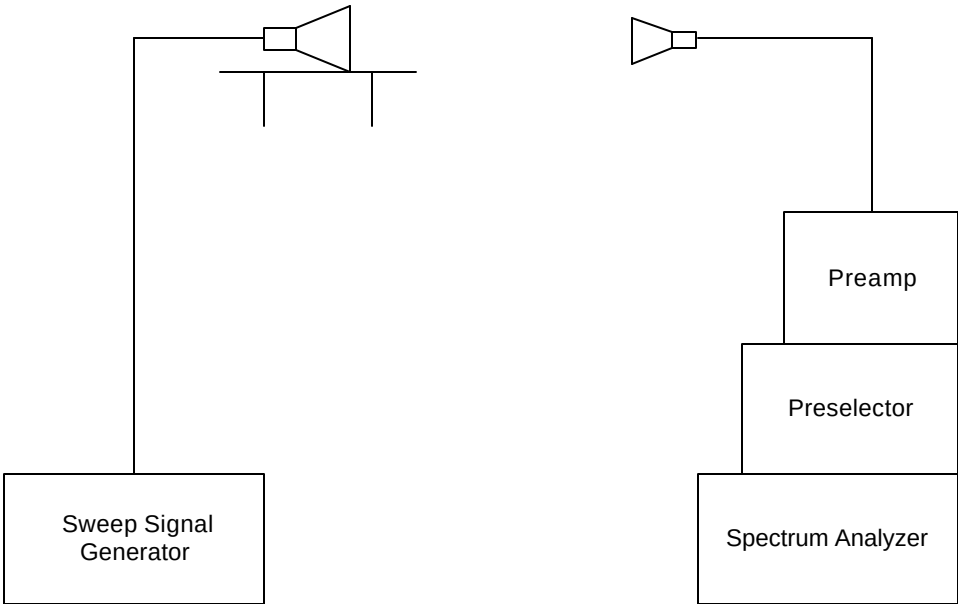
Tested by

  
 A. Laudani

Reviewed by

  
 J. Owen

Test setup for Substitution Method



REPORT No: SC301623      TESTER: Alan Laudani      SPEC: FCC Part 22 para 22.917(b)(2)  
 CUSTOMER: Kyocera Wireless      TEST DIST: 3 Meters  
 E U T: KE424C      TEST SITE: Roof  
 EUT MODE: Transmit CDMA      BICONICAL: N/A  
 DATE: April 3, 2003      ERP/EIRP Factor: 7      LOG: N/A  
 NOTES:      HORN: 251  
 RBW = VBW = 1 MHz

CF = Antenna Factor + Cable Loss - Preamp/Amplifier Gain

| FREQ<br>(MHz) | VERTICAL<br>(dBuv)<br>pk | HORIZONTAL<br>(dBuv)<br>pk | CF (dBm)<br>pk | MAX LEVEL (dBm)<br>pk | SPEC LIMIT<br>(dBm)<br>pk | MARGIN<br>(dB)<br>pk | EUT<br>Rotation | Antenna<br>Height | Notes                   |
|---------------|--------------------------|----------------------------|----------------|-----------------------|---------------------------|----------------------|-----------------|-------------------|-------------------------|
| 824.7         | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (Low Band)  |
| 1649.4        | 49.9                     | 52.7                       | -9.3           | -53.9                 | -13.0                     | -40.9                | 158             | 1.5               |                         |
| 2474.1        | 42.6                     | 43                         | -4.6           | -59.0                 | -13.0                     | -46                  |                 |                   | noise floor             |
| 3298.8        | 44.9                     | 44                         | -1.7           | -54.2                 | -13.0                     | -41.2                |                 |                   | noise floor             |
| 4123.5        | 44.6                     | 45.7                       | 0.2            | -51.5                 | -13.0                     | -38.5                |                 |                   | noise floor             |
| 4948.2        | 45.4                     | 45.9                       | 0.6            | -50.9                 | -13.0                     | -37.9                |                 |                   | noise floor             |
| 5772.9        | 46                       | 46                         | 5.1            | -46.3                 | -13.0                     | -33.3                |                 |                   | noise floor             |
| 6597.6        | 45.4                     | 46.5                       | 5.8            | -45.1                 | -13.0                     | -32.1                |                 |                   | noise floor             |
| 7422.3        | 43.5                     | 43.7                       | 8.2            | -45.4                 | -13.0                     | -32.4                |                 |                   | noise floor             |
| 8247          | 43.4                     | 42.9                       | 9.4            | -44.5                 | -13.0                     | -31.5                |                 |                   | noise floor             |
| 838.49        | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (Mid Band)  |
| 1672.99       | 49.4                     | 49.3                       | -9.1           | -57.0                 | -13.0                     | -44                  | 54              | 1                 |                         |
| 2509.47       | 46.7                     | 49.5                       | -4.5           | -52.3                 | -13.0                     | -39.3                | 7               | 1                 |                         |
| 3345.96       | 45.4                     | 45.2                       | -1.6           | -53.5                 | -13.0                     | -40.5                |                 |                   | noise floor             |
| 4182.45       | 45.6                     | 46.4                       | 0.0            | -50.9                 | -13.0                     | -37.9                |                 |                   | noise floor             |
| 5018.84       | 44.7                     | 45.7                       | 0.8            | -50.8                 | -13.0                     | -37.8                |                 |                   | noise floor             |
| 5855.43       | 44.4                     | 43                         | 5.3            | -47.7                 | -13.0                     | -34.7                |                 |                   | noise floor             |
| 6681.92       | 43.7                     | 43.4                       | 6.1            | -47.5                 | -13.0                     | -34.5                |                 |                   | noise floor             |
| 7528.41       | 42.3                     | 43.1                       | 8.4            | -45.8                 | -13.0                     | -32.8                |                 |                   | noise floor             |
| 8364.9        | 43.5                     | 42.4                       | 9.7            | -44.2                 | -13.0                     | -31.2                |                 |                   | noise floor             |
| 848.31        | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (High Band) |
| 1696.62       | 48.3                     | 50.5                       | -8.9           | -55.8                 | -13.0                     | -42.8                | 235             | 1.5               |                         |
| 2544.93       | 47.6                     | 46.4                       | -4.3           | -54.1                 | -13.0                     | -41.1                |                 |                   | noise floor             |
| 3393.24       | 45.4                     | 45                         | -1.4           | -53.3                 | -13.0                     | -40.3                |                 |                   | noise floor             |
| 4241.55       | 45.8                     | 45.4                       | -0.1           | -51.6                 | -13.0                     | -38.6                |                 |                   | noise floor             |
| 5089.86       | 45.6                     | 46.1                       | 1.3            | -49.9                 | -13.0                     | -36.9                |                 |                   | noise floor             |
| 5938.17       | 45.8                     | 46                         | 5.5            | -45.8                 | -13.0                     | -32.8                |                 |                   | noise floor             |
| 6786.48       | 44.3                     | 44.3                       | 6.5            | -46.6                 | -13.0                     | -33.6                |                 |                   | noise floor             |
| 7634.79       | 43.1                     | 43.4                       | 8.5            | -45.4                 | -13.0                     | -32.4                |                 |                   | noise floor             |
| 8483.1        | 42                       | 42.9                       | 10.0           | -44.5                 | -13.0                     | -31.5                |                 |                   | noise floor             |

REPORT No: SC301623      TESTER: Alan Laudani      SPEC: FCC Part 22 para 22.917(b)(2)

CUSTOMER: Kyocera Wireless      TEST DIST: 3 Meters

E U T: KE424C      TEST SITE: Roof

EUT MODE: Transmit FM      BICONICAL: N/A

DATE: April 3, 2003      ERP/EIRP Factor 7      LOG: N/A

NOTES: RBW = VBW = 1 MHz      HORN: 251

CF = Antenna Factor + Cable Loss - Preamp/Amplifier Gain

| FREQ<br>(MHz) | VERTICAL<br>(dBuv)<br>pk | HORIZONTAL<br>(dBuv)<br>pk | CF (dBm)<br>pk | MAX LEVEL (dBm)<br>pk | SPEC LIMIT<br>(dBm)<br>pk | MARGIN<br>(dB)<br>pk | EUT<br>Rotation | Antenna<br>Height | Notes                   |
|---------------|--------------------------|----------------------------|----------------|-----------------------|---------------------------|----------------------|-----------------|-------------------|-------------------------|
| 824.04        | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (Low Band)  |
| 1648.08       | 51.9                     | 48.9                       | -9.3           | -54.7                 | -13.0                     | -41.7                | 36              | 1                 |                         |
| 2472.12       | 41.7                     | 42                         | -4.6           | -60.0                 | -13.0                     | -47                  |                 |                   | noise floor             |
| 3296.16       | 45.3                     | 45.7                       | -1.7           | -53.4                 | -13.0                     | -40.4                |                 |                   | noise floor             |
| 4120.2        | 44.7                     | 41.4                       | 0.2            | -52.5                 | -13.0                     | -39.5                |                 |                   | noise floor             |
| 4944.24       | 42.6                     | 40.9                       | 0.6            | -54.0                 | -13.0                     | -41                  |                 |                   | noise floor             |
| 5768.28       | 40.3                     | 42.3                       | 5.1            | -50.0                 | -13.0                     | -37                  |                 |                   | noise floor             |
| 6592.32       | 33.9                     | 31.3                       | 5.8            | -57.7                 | -13.0                     | -44.7                |                 |                   | noise floor             |
| 7416.36       | 33.5                     | 32.3                       | 8.2            | -55.6                 | -13.0                     | -42.6                |                 |                   | noise floor             |
| 8240.4        | 32.1                     | 32.4                       | 9.4            | -55.5                 | -13.0                     | -42.5                |                 |                   | noise floor             |
| 836.49        | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (Mid Band)  |
| 1672.98       | 50.8                     | 55.5                       | -9.1           | -50.9                 | -13.0                     | -37.9                | 40              | 1                 |                         |
| 2509.47       | 48.9                     | 50.5                       | -4.5           | -51.3                 | -13.0                     | -38.3                | 0               | 1.3               |                         |
| 3345.96       | 43.2                     | 45.7                       | -1.6           | -53.2                 | -13.0                     | -40.2                |                 |                   | noise floor             |
| 4182.45       | 45                       | 46                         | 0.0            | -51.3                 | -13.0                     | -38.3                |                 |                   | noise floor             |
| 5018.94       | 44.9                     | 45.5                       | 0.8            | -51.0                 | -13.0                     | -38                  |                 |                   | noise floor             |
| 5855.43       | 42.8                     | 43.8                       | 5.3            | -48.3                 | -13.0                     | -35.3                |                 |                   | noise floor             |
| 6691.92       | 42.7                     | 43                         | 6.1            | -48.2                 | -13.0                     | -35.2                |                 |                   | noise floor             |
| 7528.41       | 42.1                     | 42                         | 8.4            | -46.8                 | -13.0                     | -33.8                |                 |                   | noise floor             |
| 8364.9        | 42.7                     | 42.8                       | 9.7            | -44.9                 | -13.0                     | -31.9                |                 |                   | noise floor             |
| 848.97        | 124.4                    |                            | 0.0            | 27.0                  |                           |                      |                 |                   | Fundamental (High Band) |
| 1697.94       | 50.4                     | 49.3                       | -8.9           | -55.9                 | -13.0                     | -42.9                | 0               | 1.1               |                         |
| 2546.91       | 47.5                     | 48                         | -4.3           | -53.7                 | -13.0                     | -40.7                | 334             | 1.2               |                         |
| 3395.88       | 44.6                     | 45.5                       | -1.4           | -53.2                 | -13.0                     | -40.2                |                 |                   | noise floor             |
| 4244.85       | 46.1                     | 46.1                       | -0.1           | -51.3                 | -13.0                     | -38.3                |                 |                   | noise floor             |
| 5093.82       | 46.4                     | 45.1                       | 1.4            | -49.6                 | -13.0                     | -36.6                |                 |                   | noise floor             |
| 5942.79       | 42.6                     | 43.5                       | 5.5            | -48.3                 | -13.0                     | -35.3                |                 |                   | noise floor             |
| 6791.76       | 42.2                     | 41.2                       | 6.5            | -48.7                 | -13.0                     | -35.7                |                 |                   | noise floor             |
| 7640.73       | 42.7                     | 42.6                       | 8.5            | -46.1                 | -13.0                     | -33.1                |                 |                   | noise floor             |
| 8489.7        | 41.7                     | 41.8                       | 10.0           | -45.6                 | -13.0                     | -32.6                |                 |                   | noise floor             |

REPORT No: SC301623 TESTER: Alan Laudani SPEC: FCC Part 24 para 24.238(a)  
 CUSTOMER: Kyocera Wireless  
 E U T: KE424C TEST DIST: 3 Meters  
 EUT MODE: Transmit PCS TEST SITE: Roof  
 DATE: Apr. 3, 2003 ERP/EIRP Factor 5.5 LOG: N/A  
 BICONICAL: N/A  
 NOTES: HORN: 251

| Part 24 - RBW 1 MHz                                      |                    |                      |             |                    |                     |                |              |                |                         |
|----------------------------------------------------------|--------------------|----------------------|-------------|--------------------|---------------------|----------------|--------------|----------------|-------------------------|
| CF = Antenna Factor + Cable Loss - Preamp/Amplifier Gain |                    |                      |             |                    |                     |                |              |                |                         |
| FREQ (MHz)                                               | VERTICAL (dBuV) pk | HORIZONTAL (dBuV) pk | CF (dBm) pk | MAX LEVEL (dBm) pk | SPEC LIMIT (dBm) pk | MARGIN (dB) pk | EUT Rotation | Antenna Height | Notes                   |
| 1851.25                                                  | 128.6              |                      | -7.8        | 25.5               |                     |                |              |                |                         |
| 3702.5                                                   | 59.5               | 61.6                 | -0.4        | -34.1              | -13.0               | -21.1          | 262          | 1.1            | Fundamental (Low Band)  |
| 5553.75                                                  | 50.8               | 50                   | 4.5         | -40.0              | -13.0               | -27            | 223          | 1.1            |                         |
| 7405                                                     | 43.1               | 42.6                 | 8.2         | -44.0              | -13.0               | -31            |              |                | noise floor             |
| 9256.25                                                  | 43                 | 43                   | 10.4        | -41.9              | -13.0               | -28.9          |              |                | noise floor             |
| 11107.5                                                  | 41.8               | 43                   | 13.1        | -39.1              | -13.0               | -26.1          |              |                | noise floor             |
| 12958.75                                                 | 49                 | 50                   | 12.7        | -32.5              | -13.0               | -19.5          |              |                | noise floor             |
| 14810                                                    | 50                 | 49                   | 16.1        | -28.1              | -13.0               | -16.1          |              |                | noise floor             |
| 16661.25                                                 | 52                 | 49.7                 | 18.5        | -24.8              | -13.0               | -11.8          |              |                | noise floor             |
| 1880                                                     | 128.4              |                      | -7.6        | 25.5               |                     |                |              |                |                         |
| 3760                                                     | 61.2               | 60.2                 | -0.3        | -34.3              | -13.0               | -21.3          | 263          | 1.3            | Fundamental (Mid Band)  |
| 5640                                                     | 52.8               | 53.8                 | 4.7         | -36.8              | -13.0               | -23.8          | 195          | 1.1            |                         |
| 7520                                                     | 44.1               | 44                   | 8.4         | -42.7              | -13.0               | -29.7          |              |                | noise floor             |
| 9400                                                     | 43.3               | 43.6                 | 10.0        | -41.7              | -13.0               | -28.7          |              |                | noise floor             |
| 11280                                                    | 43.3               | 42.8                 | 13.2        | -38.8              | -13.0               | -25.8          |              |                | noise floor             |
| 13160                                                    | 50                 | 50.7                 | 13.2        | -31.4              | -13.0               | -18.4          |              |                | noise floor             |
| 15040                                                    | 51.1               | 50.9                 | 17.0        | -27.1              | -13.0               | -14.1          |              |                | noise floor             |
| 16920                                                    | 50.8               | 50.1                 | 19.5        | -25.0              | -13.0               | -12            |              |                | noise floor             |
| 1908.75                                                  | 128.2              |                      | -7.4        | 25.5               |                     |                |              |                |                         |
| 3817.5                                                   | 64.4               | 60.6                 | -0.1        | -31.0              | -13.0               | -18            | 256          | 1.2            | Fundamental (High Band) |
| 5725.25                                                  | 51.7               | 58.5                 | 4.9         | -31.8              | -13.0               | -18.8          | 240          | 1.1            |                         |
| 7635                                                     | 42.4               | 42.7                 | 8.5         | -44.0              | -13.0               | -31            |              |                | noise floor             |
| 9543.75                                                  | 45.2               | 43.7                 | 9.8         | -40.3              | -13.0               | -27.3          |              |                | noise floor             |
| 11452.5                                                  | 43.2               | 43.6                 | 13.3        | -38.4              | -13.0               | -25.4          |              |                | noise floor             |
| 13361.25                                                 | 49.6               | 49.6                 | 14.0        | -31.7              | -13.0               | -18.7          |              |                | noise floor             |
| 15270                                                    | 50                 | 50.2                 | 17.3        | -27.7              | -13.0               | -14.7          |              |                | noise floor             |
| 17178.75                                                 | 50.4               | 50                   | 21.1        | -23.7              | -13.0               | -10.7          |              |                | noise floor             |

Photograph of Test Setup



Photograph of Test Setup



## **APPENDIX**

### **Supplemental Information**



**TÜV**  
PRODUCT SERVICE

[illegible]

NOTES: 1. \_\_\_\_\_

2. \_\_\_\_\_