

FCC TEST REPORT (15.407)

REPORT NO.: RF940330L05
MODEL NO.: WMIA-139AG
RECEIVED: Apr. 25, 2005
TESTED: May 03 ~ May 10, 2005
ISSUED: May 11, 2005

APPLICANT: SparkLAN Communications, Inc.

ADDRESS: 3Fl., No. 246, Sec. 1, Neihu Road., Neihu
Chiu, Taipei Taiwan 114, R.O.C

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan,
R.O.C.

This test report consists of 87 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, A2LA or any government agencies. The test results in the report only apply to the tested sample.



0528
ILAC MRA



No. 2177-01

Table of Contents

1.	CERTIFICATION	4
2.	SUMMARY OF TEST RESULTS	5
2.1	MEASUREMENT UNCERTAINTY	5
3.	GENERAL INFORMATION.....	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	8
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:	9
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	11
3.4	DESCRIPTION OF SUPPORT UNITS	11
4.	TEST TYPES AND RESULTS (5150 ~ 5350MHz BAND)	12
4.1	CONDUCTED EMISSION MEASUREMENT	12
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	12
4.1.2	TEST INSTRUMENTS.....	12
4.1.3	TEST PROCEDURES	13
4.1.4	DEVIATION FROM TEST STANDARD	13
4.1.5	TEST SETUP	14
4.1.6	EUT OPERATING CONDITIONS	14
4.1.7	TEST RESULTS	15
4.2	RADIATED EMISSION MEASUREMENT	17
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	17
4.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	18
4.2.3	TEST INSTRUMENTS.....	19
4.2.4	TEST PROCEDURES	20
4.2.5	DEVIATION FROM TEST STANDARD	20
4.2.6	TEST SETUP	21
4.2.7	EUT OPERATING CONDITION	21
4.2.8	TEST RESULTS	22
4.3	PEAK TRANSMIT POWER MEASUREMENT	38
4.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT.....	38
4.3.2	TEST INSTRUMENTS.....	38
4.3.3	TEST PROCEDURE.....	39
4.3.4	DEVIATION FROM TEST STANDARD	39
4.3.5	TEST SETUP	39
4.3.6	EUT OPERATING CONDITIONS	39
4.3.7	TEST RESULTS	40
4.4	PEAK POWER EXCURSION MEASUREMENT	50
4.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT.....	50
4.4.2	TEST INSTRUMENTS.....	50
4.4.3	TEST PROCEDURE.....	51
4.4.4	DEVIATION FROM TEST STANDARD	51
4.4.5	TEST SETUP	51



4.4.6	EUT OPERATING CONDITIONS	51
4.4.7	TEST RESULTS	52
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT	58
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	58
4.5.2	TEST INSTRUMENTS.....	58
4.5.3	TEST PROCEDURES	59
4.5.4	DEVIATION FROM TEST STANDARD	59
4.5.5	TEST SETUP	59
4.5.6	EUT OPERATING CONDITIONS	59
4.5.7	TEST RESULTS	60
4.6	FREQUENCY STABILITY	66
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	66
4.6.2	TEST INSTRUMENTS.....	66
4.6.3	TEST PROCEDURE.....	66
4.6.4	DEVIATION FROM TEST STANDARD	66
4.6.5	TEST SETUP	67
4.6.6	EUT OPERATING CONDITION	67
4.6.7	TEST RESULTS	68
4.7	BAND EDGES MEASUREMENT	69
4.7.1	TEST INSTRUMENTS.....	69
4.7.2	TEST PROCEDURE.....	69
4.7.3	EUT OPERATING CONDITION	69
4.7.4	TEST RESULTS	69
4.8	ANTENNA REQUIREMENT	80
4.8.1	STANDARD APPLICABLE	80
4.8.2	ANTENNA CONNECTED CONSTRUCTION.....	80
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	81
6.	INFORMATION ON THE TESTING LABORATORIES	87



1. CERTIFICATION

PRODUCT: 802.11a Wireless MiniPCI Card
BRAND NAME: SparkLAN
MODEL NO.: WMIA-139AG
APPLICANT: SparkLAN Communications, Inc.
TEST SAMPLE: Engineering Sample
TESTED: May 03 ~ May 10, 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 : Windy Chou, **DATE:** May 11, 2005
(Windy Chou)

TECHNICAL
ACCEPTANCE : Gary Chang, **DATE:** May 11, 2005
Responsible for
RF
(Gary Chang)

APPROVED BY : Cody Chang, **DATE:** May 11, 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 -22.03dB at 0.171MHz
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 -1.51dB at 5350.00MHz
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	802.11a Wireless MiniPCI Card
MODEL NO.	WMIA-139AG
POWER SUPPLY	5.0Vdc from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11a: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 5)
FREQUENCY RANGE	802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz
NUMBER OF CHANNEL	802.11a: 13 for Normal mode / 5 for Turbo mode
CHANNEL SPACING	802.11a: 20MHz for Normal mode / 40MHz for Turbo mode
OUTPUT POWER	67.143W for 5.150 ~ 5.350GHz 63.680mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	Refer to NOTE 3 below
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT operates in the 5GHz Bands and compatibility with 802.11a technology.
2. This EUT is capable of providing data rates of up to 108 Mbps in 802.11a Turbo mode depending upon reception quality.
3. The following antennas are used in this EUT.

Item	Antenna Brand	Antenna Type	Gain(dBi)
1	PINWHEEL	Printed	2.7
2	PINWHEEL	Printed	2.7
3	TIKI	Printed	7.51

Remark: The item 2 and 3 were chosen for final test in this report. We have tested for each antenna and chosen the highest gain of each antenna for final test and recorded in this report.

4. 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:

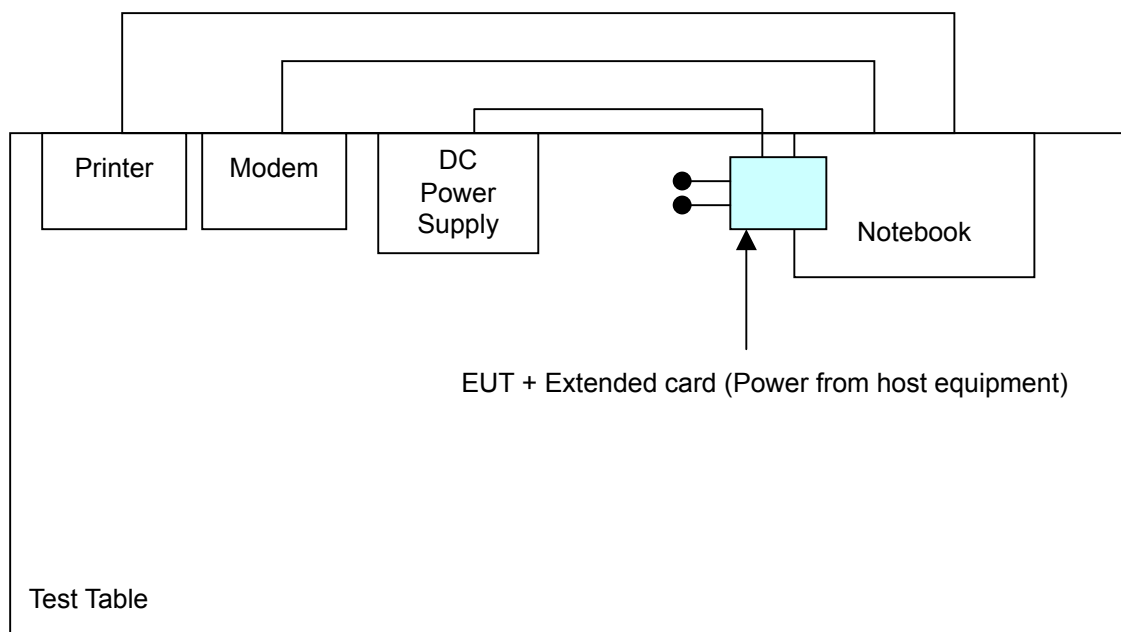
Eight channels are provided to this EUT for normal mode.

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	
1	Note 1	x	x	Note 2	Antenna 2 (gain: 2.70)
2	Note 1	x	x	Note 2	Antenna 3 (gain: 7.51)

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: Power Line Conducted Emission is independent of antenna.

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, XYZ Axis 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)
2	802.11a	1 to 8	5	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, XYZ Axis 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	802.11a	1 to 8	5	OFDM	BPSK	6
2	802.11a	1 to 8	5	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, XYZ Axis 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	802.11a	1 to 8	5	OFDM	BPSK	6
1	802.11a Turbo	1 to 3	1, 3	OFDM	BPSK	12
2	802.11a	1 to 8	5	OFDM	BPSK	6
2	802.11a Turbo	1 to 3	1, 3	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)
802.11a	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 an 802.11a Wireless MiniPCI Card. 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	NOTEBOOK COMPUTER	DELL	PP05L	16484462992	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY054147	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008269	IFAXDM1414
4	DC Power Supply	Topward	6603D	700637	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2 shielded cable without core
3	1.2 shielded cable without core
4	NA

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 (dBμV)	
	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	100288	Nov. 06, 2005
RF signal cable Woken	5D-FB	Cable-HyC02-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 20, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 20, 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 3.
 3. The VCCI Site Registration No. is C-2047.



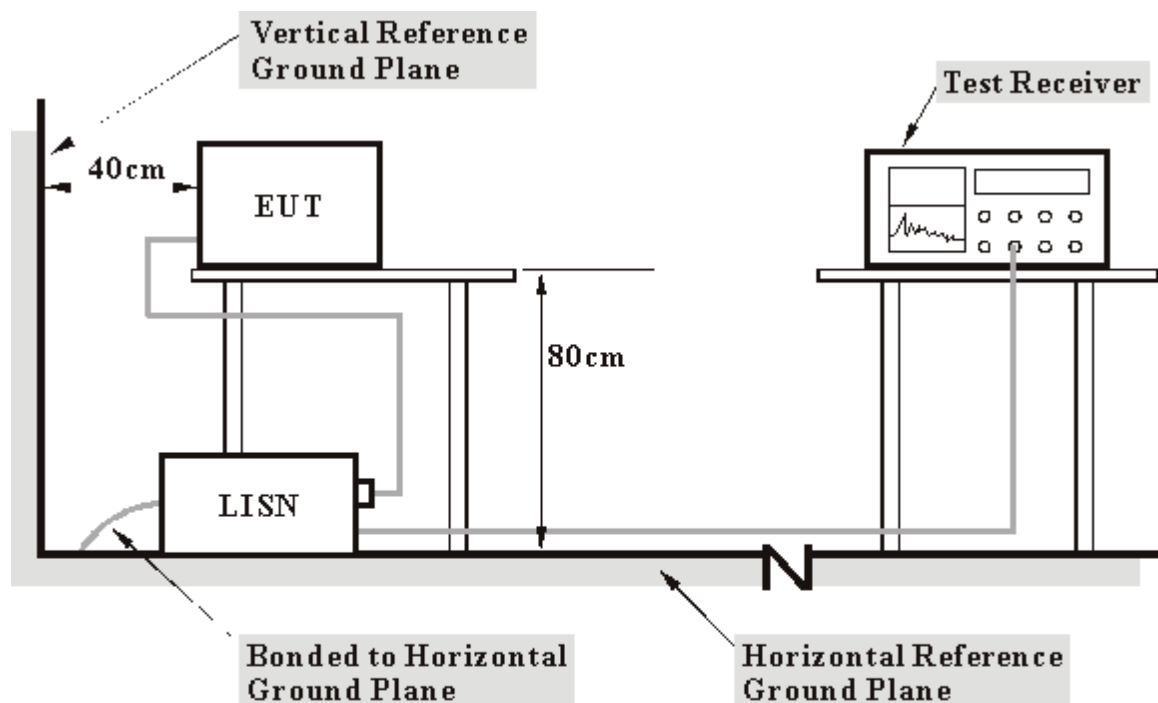
4.1.3 TEST PROCEDURES

- 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 via a extended card and placed on the testing table.
- b. The Notebook systems run a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The Notebook sent "H" messages to its screen.
- d. The notebook system sent "H" messages to modem.
- e. The notebook system sent "H" messages to printer, and the printer printed them on paper.
- f. Steps c ~ e were repeated.

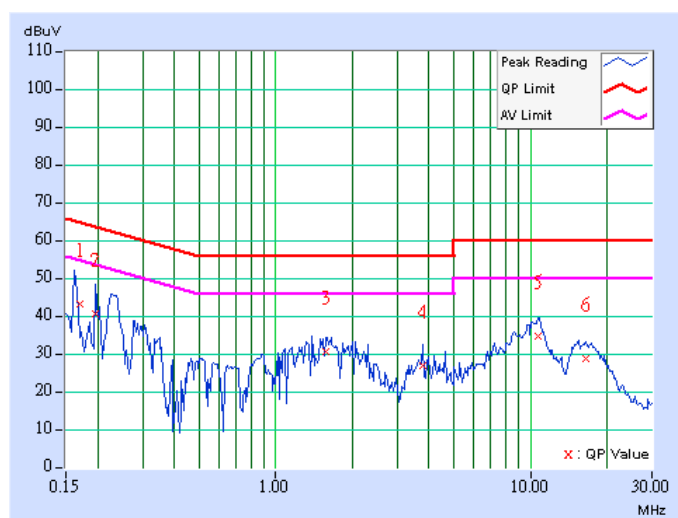
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	PHASE	Line 1
CHANNEL	Channel 5	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
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	0.171	0.10	42.79	-	42.89	-	64.92	54.92	-22.03	-
2	0.197	0.10	40.06	-	40.16	-	63.74	53.74	-23.58	-
3	1.566	0.20	30.06	-	30.26	-	56.00	46.00	-25.74	-
4	3.770	0.20	26.61	-	26.81	-	56.00	46.00	-29.19	-
5	10.719	0.31	34.15	-	34.46	-	60.00	50.00	-25.54	-
6	16.492	0.52	28.26	-	28.78	-	60.00	50.00	-31.22	-

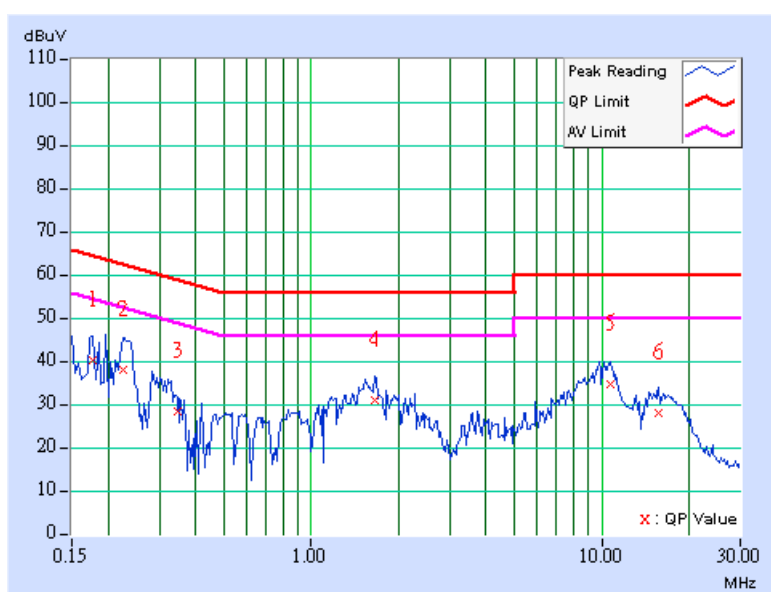
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	PHASE	Line 2
CHANNEL	Channel 5	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
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	0.177	0.10	40.01	-	40.11	-	64.61	54.61	-24.50	-
2	0.224	0.10	37.65	-	37.75	-	62.66	52.66	-24.91	-
3	0.349	0.10	28.13	-	28.23	-	58.99	48.99	-30.76	-
4	1.660	0.20	30.68	-	30.88	-	56.00	46.00	-25.12	-
5	10.723	0.41	34.27	-	34.68	-	60.00	50.00	-25.32	-
6	15.746	0.54	27.44	-	27.98	-	60.00	50.00	-32.02	-

- 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 (dBμV/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.

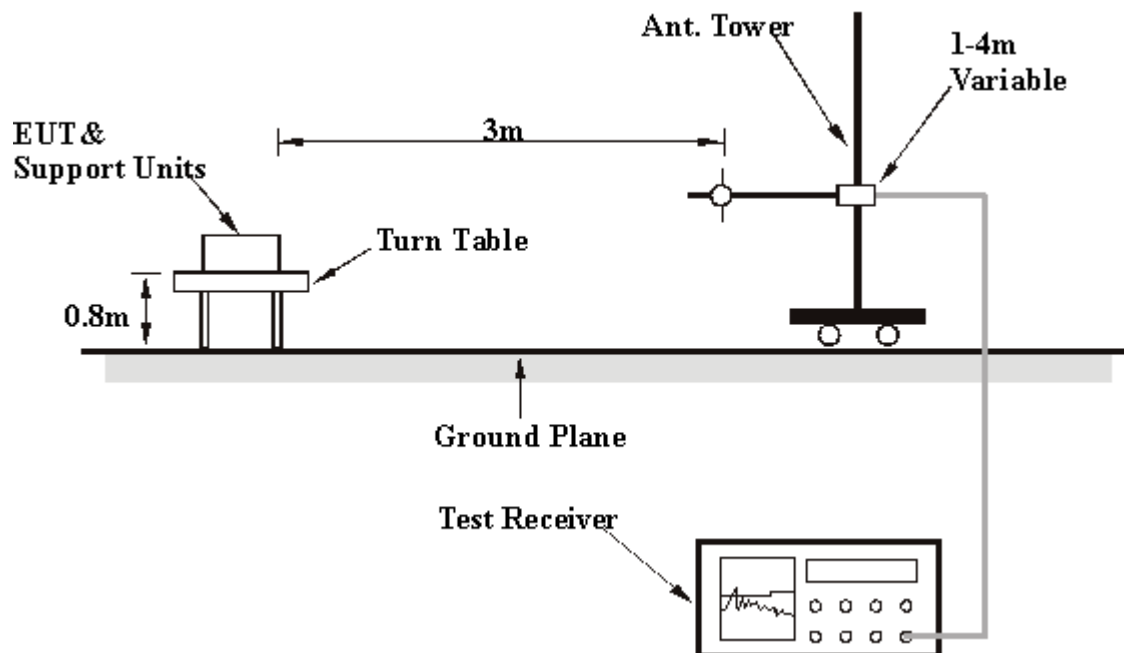
NOTE:

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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT configure mode	1

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	31.10 QP	43.50	-12.40	1.50 H	127	20.36	10.74
2	131.08	34.29 QP	43.50	-9.21	1.25 H	325	20.71	13.58
3	166.07	41.30 QP	43.50	-2.20	1.50 H	94	27.23	14.07
4	199.12	41.50 QP	43.50	-2.00	1.00 H	298	30.30	11.20
5	232.16	41.59 QP	46.00	-4.41	1.50 H	97	29.18	12.41
6	267.15	43.50 QP	46.00	-2.50	1.25 H	328	29.97	13.53
7	298.26	32.94 QP	46.00	-13.06	1.25 H	184	18.64	14.30
8	333.25	39.90 QP	46.00	-6.10	1.00 H	184	24.82	15.08
9	401.28	36.69 QP	46.00	-9.31	1.00 H	199	20.02	16.67
10	465.43	34.88 QP	46.00	-11.12	1.50 H	82	16.76	18.12

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	31.94	26.61 QP	40.00	-13.39	1.00 V	256	12.94	13.68
2	64.99	24.83 QP	40.00	-15.17	1.00 V	103	11.93	12.90
3	166.07	32.89 QP	43.50	-10.61	1.00 V	199	18.82	14.07
4	199.12	36.03 QP	43.50	-7.47	1.75 V	268	24.83	11.20
5	232.16	33.50 QP	46.00	-12.50	1.50 V	262	21.09	12.41
6	265.21	36.66 QP	46.00	-9.34	1.50 V	274	23.22	13.45
7	333.25	34.36 QP	46.00	-11.64	1.25 V	277	19.28	15.08
8	465.43	32.87 QP	46.00	-13.13	1.75 V	271	14.75	18.12

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT configure mode	2

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	31.94	25.22 QP	40.00	-14.78	1.50 H	211	11.55	13.68
2	64.99	26.37 QP	40.00	-13.63	1.00 H	247	13.47	12.90
3	98.04	39.42 QP	43.50	-4.08	2.00 H	28	28.84	10.59
4	133.03	39.89 QP	43.50	-3.61	2.00 H	13	26.17	13.72
5	166.07	41.65 QP	43.50	-1.85	1.50 H	334	27.58	14.07
6	199.12	38.90 QP	43.50	-4.60	1.50 H	355	27.70	11.20
7	232.16	33.12 QP	46.00	-12.88	1.00 H	322	20.71	12.41
8	265.21	32.00 QP	46.00	-14.00	1.00 H	289	18.56	13.45
9	358.52	33.02 QP	46.00	-12.98	1.00 H	262	17.36	15.66
10	391.56	34.18 QP	46.00	-11.82	1.00 H	214	17.74	16.44
11	465.43	33.11 QP	46.00	-12.89	1.50 H	256	14.99	18.12
12	599.56	35.50 QP	46.00	-10.50	1.50 H	217	14.62	20.88

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	31.94	28.70 QP	40.00	-11.30	1.00 V	226	15.02	13.68
2	64.99	34.01 QP	40.00	-5.99	1.00 V	88	21.12	12.90
3	98.04	32.63 QP	43.50	-10.87	1.00 V	298	22.04	10.59
4	134.97	31.01 QP	43.50	-12.49	1.00 V	250	17.16	13.86
5	193.29	32.30 QP	43.50	-11.20	1.50 V	91	20.64	11.66
6	601.50	30.64 QP	46.00	-15.36	1.00 V	259	9.73	20.91

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 configure mode 1

EUT	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	62.89 PK	74.00	-11.11	1.11 H	117	25.84	37.05
1	#5150.00	51.66 AV	54.00	-2.34	1.11 H	117	14.60	37.05
2	*5180.00	108.90 PK			1.11 H	117	71.81	37.09
2	*5180.00	97.68 AV			1.11 H	117	60.59	37.09
3	6906.00	56.67 PK	68.30	-11.63	1.11 H	360	15.10	41.57
4	10360.00	55.09 PK	68.30	-13.21	1.14 H	145	9.03	46.06

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	#5150.00	54.28 PK	74.00	-19.72	1.09 V	290	17.23	37.05
1	#5150.00	44.50 AV	54.00	-9.50	1.09 V	290	7.45	37.05
2	*5180.00	100.80 PK			1.09 V	290	63.71	37.09
2	*5180.00	91.30 AV			1.09 V	290	54.21	37.09
3	6906.00	53.93 PK	68.30	-14.37	1.03 V	318	12.36	41.57
4	10360.00	55.44 PK	68.30	-12.86	1.12 V	235	9.38	46.06

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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 4	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	108.76 PK			1.12 H	115	71.56	37.20
1	*5240.00	98.44 AV			1.12 H	115	61.24	37.20
2	6986.00	55.84 PK	68.30	-12.46	1.04 H	360	14.10	41.74
3	10480.00	55.36 PK	68.30	-12.94	1.14 H	256	9.00	46.36

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	*5240.00	101.83 PK			1.00 V	308	64.63	37.20
1	*5240.00	91.91 AV			1.00 V	308	54.71	37.20
2	6986.00	52.86 PK	68.30	-15.44	1.04 V	325	11.12	41.74
3	10480.00	55.71 PK	68.30	-12.59	1.10 V	247	9.35	46.36

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	111.40 PK			1.16 H	306	74.15	37.25
1	*5260.00	100.32 AV			1.16 H	306	63.07	37.25
2	7013.00	56.98 PK	68.30	-11.32	1.18 H	61	15.19	41.79
3	10520.00	55.87 PK	68.30	-12.43	1.11 H	265	9.40	46.48

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	104.69 PK			1.00 V	309	67.44	37.25
1	*5260.00	95.05 AV			1.00 V	309	57.80	37.25
2	7013.00	52.82 PK	68.30	-15.48	1.12 V	350	11.03	41.79
3	10520.00	56.36 PK	68.30	-11.94	1.12 V	241	9.89	46.48

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 8	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	108.92 PK			1.16 H	307	71.56	37.36
1	*5320.00	98.47 AV			1.16 H	307	61.11	37.36
2	#5350.00	57.51 PK	74.00	-16.49	1.16 H	307	20.12	37.39
2	#5350.00	47.26 AV	54.00	-6.74	1.16 H	307	9.87	37.39
3	7093.00	54.95 PK	68.30	-13.35	1.05 H	9	13.03	41.92
4	#10640.00	56.54 PK	74.00	-17.46	1.13 H	280	9.82	46.72
4	#10640.00	44.68 AV	54.00	-9.32	1.13 H	280	9.82	46.72

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	100.12 PK			1.04 V	279	62.76	37.36
1	*5320.00	91.35 AV			1.04 V	279	53.99	37.36
2	#5350.00	48.91 PK	74.00	-25.09	1.04 V	279	11.52	37.39
2	#5350.00	40.14 AV	54.00	-13.86	1.04 V	279	2.75	37.39
3	7093.00	51.50 PK	68.30	-16.80	1.27 V	351	9.58	41.92
4	#10640.00	56.90 PK	74.00	-17.10	1.11 V	247	10.18	46.72
4	#10640.00	45.74 AV	54.00	-8.26	1.11 V	247	10.18	46.72

- 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 OFDM modulation - EUT configure mode 2

EUT	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	62.84 PK	74.00	-11.16	1.35 H	72	25.79	37.05
1	#5150.00	52.16 AV	54.00	-1.84	1.35 H	72	15.10	37.05
2	*5180.00	111.80 PK			1.35 H	72	74.71	37.09
2	*5180.00	100.02 AV			1.35 H	72	62.93	37.09
3	6906.00	57.53 PK	68.30	-10.77	1.29 H	91	15.96	41.57
4	10360.00	56.93 PK	68.30	-11.37	1.23 H	306	10.87	46.06

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	#5150.00	47.55 PK	74.00	-26.45	1.39 V	60	10.49	37.05
1	#5150.00	37.51 AV	54.00	-16.49	1.39 V	60	0.45	37.05
2	*5180.00	97.97 PK			1.39 V	60	60.88	37.09
2	*5180.00	87.93 AV			1.39 V	60	50.84	37.09
3	6906.00	51.83 PK	68.30	-16.47	1.04 V	304	10.26	41.57
4	10360.00	56.56 PK	68.30	-11.74	1.34 V	212	10.50	46.06

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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 4	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	113.89 PK			1.30 H	84	76.69	37.20
1	*5240.00	103.40 AV			1.30 H	84	66.20	37.20
2	6986.00	56.45 PK	68.30	-11.85	1.30 H	101	14.71	41.74
3	10480.00	57.10 PK	68.30	-11.20	1.24 H	350	10.74	46.36

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	*5240.00	98.57 PK			1.35 V	100	61.37	37.20
1	*5240.00	88.69 AV			1.35 V	100	51.49	37.20
2	6986.00	52.11 PK	68.30	-16.19	1.04 V	310	10.37	41.74
3	10480.00	57.02 PK	68.30	-11.28	1.28 V	201	10.66	46.36

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	118.07 PK			1.35 H	71	80.82	37.25
1	*5260.00	107.76 AV			1.35 H	71	70.51	37.25
2	7013.00	57.61 PK	68.30	-10.69	1.31 H	98	15.82	41.79
3	10520.00	59.98 PK	68.30	-8.32	1.38 H	236	13.51	46.48

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	102.15 PK			1.65 V	50	64.90	37.25
1	*5260.00	92.23 AV			1.65 V	50	54.98	37.25
2	7013.00	52.42 PK	68.30	-15.88	1.08 V	289	10.63	41.79
3	10520.00	57.85 PK	68.30	-10.45	1.28 V	240	11.37	46.48

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 8	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	113.85 PK			1.34 H	73	76.49	37.36
1	*5320.00	102.94 AV			1.34 H	73	65.58	37.36
2	#5350.00	63.04 PK	74.00	-10.96	1.34 H	73	25.65	37.39
2	#5350.00	52.13 AV	54.00	-1.87	1.34 H	73	14.74	37.39
3	7093.00	55.40 PK	68.30	-12.90	1.29 H	98	13.48	41.92
4	#10640.00	58.10 PK	74.00	-15.90	1.28 H	300	11.38	46.72
4	#10640.00	45.68 AV	54.00	-8.32	1.28 H	300	-1.04	46.72

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	98.15 PK			1.35 V	49	60.79	37.36
1	*5320.00	88.34 AV			1.35 V	49	50.98	37.36
2	#5350.00	47.34 PK	74.00	-26.66	1.35 V	49	9.95	37.39
2	#5350.00	37.53 AV	54.00	-16.47	1.35 V	49	0.14	37.39
3	7093.00	52.38 PK	68.30	-15.92	1.06 V	310	10.46	41.92
4	#10640.00	57.25 PK	74.00	-16.75	1.31 V	240	10.53	46.72
4	#10640.00	43.18 AV	54.00	-10.82	1.31 V	240	-3.54	46.72

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	58.65 PK	74.00	-15.35	1.24 H	305	21.59	37.05
1	#5150.00	48.24 AV	54.00	-5.76	1.24 H	305	11.19	37.05
2	*5210.00	104.29 PK			1.24 H	305	67.16	37.13
2	*5210.00	93.88 AV			1.24 H	305	56.75	37.13
3	6946.00	56.05 PK	68.30	-12.25	1.02 H	360	14.39	41.66
4	10420.00	55.64 PK	68.30	-12.66	1.25 H	30	9.52	46.12

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	54.58 PK	74.00	-19.42	1.12 V	308	17.52	37.05
1	#5150.00	44.05 AV	54.00	-9.95	1.12 V	308	6.99	37.05
2	*5210.00	100.22 PK			1.12 V	308	63.09	37.13
2	*5210.00	89.69 AV			1.12 V	308	52.56	37.13
3	6946.00	51.64 PK	68.30	-16.66	1.11 V	339	9.98	41.66
4	10420.00	55.06 PK	68.30	-13.24	1.15 V	50	8.94	46.12
5	#15630.00	60.46 PK	74.00	-13.54	1.15 V	57	12.36	48.10
5	#15630.00	47.92 AV	54.00	-6.08	1.15 V	57	-0.18	48.10

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 2	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	105.92 PK			1.21 H	10	68.69	37.23
1	*5250.00	95.74 AV			1.21 H	10	58.51	37.23
2	7000.00	55.86 PK	68.30	-12.44	1.04 H	180	14.09	41.77
3	10500.00	55.70 PK	68.30	-12.60	1.20 H	360	9.26	46.44

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	102.50 PK			1.15 V	310	65.28	37.23
1	*5250.00	90.78 AV			1.15 V	310	53.55	37.23
2	7000.00	52.31 PK	68.30	-15.99	1.10 V	247	10.54	41.77
3	#15750.00	61.10 PK	74.00	-12.90	1.10 V	360	13.38	47.72
3	#15750.00	48.23 AV	54.00	-5.77	1.10 V	360	0.51	47.72

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 3	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	1

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	108.12 PK			1.15 H	308	70.80	37.32
1	*5290.00	97.21 AV			1.15 H	308	59.89	37.32
2	#5350.00	57.00 PK	74.00	-17.00	1.15 H	308	19.61	37.39
2	#5350.00	46.00 AV	54.00	-8.00	1.15 H	308	8.61	37.39
3	7053.00	54.61 PK	68.30	-13.69	1.23 H	267	12.76	41.85
4	10580.00	61.52 PK	68.30	-6.78	1.40 H	18	14.93	46.58

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	102.14 PK			1.44 V	63	64.82	37.32
1	*5290.00	92.57 AV			1.44 V	63	55.25	37.32
2	#5350.00	57.42 PK	74.00	-16.58	1.44 V	63	20.03	37.39
2	#5350.00	47.14 AV	54.00	-6.86	1.44 V	63	9.75	37.39
3	7053.00	51.40 PK	68.30	-16.90	1.18 V	342	9.55	41.85
4	10580.00	61.79 PK	68.30	-6.51	1.24 V	36	15.20	46.58

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	63.02 PK	74.00	-10.98	1.39 H	78	25.97	37.05
1	#5150.00	52.19 AV	54.00	-1.81	1.39 H	78	15.13	37.05
2	*5210.00	109.57 PK			1.39 H	78	72.44	37.13
2	*5210.00	98.94 AV			1.39 H	78	61.81	37.13
3	6946.00	58.15 PK	68.30	-10.15	1.30 H	96	16.49	41.66
4	10420.00	55.71 PK	68.30	-12.59	1.26 H	307	9.59	46.12

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	46.32 PK	74.00	-27.68	1.37 V	55	9.27	37.05
1	#5150.00	36.95 AV	54.00	-17.05	1.37 V	55	-0.10	37.05
2	*5210.00	95.08 PK			1.37 V	55	57.95	37.13
2	*5210.00	85.71 AV			1.37 V	55	48.58	37.13
3	6946.00	52.64 PK	68.30	-15.66	1.07 V	12	10.98	41.66
4	10420.00	55.33 PK	68.30	-12.97	1.14 V	275	9.21	46.12

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 2	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	112.48 PK			1.41 H	102	75.25	37.23
1	*5250.00	101.57 AV			1.41 H	102	64.34	37.23
2	7000.00	58.68 PK	68.30	-9.62	1.34 H	150	16.91	41.77
3	10500.00	56.86 PK	68.30	-11.44	1.31 H	350	10.42	46.44

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	96.55 PK			1.40 V	45	59.32	37.23
1	*5250.00	86.49 AV			1.40 V	45	49.26	37.23
2	7000.00	53.50 PK	68.30	-14.80	1.10 V	350	11.73	41.77
3	10500.00	56.18 PK	68.30	-12.12	1.10 V	340	9.74	46.44

- 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	802.11a Wireless MiniPCI Card	MEASUREMENT DETAIL	
MODEL	WMIA-139AG	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 3	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	24deg. C, 66%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui	EUT CONFIGURE MODE	2

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	114.01 PK			1.05 H	309	76.69	37.32
1	*5290.00	102.50 AV			1.05 H	309	65.18	37.32
2	#5350.00	62.87 PK	74.00	-11.13	1.05 H	309	25.48	37.39
2	#5350.00	52.49 AV	54.00	-1.51	1.05 H	309	15.10	37.39
3	7053.00	57.43 PK	68.30	-10.87	1.33 H	109	15.58	41.85
4	10580.00	55.86 PK	68.30	-12.44	1.08 H	285	9.28	46.58

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	97.45 PK			1.32 V	45	60.13	37.32
1	*5290.00	87.34 AV			1.32 V	45	50.02	37.32
2	#5350.00	46.33 PK	74.00	-27.67	1.32 V	45	8.94	37.39
2	#5350.00	36.22 AV	54.00	-17.78	1.32 V	45	-1.17	37.39
3	7053.00	53.10 PK	68.30	-15.20	1.05 V	350	11.25	41.85
4	10580.00	55.46 PK	68.30	-12.84	1.11 V	301	8.88	46.58

- 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:

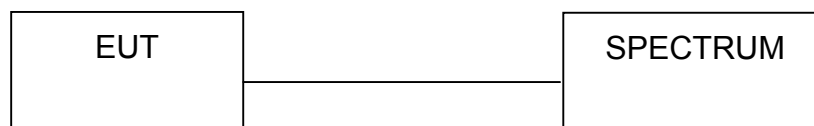
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

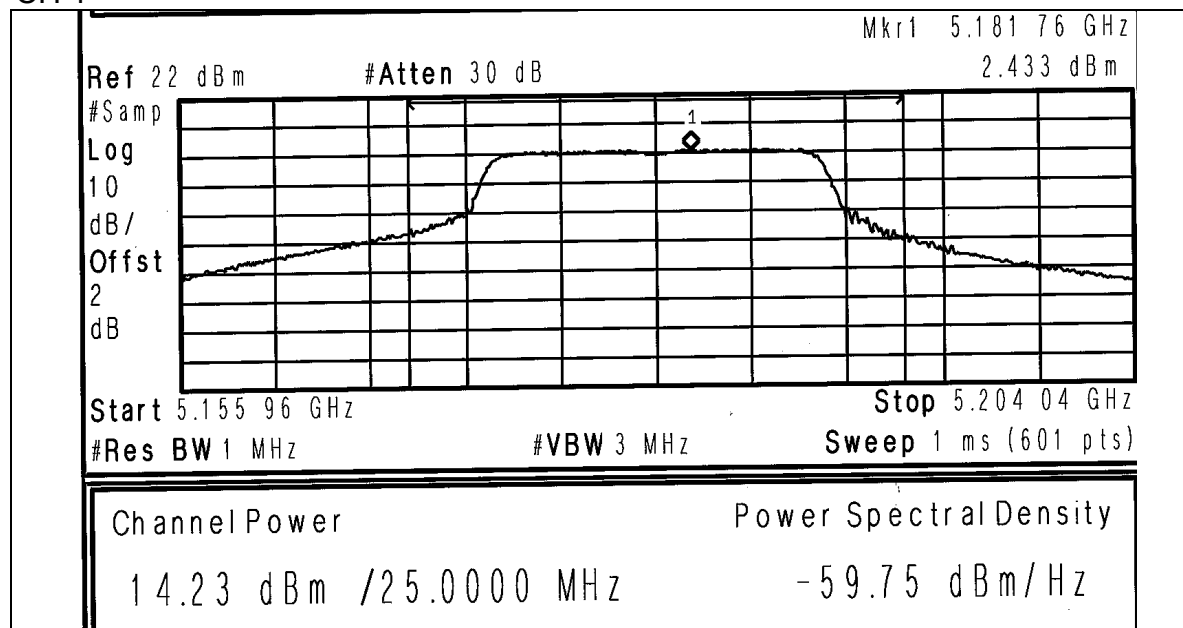
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	26.485	14.23	15.00	24.80	PASS
4	5240	27.542	14.40	15.00	24.40	PASS
5	5260	67.143	18.27	22.00	25.04	PASS
8	5320	26.002	14.15	22.00	25.12	PASS

NOTE1: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

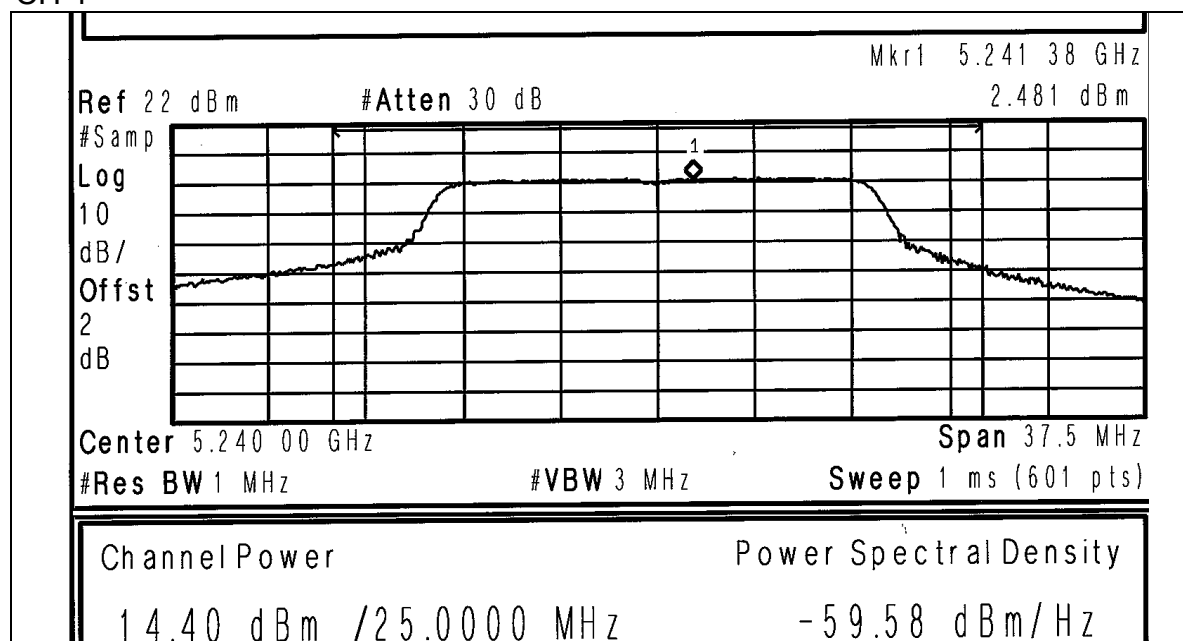
NOTE2: According to 15.407(a) (2), the maximum antenna gain 7.51dBi is higher than 6dBi, so limit of peak power shall be reduced by 2dBi.

Peak Power Output:

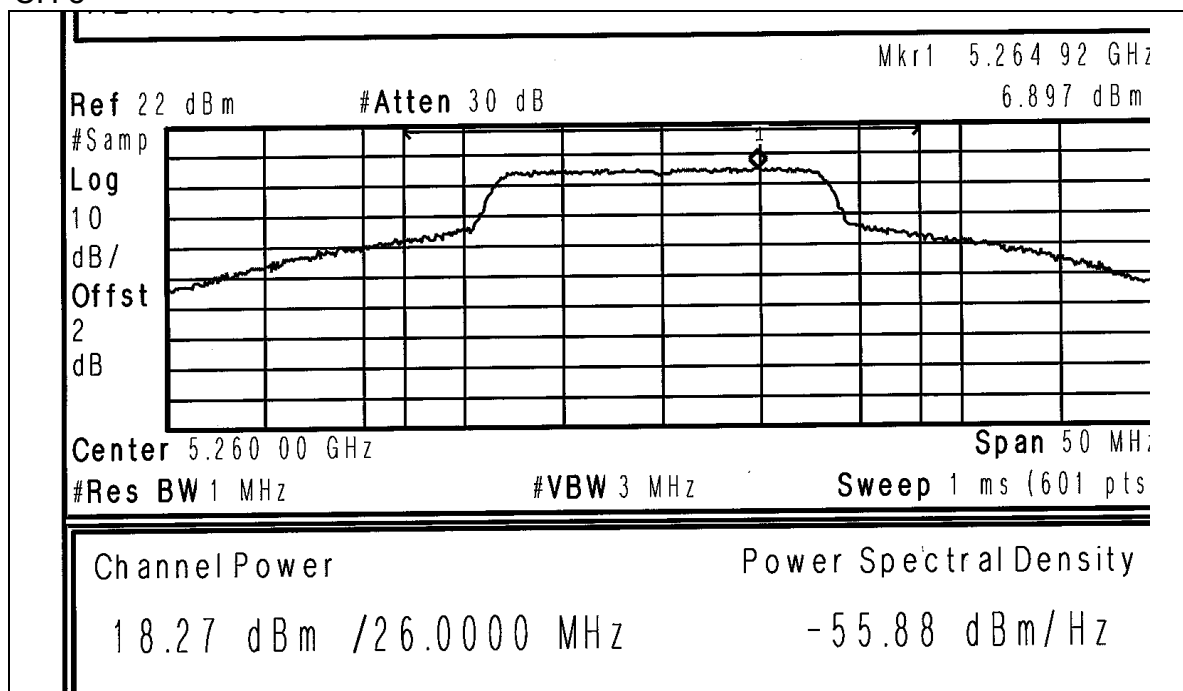
CH 1



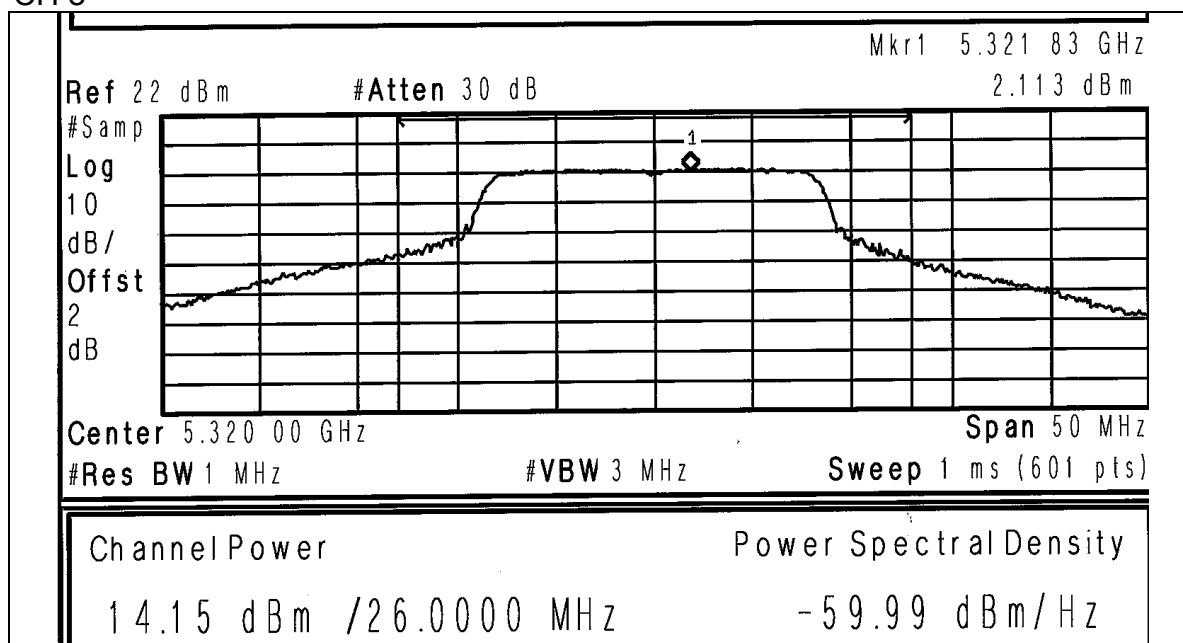
CH 4



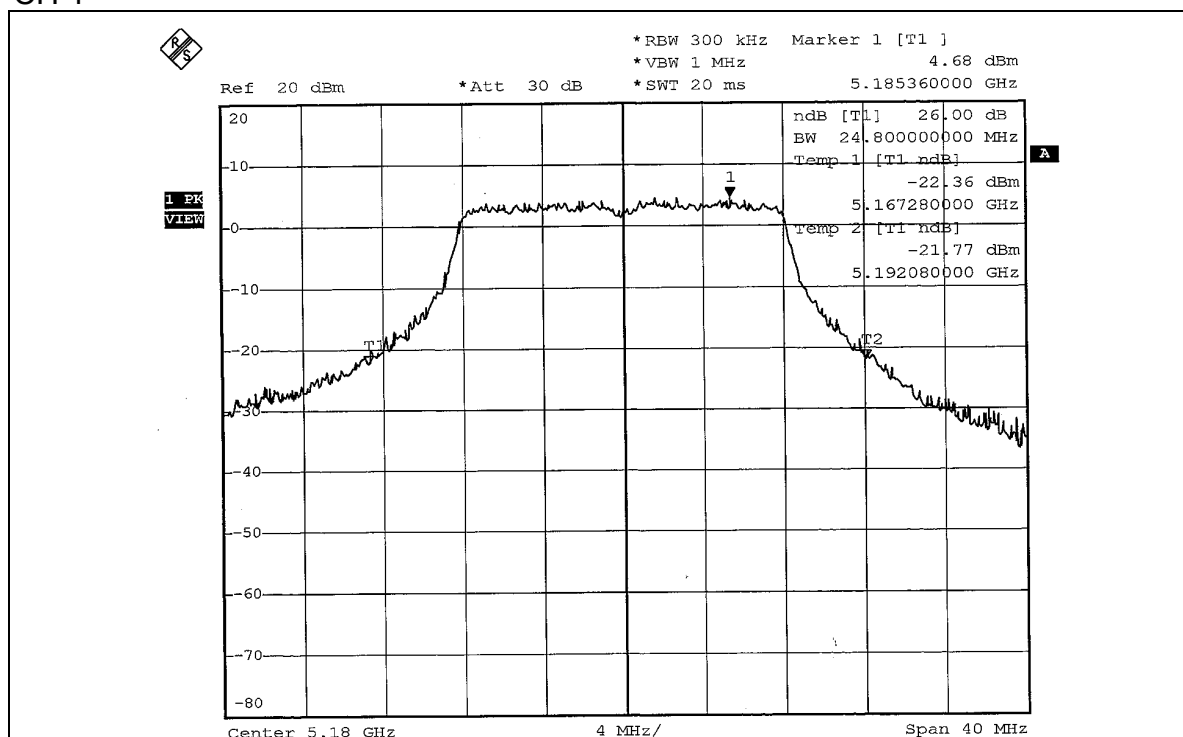
CH 5



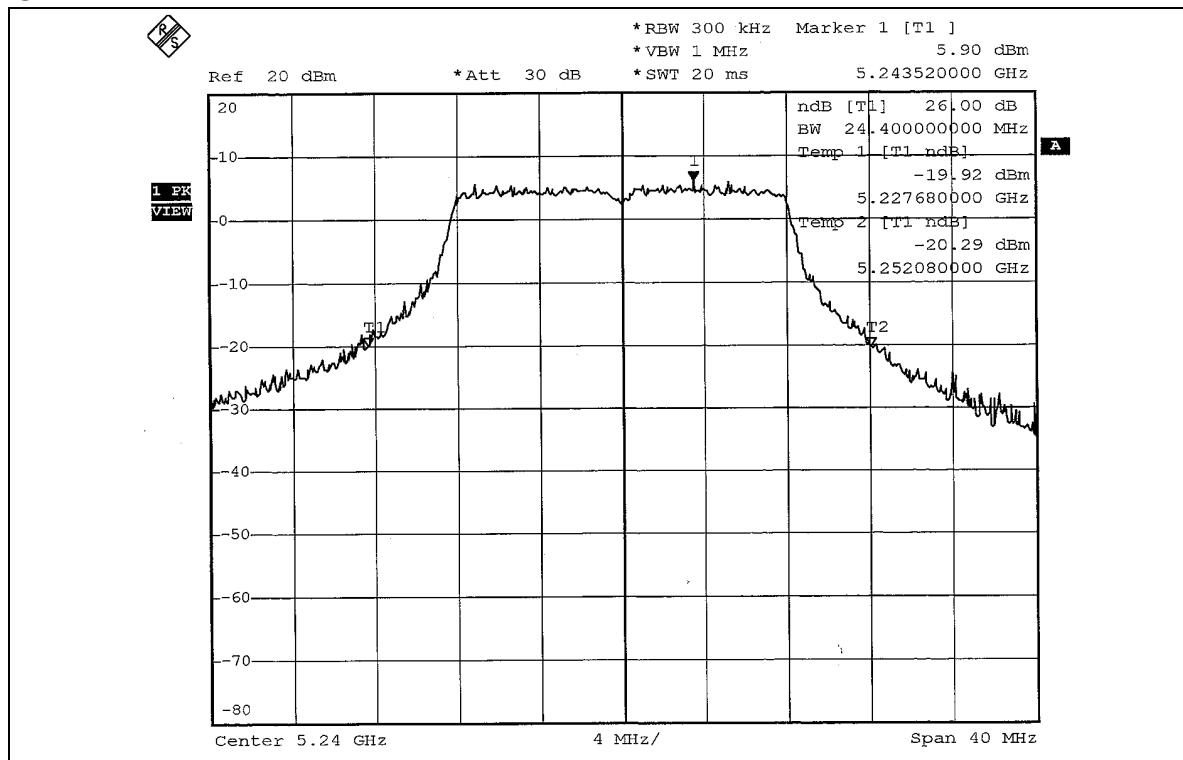
CH 8



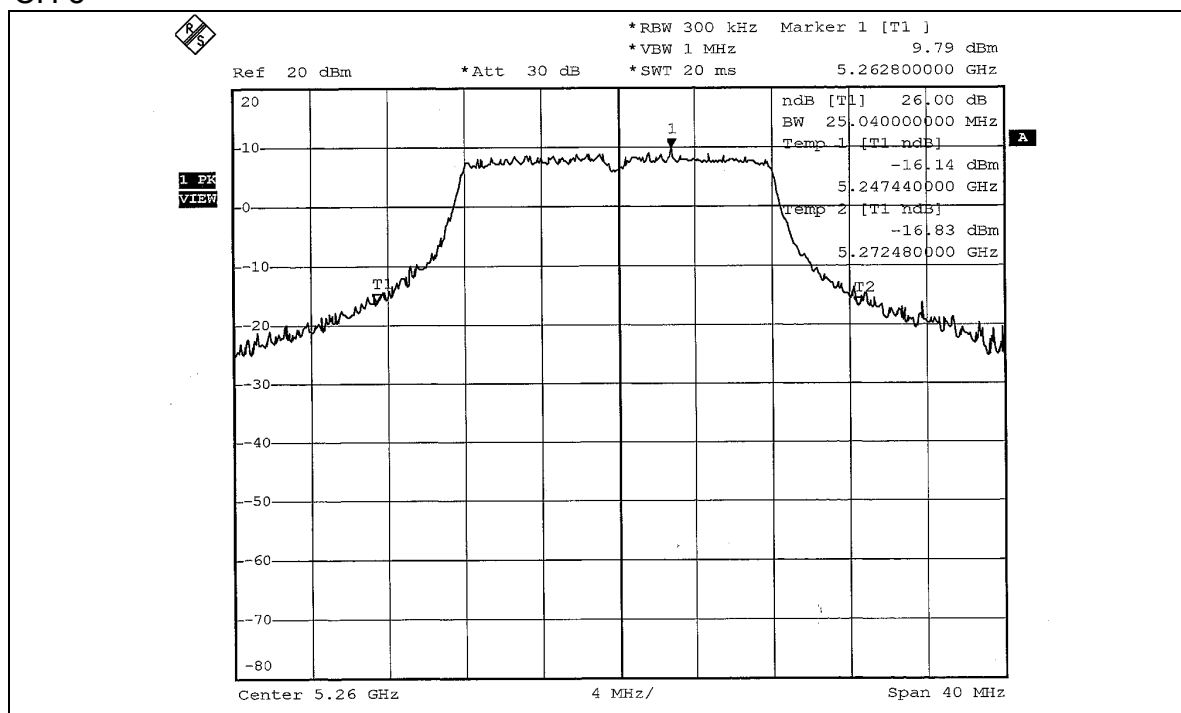
26dB Occupied Bandwidth: CH 1



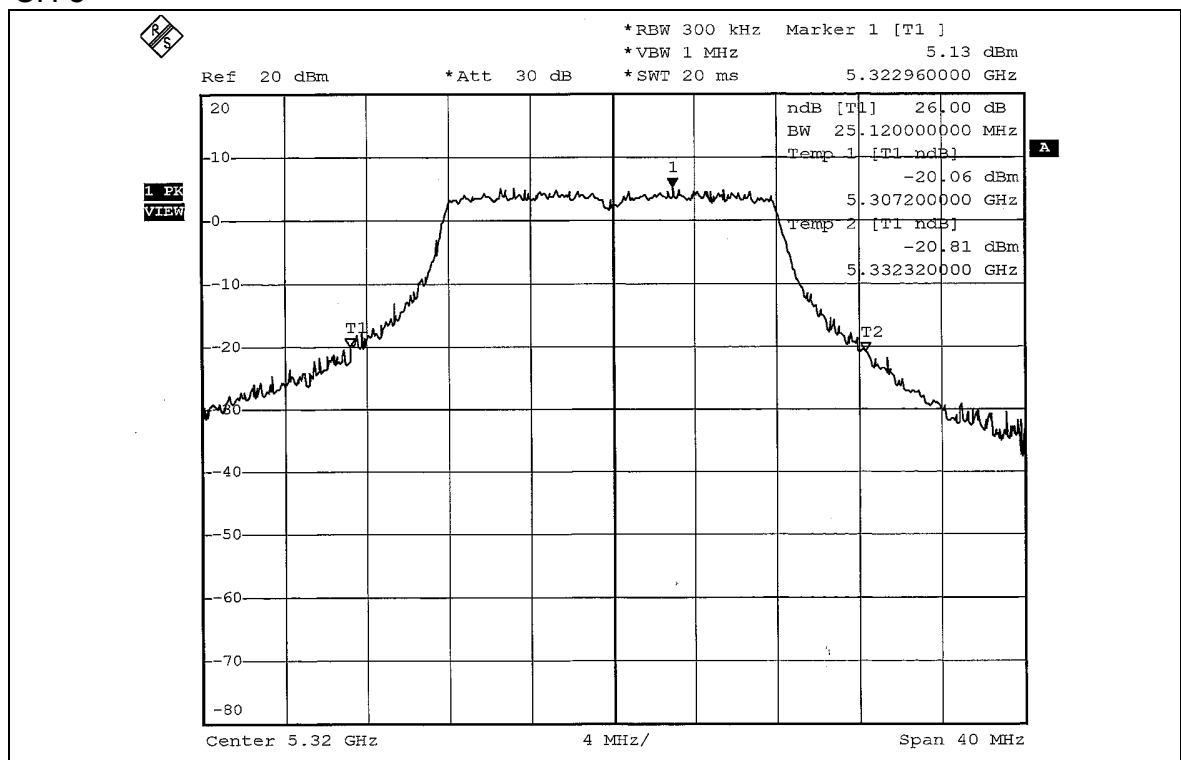
CH 4



CH 5



CH 8



802.11a Turbo OFDM modulation

EUT	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

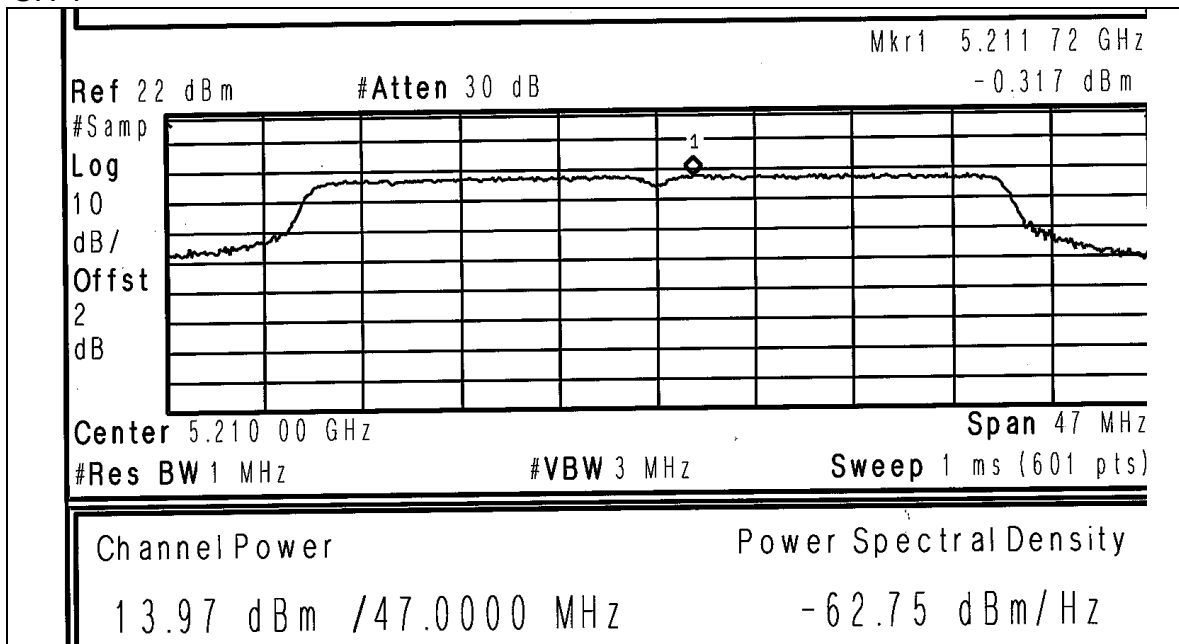
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5210	24.946	13.97	15.00	46.40	PASS
2	5250	40.272	15.05	15.00	45.40	PASS
3	5290	51.880	17.15	22.00	46.00	PASS

NOTE1: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

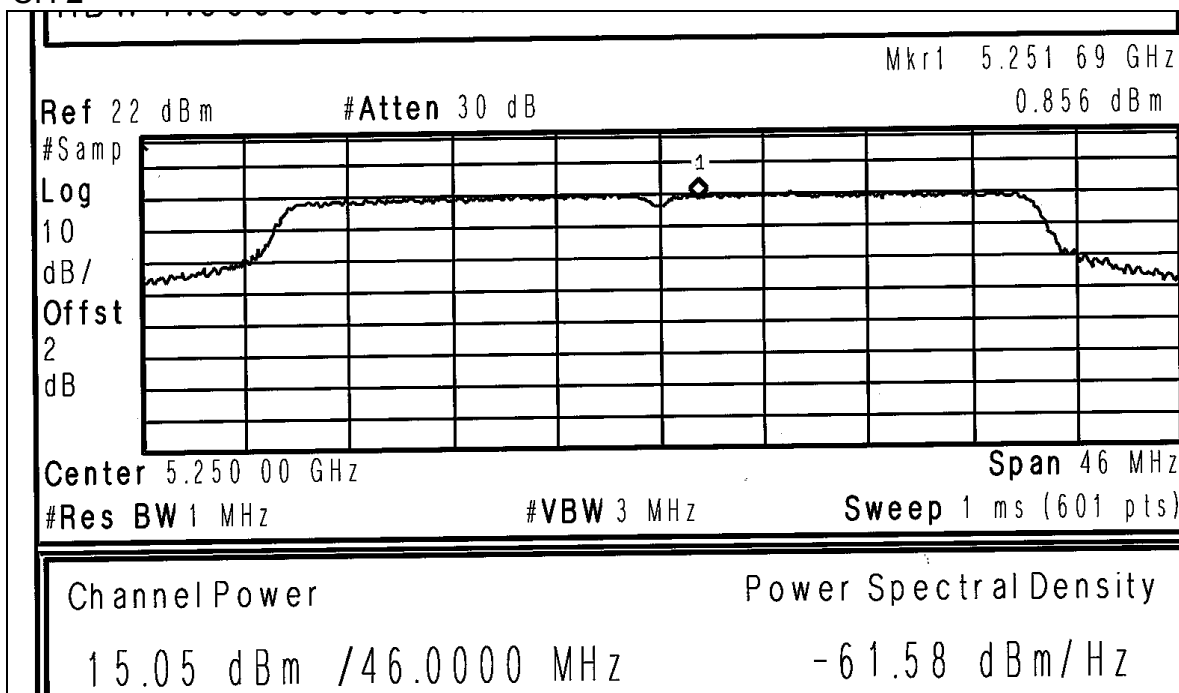
NOTE2: According to 15.407(a) (2), the maximum antenna gain 7.51dBi is higher than 6dBi, so limit of peak power shall be reduced by 2dBi.

Peak Power Output:

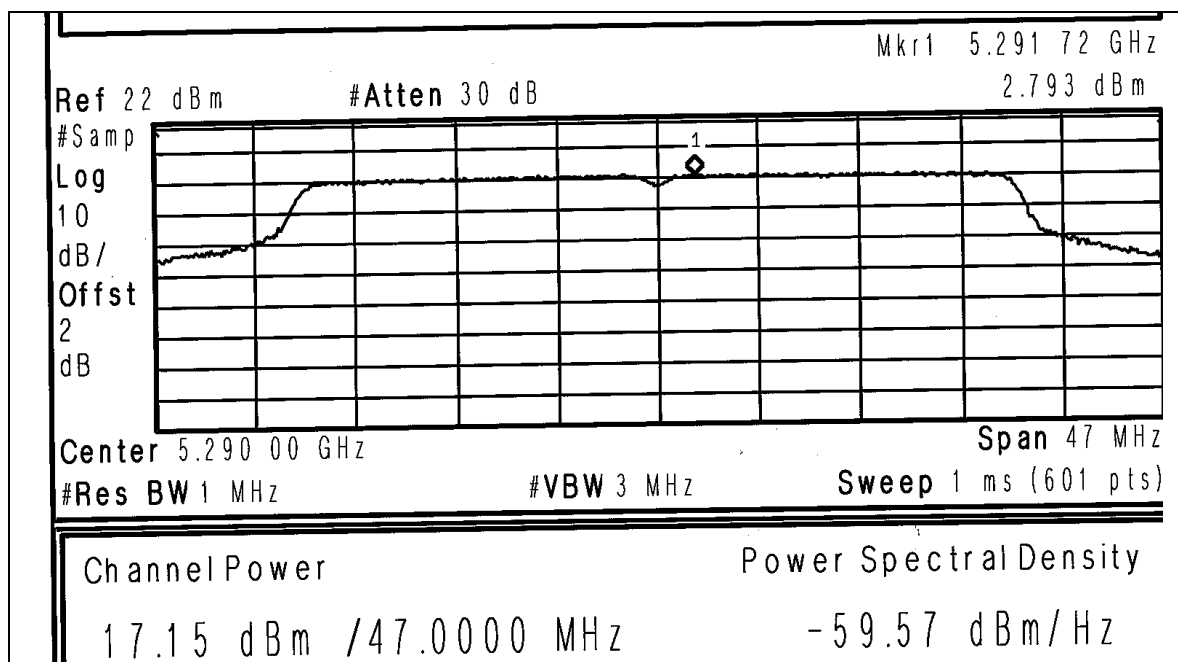
CH 1



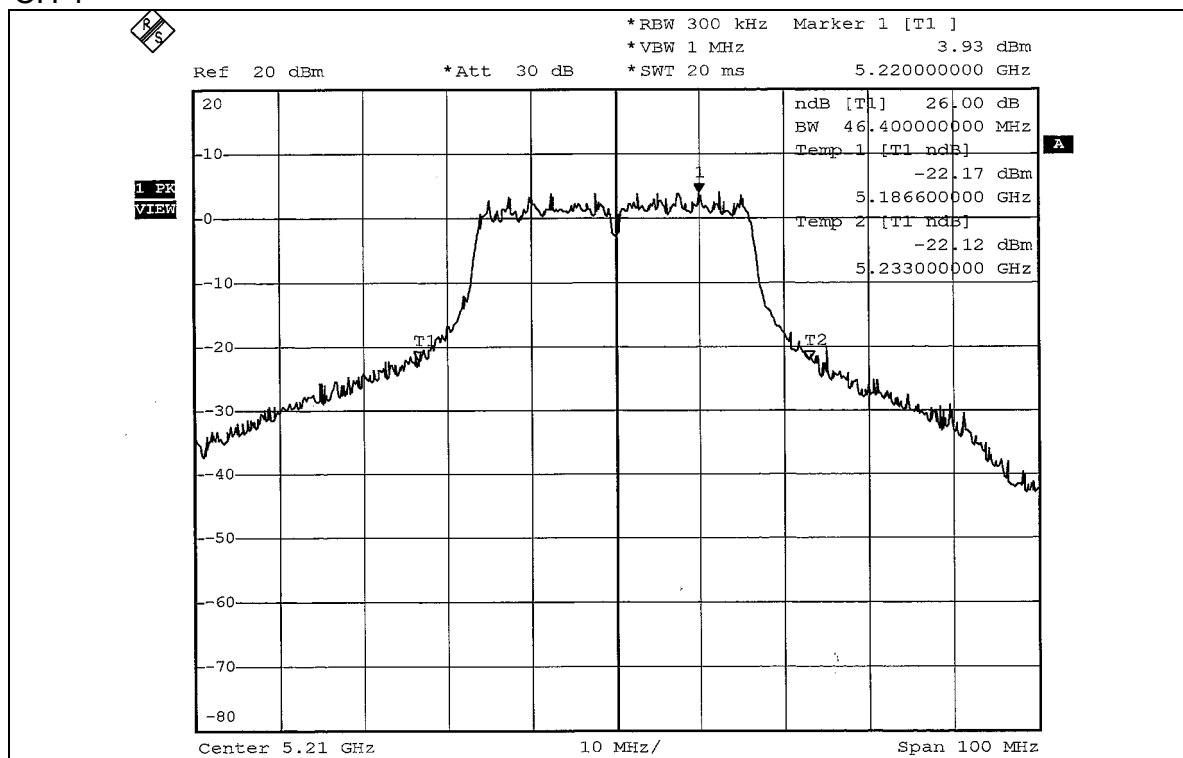
CH 2



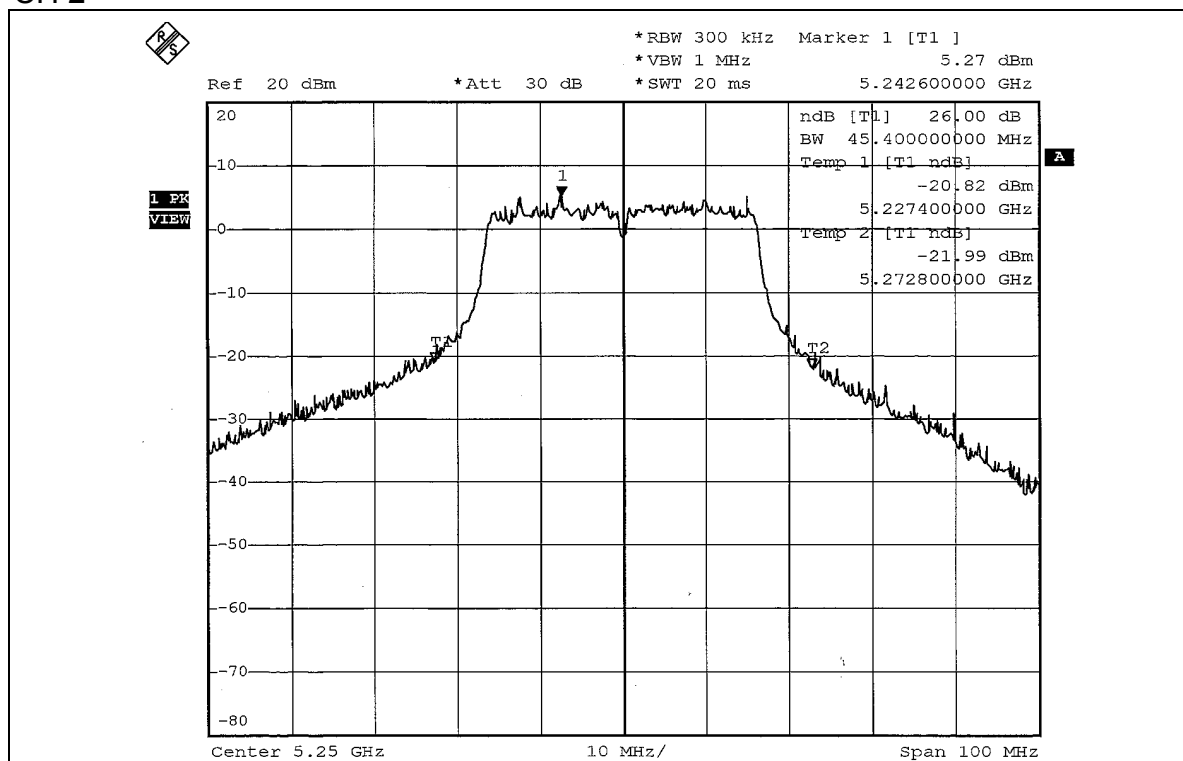
CH 3



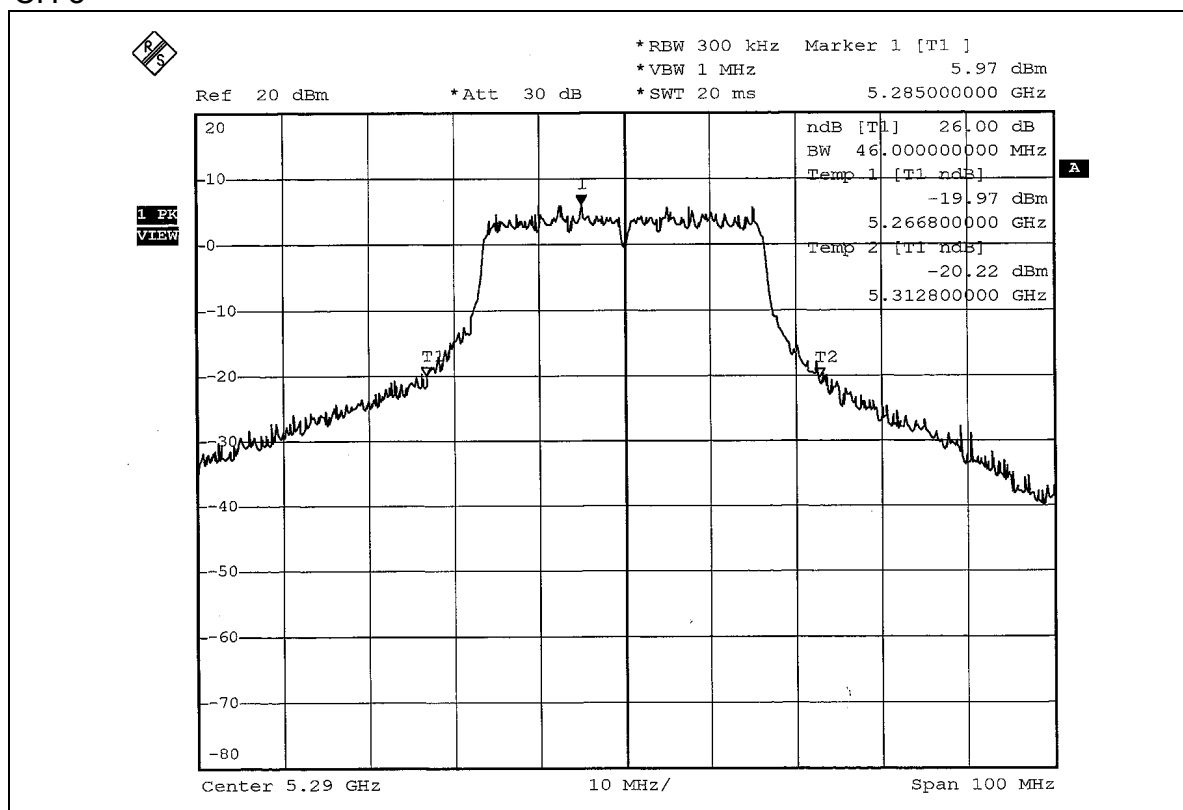
26dB Occupied Bandwidth: CH 1



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.

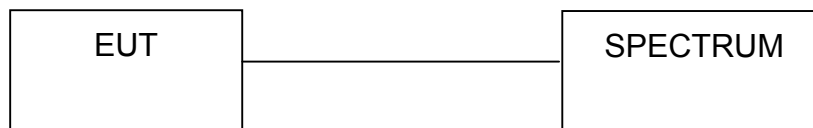
4.4.3 TEST PROCEDURE

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.

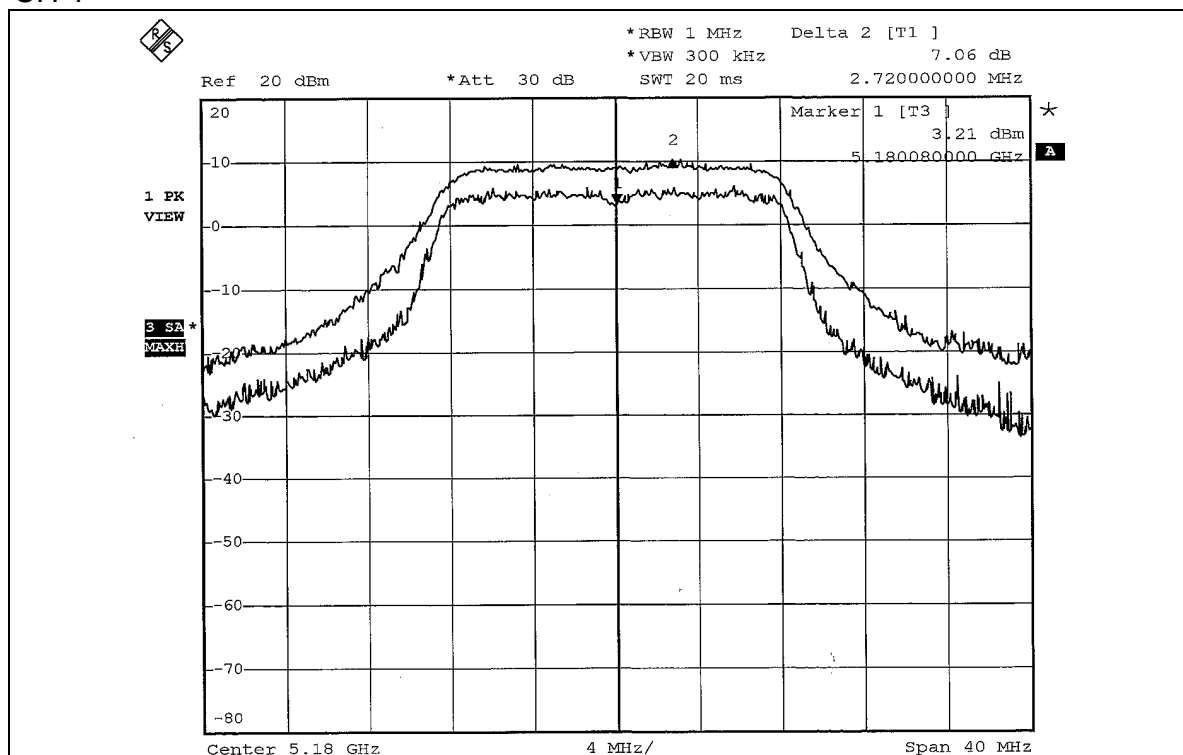
4.4.7 TEST RESULTS

802.11a OFDM modulation

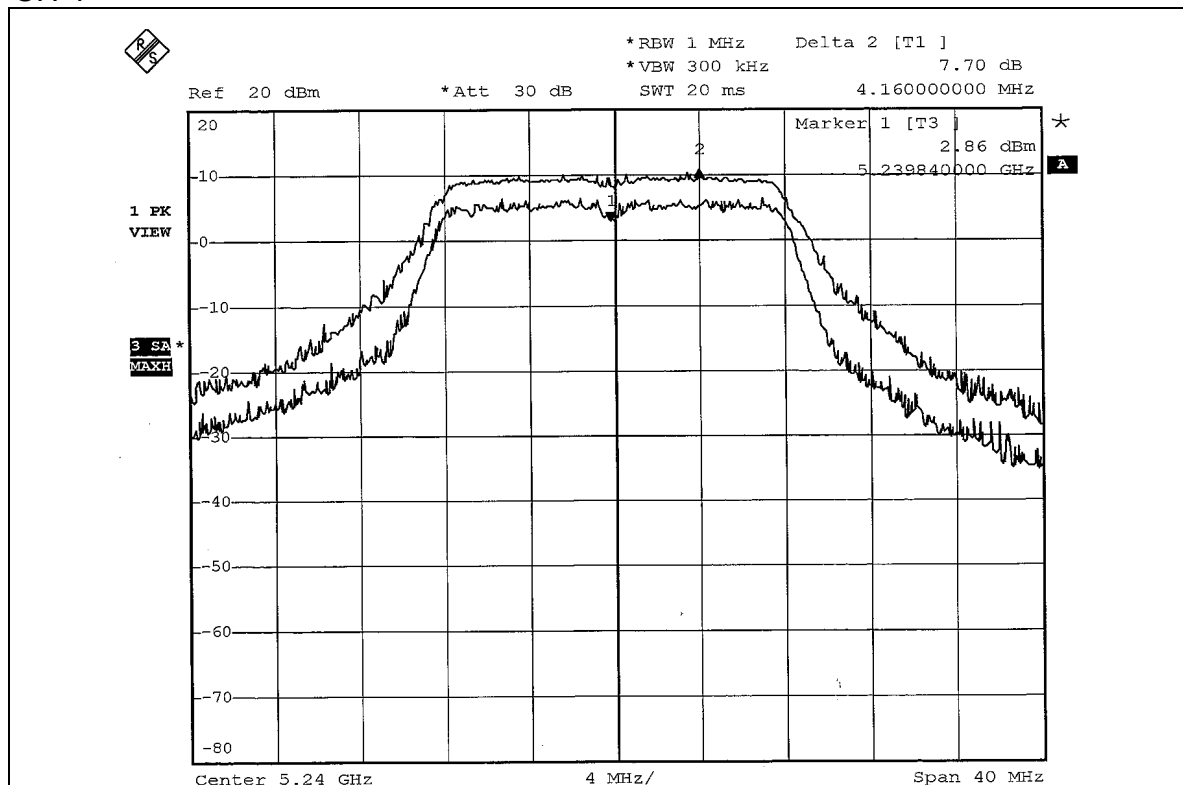
EUT	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	7.06	13	PASS
4	5240	7.70	13	PASS
5	5260	7.39	13	PASS
8	5320	6.11	13	PASS

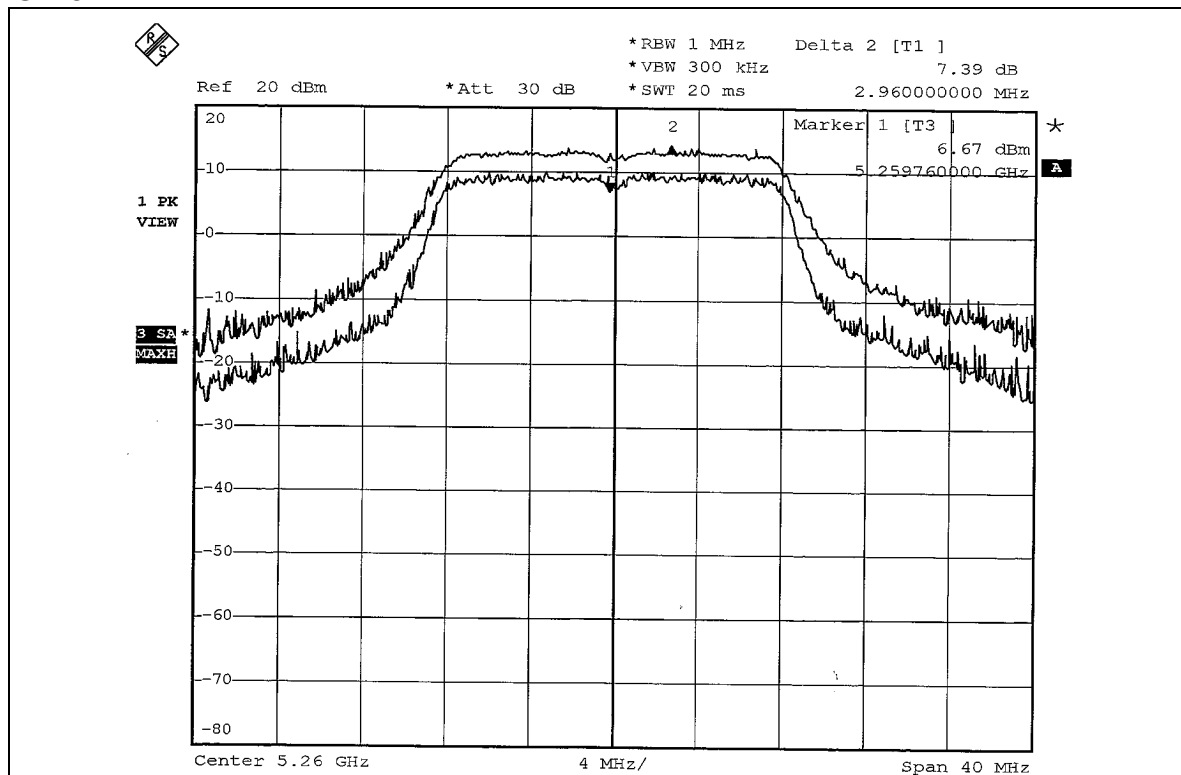
CH 1



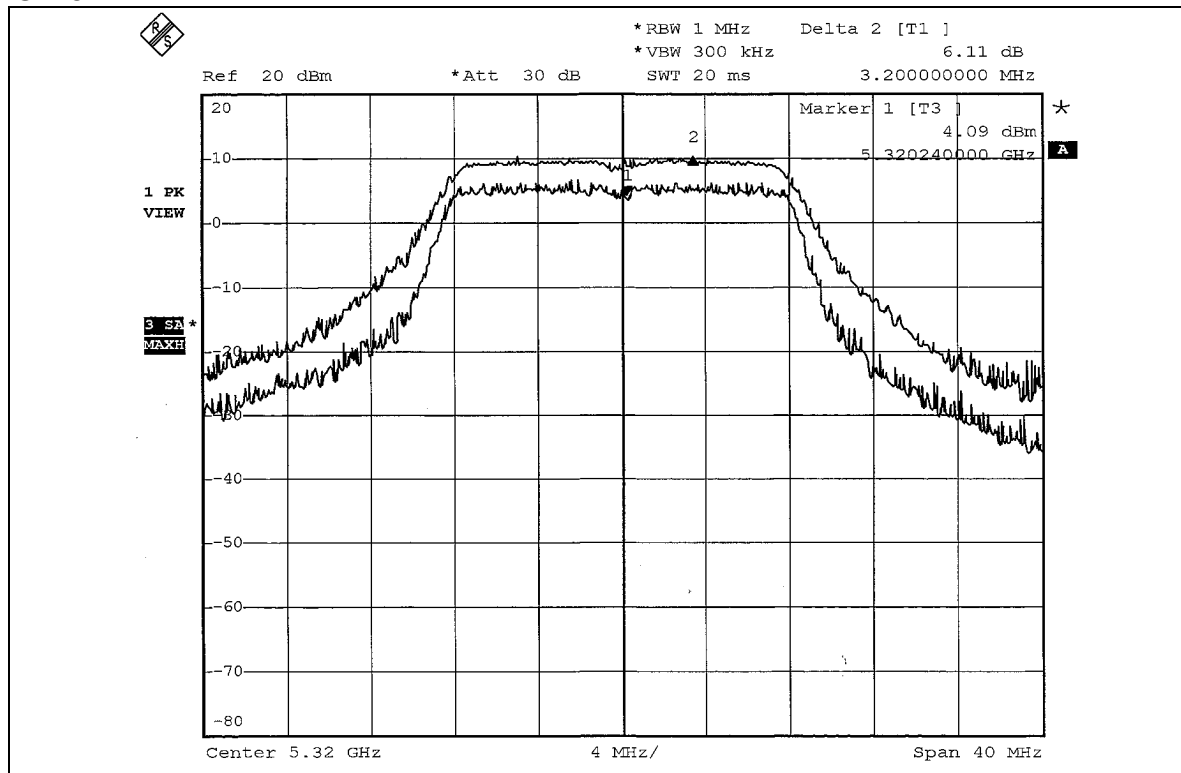
CH 4



CH 5



CH 8

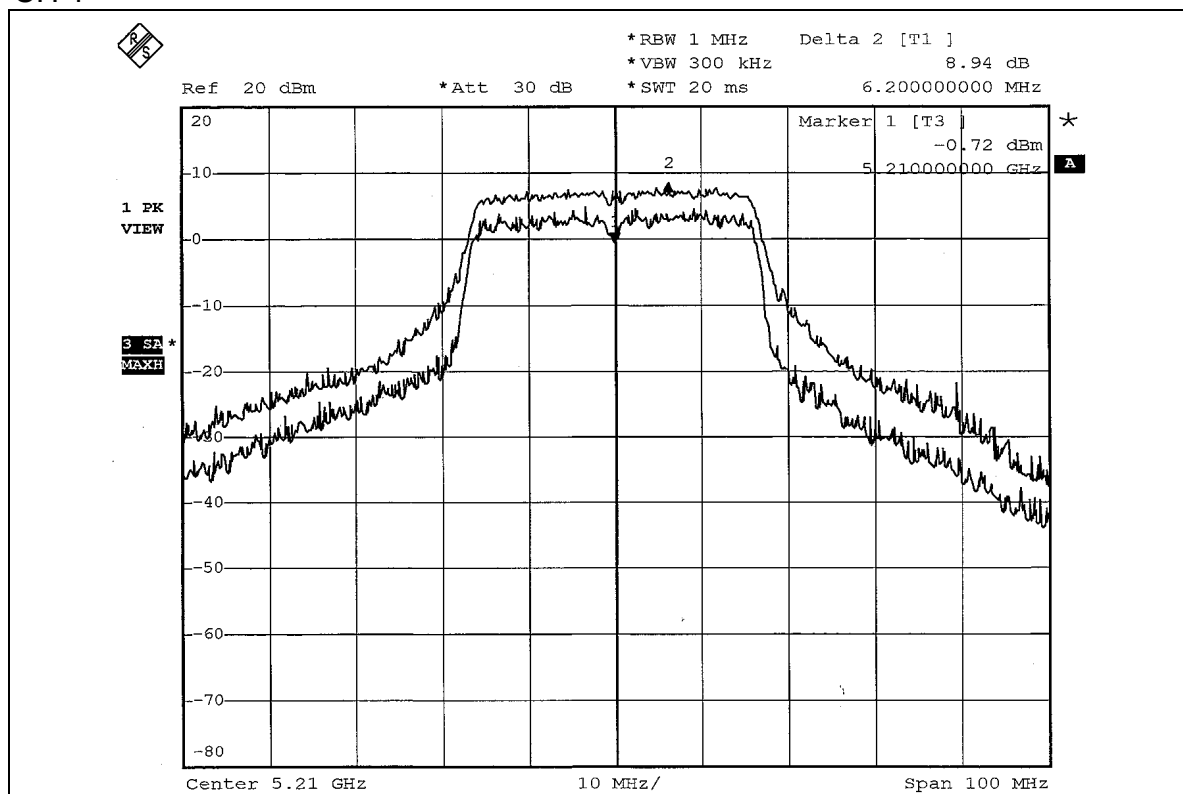


**802.11a Turbo OFDM modulation**

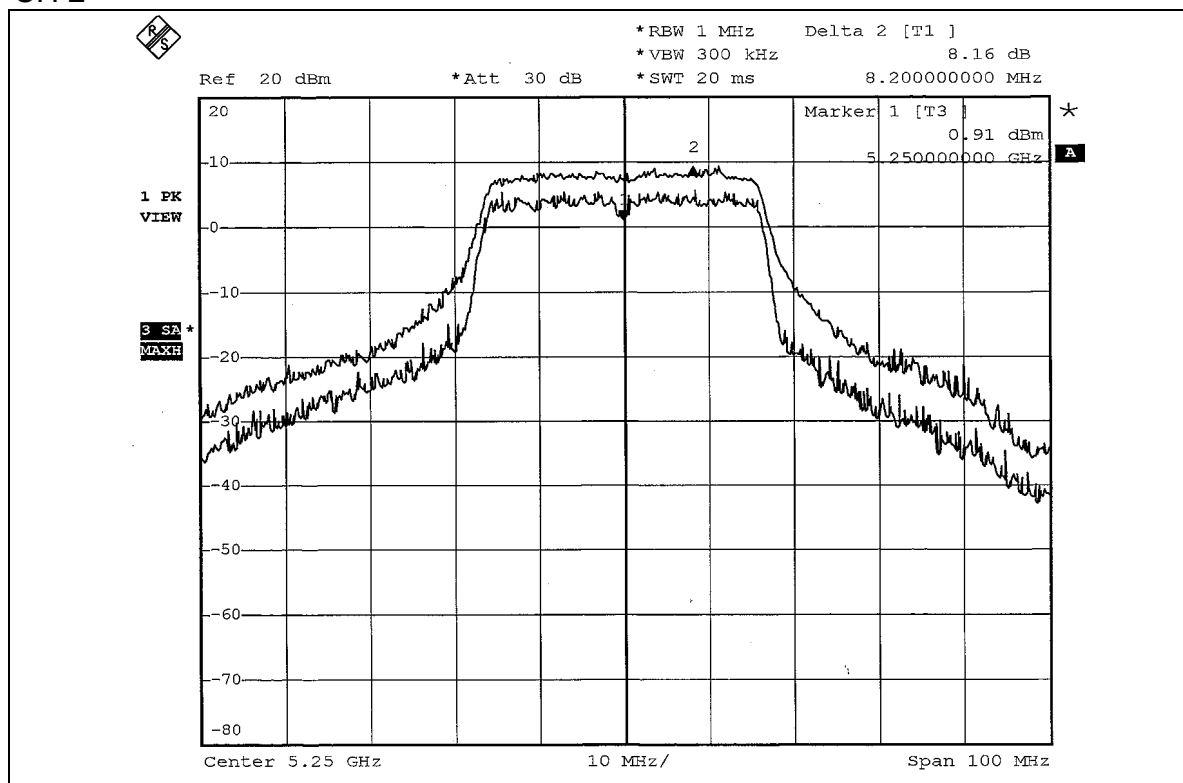
EUT	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5210	8.94	13	PASS
2	5250	8.16	13	PASS
3	5290	9.46	13	PASS

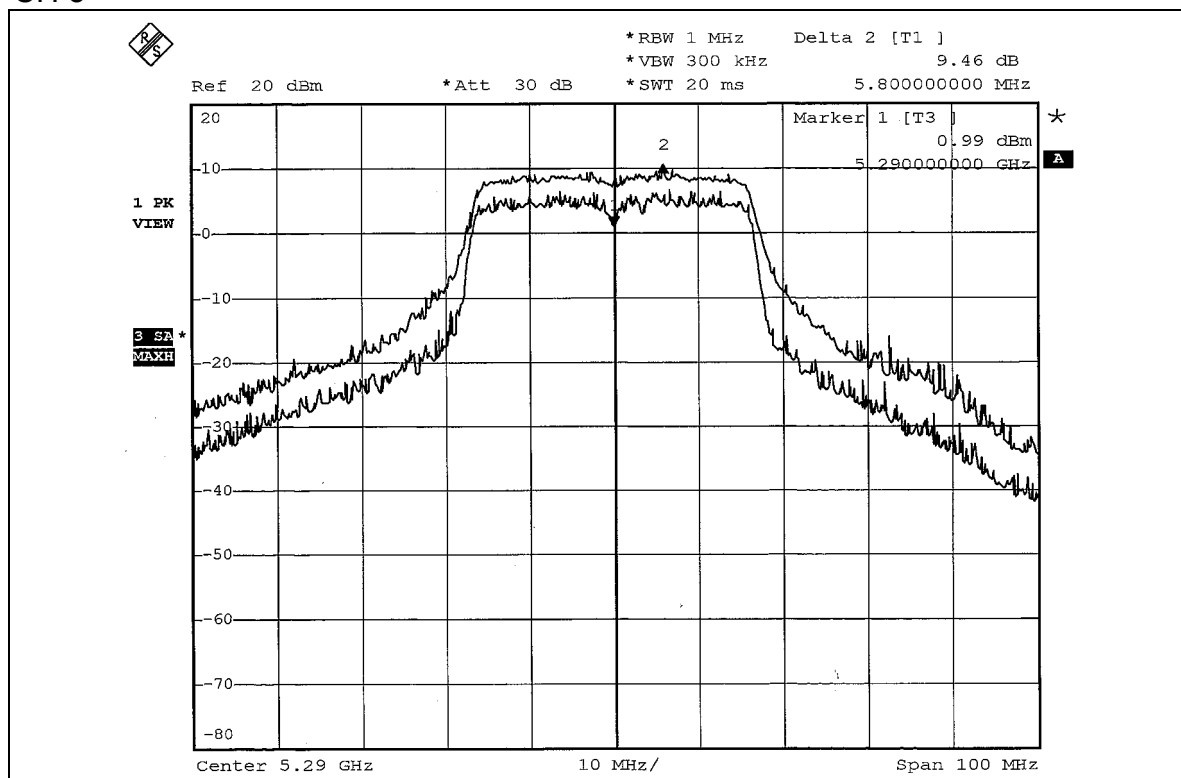
CH 1



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

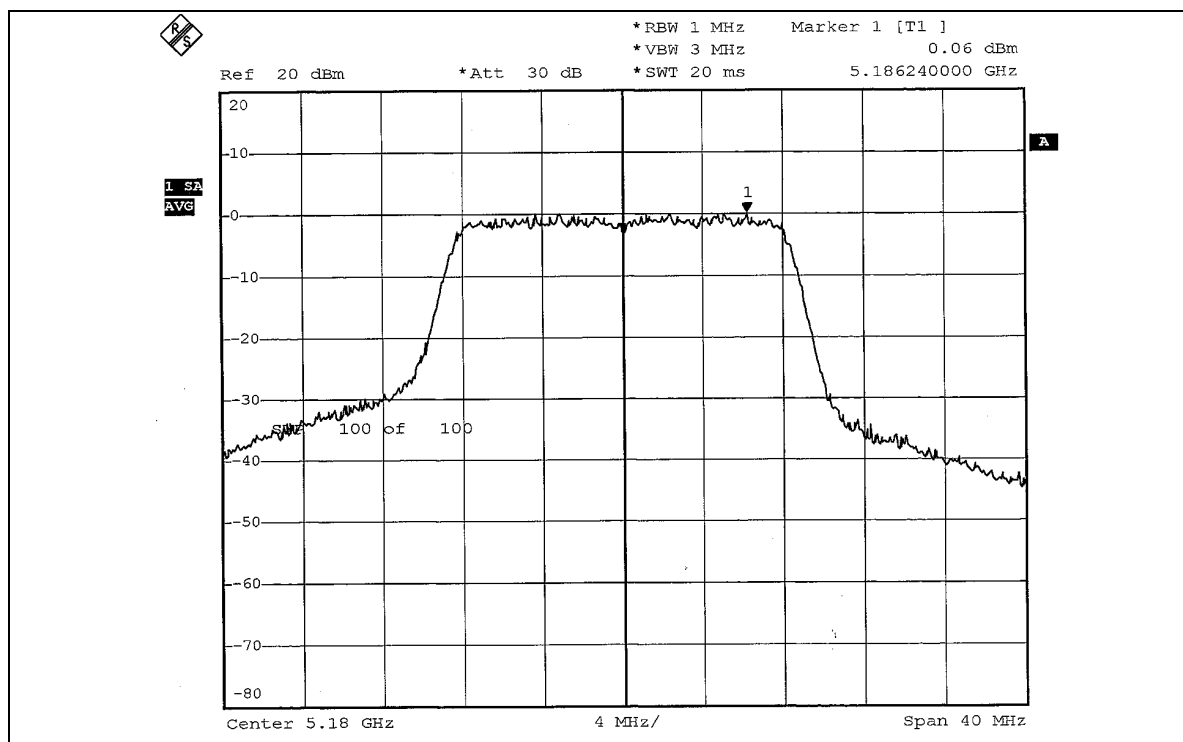
802.11a OFDM modulation

EUT	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

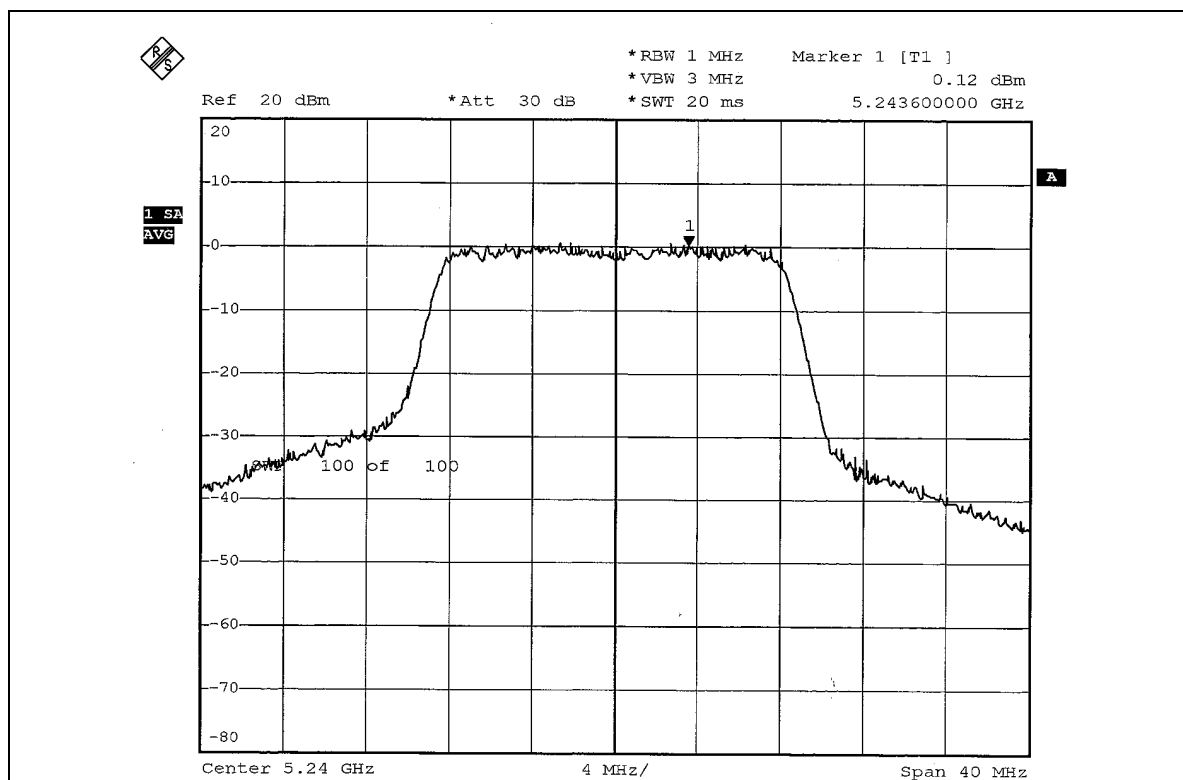
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	0.06	2	PASS
4	5240	0.12	2	PASS
5	5260	4.03	9	PASS
8	5320	0.41	9	PASS

NOTE: According to 15.407(a) (2), the maximum antenna gain 7.51dBi is higher than 6dBi, so limit of peak power shall be reduced by 2dBi.

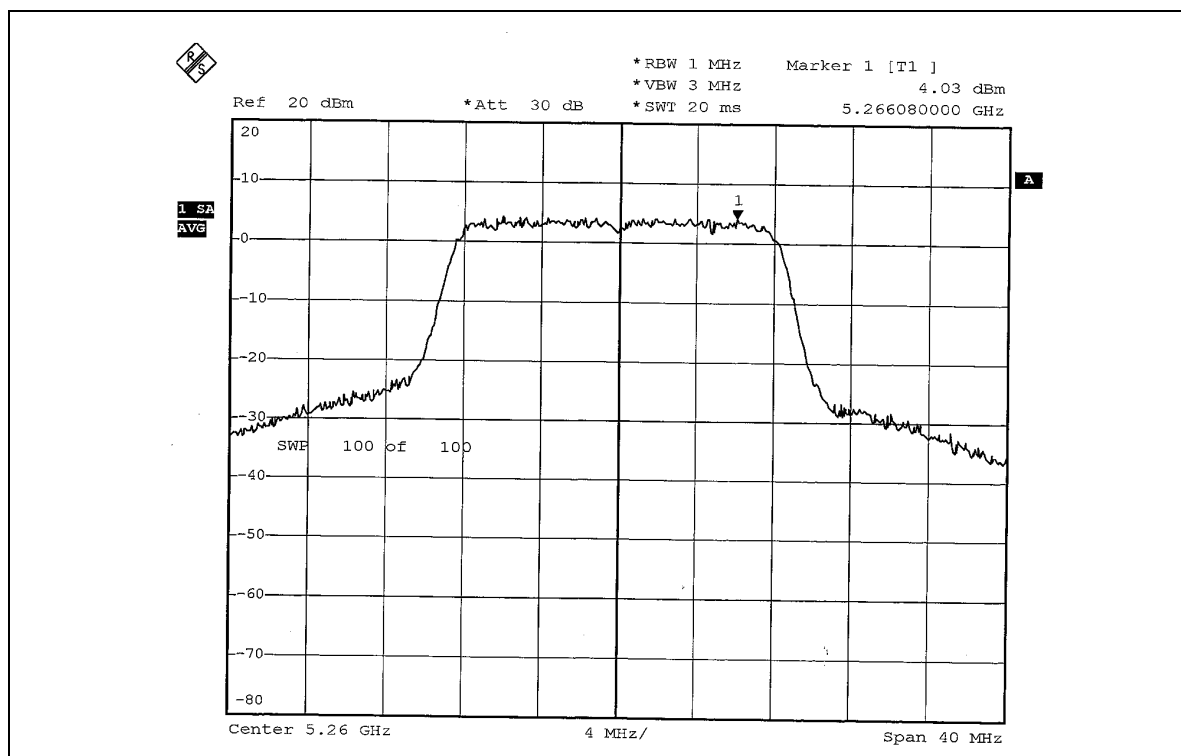
CH 1



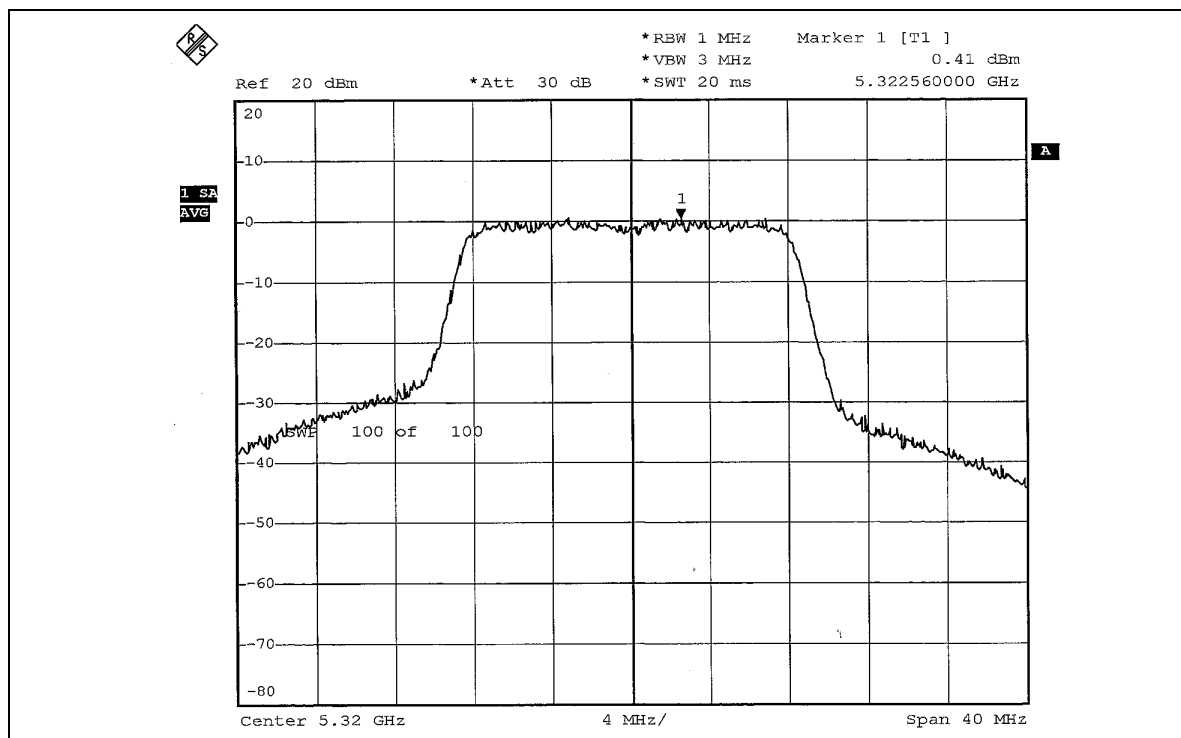
CH 4



CH 5



CH 8



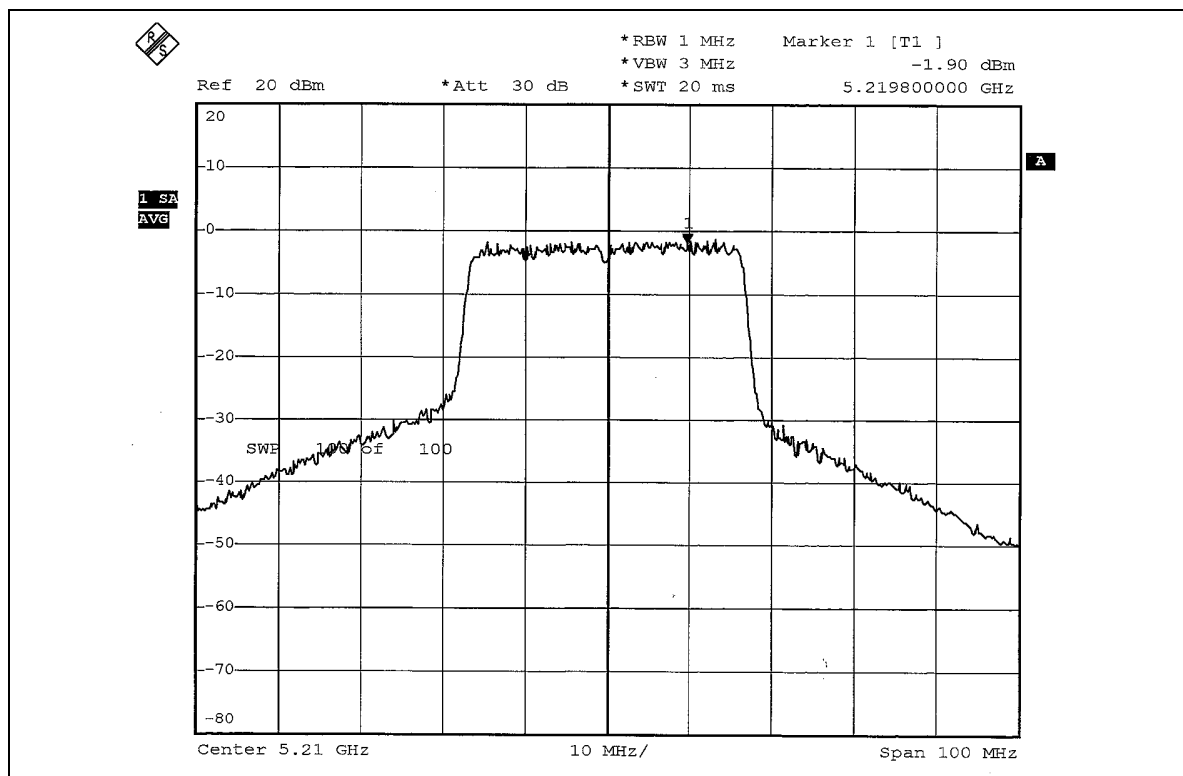
**802.11a Turbo OFDM modulation**

EUT	802.11a Wireless MiniPCI Card	MODEL	WMIA-139AG
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	26deg.C, 65%RH, 991hPa
TESTED BY	Match Tsui		

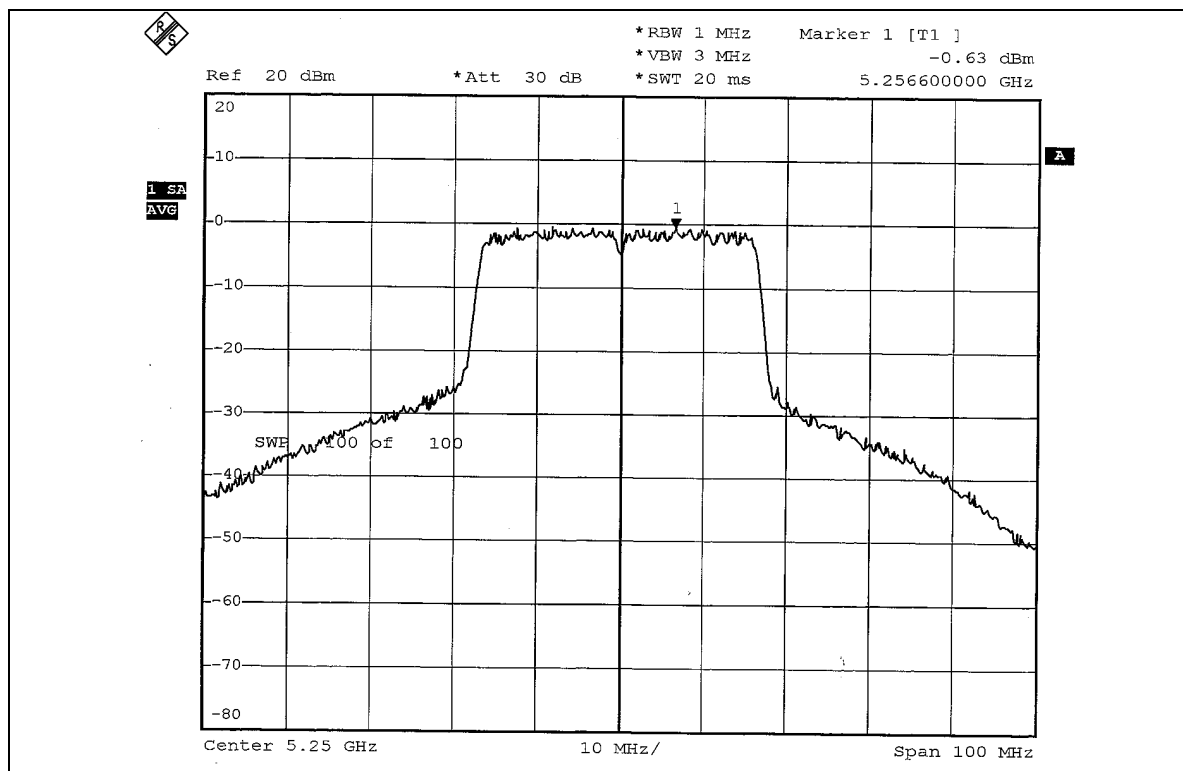
CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-1.90	2	PASS
2	5250	-0.63	2	PASS
3	5290	0.36	9	PASS

NOTE: According to 15.407(a) (2), the maximum antenna gain 7.51dBi is higher than 6dBi, so limit of peak power shall be reduced by 2dBi.

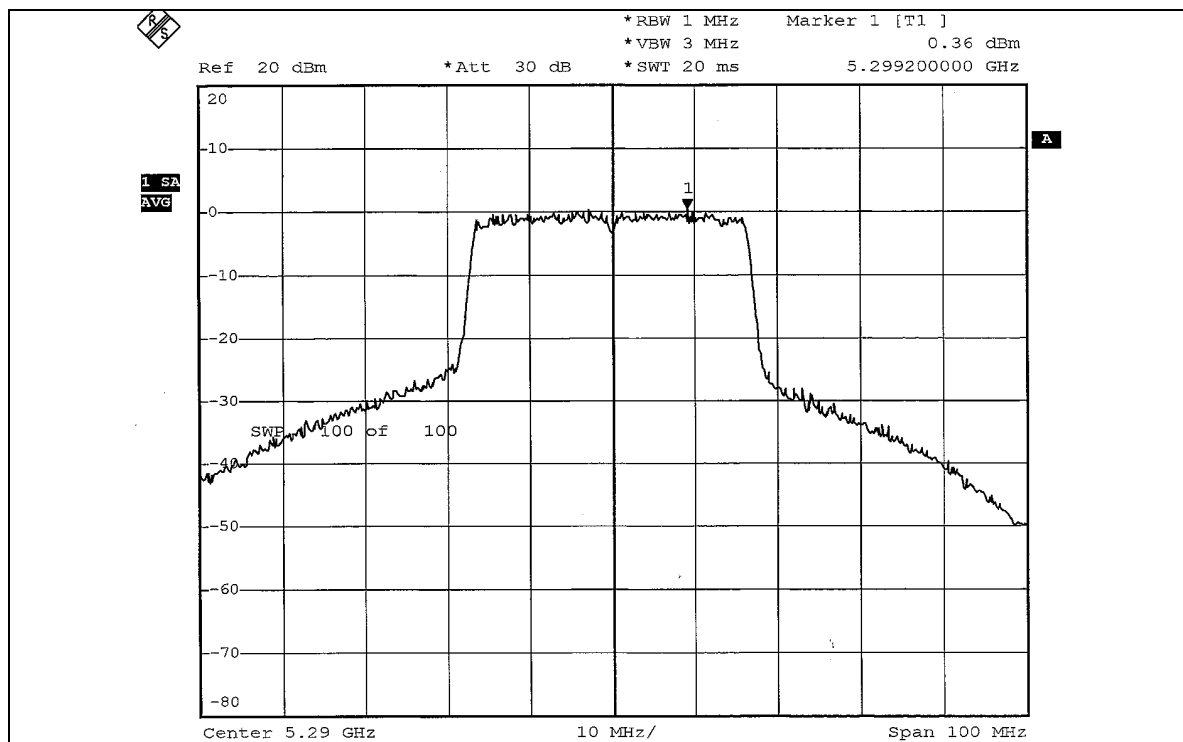
CH 1



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.

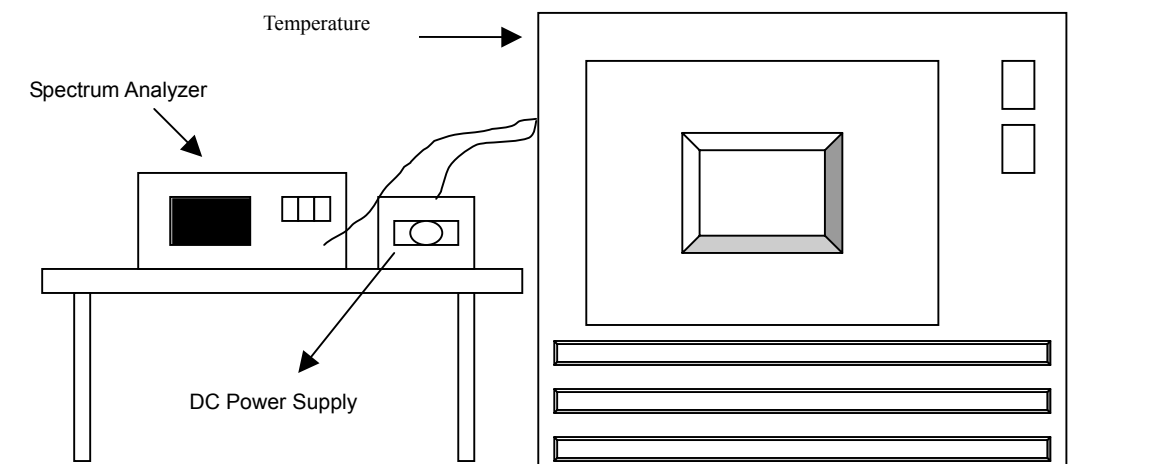
4.6.3 TEST PROCEDURE

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 : $\pm 0.015\%$	
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138.0	5320.0425	0.0007989	5320.0426	0.0008008	5320.0427	0.0008026	5320.0426	0.0008008
	120.0	5320.0423	0.0007951	5320.0428	0.0008045	5320.0425	0.0007989	5320.0422	0.0007932
	102.0	5320.0427	0.0008026	5320.0419	0.0007876	5320.0423	0.0007951	5320.0429	0.0008064
40	138.0	5320.0385	0.0007237	5320.0388	0.0007293	5320.0384	0.0007218	5320.0389	0.0007312
	120.0	5320.0381	0.0007162	5320.0385	0.0007237	5320.0390	0.0007331	5320.0388	0.0007293
	102.0	5320.0382	0.0007180	5320.0382	0.0007180	5320.0391	0.0007350	5320.0385	0.0007237
30	138.0	5320.0321	0.0006034	5320.0324	0.0006090	5320.0326	0.0006128	5320.0326	0.0006128
	120.0	5320.0320	0.0006015	5320.0322	0.0006053	5320.0325	0.0006109	5320.0322	0.0006053
	102.0	5320.0325	0.0006109	5320.0325	0.0006109	5320.0327	0.0006147	5320.0324	0.0006090
20	138.0	5320.0281	0.0005282	5320.0281	0.0005282	5320.0284	0.0005338	5320.0288	0.0005414
	120.0	5320.0282	0.0005301	5320.0285	0.0005357	5320.0285	0.0005357	5320.0286	0.0005376
	102.0	5320.0285	0.0005357	5320.0286	0.0005376	5320.0283	0.0005320	5320.0285	0.0005357
10	138.0	5320.0211	0.0003966	5320.0210	0.0003947	5320.0212	0.0003985	5320.0218	0.0004098
	120.0	5320.0215	0.0004041	5320.0215	0.0004041	5320.0213	0.0004004	5320.0216	0.0004060
	102.0	5320.0216	0.0004060	5320.0216	0.0004060	5320.0217	0.0004079	5320.0215	0.0004041
0	138.0	5320.0156	0.0002932	5320.0155	0.0002914	5320.0154	0.0002895	5320.0152	0.0002857
	120.0	5320.0155	0.0002914	5320.0157	0.0002951	5320.0156	0.0002932	5320.0154	0.0002895
	102.0	5320.0152	0.0002857	5320.0153	0.0002876	5320.0152	0.0002857	5320.0159	0.0002989
-10	138.0	5320.0092	0.0001729	5320.0095	0.0001786	5320.0094	0.0001767	5320.0093	0.0001748
	120.0	5320.0093	0.0001748	5320.0094	0.0001767	5320.0096	0.0001805	5320.0094	0.0001767
	102.0	5320.0094	0.0001767	5320.0097	0.0001823	5320.0091	0.0001711	5320.0095	0.0001786
-20	138.0	5319.9925	-0.0001410	5319.9926	-0.0001391	5319.9925	-0.0001410	5319.9922	-0.0001466
	120.0	5319.9927	-0.0001372	5319.9930	-0.0001316	5319.9927	-0.0001372	5319.9921	-0.0001485
	102.0	5319.9923	-0.0001447	5319.9925	-0.0001410	5319.9926	-0.0001391	5319.9928	-0.0001353
-30	138.0	5319.9880	-0.0002256	5319.9886	-0.0002143	5319.9884	-0.0002180	5319.9882	-0.0002218
	120.0	5319.9882	-0.0002218	5319.9883	-0.0002199	5319.9888	-0.0002114	5319.9883	-0.0002199
	102.0	5319.9885	-0.0002162	5319.9882	-0.0002218	5319.9882	-0.0002218	5319.9887	-0.0002124



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 loss 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 field 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 - EUT configure mode 1****Channel 1 (5180MHz)**

The band edge emission plot on page 74 shows 41.81dBc 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 108.90dBuV/m (Peak), so the maximum field strength in restrict band is $108.90 - 41.81 = 67.09$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 74 shows 47.80dBc 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 97.68dBuV/m (Average), so the maximum field strength in restrict band is $97.68 - 47.80 = 49.88$ dBuV/m which is under 54dBuV/m limit.

Channel 8 (5320MHz)

The band edge emission plot on page 75 shows 46.32dBc 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 108.92dBuV/m (Peak), so the maximum field strength in restrict band is $108.92 - 46.32 = 62.60$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 76 shows 51.89dBc 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 98.47dBuV/m (Average), so the maximum field strength in restrict band is $98.47 - 51.89 = 46.58$ dBuV/m which is under 54dBuV/m limit.

**802.11a OFDM modulation - EUT configure mode 2****Channel 1 (5180MHz)**

The band edge emission plot on page 74 shows 41.81dBc 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 111.80dBuV/m (Peak), so the maximum field strength in restrict band is $111.80 - 41.81 = 69.99$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 74 shows 47.80dBc 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 100.02dBuV/m (Average), so the maximum field strength in restrict band is $100.02 - 47.80 = 52.22$ dBuV/m which is under 54dBuV/m limit.

Channel 8 (5320MHz)

The band edge emission plot on page 75 shows 46.32dBc 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 113.85dBuV/m (Peak), so the maximum field strength in restrict band is $113.85 - 46.32 = 67.53$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 76 shows 51.89dBc 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 102.94dBuV/m (Average), so the maximum field strength in restrict band is $102.94 - 51.89 = 51.05$ dBuV/m which is under 54dBuV/m limit.

**802.11a Turbo OFDM modulation - EUT configure mode 1****Channel 1 (5210MHz)**

The band edge emission plot on page 77 shows 37.19dBc 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 104.29dBuV/m (Peak), so the maximum field strength in restrict band is $104.29 - 37.19 = 67.10$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 77 shows 46.42dBc 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 93.88dBuV/m (Average), so the maximum field strength in restrict band is $93.88 - 46.42 = 47.46$ dBuV/m which is under 54dBuV/m limit.

Channel 3 (5290MHz)

The band edge emission plot on the pages 78 shows 45.36dBc 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 108.12dBuV/m (Peak), so the maximum field strength in restrict band is $108.12 - 45.36 = 62.76$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the pages 79 shows 50.27dBc 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 97.21dBuV/m (Average), so the maximum field strength in restrict band is $97.21 - 50.27 = 46.94$ dBuV/m which is under 54dBuV/m limit.

802.11a Turbo OFDM modulation - EUT configure mode 2**Channel 1 (5210MHz)**

The band edge emission plot on page 77 shows 37.19dBc 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 109.57dBuV/m (Peak), so the maximum field strength in restrict band is $109.57 - 37.19 = 72.38$ dBuV/m which is under 74dBuV/m limit.

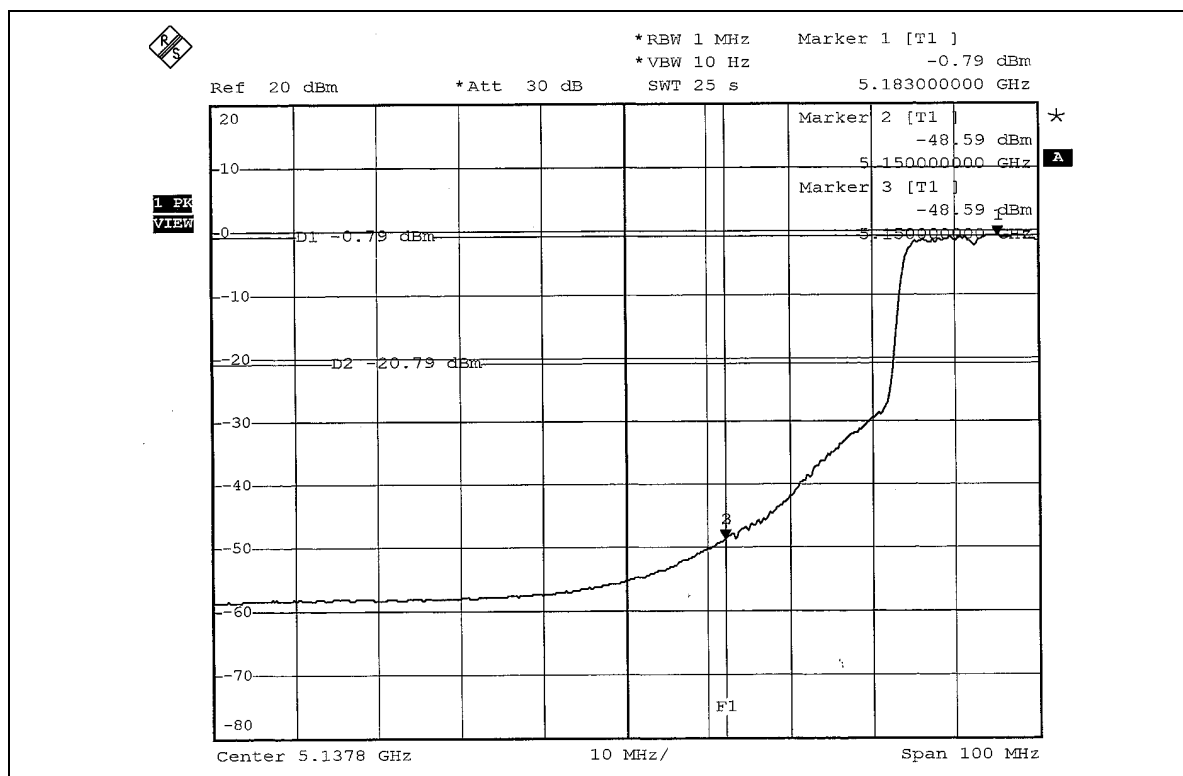
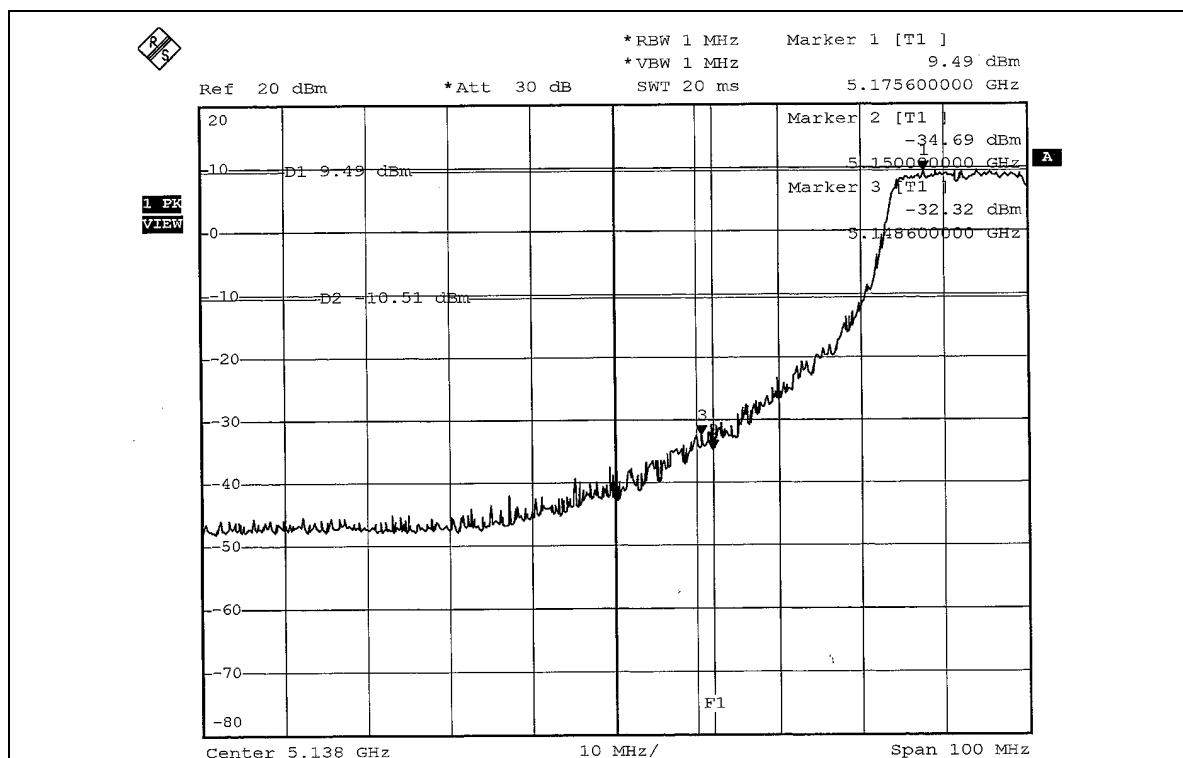
The band edge emission plot on page 77 shows 46.42dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 98.94dBuV/m (Average), so the maximum field strength in restrict band is $98.94 - 46.42 = 52.52$ dBuV/m which is under 54dBuV/m limit.

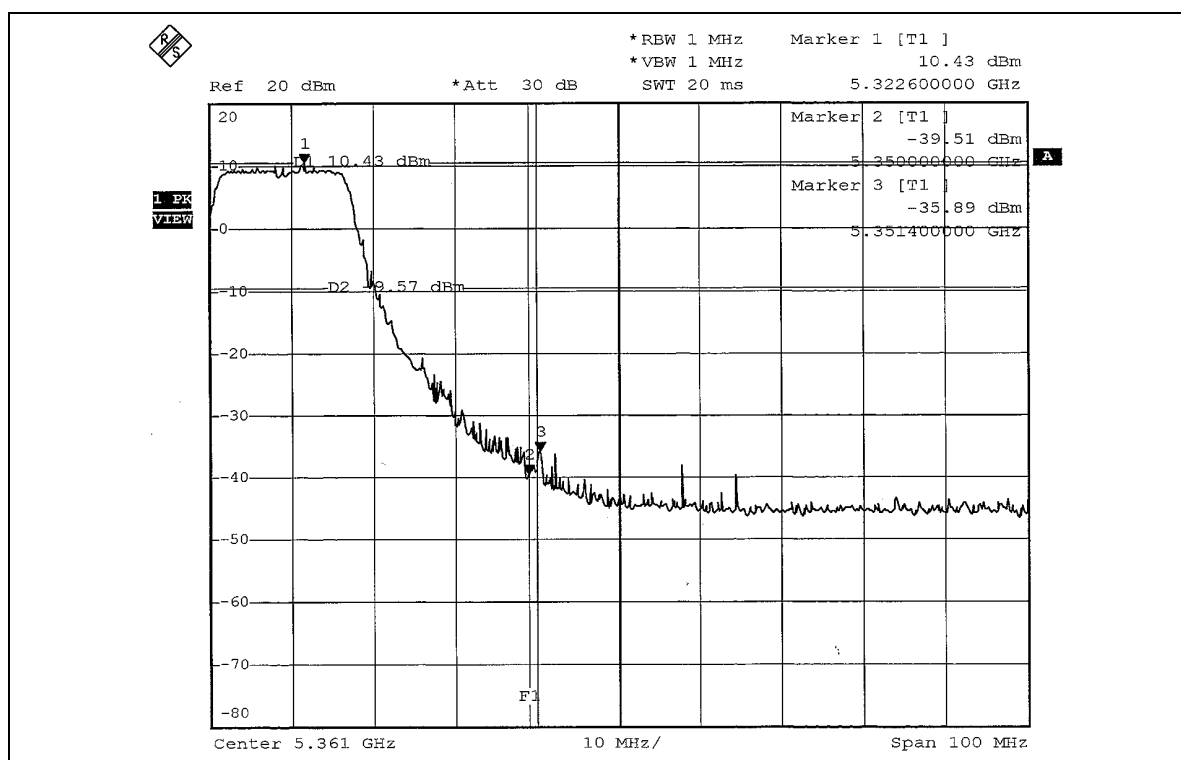
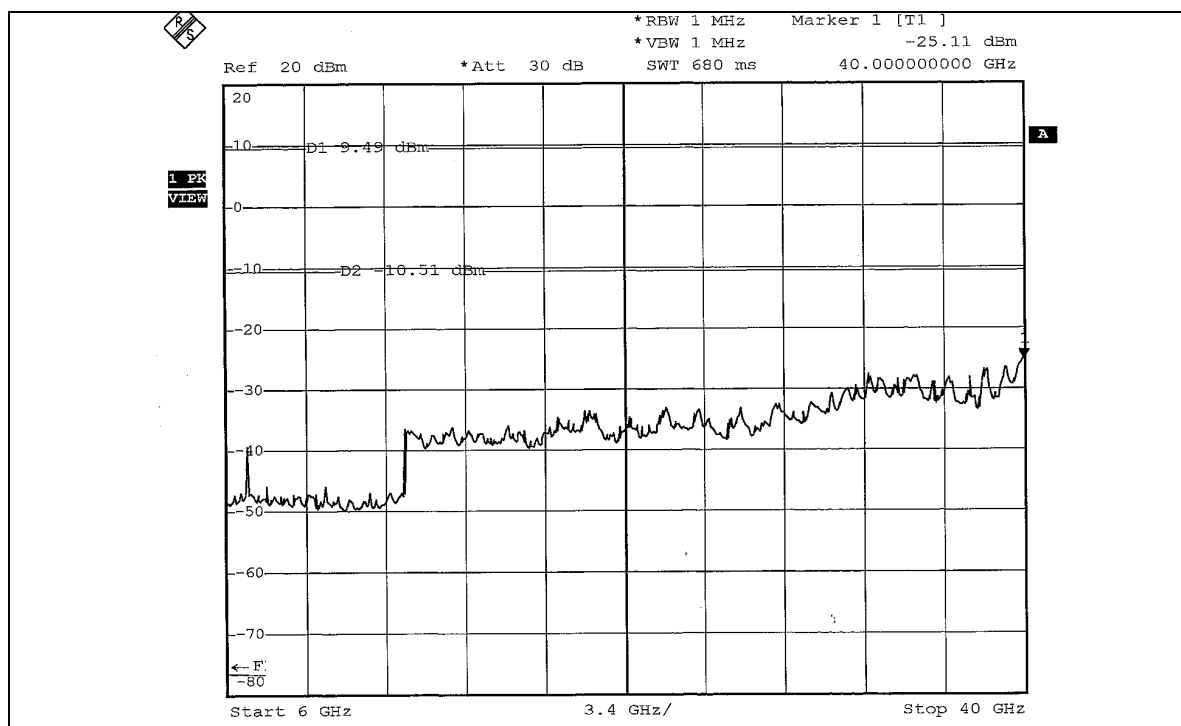
Channel 3 (5290MHz)

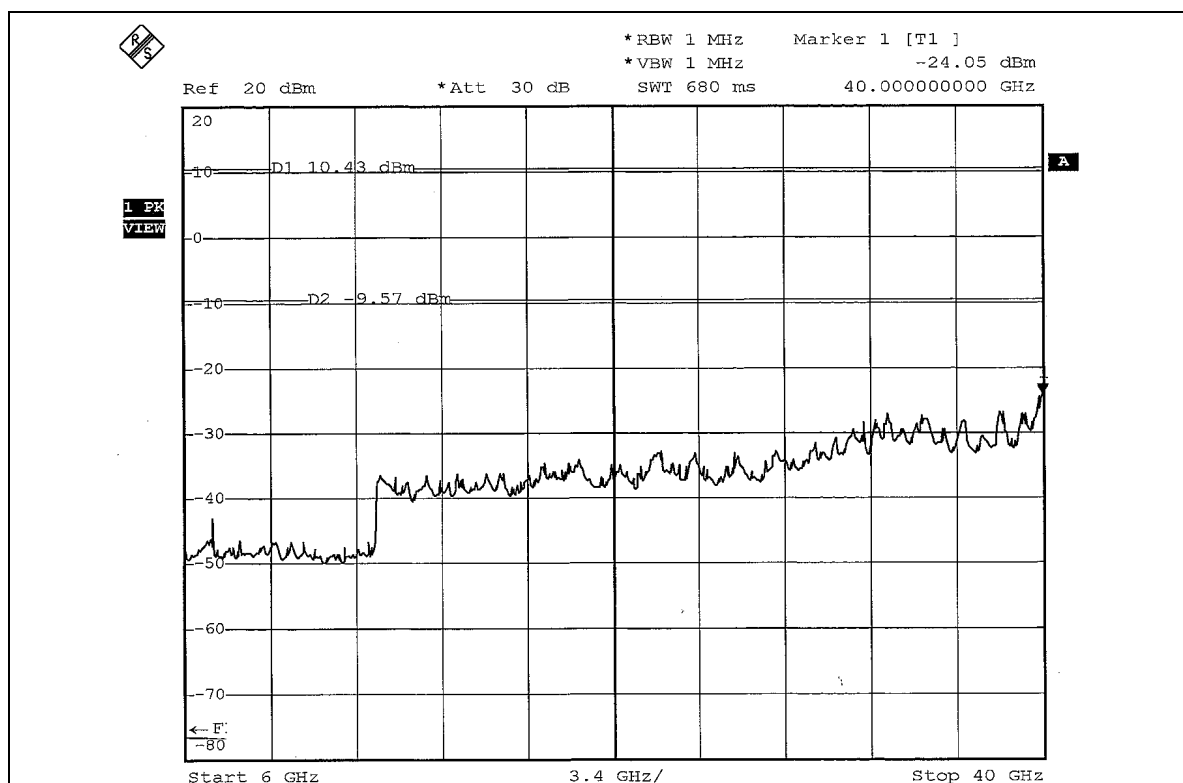
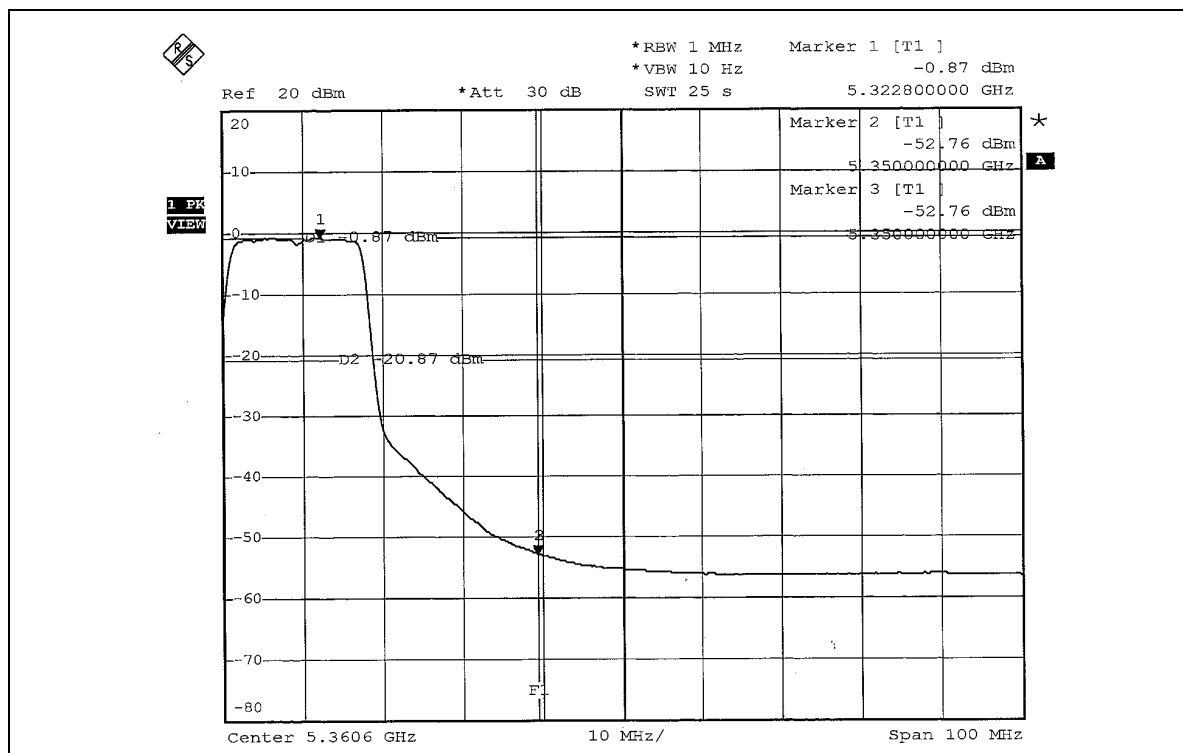
The band edge emission plot on the pages 78 shows 45.36dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 114.01dBuV/m (Peak), so the maximum field strength in restrict band is $114.01 - 45.36 = 68.65$ dBuV/m which is under 74dBuV/m limit.

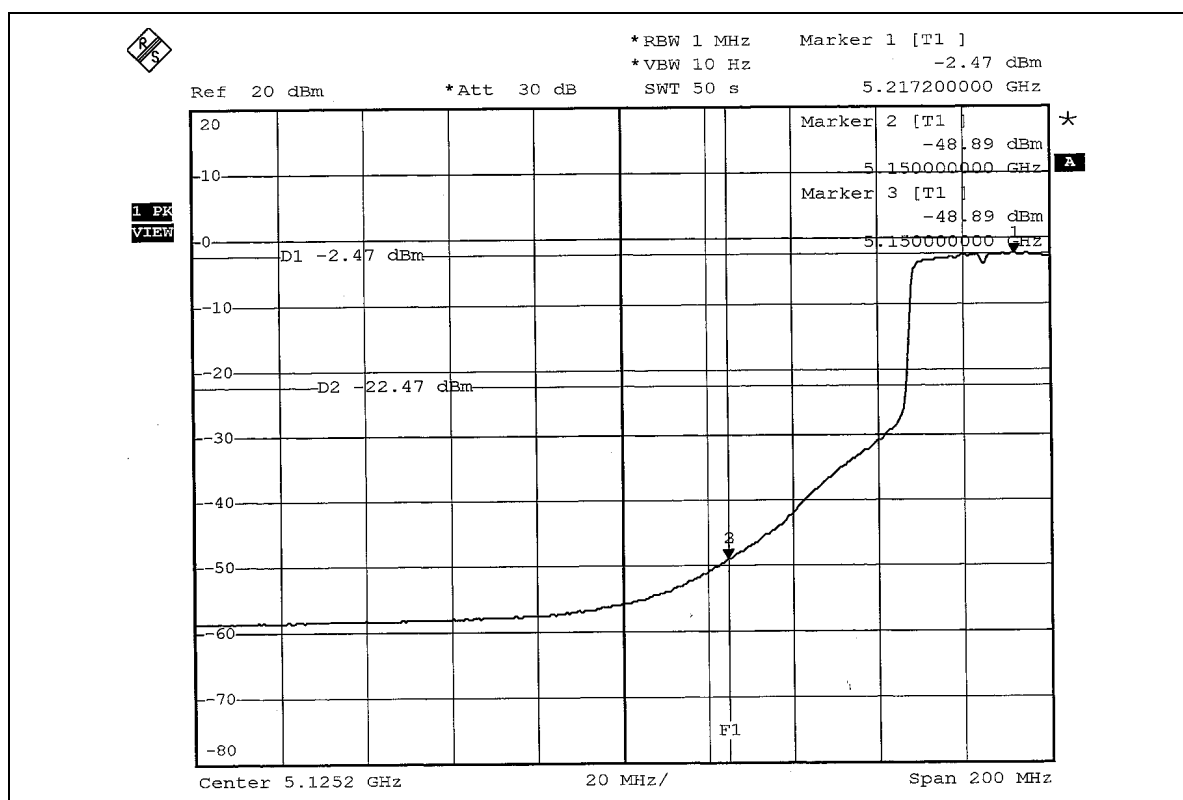
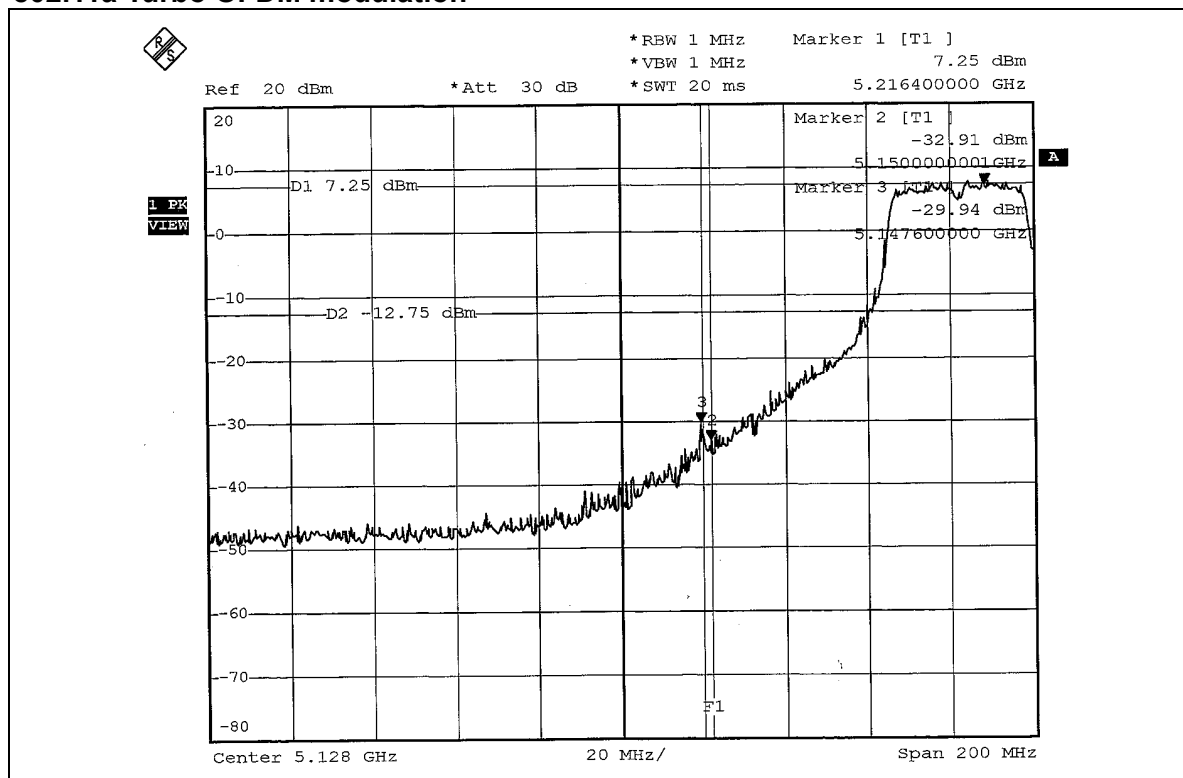
The band edge emission plot on the pages 79 shows 50.27dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 102.50dBuV/m (Average), so the maximum field strength in restrict band is $102.50 - 50.27 = 52.23$ dBuV/m which is under 54dBuV/m limit.

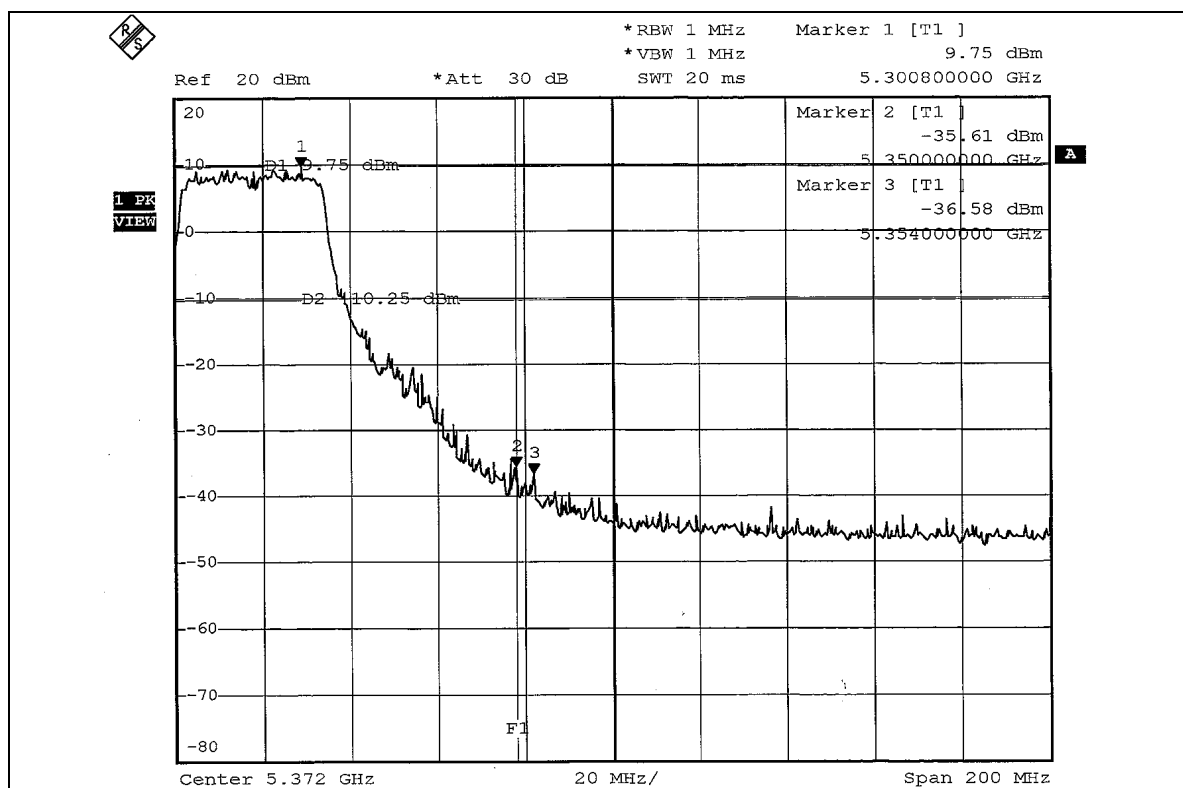
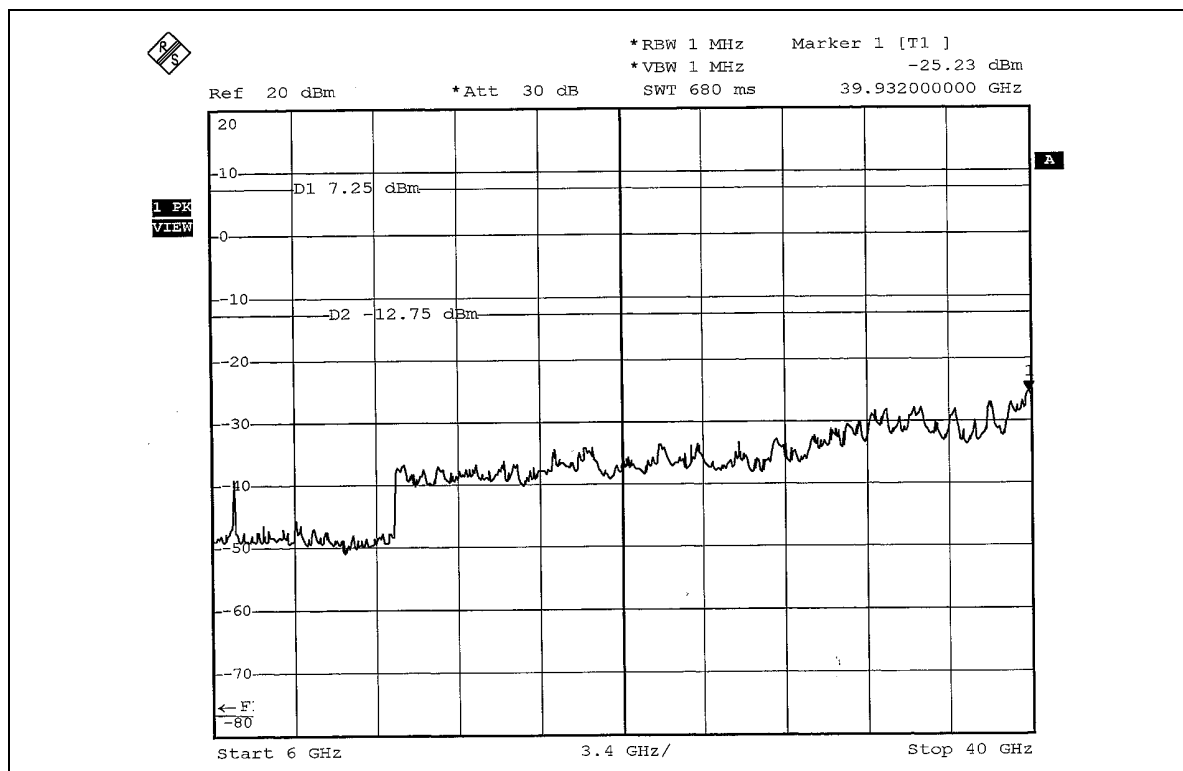
802.11a OFDM modulation

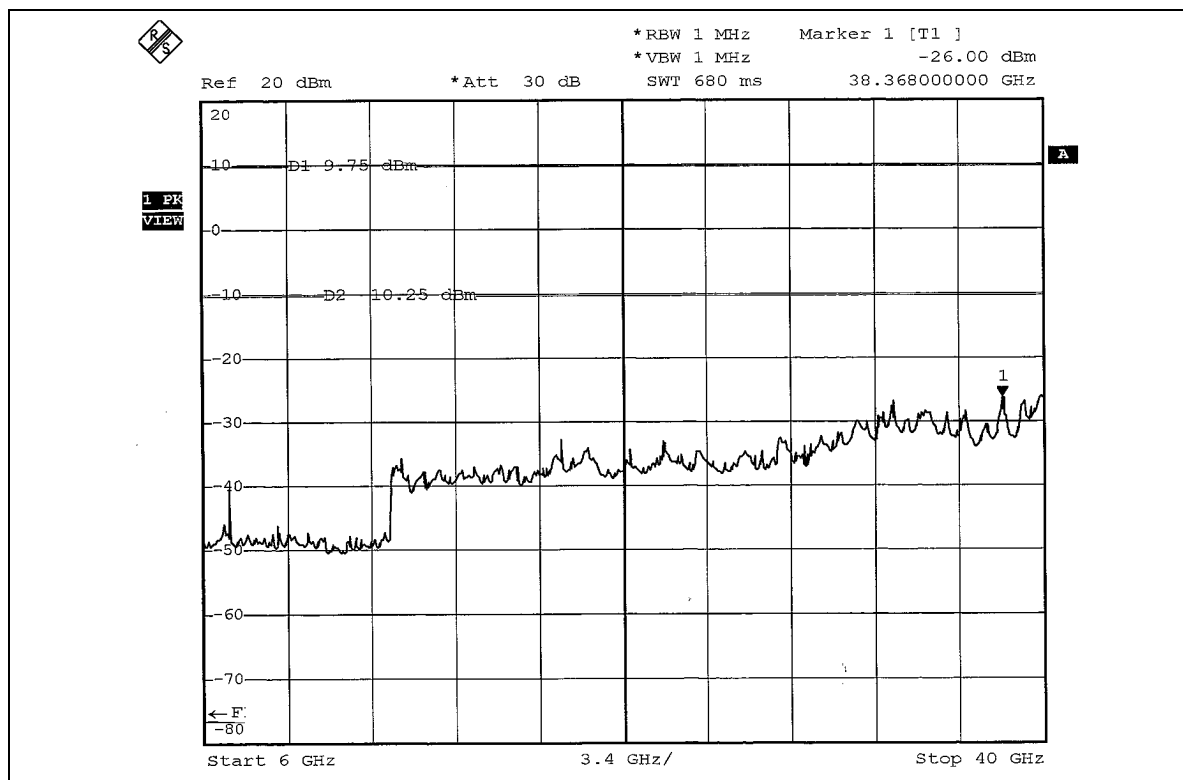
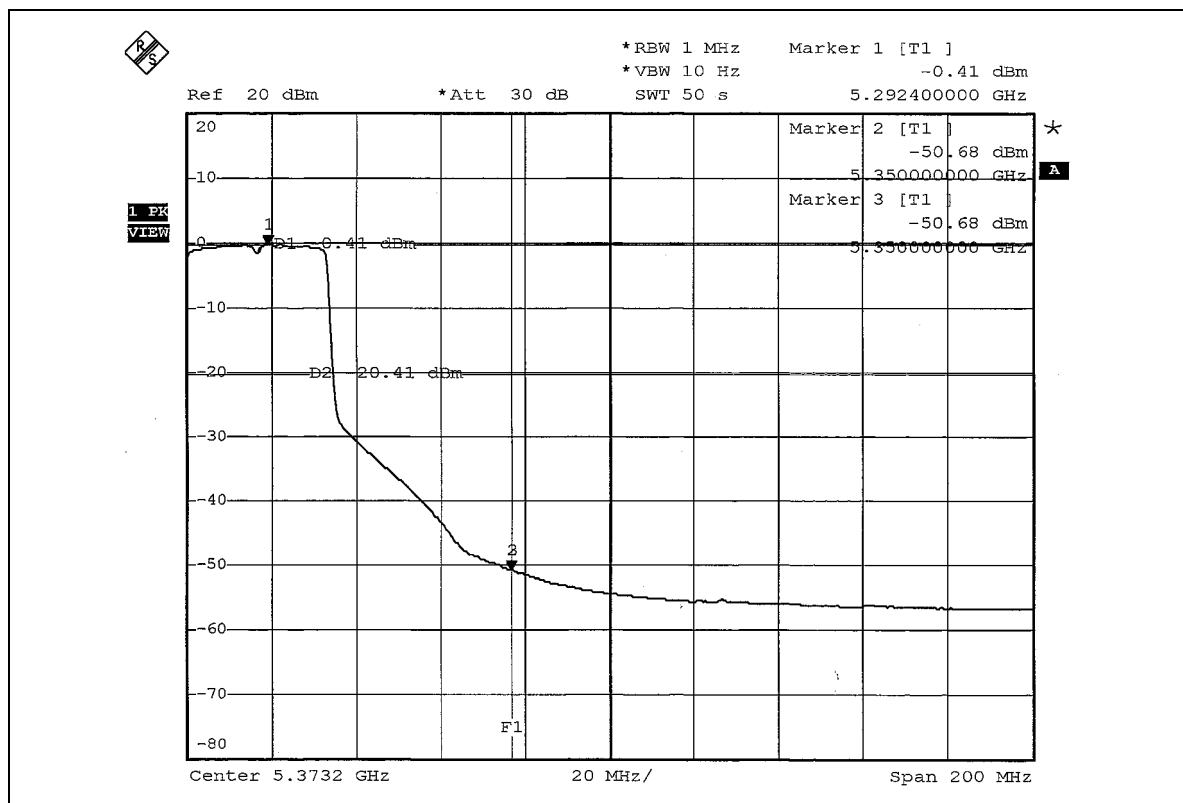






802.11a Turbo OFDM modulation







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.

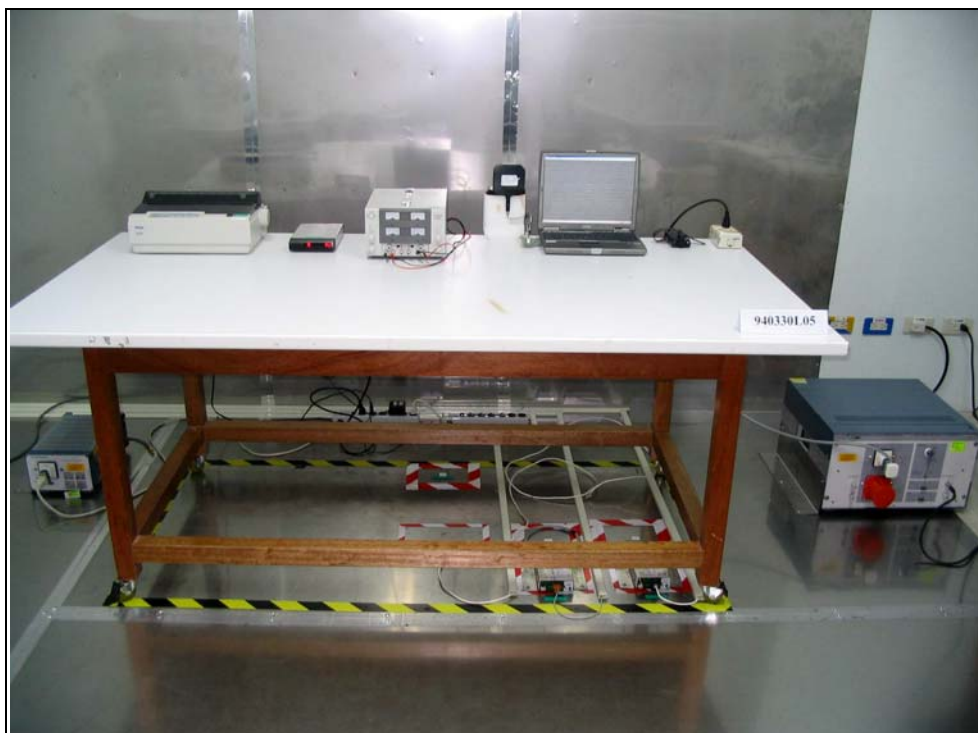
And according to FCC 47 CFR Section 15.407(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Printed antenna with UFL connector. The maximum Gain of the antenna is 7.51dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

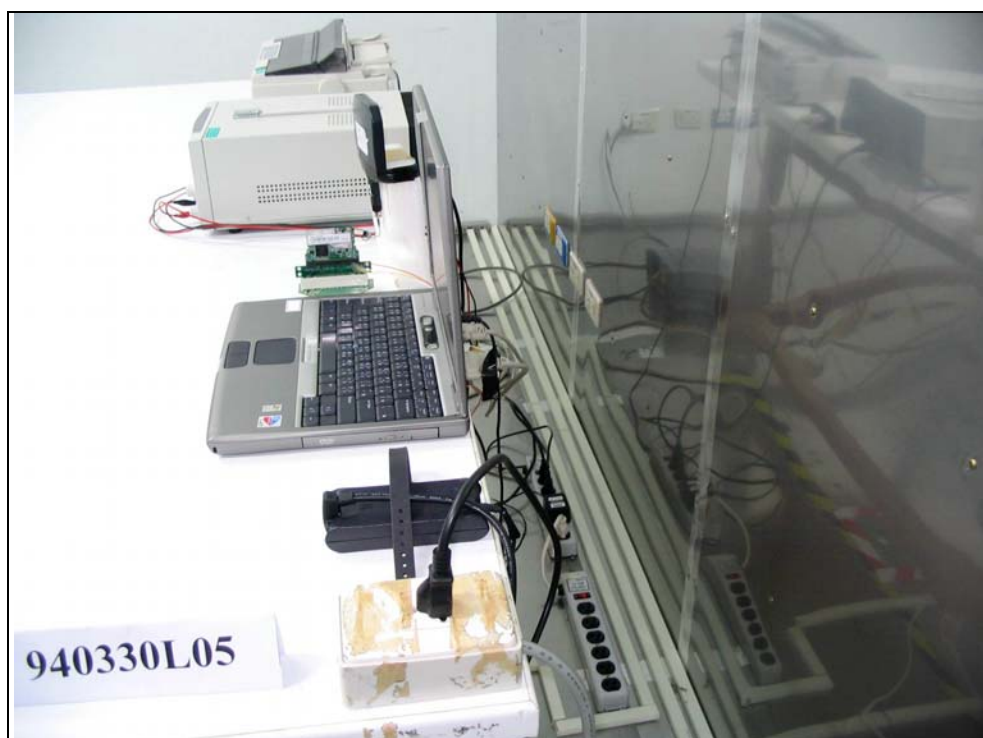
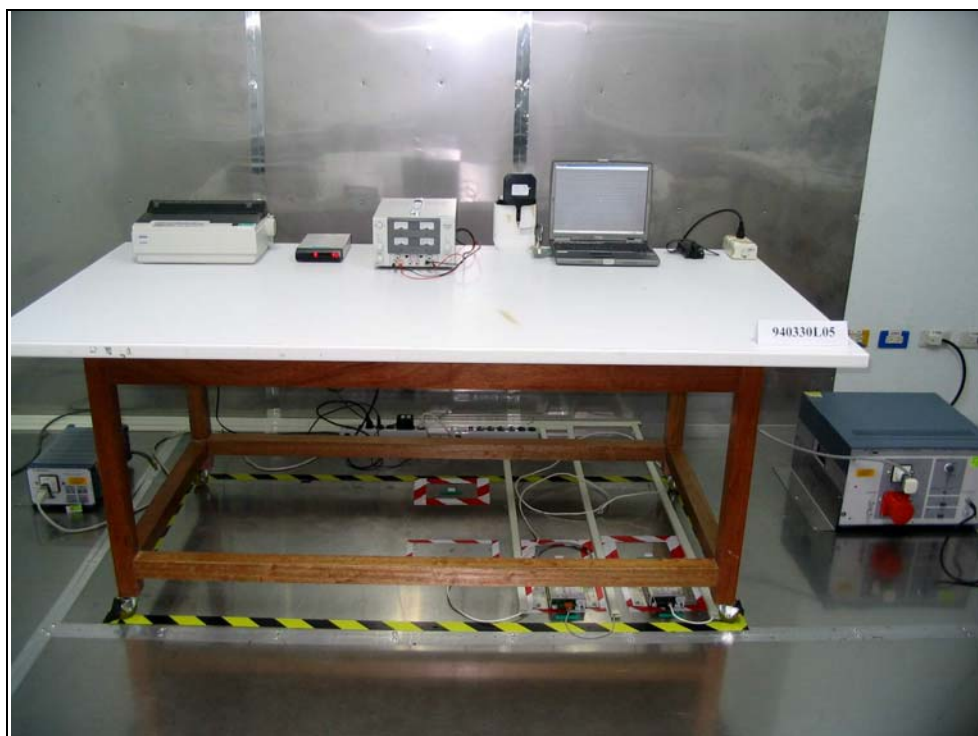
CONDUCTED EMISSION TEST – Antenna 1



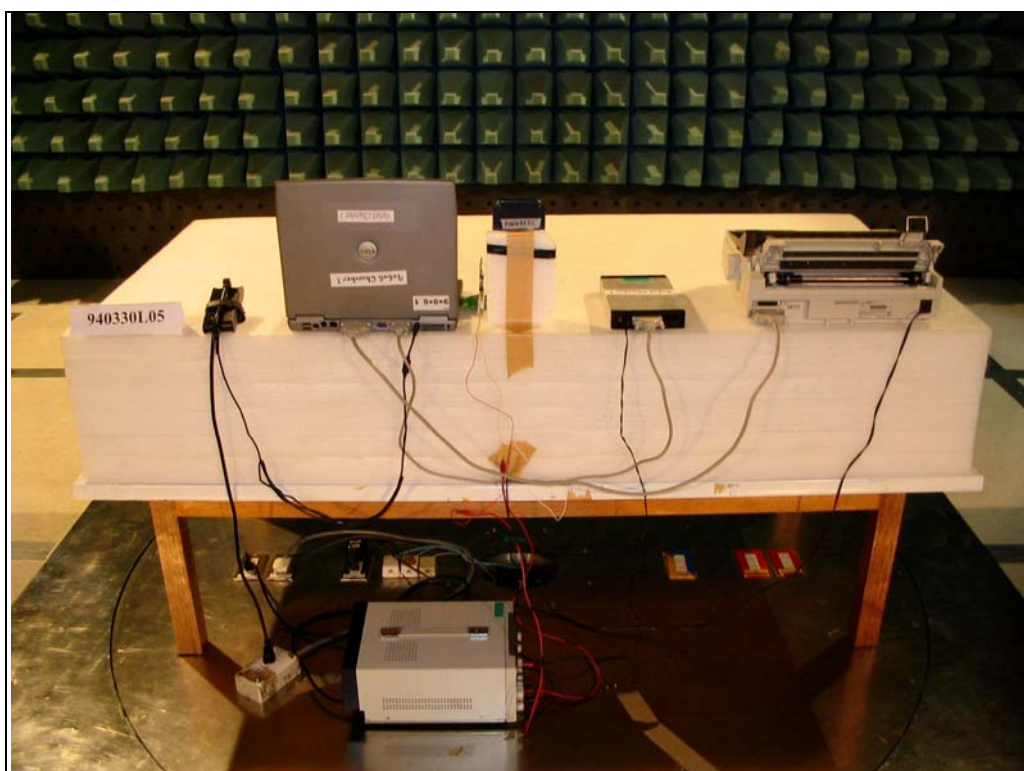
CONDUCTED EMISSION TEST – Antenna 2



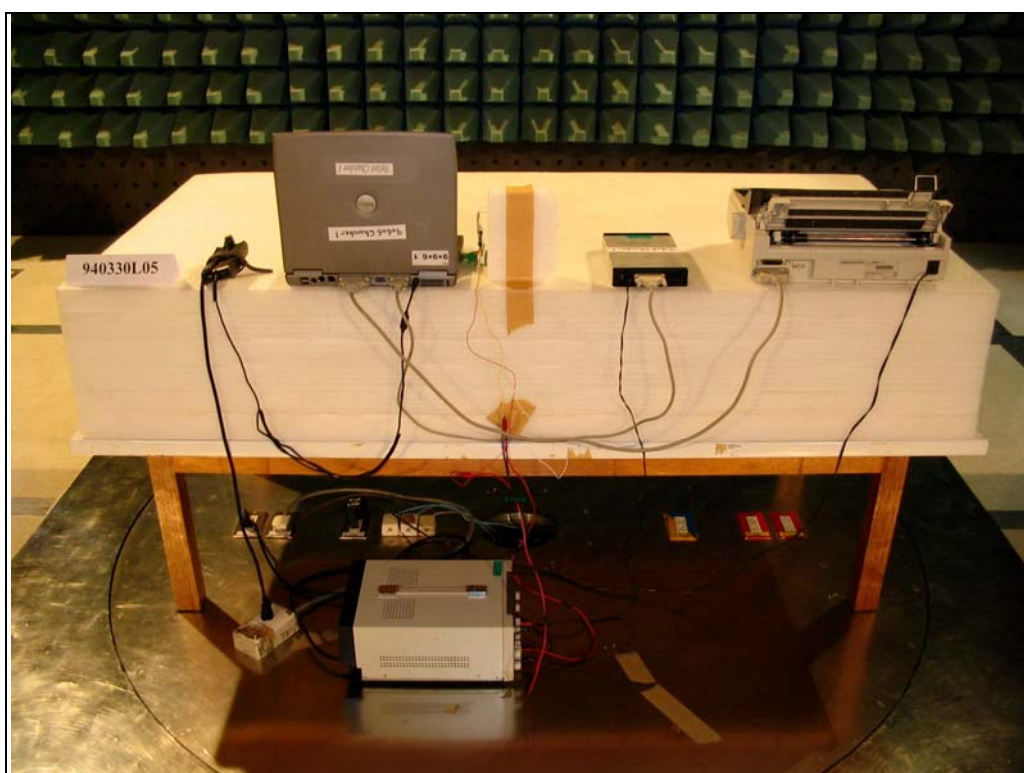
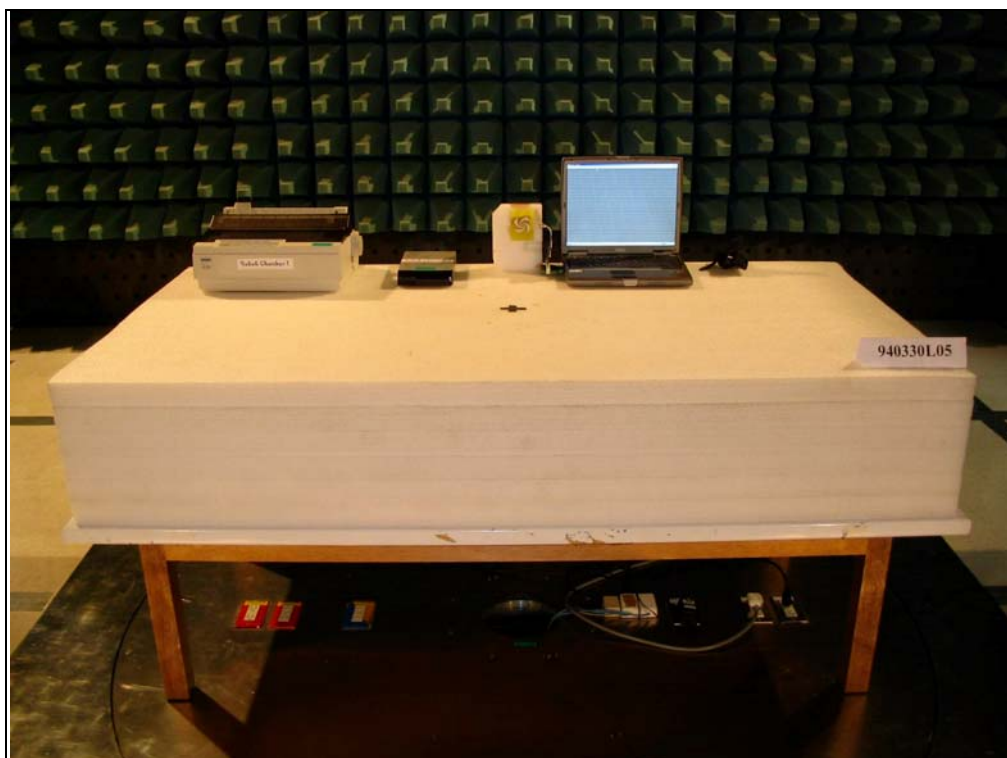
CONDUCTED EMISSION TEST – Antenna 3



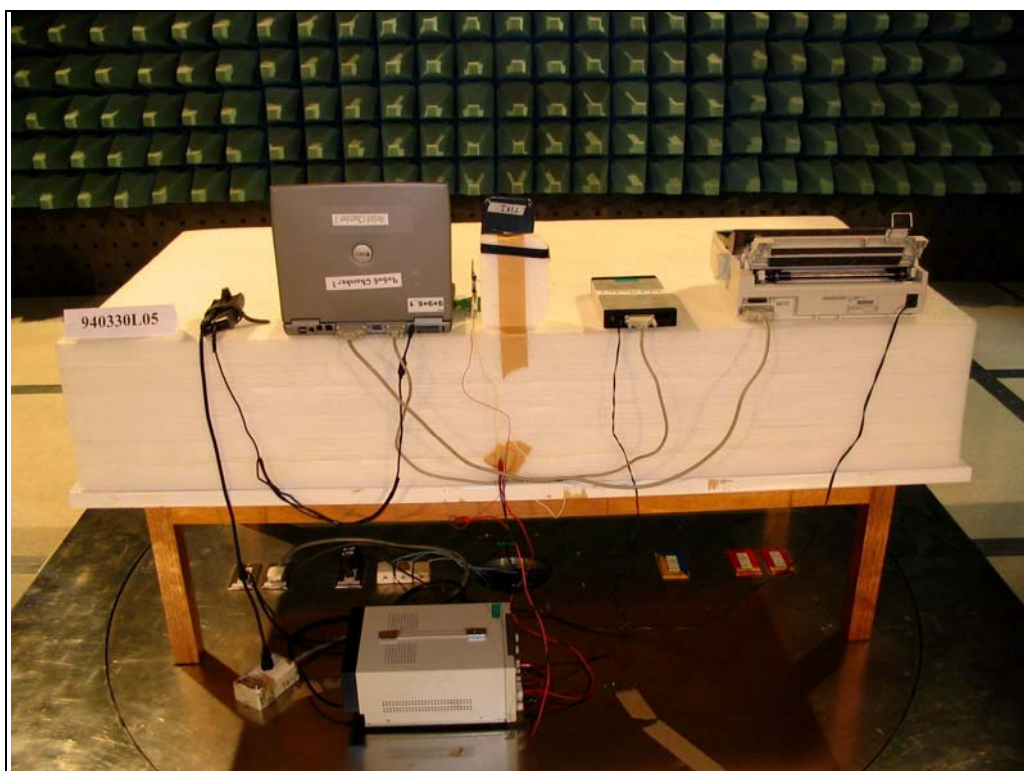
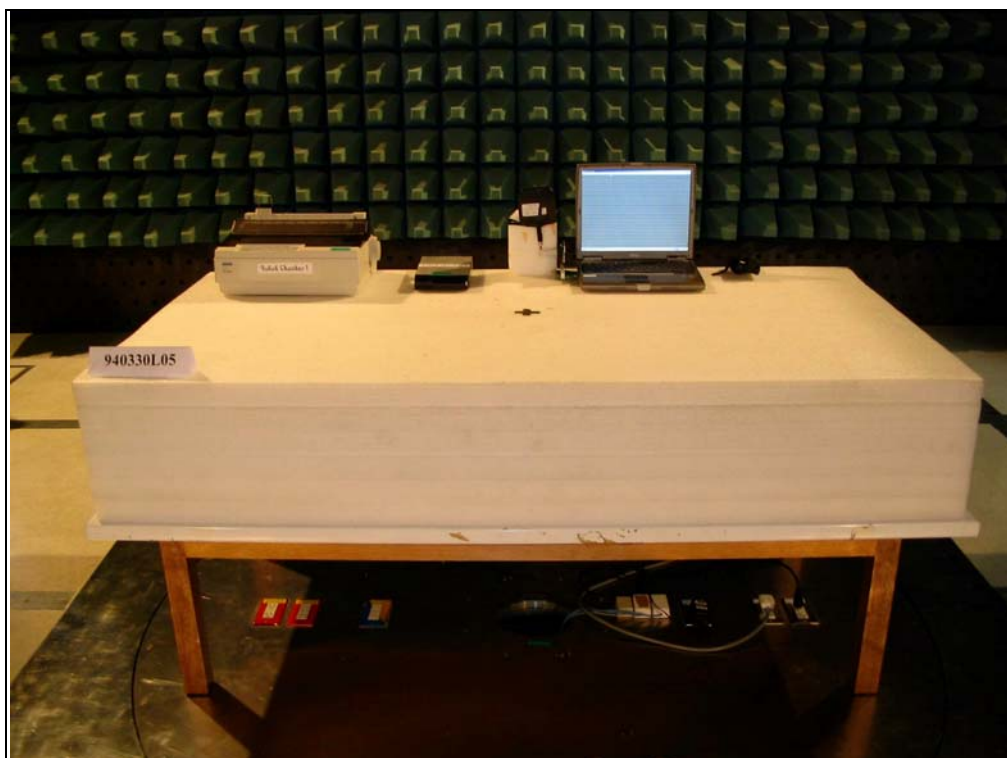
RADIATED EMISSION TEST – Antenna 1



RADIATED EMISSION TEST – Antenna 2



RADIATED EMISSION TEST – Antenna 3



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