

1. Test Report Certification**Applicant:** Computer & Communication Laboratory**Address:** Industrial Technology Research Institute
No. 195-1, Sec. 4, Chung-Hsing Road,
Chutung, Hsin-Chu, Taiwan, R.O.C.**EUT Description:** Wireless LAN Card**(A) Power Supply:** From personal computer**(B) Model:** LAN2GO-DS**Final Tested Date:** June 11, 1998**Measurement Procedure Used:**

Part 15 Subpart B of FCC rules and regulations (47 CFR Part 15) FCC / ANSI C63.4-1992.

We Hereby Show That:

The measurement shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable.

Testing Engineer: Jesse Ho **Date:** June 11 1998

Jesse Ho

Supervisor: Linda Chiang **Date:** June 11 1998

Linda Chiang

Approved By: Johnson Ho **Date:** 6/11/98

Johnson Ho

2. Test Statement

2.1 Antenna Statement

The attached antenna on this PCMCIA card (Direct Sequence Transmitter)
Will be:

- a. Solder on PCB or
- b. The connector will be fixed by strong adhesive material.
(the model# of adhesive material is R25
manufacture is: chandar)

2.2 Departure from documented policies, procedures, or specifications:

Were there any departures from documented policies, procedures, or specifications?
No **X** Yes _____. If yes, please explain.

2.3 Test Statement

- This EUT is a peripheral of PC.
- The certificate or report shall not be reproduced except in full, without the written approval of **SRT Lab.**, This report must not be used by the client to claim product endorsement by **NVLAP** or any agency of the US Government.
- Partial tests (Power Spectral Density & Processing Gain) were tested at Computer & Communications Research Laboratory. All test condition were audited by **SRT LAB's** engineer.

3. EUT Modifications

The following accessories were added to the EUT during testing:

Did not have any modification by SRT Lab.

4. Conducted Power Line Test

4.1 Test Equipment

The following test equipment was used during the conducted power line test:

Equipment	Specification	Manufacturer	Model # / Serial #	Cal. Center /Last Cal. Date	Next Cal. Date
Receiver System	100Hz to 1500MHz	Hewlett Packard	8574A 3001A04931	by Simco June, 97	June, 1998
Receiver System	9KHz to 30MHz	Rohde & Schwartz	ESH3 893517/013	by Simco June, 97	June, 1998
LISN	50uH / 50 Ohms	Solar Corp.	8012-50-R-24-BNC / 924839	by Simco June, 97	June, 1998
LISN	50uH / 50 Ohms	Rohde & Schwartz	ESH3-25 89491/016	by Simco June, 97	June, 1998
Signal Generator	100 KHz to 1024 MHz	Hewlett Packard	8648A 3636a02776	by HP January, 98	January, 1999
Isolation Transformer	N/A	Solar Corp.	7032-1 N/A	N/A	N/A
Anechoic Chamber	N/A	TEC	SRT002 N/A	N/A	N/A
Spectrum Analyzer	100 KHz to 2500 MHz	IFR Corp.	A-8000 1456	by simco June, 97	June, 1998
Spectrum Analyzer	400 KHz to 26.5 GHz	HP	8593E 3710A03220	by HP January, 98	January, 1999
Power Analyzer	16 Amps 650 Volts	AEMC	3930 57204	N/A	N/A
Power Source	0-260VAC 47-500Hz	Interpower	85510510 39310	N/A	N/A
Cable	RG214U	Intercomp	Cable #8	by SRT Lab. January, 98	Jan. 1999
Cable	RG214U	Intercomp	Cable #9	by SRT Lab. January, 98	Jan. 1999

4.2 Configuration of the EUT

The EUT was configured according to **ANSI C63.4 - 1992**. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

EUT:

Device	Manufacturer	Model #	FCC ID
Wireless LAN Card	Computer & Communication Lab.	LAN2GO-DS	FACLAN2GO-DS

Peripherals:

Device	Manufacturer	Model # / Serial #	FCC ID
Printer	HP	2225C	DSI6XU2225
Modem	Datatronics	1200CK	E2O5OV1200CK
Computer	HP	5500CS	B945500

Remark:

4.2 Configuration of the EUT (Continued)

Cable: All one meter or greater in length – bundled according to ANSI C63.4 - 1992

Printer: Power - unshielded supplied with printer
Data - shielded with plastic hoods

Modem: Power - unshielded supplied with modem
Data - shielded with metal hoods

Computer: Power - shielded supplied with NB

Power Adapter: Power - shielded

Internal Device:

Device	Manufacturer	Model #	FCC ID
N/A			

4.3 EUT Operating Condition:

Operating condition is according to **ANSI C63.4 - 1992**. The operating speed of the computer was 100MHz.

- 1. EUT power on.**
- 2. Run Tx and Rx testing program:**
- 3. Put PCMCIA card (EUT) into notebook and set up channel.**
- 4. Send signal out.**

Remark: 1. Three channels were tested.

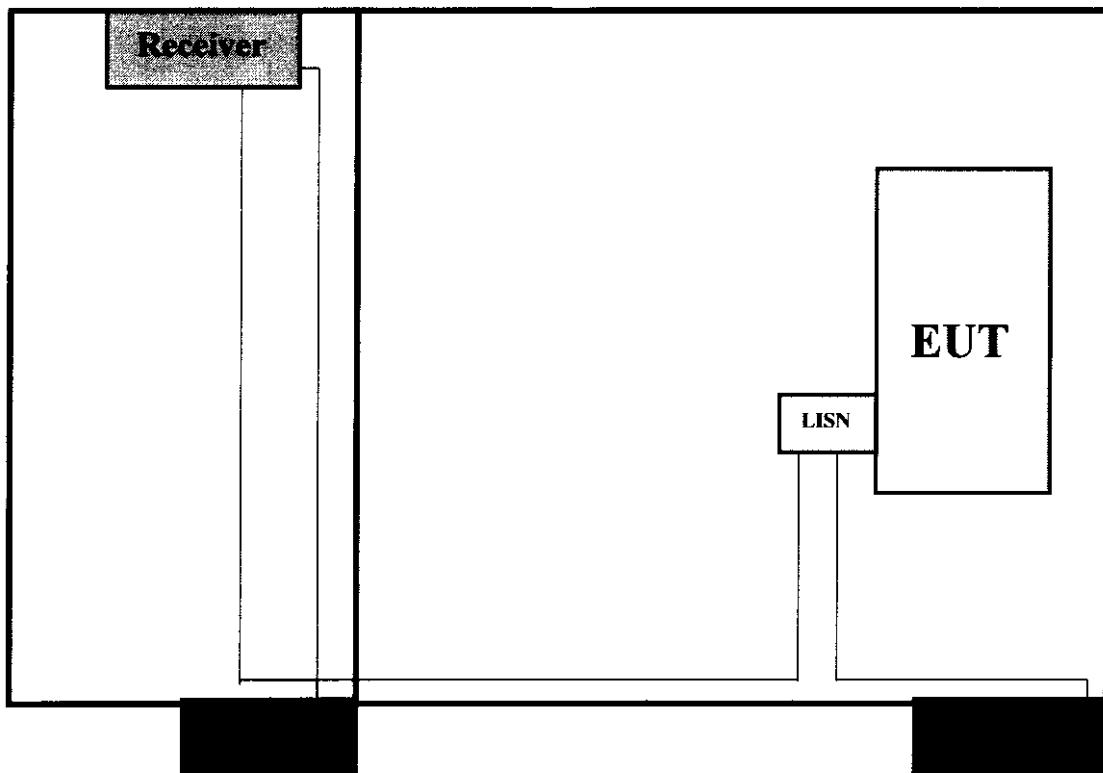
- * **Channel 1: 2.412GHz**
- * **Channel 6: 2.437GHz**
- * **Channel 11: 2.462GHz**

2. **CPU Type: Pentium 100**
Clock Chip: 66 MHz

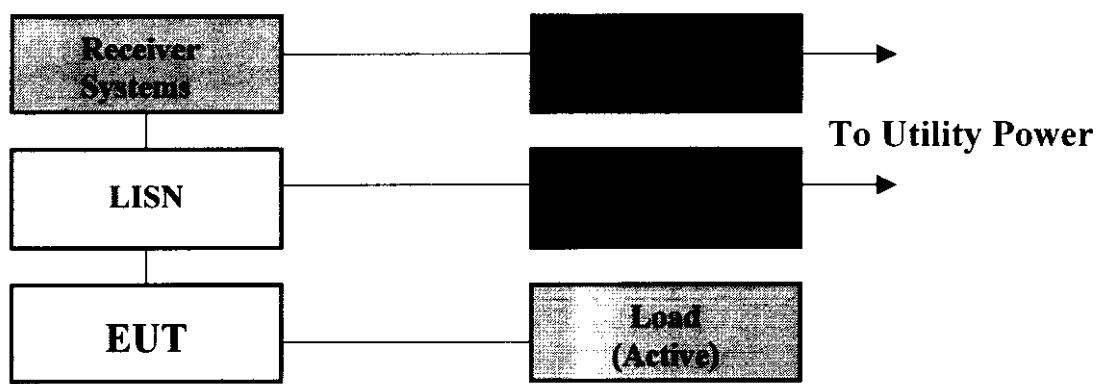
4.4 Test Procedure

The **EUT** was test according to ANSI C63.4 - 1992. The conducted test was performed in an anechoic chamber. The frequency spectrum from 0.45 MHz to 30 MHz was investigated. The LISN used was 50 Ohms/50 μ Henry as specified by section 5.1 of ANSI C63.4 - 1992. Cables and peripherals were moved to find the maximum emission levels for each frequency.

4.5 Test Setup



Anechoic Chamber Configuration



Wireless LAN Card

Notebook Computer
Printer
Modem

4.6 Conducted Power Line Emission Limit

Frequency Range (MHz)	Class A Limits	Class B Limits
0.450 - 1.705	1000 μ V	250 μ V
1.705 - 30.00	3000 μ V	250 μ V

Note: In the above table, the tighter limits applies at the band edges.

4.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 27 °C

Humidity: 65 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	*	36.80	*	69.18	250
1.5130	*	36.60	*	67.61	250
1.5980	36.90	37.40	69.98	74.13	250
1.6870	*	36.60	*	67.61	250
4.7760	*	36.60	*	67.61	250
5.0440	36.70	*	68.39	*	250
5.1290	37.10	*	71.61	*	250
5.2160	37.10	*	71.61	*	250
5.3040	37.10	*	71.61	*	250
5.3940	37.10	*	71.61	*	250
17.1700	*	38.40	*	83.18	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is < ±2dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 1: 2.412GHz

Signed by Testing Engineer: _____

4.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 26 °C

Humidity: 60 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	36.80	37.00	69.18	70.79	250
1.5070	36.50	36.60	66.83	67.61	250
1.5980	37.00	37.50	70.79	74.99	250
1.6800	*	36.50	*	66.83	250
7.2650	36.50	36.10	66.83	63.83	250
8.5210	36.60	*	67.61	*	250
8.8490	*	36.60	*	67.61	250
17.1000	37.60	*	75.86	*	250
17.1700	*	37.90	*	78.52	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is < ± 2 dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 6: 2.37GHz

Signed by Testing Engineer: _____

4.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 26 °C

Humidity: 60 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	36.50	36.30	66.83	65.31	250
1.5980	36.80	36.20	69.18	64.57	250
6.6250	36.30	36.00	65.31	63.10	250
8.6650	36.30	36.10	65.31	63.83	250
8.9610	36.40	36.30	66.07	65.31	250
16.8800	37.70	37.50	74.00	74.99	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is <±2dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 11: 2.462GHz

Signed by Testing Engineer: _____ *[Signature]*

5. Radiated Emission Test

5.1 Test Equipment List

The following test equipment was used during the radiated emission test:

Equipment	Specification	Manufacturer	Model # / Serial #	Cal. Center / Last Cal. Date	Next Cal. Date
Receiver Systems	100 Hz to 1500 MHz	Hewlett Packard	8574A 3001A04931	By Simco June, 97	June, 1998
Spectrum Analyzer	100 Hz to 2500 MHz	IFR Corp.	A-8000 1456	By Simco June, 97	June, 1998
Spectrum Analyzer	400 KHz to 26.5 GHz	HP	8593E 3710A03220	By HP Jan. 98	Jan. 1999
Dipole Antenna	28 MHz to 1000 MHz	EMCO	3121C 9505-1136	By EMCO June, 97	June, 1998
Biconical Antenna	20 MHz to 200 MHz	EMCO	3104C 9111-4455	By SRT Lab. May, 1998	May, 1999
Biconical Antenna	30 MHz to 300 MHz	EMCO	3108 2380	By SRT Lab. May, 1998	May, 1999
Log-periodic Antenna	200 MHz to 1000 MHz	EMCO	3146 9002-2687	By SRT Lab. May, 1998	May, 1999
Signal Generator	100 KHz to 1024 MHz	Hewlett Packard	8648A 2923A30924	By HP Jan. 98	Jan. 1999
Preamplifier	100 KHz to 1300 MHz	Hewlett Packard	8447D 2944A06746	By Simco June, 97	June, 1998
Horn Antenna	1000 MHz to 18 GHz	EMCO	3115 3619	By Simco July, 1997	July, 1998
Horn Antenna	18 GHz to 26.5 GHz	EMCO	3116	By EMCO May, 1998	May, 1999
Cable	RG214U	Intercorp	Cable #1	By SRT Lab. Jan. 1998	Jan. 1999
Turntable	0 - 360 Degree	SRT Lab.	SRT001	By SRT Lab. June, 1997	June, 1998
Antenna Mast	5 Meters Height	SRT Lab.	SRT001	N/A	N/A

5.2 Configuration of the EUT

Same as section 4.2 of this report.

5.3 EUT Operating Condition

Same as section 4.3 of this report.

5.4 Test Procedure

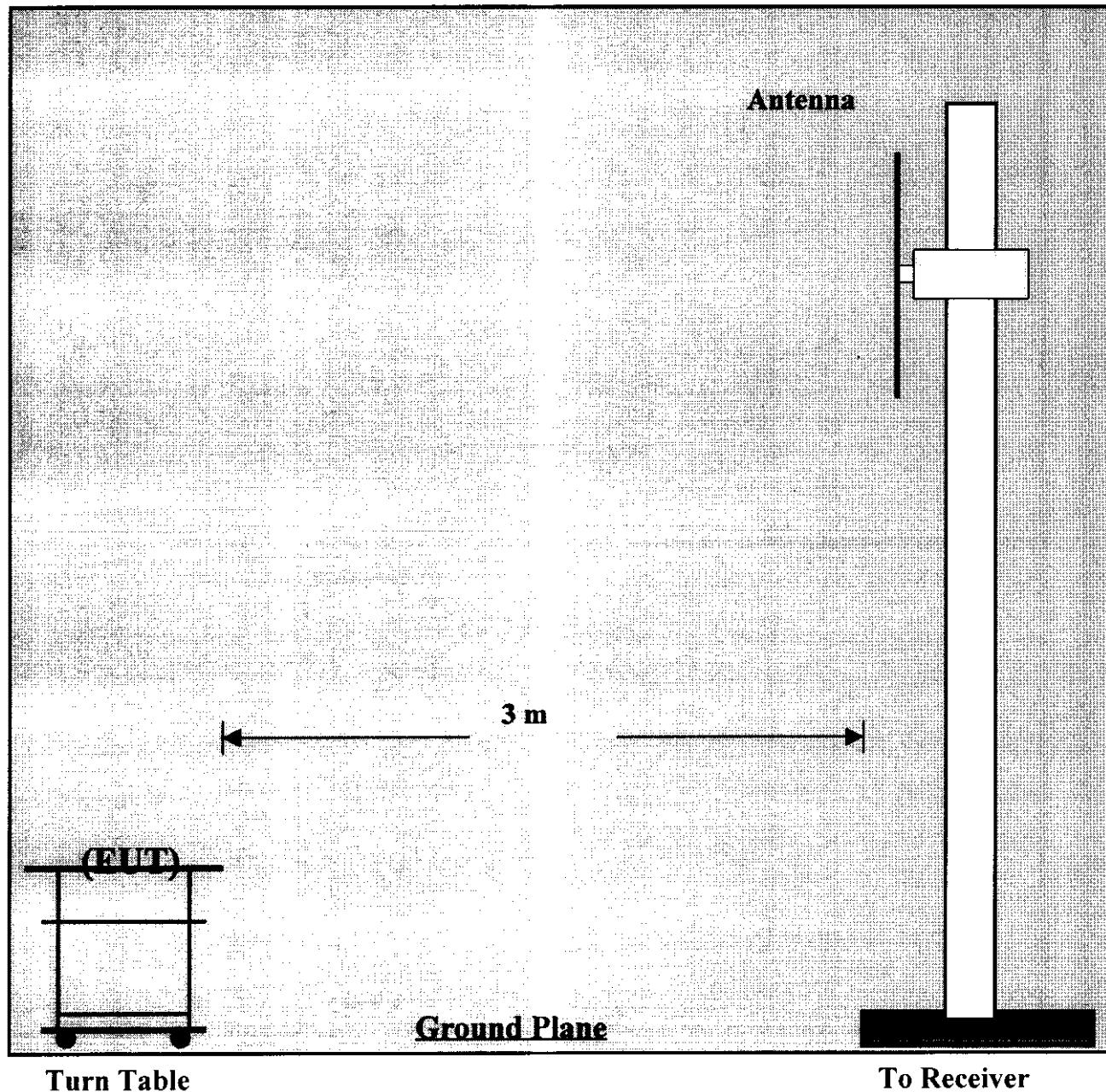
The EUT was tested according to **ANSI C63.4 - 1992**. The radiated test was performed at SRT lab's open site. This site is on file with the FCC laboratory division, reference 31040/sit.

The frequency spectrum from 30MHz to 25Hz was investigated. The measurements **under 1000 MHz** with resolution bandwidth of 120KHz are quasi-peak reading made at three using an adjustable dipole antenna. Peripherals, cables, EUT orientation, and antenna height were varied to find the maximum emission for each frequency.

The measurements **above 1000MHz** with a resolution bandwidth of 1MHz are peak reading at a distance of three meters with a horn antenna.

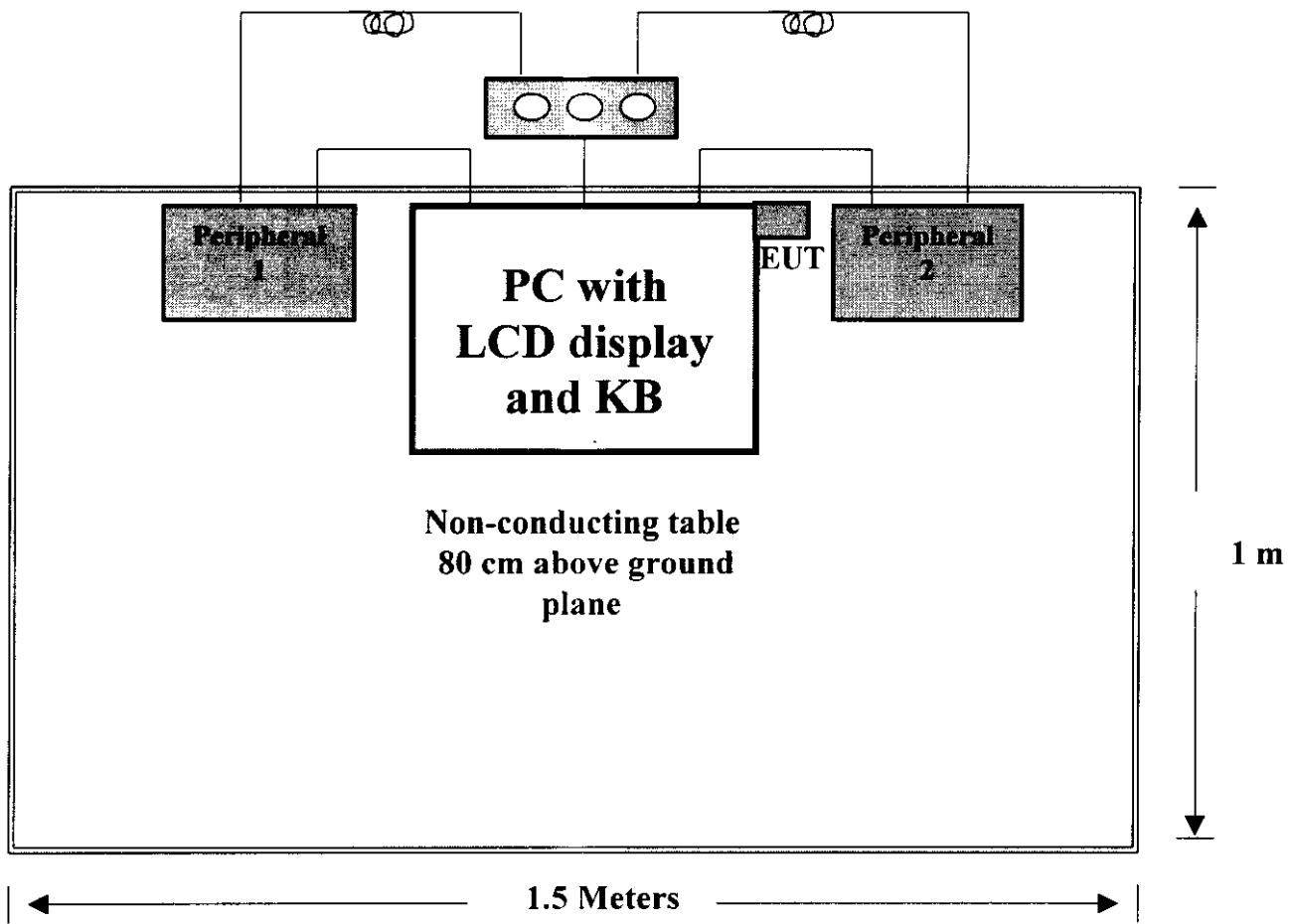
(some points were tested at one meter, the test results will be calculated to 3 meters).

5.5 Radiated Test Setup



5.5 Emission Test Setup (ANSI C63.4 - 1992)

*** Optional For Radiated Tests**



Test configuration for tabletop equipment
(Top View)

- EUT, peripherals, between peripherals the distance is fixed at 10 cm on edge of the turn table.

5.6 Radiated Emission Limit

- a. Inside band of spurious: under 20dB of funder metal.
- b. Harmonic: * under 20dB of fund.
- c. Restricted Band Emission: over 1GHz, the limit is 54dBuV at 3M.
- d. Under 1GHz:

Class B

Frequency (MHz)	Distance (m)	Field Strength (μV/m)
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
Above 960	3	500

Class A

Frequency (MHz)	Distance (m)	Field Strength (μV/m)
30 - 88	3	316.3
88 - 216	3	473.2
216 - 960	3	631.0
Above 960	3	1000.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna and the closest point of any part of the device or system.

5.7 Radiated Emission Test Result

The frequency spectrum from 30MHz to 2GHz was investigated. The values under 1GHz with a resolution bandwidth of 120KHz are quasi-peak reading made at 3 meters. The measurements above 1GHz with a resolution bandwidth of 1MHz are peak reading at a distance of 3 meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.65	0.80	6.60	20.60	28.50	25.12	62.37	100
120.21	1.40	7.20	21.70	29.10	32.73	76.74	150
233.37	1.80	10.70	25.80	20.50	82.22	44.67	200
263.99	2.00	13.10	25.80	19.40	110.92	53.09	200
668.06	3.30	20.10	*	10.80	*	51.29	200
710.37	3.40	20.20	17.70	13.80	116.14	74.13	200
905.18	3.90	22.60	10.30	12.60	69.18	90.16	200

Remarks:

- * Measurement does not apply for this frequency.
- Uncertainty in conducted emission measured is $<\pm 2$ dB
- CPU Type: Pentium 100
Clock Chip: 66MHz
- Sample Calculation :
 $20 \log(\text{Emission}) \mu\text{V}/\text{m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dBuV/m)}$
- Test Equipment Please See 6.1
- Test Configuration Please See 6.2
- Any Departure from Specification: N/A
- Channel 1: 2.412GHz

Signed by Testing Engineer: _____

5.7 Radiated Emission Test Result

The frequency spectrum from **30MHz to 2GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **3** meters.

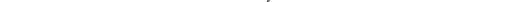
Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.05	0.80	6.60	19.60	28.00	22.39	58.88	100
120.21	1.40	7.20	24.90	28.70	47.32	73.28	150
233.37	1.80	10.70	24.00	20.00	66.83	42.17	200
263.99	2.00	13.10	24.80	17.00	98.86	40.27	200
668.06	3.30	20.10	*	14.30	*	76.74	200
710.37	3.40	20.20	17.00	13.70	107.15	73.28	200
905.18	3.90	22.60	11.10	13.50	75.86	100.00	200

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Sample Calculation:
 $20 \log(\text{Emission}) \mu\text{V/m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dB)}$
- 5). Test Equipment Please See 6.1
- 6). Test Configuration Please See 6.2
- 7). Any Departure from Specification: **N/A**
- 8). Channel 6: 2.437GHz

Signed by Testing Engineer: 

5.7 Radiated Emission Test Result

The frequency spectrum from **30MHz to 2GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **3** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.65	0.80	6.60	20.10	28.40	23.71	61.66	100
120.21	1.40	7.20	24.70	29.00	46.24	75.86	150
233.37	1.80	10.70	24.70	20.50	72.44	44.67	200
263.99	2.00	13.10	25.50	17.90	107.15	44.67	200
668.06	3.30	20.10	*	12.30	*	60.95	200
710.37	3.40	20.20	17.50	13.20	113.50	69.18	200
905.18	3.90	22.60	10.60	13.20	71.61	96.61	200

Remarks:

- * Measurement does not apply for this frequency.
- Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- CPU Type: Pentium 100
Clock Chip: 66MHz
- Sample Calculation:
 $20 \log(\text{Emission})\text{uV/m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dB)}$
- Test Equipment Please See 6.1
- Test Configuration Please See 6.2
- Any Departure from Specification: N/A
- Channel 11: 2.462GHz

Signed by Testing Engineer: John Doe

5.7 Radiated Emission Test Result

The frequency spectrum from **1GHz to 25GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **1** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2412.00	7.50	29.10	64.20	73.90	100.80	110.50	*
2132.00	7.00	29.40	25.30	24.50	61.70	60.90	80.8
4264.00	8.20	34.00	4.70	5.00	46.90	47.20	54
4824.00	8.40	34.10	8.50	9.40	51.00	51.90	54
7236.00	9.50	37.30	*	*	*	*	54
9648.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 2$ dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: N/A
- 7). Channel 1: 2.412GHz

Signed by Testing Engineer: _____

5.7 Radiated Emission Test Result

The frequency spectrum from **1GHz to 25GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **1** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2437.00	7.60	29.10	63.30	70.40	100.00	107.10	*
2154.00	7.00	29.40	25.20	24.90	61.60	61.30	80
4314.00	8.20	34.00	4.70	4.90	46.90	47.10	54
4874.00	8.40	34.10	8.20	8.80	50.70	51.30	54
7311.00	9.50	37.30	*	*	*	*	54
9748.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4$ dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: **N/A**
- 7). Channel 6: 2.437GHz

Signed by Testing Engineer: John Doe

5.7 Radiated Emission Test Result

The frequency spectrum from 1GHz to 25GHz was investigated. The values under 1GHz with a resolution bandwidth of 120KHz are quasi-peak reading made at 3 meters. The measurements above 1GHz with a resolution bandwidth of 1MHz are peak reading at a distance of 1 meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2463.00	7.60	29.10	58.50	67.70	95.20	104.40	*
2182.00	7.00	29.40	25.10	25.20	61.50	61.60	75.2
4364.00	8.20	34.00	4.20	4.20	46.40	46.40	54
4926.00	8.40	34.10	8.30	8.10	50.80	50.60	54
7389.00	9.50	37.30	*	*	*	*	54
9852.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is <±4dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: N/A
- 7). Channel 11: 2.462GHz

Signed by Testing Engineer:

6. Bandwidth

6.1 Limit

Minimum 6dB bandwidth=500MHz

6.2 Test Result

Please see attached plotter.

08:03:54 JUL 05, 1993

CH #3 CHAIN 1 4.0
SPAN 405.7 dBW 1.0 dB
MARK 1.0G
dB

MARK 1 16.75 MHz
.01 dB

MARKER
NORMAL

MARKER
4
MARKER
AMPTD

SELECT
4, 2, 3, 4
MARKER 1
ON, OFF

MORE
4 of 2
SPAN 30.00 MHz
SWP 20.0 msec
CHAIN 2, 46200 CH
RES 32 320 mHz

07:53:32 JUN 09, 1998

CH#3 CHANNEL 6

REF 109.2 dB μ V #AT 40 dB

PEAK

LOG

5 dB/ μ V

MKR A 16.38 MHz

-.26 dB

MARKER
NORMAL

MARKER ▲

MKR A

16.38 MHz

-.26 dB

SELECT
1 2 3 4

MA SB
SC FC
COAR

MARKER 4
ON OFF

More
1 of 2

SPAN 50.00 MHz
SWP 20.0 msec

CENTER 2.43700 GHz
AES BW 300 kHz

Q7: 48: 37 JUN 09, 1998

Q7 #3 CHANNEL 4

REF 142.2 dB μ V #AT 40 dB

PEAK

1.06

dBZ

MARKER A
16.75 MHz
1.30 dB

MA SB
SC FC
CORR

MARKER A
16.75 MHz

1.30 dB

NORMAL

MARKER A

MARKER A
AMPTD

SELECT
4 2 3 4

MARKER A
ON, OFF

More
1 OF 2

SPAN 50.00 MHz
SWP 20.0 msec

CENTER 2.41200 GHz
RES BW 300 kHz

7. Peak Power

7.1 Limit

Peak Power output less than 1w.
EIRP < 36dBm

7.2 Test Result

- a. Peak power output is 10dBm.
- b. Antenna gain is about 2dBi.

Total EIRP is 12dBm.

8. Power Spectral Density

8.1 Test Equipment

HP Spectrum Analyzer (~ 26.5GHz).

8.2 Test Procedure

Set the test condition as below:

Resolution Bandwidth: 3KHz

SPAN: 2MHz

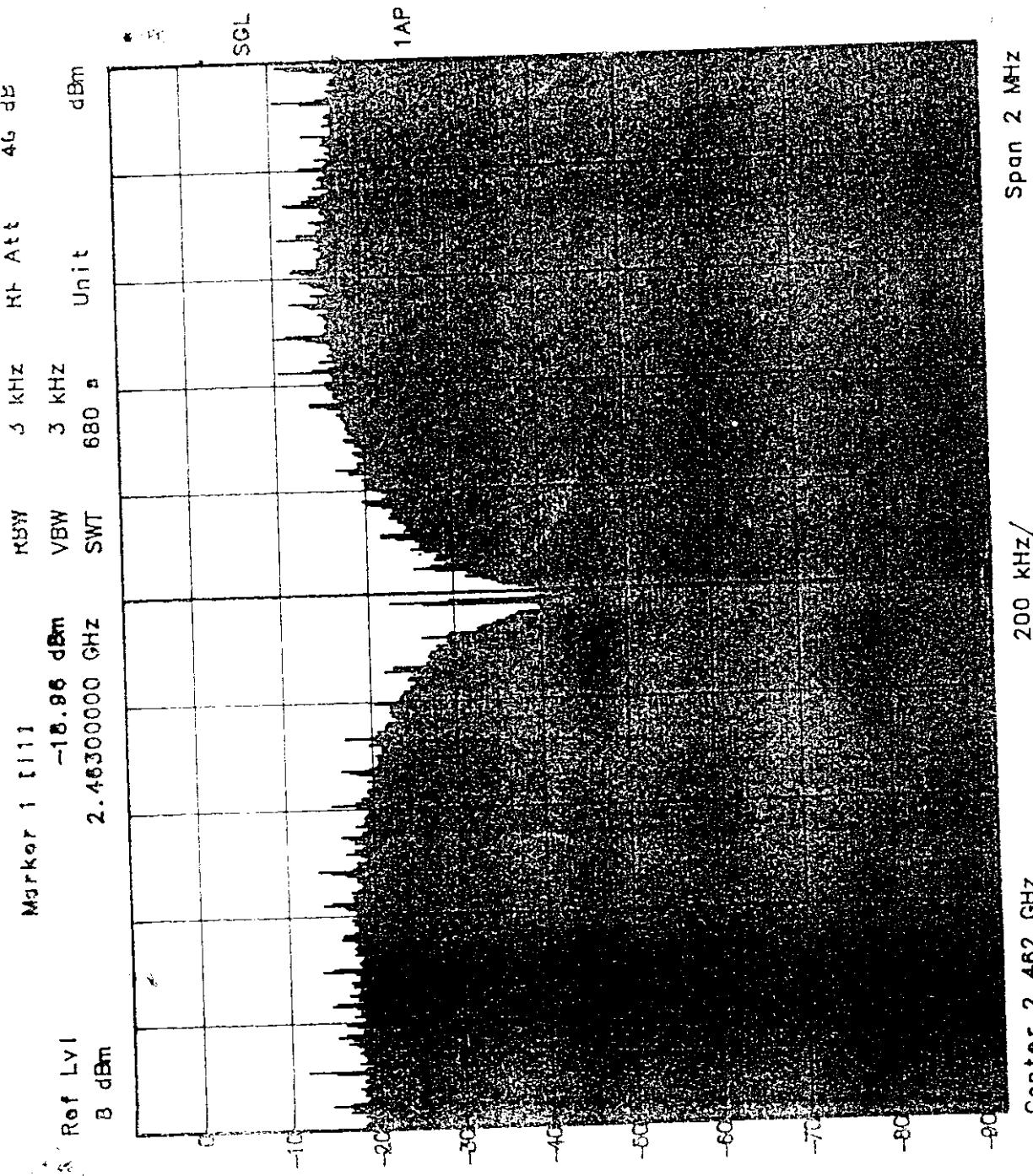
Sweep time: 667 seconds

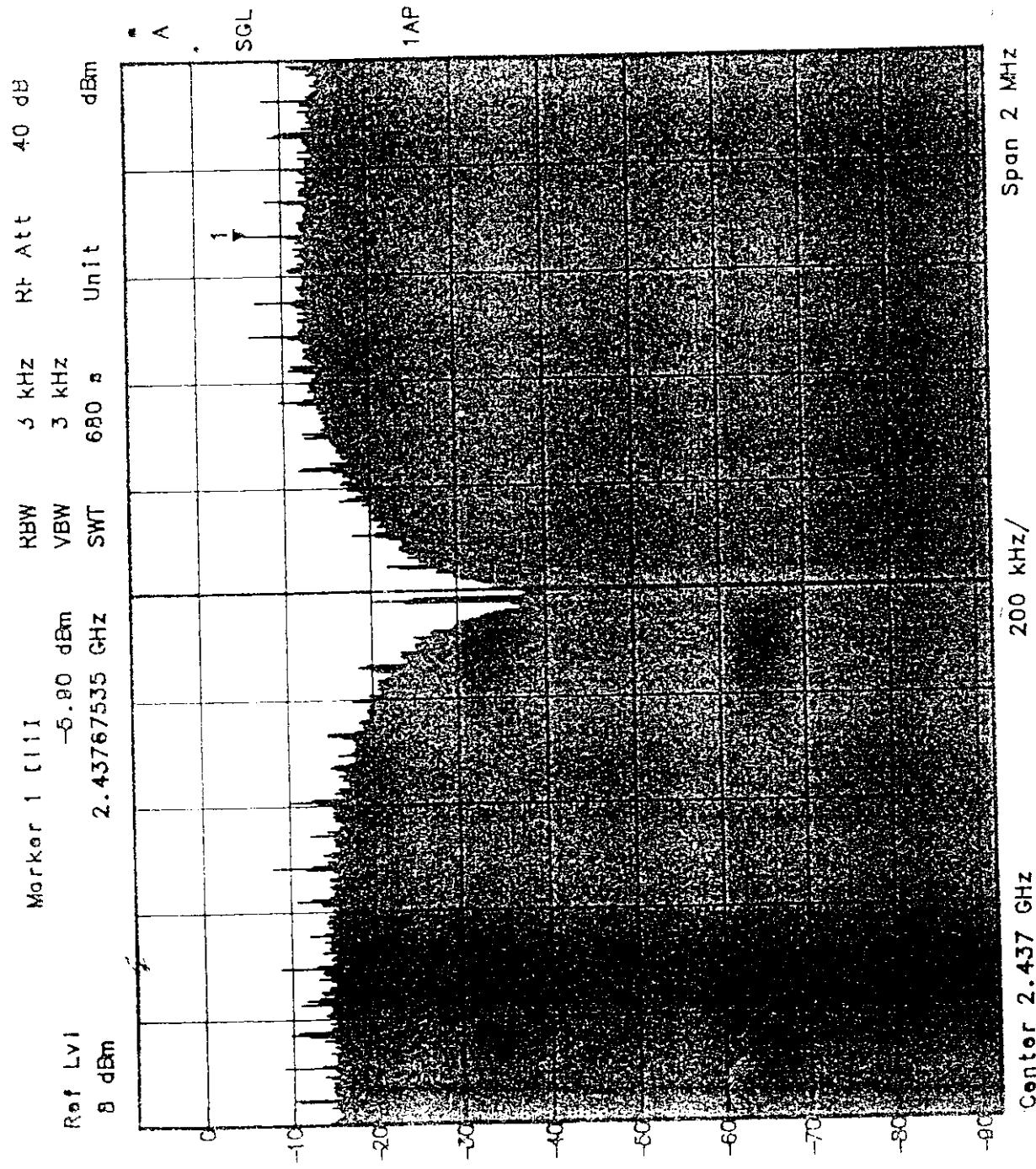
8.3 Limit

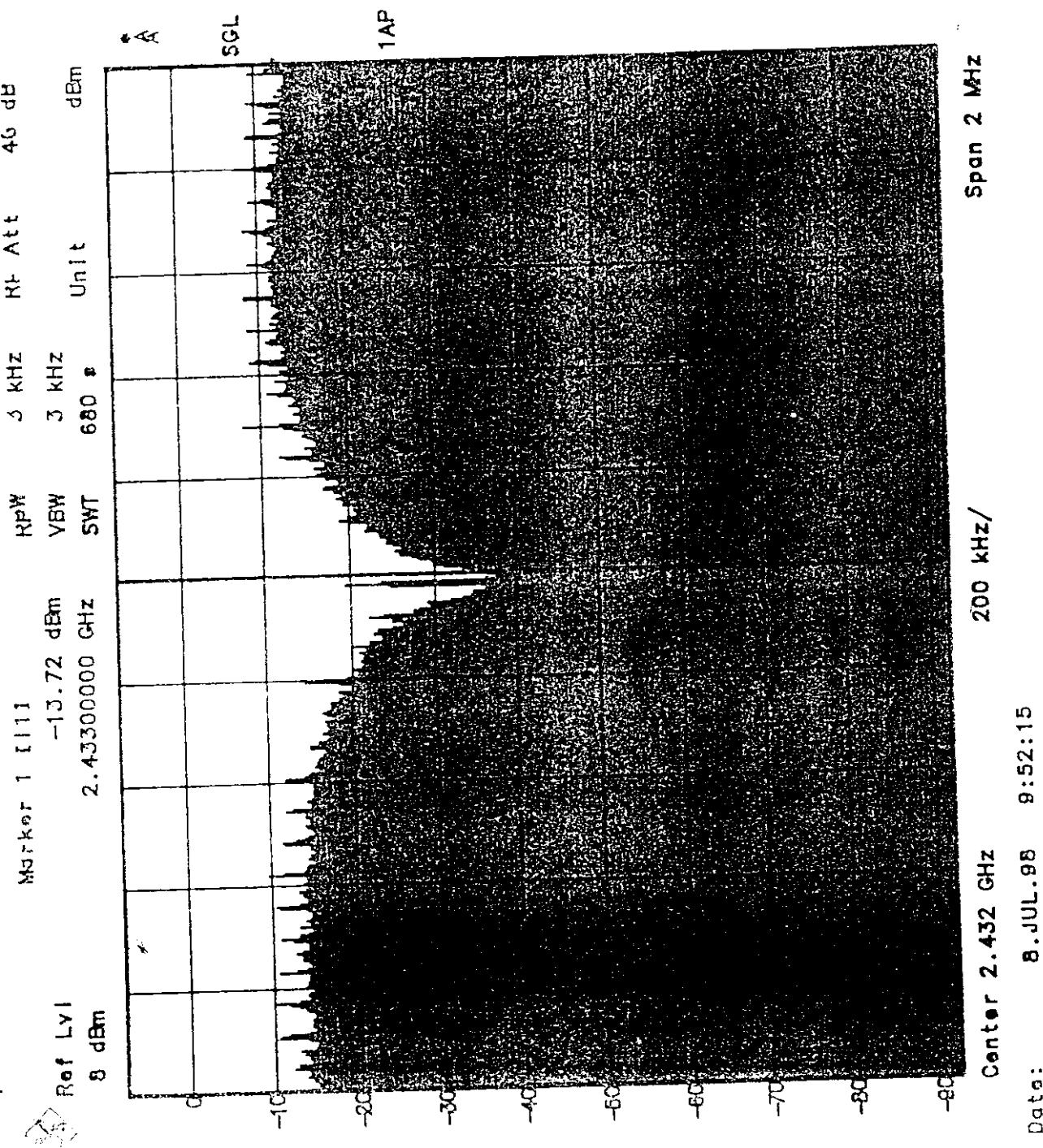
The limit is 8dBm

8.4 Test Result

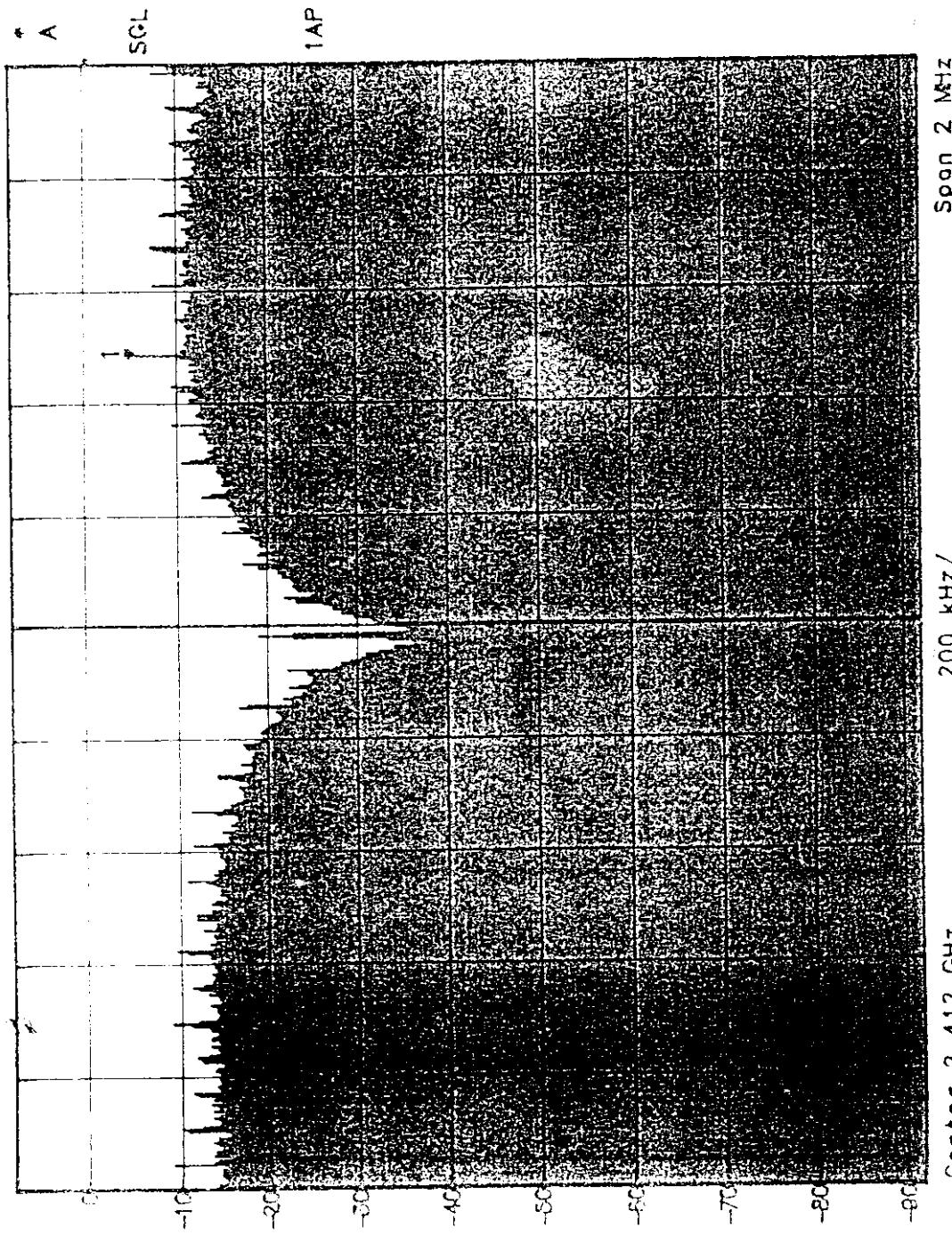
Please see attached plotter.







Ref Lvl 8 dBm
Marker 1 1111 -5.00 dBm
Center 2.41248697 GHz
Span 200 kHz/
Date: 8.JUL.95 Time: 2:00:00

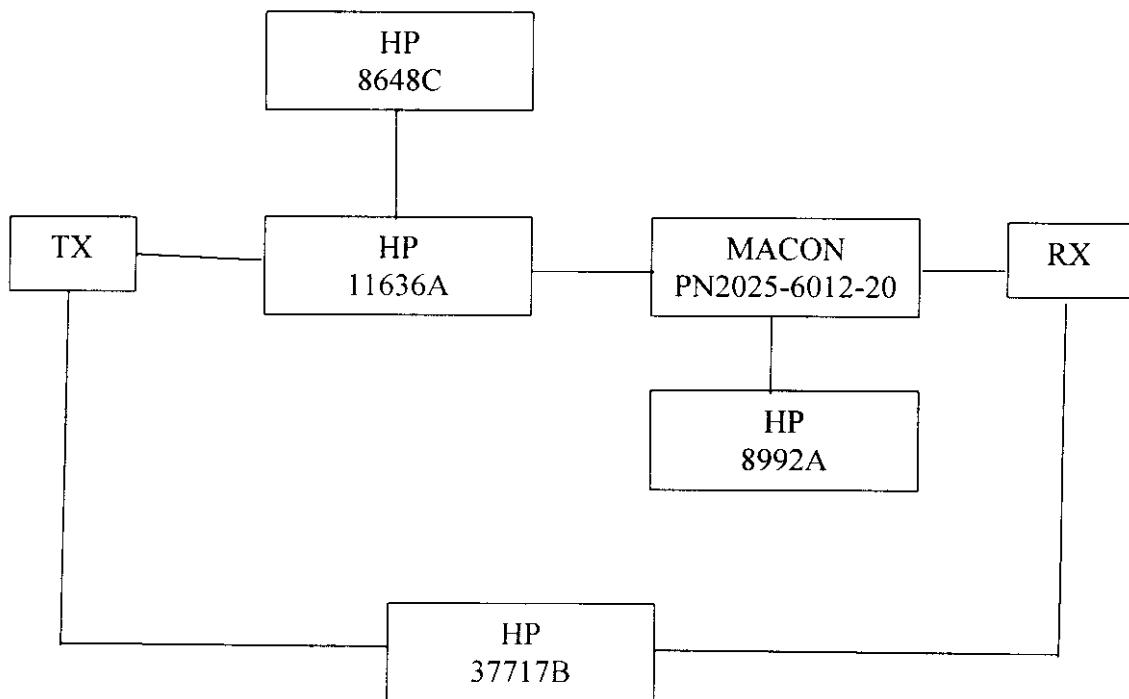


9. Processing Gain

9.1 Test Equipment

Equipment	Manufacturer	Model#	Cal. date
Jamming Signal Generator	HP	8648C	9/22
Power divider	HP	11636A	9/22
Conpler	MACON	PN2025-6012-20	9/22
Power Meter	HP	8992A	10/16
Communication Analyzer	HP	37717B	9/5

9.2 Test set-up



9.3 Test Procedure

1. TX power on.
2. Jamming signal power off.
3. Test TX power.
4. Jamming signal power on.
5. Adjust central frequency.
6. Adjust jamming signal power then communication analyzer will show $BER \leq 10^{-5}$
7. TX power off.
8. Check jamming power.
9. Compare the jamming signal power and TX power.
10. Change frequency, each step is 50KHz.

9.4 Test Limit

1. $S/N + J/S + L \geq 10\text{dB}$.
2. BER is small or equal than 10^{-5} .
3. 20% error is allowed.

9.5 Test Result

1. When BER is less than 10^{-5} , the S/N is 9.8dB for BPSK.
2. All processing gain are over 10dB. So, all can meet FCC limits.

* **Channel: 6**

* **Center frequency: 2437MHz**

* **Test step: 50KHz/step**

* **Test range: 2426.00MHz to 2448.95MHz**

* **Test condition**

TX	ON	ON	OFF
Jamming	OFF	ON	ON
dBm	-12.00	-10.63	Below table

Processing Gain = $(S/N)_0 + M_j + L_{sys} \geq 10\text{dB}$

$(S/N)_0$: when BER is less than or equal 10^{-5} , the $(S/N)_0$ is 9.8dB for BPSK

$L_{sys} : -10.63 - (-12.00) = 1.37\text{dB}$

$M_j = J/S$,

$S = -12.00\text{dBm}$

If J is over -13.17dBm ,

then Processing Gain (PG) will over 10dB

* **Test result: all J signals are over -13.17dBm**

so, all PG $\geq 10\text{dB}$

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)
2426.00	3.8
.05	3.6
.10	3.5
.15	3.4
.20	3.3
.25	3.2
.30	2.9
.35	2.8
.40	2.6
.45	2.4
.50	2.3
.55	2.1
.60	2.0
.65	1.9
.70	1.8
.75	1.7
.80	1.6
.85	1.5
.90	1.4
.95	1.3
2427.00	1.3
.05	1.2
.10	1.2
.15	1.2
.20	1.2
.25	1.2
.30	1.2
.35	1.2
.40	1.1
.45	1.1
.50	1.1
.55	1.1
.60	1.2
.65	1.3
.70	1.4
.75	1.5
.80	1.7
.85	1.6
.90	1.7
.95	1.8

Frequency range(MHz)	Jamming range(dBm)
2428.00	1.8
.05	1.9
.10	1.9
.15	1.9
.20	1.9
.25	1.9
.30	1.9
.35	2.0
.40	2.0
.45	2.0
.50	1.9
.55	1.7
.60	1.5
.65	1.4
.70	1.4
.75	1.2
.80	1.2
.85	1.1
.90	1.0
.95	0.8
2429.00	0.7
.05	0.6
.10	0.5
.15	0.4
.20	0.3
.25	0.2
.30	0.1
.35	0.0
.40	-0.1
.45	-0.3
.50	-0.4
.55	-0.6
.60	-0.9
.65	-0.9
.70	-1.0
.75	-1.1
.80	-1.3
.85	-1.4
.90	-1.5
.95	-1.5

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)
2430.00	-1.6
.05	-1.5
.10	-1.5
.15	-1.4
.20	-1.3
.25	-1.3
.30	-1.3
.35	-1.2
.40	-1.3
.45	-1.2
.50	-1.1
.55	-1.1
.60	-1.1
.65	-1.0
.70	-0.9
.75	-0.9
.80	-0.8
.85	-0.6
.90	-0.6
.95	-0.6
2431.00	-0.6
.05	-0.5
.10	-0.4
.15	-0.3
.20	-0.2
.25	-0.2
.30	-0.1
.35	-0.1
.40	-0.1
.45	-0.2
.50	-0.2
.55	-0.2
.60	-0.3
.65	-0.4
.70	-0.5
.75	-0.7
.80	-0.8
.85	-0.9
.90	-1.1
.95	-1.2

Frequency range(MHz)	Jamming range(dBm)
2432.00	-1.4
.05	-1.5
.10	-1.5
.15	-1.7
.20	-1.7
.25	-1.8
.30	-2.0
.35	-2.1
.40	-2.1
.45	-2.2
.50	-2.3
.55	-2.4
.60	-2.3
.65	-2.3
.70	-2.4
.75	-2.4
.80	-2.4
.85	-2.5
.90	-2.4
.95	-2.4
2433.00	-2.4
.05	-2.2
.10	-2.1
.15	-2.0
.20	-1.9
.25	-1.8
.30	-1.6
.35	-1.4
.40	-1.4
.45	-1.3
.50	-1.3
.55	-1.2
.60	-1.0
.65	-0.9
.70	-0.8
.75	-0.7
.80	-0.6
.85	-0.6
.90	-0.6
.95	-0.6

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)	Frequency range(MHz)	Jamming range(dBm)
2434.00	-0.5	2436.00	-1.4
.05	-0.4	.05	-1.2
.10	-0.4	.10	-1.1
.15	-0.4	.15	-1.1
.20	-0.4	.20	-0.9
.25	-0.5	.25	-0.8
.30	-0.5	.30	-0.7
.35	-0.6	.35	-0.7
.40	-0.7	.40	-0.7
.45	-0.7	.45	-0.6
.50	-0.7	.50	-0.7
.55	-0.6	.55	-0.5
.60	-0.6	.60	-0.5
.65	-0.7	.65	-0.4
.70	-0.9	.70	-0.4
.75	-1.0	.75	-0.4
.80	-1.2	.80	-0.2
.85	-1.2	.85	-0.2
.90	-1.3	.90	-0.2
.95	-1.4	.95	-0.6
2435.00	-1.5		
.05	-1.7		
.10	-1.9		
.15	-2.0		
.20	-2.1		
.25	-2.1		
.30	-2.1		
.35	-2.1		
.40	-2.1		
.45	-2.1		
.50	-2.1		
.55	-2.0		
.60	-2.0		
.65	-2.0		
.70	-1.9		
.75	-1.8		
.80	-1.8		
.85	-1.8		
.90	-1.8		
.95	-1.6		

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)	Frequency range(MHz)	Jamming range(dBm)
2437.00	-0.8	2439.00	-0.7
.05	-0.3	.05	-0.5
.10	-0.2	.10	-0.5
.15	-0.2	.15	-0.4
.20	-0.5	.20	-0.3
.25	-0.6	.25	-0.3
.30	-0.8	.30	-0.3
.35	-0.9	.35	-0.3
.40	-1.0	.40	-0.3
.45	-1.0	.45	-0.3
.50	-1.2	.50	-0.3
.55	-1.2	.55	-0.2
.60	-1.2	.60	-0.2
.65	-1.2	.65	-0.2
.70	-1.3	.70	-0.2
.75	-1.3	.75	-0.3
.80	-1.4	.80	-0.4
.85	-1.4	.85	-0.4
.90	-1.5	.90	-0.4
.95	-1.6	.95	-0.5
2438.00	-1.8	2440.00	-0.6
.05	-1.8	.05	-0.6
.10	-1.8	.10	-0.7
.15	-1.8	.15	-0.8
.20	-1.7	.20	-0.8
.25	-1.6	.25	-0.9
.30	-1.5	.30	-1.0
.35	-1.5	.35	-1.1
.40	-1.4	.40	-1.2
.45	-1.4	.45	-1.2
.50	-1.4	.50	-1.4
.55	-1.3	.55	-1.4
.60	-1.3	.60	-1.4
.65	-1.2	.65	-1.4
.70	-1.1	.70	-1.4
.75	-1.0	.75	-1.4
.80	-0.9	.80	-1.4
.85	-0.9	.85	-1.3
.90	-0.8	.90	-1.4
.95	-0.7	.95	-1.3

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)	Frequency range(MHz)	Jamming range(dBm)
2441.00	-1.2	2443.00	0.4
.05	-1.1	.05	0.4
.10	-1.0	.10	0.4
.15	-0.9	.15	0.3
.20	-0.8	.20	0.2
.25	-0.7	.25	0.2
.30	-0.5	.30	0.2
.35	-0.3	.35	0.2
.40	-0.3	.40	0.3
.45	-0.1	.45	0.3
.50	-0.1	.50	0.4
.55	0.2	.55	0.4
.60	0.3	.60	0.5
.65	0.3	.65	0.6
.70	0.4	.70	0.7
.75	0.3	.75	0.9
.80	0.7	.80	1.1
.85	0.7	.85	1.1
.90	0.8	.90	1.3
.95	0.9	.95	1.4
2442.00	1.1	2444.00	1.5
.05	1.2	.05	1.6
.10	1.3	.10	1.7
.15	1.3	.15	1.8
.20	1.4	.20	2.0
.25	1.4	.25	2.1
.30	1.4	.30	2.3
.35	1.5	.35	2.5
.40	1.5	.40	2.6
.45	1.4	.45	2.7
.50	1.4	.50	2.8
.55	1.4	.55	2.9
.60	1.3	.60	3.1
.65	1.2	.65	3.2
.70	1.2	.70	3.2
.75	1.0	.75	3.3
.80	0.9	.80	3.3
.85	0.7	.85	3.3
.90	0.7	.90	3.3
.95	0.6	.95	3.4

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)
2445.00	3.5
.05	3.5
.10	3.5
.15	3.5
.20	3.4
.25	3.4
.30	3.4
.35	3.4
.40	3.4
.45	3.2
.50	3.2
.55	3.2
.60	3.1
.65	3.0
.70	3.0
.75	2.9
.80	2.9
.85	2.9
.90	2.8
.95	2.8
2446.00	2.8
.05	2.9
.10	3.0
.15	3.1
.20	3.2
.25	3.3
.30	3.5
.35	3.7
.40	3.8
.45	4.0
.50	4.1
.55	4.4
.60	4.6
.65	4.9
.70	5.0
.75	5.3
.80	5.4
.85	5.6
.90	5.7
.95	5.8

Frequency range(MHz)	Jamming range(dBm)
2447.00	5.9
.05	6.1
.10	6.2
.15	6.4
.20	6.5
.25	6.6
.30	6.7
.35	6.8
.40	6.9
.45	7.0
.50	7.0
.55	7.2
.60	7.3
.65	7.3
.70	7.3
.75	7.3
.80	7.2
.85	7.1
.90	7.2
.95	7.1
2448.00	7.0
.05	
.10	
.15	
.20	
.25	
.30	
.35	
.40	
.45	
.50	
.55	
.60	
.65	
.70	
.75	
.80	
.85	
.90	
.95	



SPECTRUM RESEARCH & TESTING LABORATORY, INC.
15200 Shady Grove Road, Suite 350
Rockville, MD 20850
Tel: (301) 670-2818 Fax: (301) 963-8573

Date : Nov. 09, 1998

Federal Communications Commission
Equipment Authorization Division, Applications Processing Branch
7435 Oakland Mills Road, Columbia, MD 21046
Tel: (301) 362-3000 Fax: (301)344-2050

Attn: Mr. Richard Fabina

Reference: FCC ID: FACLAN2GO-DS (Correspondance ID: 4184)

Confirmation # EA91775

Dear Mr. Fabina:

Enclosed is a copy of the technical information (total 7 pages) that you requested on 10/21/98 through e-mail for following

FCC ID:

CONFIRMATION NO.

FACLAN2GO-DS

EA91775

If you have any questions, please feel free to contact us at Tel: (301) 670-2818 or

Fax at (301) 963-8573 & our e-mail address is achatesinc@aol.com.

Sincerely,

Annie Liu

Annie Liu

Enclosures

11/09/98
FCC ID: FACLAN2GO-DS
Serial No: 100



台 湾 律 頻 調 檢 技 术 有 限 公 司
SPECTRUM RESEARCH & TESTING LABORATORY, INC.
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No. 101-10, Ling 8 Shan-Tong Li,
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TEL(03)498-7684,498-7984 FAX(03)498-6528

NOV. 04, 1998

TO: Federal Communications Commission
ATTN: Mr. Richard Fabina
FM: Johnson Ho

RE: FCC ID: FACLAN2GO-DS

Confirmation #: EA91775

Dear Mr. Richard Fabina:

This is in response to your inquiry for FCC ID: FACLAN2GO-DS.

1. When SRT test the EUT, We used HP Notebook PC as peripheral. The Notebook PC's FCC ID is: 8945500.
2. For this EUT, it follows the IEEE 802.11 protocol and Harris Prism chipset is used. The data rate is 1Mbps using BPSK modulation or 2Mbps using QPSK, so the symbol rate is always 1 MHz. The chipping rate is 11M chips per second. The processing gain of DS Spread Spectrum is usually defined as the chipping rate over symbol rate, which is over $11M/1M=11=10.4dB$ in this EUT.
3. The factory will use permanent adhesive. It is an instantous cyanoacrylate adhesive.(Model # R25, made by Chandar)
4. This EUT power is 10mW. The emission test data is 110.5 dBuv at 3 meters. The test distance is 1 meter, but the data already changed to 3 meters condition. Please check the others freq. limits data. It is 3 meters data.
5. Attached are channel 6 processing gain test data. All three channels we already tested .

Above are applicant answering. If you need more information or have any questions, please feel free to contact SRT ,
THANK YOU VERY MUCH!

Sincerely,

Johnson Ho
Johnson Ho

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8F09-1

Ch No. : 6 center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2426.00	3.8	2428.00	1.8
.05	3.6	.05	1.9
.10	3.5	.10	1.9
.15	3.4	.15	1.9
.20	3.3	.20	1.9
.25	3.2	.25	1.9
.30	2.9	.30	1.9
.35	2.8	.35	2.0
.40	2.6	.40	2.0
.45	2.4	.45	2.0
.50	2.3	.50	1.9
.55	2.1	.55	1.7
.60	2.0	.60	1.5
.65	1.9	.65	1.4
.70	1.8	.70	1.4
.75	1.7	.75	1.2
.80	1.6	.80	1.2
.85	1.5	.85	1.1
.90	1.4	.90	1.0
.95	1.3	.95	0.8
2427.00	1.3	2429.00	0.7
.05	1.2	.05	0.6
.10	1.2	.10	0.5
.15	1.2	.15	0.4
.20	1.2	.20	0.3
.25	1.2	.25	0.2
.30	1.2	.30	0.1
.35	1.2	.35	0.0
.40	1.1	.40	-0.1
.45	1.1	.45	-0.3
.50	1.1	.50	-0.4
.55	1.1	.55	-0.6
.60	1.2	.60	-0.9
.65	1.3	.65	-0.9
.70	1.4	.70	-1.0
.75	1.5	.75	-1.1
.80	1.7	.80	-1.3
.85	1.6	.85	-1.4
.90	1.7	.90	-1.5
.95	1.8	.95	-1.5

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8F09-1

Ch No. : 6 center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2430.00	-1.6	2432.00	-1.4
.05	-1.5	.05	-1.5
.10	-1.5	.10	-1.5
.15	-1.4	.15	-1.7
.20	-1.3	.20	-1.7
.25	-1.3	.25	-1.8
.30	-1.3	.30	-2.0
.35	-1.2	.35	-2.1
.40	-1.3	.40	-2.1
.45	-1.2	.45	-2.2
.50	-1.1	.50	-2.3
.55	-1.1	.55	-2.4
.60	-1.1	.60	-2.3
.65	-1.0	.65	-2.3
.70	-0.9	.70	-2.4
.75	-0.9	.75	-2.4
.80	-0.8	.80	-2.4
.85	-0.6	.85	-2.5
.90	-0.6	.90	-2.4
.95	-0.6	.95	-2.4
2431.00	-0.6	2433.00	-2.4
.05	-0.5	.05	-2.2
.10	-0.4	.10	-2.1
.15	-0.3	.15	-2.0
.20	-0.2	.20	-1.9
.25	-0.2	.25	-1.8
.30	-0.1	.30	-1.6
.35	-0.1	.35	-1.4
.40	-0.1	.40	-1.4
.45	-0.2	.45	-1.3
.50	-0.2	.50	-1.3
.55	-0.2	.55	-1.2
.60	-0.3	.60	-1.0
.65	-0.4	.65	-0.9
.70	-0.5	.70	-0.8
.75	-0.7	.75	-0.7
.80	-0.8	.80	-0.6
.85	-0.9	.85	-0.6
.90	-1.1	.90	-0.6
.95	-1.2	.95	-0.6

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8P09-1

Ch No. : 6 center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2434.00	-0.5	2436.00	-1.4
.05	-0.4	.05	-1.2
.10	-0.4	.10	-1.1
.15	-0.4	.15	-1.1
.20	-0.4	.20	-0.9
.25	-0.5	.25	-0.8
.30	-0.5	.30	-0.7
.35	-0.6	.35	-0.7
.40	-0.7	.40	-0.7
.45	-0.7	.45	-0.6
.50	-0.7	.50	-0.7
.55	-0.6	.55	-0.5
.60	-0.6	.60	-0.5
.65	-0.7	.65	-0.4
.70	-0.9	.70	-0.4
.75	-1.0	.75	-0.4
.80	-1.2	.80	-0.2
.85	-1.2	.85	-0.2
.90	-1.3	.90	-0.2
.95	-1.4	.95	-0.6
2435.00	-1.5	.00	
.05	-1.7	.05	
.10	-1.9	.10	
.15	-2.0	.15	
.20	-2.1	.20	
.25	-2.1	.25	
.30	-2.1	.30	
.35	-2.1	.35	
.40	-2.1	.40	
.45	-2.1	.45	
.50	-2.1	.50	
.55	-2.0	.55	
.60	-2.0	.60	
.65	-2.0	.65	
.70	-1.9	.70	
.75	-1.8	.75	
.80	-1.8	.80	
.85	-1.8	.85	
.90	-1.8	.90	
.95	-1.6	.95	

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8F09-1

Ch No. : 6 center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2437.00	-0.8	2439.00	-0.7
.05	-0.3	.05	-0.5
.10	-0.2	.10	-0.5
.15	-0.2	.15	-0.4
.20	-0.5	.20	-0.3
.25	-0.6	.25	-0.3
.30	-0.8	.30	-0.3
.35	-0.9	.35	-0.3
.40	-1.0	.40	-0.3
.45	-1.0	.45	-0.3
.50	-1.2	.50	-0.3
.55	-1.2	.55	-0.2
.60	-1.2	.60	-0.2
.65	-1.2	.65	-0.2
.70	-1.3	.70	-0.2
.75	-1.3	.75	-0.3
.80	-1.4	.80	-0.4
.85	-1.4	.85	-0.4
.90	-1.5	.90	-0.4
.95	-1.6	.95	-0.5
2438.00	-1.8	2440.00	-0.6
.05	-1.8	.05	-0.6
.10	-1.8	.10	-0.7
.15	1.8	.15	-0.8
.20	-1.7	.20	-0.8
.25	-1.6	.25	-0.9
.30	-1.5	.30	-1.0
.35	-1.5	.35	-1.1
.40	-1.4	.40	-1.2
.45	-1.4	.45	-1.2
.50	-1.4	.50	-1.4
.55	-1.3	.55	-1.4
.60	-1.3	.60	-1.4
.65	-1.2	.65	-1.4
.70	-1.1	.70	-1.4
.75	-1.0	.75	-1.4
.80	-0.9	.80	-1.4
.85	-0.9	.85	-1.3
.90	-0.8	.90	-1.4
.95	-0.7	.95	-1.3

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8F09-1

Ch No. : 6 center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2441.00	-1.2	2443.00	0.4
.05	-1.1	.05	0.4
.10	-1.0	.10	0.4
.15	-0.9	.15	0.3
.20	-0.8	.20	0.2
.25	-0.7	.25	0.2
.30	-0.5	.30	0.2
.35	-0.3	.35	0.2
.40	-0.3	.40	0.3
.45	-0.1	.45	0.3
.50	-0.1	.50	0.4
.55	0.2	.55	0.4
.60	0.3	.60	0.5
.65	0.3	.65	0.6
.70	0.4	.70	0.7
.75	0.3	.75	0.9
.80	0.7	.80	1.1
.85	0.7	.85	1.1
.90	0.8	.90	1.3
.95	0.9	.95	1.4
2442.00	1.1	2444.00	1.5
.05	1.2	.05	1.6
.10	1.3	.10	1.7
.15	1.3	.15	1.8
.20	1.4	.20	2.0
.25	1.4	.25	2.1
.30	1.4	.30	2.3
.35	1.5	.35	2.5
.40	1.5	.40	2.6
.45	1.4	.45	2.7
.50	1.4	.50	2.8
.55	1.4	.55	2.9
.60	1.3	.60	3.1
.65	1.2	.65	3.1
.70	1.2	.70	3.2
.75	1.0	.75	3.2
.80	0.9	.80	3.3
.85	0.7	.85	3.3
.90	0.7	.90	3.3
.95	0.6	.95	3.4

Spectrum Research Testing Lab. FCC ID: FACLAN2GO-DS Report: T8F09-1

Ch No. : 6

center frequency: 2437

Frequency (MHz)	Jamming (dBm)	Frequency (MHz)	Jamming (dBm)
2445.00	3.5	2447.00	5.9
.05	3.5	.05	6.1
.10	3.5	.10	6.2
.15	3.5	.15	6.4
.20	3.4	.20	6.5
.25	3.4	.25	6.6
.30	3.4	.30	6.7
.35	3.4	.35	6.8
.40	3.4	.40	6.9
.45	3.2	.45	7.0
.50	3.2	.50	7.0
.55	3.2	.55	7.2
.60	3.1	.60	7.3
.65	3.0	.65	7.3
.70	3.0	.70	7.3
.75	2.9	.75	7.3
.80	2.9	.80	7.2
.85	2.9	.85	7.1
.90	2.8	.90	7.2
.95	2.8	.95	7.1
2446.00	2.8	2448.00	7.0
.05	2.9	.05	
.10	3.0	.10	
.15	3.1	.15	
.20	3.2	.20	
.25	3.3	.25	
.30	3.5	.30	
.35	3.7	.35	
.40	3.8	.40	
.45	4.0	.45	
.50	4.1	.50	
.55	4.4	.55	
.60	4.6	.60	
.65	4.9	.65	
.70	5.0	.70	
.75	5.3	.75	
.80	5.4	.80	
.85	5.6	.85	
.90	5.7	.90	
.95	5.8	.95	

To: Johnson Ho (Computer & Communication Laboratory)
From: Rich Fabina FCC Application Processing Branch
Date: October 21, 1998
FCC ID: FACLAN2GO-DS

Applicant Name: Johnson Ho

Subject: ADDITIONAL INFORMATION ON FCC ID: FACLAN2GO-DS

The items indicated below must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 60 days may result in application dismissal pursuant to Section 2.917(c) and forfeiture of the filing fee pursuant to Section 1.1106

ONLY ONE ELECTRONIC REPLY PER REFERENCE NUMBER (shown at the end of this fax) IS ACCEPTED ELECTRONICALLY VIA THE INTERNET. PLEASE DO NOT SUBMIT A PARTIAL REPLY OR ASK QUESTIONS ABOUT THIS REQUEST FOR ADDITIONAL INFORMATION VIA THE INTERNET. PARTIAL REPLIES MUST BE SENT VIA STANDARD METHODS LIKE FAX, EMAIL OR MESSENGER SERVICE. IF YOU HAVE QUESTIONS ABOUT THIS REQUEST FOR ADDITIONAL INFORMATION, CONTACT MR. RICHARD FABINA VIA EITHER TELEPHONE AT 301-362-3027 BETWEEN 1:00 AND 3:30 P.M. EASTERN TIME OR FAX AT 301-344-2050 ANYTIME. YOUR COOPERATION IS APPRECIATED.

1. This device is a composite device that consists of a spread spectrum transmitter and a personal computer (PC) peripheral. The transmitter requires Certification. The PC peripheral may either be authorized under the Certification or Declaration of Conformity (DoC) procedures. You have two options below, either A or B:

(A) If you intend to obtain Certification for the PC peripheral portion of this device, please submit another application using the same FCC ID number with the correct fee for Certification to Equipment Approval Services (EAS) in Pittsburgh, PA. Do not submit this application with fee directly to the FCC lab. Applications with a fee attached must be submitted to EAS in Pittsburgh for processing of the fee. See Section 1.1103 for the complete address of EAS.

The fees for equipment authorization were changed effective September 14, 1998. Certification of a PC peripheral is now \$940.00. If you file for Certification of the PC peripheral portion of this device, you must pay the new fee of \$940.00.

(B) If you intend to obtain DoC for the PC peripheral portion of this device, please provide the following:
(a) the name of the accredited test laboratory that performed the DoC testing in accordance with Section 2.1075(a)(3)(ii),
(b) the compliance information described in Sections 2.1077(a)(1) through (3) (i.e., identification of the product by name or model number, and the identification, by name, address and telephone number, of the responsible party as defined in Section 2.909), and
(c) a sample of the DoC label and its location on the device.

- 2. An operational description of this transmitter in accordance with Section 2.1033(b)(4) of the FCC Rules. At a minimum, this description must include the data rates, symbol rates, chipping or spreading rate and the theoretical processing gain and how you determine it.
- ✓ 3. Connection of the antenna to this transmitter with an adhesive must be done at the factory with a permanent adhesive or glue. Please have the applicant confirm that the antenna will be attached at the factory and describe the type of permanent adhesive that will be used.
- ✓ 4. The output power measured from this device during radiated emission measurements does not agree with the output power listed in the test report. You state that this device has 10 milliwatts of output power but the maximum field strength reading of 110.5 dBuV/m @ 1 meter converts to only 3.7 milliwatts using the following formula: $P = (Ed)^2/30$, where $d = 1$ meter and $E = 3.35$ volts/meter. Unless you remeasure all the radiated emission levels to show an output power closer to the 10 milliwatts described in the test report, I will grant this transmitter with the maximum output power listed as 3.7 milliwatts.
- 5. For your information - Processing gain tests need only be performed on one channel, not three channels as you have done. In addition, the Commission requires the readings of the jammer signal to be reported at 50 kHz intervals where they are measured not reported as a range as you have done this time. We will accept this form of data reporting this time only. Future test results submitted in this manner will have to be resubmitted in the standard format that we accept. If you have any questions about this matter, please contact Mr. Richard Fabina at one of the telephone numbers listed above.

DO NOT Reply to this email by using the 'Reply' button. In order for your response to be processed expeditiously, you must upload your response via the Internet at <https://dettifoss.fcc.gov/beta/oet/index.html>

Replies to this letter MUST contain the Reference Number: 4184

* * * COMMUNICATION RESULT REPORT (NOV.10.1998 5:08PM) * * *

TTI CONG MAIL/OLIA FCC

FILE MODE	OPTION	ADDRESS (GROUP)	RESULT	PAGE
417 MEMORY TX		13019638573	OK	P. 1/1

REASON FOR ERROR

E-1) HANG UP OR LINE FAIL
E-3) NO ANSWERE-2) BUSY
E-4) NO FACSIMILE CONNECTION

FEDERAL COMMUNICATIONS COMMISSION
 Equipment Authorization Division, Applications Processing Branch
 7435 Oakland Mills Road, Columbia, MD 21046
 Telephone: (301) 362-3000, Facsimile: (301) 344-2050

Date: November 10, 1998 04:00 pmFrom: Rich Fabina Telephone: (301)-362-3027To: Johnson HoOrganization: Spectrum Research & Testing Lab IncTelephone: 301 670-2818 Facsimile: 301 963-8573This cover sheet is page 1 of 1. Please direct inquiries to the sender at the above extension.Reference FCC ID: FACLAN2GO-DSApplicant: Computer & Communication Laboratory

The response to our request for additional information dated October 21, 1998 was incomplete. Please respond to all unanswered items within 60 days of the date of the original request.

Failure to provide the requested information with this time period may result in application dismissal pursuant to section 2.917(c) and forfeiture of the filing fee pursuant to section 1.1106.

1. You failed to respond to item number 1 on the original request for additional information.

This device is a composite device that consists of a spread spectrum transmitter and a personal computer (PC) peripheral. The transmitter requires Certification. The PC peripheral may either be authorized under the Certification or Declaration of Conformity (DoC) procedures. You have two options below, either A or B:

(A) If you intend to obtain Certification for the PC peripheral portion of this device, please submit another



SPECTRUM RESEARCH & TESTING LABORATORY, INC.
15200 Shady Grove Road, Suite 350
Rockville, MD 20850
Tel: (301) 670-2818 Fax: (301) 963-8573

Date: October 05, 1998

Federal Communications Commission
Linda Elliott/ Legal Instruments Examiner
Applications Processing Branch
7435 Oakland Mills Road
Columbia, MD 21046

AC/LE 10-9-98
TR/RF 9-18-98

Dear Ms. Elliott:

Enclosed are two labels and compliance statement for

FCC ID: FACLAN2GO-DS Confirmation #EA91775 *

FCC ID: FACLAN2GO-FH Confirmation #EA91776

Which you request on e-mail at 9-24-98.

Sincerely,

A handwritten signature in black ink, appearing to read 'Annie Liu'.

Annie Liu
Manager

3609

100
32 M 98
FCC LABORATORY

Spectrum Research & Testing Lab. FCC ID: FACLAN2GO-DS Report#: T8F09-1

Sample OF FCC ID Label

FCC ID : FACLAN2GO-DS
MODEL : LAN2GO-DS
SERIAL# : *****

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS. (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENE THAT MAY CAUSE UNDESIRED OPERATION.

The above label will be placed on the equipment as shown in the photograph below.

Dimension: 1.5cm x 3cm

To: Johnson Ho (Computer & Communication Laboratory)
From: Linda Elliott FCC Application Processing Branch
Date: September 24, 1998
FCC ID: FACLAN2GO-DS

Applicant Name: Johnson Ho

Subject: Administrative request

The items indicated below must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 60 days may result in application dismissal pursuant to Section 2.917(c) and forfeiture of the filing fee pursuant to Section 1.1106

Please provide identification labels pursuant to Section 2.925, and compliance statements pursuant to Section 15.19(a)(3) of the Rules for the following two applications:

FCC ID: FACLAN2GO-DS Confirmation #EA91775
FCC ID: FACLAN2GO-FH Confirmation #EA91776

Applicant: Computer & Communication Lab

DO NOT Reply to this email by using the 'Reply' button. In order for your response to be processed expeditiously, you must upload your response via the Internet at <https://dettifoss.fcc.gov/beta/oet/index.html>

Replies to this letter MUST contain the Reference Number: 3610



Industrial Technology Research Institute
Computer & Communication Research Laboratory

Federal Communications Commission
Authorization and Evaluation Division
7105 Oakland Mills Road
Columbia, MD 21046

Dear Sir/Madam:

This is to serve as proper written authorization that Spectrum Research and Testing Laboratory, Inc. 1603 Skimmers Turn road, Owings, Maryland 20736, will act as our representative in all matters relating to FCC applications for equipment approval. This includes the signing of all related documents, the transmitting of required fees, and receiving correspondence and notifications from FCC. All acts performed by Spectrum Research and Testing Laboratory, Inc. especially modifications to our equipment under testing will be carried out on our behalf.

Meaning by checking yes, the applicant certifies that, in case of an individual applicant, he or she is not subject to a denial of federal benefits, that includes FCC benefits, pursuant to section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862, or in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the applicant is subject to a denial of federal benefits, that includes FCC benefits, pursuant to that section. For a definition of a "party" for these purposes see 47 C.F.R. 1.2002(b).

[] Yes [] No

If you have any questions regarding our applications for equipment approval, please contact Spectrum Research and Testing Laboratory, Inc., by calling (301) 855-2262.

Respectfully,

Effective Dates:

Signature

Effective dates:

6/1/98 to 6/1/99

Name: Gerald Wang
Title: Eng.
Date: 6/19/1998

Federal Communications Commission
Office of Engineering and Technology
Equipment Authorization Branch
7435 Oakland Mills Road
Columbia, MD 21046

To whom it may concern,

This letter is to explain the Wireless Lan test condition . This project was investigated with Notebook PC PCMCIA slot. The Transmitting signal is 2.4GHz and with:

Spread Spectrum Function

The data shown in this report reflects the worst case data for each clock frequency listed above.

Sincerely,

Jesse Ho
Ass. Manager



Class B Certification Application

under Part 15, Subpart B

EUT: Wireless LAN Card

Model: LAN2GO-DS

FCC ID: FACLAN2GO-DS

Prepared for:

Computer & Communication Laboratory
Industrial Technology Research Institute

No. 195-11, Sec. 4 , Chung-Hsin Rd.

Chutung Hsin-Chu, Taiwan, R.O.C.

SRT Report: T8F09-1

EMI Testing Report

EUT: Wireless LAN Card

Model: LAN2GO-DS

FCC ID: FACLAN2GO-DS

Prepared for:

Computer Communication Laboratory

Industrial Technology Research Institute

No. 195-11, Sec.4, Chung-Hsing Road,

Chutung, Hsin-Chu,

Taiwan, R.O.C.

Prepared by:

Spectrum Research & Testing
Laboratory Inc.

1603 Skinners Turn Road
Owings, MD 20736

Table of Contents

1. Test Report Certification.....	2
2. Test Statement	
2.1 Antenna Statement.....	3
2.2 Departure From Document Policies, Procedure or Specifications.....	3
2.3 Test Statement.....	3
3. Modification Letter.....	4
4. EUT Modifications.....	5
5. Conducted Power Line Test	
5.1 Test Equipment.....	6
5.2 Configuration of the EUT.....	7-8
5.3 EUT Operating Condition.....	9
5.4 Test Procedure.....	10
5.5 Test Setup.....	11
5.6 Emission Limit.....	12
5.7 Conducted Power Line Test Result.....	13-15
6. Radiated Emission Test	
6.1 Test Equipment.....	16
6.2 Configuration of the EUT.....	17
6.3 EUT Operation Condition.....	17
6.4 Test Procedure.....	17
6.5 Test Setup.....	18-19
6.6 Radiated Emission Limit.....	20
6.7 Radiated Emission Test Result.....	21-26
7. Bandwidth	
7.1 Limit.....	27
7.2 Result.....	27

8. Peak Power	
8.1 Limit.....	28
8.2 Result.....	28
9. Power Spectral Density	
9.1 Test Equipment.....	29
9.2 Test Procedure.....	29
9.3 Limit.....	29
9.4 Result.....	29
10. Processing Gain	
10.1 Test Equipment.....	30
10.2 Test Set-up.....	30
10.3 Test Procedure.....	31
10.4 Limit.....	31
10.5 Test Result.....	31
11. Photos.....	38-55

1. Test Report Certification**Applicant:** Computer & Communication Laboratory**Address:** Industrial Technology Research Institute
No. 195-1, Sec. 4, Chung-Hsing Road,
Chutung, Hsin-Chu, Taiwan, R.O.C.**EUT Description:** Wireless LAN Card**(A) Power Supply:** From personal computer**(B) Model:** LAN2GO-DS**(C) FCC ID:** **FACLAN2GO-DS****Final Tested Date:** June 11, 1998**Measurement Procedure Used:**

Part 15 Subpart C of FCC rules and regulations (47 CFR Part 15) FCC / ANSI C63.4-1992.

We Hereby Show That:

The measurement shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable.

Testing Engineer: Jesse Ho **Date:** 6/11/98Jesse Ho**Supervisor:** Linda Chiang **Date:** June 11, 1998Linda Chiang**Approved By:** Johnson Ho **Date:** 6/11/98Johnson Ho

2. Test Statement

2.1 Antenna Statement

The attached antenna on this PCMCIA card (Direct Sequence Transmitter)
Will be:

- a. Solder on PCB or
- b. The connector will be fixed by strong adhesive material.

2.2 Departure from documented policies, procedures, or specifications:

Were there any departures from documented policies, procedures, or specifications?
No **X** Yes _____. If yes, please explain.

2.3 Test Statement

- The certificate or report shall not be reproduced except in full, without the written approval of **SRT Lab.**, This report must not be used by the client to claim product endorsement by **NVLAP** or any agency of the US Government.
- Partial tests (Power Spectral Density & Processing Gain) were tested at Computer & Communications Research Laboratory. All test conditions were audited by **SRT LAB's** engineer.

3. Modification Letter

This section contains the following documents:

A. Letter of modifications



Industrial Technology Research Institute
Computer & Communication Research Laboratory

Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD 21046

Dear Sir/Madam:

This is to serve as proper notice that our company agrees to make all modifications to FCC ID FACLAN2GO-DS listed in section 3.0 of the test report submitted by Spectrum Research and Testing Laboratory, Inc.

Respectfully,

Signature

Name: Gerald Wang
Title: Eng.
Date: 6/19/1998

4. EUT Modifications

The following accessories were added to the EUT during testing:

Did not have any modification by SRT Lab.

5. Conducted Power Line Test

5.1 Test Equipment

The following test equipment was used during the conducted power line test:

Equipment	Specification	Manufacturer	Model # / Serial #	Cal. Center /Last Cal. Date	Next Cal. Date
Receiver System	100Hz to 1500MHz	Hewlett Packard	8574A 3001A04931	by Simco June, 97	June, 1998
Receiver System	9KHz to 30MHz	Rohde & Schwartz	ESH3 893517/013	by Simco June, 97	June, 1998
LISN	50uH / 50 Ohms	Solar Corp.	8012-50-R-24-BNC / 924839	by Simco June, 97	June, 1998
LISN	50uH / 50 Ohms	Rohde & Schwartz	ESH3-25 89491/016	by Simco June, 97	June, 1998
Signal Generator	100 KHz to 1024 MHz	Hewlett Packard	8648A 3636a02776	by HP January, 98	January, 1999
Isolation Transformer	N/A	Solar Corp.	7032-1 N/A	N/A	N/A
Anechoic Chamber	N/A	TEC	SRT002 N/A	N/A	N/A
Spectrum Analyzer	100 KHz to 2500 MHz	IFR Corp.	A-8000 1456	by simco June, 97	June, 1998
Spectrum Analyzer	400 KHz to 26.5 GHz	HP	8593E 3710A03220	by HP January, 98	January, 1999
Power Analyzer	16 Amps 650 Volts	AEMC	3930 57204	N/A	N/A
Power Source	0-260VAC 47-500Hz	Interpower	85510510 39310	N/A	N/A
Cable	RG214U	Intercomp	Cable #8	by SRT Lab. January, 98	Jan. 1999
Cable	RG214U	Intercomp	Cable #9	by SRT Lab. January, 98	Jan. 1999

5.2 Configuration of the EUT

The **EUT** was configured according to **ANSI C63.4 - 1992**. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

EUT:

Device	Manufacturer	Model #	FCC ID
Wireless LAN Card	Computer & Communication Lab.	LAN2GO-DS	FACLAN2GO-DS

Peripherals:

Device	Manufacturer	Model # / Serial #	FCC ID
Printer	HP	2225C	DSI6XU2225
Modem	Datatronics	1200CK	E2O5OV1200CK
Computer	HP	5500CS	B945500

Remark:

5.2 Configuration of the EUT (Continued)

Cable: All one meter or greater in length – bundled according to **ANSI C63.4 - 1992**

Printer: Power - unshielded supplied with printer
Data - shielded with plastic hoods

Modem: Power - unshielded supplied with modem
Data - shielded with metal hoods

Computer: Power - shielded supplied with NB

Power Adapter: Power - shielded

Internal Device:

Device	Manufacturer	Model #	FCC ID
N/A			

5.3 EUT Operating Condition:

Operating condition is according to **ANSI C63.4 - 1992**. The operating speed of the computer was 100MHz.

1. EUT power on.
2. Run Tx and Rx testing program;
3. Put PCMCIA card (EUT) into notebook and set up channel.
4. Send signal out.

Remark: 1. Three channels were tested.

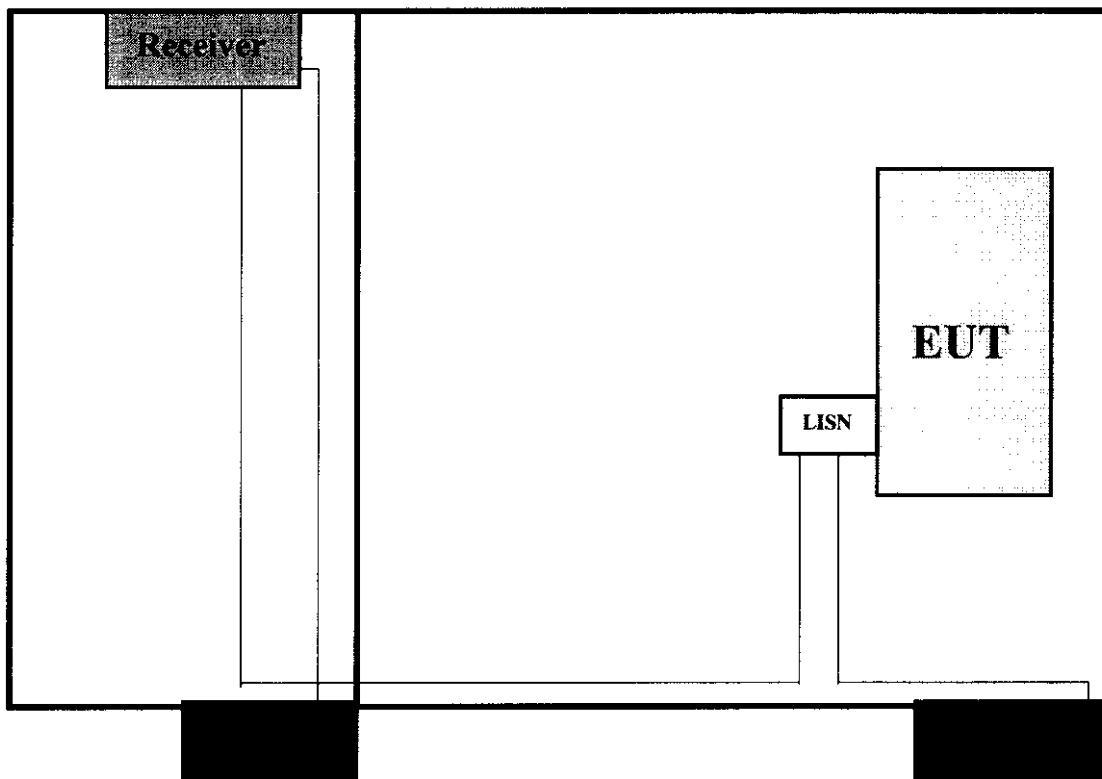
- * Channel 1: 2.412GHz
- * Channel 6: 2.437GHz
- * Channel 11: 2.462GHz

2. CPU Type: Pentium 100
Clock Chip: 66 MHz

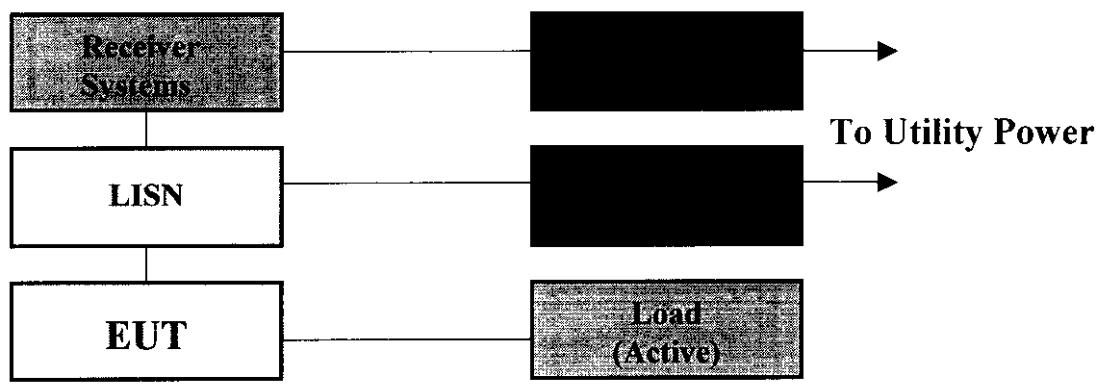
5.4 Test Procedure

The **EUT** was test according to ANSI C63.4 - 1992. The conducted test was performed in an anechoic chamber. The frequency spectrum from 0.45 MHz to 30 MHz was investigated. The LISN used was 50 Ohms/50 μ Henry as specified by section 5.1 of ANSI C63.4 - 1992. Cables and peripherals were moved to find the maximum emission levels for each frequency.

5.5 Test Setup



Anechoic Chamber Configuration



Wireless LAN Card

Notebook Computer
Printer
Modem

5.6 Conducted Power Line Emission Limit

Frequency Range (MHz)	Class A Limits	Class B Limits
0.450 - 1.705	1000 μ V	250 μ V
1.705 - 30.00	3000 μ V	250 μ V

Note: In the above table, the tighter limits applies at the band edges.

5.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 27 °C

Humidity: 65 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	*	36.80	*	69.18	250
1.5130	*	36.60	*	67.61	250
1.5980	36.90	37.40	69.98	74.13	250
1.6870	*	36.60	*	67.61	250
4.7760	*	36.60	*	67.61	250
5.0440	36.70	*	68.39	*	250
5.1290	37.10	*	71.61	*	250
5.2160	37.10	*	71.61	*	250
5.3040	37.10	*	71.61	*	250
5.3940	37.10	*	71.61	*	250
17.1700	*	38.40	*	83.18	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is < ± 2 dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 1: 2.412GHz

Signed by Testing Engineer:

5.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 26 °C

Humidity: 60 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	36.80	37.00	69.18	70.79	250
1.5070	36.50	36.60	66.83	67.61	250
1.5980	37.00	37.50	70.79	74.99	250
1.6800	*	36.50	*	66.83	250
7.2650	36.50	36.10	66.83	63.83	250
8.5210	36.60	*	67.61	*	250
8.8490	*	36.60	*	67.61	250
17.1000	37.60	*	75.86	*	250
17.1700	*	37.90	*	78.52	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is < ± 2 dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 6: 2.37GHz

Signed by Testing Engineer: J. B.

5.7 Conducted Power Line Test Result

The frequency spectrum from 0.45 MHz to 30 MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9KHz.

Temperature: 26 °C

Humidity: 60 %RH

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Line 1 (uV)	Line 2 (uV)	Limits (uV)
1.4210	36.50	36.30	66.83	65.31	250
1.5980	36.80	36.20	69.18	64.57	250
6.6250	36.30	36.00	65.31	63.10	250
8.6650	36.30	36.10	65.31	63.83	250
8.9610	36.40	36.30	66.07	65.31	250
16.8800	37.70	37.50	74.00	74.99	250

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 2$ dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 5.1
- 5). Test Configuration Please See 5.2
- 6). Any Departure from Specification: N/A
- 7). Channel 11: 2.462GHz

Signed by Testing Engineer: J. Z. J.

6. Radiated Emission Test**6.1 Test Equipment List**

The following test equipment was used during the radiated emission test:

Equipment	Specification	Manufacturer	Model # / Serial #	Cal. Center / Last Cal. Date	Next Cal. Date
Receiver Systems	100 Hz to 1500 MHz	Hewlett Packard	8574A 3001A04931	By Simco June, 97	June, 1998
Spectrum Analyzer	100 Hz to 2500 MHz	IFR Corp.	A-8000 1456	By Simco June, 97	June, 1998
Spectrum Analyzer	400 KHz to 26.5 GHz	HP	8593E 3710A03220	By HP Jan. 98	Jan. 1999
Dipole Antenna	28 MHz to 1000 MHz	EMCO	3121C 9505-1136	By EMCO June, 97	June, 1998
Biconical Antenna	20 MHz to 200 MHz	EMCO	3104C 9111-4455	By SRT Lab. May, 1998	May, 1999
Biconical Antenna	30 MHz to 300 MHz	EMCO	3108 2380	By SRT Lab. May, 1998	May, 1999
Log-periodic Antenna	200 MHz to 1000 MHz	EMCO	3146 9002-2687	By SRT Lab. May, 1998	May, 1999
Signal Generator	100 KHz to 1024 MHz	Hewlett Packard	8648A 2923A30924	By HP Jan. 98	Jan, 1999
Preamplifier	100 KHz to 1300 MHz	Hewlett Packard	8447D 2944A06746	By Simco June, 97	June, 1998
Horn Antenna	1000 MHz to 18 GHz	EMCO	3115 3619	By Simco July, 1997	July, 1998
Horn Antenna	18 GHz to 26.5 GHz	EMCO	3116	By EMCO May, 1998	May, 1999
Cable	RG214U	Intercorp	Cable #1	By SRT Lab. Jan. 1998	Jan, 1999
Turntable	0 - 360 Degree	SRT Lab	SRT001	By SRT Lab. June, 1997	June, 1998
Antenna Mast	5 Meters Height	SRT Lab.	SRT001	N/A	N/A

6.2 Configuration of the EUT

Same as section 5.2 of this report.

6.3 EUT Operating Condition

Same as section 5.3 of this report.

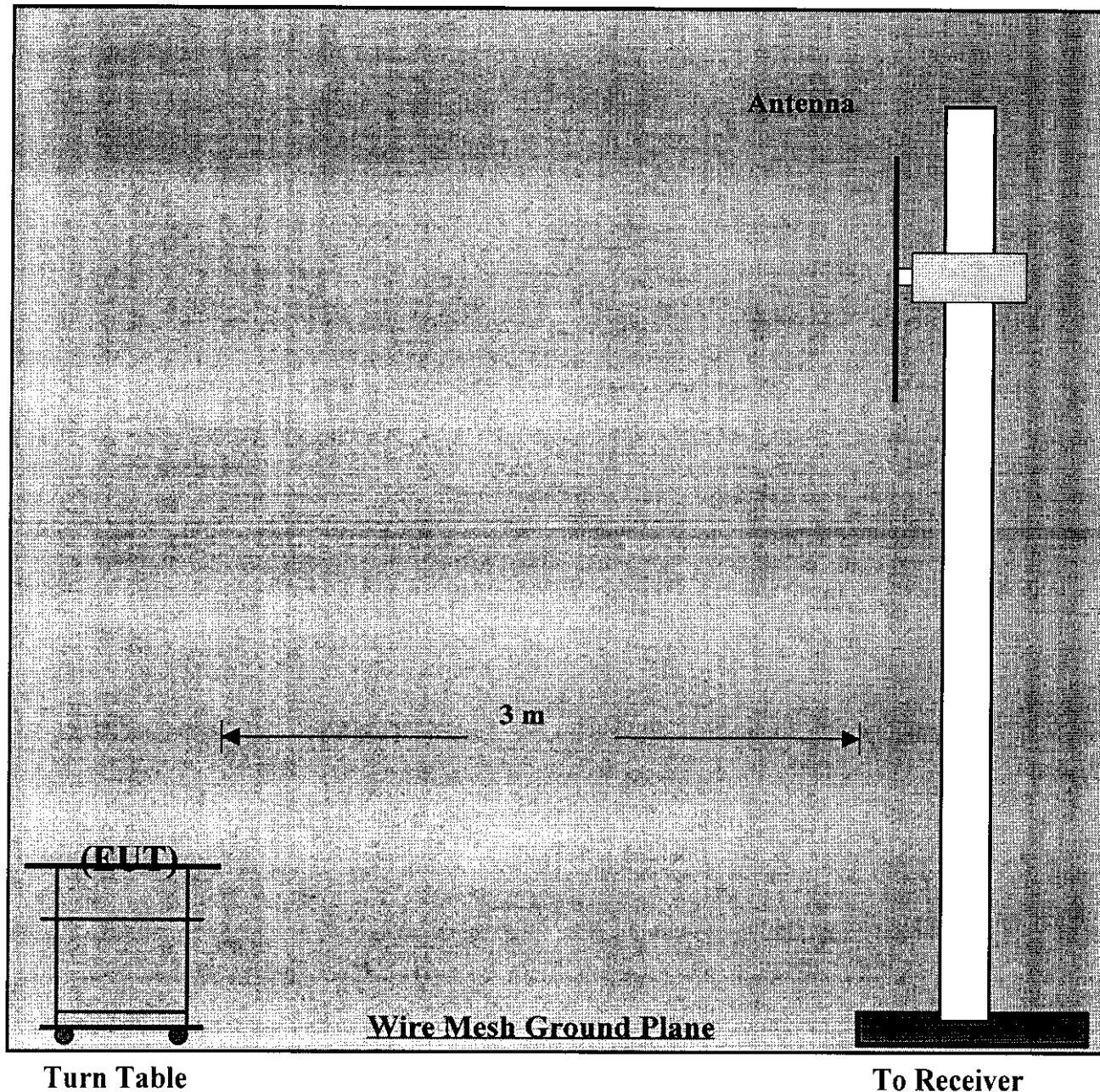
6.4 Test Procedure

The EUT was tested according to **ANSI C63.4 - 1992**. The radiated test was performed at SRT lab's open site. This site is on file with the FCC laboratory division, reference 31040/sit.

The frequency spectrum from 30MHz to 25Hz was investigated. The measurements **under 1000 MHz** with resolution bandwidth of 120KHz are quasi-peak reading made at three using an adjustable dipole antenna. Peripherals, cables, EUT orientation, and antenna height were varied to find the maximum emission for each frequency.

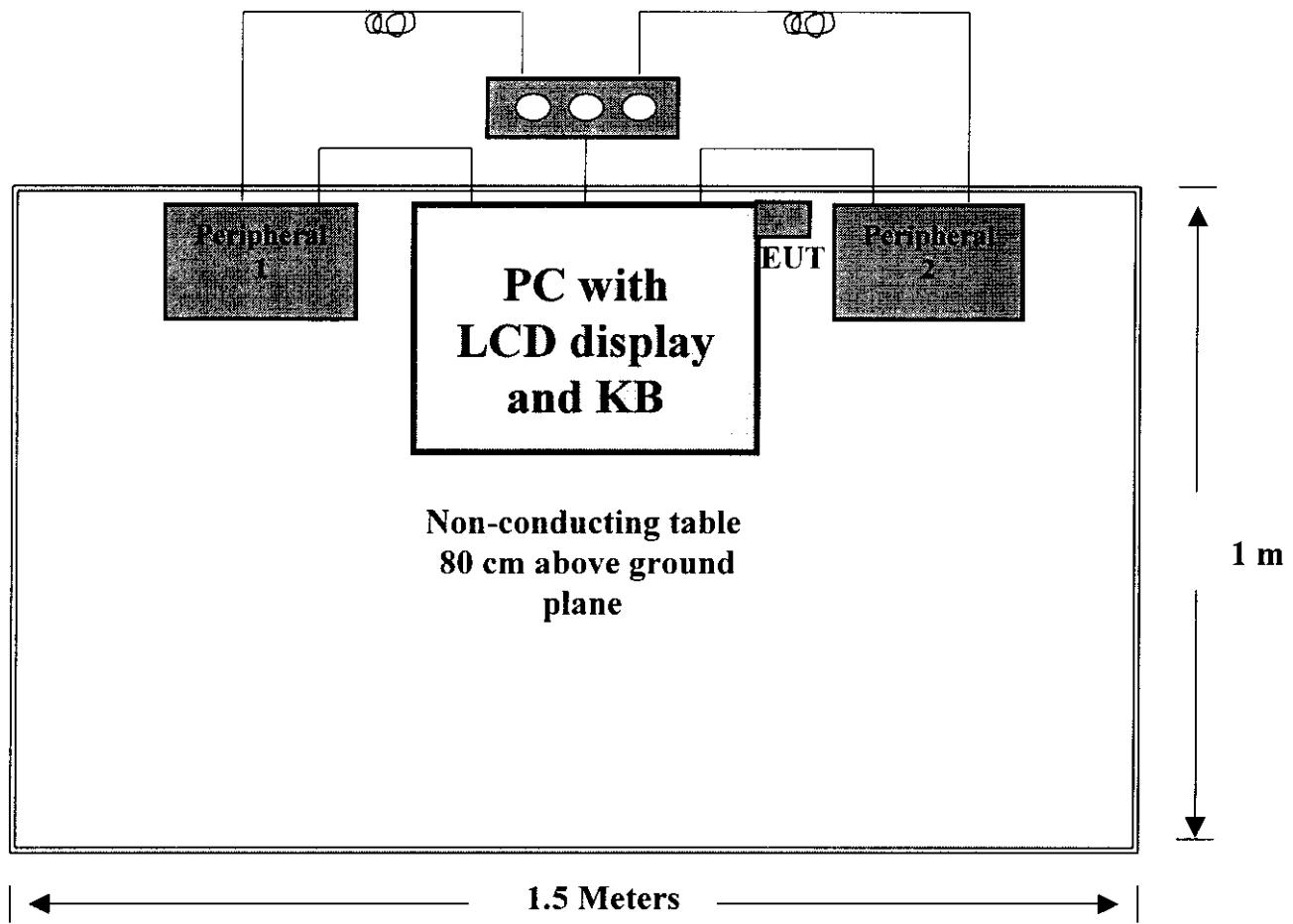
The measurements **above 1000MHz** with a resolution bandwidth of 1MHz are peak reading at a distance of three meters with a horn antenna.
(some points were tested at one meter, the test results will be calculated to 3 meters).

6.5 Radiated Test Setup



6.5 Emission Test Setup (ANSI C63.4 - 1992)

*** Optional For Radiated Tests**



Test configuration for tabletop equipment
(Top View)

- EUT, peripherals, between peripherals the distance is fixed at 10 cm on edge of the turn table.

6.6 Radiated Emission Limit

- a. Inside band of spurious: under 20dB of funder metal.
- b. Harmonic: * under 20dB of fund.
- c. Restricted Band Emission: over 1GHz, the limit is 54dBuV at 3M.
- d. Under 1GHz:

Class B

Frequency (MHz)	Distance (m)	Field Strength (μV/m)
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
Above 960	3	500

Class A

Frequency (MHz)	Distance (m)	Field Strength (μV/m)
30 - 88	3	316.3
88 - 216	3	473.2
216 - 960	3	631.0
Above 960	3	1000.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna and the closest point of any part of the device or system.

6.7 Radiated Emission Test Result

The frequency spectrum from **30MHz to 2GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **3** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.65	0.80	6.60	20.60	28.50	25.12	62.37	100
120.21	1.40	7.20	21.70	29.10	32.73	76.74	150
233.37	1.80	10.70	25.80	20.50	82.22	44.67	200
263.99	2.00	13.10	25.80	19.40	110.92	53.09	200
668.06	3.30	20.10	*	10.80	*	51.29	200
710.37	3.40	20.20	17.70	13.80	116.14	74.13	200
905.18	3.90	22.60	10.30	12.60	69.18	90.16	200

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 2$ dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Sample Calculation :
 $20 \log(\text{Emission}) \mu\text{V}/\text{m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dBuV/m)}$
- 5). Test Equipment Please See 6.1
- 6). Test Configuration Please See 6.2
- 7). Any Departure from Specification: N/A
- 8). Channel 1: 2.412GHz

Signed by Testing Engineer: J. T. J. K.

6.7 Radiated Emission Test Result

The frequency spectrum from **30MHz to 2GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **3** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.05	0.80	6.60	19.60	28.00	22.39	58.88	100
120.21	1.40	7.20	24.90	28.70	47.32	73.28	150
233.37	1.80	10.70	24.00	20.00	66.83	42.17	200
263.99	2.00	13.10	24.80	17.00	98.86	40.27	200
668.06	3.30	20.10	*	14.30	*	76.74	200
710.37	3.40	20.20	17.00	13.70	107.15	73.28	200
905.18	3.90	22.60	11.10	13.50	75.86	100.00	200

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Sample Calculation:
 $20 \log(\text{Emission}) \mu\text{V/m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dB)}$
- 5). Test Equipment Please See 6.1
- 6). Test Configuration Please See 6.2
- 7). Any Departure from Specification: N/A
- 8). Channel 6: 2.437GHz

Signed by Testing Engineer:

6.7 Radiated Emission Test Result

The frequency spectrum from **30MHz to 2GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **3** meters.

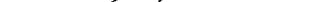
Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (uV)		Limits (uV)
			Horizontal	Vertical	Horizontal	Vertical	
51.65	0.80	6.60	20.10	28.40	23.71	61.66	100
120.21	1.40	7.20	24.70	29.00	46.24	75.86	150
233.37	1.80	10.70	24.70	20.50	72.44	44.67	200
263.99	2.00	13.10	25.50	17.90	107.15	44.67	200
668.06	3.30	20.10	*	12.30	*	60.95	200
710.37	3.40	20.20	17.50	13.20	113.50	69.18	200
905.18	3.90	22.60	10.60	13.20	71.61	96.61	200

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Sample Calculation:
 $20 \log(\text{Emission}) \mu\text{V/m} = \text{Cable Loss(dB)} + \text{Factor(dB)} + \text{Reading(dB)}$
- 5). Test Equipment Please See 6.1
- 6). Test Configuration Please See 6.2
- 7). Any Departure from Specification: N/A
- 8). Channel 11: 2.462GHz

Signed by Testing Engineer: J. S. 

6.7 Radiated Emission Test Result

The frequency spectrum from **1GHz** to **25GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **1** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2412.00	7.50	29.10	64.20	73.90	100.80	110.50	*
2132.00	7.00	29.40	25.30	24.50	61.70	60.90	80.8
4264.00	8.20	34.00	4.70	5.00	46.90	47.20	54
4824.00	8.40	34.10	8.50	9.40	51.00	51.90	54
7236.00	9.50	37.30	*	*	*	*	54
9648.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is < ± 2 dB
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: N/A
- 7). Channel 1: 2.412GHz

Signed by Testing Engineer: S - C.P.

6.7 Radiated Emission Test Result

The frequency spectrum from **1GHz** to **25GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **1** meters.

Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2437.00	7.60	29.10	63.30	70.40	100.00	107.10	*
2154.00	7.00	29.40	25.20	24.90	61.60	61.30	80
4314.00	8.20	34.00	4.70	4.90	46.90	47.10	54
4874.00	8.40	34.10	8.20	8.80	50.70	51.30	54
7311.00	9.50	37.30	*	*	*	*	54
9748.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: N/A
- 7). Channel 6: 2.437GHz

6.7 Radiated Emission Test Result

The frequency spectrum from **1GHz to 25GHz** was investigated. The values **under 1GHz** with a resolution bandwidth of 120KHz are quasi-peak reading made at **3** meters. The measurements **above 1GHz** with a resolution bandwidth of 1MHz are peak reading at a distance of **1** meters.

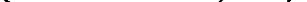
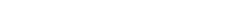
Temperature: 22 °C

Humidity: 50 %RH

Frequency (MHz)	Cable Loss (dB)	Antenna Factor(dB)	Reading (dBuV)		Emission (dBuV)		Limits (dBuV)
			Horizontal	Vertical	Horizontal	Vertical	
2463.00	7.60	29.10	58.50	67.70	95.20	104.40	*
2182.00	7.00	29.40	25.10	25.20	61.50	61.60	75.2
4364.00	8.20	34.00	4.20	4.20	46.40	46.40	54
4926.00	8.40	34.10	8.30	8.10	50.80	50.60	54
7389.00	9.50	37.30	*	*	*	*	54
9852.00	11.00	39.50	*	*	*	*	54

Remarks:

- 1). * Measurement does not apply for this frequency.
- 2). Uncertainty in conducted emission measured is $< \pm 4\text{dB}$
- 3). CPU Type: Pentium 100
Clock Chip: 66MHz
- 4). Test Equipment Please See 6.1
- 5). Test Configuration Please See 6.2
- 6). Any Departure from Specification: N/A
- 7). Channel 11: 2.462GHz

Signed by Testing Engineer:  

7. Bandwidth

7.1 Limit

Minimum 6dB bandwidth=500MHz

7.2 Test Result

Please see attached plotter.

07:48:37 JUN 09, 1998

#3 CHANSEL

REF 142.2 dBm #AT 40 dB

PWRF

LOG

5

dBm

MARKER

46.75 MHz

1.30 dB

NA SB

SC FC

CONA

SW REG

1 2 3 4

MARKER 2

ON OFF

More

1 of 2

CENTER 2.41200 GHz

AES BW 300 kHz

V3K 100 kHz

SPAN 50.00 MHz

SWP 20.0 msec

07:53:32 JUN 09, 1998

RF #3 CHANNEL 6

REF 109.2 dBV #AT 40 dB

PEAK

106

5

dBV

MKR A 46.38 MHz

-26 dB

MARKER
NORMAL

MARKER
A

MARKER A

46.38 MHz

-26 dB

MARKER
A
ADPTD

SELECT
1 2 3 4

NA SB
SC FC
CORN

MARKER
A
ON OFF

More
A or B

CENTER 2.43700 GHz

SPAN 50.00 MHz

SPAN 400 kHz

SPAN 50.00 msec

8. Peak Power

8.1 Limit

Peak Power output less than 1w.
EIRP < 36dBm

8.2 Test Result

a. Peak power output is 10dBm.

b. Antenna gain is about 2dBi.

Total EIRP is 12dBm.

9. Power Spectral Density

9.1 Test Equipment

HP Spectrum Analyzer (~ 26.5GHz).

9.2 Test Procedure

Set the test condition as below:

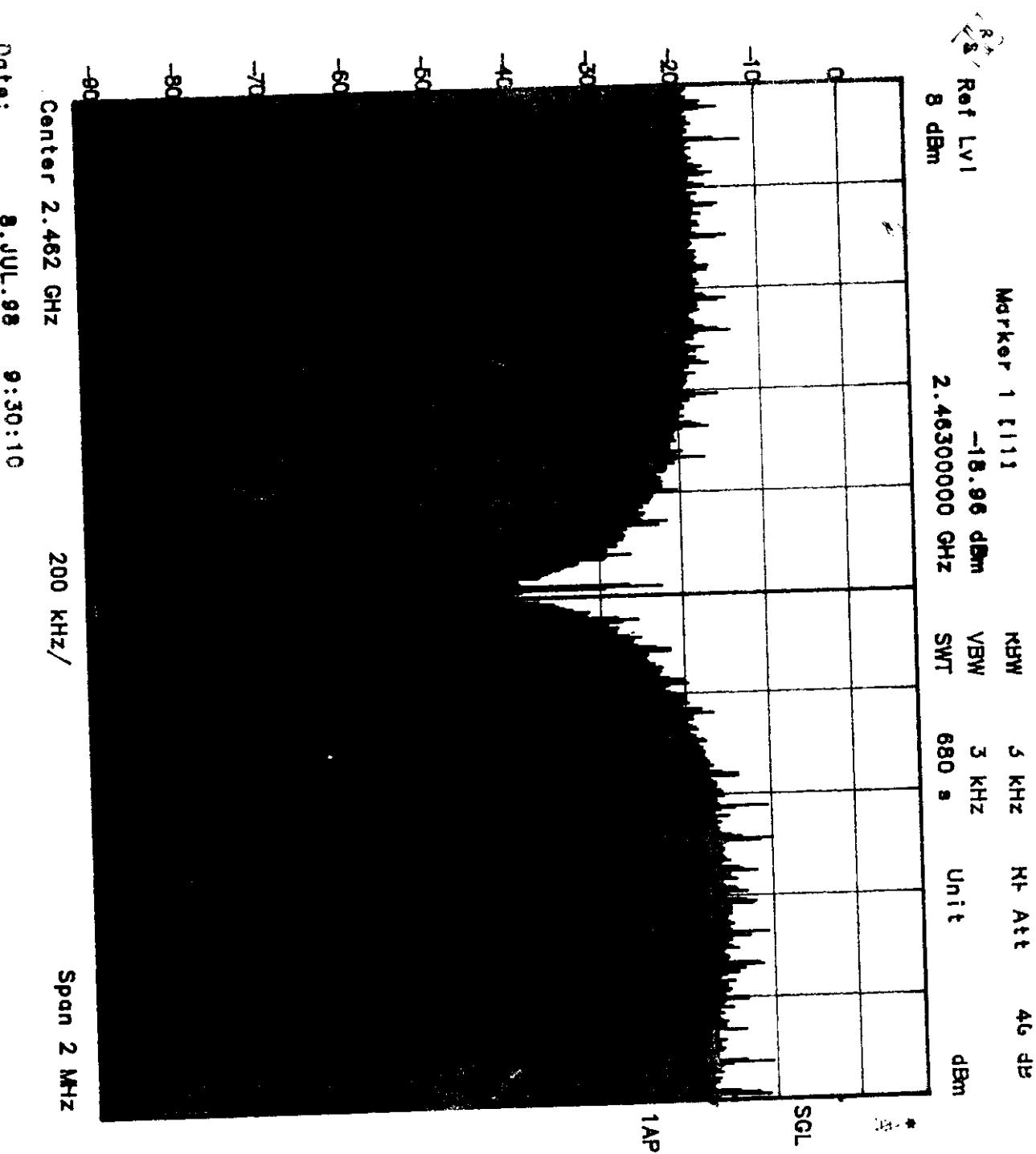
Resolution Bandwidth: 3KHz
SPAN: 2MHz
Sweep time: 667 seconds

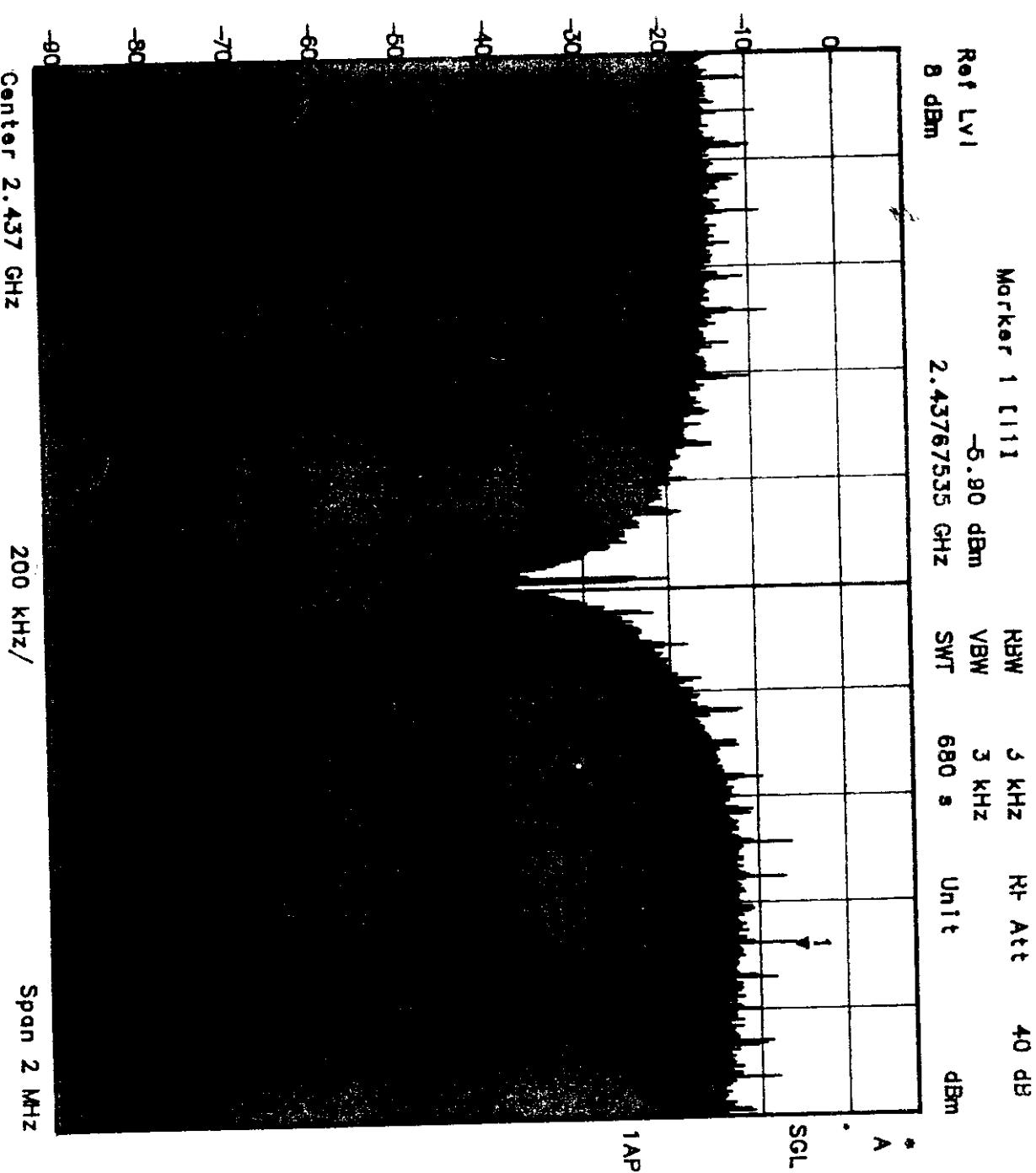
9.3 Limit

The limit is 8dBm

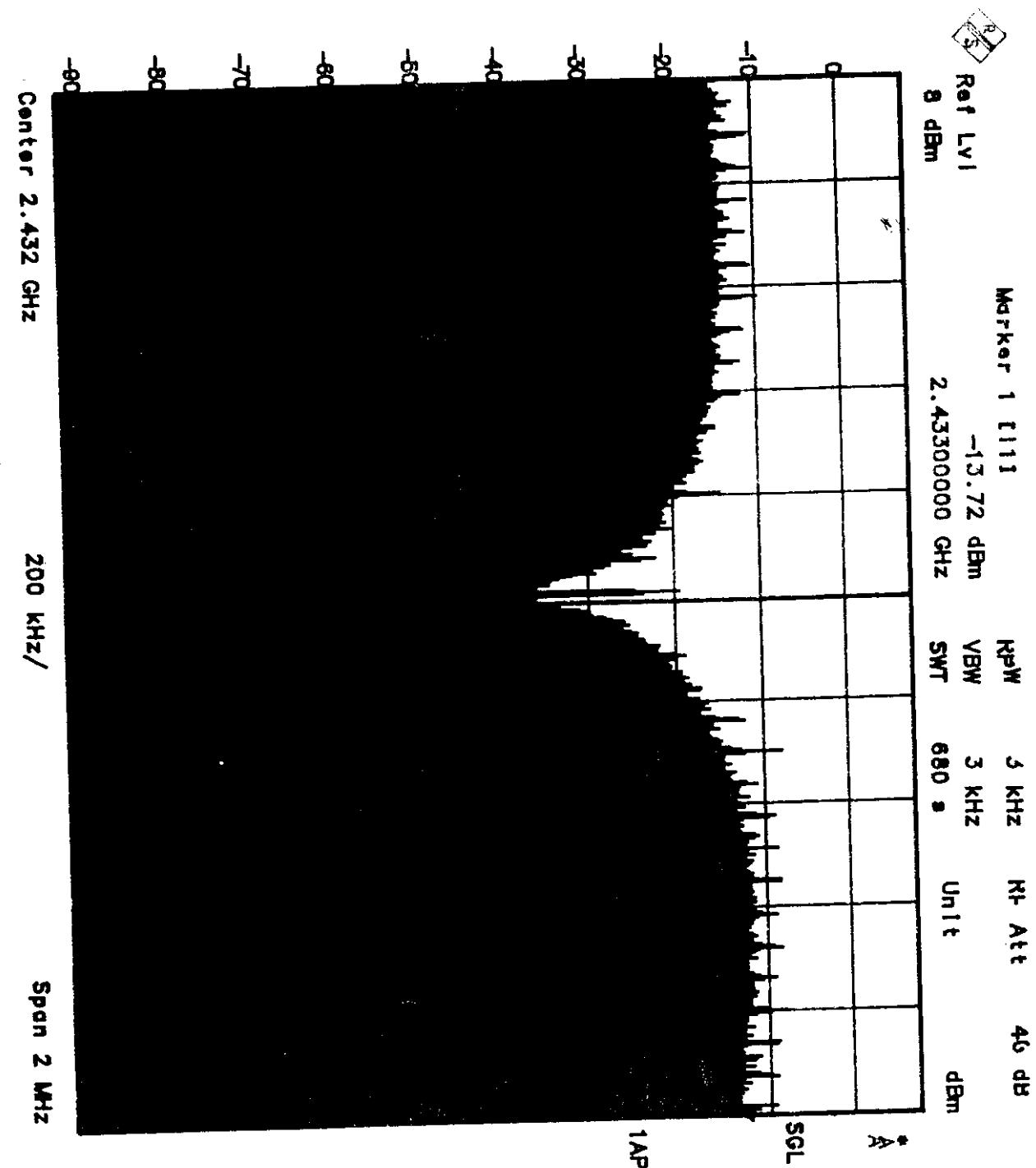
9.4 Test Result

Please see attached plotter.





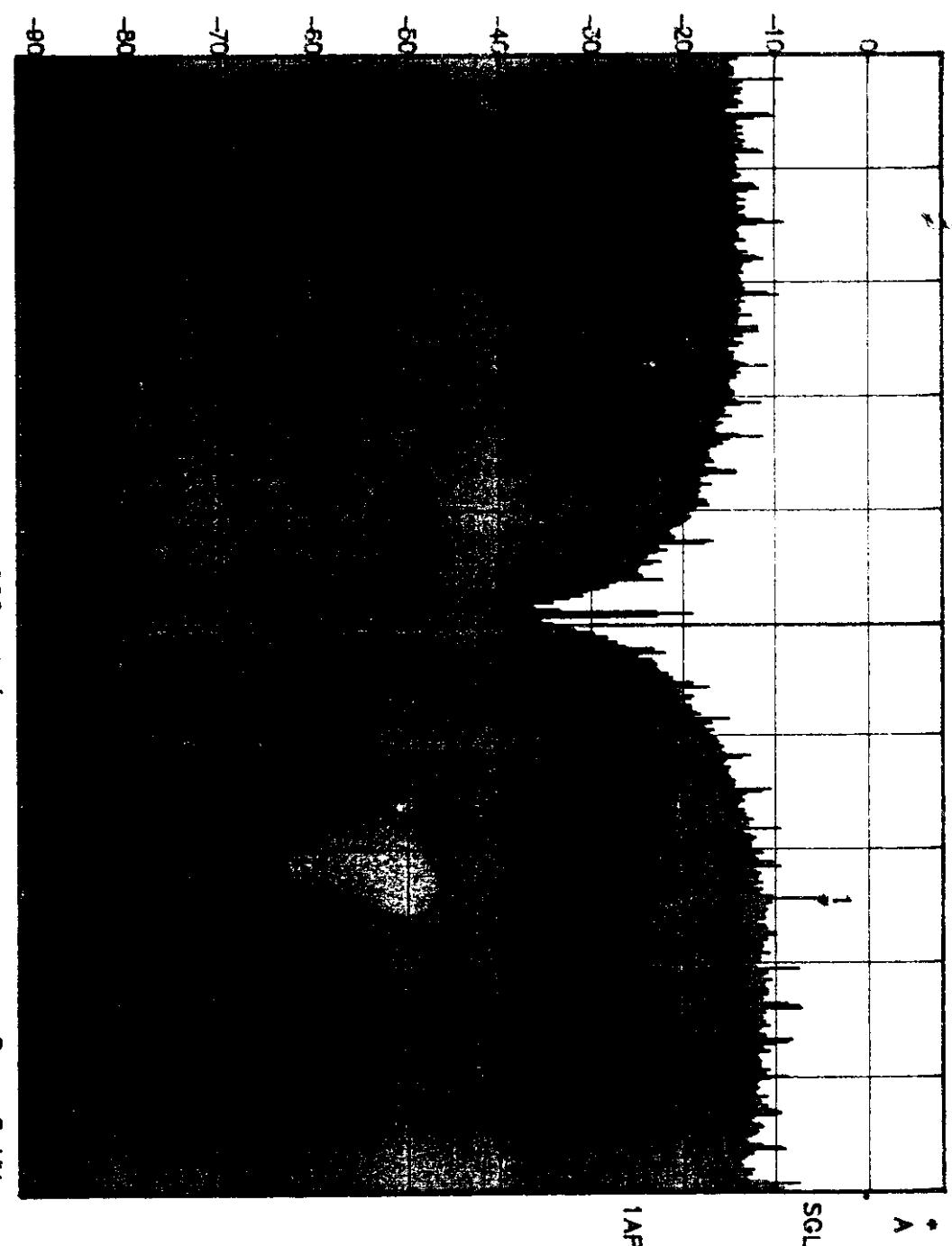
Date: 8.JUL.98 8:45:42



PS

Ref Lvl
8 dBm

Marker 1 111 -5.09 dBm 2.41248697 GHz SWT 680 s Unit dBm
RBW 3 kHz RF Att 40 dB
VBW 3 kHz



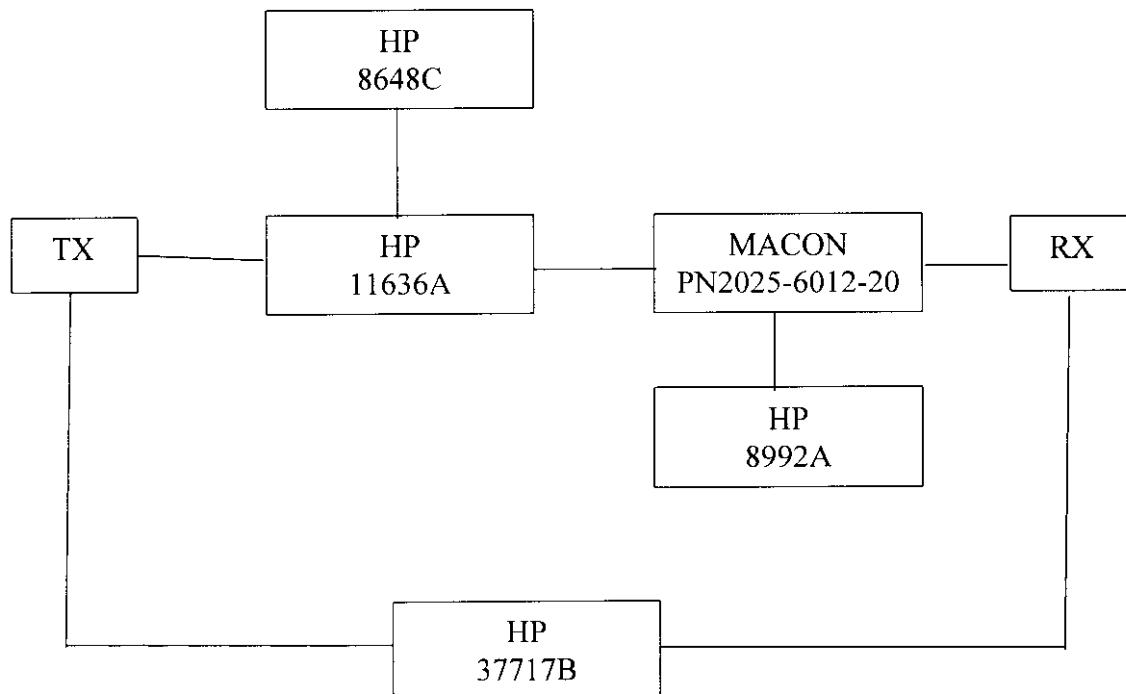
Date: 8.JUL.2002 0:59:04

10. Processing Gain

10.1 Test Equipment

Equipment	Manufacturer	Model#	Cal. date
Jamming Signal Generator	HP	8648C	9/22
Power divider	HP	11636A	9/22
Conpler	MACON	PN2025-6012-20	9/22
Power Meter	HP	8992A	10/16
Communication Analyzer	HP	37717B	9/5

10.2 Test set-up



10.3 Test Procedure

1. TX power on.
2. Jamming signal power off.
3. Test TX power.
4. Jamming signal power on.
5. Adjust centeral frequency.
6. Adjust jamming signal power then communication analyzer will show $BER \leq 10^{-5}$
7. TX power off.
8. Check jaming power.
9. Compare the jamming signal power and TX power.
10. Change frequency, each step is 50KHz.

10.4 Test Limit

1. $S/N + J/S + L \geq 10\text{dB}$.
2. BER is small or equal than 10^{-5} .
3. 20% error is allowed.

10.5 Test Result

1. When BER is less then 10^{-5} , the S/N is 9.8dB for BPSK.
2. All processing gain are over 10dB. So, all can meet FCC limits.

* **Channel: 1**

* **Center frequency: 2412MHz**

* **Test step: 50KHz/step**

* **Test range: 2401.00MHz to 2423.95MHz**

* **Test condition**

TX	ON	ON	OFF
Jamming	OFF	ON	ON
dBm	-11.28	-10.87	Below table

Processing Gain = $(S/N)_0 + M_j + L_{sys} \geq 10\text{dB}$

$(S/N)_0$: when BER is less than or equal 10^{-5} , the $(S/N)_0$ is 9.8dB for BPSK

$L_{sys} : -10.87 - (-11.28) = 0.41\text{dB}$

$M_j = J/S$,

$S = -11.28\text{dBm}$

If J is over -11.49dBm ,

then Processing Gain (PG) will over 10dB

* **Test result: all J signals are over -11.49dBm**

so, all PG $\geq 10\text{dB}$

$$\begin{aligned}
 & 10 \cdot 21.492 + M_j \geq 10 \cdot 21.371 \\
 & 10 \cdot 21.492 - 10 \geq -10.87 \\
 & 10 \cdot 21.492 \geq -10.87
 \end{aligned}$$

* Channel: 1

Center Frequency: 2412MHz

Frequency range(MHz)	Jamming range(dBm)
2401.00 ~ 2401.95	1.6 ~ 4.2
2403.00 ~ 2403.95	1.0 ~ 2.1
2405.00 ~ 2405.95	-1.3 ~ -0.5
2407.00 ~ 2407.95	-2.3 ~ -1.1
2409.00 ~ 2409.95	-1.2 ~ -0.1
2411.00 ~ 2411.95	-1.3 ~ 0.0
2413.00 ~ 2413.95	-1.4 ~ -0.6
2415.00 ~ 2415.95	-1.3 ~ -0.2
2417.00 ~ 2417.95	0.8 ~ 1.7
2419.00 ~ 2419.95	1.4 ~ 3.6
2421.00 ~ 2421.95	2.8 ~ 5.6
2423.00 ~ 2423.95	> 7.0

Frequency range(MHz)	Jamming range(dBm)
2402.00 ~ 2402.95	1.2 ~ 1.8
2404.00 ~ 2404.95	-1.2 ~ 0.9
2406.00 ~ 2406.95	-0.9 ~ 0.1
2408.00 ~ 2408.95	-2.2 ~ -0.3
2410.00 ~ 2410.95	-2.0 ~ -1.4
2412.00 ~ 2412.95	-1.3 ~ 0.1
2414.00 ~ 2414.95	-0.4 ~ 0.2
2416.00 ~ 2416.95	-1.1 ~ 1.1
2418.00 ~ 2418.95	0.4 ~ 1.4
2420.00 ~ 2420.95	2.8 ~ 3.6
2422.00 ~ 2422.95	5.7 ~ 7.1
2424.00 ~ 2424.95	

* **Channel: 6**

* **Center frequency: 2437MHz**

* **Test step: 50KHz/step**

* **Test range: 2426.00MHz to 2448.95MHz**

* **Test condition**

TX	ON	ON	OFF
Jamming	OFF	ON	ON
dBm	-12.00	-10.63	Below table

$$\text{Processing Gain} = (S/N)_0 + M_j + L_{sys} \geq 10\text{dB}$$

$(S/N)_0$: when BER is less than or equal 10^{-5} , the $(S/N)_0$ is 9.8dB for BPSK

$$L_{sys} : -10.63 - (-12.00) = 1.37\text{dB}$$

$$M_j = J/S,$$

$$S = -12.00\text{dBm}$$

If J is over -13.17dBm ,

then Processing Gain (PG) will over 10dB

* **Test result: all J signals are over -13.17dBm**

so, all PG $\geq 10\text{dB}$

* Channel: 6

Center Frequency: 2437MHz

Frequency range(MHz)	Jamming range(dBm)	Frequency range(MHz)	Jamming range(dBm)
2426.00 ~ 2426.95	1.3 ~ 3.8	2427.00 ~ 2427.95	1.1 ~ 1.8
2428.00 ~ 2428.95	0.8 ~ 2.0	2429.00 ~ 2429.95	-1.5 ~ 0.7
2430.00 ~ 2430.95	-1.6 ~ -0.6	2431.00 ~ 2431.95	-1.2 ~ -0.1
2432.00 ~ 2432.95	-2.5 ~ -1.4	2433.00 ~ 2433.95	-2.4 ~ -0.6
2434.00 ~ 2434.95	-1.4 ~ -0.4	2435.00 ~ 2435.95	-2.1 ~ -1.5
2436.00 ~ 2436.95	-1.4 ~ -0.2	2437.00 ~ 2437.95	-1.6 ~ -0.2
2438.00 ~ 2438.95	-1.8 ~ -0.7	2439.00 ~ 2439.95	-0.7 ~ -0.2
2440.00 ~ 2440.95	-1.4 ~ -0.6	2441.00 ~ 2441.95	-1.2 ~ 0.9
2442.00 ~ 2442.95	0.6 ~ 1.5	2443.00 ~ 2443.95	0.2 ~ 1.4
2444.00 ~ 2444.95	1.5 ~ 3.4	2445.00 ~ 2445.95	2.8 ~ 3.5
2446.00 ~ 2446.95	2.8 ~ 5.8	2447.00 ~ 2447.95	5.9 ~ 7.3
2448.00 ~ 2448.95	> 7.0	2449.00 ~ 2449.95	

* **Channel: 11**

* **Center frequency: 2462MHz**

* **Test step: 50KHz/step**

* **Test range: 2451.00MHz to 2437.95MHz**

* **Test condition**

TX	ON	ON	OFF
Jamming	OFF	ON	ON
dBm	-14.72	-14.24	Below table

Processing Gain = $(S/N)_0 + M_j + L_{sys} \geq 10\text{dB}$

$(S/N)_0$: when BER is less than or equal 10^{-5} , the $(S/N)_0$ is 9.8dB for BPSK

$L_{sys} : -14.24 - (-14.72) = 0.48\text{dB}$

$M_j = J/S,$

$S = -14.72\text{dBm}$

If J is over -15.00dBm ,

then Processing Gain (PG) will over 10dB

* **Test result: all J signals are over -15.00dBm**

so, all PG $\geq 10\text{dB}$

* Channel: 11

Center Frequency: 2462MHz

Frequency range(MHz)	Jamming range(dBm)	Frequency range(MHz)	Jamming range(dBm)
2451.00 ~ 2451.95	-3.4 ~ -0.7	2452.00 ~ 2452.95	-3.6 ~ -2.8
2453.00 ~ 2453.95	-3.5 ~ -2.7	2454.00 ~ 2454.95	-5.8 ~ -3.7
2455.00 ~ 2455.95	-5.9 ~ -4.8	2456.00 ~ 2456.95	-5.4 ~ -4.1
2457.00 ~ 2457.95	-6.3 ~ -5.5	2458.00 ~ 2458.95	-6.2 ~ -4.5
2459.00 ~ 2459.95	-4.6 ~ -4.1	2460.00 ~ 2460.95	-6.0 ~ -4.9
2461.00 ~ 2461.95	-5.3 ~ -3.9	2462.00 ~ 2462.95	-5.2 ~ -3.7
2463.00 ~ 2463.95	-5.2 ~ -4.3	2464.00 ~ 2464.95	-4.3 ~ -3.7
2465.00 ~ 2465.95	-4.9 ~ -4.0	2466.00 ~ 2466.95	-4.7 ~ -2.4
2467.00 ~ 2467.95	-2.8 ~ -1.8	2468.00 ~ 2468.95	-3.0 ~ -1.8
2469.00 ~ 2469.95	-1.7 ~ 0.5	2470.00 ~ 2470.95	0.0 ~ 0.7
2471.00 ~ 2471.95	0.0 ~ 3.1	2472.00 ~ 2472.95	3.2 ~ 4.6
2473.00 ~ 2473.95	> 4.3	2474.00 ~ 2474.95	