

5.4.3.5 Antenna 5

802.11b CH01 (Vertical)

		Frequency (MHz)	Over Limit (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Cable Loss (dB)	Remark	Ant Pos (cm)	Table Pos (deg)
1	!	2390	-2.05	51.95	54	64.56	28.4	44.34	3.33	Average	0	0
2		2390	-10.24	63.76	74	76.37	28.4	44.34	3.33	Peak	0	0
3	X	2414		111.82		124.4	28.41	44.34	3.35	Peak	-	-
4	X	2414		104.15		116.73	28.41	44.34	3.35	Average	0	0
5		2483.5	-11.12	42.88	54	55.31	28.48	44.31	3.4	Average	0	0
6		2483.5	-18.32	55.68	74	68.11	28.48	44.31	3.4	Peak	0	0

802.11b CH11 (Vertical)

		Frequency (MHz)	Over Limit (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Cable Loss (dB)	Remark	Ant Pos (cm)	Table Pos (deg)
1		2390	-13	41	54	53.61	28.4	44.34	3.33	Average	0	0
2		2390	-20.25	53.75	74	66.36	28.4	44.34	3.33	Peak	0	0
3	X	2462		111.16		123.63	28.47	44.32	3.38	Peak	-	-
4	X	2462		104.01		116.48	28.47	44.32	3.38	Average	0	0
5	!	2483.5	-2.38	51.62	54	64.05	28.48	44.31	3.4	Average	0	0
6		2483.5	-10.33	63.67	74	76.1	28.48	44.31	3.4	Peak	0	0

802.11g CH01 (Vertical)

		Frequency (MHz)	Over Limit (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Cable Loss (dB)	Remark	Ant Pos (cm)	Table Pos (deg)
1		2390	-9.29	64.71	74	77.32	28.4	44.34	3.33	Peak	0	0
2	!	2390	-1.48	52.52	54	65.13	28.4	44.34	3.33	Average	100	0
3	X	2413.32		113.05		125.63	28.41	44.34	3.35	Peak	0	0
4	X	2413.32		104.89		117.47	28.41	44.34	3.35	Average	0	0
5		2483.5	-9.81	44.19	54	56.62	28.48	44.31	3.4	Average	0	0
6		2483.5	-16.88	57.12	74	69.55	28.48	44.31	3.4	Peak	0	0

802.11g CH11 (Vertical)

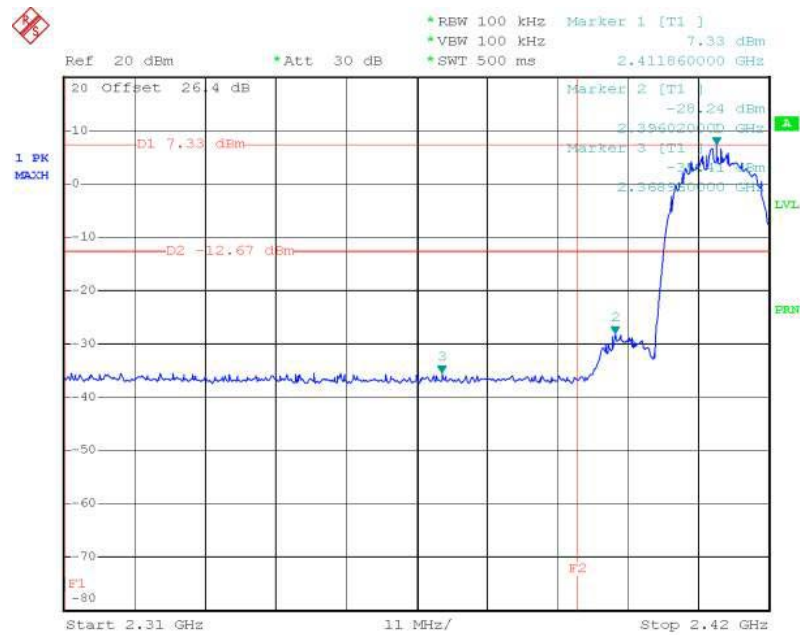
	Frequency (MHz)	Over Limit (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Cable Loss (dB)	Remark	Ant Pos (cm)	Table Pos (deg)
1	2388	-12.52	41.48	54	54.11	28.4	44.34	3.31	Average	0	0
2	2388	-21.19	52.81	74	65.44	28.4	44.34	3.31	Peak	-	-
3	X 2464		106.08		118.56	28.47	44.31	3.36	Peak	-	-
4	X 2464		95.89		108.37	28.47	44.31	3.36	Average	0	0
5	! 2483.5	-1.65	52.35	54	64.8	28.48	44.31	3.38	Average	0	0
6	2483.5	-6.19	67.81	74	80.26	28.48	44.31	3.38	Peak	0	0

5.4.4 Test Data

5.4.4.1 Antenna 1

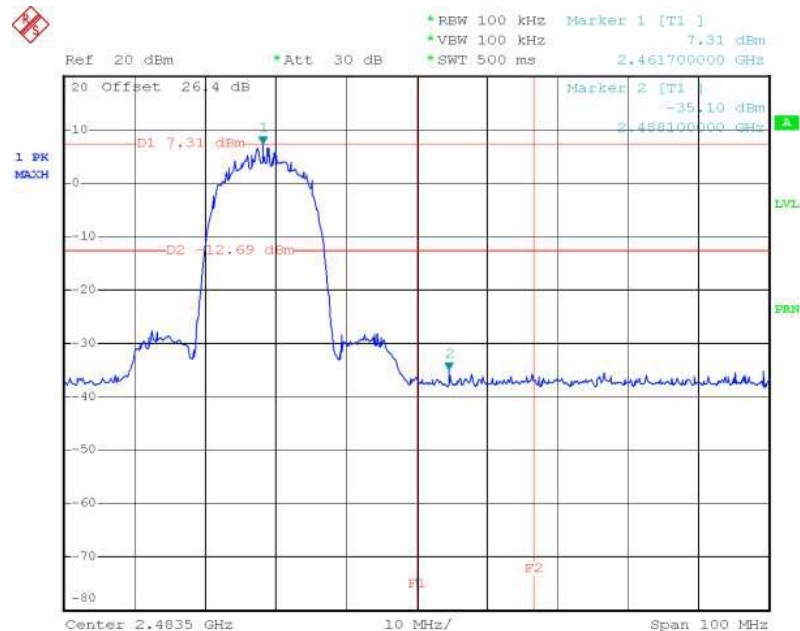
802.11b

1-1



Date: 24.JUL.2004 00:31:36

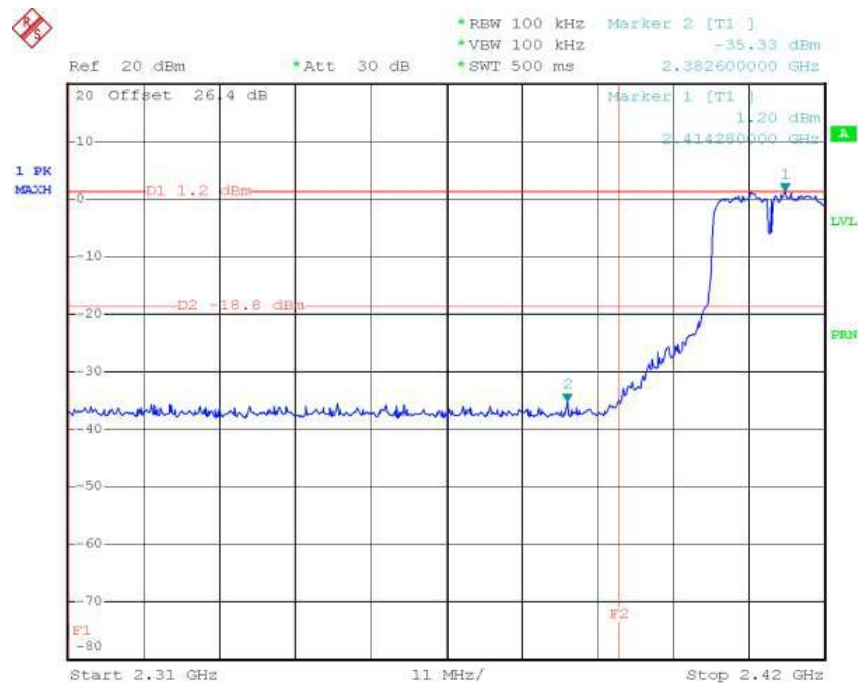
1-3



Date: 24.JUL.2004 01:11:19

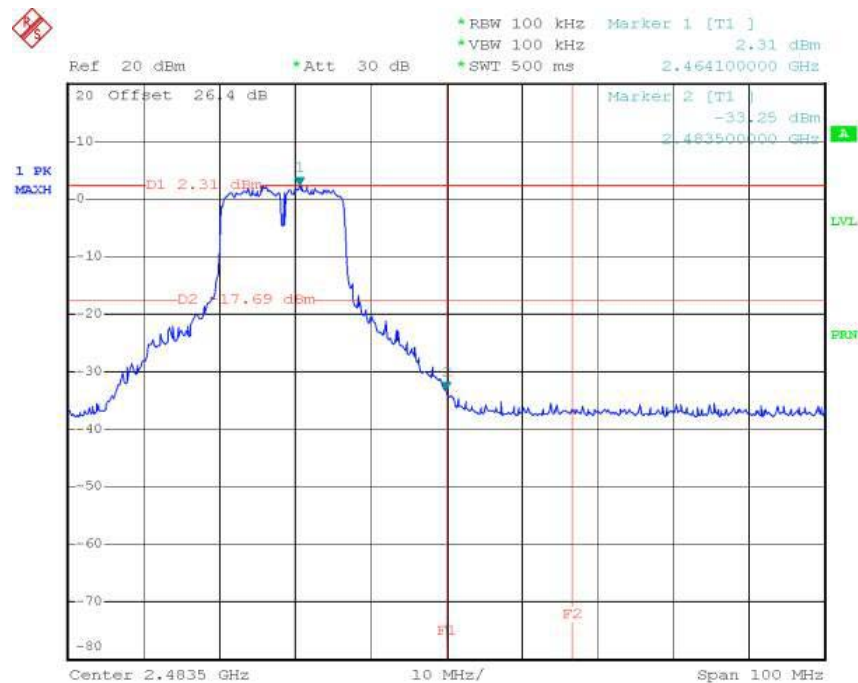
802.11g

1-4



Date: 24.JUL.2004 01:06:40

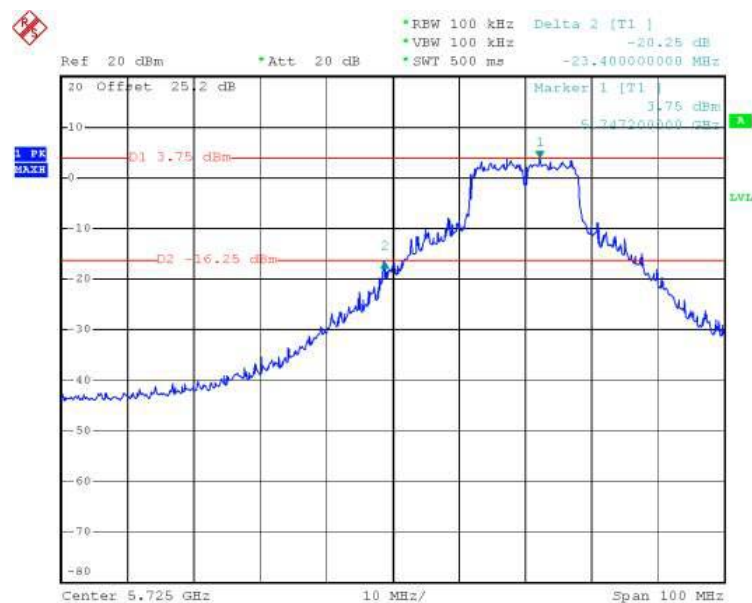
1-6



Date: 24.JUL.2004 01:09:49

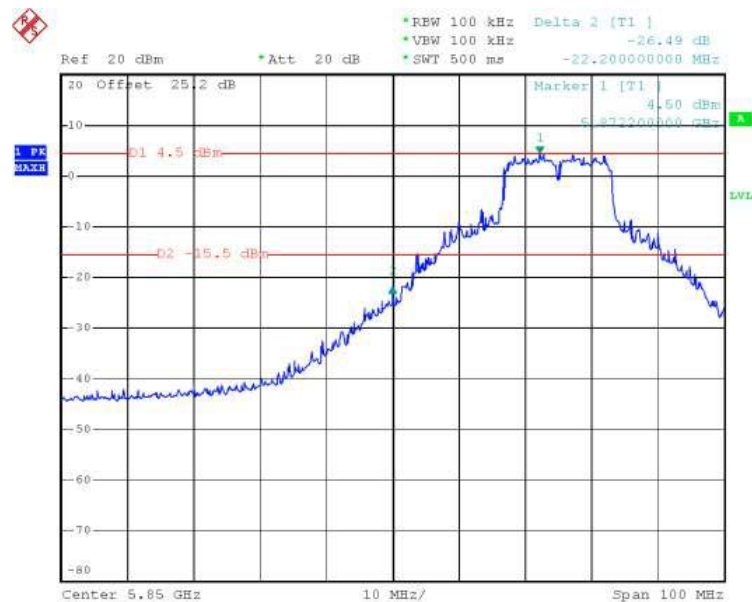
802.11a

1-7



Date: 2.AUG.2004 13:55:43

1-9

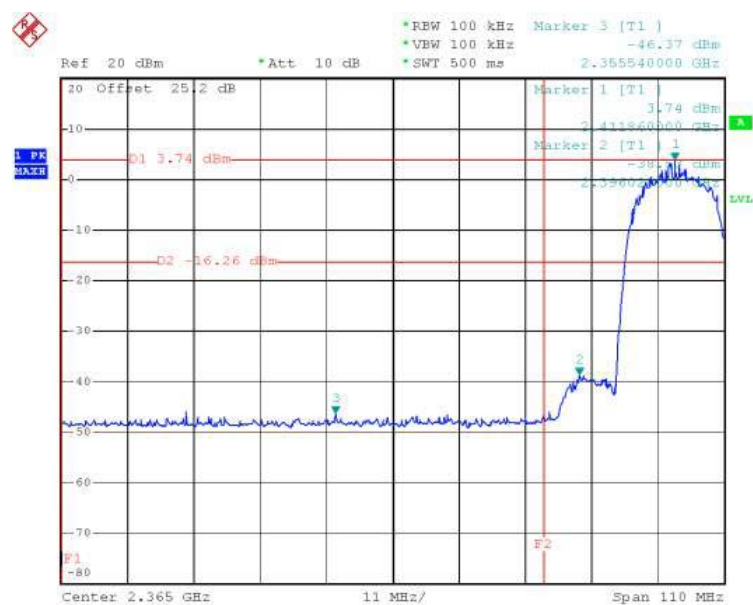


Date: 2.AUG.2004 13:57:55

5.4.4.2 Antenna 2

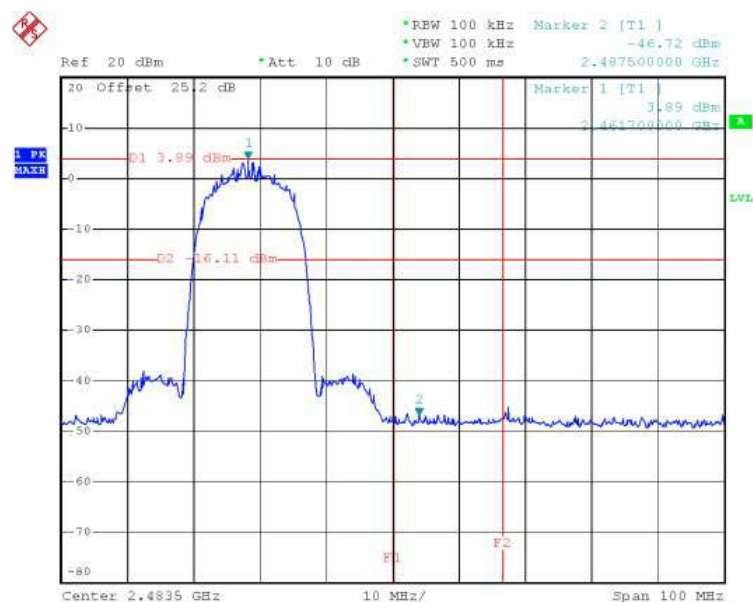
802.11b

2-1



Date: 26.JUL.2004 15:00:01

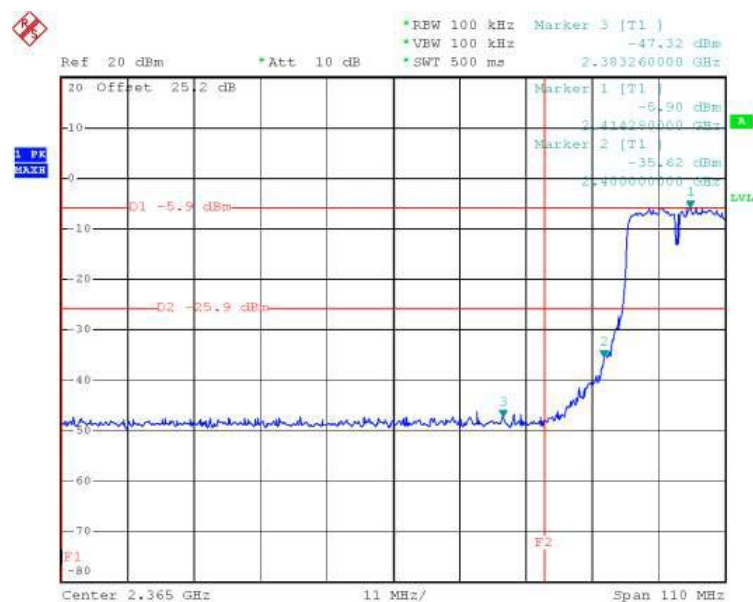
2-2



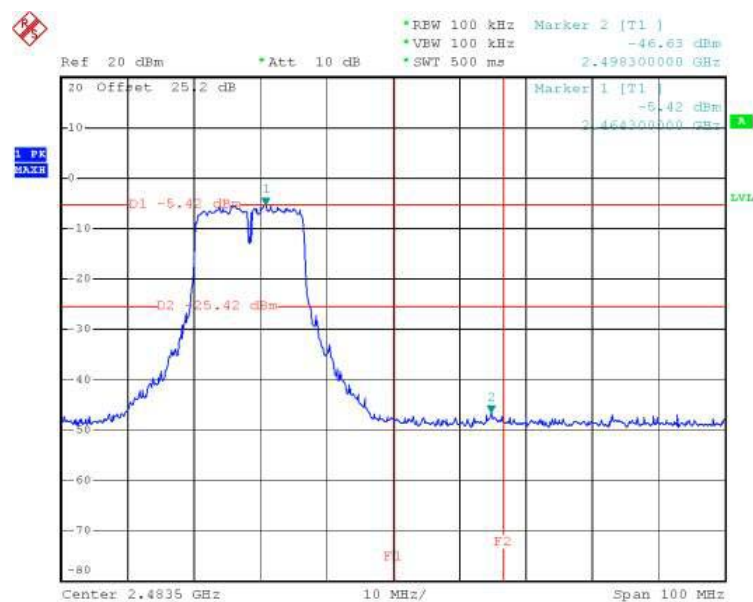
Date: 26.JUL.2004 15:02:14

802.11g

2-3

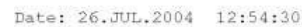


2-4



802.11b

3-1

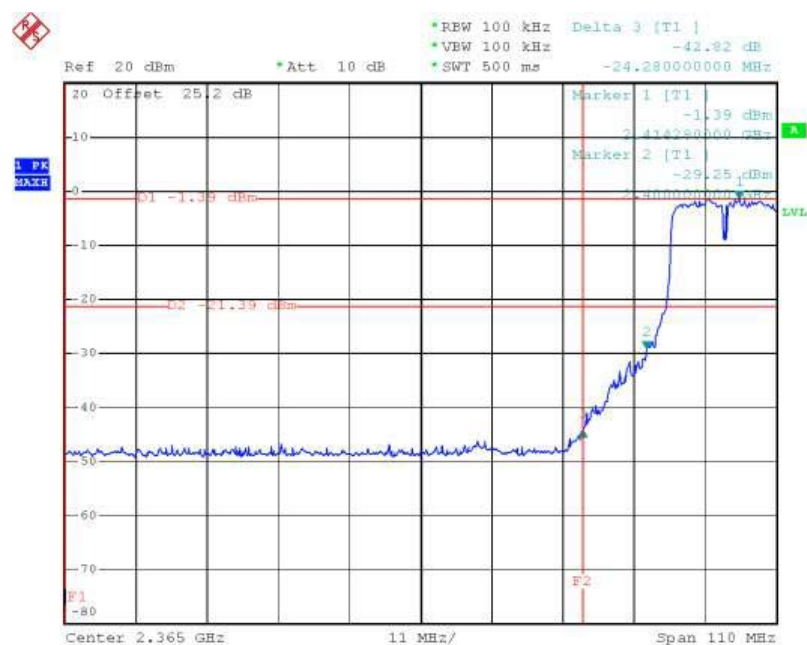


3-2



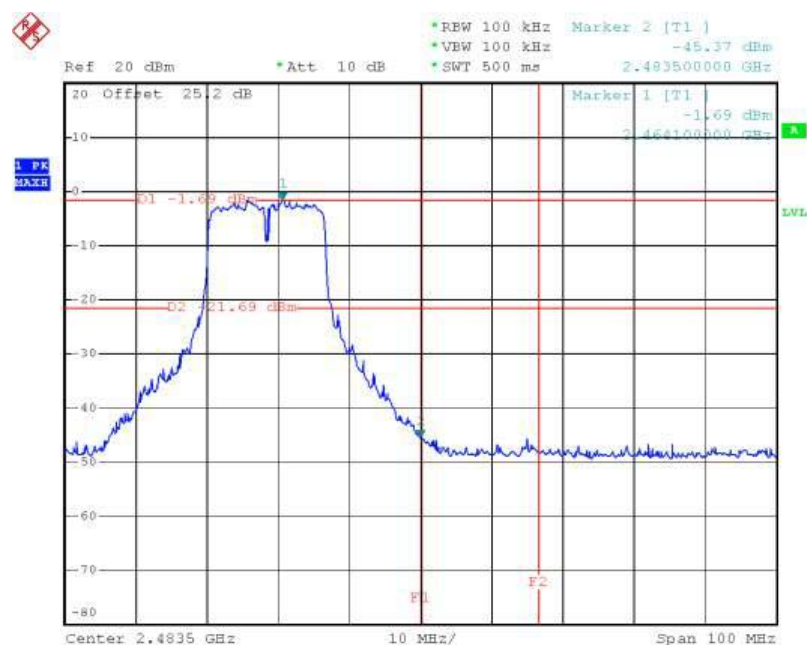
802.11g

3-3



Date: 26.JUL.2004 13:14:14

3-4

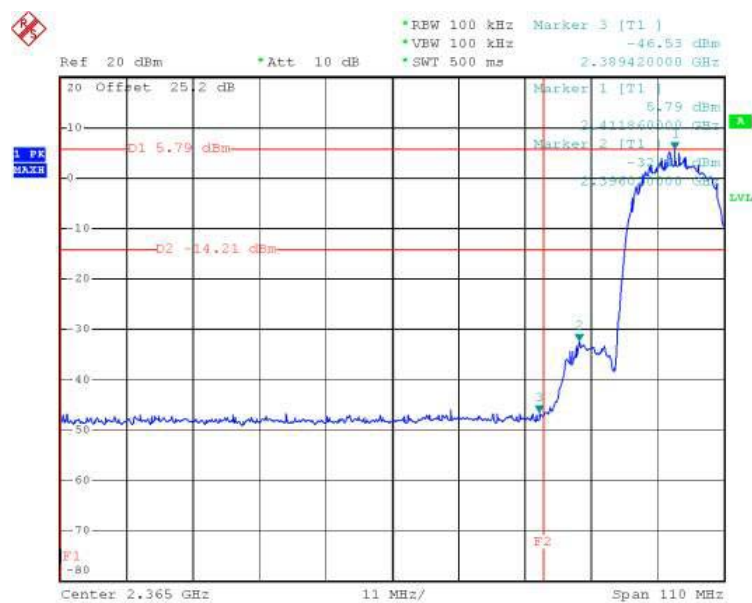


Date: 26.JUL.2004 13:22:49

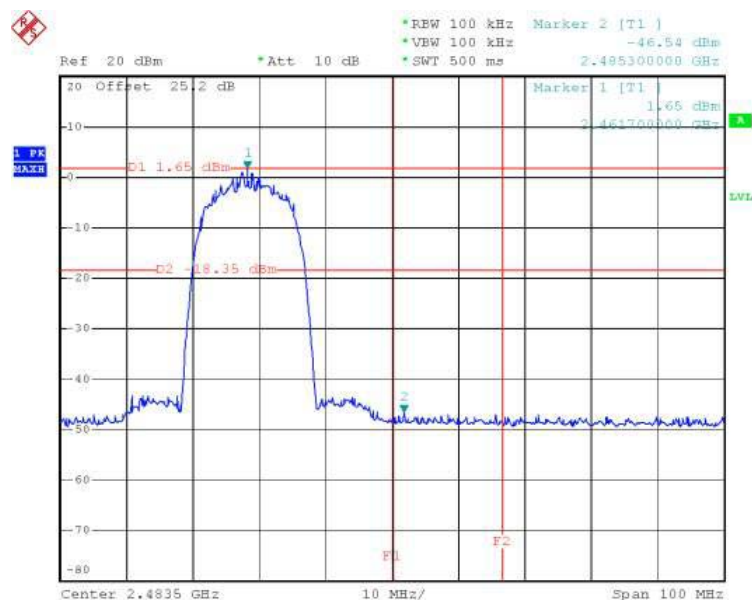
5.4.4.4 Antenna 4

802.11b

4-1

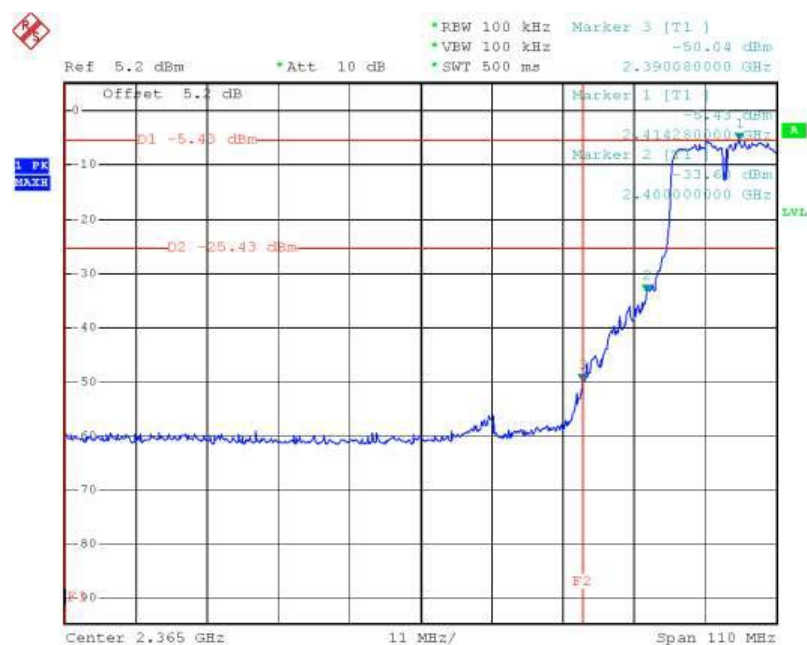


4-2



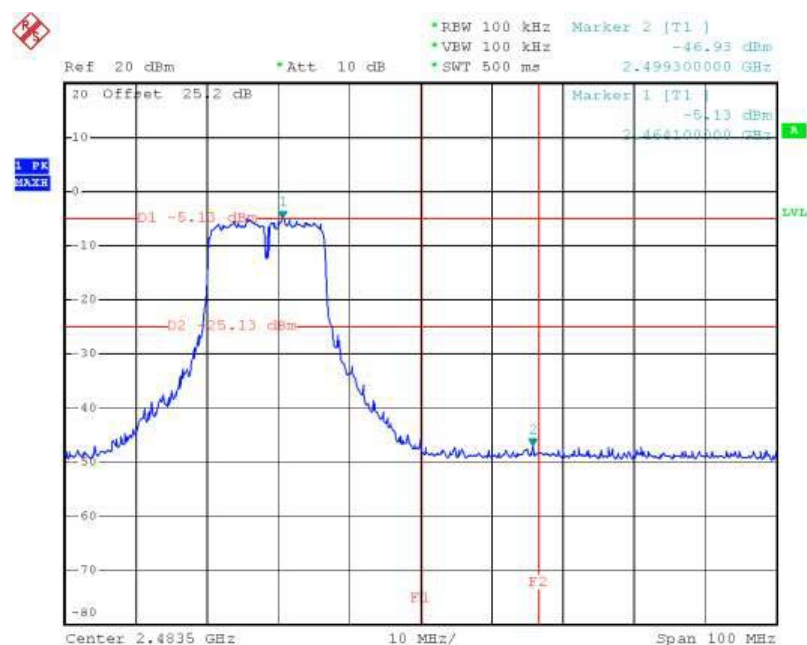
802.11g

4-3



Date: 26.JUL.2004 17:10:49

4-4

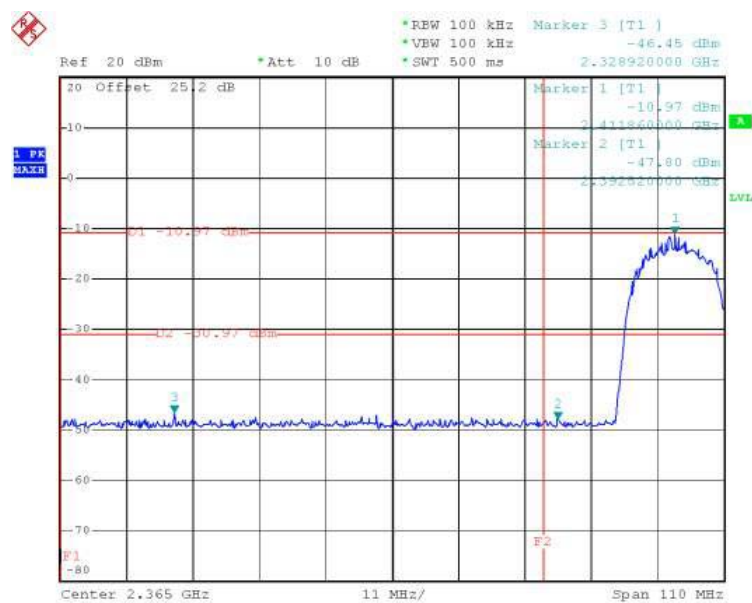


Date: 26.JUL.2004 17:13:09

5.4.4.5 Antenna 5

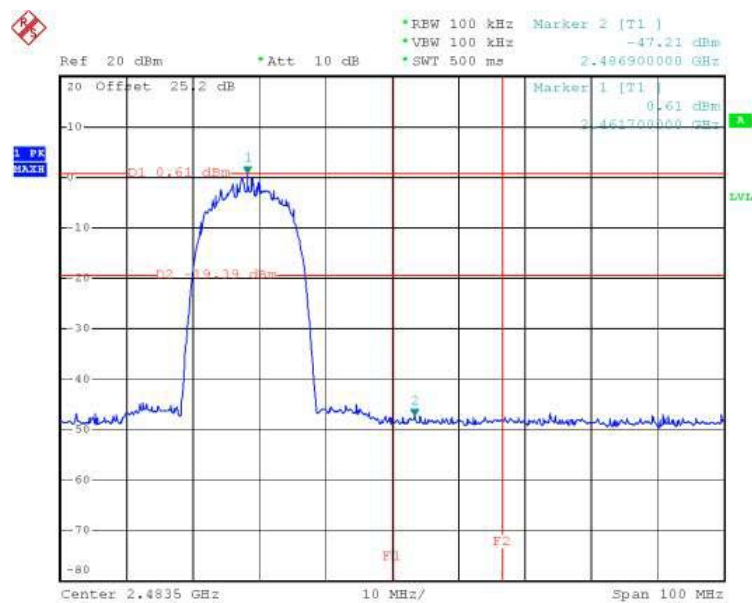
802.11b

5-1



Date: 26.JUL.2004 16:42:11

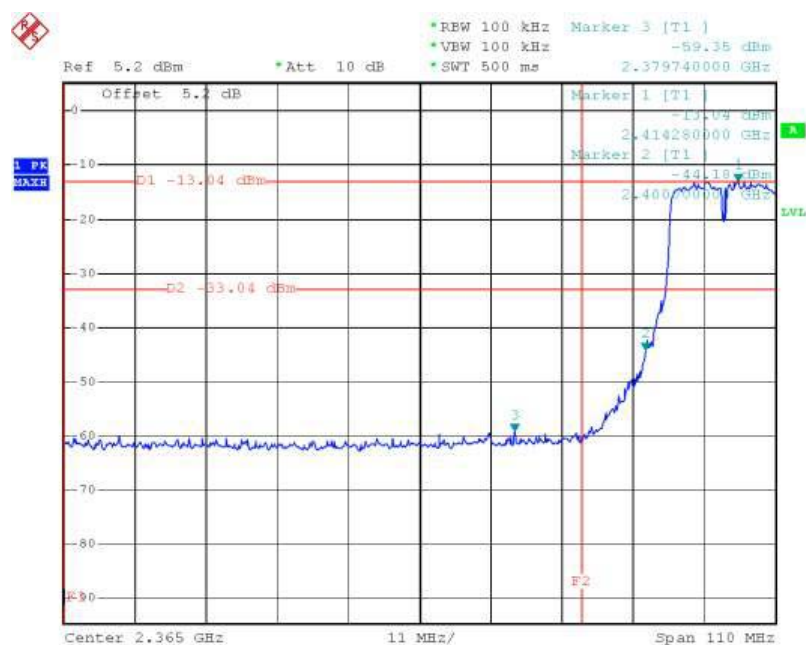
5-2



Date: 26.JUL.2004 16:45:17

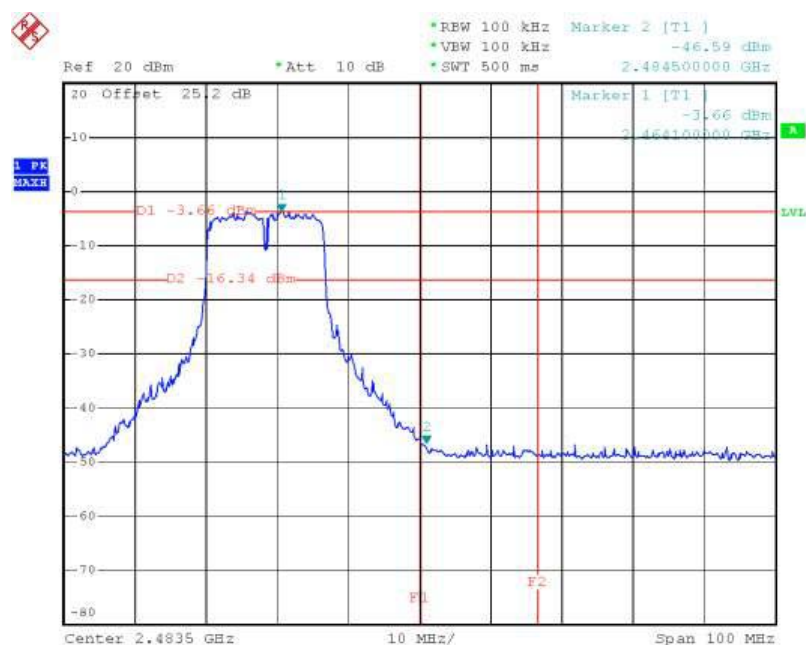
802.11g

5-3



Date: 26.JUL.2004 17:08:48

5-4

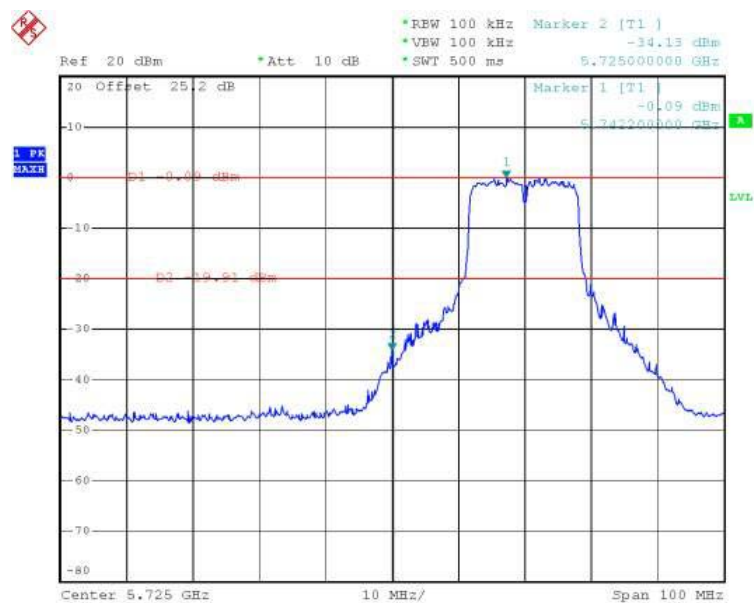


Date: 26.JUL.2004 17:14:28

5.4.4.6 Antenna 6

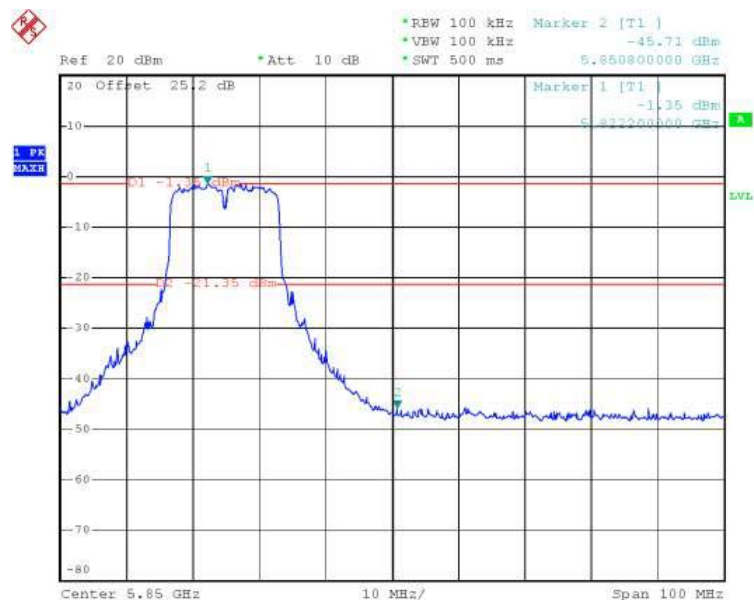
802.11a

6-1



Date: 26.JUL.2004 19:10:51

6-2



Date: 26.JUL.2004 19:12:19

802.11a



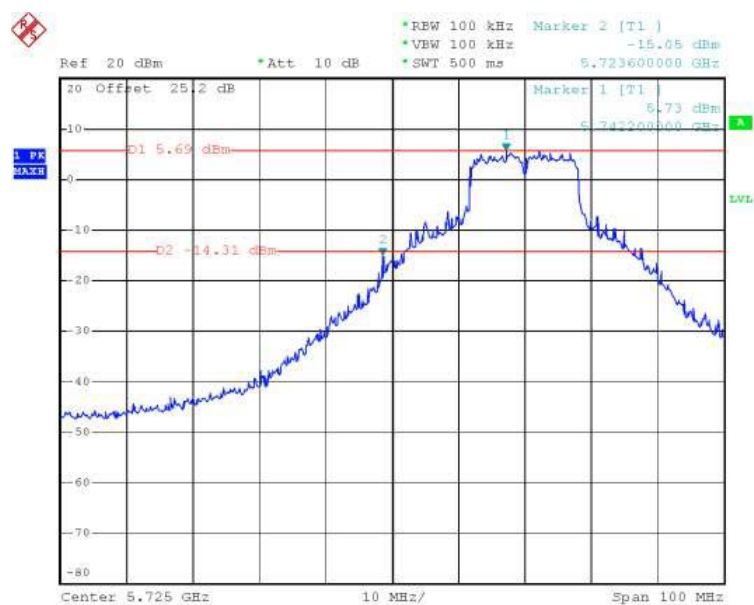
7-2

Issued Date : Aug. 12, 2004

5.4.4.8 Antenna 8

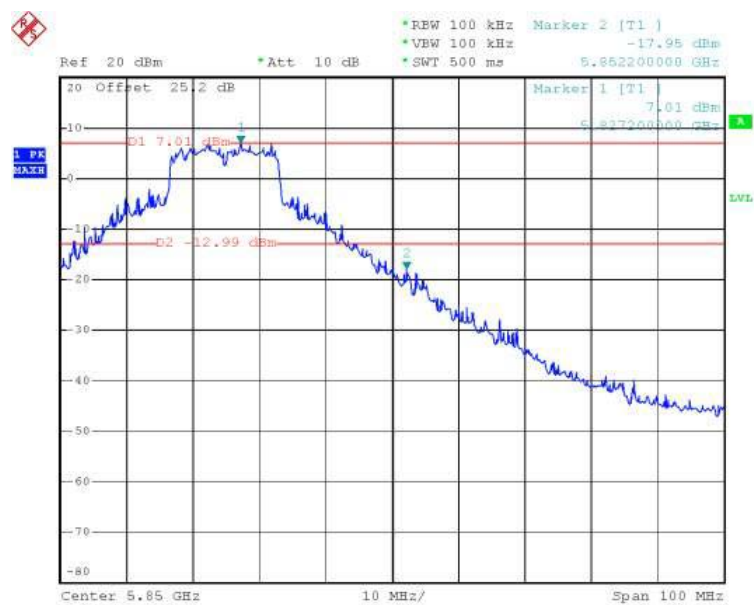
802.11a

8-1



Date: 26.JUL.2004 19:08:16

8-2



Date: 26.JUL.2004 19:14:27

5.5 Peak Output Power

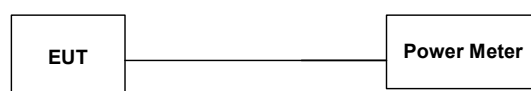
5.5.1 Measuring Instruments :

As described in chapter 10 of this test report.

5.5.2 Test Procedure :

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter.
The power is equal to the reading level on power meter plus cable loss at the EUT antenna terminal.

5.5.3 Test Setup Layout :



5.5.4 Test Result :

5.5.4.1 Antenna 1

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	17.30	30 dBm
06	2437	19.40	30 dBm
11	2462	20.28	30 dBm

- Application: 802.11g

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	19.47	30 dBm
06	2437	21.52	30 dBm
11	2462	20.39	30 dBm

- Application: 802.11a

Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
5745	23.30	30 dBm
5785	23.40	30 dBm
5825	23.31	30 dBm

Limit= 30 dBm

5.5.4.2 Antenna 2

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	14.71	27.5 dBm
06	2437	18.09	27.5 dBm
11	2462	15.32	27.5 dBm

- Application: 802.11g

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	13.8	27.5 dBm
06	2437	20.8	27.5 dBm
11	2462	14.6	27.5 dBm

Limit= 30-(8.5-6)=27.5 dBm

5.5.4.3 Antenna 3

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	17.07	30 dBm
06	2437	18.11	30 dBm
11	2462	18.14	30 dBm

- Application: 802.11g

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	17.75	30 dBm
06	2437	19.89	30 dBm
11	2462	17.85	30 dBm
Limit= 30 dBm			

5.5.4.4 Antenna 4

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	16.95	30 dBm
06	2437	18.05	30 dBm
11	2462	13.34	30 dBm

- Application: 802.11g

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	16.1	30 dBm
06	2437	21.5	30 dBm
11	2462	16.9	30 dBm
Limit= 30 dBm			

5.5.4.5 Antenna 5

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11b

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	13.3	23.1 dBm
06	2437	15.52	23.1 dBm
11	2462	12.93	23.1 dBm

- Application: 802.11g

Channel	Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
01	2412	16.26	23.1 dBm
06	2437	19.73	23.1 dBm
11	2462	10.72	23.1 dBm

Limit= 30-(12.9-6)=23.1 dBm

5.5.4.6 Antenna 6

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11a

Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
5745	23.7	30 dBm
5785	23.7	30 dBm
5825	24.0	30 dBm

Limit= 30 dBm

5.5.4.7 Antenna 7

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11a

Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
5745	23.33	30 dBm
5785	23.36	30 dBm
5825	23.32	30 dBm

Limit= 30 dBm

5.5.4.8 Antenna 8

- Temperature : 25.5°C
- Relative Humidity : 53 %
- Application: 802.11a

Frequency (MHz)	Measured Output Power (dBm)	Limits (dBm)
5745	22.23	23 dBm
5785	22.49	23 dBm
5825	22.71	23 dBm

Limit= 30-(13-6)=23 dBm

6. Test of Conducted Emission

Conducted emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in ANSI C63.4-2001 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

6.1. Major Measuring Instruments

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

6.2. Test Procedures

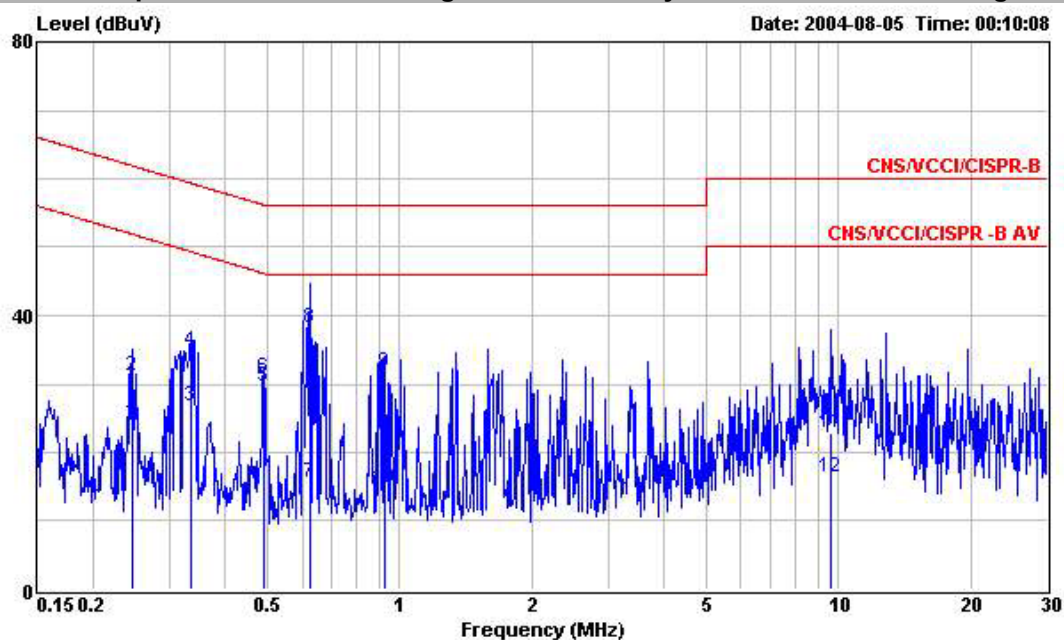
- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of the line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

6.3. Test Result of Conducted Emission

6.3.1 Frequency Range of Test : 150kHz to 30 MHz

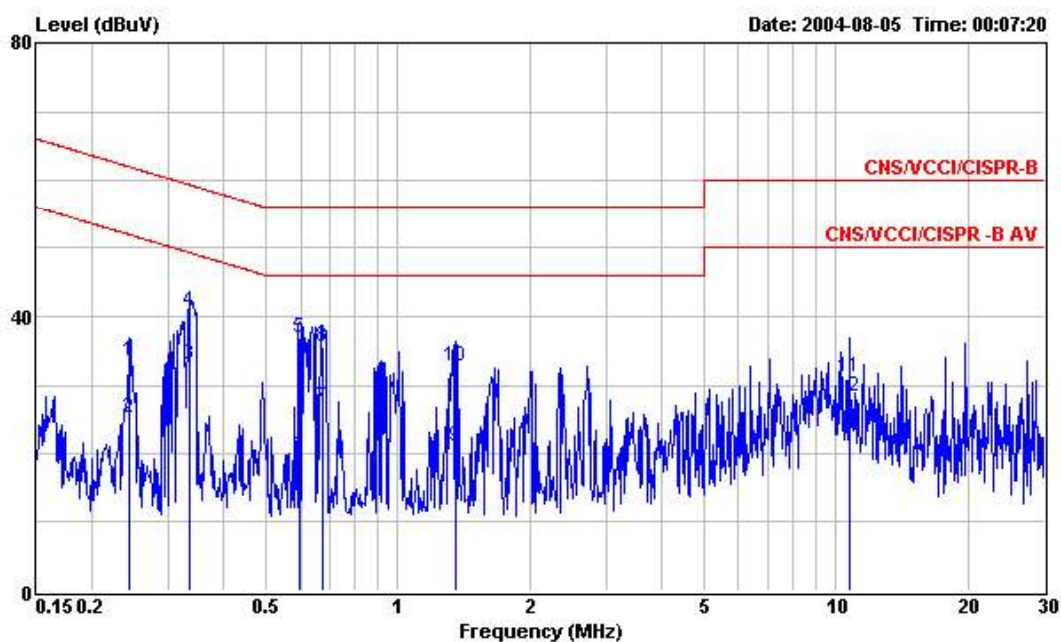
- Test Mode : Mode 1
- Temperature : 25.5°C
- Relative Humidity : 53 %

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 g link mode

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.247	24.42	-27.44	51.86	24.30	0.10	0.02	Average
2	0.247	31.28	-30.58	61.86	31.16	0.10	0.02	QP
3	0.336	26.70	-22.60	49.30	26.58	0.10	0.02	Average
4	0.336	34.79	-24.51	59.30	34.67	0.10	0.02	QP
5	0.489	29.71	-16.47	46.18	29.58	0.10	0.03	Average
6	0.489	30.85	-25.33	56.18	30.72	0.10	0.03	QP
7	0.627	15.48	-30.52	46.00	15.35	0.10	0.03	Average
8	0.627	38.25	-17.75	56.00	38.12	0.10	0.03	QP
9	0.923	31.60	-24.40	56.00	31.46	0.10	0.04	QP
10	0.923	14.68	-31.32	46.00	14.54	0.10	0.04	Average
11	9.600	22.78	-37.22	60.00	22.48	0.20	0.10	QP
12	9.600	16.31	-33.69	50.00	16.01	0.20	0.10	Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 g link mode

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.244	33.58	-28.38	61.96	33.46	0.10	0.02	QP
2	0.244	25.28	-26.68	51.96	25.16	0.10	0.02	Average
3	0.336	33.09	-16.21	49.30	32.97	0.10	0.02	Average
4	0.336	40.69	-18.61	59.30	40.57	0.10	0.02	QP
5	0.595	36.87	-19.13	56.00	36.74	0.10	0.03	QP
6	0.595	19.53	-26.47	46.00	19.40	0.10	0.03	Average
7	0.672	26.77	-19.23	46.00	26.63	0.10	0.04	Average
8	0.672	35.56	-20.44	56.00	35.42	0.10	0.04	QP
9	1.350	21.08	-24.92	46.00	20.92	0.10	0.06	Average
10	1.350	32.72	-23.28	56.00	32.56	0.10	0.06	QP
11	10.730	31.27	-28.73	60.00	30.95	0.22	0.10	QP
12	10.730	28.37	-21.63	50.00	28.05	0.22	0.10	Average

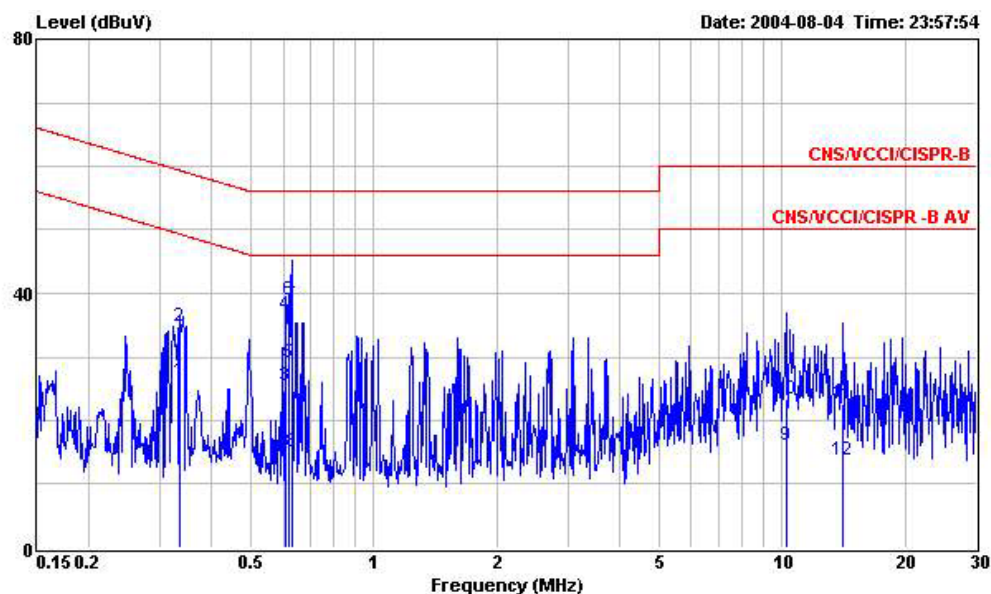
Test Engineer : Jay

Jay

6.3.2 Frequency Range of Test : 150kHz to 30 MHz

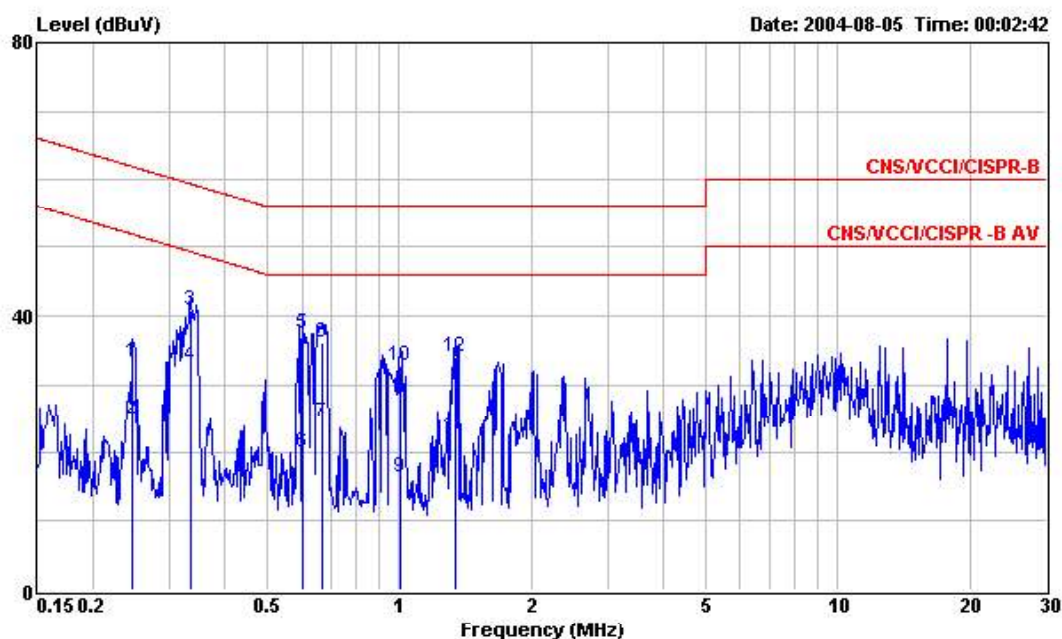
- Test Mode : Mode 2
- Temperature : 25.5°C
- Relative Humidity : 53 %

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 a link mode

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV		dBuV	dBuV	dB	dB	
1	0.334	26.20	-23.15	49.35	26.08	0.10	0.02	Average
2	0.334	34.91	-24.44	59.35	34.79	0.10	0.02	QP
3	0.610	25.50	-20.50	46.00	25.37	0.10	0.03	Average
4	0.610	36.63	-19.37	56.00	36.50	0.10	0.03	QP
5	0.618	28.98	-17.02	46.00	28.85	0.10	0.03	Average
6	0.618	38.93	-17.07	56.00	38.80	0.10	0.03	QP
7	0.630	38.25	-17.75	56.00	38.12	0.10	0.03	QP
8	0.630	15.03	-30.97	46.00	14.90	0.10	0.03	Average
9	10.230	16.08	-33.92	50.00	15.78	0.20	0.10	Average
10	10.230	23.33	-36.67	60.00	23.03	0.20	0.10	QP
11	14.140	22.67	-37.33	60.00	22.35	0.20	0.12	QP
12	14.140	13.77	-36.23	50.00	13.45	0.20	0.12	Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 a link mode

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.247	33.17	-28.69	61.86	33.05	0.10	0.02	QP
2	0.247	24.96	-26.90	51.86	24.84	0.10	0.02	Average
3	0.334	40.81	-18.54	59.35	40.69	0.10	0.02	QP
4	0.334	32.68	-16.67	49.35	32.56	0.10	0.02	Average
5	0.601	37.41	-18.59	56.00	37.28	0.10	0.03	QP
6	0.601	19.87	-26.13	46.00	19.74	0.10	0.03	Average
7	0.665	24.46	-21.54	46.00	24.32	0.10	0.04	Average
8	0.665	36.02	-19.98	56.00	35.88	0.10	0.04	QP
9	1.010	16.27	-29.73	46.00	16.13	0.10	0.04	Average
10	1.010	32.60	-23.40	56.00	32.46	0.10	0.04	QP
11	1.340	22.47	-23.53	46.00	22.31	0.10	0.06	Average
12	1.340	34.15	-21.85	56.00	33.99	0.10	0.06	QP

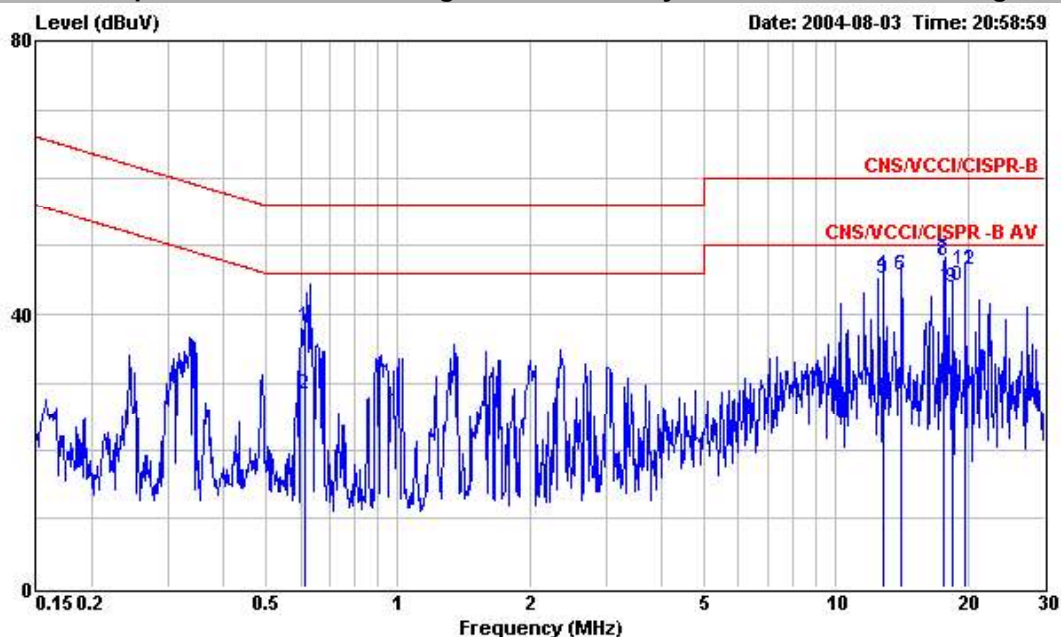
Test Engineer : 

Jay

6.3.3 Frequency Range of Test : 150kHz to 30 MHz

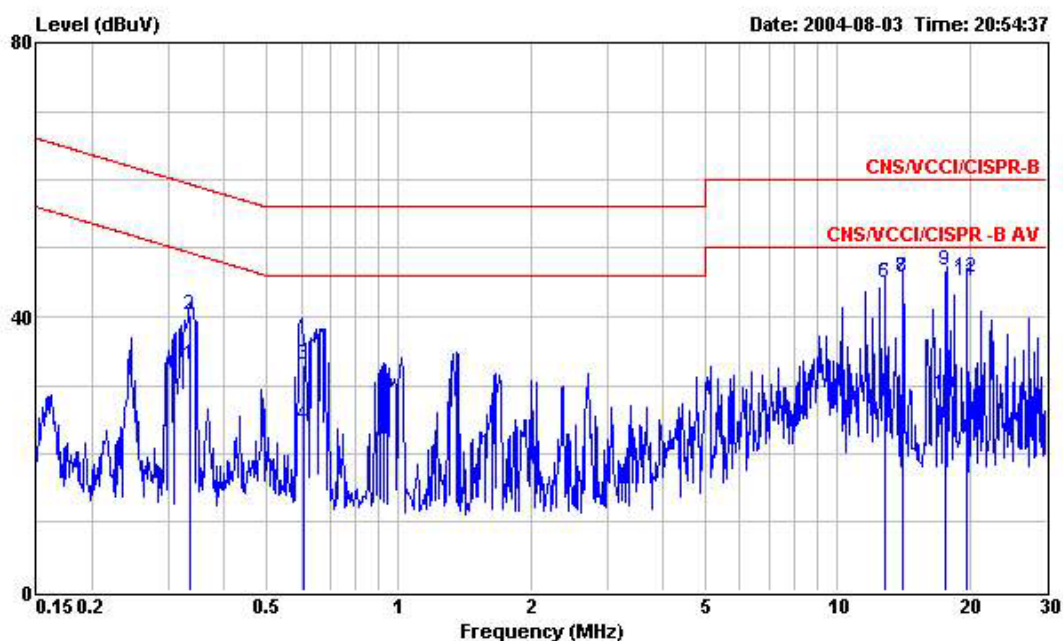
- Test Mode : Mode 3
- Temperature : 25.5°C
- Relative Humidity : 53 %

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 a+g link mode

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.611	38.08	-17.92	56.00	37.95	0.10	0.03	QP
2	0.611	28.35	-17.65	46.00	28.22	0.10	0.03	Average
3	12.808	45.27	-14.73	60.00	44.96	0.20	0.11	QP
4	12.808	45.81	-4.19	50.00	45.50	0.20	0.11	Average
5	14.153	45.79	-14.21	60.00	45.47	0.20	0.12	QP
6	14.153	45.68	-4.32	50.00	45.36	0.20	0.12	Average
7	17.694	48.04	-1.96	50.00	47.64	0.26	0.14	Average
8	17.694	47.78	-12.22	60.00	47.38	0.26	0.14	QP
9	18.490	43.94	-16.06	60.00	43.53	0.27	0.14	QP
10	18.490	44.05	-5.95	50.00	43.64	0.27	0.14	Average
11	19.710	46.41	-13.59	60.00	45.96	0.30	0.15	QP
12	19.710	46.58	-3.42	50.00	46.13	0.30	0.15	Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5110
 Memo : 802.11 a+g link mode

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.336	32.88	-16.43	49.31	32.76	0.10	0.02	Average
2	0.336	40.37	-18.94	59.31	40.25	0.10	0.02	QP
3	0.611	32.92	-23.08	56.00	32.79	0.10	0.03	QP
4	0.611	24.22	-21.78	46.00	24.09	0.10	0.03	Average
5	12.810	44.94	-15.06	60.00	44.57	0.26	0.11	QP
6	12.810	44.81	-5.19	50.00	44.44	0.26	0.11	Average
7	14.152	45.63	-14.37	60.00	45.22	0.29	0.12	QP
8	14.152	45.76	-4.24	50.00	45.35	0.29	0.12	Average
9	17.695	46.82	-13.18	60.00	46.38	0.30	0.14	QP
10	17.695	28.52	-21.48	50.00	28.08	0.30	0.14	Average
11	19.710	45.28	-14.72	60.00	44.83	0.30	0.15	QP
12	19.710	45.78	-4.22	50.00	45.33	0.30	0.15	Average

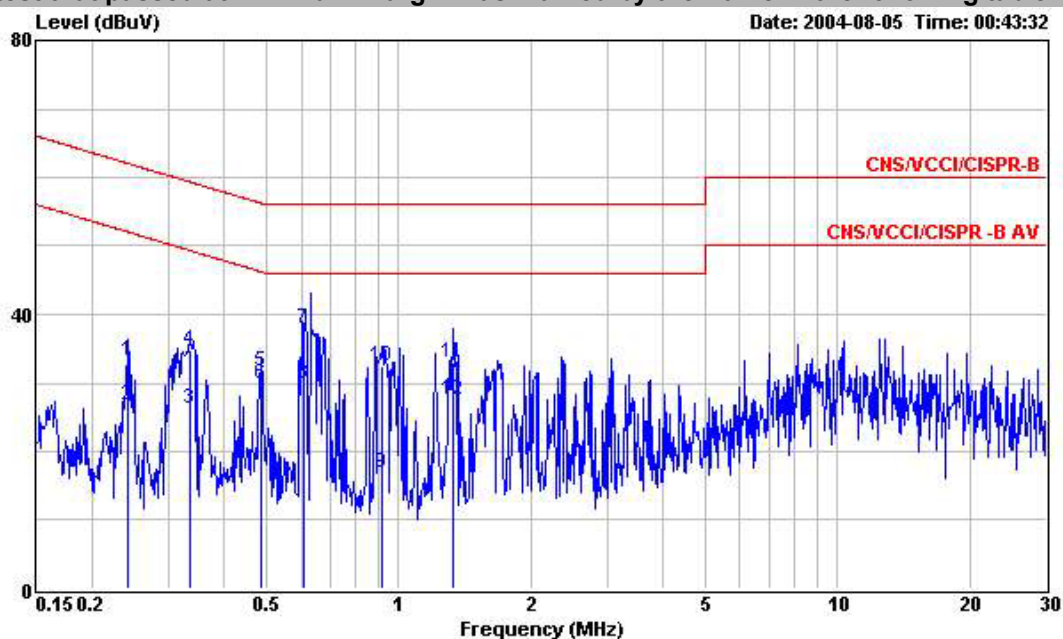
Test Engineer : 

Jay

6.3.4 Frequency Range of Test : 150kHz to 30 MHz

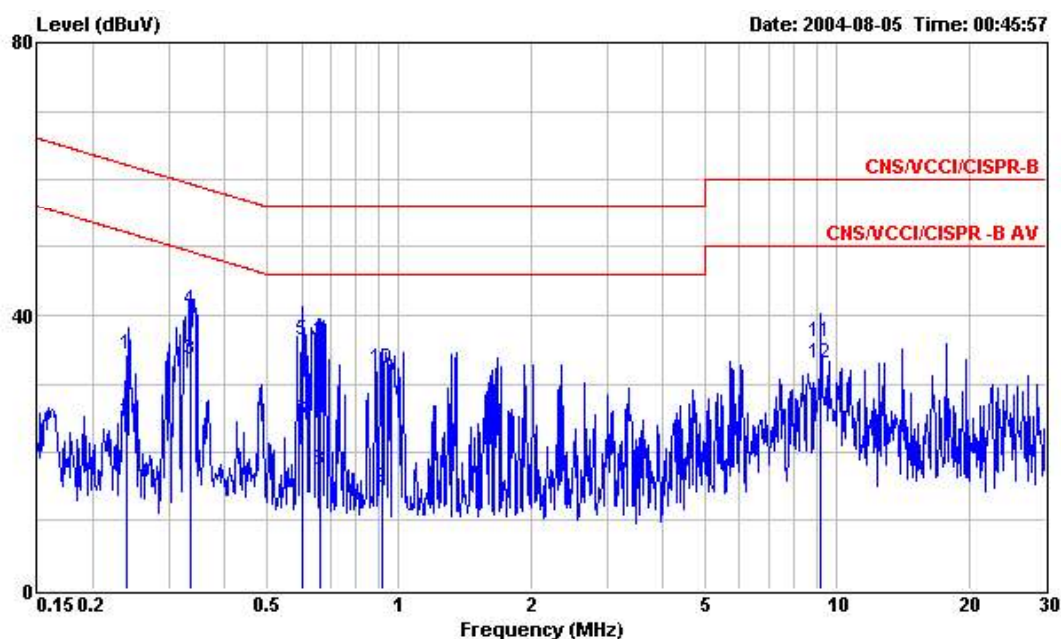
- Test Mode : Mode 4
- Temperature : 25.5°C
- Relative Humidity : 53 %

■ The test that passed at minimum margin was marked by the frame in the following table.



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WASP-5100
 Memo : 802.11 g link mode

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.242	33.16	-28.87	62.03	33.04	0.10	0.02	QP
2	0.242	26.67	-25.36	52.03	26.55	0.10	0.02	Average
3	0.334	26.26	-23.09	49.35	26.14	0.10	0.02	Average
4	0.334	34.77	-24.58	59.35	34.65	0.10	0.02	QP
5	0.486	31.67	-24.57	56.24	31.54	0.10	0.03	QP
6	0.486	29.79	-16.45	46.24	29.66	0.10	0.03	Average
7	0.607	37.89	-18.11	56.00	37.76	0.10	0.03	QP
8	0.607	29.93	-16.07	46.00	29.80	0.10	0.03	Average
9	0.914	16.83	-29.17	46.00	16.69	0.10	0.04	Average
10	0.914	32.50	-23.50	56.00	32.36	0.10	0.04	QP
11	1.330	32.95	-23.05	56.00	32.79	0.10	0.06	QP
12	1.330	27.46	-18.54	46.00	27.30	0.10	0.06	Average



Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : 802.11a/b/g Access Point
 Power : 120Vac/60Hz
 Model : WAP-5100
 Memo : 802.11 g link mode

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.240	34.22	-27.88	62.10	34.10	0.10	0.02	QP
2	0.240	24.43	-27.67	52.10	24.31	0.10	0.02	Average
3	0.336	33.49	-15.81	49.30	33.37	0.10	0.02	Average
4	0.336	40.79	-18.51	59.30	40.67	0.10	0.02	QP
5	0.601	36.29	-19.71	56.00	36.16	0.10	0.03	QP
6	0.601	24.67	-21.33	46.00	24.54	0.10	0.03	Average
7	0.658	35.97	-20.03	56.00	35.83	0.10	0.04	QP
8	0.658	17.34	-28.66	46.00	17.20	0.10	0.04	Average
9	0.918	14.68	-31.32	46.00	14.54	0.10	0.04	Average
10	0.918	32.30	-23.70	56.00	32.16	0.10	0.04	QP
11	9.200	36.05	-23.95	60.00	35.75	0.20	0.10	QP
12	9.200	32.94	-17.06	50.00	32.64	0.20	0.10	Average

Test Engineer : Jay

Jay