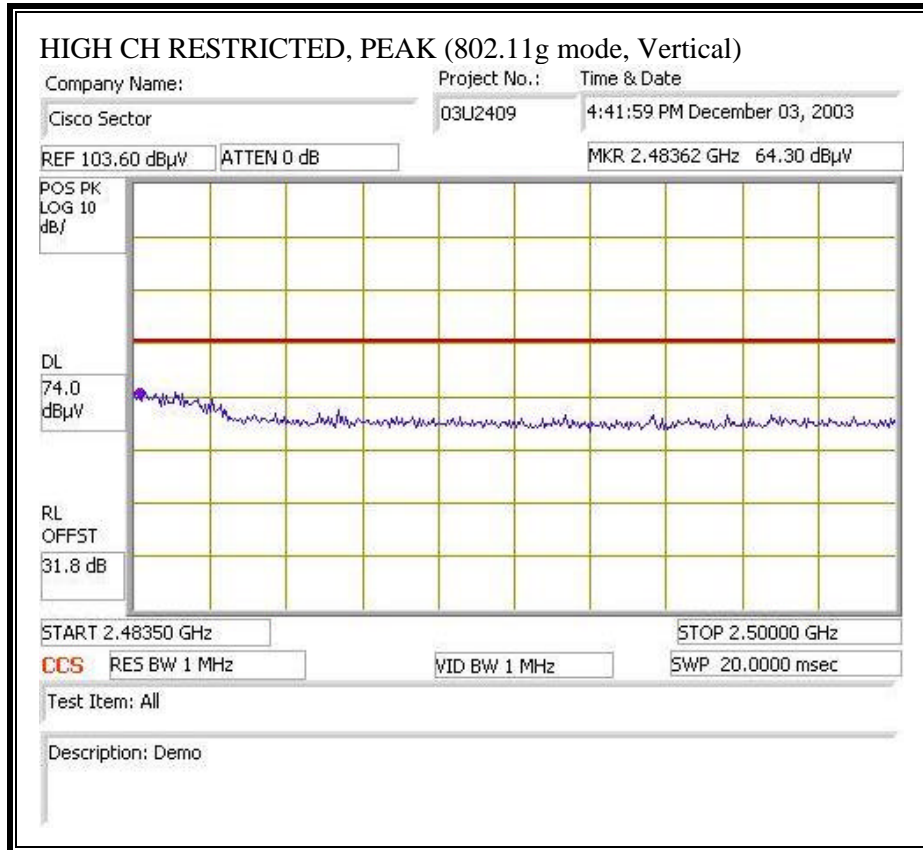
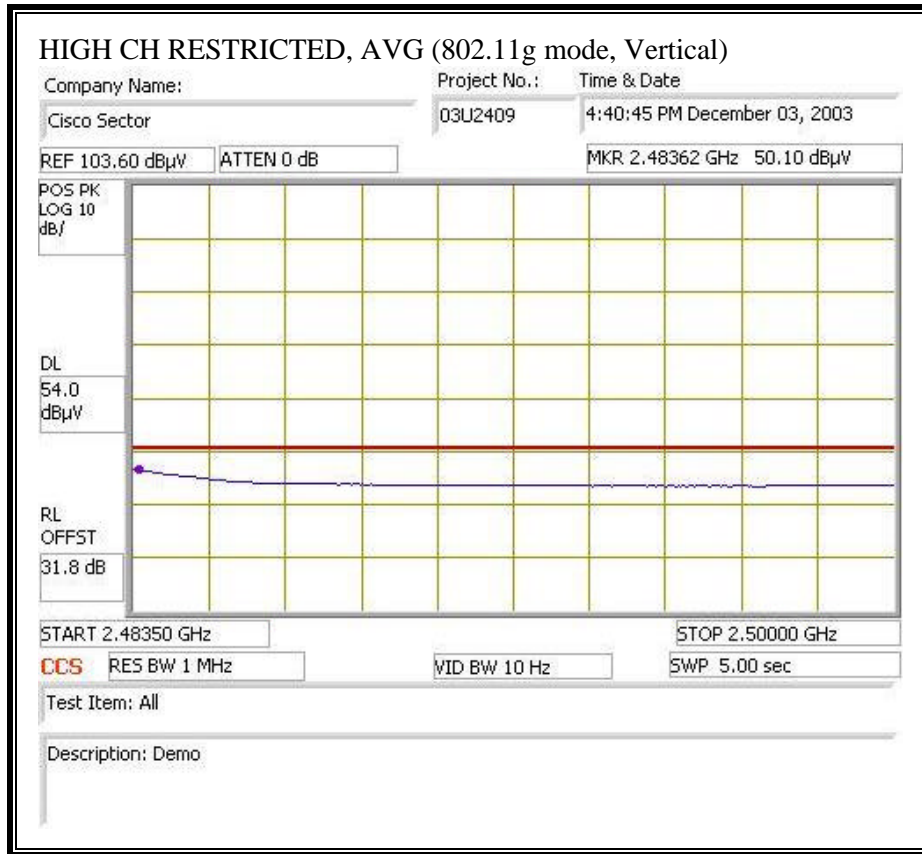


RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (g MODE)

12/03/03 High Frequency Measurement
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Ben Du
 Project #: 03U2409
 Company: CISCO
 EUT Descr: WLAN Card
 EUT M/N:
 Test Target: FCC 15 B
 Mode Oper: Tx, g mode, with 15 dBi Sector Antenna

Test Equipment:

EMCO Horn 1-18GHz
 T89; S/N: 3245 @3m

Pre-amplifier 1-26GHz
 T86 Mitoq 924341

Spectrum Analyzer
 Agilent E4446A Analyzer

Horn > 18GHz

Limit
 FCC 15.205

H Frequency Cables
 (2 ft) (2-3 ft) (4-6 ft) (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth 1 MHz Video Bandwidth
 Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth

| f GHz | Dist feet | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | HPF | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes |
|----------------|-----------|--------------|----------------|---------|-------|--------|-----------|-----|-------------|------------|---------------|----------------|-----------|------------|-------|
| Tx at 2.412GHz | | | | | | | | | | | | | | | |
| 4.824 | 9.8 | 50.9 | 41.2 | 33.1 | 3.1 | -45.6 | 0.0 | 1.0 | 42.5 | 32.8 | 74.0 | 54.0 | -31.5 | -21.2 | V |
| 4.824 | 9.8 | 47.5 | 38.5 | 33.1 | 3.1 | -45.6 | 0.0 | 1.0 | 39.1 | 30.1 | 74.0 | 54.0 | -34.9 | -23.9 | H |
| Tx at 2.437GHz | | | | | | | | | | | | | | | |
| 4.874 | 9.8 | 49.6 | 39.7 | 33.1 | 3.2 | -45.6 | 0.0 | 1.0 | 41.2 | 31.3 | 74.0 | 54.0 | -32.8 | -22.7 | V |
| 7.311 | 9.8 | 42.0 | 32.8 | 36.0 | 4.1 | -46.6 | 0.0 | 1.0 | 36.5 | 27.3 | 74.0 | 54.0 | -37.5 | -26.7 | V |
| 4.874 | 9.8 | 45.8 | 38.2 | 33.1 | 3.2 | -45.6 | 0.0 | 1.0 | 37.4 | 29.8 | 74.0 | 54.0 | -36.6 | -24.2 | H |
| 7.311 | 9.8 | 39.9 | 31.6 | 36.0 | 4.1 | -46.6 | 0.0 | 1.0 | 34.4 | 26.1 | 74.0 | 54.0 | -39.6 | -27.9 | H |
| Tx at 2.62GHz | | | | | | | | | | | | | | | |
| 4.924 | 9.8 | 51.1 | 42.3 | 33.1 | 3.2 | -45.7 | 0.0 | 1.0 | 42.7 | 33.9 | 74.0 | 54.0 | -31.3 | -20.1 | V |
| 7.386 | 9.8 | 46.5 | 31.9 | 36.1 | 4.1 | -46.5 | 0.0 | 1.0 | 35.1 | 26.6 | 74.0 | 54.0 | -38.9 | -27.4 | V |
| 4.924 | 9.8 | 48.1 | 40.0 | 33.1 | 3.2 | -45.7 | 0.0 | 1.0 | 39.7 | 31.6 | 74.0 | 54.0 | -34.3 | -22.4 | H |
| 7.386 | 9.8 | 38.6 | 31.5 | 36.1 | 4.1 | -46.5 | 0.0 | 1.0 | 33.2 | 26.1 | 74.0 | 54.0 | -40.8 | -27.9 | H |

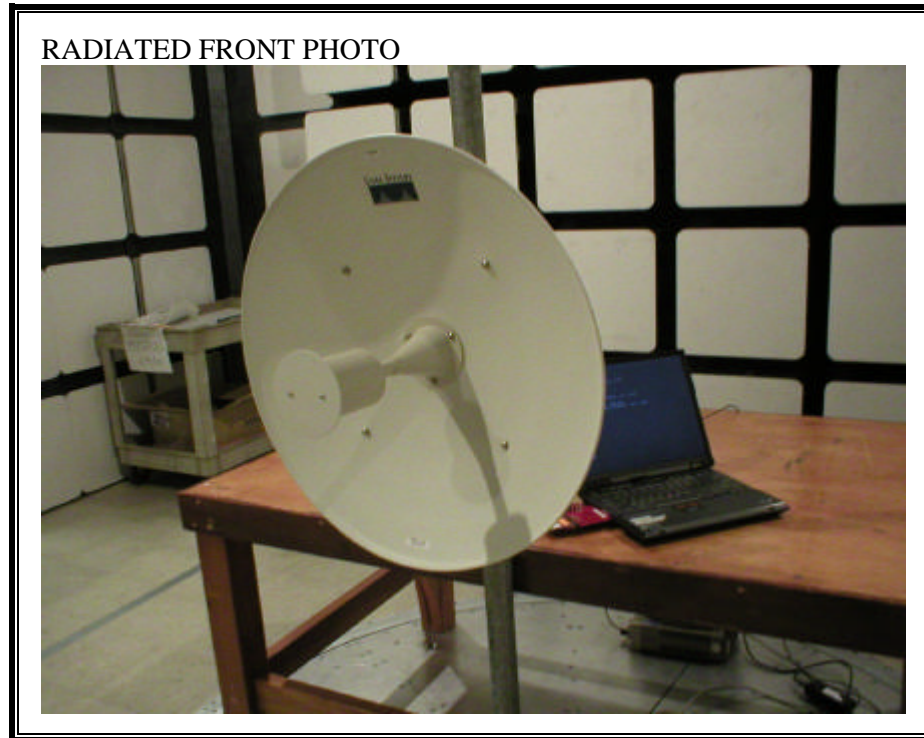
f Measurement Frequency
 Dist Distance to Antenna
 Read Analyzer Reading
 AF Antenna Factor
 CL Cable Loss

Amp Preamp Gain
 D Corr Distance Correct to 3 meters
 Avg Average Field Strength @ 3 m
 Peak Calculated Peak Field Strength
 HPF High Pass Filter

Avg Lim Average Field Strength Limit
 Pk Lim Peak Field Strength Limit
 Avg Mar Margin vs. Average Limit
 Pk Mar Margin vs. Peak Limit

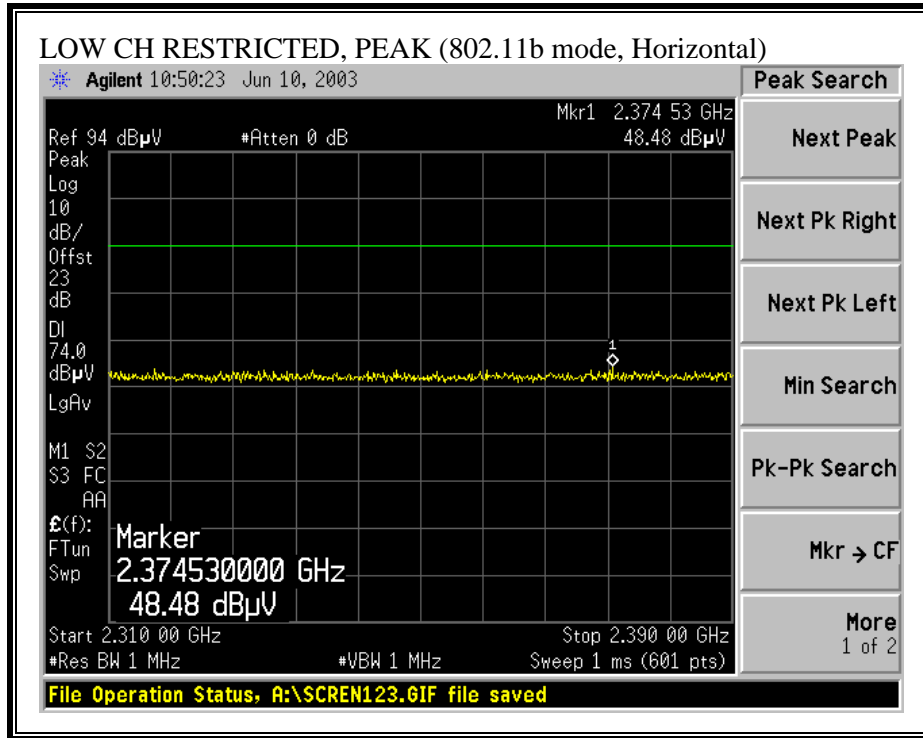
7.9.7. RADIATED EMISSIONS WITH 21 dBi DISH ANTENNA

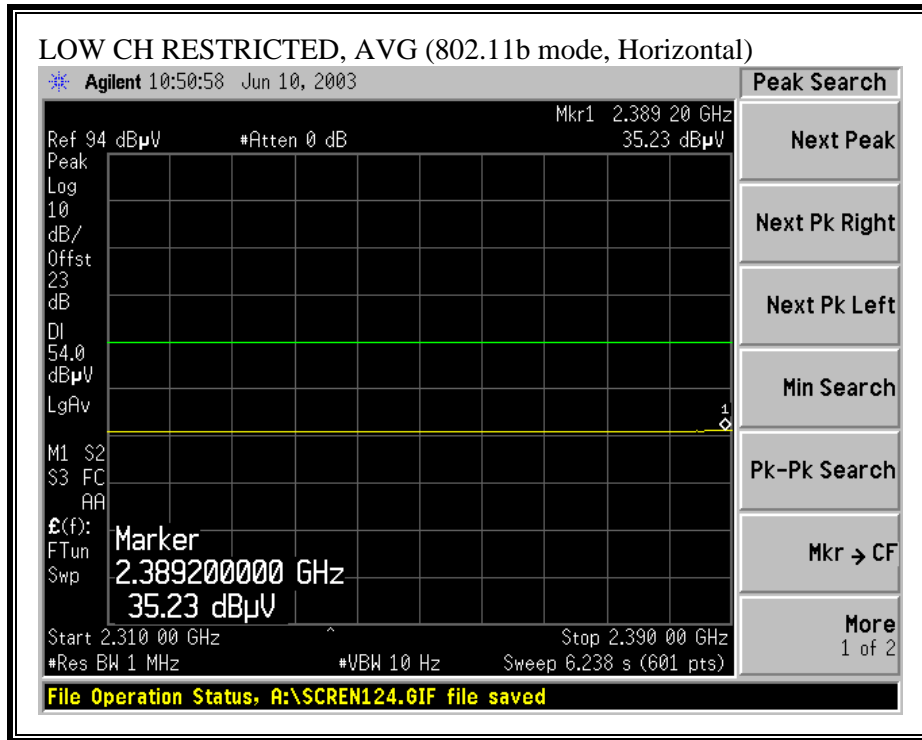
RADIATED RF MEASUREMENT SETUP



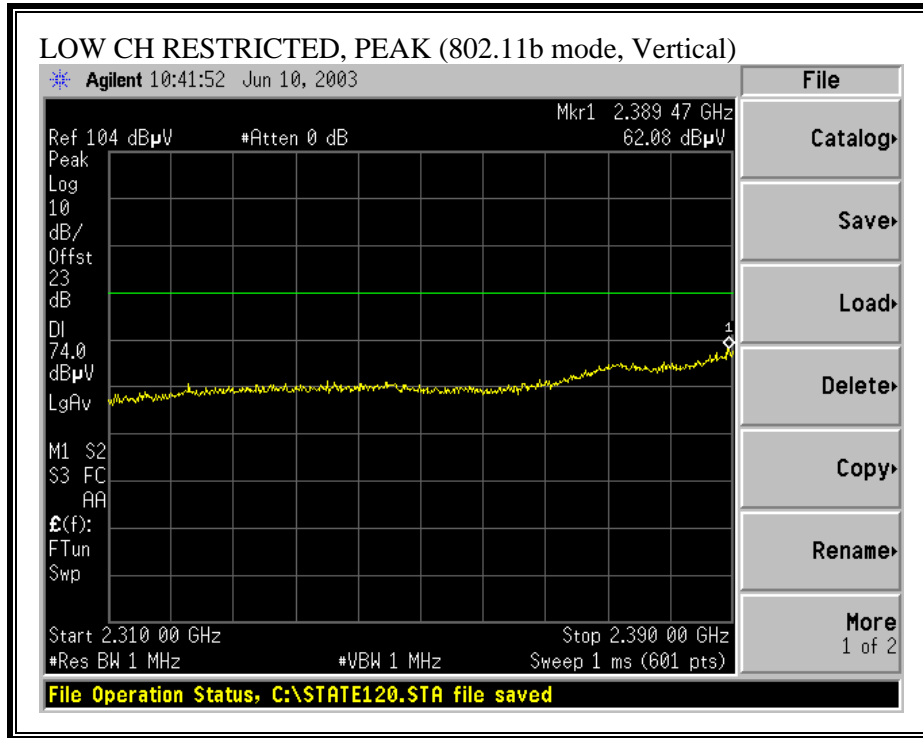


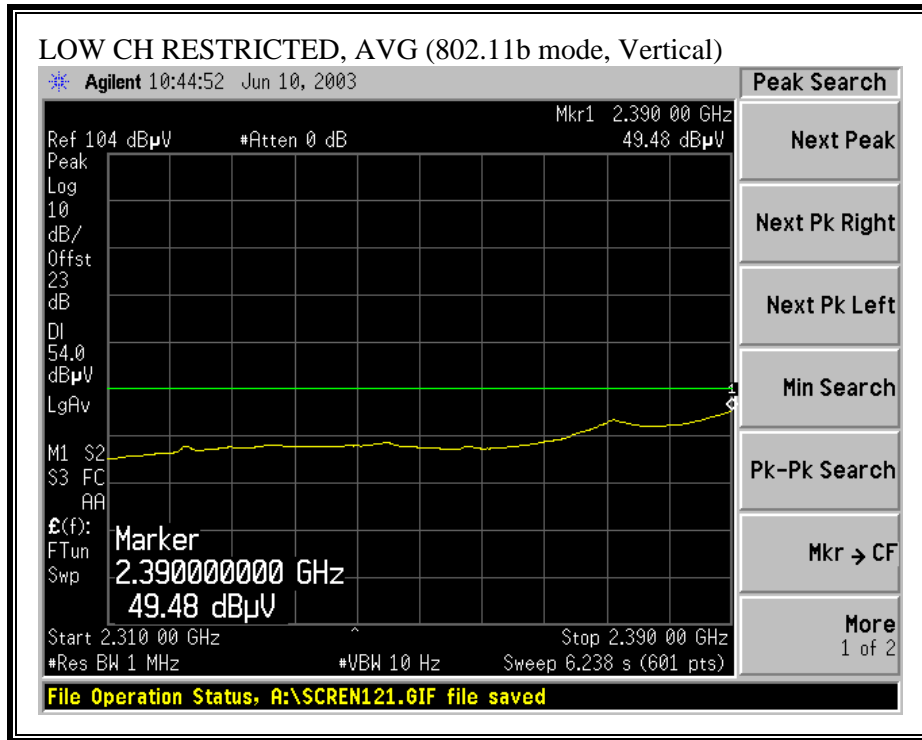
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



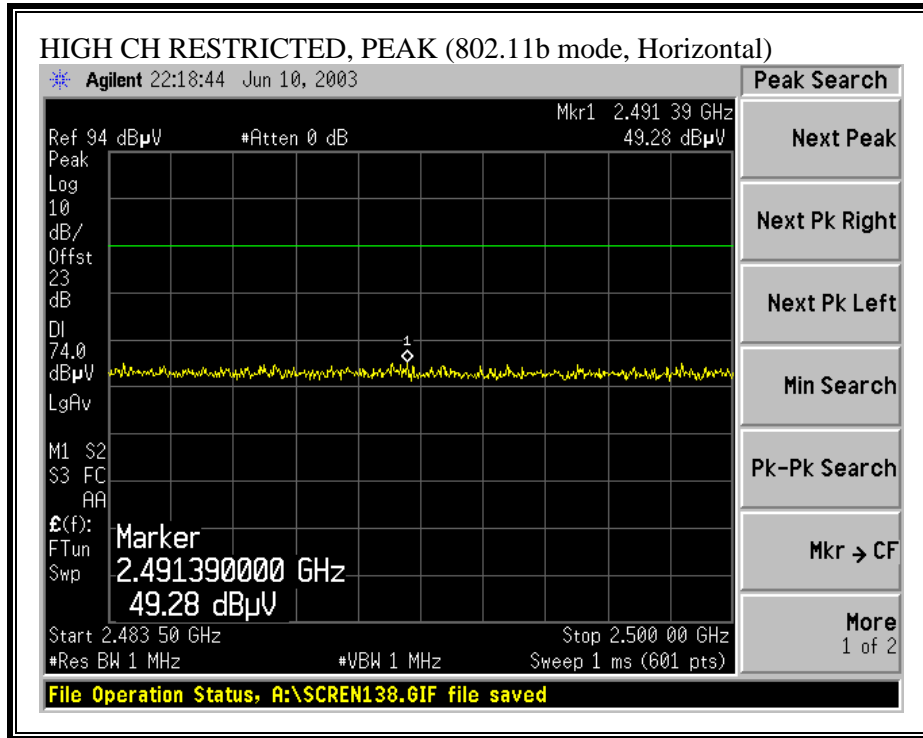


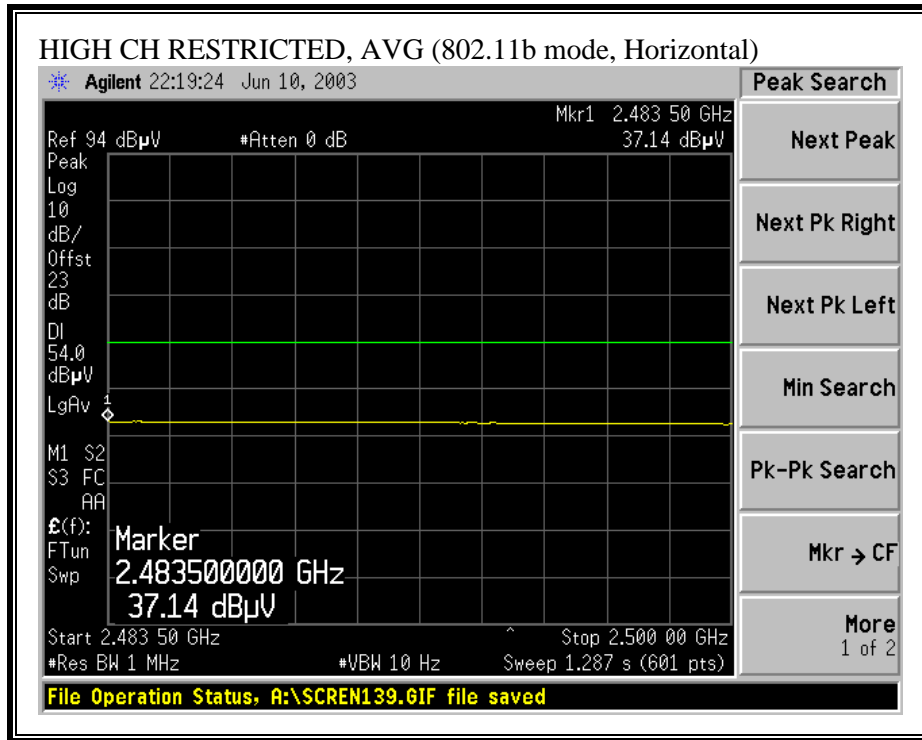
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



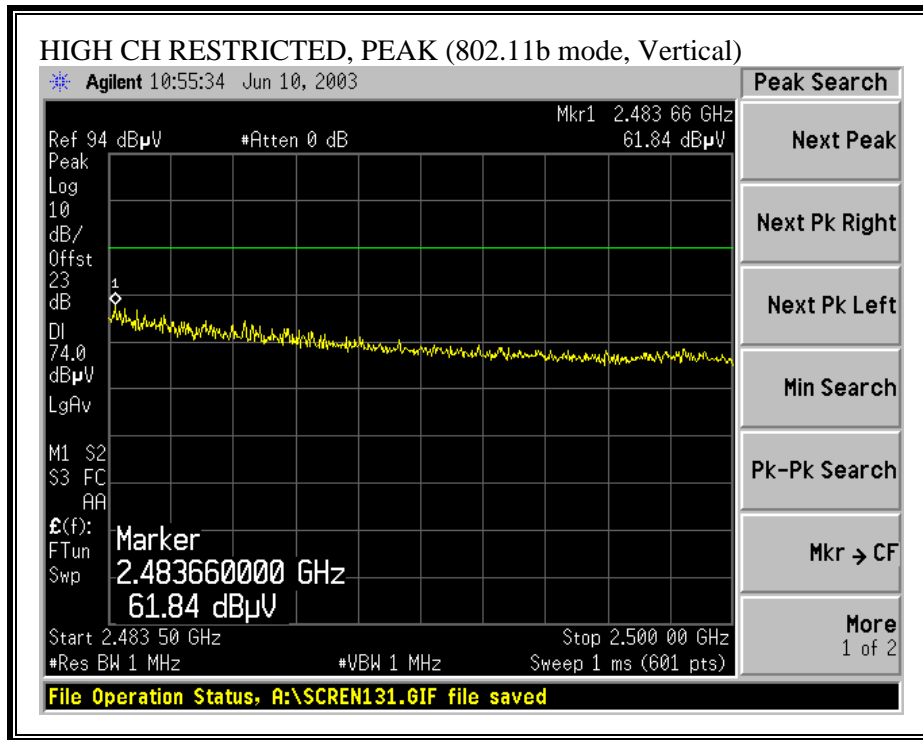


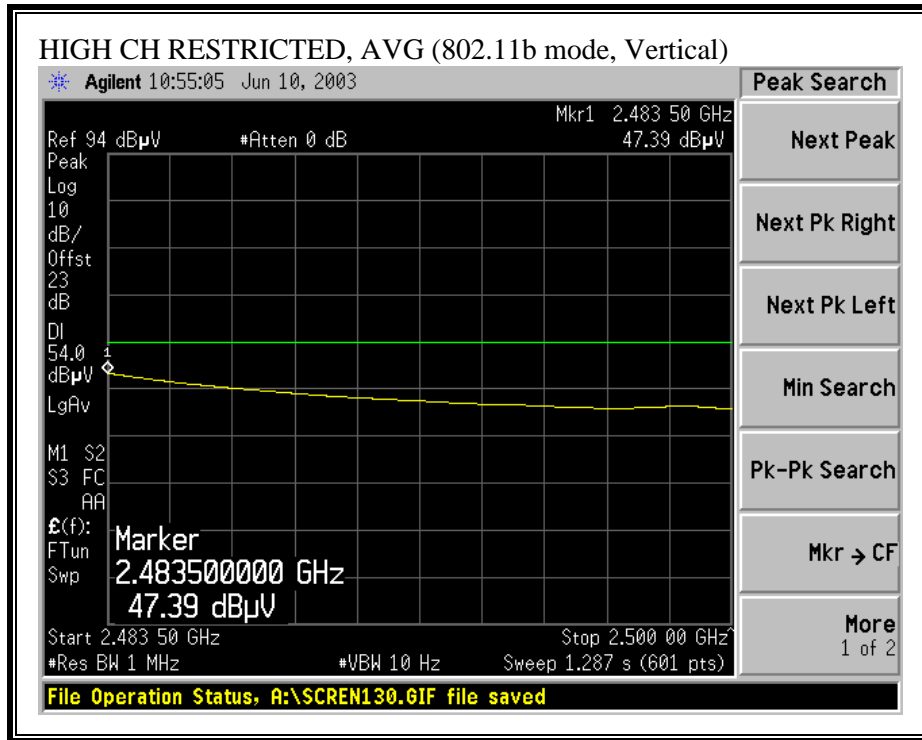
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (b MODE)

05/10/03 High Frequency Measurement
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
 Project #:
 Company: Cisco
 EUT Descrip.: AIR-MP31G-A-K9
 EUT M/N: SMT07210013
 Test Target:
 Mode Oper: Transmit, b mode, with 21dBi Dish Antenna

Test Equipment:

| | | | | |
|---|---|--|--|---------------------|
| EMCO Horn 1-18GHz T60; S/N: 2238 @3m | Pre-amplifier 1-26GHz T86 Mileq 924341 | Spectrum Analyzer Agilent E4446A Analyzer | Horn > 18GHz T117; ARA 18-26GHz; S/N:1013 | Limit FCC 15.205 |
|---|---|--|--|---------------------|

H Frequency Cables:
 (2 ft) (2-3 ft) (4-6 ft) (12 ft)

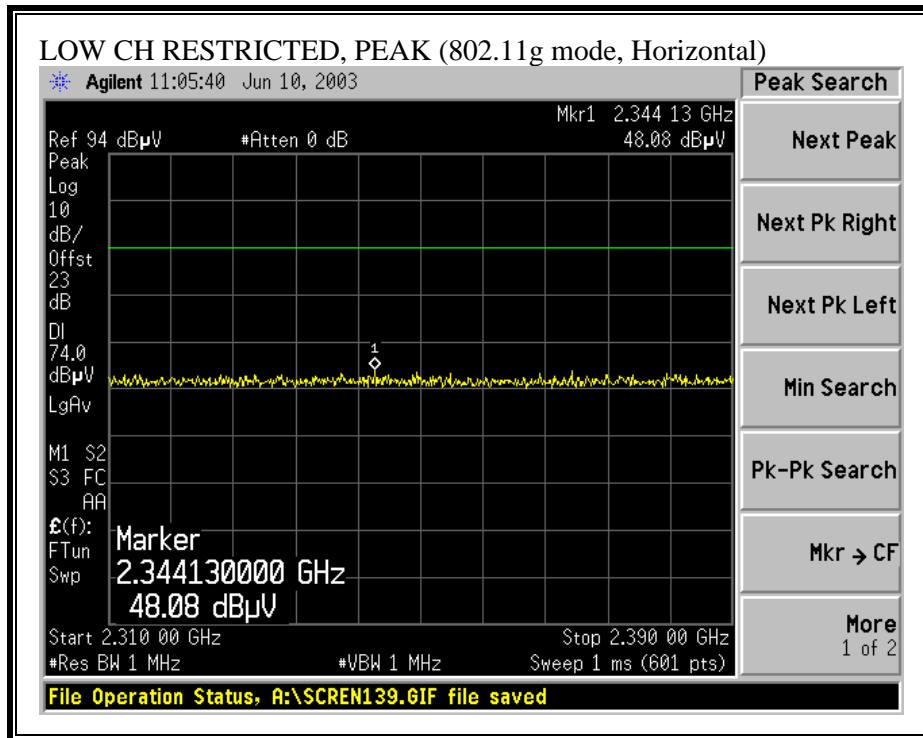
Peak Measurements: 1 MHz Resolution Bandwidth, 1 MHz Video Bandwidth
 Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

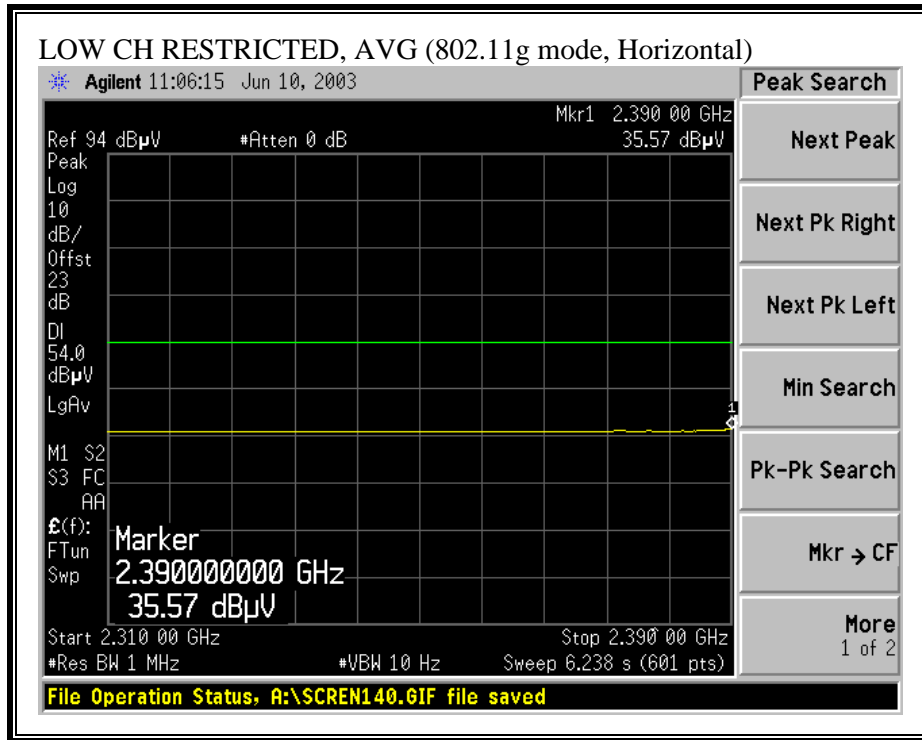
| f GHz | Dist feet | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | HPF | Peak dBuV/m | Avg dBuV/m | Plc Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes |
|-----------------------------|-----------|--------------|----------------|---------|-------|--------|-----------|-----|-------------|------------|----------------|----------------|-----------|------------|-------|
| Spurious | | | | | | | | | | | | | | | |
| Harmonics | | | | | | | | | | | | | | | |
| Channel 1 (2412MHz) | | | | | | | | | | | | | | | |
| 4.824 | 9.8 | 83.9 | 81.1 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 46.8 | 44.0 | 74.0 | 84.0 | -27.2 | -10.0 | H |
| 4.824 | 9.8 | 58.4 | 56.6 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 51.3 | 49.5 | 74.0 | 54.0 | -22.7 | -4.5 | V |
| Channel 6 (2437MHz) | | | | | | | | | | | | | | | |
| 4.874 | 9.8 | 84.3 | 81.8 | 33.8 | 3.8 | -45.6 | 0.0 | 1.0 | 47.2 | 44.7 | 74.0 | 84.0 | -26.8 | -9.3 | V |
| 7.311 | 9.8 | 48.5 | 36.6 | 37.3 | 4.8 | -46.6 | 0.0 | 1.0 | 45.0 | 33.1 | 74.0 | 54.0 | -29.0 | -20.9 | V |
| 7.311 | 9.8 | 48.0 | 36.6 | 37.3 | 4.8 | -46.6 | 0.0 | 1.0 | 44.5 | 33.1 | 74.0 | 54.0 | -29.5 | -20.9 | H |
| 4.874 | 9.8 | 52.2 | 47.2 | 33.8 | 3.8 | -45.6 | 0.0 | 1.0 | 45.1 | 40.1 | 74.0 | 54.0 | -28.9 | -13.9 | H |
| Channel 11 (2462MHz) | | | | | | | | | | | | | | | |
| 4.924 | 9.8 | 59.4 | 57.7 | 33.8 | 3.8 | -45.7 | 0.0 | 1.0 | 52.3 | 50.6 | 74.0 | 84.0 | -21.7 | -3.4 | V |
| 7.386 | 9.8 | 48.5 | 36.6 | 37.4 | 4.9 | -46.5 | 0.0 | 1.0 | 45.1 | 33.2 | 74.0 | 54.0 | -28.9 | -20.8 | V |
| 7.386 | 9.8 | 48.0 | 36.6 | 37.4 | 4.9 | -46.5 | 0.0 | 1.0 | 44.6 | 33.2 | 74.0 | 54.0 | -29.4 | -20.8 | H |
| 4.924 | 9.8 | 49.8 | 42.3 | 33.8 | 3.8 | -45.7 | 0.0 | 1.0 | 42.7 | 35.2 | 74.0 | 54.0 | -31.3 | -18.8 | H |

36.5

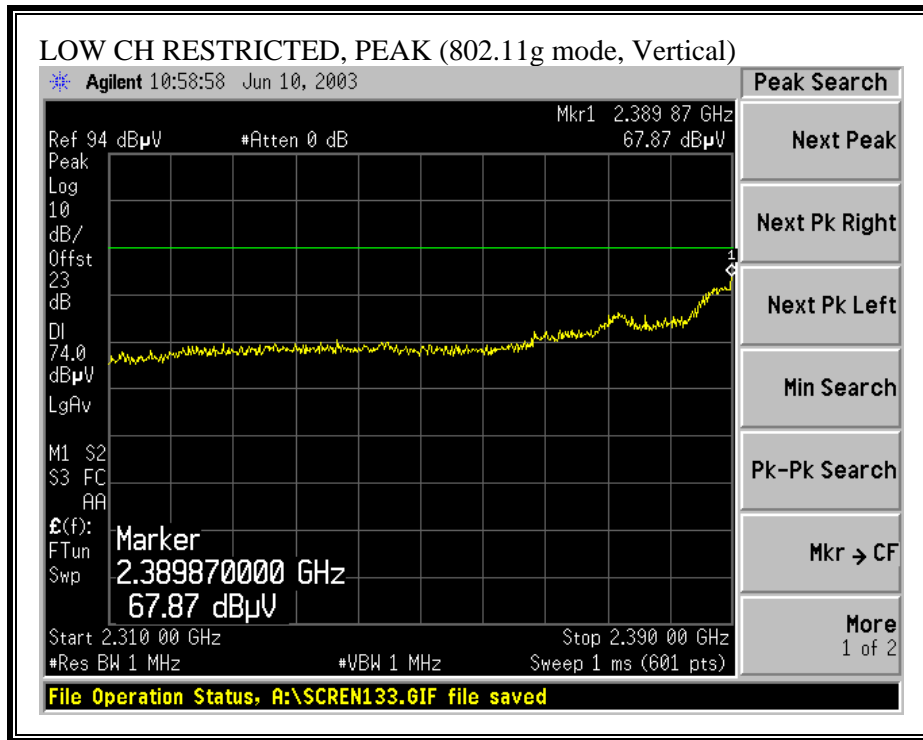
| | | | | | |
|------|-----------------------|--------|--------------------------------|---------|------------------------------|
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | | |

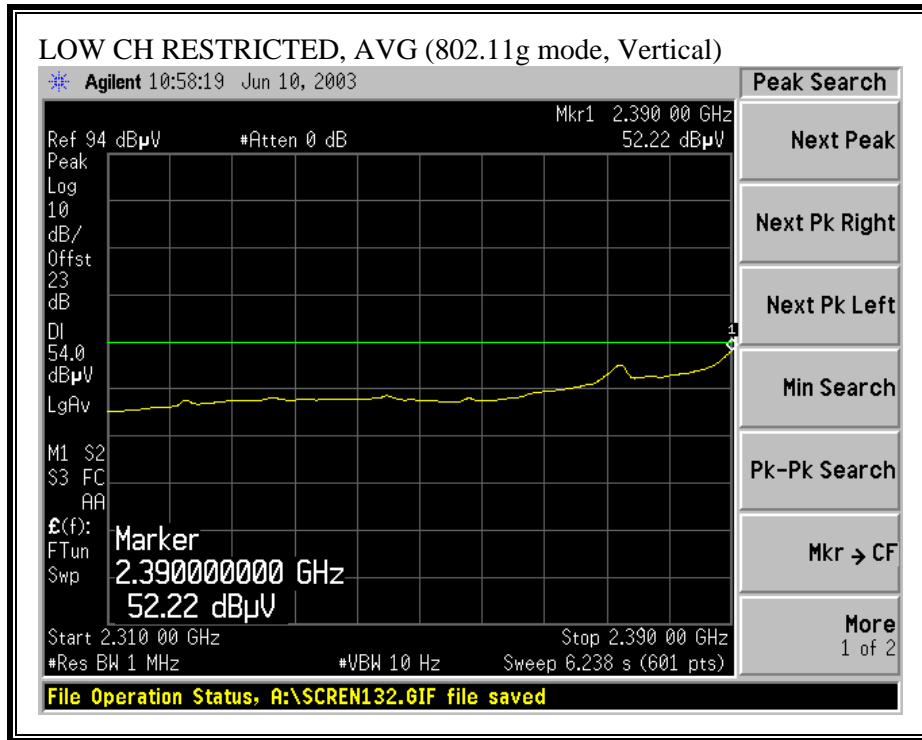
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)



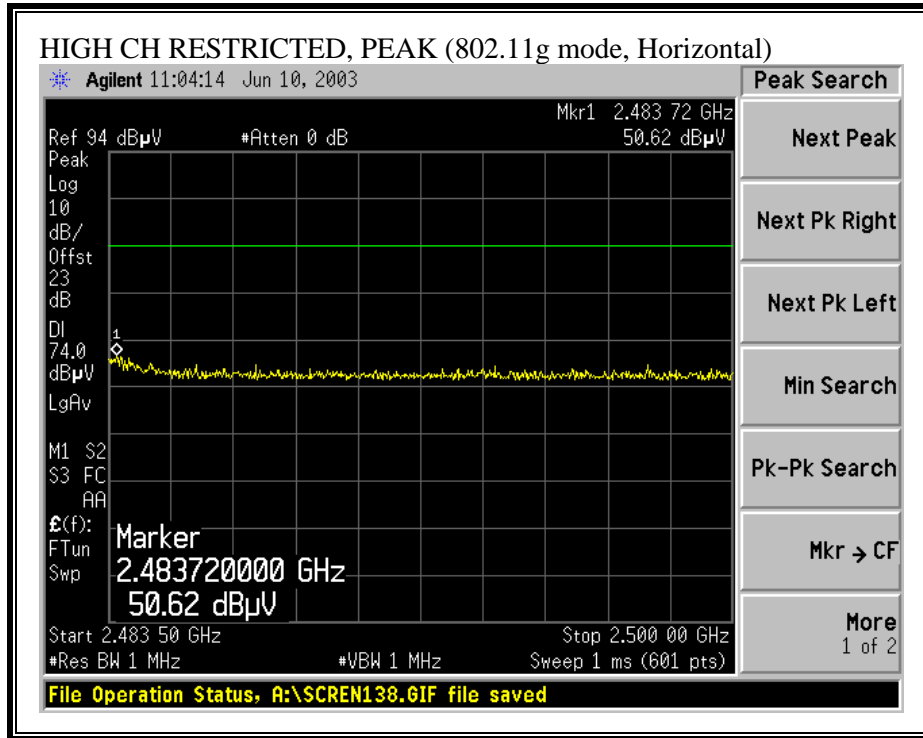


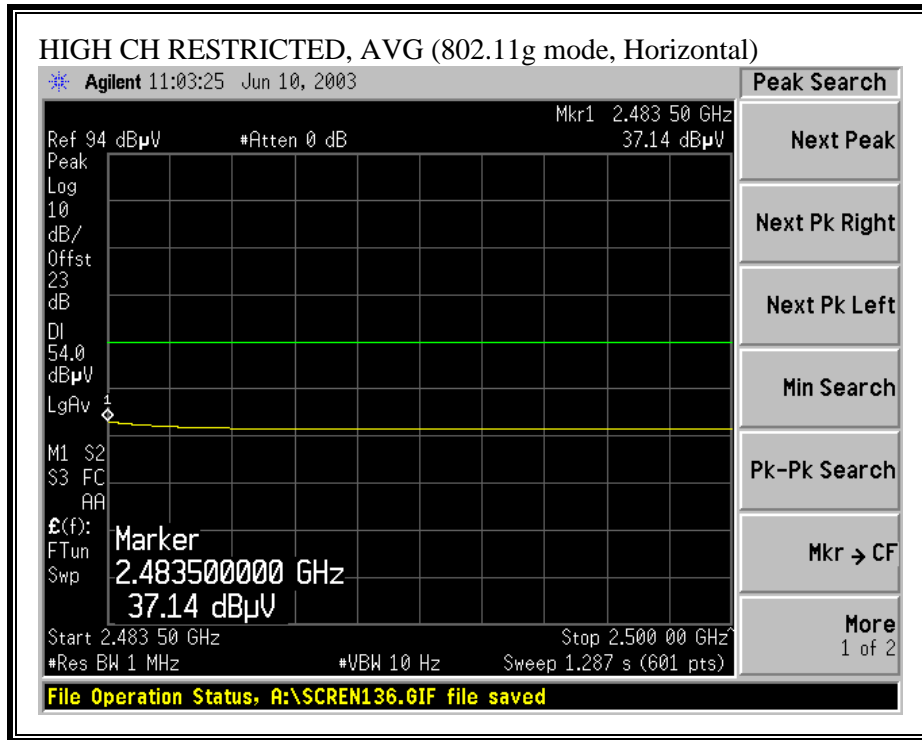
RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)



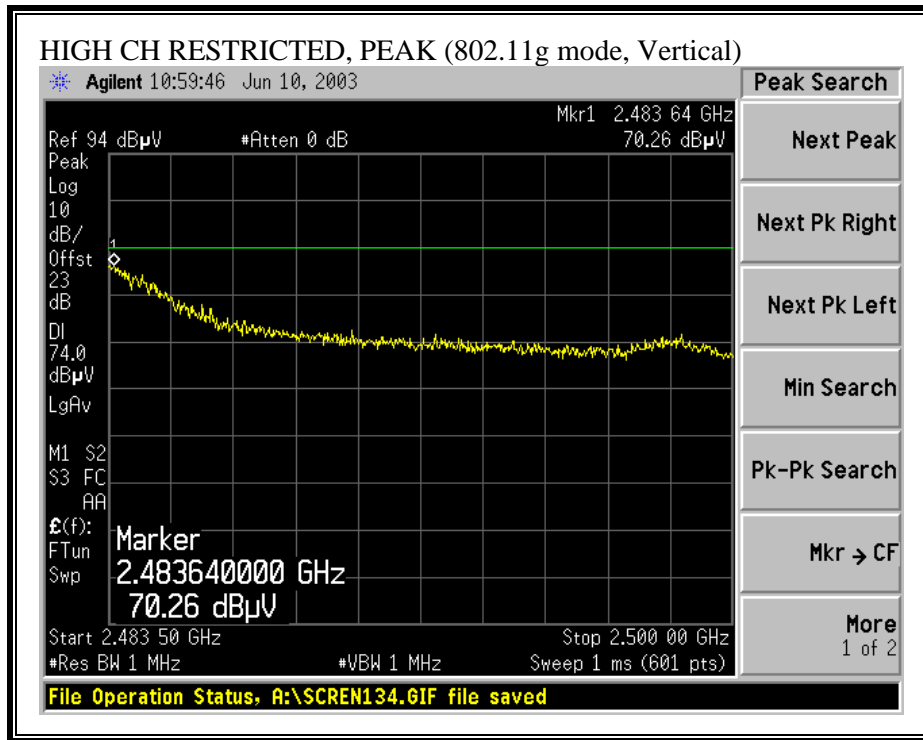


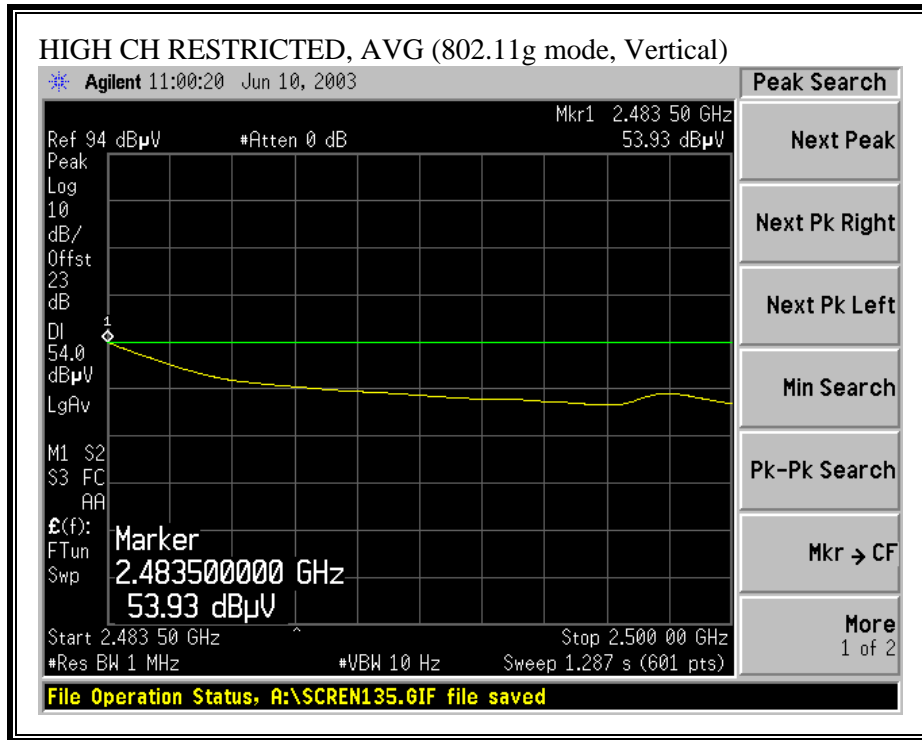
RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (g MODE)

05/10/03 High Frequency Measurement
 Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
 Project #:
 Company: Cisco
 EUT Descrip.: AIR-MP310-A-K9
 EUT M/N: SMT07210013
 Test Target:
 Mode Oper: Transmit, g mode, with 21dBi Dish Antenna

Test Equipment:

EMCO Horn 1-18GHz
 T60; S/N: 2238 @3m

Pre-amplifier 1-26GHz
 T86 M10q 924341

Spectrum Analyzer
 Agilent E4446A Analyzer

Horn > 18GHz
 T117; ARA 18-26GHz; S/N:1013

Link
 FCC 15.205

H-Frequency Cables
 (2 ft) (2-3 ft) (4-6 ft) (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth
 1 MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth
 10 Hz Video Bandwidth

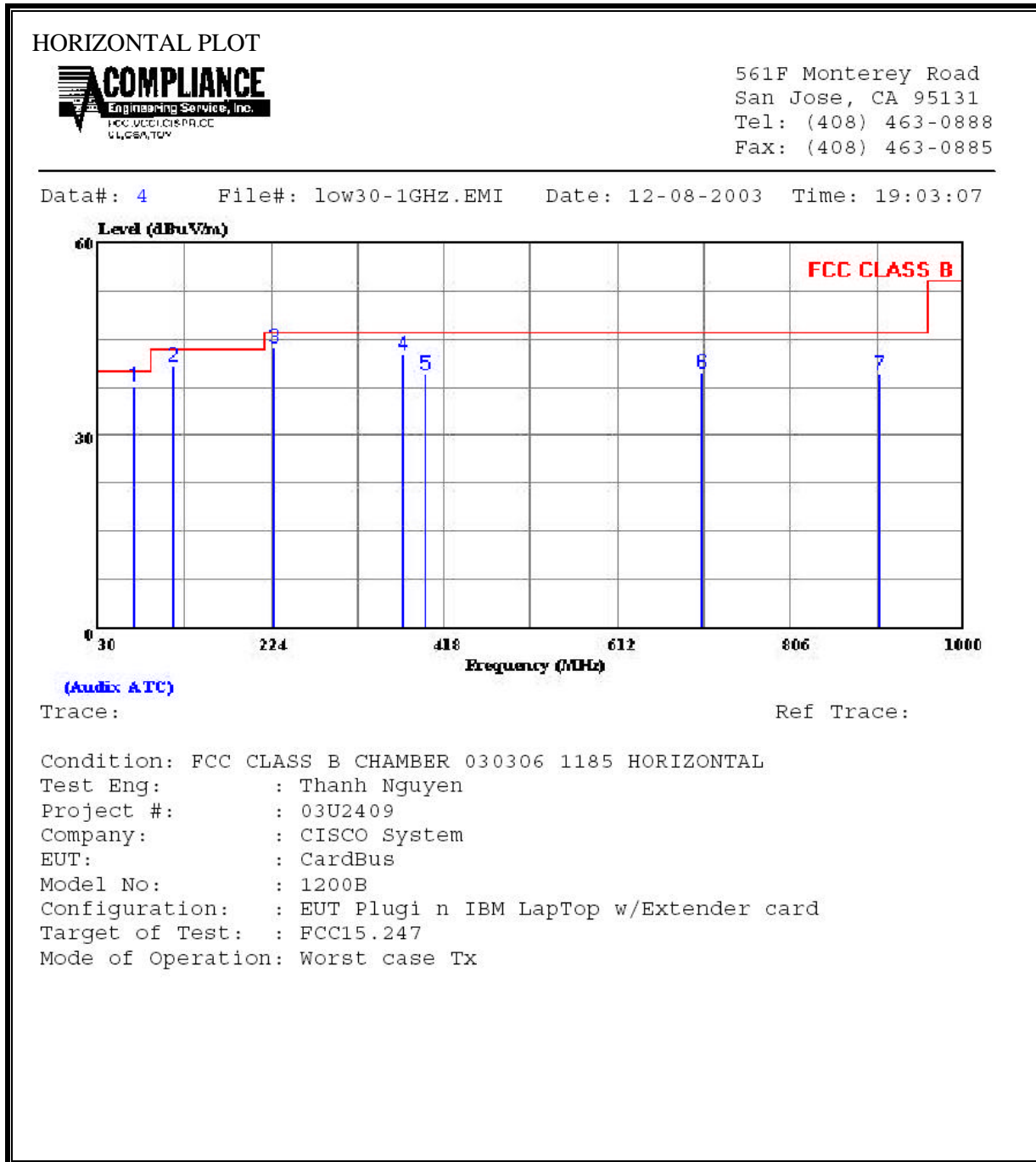
| f GHz | Dist feet | Read Pk dBuV | Read Avg. dBuV | AF dB-m | CL dB | Amp dB | D Corr dB | HPF | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes |
|-----------------------------|-----------|--------------|----------------|---------|-------|--------|-----------|-----|-------------|------------|---------------|----------------|-----------|------------|-------|
| Spurious: | | | | | | | | | | | | | | | |
| Harmonics | | | | | | | | | | | | | | | |
| Channel 1 (2412MHz) | | | | | | | | | | | | | | | |
| 4.824 | 9.8 | 54.6 | 51.1 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 47.5 | 44.0 | 74.0 | 54.0 | -26.5 | -10.0 | H |
| 4.824 | 9.8 | 58.2 | 56.8 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 51.1 | 49.7 | 74.0 | 54.0 | -22.9 | -4.3 | V |
| Channel 6 (2437MHz) | | | | | | | | | | | | | | | |
| 4.874 | 9.8 | 57.2 | 54.8 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 50.1 | 47.7 | 74.0 | 54.0 | -23.9 | -6.3 | H |
| 7.311 | 9.8 | 51.0 | 36.6 | 36.2 | 5.7 | -46.6 | 0.0 | 1.0 | 47.3 | 32.9 | 74.0 | 54.0 | -26.7 | -21.1 | H |
| 7.311 | 9.8 | 49.9 | 36.5 | 36.2 | 5.7 | -46.6 | 0.0 | 1.0 | 46.2 | 32.8 | 74.0 | 54.0 | -27.8 | -21.2 | V |
| 4.874 | 9.8 | 56.8 | 56.9 | 33.1 | 4.4 | -45.6 | 0.0 | 1.0 | 49.7 | 49.8 | 74.0 | 54.0 | -24.3 | -4.2 | V |
| Channel 11 (2462MHz) | | | | | | | | | | | | | | | |
| 4.924 | 9.8 | 59.8 | 58.2 | 33.2 | 4.5 | -45.7 | 0.0 | 1.0 | 52.7 | 51.1 | 74.0 | 54.0 | -21.3 | -2.9 | V |
| 7.386 | 9.8 | 48.5 | 36.6 | 36.3 | 5.7 | -46.5 | 0.0 | 1.0 | 45.0 | 33.1 | 74.0 | 54.0 | -29.0 | -20.9 | V |
| 7.386 | 9.8 | 48.0 | 36.6 | 36.3 | 5.7 | -46.5 | 0.0 | 1.0 | 44.5 | 33.1 | 74.0 | 54.0 | -29.5 | -20.9 | H |
| 4.924 | 9.8 | 55.7 | 52.2 | 33.2 | 4.5 | -45.7 | 0.0 | 1.0 | 48.6 | 45.1 | 74.0 | 54.0 | -26.4 | -5.9 | H |

36.1

f Measurement Frequency Amp Preamp Gain Avg Lim Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Pk Lim Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Avg Mar Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Pk Mar Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

7.9.8. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

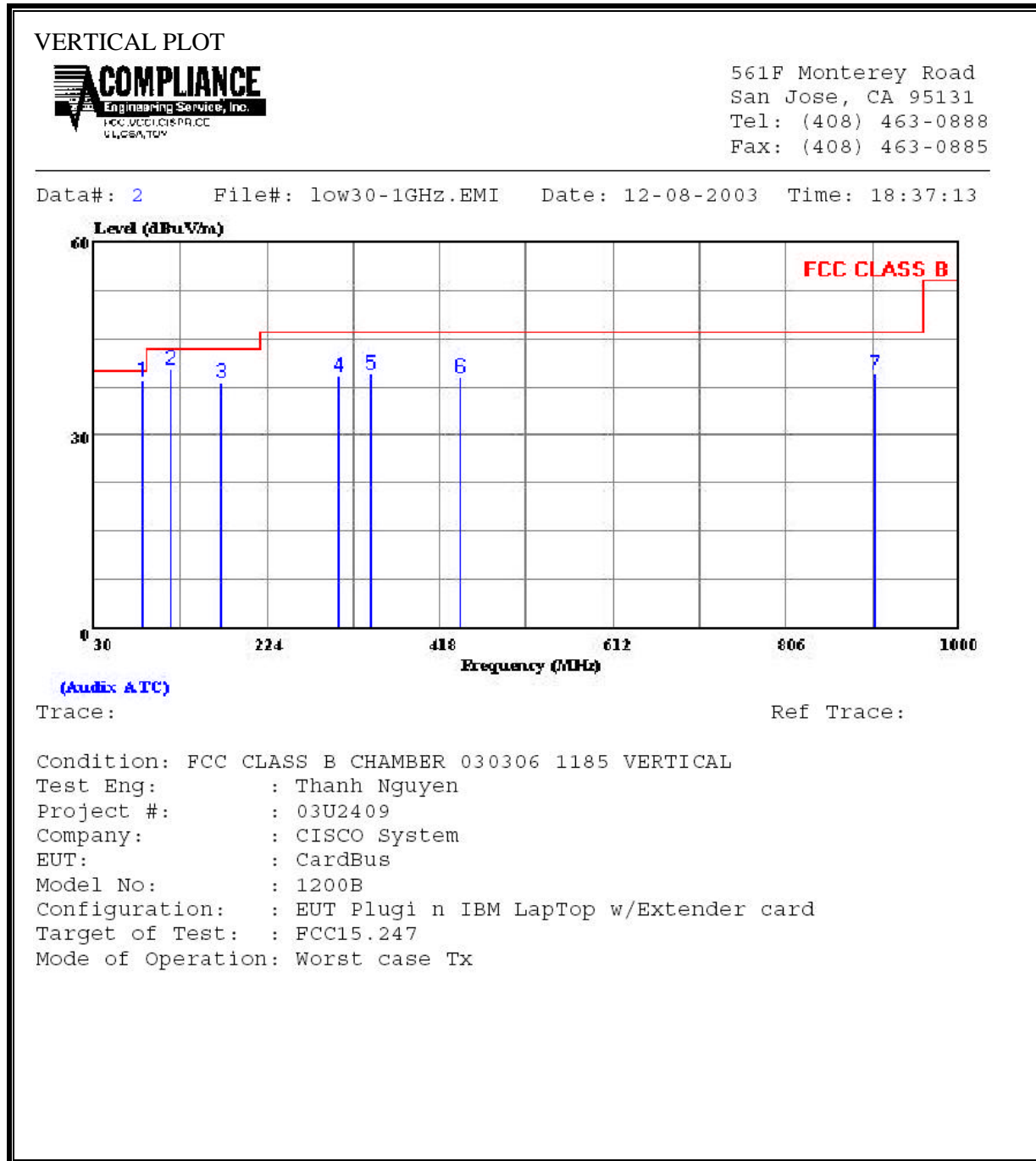
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



HORIZONTAL DATA

| | Freq | Remark | Read Level | Factor | Level | Limit Line | Over Limit |
|---|---------|--------|---------------|--------|--------|---------------|---------------|
| | MHz | | dBuV | dB | dBuV/m | dBuV/m | dB |
| 1 | 70.740 | Peak | 29.00 | 8.55 | 37.55 | 40.00 | -2.45 |
| 2 | 113.420 | Peak | 29.65 | 11.06 | 40.71 | 43.50 | -2.79 |
| 3 | 227.880 | Peak | 31.54 | 12.07 | 43.61 | 46.00 | -2.39 |
| 4 | 371.440 | Peak | 26.67 | 15.80 | 42.47 | 46.00 | -3.53 |
| 5 | 397.630 | Peak | 23.19 | 16.40 | 39.59 | 46.00 | -6.41 |
| 6 | 706.090 | Peak | 18.37 | 21.39 | 39.76 | 46.00 | -6.24 |
| 7 | 904.940 | Peak | 15.72 | 23.83 | 39.55 | 46.00 | -6.45 |

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



VERTICAL DATA

| | Freq | Remark | Read Level | Factor | Level | Limit Line | Over Limit |
|---|---------|--------|---------------|--------|--------|---------------|---------------|
| | MHz | | dBuV | dB | dBuV/m | dBuV/m | dB |
| 1 | 85.290 | Peak | 30.19 | 8.16 | 38.35 | 40.00 | -1.65 |
| 2 | 116.330 | Peak | 28.99 | 11.31 | 40.30 | 43.50 | -3.20 |
| 3 | 172.590 | Peak | 28.14 | 10.16 | 38.30 | 43.50 | -5.20 |
| 4 | 303.540 | Peak | 25.23 | 13.89 | 39.12 | 46.00 | -6.88 |
| 5 | 339.430 | Peak | 24.53 | 14.93 | 39.46 | 46.00 | -6.54 |
| 6 | 440.310 | Peak | 21.38 | 17.49 | 38.87 | 46.00 | -7.13 |
| 7 | 904.940 | Peak | 15.53 | 23.83 | 39.36 | 46.00 | -6.64 |

7.10. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|-----------------------------|------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

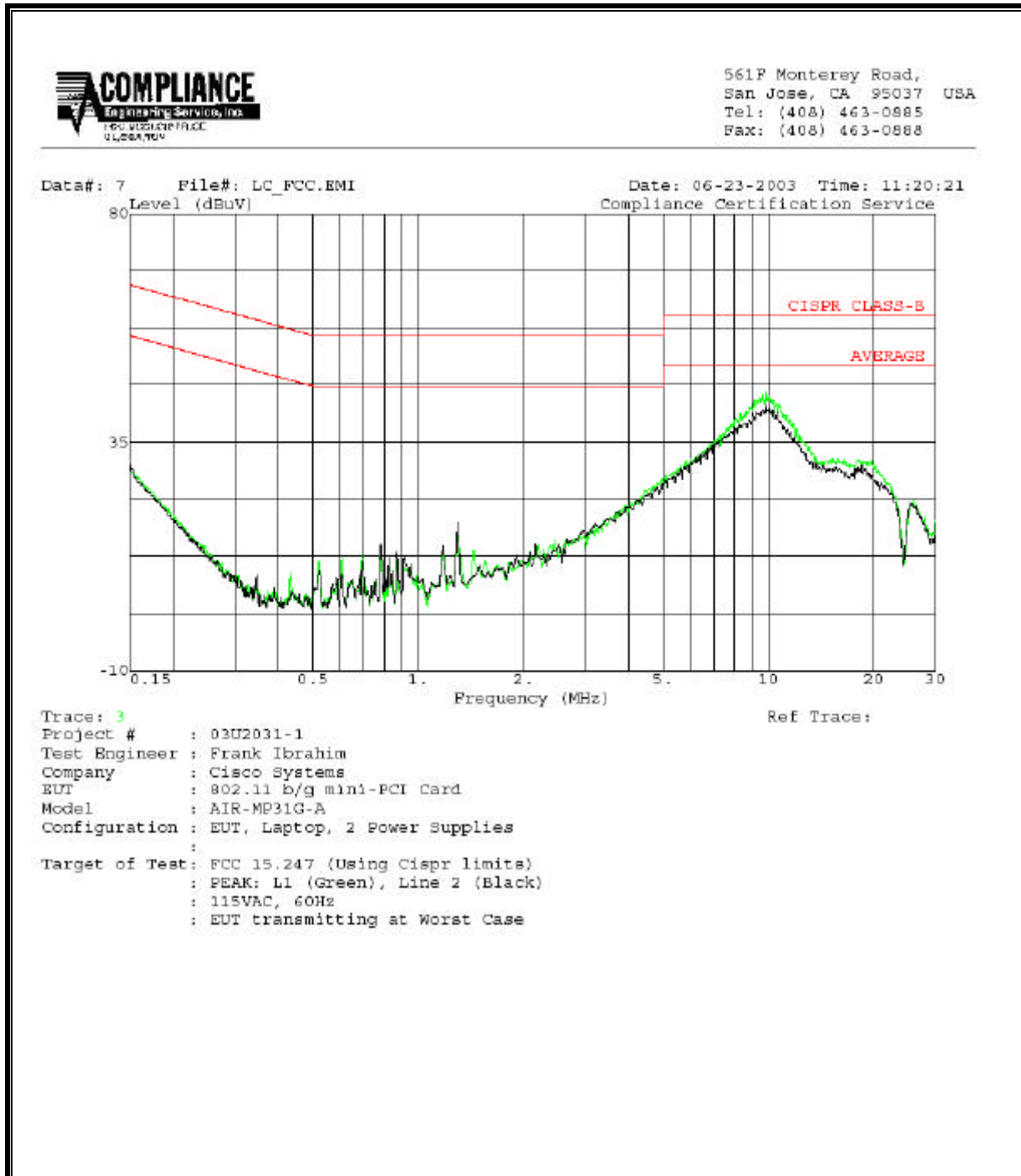
RESULTS

No non-compliance noted:

6 WORST EMISSIONS

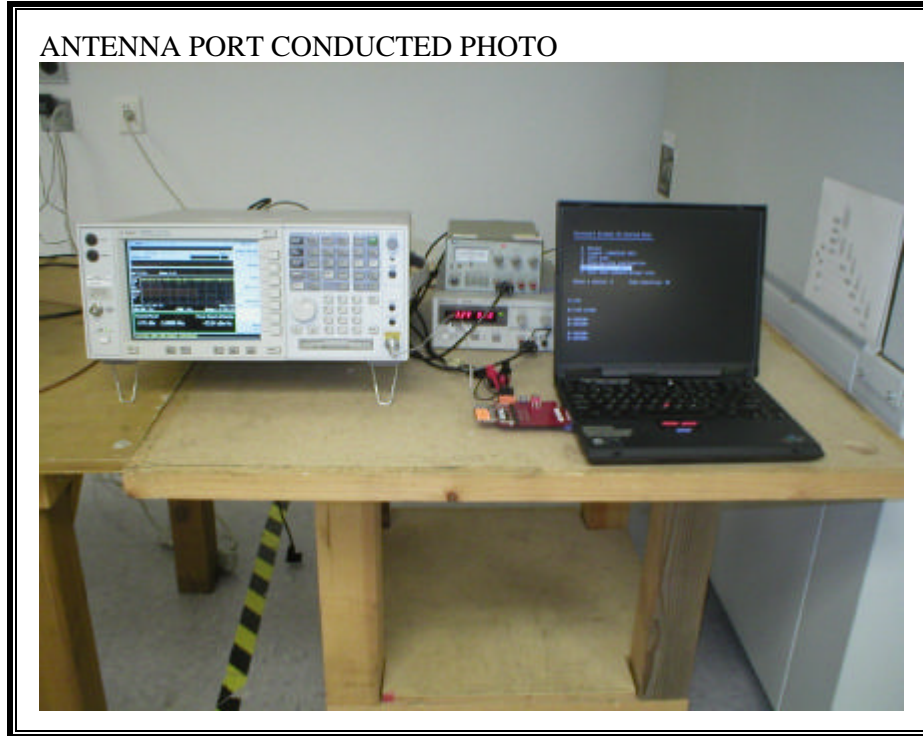
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|--|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq. | Reading | | | Closs | Limit | EN_B | Margin | | Remark |
| (MHz) | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB) | QP | AV | QP (dB) | AV (dB) | L1 / L2 |
| 0.15 | 29.28 | -- | -- | 0.00 | 66.00 | 56.00 | -36.72 | -26.72 | L1 |
| 9.86 | 45.06 | -- | -- | 0.00 | 60.00 | 50.00 | -14.94 | -4.94 | L1 |
| 18.14 | 31.58 | -- | -- | 0.00 | 60.00 | 50.00 | -28.42 | -18.42 | L1 |
| 0.15 | 30.70 | -- | -- | 0.00 | 65.97 | 55.97 | -35.27 | -25.27 | L2 |
| 9.86 | 42.42 | -- | -- | 0.00 | 60.00 | 50.00 | -17.58 | -7.58 | L2 |
| 18.52 | 30.54 | -- | -- | 0.00 | 60.00 | 50.00 | -29.46 | -19.46 | L2 |
| 6 Worst Data | | | | | | | | | |

RESULTS

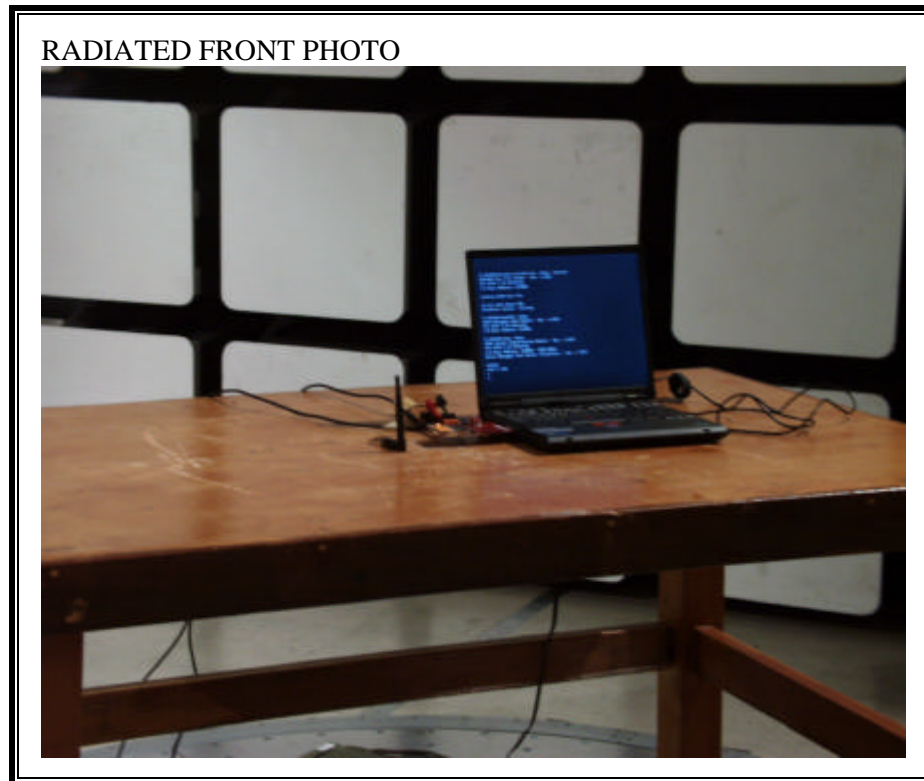


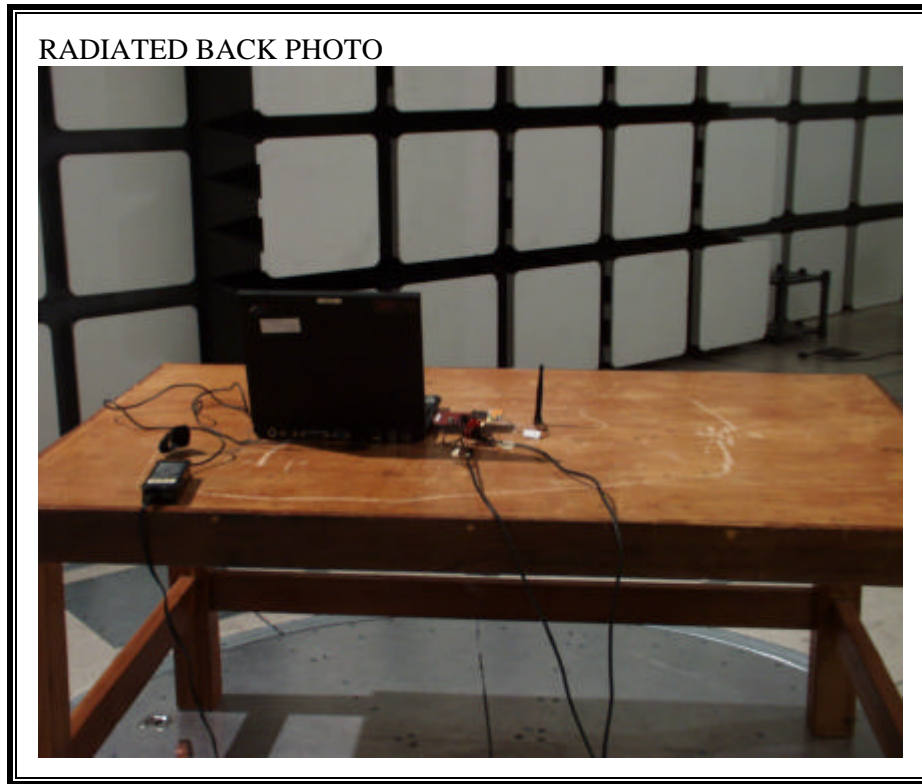
8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



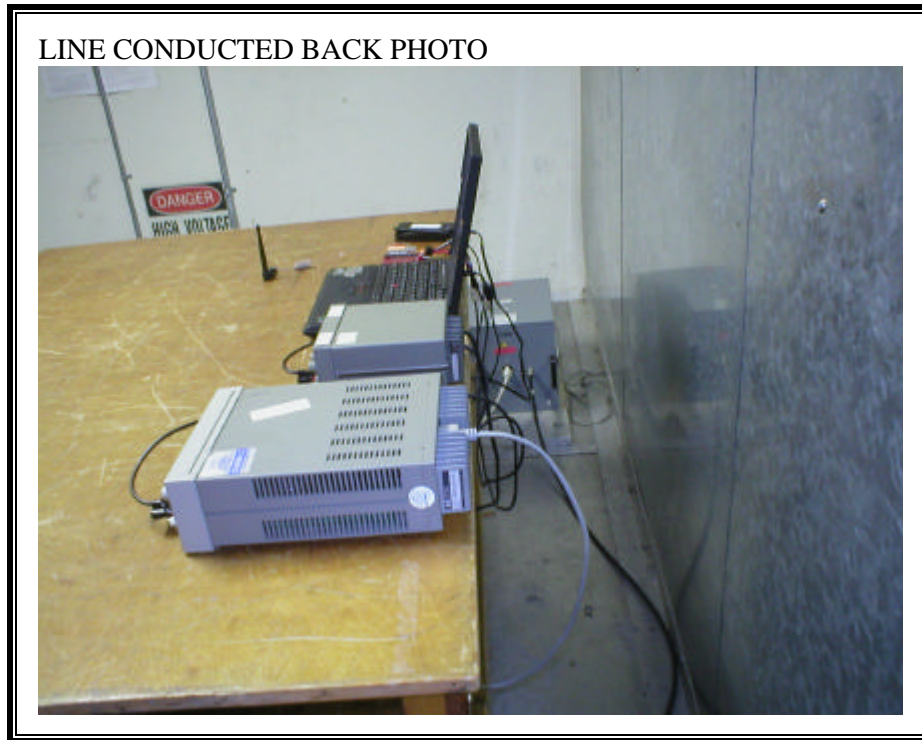
RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT