

FCC TEST REPORT (15.407)

REPORT NO.: RF940106L04
MODEL NO.: PK292010700 (with miniPCI
WLAN WMIA-123AG47)
RECEIVED: Jan. 06, 2005
TESTED: Feb. 14 ~ Mar. 17, 2005
ISSUED: Mar. 22, 2005

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0528
ILAC MRA



No. 2177-01



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1. CERTIFICATION

PRODUCT: Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)
BRAND NAME: Motion Computing
MODEL NO.: PK292010700 (with miniPCI WLAN WMIA-123AG47)
APPLICANT: Gemtek Technology Co., Ltd.
TEST SAMPLE: Engineering Sample
TESTED: Feb. 14 ~ Mar. 17, 2005
STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.4-2003

The above equipment has 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 : Andrea Hsia , **DATE:** Mar. 22, 2005
(Andrea Hsia)

TECHNICAL
ACCEPTANCE : Gary Chang , **DATE:** Mar. 22, 2005
Responsible for (Gary Chang)
RF

APPROVED BY : Cody Chang , **DATE:** Mar. 22, 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 E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.65dB at 0.564MHz
15.407(b/1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.58dB at 57.21MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	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	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)
MODEL NO.	PK292010700 (with miniPCI WLAN WMIA-123AG47)
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	For WLAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM For Bluetooth: GFSK
MODULATION TECHNOLOGY	For WLAN: DSSS, OFDM For Bluetooth: FHSS
TRANSFER RATE	For WLAN: 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11a: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 5) For Bluetooth: 732kbps
FREQUENCY RANGE	For WLAN: 802.11b & 802.11g: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz For Bluetooth: 2402 MHz ~ 2480 MHz
NUMBER OF CHANNEL	For WLAN: 802.11b & 802.11g: 11 802.11a: 13 for Normal mode / 5 for Turbo mode For Bluetooth: 79
CHANNEL SPACING	For WLAN: 802.11b & 802.11g: 5MHz 802.11a: 20MHz for Normal mode / 40MHz for Turbo mode For Bluetooth: 1MHz
OUTPUT POWER	For WLAN: 80.724mW for 802.11b 70.795mW for 802.11g 38.905mW for 5.150 ~ 5.350GHz 40.458mW for 5.725 ~ 5.850GHz For Bluetooth: 52.481mW
ANTENNA TYPE	For WLAN: 802.11b & 802.11g: Patch antenna with 0.02dBi gain 802.11a: Patch antenna with 1.05dBi gain For Bluetooth: Integrated Printed with 0.5dBi gain
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA



NOTE:

1. The EUT is installed in a tablet PC which brand is Motion and the model is PK292010700.
2. The tablet PC is power by following adapter:

Brand	DELTA ELECTRONICS, INC.
Model	ADP-50HH REV.A
Input	100-240Vac, 50~60Hz, 1.5A
Output	19Vdc, 2.64A
Power Line	AC 1.8m non-shielded cable without core DC 1.8m non-shielded cable with one core

3. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
4. Bluetooth technology is used in this EUT.
5. This EUT is capable of providing data rates of up to 108 Mbps in 802.11a Turbo mode depending upon reception quality.
6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 5150 ~ 5250MHz, 5250MHz ~ 5350MHz bands:

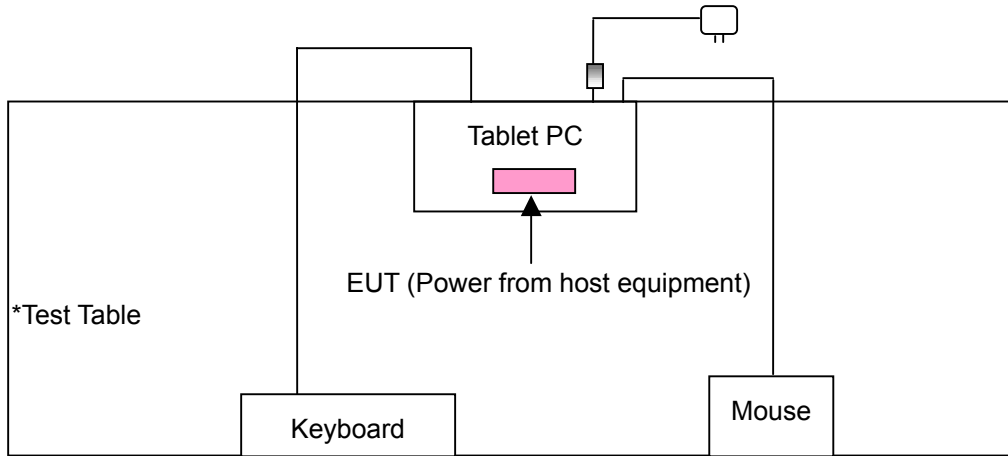
Eight channels are provided to this EUT for normal mode.

Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz
5	5260 MHz
6	5280 MHz
7	5300 MHz
8	5320 MHz

Three channels are provided to this EUT for turbo mode.

Channel	Frequency
1	5210 MHz
2	5250 MHz
3	5290 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	
-	X	X	X	X	-

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
 RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

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, XYZ Axis 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)	Axis
802.11a	1 to 8	3	OFDM	BPSK	6	Z

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, XYZ Axis 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)	Axis
802.11a	1 to 8	3	OFDM	BPSK	6	Z

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, XYZ Axis 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)	Axis
802.11a	1 to 8	1, 4, 5, 8	OFDM	BPSK	6	Z
802.11a Turbo	1 to 3	1, 2, 3	OFDM	BPSK	12	Z



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)
802.11a	1 to 8	1, 8	OFDM	BPSK	6
802.11a Turbo	1 to 3	1, 3	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)
802.11a	1 to 8	1, 4, 5, 8	OFDM	BPSK	6
802.11a Turbo	1 to 3	1, 2, 3	OFDM	BPSK	12



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN). According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

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	TABLET PC	MOTION	PK292010700	NA	FCC DoC Approved
2	USB KEYBOARD	BTC	5200U	G09302046570	E5XKB5122U
3	MOUSE	DELL	M056U0	349003922	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.5m shielded cable without core
3	1.8m shielded cable without core

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



4. TEST TYPES AND RESULTS (5150 ~ 5350MHz Band)

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.



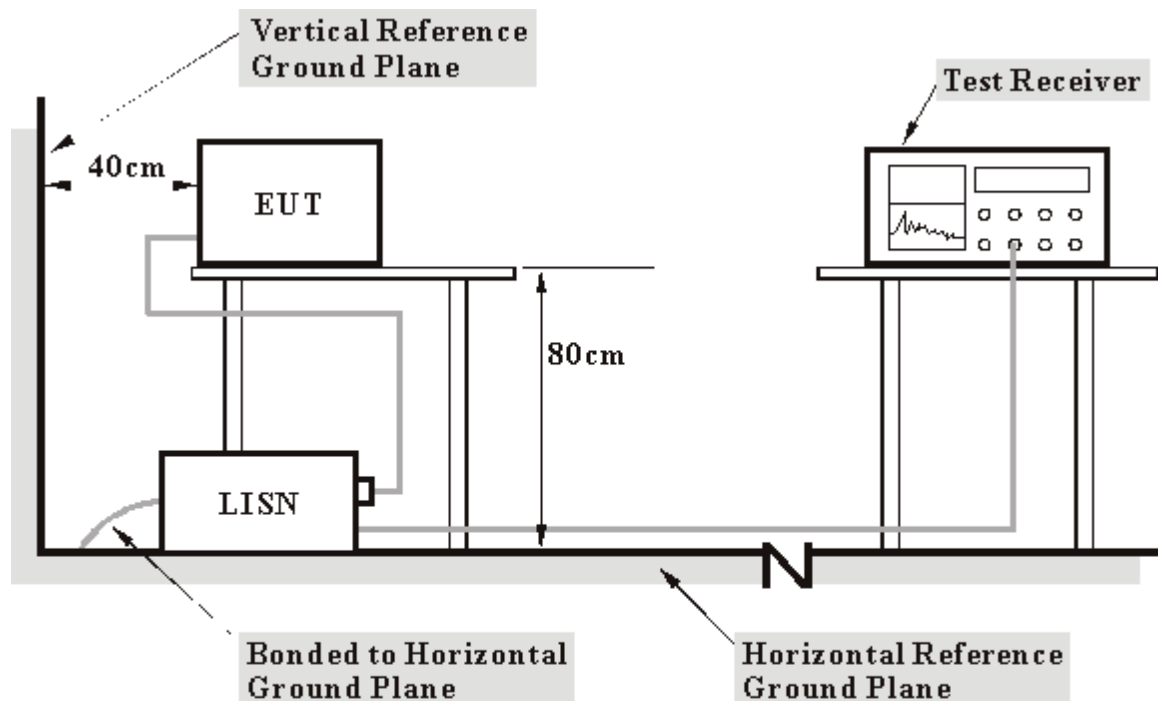
4.1.3 TEST PROCEDURES

- 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 Tablet PC and placed on the testing table.
- b. The Tablet PC run a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The Tablet PC sent "H" messages to its screen.



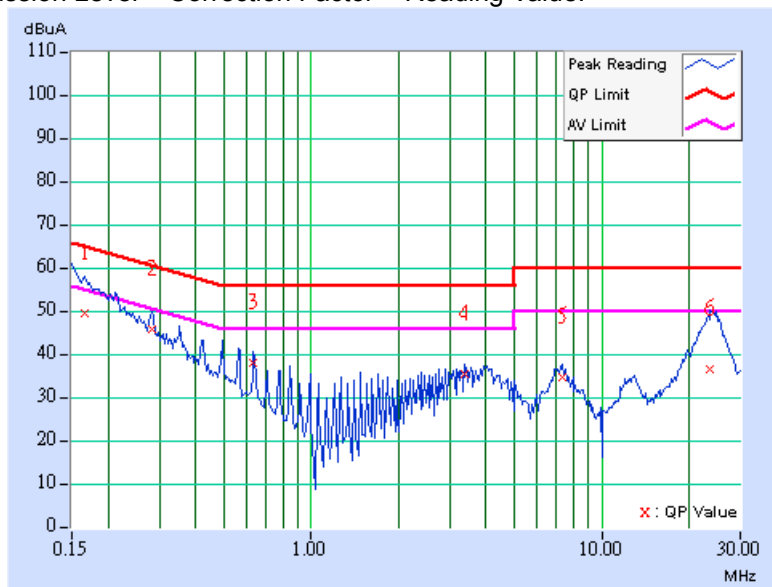
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 3	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	0.166	0.10	48.59	-	48.69	-	65.18
2	0.283	0.11	44.81	-	44.92	-	60.73	50.73	-15.81	-
3	0.634	0.14	37.25	-	37.39	-	56.00	46.00	-18.61	-
4	3.387	0.26	34.54	-	34.80	-	56.00	46.00	-21.20	-
5	7.336	0.40	33.65	-	34.05	-	60.00	50.00	-25.95	-
6	23.695	1.06	35.68	-	36.74	-	60.00	50.00	-23.26	-

- 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.

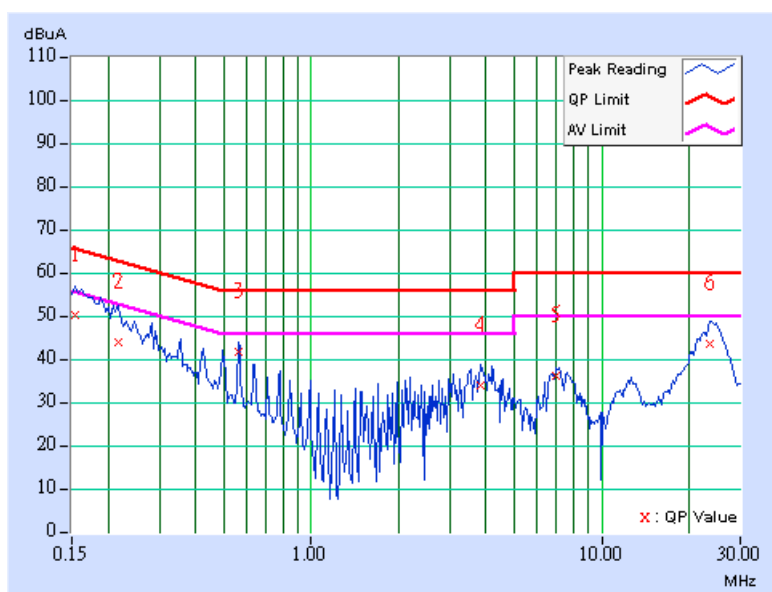




EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 3	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	TESTED 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	0.154	0.10	49.71	-	49.81	-	65.79	55.79	-15.98	-
2	0.216	0.10	43.45	-	43.55	-	62.96	52.96	-19.41	-
3	0.564	0.12	41.23	-	41.35	-	56.00	46.00	-14.65	-
4	3.813	0.27	33.39	-	33.66	-	56.00	46.00	-22.34	-
5	6.926	0.37	35.78	-	36.15	-	60.00	50.00	-23.85	-
6	23.672	0.62	43.21	-	43.83	-	60.00	50.00	-16.17	-

- 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.





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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dB μ V/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

NOTE:

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$



4.2.3 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.



4.2.4 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 10dB 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

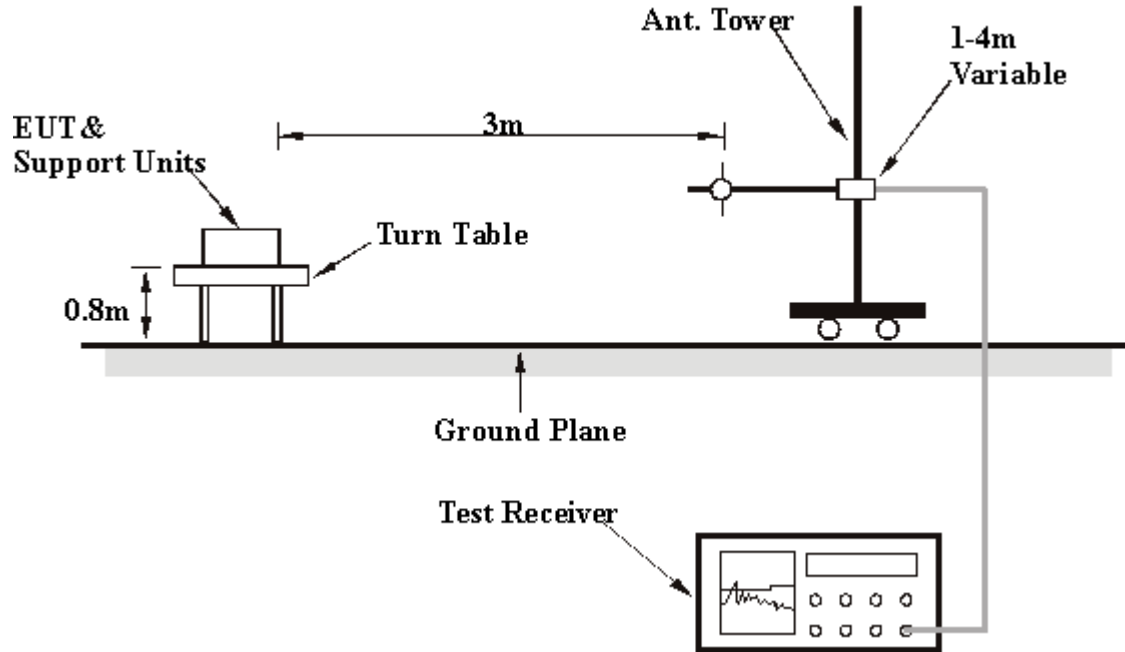
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection 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.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

Below 1GHz Worst-Case Data

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA- 123AG47)
CHANNEL	Channel 3	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 72%RH, 991hPa	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	41.66	25.25 QP	40.00	-14.75	1.50 H	148	10.01	15.25
2	84.43	33.02 QP	40.00	-6.98	1.50 H	274	22.94	10.08
3	119.42	36.38 QP	43.50	-7.12	1.25 H	280	23.40	12.97
4	183.57	34.97 QP	43.50	-8.53	1.25 H	196	22.31	12.66
5	214.67	35.48 QP	43.50	-8.02	1.50 H	295	23.76	11.72
6	255.49	30.19 QP	46.00	-15.81	1.00 H	172	16.88	13.32
7	286.59	37.36 QP	46.00	-8.64	1.00 H	166	23.02	14.33
8	366.29	30.66 QP	46.00	-15.34	1.00 H	295	14.61	16.04
9	399.34	32.72 QP	46.00	-13.28	1.00 H	145	15.93	16.79
10	469.32	35.92 QP	46.00	-10.08	1.50 H	190	17.55	18.37
11	500.42	37.26 QP	46.00	-8.74	1.50 H	244	18.51	18.75
12	549.02	33.37 QP	46.00	-12.63	1.50 H	238	13.63	19.74
13	671.48	31.80 QP	46.00	-14.20	1.00 H	253	9.77	22.03
14	714.25	31.21 QP	46.00	-14.79	1.25 H	148	8.49	22.71
15	916.41	30.74 QP	46.00	-15.26	1.25 H	220	5.28	25.46

- 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



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA- 123AG47)
CHANNEL	Channel 3	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	20deg. C, 72%RH, 991hPa	TESTED BY	Match Tsui

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	57.21	38.42 QP	40.00	-1.58	1.25 V	130	24.43	13.99
2	96.09	32.53 QP	43.50	-10.97	1.25 V	340	21.86	10.68
3	129.14	27.75 QP	43.50	-15.75	1.00 V	112	14.09	13.66
4	166.07	32.27 QP	43.50	-11.23	1.00 V	34	17.99	14.28
5	222.44	31.71 QP	46.00	-14.29	1.25 V	31	19.72	11.99
6	265.21	31.88 QP	46.00	-14.12	1.50 V	28	18.27	13.61
7	333.25	30.02 QP	46.00	-15.98	1.50 V	331	14.73	15.29
8	397.39	31.32 QP	46.00	-14.68	1.50 V	190	14.58	16.75
9	469.32	29.80 QP	46.00	-16.20	2.00 V	106	11.43	18.37
10	500.42	30.14 QP	46.00	-15.86	1.25 V	4	11.39	18.75
11	766.73	31.86 QP	46.00	-14.14	1.25 V	325	8.17	23.68
12	912.53	33.08 QP	46.00	-12.92	1.00 V	310	7.66	25.42

- 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



802.11a OFDM modulation

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA- 123AG47)
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	#5150.00	56.95 PK	74.00	-17.05	1.11 H	313	18.70	38.26
1	#5150.00	47.42 AV	54.00	-6.58	1.11 H	313	9.16	38.26
2	*5180.00	101.56 PK			1.11 H	313	63.26	38.30
2	*5180.00	92.03 AV			1.11 H	313	53.73	38.30
3	6906.00	49.32 PK	68.30	-18.98	1.12 H	1	6.51	42.81
3	6906.00	37.04 AV	54.00	-16.96	1.12 H	1	-5.77	42.81
4	10360.00	60.74 PK	68.30	-7.56	1.00 H	325	12.70	48.04
4	10360.00	47.14 AV	54.00	-6.86	1.00 H	325	-0.90	48.04

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	#5150.00	59.05 PK	74.00	-14.95	1.23 V	250	20.79	38.26
1	#5150.00	49.46 AV	54.00	-4.54	1.23 V	250	11.20	38.26
2	*5180.00	103.66 PK			1.23 V	250	65.36	38.30
2	*5180.00	94.07 AV			1.23 V	250	55.77	38.30
3	6906.00	50.06 PK	68.30	-18.24	1.08 V	208	7.25	42.81
3	6906.00	37.94 AV	54.00	-16.06	1.08 V	208	-4.87	42.81
4	10360.00	65.69 PK	68.30	-2.61	1.22 V	249	17.65	48.04
4	10360.00	50.89 AV	54.00	-3.11	1.22 V	249	2.85	48.04

NOTE:

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
6. "#"The radiated frequency falling in the restricted band.



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	*5240.00	100.32 PK			1.26 H	264	61.94	38.38
1	*5240.00	89.57 AV			1.26 H	264	51.19	38.38
2	6986.00	49.75 PK	68.30	-18.55	1.04 H	142	6.65	43.10
3	10480.00	57.29 PK	68.30	-11.01	1.23 H	209	9.01	48.28

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	*5240.00	103.69 PK			1.08 V	253	65.31	38.38
1	*5240.00	94.29 AV			1.08 V	253	55.91	38.38
2	6986.00	50.41 PK	68.30	-17.89	1.10 V	180	7.31	43.10
3	10480.00	62.58 PK	68.30	-5.72	1.14 V	266	14.30	48.28

- NOTE:**
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
 6. "#"The radiated frequency falling in the restricted band.



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	*5260.00	99.61 PK			1.12 H	329	61.21	38.40
1	*5260.00	89.68 AV			1.12 H	329	51.28	38.40
2	7013.00	49.53 PK	68.30	-18.77	1.11 H	21	6.36	43.18
3	10520.00	58.42 PK	68.30	-9.88	1.05 H	172	10.06	48.36

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	*5260.00	103.76 PK			1.09 V	255	65.36	38.40
1	*5260.00	93.49 AV			1.09 V	255	55.09	38.40
2	5260.00	55.83 PK	68.30	-12.47	1.14 V	83	17.43	38.40
3	7013.00	51.42 PK	68.30	-16.88	1.08 V	1	8.25	43.18

- NOTE:**
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
 6. "#" The radiated frequency falling in the restricted band.



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 8	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	*5320.00	101.05 PK			1.25 H	328	62.57	38.48
1	*5320.00	91.57 AV			1.25 H	328	53.09	38.48
2	#5350.00	50.03 PK	74.00	-23.97	1.25 H	328	11.52	38.52
3	7093.00	49.98 PK	68.30	-18.32	1.24 H	120	6.63	43.35
4	#10640.00	57.43 PK	74.00	-16.57	1.16 H	94	8.86	48.57
4	#10640.00	44.65 AV	54.00	-9.35	1.16 H	94	-3.92	48.57

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	*5320.00	104.06 PK			1.44 V	299	65.58	38.48
1	*5320.00	92.92 AV			1.44 V	299	54.44	38.48
2	#5350.00	53.04 PK	74.00	-20.96	1.44 V	299	14.52	38.52
2	#5350.00	41.90 AV	54.00	-12.10	1.44 V	299	3.38	38.52
3	7093.00	50.84 PK	68.30	-17.46	1.08 V	112	7.50	43.35
4	#10640.00	62.17 PK	74.00	-11.83	1.12 V	85	13.60	48.57
4	#10640.00	49.93 AV	54.00	-4.07	1.12 V	85	1.36	48.57

- NOTE:**
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
 6. "#": The radiated frequency falling in the restricted band.



802.11a Turbo OFDM modulation

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	#5150.00	55.28 PK	74.00	-18.72	1.01 H	325	17.02	38.26
1	#5150.00	45.23 AV	54.00	-8.77	1.01 H	325	6.97	38.26
2	*5210.00	98.35 PK			1.01 H	325	60.01	38.34
2	*5210.00	88.30 AV			1.01 H	325	49.96	38.34
3	6946.00	49.05 PK	68.30	-19.25	1.12 H	120	6.09	42.96
4	10420.00	57.31 PK	68.30	-10.99	1.30 H	28	9.13	48.18

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	#5150.00	58.72 PK	74.00	-15.28	1.11 V	254	20.46	38.26
1	#5150.00	49.02 AV	54.00	-4.98	1.11 V	254	10.77	38.26
2	*5210.00	101.39 PK			1.11 V	254	63.05	38.34
2	*5210.00	90.89 AV			1.11 V	254	52.55	38.34
3	6946.00	50.50 PK	68.30	-17.80	1.23 V	213	7.54	42.96
4	10420.00	60.65 PK	68.30	-7.65	1.15 V	82	12.47	48.18

- NOTE:**
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
 6. "#"The radiated frequency falling in the restricted band.



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	*5250.00	99.48 PK			1.00 H	325	61.09	38.39
1	*5250.00	90.06 AV			1.00 H	325	51.67	38.39
2	7000.00	49.75 PK	68.30	-18.55	1.07 H	100	6.60	43.15
3	10500.00	55.84 PK	68.30	-12.46	1.05 H	165	7.52	48.32

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	*5250.00	101.86 PK			1.09 V	248	63.47	38.39
1	*5250.00	90.76 AV			1.09 V	248	52.37	38.39
2	7000.00	50.76 PK	68.30	-17.54	1.11 V	210	7.61	43.15
3	10500.00	61.11 PK	68.30	-7.19	1.19 V	72	12.79	48.32

- NOTE:**
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
 6. "#": The radiated frequency falling in the restricted band.



EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 66%RH, 991hPa	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	*5290.00	99.53 PK			1.10 H	322	61.09	38.44
1	*5290.00	89.57 AV			1.10 H	322	51.13	38.44
2	#5350.00	50.66 PK	74.00	-23.34	1.10 H	322	12.14	38.52
2	#5350.00	40.70 AV	54.00	-13.30	1.10 H	322	2.19	38.52
3	7053.00	49.93 PK	68.30	-18.37	1.20 H	111	6.67	43.26
4	10580.00	56.56 PK	68.30	-11.74	1.14 H	322	8.09	48.47

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	*5290.00	102.05 PK			1.44 V	292	63.61	38.44
1	*5290.00	92.69 AV			1.44 V	292	54.25	38.44
2	#5350.00	53.18 PK	74.00	-20.82	1.44 V	292	14.66	38.52
2	#5350.00	43.82 AV	54.00	-10.18	1.44 V	292	5.30	38.52
3	7053.00	50.90 PK	68.30	-17.40	1.21 V	300	7.64	43.26
4	10580.00	63.27 PK	68.30	-5.03	1.14 V	85	14.80	48.47

- NOTE:**
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
 6. "#"The radiated frequency falling in the restricted band.



4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 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.



4.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 3MHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

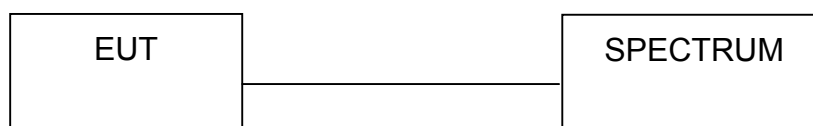
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

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 specific channel frequencies individually.



4.3.7 TEST RESULTS

802.11a OFDM modulation

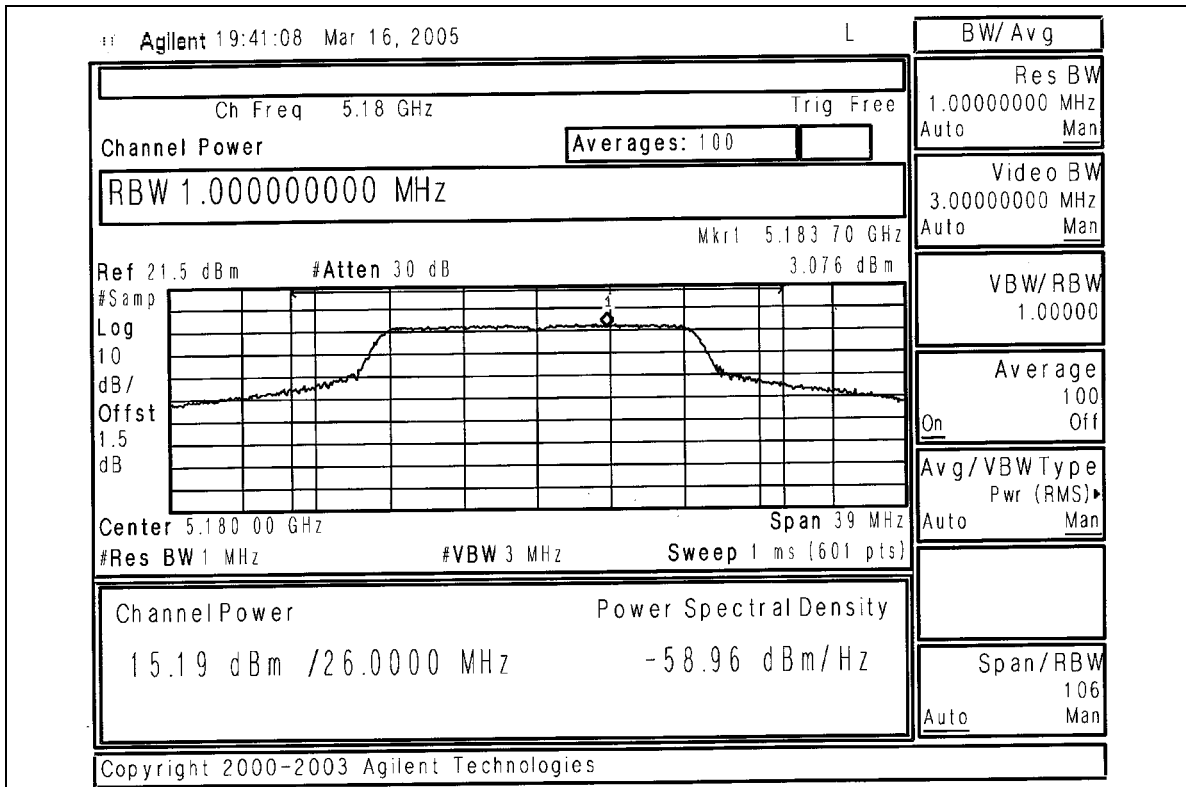
EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUEN CY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	33.037	15.19	17.00	25.28	PASS
4	5240	36.983	15.68	17.00	25.92	PASS
5	5260	37.931	15.79	24.00	24.88	PASS
8	5320	37.757	15.77	24.00	25.44	PASS

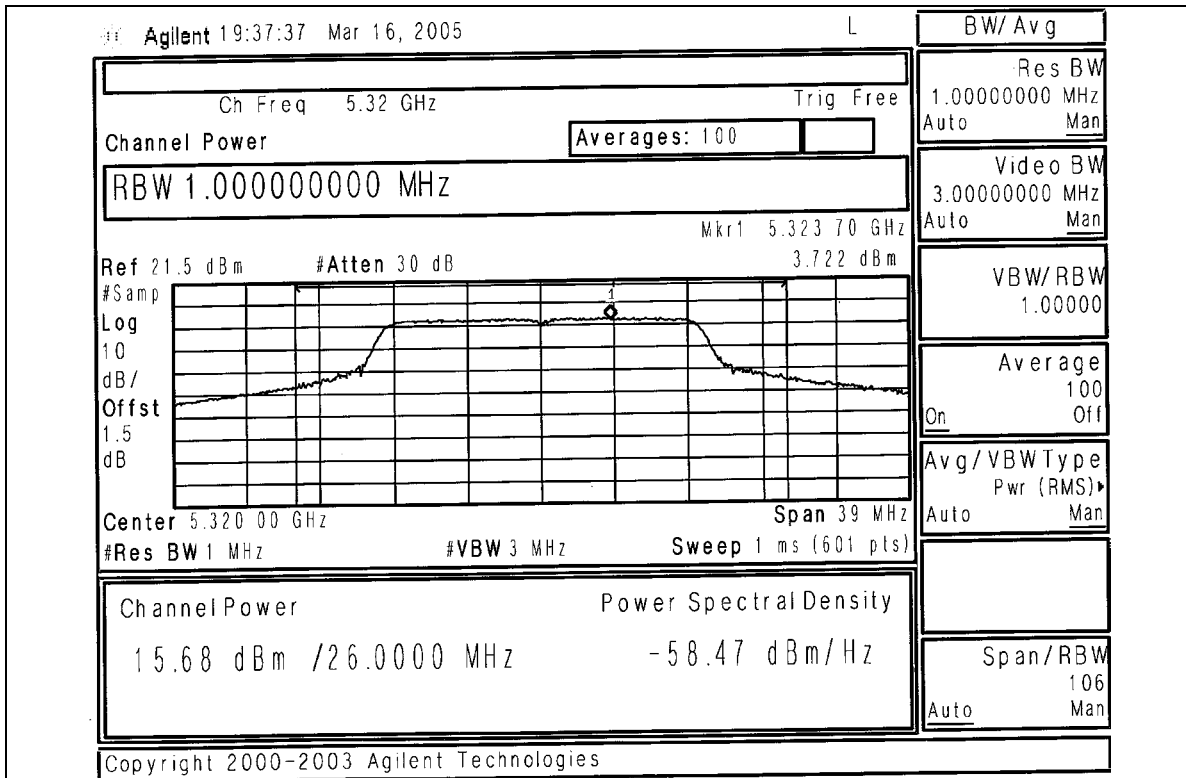
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.



Peak Power Output:
CH 1

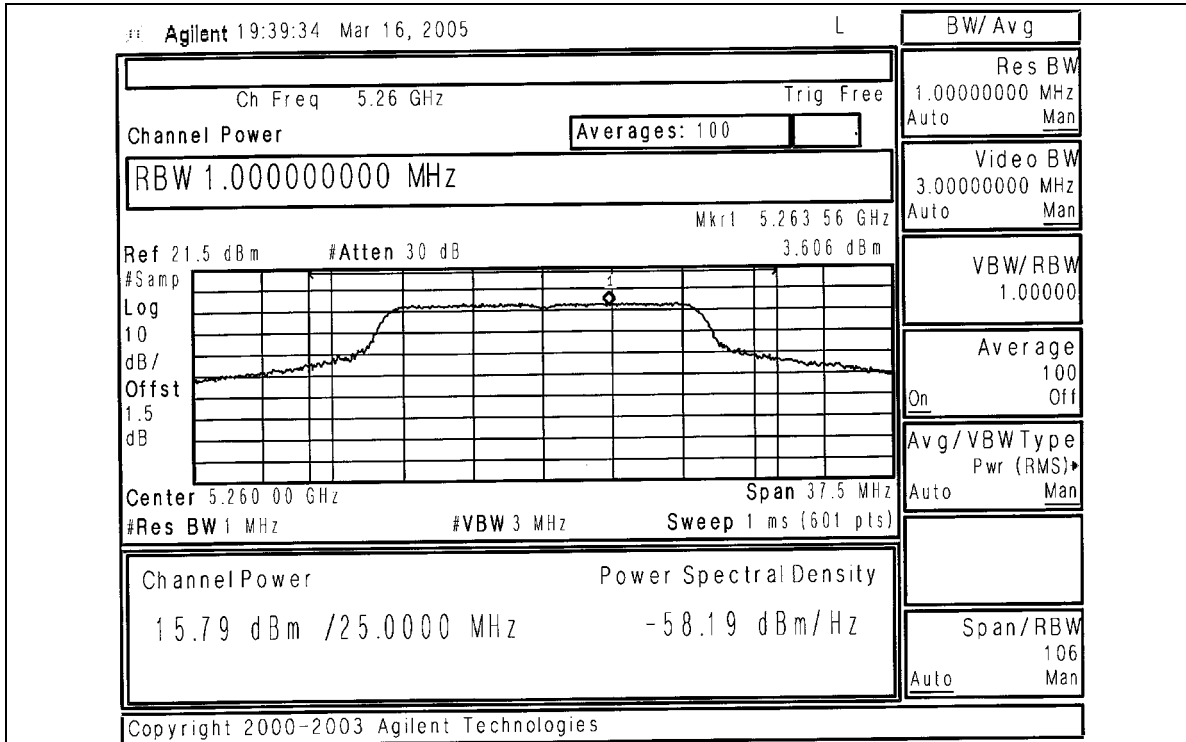


CH 4

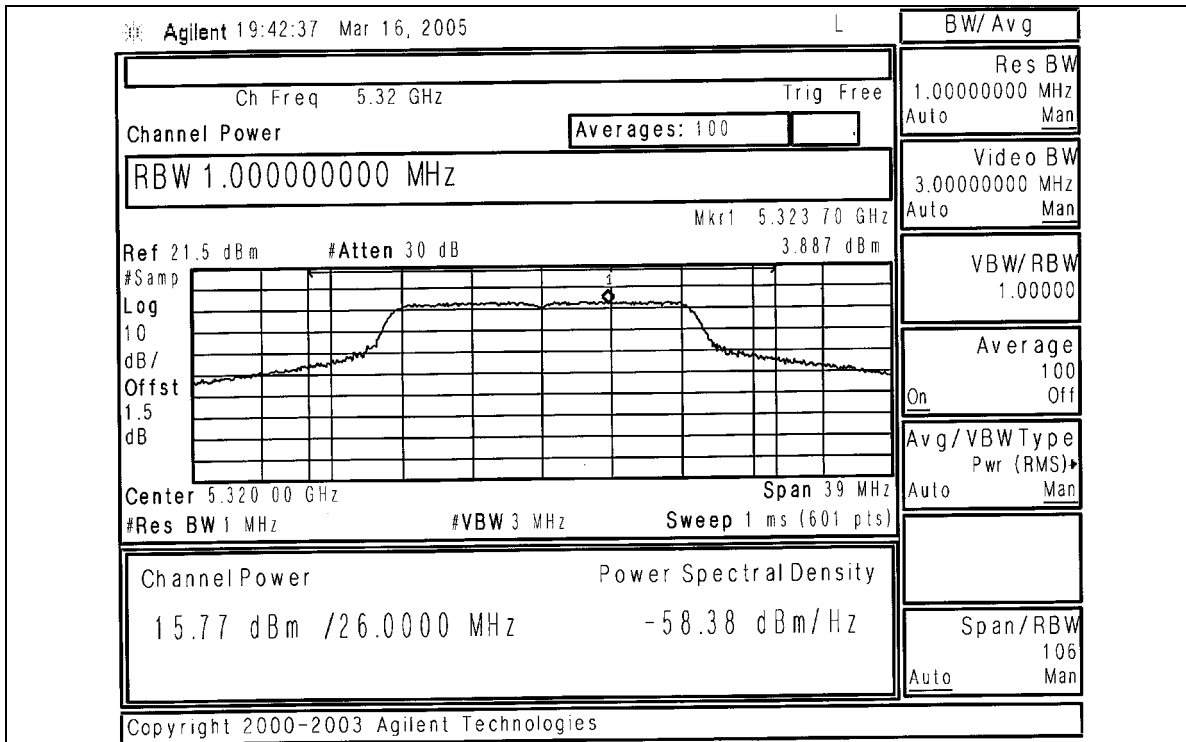




CH 5

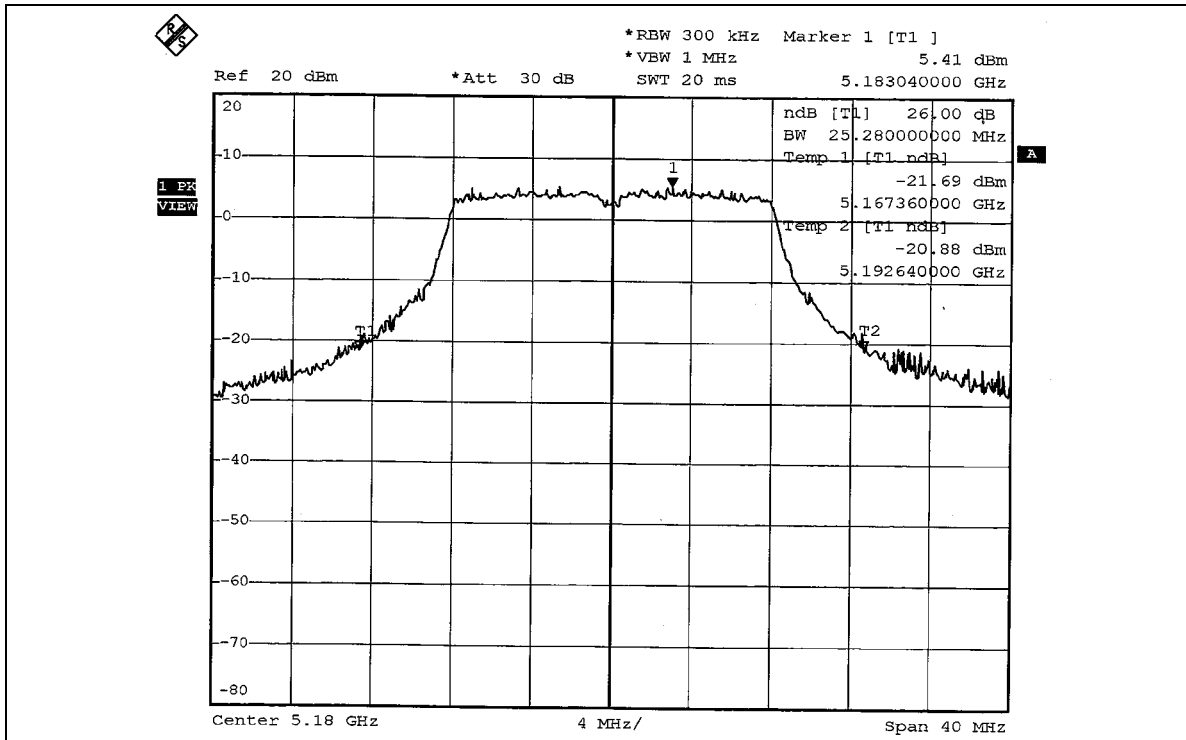


CH 8

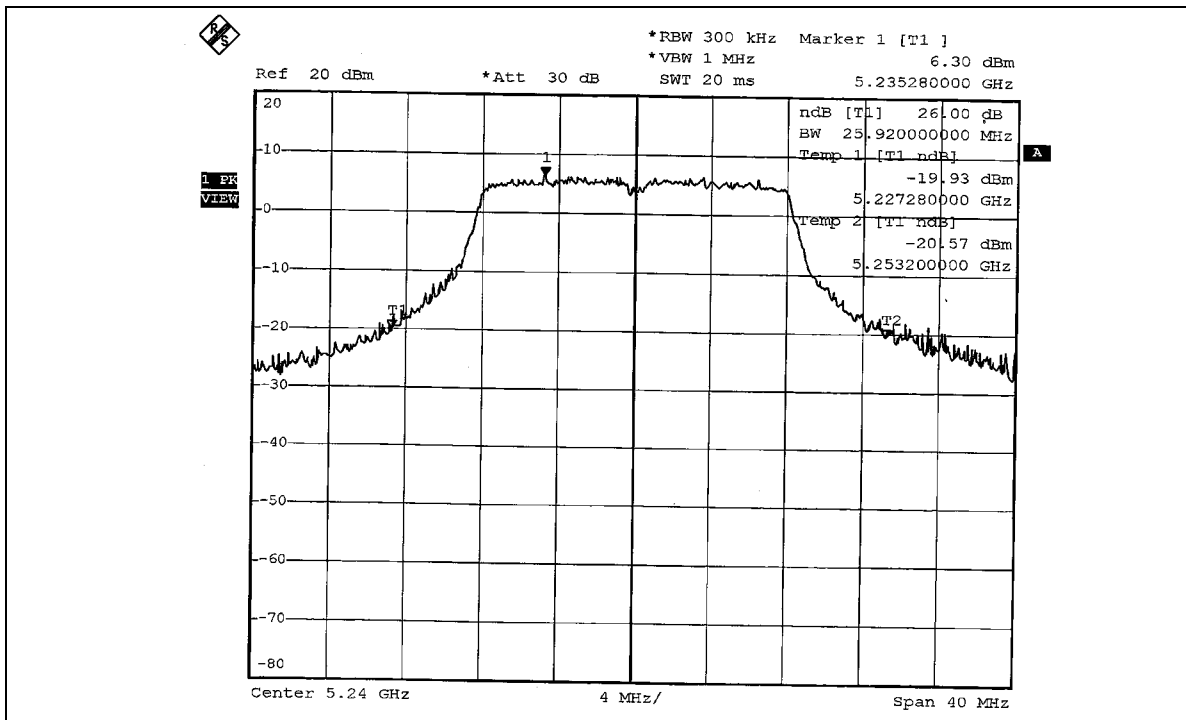




26dB Occupied Bandwidth:
CH 1

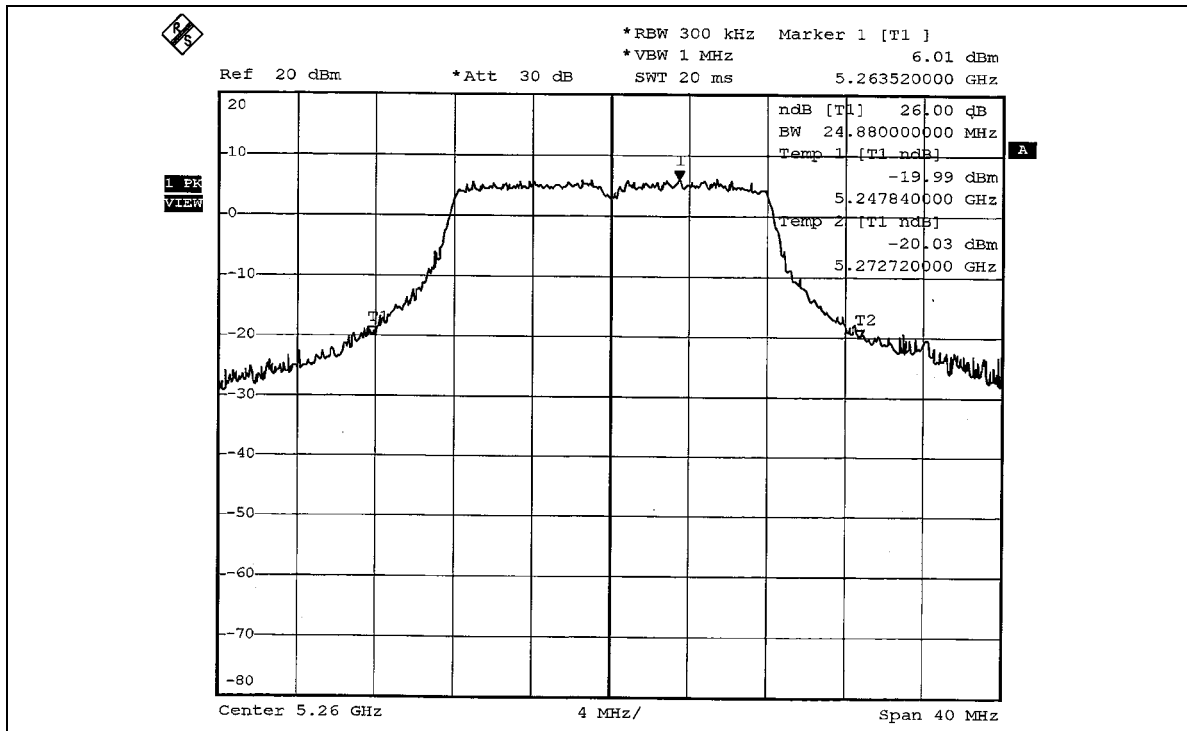


CH 4

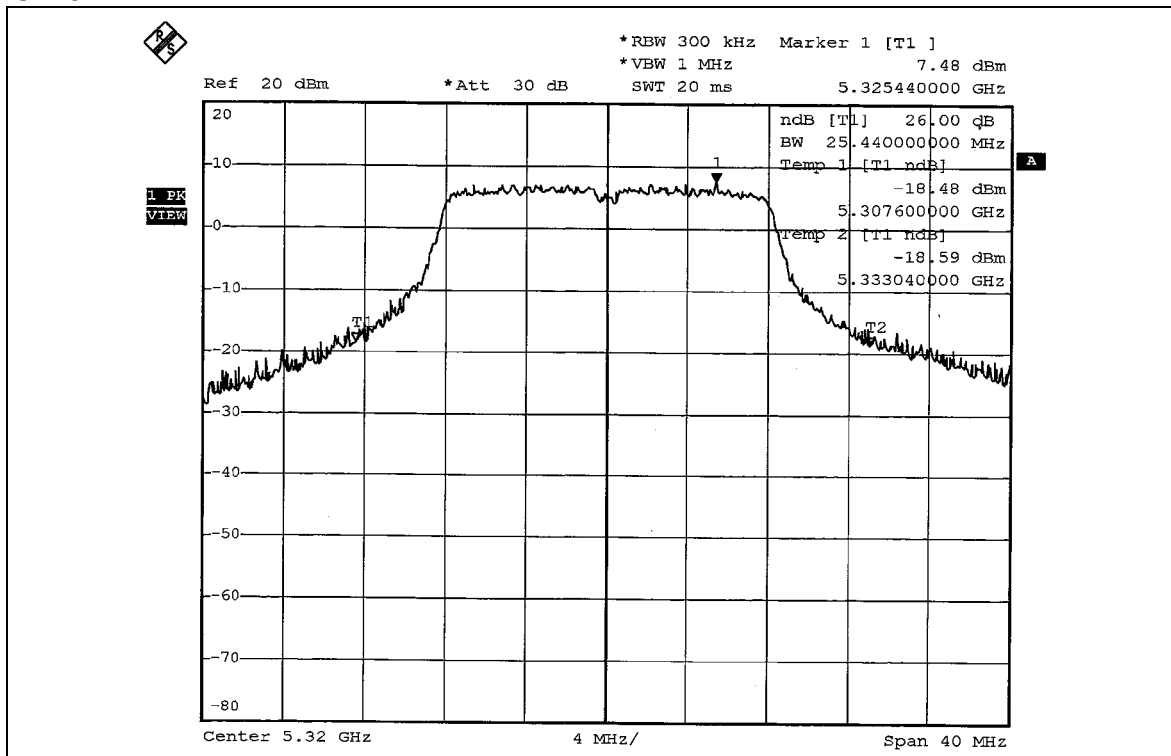




CH 5



CH 8



**802.11a Turbo OFDM modulation**

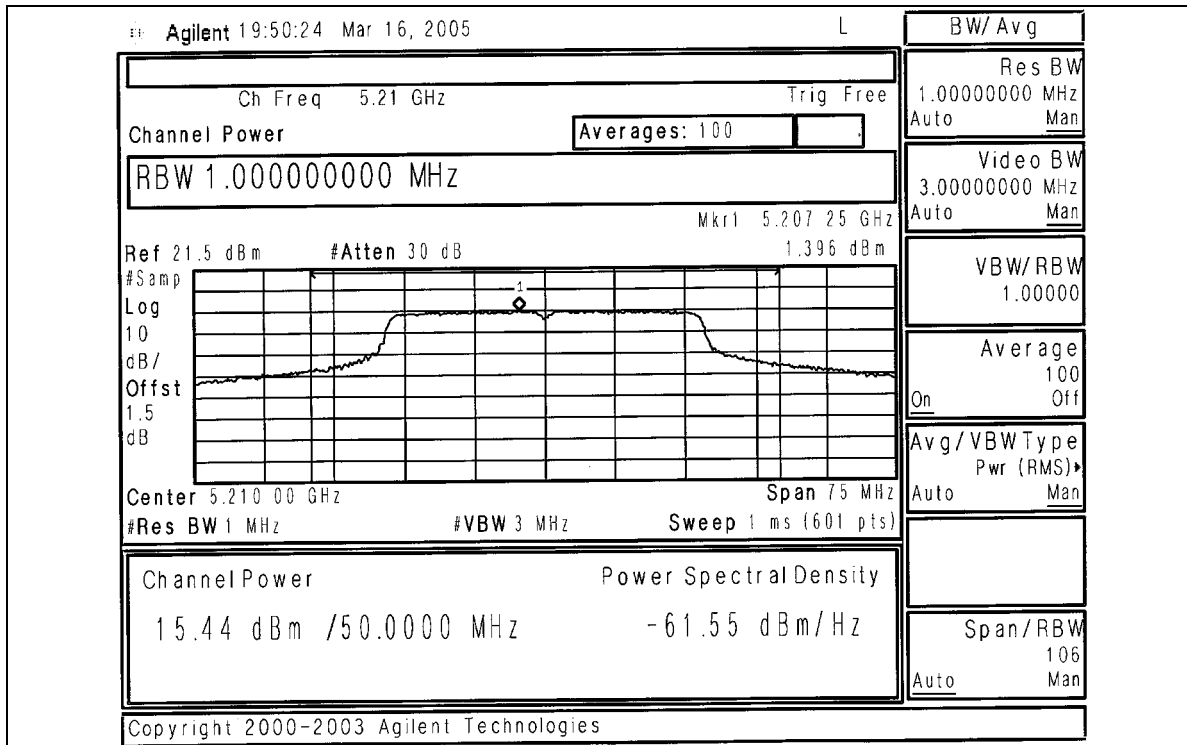
EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUEN CY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5210	34.995	15.44	17.00	49.44	PASS
2	5250	35.237	15.47	17.00	48.64	PASS
3	5290	38.905	15.90	24.00	52.16	PASS

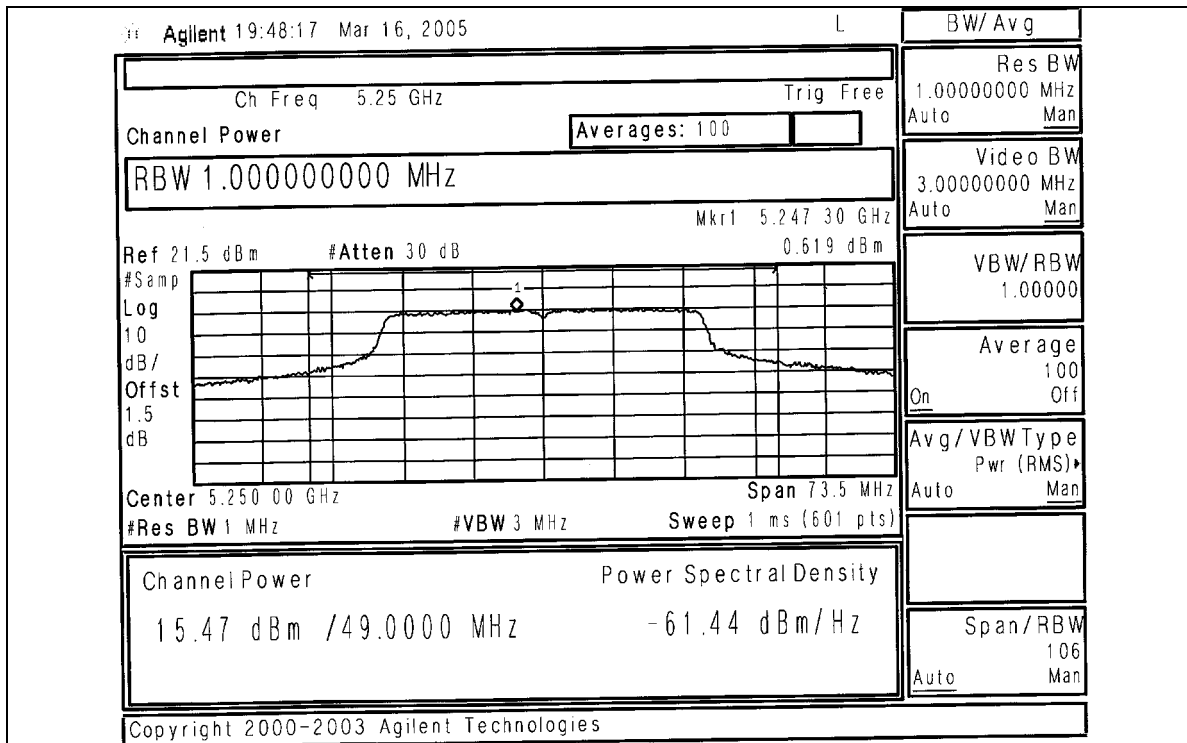
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.



Peak Power Output:
CH 1

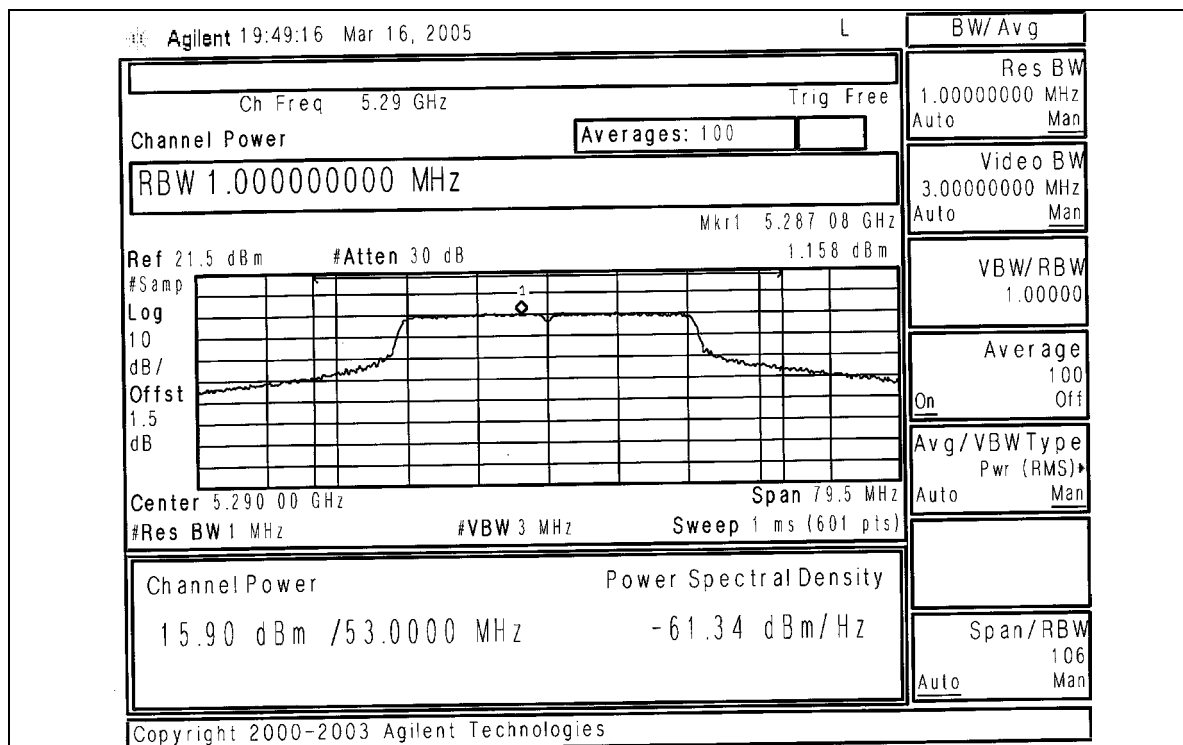


CH 2



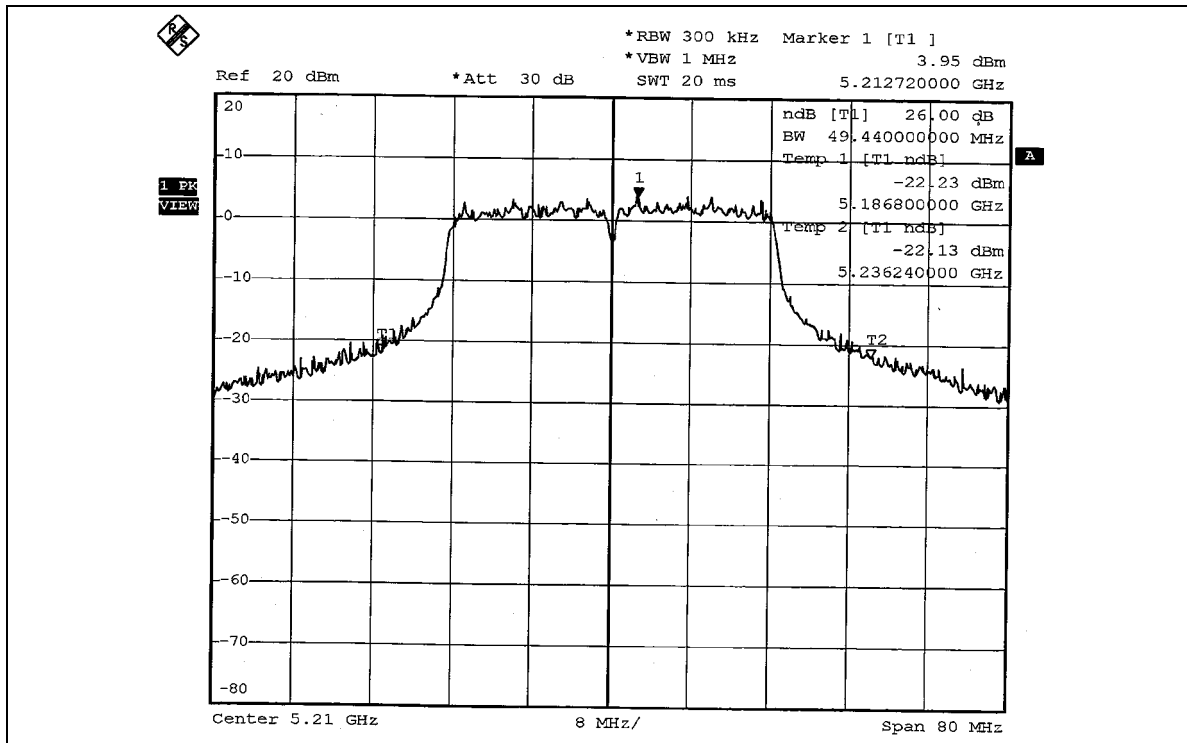


CH 3

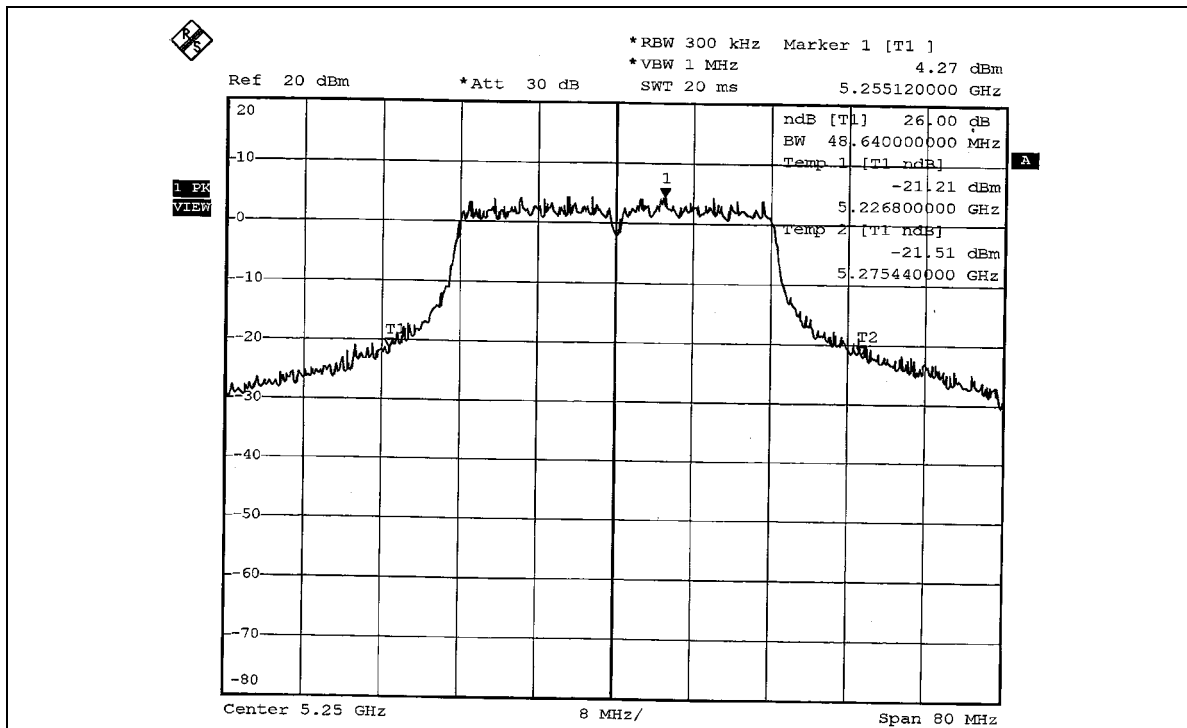




26dB Occupied Bandwidth:
CH 1

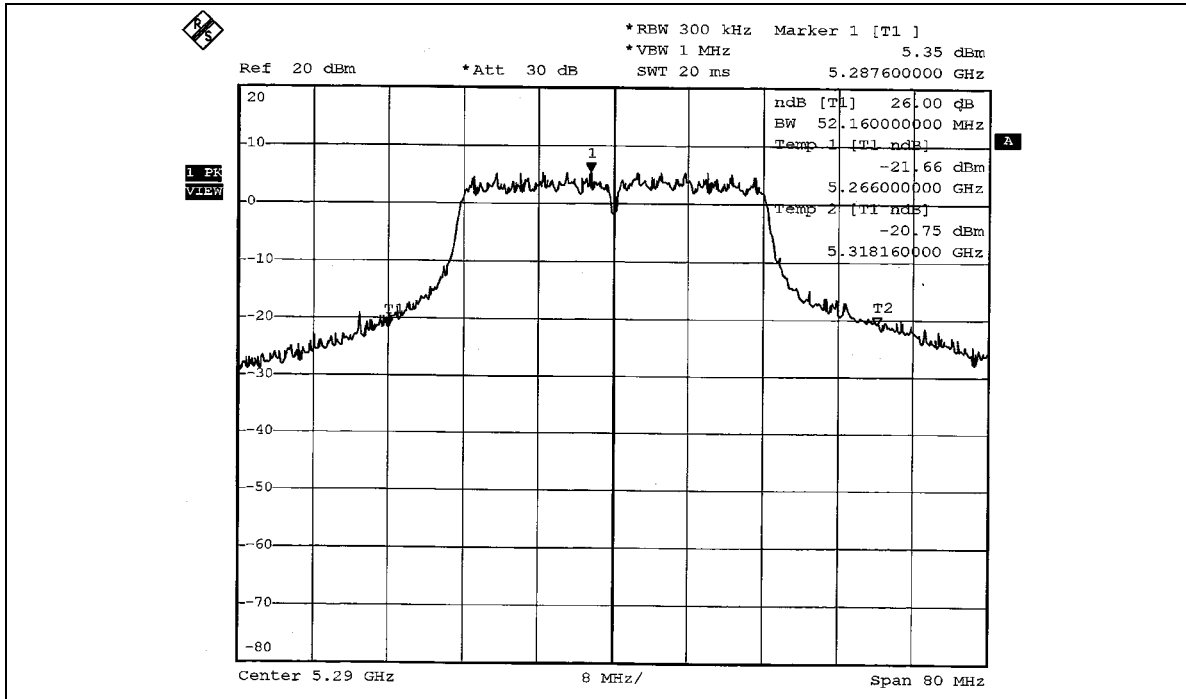


CH 2





CH 3





4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.725 – 5.825 GHz	13dB

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
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.



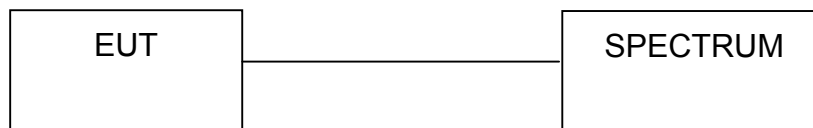
4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



4.4.7 TEST RESULTS

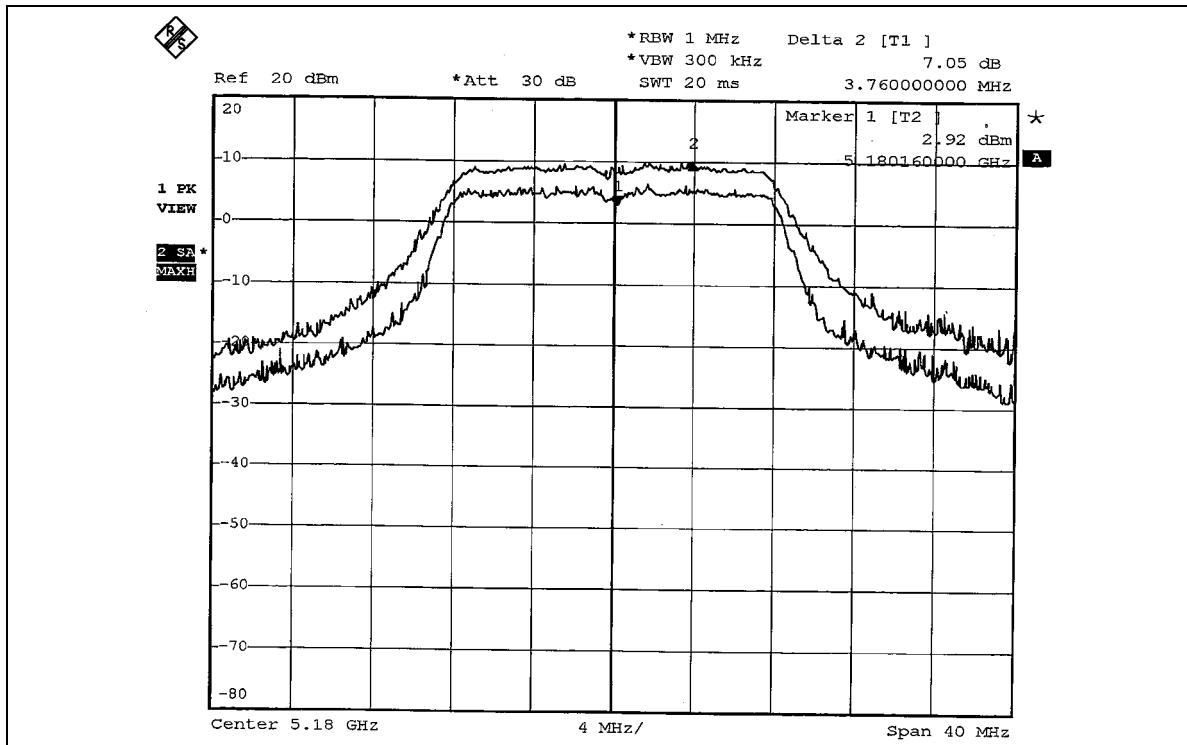
802.11a OFDM modulation

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

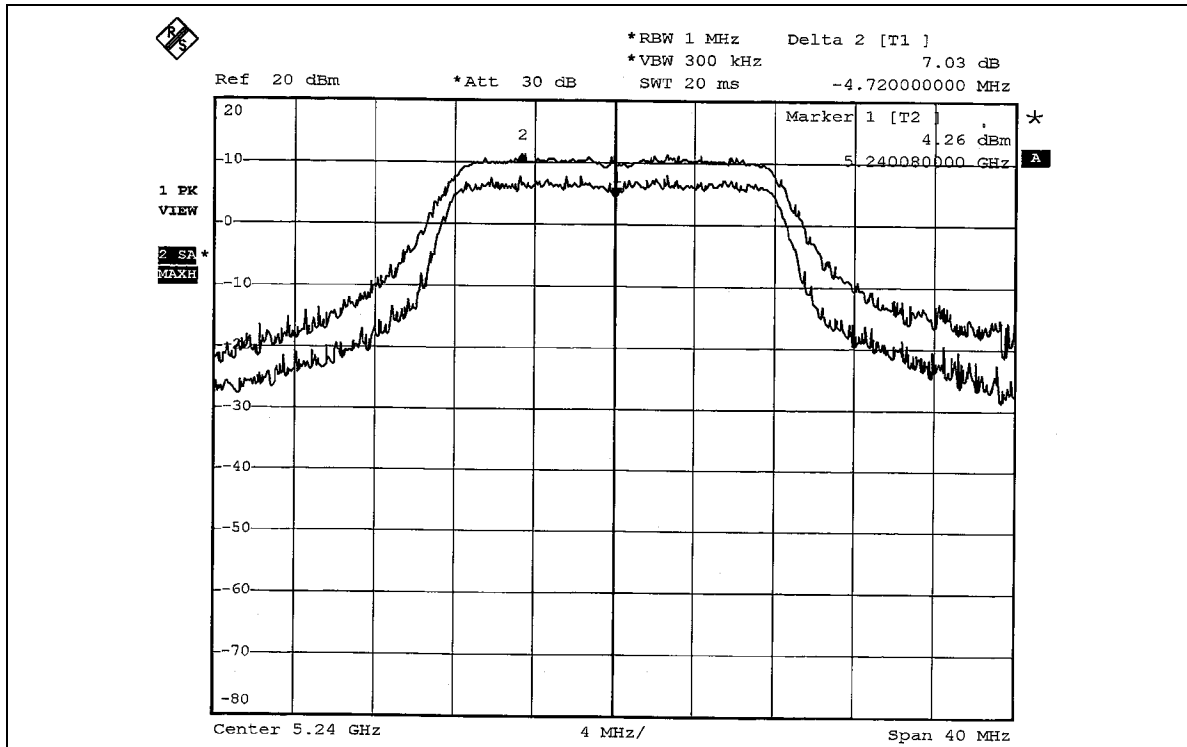
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	7.05	13	PASS
4	5240	7.03	13	PASS
5	5260	7.51	13	PASS
8	5320	7.13	13	PASS



CH 1

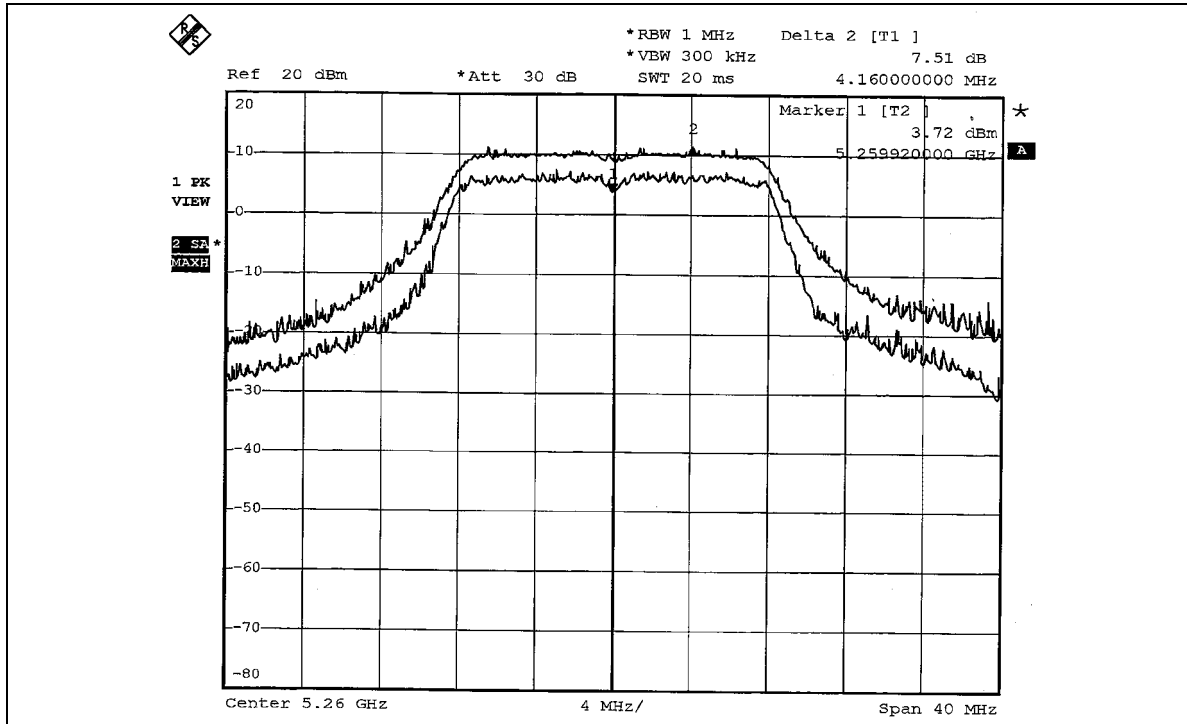


CH 4

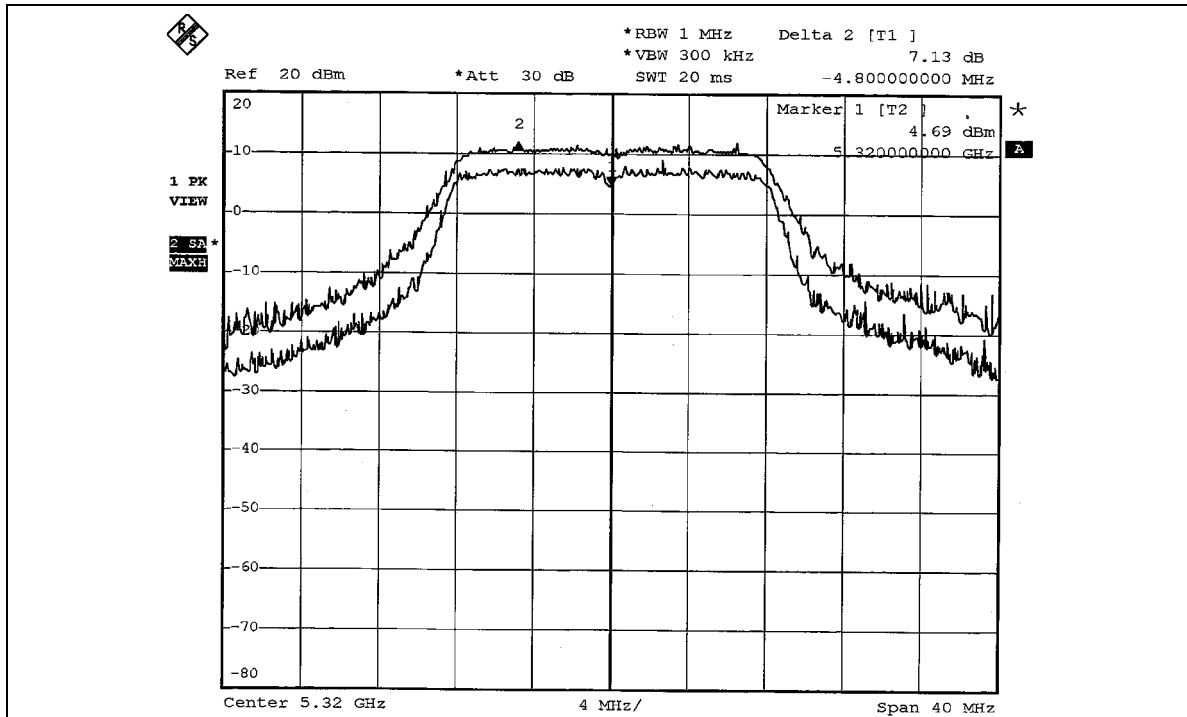




CH 5



CH 8



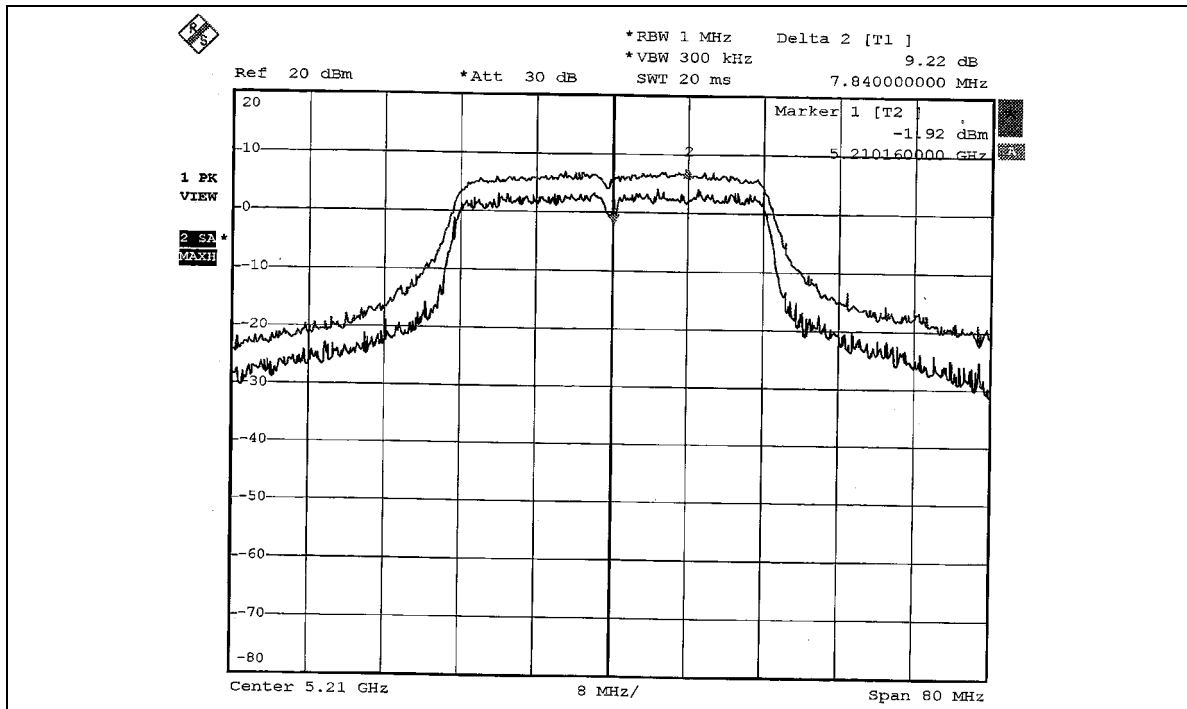
**802.11a Turbo OFDM modulation**

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA- 123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

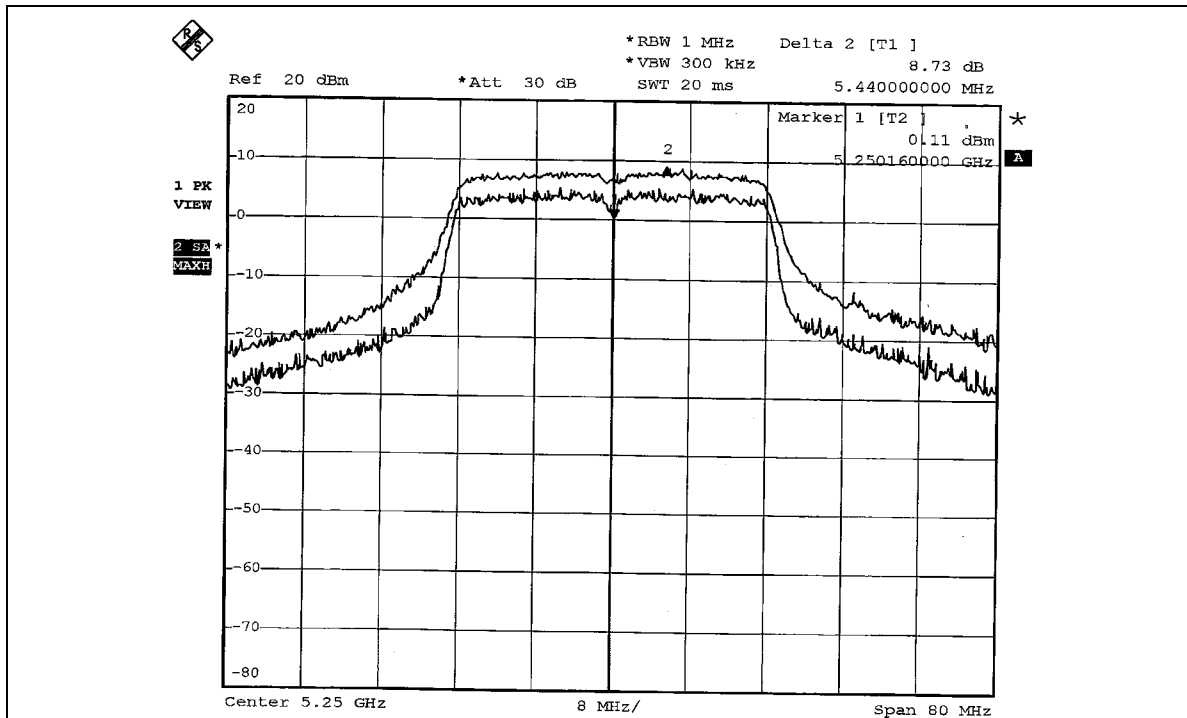
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5210	9.22	13	PASS
2	5250	8.73	13	PASS
3	5290	8.35	13	PASS



CH 1

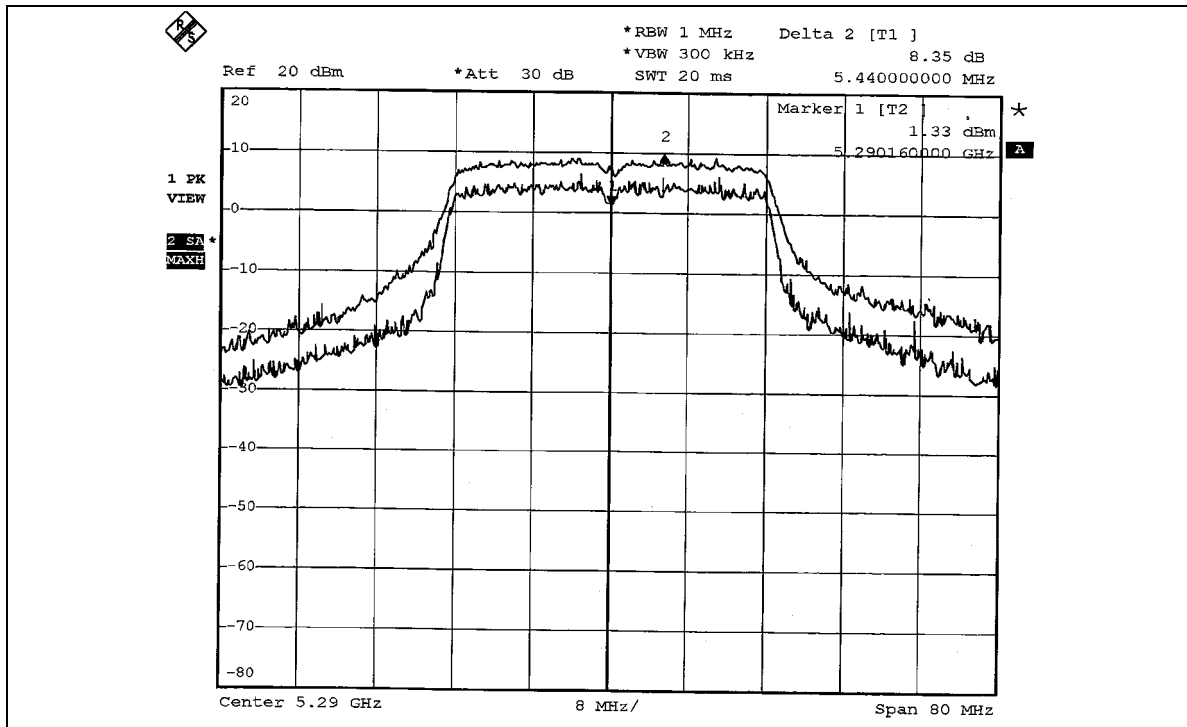


CH 2





CH 3





4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
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 PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 5.3.6



4.5.7 TEST RESULTS

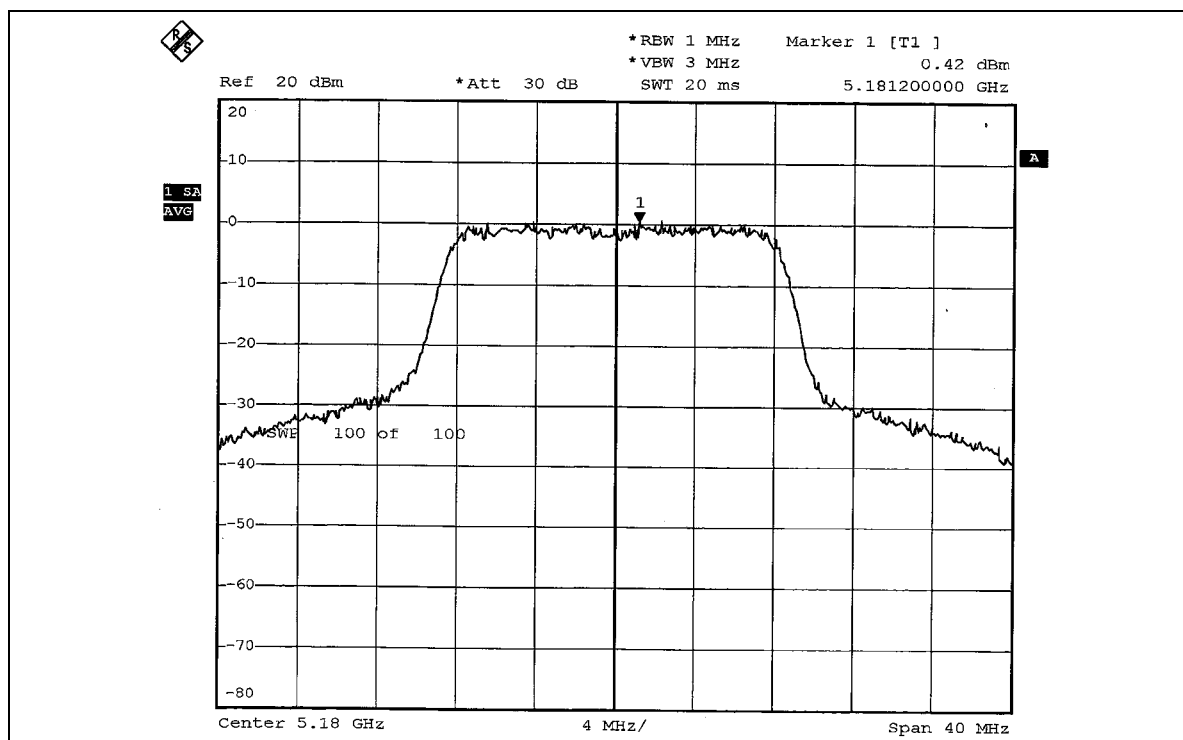
802.11a OFDM modulation

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

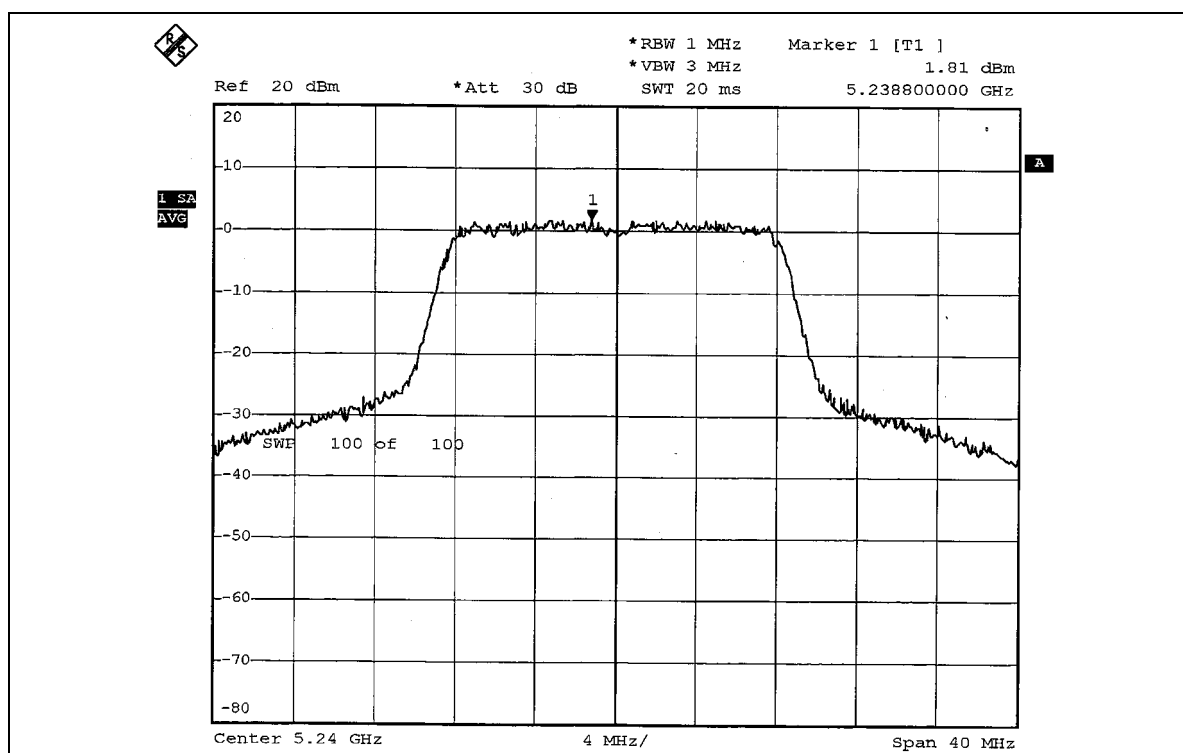
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	0.42	4	PASS
4	5240	1.81	4	PASS
5	5260	1.28	11	PASS
8	5320	2.29	11	PASS



CH 1

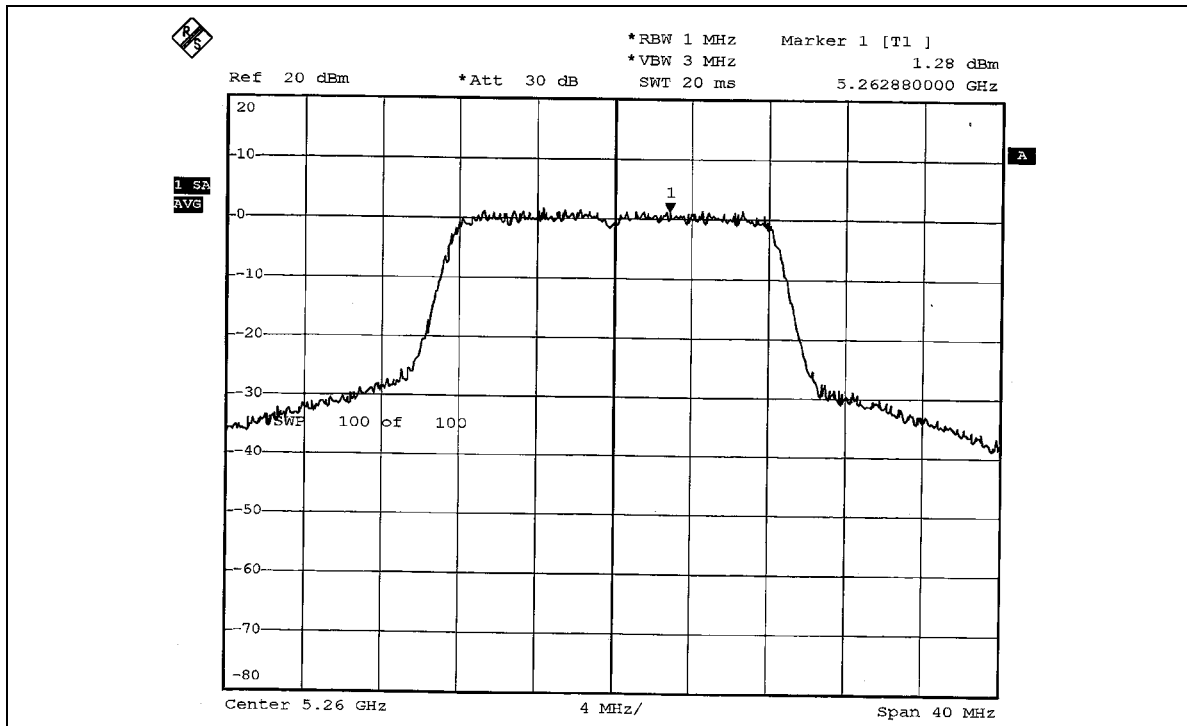


CH 4

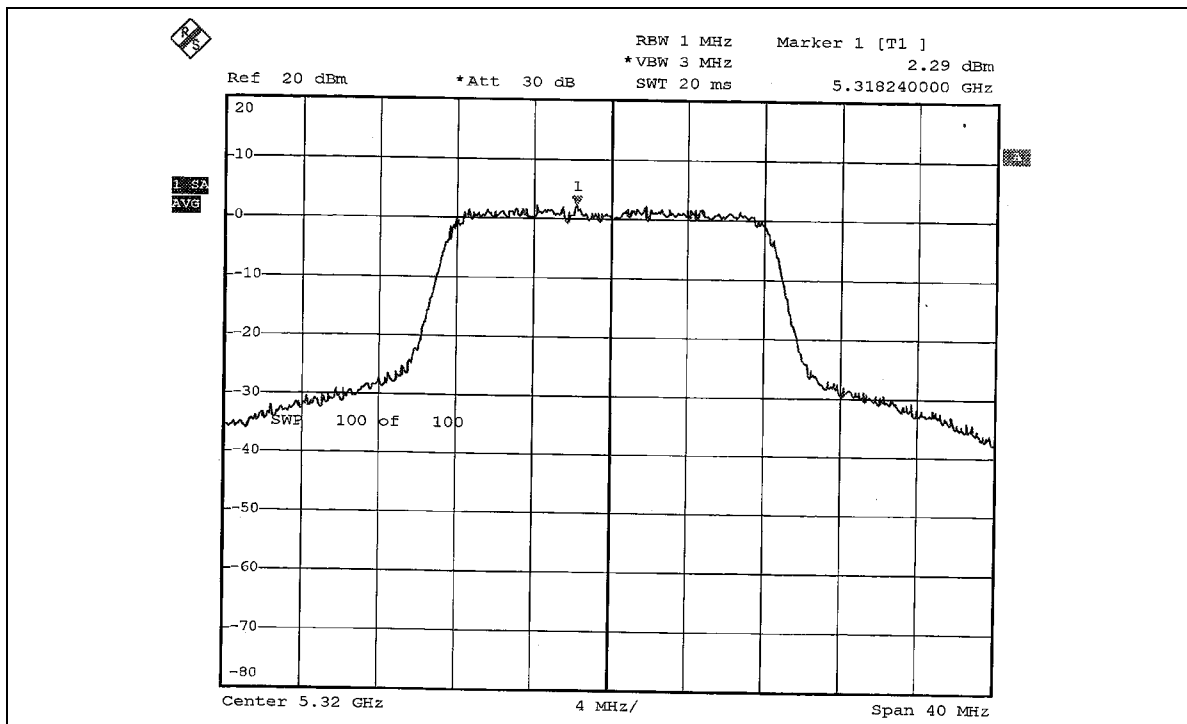




CH 5



CH 8



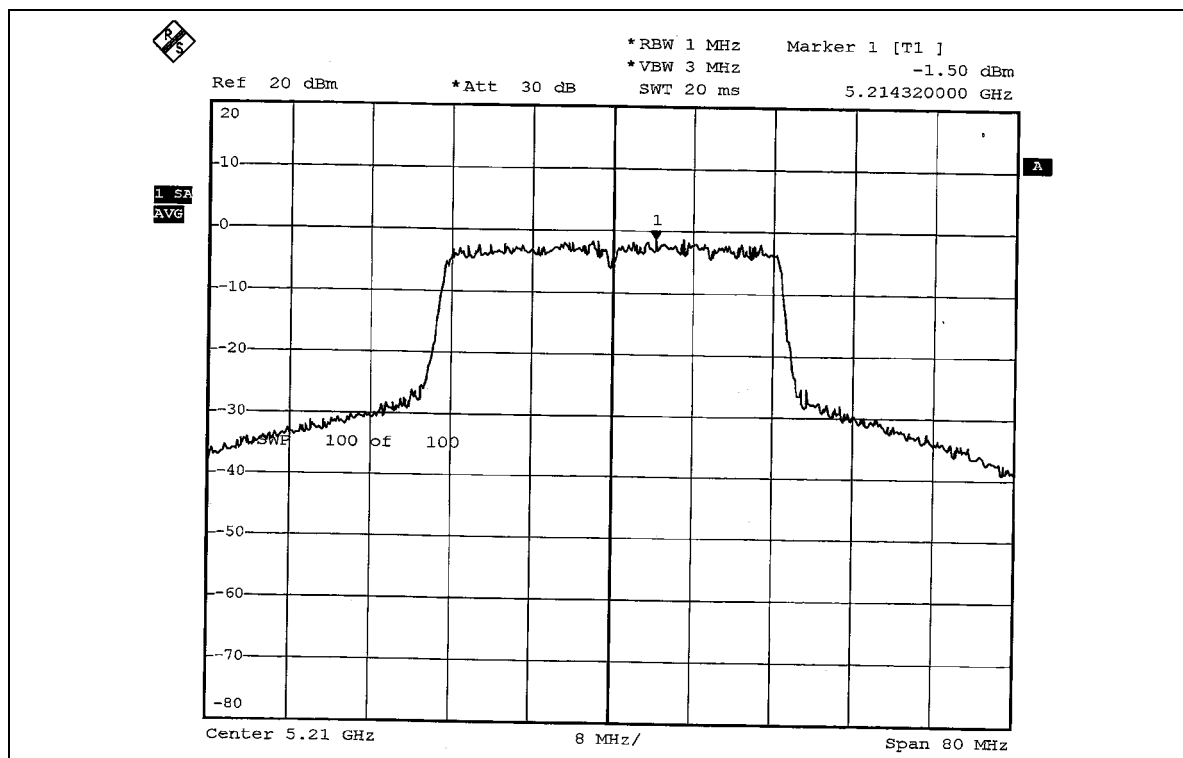
**802.11a Turbo OFDM modulation**

EUT	Motion Computing LE1600 (with IEEE 802.11a/b/g miniPCI WLAN)	MODEL	PK292010700 (with miniPCI WLAN WMIA-123AG47)
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

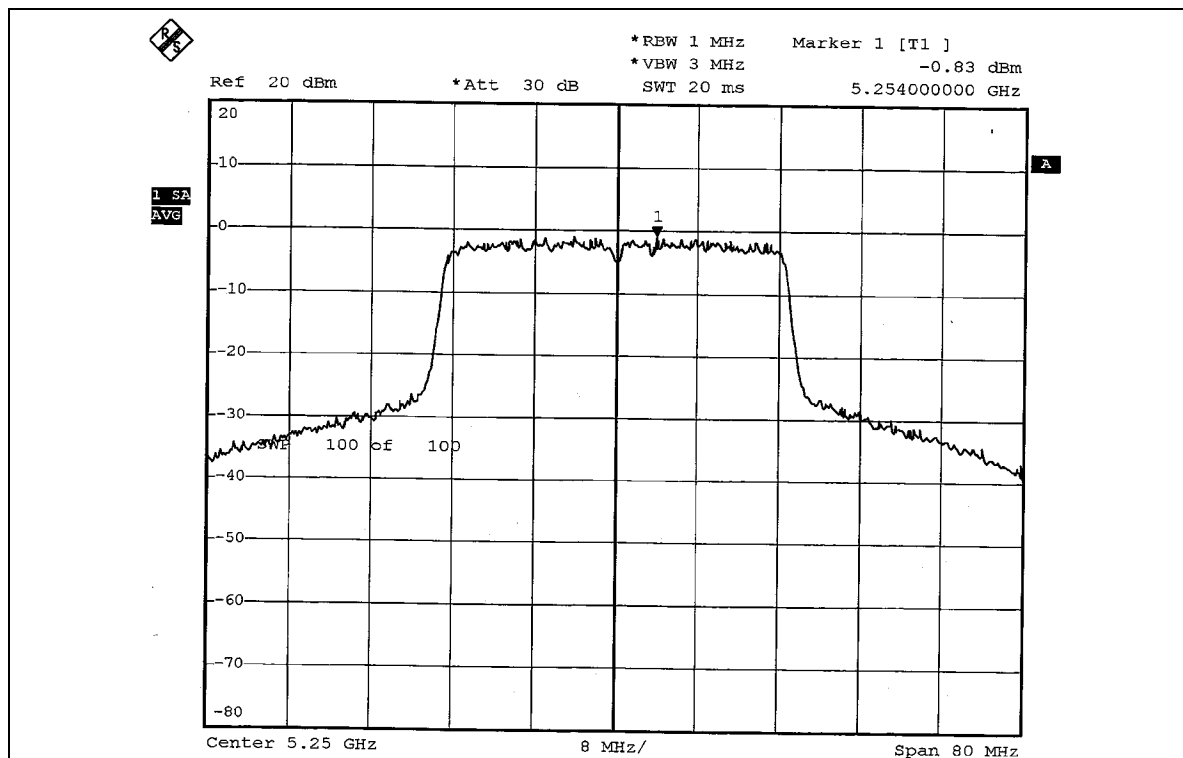
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-1.50	4	PASS
2	5250	-0.83	11	PASS
3	5290	-0.08	11	PASS



CH 1

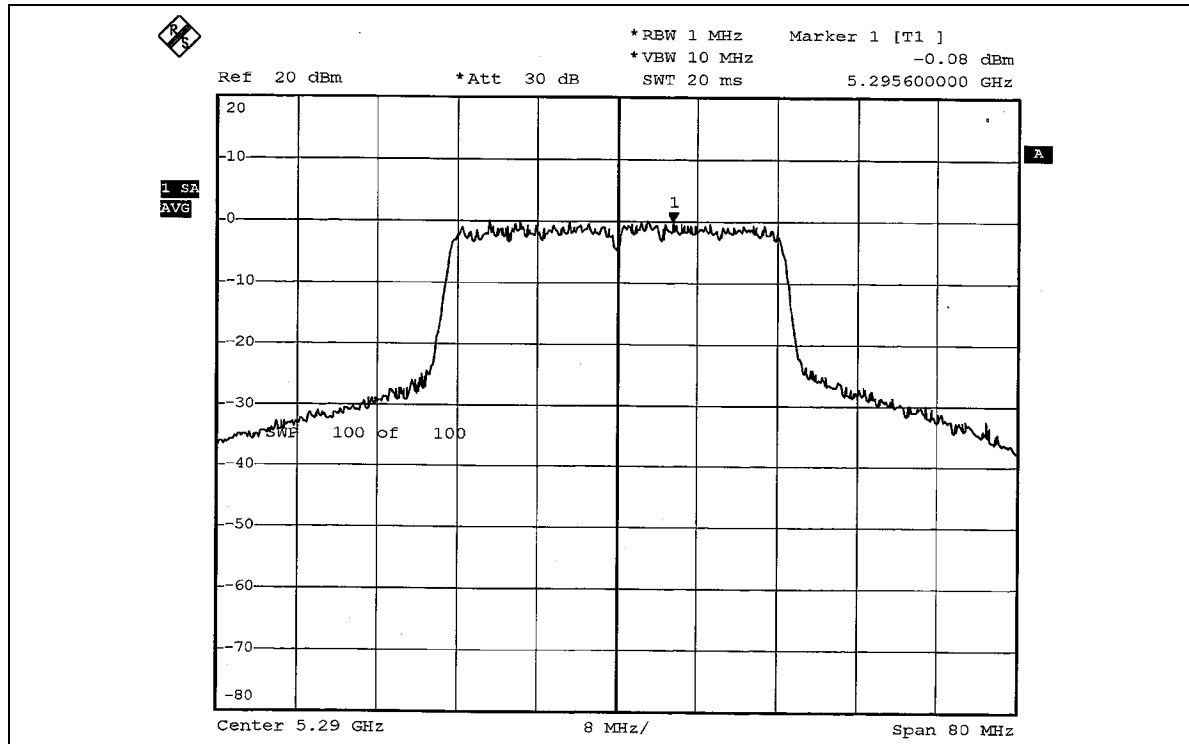


CH 2





CH 3





4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Mar. 09, 2006
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W901030	Jul. 18, 2005

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

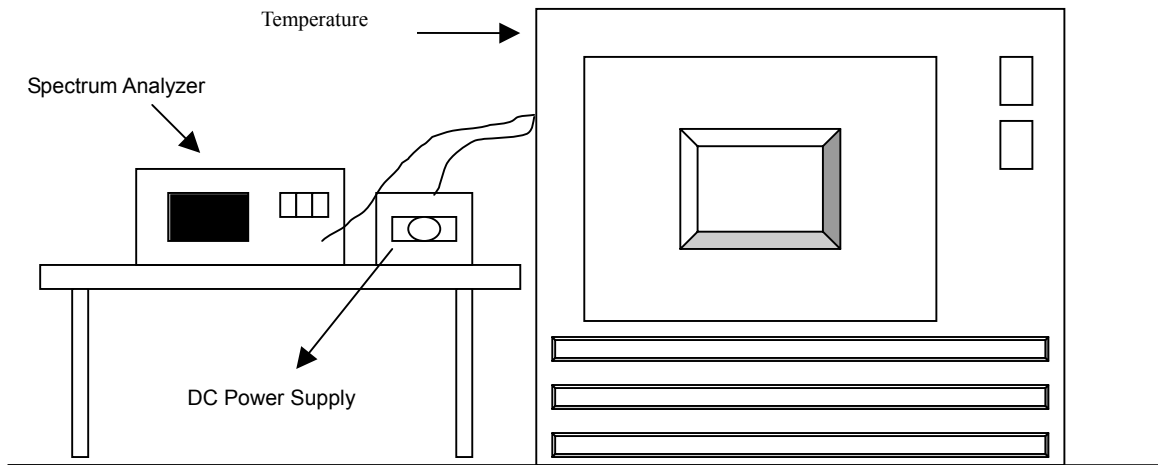
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6



4.6.7 TEST RESULTS

		Operating frequency: 5320MHz				Limit : ± 0.015%			
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138.0	5320.0351	0.0006598	5320.0351	0.0006598	5320.0356	0.0006692	5320.0352	0.0006617
	120.0	5320.0352	0.0006617	5320.0352	0.0006617	5320.0358	0.0006729	5320.0357	0.0006711
	102.0	5320.0355	0.0006673	5320.0355	0.0006673	5320.0354	0.0006654	5320.0354	0.0006654
40	138.0	5320.0337	0.0006335	5320.0337	0.0006335	5320.0335	0.0006297	5320.0330	0.0006203
	120.0	5320.0334	0.0006278	5320.0334	0.0006278	5320.0334	0.0006278	5320.0328	0.0006165
	102.0	5320.0331	0.0006222	5320.0331	0.0006222	5320.0337	0.0006335	5320.0327	0.0006147
30	138.0	5320.0218	0.0004098	5320.0218	0.0004098	5320.0231	0.0004342	5320.0235	0.0004417
	120.0	5320.0224	0.0004211	5320.0224	0.0004211	5320.0233	0.0004380	5320.0236	0.0004436
	102.0	5320.0227	0.0004267	5320.0227	0.0004267	5320.0234	0.0004398	5320.0236	0.0004436
20	138.0	5320.0196	0.0003684	5320.0196	0.0003684	5320.0191	0.0003628	5320.0186	0.0003496
	120.0	5320.0185	0.0003477	5320.0185	0.0003477	5320.0193	0.0003665	5320.0188	0.0003534
	102.0	5320.0188	0.0003534	5320.0188	0.0003534	5320.0195	0.0003158	5320.0185	0.0003477
10	138.0	5320.0171	0.0003214	5320.0171	0.0003214	5320.0168	0.0003120	5320.0164	0.0003083
	120.0	5320.0165	0.0003102	5320.0165	0.0003102	5320.0166	0.0003102	5320.0165	0.0003102
	102.0	5320.0158	0.0002970	5320.0158	0.0002970	5320.0165	0.0002406	5320.0167	0.0003139
0	138.0	5320.0128	0.0002406	5320.0128	0.0002406	5320.0128	0.0002368	5320.0132	0.0002481
	120.0	5320.0137	0.0002575	5320.0137	0.0002575	5320.0126	0.0002331	5320.0134	0.0002519
	102.0	5320.0142	0.0002669	5320.0142	0.0002669	5320.0124	-0.0002632	5320.0131	0.0002462
-10	138.0	5319.9910	-0.0001692	5319.9910	-0.0001692	5319.9860	-0.0002820	5319.9860	-0.0002632
	120.0	5319.9900	-0.0001880	5319.9900	-0.0001880	5319.9850	-0.0003008	5319.9850	-0.0002820
	102.0	5319.9890	-0.0002068	5319.9890	-0.0002068	5319.9840	-0.0004511	5319.9840	-0.0003008
-20	138.0	5319.9750	-0.0004699	5319.9750	-0.0004699	5319.9760	-0.0004699	5319.9720	-0.0005263
	120.0	5319.9650	-0.0006579	5319.9650	-0.0006579	5319.9750	-0.0005639	5319.9710	-0.0005451
	102.0	5319.9700	-0.0005639	5319.9700	-0.0005639	5319.9700	-0.0006579	5319.9680	-0.0006015
-30	138.0	5319.9680	-0.0006015	5319.9680	-0.0006015	5319.9650	-0.0006767	5319.9620	-0.0007143
	120.0	5319.9650	-0.0006579	5319.9650	-0.0006579	5319.9640	-0.0006955	5319.9600	-0.0007519
	102.0	5319.9670	-0.0006203	5319.9670	-0.0006203	5319.9630	-0.0006955	5319.9640	-0.0006767



4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
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.

4.7.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 1MHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

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

**802.11a OFDM modulation****Channel 1 (5180MHz)**

The band edge emission plot on page 66 shows 38.62dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 103.66dBuV/m (Peak), so the maximum field strength in restrict band is $103.66-38.62=65.04$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 66 shows 44.60dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 94.07dBuV/m (Average), so the maximum field strength in restrict band is $94.07-44.60=49.47$ dBuV/m which is under 54dBuV/m limit.

Channel 8 (5320MHz)

The band edge emission plot on page 67 shows 41.94dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 104.06dBuV/m (Peak), so the maximum field strength in restrict band is $104.06-41.94=62.12$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 68 shows 48.56dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 97.21dBuV/m (Average), so the maximum field strength in restrict band is $97.21-48.56=48.65$ dBuV/m which is under 54dBuV/m limit.



802.11a Turbo OFDM modulation

Channel 1 (5210MHz)

The band edge emission plot on page 69 shows 37.57dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 101.89dBuV/m (Peak), so the maximum field strength in restrict band is $101.39-37.57=63.82$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 69 shows 43.27dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 90.89dBuV/m (Average), so the maximum field strength in restrict band is $90.89-43.27=47.62$ dBuV/m which is under 54dBuV/m limit.

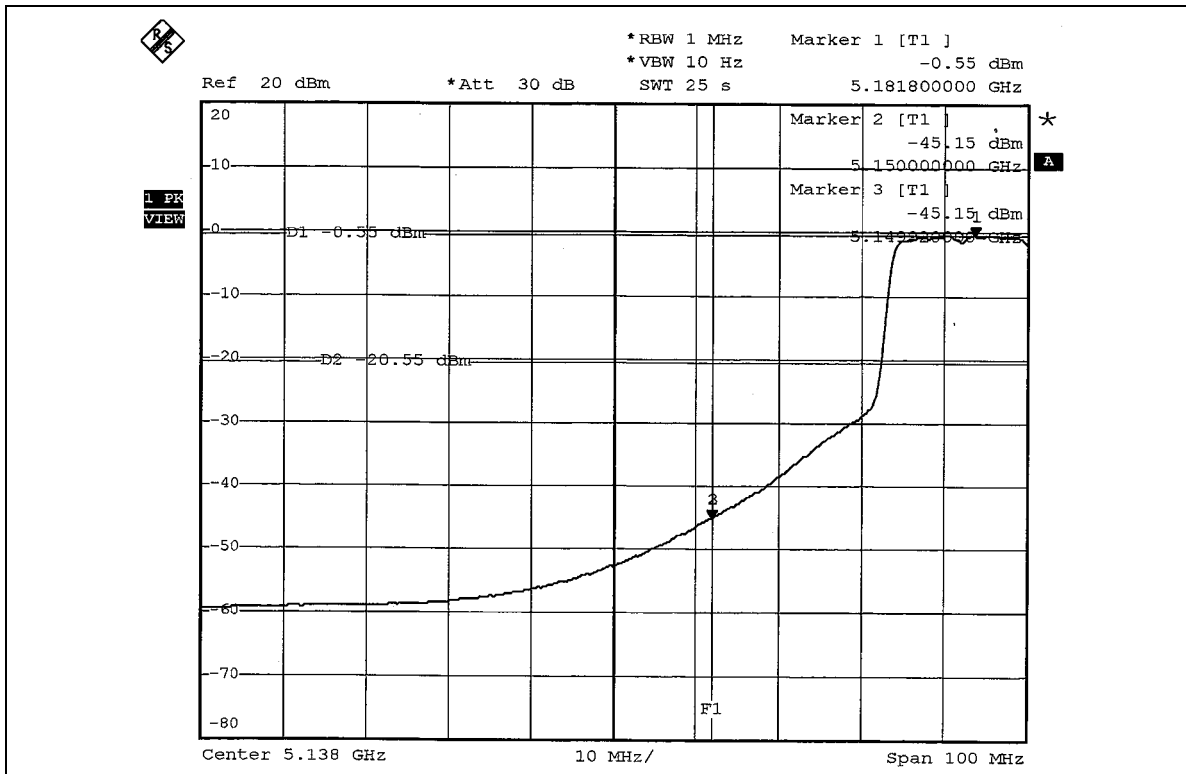
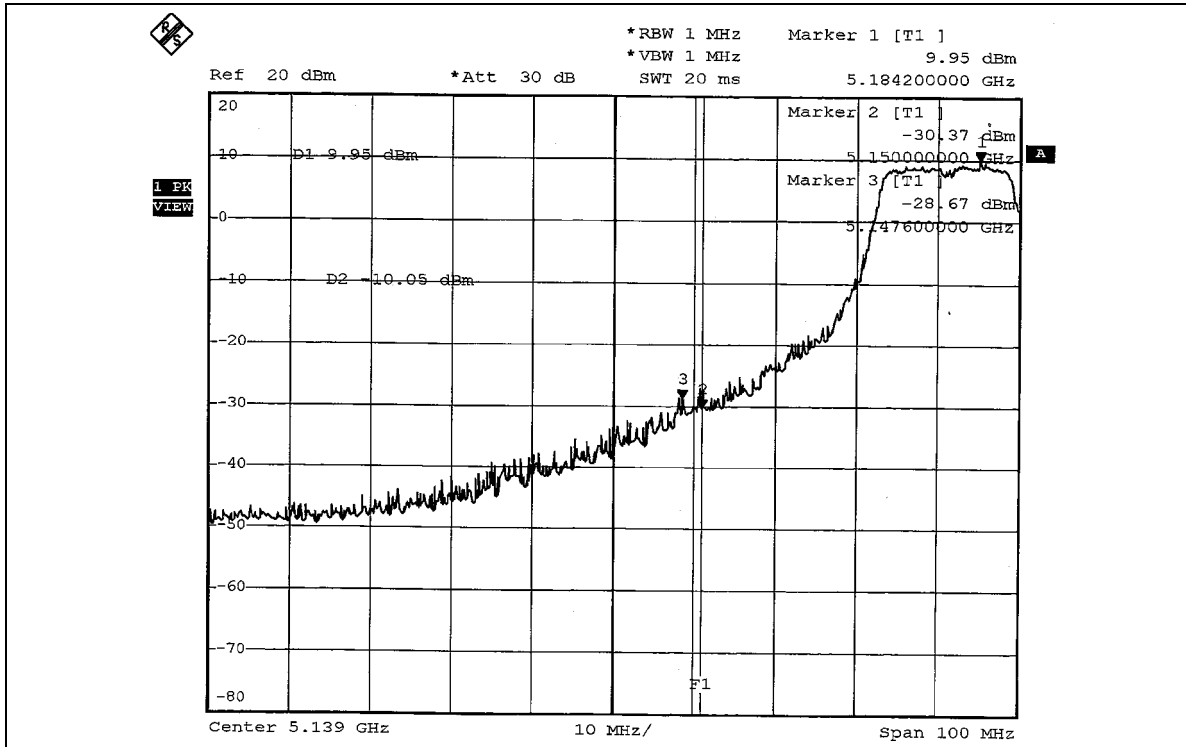
Channel 3 (5290MHz)

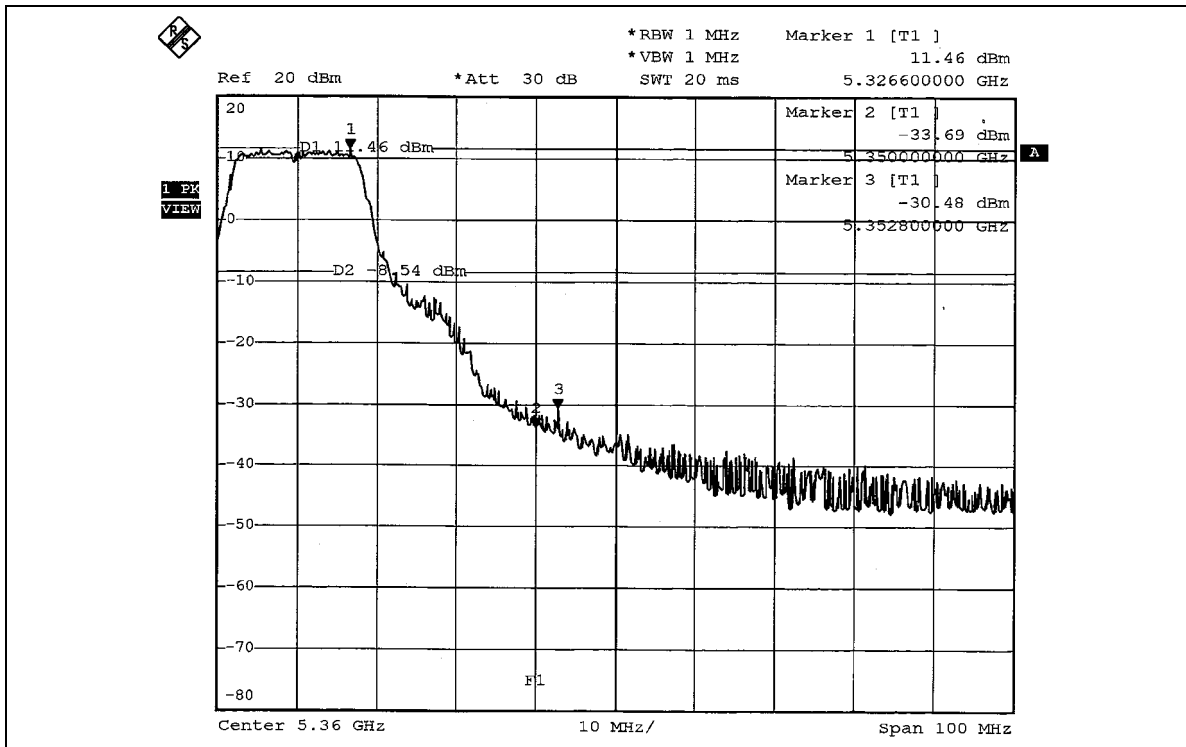
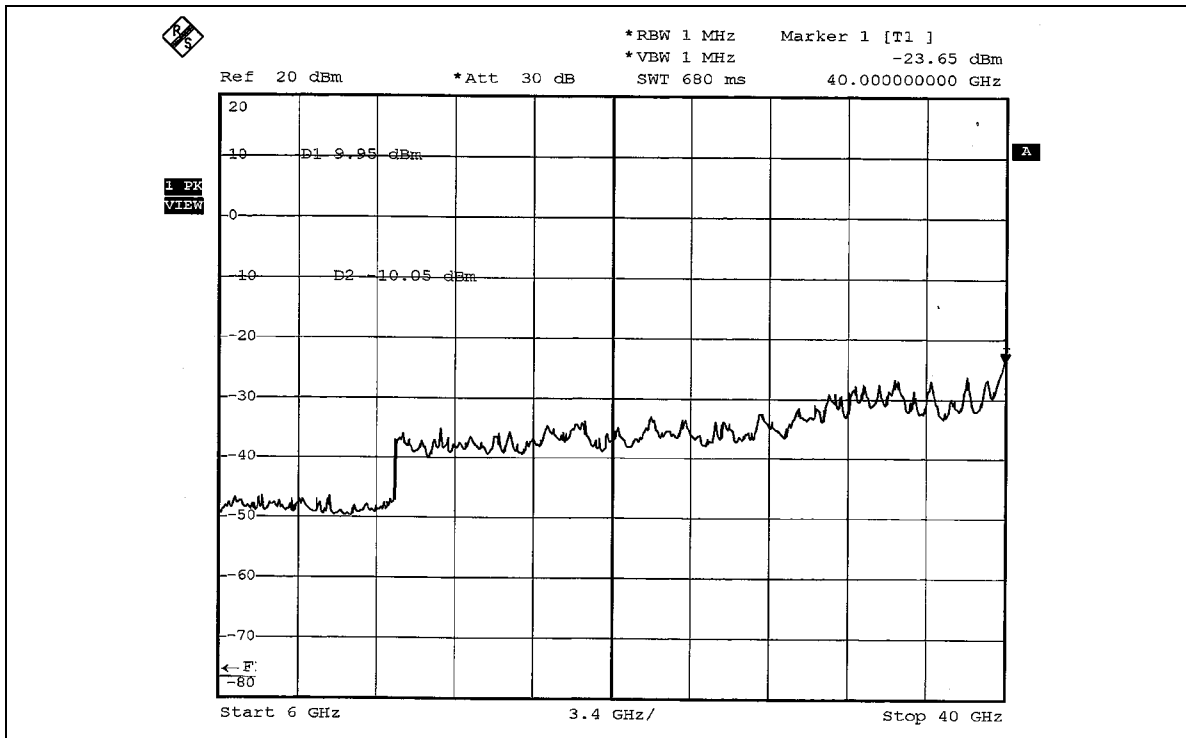
The band edge emission plot on the pages 70 shows 39.06dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 102.05dBuV/m (Peak), so the maximum field strength in restrict band is $102.05-39.06=62.99$ dBuV/m which is under 74dBuV/m limit.

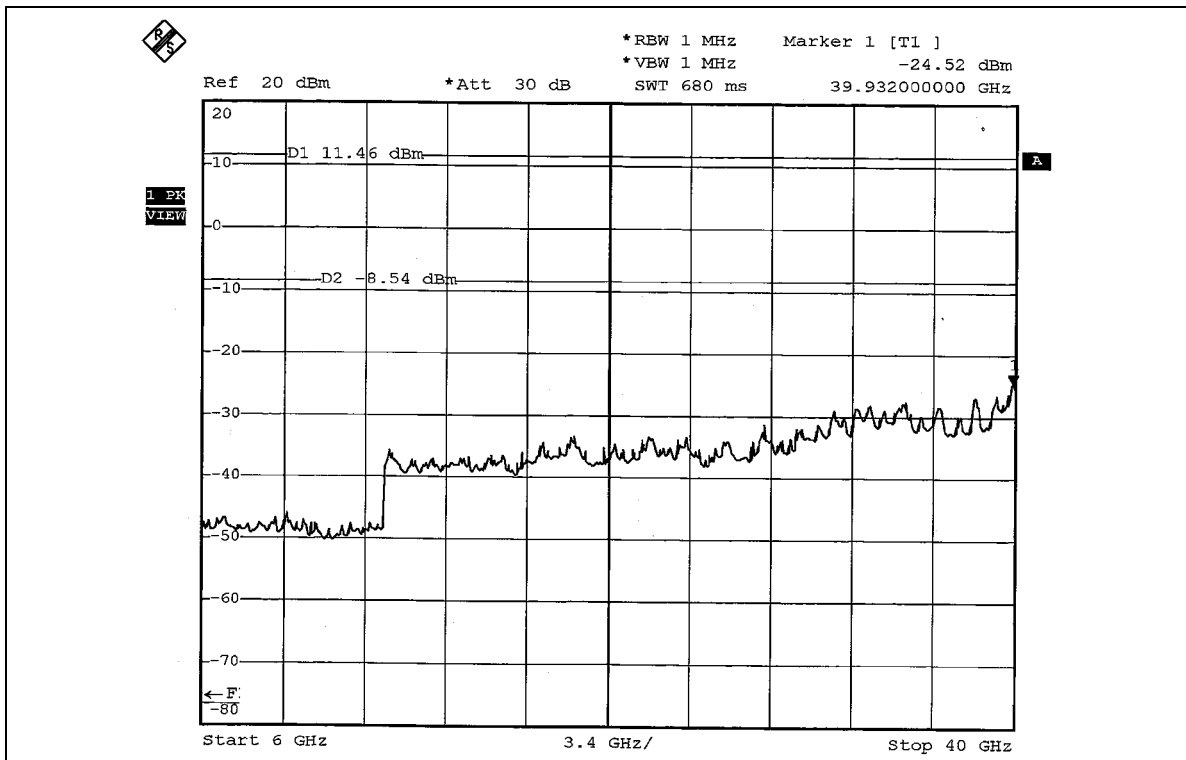
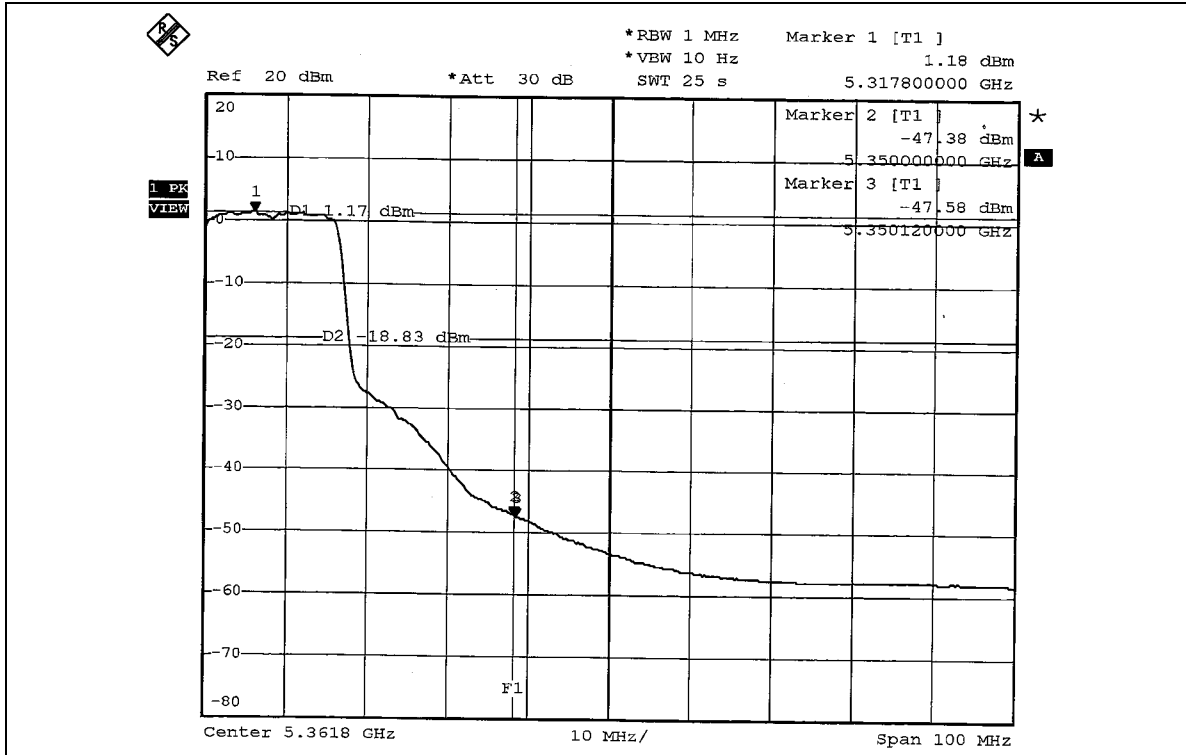
The band edge emission plot on the pages 71 shows 48.65dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 92.69dBuV/m (Average), so the maximum field strength in restrict band is $92.69-48.65=44.04$ dBuV/m which is under 54dBuV/m limit.



802.11a OFDM modulation

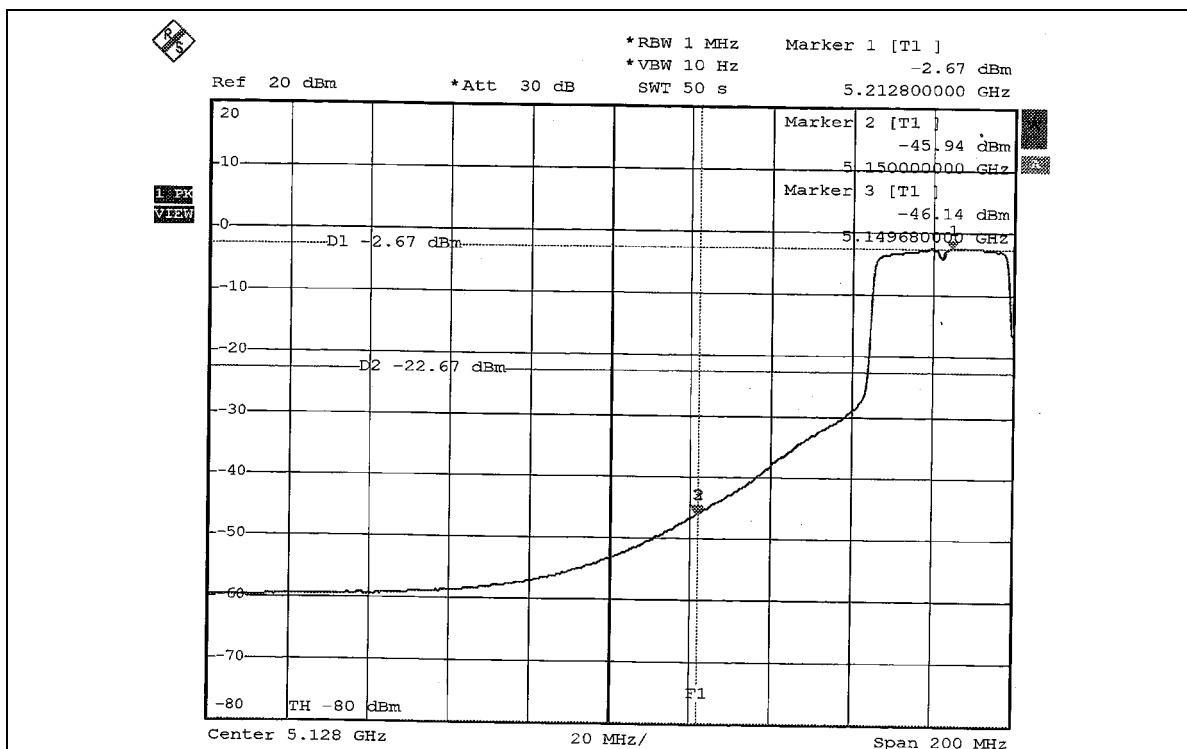
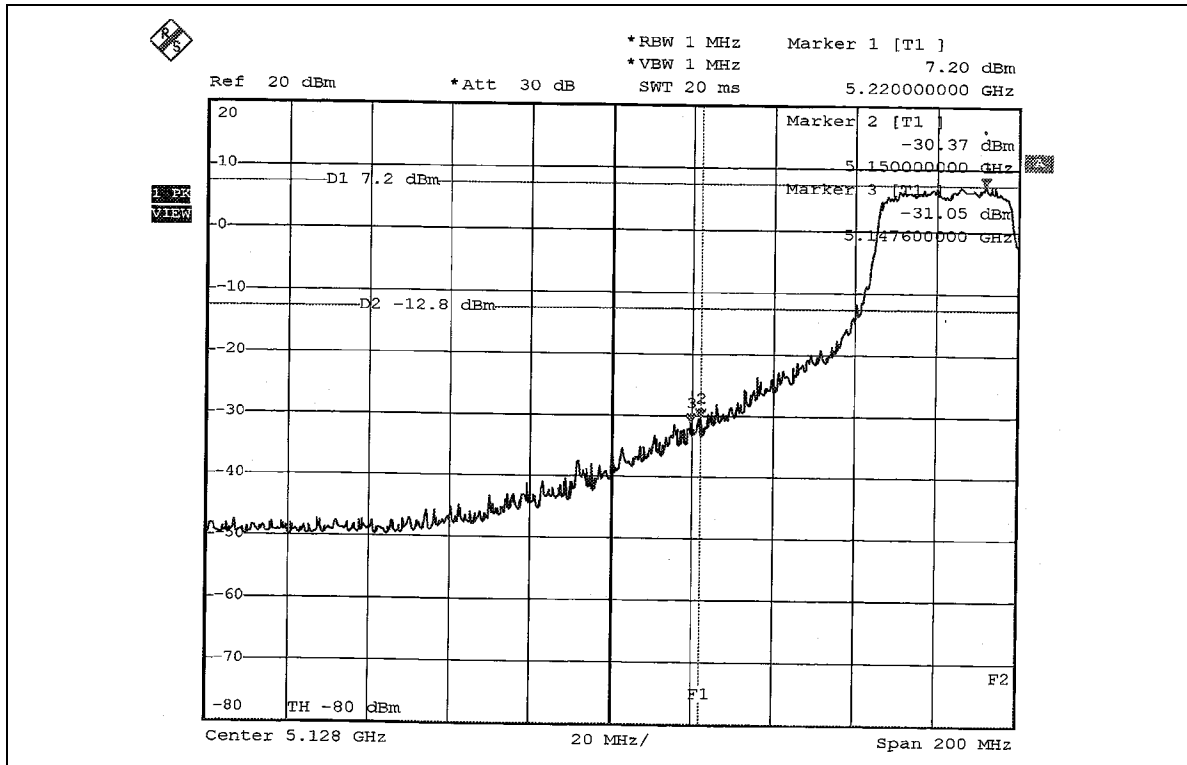


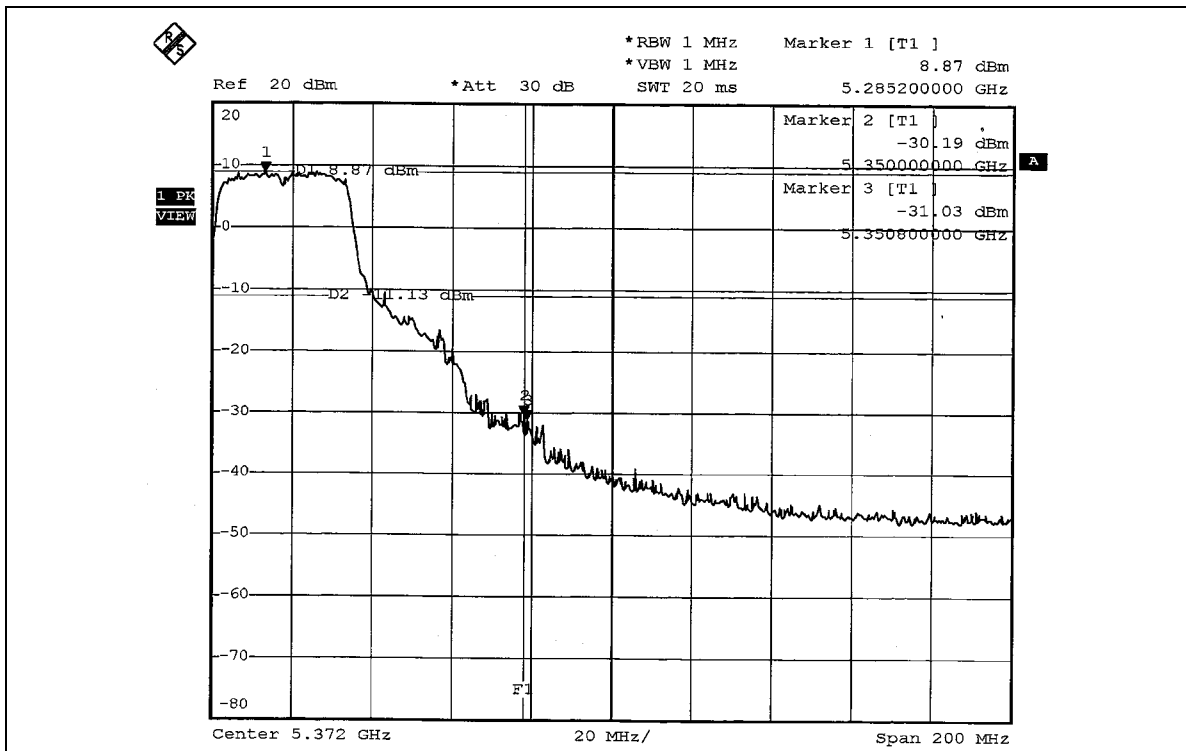
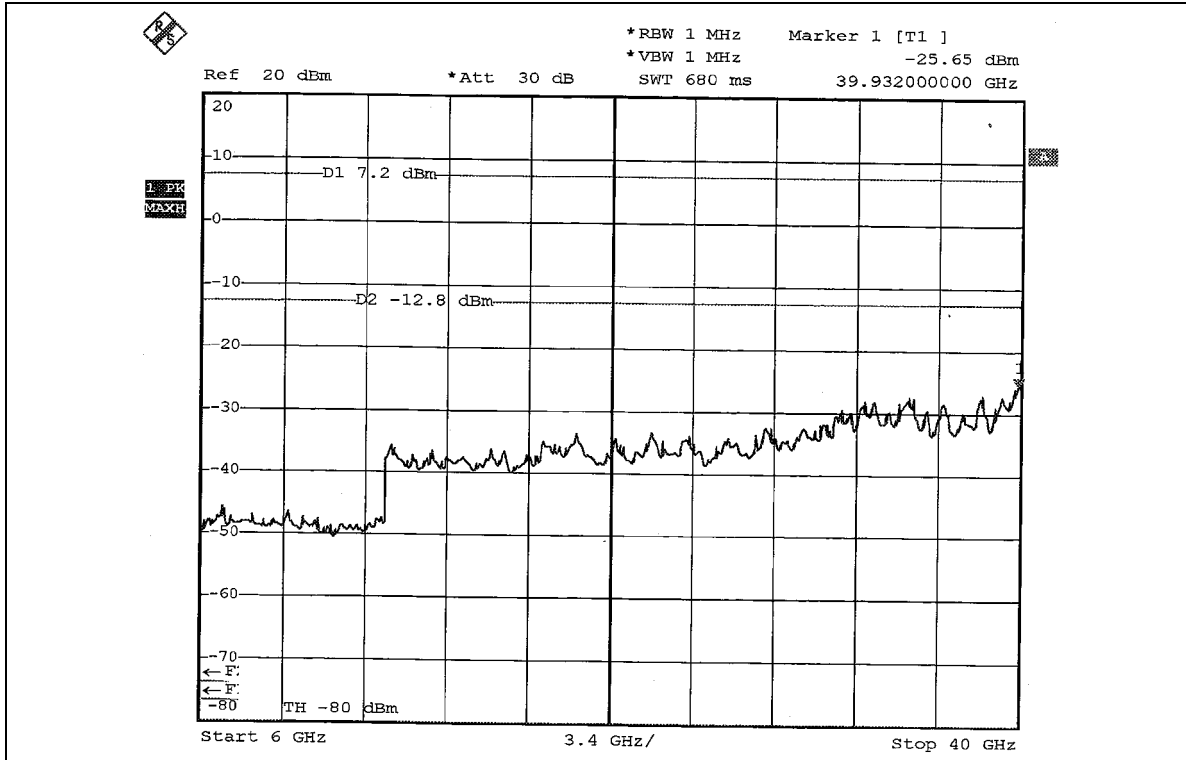


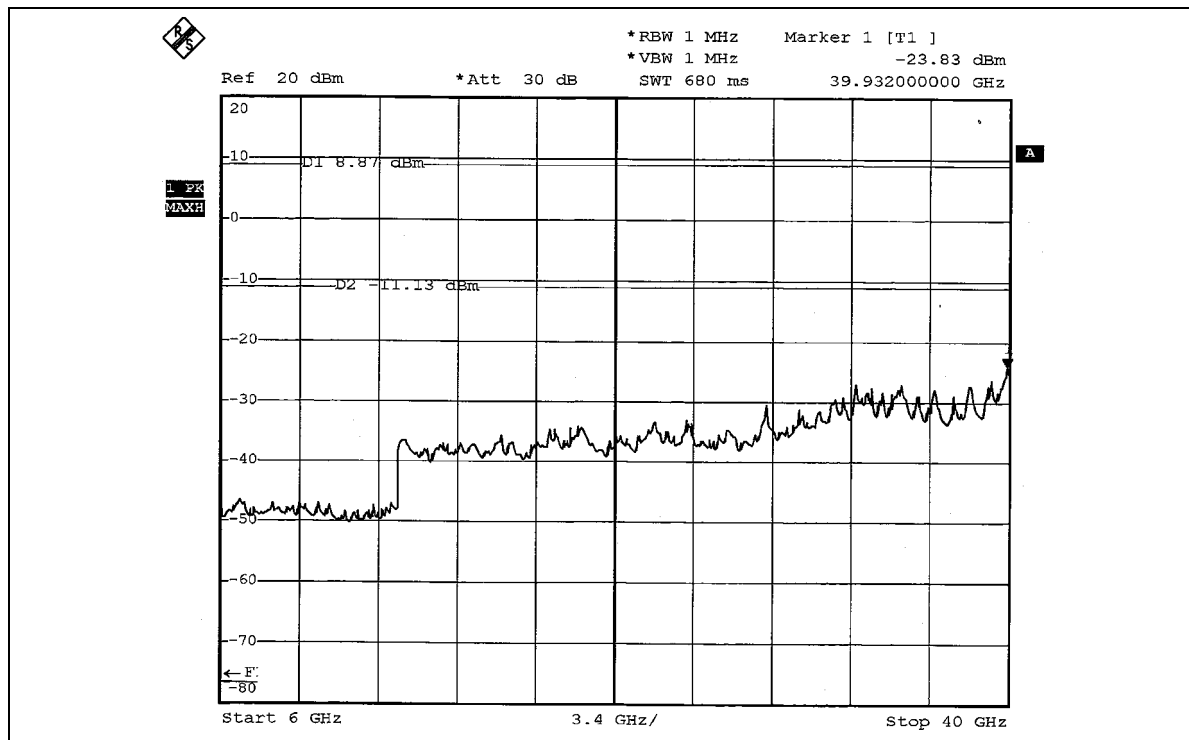
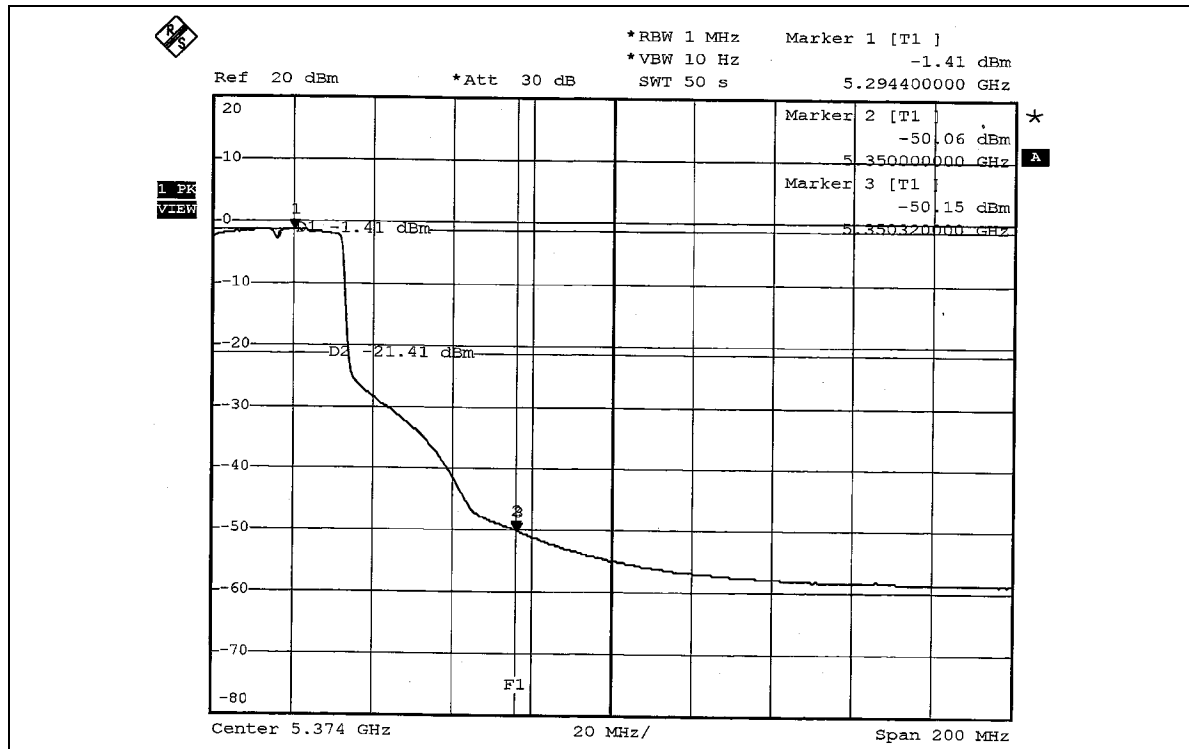




802.11a Turbo OFDM modulation









4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

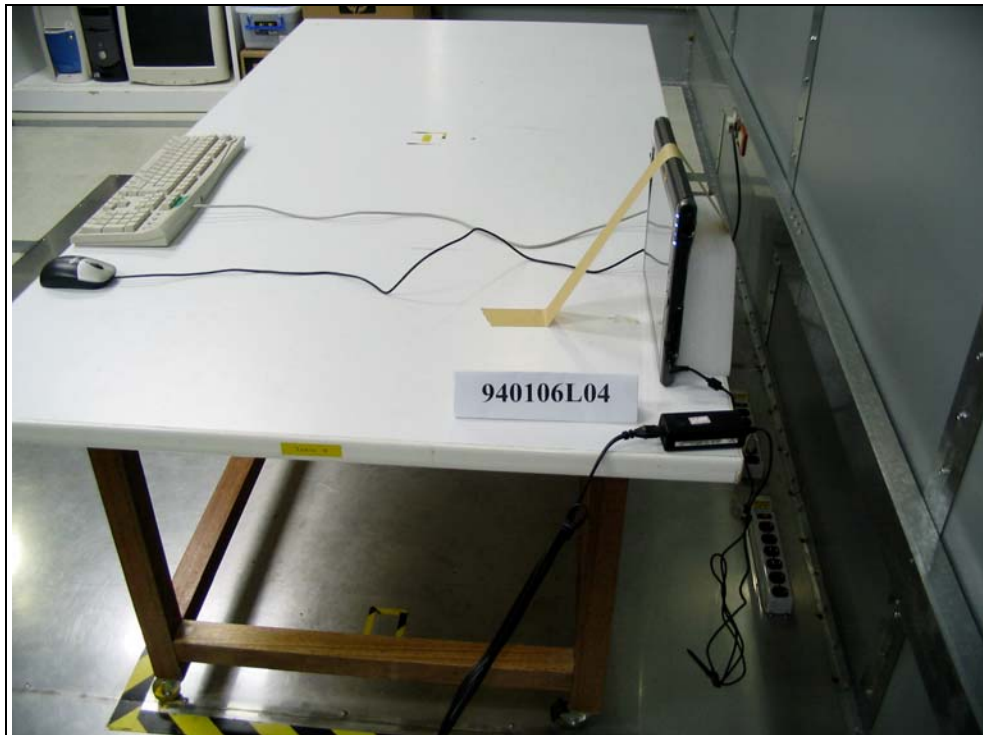
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407(a), 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.

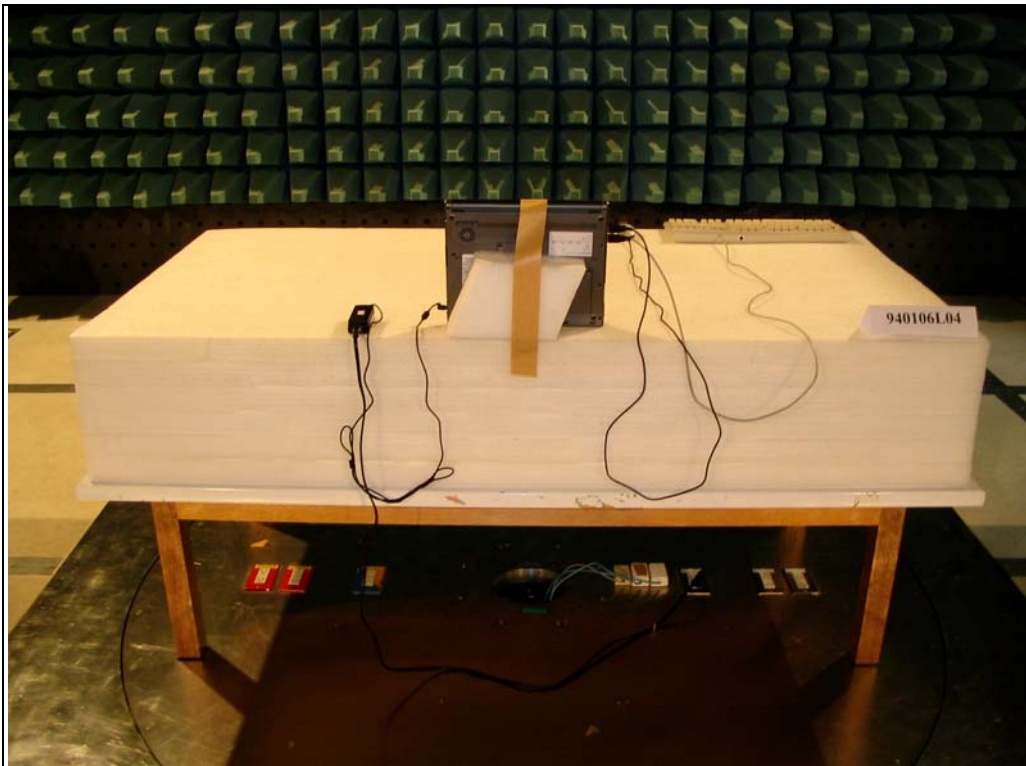
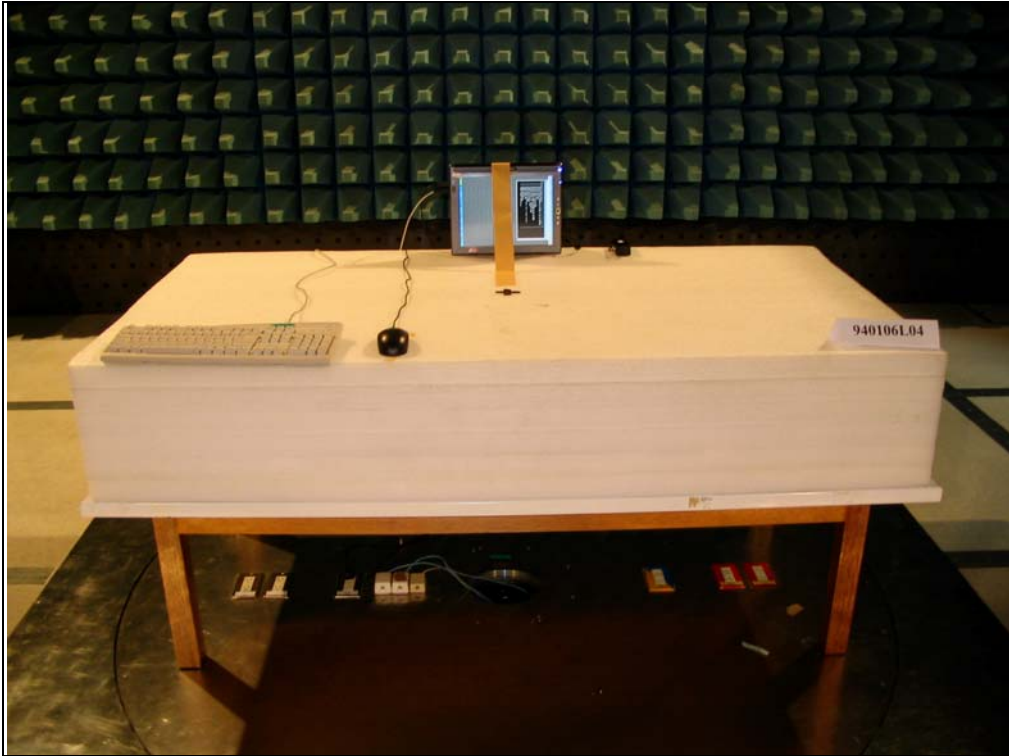
4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Patch antenna with UFL connector. The maximum Gain of the antenna is 1.05dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST





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

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232
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