Mad Catz X-box Game controller
2400-2483.5 MHz FCC Part 15.247 transceiver
Uses Digital Modulation (not Frequency Hopping)

| Channel	f (MHz)
1	2408.448
2	2414.592
3	2420.736
4	2426.880
5	2433.024
6	2439.168
7	2445.312
8	2451.456
9	2457.600
10	2463.744
11	2469.888
12	2476.032

Mad Catz transceiver board – onboard antenna disconnected, external SMA connector added for conducted measurements.
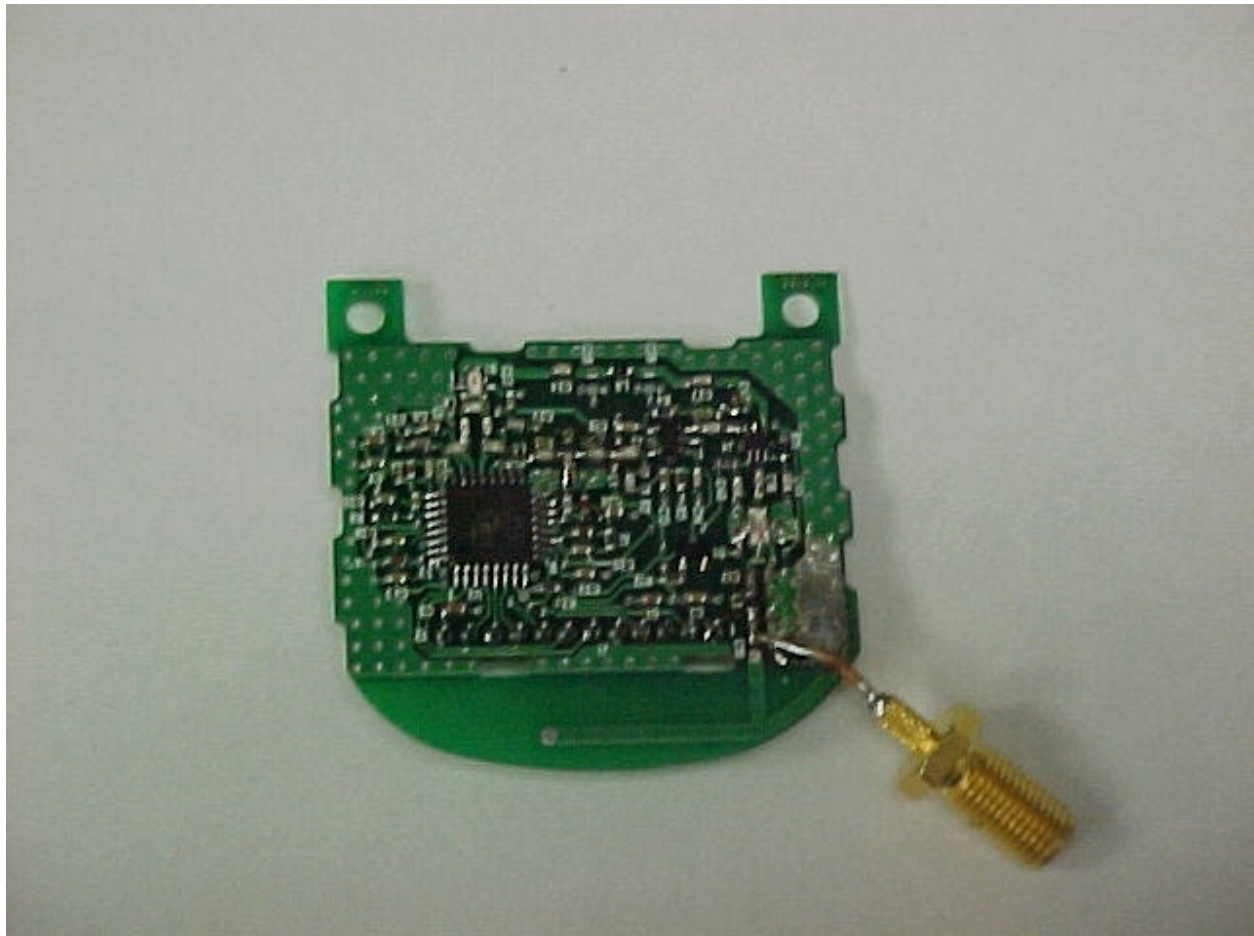
Mad Catz transceiver board and external controller board.
4.8 V supply voltage = maximum Handset battery pack voltage (3, 1.5V batteries). The Base is regulated at 3.3V.
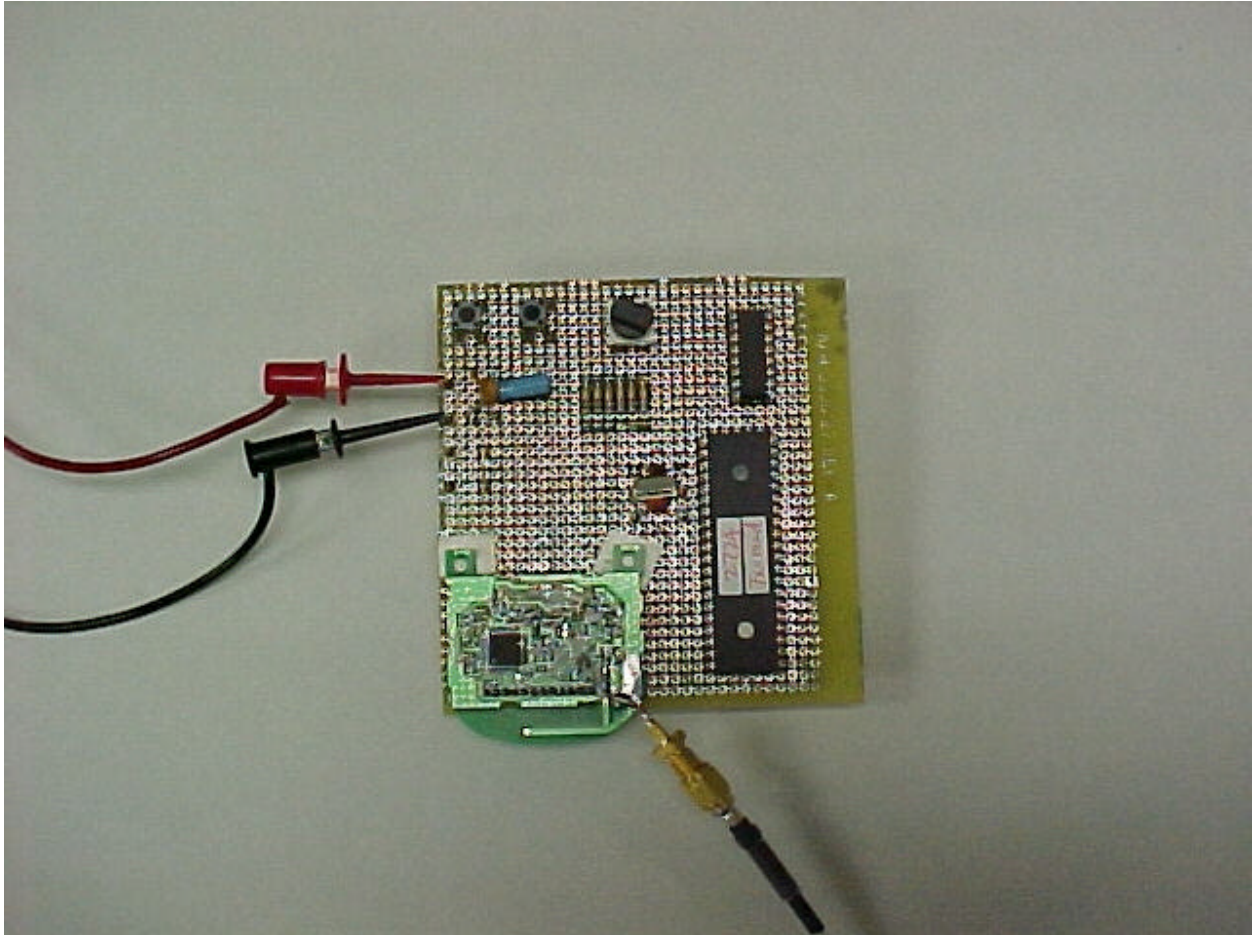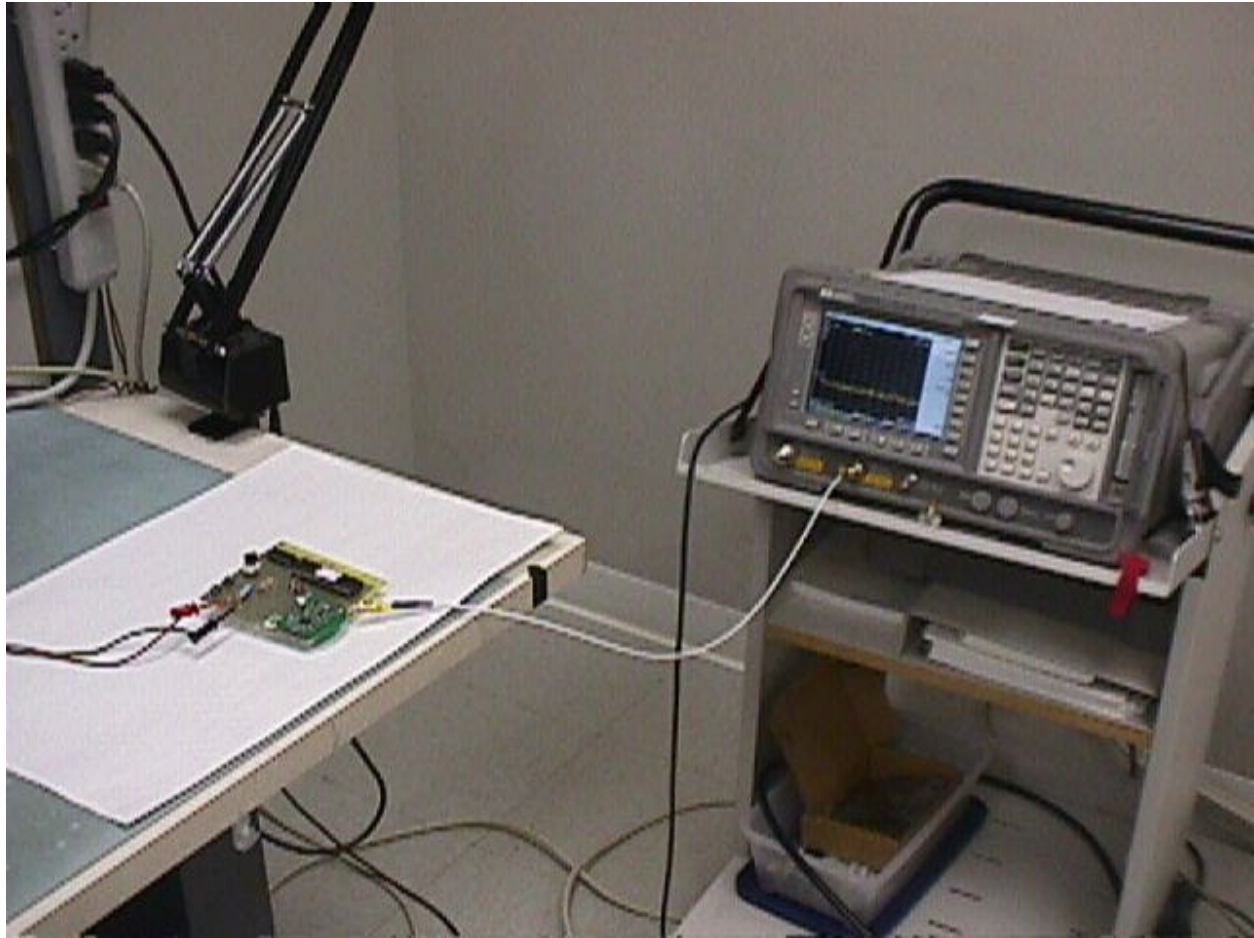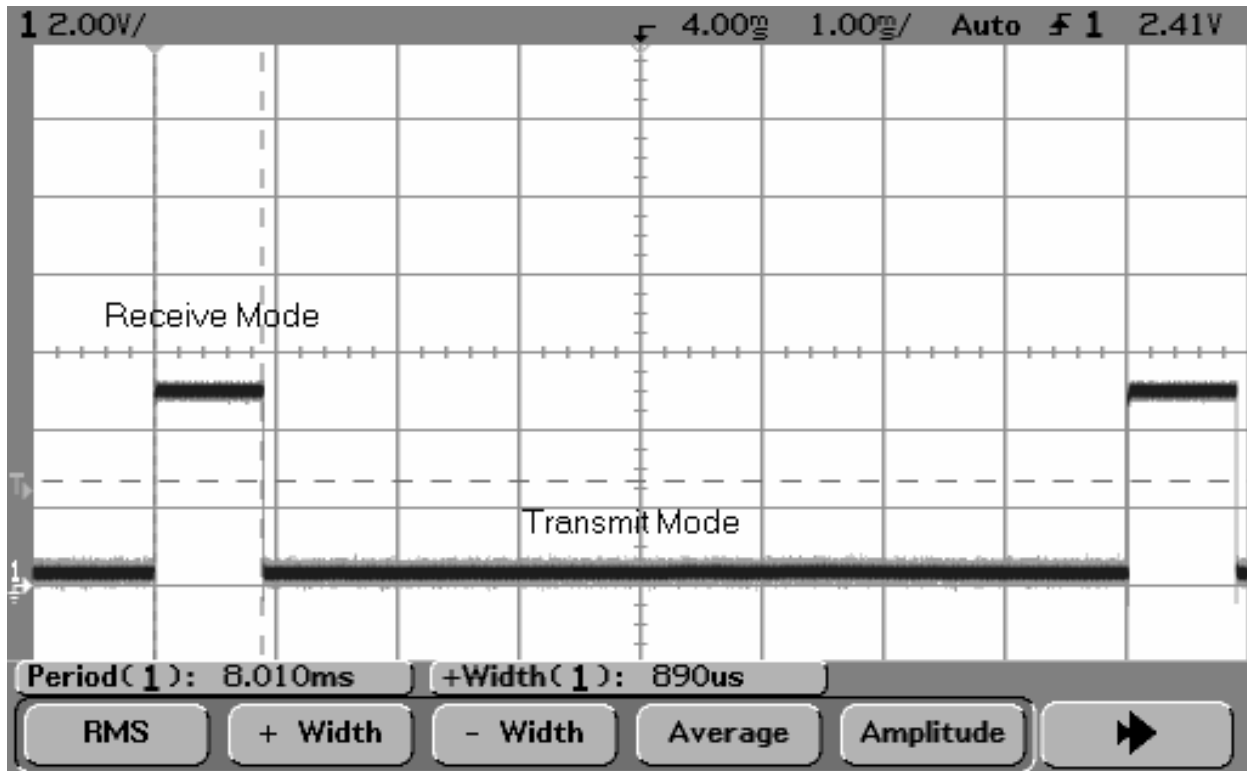
ALL MEASUREMENTS USE: E4407B Spectrum Analyzer (Calibration due Oct 28, 2003).
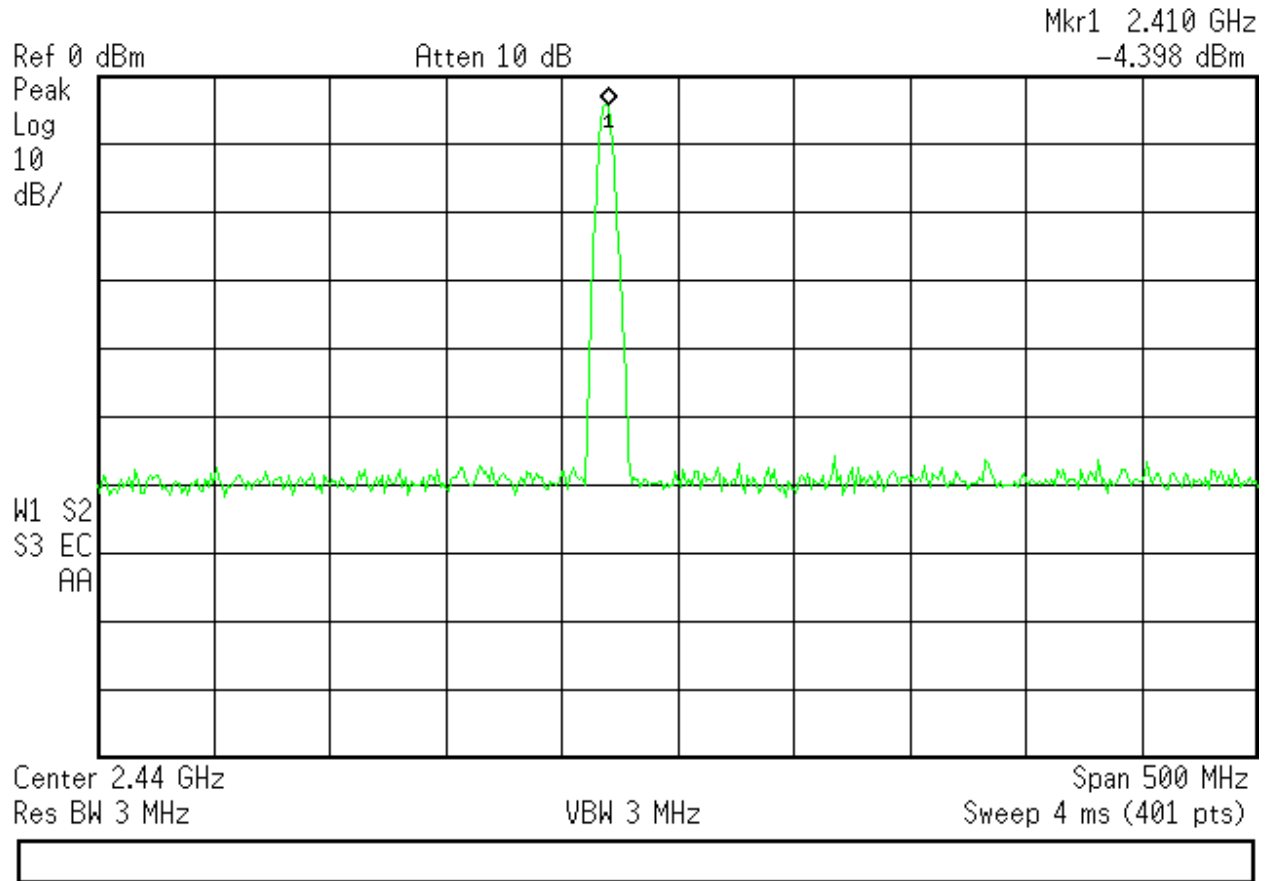
Cable Loss = 1.6 dB at 2.44 GHz.

Measurements performed with a Transmit Mode duty cycle of 90%. Must switch back to Receive mode to re-lock the PLL.

Fundamental power, Channel 1:

Fundamental power, Channel 6:

```
✳ Agilent    17:22:41  May 6, 2003

                                                          Mkr1  2.440 GHz
Ref 0 dBm                   Atten 10 dB                    -3.279 dBm
Peak
Log
10
dB/


       Marker
       2.440000000 GHz
       -3.279 dBm
W1 S2
S3 EC
   AA




Center 2.44 GHz                                          Span 500 MHz
Res BW 3 MHz                  VBW 3 MHz           Sweep 4 ms (401 pts)
```
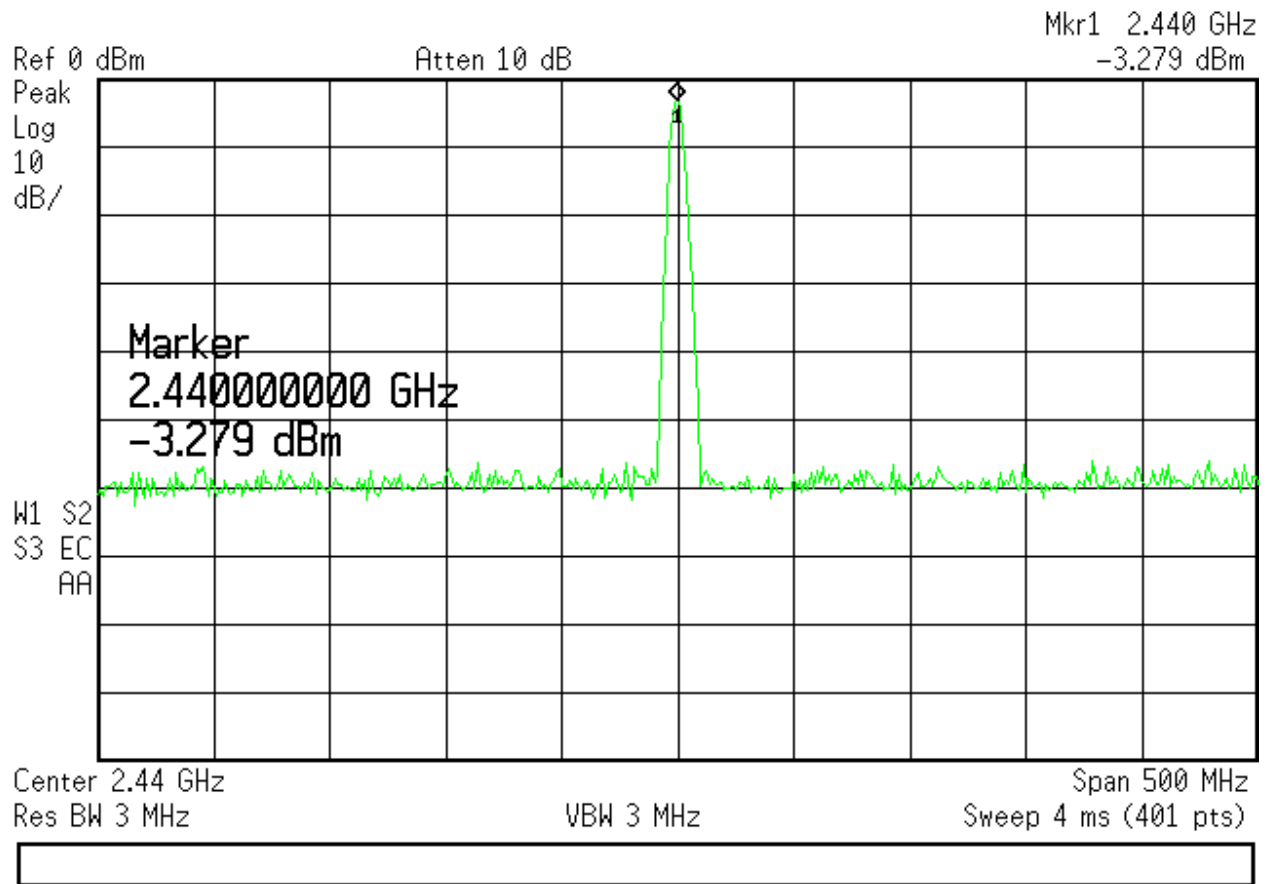
Fundamental power, Channel 12:

```
 ☀ Agilent    17:23:11  May 6, 2003

                                                        Mkr1  2.476 GHz
Ref 0 dBm                   Atten 10 dB                   -2.713 dBm
Peak
Log
10
dB/

         Marker
         2.476000000 GHz
         -2.713 dBm

W1 S2
S3 EC
   AA


Center 2.44 GHz                                          Span 500 MHz
Res BW 3 MHz                 VBW 3 MHz          Sweep 4 ms (401 pts)
```
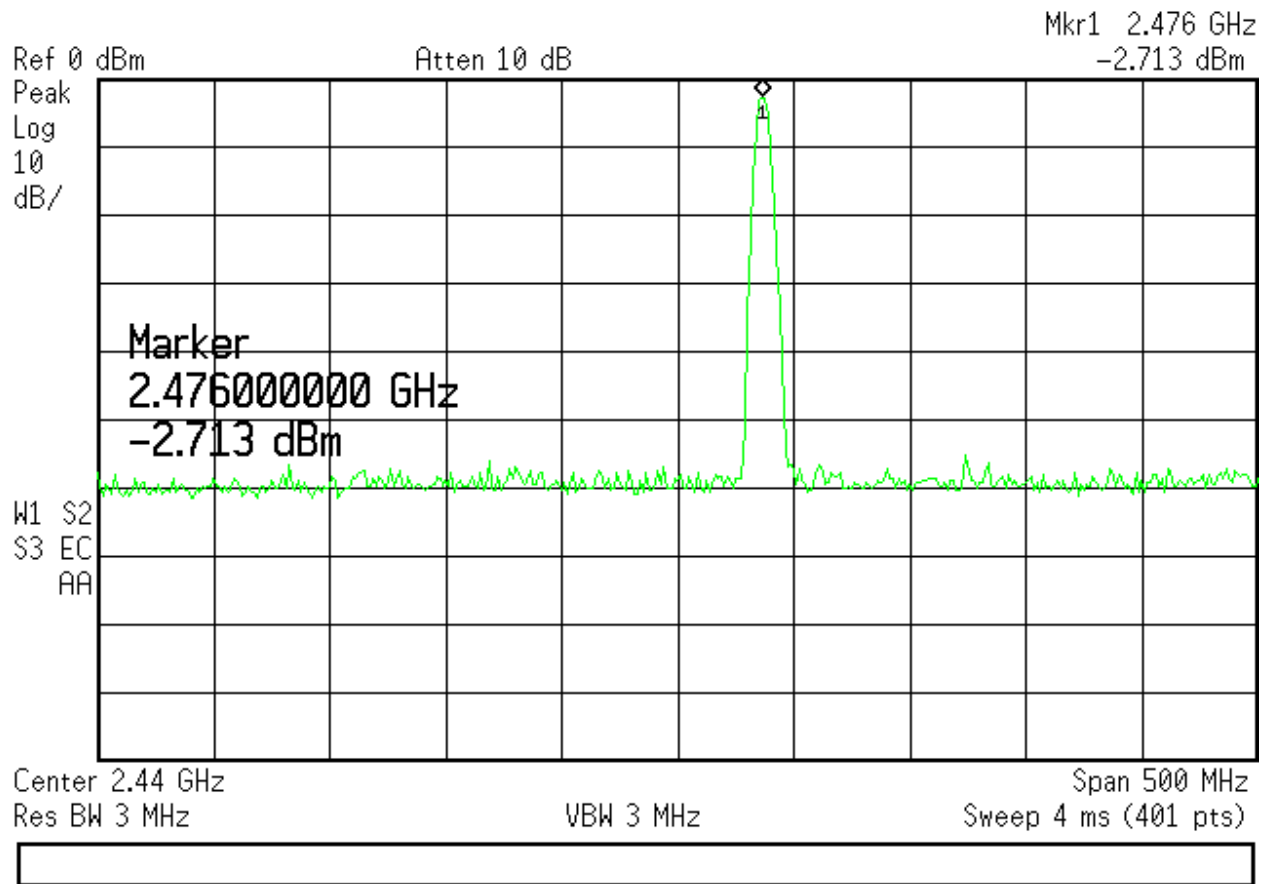
Part 15.247 (c): Channel 1, Spurious levels at band edges > 20 dBc


```
❈ Agilent   12:45:06  Apr 24, 2003

                                                  Mkr3  2.4835 GHz
Ref 0 dBm              Atten 10 dB                -69.97 dBm
Peak
Log
10
dB/




Start 2.4 GHz                             Stop 2.483 GHz
#Res BW 100 kHz           #VBW 3 MHz      Sweep 8.353 ms (401 pts)

  Marker    Trace     Type      X Axis        Amplitude
    1        (1)      Freq     2.4000 GHz    -70.94 dBm
    2        (1)      Freq     2.4390 GHz    -68.62 dBm
    3        (1)      Freq     2.4835 GHz    -69.97 dBm
```
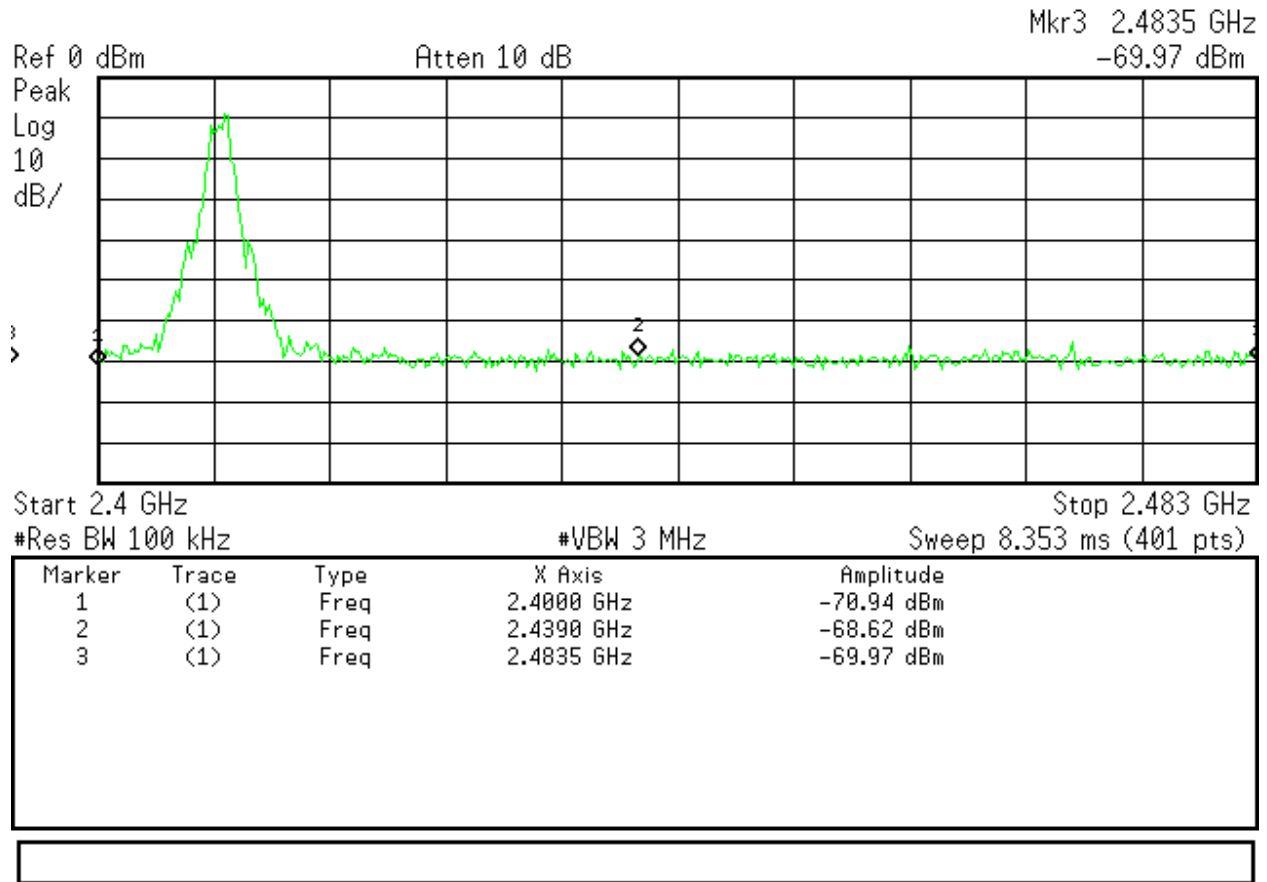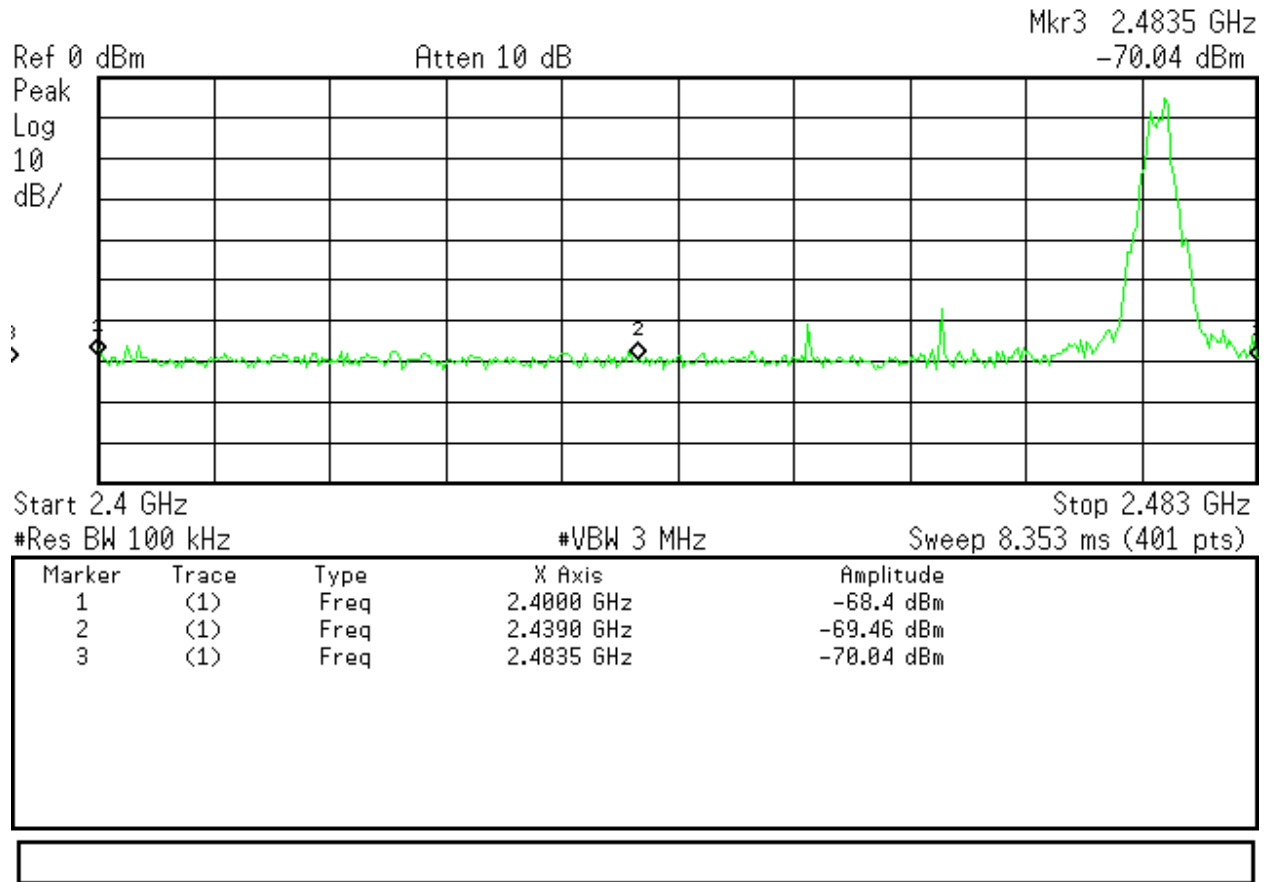
Part 15.247 (c): Channel 6, Spurious levels at band edges > 20 dBc
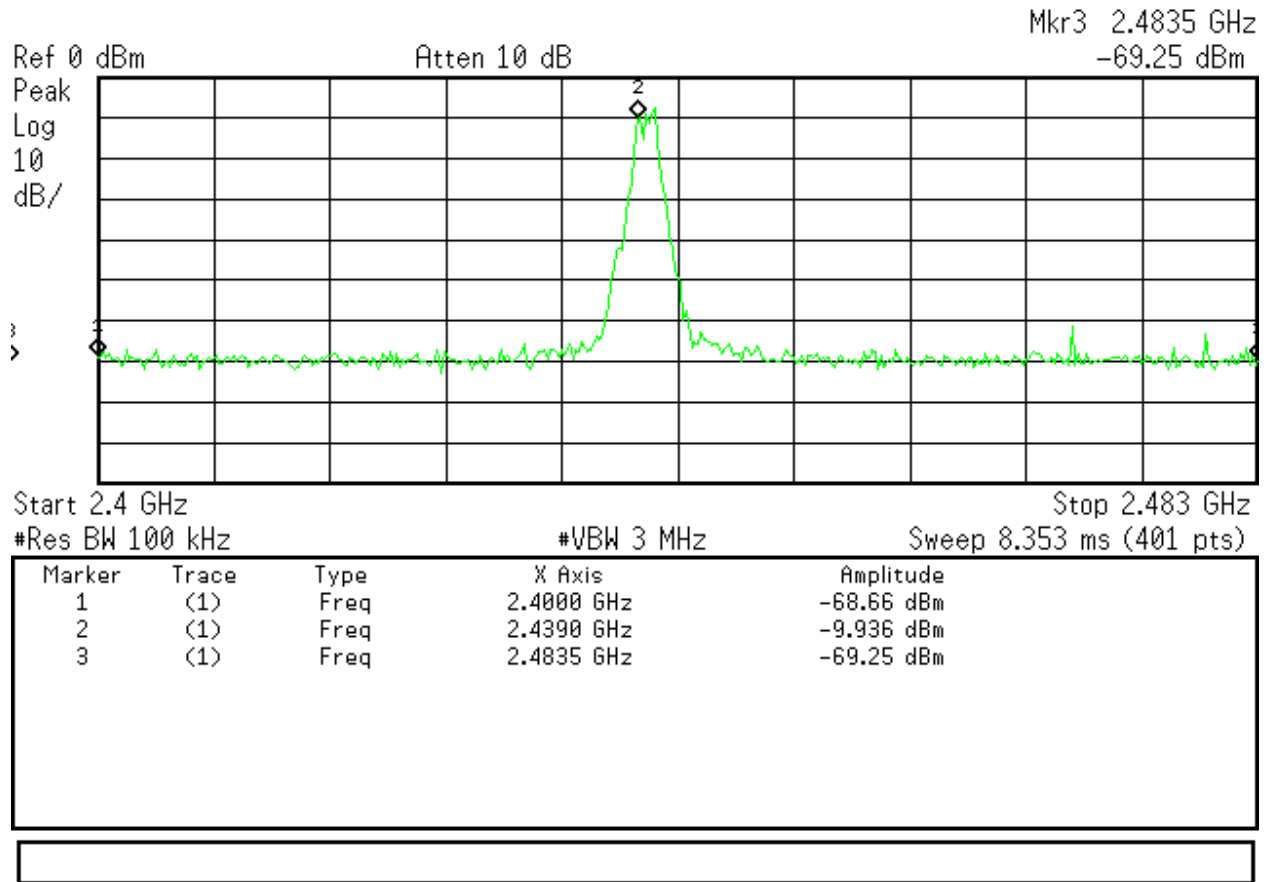
Part 15.247 (c): Channel 12, Spurious levels at band edges > 20 dBc
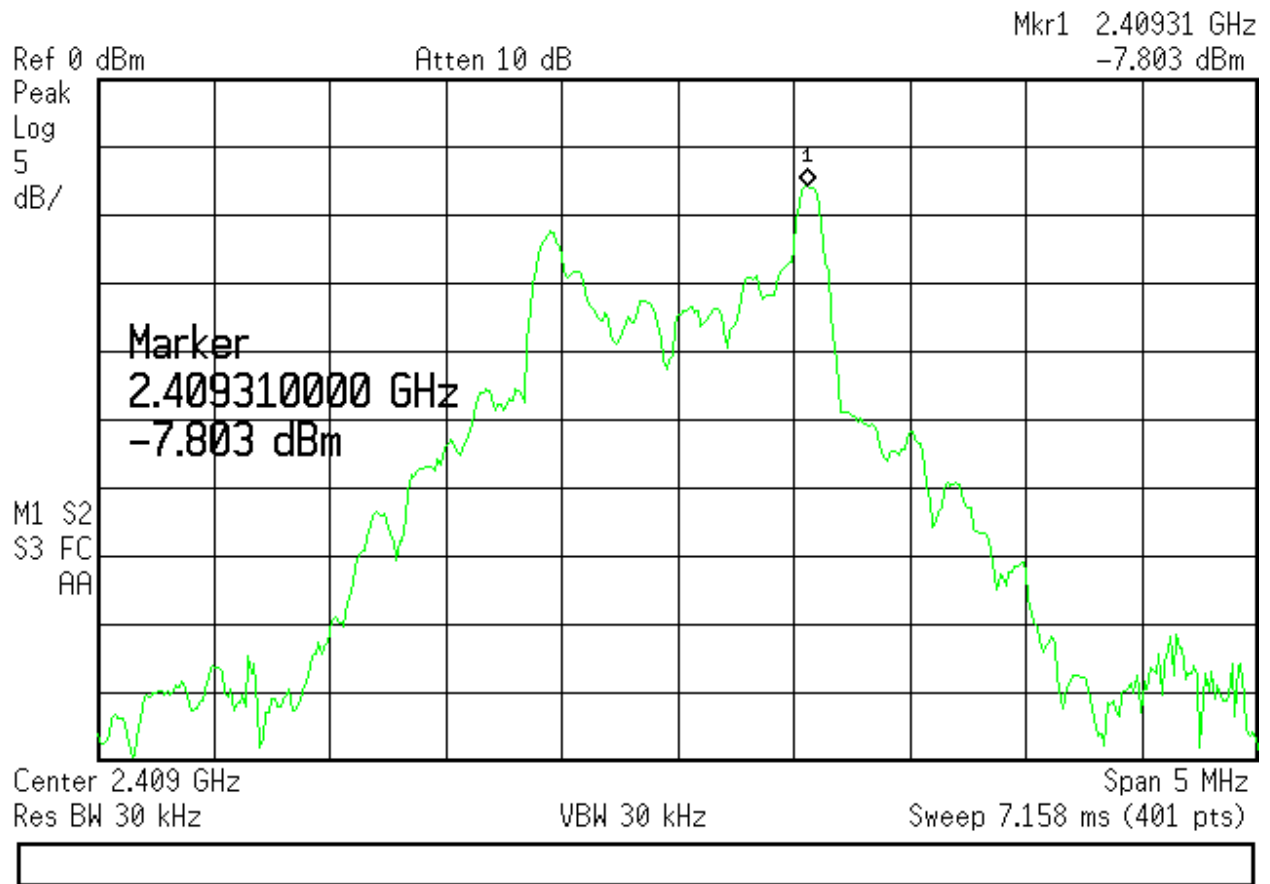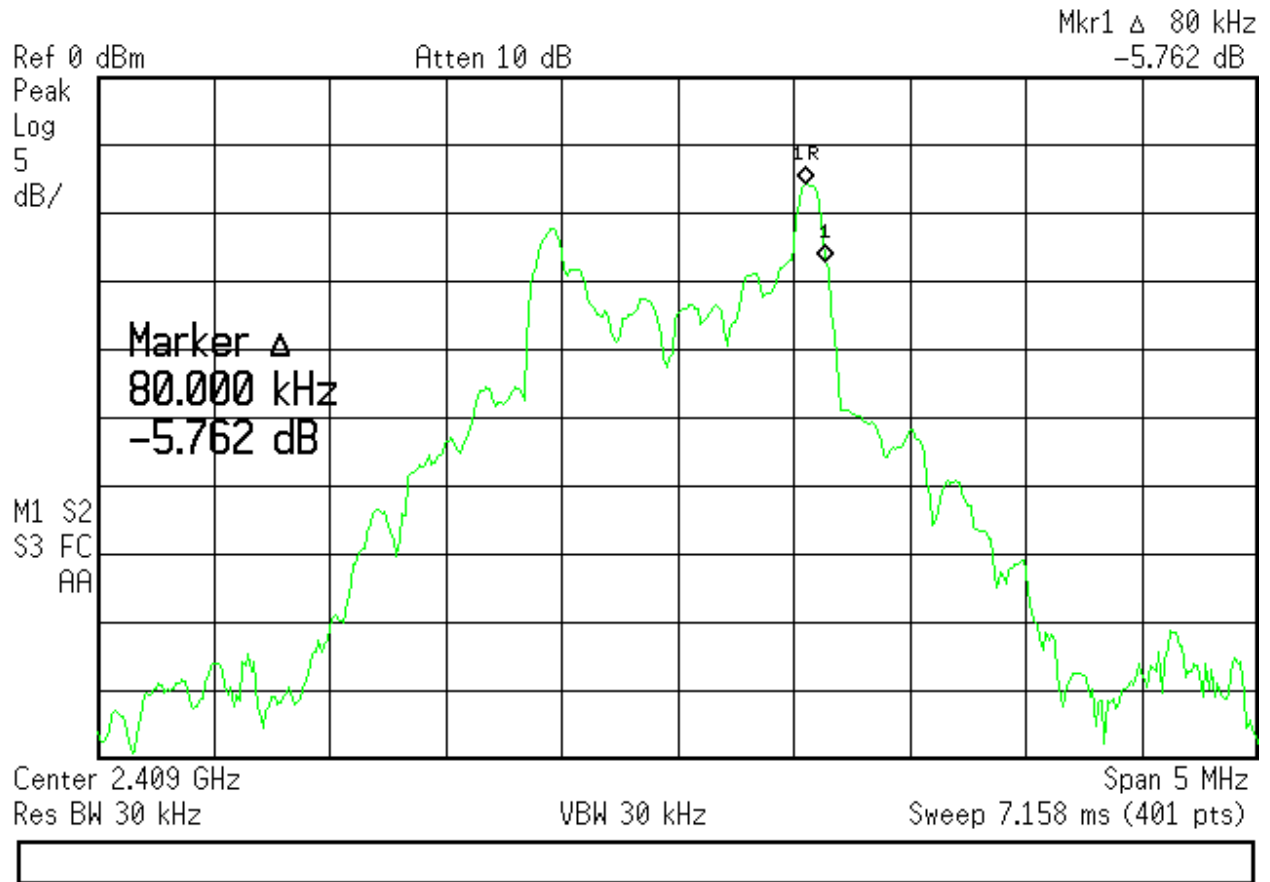

Agilent   12:46:38 Apr 24, 2003

Mkr3 2.4835 GHz
-70.04 dBm

Ref 0 dBm   Atten 10 dB

Start 2.4 GHz   Stop 2.483 GHz
#Res BW 100 kHz   #VBW 3 MHz   Sweep 8.353 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.4000 GHz	-68.4 dBm
2	(1)	Freq	2.4390 GHz	-69.46 dBm
3	(1)	Freq	2.4835 GHz	-70.04 dBm

Part 15.247 (a) (2): Channel 1, 6 dB bandwidth > 500 kHz

❈ **Agilent**   12:33:58 Apr 24, 2003

Mkr1 2.40931 GHz

Ref 0 dBm   Atten 10 dB   −7.803 dBm
Peak
Log
5
dB/

1

Marker
2.409310000 GHz
−7.803 dBm

M1 S2
S3 FC
  AA

Center 2.409 GHz   Span 5 MHz
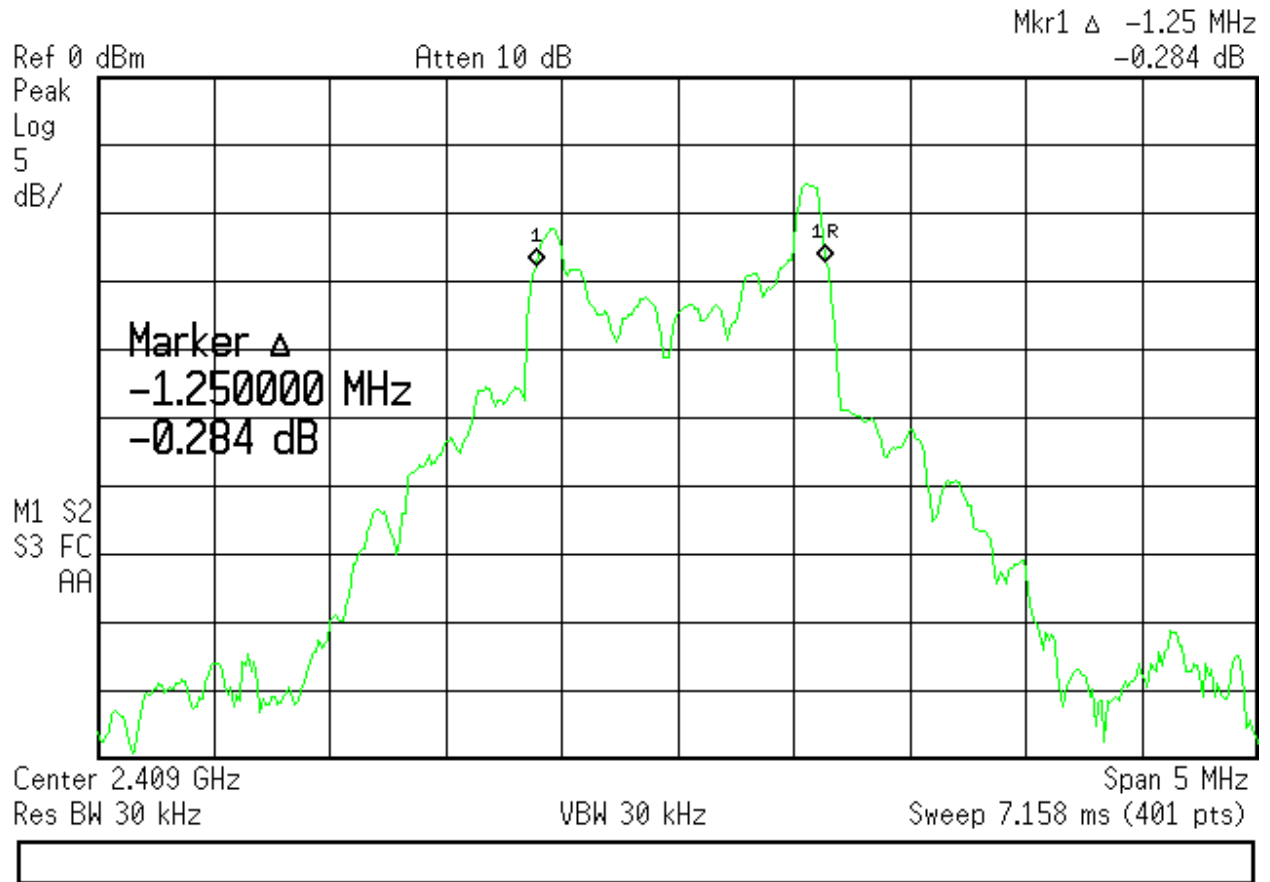Res BW 30 kHz   VBW 30 kHz   Sweep 7.158 ms (401 pts)
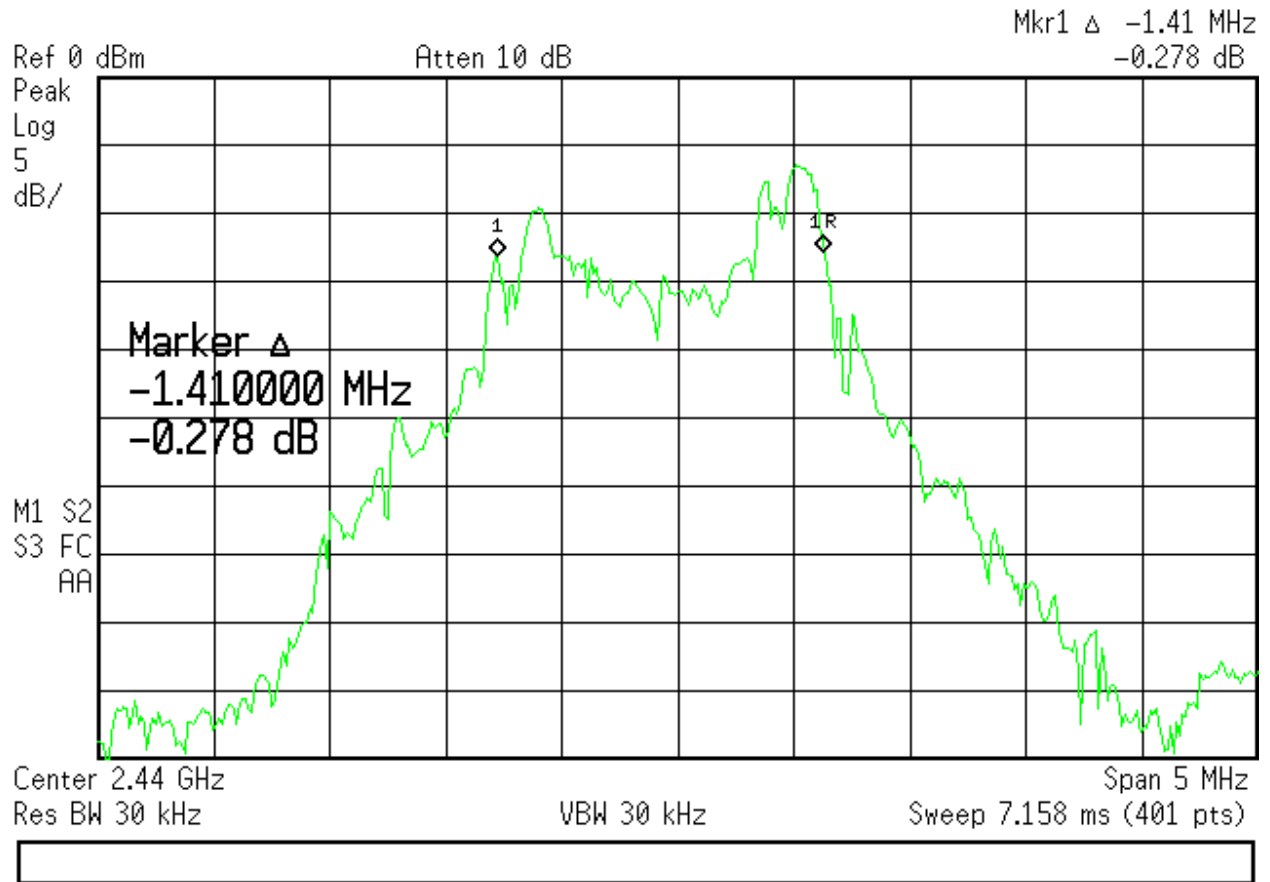
Part 15.247 (a) (2) : Channel 1, 6 dB bandwidth > 500 kHz

Part 15.247 (a) (2): Channel 1, 6 dB bandwidth > 500 kHz

Agilent   12:35:29 Apr 24, 2003

Mkr1 ∆ −1.25 MHz
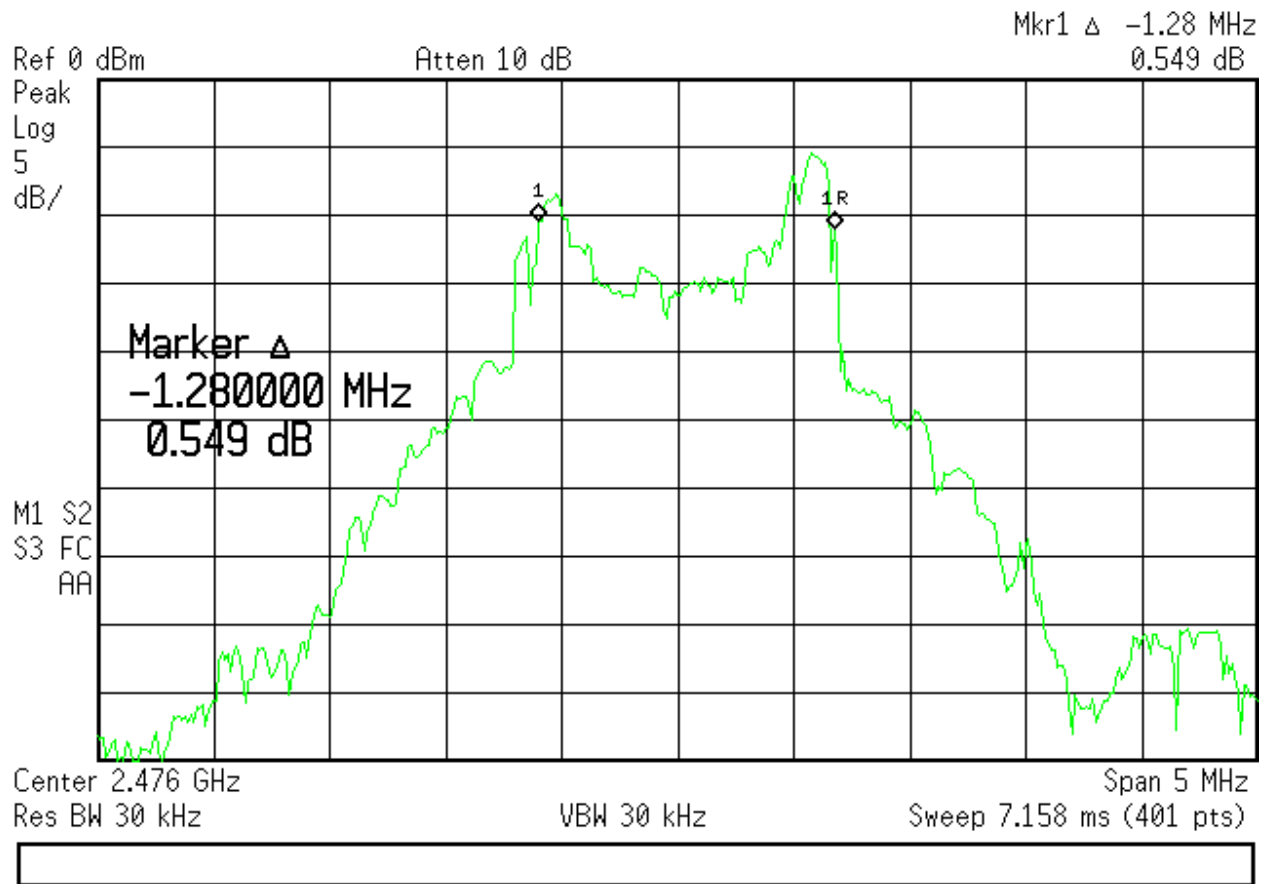−0.284 dB

Ref 0 dBm   Atten 10 dB
Peak
Log
5
dB/

Marker ∆
−1.250000 MHz
−0.284 dB

M1 S2
S3 FC
AA

Center 2.409 GHz   Span 5 MHz
Res BW 30 kHz   VBW 30 kHz   Sweep 7.158 ms (401 pts)

Part 15.247 (a) (2) : Channel 6, 6 dB bandwidth > 500 kHz

Part 15.247 (a) (2): Channel 12, 6 dB bandwidth > 500 kHz

Part 15.247 (d): Channel 1, PSD < 8 dBm/3 kHz
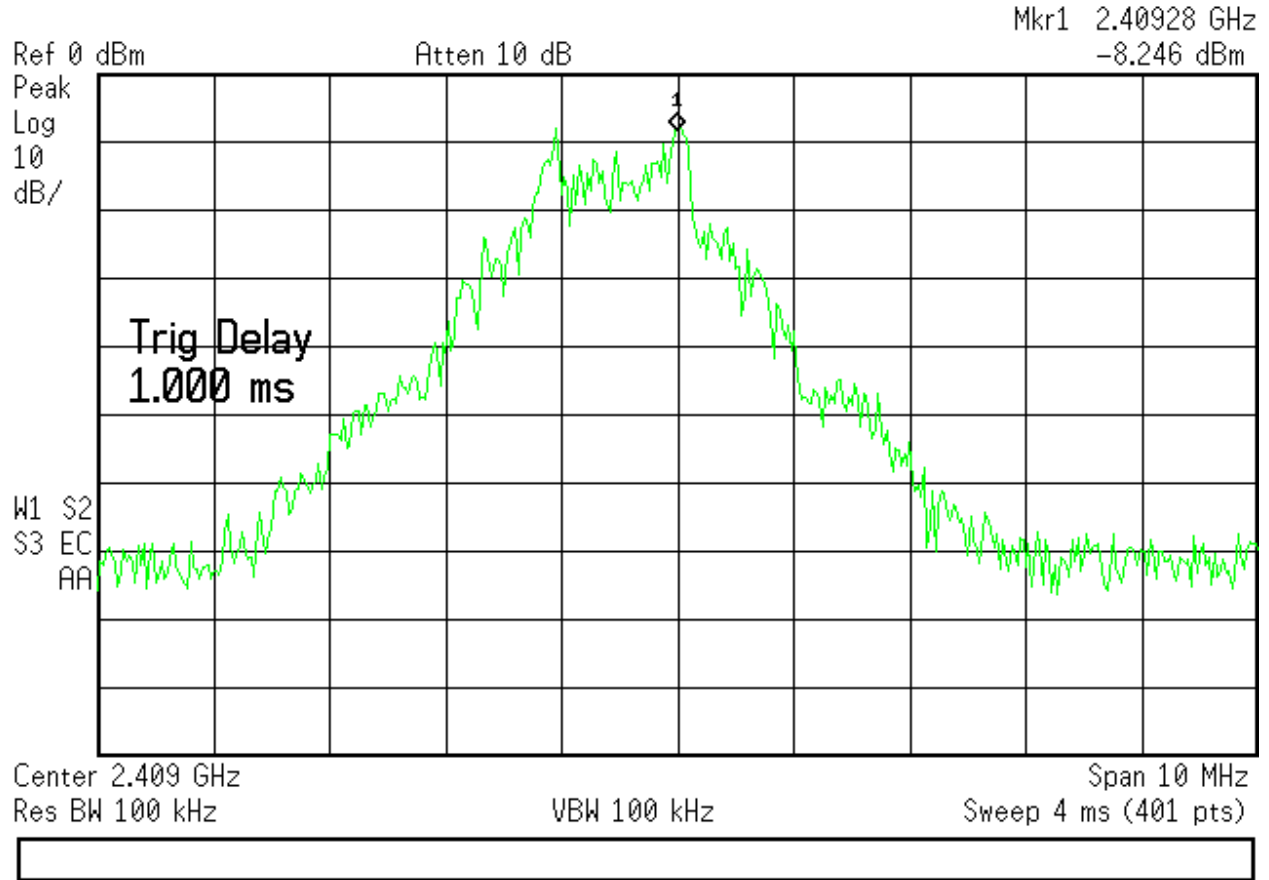
512 kHz deviation. 1.152 Mbps.

Part 15.247 (d): Channel 1, PSD < 8 dBm/3 kHz
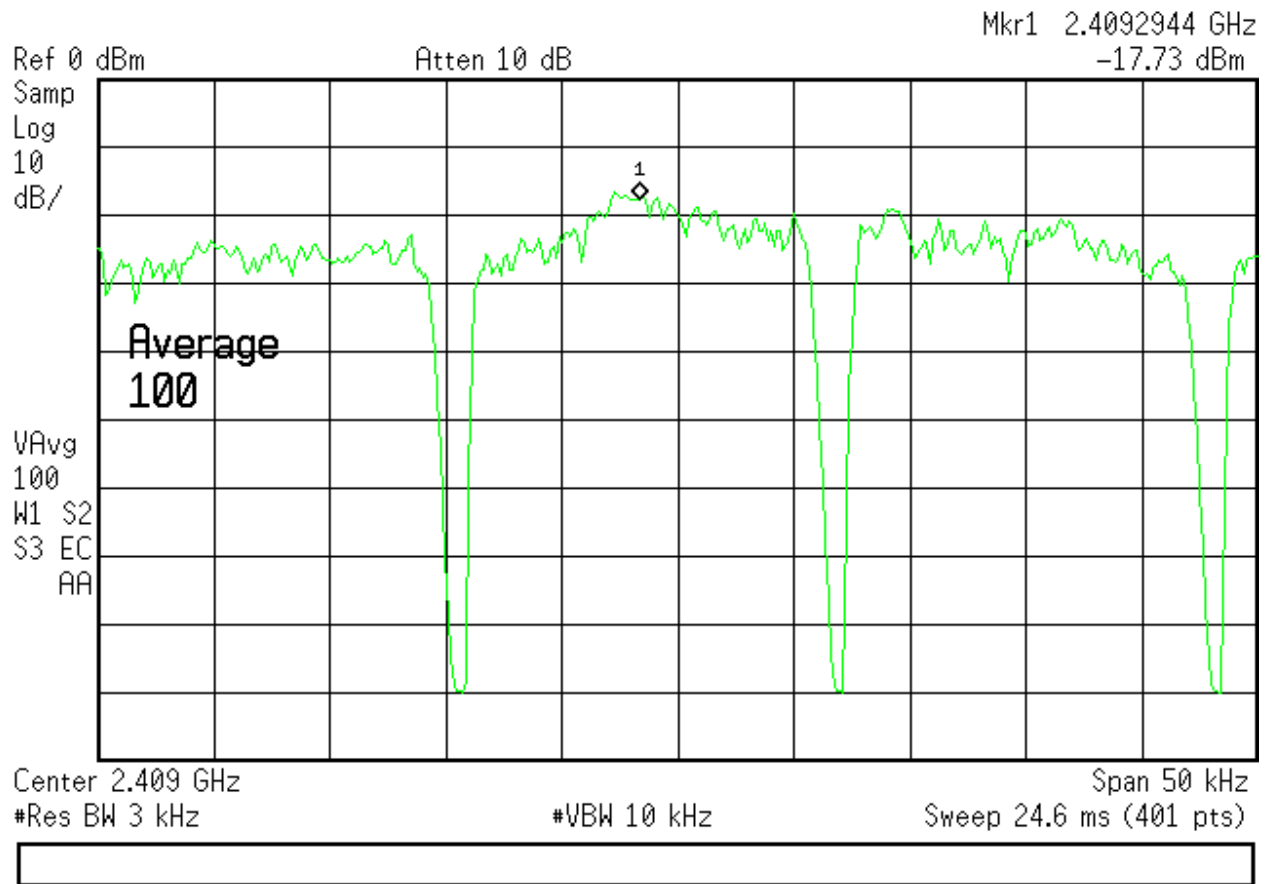

Agilent   17:46:03 May 6, 2003

Mkr1 2.4092944 GHz
      −17.73 dBm

Ref 0 dBm   Atten 10 dB
Samp
Log
10
dB/

Average
100

VAvg
100
W1 S2
S3 EC
AA

Center 2.409 GHz   Span 50 kHz
#Res BW 3 kHz   #VBW 10 kHz   Sweep 24.6 ms (401 pts)

Part 15.247 (d): Channel 6, PSD < 8 dBm/3 kHz
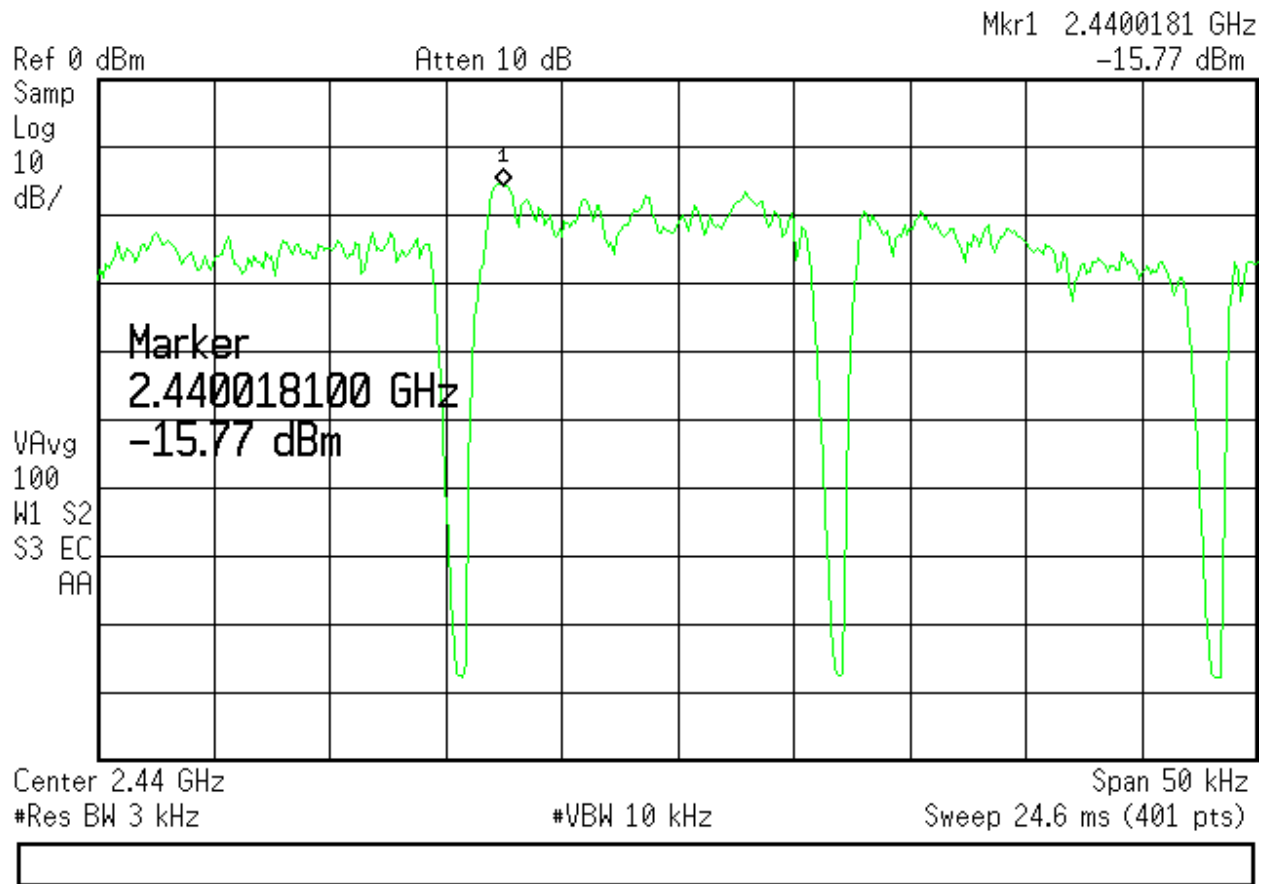
Part 15.247 (d): Channel 12, PSD < 8 dBm/3 kHz
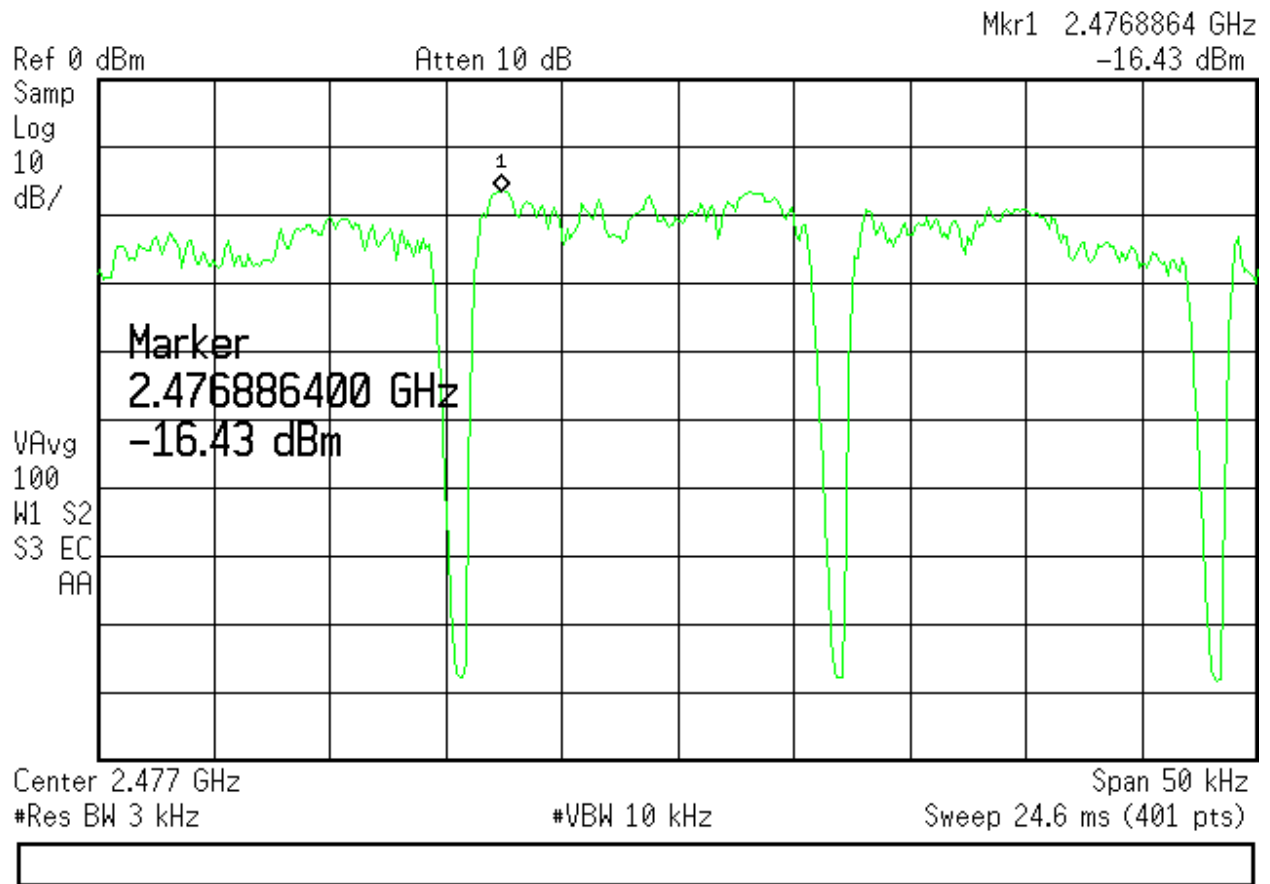
Channel 1:

Agilent   09:58:32 May 7, 2003

Mkr1 2.408 GHz
          −7.422 dBm

Ref 0 dBm   Atten 10 dB

Peak
Log
10
dB/

W1 S2
S3 EC
  AA

Start 0 Hz   Stop 3 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 386.5 ms (401 pts)
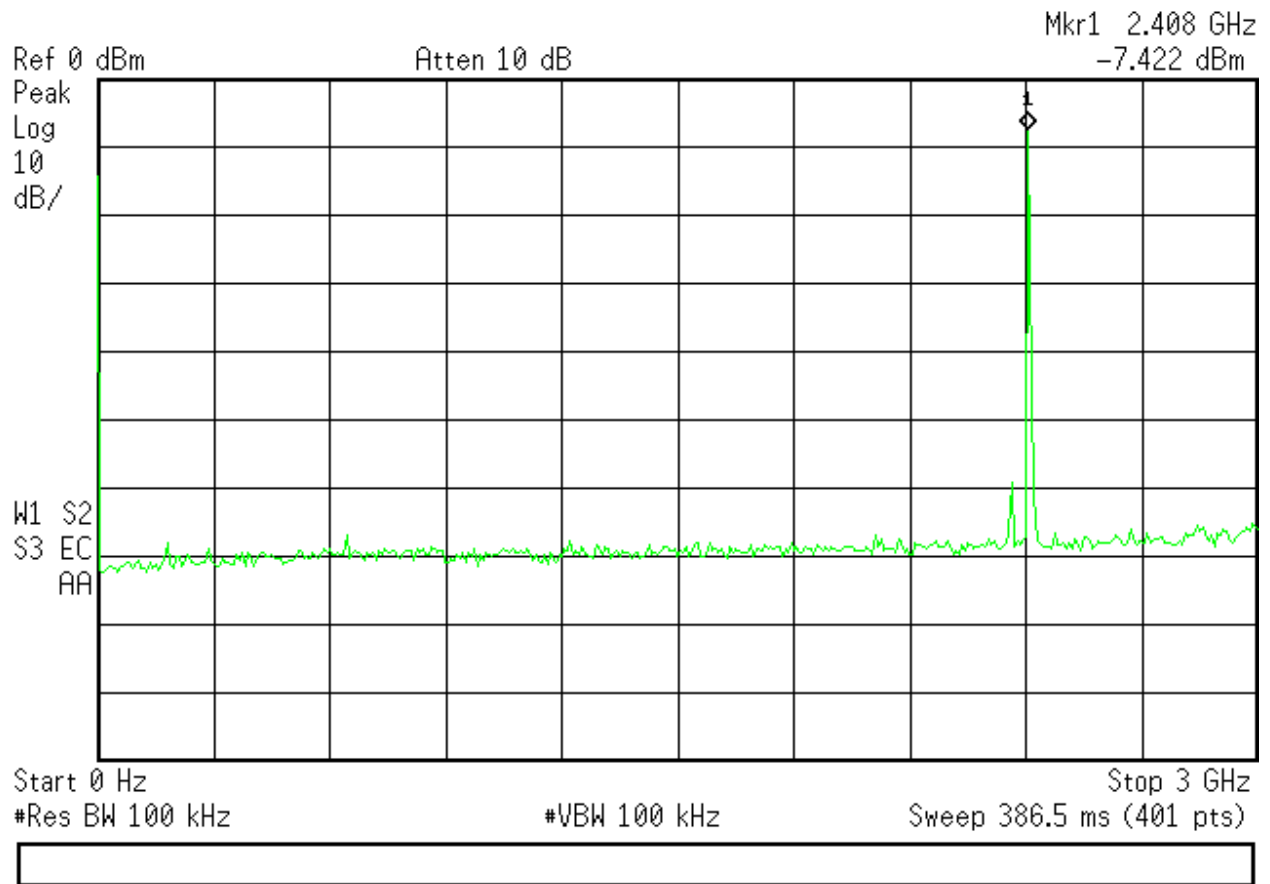
Channel 1:

```
❄ Agilent    10:00:49  May 7, 2003

                                                      Mkr1  2.40 GHz
Ref 0 dBm                  Atten 10 dB                  -7.66 dBm
Peak   1
Log    ◇
10
dB/

       Marker
       2.400000000 GHz
        -7.66 dBm

W1 S2
S3 EC
   AA




Start 2 GHz                                          Stop 25 GHz
#Res BW 100 kHz           #VBW 100 kHz    Sweep 2.963 s (401 pts)
```
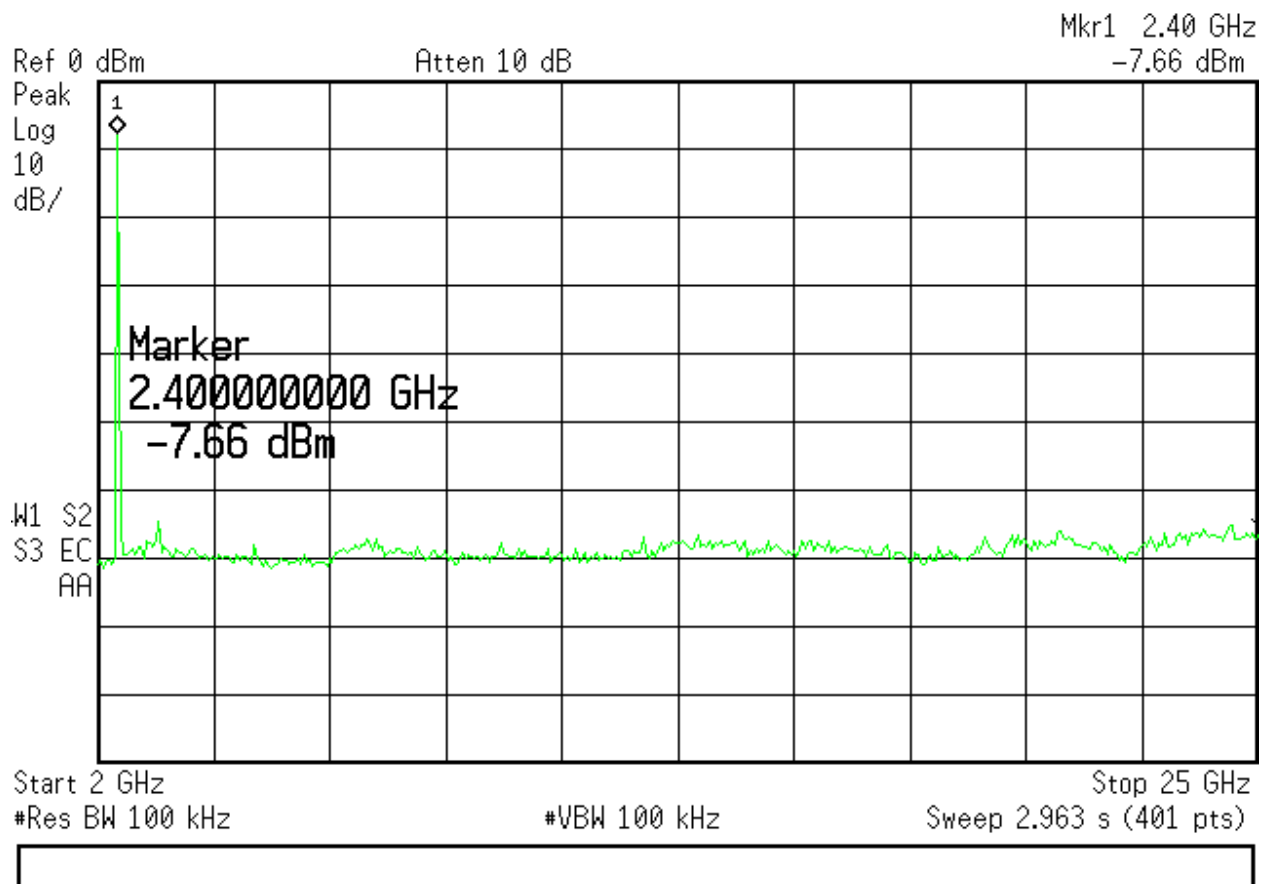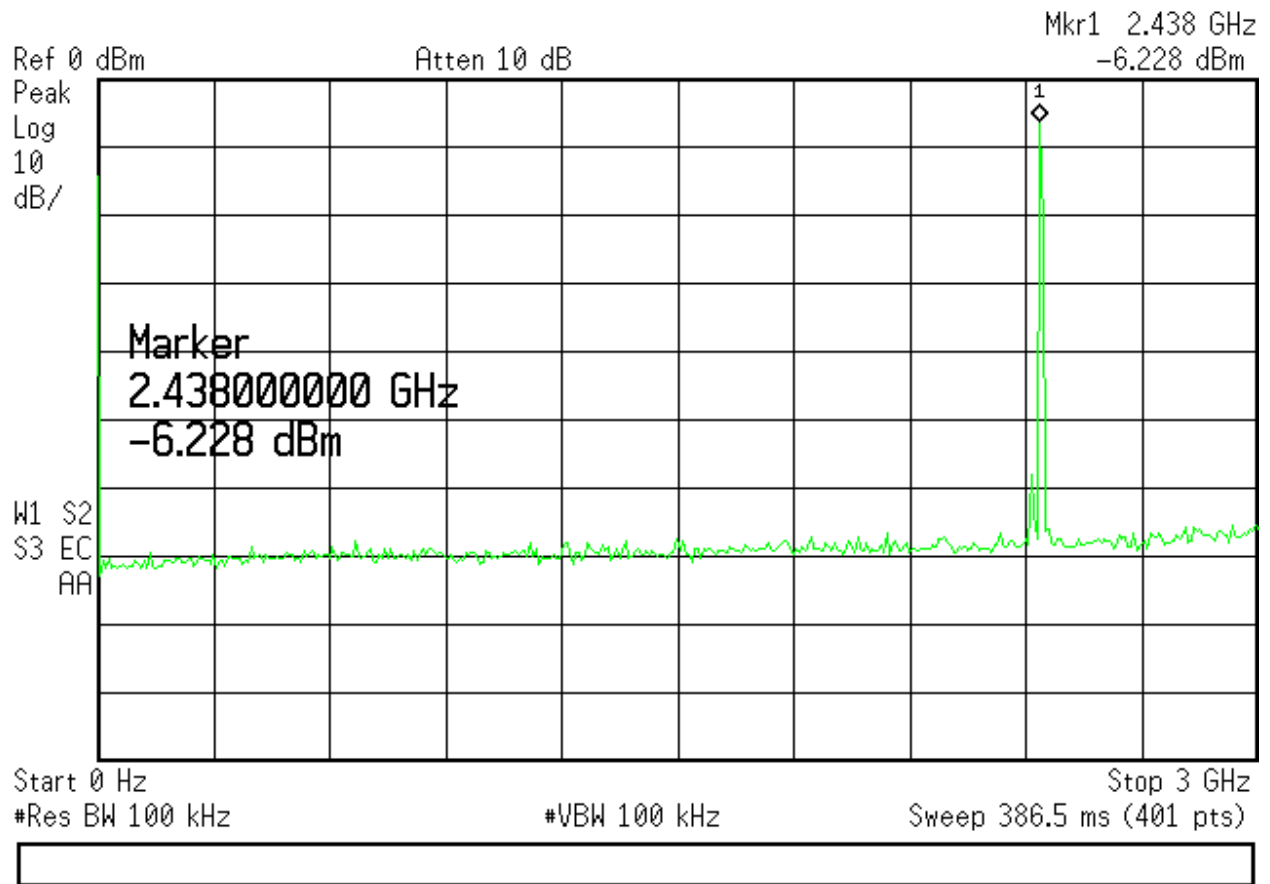
Channel 6:

Channel 6:

Agilent   10:01:12 May 7, 2003

Mkr1 2.46 GHz
-8.21 dBm

Ref 0 dBm   Atten 10 dB

Peak
Log
10
dB/

Marker
2.460000000 GHz
-8.21 dBm

W1 S2
S3 EC
AA

Start 2 GHz   Stop 25 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 2.963 s (401 pts)
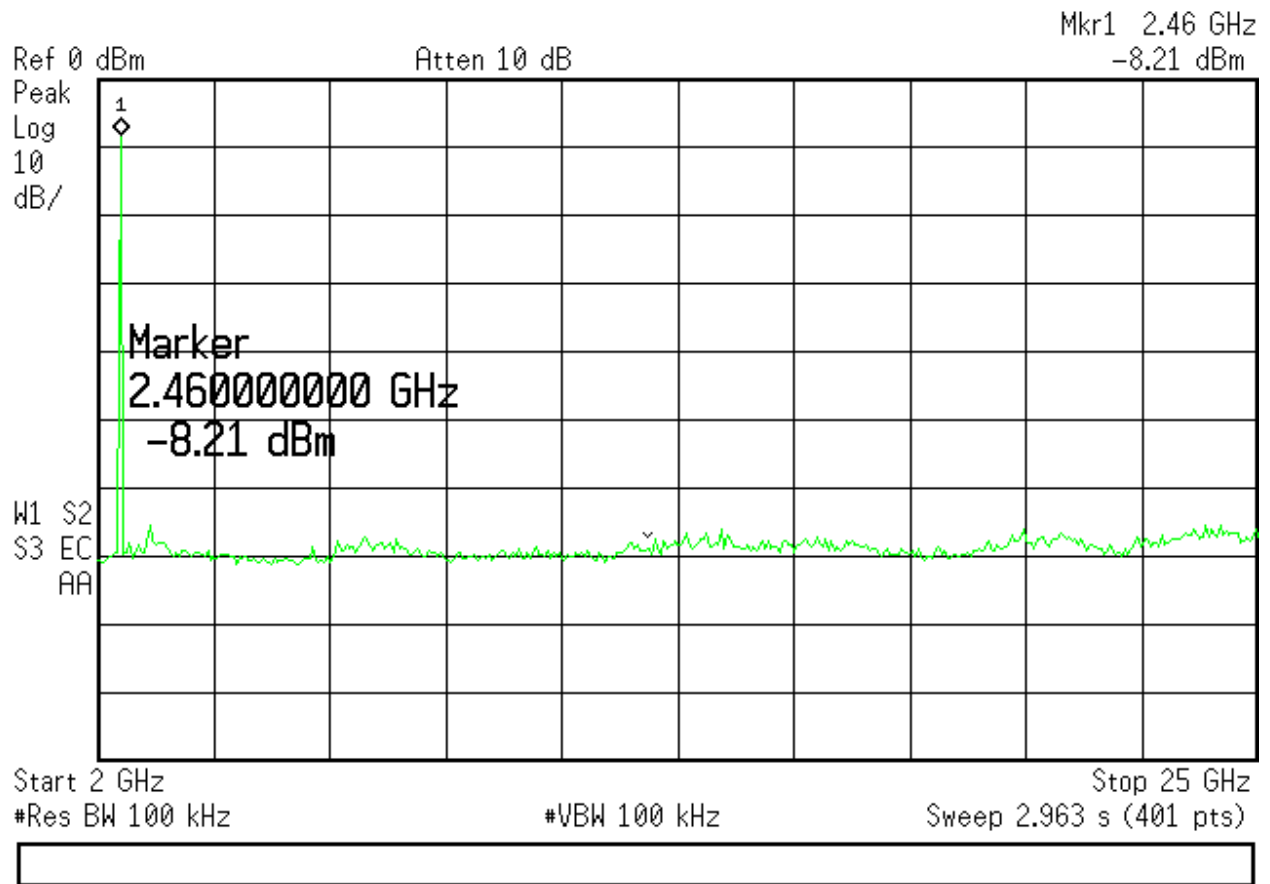
Channel 12:

※ **Agilent**   09:59:36 May 7, 2003

Mkr1 2.475 GHz
                                                                    −5.689 dBm
Ref 0 dBm   Atten 10 dB
Peak
Log
10
dB/

Marker
2.475000000 GHz
−5.689 dBm

W1 S2
S3 EC
AA

Start 0 Hz   Stop 3 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 386.5 ms (401 pts)
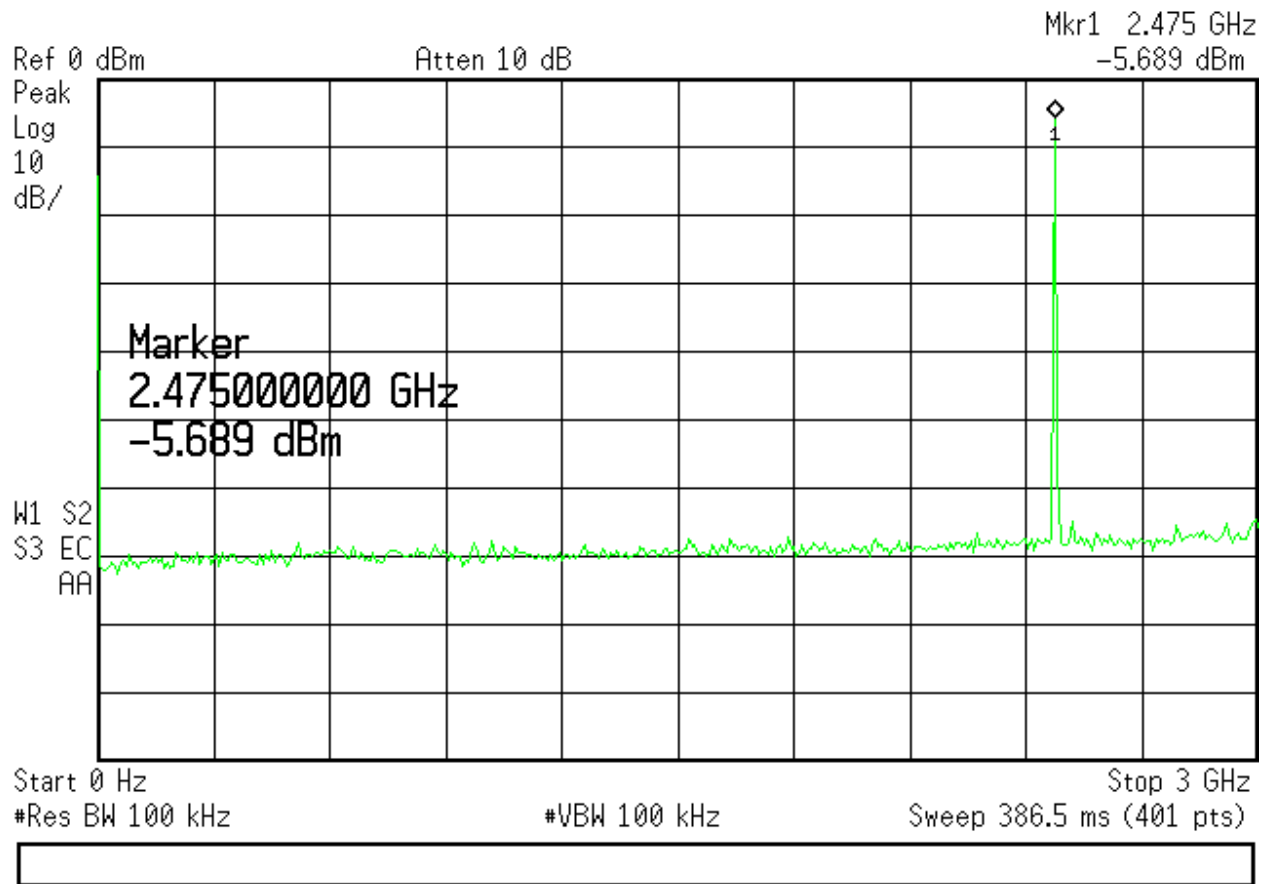
Channel 12:

Agilent   10:01:47 May 7, 2003

Mkr1 2.46 GHz
−4.733 dBm

Ref 0 dBm   Atten 10 dB
Peak
Log
10
dB/

Marker
2.460000000 GHz
−4.733 dBm

W1 S2
S3 EC
AA

Start 2 GHz   Stop 25 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 2.963 s (401 pts)