

FCC TEST REPORT

REPORT NO.: RF940315L01

MODEL NO.: WLL3120

RECEIVED: Mar. 15, 2005

TESTED: Mar. 18 ~ 21, 2005

ISSUED: Mar. 24 2005

APPLICANT: ASKEY COMPUTER CORP.

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ILAC MRA



No. 2177-01

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1. CERTIFICATION

PRODUCT: 2.4GHz wireless Mini PCI card
BRAND NAME: Askey
MODEL NO.: WLL3120
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Mar. 18 ~ 21, 2005
APPLICANT: ASKEY COMPUTER CORP.
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

The above equipment have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Windy Chou , **DATE:** Mar. 24, 2005
(Windy Chou)

TECHNICAL
ACCEPTANCE : Gary Chang , **DATE:** Mar. 24, 2005
Responsible for RF (Gary Chang)

APPROVED BY : Cody Chang , **DATE:** Mar. 24, 2005
(Cody Chang, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -19.00dB at 0.228MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.24dB at 1608.00MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~ 1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	2.4GHz wireless Mini PCI card
MODEL NO.	WLL3120
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
RADIO TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108 or 125Mbps *see NOTE 4)
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	63.973mW
ANTENNA TYPE	Refer to NOTE 1 below
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The BCM4318E is the enhanced version from BCM4318.
2. There are seven combinations of antenna type provided to this EUT. Please refer to following table.

No.	Manufacturer	Antenna type	Gain (dBi)	
			Main	Aux.
1	Wha Yu Industrial Co., Ltd.	Printed Dipole	3	
		Dipole	3	
2	High-Tek (Storm)	PIFA	2.45	2.42
3	High-Tek (Magic)	PIFA	2.14	2.41
4	High-Tek (Shadow)	PIFA	2.85	1.52
5	WGT (Storm)	PIFA	2.31	2.57
6	WGT (Magic)	PIFA	0.86	2.11
7	WGT (Shadow)	PIFA	2.76	2.86

*After pre-testing each type of antenna, we have chosen the highest gain of each type, item 1 and 7 for final test and recorded in the report.

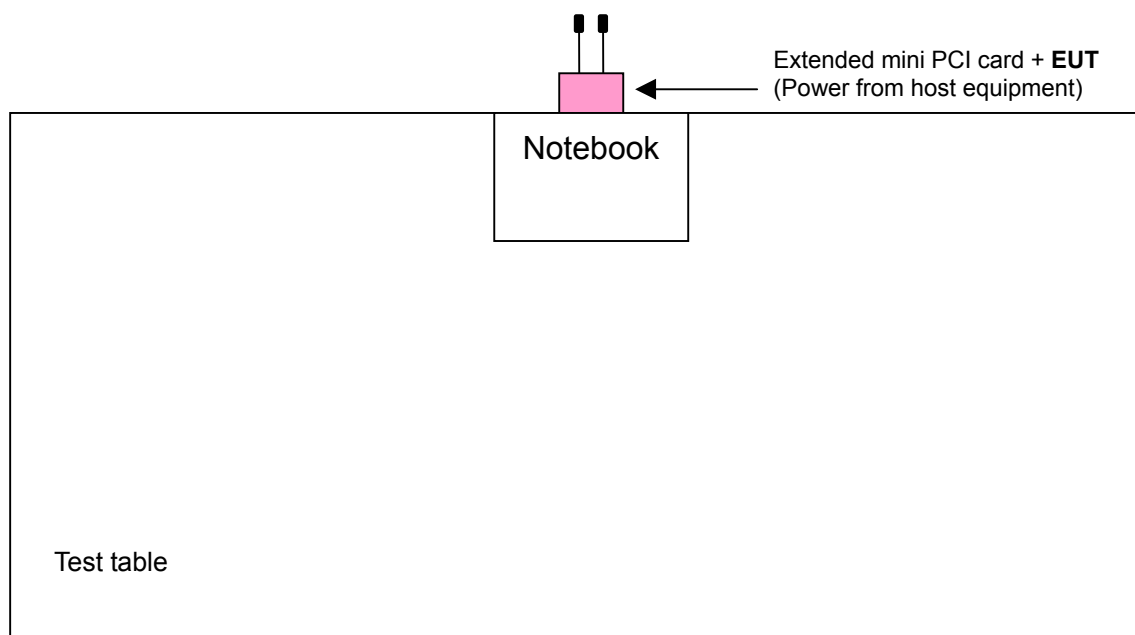
3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
4. This EUT is capable of providing data rates of up to 108 or 125Mbps in 802.11g Turbo Mode depending upon reception quality.
5. The EUT complies with IEEE 802.11g standards and backwards compatible with IEEE 802.11b products.
6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Eleven channels are provided to this EUT.

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
1	Note 1	x	x	Note 2	Printed & Dipole antenna (refer to NOTE 2 of sec. 3.1) antenna No 1
2	Note 1	x	x	Note 2	PIFA antenna (refer to NOTE 2 of sec. 3.1) antenna No 7

Where PLC: Power Line Conducted Emission

RE<1G RE: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

Note 1: Pre-scan shown antenna has no effect for Conducted Emission test.

Note 2: Conducted RF measurement is independent of antenna.

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1	802.11g	1 to 11	1	OFDM	BPSK	6
2	802.11g	1 to 11	1	OFDM	BPSK	6



Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1	802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
1	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
1	802.11g Turbo	6	6	OFDM	BPSK	12
2	802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
2	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
2	802.11g Turbo	6	6	OFDM	BPSK	12

Bandedge Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	11
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	BPSK	12

Antenna Port Conducted Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	BPSK	12



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 2.4GHz wireless Mini PCI card. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

ANSI C63.4- 2003

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	Dell	PP01L	07899029300023	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non-shielded (1.8m).

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.



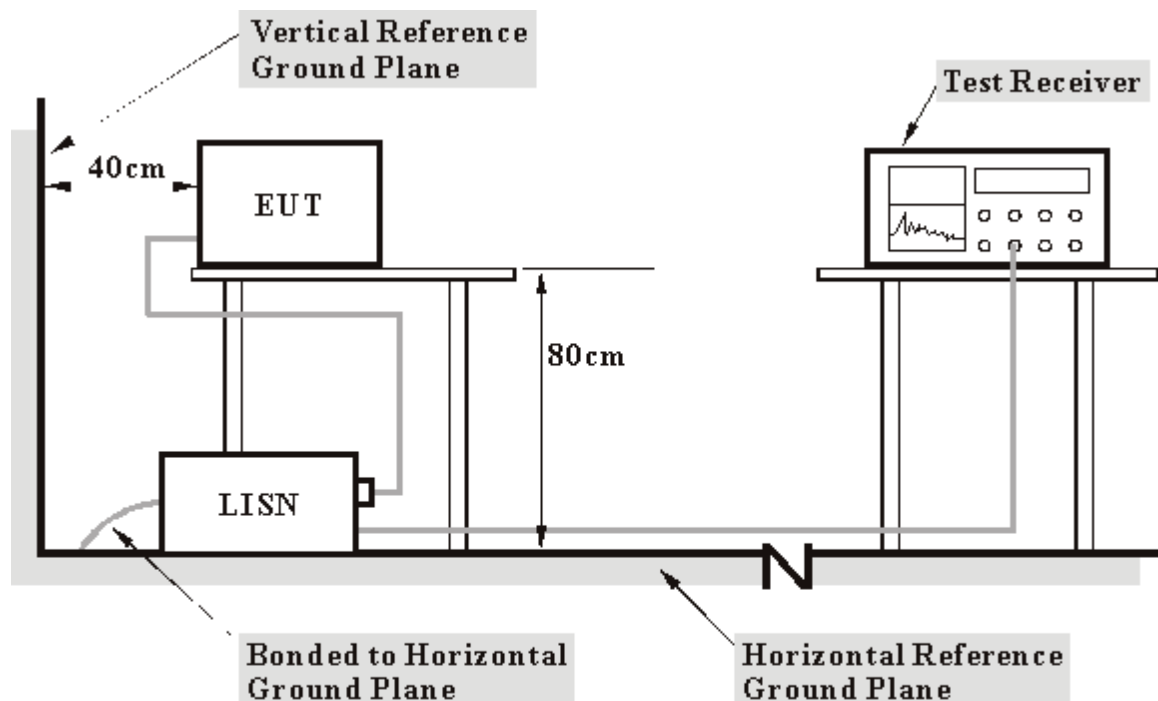
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT into notebook system via mini PCI extended card placed on a testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable all functions under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to its screen.

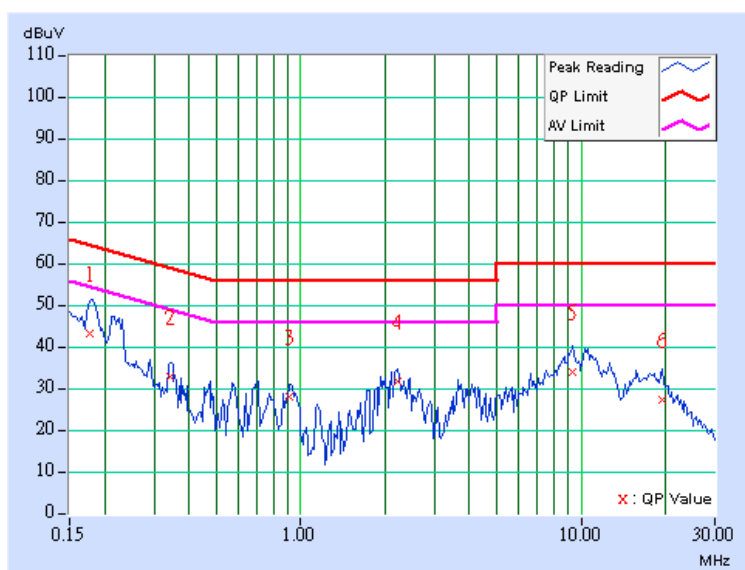
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.178	0.11	42.41	-	42.52	-	64.60	54.60	-22.08	-
2	0.341	0.11	31.96	-	32.07	-	59.17	49.17	-27.09	-
3	0.912	0.17	27.39	-	27.56	-	56.00	46.00	-28.44	-
4	2.215	0.22	30.79	-	31.01	-	56.00	46.00	-24.99	-
5	9.375	0.41	33.13	-	33.54	-	60.00	50.00	-26.46	-
6	19.504	0.91	26.42	-	27.33	-	60.00	50.00	-32.67	-

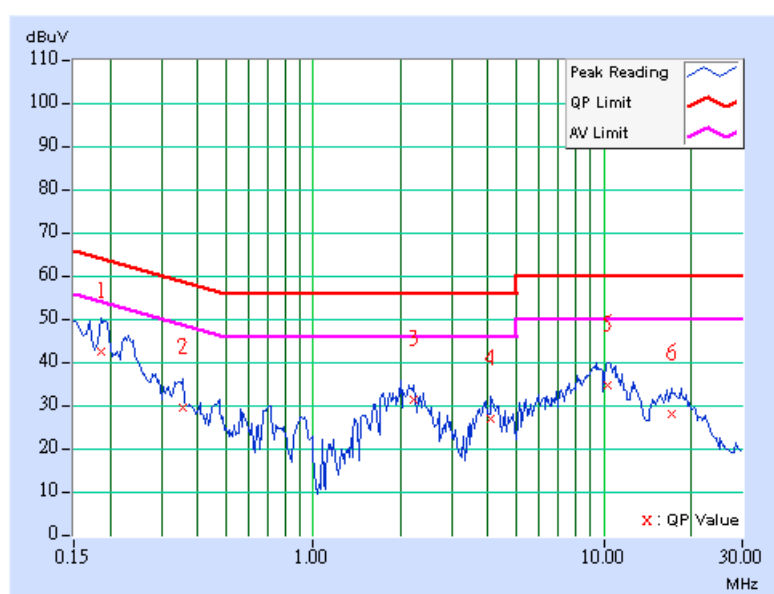
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	41.96	-	42.06	-	64.25	54.25	-22.19	-
2	0.357	0.11	29.01	-	29.12	-	58.80	48.80	-29.68	-
3	2.223	0.22	30.93	-	31.15	-	56.00	46.00	-24.85	-
4	4.070	0.28	26.56	-	26.84	-	56.00	46.00	-29.16	-
5	10.359	0.41	34.44	-	34.85	-	60.00	50.00	-25.15	-
6	17.094	0.55	27.73	-	28.28	-	60.00	50.00	-31.72	-

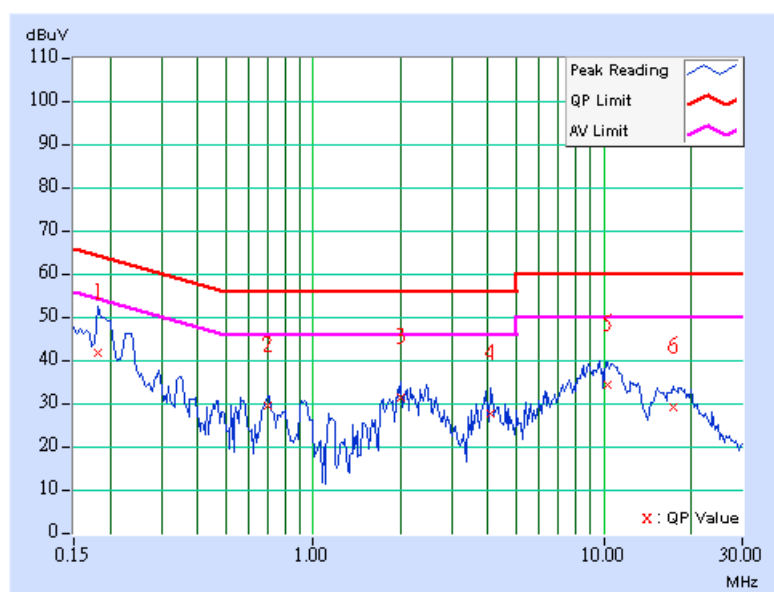
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.11	41.16	-	41.27	-	64.43	54.43	-23.16	-
2	0.701	0.15	28.70	-	28.85	-	56.00	46.00	-27.15	-
3	2.008	0.21	30.74	-	30.95	-	56.00	46.00	-25.05	-
4	4.078	0.29	27.02	-	27.31	-	56.00	46.00	-28.69	-
5	10.262	0.43	33.75	-	34.18	-	60.00	50.00	-25.82	-
6	17.305	0.77	28.40	-	29.17	-	60.00	50.00	-30.83	-

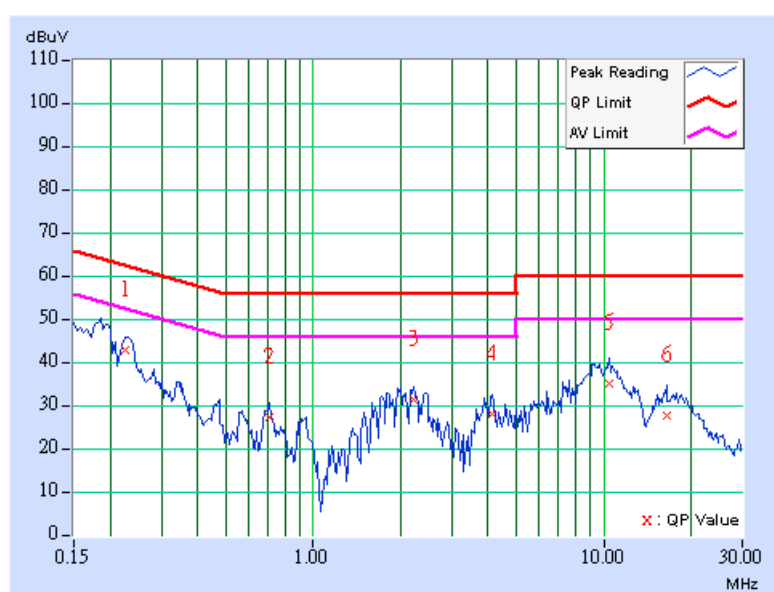
- REMARKS:**
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 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
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 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.224	0.10	42.44	-	42.54	-	62.66	52.66	-20.12	-
2	0.705	0.14	26.85	-	26.99	-	56.00	46.00	-29.01	-
3	2.215	0.22	30.89	-	31.11	-	56.00	46.00	-24.89	-
4	4.117	0.28	27.70	-	27.98	-	56.00	46.00	-28.02	-
5	10.465	0.41	34.48	-	34.89	-	60.00	50.00	-25.11	-
6	16.508	0.53	27.30	-	27.83	-	60.00	50.00	-32.17	-

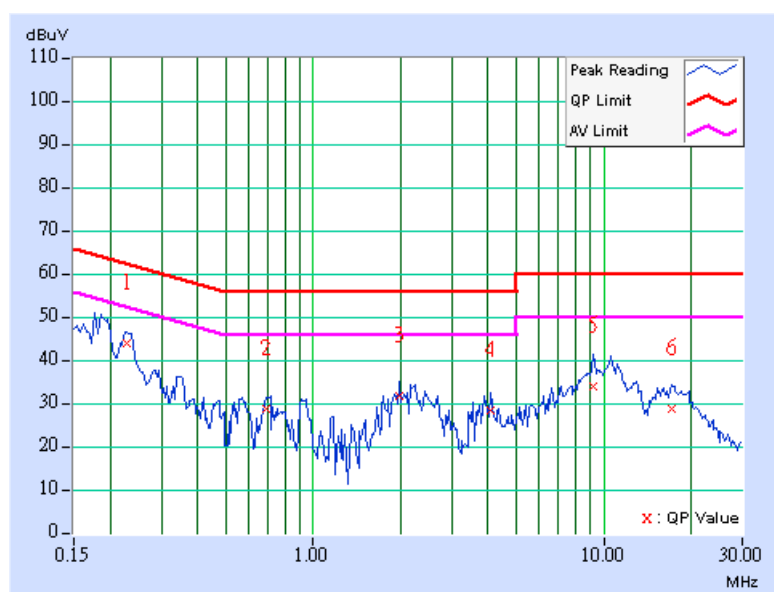
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.228	0.11	43.41	-	43.52	-	62.52	52.52	-19.00	-
2	0.693	0.14	28.29	-	28.43	-	56.00	46.00	-27.57	-
3	1.988	0.21	31.11	-	31.32	-	56.00	46.00	-24.68	-
4	4.098	0.29	27.83	-	28.12	-	56.00	46.00	-27.88	-
5	9.168	0.41	33.49	-	33.90	-	60.00	50.00	-26.10	-
6	17.184	0.77	28.13	-	28.90	-	60.00	50.00	-31.10	-

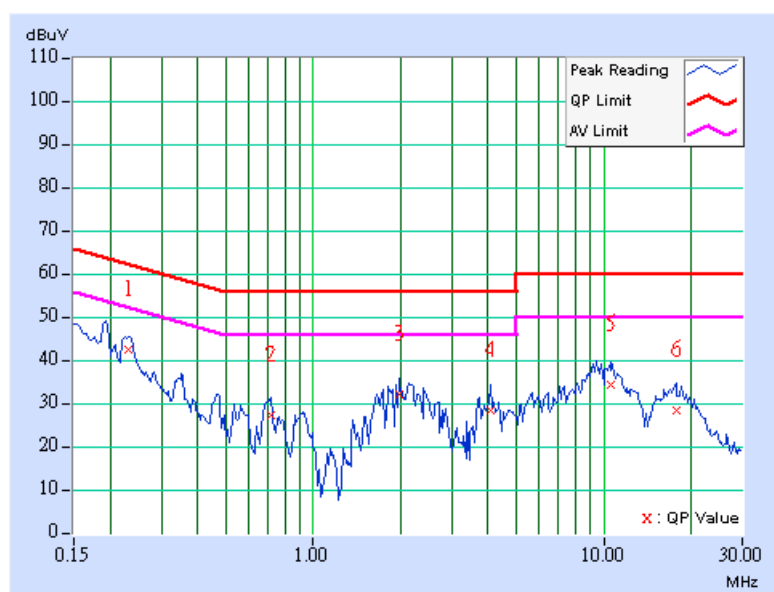
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa	TESTED BY	Match Tsui

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.232	0.10	42.09	-	42.19	-	62.38	52.38	-20.19	-
2	0.713	0.14	26.77	-	26.91	-	56.00	46.00	-29.09	-
3	1.977	0.21	31.53	-	31.74	-	56.00	46.00	-24.26	-
4	4.102	0.28	28.11	-	28.39	-	56.00	46.00	-27.61	-
5	10.520	0.41	33.95	-	34.36	-	60.00	50.00	-25.64	-
6	17.895	0.57	27.88	-	28.45	-	60.00	50.00	-31.55	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 19, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 16, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170241	Feb. 23, 2006
Preamplifier Agilent	8449B	3008A01961	Nov. 09, 2005
Preamplifier Agilent	8447D	2944A10629	Nov. 09, 2005
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218182/4	Feb. 17, 2006
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218194/4	Feb. 17, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 1.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The IC Site Registration No. is IC4924-2.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

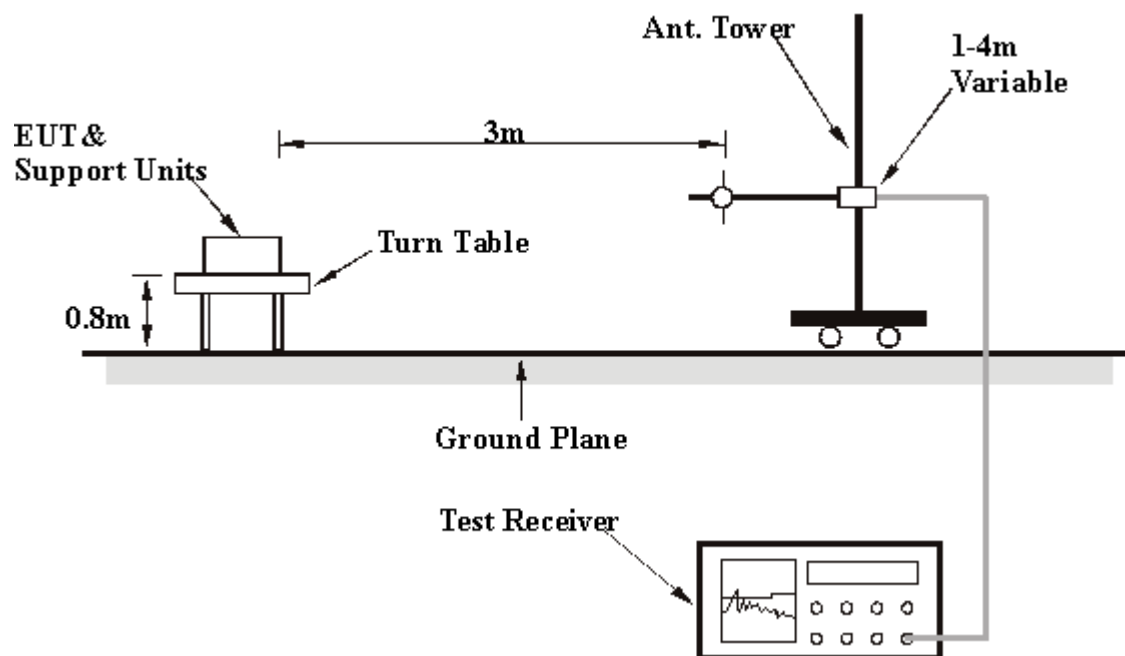
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

Below 1GHz Worst-Case Data (Printed & Dipole antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa	TEST MODE	1
TESTED BY	Gary Chang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	99.98	36.46 QP	43.50	-7.04	3.00 H	148	25.72	10.74
2	166.07	39.21 QP	43.50	-4.29	1.00 H	169	25.15	14.07
3	218.56	39.57 QP	46.00	-6.43	1.00 H	118	27.98	11.59
4	253.55	36.85 QP	46.00	-9.15	1.00 H	340	23.71	13.13
5	364.35	34.52 QP	46.00	-11.48	1.00 H	193	18.72	15.80
6	399.34	38.20 QP	46.00	-7.80	1.00 H	250	21.58	16.62

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.83	28.83 QP	40.00	-11.17	1.00 V	52	14.51	14.32
2	99.98	32.73 QP	43.50	-10.77	1.00 V	223	21.98	10.74
3	166.07	36.93 QP	43.50	-6.57	1.00 V	226	22.86	14.07
4	500.42	37.99 QP	46.00	-8.01	1.00 V	133	19.40	18.59
5	630.66	34.81 QP	46.00	-11.19	1.00 V	202	13.49	21.32
6	665.65	36.98 QP	46.00	-9.02	1.00 V	52	15.18	21.79

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

Below 1GHz Worst-Case Data (PIFA antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa	TEST MODE	2
TESTED BY	Gary Chang		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	78.60	36.43 QP	40.00	-3.57	4.00 H	331	26.32	10.11
2	164.13	35.02 QP	43.50	-8.48	1.75 H	136	20.76	14.26
3	204.95	34.34 QP	43.50	-9.16	1.50 H	25	23.09	11.25
4	238.00	42.00 QP	46.00	-4.00	1.50 H	295	29.21	12.79
5	304.09	37.12 QP	46.00	-8.88	1.00 H	310	22.70	14.42
6	632.61	36.44 QP	46.00	-9.56	1.25 H	34	15.09	21.35

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.89	29.00 QP	40.00	-11.00	1.00 V	127	15.00	14.00
2	64.99	33.81 QP	40.00	-6.19	1.00 V	106	20.92	12.90
3	99.98	32.00 QP	43.50	-11.50	1.00 V	283	21.26	10.74
4	166.07	33.72 QP	43.50	-9.78	1.00 V	286	19.65	14.07
5	498.48	33.87 QP	46.00	-12.13	1.00 V	121	15.30	18.57
6	630.66	33.21 QP	46.00	-12.79	1.00 V	199	11.89	21.32

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

802.11b DSSS modulation (Printed & Dipole antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	47.37 PK	74.00	-26.63	1.32 H	319	19.40	27.97
1	1608.00	45.20 AV	54.00	-8.80	1.32 H	319	17.23	27.97
2	2390.00	52.25 PK	74.00	-21.75	1.41 H	333	21.28	30.97
2	2390.00	43.59 AV	54.00	-10.41	1.41 H	333	12.62	30.97
3	*2412.00	99.49 PK			1.41 H	333	68.43	31.06
3	*2412.00	92.36 AV			1.41 H	333	61.30	31.06

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	53.96 PK	74.00	-20.04	1.01 V	99	25.99	27.97
1	1608.00	52.41 AV	54.00	-1.59	1.01 V	99	24.44	27.97
2	*2412.00	108.75 PK			1.12 V	214	77.69	31.06
2	*2412.00	102.33 AV			1.12 V	214	71.27	31.06
3	4824.00	49.22 PK	74.00	-24.78	1.15 V	117	12.79	36.43
3	4824.00	44.02 AV	54.00	-9.98	1.15 V	117	7.59	36.43
4	9648.00	53.71 PK	74.00	-20.29	1.01 V	317	8.64	45.07
4	9648.00	44.46 AV	54.00	-9.54	1.01 V	317	-0.61	45.07

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	45.12 PK	74.00	-28.88	1.01 H	238	17.12	28.00
1	1624.00	42.67 AV	54.00	-11.33	1.01 H	238	14.67	28.00
2	*2437.00	100.65 PK			1.37 H	335	69.48	31.17
2	*2437.00	93.37 AV			1.37 H	335	62.20	31.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	48.96 PK	74.00	-25.04	1.39 V	360	20.96	28.00
1	1624.00	47.69 AV	54.00	-6.31	1.39 V	360	19.69	28.00
2	*2437.00	109.36 PK			1.12 V	1	78.19	31.17
2	*2437.00	102.27 AV			1.12 V	1	71.10	31.17
3	4874.00	49.57 PK	74.00	-24.43	1.10 V	300	13.03	36.54
3	4874.00	43.98 AV	54.00	-10.02	1.10 V	300	7.44	36.54

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	46.09 PK	74.00	-27.91	1.25 H	315	18.05	28.03
1	1641.00	43.61 AV	54.00	-10.39	1.25 H	315	15.57	28.03
2	*2462.00	100.08 PK			1.07 H	330	68.80	31.28
2	*2462.00	93.31 AV			1.07 H	330	62.03	31.28
3	2483.50	53.41 PK	74.00	-20.59	1.07 H	330	22.04	31.37
3	2483.50	44.16 AV	54.00	-9.84	1.07 H	330	12.79	31.37

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	50.85 PK	74.00	-23.15	1.01 V	96	22.81	28.03
1	1641.00	49.45 AV	54.00	-4.55	1.01 V	96	21.41	28.03
2	*2462.00	109.97 PK			1.12 V	164	78.69	31.28
2	*2462.00	103.14 AV			1.12 V	164	71.86	31.28
3	2483.50	53.66 PK	74.00	-20.34	1.12 V	164	22.29	31.37
3	2483.50	45.67 AV	54.00	-8.33	1.12 V	164	14.30	31.37
4	4924.00	50.09 PK	74.00	-23.91	1.20 V	150	13.43	36.66
4	4924.00	44.51 AV	54.00	-9.49	1.20 V	150	7.85	36.66

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

802.11b DSSS modulation (PIFA antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	47.97 PK	74.00	-26.03	1.01 H	264	20.00	27.97
1	1608.00	46.11 AV	54.00	-7.89	1.01 H	264	18.14	27.97
2	2390.00	55.50 PK	74.00	-18.50	1.15 H	341	24.53	30.97
2	2390.00	44.48 AV	54.00	-9.52	1.15 H	341	13.51	30.97
3	*2412.00	109.09 PK			1.15 H	341	78.03	31.06
3	*2412.00	102.25 AV			1.15 H	341	71.19	31.06

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	46.79 PK	74.00	-27.21	1.02 V	76	18.82	27.97
1	1608.00	44.57 AV	54.00	-9.43	1.02 V	76	16.60	27.97
2	2390.00	51.94 PK	74.00	-22.06	1.03 V	1	20.97	30.97
2	2390.00	43.61 AV	54.00	-10.39	1.03 V	1	12.64	30.97
3	*2412.00	102.10 PK			1.03 V	1	71.04	31.06
3	*2412.00	95.03 AV			1.03 V	1	63.97	31.06

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	45.26 PK	74.00	-28.74	1.27 H	265	17.26	28.00
1	1624.00	42.77 AV	54.00	-11.23	1.27 H	265	14.77	28.00
2	*2437.00	108.64 PK			1.13 H	342	77.47	31.17
2	*2437.00	101.08 AV			1.13 H	342	69.91	31.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	46.25 PK	74.00	-27.75	1.14 V	273	18.25	28.00
1	1624.00	44.18 AV	54.00	-9.82	1.14 V	273	16.18	28.00
2	*2437.00	101.68 PK			1.35 V	75	70.51	31.17
2	*2437.00	94.06 AV			1.35 V	75	62.89	31.17

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 62%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	44.10 PK	74.00	-29.90	1.14 H	7	16.06	28.03
1	1641.00	41.54 AV	54.00	-12.46	1.14 H	7	13.50	28.03
2	*2462.00	110.02 PK			1.12 H	342	78.74	31.28
2	*2462.00	102.90 AV			1.12 H	342	71.62	31.28
3	2483.50	56.77 PK	74.00	-17.23	1.12 H	342	25.40	31.37
3	2483.50	46.05 AV	54.00	-7.95	1.12 H	342	14.68	31.37

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	42.12 PK	74.00	-31.88	1.31 V	348	14.08	28.03
1	1641.00	37.47 AV	54.00	-16.53	1.31 V	348	9.43	28.03
2	*2462.00	104.29 PK			1.02 V	1	73.01	31.28
2	*2462.00	97.08 AV			1.02 V	1	65.80	31.28
3	2483.50	53.84 PK	74.00	-20.16	1.02 V	1	22.47	31.37
3	2483.50	44.20 AV	54.00	-9.80	1.02 V	1	12.83	31.37

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

802.11g OFDM modulation (Printed & Dipole antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	45.50 PK	74.00	-28.50	1.01 H	318	17.53	27.97
1	1608.00	42.69 AV	54.00	-11.31	1.01 H	318	14.72	27.97
2	2390.00	52.28 PK	74.00	-21.72	1.10 H	330	21.31	30.97
2	2390.00	43.63 AV	54.00	-10.37	1.10 H	330	12.66	30.97
3	*2412.00	92.85 PK			1.10 H	330	61.79	31.06
3	*2412.00	86.87 AV			1.10 H	330	55.81	31.06

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	55.01 PK	74.00	-18.99	1.01 V	98	27.04	27.97
1	1608.00	52.76 AV	54.00	-1.24	1.01 V	98	24.79	27.97
2	2390.00	53.77 PK	74.00	-20.23	1.14 V	174	22.80	30.97
2	2390.00	44.36 AV	54.00	-9.64	1.14 V	174	13.39	30.97
3	*2412.00	103.20 PK			1.14 V	174	72.14	31.06
3	*2412.00	97.20 AV			1.14 V	174	66.14	31.06

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	45.84 PK	74.00	-28.16	1.23 H	239	17.84	28.00
1	1624.00	43.64 AV	54.00	-10.36	1.23 H	239	15.64	28.00
2	*2437.00	94.88 PK			1.41 H	333	63.71	31.17
2	*2437.00	88.66 AV			1.41 H	333	57.49	31.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	53.28 PK	74.00	-20.72	1.01 V	100	25.28	28.00
1	1624.00	52.47 AV	54.00	-1.53	1.01 V	100	24.47	28.00
2	*2437.00	104.10 PK			1.10 V	5	72.93	31.17
2	*2437.00	99.26 AV			1.10 V	5	68.09	31.17

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	43.86 PK	74.00	-30.14	1.01 H	321	15.82	28.03
1	1641.00	41.31 AV	54.00	-12.69	1.01 H	321	13.27	28.03
2	*2462.00	93.96 PK			1.01 H	213	62.90	31.06
2	*2462.00	87.66 AV			1.01 H	213	56.60	31.06
3	2483.50	52.48 PK	74.00	-21.52	1.01 H	213	21.11	31.37
3	2483.50	44.03 AV	54.00	-9.97	1.01 H	213	12.66	31.37

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	51.63 PK	74.00	-22.37	1.01 V	97	23.59	28.03
1	1641.00	50.42 AV	54.00	-3.58	1.01 V	97	22.38	28.03
2	*2462.00	104.65 PK			1.13 V	173	73.37	31.28
2	*2462.00	98.82 AV			1.13 V	173	67.54	31.28
3	2483.50	55.45 PK	74.00	-18.55	1.13 V	173	24.08	31.37
3	2483.50	44.74 AV	54.00	-9.26	1.13 V	173	13.37	31.37

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

802.11g OFDM modulation (PIFA antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	48.45 PK	74.00	-25.55	1.01 H	265	20.48	27.97
1	1608.00	46.66 AV	54.00	-7.34	1.01 H	265	18.69	27.97
2	2390.00	53.74 PK	74.00	-20.26	1.19 H	170	22.77	30.97
2	2390.00	44.40 AV	54.00	-9.60	1.19 H	170	13.43	30.97
3	*2412.00	102.45 PK			1.19 H	170	71.39	31.06
3	*2412.00	94.73 AV			1.19 H	170	63.67	31.06
4	3216.00	43.71 PK	74.00	-30.29	1.01 H	306	11.12	32.59
4	3216.00	35.69 AV	54.00	-18.31	1.01 H	306	3.10	32.59

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1608.00	48.92 PK	74.00	-25.08	1.17 V	278	20.95	27.97
1	1608.00	47.31 AV	54.00	-6.69	1.17 V	278	19.34	27.97
2	2390.00	52.91 PK	74.00	-21.09	1.28 V	321	21.94	30.97
2	2390.00	43.64 AV	54.00	-10.36	1.28 V	321	12.67	30.97
3	*2412.00	96.93 PK			1.28 V	321	65.87	31.06
3	*2412.00	90.09 AV			1.28 V	321	59.03	31.06

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	46.10 PK	74.00	-27.90	1.01 H	256	18.10	28.00
1	1624.00	44.05 AV	54.00	-9.95	1.01 H	256	16.05	28.00
2	*2437.00	103.53 PK			1.15 H	340	72.36	31.17
2	*2437.00	97.36 AV			1.15 H	340	66.19	31.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1624.00	45.89 PK	74.00	-28.11	1.29 V	56	17.89	28.00
1	1624.00	43.57 AV	54.00	-10.43	1.29 V	56	15.57	28.00
2	*2437.00	98.00 PK			1.24 V	314	66.83	31.17
2	*2437.00	91.38 AV			1.24 V	314	60.21	31.17

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	45.17 PK	74.00	-28.83	1.16 H	360	17.13	28.03
1	1641.00	42.84 AV	54.00	-11.16	1.16 H	360	14.80	28.03
2	*2462.00	102.47 PK			1.39 H	23	71.19	31.28
2	*2462.00	95.64 AV			1.39 H	23	64.36	31.28
3	2483.50	56.45 PK	74.00	-17.55	1.39 H	23	25.08	31.37
3	2483.50	44.88 AV	54.00	-9.12	1.39 H	23	13.51	31.37

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1641.00	45.20 PK	74.00	-28.80	1.03 V	75	17.16	28.03
1	1641.00	42.58 AV	54.00	-11.42	1.03 V	75	14.54	28.03
2	*2462.00	97.83 PK			1.01 V	360	66.55	31.28
2	*2462.00	92.32 AV			1.01 V	360	61.04	31.28
3	2483.50	53.96 PK	74.00	-20.04	1.01 V	360	22.59	31.37
3	2483.50	44.15 AV	54.00	-9.85	1.01 V	360	12.78	31.37

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

802.11g Turbo OFDM modulation (Printed & Dipole antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	1
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1628.00	45.21 PK	74.00	-28.79	1.06 H	208	16.43	28.78
2	2390.00	40.11 PK	74.00	-33.89	1.39 H	8	8.31	31.80
3	*2437.00	99.91 PK			1.39 H	8	67.96	31.95
3	*2437.00	88.51 AV			1.39 H	8	56.56	31.95
4	2483.50	40.21 PK	74.00	-33.79	1.39 H	8	8.12	32.09
5	3256.00	48.72 PK	74.00	-25.28	1.16 H	204	13.71	35.01
6	4874.00	45.33 PK	74.00	-28.67	1.02 H	208	7.05	38.28

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1628.00	46.57 PK	74.00	-27.43	1.01 V	114	17.79	28.78
1	1628.00	35.70 AV	54.00	-18.30	1.01 V	114	6.92	28.78
2	2390.00	49.01 PK	74.00	-24.99	1.24 V	5	17.21	31.80
2	2390.00	38.04 AV	54.00	-15.96	1.24 V	5	6.24	31.80
3	*2437.00	108.81 PK			1.24 V	5	76.86	31.95
3	*2437.00	97.84 AV			1.24 V	5	65.89	31.95
4	2483.50	49.11 PK	74.00	-24.89	1.24 V	5	17.02	32.09
4	2483.50	38.14 AV	54.00	-15.86	1.24 V	5	6.05	32.09
5	3256.00	49.49 PK	74.00	-24.51	1.05 V	235	14.48	35.01
6	4874.00	47.49 PK	74.00	-26.51	1.06 V	23	9.20	38.28

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

802.11g Turbo OFDM modulation (PIFA antenna)

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 53%RH, 991hPa	TEST MODE	2
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1628.00	48.25 PK	74.00	-25.75	1.06 H	90	19.47	28.78
2	2390.00	48.81 PK	74.00	-25.19	1.80 H	56	17.01	31.80
3	*2437.00	104.11 PK			1.80 H	56	72.16	31.95
3	*2437.00	94.96 AV			1.80 H	56	63.01	31.95
4	2483.50	49.23 PK	74.00	-24.77	1.80 H	56	17.14	32.09
5	3256.00	47.16 PK	74.00	-26.84	1.25 H	206	12.15	35.01
6	4874.00	49.23 PK	74.00	-24.77	1.05 H	203	10.95	38.28

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1628.00	47.25 PK	74.00	-26.75	1.15 V	255	18.47	28.78
2	2390.00	50.36 PK	74.00	-23.64	1.06 V	93	18.56	31.80
2	2390.00	40.05 AV	54.00	-13.95	1.06 V	93	8.25	31.80
3	*2437.00	105.66 PK			1.06 V	93	73.71	31.95
3	*2437.00	95.35 AV			1.06 V	93	63.40	31.95
4	2483.50	50.78 PK	74.00	-23.22	1.06 V	93	18.69	32.09
4	2483.50	40.47 AV	54.00	-13.53	1.06 V	93	8.38	32.09
5	3256.00	48.23 PK	74.00	-25.77	1.06 V	135	13.22	35.01
6	4874.00	48.23 PK	74.00	-25.77	1.19 V	92	9.95	38.28

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * ” : Fundamental frequency

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK 30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

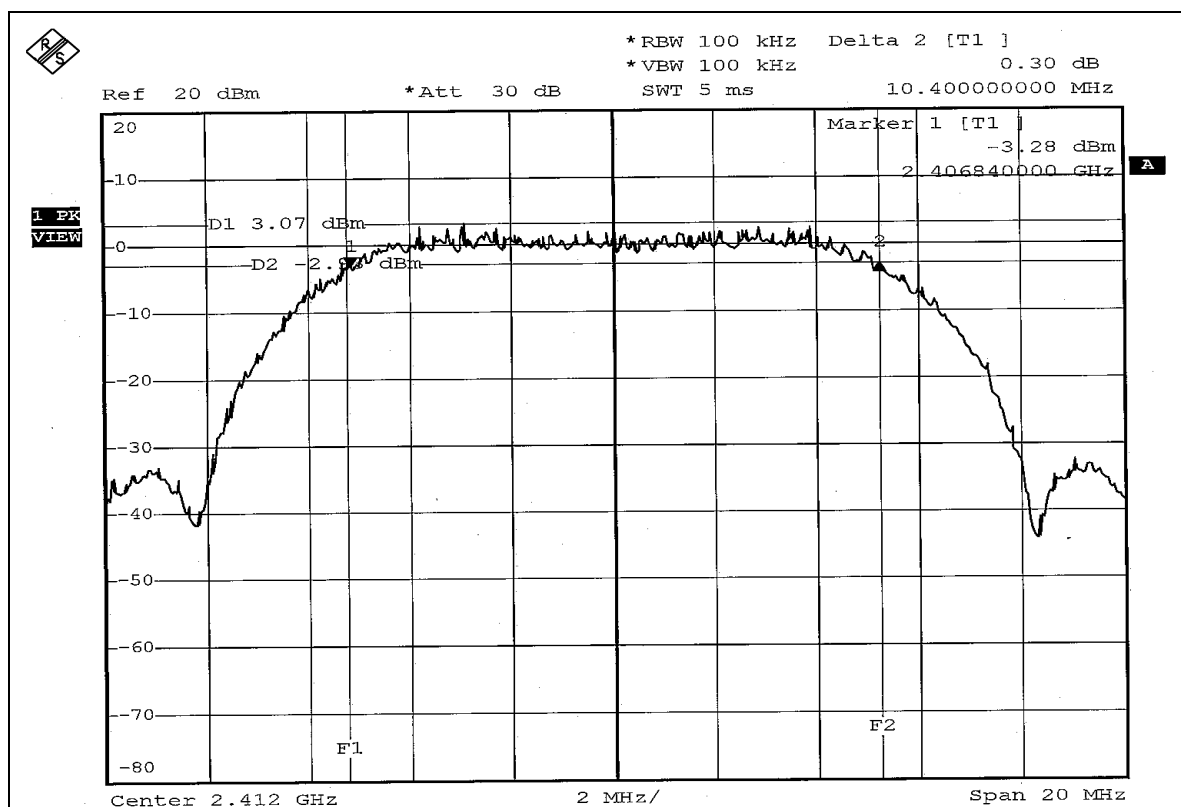
4.3.7 TEST RESULTS

802.11b DSSS modulation

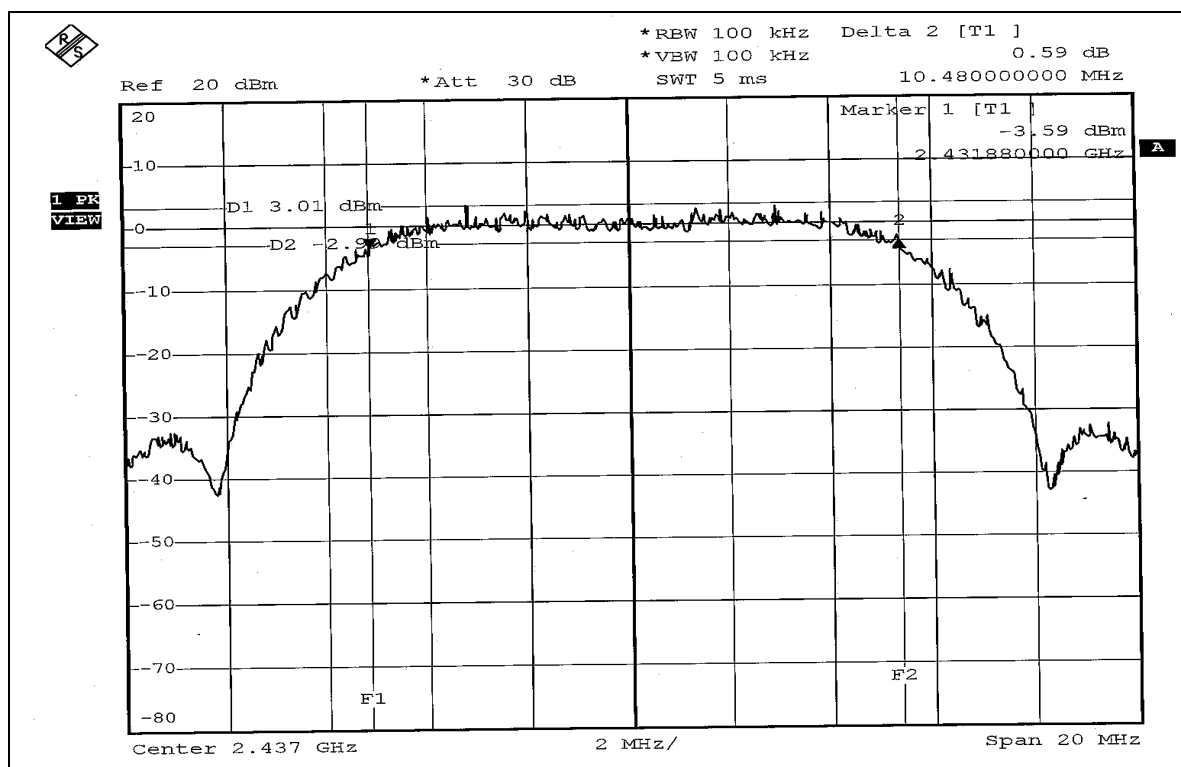
EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	10.40	0.5	PASS
6	2437	10.48	0.5	PASS
11	2462	10.48	0.5	PASS

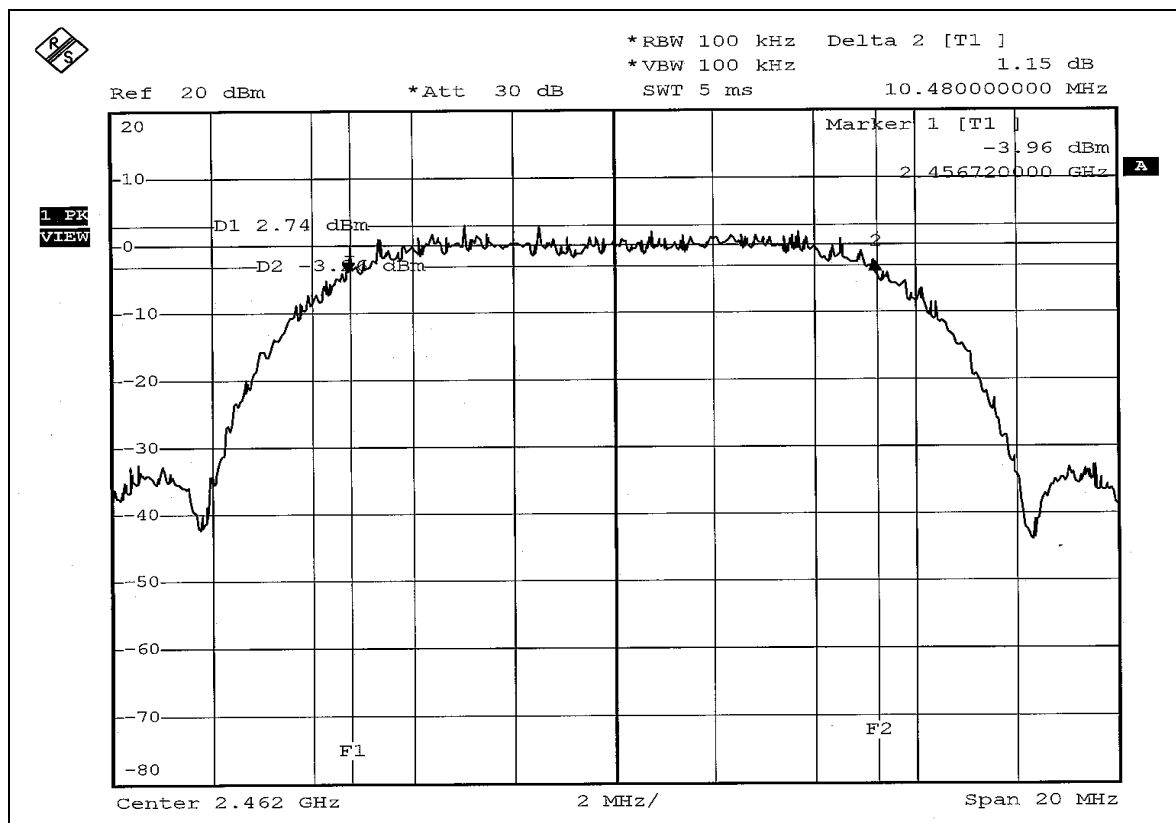
CH1



CH6



CH11

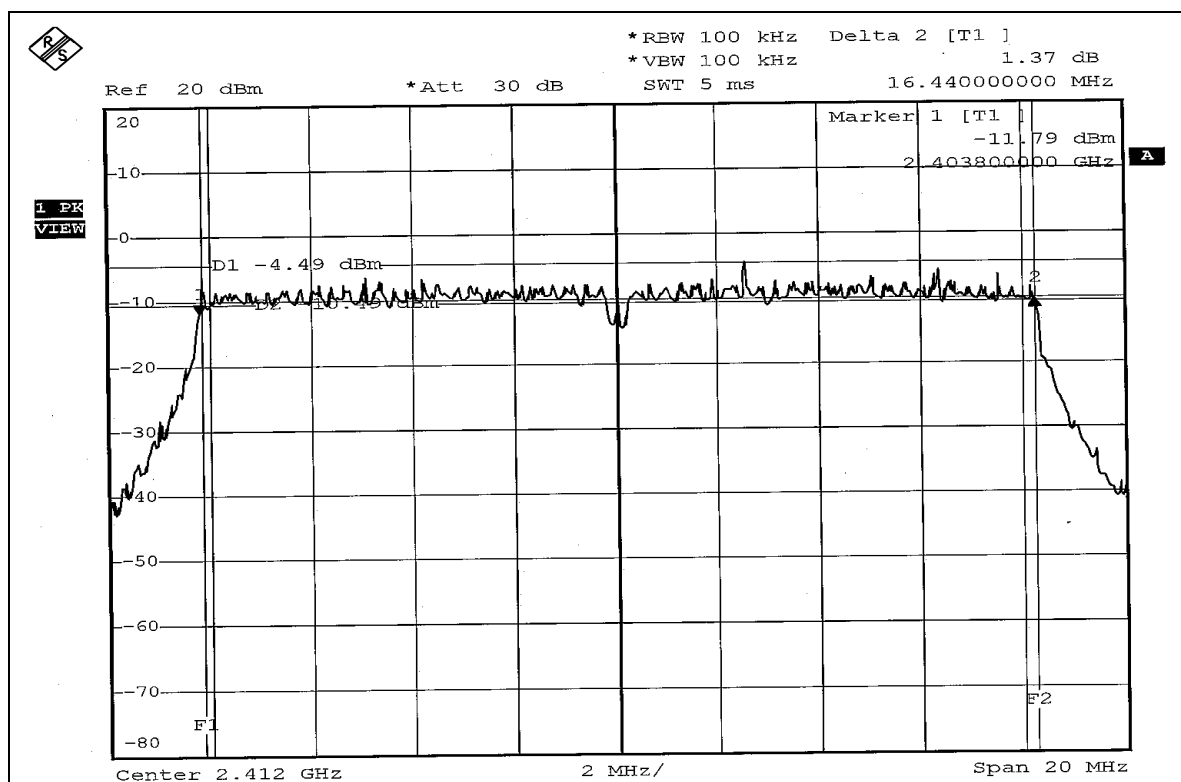


**802.11g OFDM modulation**

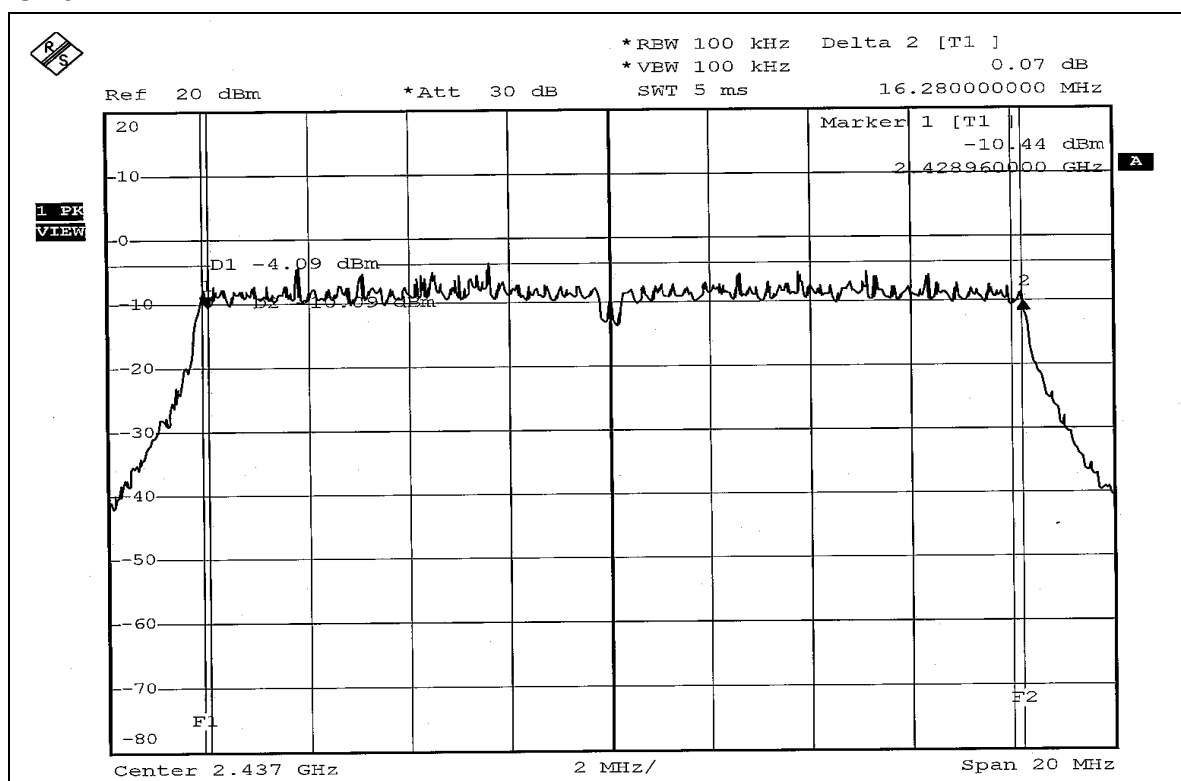
EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.44	0.5	PASS
6	2437	16.28	0.5	PASS
11	2462	16.24	0.5	PASS

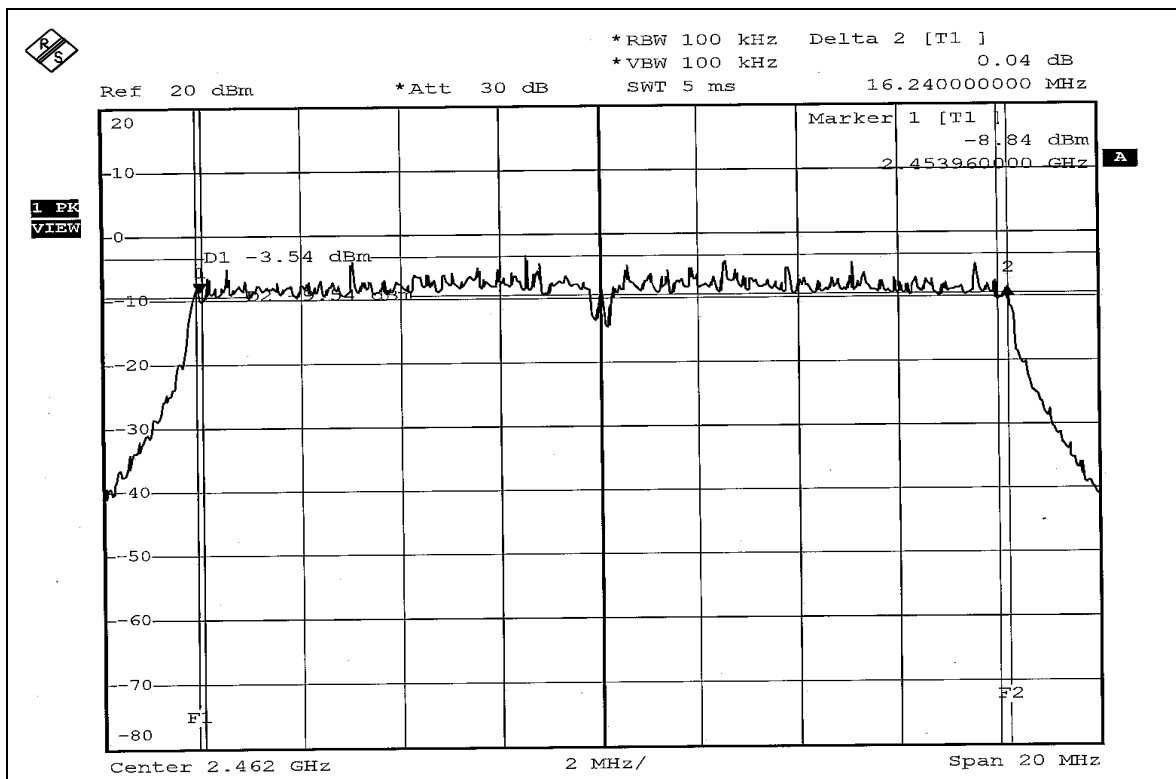
CH1



CH6



CH11

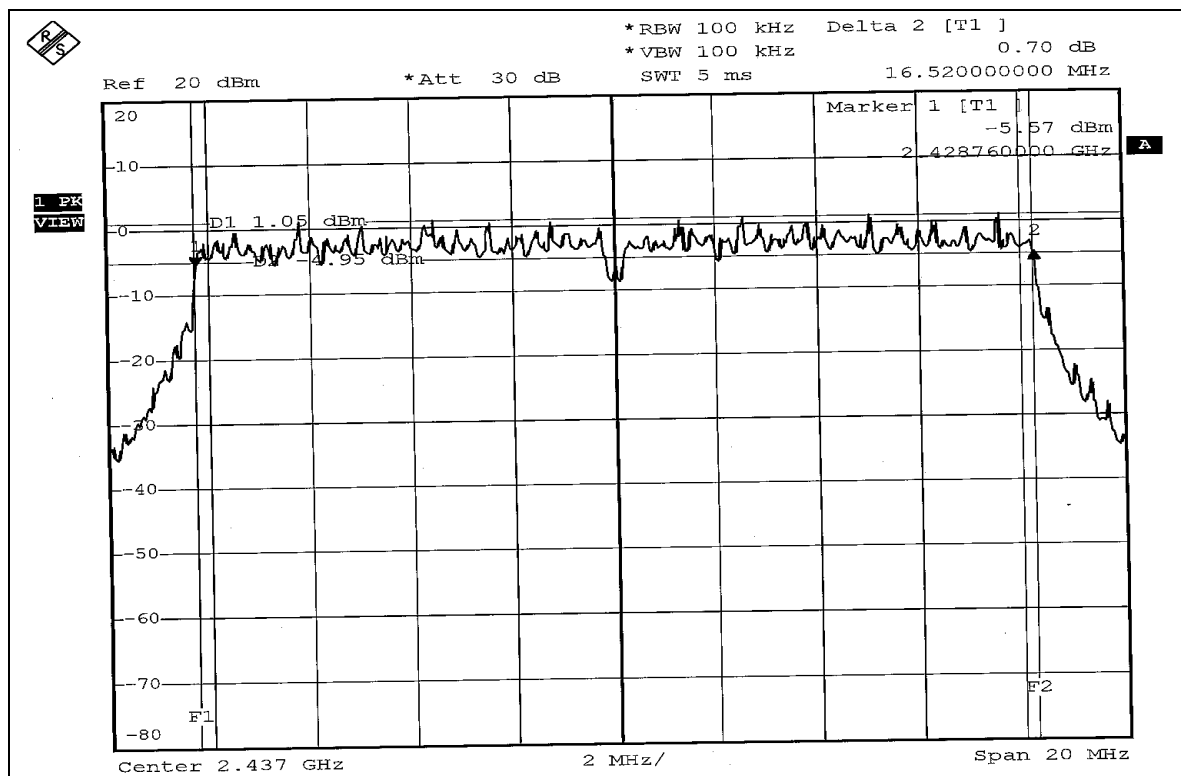


**802.11g Turbo OFDM modulation**

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6	2437	16.52	0.5	PASS

CH6



4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 06, 2005
DIGITAL RT OSCILLOSCOPE	TDS1012	C037299	Dec. 07, 2005
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA..

4.4.1 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.2 DEVIATION FROM TEST STANDARD

No deviation

4.4.3 TEST SETUP



4.4.4 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.3 TEST RESULTS

802.11b DSSS modulation

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	44.875	16.52	30	PASS
6	2437	45.394	16.57	30	PASS
11	2462	45.082	16.54	30	PASS

802.11g OFDM modulation

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	25.410	14.05	30	PASS
6	2437	25.586	14.08	30	PASS
11	2462	25.235	14.02	30	PASS

802.11g Turbo OFDM modulation

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6	2437	63.973	18.06	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

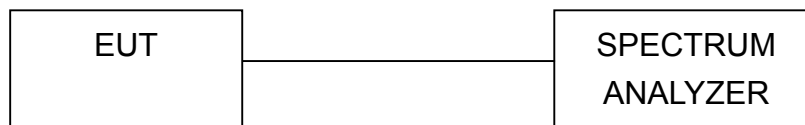
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

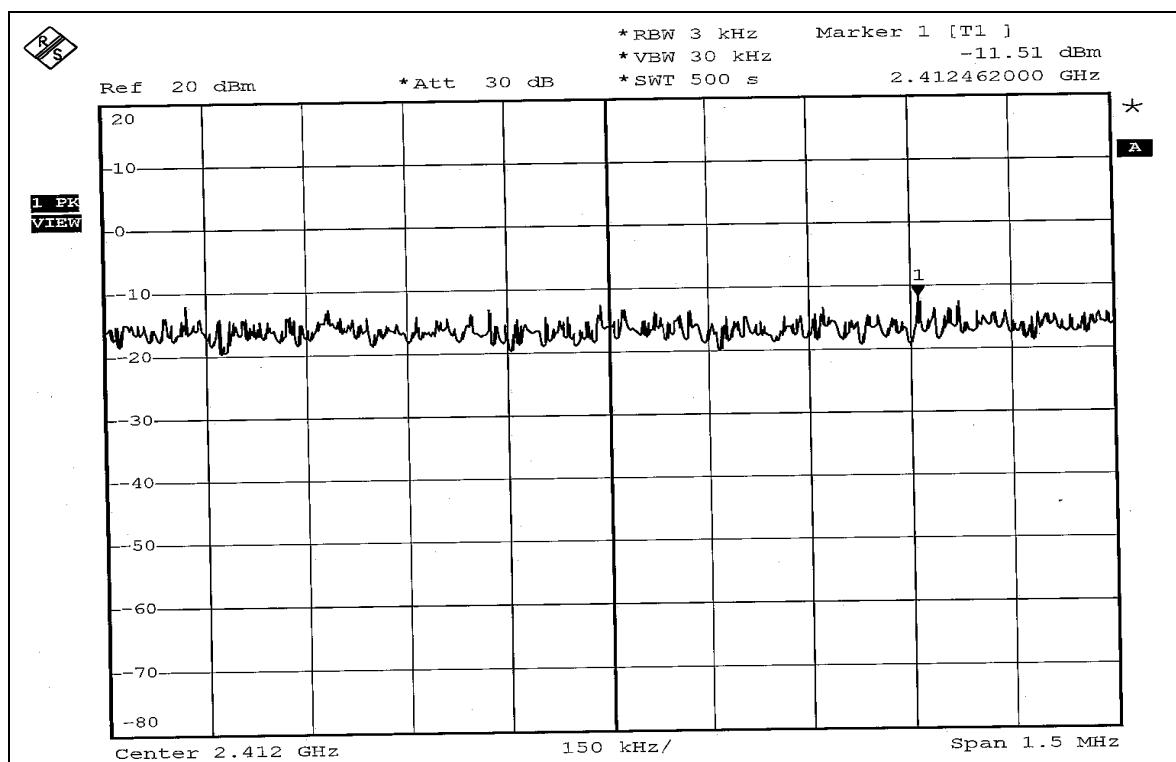
4.5.7 TEST RESULTS

802.11b DSSS modulation

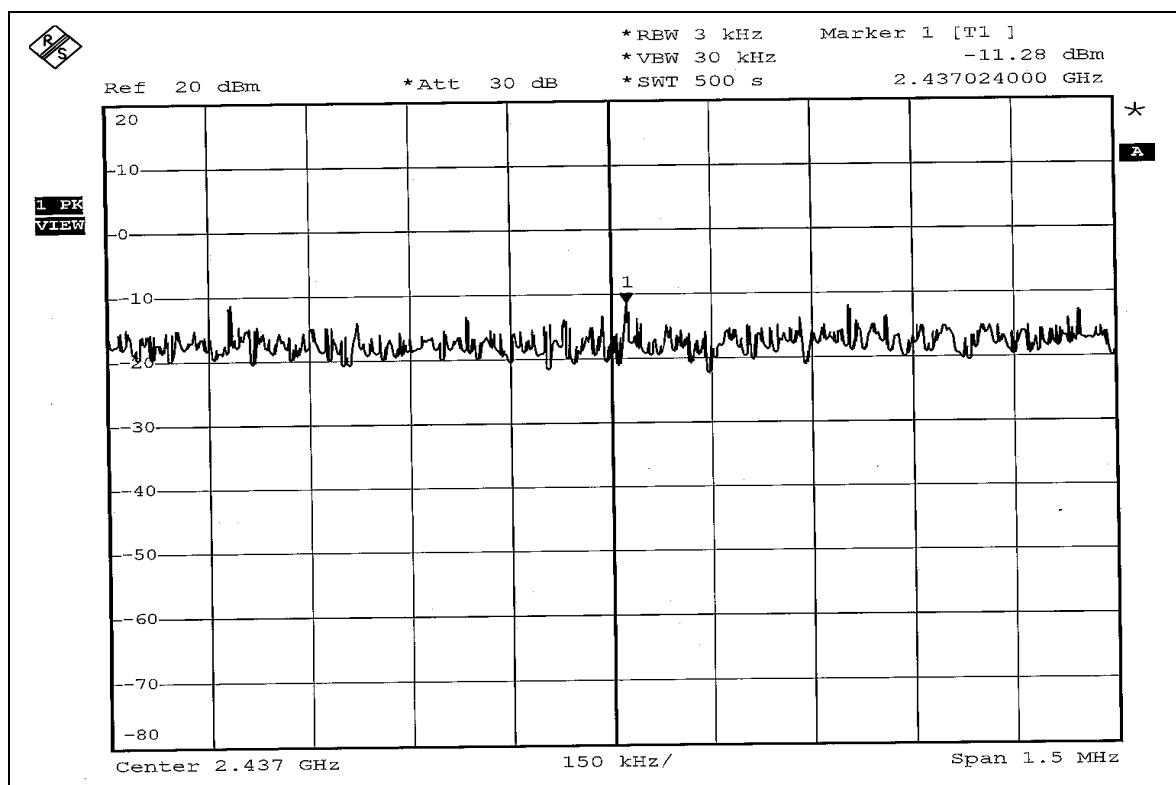
EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	CCK	TRANSFER RATE	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.51	8	PASS
6	2437	-11.28	8	PASS
11	2462	-11.63	8	PASS

CH1

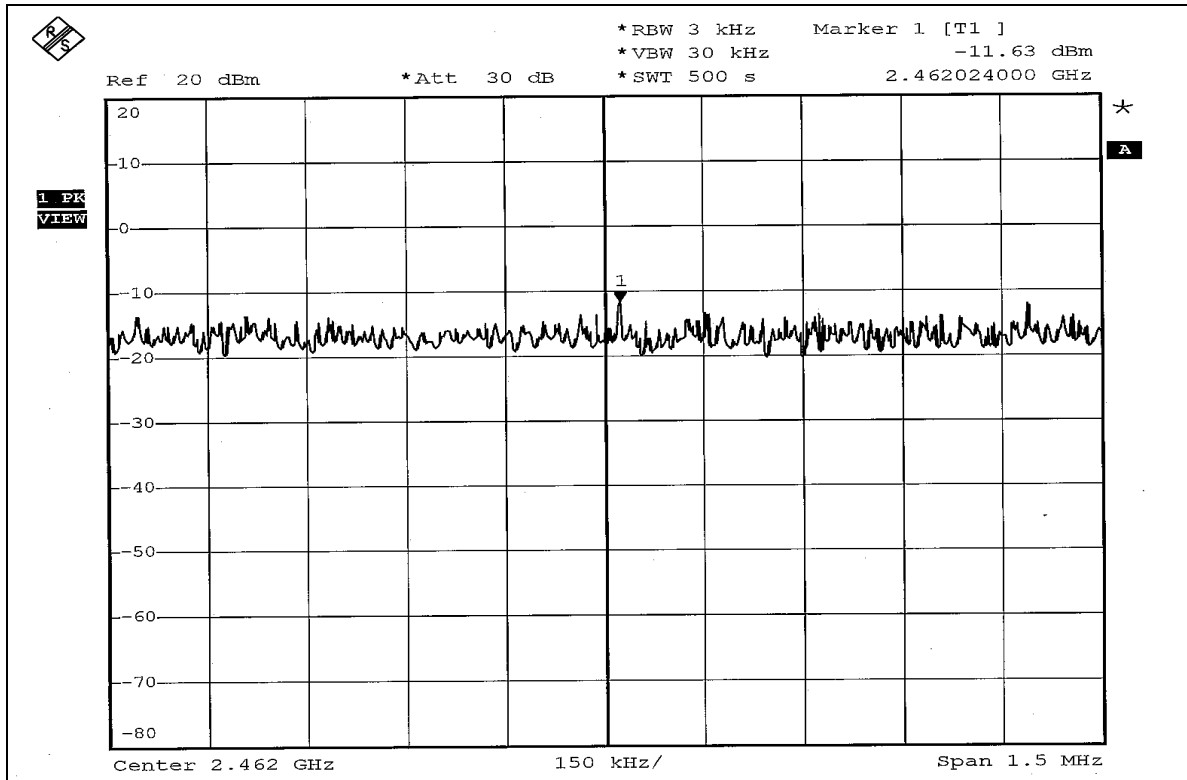


CH6





CH11

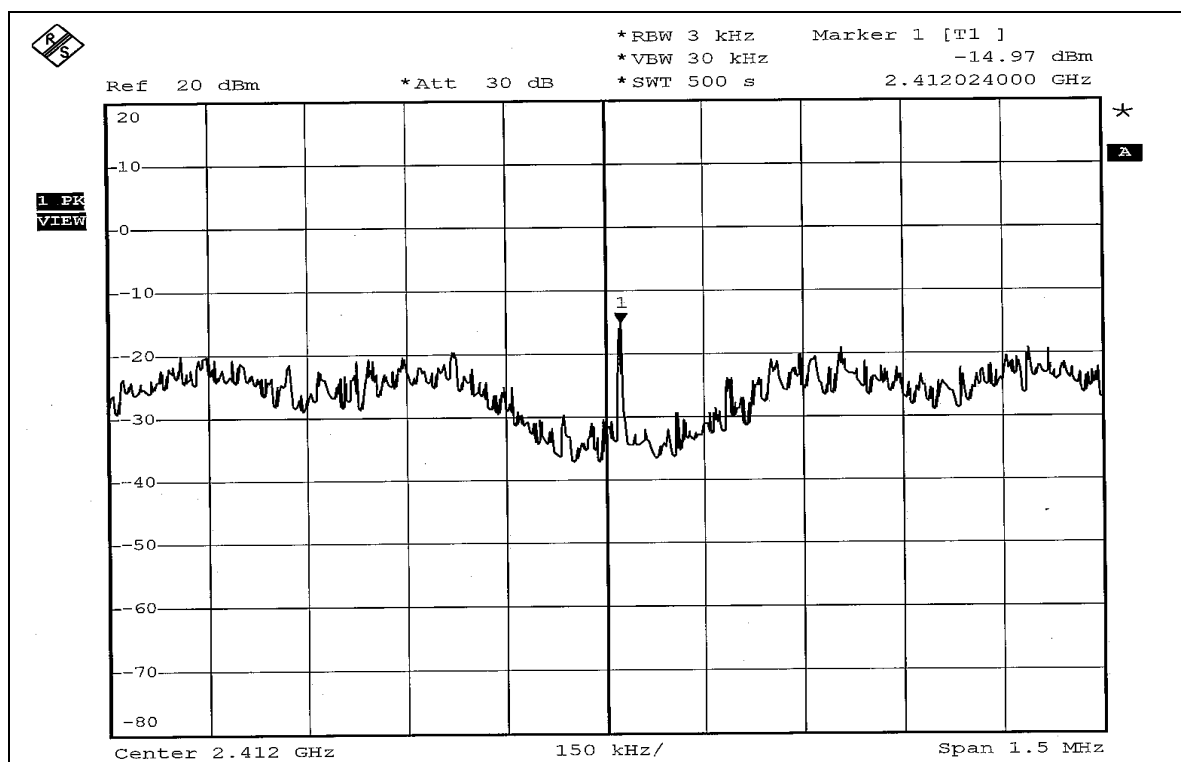


**802.11g OFDM modulation**

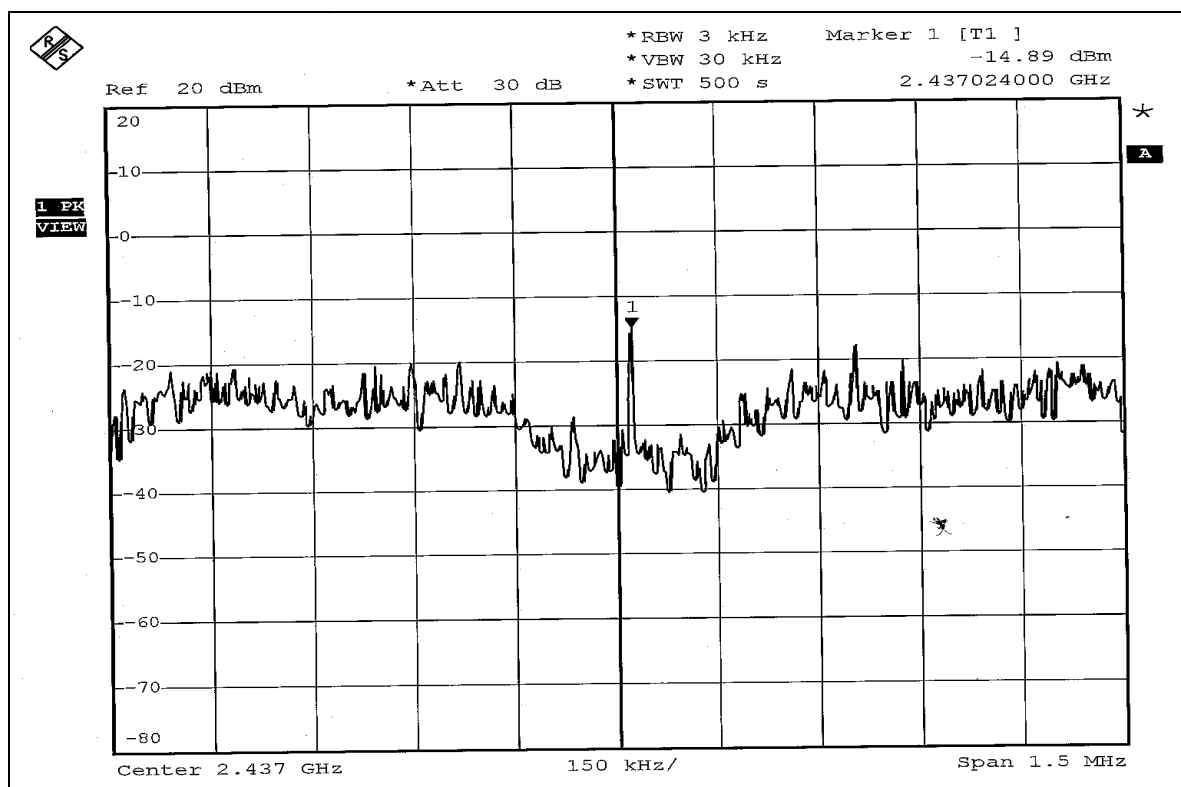
EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-14.97	8	PASS
6	2437	-14.89	8	PASS
11	2462	-14.60	8	PASS

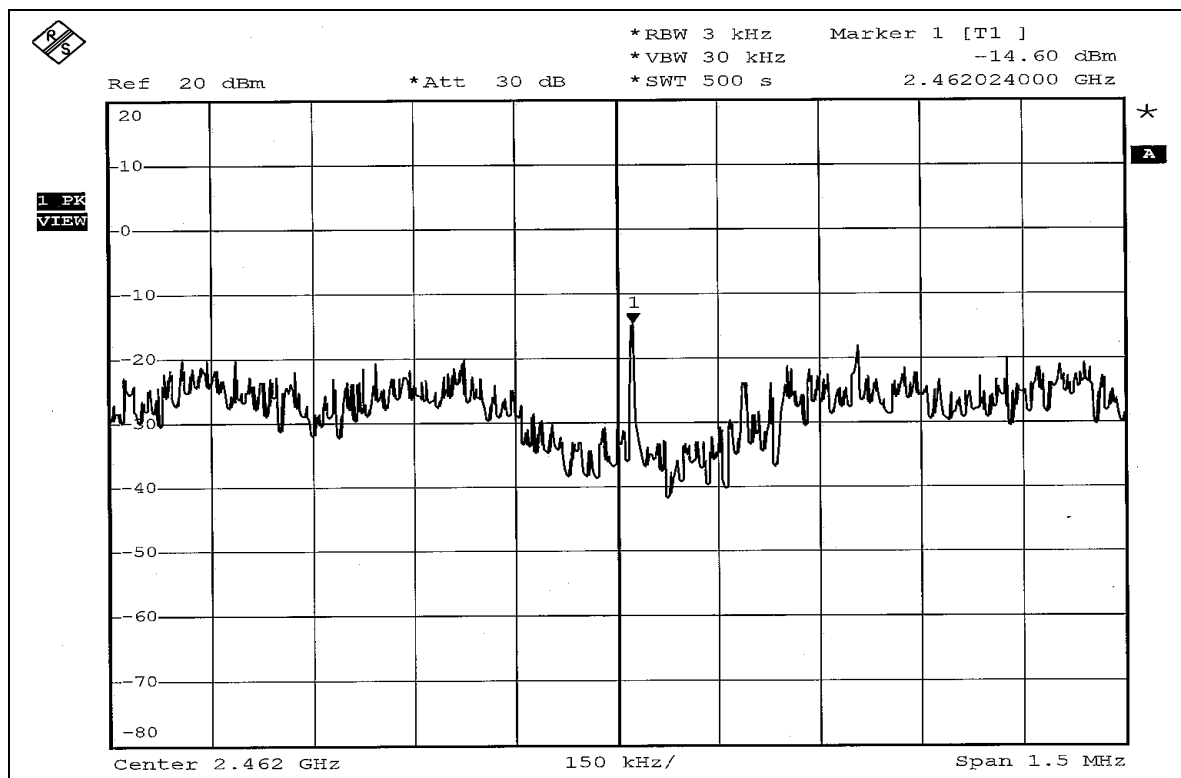
CH1



CH6



CH11

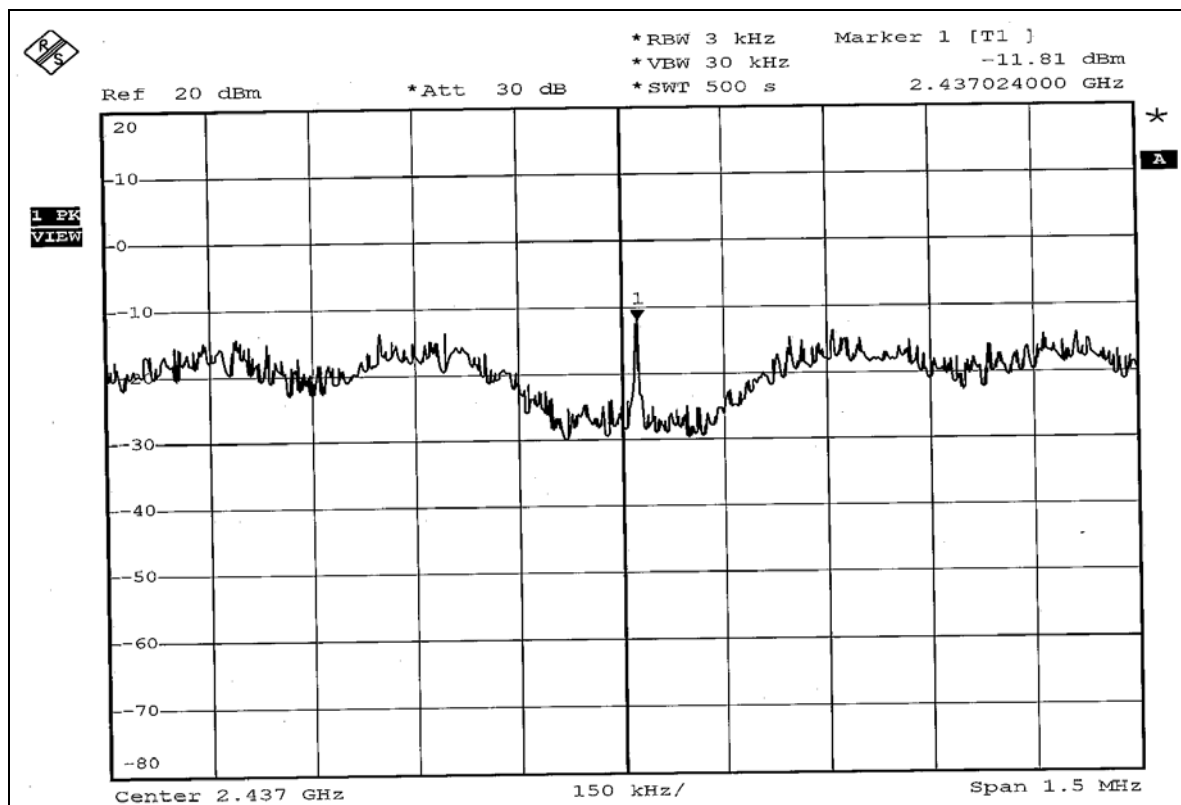


802.11g Turbo OFDM modulation

EUT	2.4GHz wireless Mini PCI card	MODEL	WLL3120
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6	2437	-11.81	8	PASS

CH6



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz ; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6



4.6.6 TEST RESULTS

The spectrum plots are attached on the following 18 images. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

4.6.7 TEST RESULTS

802.11b DSSS modulation (Test Mode 1 - Printed & Dipole antenna)

NOTE 1: The band edge emission plot on page 71 shows 51.21dBc between carrier maximum power and local maximum emission in restrict band (2.3804GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 108.75dBuV/m (Peak), so the maximum field strength in restrict band is $108.75 - 51.21 = 57.54$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 71 shows 61.94dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.33dBuV/m (Average), so the maximum field strength in restrict band is $102.33 - 61.94 = 40.39$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 72 shows 51.51dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 109.97dBuV/m (Peak), so the maximum field strength in restrict band is $109.97 - 51.51 = 58.46$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 73 shows 59.54dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 103.14dBuV/m (Average), so the maximum field strength in restrict band is $103.14 - 59.54 = 43.60$ dBuV/m which is under 54dBuV/m limit.

**802.11b DSSS modulation (Test Mode 2 - PIFA antenna)**

NOTE 1: The band edge emission plot on page 71 shows 51.21dBc between carrier maximum power and local maximum emission in restrict band (2.3804GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 109.09dBuV/m (Peak), so the maximum field strength in restrict band is $109.09 - 51.21 = 57.88$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 71 shows 61.94dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.25dBuV/m (Average), so the maximum field strength in restrict band is $102.25 - 61.94 = 40.31$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 72 shows 51.51dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 110.02dBuV/m (Peak), so the maximum field strength in restrict band is $110.02 - 51.51 = 58.51$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 73 shows 59.54dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 102.90dBuV/m (Average), so the maximum field strength in restrict band is $102.90 - 59.54 = 43.36$ dBuV/m which is under 54dBuV/m limit.



802.11g OFDM modulation (Test Mode 1 - Printed & Dipole antenna)

NOTE 1: The band edge emission plot on page 74 shows 42.70dBc between carrier maximum power and local maximum emission in restrict band (2.3868GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 103.20dBuV/m (Peak), so the maximum field strength in restrict band is $103.20 - 42.70 = 60.50$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 74 shows 56.71dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 97.20dBuV/m (Average), so the maximum field strength in restrict band is $97.20 - 56.71 = 40.49$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 75 shows 44.34dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 104.65dBuV/m (Peak), so the maximum field strength in restrict band is $104.65 - 44.34 = 60.31$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 76 shows 55.72dBc between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 98.82dBuV/m (Average), so the maximum field strength in restrict band is $98.82 - 55.72 = 43.10$ dBuV/m which is under 54dBuV/m limit.



802.11g OFDM modulation (Test Mode 2 - PIFA antenna)

NOTE 1: The band edge emission plot on page 74 shows 42.70dBc between carrier maximum power and local maximum emission in restrict band (2.3868GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.45dBuV/m (Peak), so the maximum field strength in restrict band is $102.45 - 42.70 = 59.75$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 74 shows 56.71dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 94.73dBuV/m (Average), so the maximum field strength in restrict band is $94.73 - 56.71 = 38.02$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 75 shows 44.34dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 102.47dBuV/m (Peak), so the maximum field strength in restrict band is $102.47 - 44.34 = 58.13$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 76 shows 55.72dBc between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 95.64dBuV/m (Average), so the maximum field strength in restrict band is $95.64 - 55.72 = 39.92$ dBuV/m which is under 54dBuV/m limit.



802.11g Turbo OFDM modulation (Test Mode 1 - Printed & Dipole antenna)

NOTE 1: The band edge emission plot on page 77 shows 50.25dBc between carrier maximum power and local maximum emission in restrict band (2.3728GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 108.81dBuV/m (Peak), so the maximum field strength in restrict band is $108.81 - 50.25 = 58.56$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 77 shows 59.02dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 97.84dBuV/m (Average), so the maximum field strength in restrict band is $97.84 - 59.02 = 38.82$ dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on page 78 shows 49.32dBc between carrier maximum power and local maximum emission in restrict band (2.4916GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 108.81dBuV/m (Peak), so the maximum field strength in restrict band is $108.81 - 49.32 = 59.49$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 79 shows 60.09dBc between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 97.84dBuV/m (Average), so the maximum field strength in restrict band is $97.84 - 60.09 = 37.75$ dBuV/m which is under 54dBuV/m limit.

802.11g Turbo OFDM modulation (Test Mode 2 - PIFA antenna)

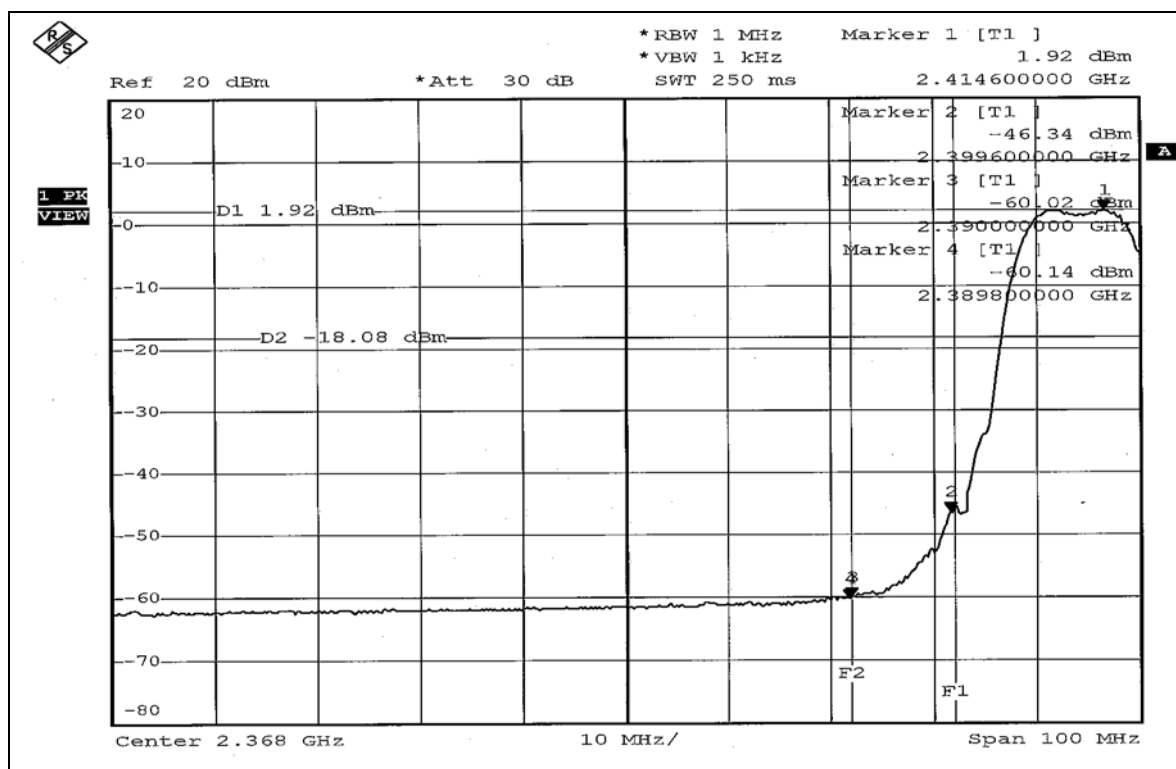
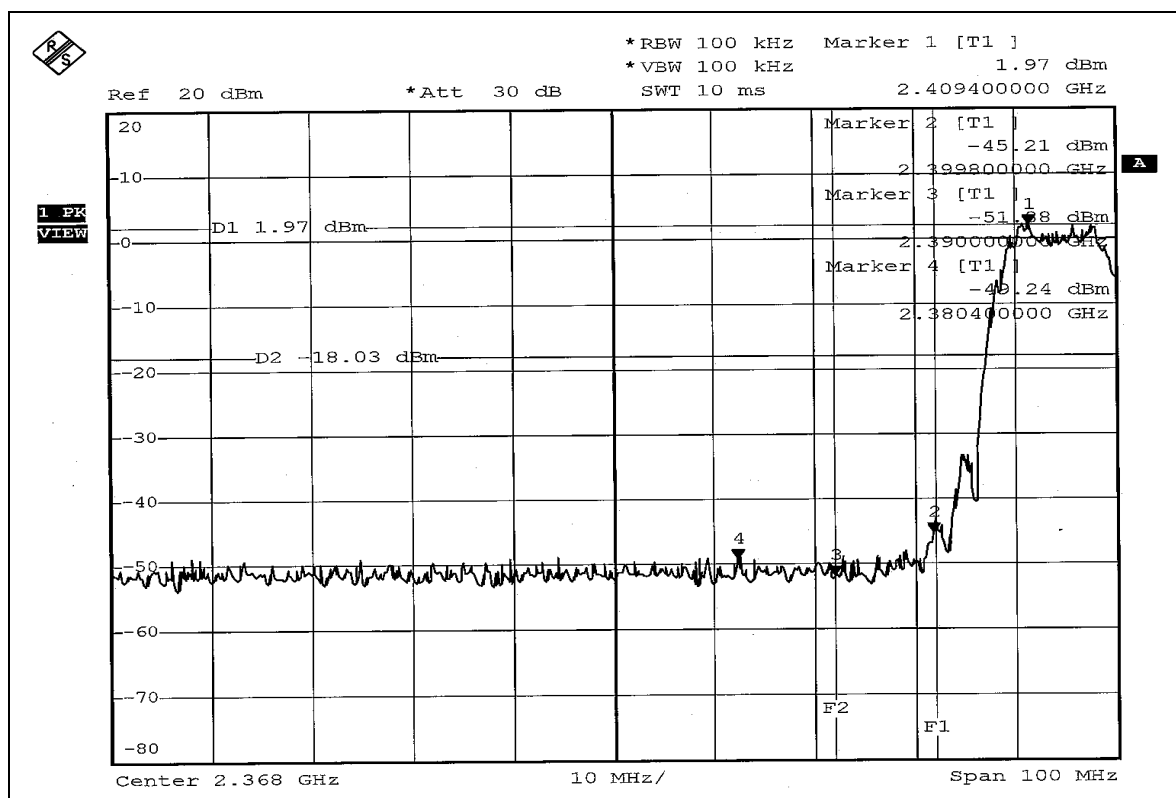
NOTE 1: The band edge emission plot on page 77 shows 50.25dBc between carrier maximum power and local maximum emission in restrict band (2.3728GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 105.66dBuV/m (Peak), so the maximum field strength in restrict band is $105.66 - 50.25 = 55.41$ dBuV/m which is under 74dBuV/m limit.

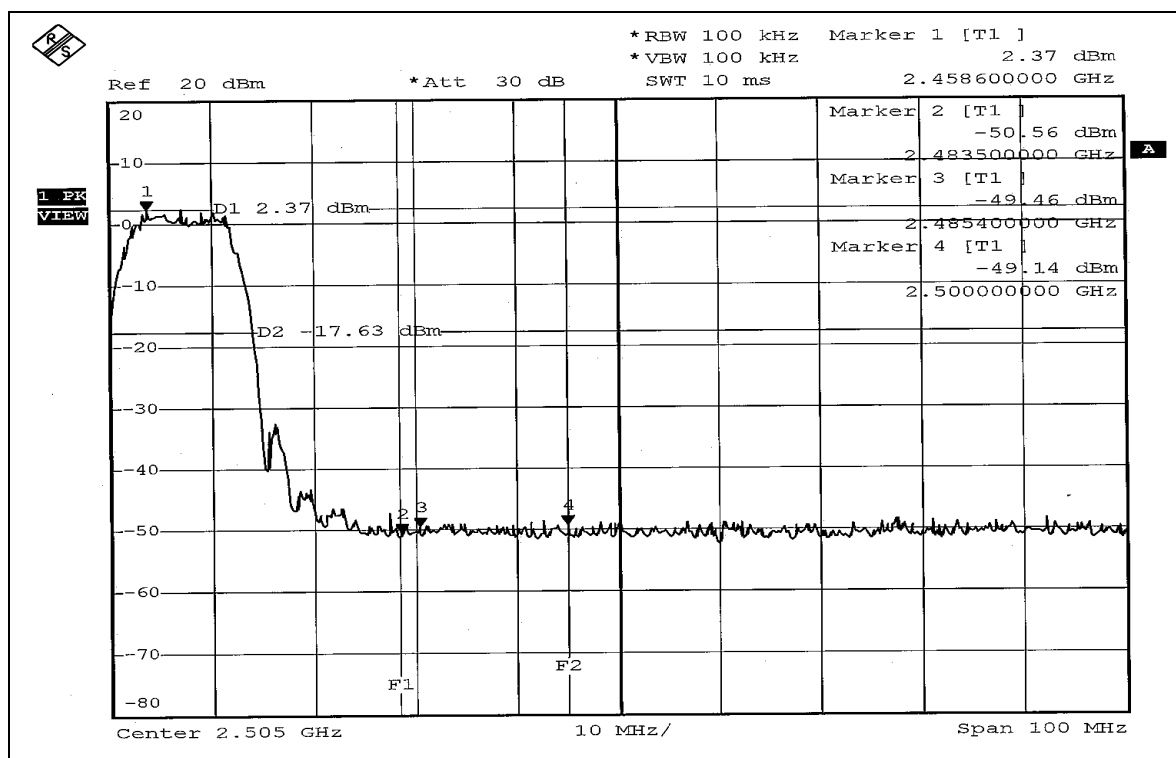
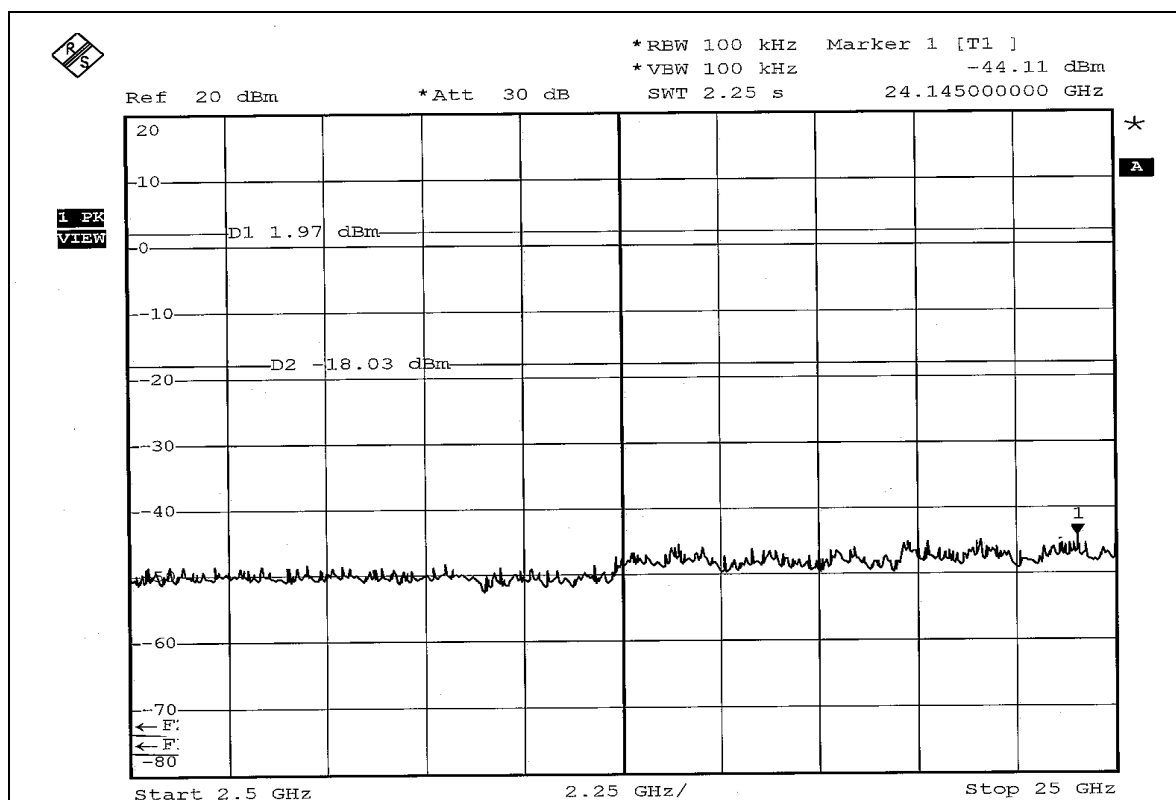
The band edge emission plot on page 77 shows 59.02dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 95.35dBuV/m (Average), so the maximum field strength in restrict band is $95.35 - 59.02 = 36.33$ dBuV/m which is under 54dBuV/m limit.

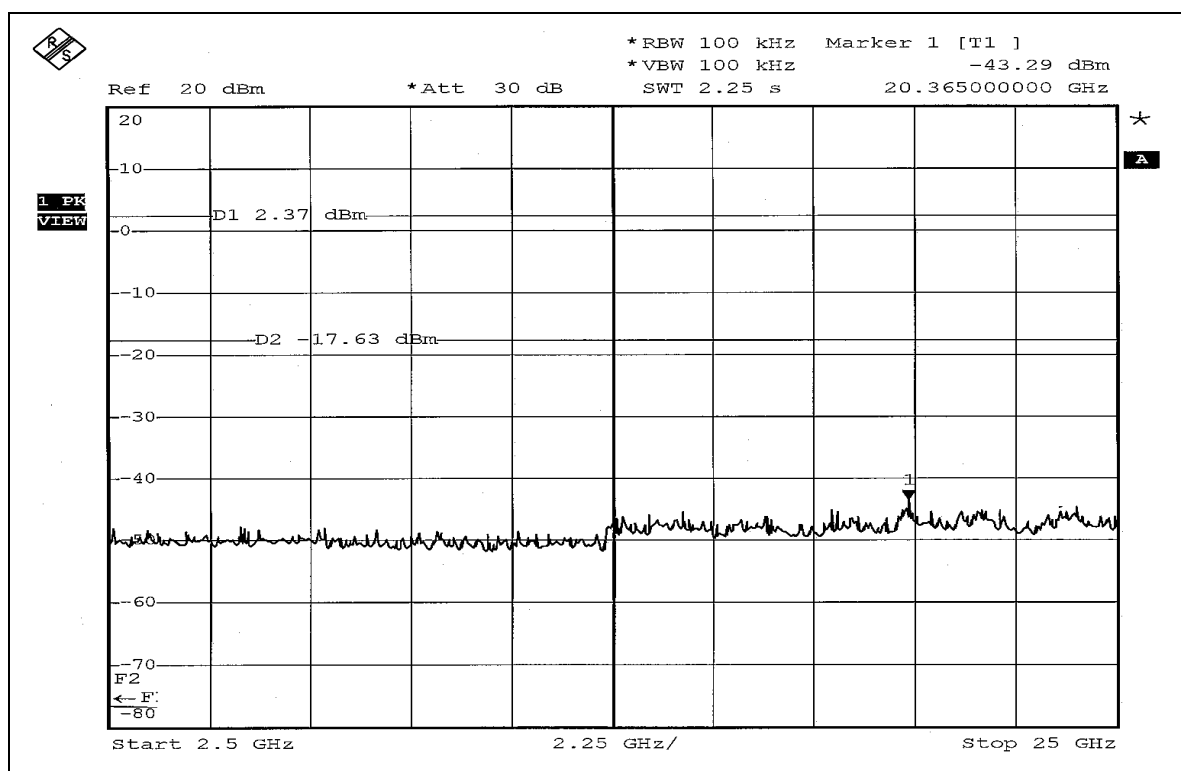
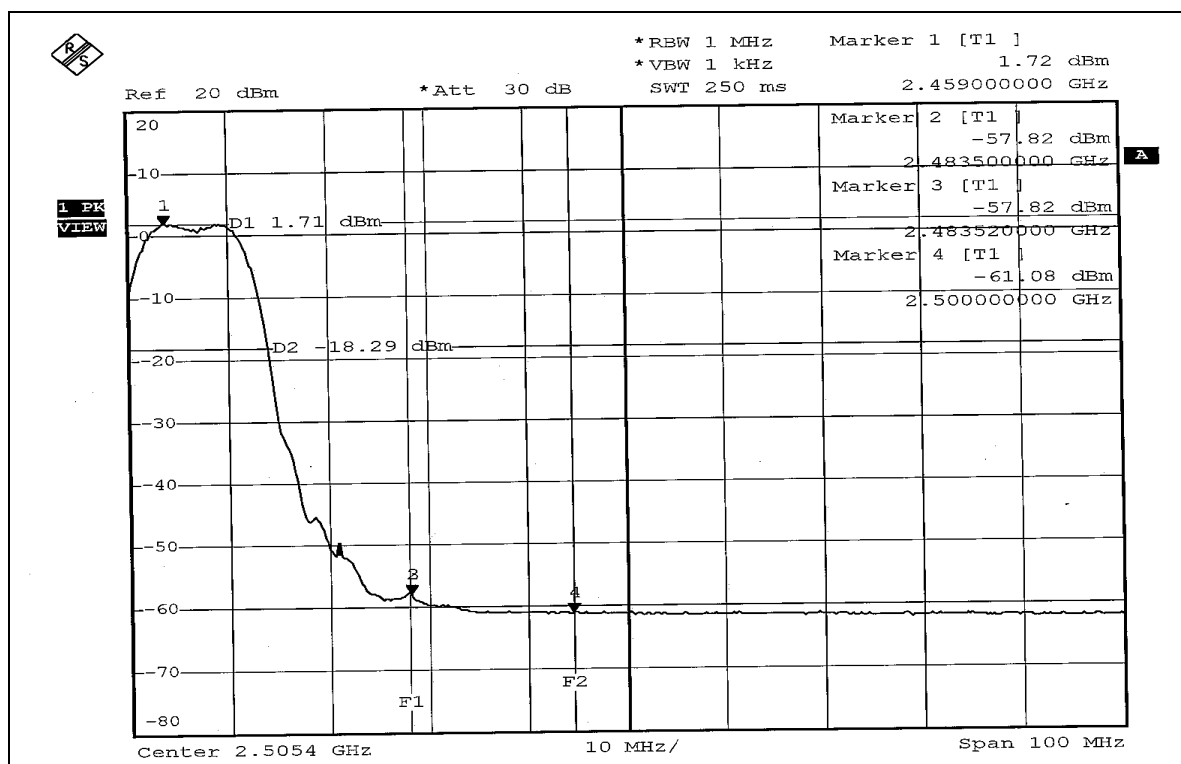
NOTE 2: The band edge emission plot on page 78 shows 49.32dBc between carrier maximum power and local maximum emission in restrict band (2.4916GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 105.66dBuV/m (Peak), so the maximum field strength in restrict band is $105.66 - 49.32 = 56.34$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 79 shows 60.09dBc between carrier maximum power and local maximum emission in restrict band (2.4836GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 95.35dBuV/m (Average), so the maximum field strength in restrict band is $95.35 - 60.09 = 35.26$ dBuV/m which is under 54dBuV/m limit.

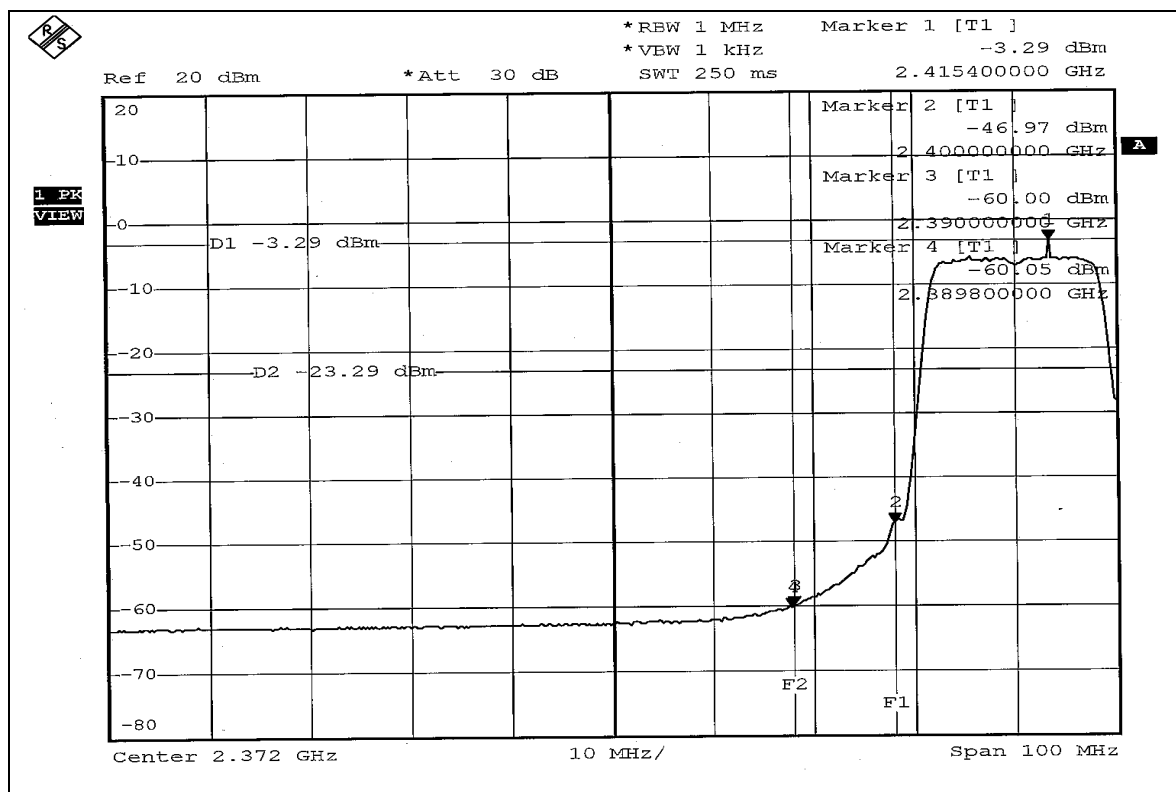
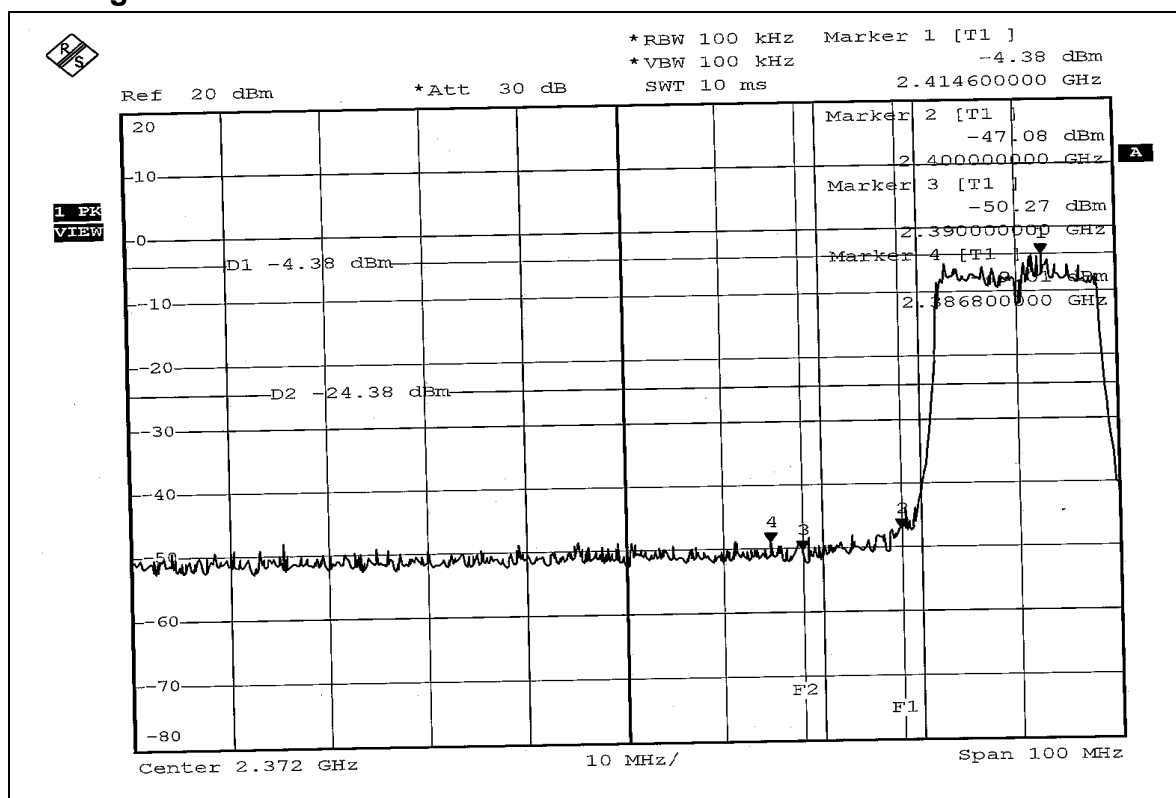
802.11b DSSS modulation

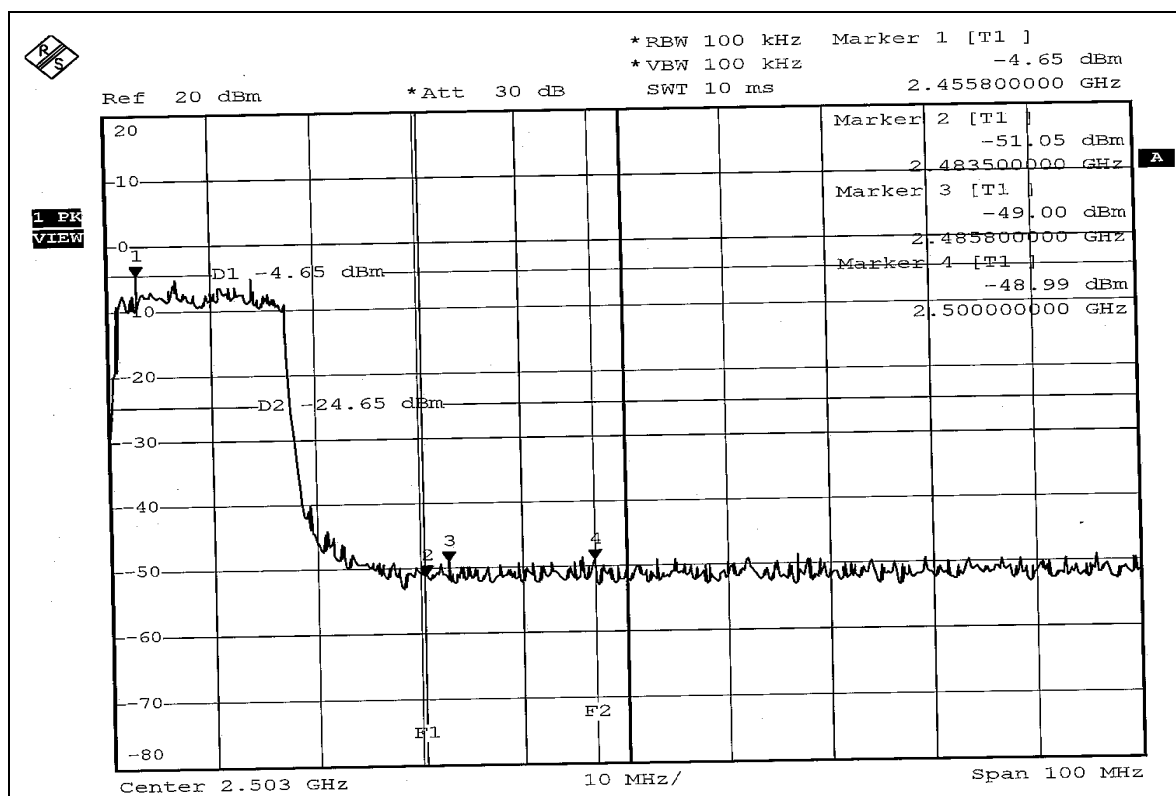
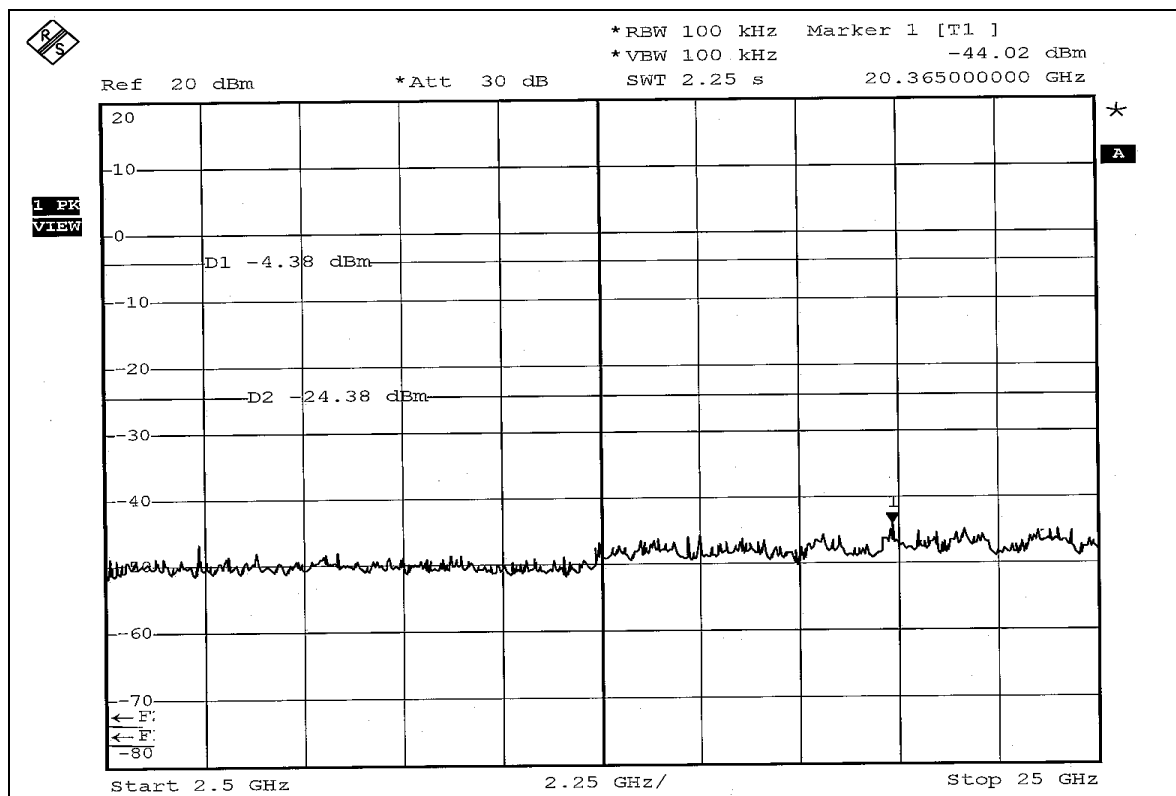


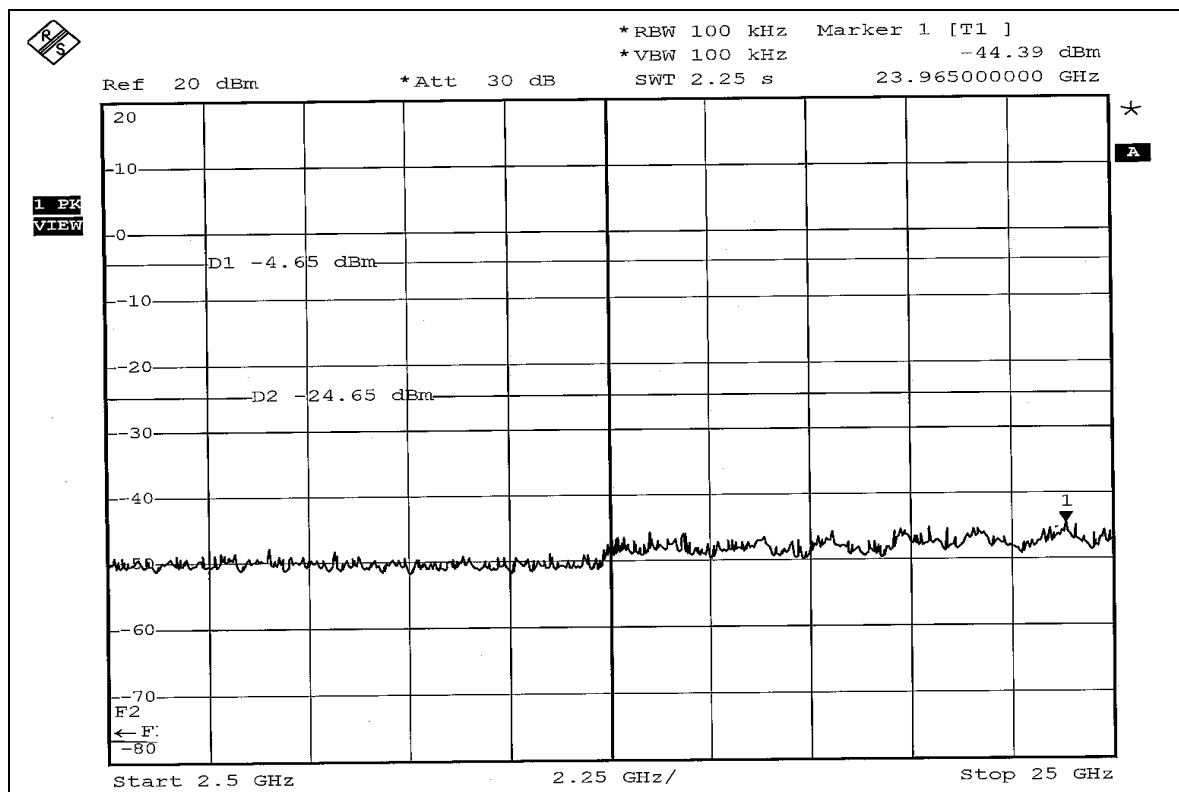
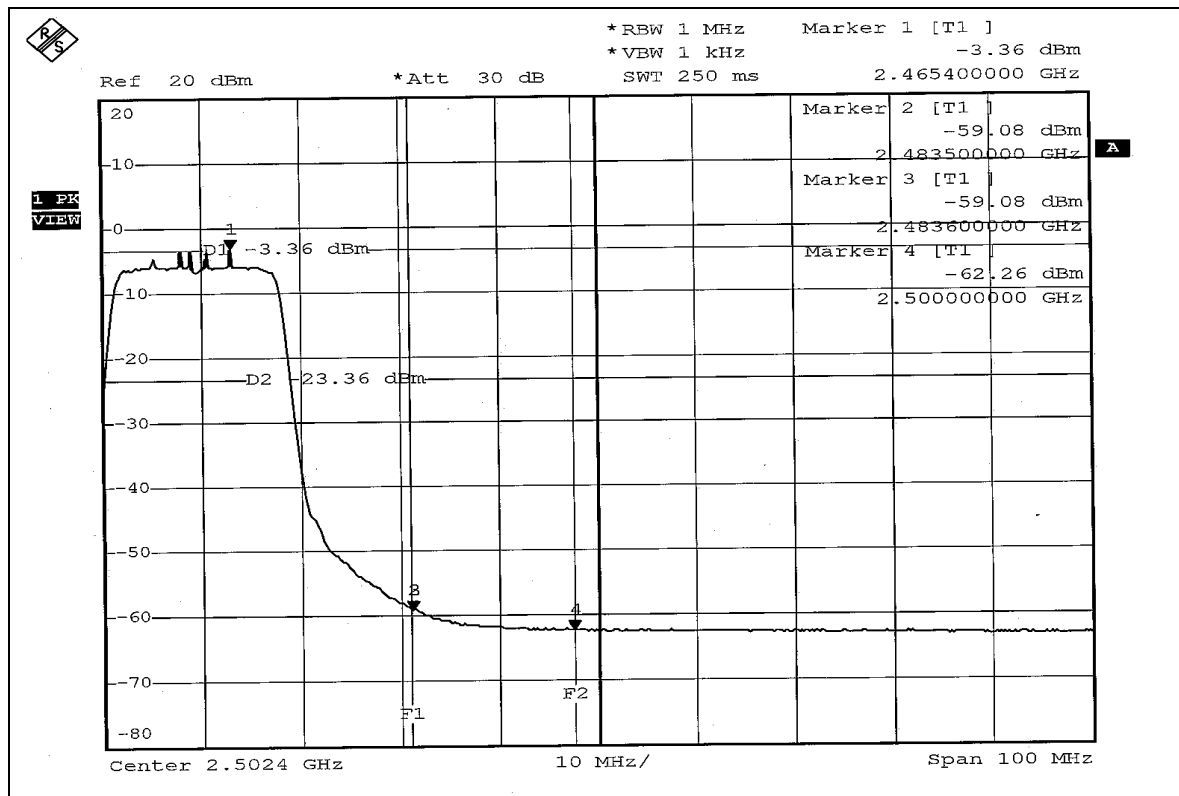


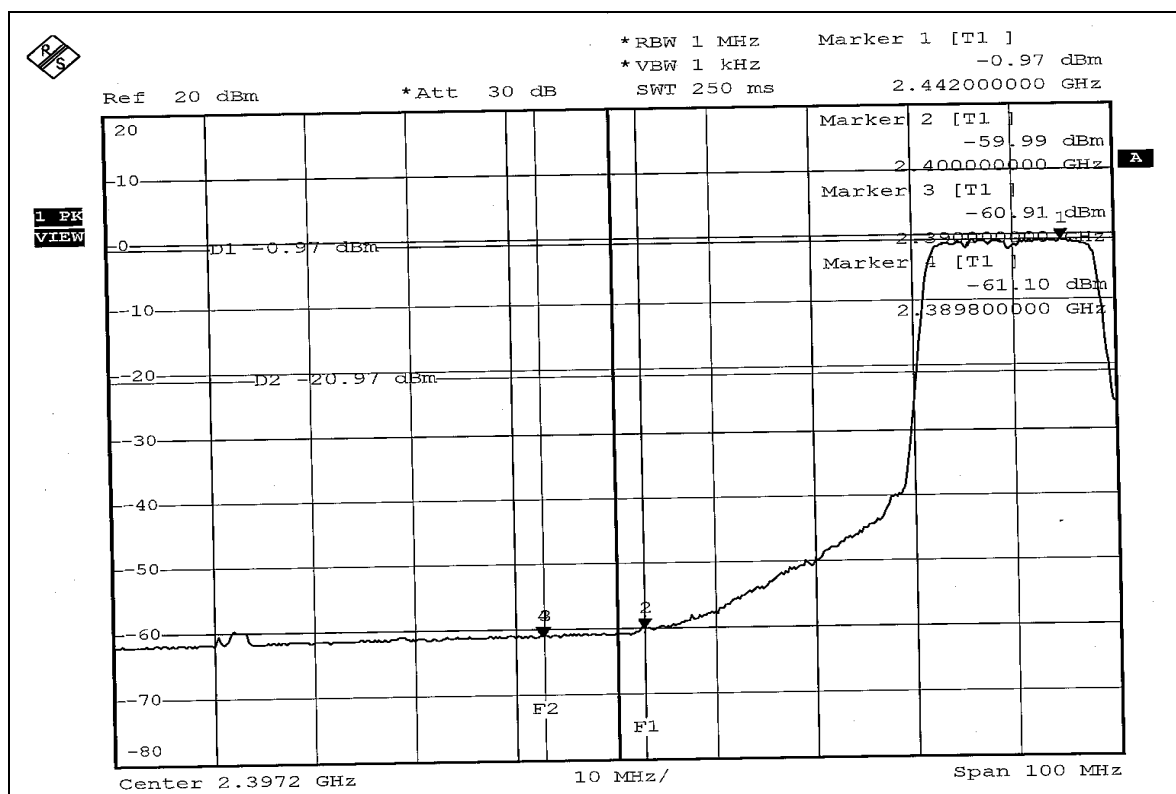
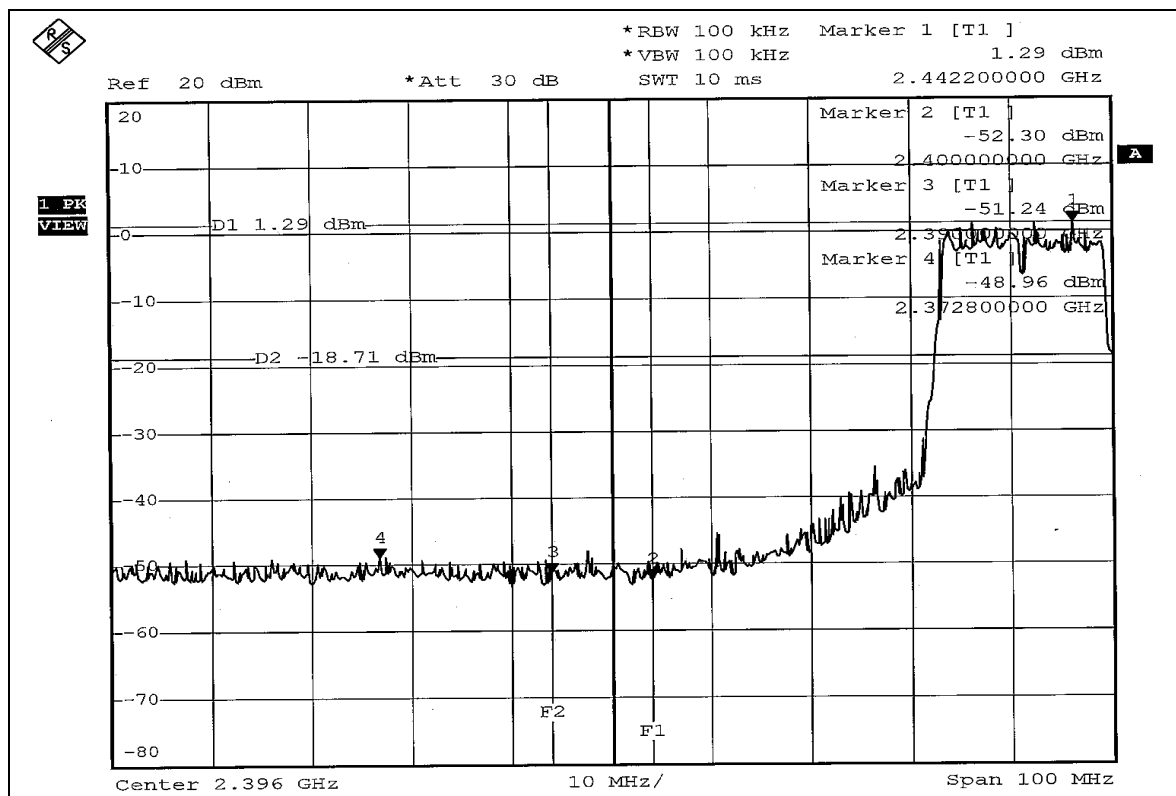


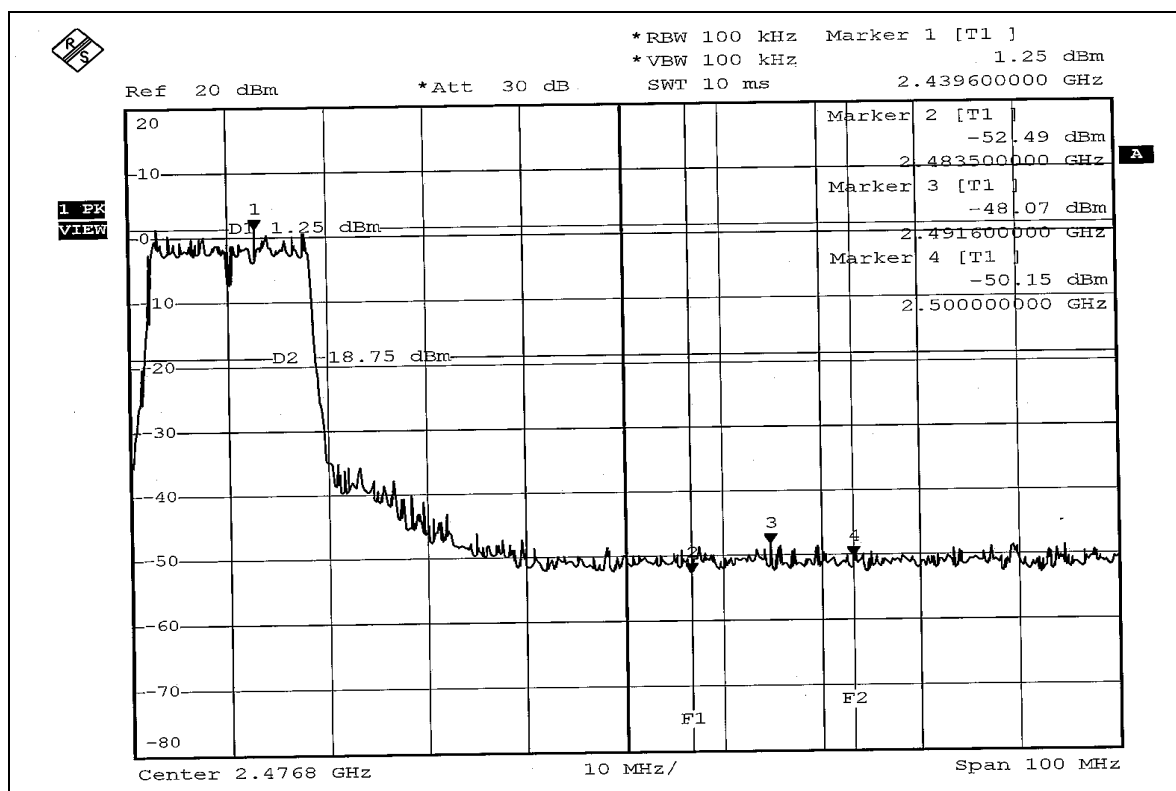
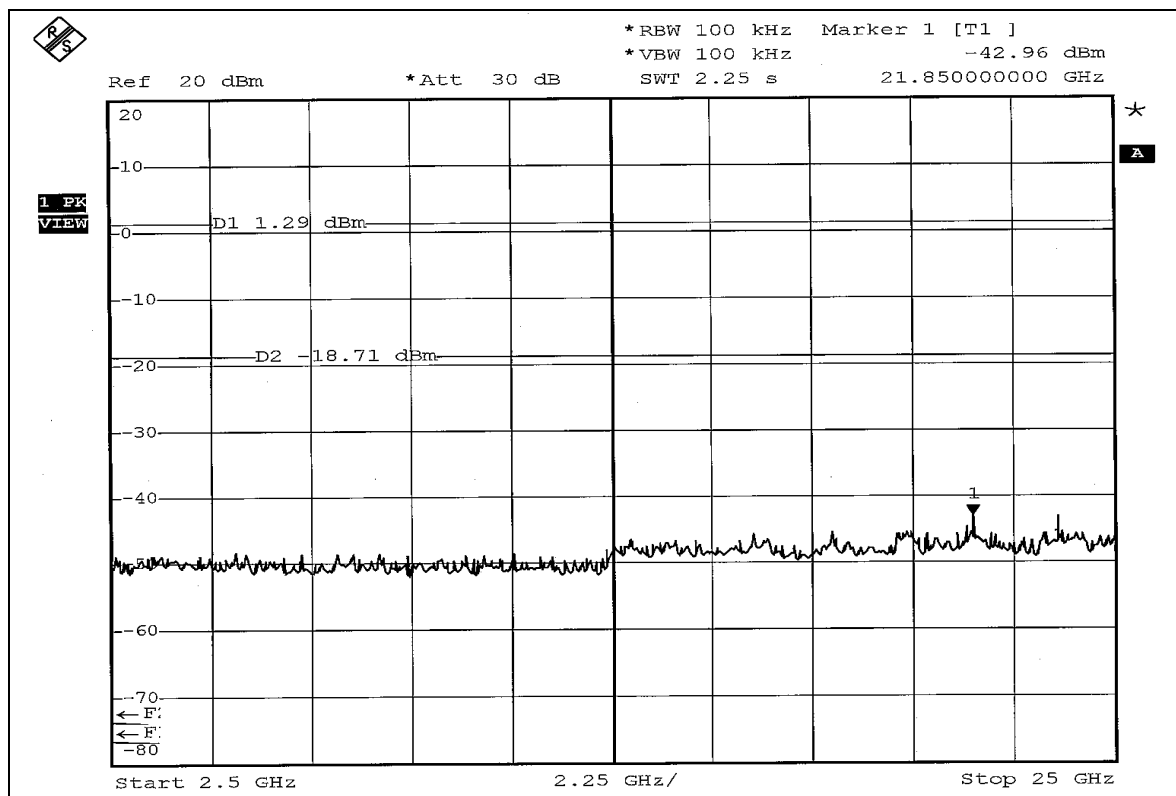
802.11g OFDM modulation

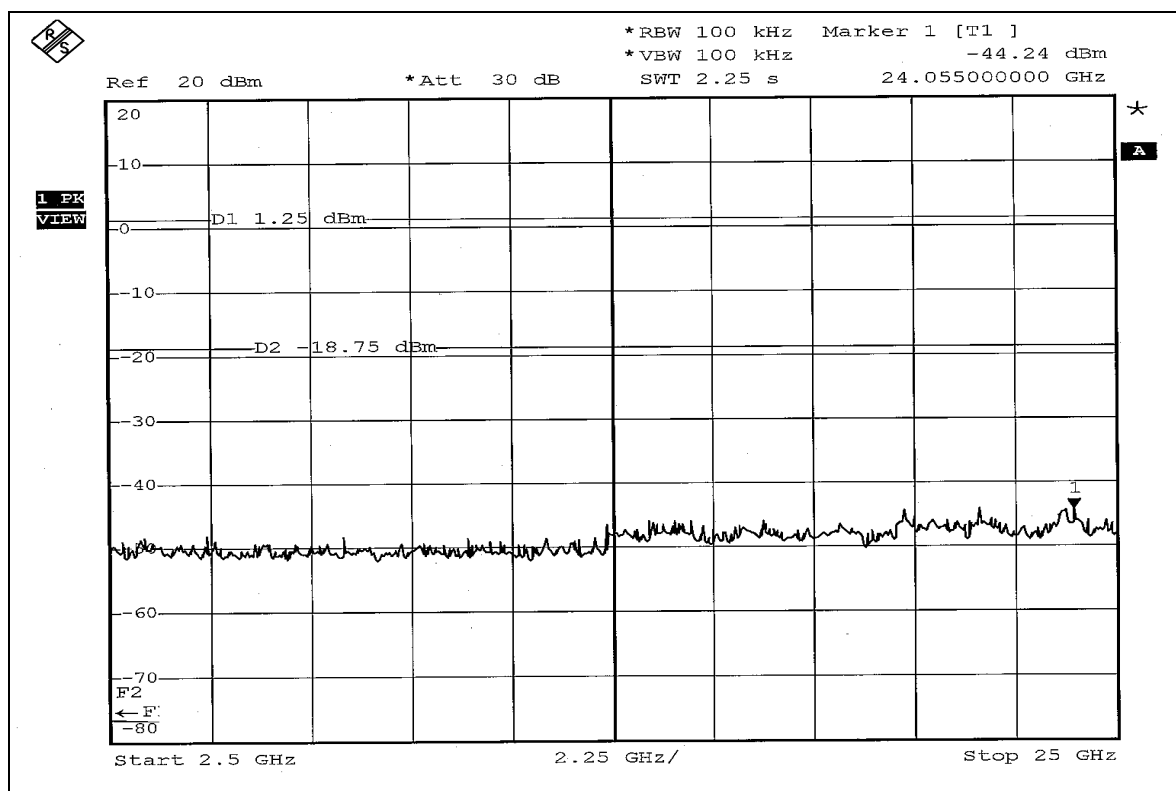
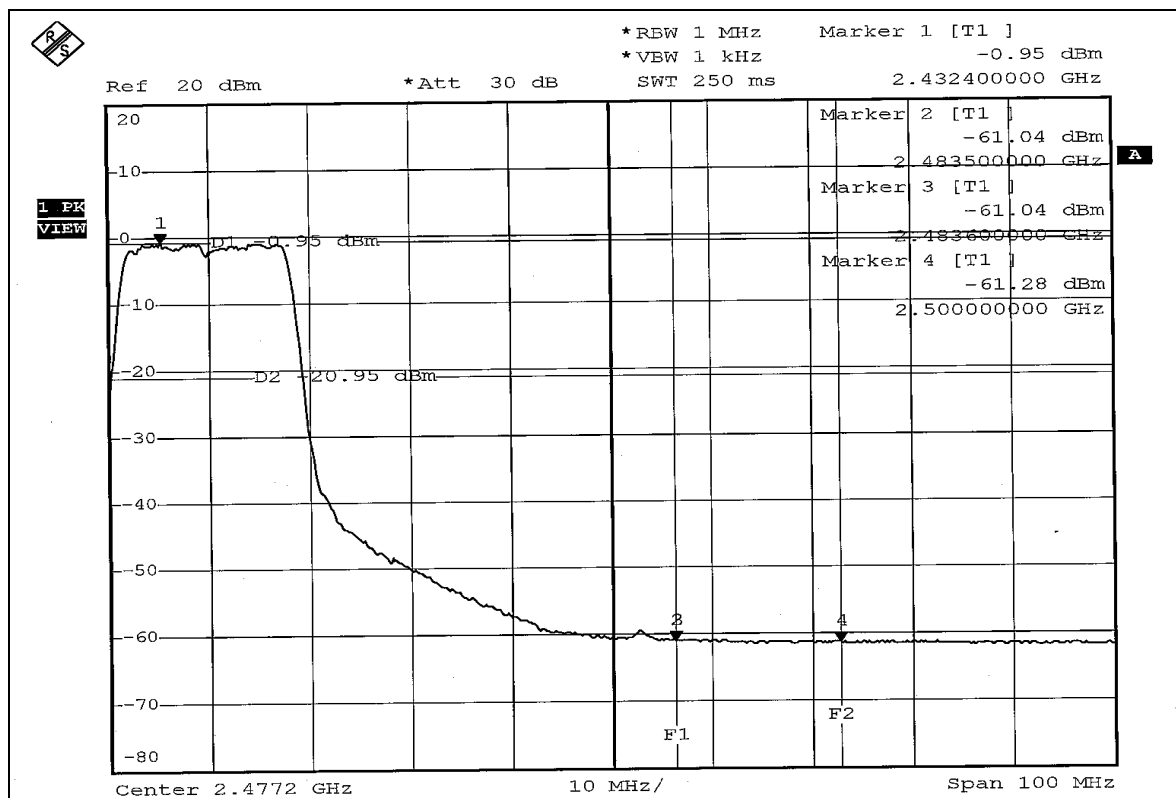






802.11g Turbo OFDM modulation





4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA antenna without antenna connector, Dipole antenna with MHF antenna connector and Printed Dipole antenna with I-PEX antenna connector. The maximum Gain of the antenna is 3.0dBi.

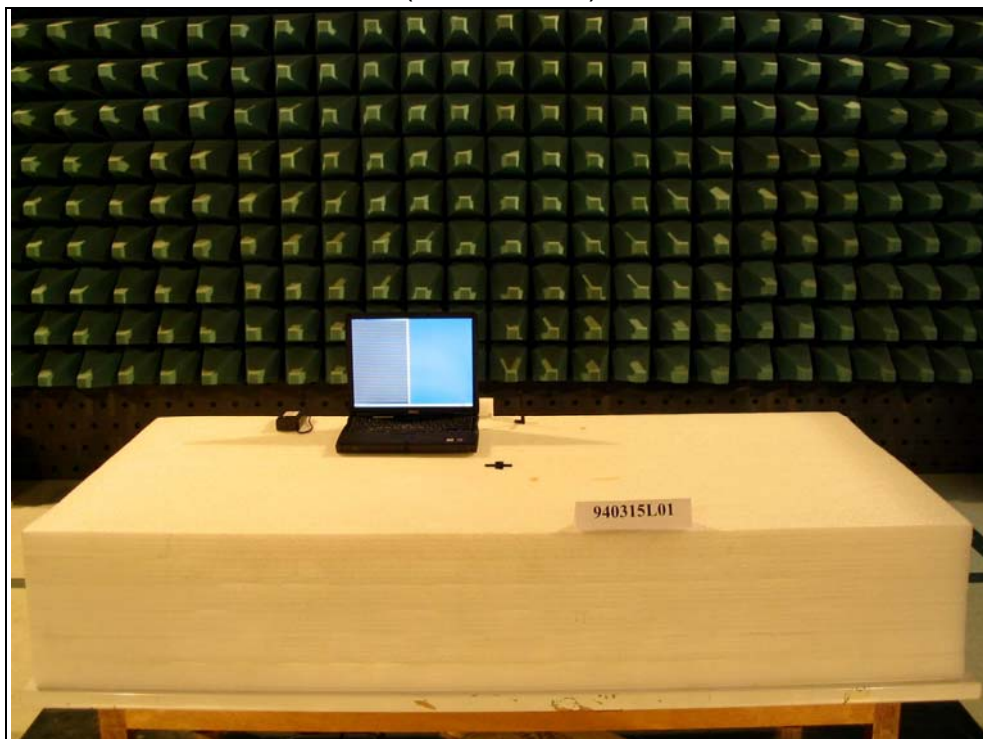
5. PHOTOGRAPHS OF THE TEST CONFIGURATION

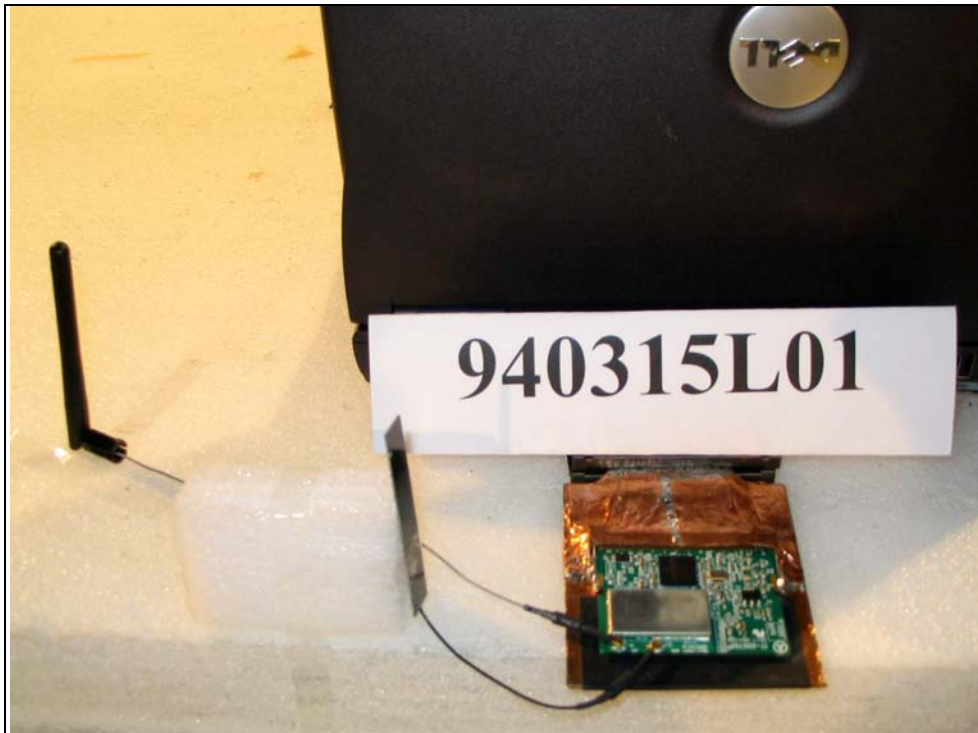
CONDUCTED EMISSION TEST



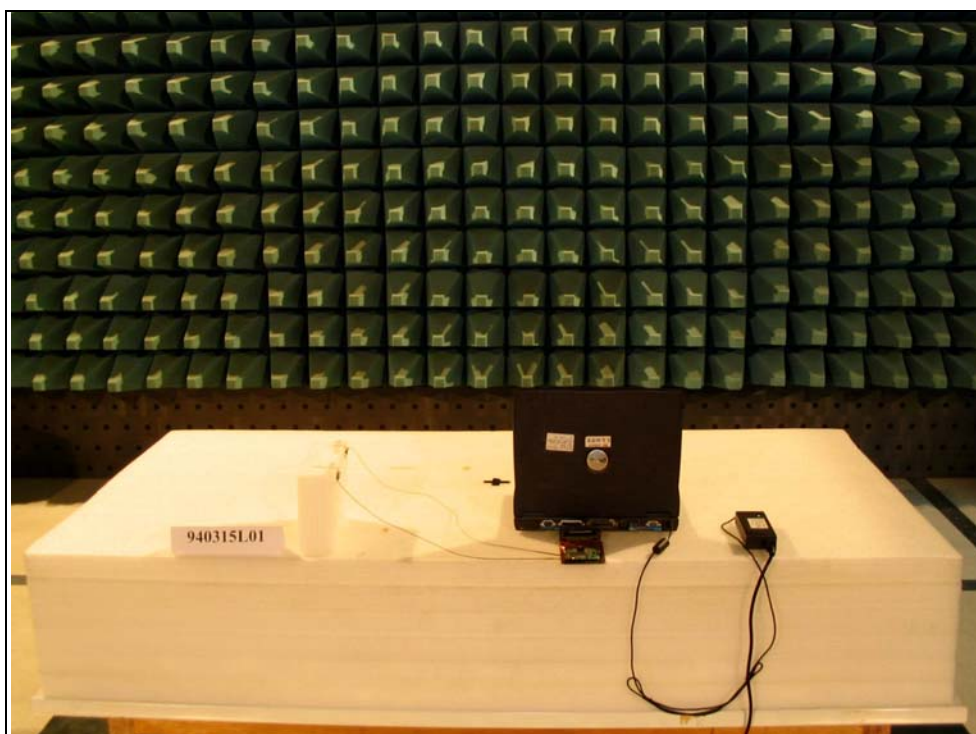


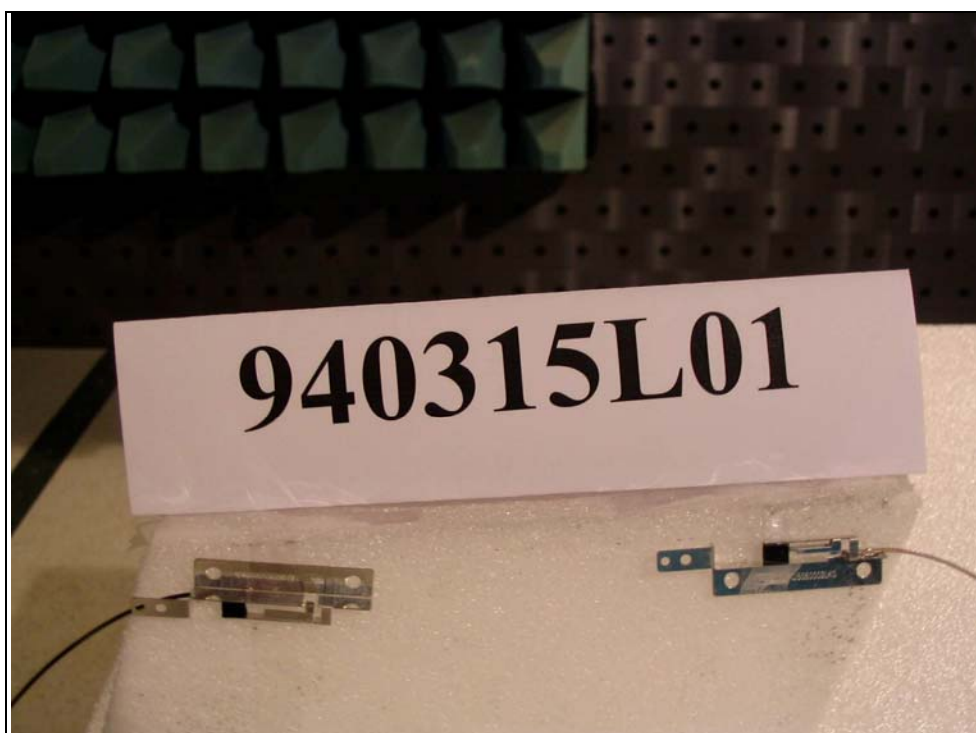
RADIATED EMISSION TEST (Test Mode 1)





RADIATED EMISSION TEST (Test Mode 2)





6. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

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Fax: 886-3-3185050

Linko RF Lab.

Tel: 886-3-3270910

Fax: 886-3-3270892

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also