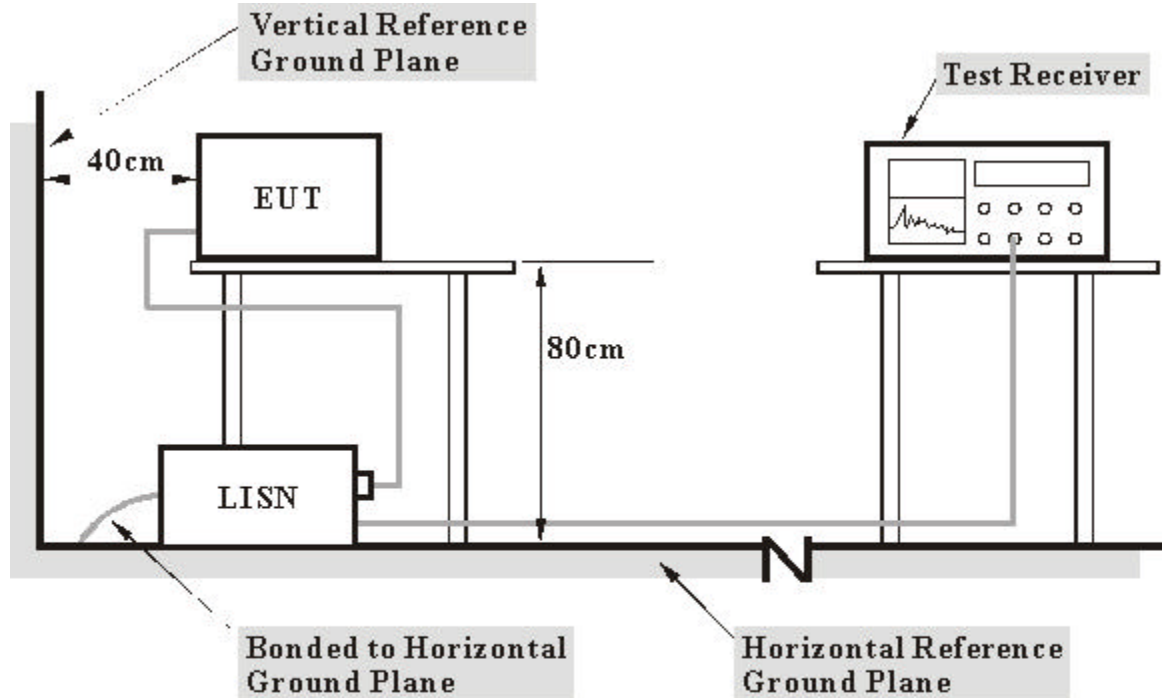


5.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



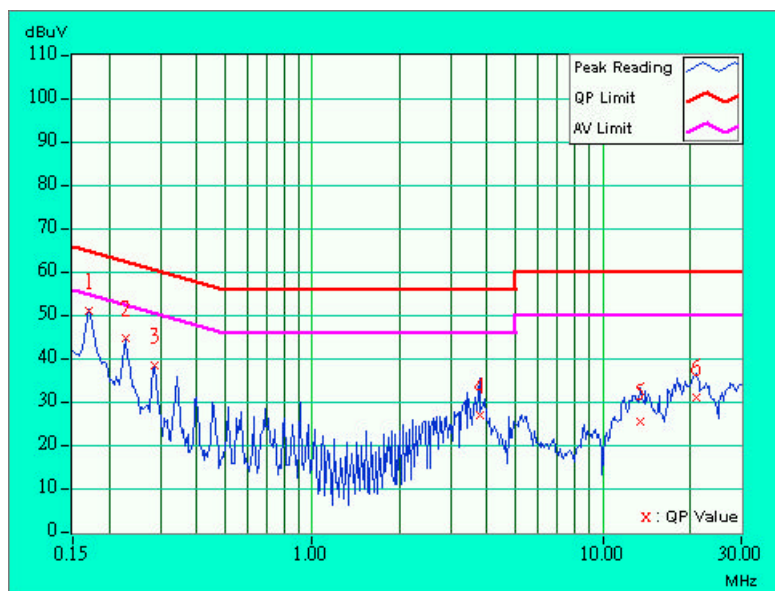
5.1.7 TEST RESULTS

| | | | |
|---------------------------------|-----------------------------|------------------------------|----------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| | | 6dB BANDWIDTH | 9 kHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | PHASE | Line (L) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 60RH, 1005 hPa | TESTED BY: Gary Chang | |

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|--------|--------------|-------------------------|-----|--------------------------|-----|-----------------|-------|-------------|-----|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.170 | 0.10 | 49.88 | - | 49.98 | - | 64.98 | 54.98 | -15.00 | - |
| 2 | 0.228 | 0.10 | 43.56 | - | 43.66 | - | 62.52 | 52.52 | -18.86 | - |
| 3 | 0.287 | 0.10 | 37.43 | - | 37.53 | - | 60.62 | 50.62 | -23.09 | - |
| 4 | 3.762 | 0.38 | 25.78 | - | 26.16 | - | 56.00 | 46.00 | -29.84 | - |
| 5 | 13.500 | 0.74 | 24.58 | - | 25.32 | - | 60.00 | 50.00 | -34.68 | - |
| 6 | 20.918 | 1.12 | 30.05 | - | 31.17 | - | 60.00 | 50.00 | -28.83 | - |

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



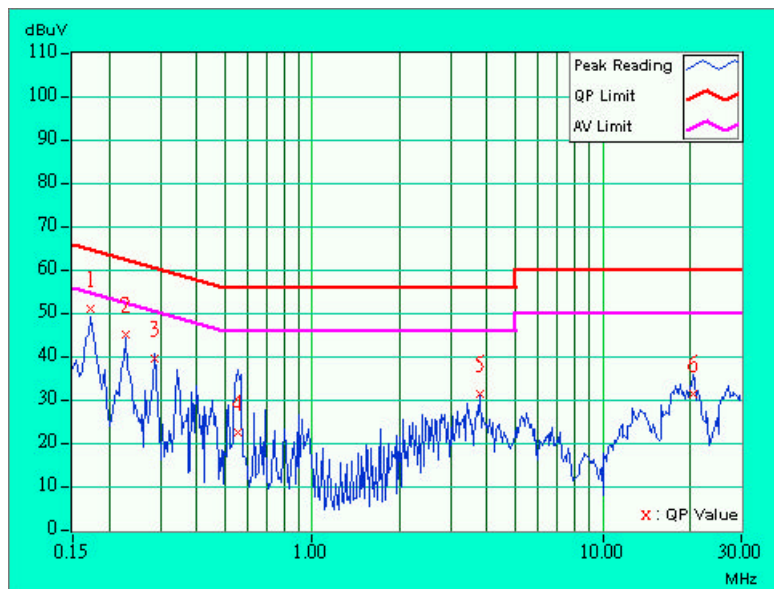


| | | | |
|---------------------------------|-----------------------------|------------------------------|-------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| | | 6dB BANDWIDTH | 9 kHz |
| INPUT POWER (SYSTEM) | 120Vac, 60 Hz | PHASE | Neutral (N) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 60RH, 1005 hPa | TESTED BY: Gary Chang | |

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|----|--------|--------------|-------------------------|-----|--------------------------|-----|-----------------|-------|-------------|-----|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.173 | 0.10 | 50.22 | - | 50.32 | - | 64.79 | 54.79 | -14.47 | - |
| 2 | 0.228 | 0.10 | 44.48 | - | 44.58 | - | 62.52 | 52.52 | -17.94 | - |
| 3 | 0.287 | 0.10 | 38.84 | - | 38.94 | - | 60.62 | 50.62 | -21.68 | - |
| 4 | 0.552 | 0.13 | 21.91 | - | 22.04 | - | 56.00 | 46.00 | -33.96 | - |
| 5 | 3.777 | 0.29 | 30.85 | - | 31.14 | - | 56.00 | 46.00 | -24.86 | - |
| 6 | 20.594 | 0.79 | 30.80 | - | 31.59 | - | 60.00 | 50.00 | -28.41 | - |

NOTE:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.





5.2 RADIATED EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



5.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

| Frequencies (MHz) | EIRP Limit (dBm) | Equivalent Field Strength at 3m (dBμV/m) *note 3 |
|-------------------|------------------|--|
| 5150~5250 | -27 | 68.3 |
| 5250~5350 | -27 | 68.3 |
| 5725~5825 | -27 *note 1 | 68.3 |
| | -17 *note 2 | 78.3 |

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$



5.2.3 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|------------------------------------|--------------------|--------------------------|------------------|
| * HP Spectrum Analyzer | 8590L | 3544A01176 | May 13, 2003 |
| * HP Preamplifier | 8447D | 2944A08485 | Apr. 29, 2003 |
| * HP Preamplifier | 8449B | 3008A01201 | Dec. 01, 2003 |
| * HP Preamplifier | 8449B | 3008A01292 | Aug. 07, 2003 |
| * ROHDE & SCHWARZ TEST RECEIVER | ESMI | 839013/007 839379/002 | Jan. 27, 2003 |
| SCHAFFNER Tunable Dipole Antenna | VHBA 9123 | 459 | Nov. 22, 2003 |
| SCHWARZBECK Tunable Dipole Antenna | UHA 9105 | 977 | |
| * CHASE BILOG Antenna | CBL6112A | 2221 | Aug. 2, 2003 |
| * SCHWARZBECK Horn Antenna | BBHA9120-D1 | D130 | July 3, 2003 |
| * EMCO Horn Antenna | 3115 | 9312-4192 | April 9, 2003 |
| * EMCO Turn Table | 1060 | 1115 | NA |
| * SHOSHIN Tower | AP-4701 | A6Y005 | NA |
| * Software | ADT_Radiated_V5.09 | NA | NA |
| * ANRITSU RF Switches | MP59B | M35046 | July 11, 2003 |
| * TIMES RF cable | LMR-600 | CABLE-ST5-01 | July, 11, 2003 |

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 5.
5. The VCCI Site Registration No. is R-1039.



5.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

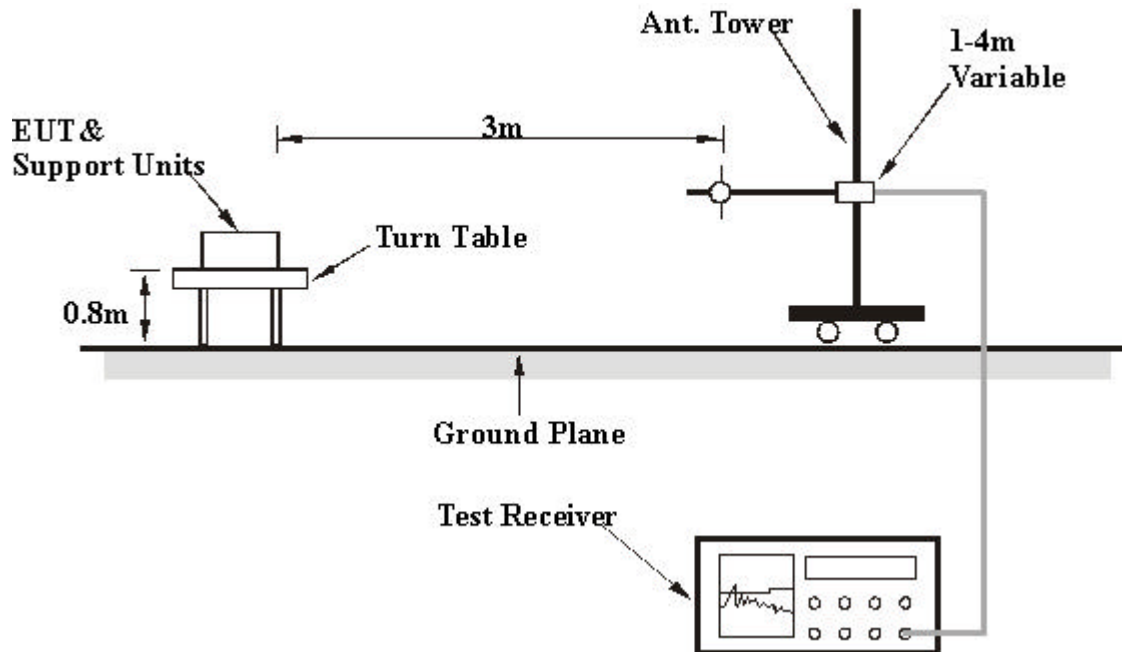
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

5.2.5 DEVIATION FROM TEST STANDARD

No deviation

5.2.6 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.2.7 EUT OPERATING CONDITIONS

Same as 4.1.6.



5.2.8 TEST RESULTS

| | | | |
|---------------------------------|-----------------------------|-----------------------------|--------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| FREQUENCY RANGE | Below 1000MHz | DETECTOR FUNCTION | Quasi-Peak |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 256.00 | 31.0 QP | 46.00 | -15.00 | 1.57 H | 45 | 11.70 | 19.30 |
| 2 | 288.00 | 30.5 QP | 46.00 | -15.50 | 1.17 H | 25 | 10.80 | 19.70 |
| 3 | 320.00 | 29.2 QP | 46.00 | -16.80 | 1.43 H | 82 | 8.70 | 20.50 |
| 4 | 384.00 | 29.2 QP | 46.00 | -16.80 | 1.12 H | 184 | 6.70 | 22.50 |
| 5 | 480.00 | 28.2 QP | 46.00 | -17.80 | 1.31 H | 50 | 3.60 | 24.60 |
| 6 | 576.00 | 30.4 QP | 46.00 | -15.60 | 1.05 H | 156 | 3.80 | 26.60 |
| 7 | 768.00 | 31.0 QP | 46.00 | -15.00 | 1.15 H | 27 | 1.10 | 29.90 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 160.00 | 34.2 QP | 43.50 | -9.30 | 1.17 V | 104 | 21.30 | 12.90 |
| 2 | 256.00 | 35.7 QP | 46.00 | -10.30 | 1.54 V | 118 | 16.40 | 19.30 |
| 3 | 288.00 | 31.4 QP | 46.00 | -14.60 | 1.08 V | 270 | 11.70 | 19.70 |
| 4 | 320.00 | 30.5 QP | 46.00 | -15.50 | 1.21 V | 316 | 10.00 | 20.50 |
| 5 | 384.00 | 30.5 QP | 46.00 | -15.50 | 1.13 V | 158 | 8.00 | 22.50 |
| 6 | 480.00 | 31.2 QP | 46.00 | -14.80 | 1.27 V | 53 | 6.60 | 24.60 |
| 7 | 576.00 | 27.5 QP | 46.00 | -18.50 | 1.15 V | 24 | 0.90 | 26.60 |
| 8 | 736.00 | 32.4 QP | 46.00 | -13.60 | 1.37 V | 216 | 3.40 | 29.00 |

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

5.2.9 TEST RESULTS

| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 1 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | #5150.00 | 63.0 PK | 74.00 | -11.00 | 1.14 H | 25 | 25.30 | 37.70 |
| 1 | #5150.00 | 50.8 AV | 54.00 | -3.20 | 1.14 H | 25 | 13.10 | 37.70 |
| 2 | *5180.00 | 99.0 PK | | | 1.14 H | 25 | 61.30 | 37.70 |
| 2 | *5180.00 | 91.1 AV | | | 1.14 H | 25 | 53.40 | 37.70 |
| 3 | 10360.00 | 58.0 PK | 68.30 | -10.30 | 1.54 H | 16 | 13.50 | 44.50 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | #5150.00 | 62.0 PK | 74.00 | -12.00 | 1.52 V | 45 | 24.30 | 37.70 |
| 1 | #5150.00 | 50.2 AV | 54.00 | -3.80 | 1.52 V | 45 | 12.50 | 37.70 |
| 2 | *5180.00 | 98.5 PK | | | 1.81 V | 264 | 60.80 | 37.70 |
| 2 | *5180.00 | 90.8 AV | | | 1.81 V | 264 | 53.10 | 37.70 |
| 3 | 10360.00 | 56.3 PK | 68.30 | -12.00 | 1.24 V | 23 | 11.80 | 44.50 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency
6. "# " : The radiated frequency falling in the restricted band.



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 4 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 105.2 PK | | | 1.00 H | 72 | 67.60 | 37.70 |
| 1 | *5240.00 | 97.5 AV | | | 1.00 H | 72 | 59.80 | 37.70 |
| 2 | 10480.00 | 57.3 PK | 68.30 | -11.00 | 1.04 H | 45 | 12.30 | 45.00 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 103.3 PK | | | 1.49 V | 126 | 65.60 | 37.70 |
| 1 | *5240.00 | 95.8 AV | | | 1.49 V | 126 | 58.10 | 37.70 |
| 2 | 10480.00 | 57.8 PK | 68.30 | -10.50 | 1.57 V | 45 | 12.80 | 45.00 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 5 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5260.00 | 104.0 PK | | | 1.14 H | 79 | 66.30 | 37.70 |
| 1 | *5260.00 | 96.0 AV | | | 1.14 H | 79 | 58.30 | 37.70 |
| 2 | 10520.00 | 60.0 PK | 68.30 | -8.00 | 1.24 H | 158 | 14.90 | 45.10 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5260.00 | 103.5 PK | | | 1.41 V | 153 | 65.80 | 37.70 |
| 1 | *5260.00 | 95.2 AV | | | 1.41 V | 153 | 57.50 | 37.70 |
| 2 | 10520.00 | 62.0 PK | 68.30 | -6.30 | 1.15 V | 24 | 16.90 | 45.10 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 8 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5320.00 | 96.2 PK | | | 1.12 H | 47 | 58.50 | 37.70 |
| 1 | *5320.00 | 86.2 AV | | | 1.12 H | 47 | 48.50 | 37.70 |
| 2 | #5350.00 | 58.5 PK | 74.00 | -15.50 | 1.25 H | 24 | 20.80 | 37.70 |
| 2 | #5350.00 | 50.8 AV | 54.00 | -3.20 | 1.25 H | 24 | 13.10 | 37.70 |
| 3 | #10640.00 | 57.7 PK | 74.00 | -16.30 | 1.47 H | 59 | 12.40 | 45.20 |
| 3 | #10640.00 | 46.8 AV | 54.00 | -7.20 | 1.47 H | 59 | 1.50 | 45.20 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5320.00 | 96.7 PK | | | 1.15 V | 127 | 59.00 | 37.70 |
| 1 | *5320.00 | 86.7 AV | | | 1.15 V | 127 | 49.00 | 37.70 |
| 2 | #5350.00 | 64.0 PK | 74.00 | -10.00 | 1.18 V | 45 | 26.30 | 37.70 |
| 2 | #5350.00 | 51.0 AV | 54.00 | -3.00 | 1.18 V | 45 | 13.30 | 37.70 |
| 3 | #10640.00 | 57.2 PK | 74.00 | -16.80 | 1.12 V | 154 | 11.90 | 45.20 |
| 3 | #10640.00 | 48.2 AV | 54.00 | -5.80 | 1.12 V | 154 | 2.90 | 45.20 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency
6. "#" : The radiated frequency falling in the restricted band.



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 9 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5715.00 | 63.5 PK | 68.30 | -4.80 | 1.15 H | 236 | 25.60 | 37.90 |
| 2 | 5725.00 | 73.2 PK | 78.30 | -5.10 | 1.15 H | 236 | 35.30 | 37.90 |
| 3 | *5745.00 | 94.8 PK | | | 1.15 H | 236 | 56.90 | 37.90 |
| 3 | *5745.00 | 88.0 AV | | | 1.15 H | 236 | 50.10 | 37.90 |
| 4 | #11490.00 | 59.5 PK | 74.00 | -14.50 | 1.42 H | 15 | 14.00 | 45.50 |
| 4 | #11490.00 | 50.7 AV | 54.00 | -3.30 | 1.42 H | 15 | 5.20 | 45.50 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5725.00 | 70.9 PK | 78.30 | -7.40 | 1.37 V | 337 | 33.00 | 37.90 |
| 2 | 5715.00 | 65.9 PK | 68.30 | -2.40 | 1.37 V | 337 | 28.00 | 37.90 |
| 3 | *5745.00 | 100.0 PK | | | 1.37 V | 337 | 62.10 | 37.90 |
| 3 | *5745.00 | 90.7 AV | | | 1.37 V | 337 | 52.80 | 37.90 |
| 4 | #11490.00 | 60.5 PK | 74.00 | -13.50 | 1.64 V | 254 | 15.00 | 45.50 |
| 4 | #11490.00 | 51.5 AV | 54.00 | -2.50 | 1.64 V | 254 | 6.00 | 45.50 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency
6. "#" : The radiated frequency falling in the restricted band.



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal Mode | CHANNEL | 12 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5805.00 | 94.2 PK | | | 1.22 H | 295 | 56.20 | 38.00 |
| 1 | *5805.00 | 88.5 AV | | | 1.22 H | 295 | 50.50 | 38.00 |
| 2 | 5825.00 | 75.0 PK | 78.30 | -3.30 | 1.23 H | 245 | 37.00 | 38.00 |
| 3 | 5835.00 | 63.0 PK | 68.30 | -5.30 | 1.23 H | 245 | 25.00 | 38.00 |
| 4 | #11610.00 | 60.5 PK | 74.00 | -13.50 | 1.41 H | 145 | 15.00 | 45.50 |
| 4 | #11610.00 | 50.7 AV | 54.00 | -3.30 | 1.41 H | 145 | 5.20 | 45.50 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5805.00 | 96.5 PK | | | 1.00 V | 165 | 58.50 | 38.00 |
| 1 | *5805.00 | 89.1 AV | | | 1.00 V | 165 | 51.10 | 38.00 |
| 2 | 5835.00 | 64.0 PK | 68.30 | -4.30 | 1.00 V | 165 | 26.00 | 38.00 |
| 3 | 5825.00 | 71.0 PK | 78.30 | -7.30 | 1.00 V | 165 | 33.00 | 38.00 |
| 4 | #11610.00 | 57.5 PK | 74.00 | -16.50 | 1.45 V | 41 | 12.00 | 45.50 |
| 4 | #11610.00 | 48.5 AV | 54.00 | -5.50 | 1.45 V | 41 | 3.00 | 45.50 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*": Fundamental frequency
6. "#": The radiated frequency falling in the restricted band.



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Turbo Mode | CHANNEL | 1 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5210.00 | 99.6 PK | | | 1.15 H | 65 | 61.90 | 37.70 |
| 1 | *5210.00 | 90.2 AV | | | 1.15 H | 65 | 52.50 | 37.70 |
| 2 | 10420.00 | 56.5 PK | 68.30 | -11.80 | 1.42 H | 57 | 11.70 | 44.80 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5210.00 | 98.0 PK | | | 1.42 V | 57 | 60.30 | 37.70 |
| 1 | *5210.00 | 88.8 AV | | | 1.42 V | 57 | 51.10 | 37.70 |
| 2 | 10420.00 | 58.0 PK | 68.30 | -10.30 | 1.08 V | 59 | 13.20 | 44.80 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Turbo Mode | CHANNEL | 2 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5250.00 | 104.0 PK | | | 1.15 H | 65 | 66.30 | 37.70 |
| 1 | *5250.00 | 93.8 AV | | | 1.15 H | 65 | 56.20 | 37.70 |
| 2 | 10500.00 | 60.5 PK | 68.30 | -7.80 | 1.18 H | 45 | 15.40 | 45.10 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5250.00 | 101.3 PK | | | 1.24 V | 28 | 63.60 | 37.70 |
| 1 | *5250.00 | 93.1 AV | | | 1.24 V | 28 | 55.40 | 37.70 |
| 2 | 10500.00 | 62.0 PK | 68.30 | -6.30 | 1.31 V | 42 | 16.90 | 45.10 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Turbo Mode | CHANNEL | 3 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5290.00 | 96.0 PK | | | 1.11 H | 51 | 58.30 | 37.70 |
| 1 | *5290.00 | 85.2 AV | | | 1.11 H | 51 | 47.50 | 37.70 |
| 2 | 10580.00 | 57.0 PK | 68.30 | -11.30 | 1.25 H | 245 | 11.90 | 45.10 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5290.00 | 94.0 PK | | | 1.23 V | 68 | 56.30 | 37.70 |
| 1 | *5290.00 | 84.5 AV | | | 1.23 V | 68 | 46.80 | 37.70 |
| 2 | 10580.00 | 56.0 PK | 68.30 | -12.30 | 1.13 V | 181 | 10.90 | 45.10 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Turbo Mode | CHANNEL | 4 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5715.00 | 65.5 PK | 68.30 | -2.80 | 1.15 H | 290 | 27.60 | 37.90 |
| 2 | 5725.00 | 73.4 PK | 78.30 | -4.90 | 1.15 H | 290 | 35.50 | 37.90 |
| 3 | *5760.00 | 96.5 PK | | | 1.15 H | 290 | 58.60 | 37.90 |
| 3 | *5760.00 | 87.2 AV | | | 1.15 H | 290 | 49.30 | 37.90 |
| 4 | #11520.00 | 57.5 PK | 74.00 | -16.50 | 1.82 H | 5 | 12.00 | 45.50 |
| 4 | #11520.00 | 48.5 AV | 54.00 | -5.50 | 1.82 H | 5 | 3.00 | 45.50 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5715.00 | 63.8 PK | 68.30 | -4.50 | 1.24 V | 25 | 25.90 | 37.90 |
| 2 | 5725.00 | 71.0 PK | 78.30 | -7.30 | 1.24 V | 25 | 33.10 | 37.90 |
| 3 | *5760.00 | 96.0 PK | | | 1.24 V | 25 | 58.10 | 37.90 |
| 3 | *5760.00 | 87.4 AV | | | 1.24 V | 25 | 49.40 | 37.90 |
| 4 | #11520.00 | 59.9 PK | 74.00 | -14.10 | 1.12 V | 35 | 14.40 | 45.50 |
| 4 | #11520.00 | 50.7 AV | 54.00 | -3.30 | 1.12 V | 35 | 5.20 | 45.50 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency
6. "#" : The radiated frequency falling in the restricted band.



| | | | |
|---------------------------------|-------------------------------|-----------------------------|--------------------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Turbo Mode | CHANNEL | 5 |
| FREQUENCY RANGE | Above 1000 MHz | DETECTOR FUNCTION | Peak(PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25 deg. C, 60%RH, 1050 hPa | INPUT POWER (SYSTEM) | 120Vac, 60Hz |
| TESTED BY | Gary Chang | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5800.00 | 94.8 PK | | | 1.12 H | 54 | 56.80 | 38.00 |
| 1 | *5800.00 | 86.0 AV | | | 1.12 H | 54 | 48.00 | 38.00 |
| 2 | 5825.00 | 73.0 PK | 78.30 | -5.30 | 1.12 H | 54 | 35.00 | 38.00 |
| 3 | 5835.00 | 63.0 PK | 68.30 | -5.30 | 1.12 H | 54 | 25.00 | 38.00 |
| 4 | #11600.00 | 60.3 PK | 74.00 | -13.70 | 1.15 H | 15 | 14.80 | 45.50 |
| 4 | #11600.00 | 50.5 AV | 54.00 | -3.50 | 1.15 H | 15 | 5.00 | 45.50 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|-----|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5800.00 | 92.0 PK | | | 1.25 V | 328 | 54.00 | 38.00 |
| 1 | *5800.00 | 84.5 AV | | | 1.25 V | 328 | 46.50 | 38.00 |
| 2 | 5825.00 | 69.0 PK | 78.30 | -9.30 | 1.25 V | 328 | 31.00 | 38.00 |
| 3 | 5835.00 | 62.4 PK | 68.30 | -5.90 | 1.25 V | 328 | 24.40 | 38.00 |
| 4 | #11600.00 | 57.5 PK | 74.00 | -16.50 | 1.42 V | 35 | 12.00 | 45.50 |
| 4 | #11600.00 | 48.5 AV | 54.00 | -5.50 | 1.42 V | 35 | 3.00 | 45.50 |

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
(Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.
5. "*" : Fundamental frequency
6. "#" : The radiated frequency falling in the restricted band.



5.3 PEAK TRANSMIT POWER MEASUREMENT

5.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

| Frequency Band | Limit |
|-------------------|---|
| 5.15 – 5.25 GHz | The lesser of 50mW (17dBm) or 4dBm + 10logB |
| 5.25 – 5.35 GHz | The lesser of 250mW (24dBm) or 11dBm + 10logB |
| 5.725 – 5.825 GHz | The lesser of 1W (30dBm) or 17dBm + 10logB |

Note: Where B is the 26dB emission bandwidth in MHz.

5.3.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| SPECTRUM ANALYZER | FSEK30 | 100049 | July 24, 2003 |

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

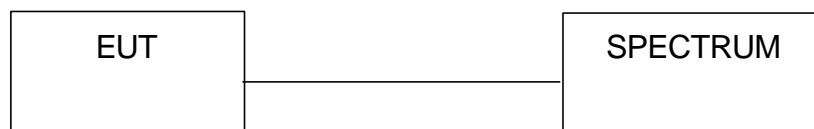
5.3.3 TEST PROCEDURE

2. The transmitter output was connected to the spectrum analyzer.
3. Set span to encompass the entire emission bandwidth of the signal.
4. Set RBW to 1MHz, VBW to 300kHz.
5. Using the spectrum analyzer's channel power measurement function to measure the output power.

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



5.3.7 TEST RESULTS

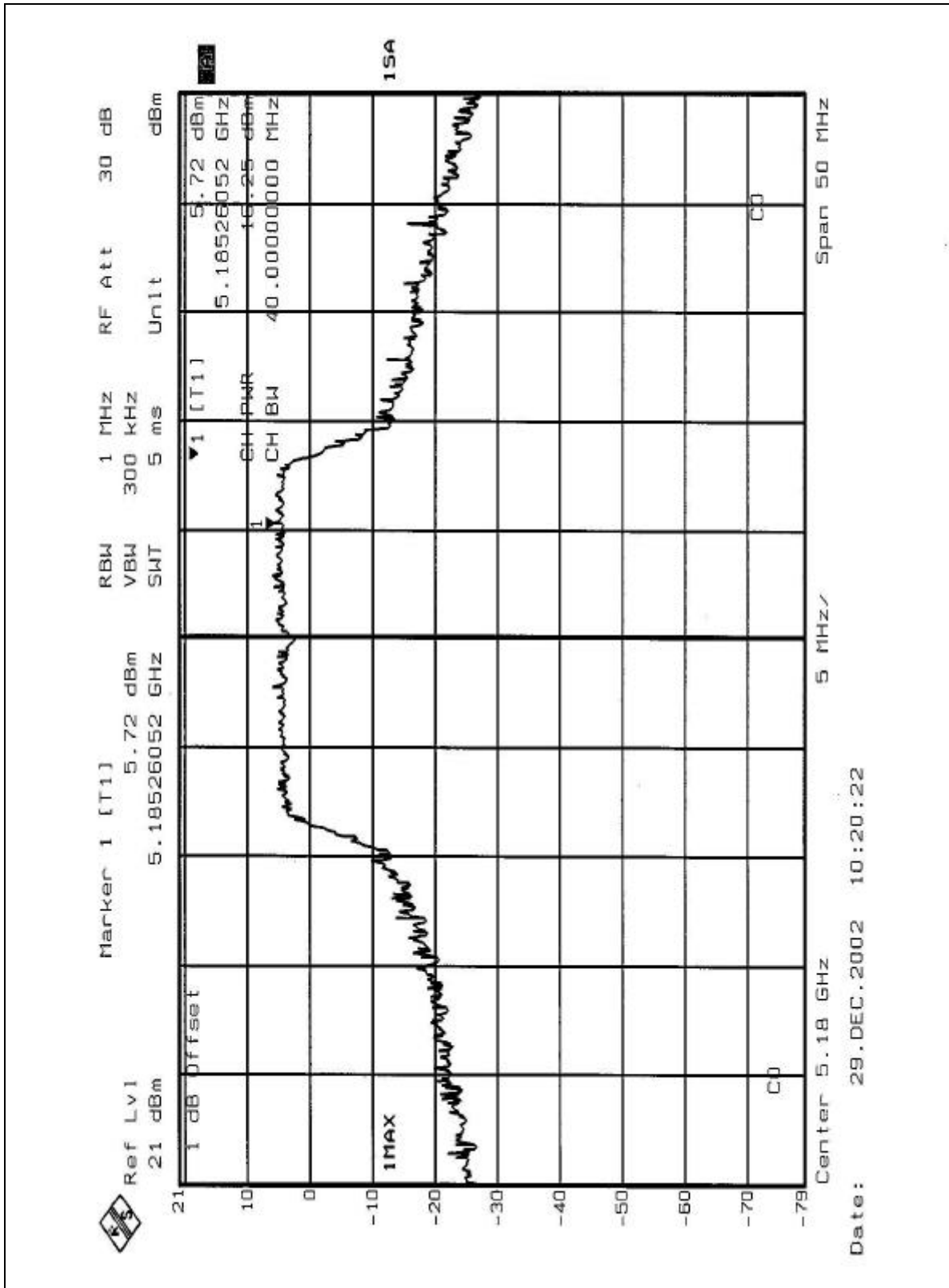
| | | | |
|---------------------------------|-----------------------------|-----------------------------|---------------|
| EUT | 2.4GHz/5GHz Mini - PCI Card | MODEL | WLL220 |
| MODE | Normal | INPUT POWER (SYSTEM) | 120Vac, 60 Hz |
| ENVIRONMENTAL CONDITIONS | 20eg. C, 60RH, 1005 hPa | TESTED BY | Steven Lu |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | 26dBc Occupied Bandwidth (MHz) | PASS/FAIL |
|----------------|--------------------------------|--------------------------------|-------------------------------|---------------------------------------|------------------|
| 1 | 5180 | 16.25 | 17.00 | 39.880 | PASS |
| 4 | 5240 | 16.11 | 17.00 | 36.072 | PASS |
| 5 | 5260 | 16.36 | 24.00 | 35.371 | PASS |
| 8 | 5320 | 16.49 | 24.00 | 39.780 | PASS |
| 9 | 5745 | 16.53 | 30.00 | 32.966 | PASS |
| 12 | 5805 | 17.15 | 30.00 | 33.166 | PASS |

NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

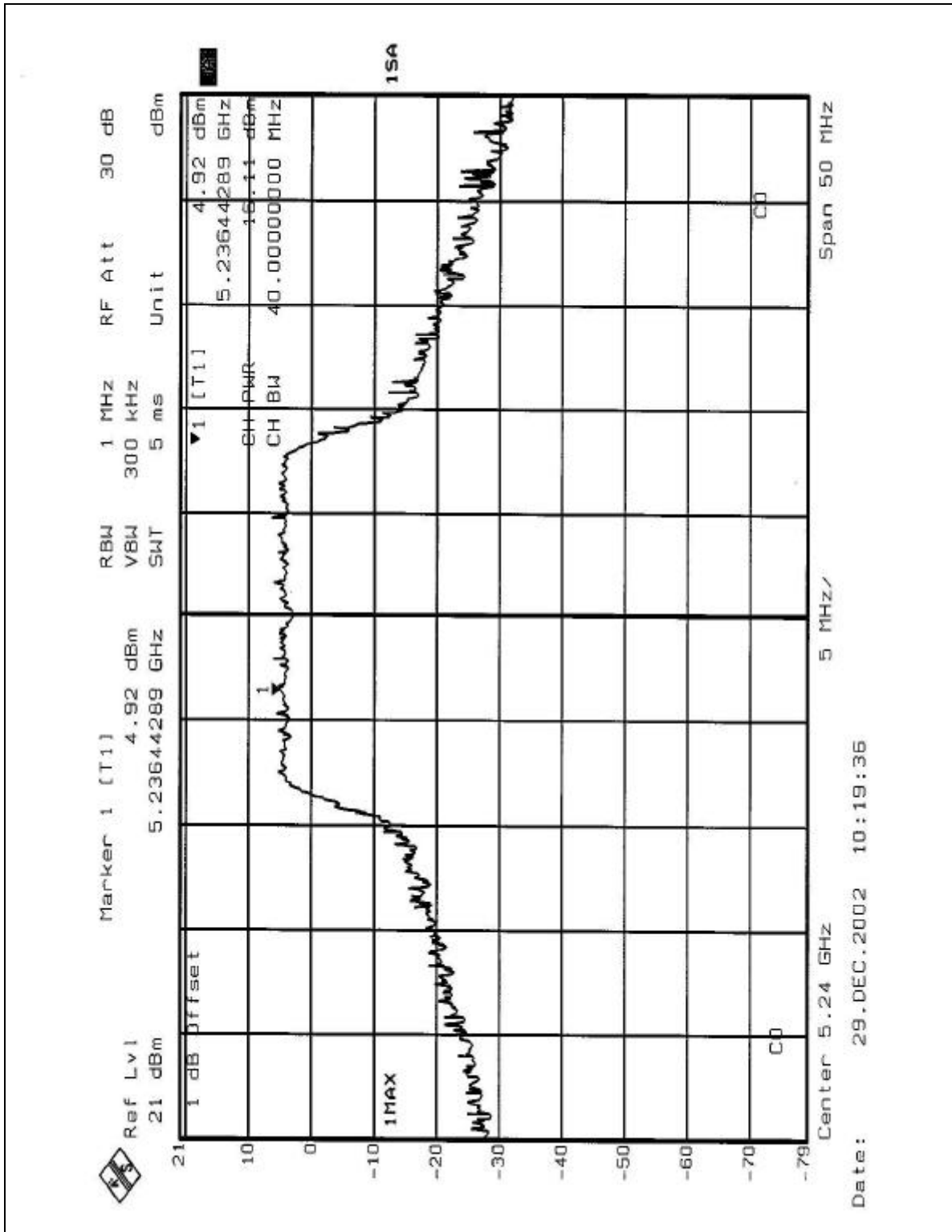


CHANNEL 1



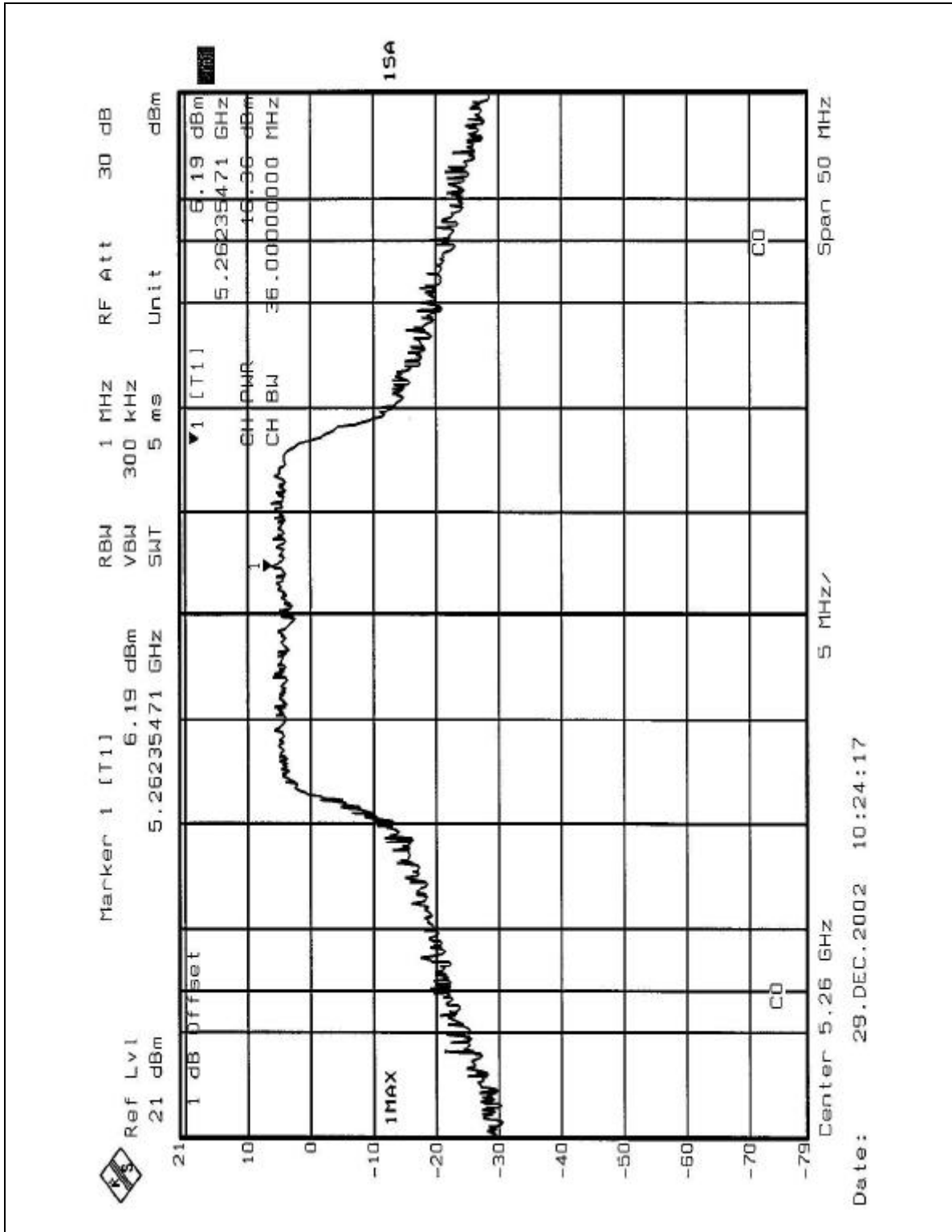


CHANNEL 4



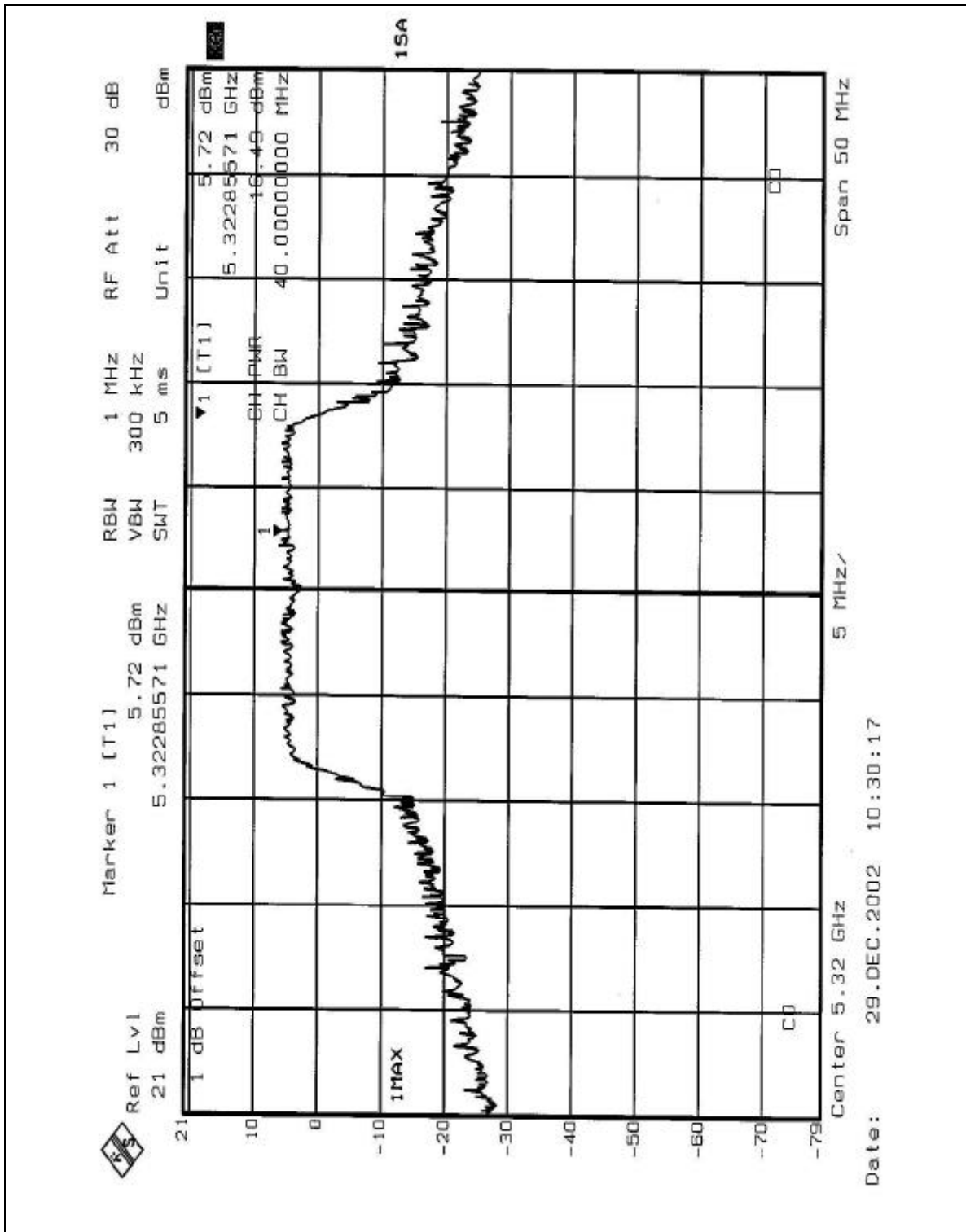


CHANNEL 5



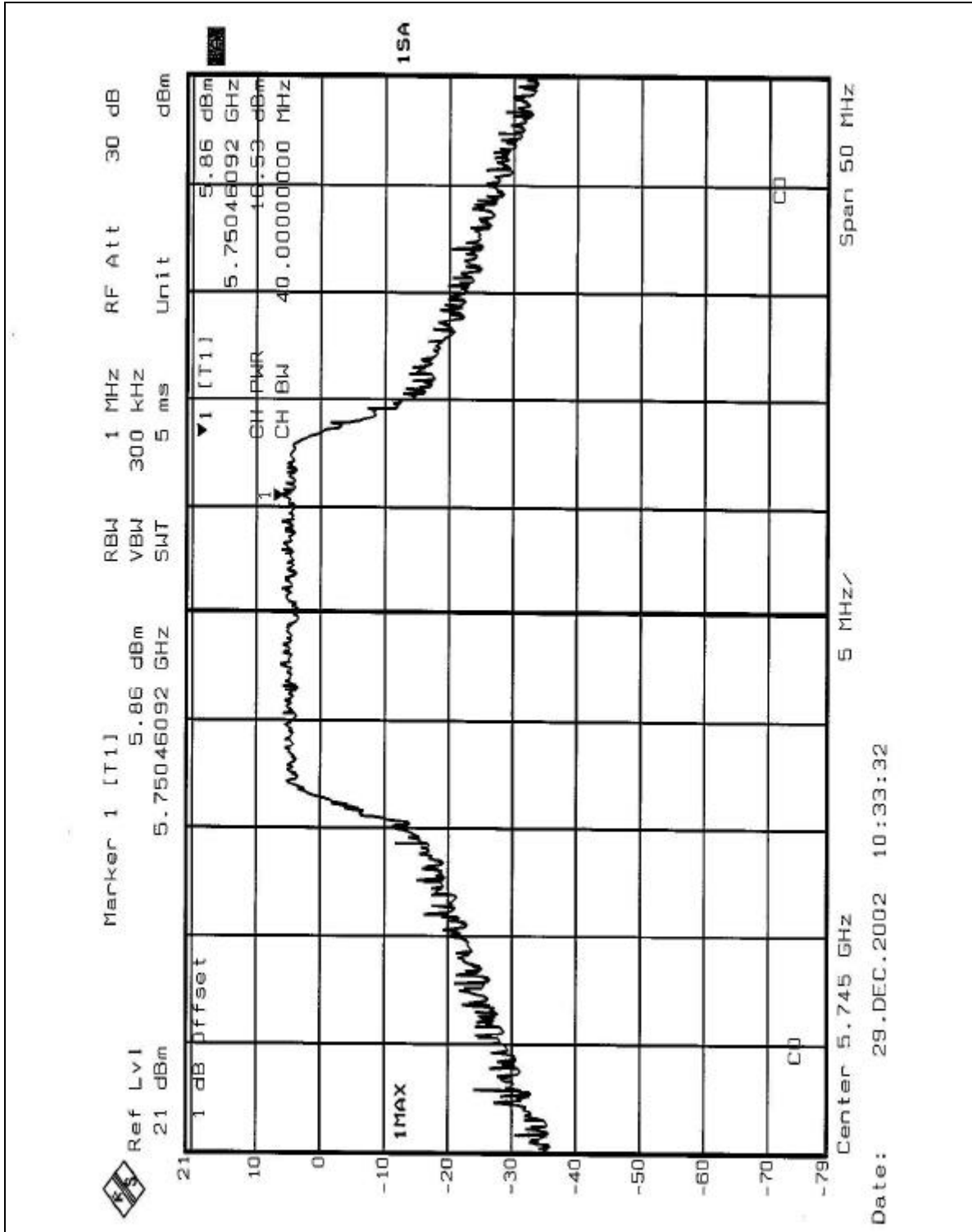


CHANNEL8



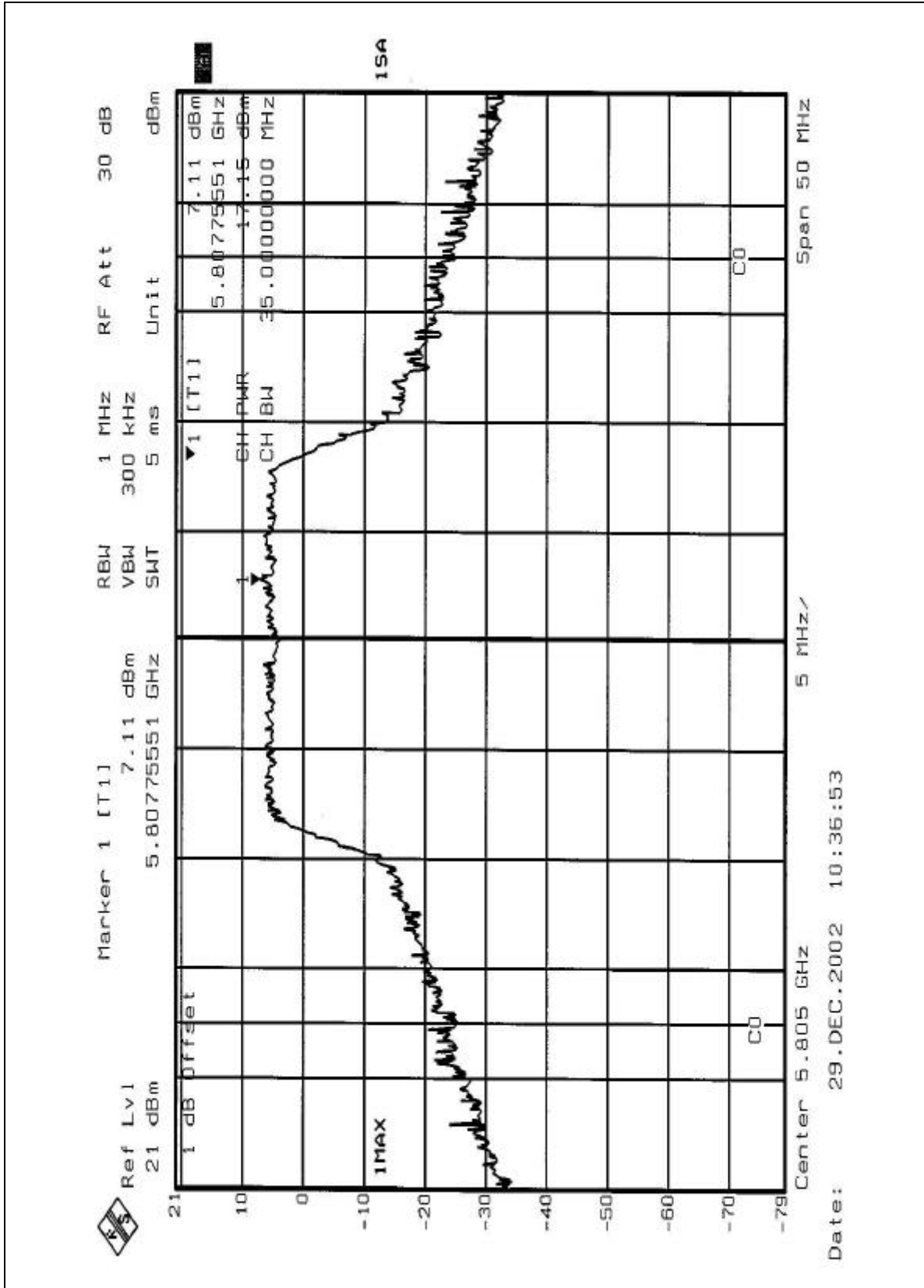


CHANNEL9



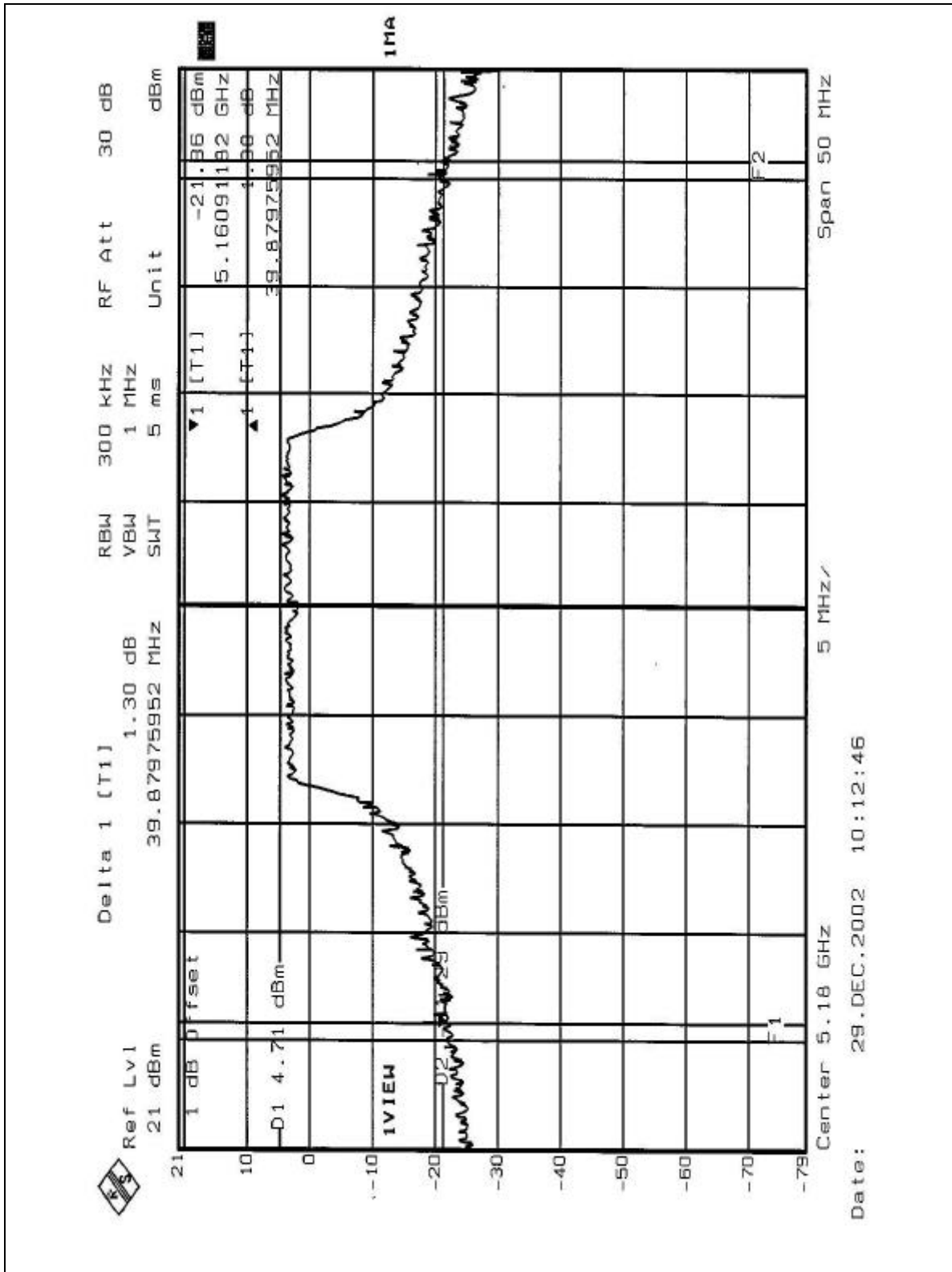


CHANNEL 12





CHANNEL 1





CHANNEL 4

