

2.9 Peak Radiated Spurious Emission in the Frequency Range 30 -25000 MHz (FCC Section 15.247(c))

The EUT was hop-stopped and when possible placed into a continuous transmit mode of operation. A preliminary scan was performed on the EUT to determine frequencies that were caused by the transmitter portion of the product. Significant emissions that fell within restricted bands were then measured on an OAT's site. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. The results of peak radiated spurious emissions falling within restricted bands are given in Table 4a –4g and Figure 5a – Figure 5ai.

Table 4A. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
Ace Dipole Antenna

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20450 | -49.86 | 34.5 | 36.9 | 7.8 | 2341.5 | 5000 |

Table 4A. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
Ace Dipole Antenna

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87105 | -61.45 | 34.3 | 34.7 | 8.1 | 501.7 | 5000 |
| 7.30700 | -51.35 | 34.6 | 37.2 | 7.9 | 2024.3 | 5000 |

Table 4A. PEAK RADIATED SPURIOUS EMISSIONS (High End)
Ace Dipole Antenna

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93995 | -58.75 | 34.3 | 34.8 | 8.2 | 707.8 | 5000 |
| 7.41055 | -54.13 | 34.6 | 37.4 | 7.9 | 1508.9 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-49.86 - 34.5 + 36.9 + 7.8 + 107)/20) = 2341.5
 CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 4B. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
DWC 3dBi Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20465 | -51.95 | 34.5 | 37.0 | 7.8 | 1840.8 | 5000 |

**Table 4B. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
DWC 3 dBi Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87105 | -66.78 | 34.3 | 34.7 | 8.1 | 271.6 | 5000 |
| 7.30710 | -54.12 | 34.6 | 37.2 | 7.9 | 1471.6 | 5000 |

**Table 4B. PEAK RADIATED SPURIOUS EMISSIONS (High End)
DWC 3 dBi Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93980 | -61.31 | 34.3 | 34.8 | 8.2 | 527.1 | 5000 |
| 7.41055 | -55.46 | 34.6 | 37.4 | 7.9 | 1294.7 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-51.95 – 34.5 + 37.0 + 7.8 + 107)/20) = 1840.8

CONVERSION FROM dBm TO dBuV = 107 dB

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**Table 4C. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
Mobile Mark Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.80356 | -59.88 | 34.3 | 34.6 | 7.9 | 581.8 | 5000 |
| 7.20459 | -51.89 | 34.5 | 37.0 | 7.8 | 1853.6 | 5000 |

**Table 4C. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
Mobile Mark Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87210 | -58.45 | 34.3 | 34.7 | 8.1 | 709.0 | 5000 |
| 7.30720 | -53.05 | 34.6 | 37.2 | 7.9 | 1664.5 | 5000 |

**Table 4C. PEAK RADIATED SPURIOUS EMISSIONS (High End)
Mobile Mark Patch Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93960 | -59.73 | 34.3 | 34.8 | 8.2 | 632.1 | 5000 |
| 7.40930 | -51.35 | 34.6 | 37.4 | 7.9 | 2077.4 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-59.88 - 34.3 + 34.6 + 7.9 + 107)/20) = 581.8

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 4D. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
6dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20585 | -53.14 | 34.5 | 37.0 | 7.8 | 1605.5 | 5000 |

**Table 4D. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
6dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87200 | -59.31 | 34.3 | 34.7 | 8.1 | 642.1 | 5000 |
| 7.30735 | -55.72 | 34.6 | 37.2 | 7.9 | 1224.1 | 5000 |

**Table 4D. PEAK RADIATED SPURIOUS EMISSIONS (High End)
6dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93970 | -64.99 | 34.3 | 34.8 | 8.2 | 345.0 | 5000 |
| 7.40950 | -54.54 | 34.6 | 37.4 | 7.9 | 1438.9 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-53.14 - 34.5 + 37.0 + 7.8 + 107)/20) = 1605.5

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 4E. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
12dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20570 | -54.79 | 34.5 | 37.0 | 7.8 | 1327.8 | 5000 |

**Table 4E. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
12dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87145 | -57.10 | 34.3 | 34.7 | 8.1 | 828.0 | 5000 |
| 7.30840 | -55.63 | 34.6 | 37.2 | 7.9 | 1237.2 | 5000 |

**Table 4E. PEAK RADIATED SPURIOUS EMISSIONS (High End)
12dB OMNI Antenna**

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93980 | -66.80 | 34.3 | 34.8 | 8.2 | 280.1 | 5000 |
| 7.41025 | -52.48 | 34.6 | 37.4 | 7.9 | 1824.4 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-54.79 - 34.5 + 37.0 + 7.8 + 107)/20) = 1327.8
CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 4F. PEAK RADIATED SPURIOUS EMISSIONS (Low End)
14dBi Corner Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20465 | -50.58 | 34.5 | 37.0 | 7.8 | 2155.3 | 5000 |

**Table 4F. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
14dBi Corner Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87250 | -59.86 | 34.3 | 34.7 | 8.1 | 602.9 | 5000 |
| 7.30815 | -53.31 | 34.6 | 37.2 | 7.9 | 1615.8 | 5000 |

**Table 4F. PEAK RADIATED SPURIOUS EMISSIONS (High End)
14dBi Corner Antenna**

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93960 | -64.43 | 34.3 | 34.8 | 8.2 | 368.0 | 5000 |
| 7.40940 | -54.96 | 34.6 | 37.4 | 7.9 | 1371.0 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-50.58 - 34.5 + 37.0 + 7.8 + 107)/20) = 2155.3
CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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Table 4G. PEAK RADIATED SPURIOUS EMISSIONS (Low End)

14dB YAGI Antenna

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 7.20565 | -55.29 | 34.5 | 37.0 | 7.8 | 1253.5 | 5000 |

**Table 4G. PEAK RADIATED SPURIOUS EMISSIONS (Middle)
14dB YAGI Antenna**

| Freq. (GHz) | Test Data* (dBm) @ 3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|-----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.87201 | -58.27 | 34.3 | 34.7 | 8.1 | 723.0 | 5000 |
| 7.30694 | -55.95 | 34.6 | 37.2 | 7.9 | 1192.0 | 5000 |

**Table 4G. PEAK RADIATED SPURIOUS EMISSIONS (High End)
14dB YAGI Antenna**

| Freq. (GHz) | Test Data* (dBm) @3m | Amp. Gain (dB) | Antenna Factor (dB) | Cable Loss (dB) | Results (uV/m) 3m | FCC Limits (uV/m) |
|-------------|----------------------|----------------|---------------------|-----------------|-------------------|-------------------|
| 4.93960 | -63.72 | 34.3 | 34.8 | 8.2 | 399.3 | 5000 |
| 7.41010 | -55.01 | 34.6 | 37.4 | 7.9 | 1363.4 | 5000 |

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-55.29 - 34.5 + 37.0 + 7.8 + 107)/20) = 1253.5
CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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Figure 5a
Peak Radiated Spurious Emission 15.247(c) Low – Ace Dipole

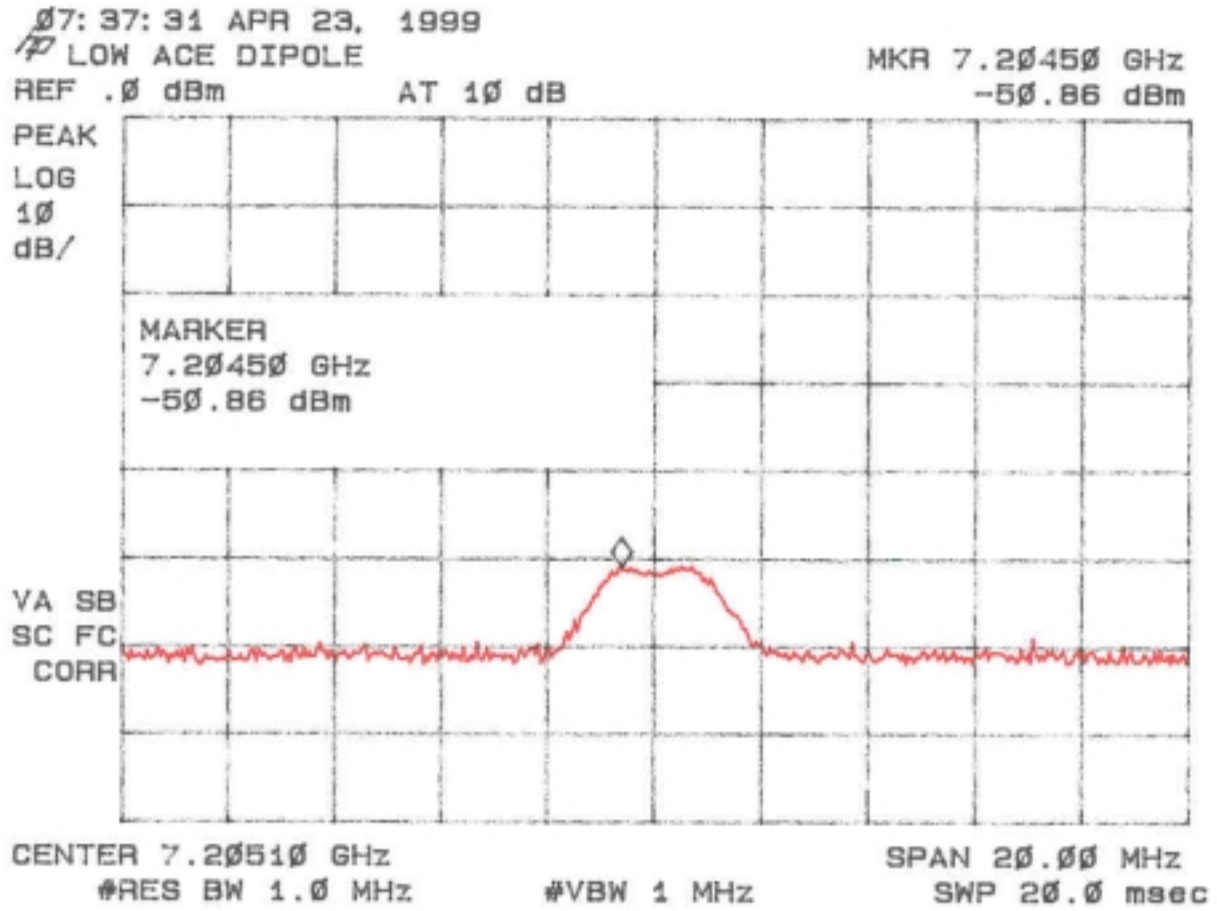


Figure 5b
Peak Radiated Spurious Emission 15.247(c) Mid – Ace Dipole

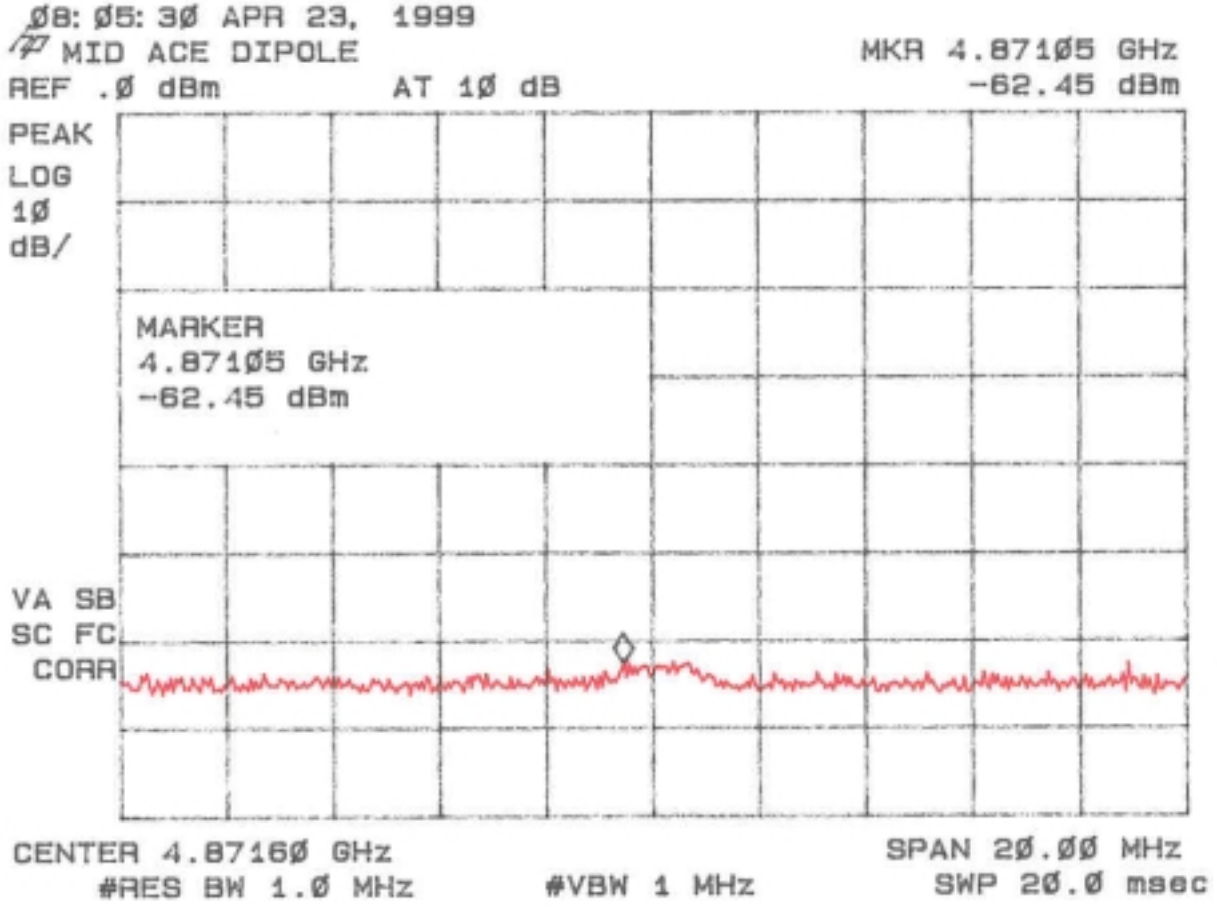


Figure 5c
Peak Radiated Spurious Emission 15.247(c) Mid – Ace Dipole

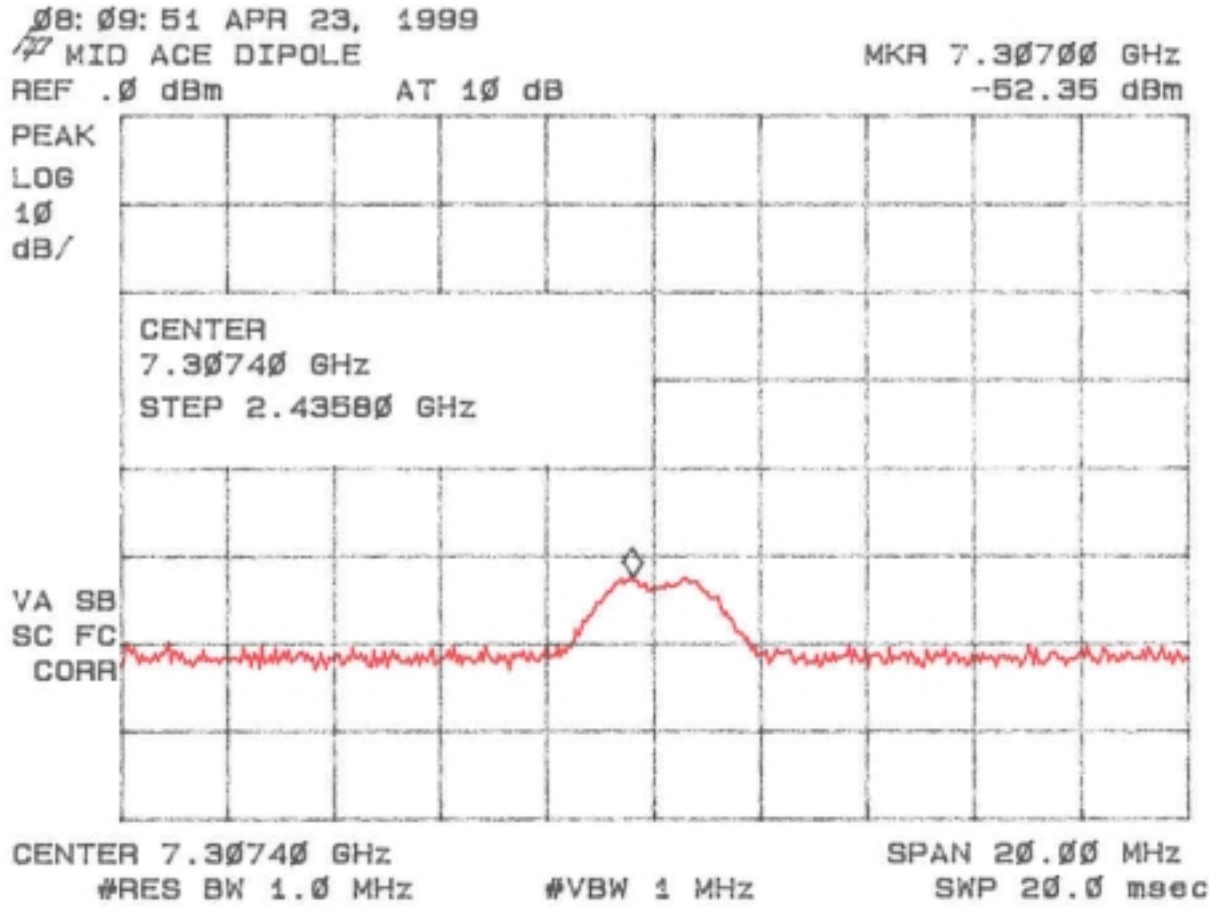


Figure 5d
Peak Radiated Spurious Emission 15.247(c) High – Ace Dipole

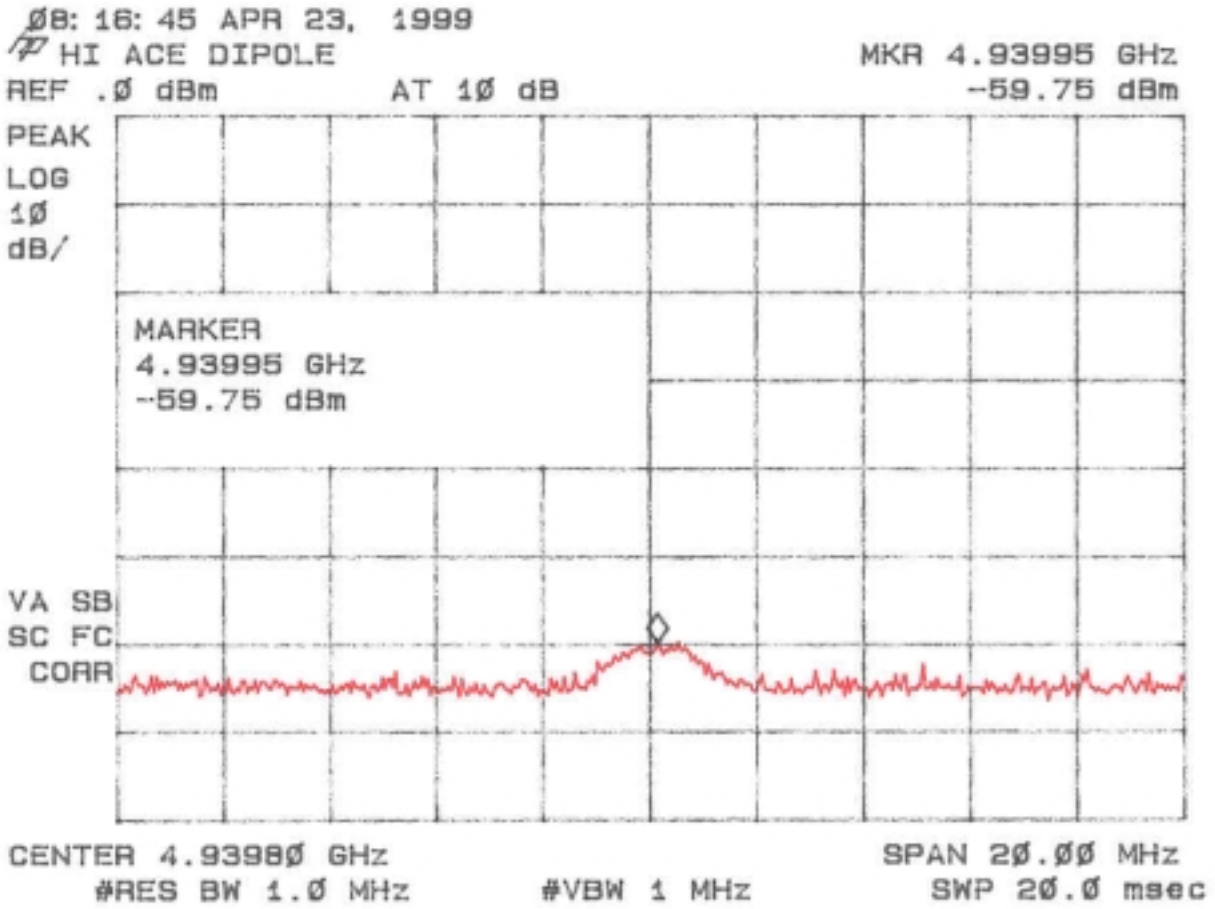


Figure 5e
Peak Radiated Spurious Emission 15.247(c) High – Ace Dipole

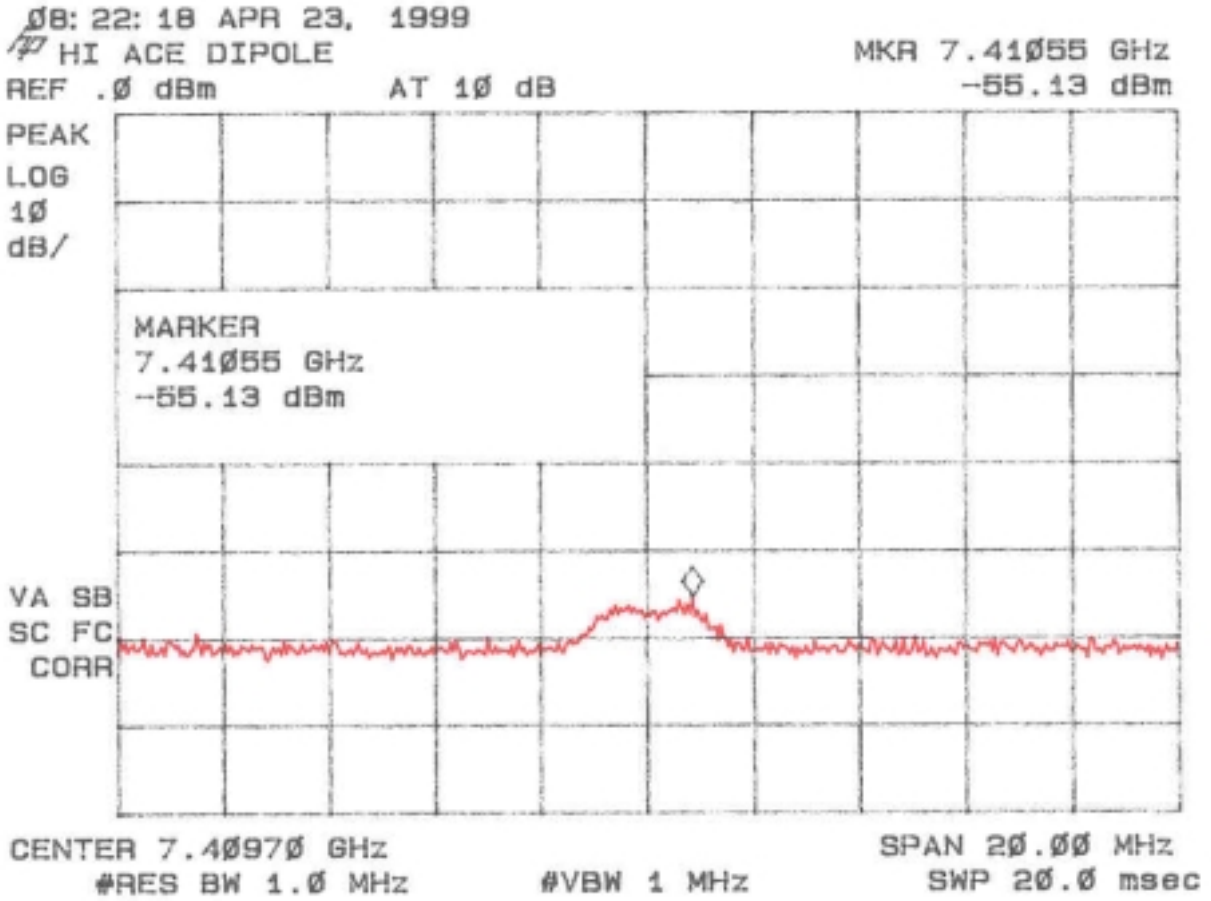


Figure 5f
Peak Radiated Spurious Emission 15.247(c) Low – DWC Patch

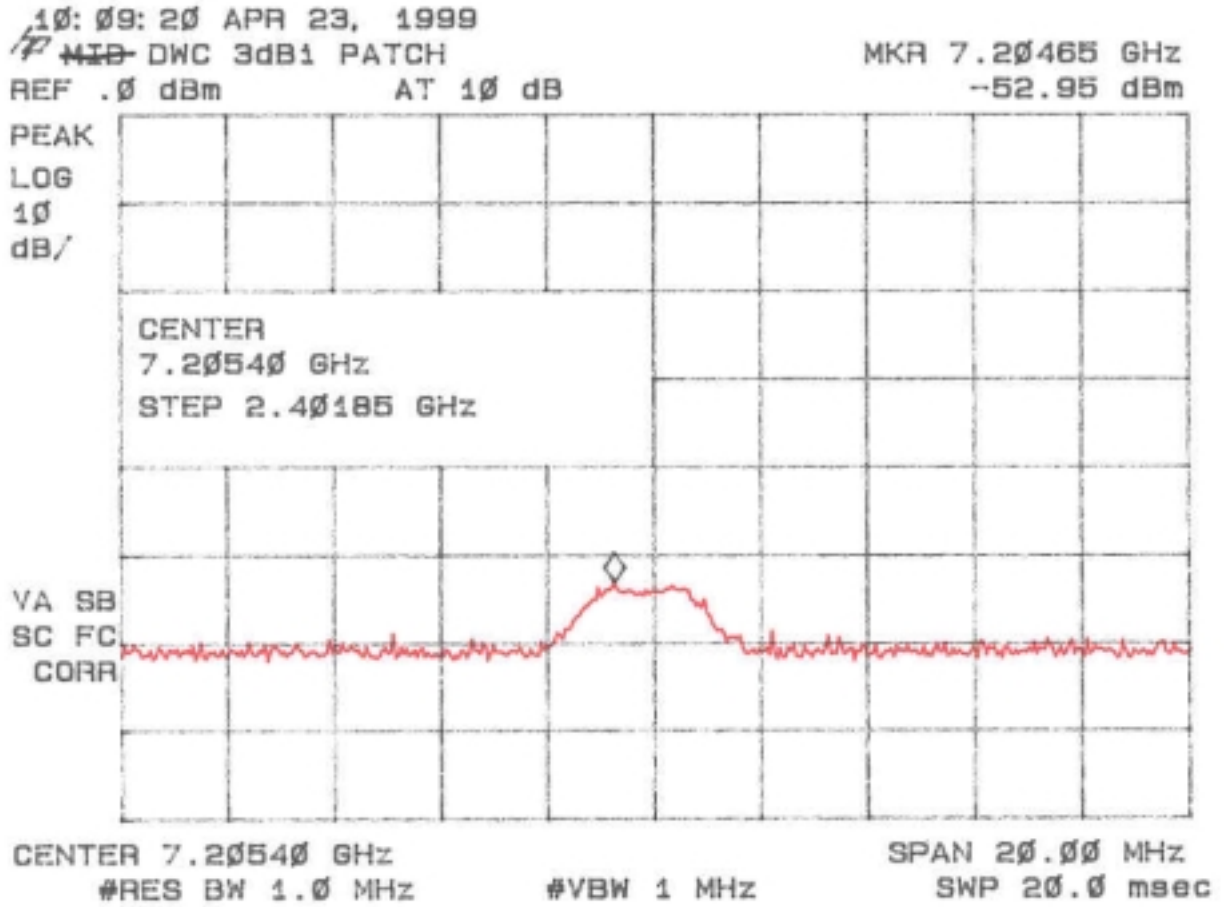


Figure 5g
Peak Radiated Spurious Emission 15.247(c) Mid – DWC Patch

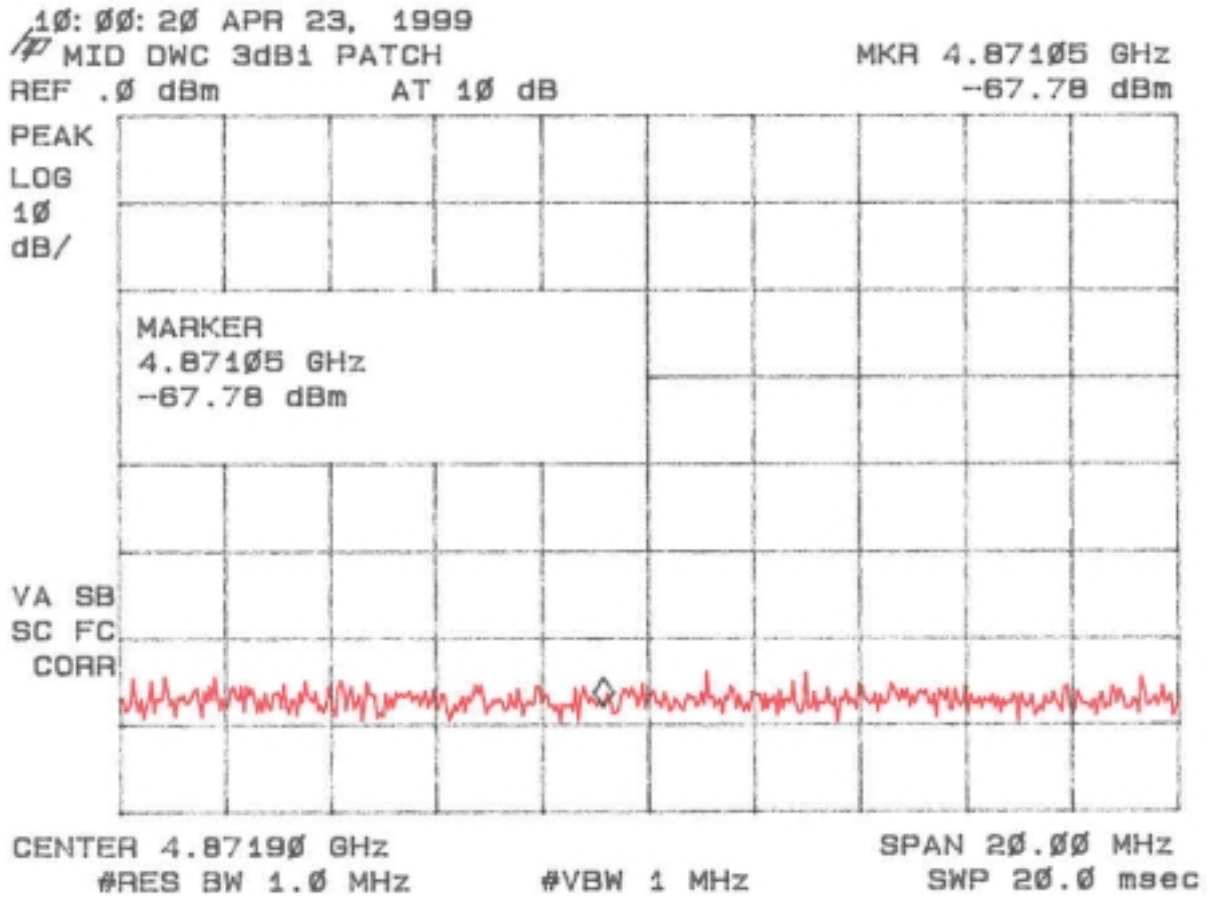


Figure 5h
Peak Radiated Spurious Emission 15.247(c) Mid – DWC Patch

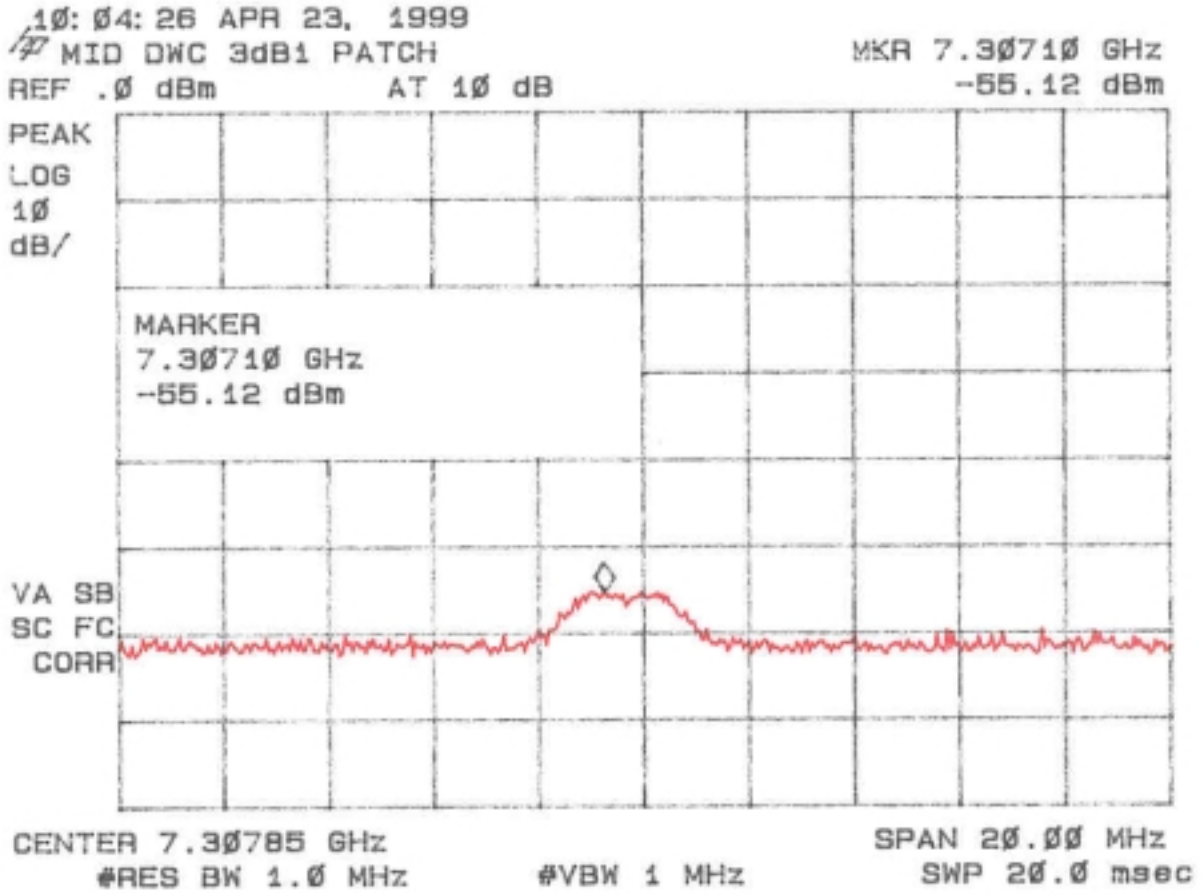


Figure 5i
Peak Radiated Spurious Emission 15.247(c) High – DWC Patch

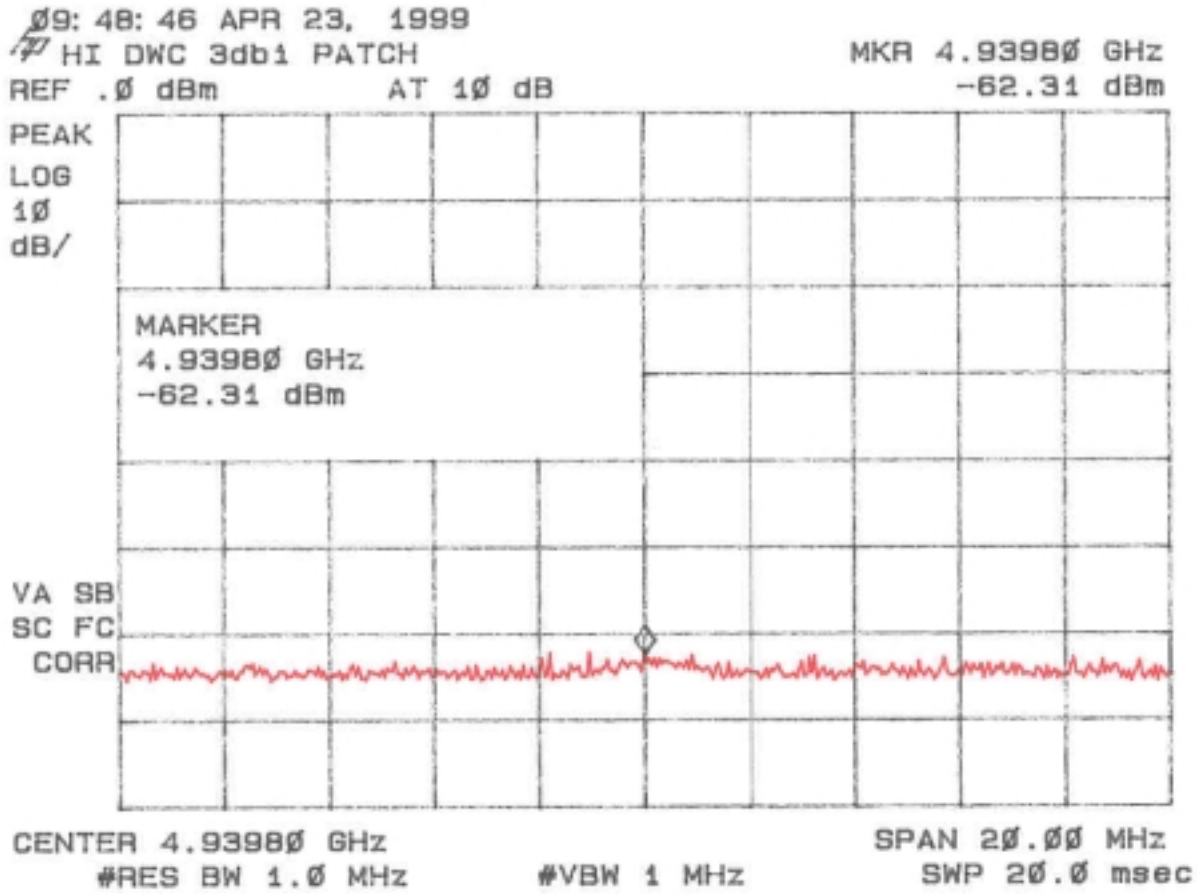


Figure 5j
Peak Radiated Spurious Emission 15.247(c) High – DWC Patch

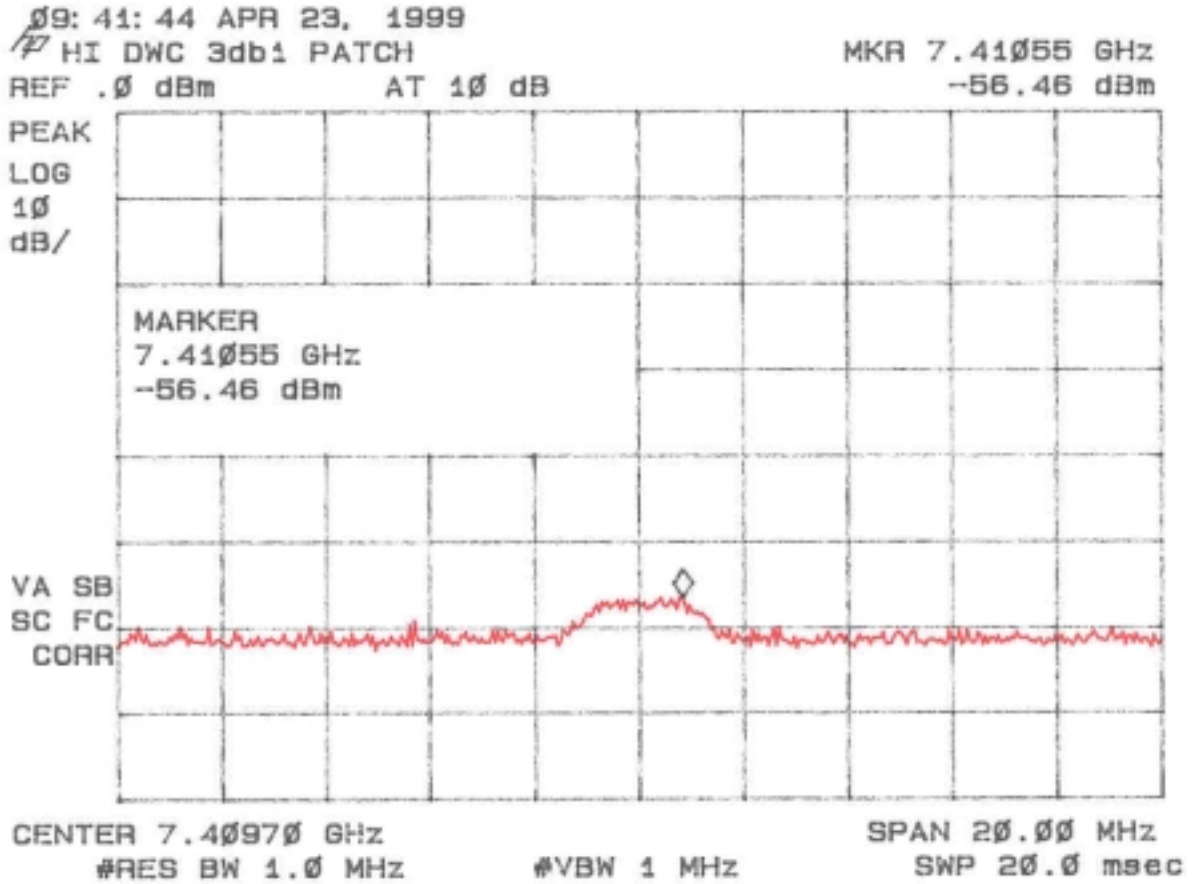


Figure 5k
Peak Radiated Spurious Emission 15.247(c) Low – Mobile Mark Patch

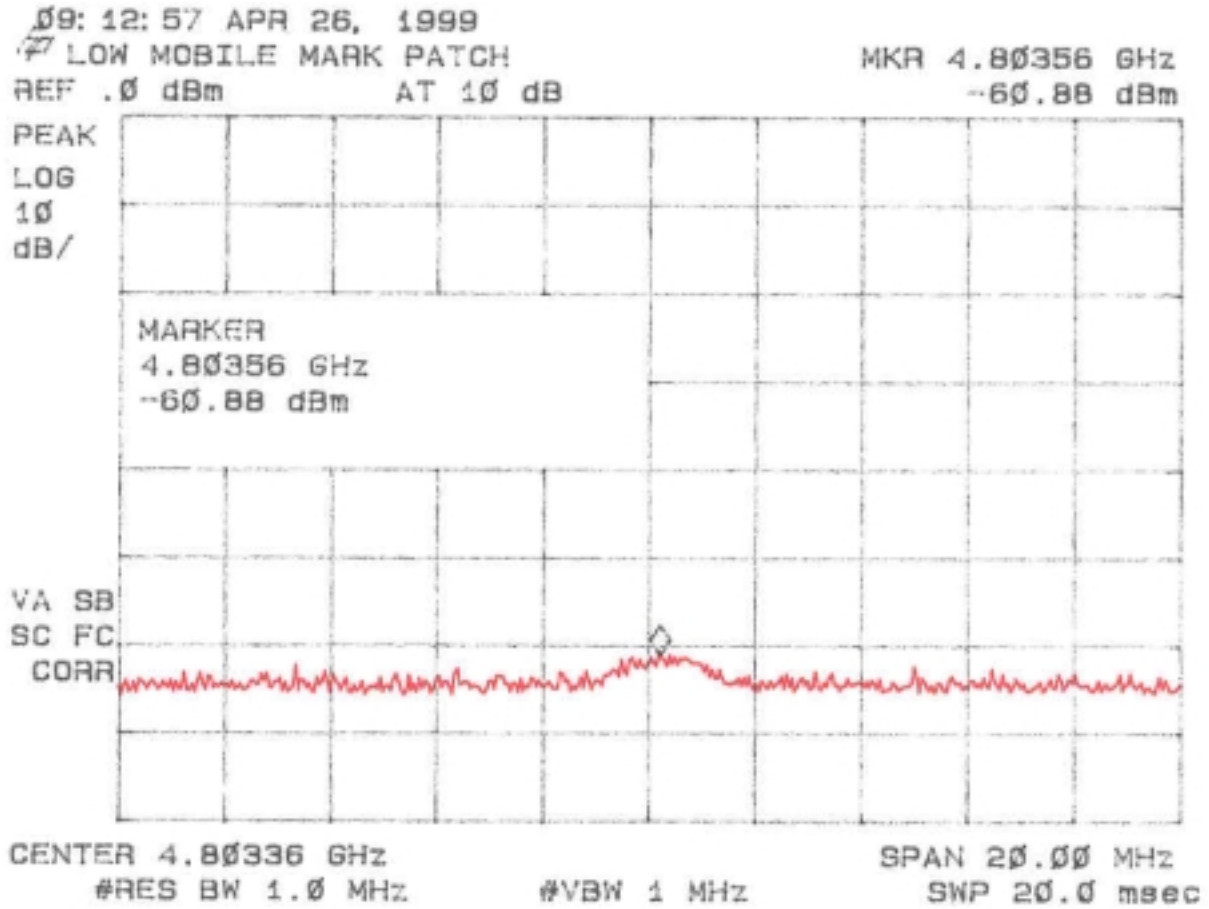


Figure 51
Peak Radiated Spurious Emission 15.247(c) Low – Mobile Mark Patch

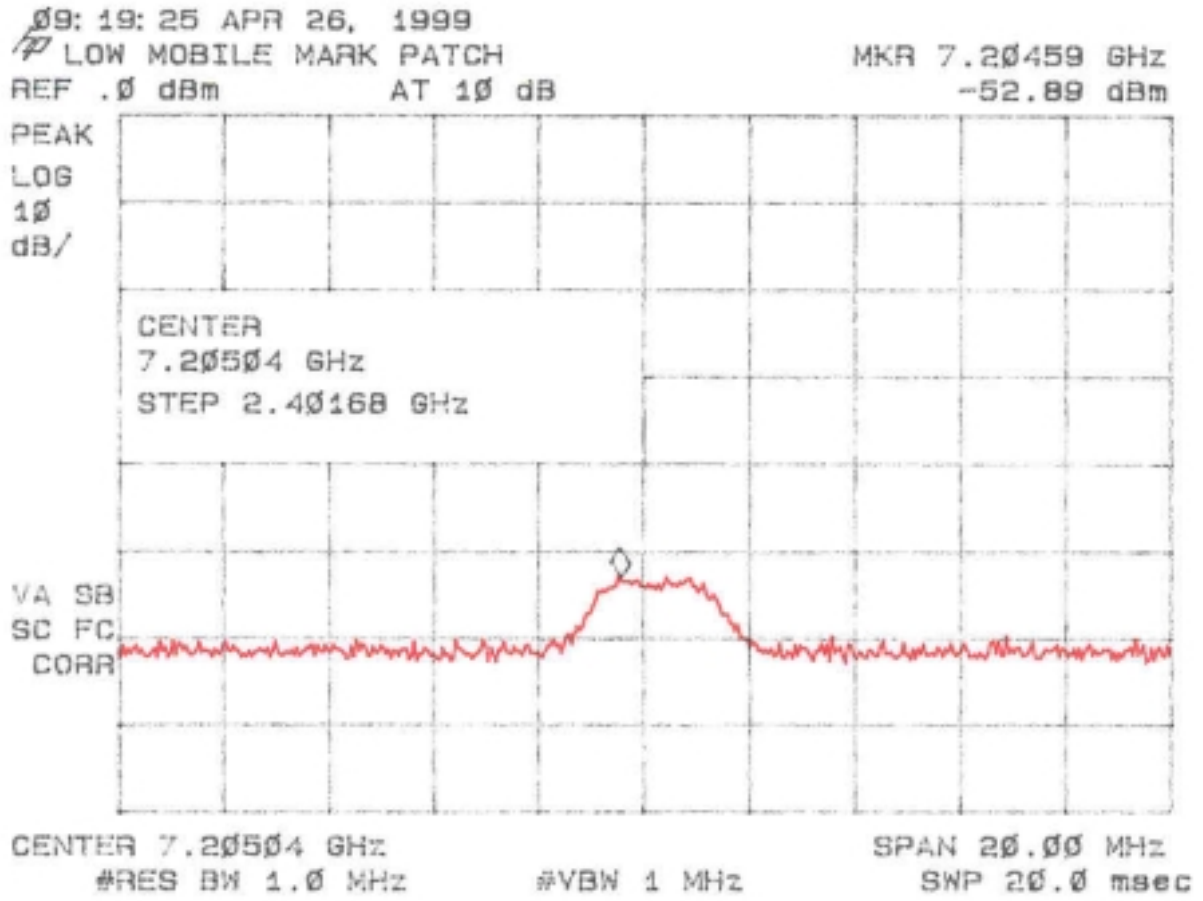


Figure 5m
Peak Radiated Spurious Emission 15.247(c) Mid – Mobile Mark Patch

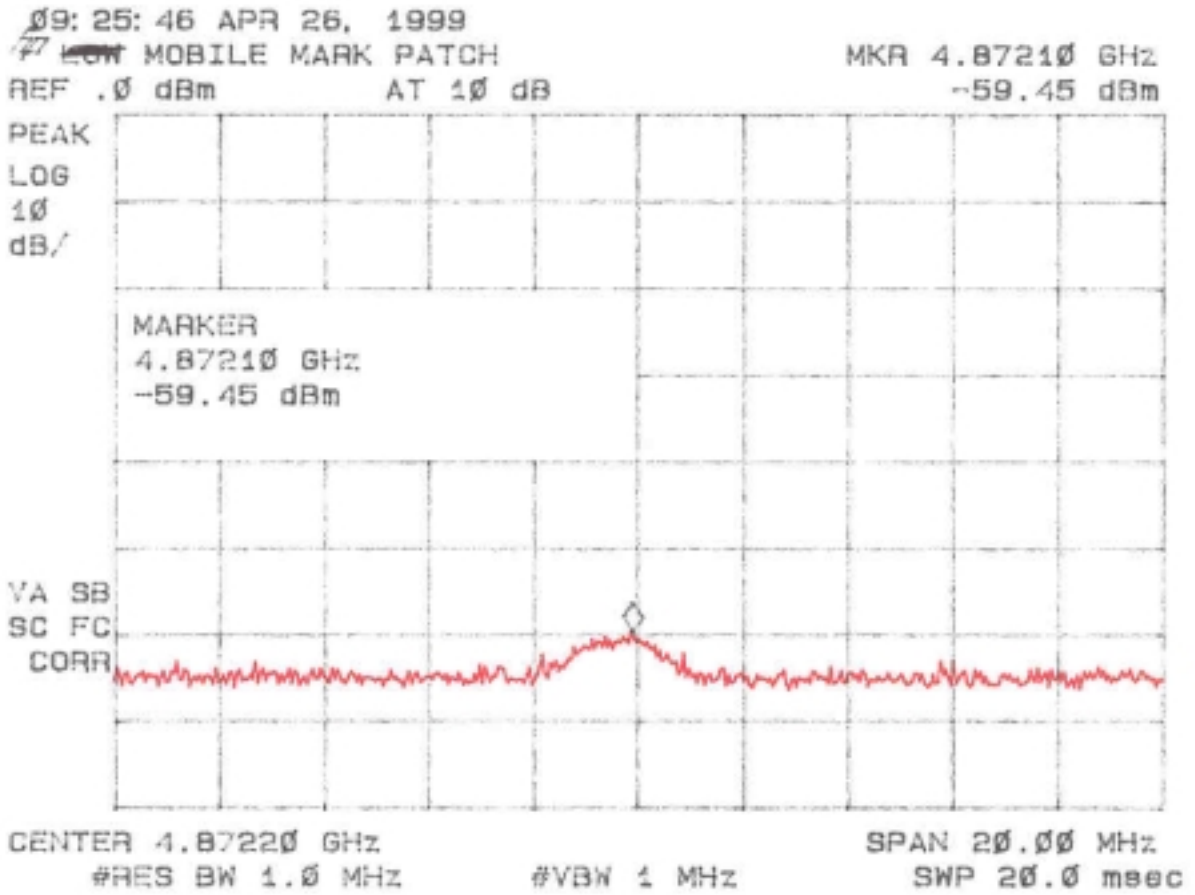


Figure 5n
Peak Radiated Spurious Emission 15.247(c) Mid – Mobile Mark Patch

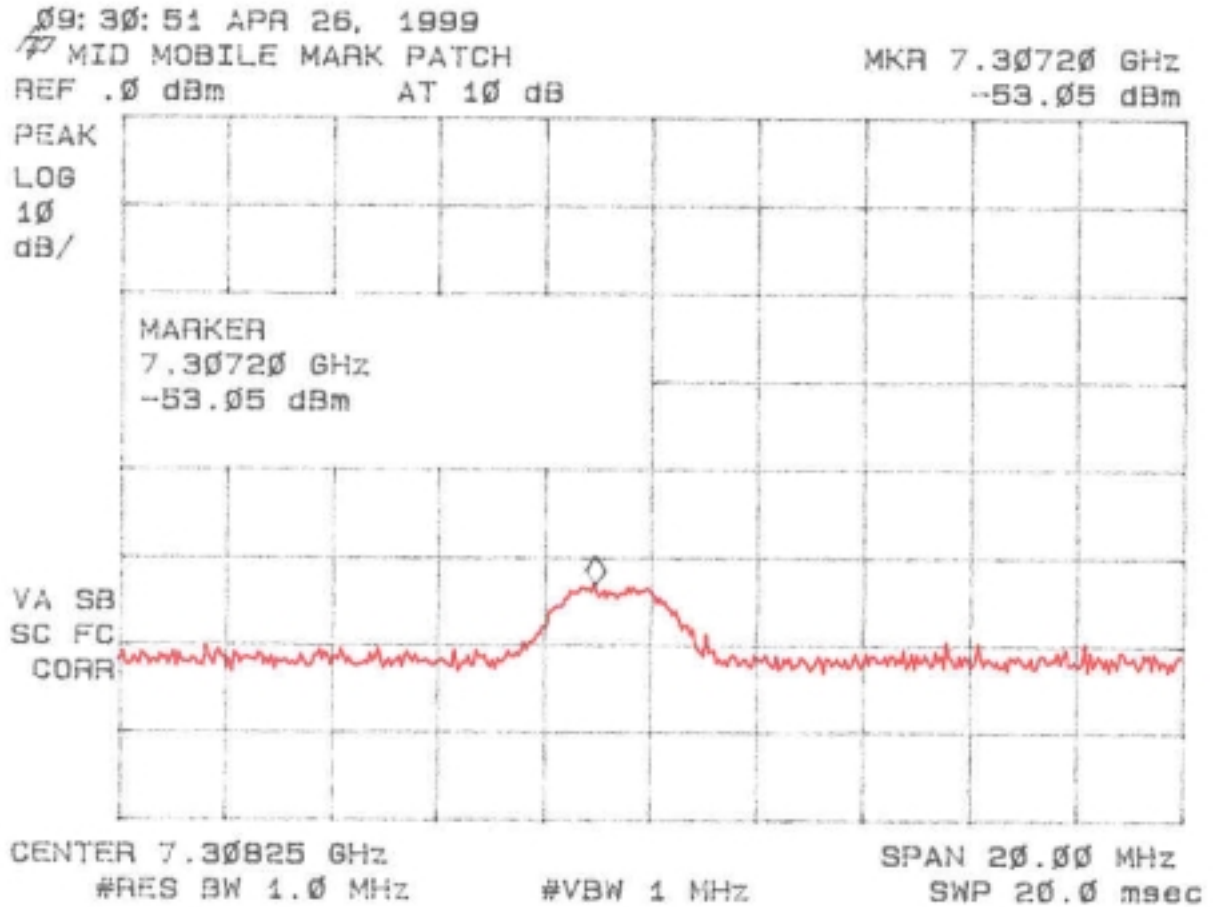


Figure 5o
Peak Radiated Spurious Emission 15.247(c) High – Mobile Mark Patch

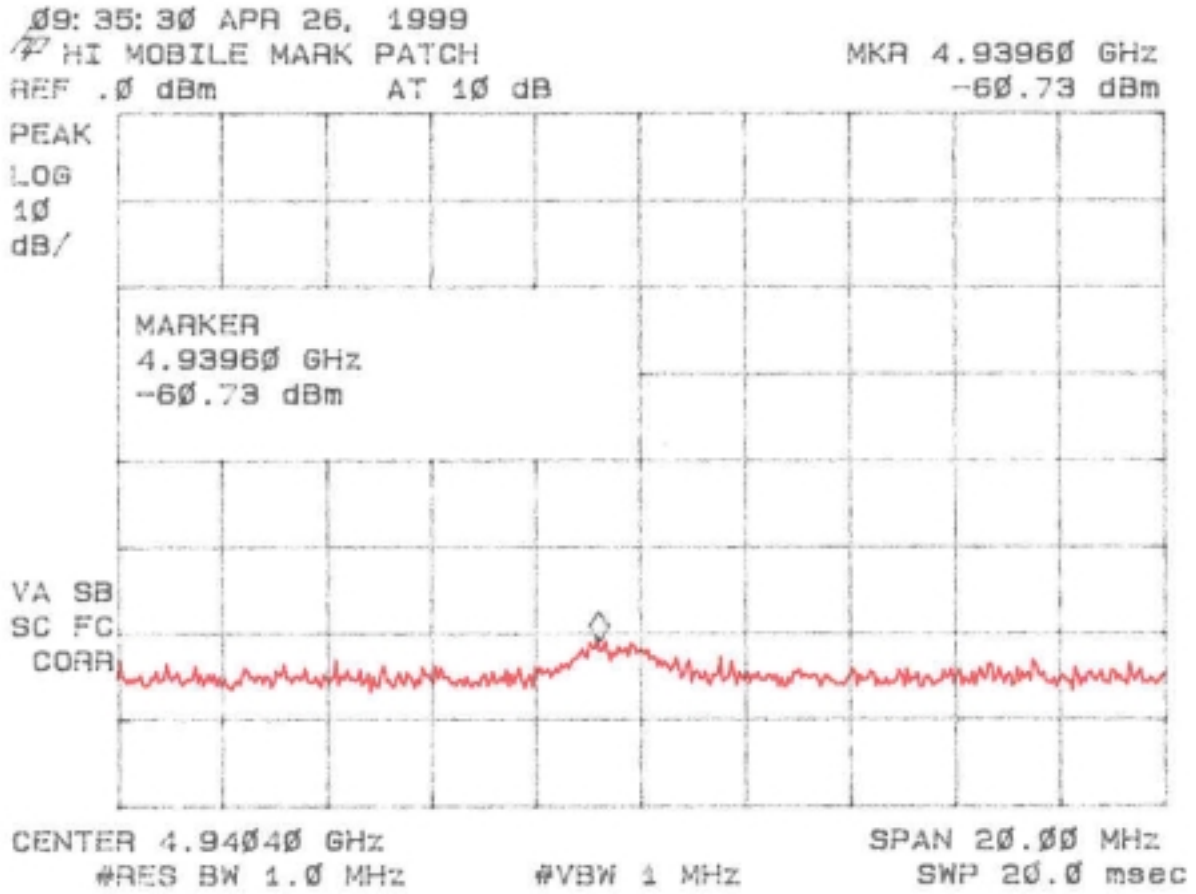


Figure 5p
Peak Radiated Spurious Emission 15.247(c) High – Mobile Mark Patch

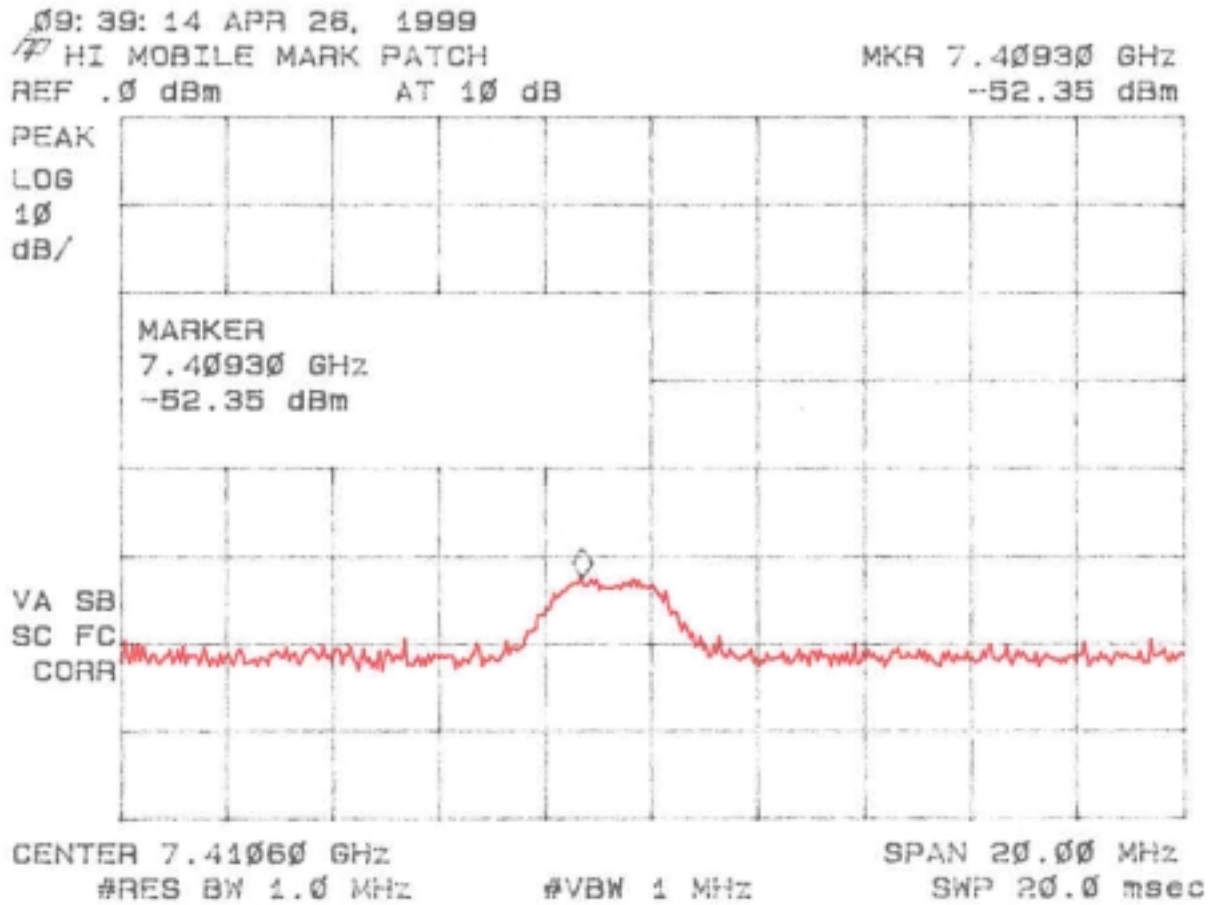


Figure 5q
Peak Radiated Spurious Emission 15.247(c) Low - 6 dB Omni

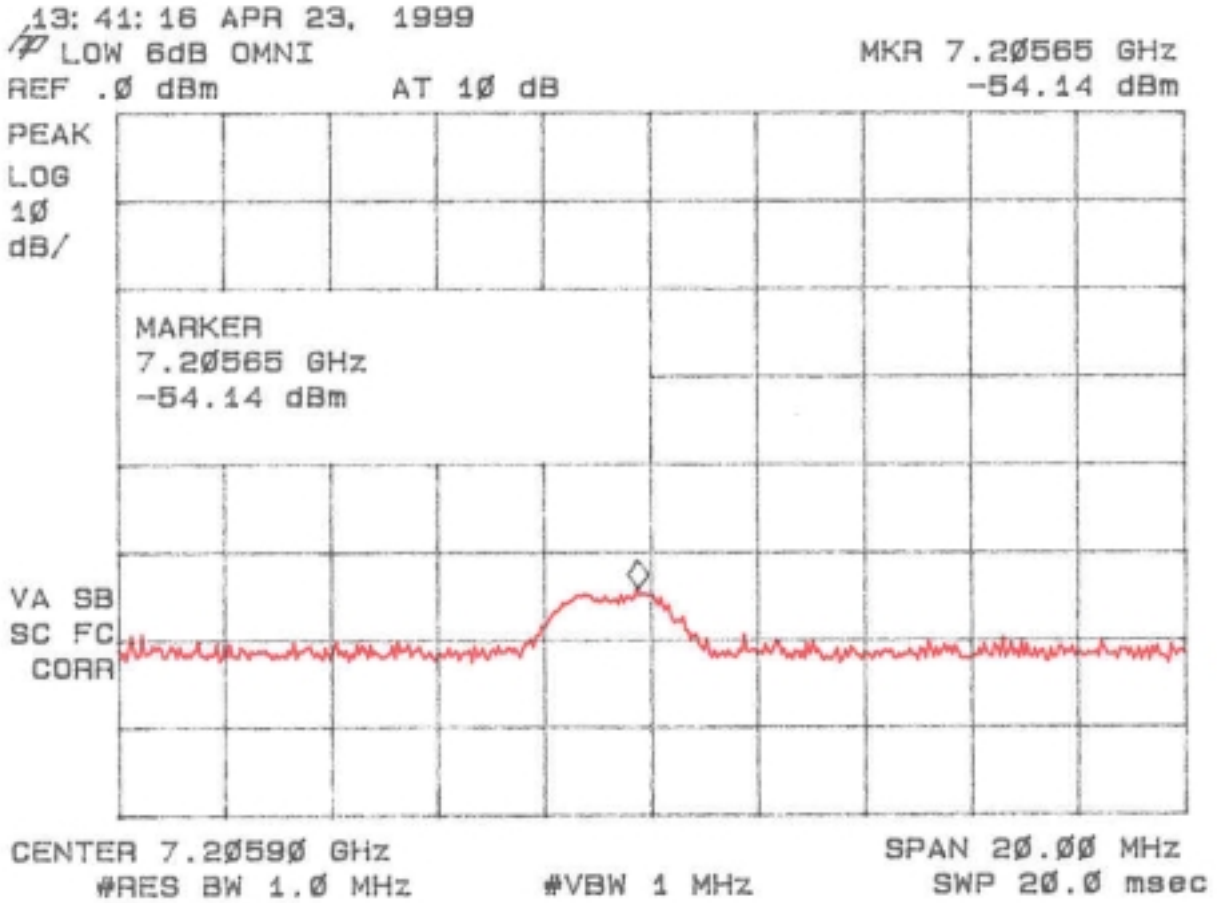


Figure 5r
Peak Radiated Spurious Emission 15.247(c) Mid – 6 dB Omni

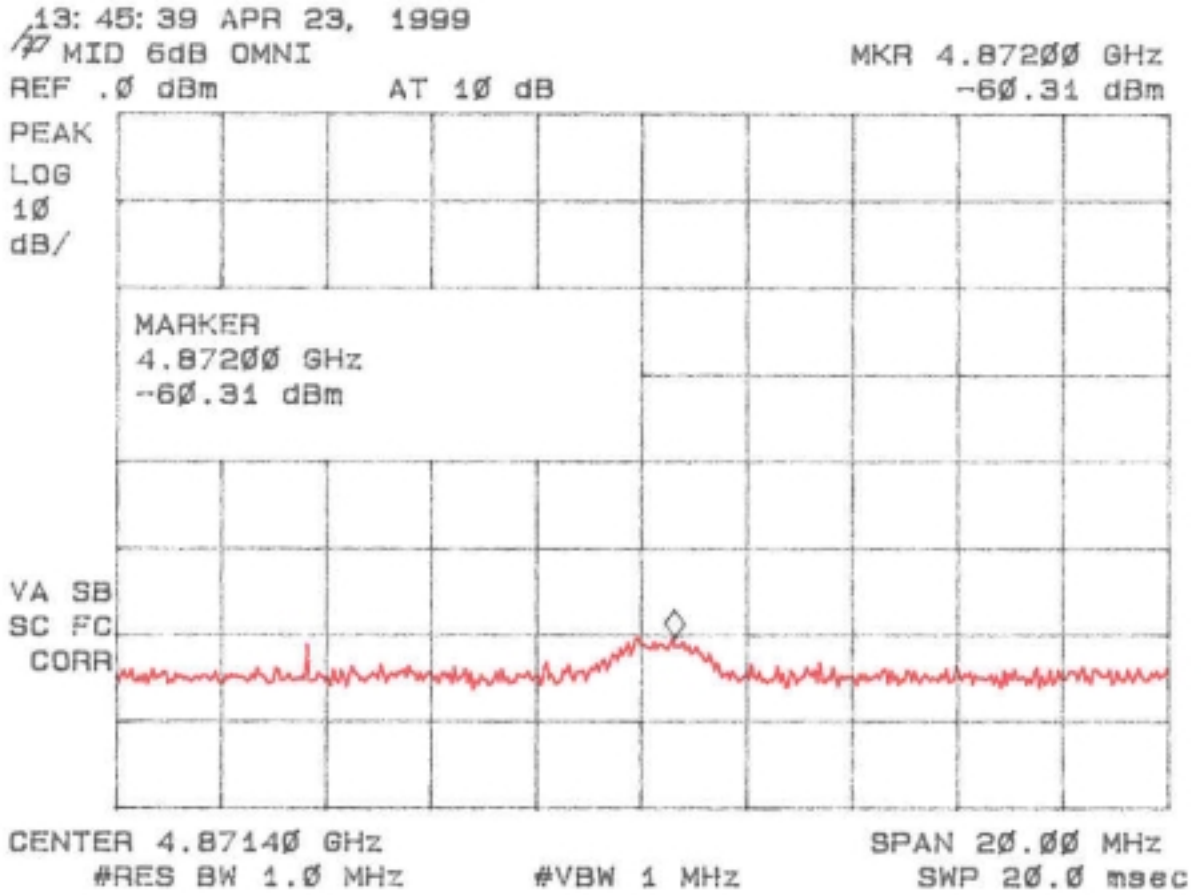


Figure 5s
Peak Radiated Spurious Emission 15.247(c) Mid – 6 dB Omni

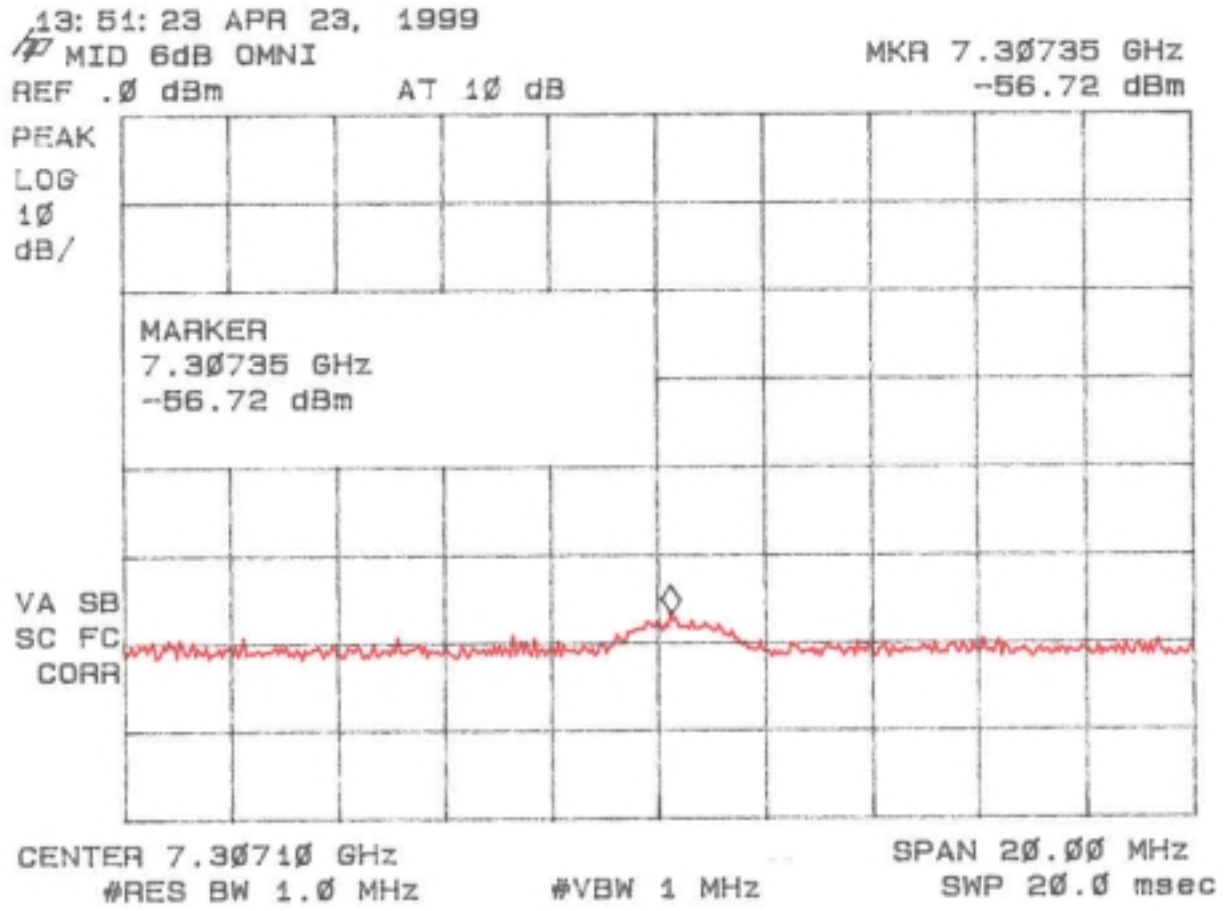


Figure 5t
Peak Radiated Spurious Emission 15.247(c) High – 6 dB Omni

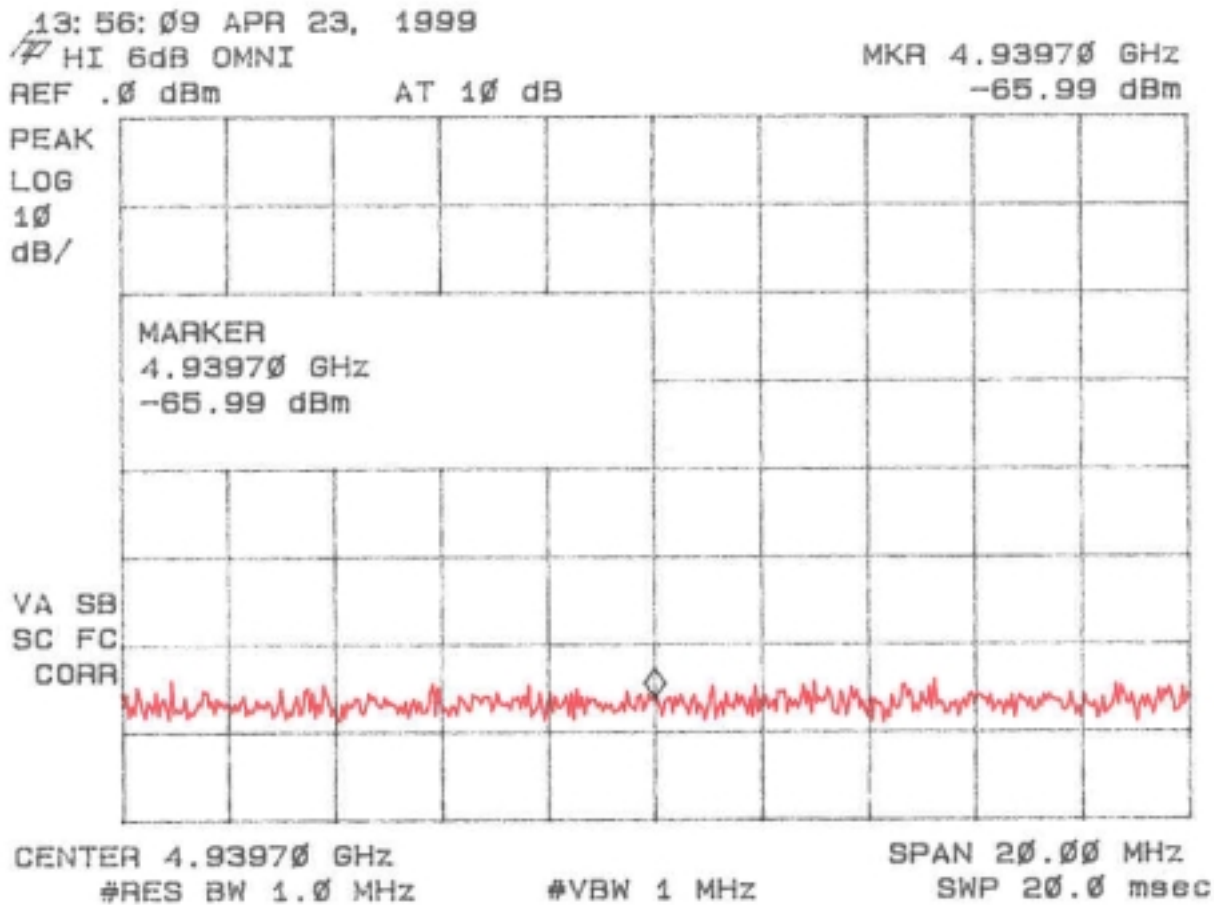


Figure 5u
Peak Radiated Spurious Emission 15.247(c) High – 6 dB Omni

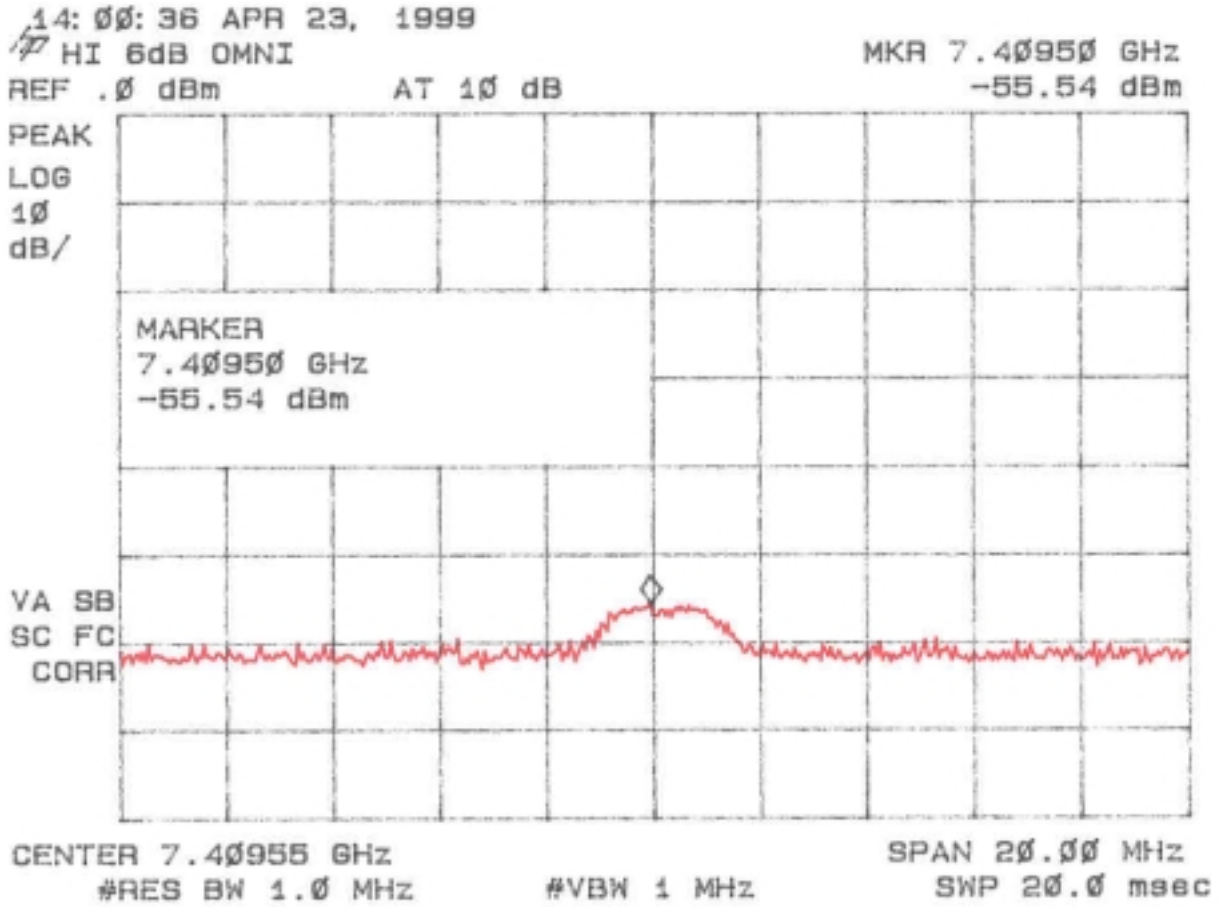


Figure 5v
Peak Radiated Spurious Emission 15.247(c) Low – 12 dB Omni

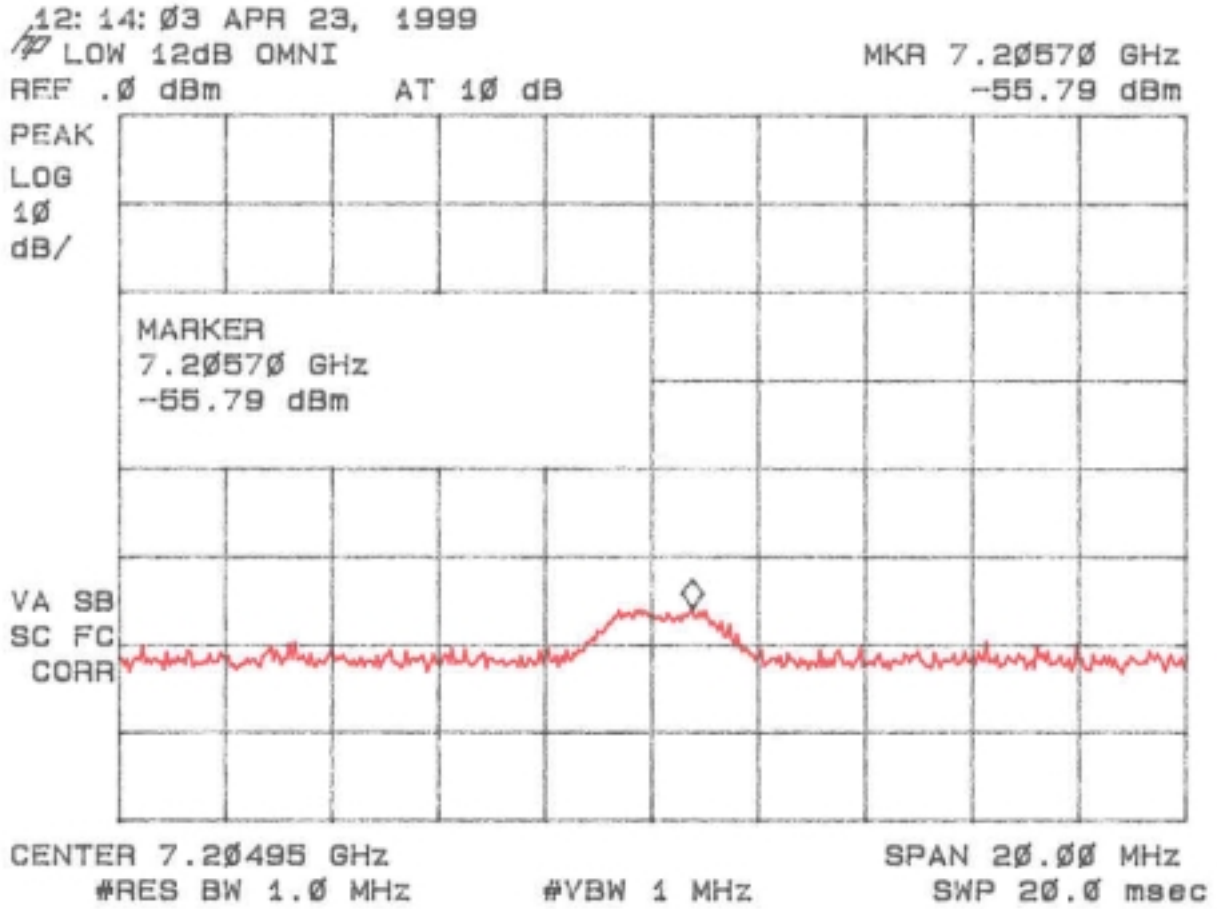


Figure 5w
Peak Radiated Spurious Emission 15.247(c) Mid – 12 dB Omni

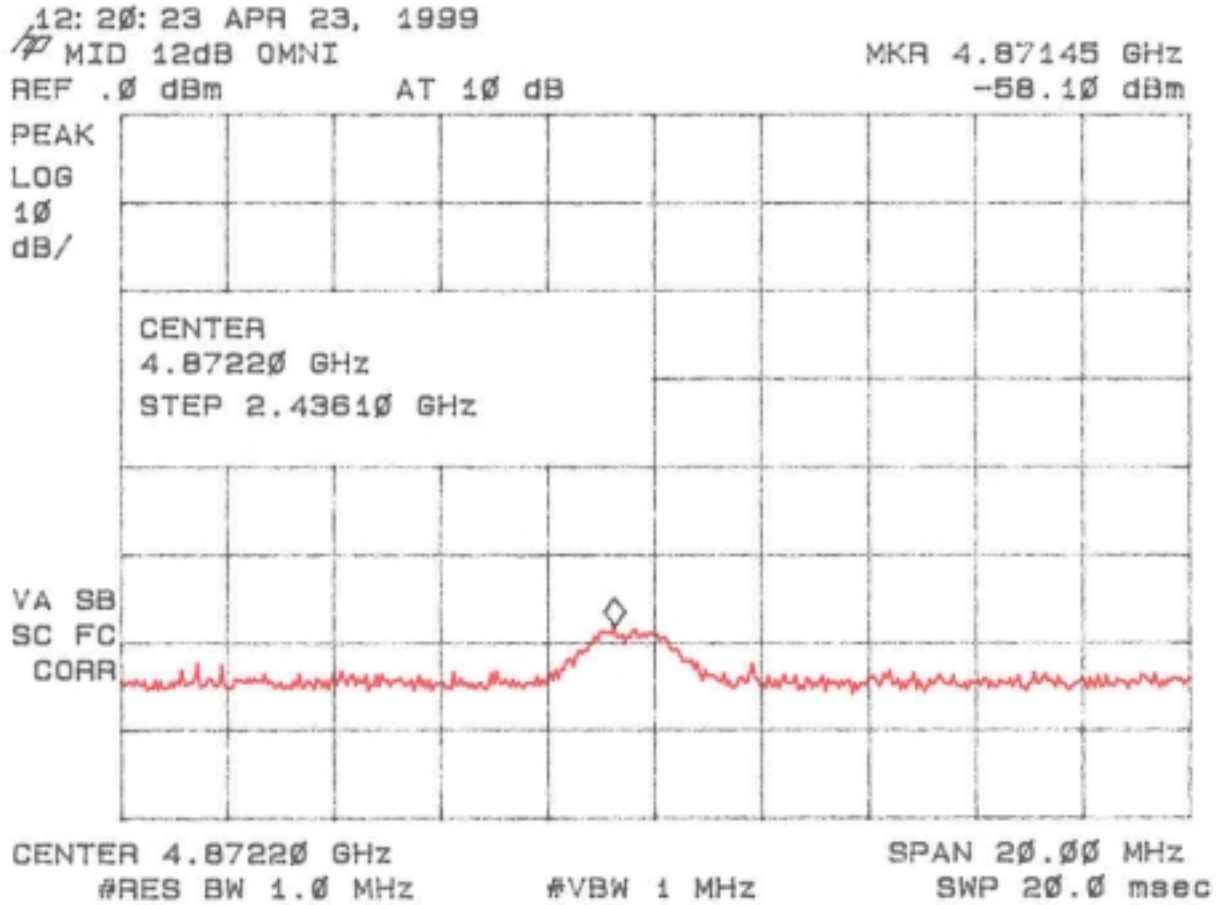


Figure 5x
Peak Radiated Spurious Emission 15.247(c) Mid – 12 dB Omni

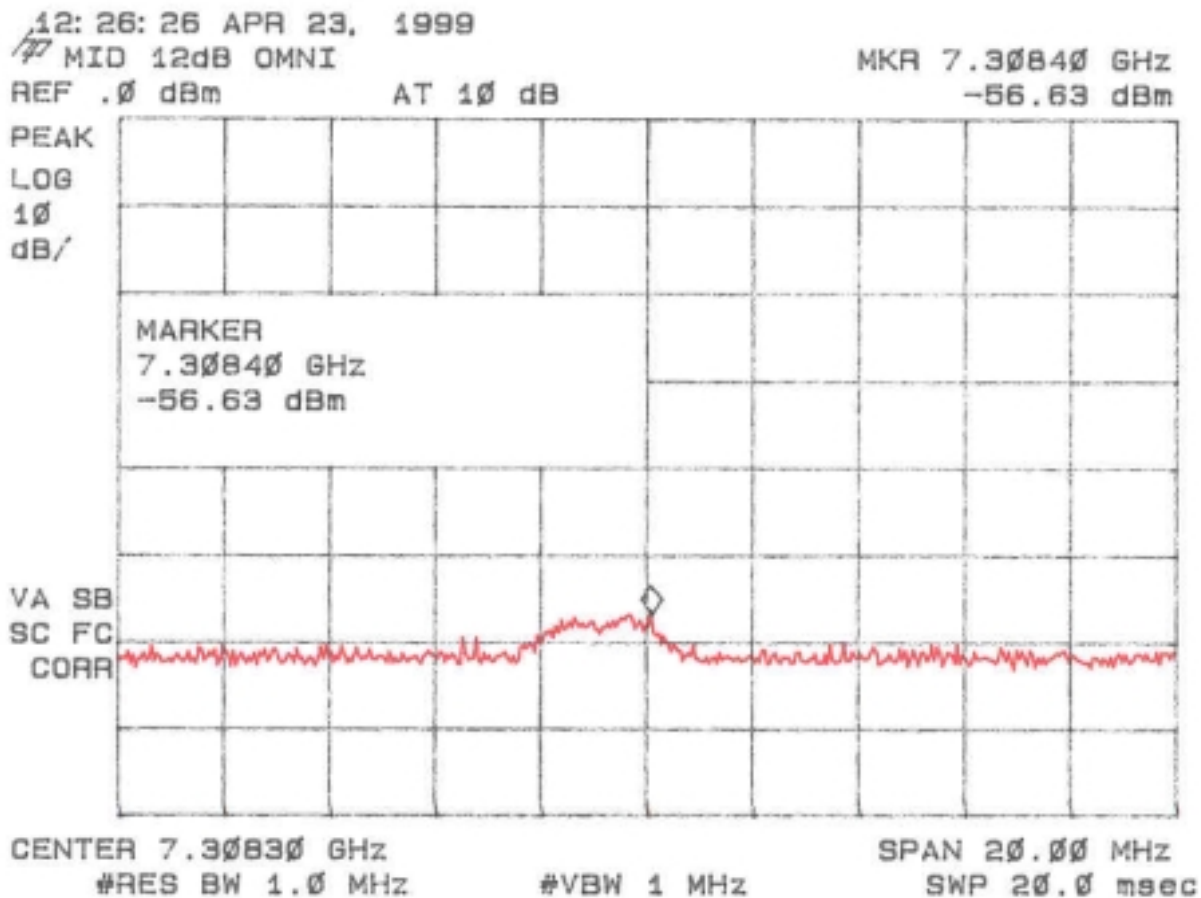


Figure 5y
Peak Radiated Spurious Emission 15.247(c) High – 12 dB Omni

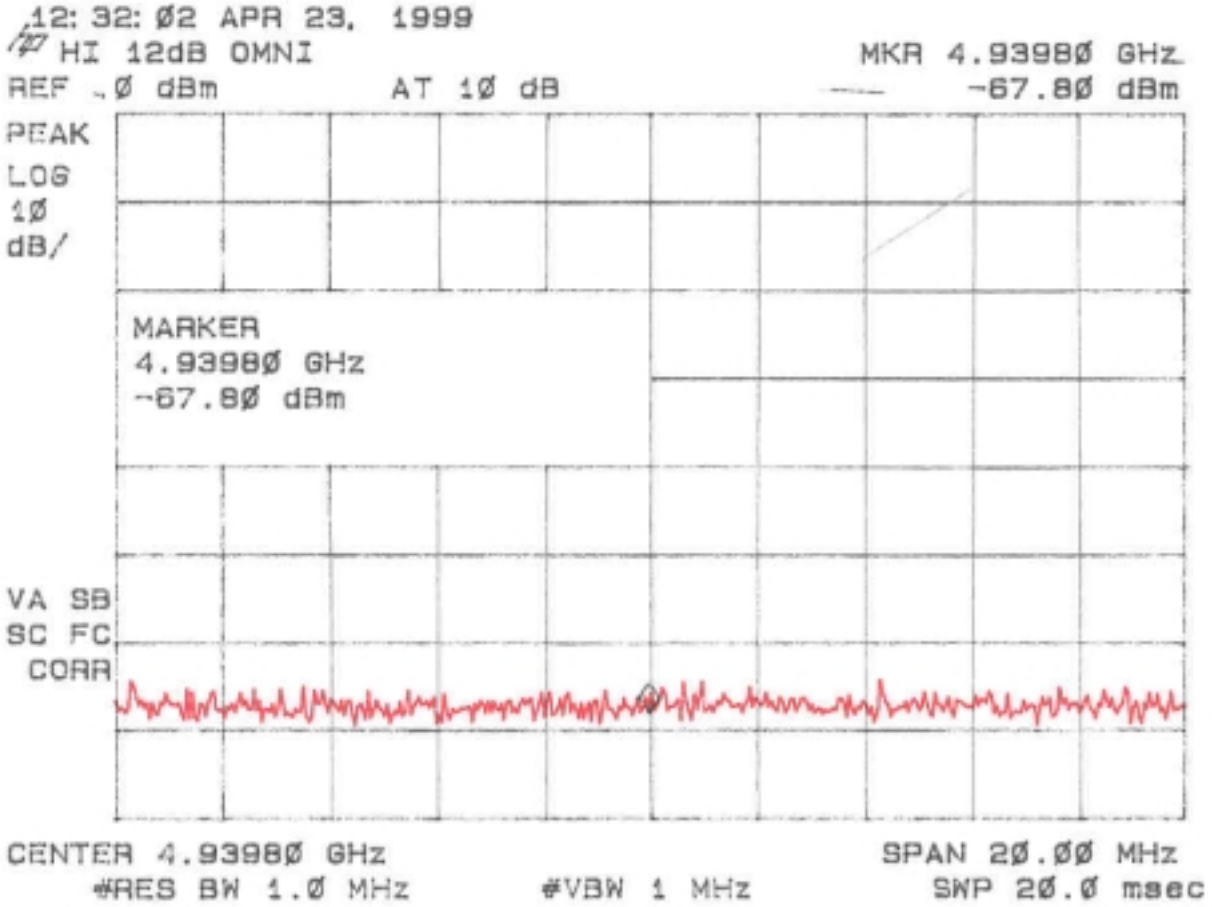


Figure 5z
Peak Radiated Spurious Emission 15.247(c) High – 12 dB Omni

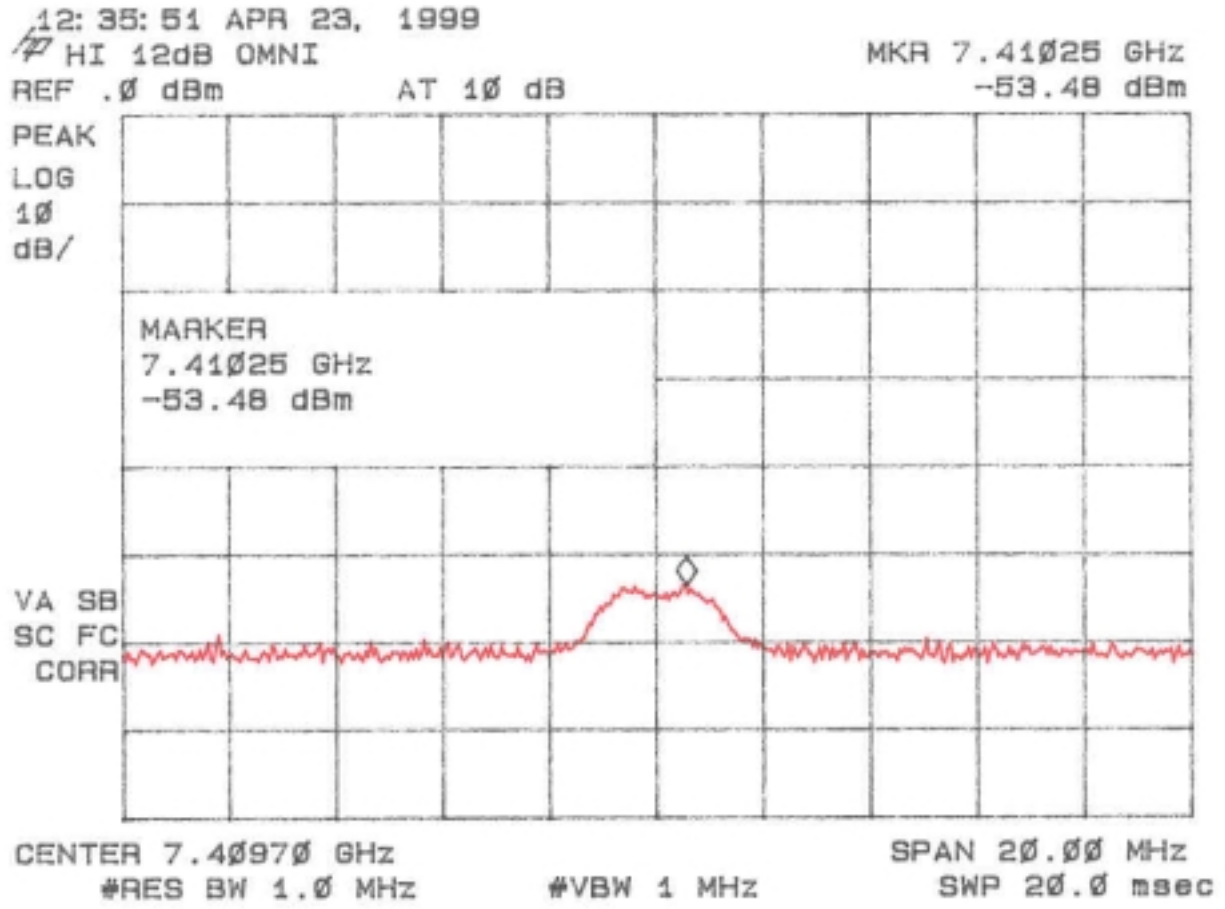


Figure 5aa
Peak Radiated Spurious Emission 15.247(c) Low – 14 dB Corner Ant.

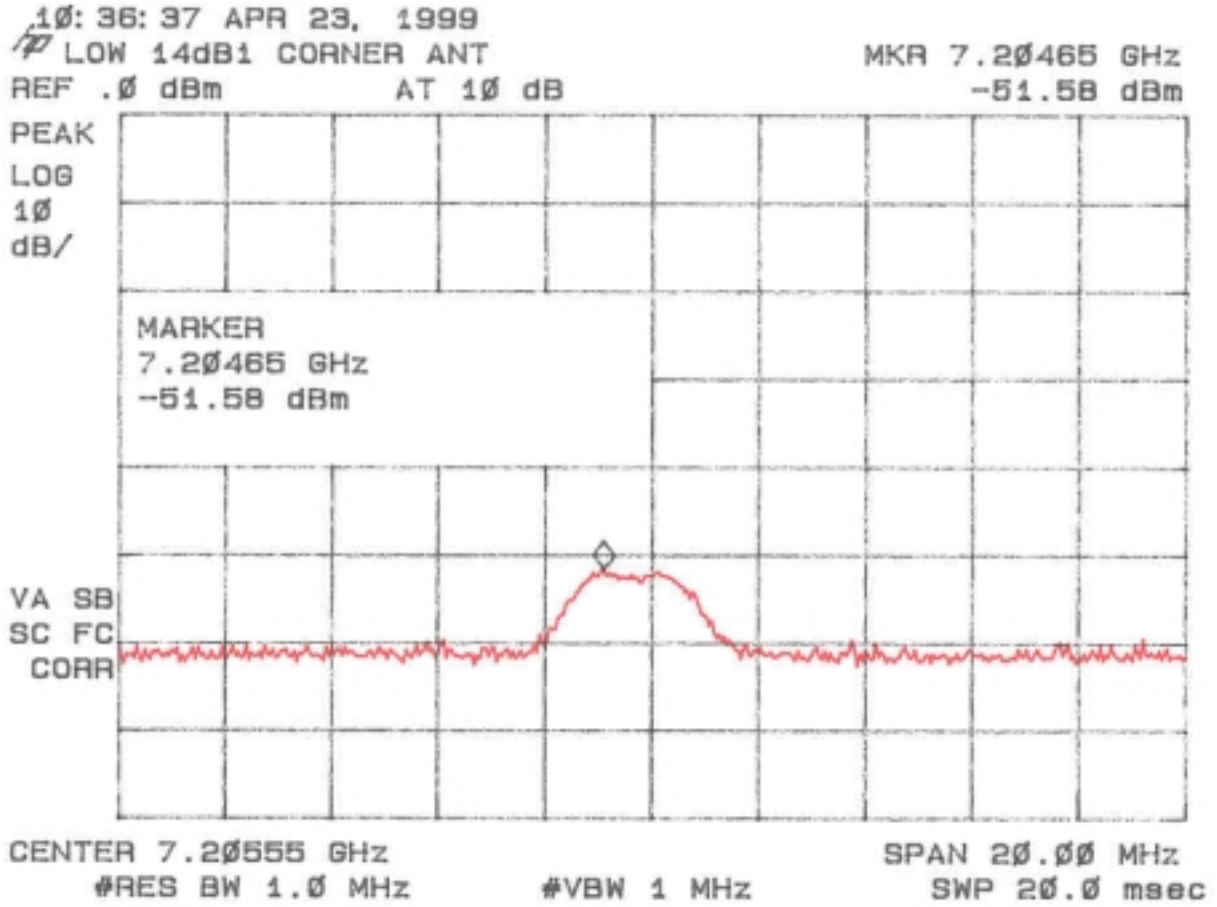


Figure 5ab
Peak Radiated Spurious Emission 15.247(c) Mid – 14 dB Corner Ant.

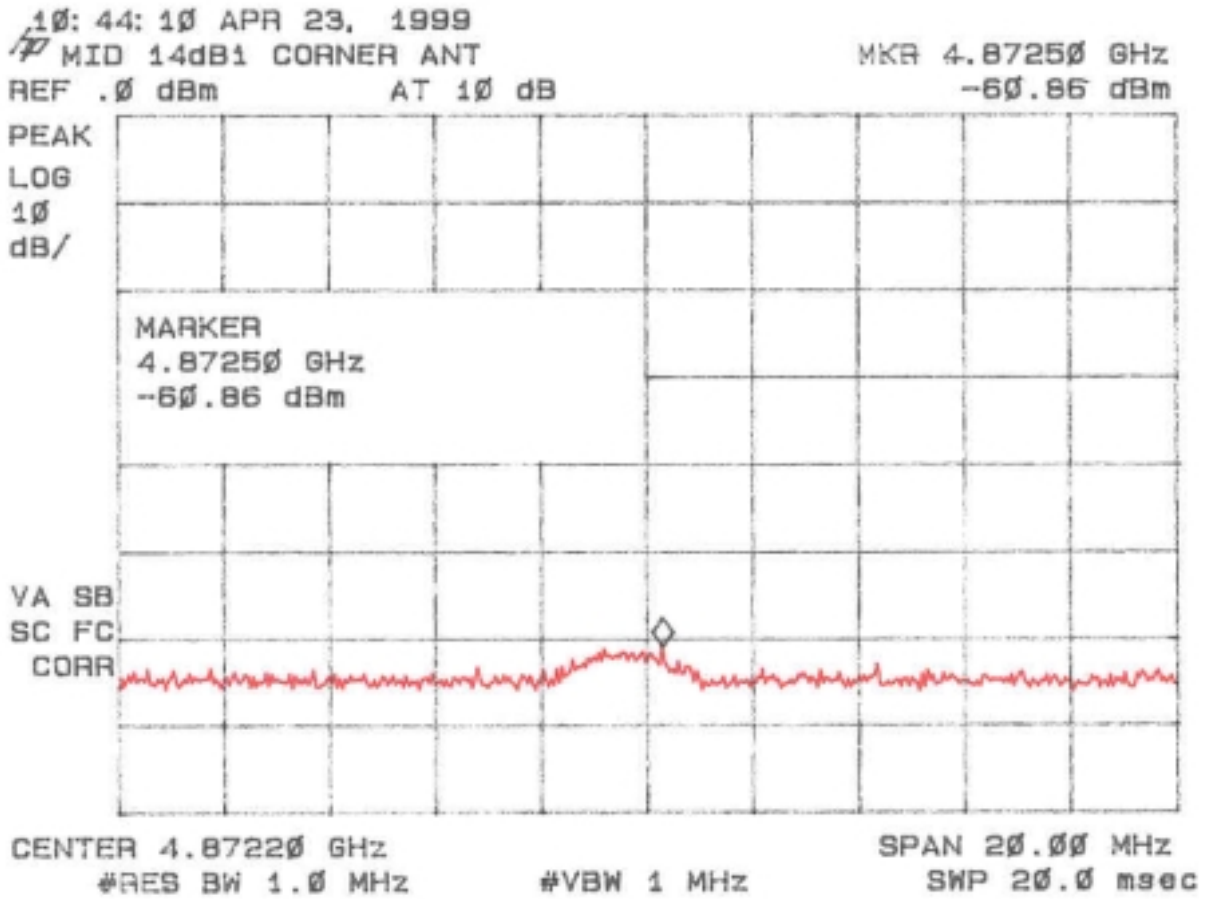


Figure 5ac
Peak Radiated Spurious Emission 15.247(c) Mid – 14 dB Corner Ant.

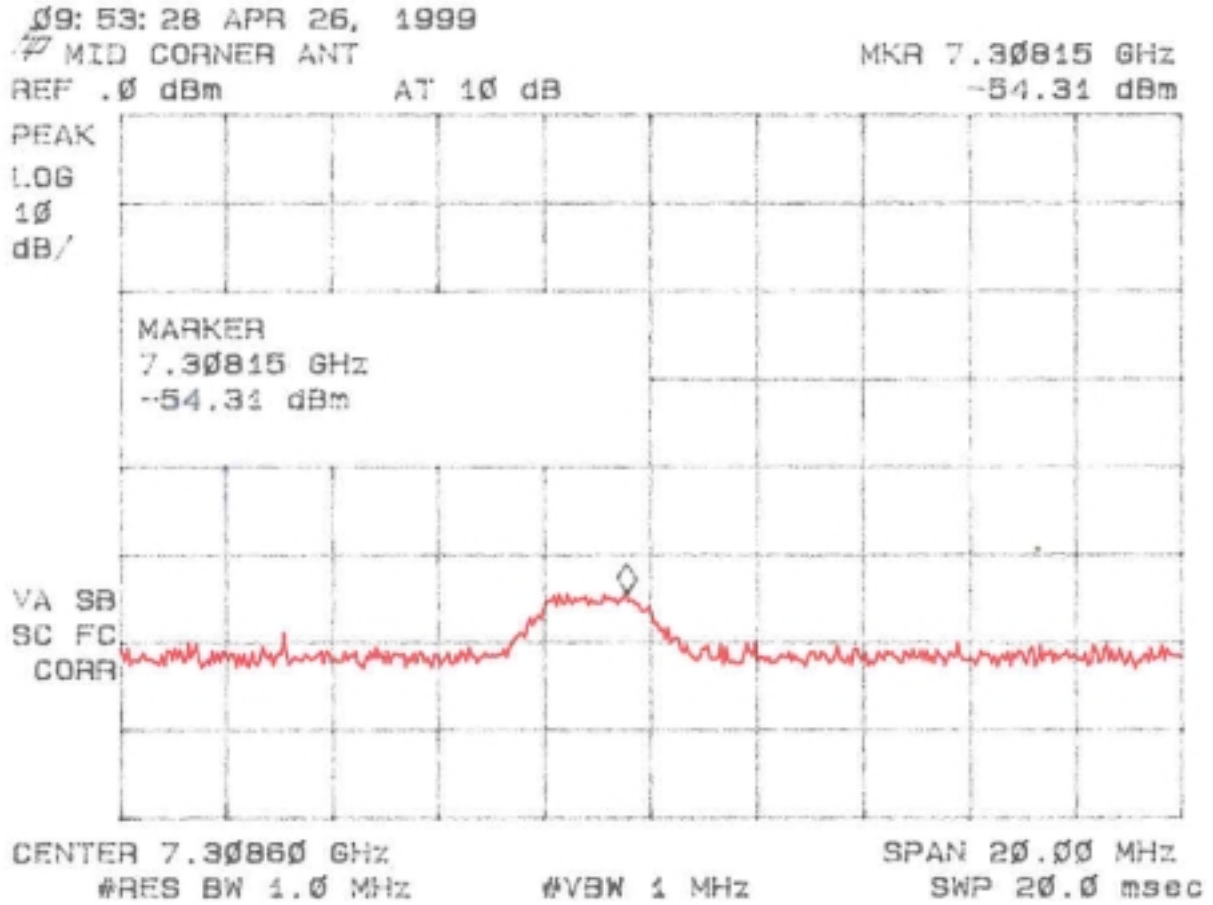


Figure 5ad
Peak Radiated Spurious Emission 15.247(c) High – 14 dB Corner Ant.

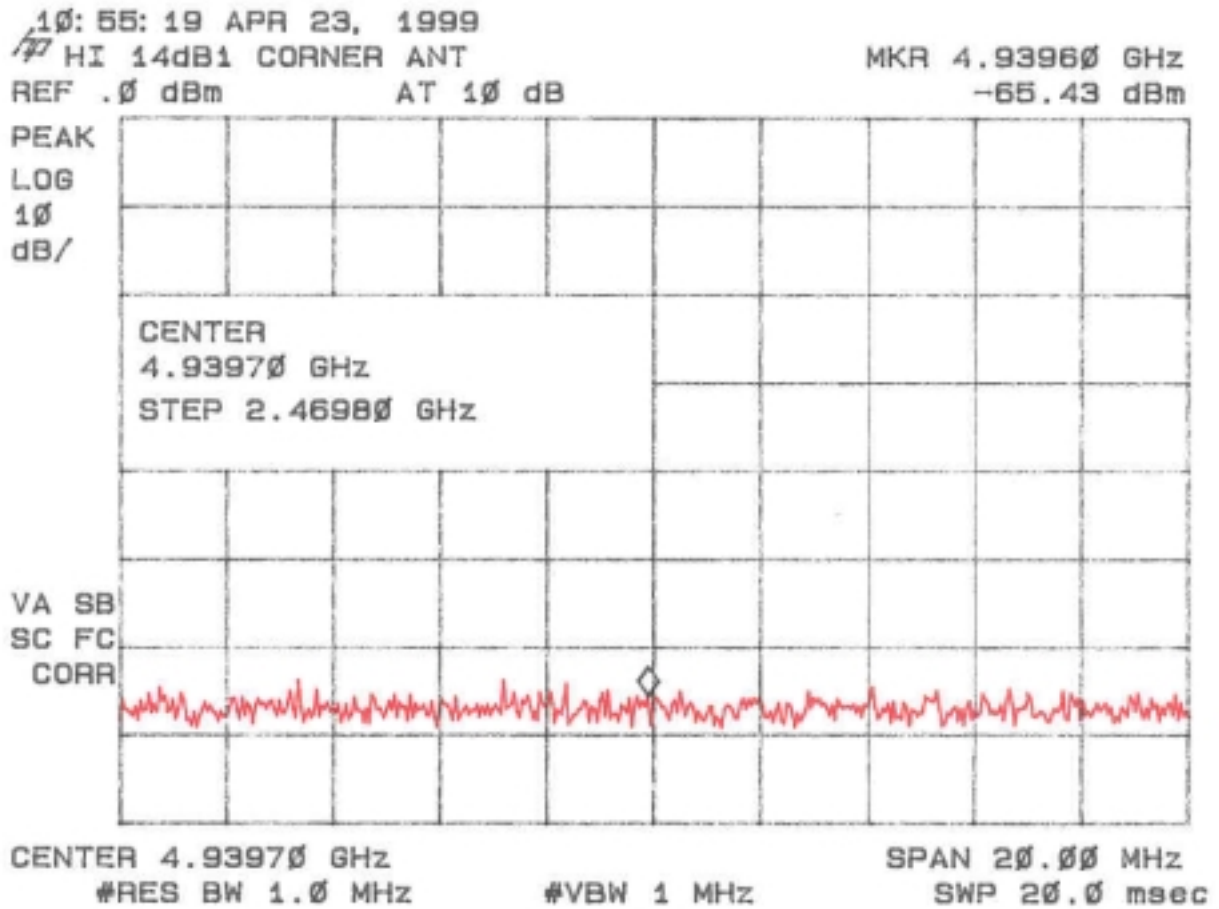


Figure 5ae
Peak Radiated Spurious Emission 15.247(c) High – 14 dB Corner Ant.

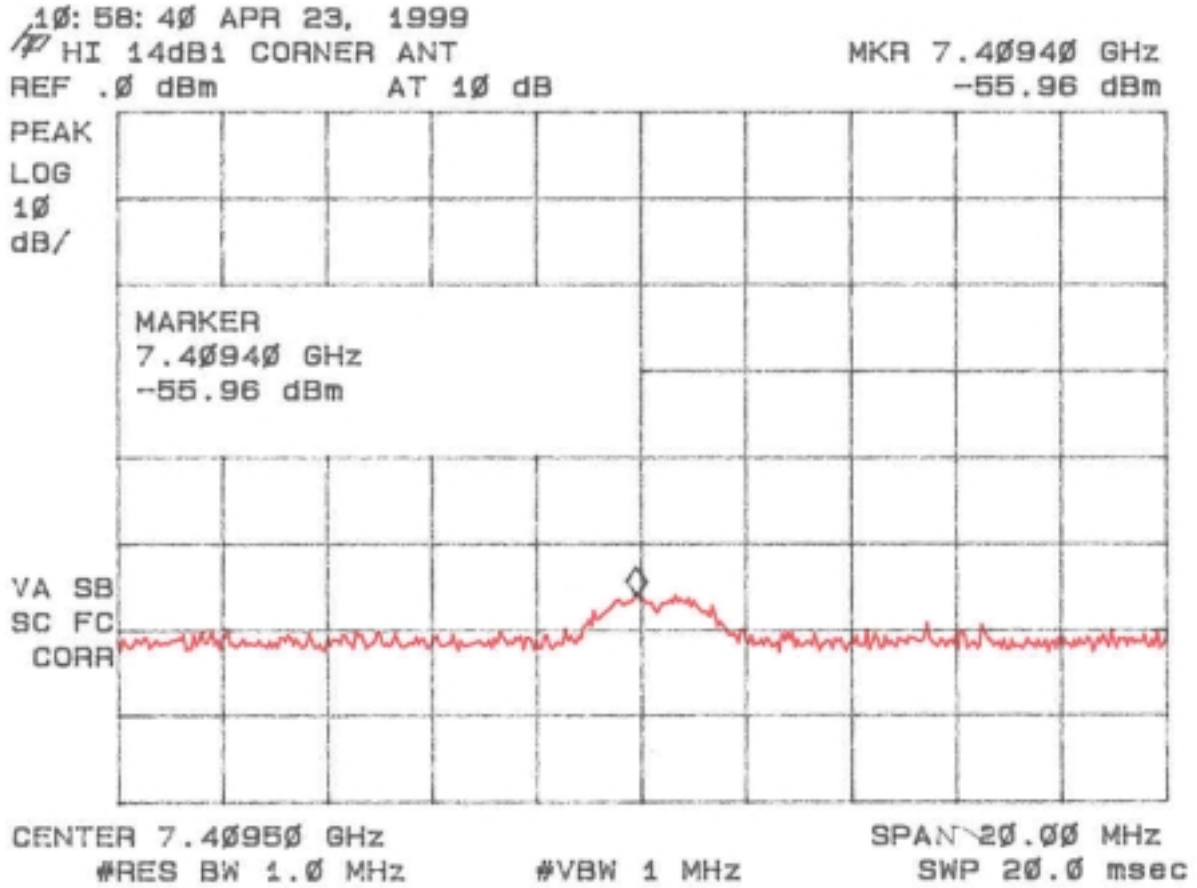


Figure 5af
Peak Radiated Spurious Emission 15.247(c) Low – 14 dB Yagi

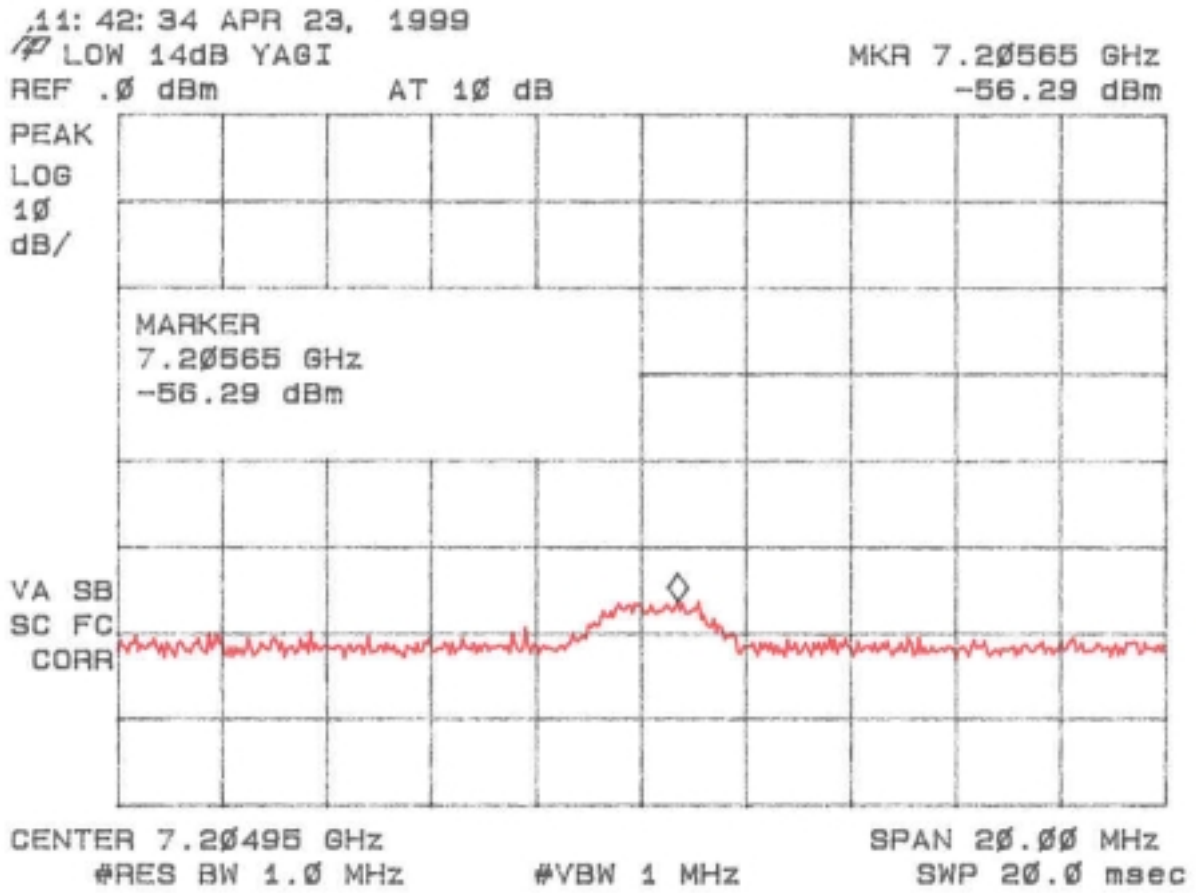


Figure 5ag
Peak Radiated Spurious Emission 15.247(c) Mid – 14 dB Yagi

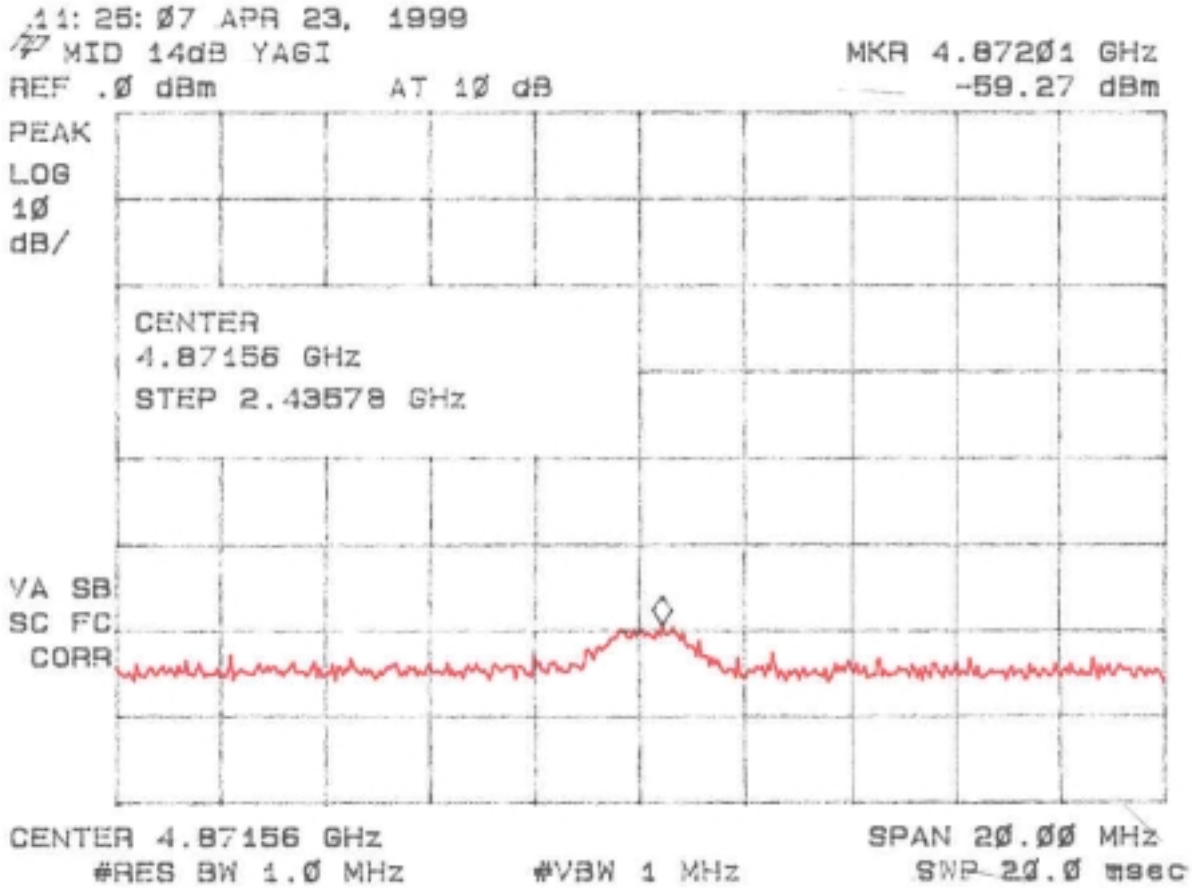


Figure 5ah
Peak Radiated Spurious Emission 15.247(c) Mid – 14 dB Yagi

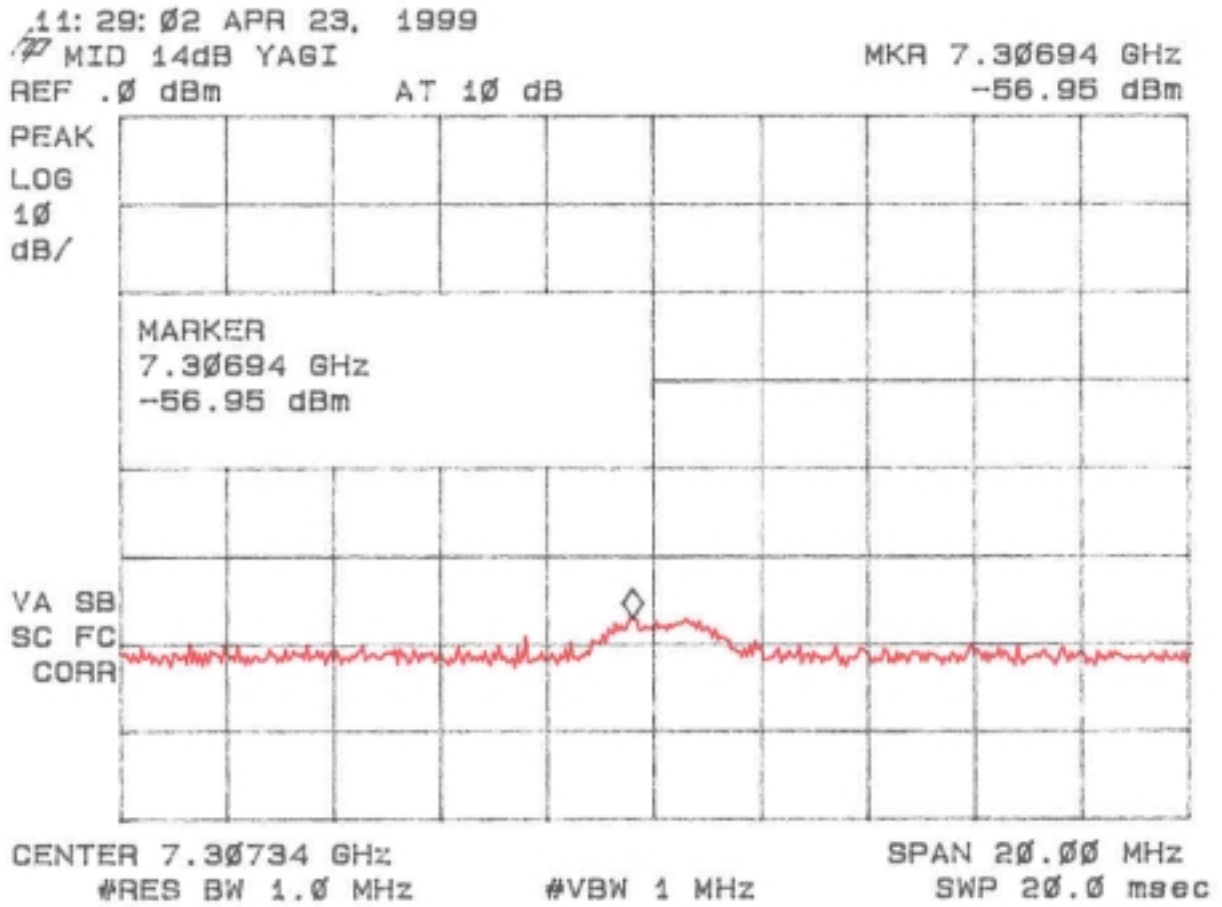


Figure 5ai
Peak Radiated Spurious Emission 15.247(c) High – 14 dB Yagi

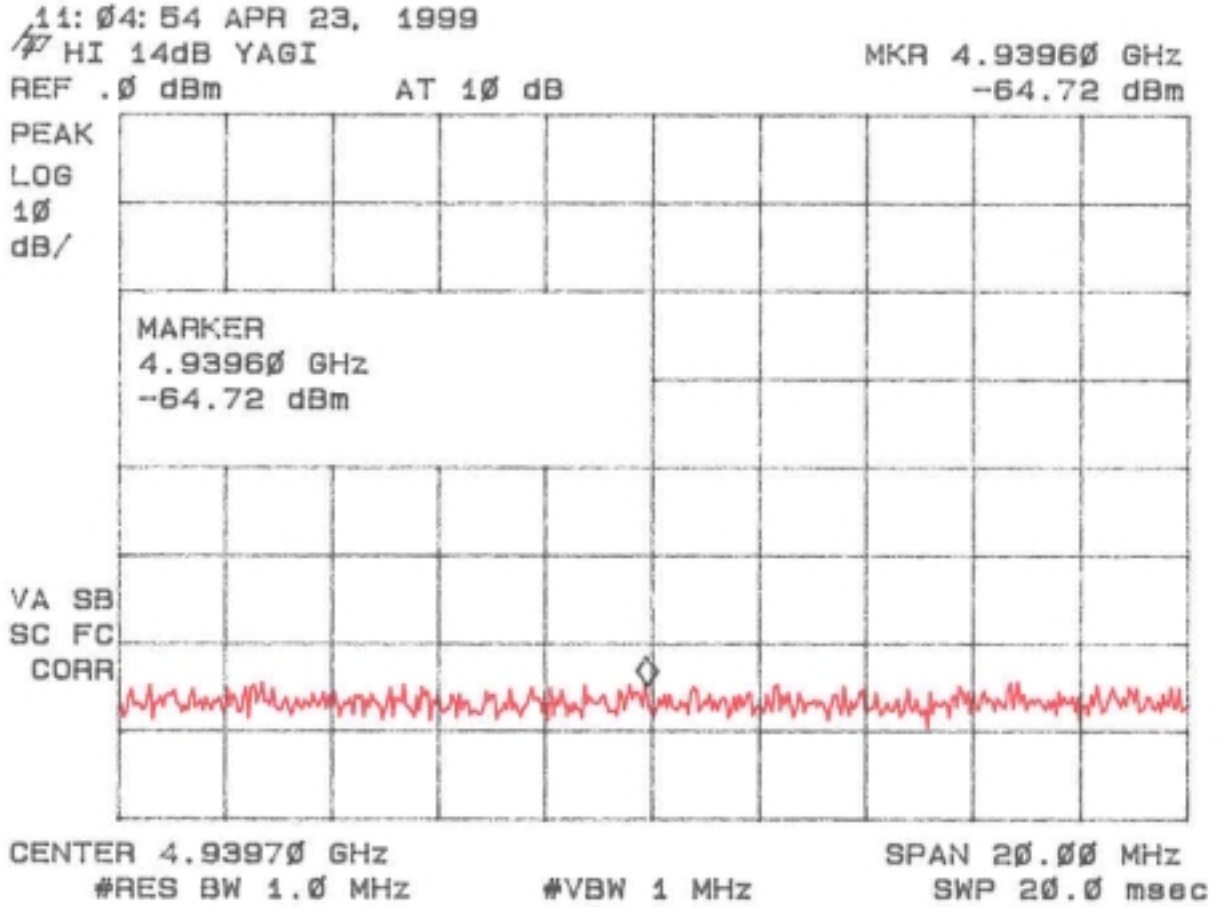


Figure 5aj
Peak Radiated Spurious Emission 15.247(c) High – 14 dB Yagi

