

**Table 4y. PEAK RADIATED SPURIOUS EMISSIONS Low Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2400.88	-20.19	31.9	861919.8	-	-
4801.98	-43.53*	5.8	2910.3	5000.0	4.7
7203.05	-49.59* **	9.8	2304.4	86192.0	31.46
9604.35	-51.42* **	12.4	2509.6	86192.0	30.72

**Table 4z. PEAK RADIATED SPURIOUS EMISSIONS Low Mid Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2432.93	-22.35	31.95	660545.4	-	-
4865.85	-48.99*	6.03	1591.9	5000.0	9.94
7299.08	-49.12* **	9.9	2443.3	5000.0	6.2
9732.15	-56.75* **	12.7	1395.9	66054.5	33.5

**Table 4aa. PEAK RADIATED SPURIOUS EMISSIONS High Mid Channel
Whip Patch Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2464.95	-25.29	32.0	484547.3	-	-
4929.95	-48.49*	6.3	1729.6	5000.0	9.2
7394.93	-46.53* **	9.9	3299.1	5000.0	3.6
9860.05	-56.63* **	12.9	1454.2	48454.7	30.45

**Table 4bb. PEAK RADIATED SPURIOUS EMISSIONS High Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.31	-45.77*	6.3	2386.7	5000.0	6.4
7428.71	-46.77* **	9.9	3221.6	5000.0	3.8

* Data corrected by 1 dB for loss of high pass filter

** Data conversion from 1 meter to 3 meters = -9.54

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-43.53 + 5.8 + 107)/20)$ = 2910.3

CONVERSION FROM dBm TO dBuV = 107 dB

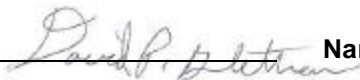
Tester
Signature:  Name: David Blethen

Figure 5y-1
Peak Radiated Spurious Emission 15.247(c) Low Channel –
Whip Antenna
2nd Harmonic

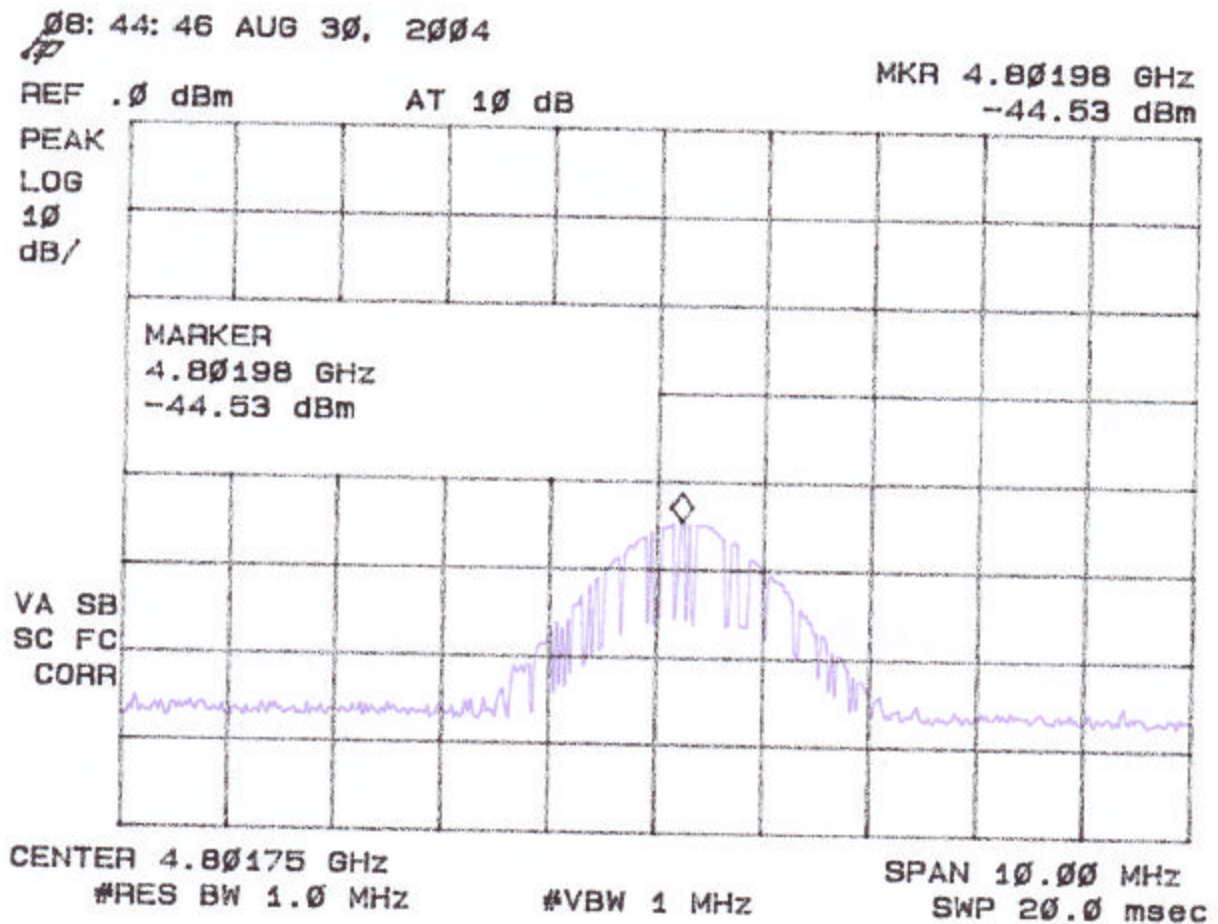


Figure 5y-2
Peak Radiated Spurious Emission 15.247(c) Low Channel –
Whip Antenna
3rd Harmonic

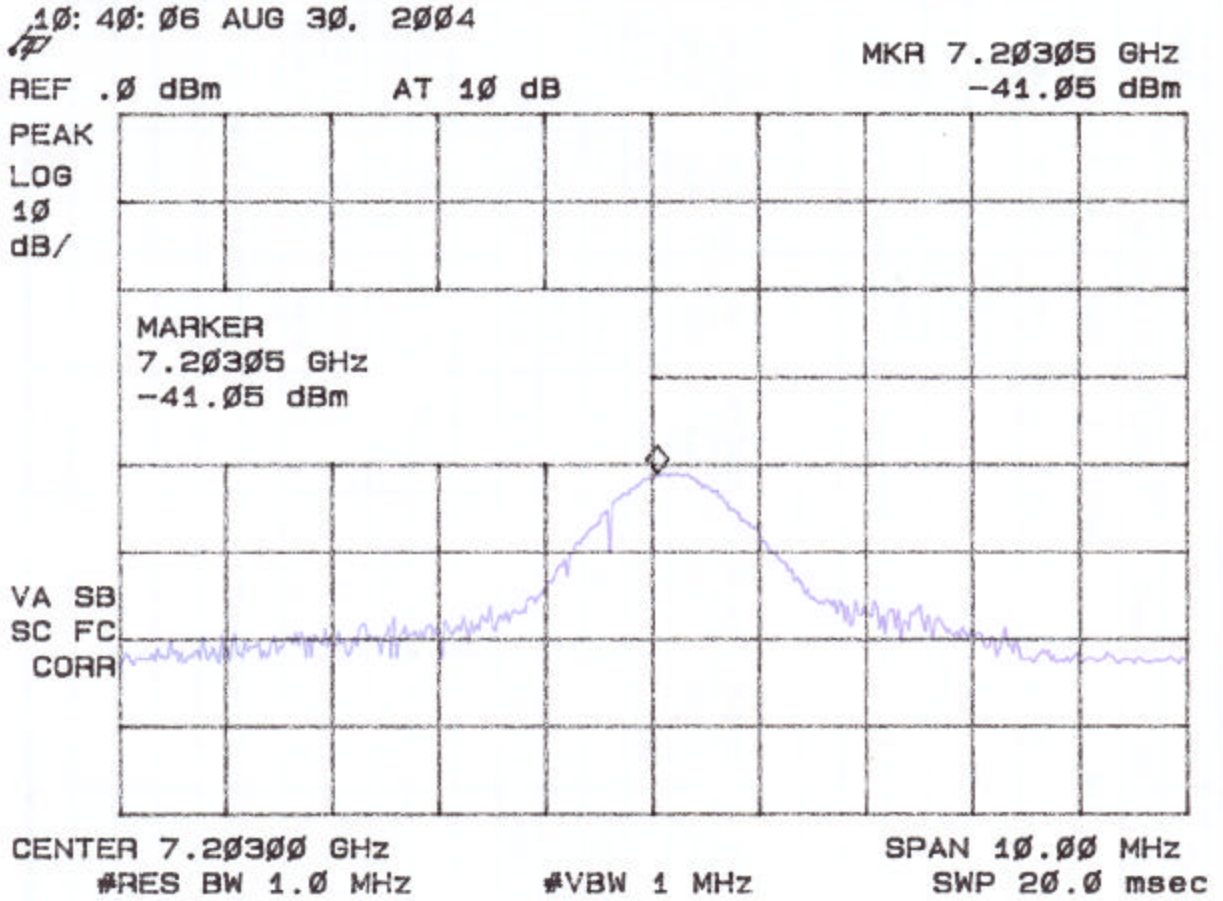


Figure 5y-3
Peak Radiated Spurious Emission 15.247(c) Low Channel –
Whip Antenna
4th Harmonic

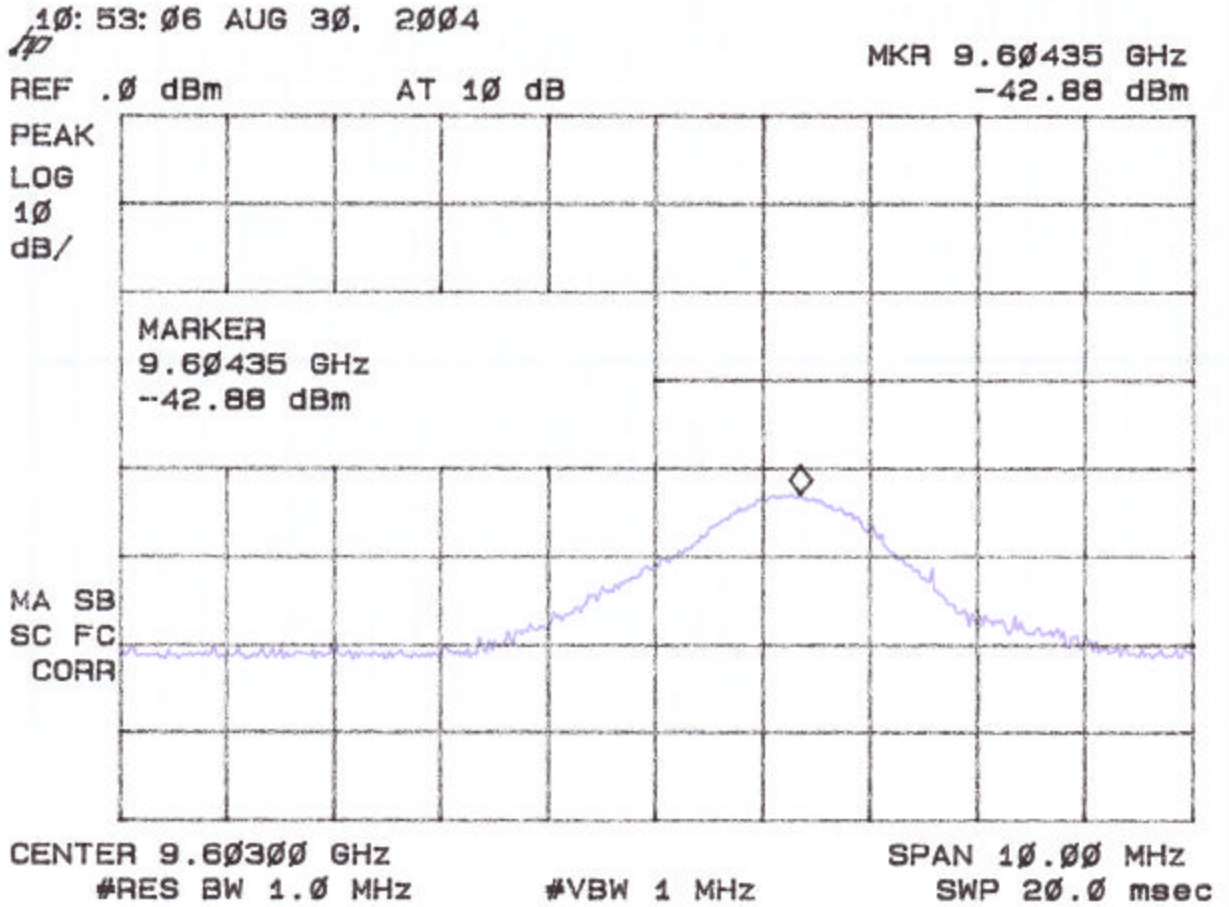


Figure 5z-1
Peak Radiated Spurious Emission 15.247(c) Low Mid Channel -
Whip Antenna
2nd Harmonic

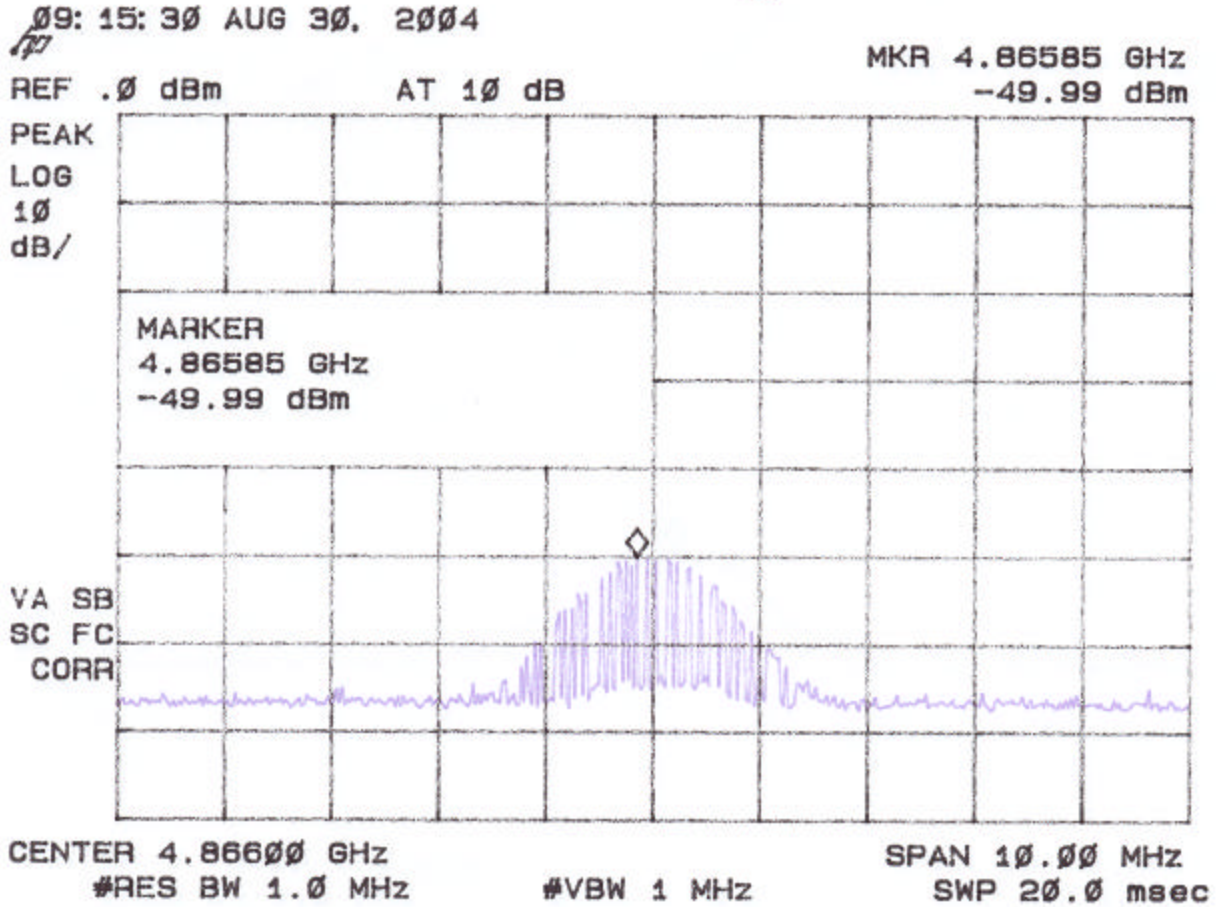


Figure 5z-2
Peak Radiated Spurious Emission 15.247(c) Low Mid Channel -
Whip Antenna
3rd Harmonic

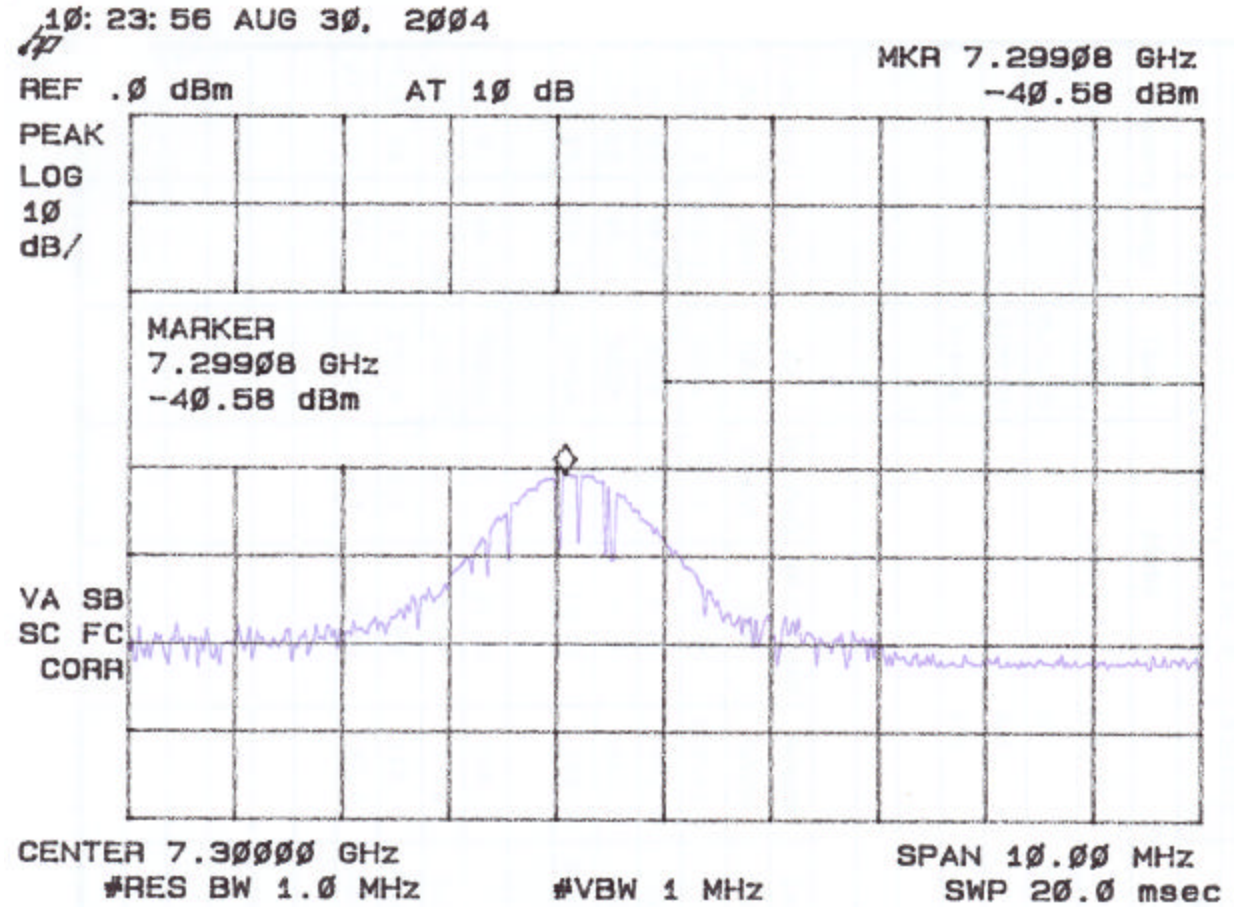


Figure 5z-3
Peak Radiated Spurious Emission 15.247(c) Low Mid Channel -
Whip Antenna
4th Harmonic

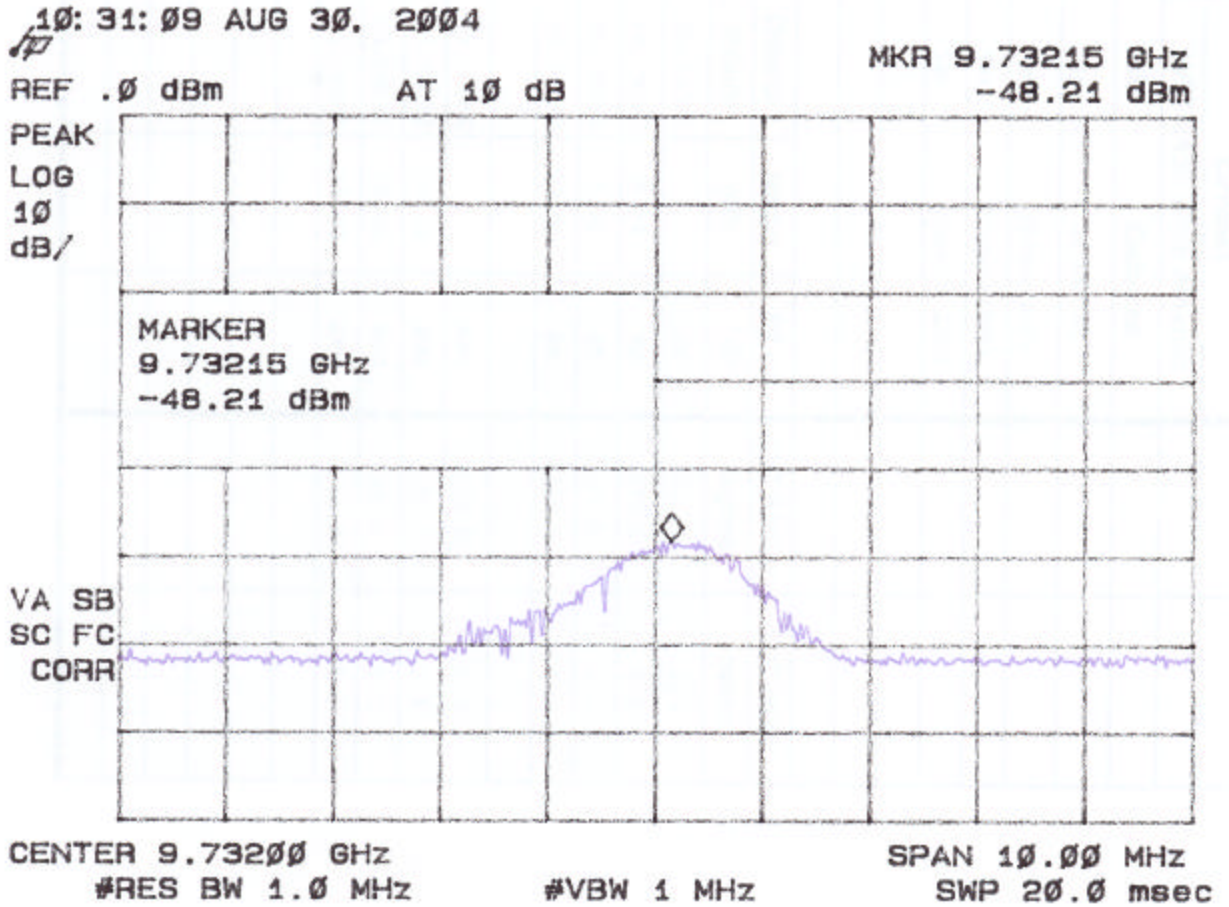


Figure 5aa-1
Peak Radiated Spurious Emission 15.247(c) High Mid Channel -
Whip Antenna
2nd Harmonic

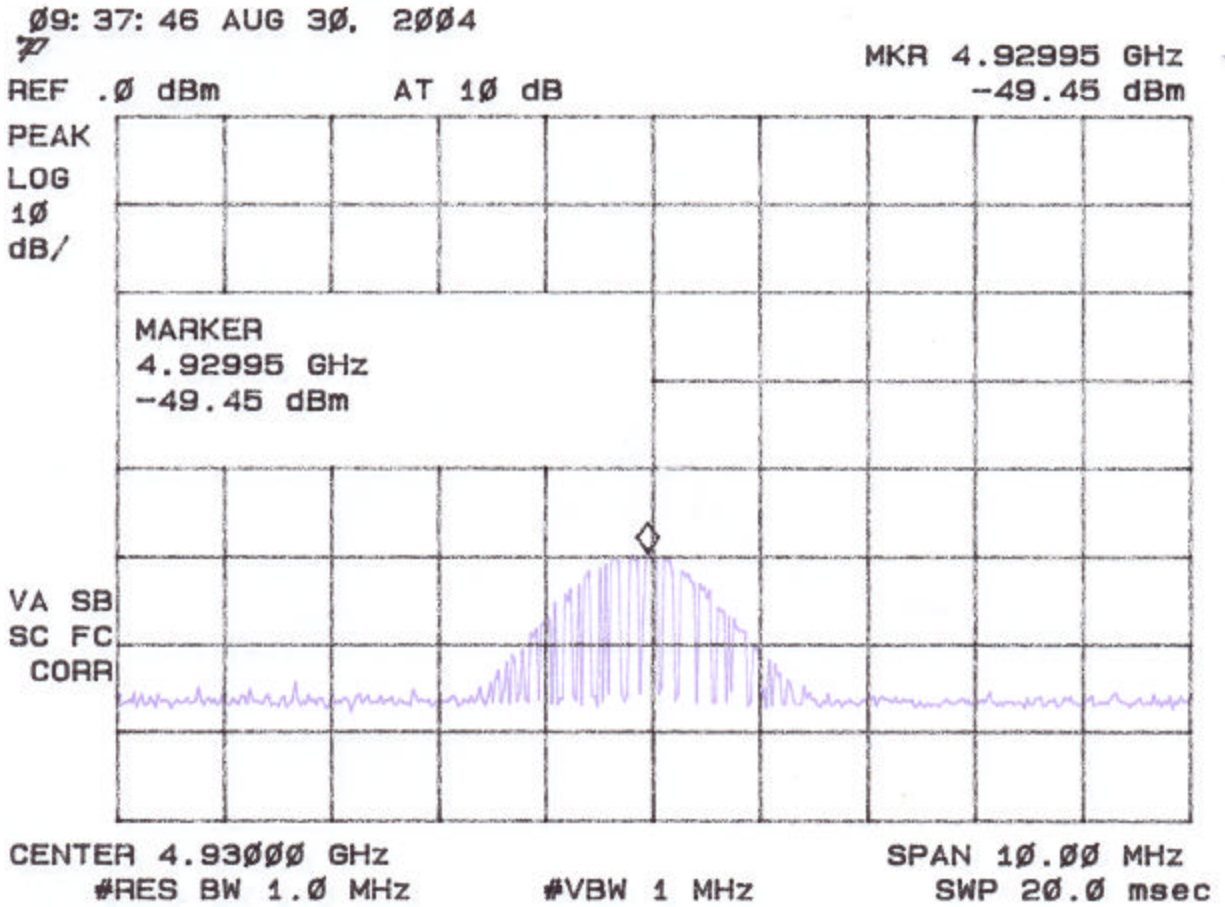


Figure 5aa-2
Peak Radiated Spurious Emission 15.247(c) High Mid Channel -
Whip Antenna
3rd Harmonic

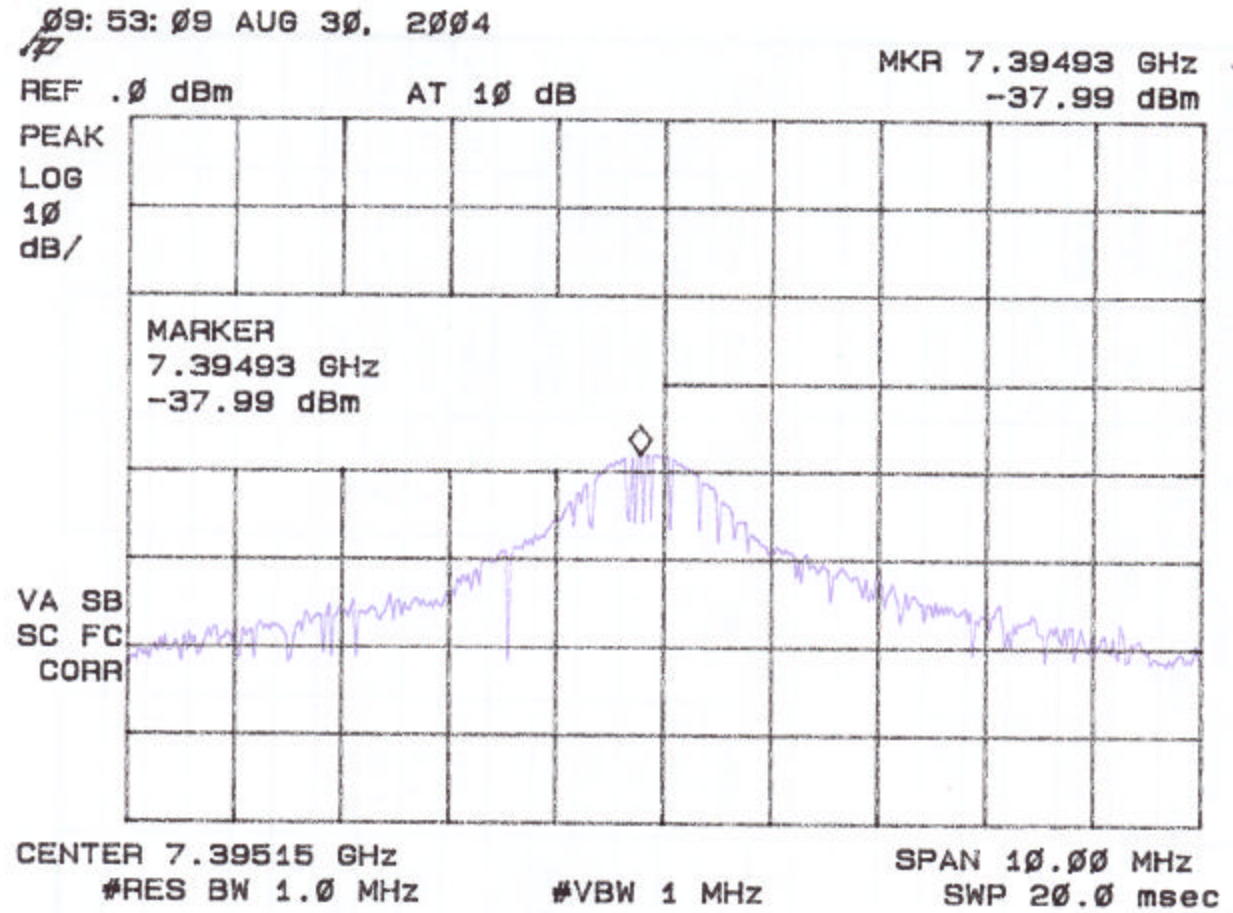


Figure 5aa-3
Peak Radiated Spurious Emission 15.247(c) High Mid Channel -
Whip Antenna
4th Harmonic

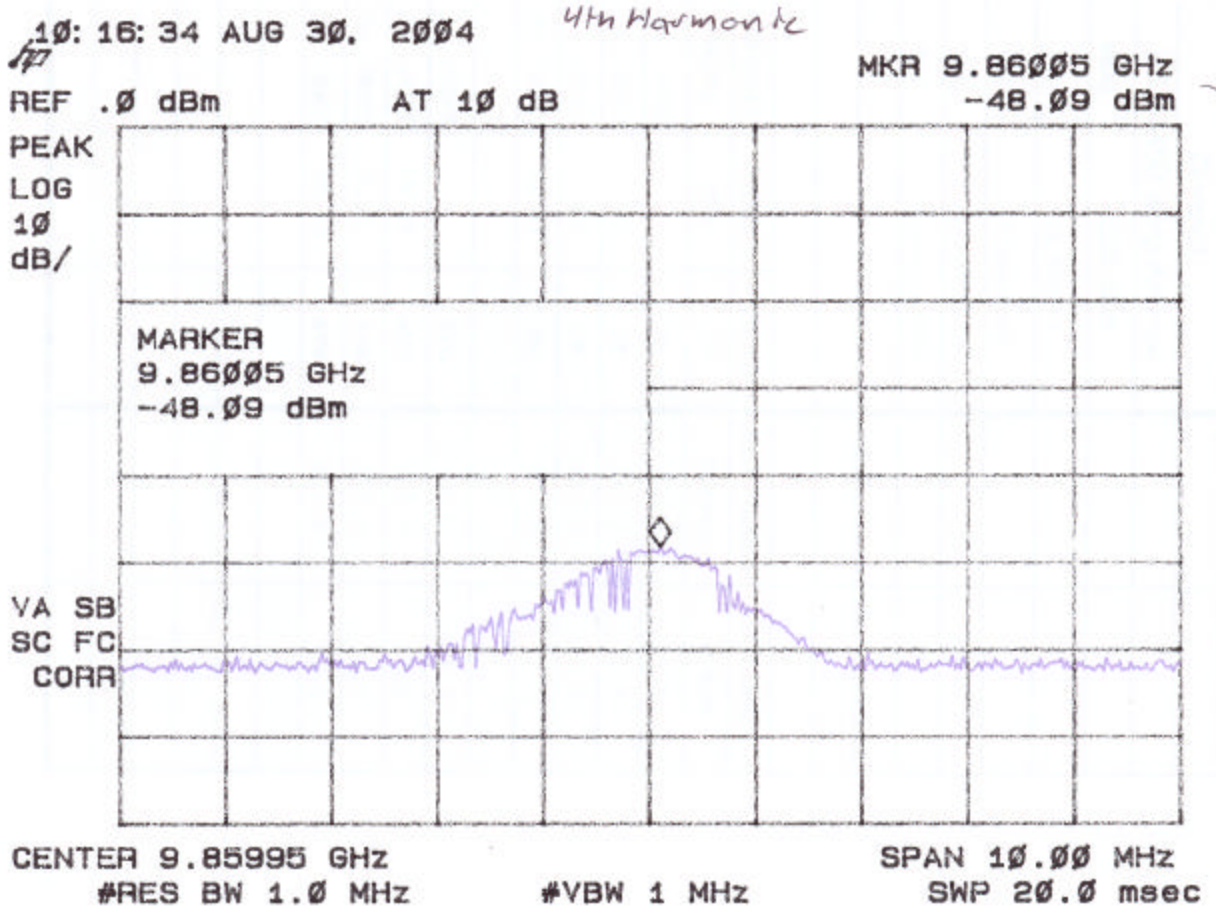


Figure 5bb-1
Peak Radiated Spurious Emission 15.247(c) High Channel -
Whip Antenna
2nd Harmonic

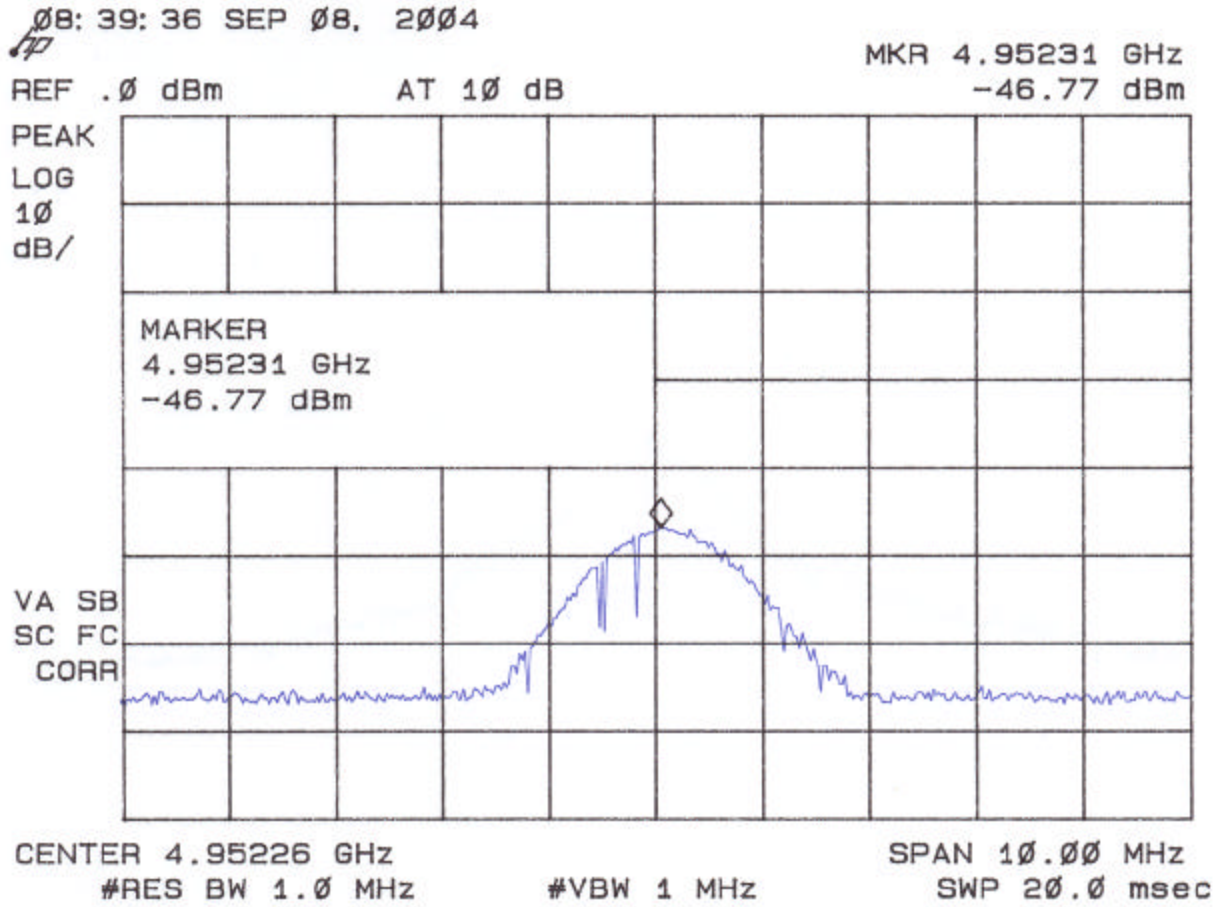
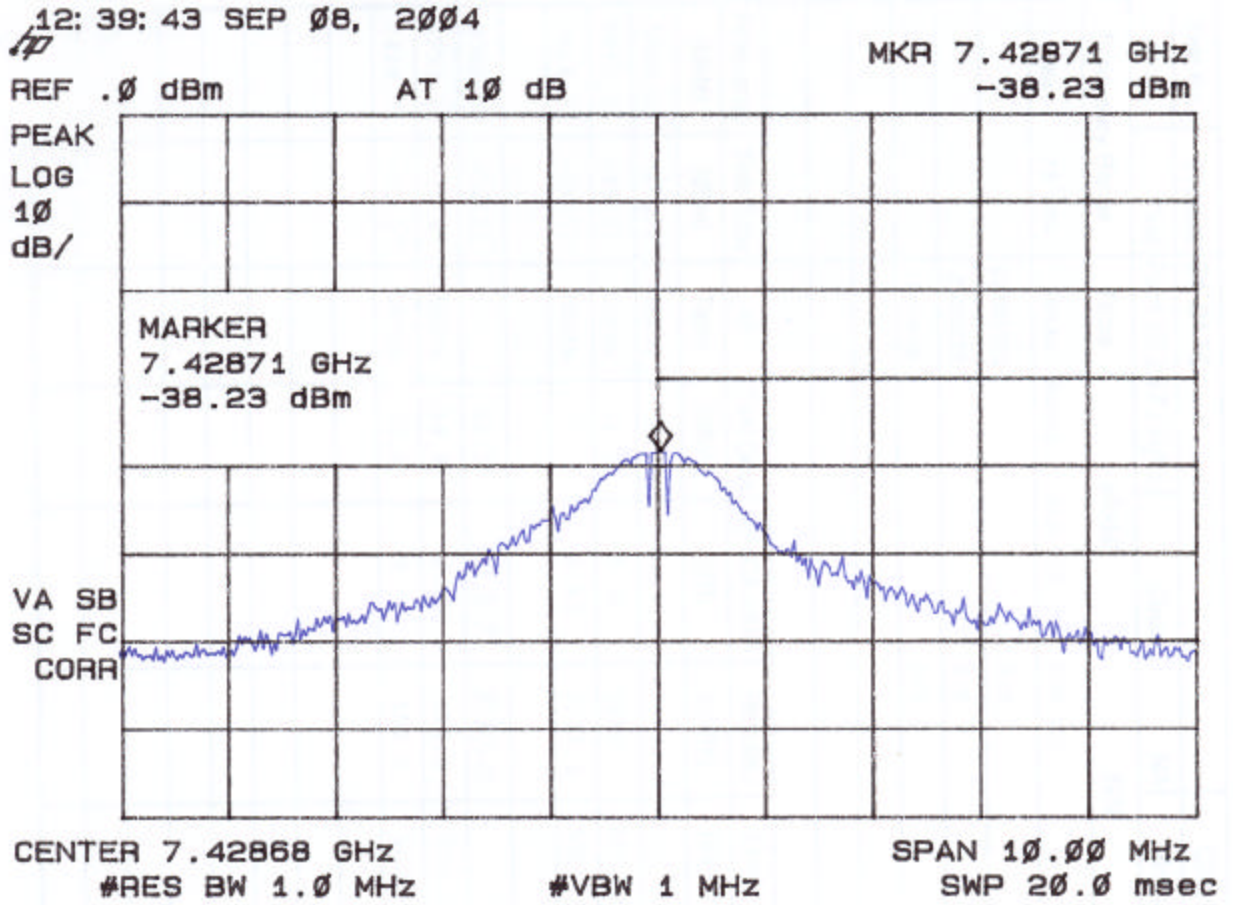


Figure 5bb-2
Peak Radiated Spurious Emission 15.247(c) High Channel -
Whip Antenna
3rd Harmonic



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

The results of average radiated spurious emissions falling within restricted bands are given in Tables 5a – 5f.

Worst Case Transmit Duty Cycle for WIT2450

The duty cycle de-rating factor used in the calculation of average radiated limits (per 15.209) is described below. This factor was calculated by first determining the worst case scenario for system operation – worst case being defined as the scenario when the WIT2450 would be transmitting the longest period during a dwell.

The worst case operating scenario is as follows:

- 1) point to point operation
(only two units communicating with each other)
- 2) data flow is almost completely unidirectional
(that is, one radio is relaying a large amount of data to the other radio with only synchronization data being passed back the other direction)
- 3) The amount of data being fed to the radio is exactly proportioned out to fit the maximum packet size allowable (280 bytes). The radio cannot send more than 280 bytes on a single channel – additional data must be sent on the next hop.

For this example, a remote unit is transferring a large data file to a base unit.

Maximum transmit time by Remote on a single channel:

$$= 280 \text{ bytes} * 8 \text{ bits /byte} * (1/460.8\text{kbps}) = 4.86 \text{ ms}$$

The minimum hop duration for this scenario would be 6.94ms. Given that we have 86 channels in our hop set, it takes 597ms to go through the entire hop table and repeat a transmission on the same channel. Therefore, only 4.86 ms worth of data can be transmitted on a single channel in any 100ms time period.

The transmission duty cycle correction factor is then calculated as:

$$20 \log_{10} (4.86\text{ms}/100\text{ms}) = \mathbf{-26.3 \text{ dB}}$$

**Table 5a. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Dipole Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2401.00	-47.42	31.9	37495.2	-	-
4802.1	-70.02	5.8	137.9	500.0	11.2
7203.08	-71.38	9.8	187.5	3749.5	26.0

**Table 5b. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Dipole Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4865.85	-76.04	6.0	70.7	500.0	17.0
7299.0	-71.58	9.9	184.1	500.0	8.7

**Table 5c. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Dipole Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4929.83	-79.9	6.3	46.6	500.0	20.6
7394.95	-71.23	9.9	192.5	500.0	8.3

**Table 5d. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Dipole Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.4	-69.02	6.3	164.2	500.0	9.7
7428.71	-71.24	9.9	192.6	500.0	8.3

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-70.02 + 5.8 + 107)/20)$ = 137.9

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

Signature:  Name: David Blethen

**Table 5e. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Parabolic Dish Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2408.30	-31.57	31.9	232825.6	-	-
4802.15	-73.02	5.8	97.6	500.0	14.2
7203.22	-71.32	9.8	188.8	23282.6	41.8

**Table 5f. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Parabolic Dish Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4865.99	-76.64	6.0	66.0	500.0	17.6
7298.99	-73.76	9.9	143.2	500.0	10.9

**Table 5g. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Parabolic Dish Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4929.93	-72.06	6.3	114.7	500.0	12.8
7394.98	-72.68	9.9	162.9	500.0	9.7

**Table 5h. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Parabolic Dish Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.31	-68.45	6.3	175.3	500.0	9.1
7428.68	-74.32	9.9	135.1	500.0	11.4

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-73.02 + 5.8 + 107)/20) = 14.2

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

Signature:  Name: David Blethen

**Table 5i. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
OMNI Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2400.9	-40.07	31.9	87391.3	-	-
4802.15	-77.87	5.8	55.8	500.0	19.0
7203.23	-72.33	9.8	168.1	8739.1	34.3

**Table 5j. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
OMNI Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4865.7	-81.06	6.0	39.7	500.0	22.0
7299.05	-73.68	9.9	144.5	500.0	10.8

**Table 5k. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
OMNI Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4930.01	-76.16	6.2	71.5	500.0	16.9
7395.06	-71.60	9.9	184.5	500.0	8.7

**Table 5l. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
OMNI Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.33	-68.51	6.3	174.1	500.0	9.2
7428.69	-69.39	9.9	238.3	500.0	6.4

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-77.87 + 5.8 + 107)/20)$ = 55.8

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 5m. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Yagi Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2401.0	-40.49	31.9	83267.3	-	-
4801.88	-76.98	5.8	61.9	500.0	18.2
7203.25	-71.73	9.8	180.1	8326.7	33.3

**Table 5n. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Yagi Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4865.93	-74.83	6.0	81.3	500.0	15.8
7299.16	-75.55	9.9	116.5	500.0	12.6

**Table 5o. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Yagi Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4930.18	-84.86	4.5	21.4	500.0	27.4
7394.98	-73.75	9.9	144.0	500.0	10.8

**Table 5p. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Yagi Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.41	-69.92	6.3	148.0	500.0	10.6
7428.73	-70.20	9.9	217.1	500.0	7.3

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-76.98 + 5.8 + 107)/20)$ = 18.2

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

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**Table 5q. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Corner Reflector Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2401.1	-37.10	31.9	123021.1	-	-
4802.13	-72.00	5.8	109.8	500.0	13.2
7203.13	-69.90	9.8	222.4	12302.1	34.9

**Table 5r. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Corner Reflector Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4865.95	-74.00	6.0	89.4	500.0	15.0
7299.13	-73.30	9.9	151.0	500.0	10.4

**Table 5s. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Corner Reflector Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4930.09	-75.90	6.2	73.7	500.0	16.6
7203.18	-69.80	9.8	224.9	500.0	6.9

**Table 5t. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Corner Reflector Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.38	-71.19	6.3	127.9	500.0	11.8
7428.71	-71.00	9.9	198.0	500.0	8.05

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog ((-72.00 + 5.8 + 107)/20) = 109.8

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

Signature:  Name: David Blethen

**Table 5u. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Large Patch Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2400.94	-46.76	31.9	45391.2	-	-
4802.0	-68.17	5.8	170.6	500.0	9.3
7203.02	-68.13	9.8	272.6	4539.1	24.43
9604.34	-81.47	12.41	78.9	4539.1	35.20

**Table 5v. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Large Patch Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2433.03	-45.95	31.95	44659.1	-	-
4865.88	-71.86	6.0	114.4	500.0	12.8
7299.13	-75.49	9.8	117.3	500.0	12.6
9732.02	-86.21	12.65	47.0	4465.9	39.6

**Table 5w. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Large Patch Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2464.88	-47.08	32.0	39430.4	-	-
4929.9	-73.41	6.3	98.2	500.0	14.1
7395.1	-69.28	9.9	240.9	500.0	6.3
9860.05	-84.96	12.93	56.0	3943.0	37.0

**Table 5x. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Large Patch Antenna**


Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.34	-71.52	6.3	123.1	500.0	12.2
7428.63	-72.23	9.9	171.8	500.0	9.3

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-68.17 + 5.8 + 107)/20)$ = 170.6

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

Signature: 

Name: David Blethen

**Table 5y. AVERAGE RADIATED SPURIOUS EMISSIONS Low Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2400.88	-46.49	31.9	41731.8	-	-
4801.98	-69.83	5.8	140.9	500.0	11.0
7203.05	-75.89	9.8	111.6	4173.2	31.5
9604.35	-77.72	12.4	121.5	4173.2	30.7

**Table 5z. AVERAGE RADIATED SPURIOUS EMISSIONS Low Mid Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2432.93	-48.85	32.0	31981.8	-	-
4865.85	-75.29	6.0	77.1	500.0	16.2
7299.08	-75.42	9.9	118.3	500.0	12.5
9732.15	-83.05	12.7	67.6	3198.2	33.5

**Table 5aa. AVERAGE RADIATED SPURIOUS EMISSIONS High Mid Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
2464.95	-51.59	32.0	23460.4	-	-
4929.95	-74.75	6.3	84.1	500.0	15.5
7394.93	-72.83	9.9	159.7	500.0	9.9
9860.05	-82.93	12.9	70.4	2346.0	30.5

**Table 5bb. AVERAGE RADIATED SPURIOUS EMISSIONS High Channel
Whip Antenna**

Freq. (MHz)	Test Data (dBm) @ 3m	AF + CA - AMP (dB)	Results (uV/m) 3m	FCC Limits (uV/m)	MARGIN BELOW FCC Limits (dB)
4952.31	-72.07	6.3	115.6	500.0	12.7
7428.71	-73.07	9.9	156.0	500.0	10.1

SAMPLE CALCULATION:

RESULTS (uV/m @ 3m) = Antilog $((-69.83 + 5.8 + 107)/20)$ = 140.9

CONVERSION FROM dBm TO dBuV = 107 dB

Tester

Signature: _____



Name: David Blethen