

4.4. 6dB Bandwidth Measurement Data

(1) Modulation Standard: IEEE 802.11b

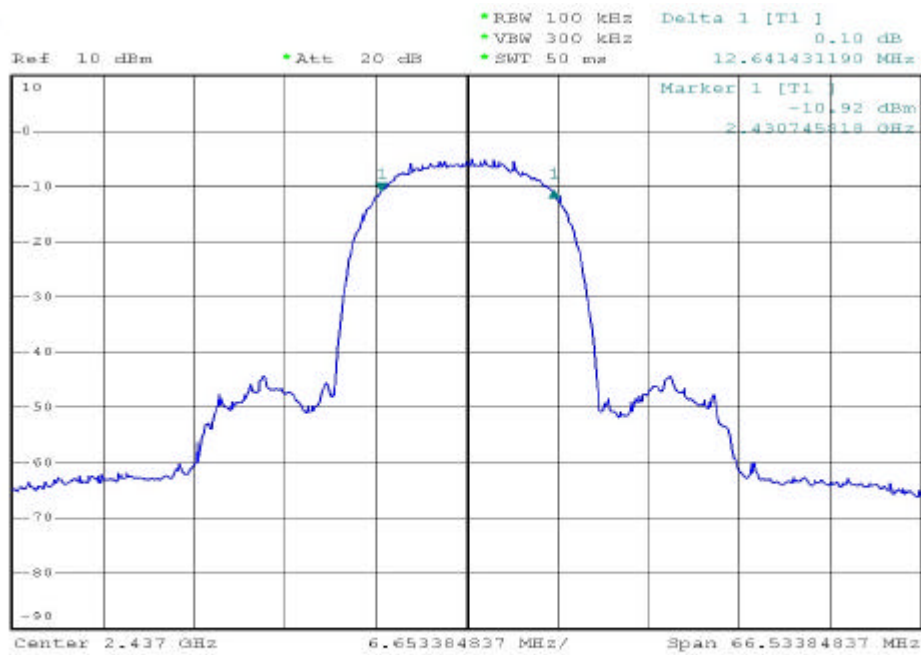
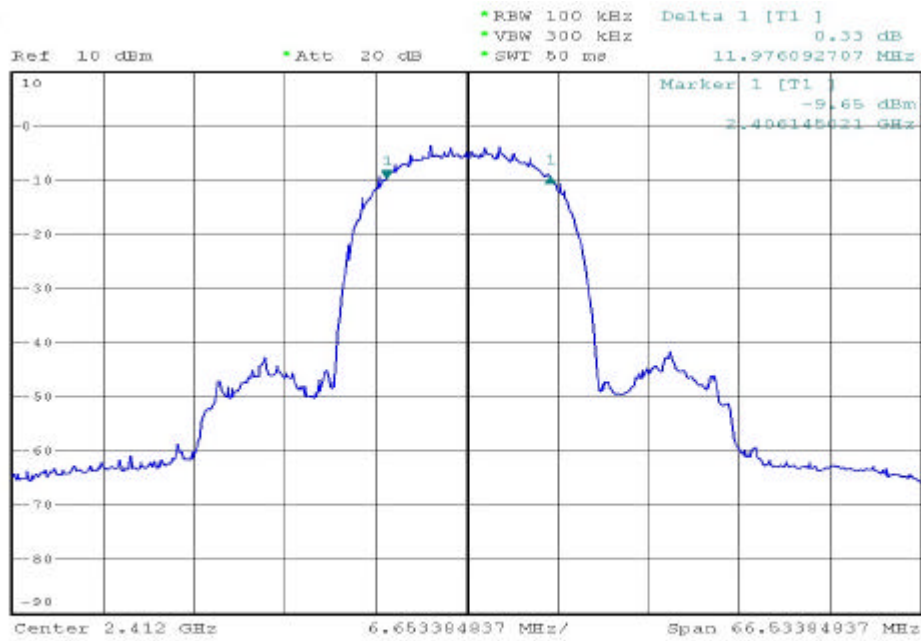
Test Date: Apr. 24. 2004 Temperature: 24 °C Humidity: 61%

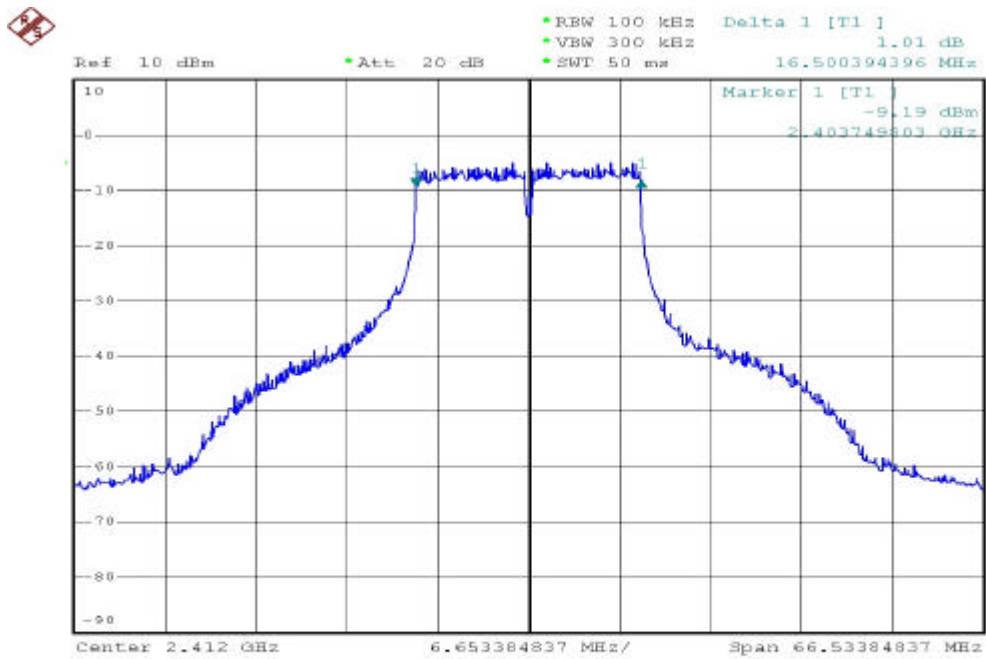
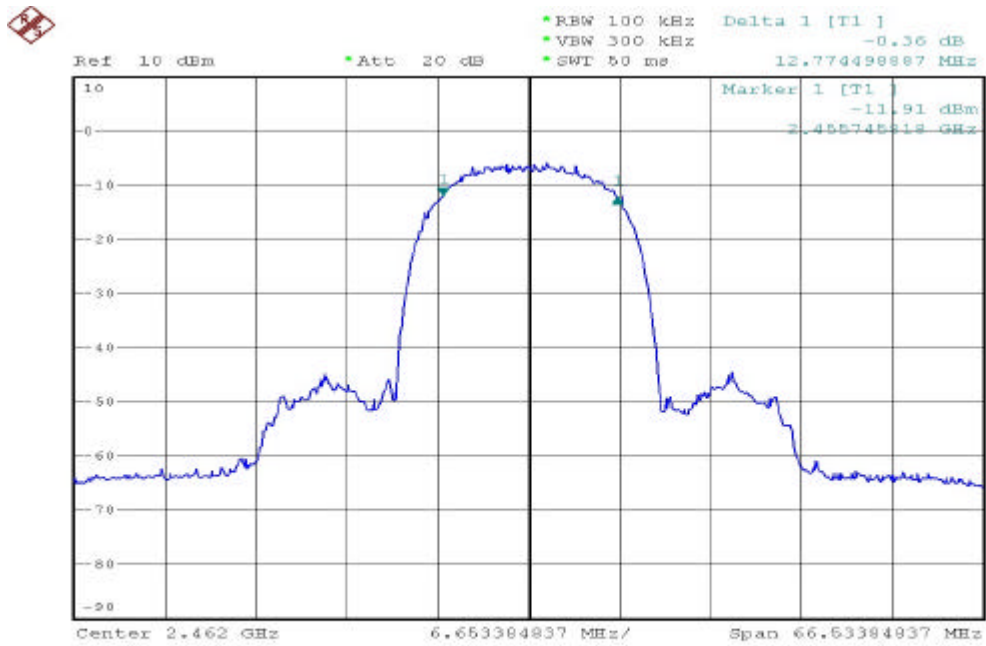
- a) Channel 01: 6dB Emission Bandwidth is 11.97 MHz
- b) Channel 06: 6dB Emission Bandwidth is 12.64 MHz
- c) Channel 11: 6dB Emission Bandwidth is 12.77 MHz

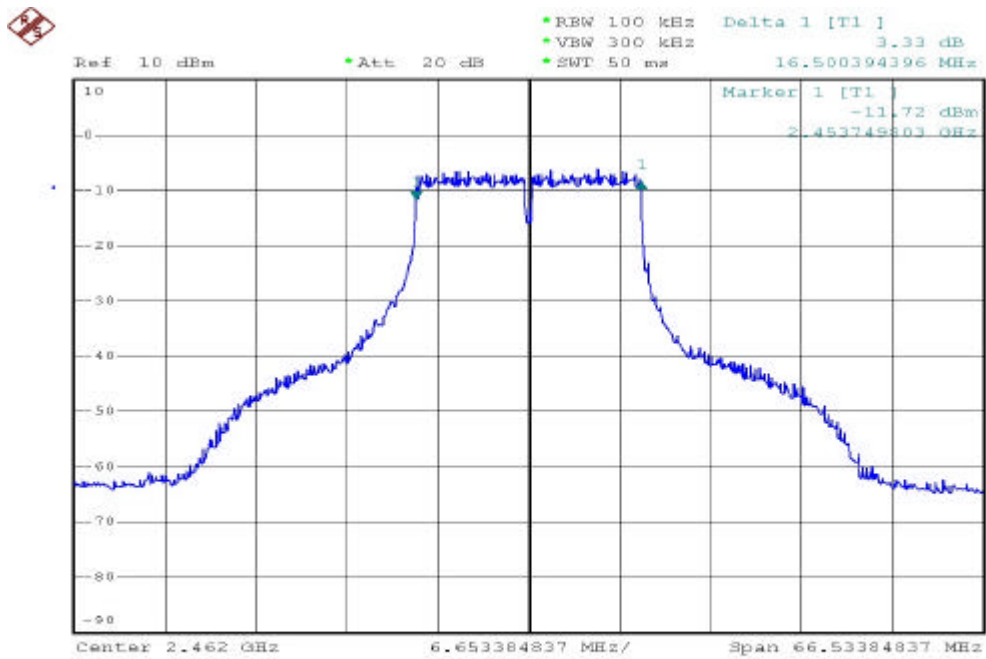
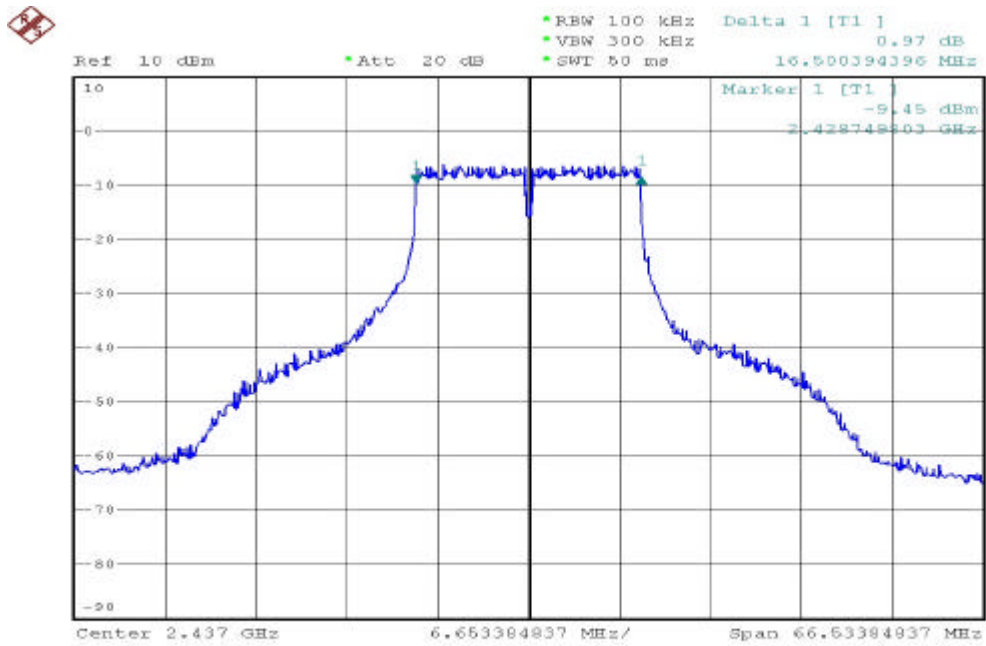
(2) Modulation Standard: IEEE 802.11g

Test Date: Apr. 24. 2004 Temperature: 24 °C Humidity: 61%

- a) Channel 01: 6dB Emission Bandwidth is 16.50 MHz
- b) Channel 06: 6dB Emission Bandwidth is 16.50 MHz
- c) Channel 11: 6dB Emission Bandwidth is 16.50 MHz







4.5. Peak Output Power Measurement Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

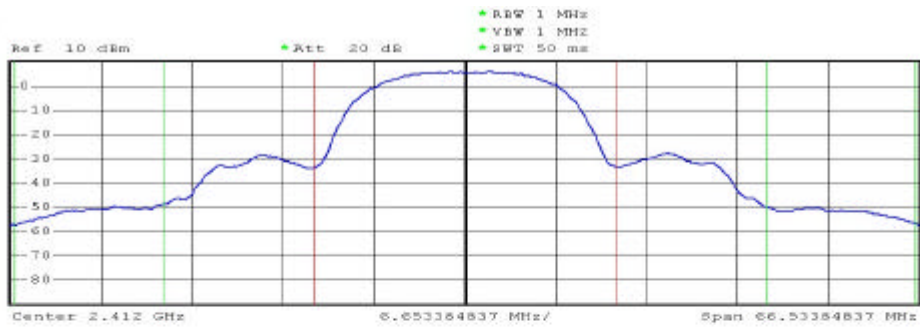
- a) Channel 01: Output Peak Power is 15.15dBm or 32.770mW
- b) Channel 06: Output Peak Power is 14.43dBm or 27.743mW
- c) Channel 11: Output Peak Power is 13.55dBm or 22.636mW

(2) Modulation Standard: IEEE 802.11g

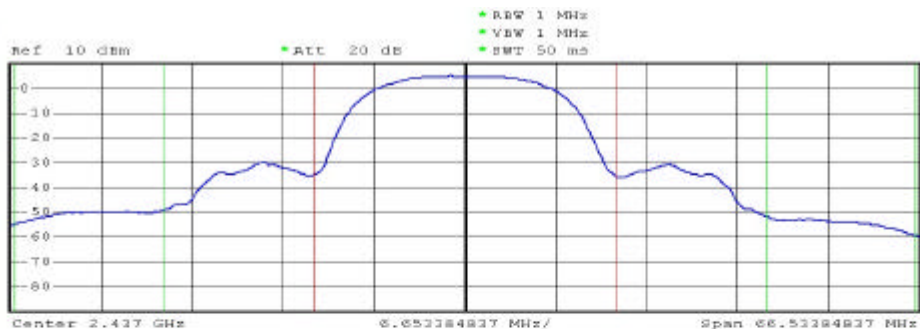
Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

- a) Channel 01: Output Peak Power is 12.23dBm or 16.708mW
- b) Channel 06: Output Peak Power is 11.48dBm or 14.052mW
- c) Channel 11: Output Peak Power is 10.48dBm or 11.166mW

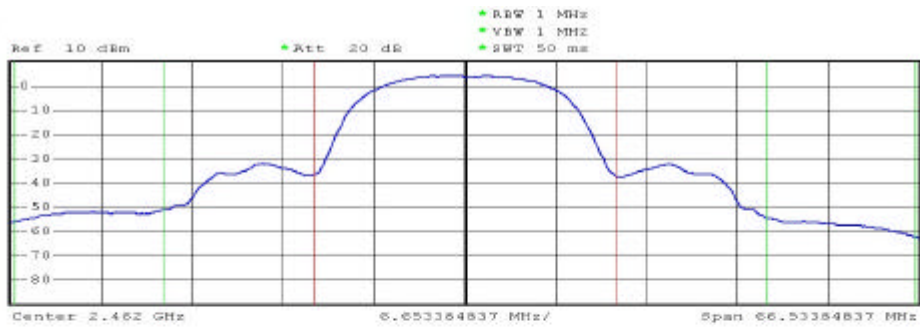
Note: Conducted Power = Reading Value + Cable Loss



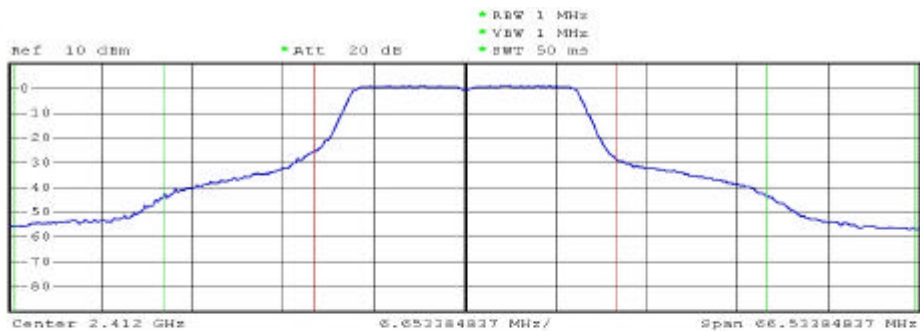
Tx Channel			
Bandwidth	22 MHz	Power	15.15 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-38.15 dB
Spacing	16.5 MHz	Upper	-37.28 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-56.84 dB
Spacing	27.5 MHz	Upper	-57.17 dB



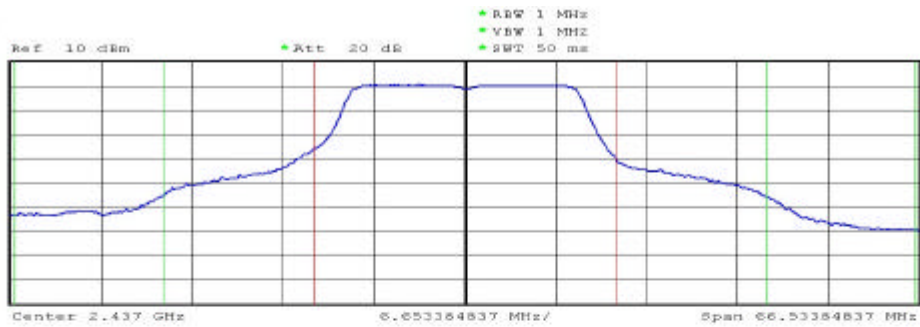
Tx Channel			
Bandwidth	22 MHz	Power	14.43 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-38.62 dB
Spacing	16.5 MHz	Upper	-39.38 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-55.17 dB
Spacing	27.5 MHz	Upper	-58.80 dB



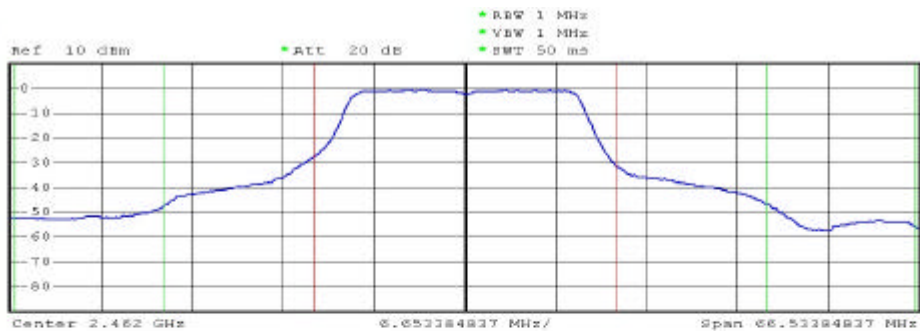
Tx Channel			
Bandwidth	22 MHz	Power	13.55 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-39.69 dB
Spacing	16.5 MHz	Upper	-40.01 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-56.44 dB
Spacing	27.5 MHz	Upper	-60.92 dB



Tx Channel			
Bandwidth	22 MHz	Power	12.23 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-35.74 dB
Spacing	16.5 MHz	Upper	-36.31 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-53.62 dB
Spacing	27.5 MHz	Upper	-53.34 dB



Tx Channel			
Bandwidth	22 MHz	Power	11.48 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-35.99 dB
Spacing	16.5 MHz	Upper	-38.06 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-52.64 dB
Spacing	27.5 MHz	Upper	-55.04 dB



Tx Channel			
Bandwidth	22 MHz	Power	10.48 dBm
Adjacent Channel			
Bandwidth	11 MHz	Lower	-36.82 dB
Spacing	16.5 MHz	Upper	-38.12 dB
Alternate Channel			
Bandwidth	11 MHz	Lower	-52.17 dB
Spacing	27.5 MHz	Upper	-53.70 dB

4.6. Band Edges Measurement Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

- a) Lower Band Edge: maximum value is -34.51dBm that is attenuated more than 20dB
- b) Upper Band Edge: maximum value is -43.92dBm that is attenuated more than 20dB

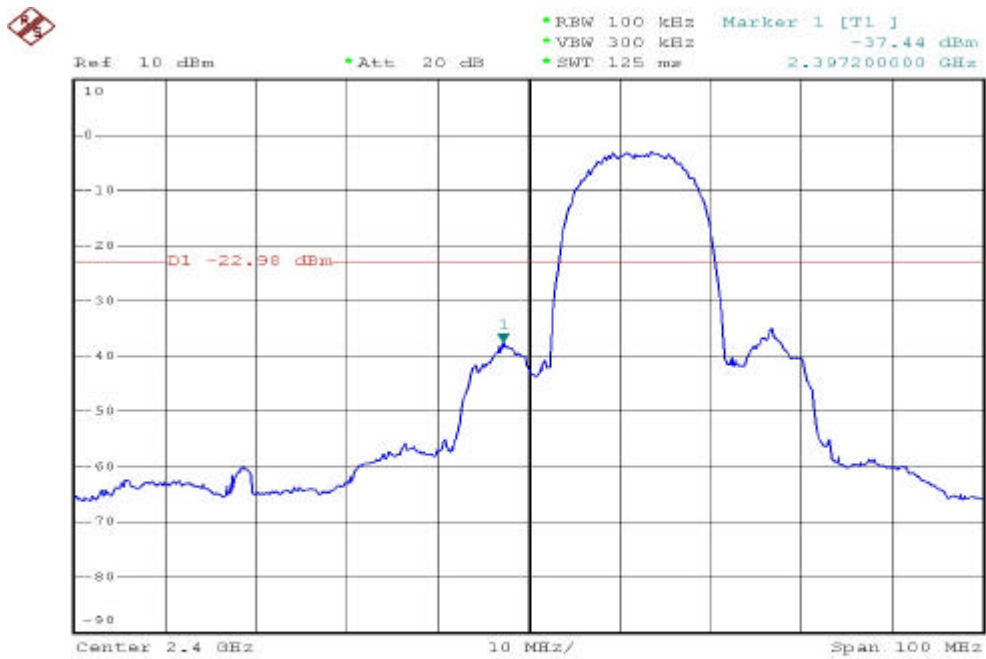
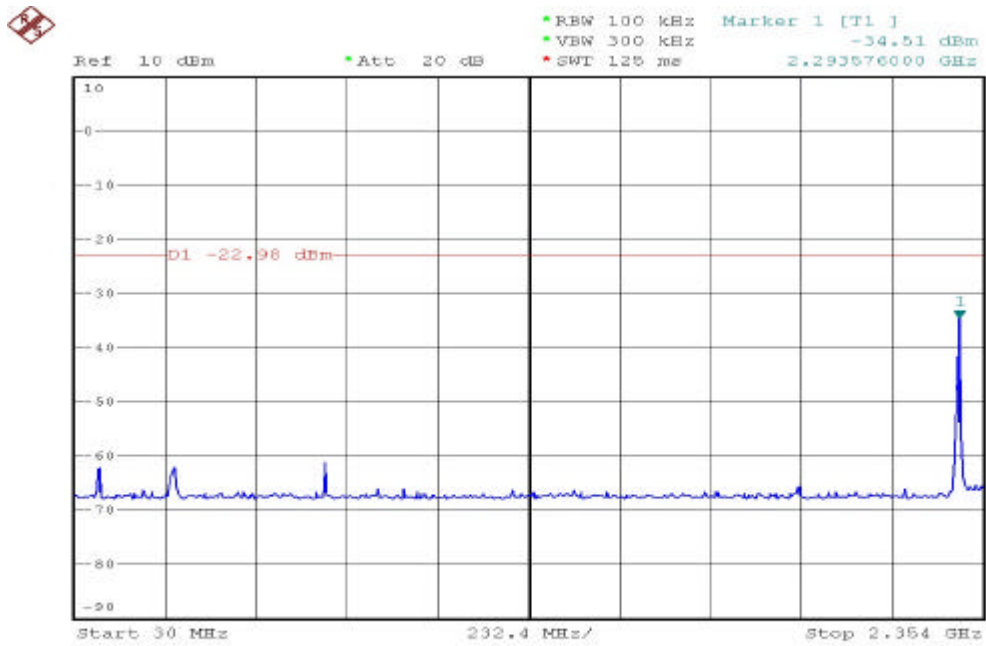
(2) Modulation Standard: IEEE 802.11g

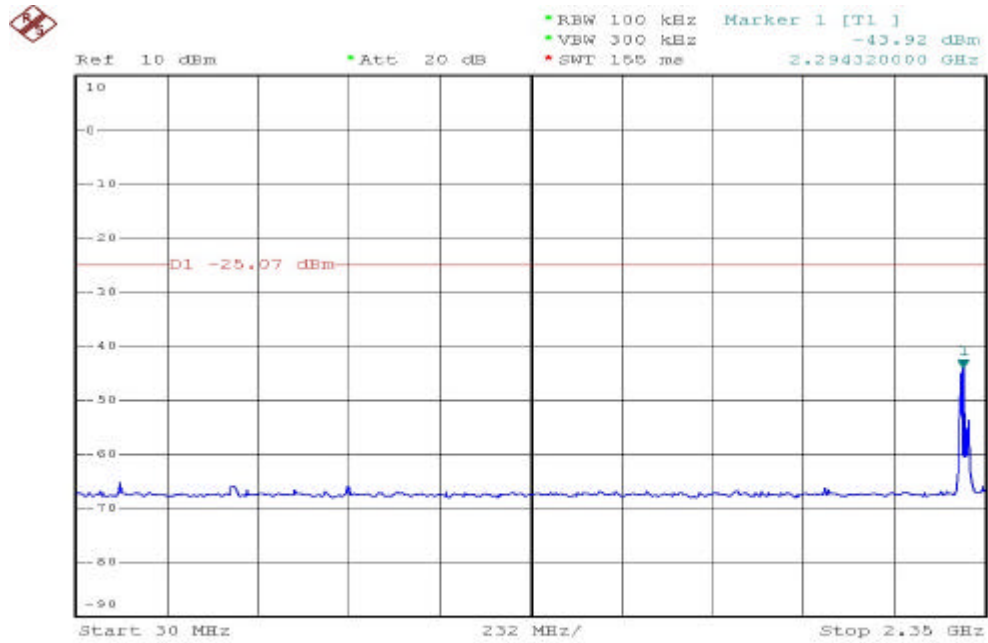
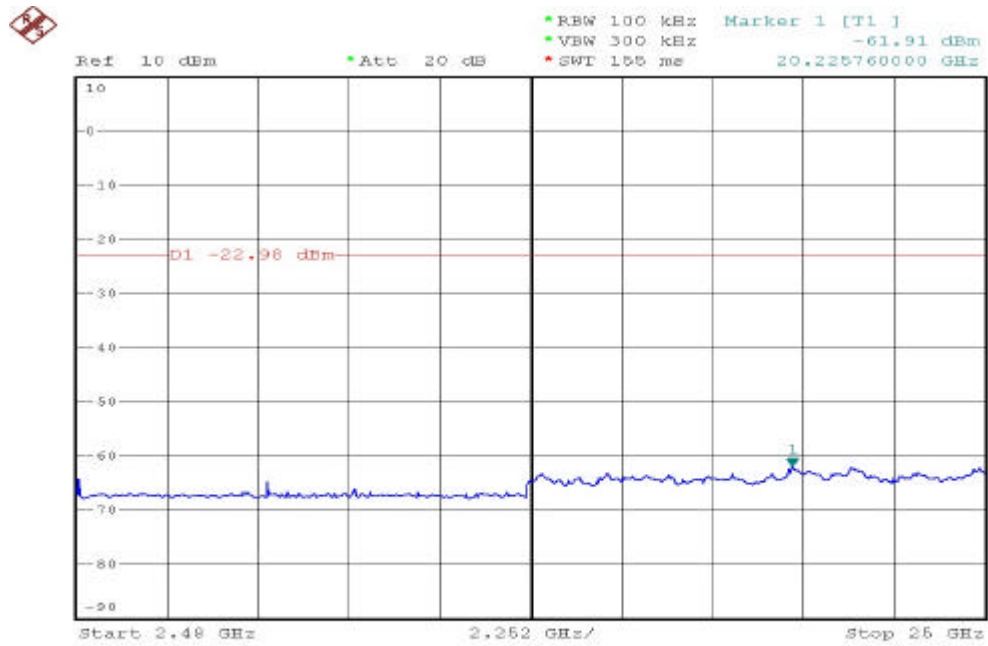
Test Date: Apr. 24. 2004

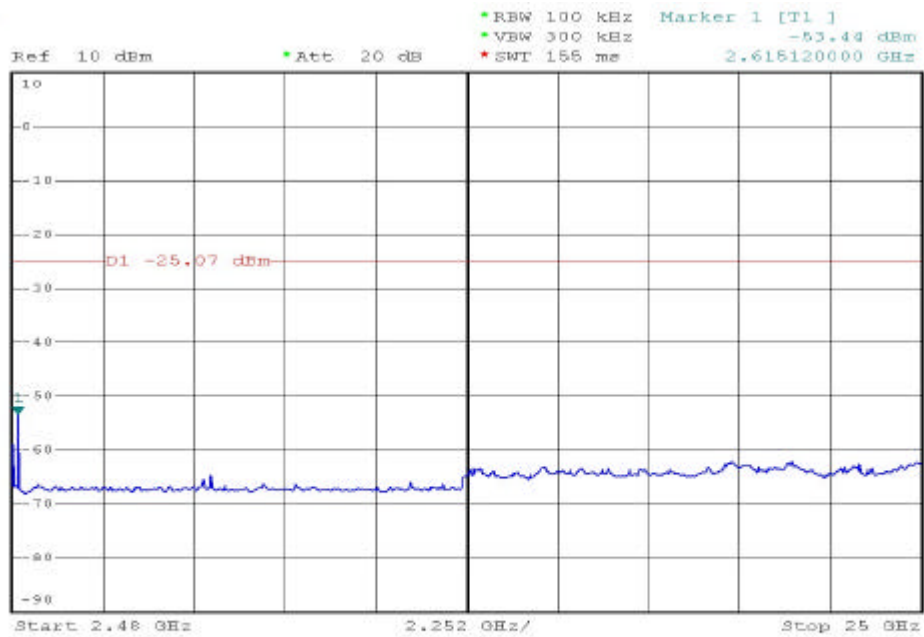
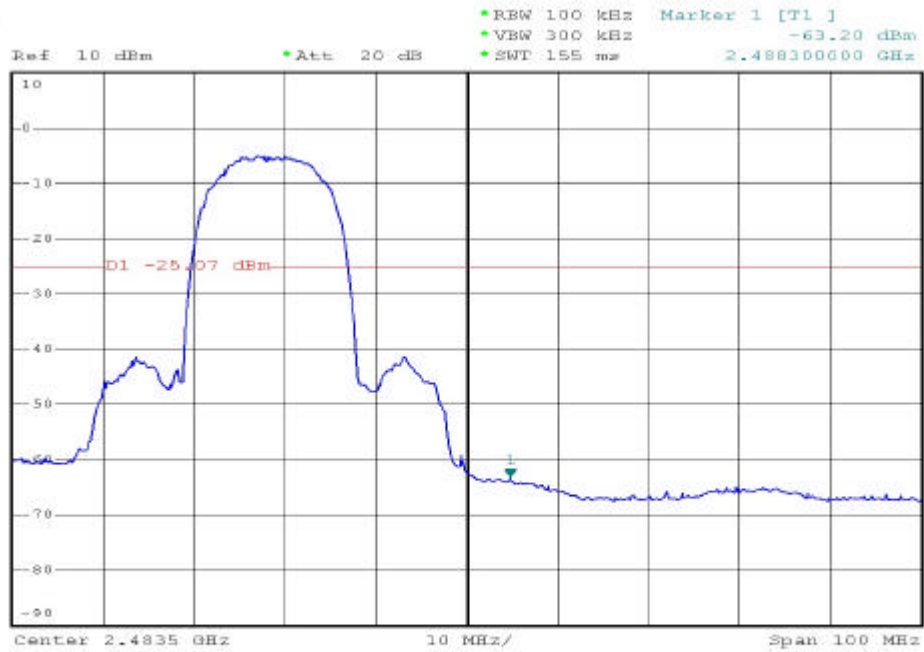
Temperature: 24 °C

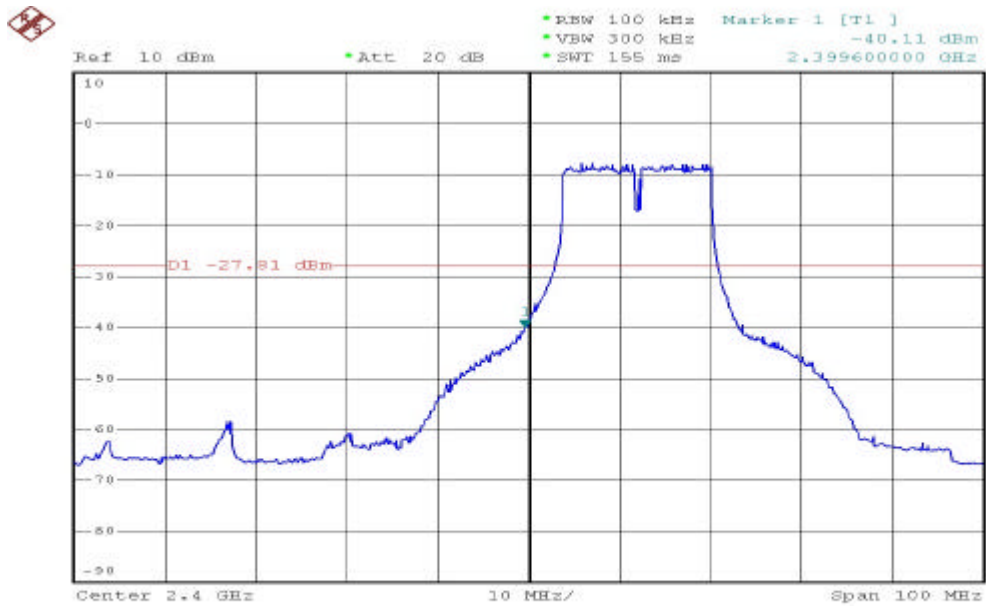
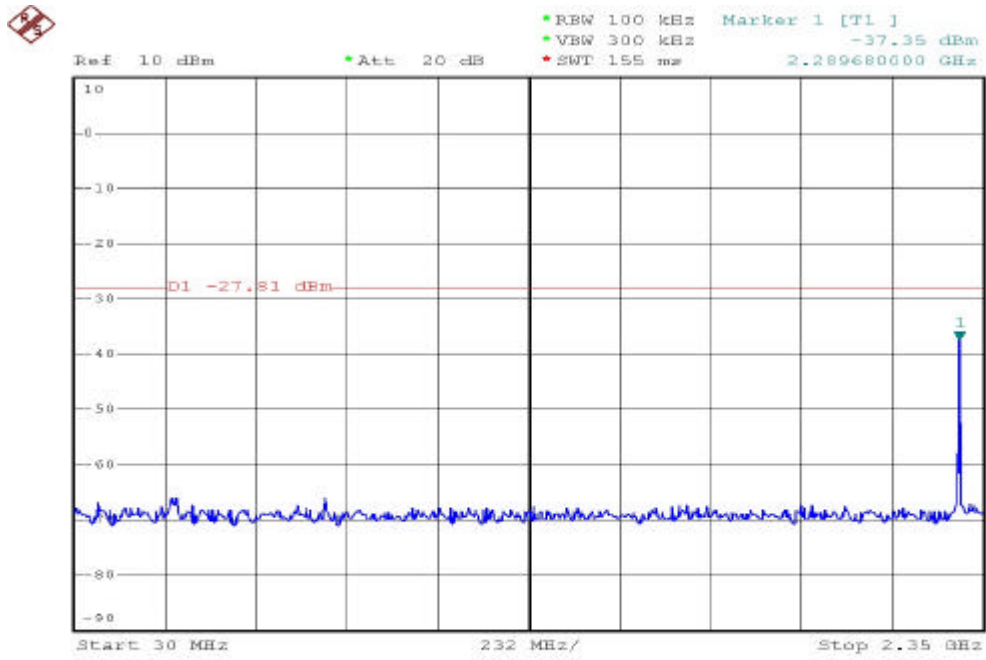
Humidity: 61%

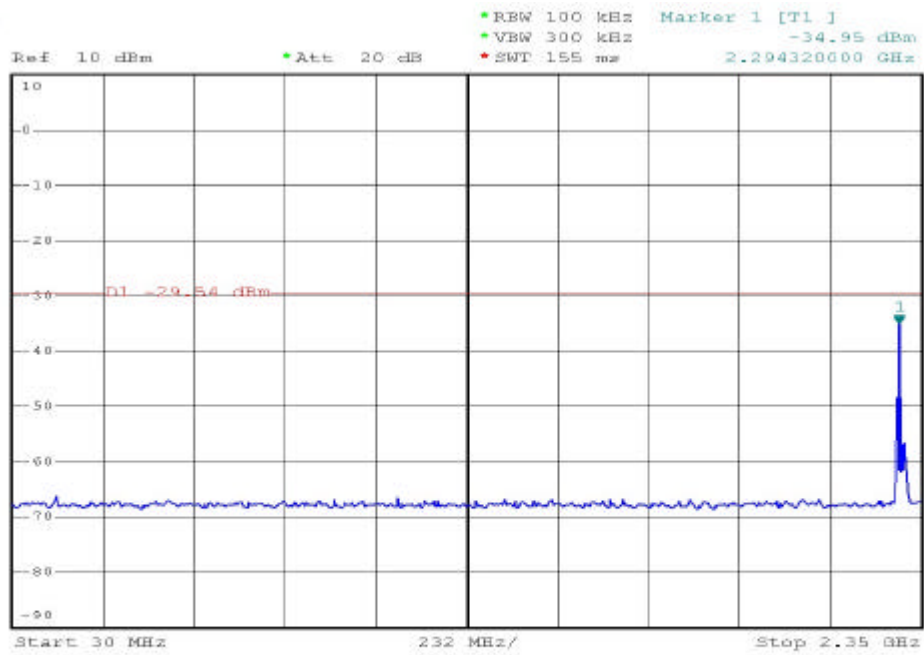
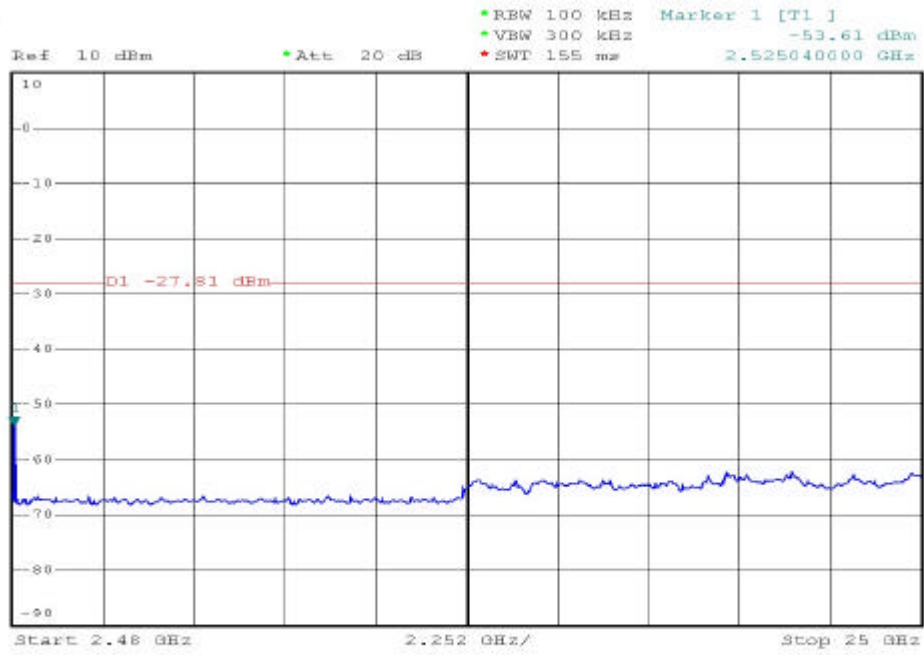
- a) Lower Band Edge: maximum value is -37.35dBm that is attenuated more than 20dB
- b) Upper Band Edge: maximum value is -34.95dBm that is attenuated more than 20dB

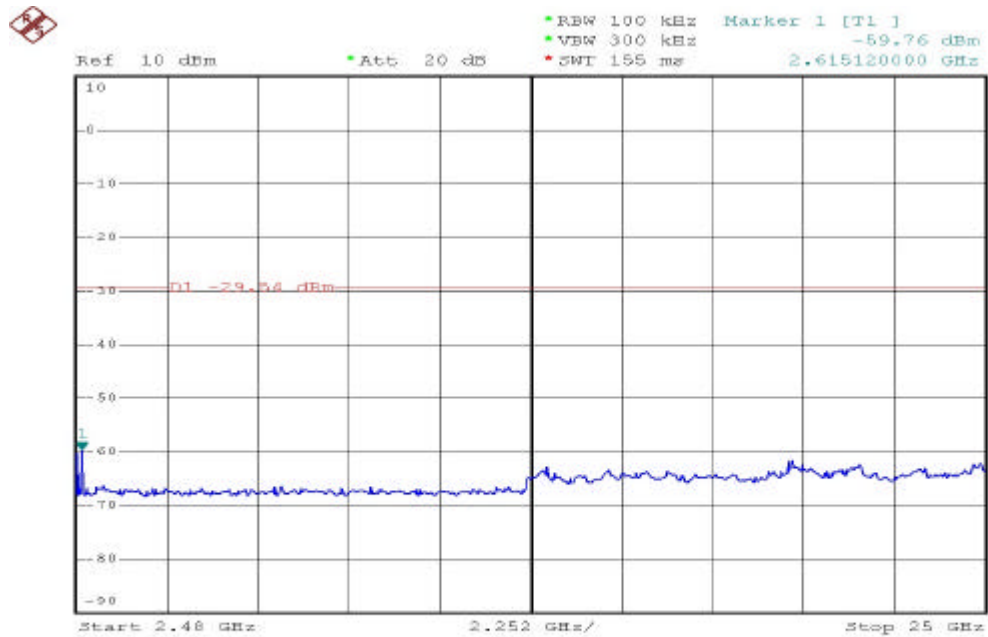
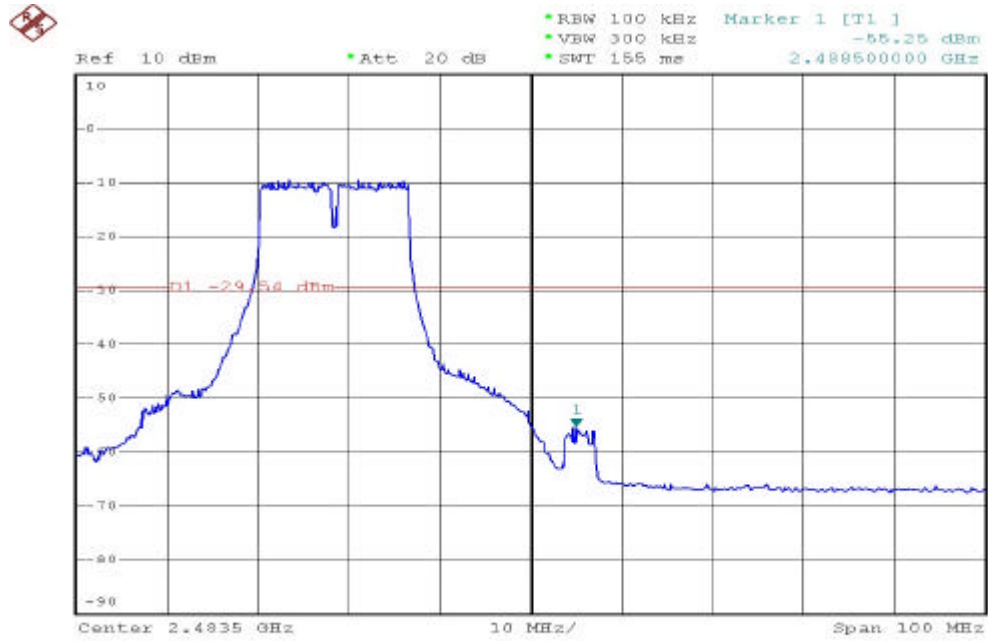












4.6.1. Note on Band edge Emission

Antenna 1, Modulation Standard: IEEE 802.11b

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

a) Channel 1

Fundamental Frequency: 2412 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2355.288	37.76	H	Avg.	74	54	-16.24	270	1.5
2343.864	40.39	V	Avg.	74	54	-13.61	180	1.4
2344.068	49.12	H	Peak	74	54	-24.88	270	1.5
2332.440	51.45	V	Peak	74	54	-22.55	180	1.4

b) Channel 11

Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2488.980	37.81	H	Avg.	74	54	-16.19	270	1.5
2486.548	40.58	V	Avg.	74	54	-13.42	180	1.4
2485.712	49.09	H	Peak	74	54	-24.91	270	1.5
2495.820	52.39	V	Peak	74	54	-21.61	180	1.4

Notes:

1. Level = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss – Amplifier
3. example:

$$37.81 = 31.60 + 6.21$$

Antenna 1, Modulation Standard: IEEE 802.11g

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

a) Channel 1

Fundamental Frequency: 2412 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2335.704	37.81	H	Avg.	74	54	-16.19	180	1.5
2343.864	40.21	V	Avg.	74	54	-13.79	220	1.4
2335.500	48.82	H	Peak	74	54	-25.18	190	1.5
2385.648	51.84	V	Peak	74	54	-22.16	270	1.4

b) Channel 11

Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2486.700	37.84	H	Avg.	74	54	-16.16	270	1.5
2486.700	40.36	V	Avg.	74	54	-13.64	180	1.4
2487.916	49.99	H	Peak	74	54	-24.01	270	1.5
2488.296	52.09	V	Peak	74	54	-21.91	180	1.4

Antenna 2, Modulation Standard: IEEE 802.11b

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

a) Channel 1

Fundamental Frequency: 2412 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2354.268	37.79	H	Avg.	74	54	-16.21	270	1.5
2343.456	40.35	V	Avg.	74	54	-13.65	180	1.4
2332.644	49.23	H	Peak	74	54	-24.77	270	1.5
2343.456	51.79	V	Peak	74	54	-22.21	180	1.4

b) Channel 11

Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2488.220	37.79	H	Avg.	74	54	-16.21	270	1.5
2498.480	40.60	V	Avg.	74	54	-13.40	180	1.4
2495.744	49.36	H	Peak	74	54	-24.64	270	1.5
2492.248	51.86	V	Peak	74	54	-22.14	180	1.4

Antenna 2, Modulation Standard: IEEE 802.11g

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

a) Channel 1

Fundamental Frequency: 2412 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2344.272	37.71	H	Avg.	74	54	-16.29	270	1.5
2334.072	37.55	V	Avg.	74	54	-16.45	180	1.4
2323.260	49.25	H	Peak	74	54	-24.75	270	1.5
2345.088	51.76	V	Peak	74	54	-22.24	180	1.4

b) Channel 11

Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2487.612	37.85	H	Avg.	74	54	-16.15	270	1.5
2488.220	40.61	V	Avg.	74	54	-13.39	180	1.4
2488.904	48.83	H	Peak	74	54	-25.17	270	1.5
2484.344	51.99	V	Peak	74	54	-22.01	180	1.4

Antenna 3, Modulation Standard: IEEE 802.11b

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

a) Channel 1

Fundamental Frequency: 2412 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2333.460	37.84	H	Avg.	74	54	-16.16	270	1.5
2334.480	40.33	V	Avg.	74	54	-23.67	180	1.4
2342.844	49.06	H	Peak	74	54	-24.94	270	1.5
2335.296	52.27	V	Peak	74	54	-21.73	180	1.4

b) Channel 11

Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2486.548	37.70	H	Avg.	74	54	-16.30	270	1.5
2487.004	40.45	V	Avg.	74	54	-13.55	180	1.4
2488.448	50.28	H	Peak	74	54	-23.72	270	1.5
2485.560	51.78	V	Peak	74	54	-22.22	180	1.4

Antenna 3, Modulation Standard: IEEE 802.11g

Operation Mode: Receiving/ Transmitting

Test Date: Apr. 24, 2004 Temperature: 24 °C Humidity: 61%

c) Channel 1

Fundamental Frequency: 2412 MHz

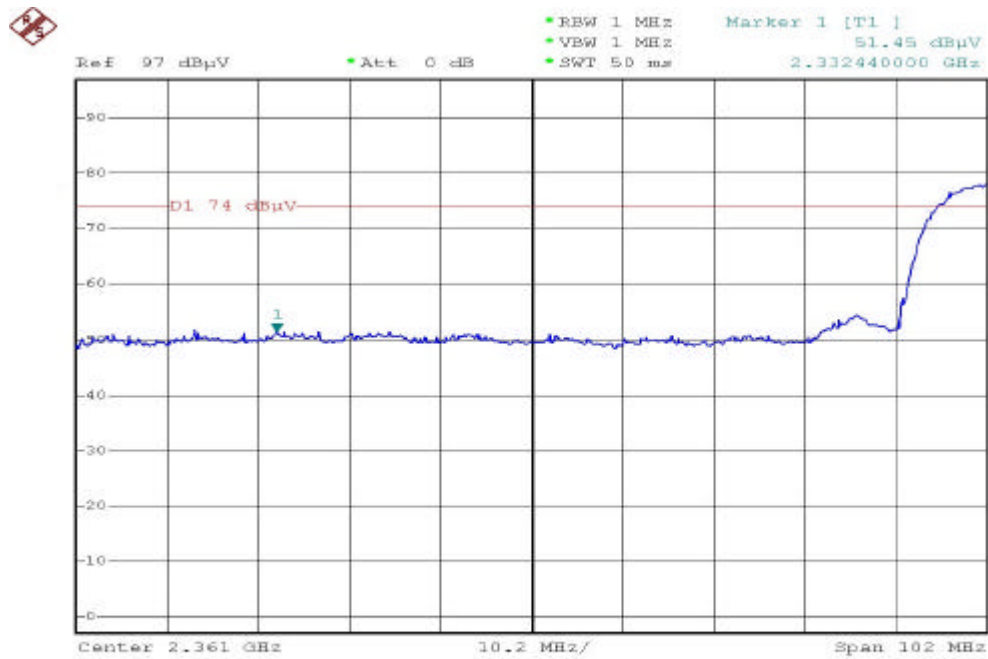
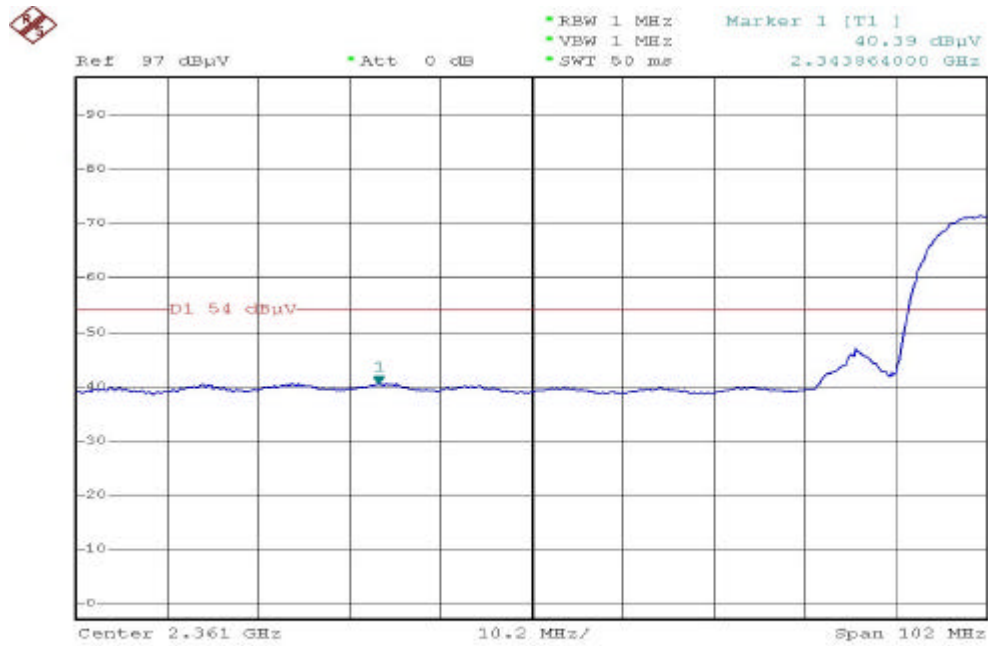
Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2354.268	37.64	H	Avg.	74	54	-16.36	270	1.5
2333.460	40.40	V	Avg.	74	54	-13.60	180	1.4
2377.728	48.71	H	Peak	74	54	-25.29	270	1.5
2353.860	51.43	V	Peak	74	54	-22.57	180	1.4

d) Channel 11

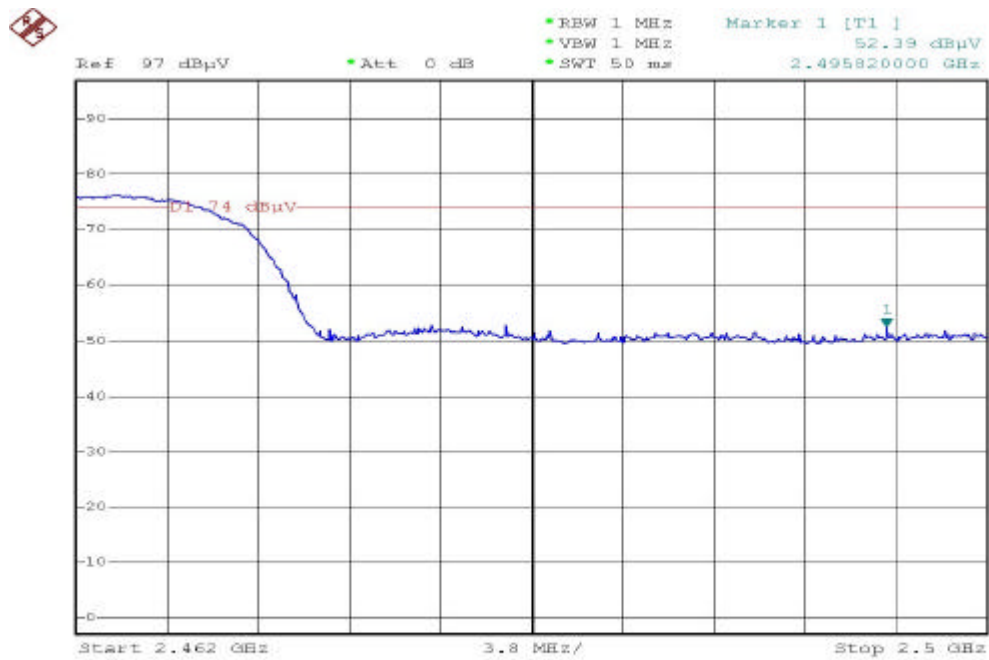
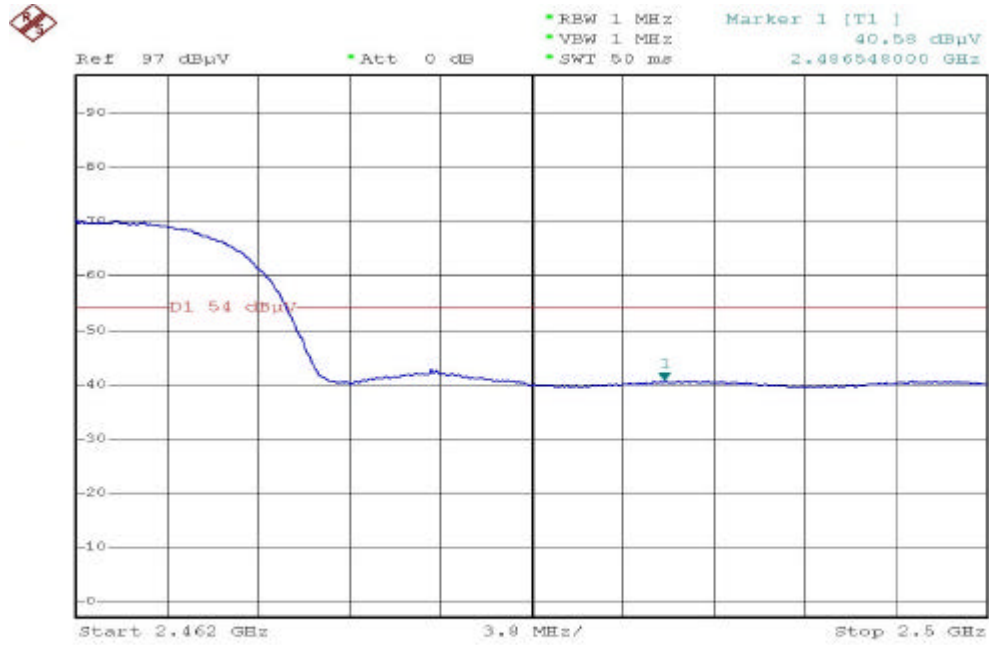
Fundamental Frequency: 2462 MHz

Frequency (MHz)	Level (dBuV)	Polarization	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant High (m)
				Peak	Ave.			
2486.928	37.76	H	Avg.	74	54	-16.24	270	1.5
2488.448	40.37	V	Avg.	74	54	-13.63	180	1.4
2487.080	48.80	H	Peak	74	54	-25.20	270	1.5
2486.548	51.68	V	Peak	74	54	-22.32	180	1.4

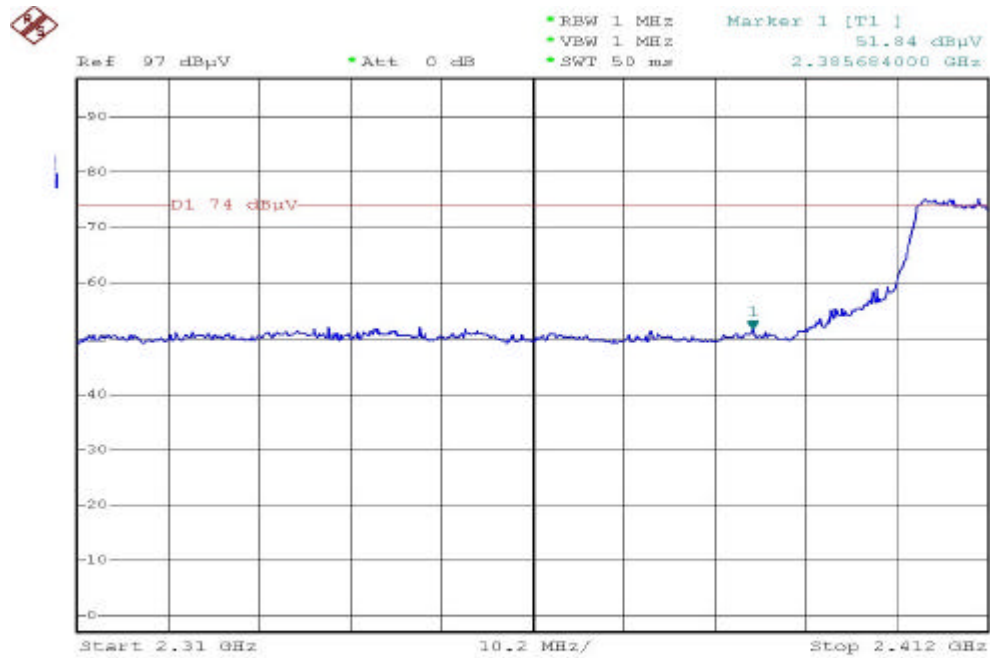
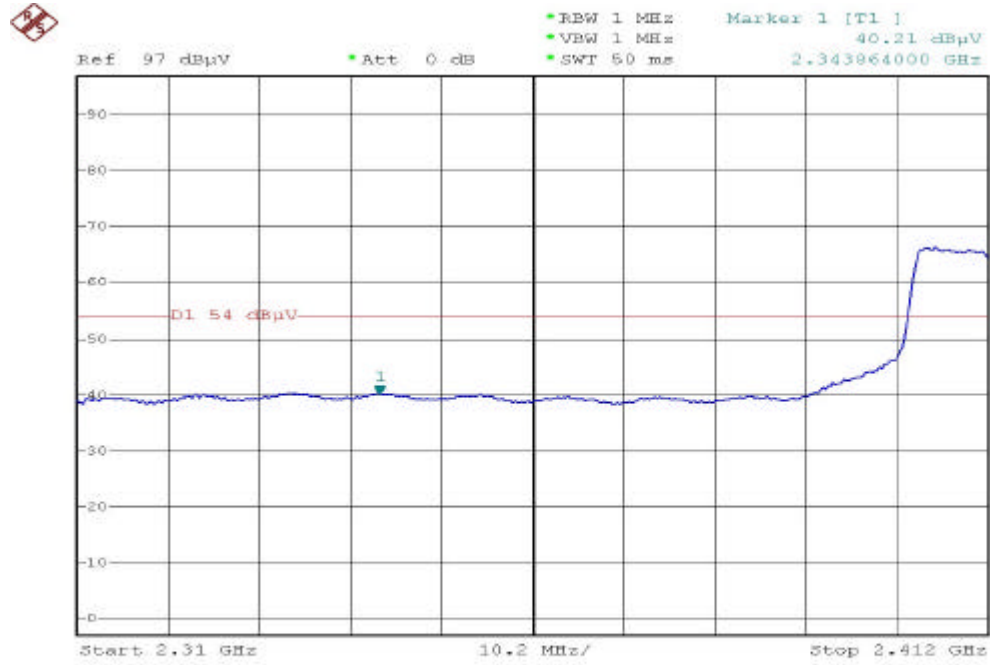
Antenna 1, Modulation Standard: IEEE 802.11b



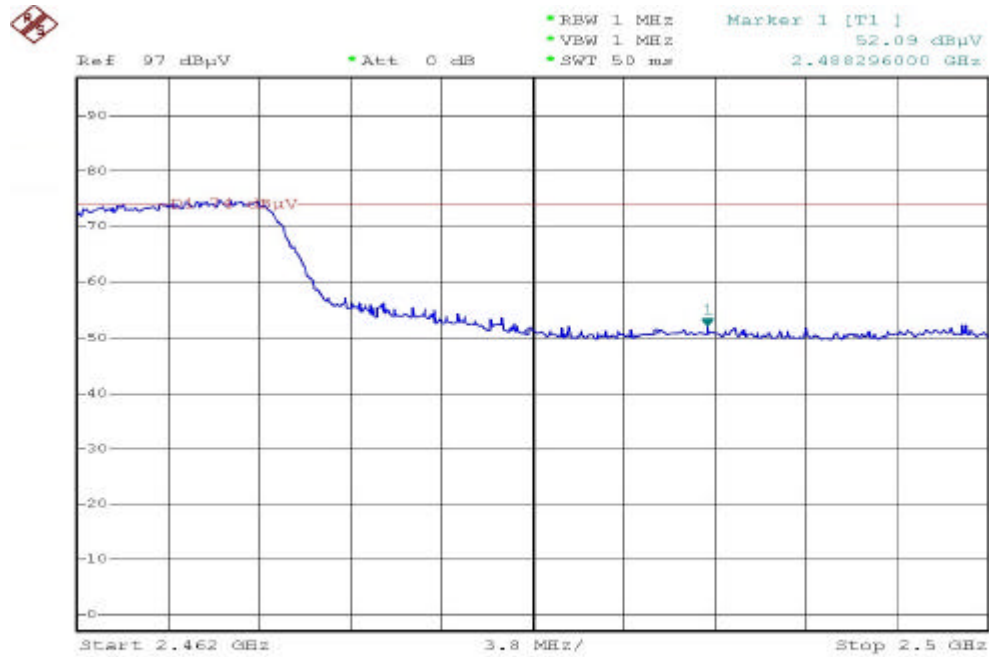
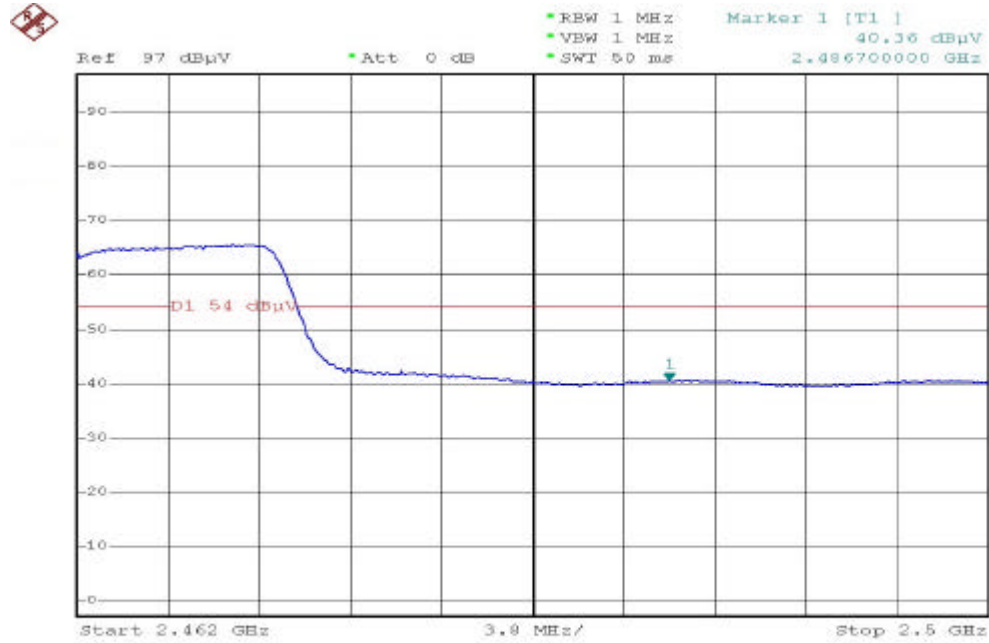
Antenna 1, Modulation Standard: IEEE 802.11b



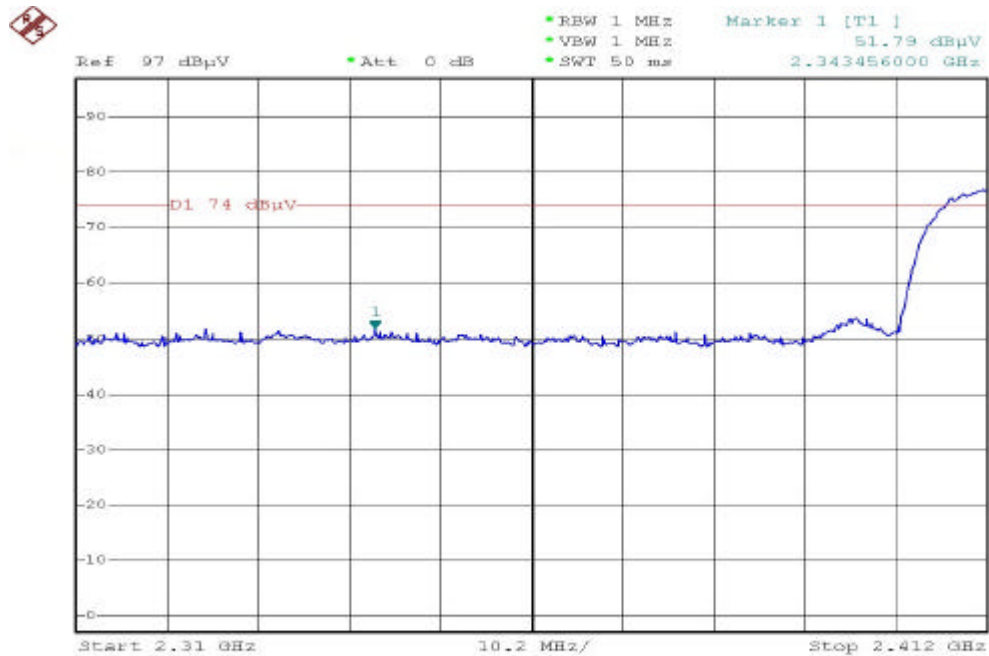
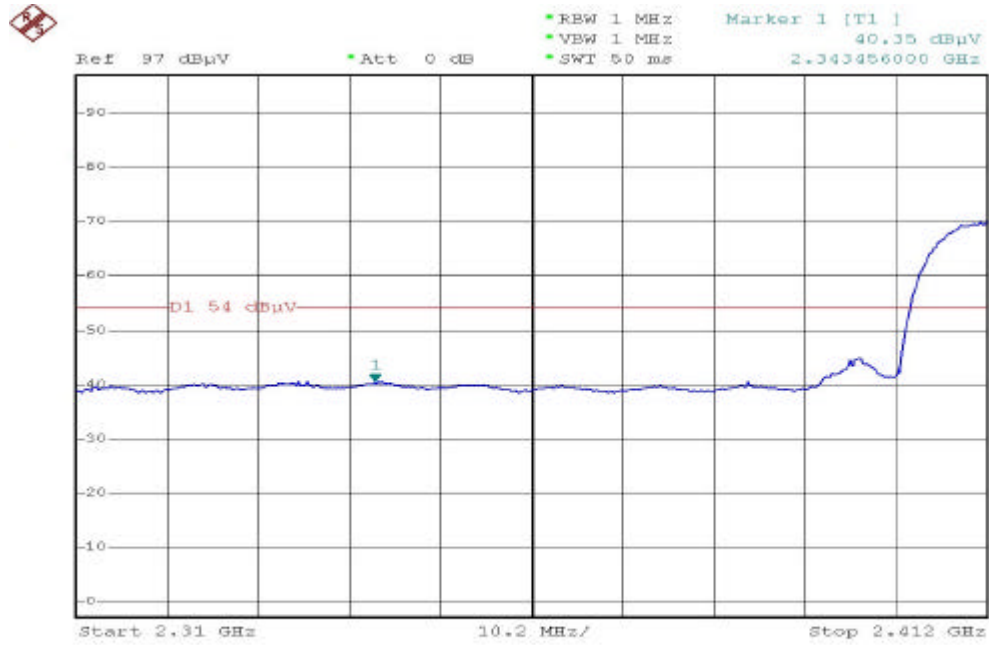
Antenna 1, Modulation Standard: IEEE 802.11g



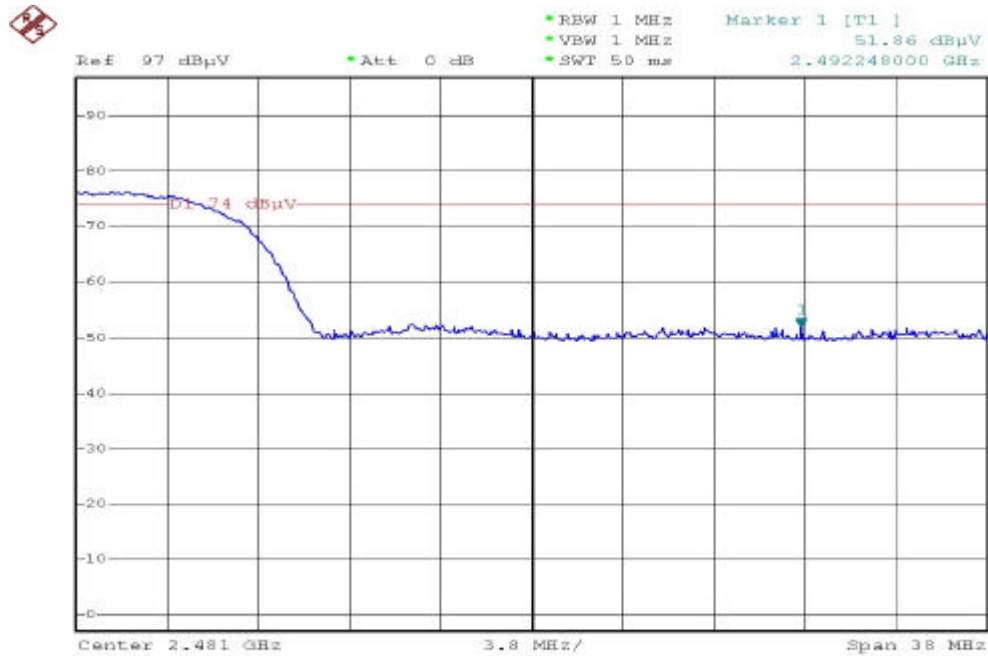
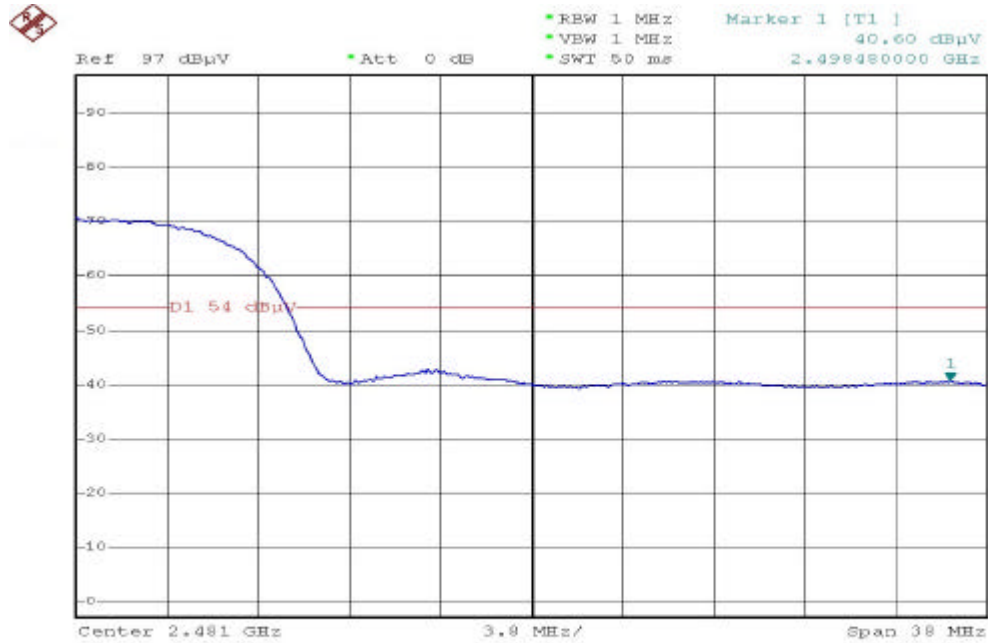
Antenna 1, Modulation Standard: IEEE 802.11g



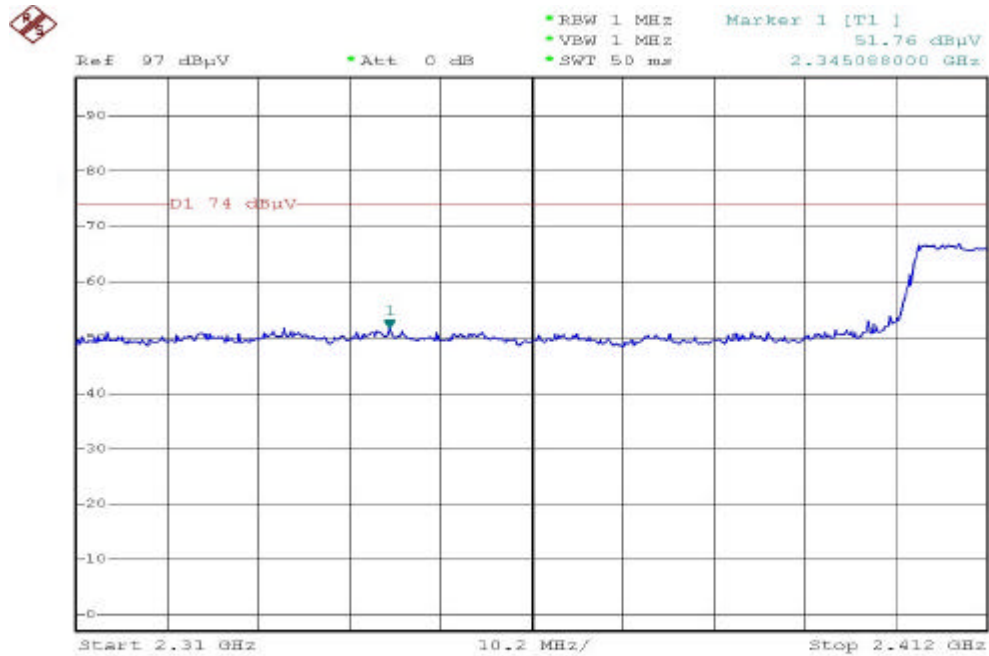
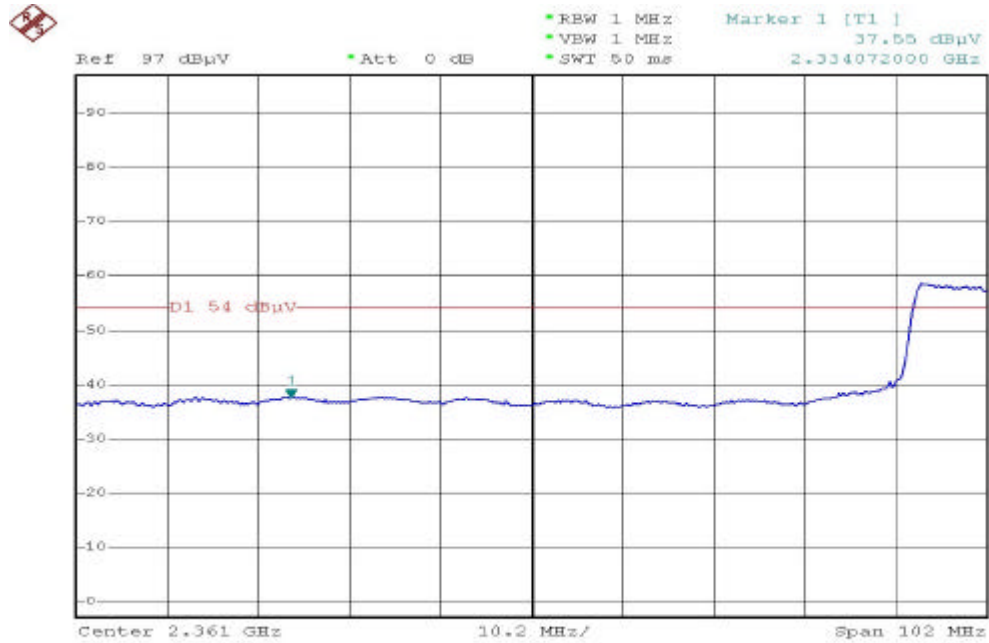
Antenna 2, Modulation Standard: IEEE 802.11b



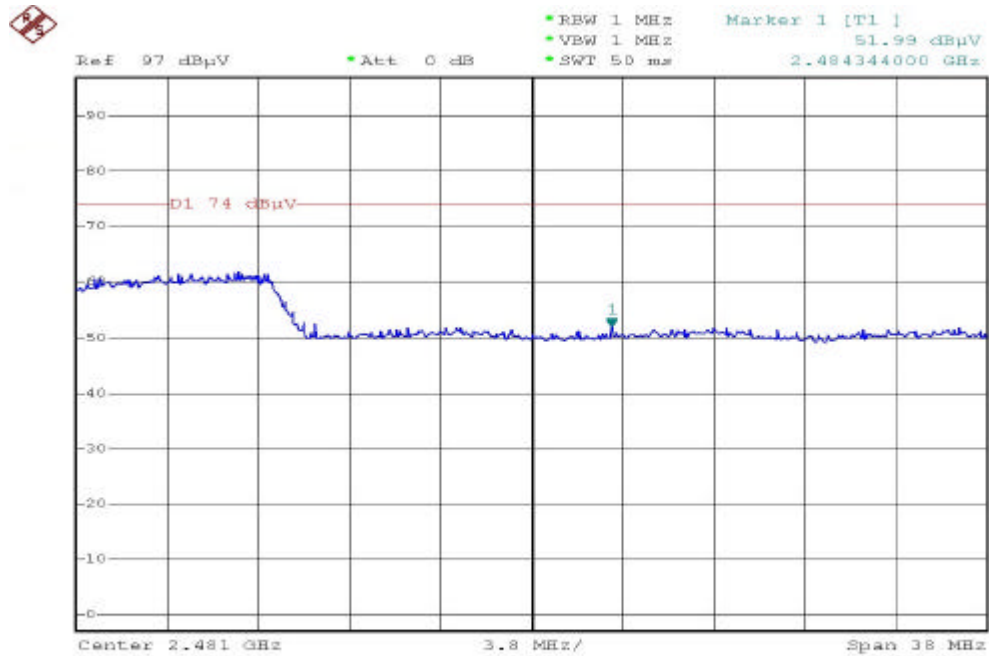
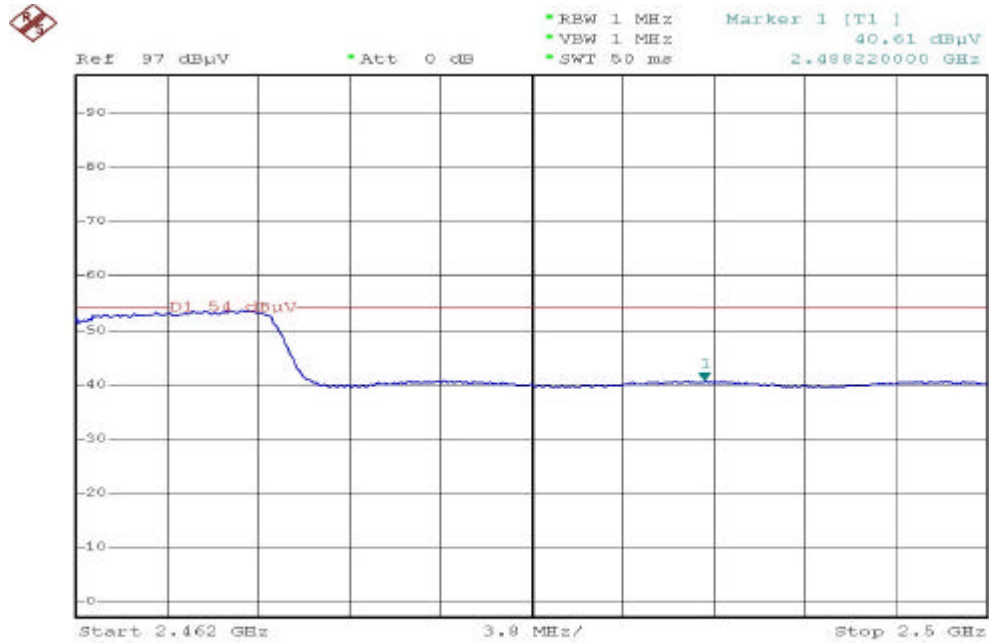
Antenna 2, Modulation Standard: IEEE 802.11b



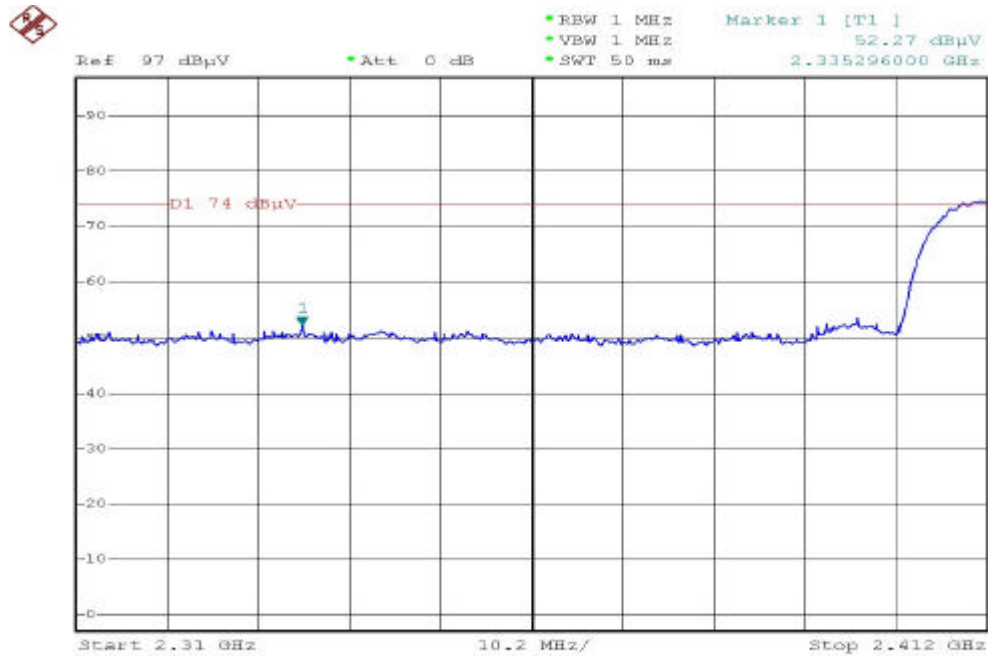
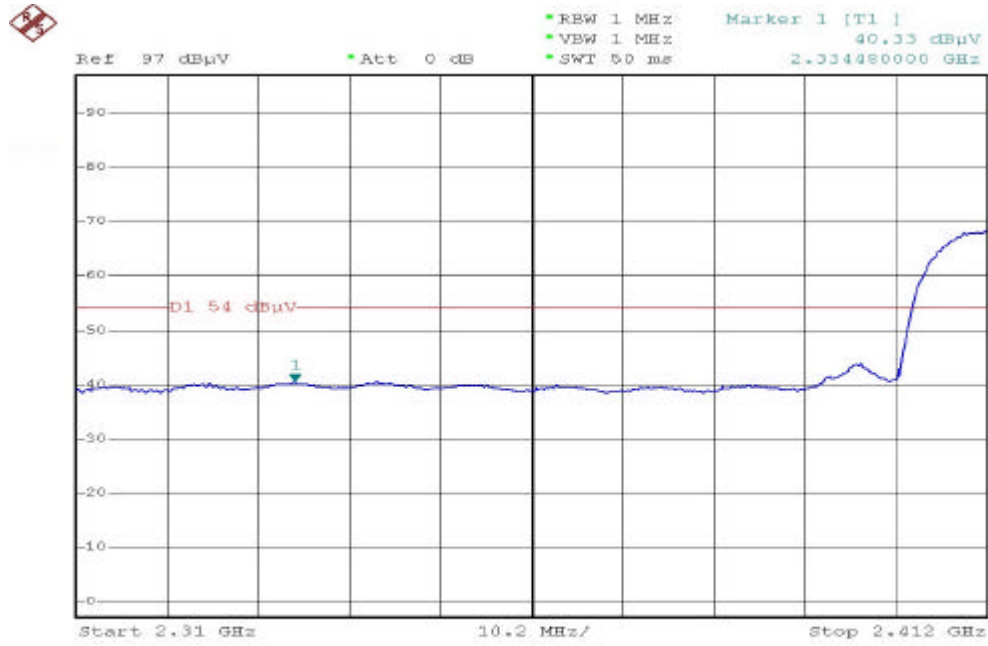
Antenna 2, Modulation Standard: IEEE 802.11g



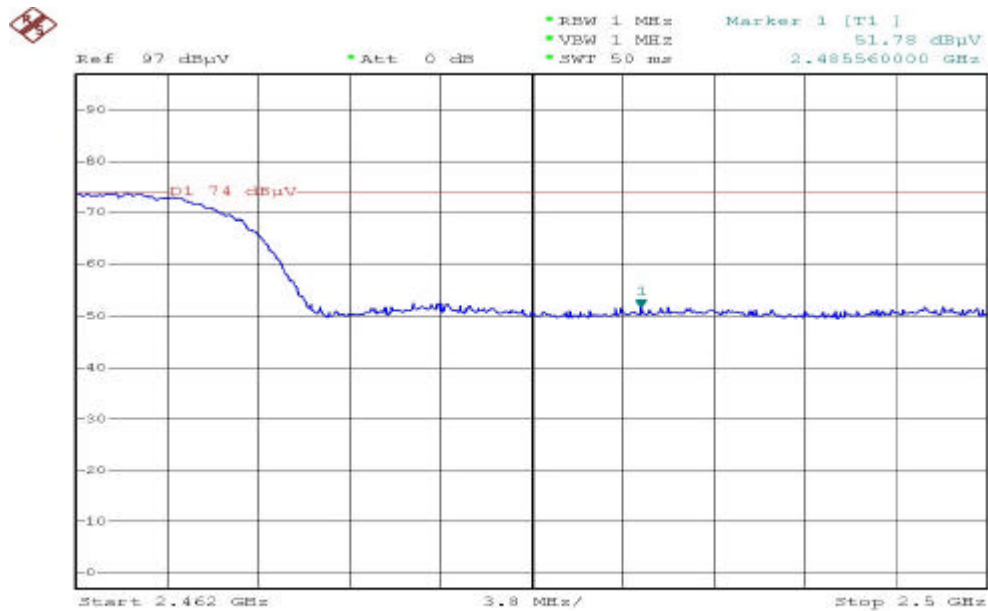
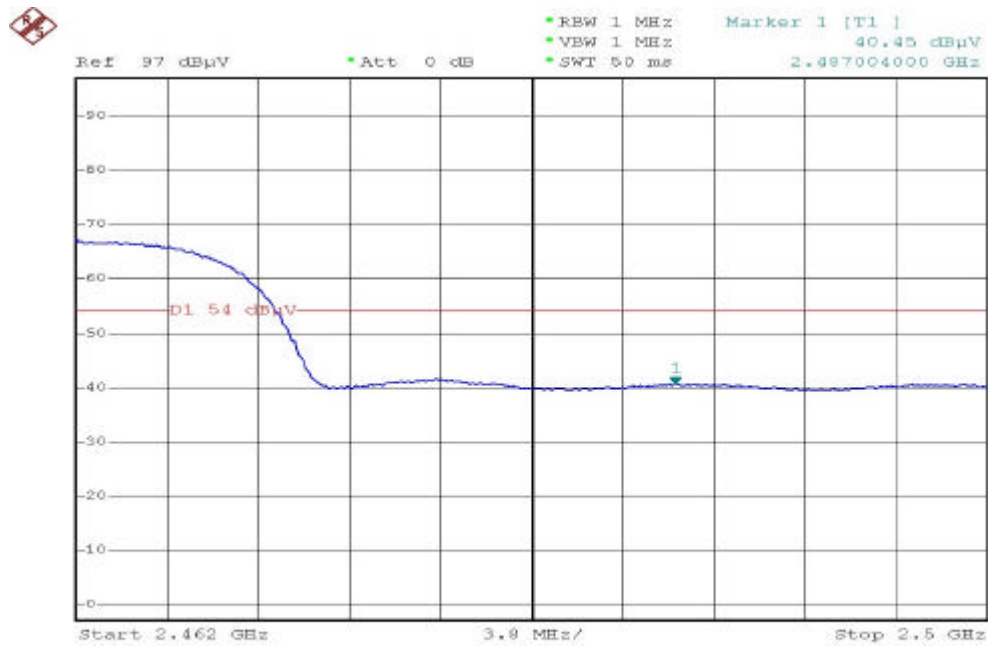
Antenna 2, Modulation Standard: IEEE 802.11g



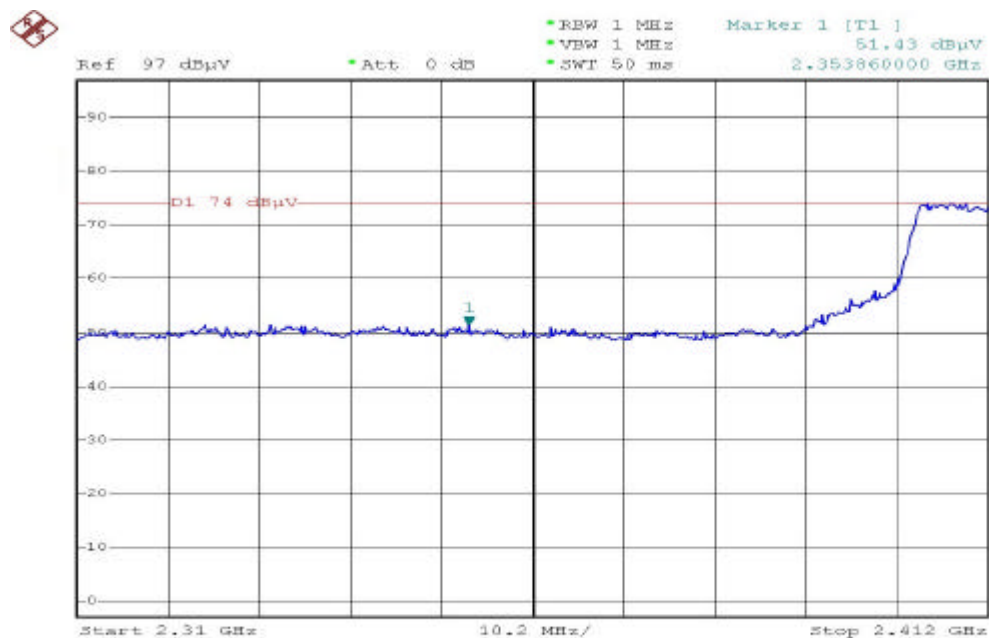
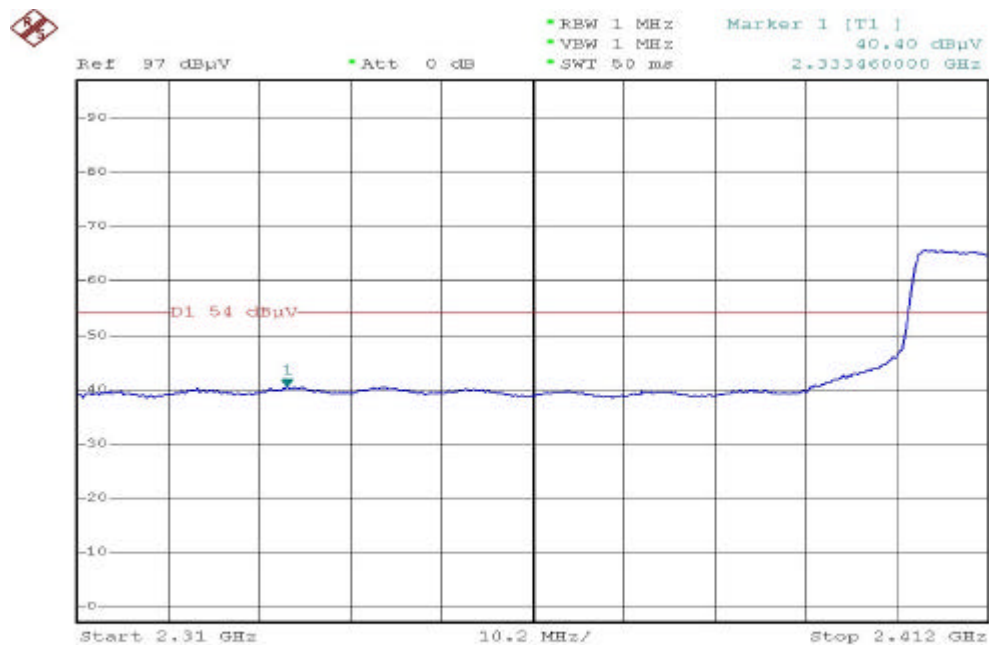
Antenna 3, Modulation Standard: IEEE 802.11b



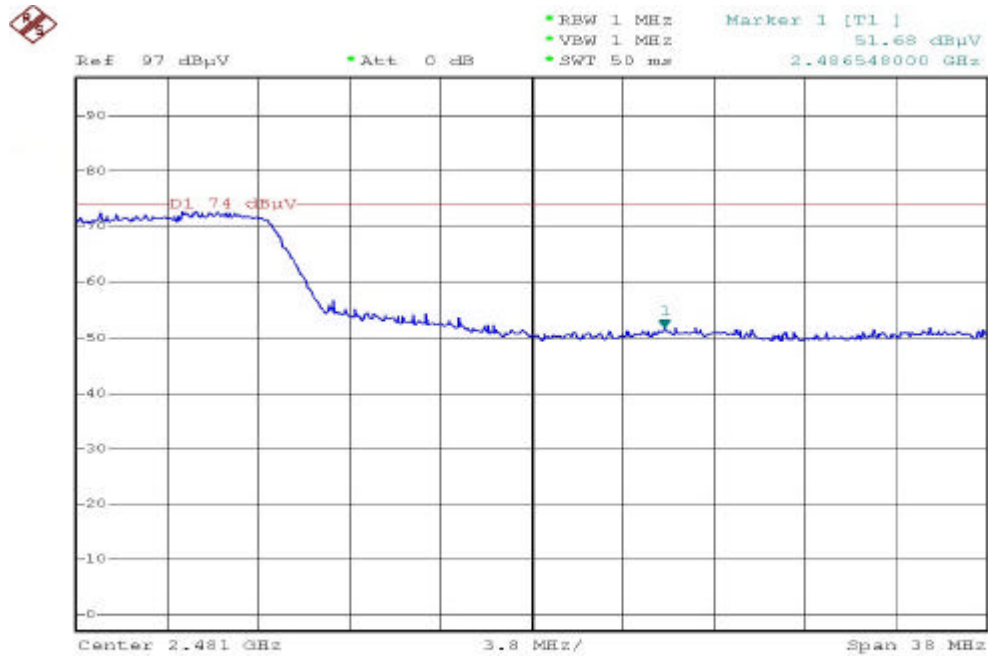
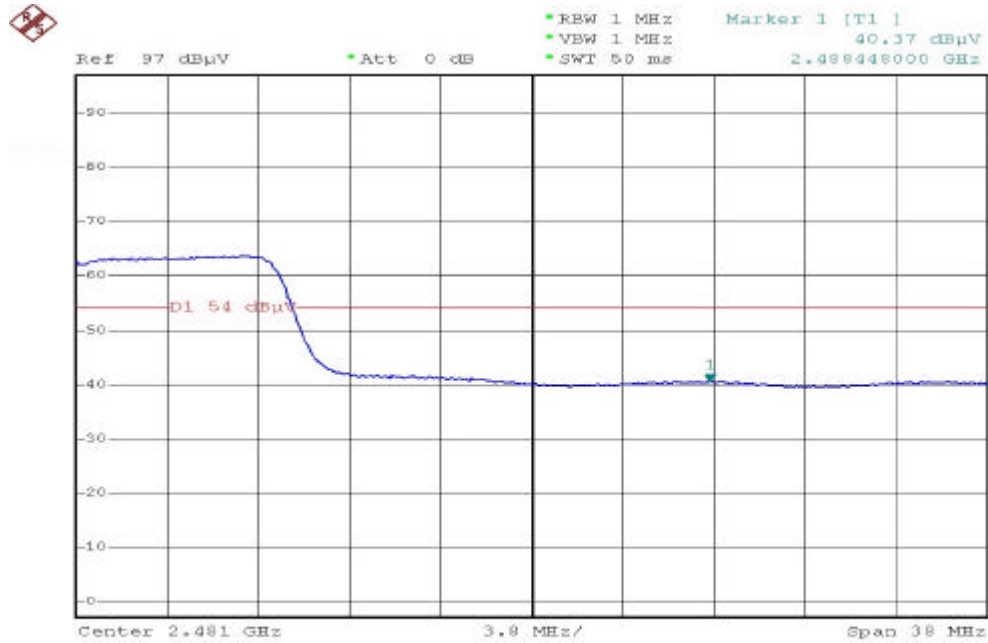
Antenna 3, Modulation Standard: IEEE 802.11b



Antenna 3, Modulation Standard: IEEE 802.11g



Antenna 3, Modulation Standard: IEEE 802.11g



4.7. Power Spectral Density Measurement Data

(1) Modulation Standard: IEEE 802.11b

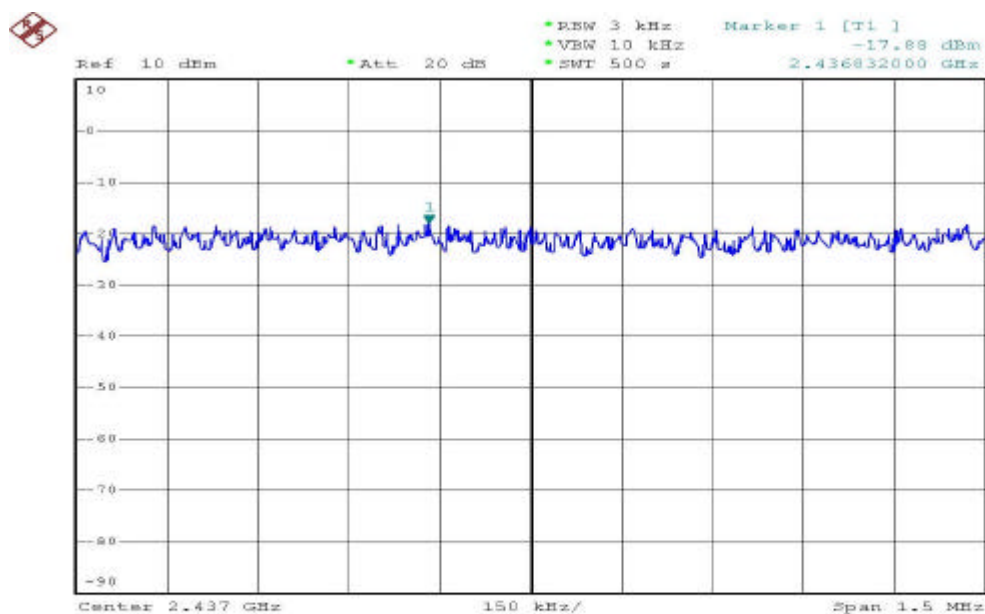
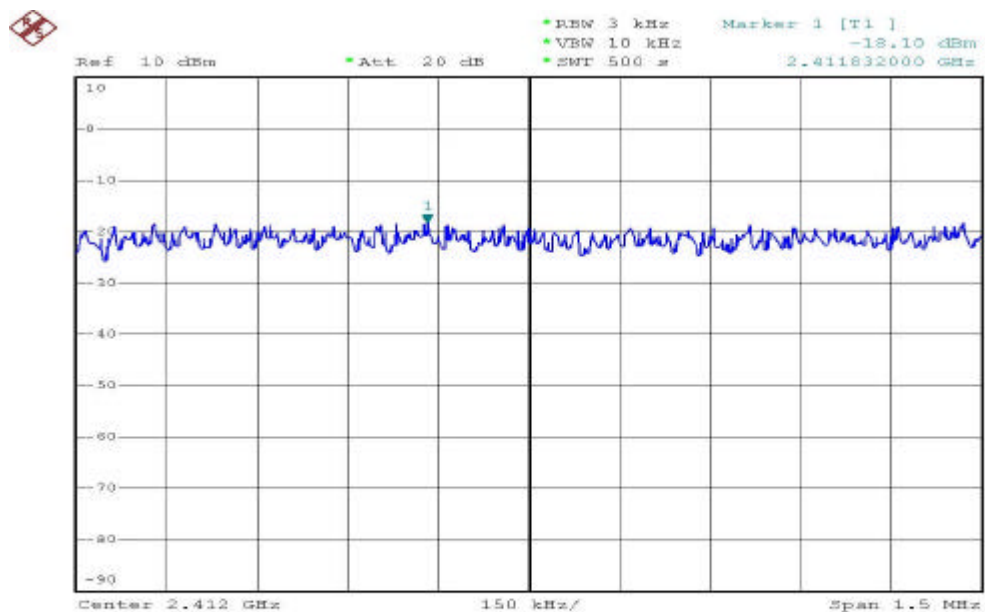
Test Date: Apr. 24, 2004 Temperature: 24°C Humidity: 61%

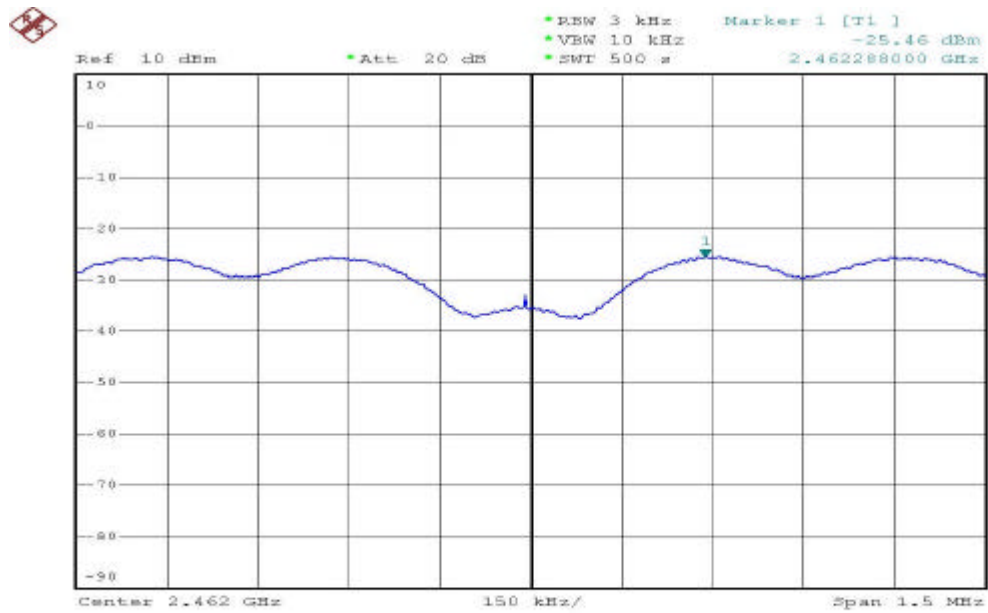
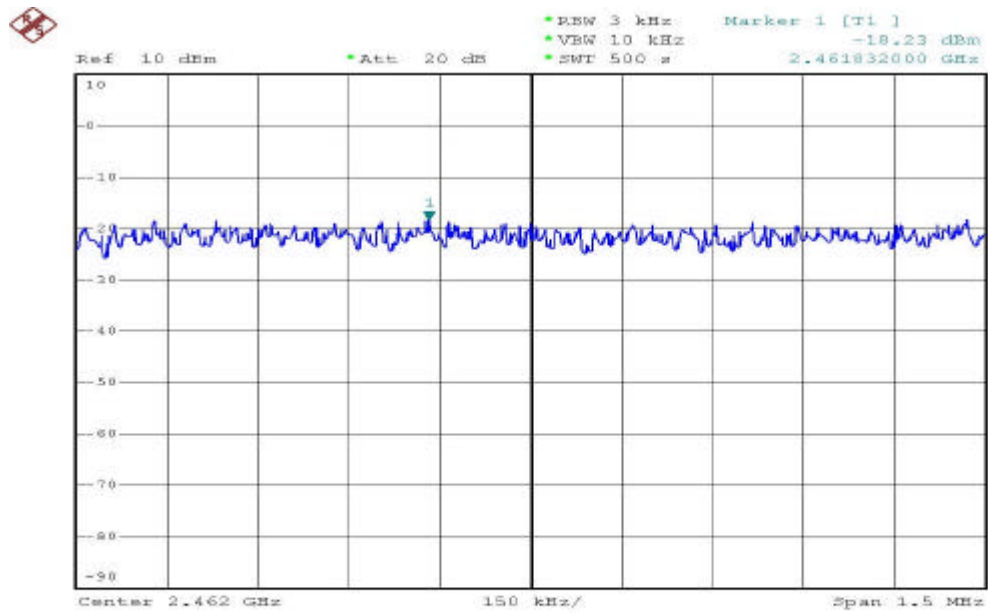
- a) Channel 01: Maximum Power Density of 3 kHz Bandwidth is-18.10dBm
- b) Channel 06: Maximum Power Density of 3 kHz Bandwidth is-17.88dBm
- c) Channel 11: Maximum Power Density of 3 kHz Bandwidth is-18.23dBm

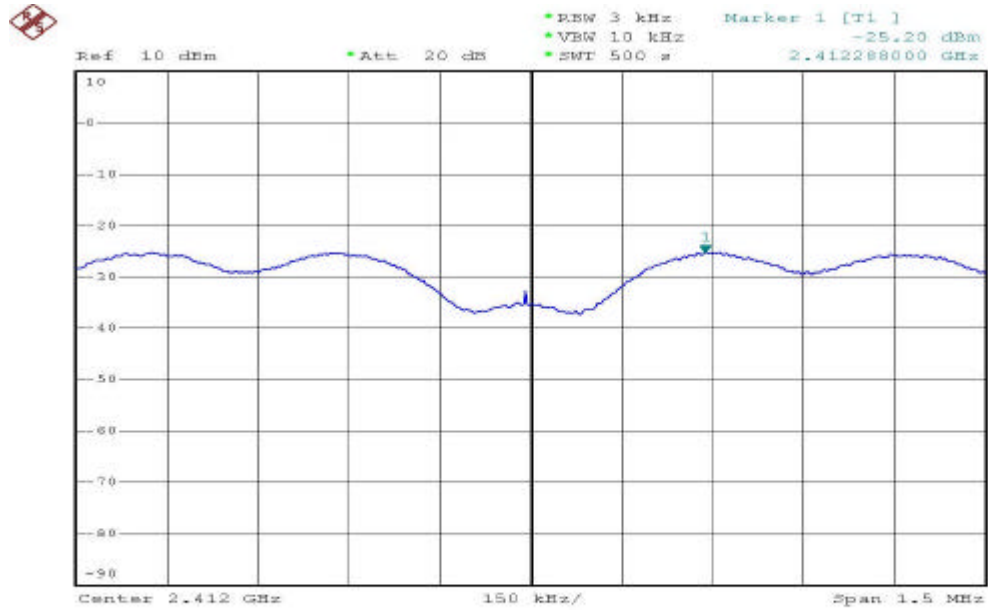
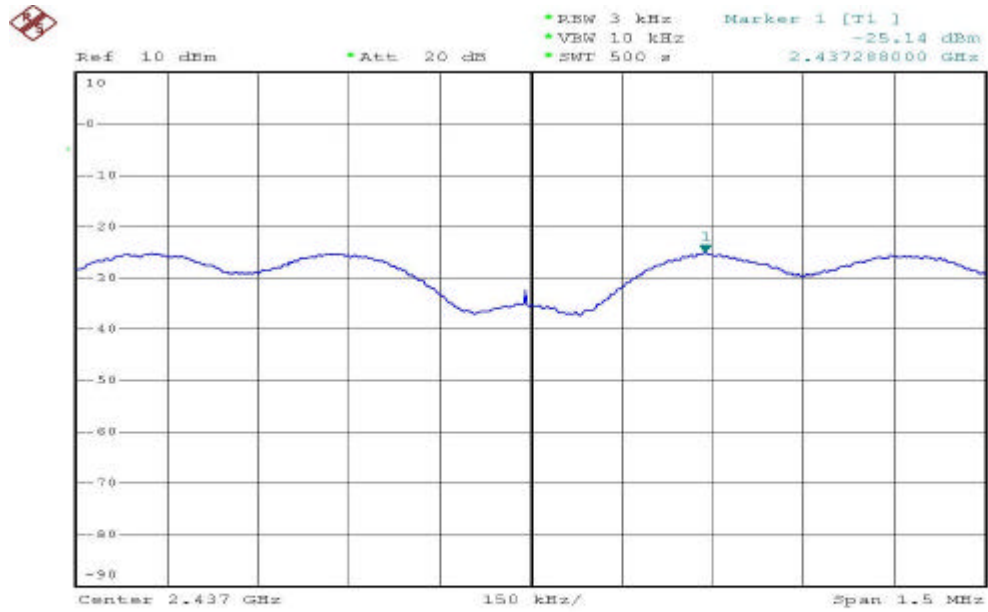
(2) Modulation Standard: IEEE 802.11g

Test Date: Apr. 24, 2004 Temperature: 24°C Humidity: 61%

- a) Channel 01: Maximum Power Density of 3 kHz Bandwidth is-25.46dBm
- b) Channel 06: Maximum Power Density of 3 kHz Bandwidth is-25.14dBm
- c) Channel 11: Maximum Power Density of 3 kHz Bandwidth is-25.20dBm







4.8. Test Result of RF Exposure Evaluation

- . Product: Wireless Mini PCI Module
- . Test Item: Test Result of RF Exposure Evaluation
- . Test site: OATSI-SD
- . Test Mode: Normal Operation

4.8.1. Antenna Gain

Antenna 1 Gain: The maximum Gain is 1.8dBi.

Antenna 2 Gain: The maximum Gain is 5.0dBi.

Antenna 3 Gain: The maximum Gain is 0dBi

4.8.2. EUT Operation condition

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.8.3. Output Power into Antenna & RF Exposure Evaluation Distance

Antenna 1, Modulation Standard: IEEE 802.11b

Test Date: Apr. 24, 2004

Temperature: 24°C

Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	15.15	1.987
06	2437	14.43	1.828
11	2462	13.55	1.651

Modulation Standard: IEEE 802.11g

Test Date: Apr. 24, 2004

Temperature: 24°C

Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	12.23	1.419
06	2437	11.48	1.301
11	2462	10.48	1.160

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

Antenna 2, Modulation Standard: IEEE 802.11b

Test Date: Apr. 24, 2004 Temperature: 24°C Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	15.15	2.872
06	2437	14.43	2.642
11	2462	13.55	2.387

Modulation Standard: IEEE 802.11g

Test Date: Apr. 24, 2004 Temperature: 24°C Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	12.23	2.050
06	2437	11.48	1.880
11	2462	10.48	1.676

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

Antenna3, Modulation Standard: IEEE 802.11b

Test Date: Apr. 24, 2004 Temperature: 24°C Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	15.15	1.615
06	2437	14.43	1.486
11	2462	13.55	1.342

Modulation Standard: IEEE 802.11g

Test Date: Mar. 24, 2004 Temperature: 24°C Humidity: 61%

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum allowable Distance @From Skin (cm)
01	2412	12.23	1.153
06	2437	11.48	1.057
11	2462	10.48	0.943

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

5. List of Measuring Equipment Used

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
1	BILOG ANTENNA	CBL6111C	SCHAFFNER	2762	2004/11/03
2	PREAMPLIFIER	RFP4002	SCHAFFNER	010	2004/11/03
3	RECEIVER	SCR3501	SCHAFFNER	437	2004/11/03
4	SIGNAL GENERATOR	8648B	HP	3629U00612	2006/02/08
5	SPECTRUM ANALYZER	8594E	HP	3520A01913	2005/01/15
6	AMPLIFIER	8447D	AGILENT	2944A10593	2004/10/09
7	AMPLIFIER	8447D	AGILENT	2944A10531	2004/07/08
8	SERIES POWER METER	E4416A	AGILENT	GB41292146	2004/11/05
9	POWER SENSOR	E9327A	AGILENT	US40441392	2004/10/06
10	DIPOLE ANTENNA	AD-100	COM-POWER	721011	2004/12/02
11	DIPOLE ANTENNA	AD-100	COM-POWER	721010	2004/12/02
12	SPECTRUM ANALYZER	R3131A	ADVANTEST	131000021	2004/11/24
13	SPECTRUM ANALYZER	FSP40	R&S	100047	2004/12/16
14	PREAMPLIFIER	8449B	AGILENT	3008A01954	2005/01/04
15	HORN ANTENNA	3115	EMCO	31601	2005/01/13
16	HORN ANTENNA	3115	EMCO	31589	2005/01/14
17	HORN ANTENNA	3116	EMCO	31970	2005/01/29
18	HORN ANTENNA	3116	EMCO	31974	2005/01/29
19	EMI RECEIVER	8546A	HP	3807A00454	2005/02/12
20	RF FILTER SECTION	85460A	HP	3704A00386	2005/02/12
21	SIGNAL GENERATOR	83640A	HP	2927A00107	2006/03/16
22	ATTENUATOR	8491B	AGILENT	50703	2004/12/16
23	ATTENUATOR	8491B	AGILENT	50705	2004/12/16
24	TEMPERATURE CHAMBER	TMJ-9712	T MACHINE	T-12-040111	2005/03/05
25	HIGH PASS FILTER	84300-80038	HP	002	N/A
26	HIGH PASS FILTER	84300-80038	HP	006	N/A
27	DC Power Supply	GPD-3030	GM	7020936	N/A
28	AC POWER CONVERTER	AFC-11005	APC	F103120008	N/A