2.8 Antenna Conducted Spurious Emission in the Frequency Range 30 - 10000 MHz (FCC Section 15.247(c))

Antenna conducted spurious emissions in the frequency range 30 – 10000 MHz have been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer. The spectrum analyzer was set for a 50 Ω impedance with the RBW = 100 kHz & VBW > RBW. All spurious emissions were measured to be greater than 20 dB down from the fundamental. The results of conducted spurious emissions are given in Figure 4a through Figure 4x.

Figure 4a.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Low

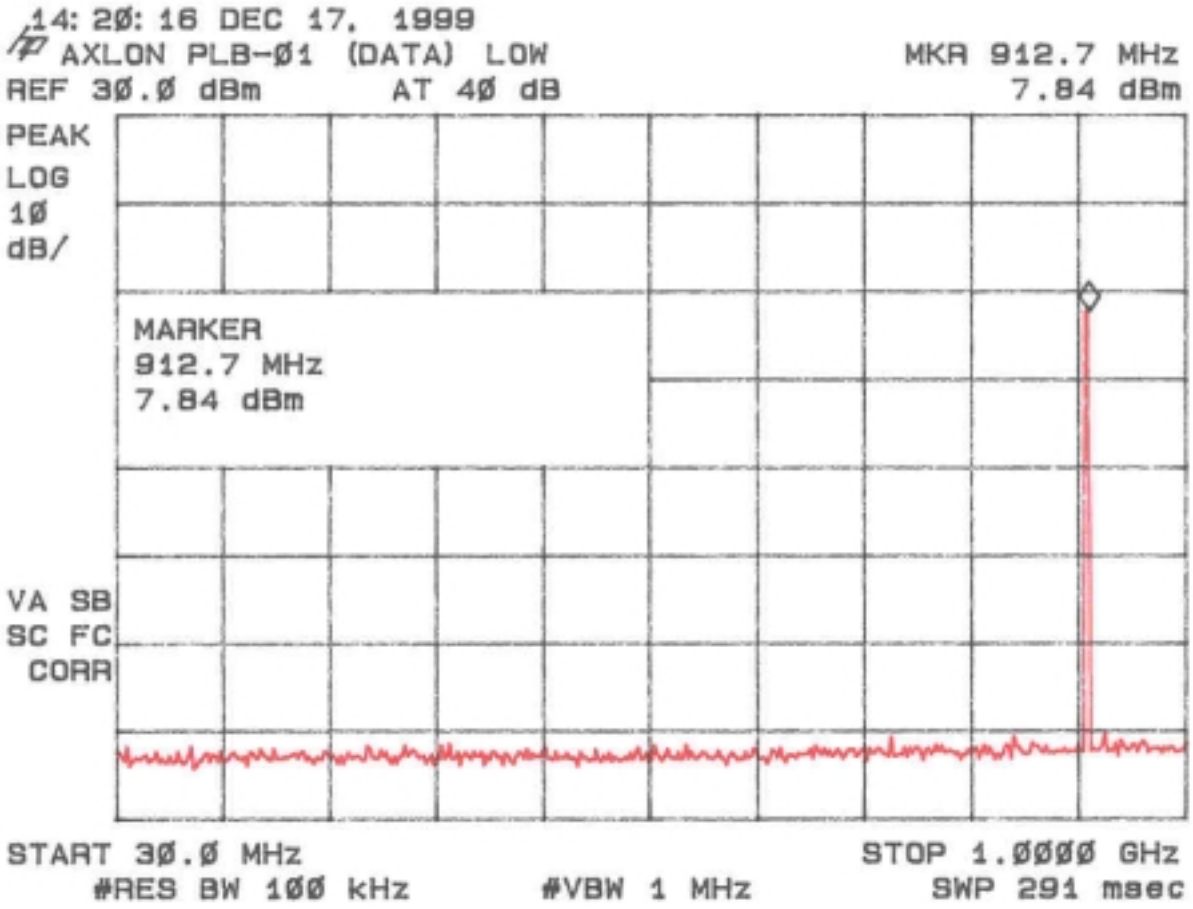


Figure 4b.
Antenna Conducted Spurious Emissions 5.247(c) (Data) Low

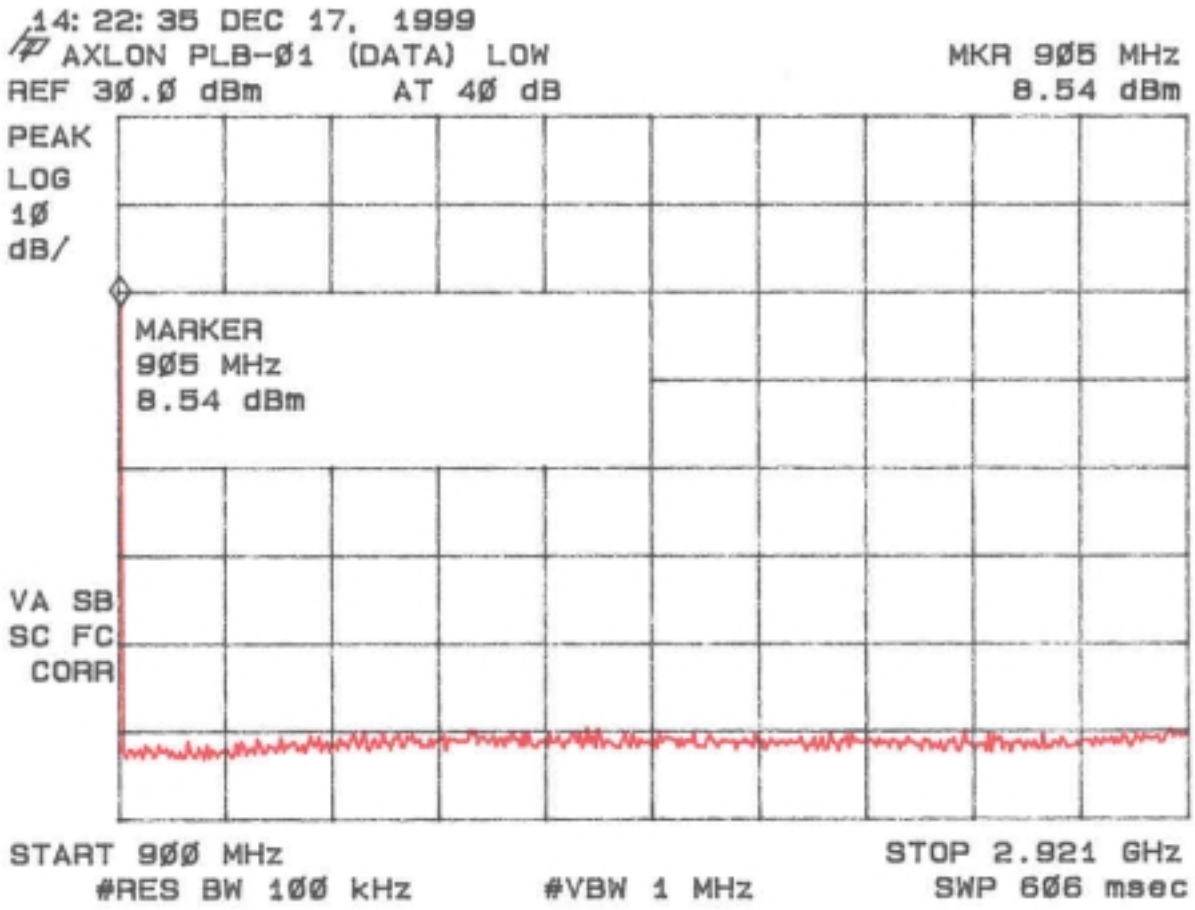


Figure 4c.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Low

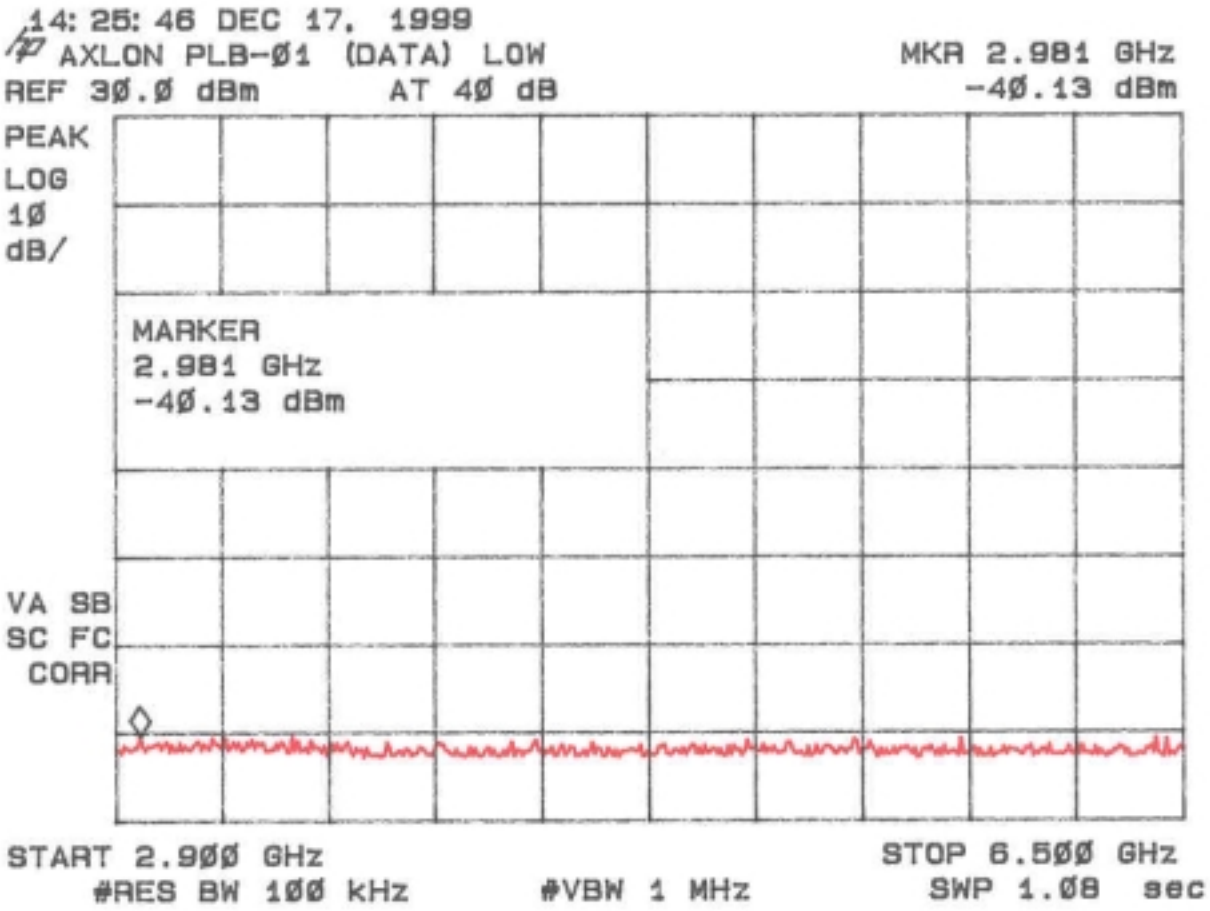


Figure 4d.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Low

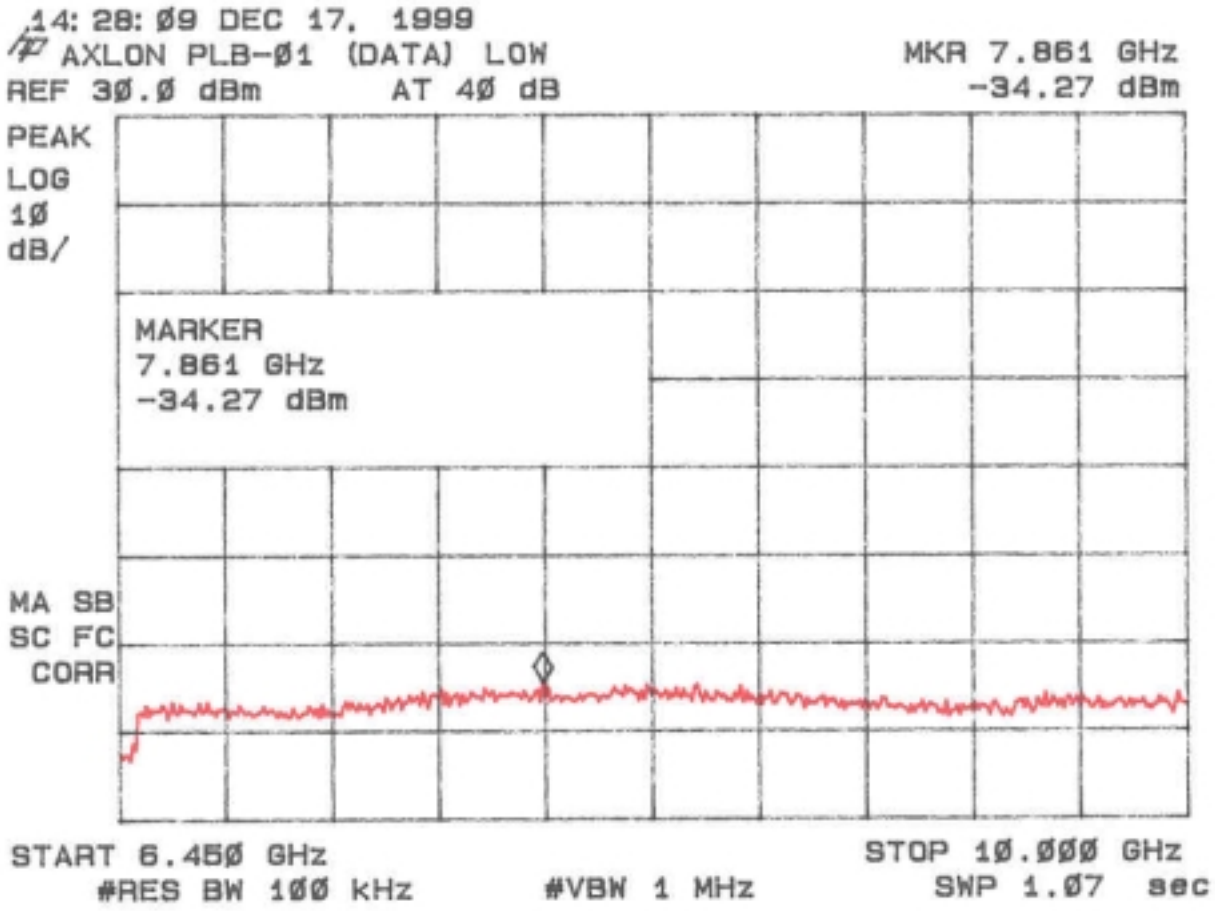


Figure 4e.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Mid

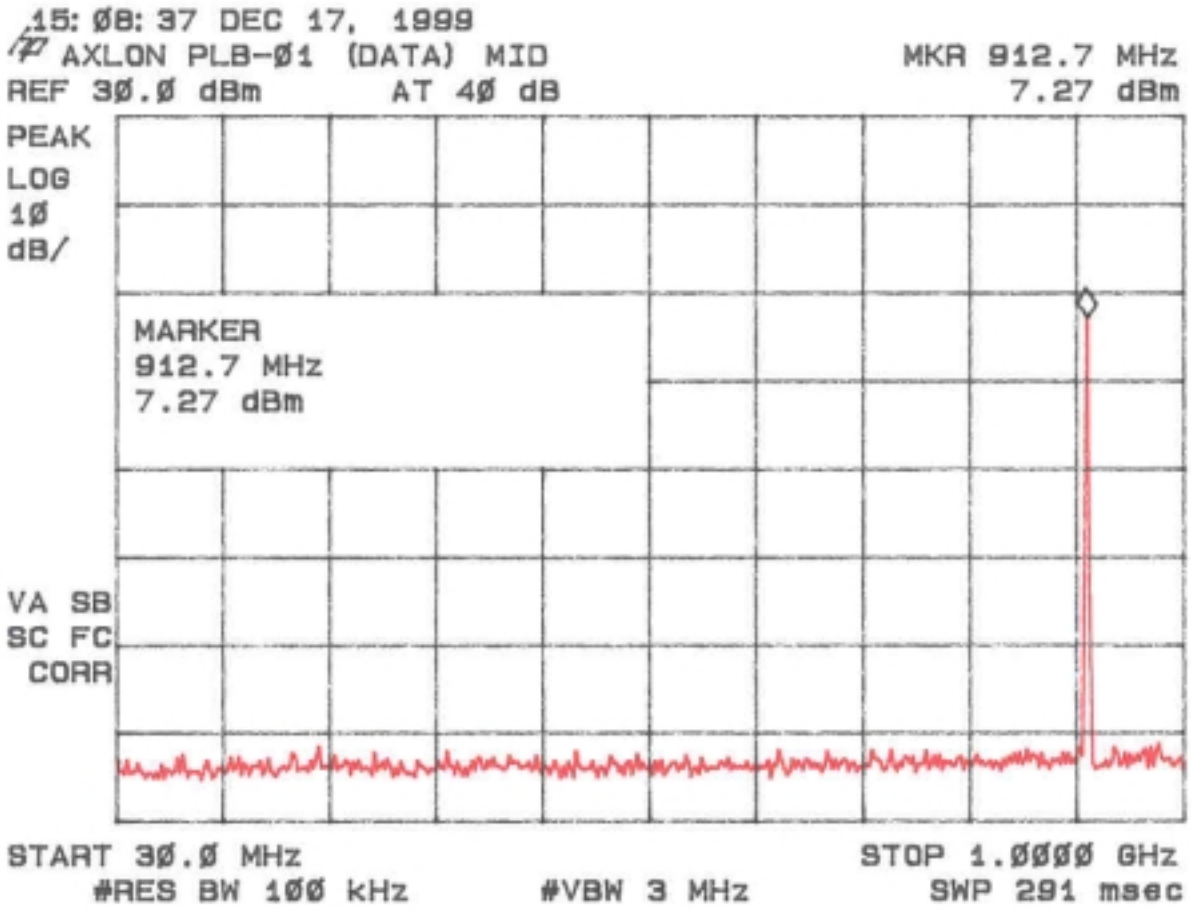


Figure 4f.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Mid

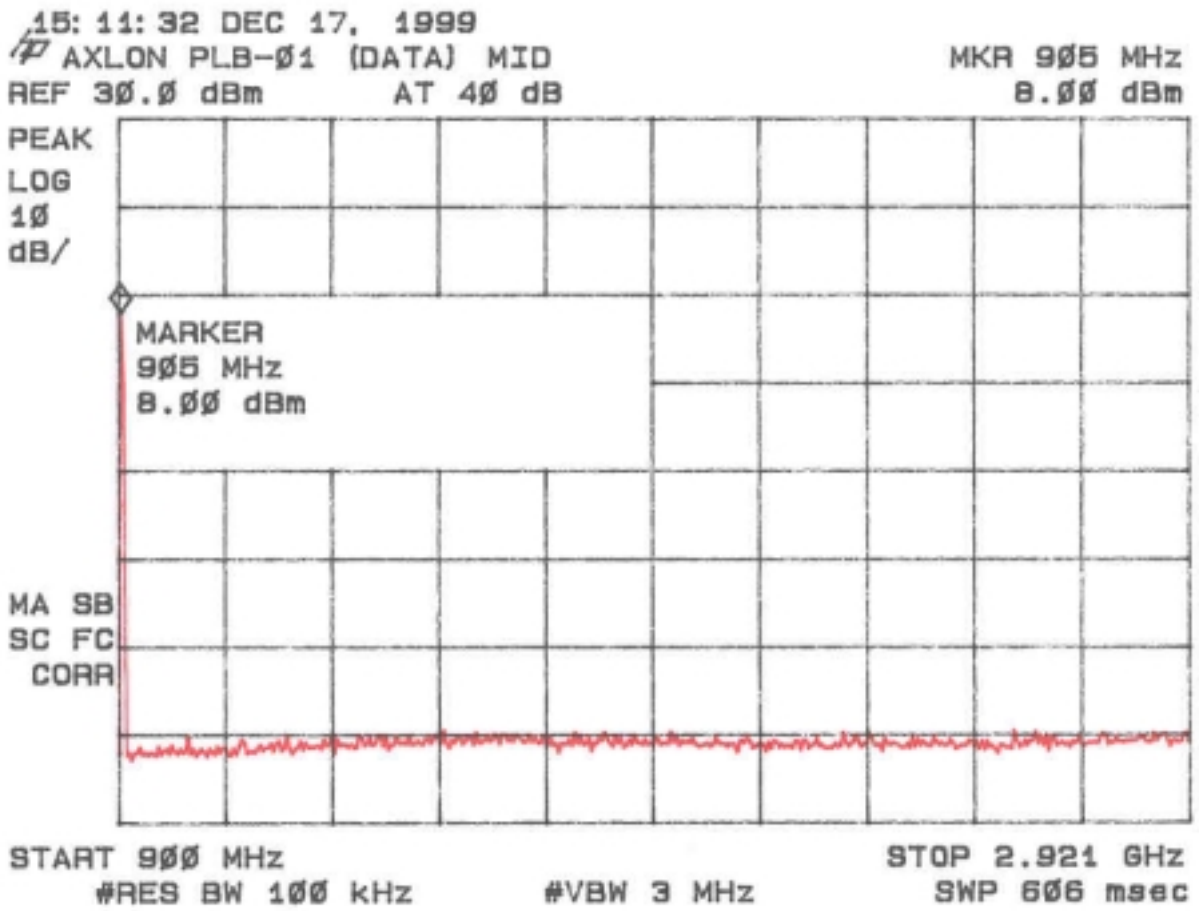


Figure 4g.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Mid

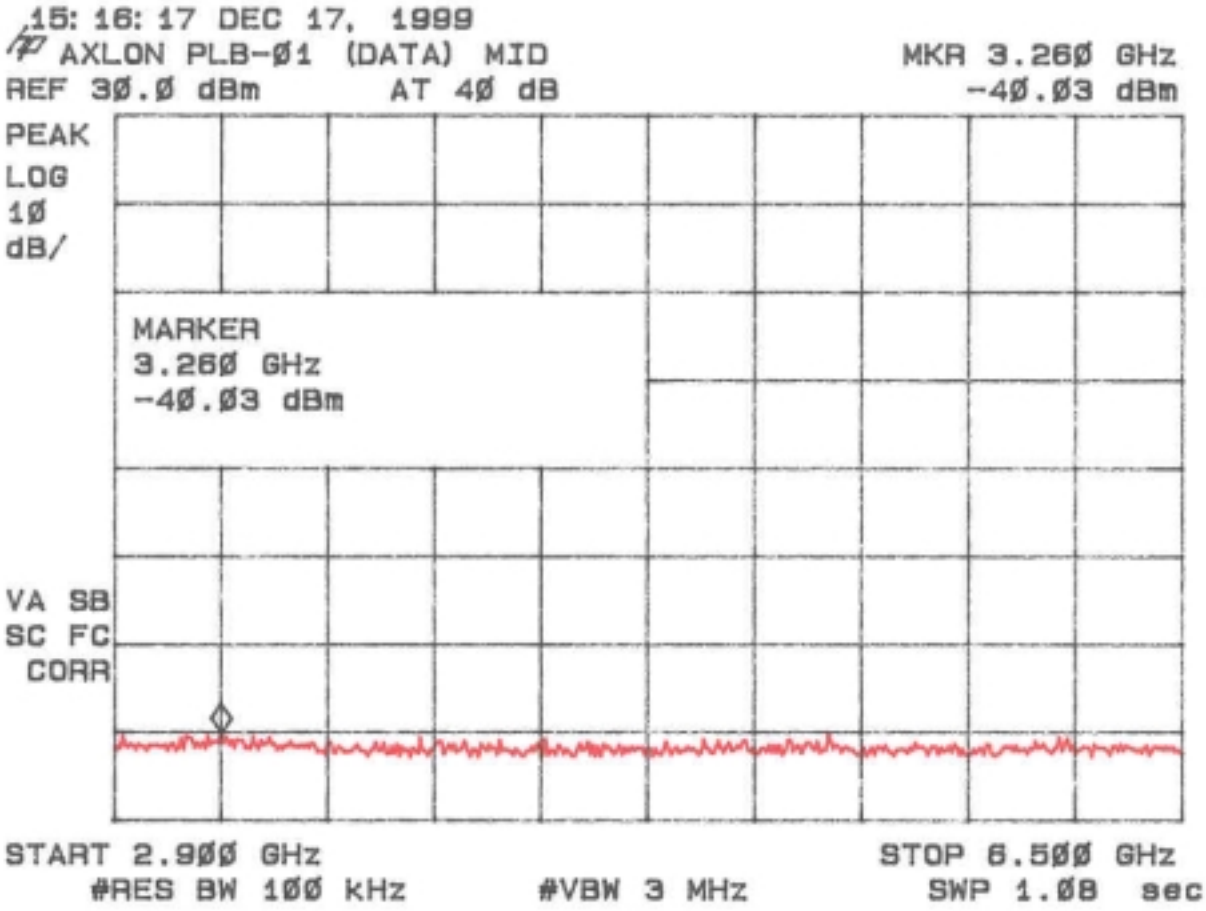


Figure 4h.
Antenna Conducted Spurious Emissions 15.247(c) (Data) Mid

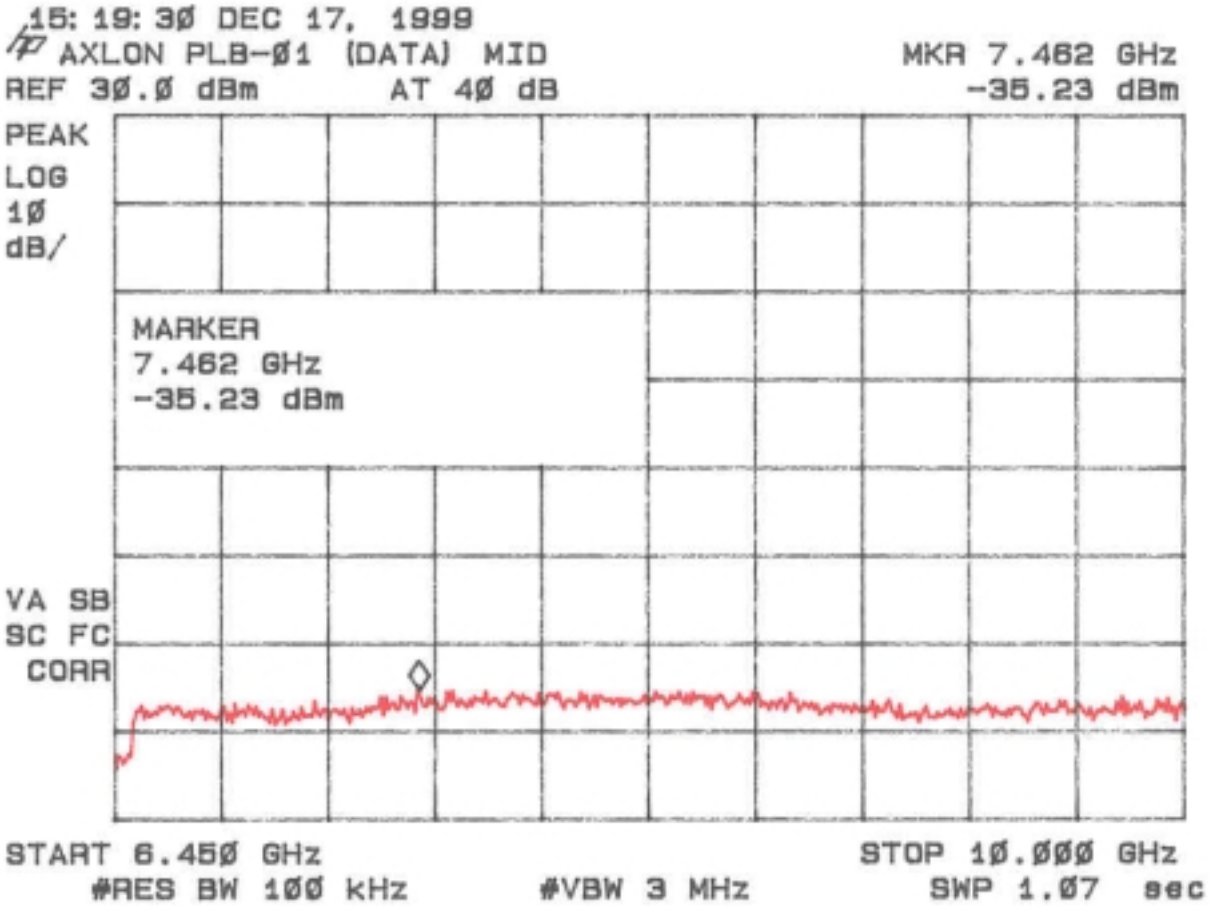


Figure 4i.
Antenna Conducted Spurious Emissions 15.247(c) (Data) High

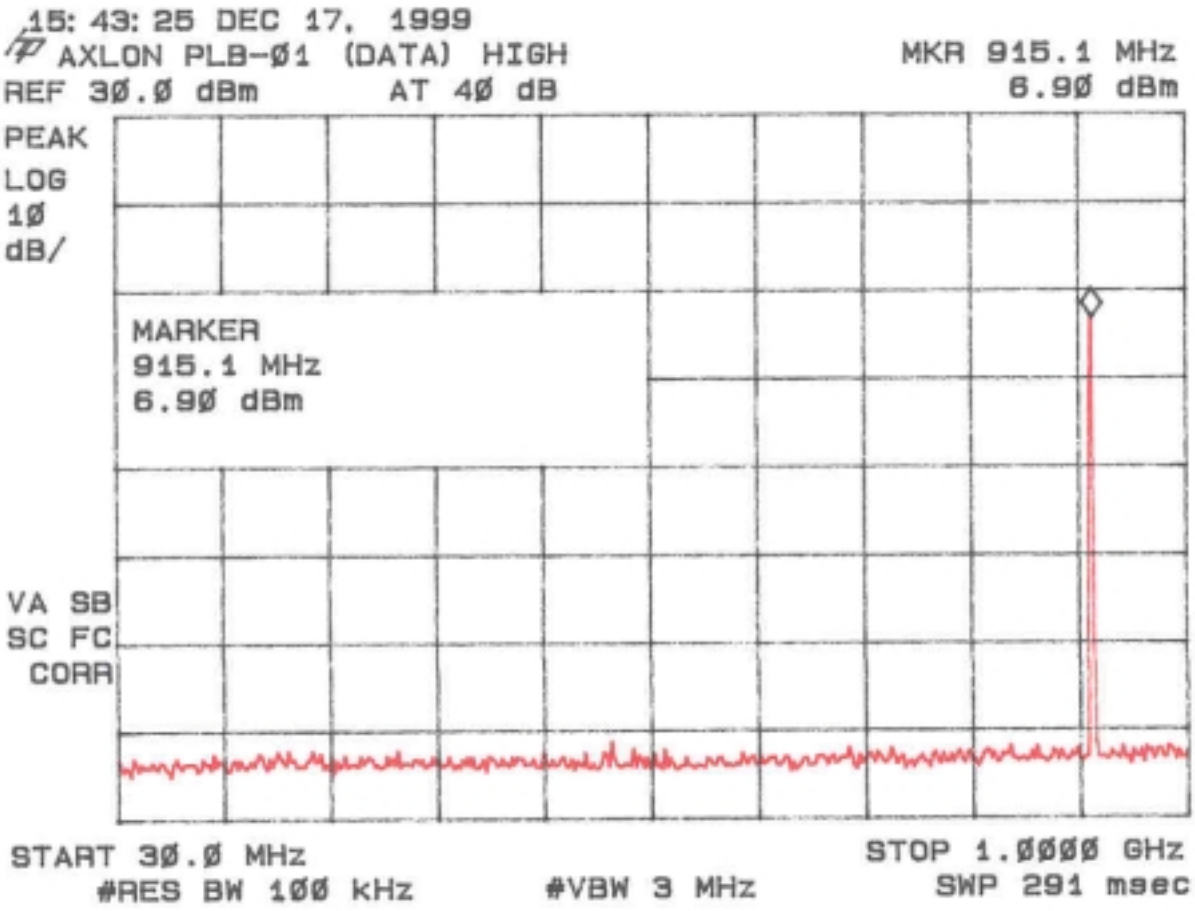


Figure 4j.
Antenna Conducted Spurious Emissions 15.247(c) (Data) High

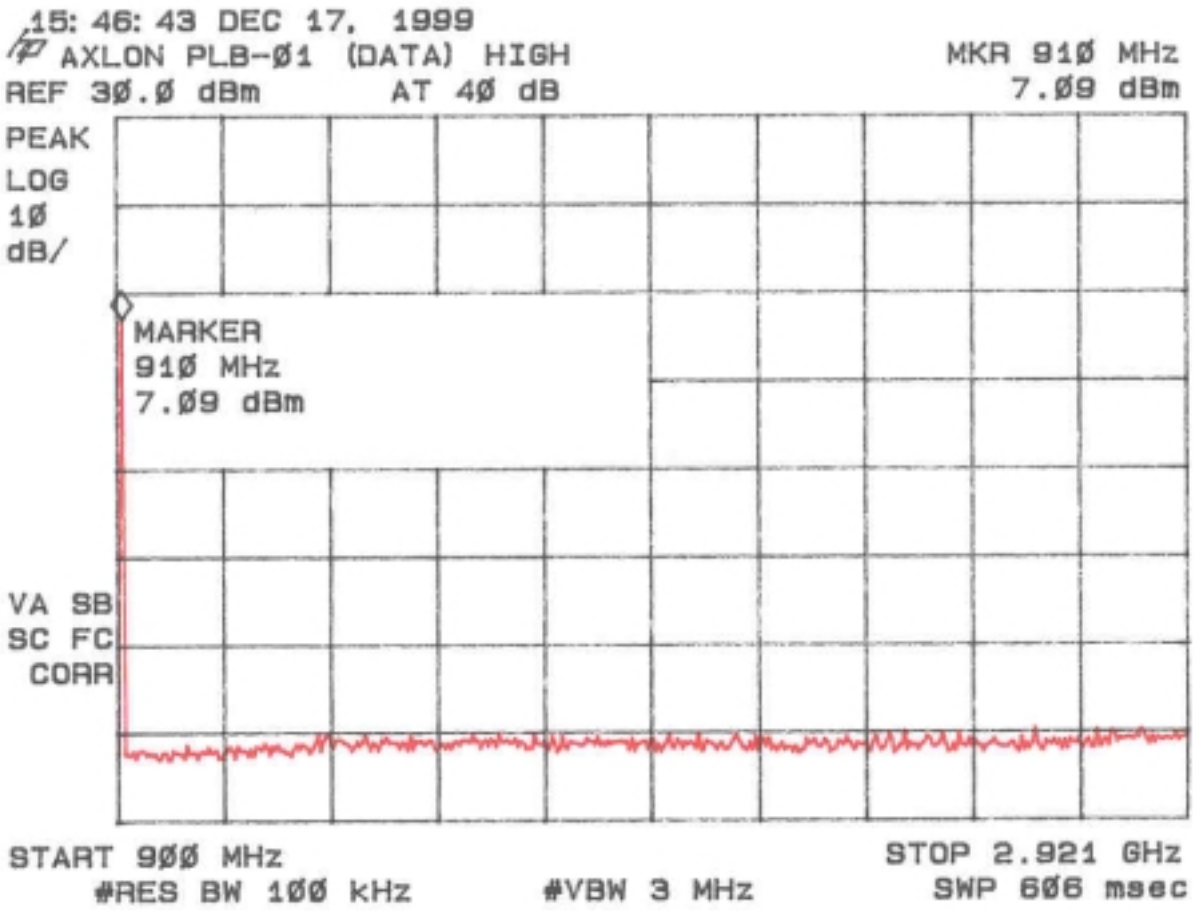


Figure 4k.
Antenna Conducted Spurious Emissions 15.247(c) (Data) High

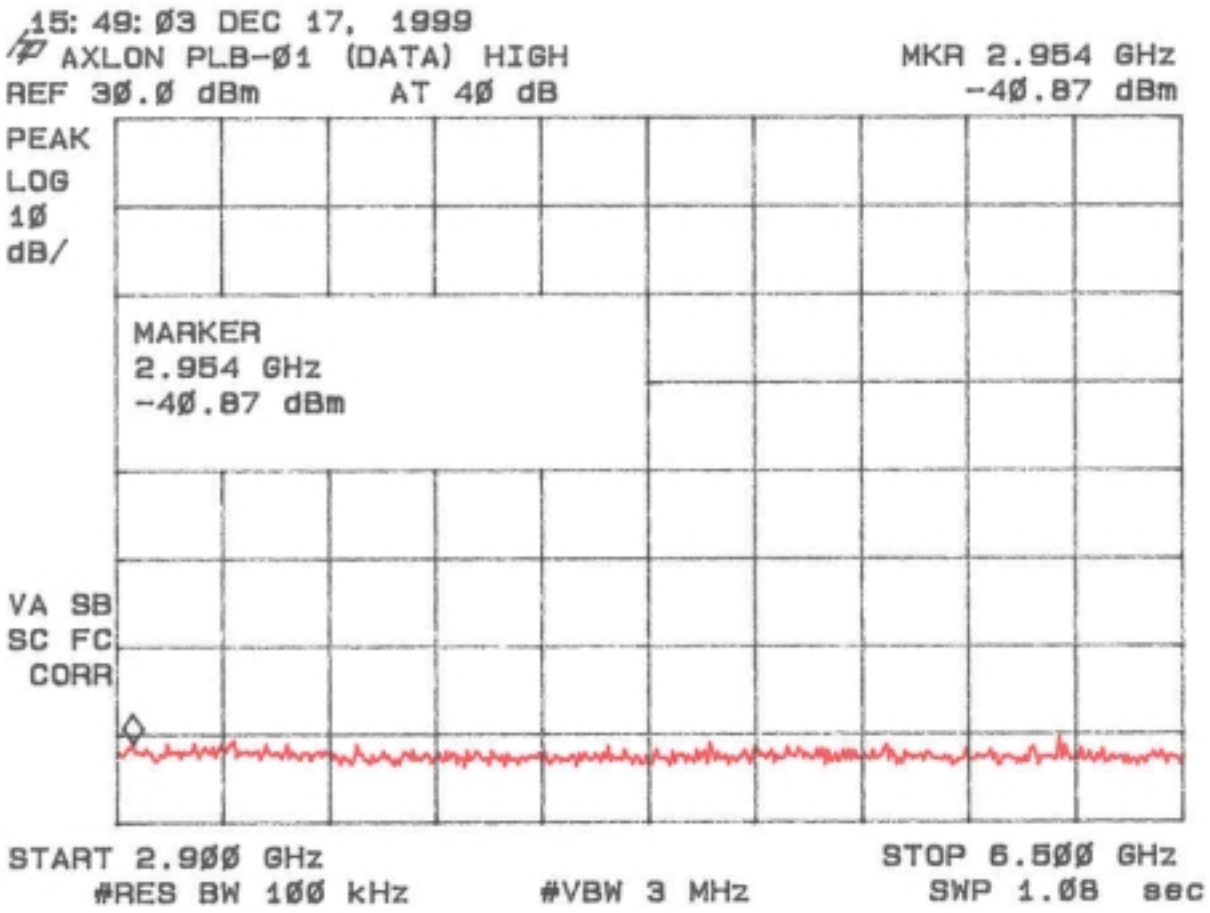


Figure 4l.
Antenna Conducted Spurious Emissions 15.247(c) (Data) High

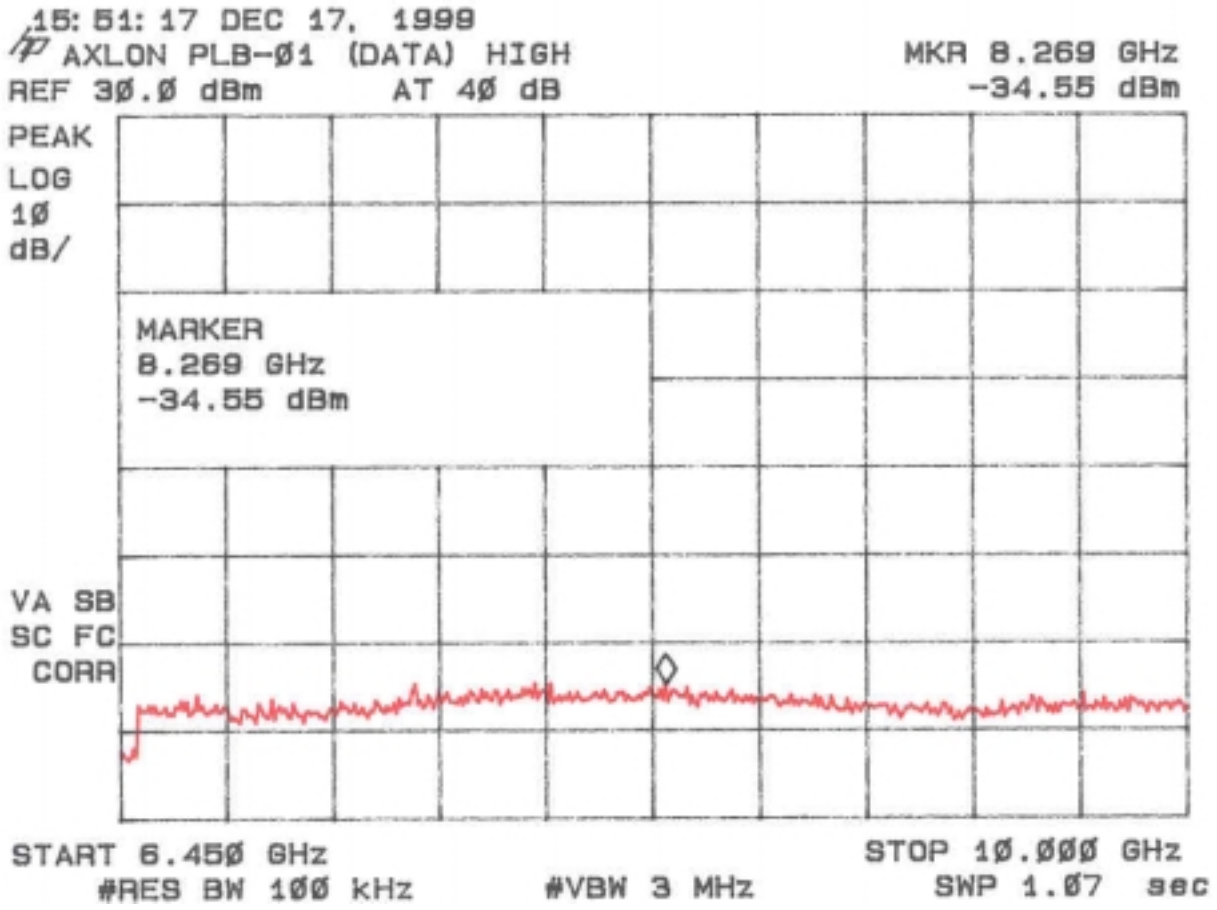


Figure 4m.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Low

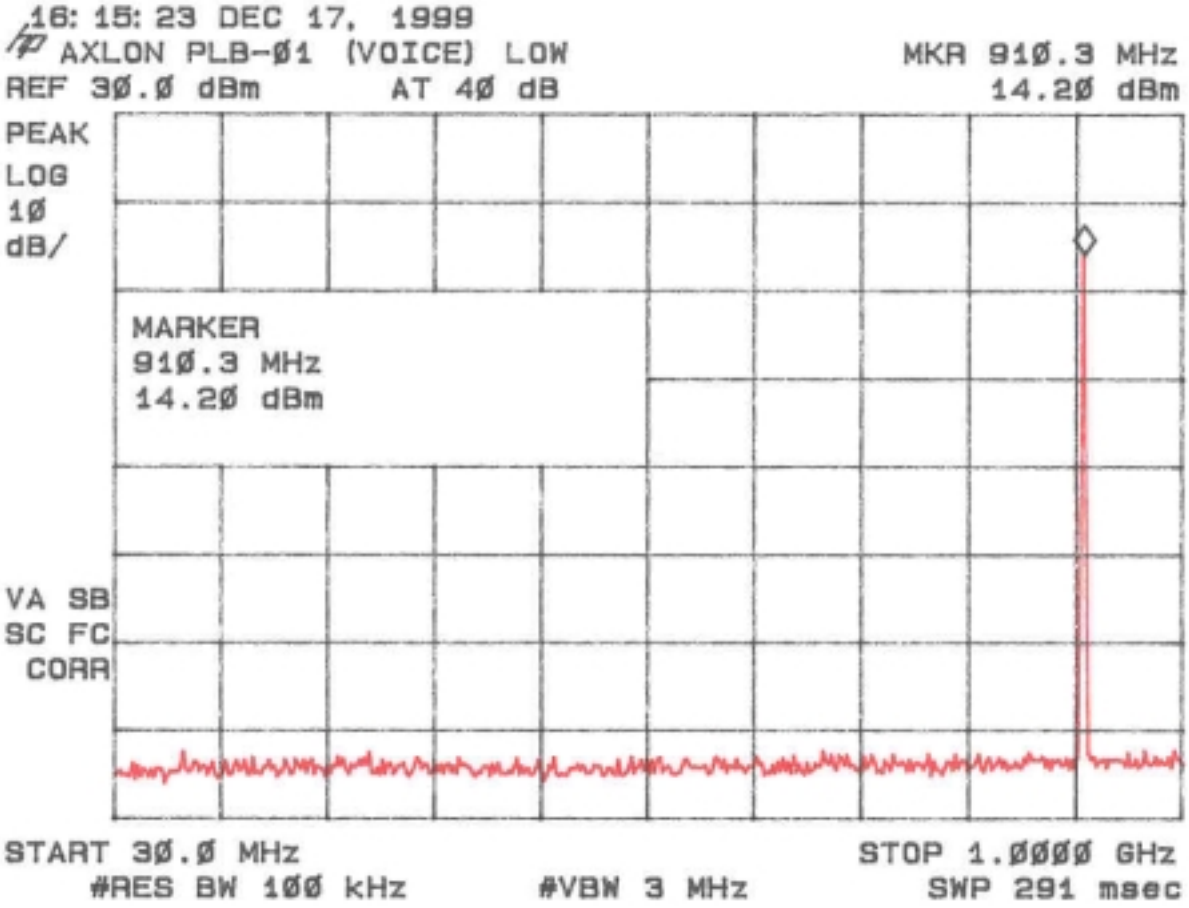


Figure 4n.
Antenna Conducted Spurious Emissions 5.247(c) (Voice) Low

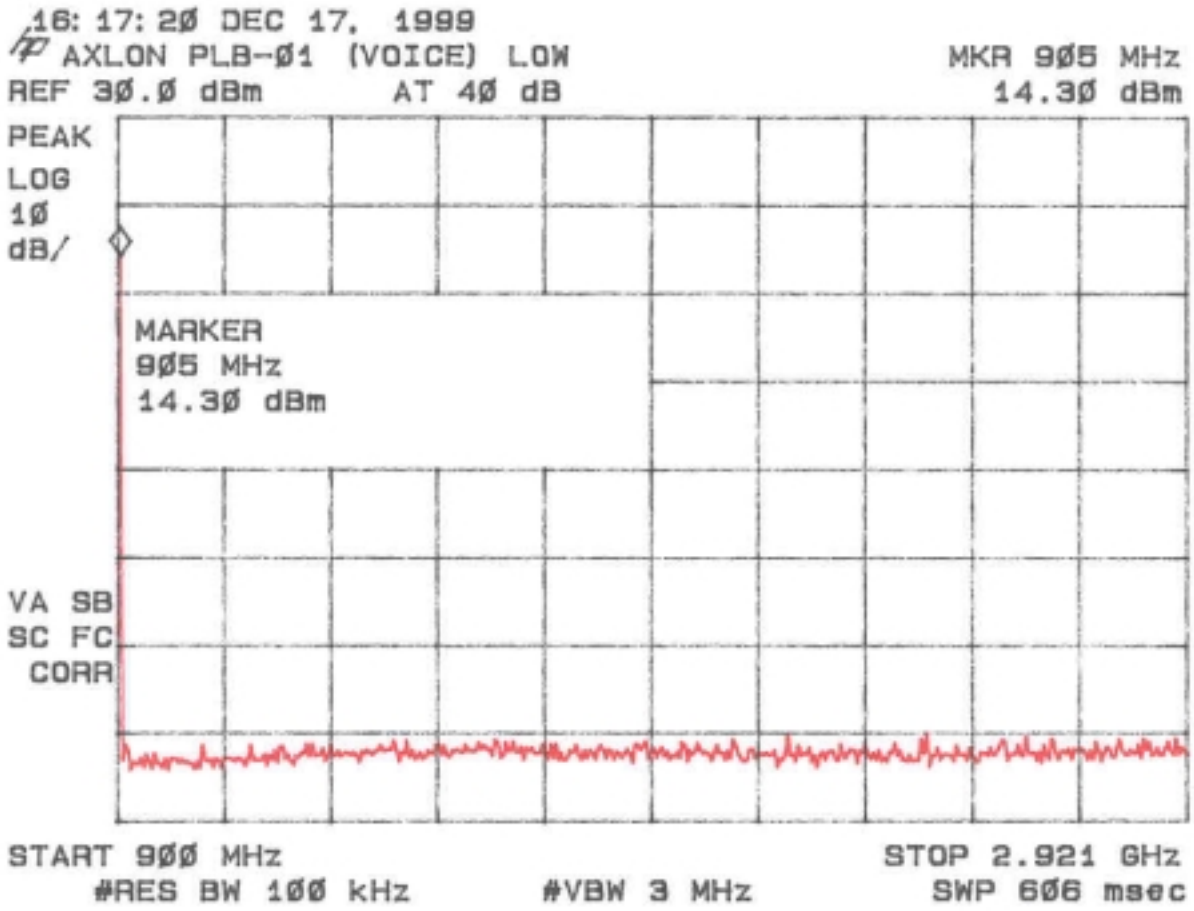


Figure 4o.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Low

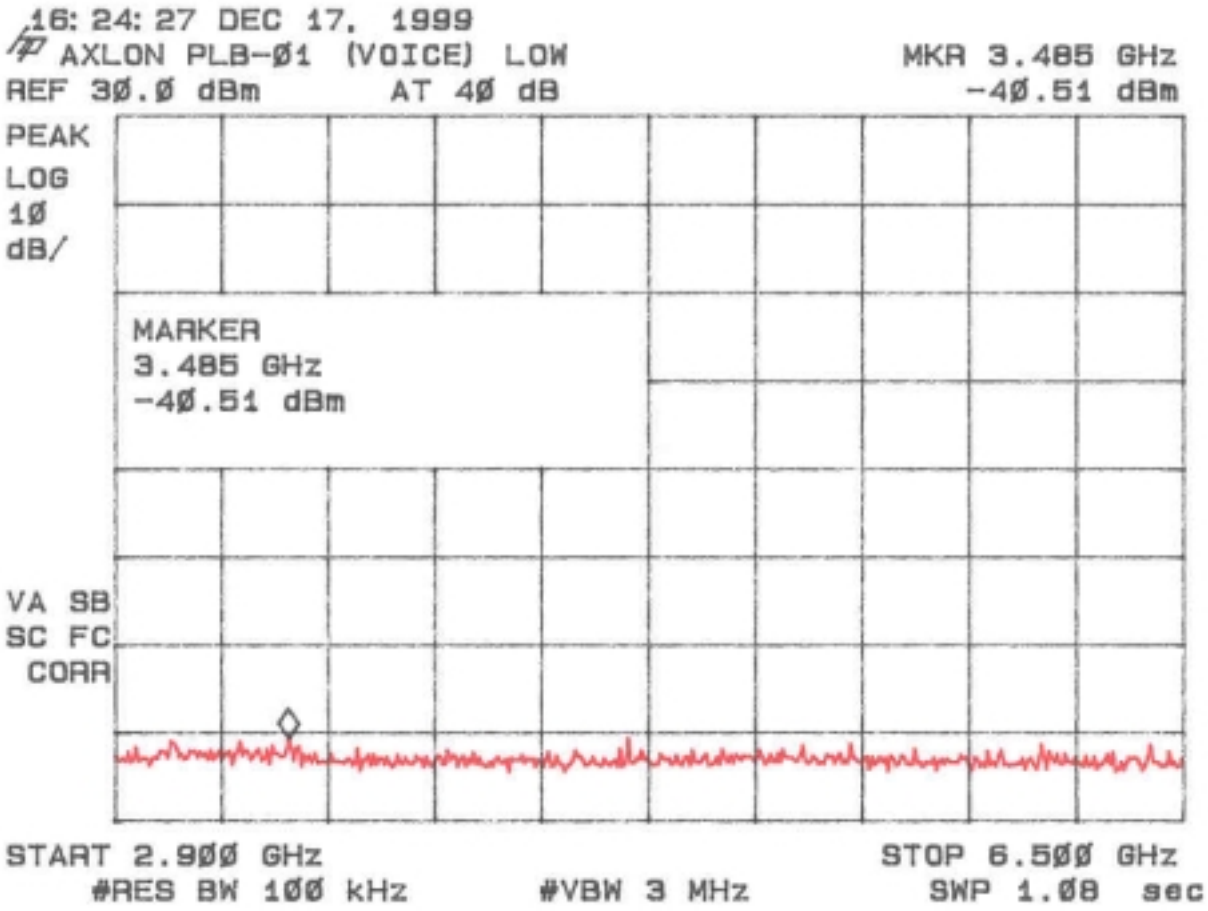


Figure 4p.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Low

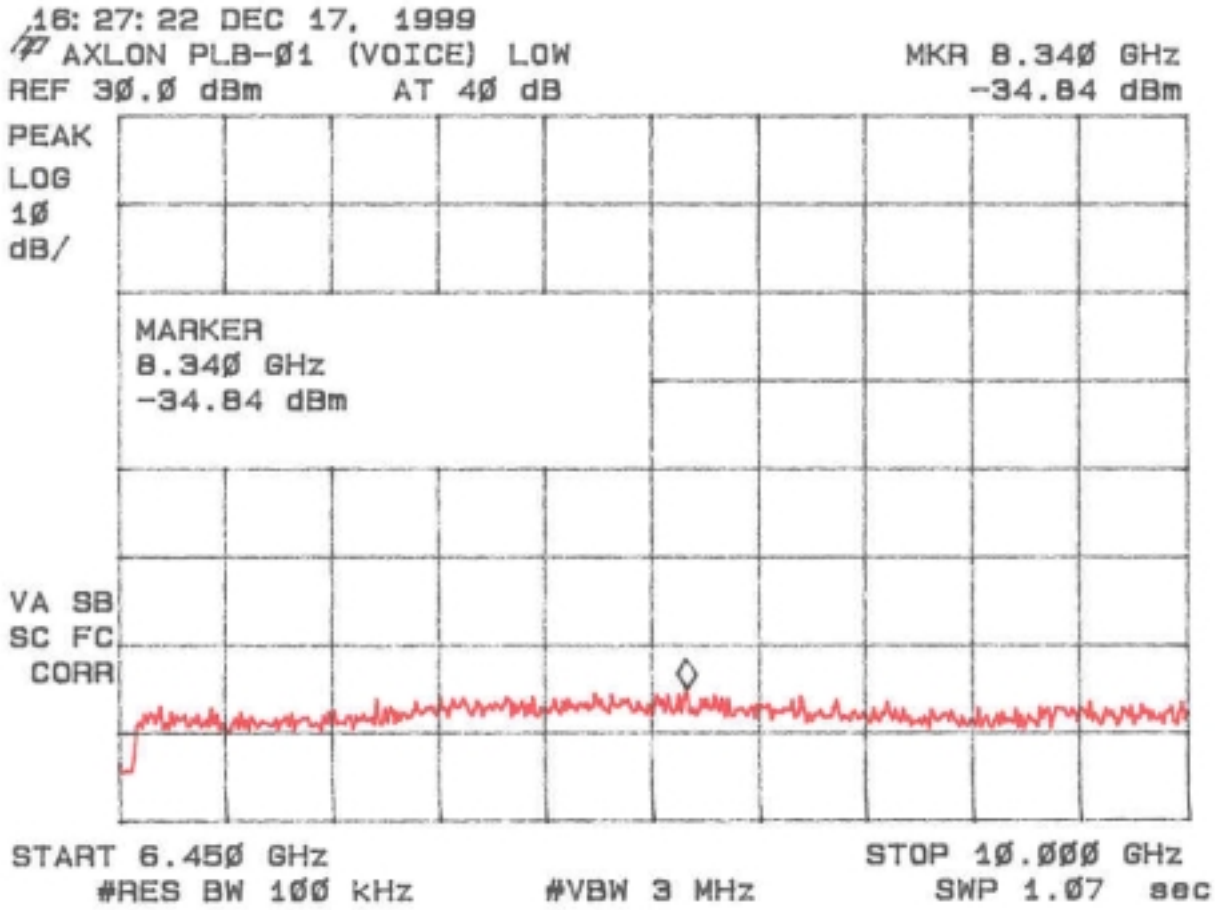


Figure 4q.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Mid

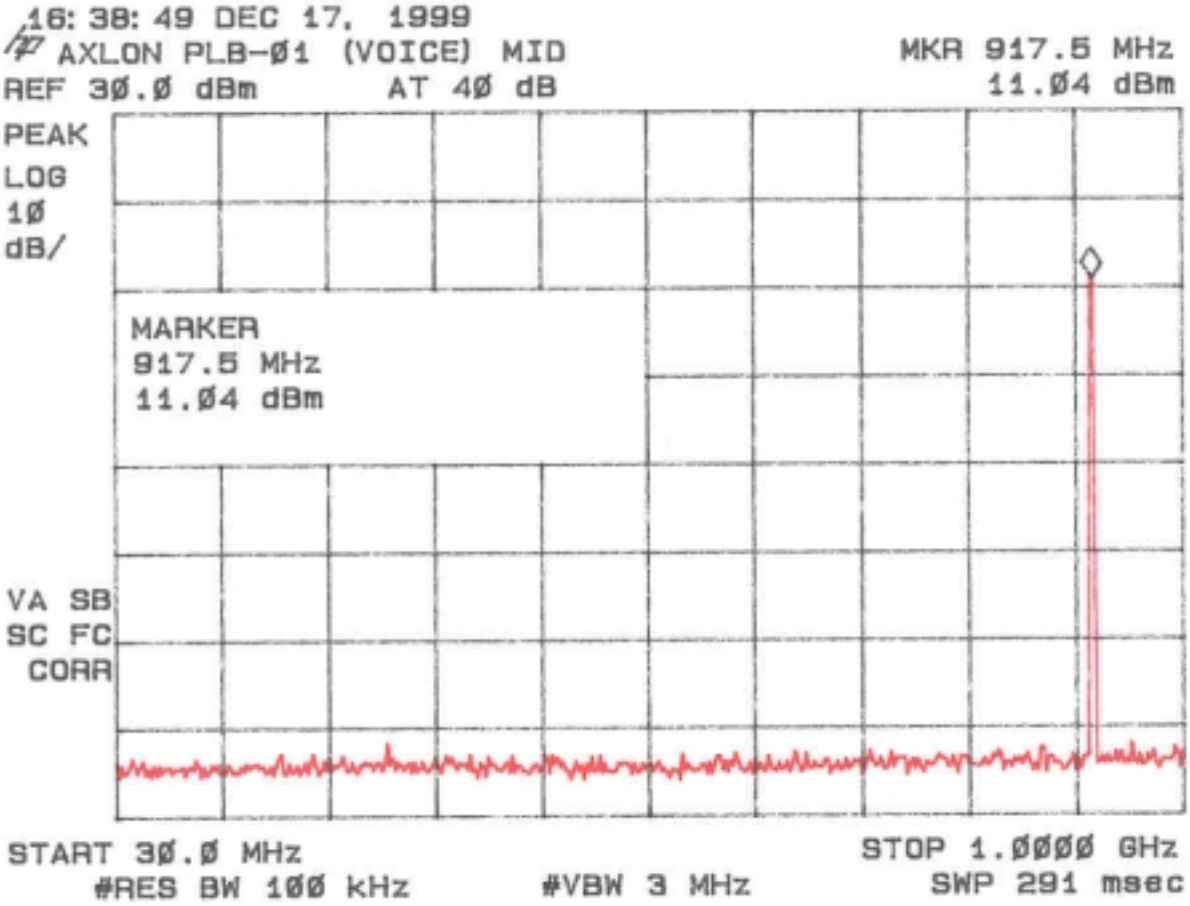


Figure 4r.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Mid

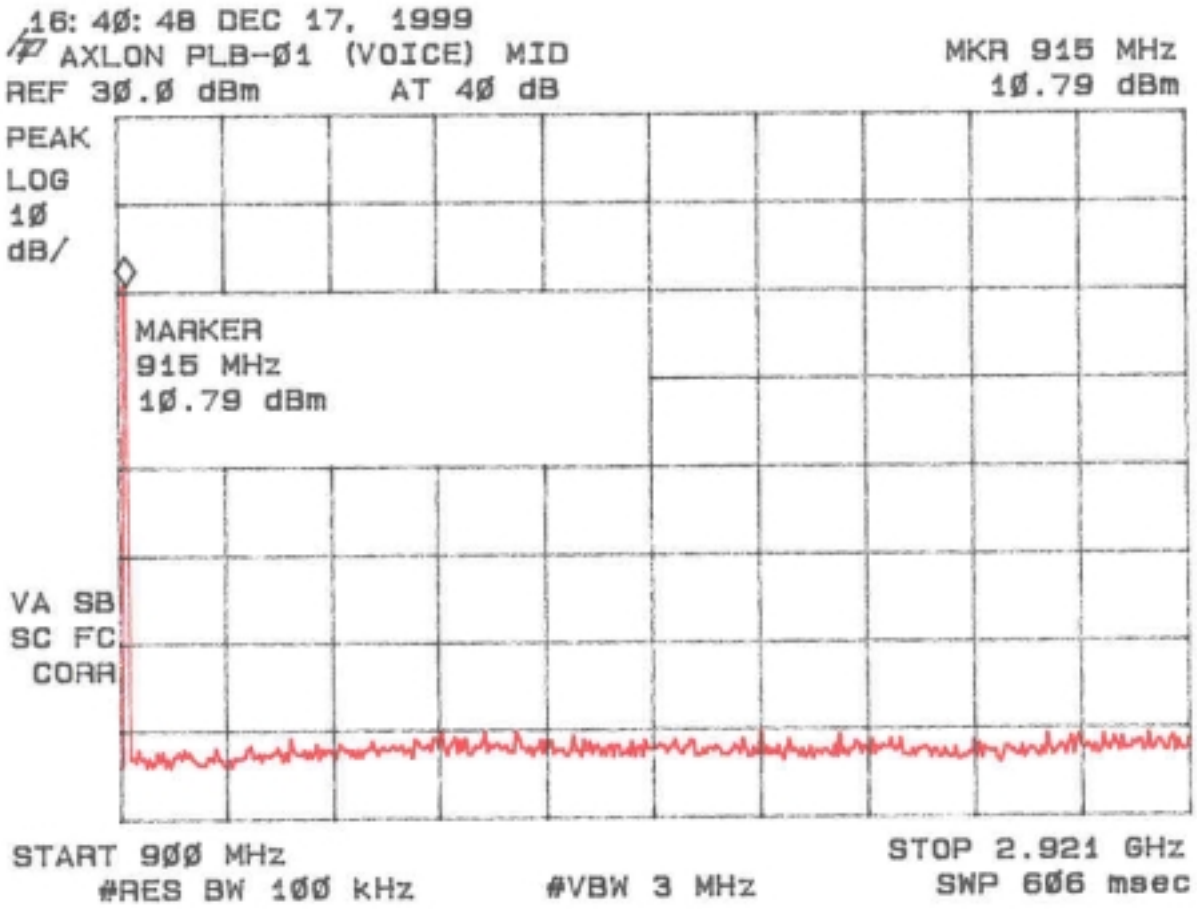


Figure 4s.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Mid

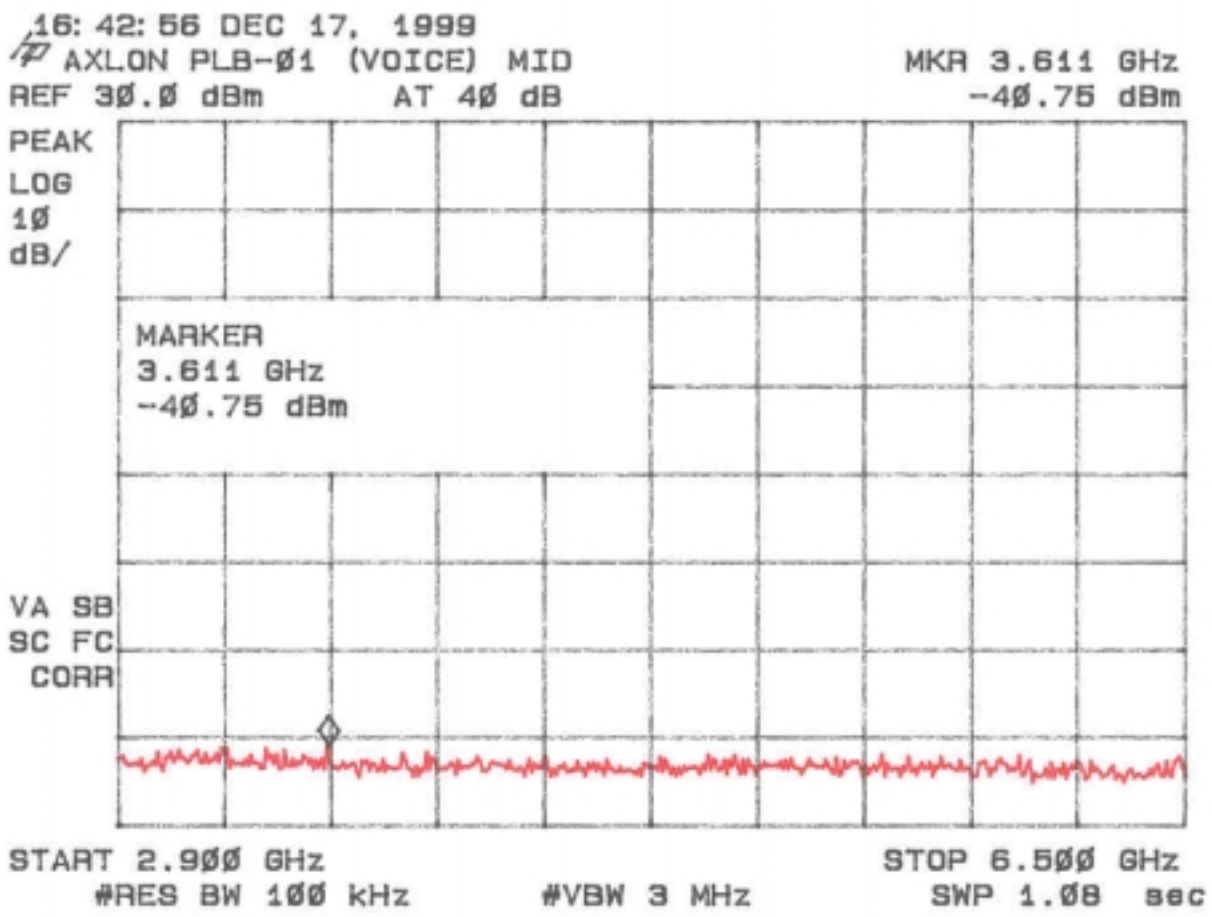


Figure 4t.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) Mid

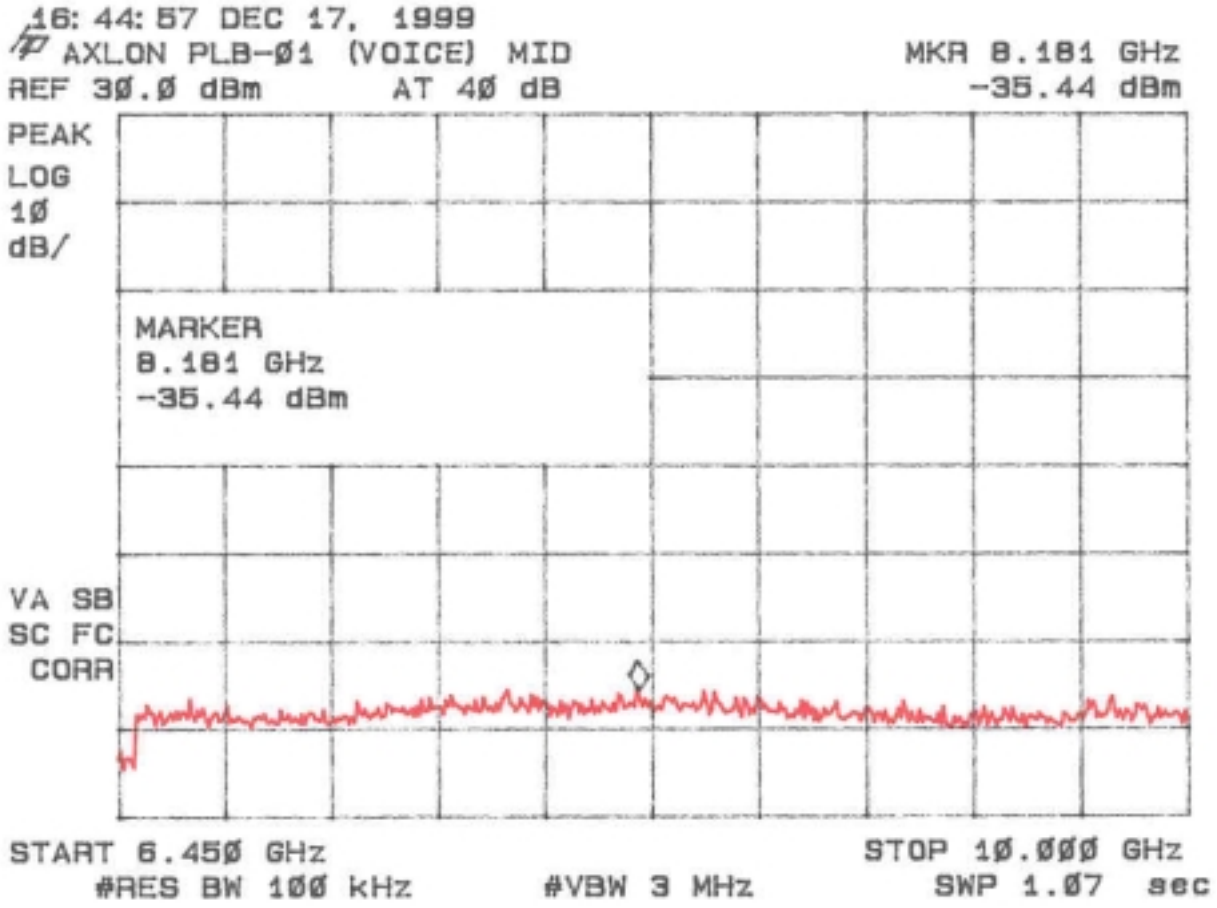


Figure 4u.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) High

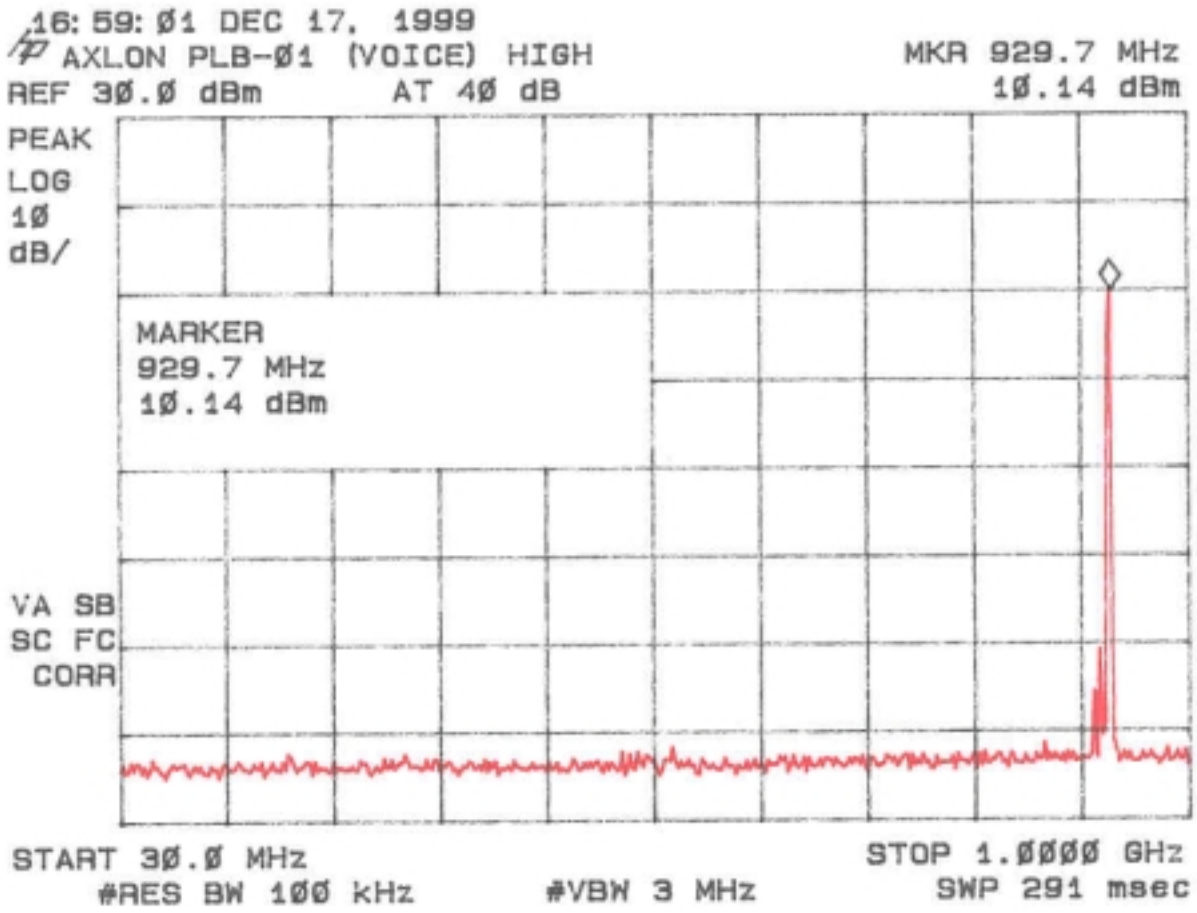


Figure 4v.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) High

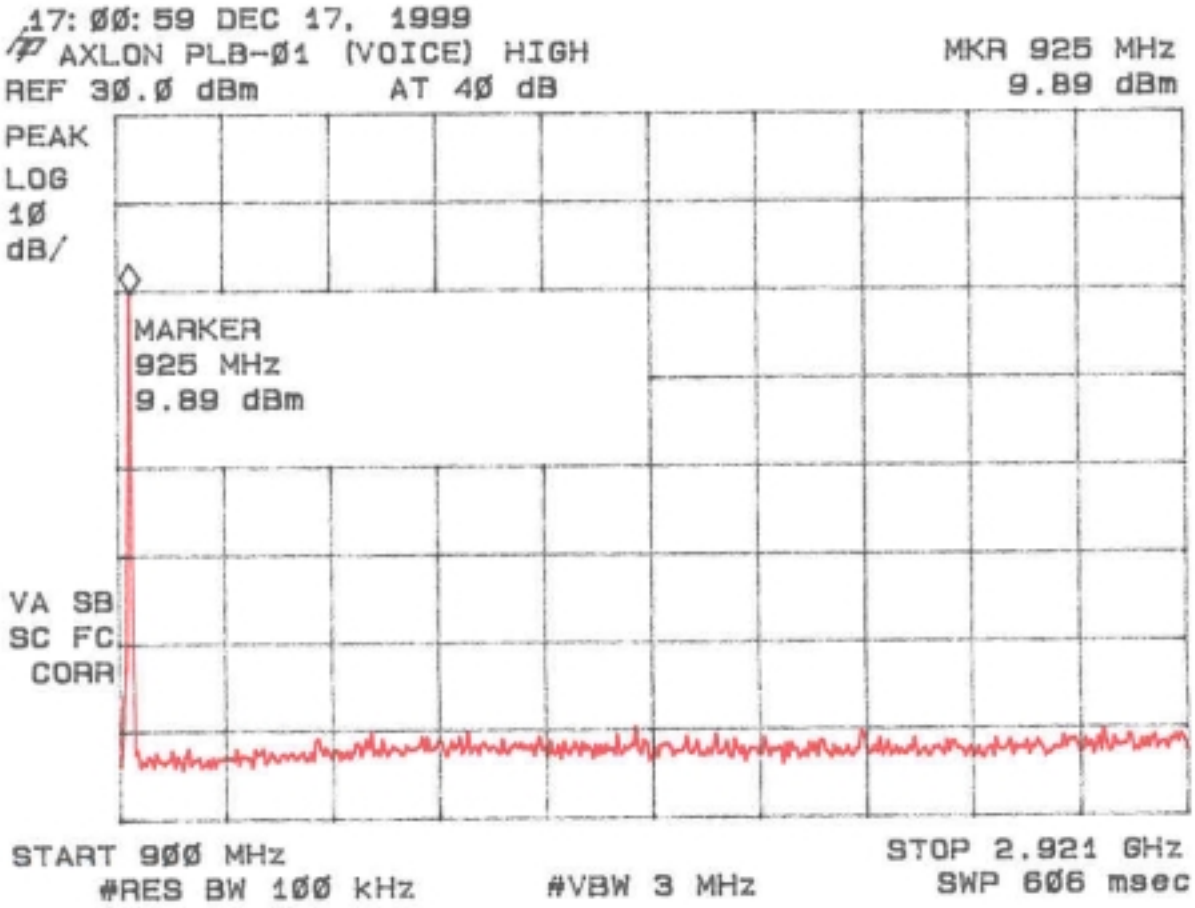


Figure 4w.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) High

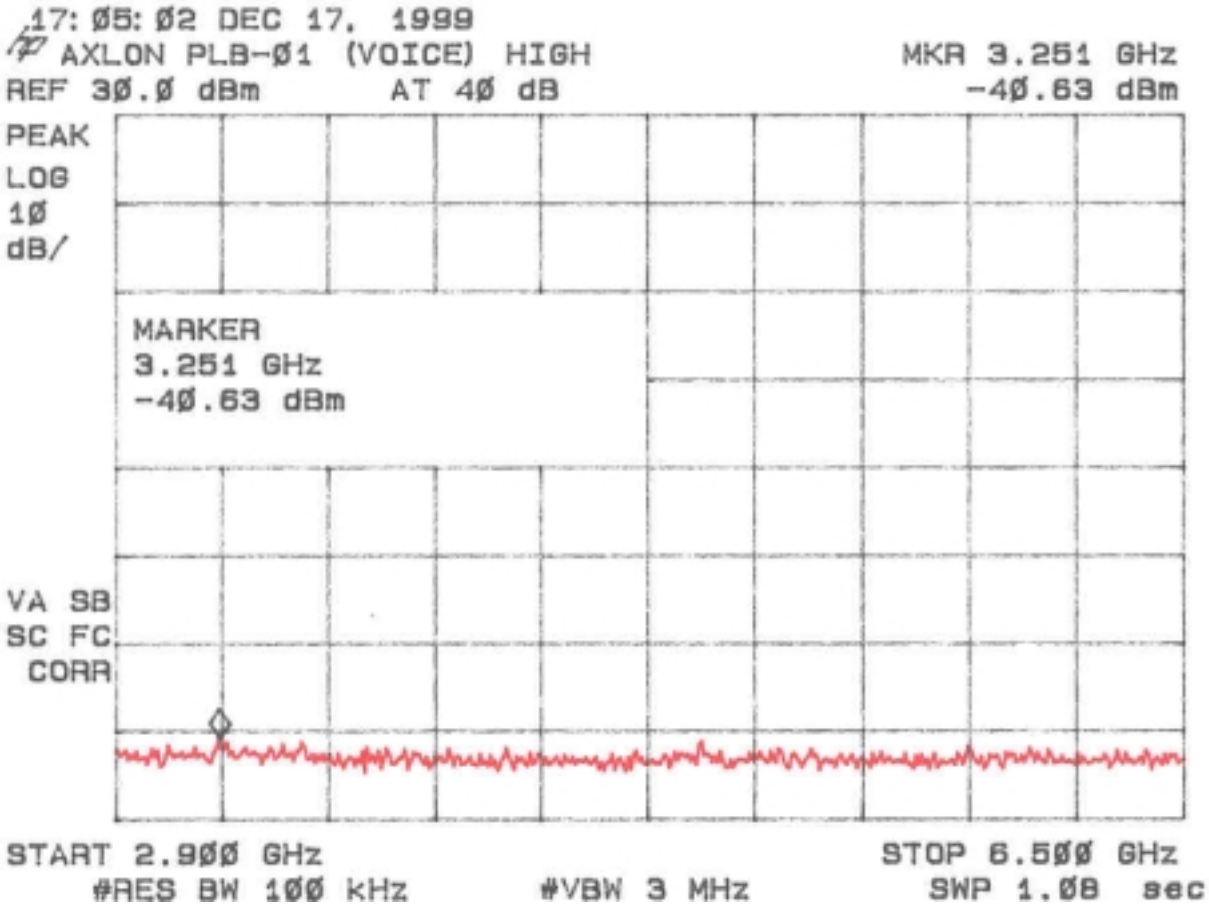
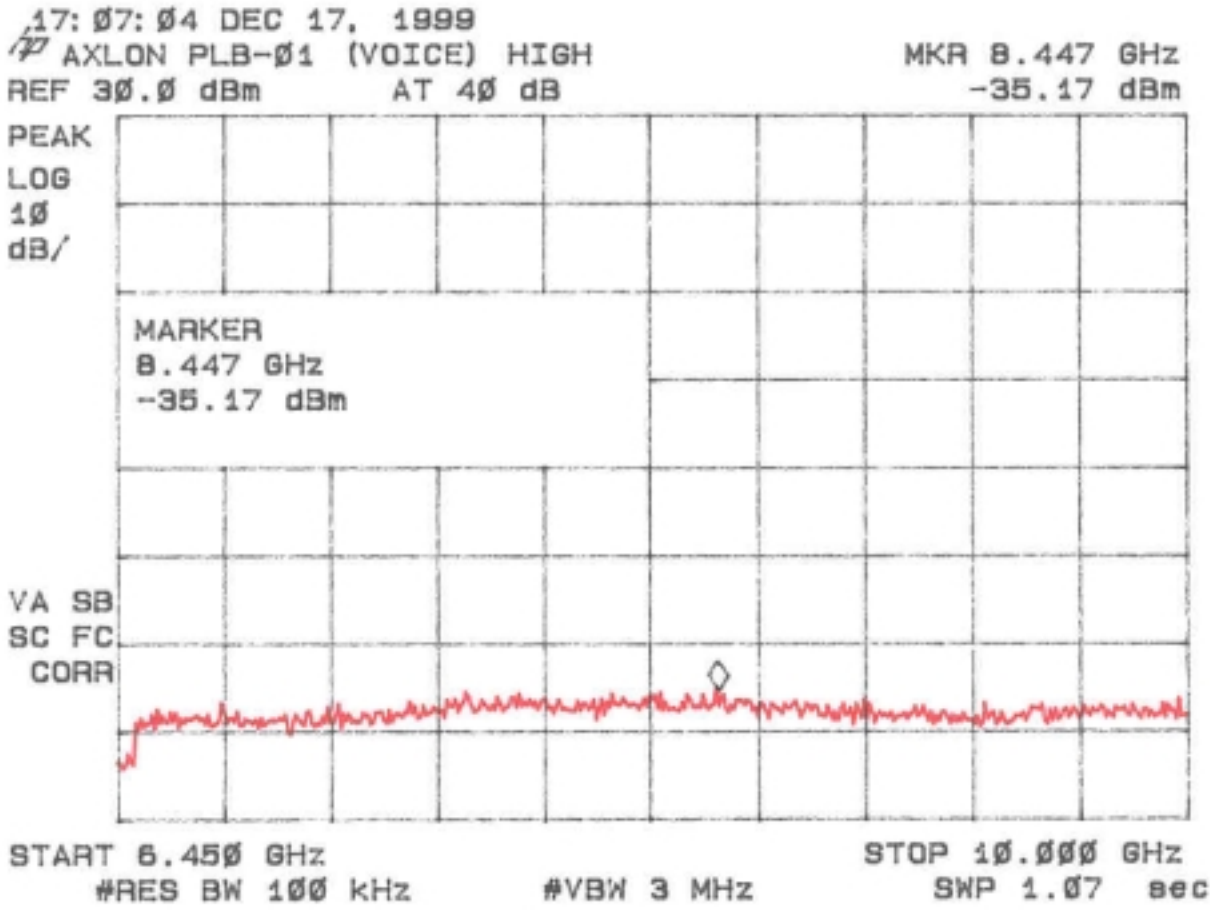


Figure 4x.
Antenna Conducted Spurious Emissions 15.247(c) (Voice) High



2.9 Peak Radiated Spurious Emission in the Frequency Range 30 -10000 MHz (FCC Section 15.247(c))

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 & 4d (low), Table 4b & 4e, (mid), Table 4c & 4f (high) and Figures 5a-5o.

Figure 5a
Peak Radiated Spurious Emission 15.247(c) (Data) Low

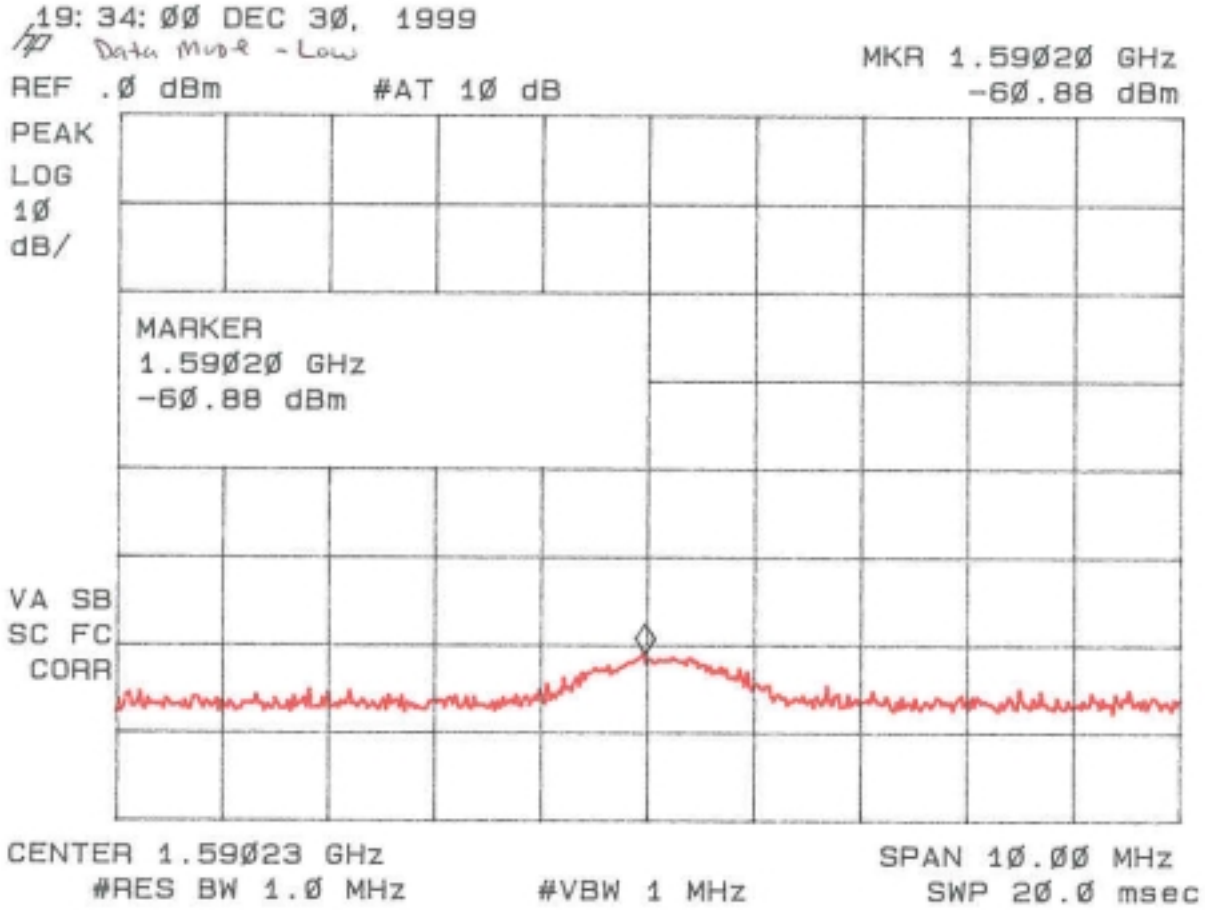


Figure 5b
Peak Radiated Spurious Emission 15.247(c) (Data) Low

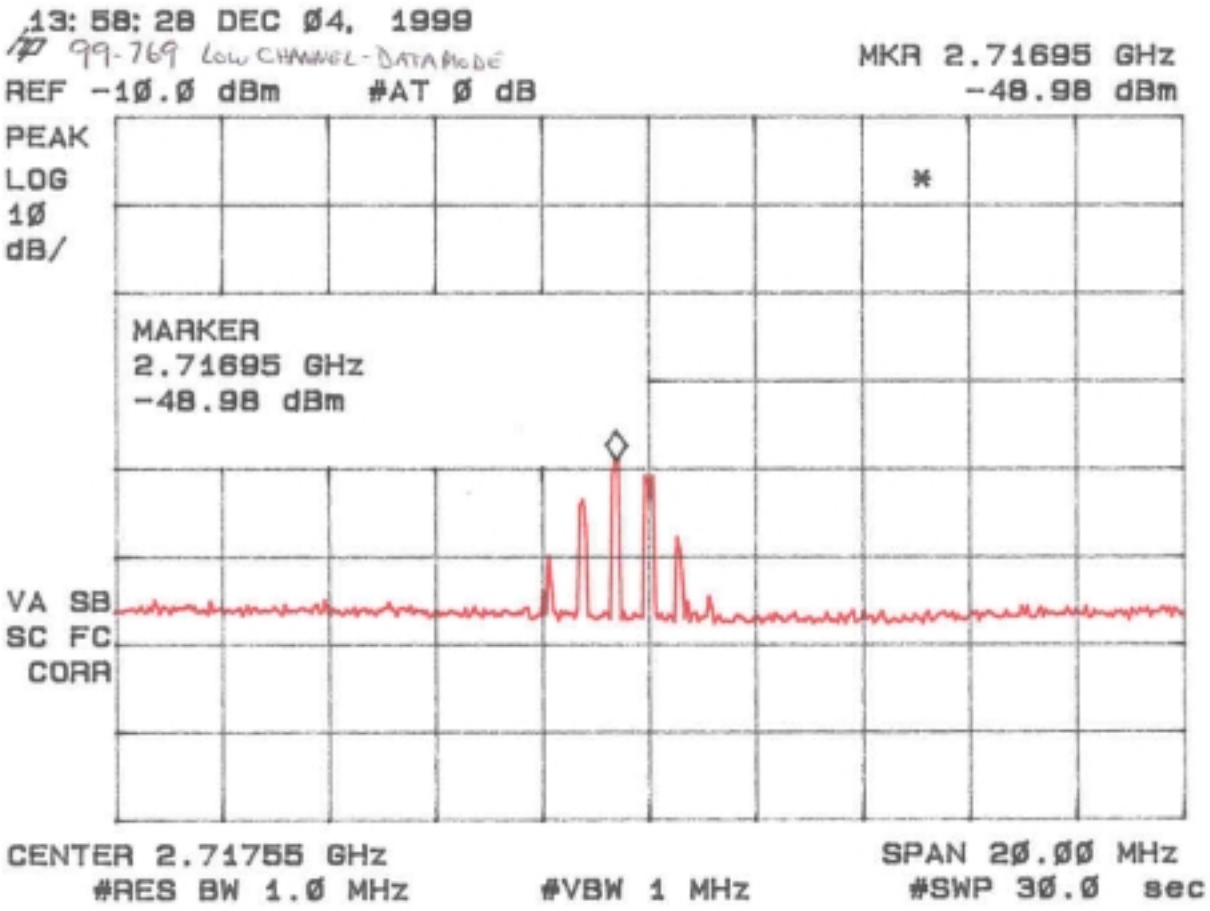


Figure 5c
Peak Radiated Spurious Emission 15.247(c) (Data) Mid

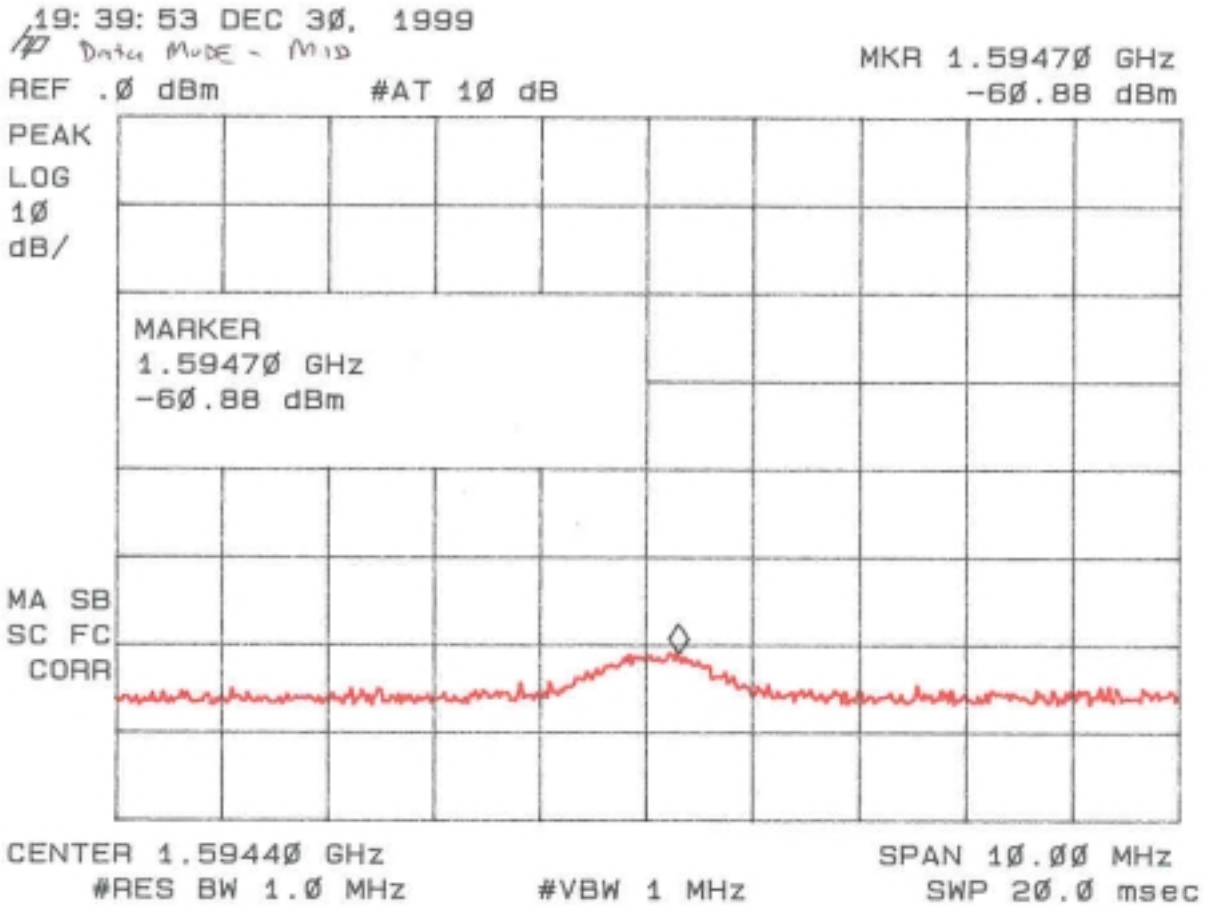


Figure 5d
Peak Radiated Spurious Emission 15.247(c) (Data) Mid

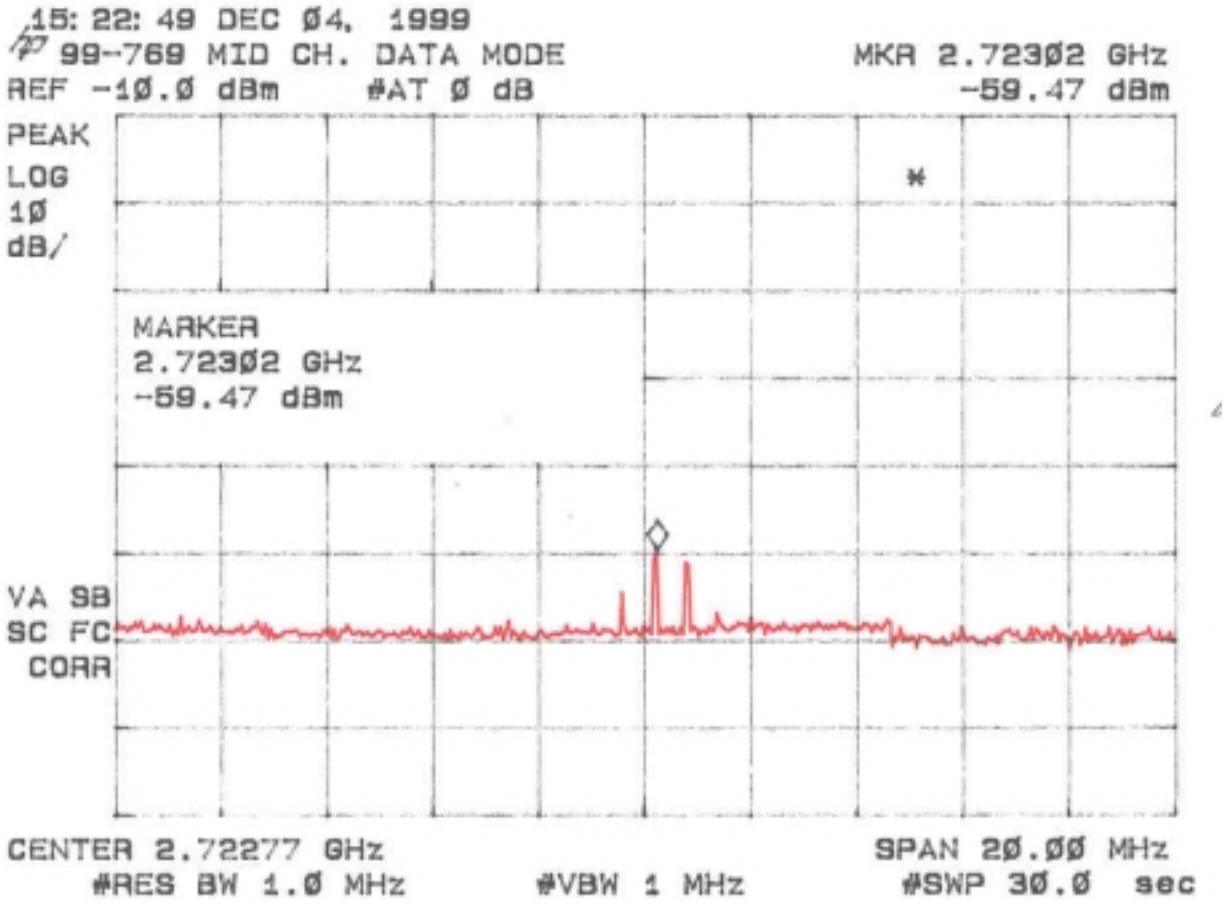


Figure 5e
Peak Radiated Spurious Emission 15.247(c) (Data) Mid

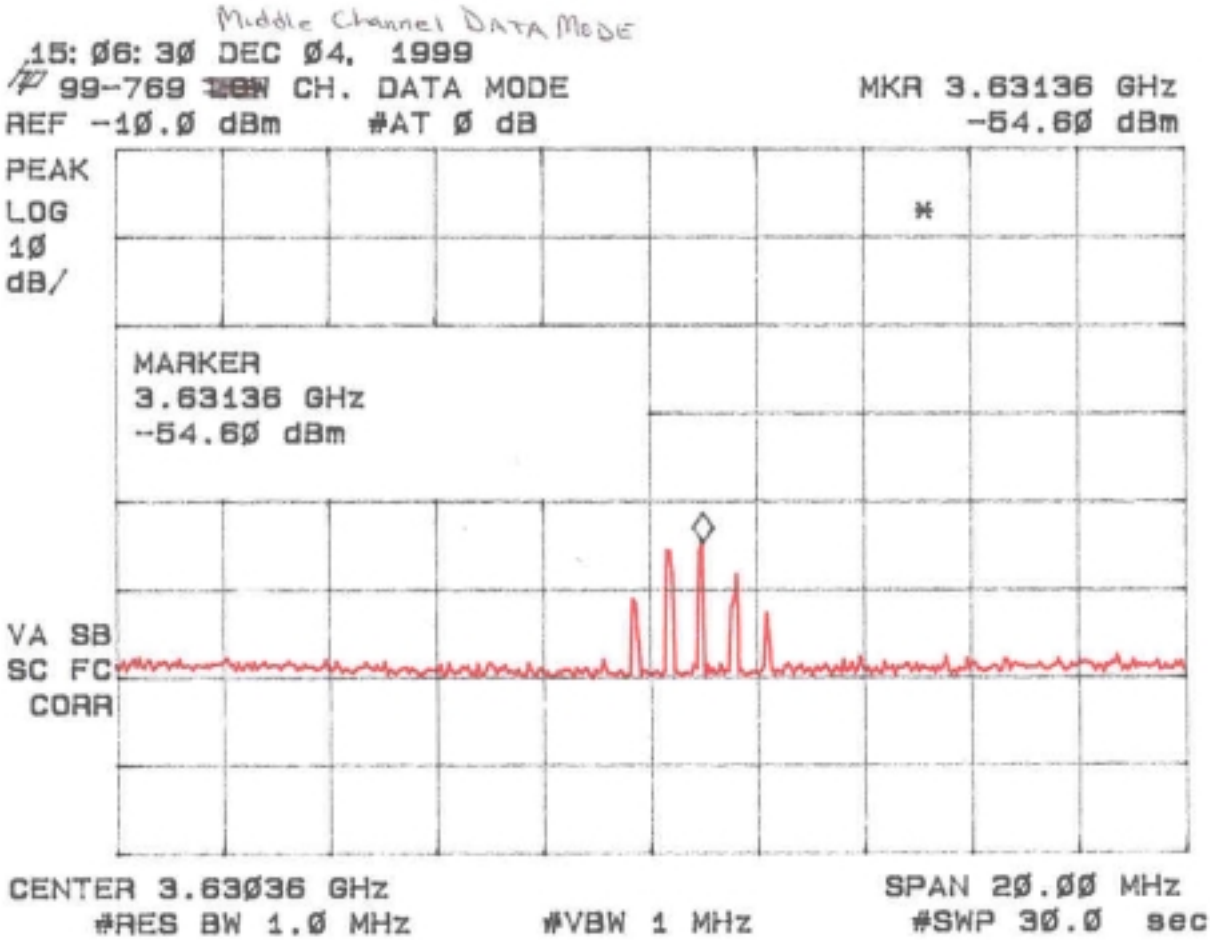


Figure 5f
Peak Radiated Spurious Emission 15.247(c) (Data) High

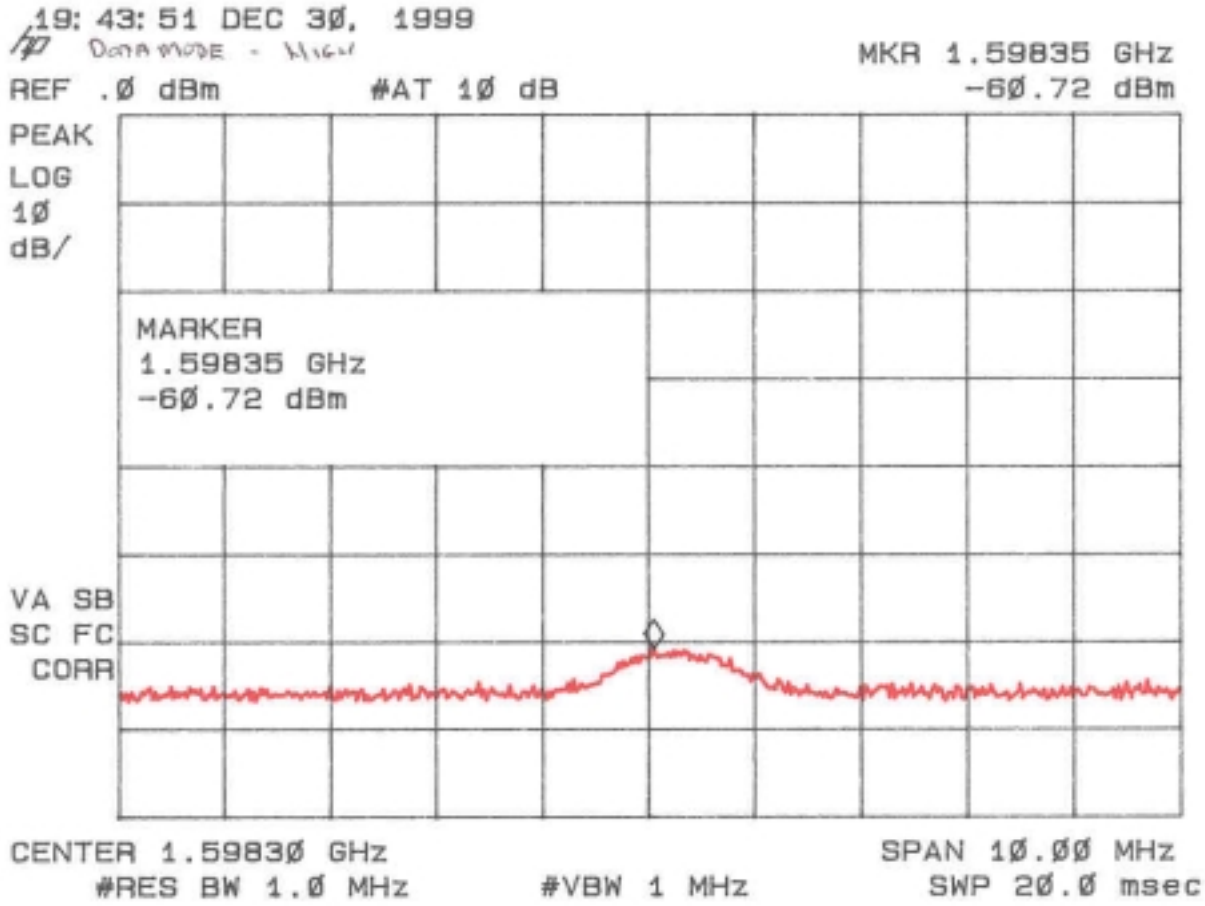


Figure 5g
Peak Radiated Spurious Emission 15.247(c) (Voice) Low

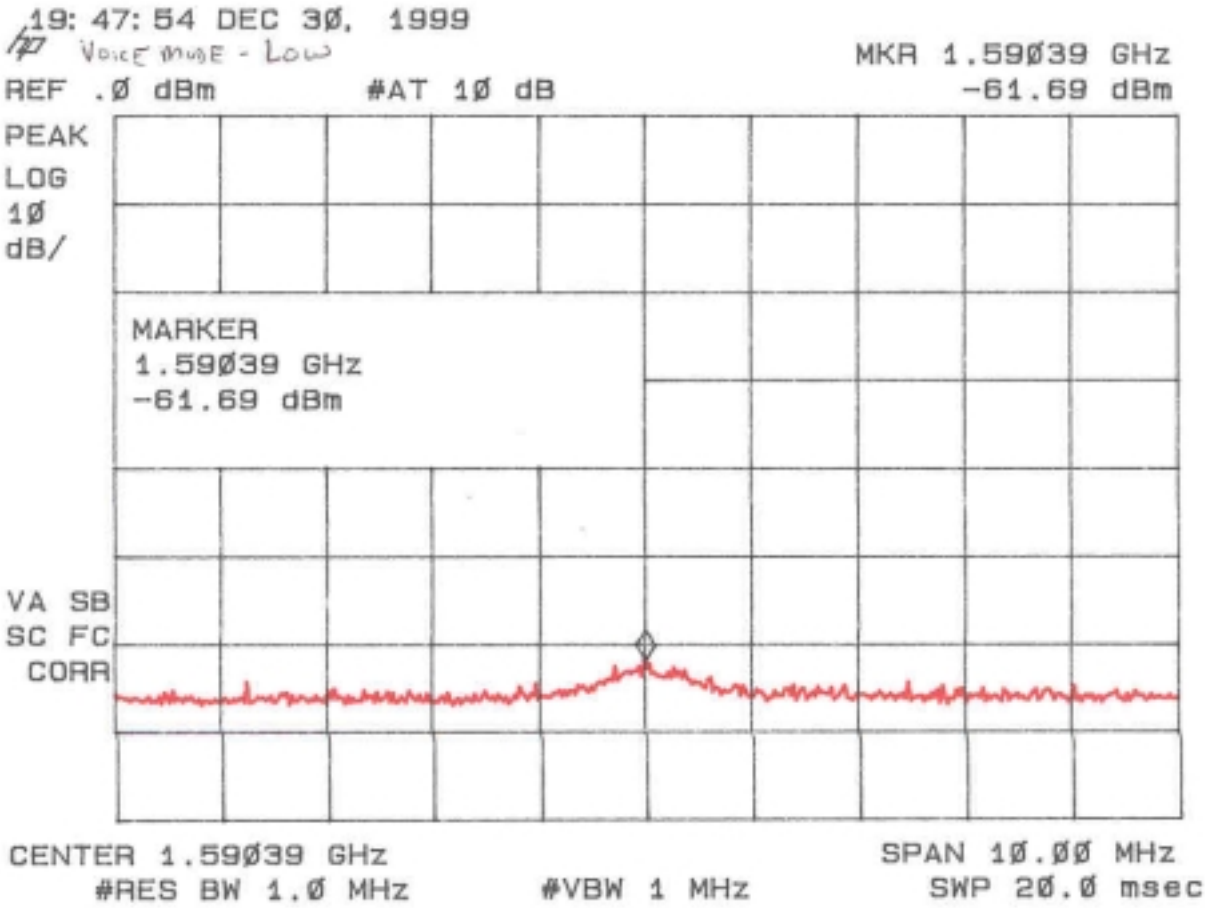


Figure 5h
Peak Radiated Spurious Emission 15.247(c) (Voice) Low

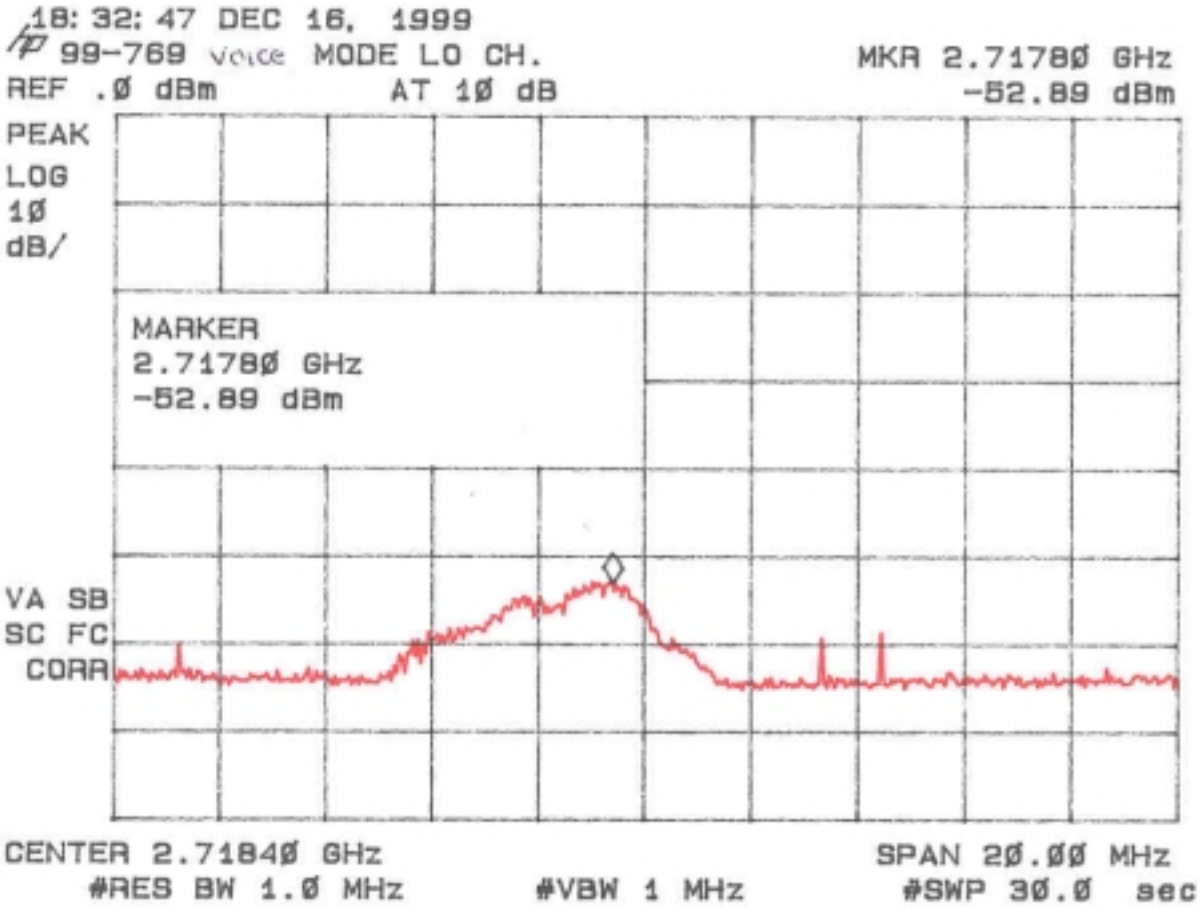


Figure 5i
Peak Radiated Spurious Emission 15.247(c) (Voice) Low

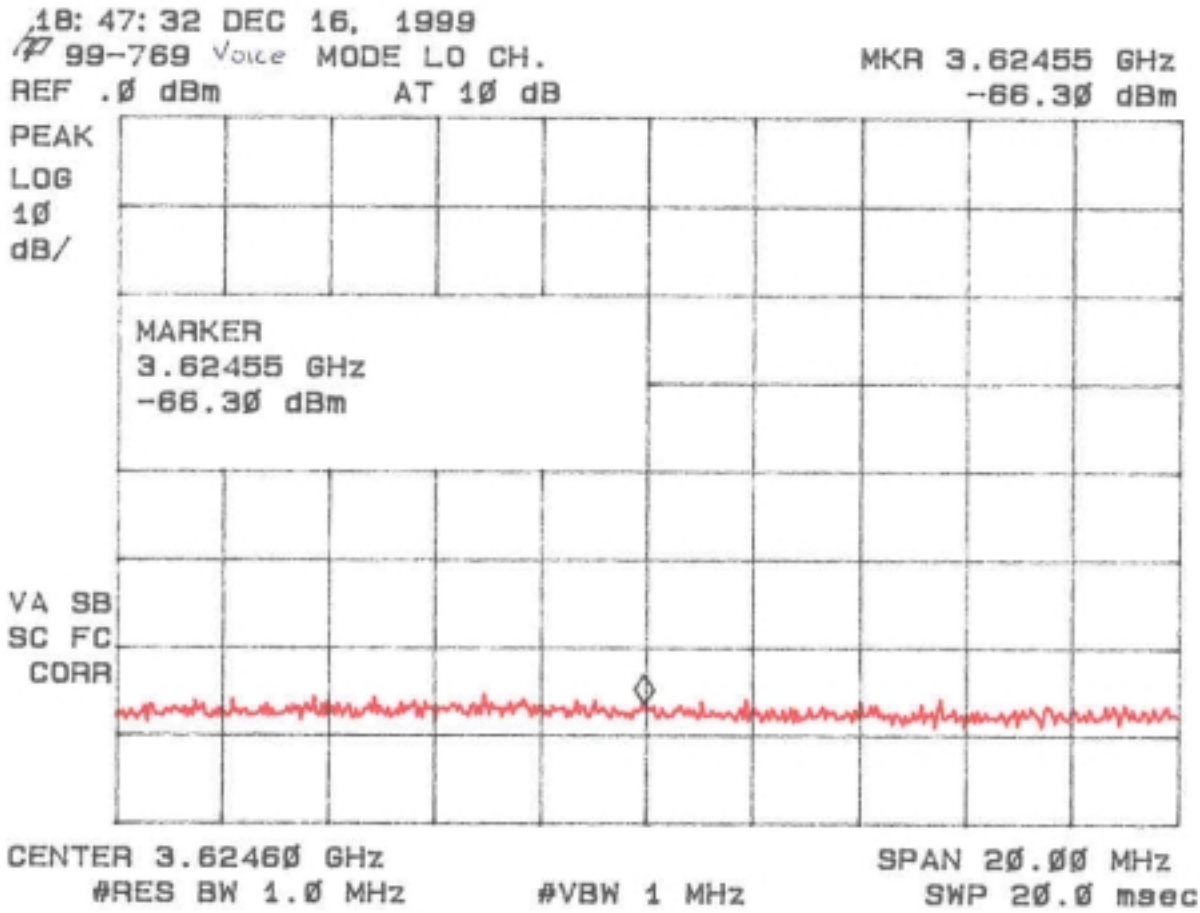


Figure 5j
Peak Radiated Spurious Emission 15.247(c) (Voice) Low

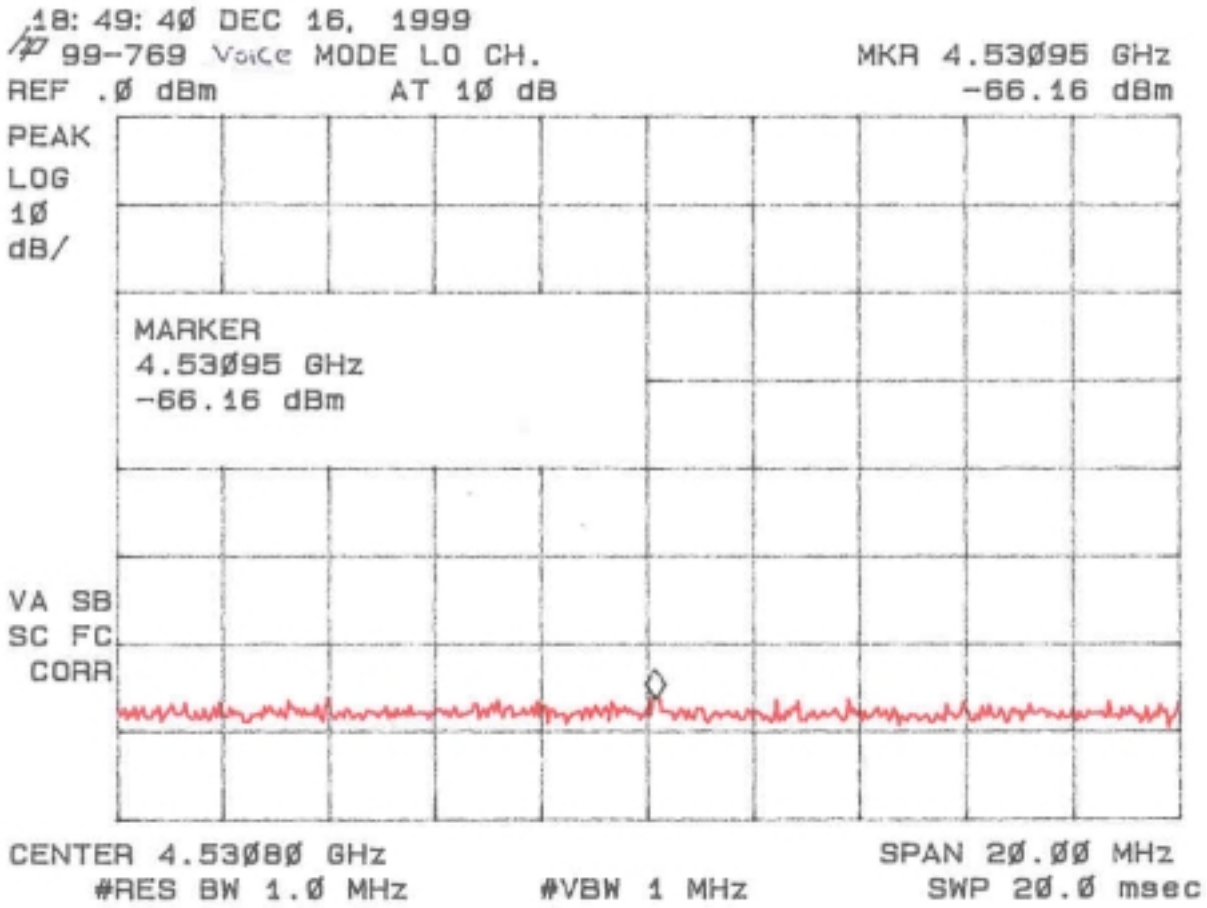


Figure 5k
Peak Radiated Spurious Emission 15.247(c) (Voice) Mid

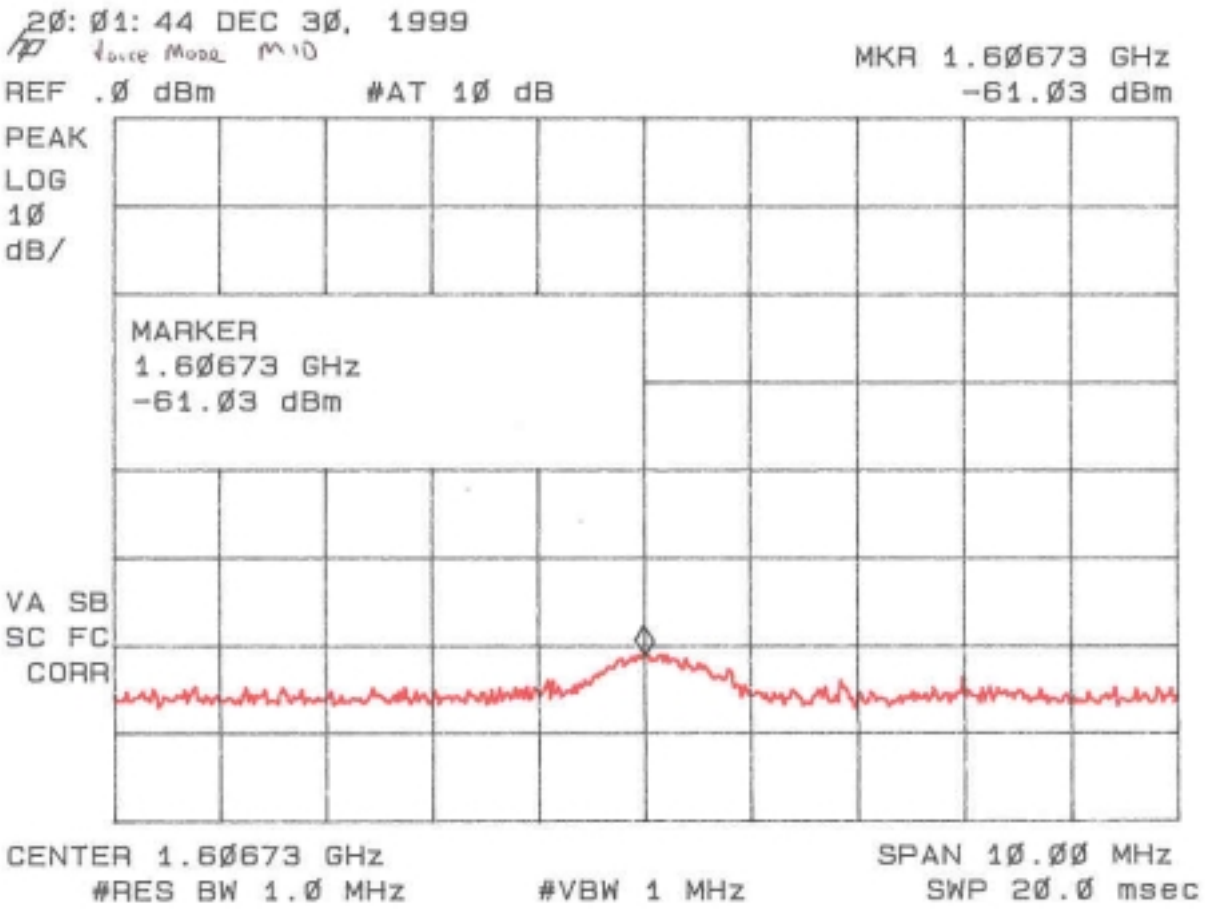


Figure 5l
Peak Radiated Spurious Emission 15.247(c) (Voice) Mid

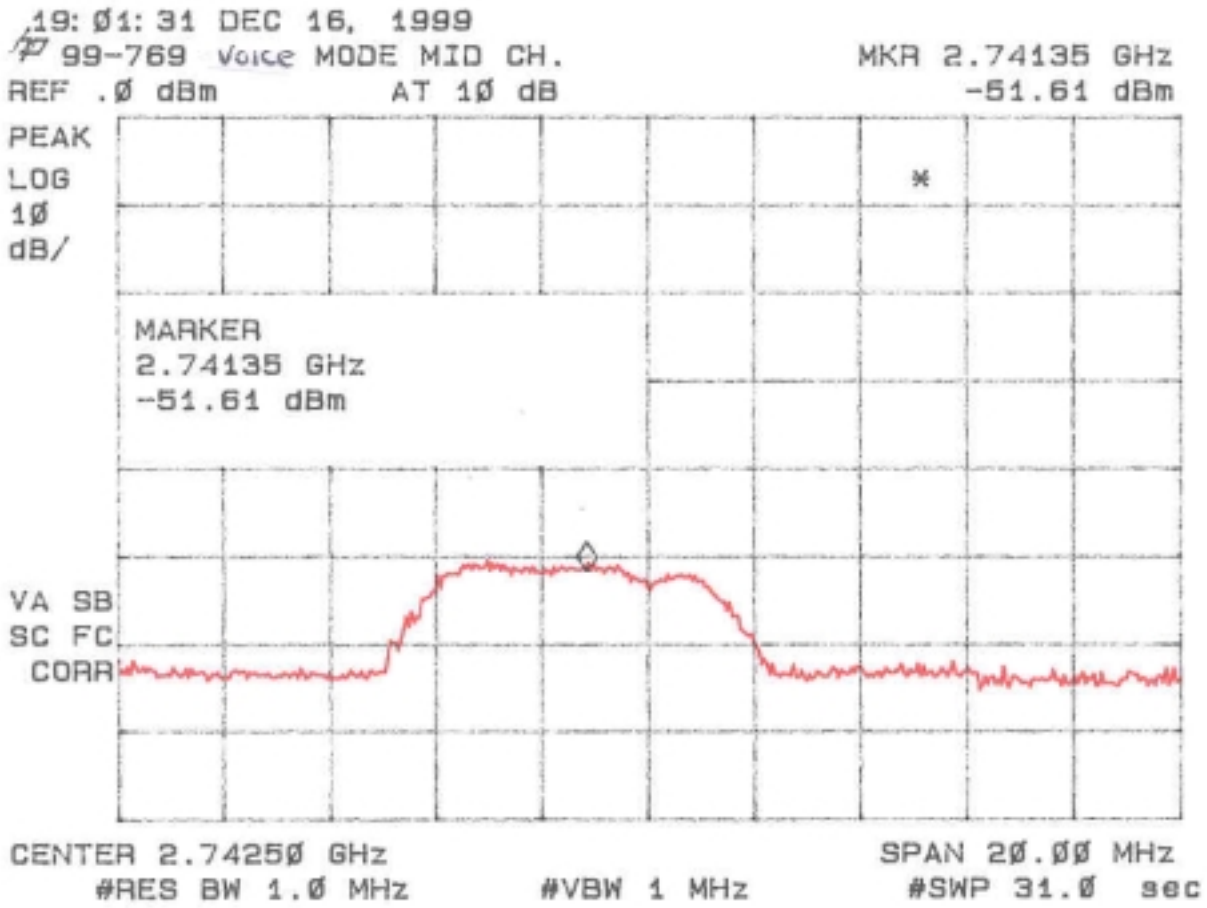


Figure 5m
Peak Radiated Spurious Emission 15.247(c) (Voice) Mid

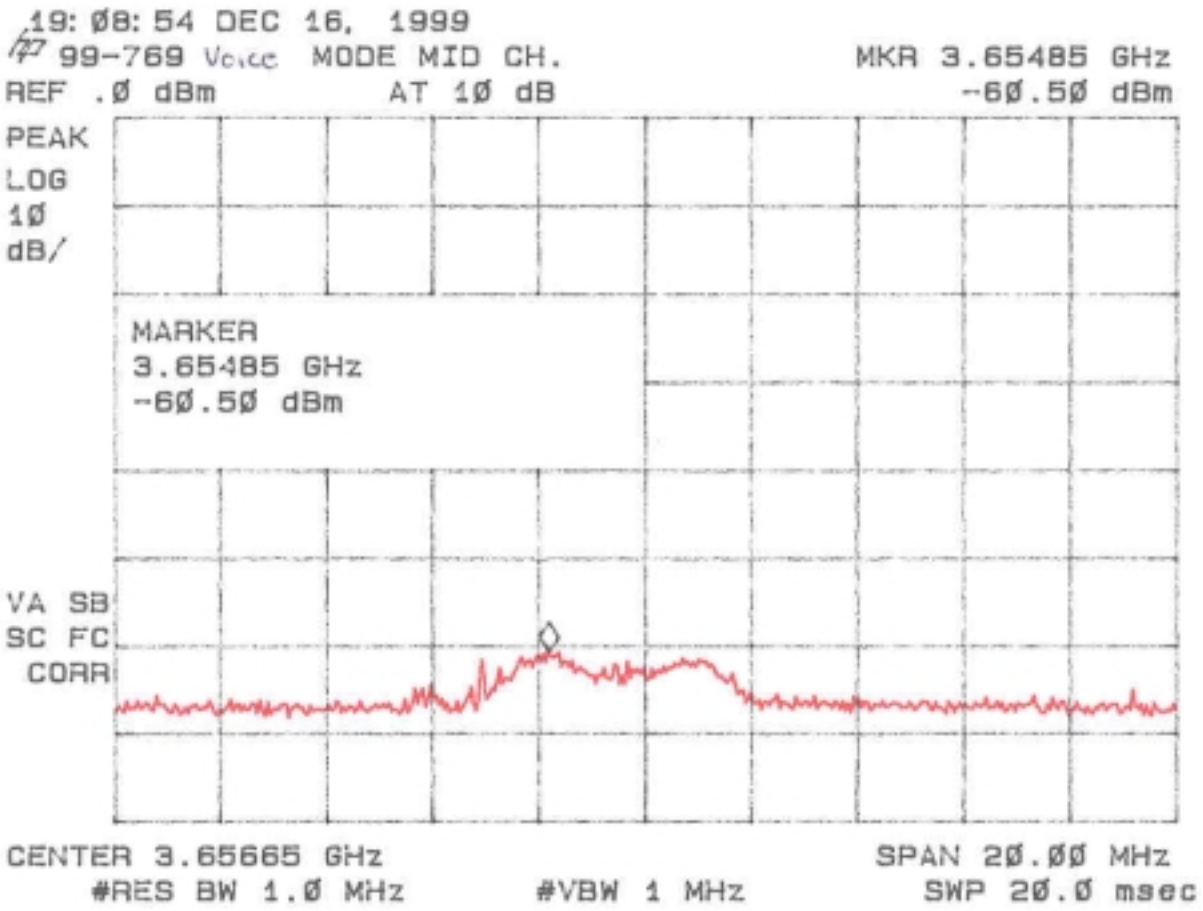


Figure 5n
Peak Radiated Spurious Emission 15.247(c) (Voice) High

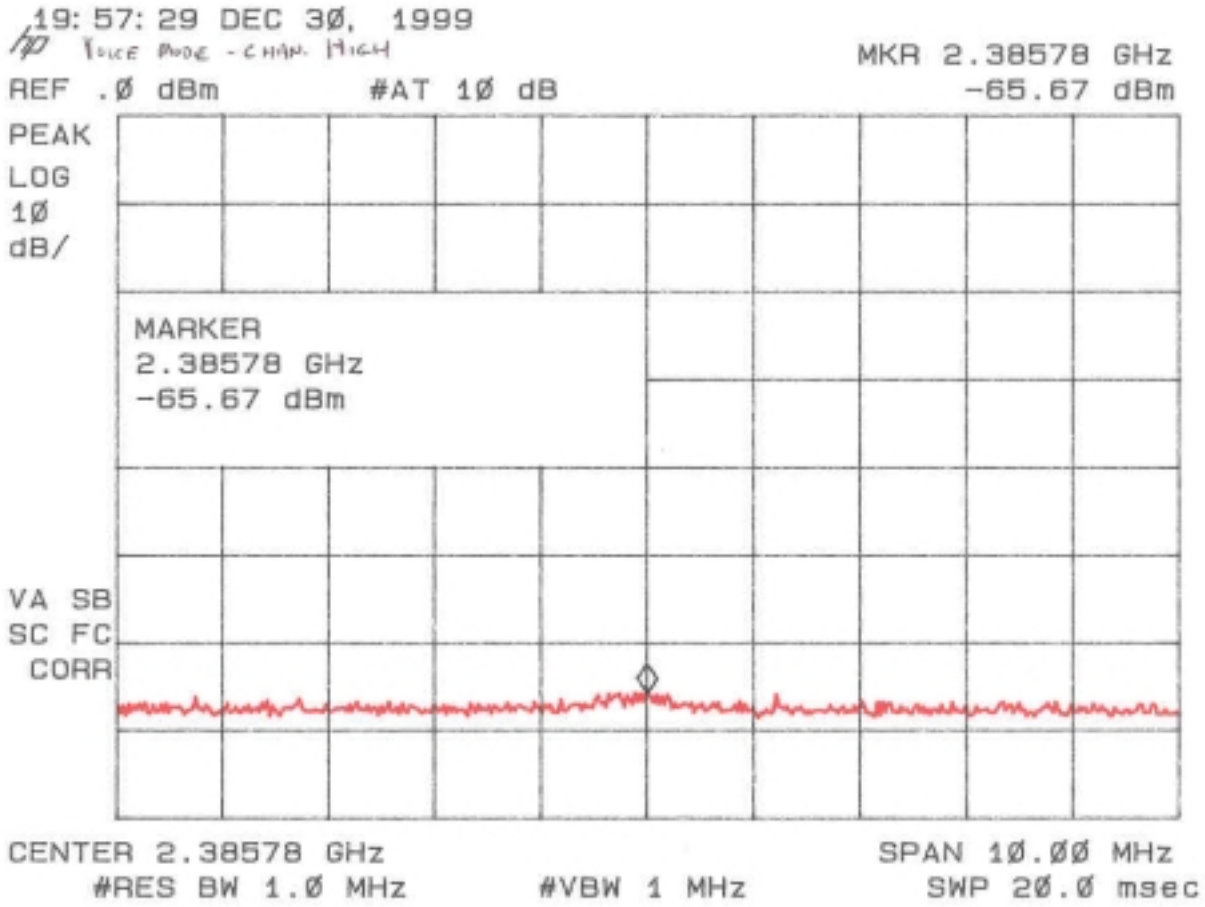


Figure 5o
Peak Radiated Spurious Emission 15.247(c) (Voice) High

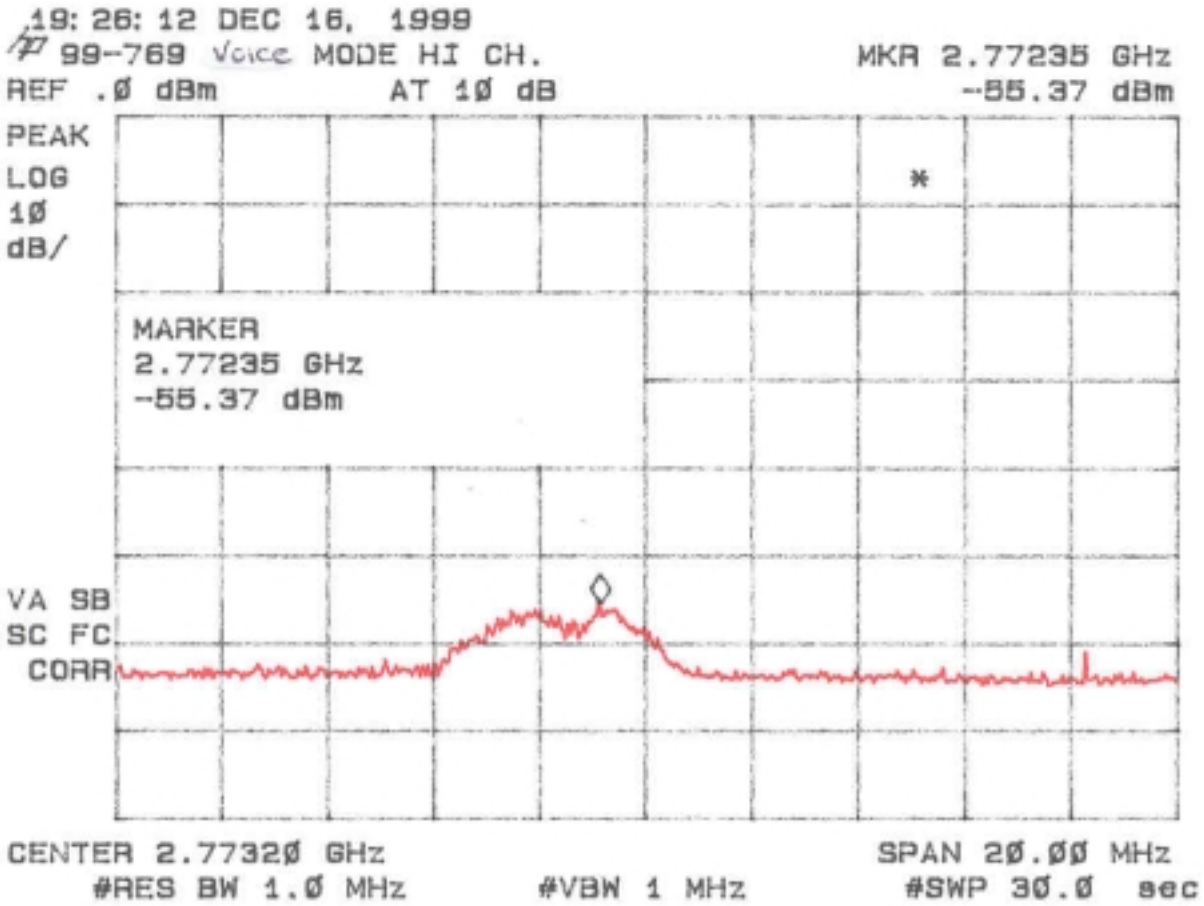


TABLE 4a PEAK RADIATED SPURIOUS EMISSIONS (Data - Low)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
1.590	-59.9	35.3	27.4	3.1	129.8	5000
2.717	-48.0	34.9	31.2	4.2	949.4	5000

TABLE 4b PEAK RADIATED SPURIOUS EMISSIONS (Data - Mid)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
1.595	-59.9	35.2	27.4	3.1	130.4	5000
2.723	-58.5	34.9	31.3	4.2	283.9	5000
3.631	-53.6	34.6	33.9	5.2	787.8	5000

TABLE 4c PEAK RADIATED SPURIOUS EMISSIONS (Data - High)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
1.598	-59.7	35.2	27.4	3.1	133.7	5000

*** = Data adjusted by + 1 dB for high pass filter**
**** = Instrumentation ground floor**

SAMPLE CALCULATION:
RESULTS (uV/m @ 3m) = Antilog ((-59.9 - 35.3 + 27.4 + 3.1 + 107)/20) = 129.8
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Results
Reviewed By
Signature: _____ Name: Tim R. Johnson

TABLE 4d PEAK RADIATED SPURIOUS EMISSIONS (Voice - Low)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
1.590	-60.7	35.3	27.4	3.1	118.4	5000
2.718	-51.9	34.9	31.2	4.2	606.1	5000
3.625	-65.3	34.6	33.9	5.2	204.2	5000
4.531	-65.2	34.2	34.0	7.1	271.3	5000

TABLE 4e PEAK RADIATED SPURIOUS EMISSIONS (Voice - Mid)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
1.607	-60.0	35.2	27.4	3.1	130.2	5000
2.741	-50.6	34.9	31.3	4.2	708.3	5000
3.655	-59.5	34.6	34.0	5.3	404.8	5000

TABLE 4f PEAK RADIATED SPURIOUS EMISSIONS (Voice - High)

Freq. (GHz)	Test Data* (dBm) @3m	Amp. Gain (dB)	Antenna Factor (dB)	Cable Loss (dB)	Results (uV/m) @3m	FCC Limits (uV/m) @3m
2.386	-64.7	34.8	30.6	3.9	124.9	5000
2.772	-54.4	34.9	31.3	4.2	461.1	5000

*** = Data adjusted by + 1 dB for high pass filter**

SAMPLE CALCULATION:
RESULTS (uV/m @ 3m) = Antilog ((-60.7 - 35.3 + 27.4 + 3.1 + 107)/20) = 118.4
CONVERSION FROM dBm TO dBuV = 107 dB

Tester Results
Reviewed By
Signature: _____ Name: Tim R. Johnson