FCC ID: BCK9GKAUR5801T1-1

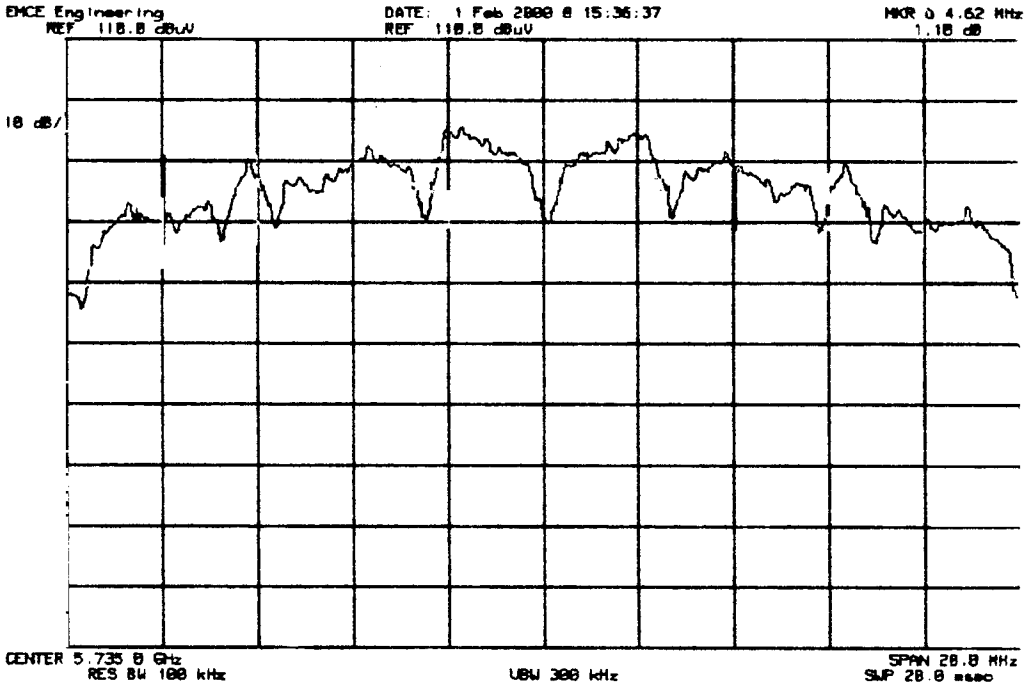


Figure 1. 6 dB Bandwidth, 1T1 Low Freq Unit.

BW = 4.62 MHz, Limit = >500 kHz.

Unit Passes Paragraph 15.247(a)

FCC ID: BCK9GKAUR5801T1-1

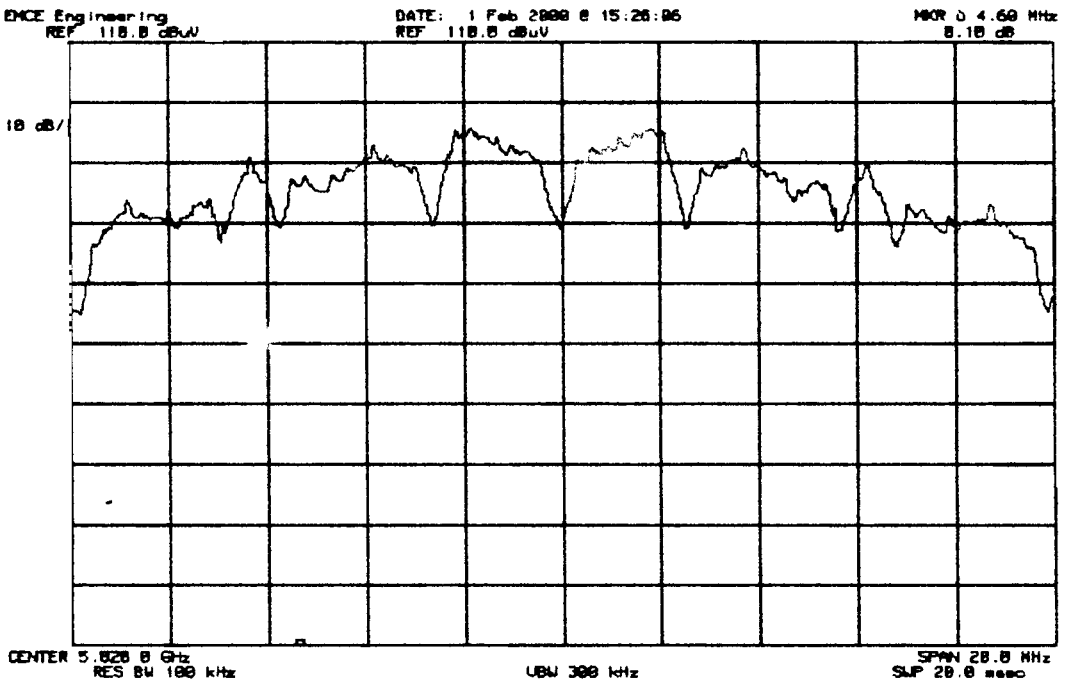


Figure 2. 6 dB Bandwidth, Mid Freq. Unit.

BW = 4.6 MHz, Limit = >500 kHz

Unit Passes Paragraph 15.247 (a)

FCC ID: BCK9GKAUR5801T1-1

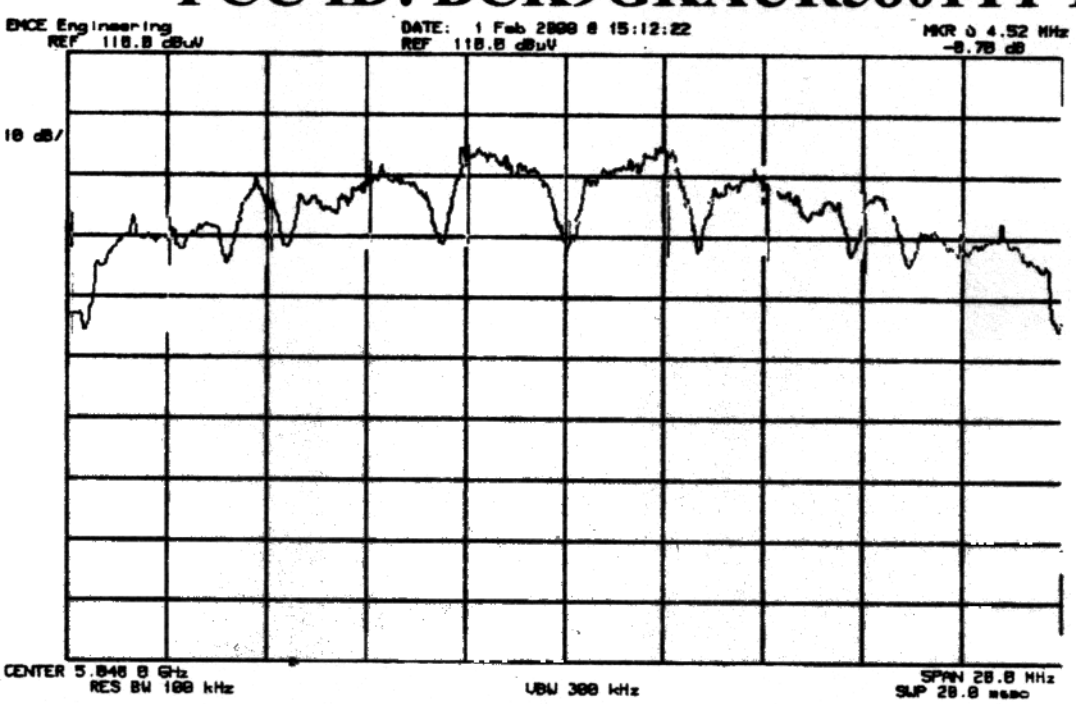


Figure 3. 6 dB Bandwidth, higher freq. Unit. BW = 4.52 MHz, Limit + >500 kHz. Unit Passes Paragraph 15.247(a)

Part 15, Paragraph 15.247 (b).
Maximum Peak Output Power

Lower frequency Unit, 990103AS1

Maximum Peak Output Power, as measured with a Power Meter =

+19.2 dBm
or
0.083 Watts

Limit = < 1.0 Watts

Unit Passes Paragraph 15.247(b)

Power meter: Hewlett Packard Company model # 435B, Serial # 2005A01436.
Cal Date: 2 Feb 2000

Part 15, Paragraph 15.247 (b).
Maximum Peak Output Power

Mid frequency Unit, 990103AL1-3

Maximum Peak Output Power, as measured with a Power Meter =

+19.0 dBm
or
0.079 Watts

Limit = < 1.0 Watts

Unit Passes Paragraph 15.247(b)

Power meter: Hewlett Packard Company model # 435B, Serial # 2005A01436.
Cal Date: 2 Feb 2000

Part 15, Paragraph 15.247 (b).
Maximum Peak Output Power

High frequency Unit, 990103AN1-3

Maximum Peak Output Power, as measured with a Power Meter =

+19.4 dBm
or
0.087 Watts

Limit = < 1.0 Watts

Unit Passes Paragraph 15.247(b)

Power meter: Hewlett Packard Company model # 435B, Serial # 2005A01436.
Cal Date: 2 Feb 2000

SUMMARY OF ANTENNA CONDUCTED FOR THREE RADIOS

Low Frequency Radio, 990103AS1				
Frequency GHz	Haremonic	Signal Level dBm	LIMIT dBm	PASS OR FAIL
5.733	1	7.5	NA	
11.465	2	< - 40.9	-12.5	PASS
17.204	3	< - 36.6	-12.5	PASS
22.926	4	< - 26.8	-12.5	PASS
28.665	5	< - 75	-12.5	PASS
34.398	6	< - 75	-12.5	PASS
40.131	7	NA	NA	
Mid Frequency Radio, 990103AL1-3				
5.816	1	8.4	NA	
11.639	2	< - 42.8	-11.6	PASS
17.444	3	< - 36	-11.6	PASS
23.299	4	< - 26.5	-11.6	PASS
29.08	5	< - 75	-11.6	PASS
34.896	6	< - 75	-11.6	PASS
40.712	7	NA	NA	
High Frequency Radio, 990103AN1-3				
5.841	1	8.5	NA	
11.674	2	< - 41.1	-11.5	PASS
17.517	3	< - 36.5	-11.5	PASS
23.357	4	< - 27.3	-11.5	PASS
29.205	5	<-76.5	-11.5	PASS
35.046	6	<-76.5	-11.5	PASS
40.887	7	NA	NA	

Para 15.247(c) Harris Model Aurora 5800

All Units Pass

Radiated Emissions Summary Harris Aurora 5800

Lower Frequency Radio, 990103AS1

Restricted Band MHz	Analyzer Reading dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Gain dB	Corrected Value dBuV/m	Limit dBuV/m	PASS OR FAIL
960-1240	17.2	22	1	26	14.2	54	PASS
1300-1427	17.3	22.5	1.2	26	15	54	PASS
1435-1626	17.5	22.6	1.4	26	15.5	54	PASS
1645.5-1646.5	17.5	22.6	1.4	26	15.5	54	PASS
1660-1710	17.6	22.6	1.4	26	15.6	54	PASS
1718-1722.2	17.6	22.7	1.4	26	15.7	54	PASS
2200-2300	18.4	21.6	2.1	28	14.1	54	PASS
2310-2390	18.5	21.3	2.2	28	14	54	PASS
2483.5-2500	19.6	21.4	2.2	28	15.2	54	PASS
2655-2900	18.6	21.8	2.2	28	14.6	54	PASS
3260-3267	17.9	21.9	3	28	14.8	54	PASS
3332-3339	17.2	22.2	3	28	14.4	54	PASS
3345-3358	17.2	22.2	3	28	14.4	54	PASS
3600-4400	17.9	20.4	3.3	28	13.6	54	PASS
4500-5150	18.5	20.4	3.3	27	15.2	54	PASS
5350-5460	18.1	20.9	5.5	27	17.5	54	PASS
7250-7750	24.2	20.6	7	27	24.8	54	PASS
8025-8500	23.3	20.8	7.5	26	25.6	54	PASS
9000-9200	23.1	21.2	7.6	26	25.9	54	PASS
9300-9500	23.6	20.8	8.1	26	26.5	54	PASS
10600-12700	27.3	22.7	8.3	26	32.3	54	PASS
13250-13400	27.4	22.6	9	25	34	54	PASS
14470-14500	27.7	22.8	9.5	25	35	54	PASS
15349-16200	28.2	22.5	10.2	26	34.9	54	PASS
17700-21400	35.6	23.2	0	26	32.8	54	PASS
22010-23120	N						
23600-24000	N						
31200-31800	N						
36430-36500	N						
38600-40000	N						

N = Signals above 21400 MHz were not measured because no harmonics fall into the Restricted Bands and all prior measurements are very low compared to the Limit. Also, there were no signals noted in the Restricted Bands during Antenna Conducted measurement.

Shaded Row includes second harmonic.

Radiated Emissions Summary Harris Aurora 5800

Mid Frequency Radio, 990103AL1-3

Restricted Band MHz	Analyzer Reading dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Gain dB	Corrected Value dBuV/m	Limit dBuV/m	PASS OR FAIL
960-1240	17.6	22	1	26	14.6	54	PASS
1300-1427	17.4	22.5	1.2	26	15.1	54	PASS
1435-1626	17.5	22.6	1.4	26	15.5	54	PASS
1645.5-1646.5	17.5	22.6	1.4	26	15.5	54	PASS
1660-1710	17.6	22.6	1.4	26	15.6	54	PASS
1718-1722.2	17.6	22.7	1.4	26	15.7	54	PASS
2200-2300	18.4	21.6	2.1	28	14.1	54	PASS
2310-2390	18.5	21.3	2.2	28	14	54	PASS
2483.5-2500	18.6	21.4	2.2	28	14.2	54	PASS
2655-2900	18.5	21.8	2.2	28	14.5	54	PASS
3260-3267	17.9	21.9	3	28	14.8	54	PASS
3332-3339	17.2	22.2	3	28	14.4	54	PASS
3345-3358	17.2	22.2	3	28	14.4	54	PASS
3600-4400	17.9	20.4	3.3	28	13.6	54	PASS
4500-5150	18.5	20.4	3.3	27	15.2	54	PASS
5350-5460	18.1	20.9	5.5	27	17.5	54	PASS
7250-7750	24.2	20.6	7	27	24.8	54	PASS
8025-8500	23.3	20.8	7.5	26	25.6	54	PASS
9000-9200	23.1	21.2	7.6	26	25.9	54	PASS
9300-9500	23.6	20.8	8.1	26	26.5	54	PASS
10600-12700	27.3	22.7	8.3	26	32.3	54	PASS
13250-13400	27.4	22.6	9	25	34	54	PASS
14470-14500	27.7	22.8	9.5	25	35	54	PASS
15349-16200	28.2	22.5	10.2	26	34.9	54	PASS
17700-21400	35.6	23.2	0	26	32.8	54	PASS
22010-23120	N						
23600-24000	N						
31200-31800	N						
36430-36500	N						
38600-40000	N						

N = Signals above 21400 MHz were not measured because no harmonics fall into the Restricted Bands and all prior measurements are very low compared to the Limit. Also, there were no signals noted in the Restricted Bands during Antenna Conducted measurement.

Shaded Row includes second harmonic.

Radiated Emissions Summary Harris Aurora 5800

Higher Frequency Radio, 990103AN1-3

Restricted Band MHz	Analyzer Reading dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Gain dB	Corrected Value dBuV/m	Limit dBuV/m	PASS OR FAIL
960-1240	17.6	22	1	26	14.6	54	PASS
1300-1427	17.3	22.5	1.2	26	15	54	PASS
1435-1626	17.5	22.6	1.4	26	15.5	54	PASS
1645.5-1646.5	17.5	22.6	1.4	26	15.5	54	PASS
1660-1710	17.6	22.6	1.4	26	15.6	54	PASS
1718-1722.2	17.6	22.7	1.4	26	15.7	54	PASS
2200-2300	18.4	21.6	2.1	28	14.1	54	PASS
2310-2390	18.5	21.3	2.2	28	14	54	PASS
2483.5-2500	18.6	21.4	2.2	28	14.2	54	PASS
2655-2900	18.7	21.8	2.2	28	14.7	54	PASS
3260-3267	17.9	21.9	3	28	14.8	54	PASS
3332-3339	17.2	22.2	3	28	14.4	54	PASS
3345-3358	17.2	22.2	3	28	14.4	54	PASS
3600-4400	17.9	20.4	3.3	28	13.6	54	PASS
4500-5150	18.5	20.4	3.3	27	15.2	54	PASS
5350-5460	18.1	20.9	5.5	27	17.5	54	PASS
7250-7750	24.2	20.6	7	27	24.8	54	PASS
8025-8500	23.3	20.8	7.5	26	25.6	54	PASS
9000-9200	23.1	21.2	7.6	26	25.9	54	PASS
9300-9500	23.6	20.8	8.1	26	26.5	54	PASS
10600-12700	27.3	22.7	8.3	26	32.3	54	PASS
13250-13400	27.4	22.6	9	25	34	54	PASS
14470-14500	27.7	22.8	9.5	25	35	54	PASS
15349-16200	28.2	22.5	10.2	26	34.9	54	PASS
17700-21400	35.7	23.2	0	26	32.9	54	PASS
22010-23120	N						
23600-24000	N						
31200-31800	N						
36430-36500	N						
38600-40000	N						

N = Signals above 21400 MHz were not measured because no harmonics fall into the Restricted Bands and all prior measurements are very low compared to the Limit. Also, there were no signals noted in the Restricted Bands during Antenna Conducted measurement.

Shaded Row includes **second harmonic.**

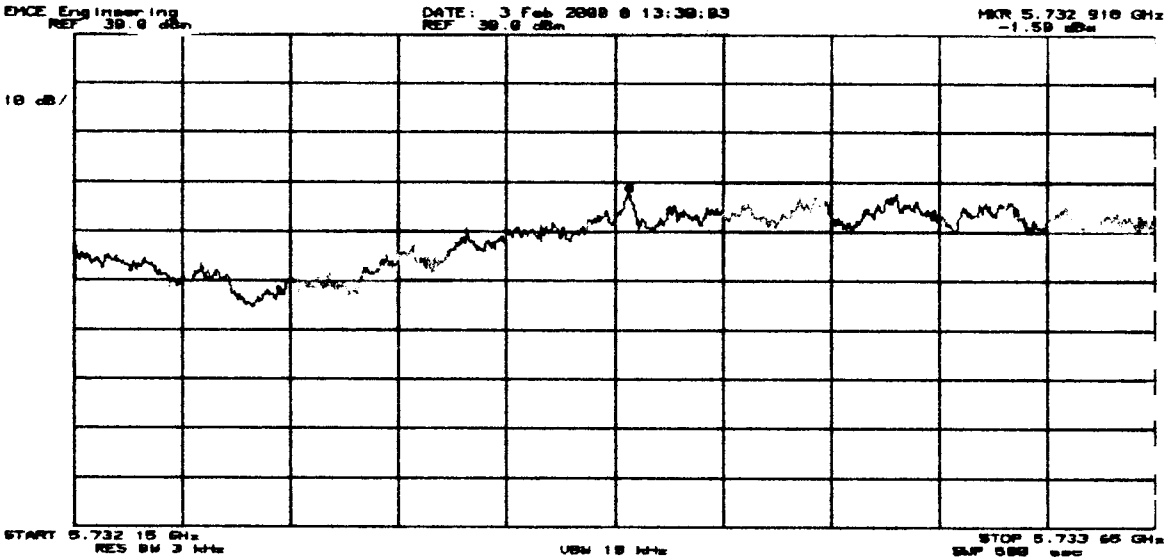


Figure 1. Power Spectral Density, lower freq. unit.

External Losses:
Cable: 6 dB
RF Coupler: 0.5 dB
TOTAL = 6.5 dB

Power Spectral Density = SA-EXT LOSS = - 1.5 + 6.5 = + 5.0 dBm

Limit = < + 8 dBm

Unit Passes Paragraph 15.247 (d)

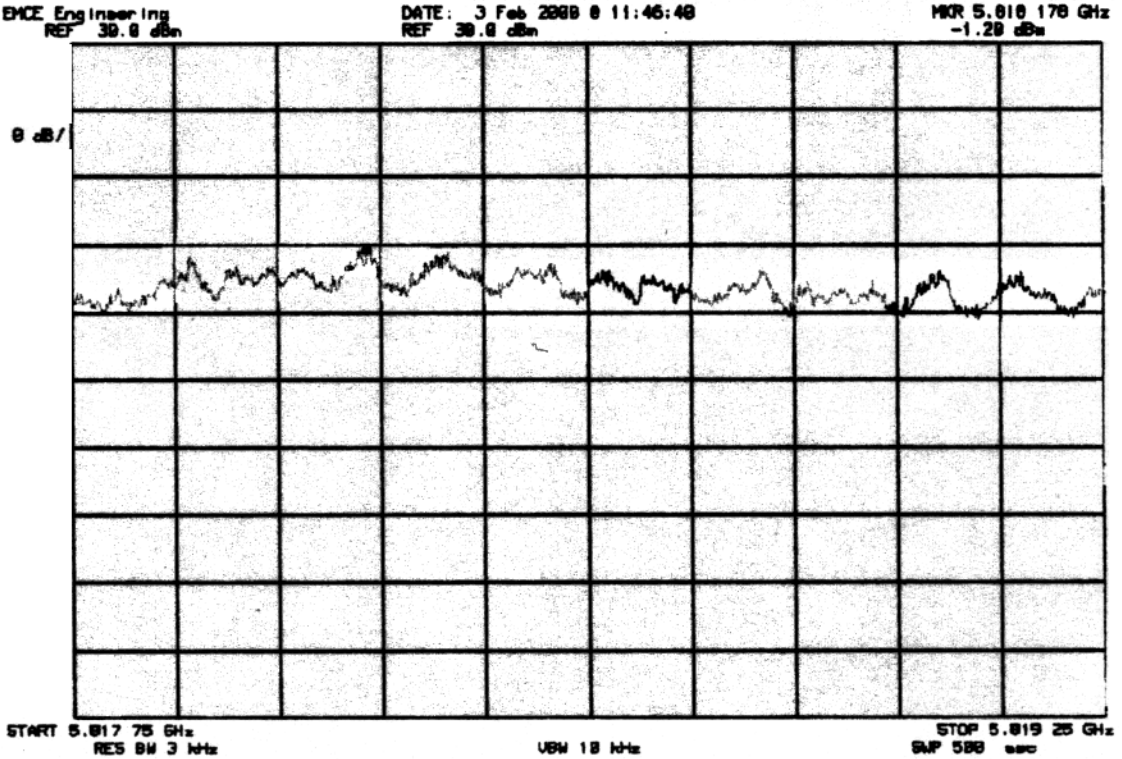


Figure 2. Power Spectral Density, Mid Freq. Unit.

External Losses:
Cable: 6 dB
RF Coupler: 0.5 dB
TOTAL = 6.5 dB

Limit = < + 8 dBm

Power Spectral Density = SA - EXT LOSS = - 1.2 + 6.5 = = 5.3 dBm

Unit Passes Paragraph 15.247 (d)

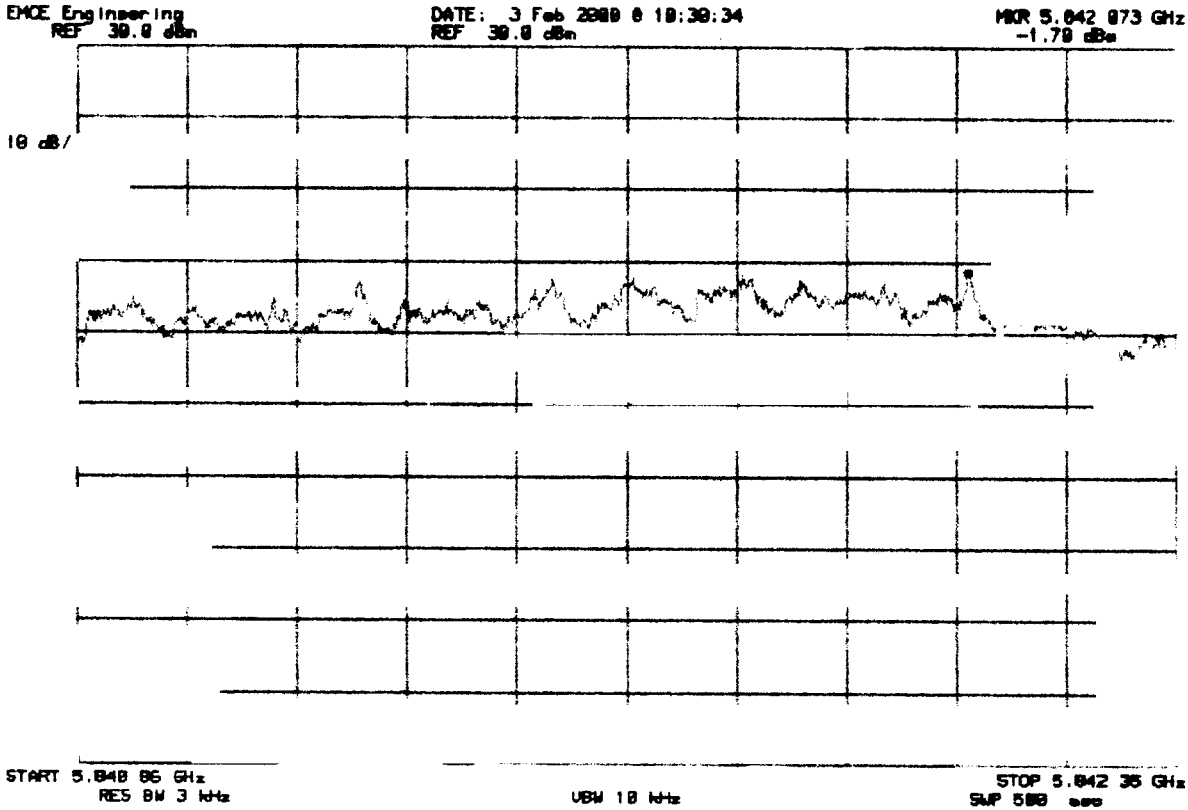


FIGURE Power Density

Figure 3. Power Spectral Density, High freq. Unit.

External Losses:
Cable: 6 dB
RF Coupler: 0.5 dB
TOTAL = 6.5 dB

Power Spectral Density = SA - EXT LOSS = - 1.7 + 6.5 = +4.8 dBm

Limit = < + 8 dBm

Unit Passes Paragraph 15.247 (d)

FCC Part 15, Compliance Processing Gain Performance Test

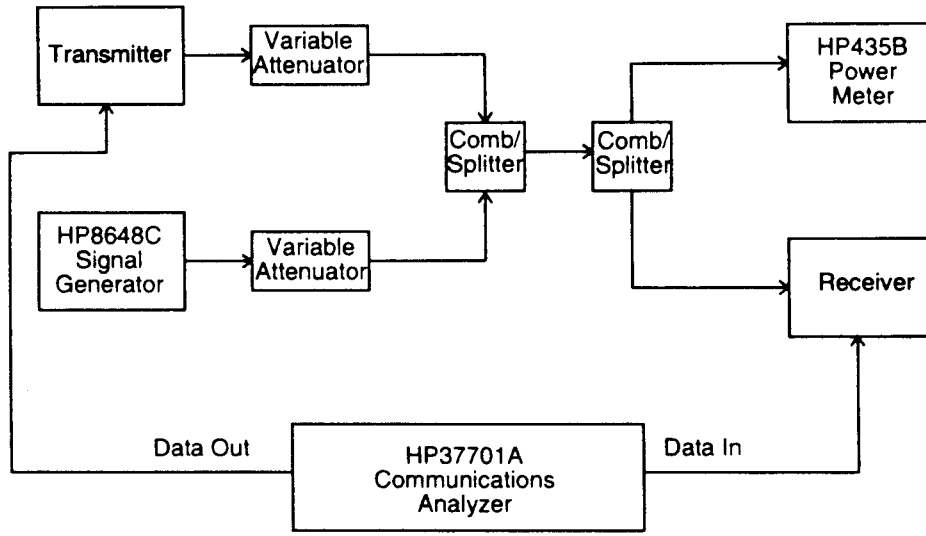
Test method recommended by FCC 97-114 is the CW Jamming Margin Method.

Characteristic	Value
Data rate	T1 (1.544 Mb/s)
Chip rate	11 chips/bit
Designed processing gain	10.4 dB

Test Setup

Test setup is shown in Figure B-12.

Figure B-12 Processing gain test setup



Jamming Margin (J/S Ratio) (for BER 10-5)

The test was performed in Direction B. 50 kHz increments were used in this test; the worst 20% were discarded. See Table B-7.

After the worst 20% (64 points marked with (x)) were discarded, the lowest J/S ratio was - 0.5 dB (marked with (**)).

Hence $M_j = -0.5$ dB.

The S/N ratio for ideal noncoherent receiver is calculated from

$Pe = \frac{1}{2} e^{(-\frac{1}{2}(S/N)_o}$

where $Pe = 10^{-5}$.

Hence $(S/N)_o = 13.3$ dB.

The processing gain can be calculated as

$G_p = (S/N)_o + M_j + L_{sys}$

where L_{sys} = System Loss.

No more than 2 dB loss is allowed (we assumed 0 dB).

Hence $G_p = 13.3 - 0.5 + 0.0 = 12.8$ dB, better than the designed coding gain of 10.4 dB and better than the FCC's minimum requirement of 10 dB.

Table B-7 Jamming margin (J/S ratio) (for BER 10^{-5}) for T1

Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)
–8.00	5.2	–6.00	0.8	–4.00	2.5	–2.00	(x) –0.5
.05	5.3	.05	–0.1	.05	2.0	.05	(x) –0.8
.10	5.6	.10	(x) –1.0	.10	1.5	.10	(x) –1.1
.15	6.1	.15	(x) –1.7	.15	1.4	.15	(x) –1.3
.20	6.0	.20	(x) –1.8	.20	1.6	.20	(x) –1.4
.25	6.2	.25	(x) –2.0	.25	1.3	.25	(x) –1.5
.30	6.5	.30	(x) –2.0	.30	1.3	.30	(x) –1.9
.35	6.5	.35	(x) –1.7	.35	1.8	.35	(x) –1.3
.40	6.8	.40	(x) –0.8	.40	1.6	.40	(x) –1.3
.45	7.2	.45	–0.2	.45	1.2	.45	(x) –1.3
.50	7.2	.50	1.2	.50	0.8	.50	(x) –0.6
.55	6.7	.55	1.9	.55	0.3	.55	–0.3
.60	6.2	.60	2.8	.60	0.0	.60	0.1
.65	6.0	.65	3.3	.65	–0.4	.65	0.1
.70	5.4	.70	3.4	.70	–0.5	.70	–0.2
.75	5.4	.75	3.6	.75	(x) –0.8	.75	–0.1
.80	4.6	.80	3.9	.80	–0.2	.80	–0.3
.85	4.2	.85	3.8	.85	(**) –0.5	.85	–0.2
.90	3.8	.90	3.6	.90	–0.5	.90	0.1
.95	3.9	.95	2.9	.95	0.4	.95	0.0
–7.00	3.8	–5.00	2.3	–3.00	0.5	–1.00	0.6
.05	3.7	.05	1.9	.05	1.0	.05	0.9
.10	3.8	.10	1.2	.10	1.3	.10	1.8
.15	3.7	.15	1.0	.15	1.2	.15	2.1
.20	3.7	.20	0.5	.20	2.0	.20	2.1
.25	3.8	.25	0.8	.25	2.6	.25	2.1
.30	3.3	.30	0.8	.30	3.0	.30	2.4
.35	3.7	.35	0.8	.35	3.9	.35	2.5
.40	3.7	.40	1.5	.40	4.5	.40	2.3
.45	4.2	.45	1.5	.45	4.4	.45	2.2
.50	4.3	.50	1.6	.50	4.2	.50	1.5
.55	3.7	.55	2.1	.55	4.0	.55	1.0
.60	3.1	.60	2.1	.60	3.5	.60	–0.1
.65	3.0	.65	2.8	.65	3.2	.65	(x) –1.7
.70	2.9	.70	2.8	.70	2.9	.70	(x) –3.0
.75	2.8	.75	2.9	.75	2.1	.75	(x) –4.0
.80	3.1	.80	3.4	.80	1.9	.80	(x) –4.6
.85	3.5	.85	3.9	.85	0.8	.85	(x) –4.8
.90	3.0	.90	3.9	.90	0.8	.90	(x) –5.2
.95	3.4	.95	3.3	.95	0.3	.95	(x) –5.8

Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)	Freq. Offset (MHz)	J/S (dB)
0.00	(x) –4.3	+2.00	(x) –2.1	+4.00	3.9	+6.00	–0.2
.05	(x) –4.3	.05	(x) –2.1	.05	4.4	.05	2.0
.10	(x) –4.9	.10	(x) –1.8	.10	4.1	.10	2.2
.15	(x) –4.7	.15	(x) –1.1	.15	4.0	.15	2.8
.20	(x) –3.8	.20	0.0	.20	3.5	.20	3.6
.25	(x) –3.5	.25	0.5	.25	3.5	.25	4.5
.30	(x) –2.2	.30	1.1	.30	2.8	.30	5.1
.35	(x) –1.4	.35	2.0	.35	2.3	.35	6.0
.40	(x) –0.5	.40	2.6	.40	1.7	.40	6.1
.45	0.1	.45	3.3	.45	1.2	.45	6.4
.50	0.3	.50	3.5	.50	1.0	.50	6.0
.55	0.3	.55	3.3	.55	0.7	.55	5.1
.60	0.7	.60	2.8	.60	0.7	.60	4.4
.65	0.8	.65	2.4	.65	1.1	.65	4.0
.70	0.8	.70	1.9	.70	1.1	.70	3.4
.75	0.8	.75	1.3	.75	1.6	.75	3.1
.80	1.2	.80	0.6	.80	1.6	.80	3.1
.85	1.2	.85	–0.3	.85	2.2	.85	3.4
.90	1.3	.90	(x) –0.8	.90	2.4	.90	3.4
.95	0.8	.95	(x) –1.1	.95	2.8	.95	4.0
+1.00	0.4	+3.00	(x) –1.4	+5.00	3.5	+7.00	4.1
.05	–0.2	.05	(x) –0.5	.05	3.4	.05	4.2
.10	(x) –0.5	.10	–0.1	.10	3.4	.10	5.2
.15	(x) –1.5	.15	–0.1	.15	2.9	.15	5.9
.20	(x) –1.7	.20	0.0	.20	2.3	.20	6.4
.25	(x) –1.8	.25	0.0	.25	1.9	.25	7.2
.30	(x) –2.6	.30	0.8	.30	2.2	.30	7.6
.35	(x) –2.2	.35	1.0	.35	2.2	.35	7.9
.40	(x) –2.5	.40	1.1	.40	2.1	.40	7.9
.45	(x) –2.1	.45	1.2	.45	2.3	.45	7.9
.50	(x) –2.4	.50	0.8	.50	1.7	.50	7.7
.55	(x) –2.3	.55	0.7	.55	1.3	.55	7.0
.60	(x) –2.4	.60	0.8	.60	0.8	.60	6.2
.65	(x) –3.0	.65	0.9	.65	0.8	.65	5.5
.70	(x) –2.5	.70	0.7	.70	–0.2	.70	5.4
.75	(x) –1.7	.75	1.4	.75	(x) –0.5	.75	5.7
.80	(x) –1.9	.80	1.2	.80	(x) –0.5	.80	5.9
.85	(x) –1.9	.85	1.3	.85	–0.3	.85	6.4
.90	(x) –1.8	.90	2.2	.90	–0.3	.90	6.3
.95	(x) –2.1	.95	2.8	.95	(x) –0.7	.95	6.5
						+8.00	6.7