

FCC TEST REPORT (15.407)

REPORT NO.: RF941206L09
MODEL NO.: G335
RECEIVED: Dec. 08, 2005
TESTED: Jan. 02 ~ Jan. 08, 2006
ISSUED: Jan. 12, 2006

APPLICANT: ELITEGROUP COMPUTER SYSTEMS CO., LTD.

ADDRESS: 2F. No. 240, Sec. 1, Nei Hu Road, 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 61 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.



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	19
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT.....	19
4.2.2	LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS.....	20
4.2.3	TEST INSTRUMENTS.....	21
4.2.4	TEST PROCEDURES	22
4.2.5	DEVIATION FROM TEST STANDARD	22
4.2.6	TEST SETUP	23
4.2.7	EUT OPERATING CONDITION	23
4.2.8	TEST RESULTS	24
4.3	PEAK TRANSMIT POWER MEASUREMENT	30
4.3.1	LIMITS OF PEAK TRANSMIT POWER MEASUREMENT.....	30
4.3.2	TEST INSTRUMENTS.....	30
4.3.3	TEST PROCEDURE.....	31
4.3.4	DEVIATION FROM TEST STANDARD	31
4.3.5	TEST SETUP	31
4.3.6	EUT OPERATING CONDITIONS	31
4.3.7	TEST RESULTS	32



4.4	PEAK POWER EXCURSION MEASUREMENT	37
4.4.1	LIMITS OF PEAK POWER EXCURSION MEASUREMENT.....	37
4.4.2	TEST INSTRUMENTS.....	37
4.4.3	TEST PROCEDURE.....	38
4.4.4	DEVIATION FROM TEST STANDARD	38
4.4.5	TEST SETUP	38
4.4.6	EUT OPERATING CONDITIONS	38
4.4.7	TEST RESULTS	39
4.5	PEAK POWER SPECTRAL DENSITY MEASUREMENT	42
4.5.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	42
4.5.2	TEST INSTRUMENTS.....	42
4.5.3	TEST PROCEDURES	43
4.5.4	DEVIATION FROM TEST STANDARD	43
4.5.5	TEST SETUP	43
4.5.6	EUT OPERATING CONDITIONS	43
4.5.7	TEST RESULTS	44
4.6	FREQUENCY STABILITY	47
4.6.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	47
4.6.2	TEST INSTRUMENTS.....	47
4.6.3	TEST PROCEDURE.....	47
4.6.4	DEVIATION FROM TEST STANDARD	47
4.6.5	TEST SETUP	48
4.6.6	EUT OPERATING CONDITION	48
4.6.7	TEST RESULTS	49
4.7	BAND EDGES MEASUREMENT	50
4.7.1	TEST INSTRUMENTS.....	50
4.7.2	TEST PROCEDURE.....	50
4.7.3	EUT OPERATING CONDITION	50
4.7.4	TEST RESULTS	50
4.8	ANTENNA REQUIREMENT	55
4.8.1	STANDARD APPLICABLE	55
4.8.2	ANTENNA CONNECTED CONSTRUCTION.....	55
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	56
6.	INFORMATION ON THE TESTING LABORATORIES	60
	APPENDIX-A.....	A-1



1. CERTIFICATION

PRODUCT: Notebook
MODEL NO.: G335
APPLICANT: ECS
BRAND NAME: ELITEGROUP COMPUTER SYSTEMS CO., LTD.
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Jan. 02 ~ Jan. 08, 2006
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 : Rebecca Huang , **DATE:** Jan. 12, 2006
Rebecca Huang

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Jan. 12, 2006
Responsible for RF Long Chen

APPROVED BY : Gary Chang , **DATE:** Jan. 12, 2006
Gary Chang / Supervisor

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 -15.17dB at 0.213MHz
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 - 4.73dB at 5150.00MHz
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
	30MHz ~ 200MHz	3.73 dB
Radiated emissions	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Notebook
MODEL NO.	G335
FCC ID	SA6G335IABG
POWER SUPPLY	19Vdc from adapter 14.8Vdc from battery
MODULATION TYPE	CCK, QPSK, BPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	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
FREQUENCY RANGE	802.11b & 802.11g: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz
NUMBER OF CHANNEL	802.11b & 802.11g: 11 802.11a: 13
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz
OUTPUT POWER	45.290mW for 802.11b 79.799mW for 802.11g 40.458mW for 5.150 ~ 5.350GHz 64.121mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	For 2.4GHz Left: PIFA antenna with cable loss -3.56dBi gain Right: PIFA antenna with cable loss -1.87dBi gain For 5.0GHz Left: PIFA antenna with cable loss -4.08dBi gain Right: PIFA antenna with cable loss -4.72dBi gain
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

- The EUT is powered by the following adapters.

Brand	LI SHIN INTERNATIONAL ENTERPRISE CORP.
Model	0335A1965
Input Power	100-240Vac, 50-60Hz, 1.7A
Output Power	19Vdc, 3.42A
Power Cord	AC 1.8 m non-shielded cable without core DC 1.6 m non-shielded cable with 1 core



Brand	LITE-ON TECHNOLOGY CORPORATION
Model	PA-1650-02
Input Power	100-240Vac, 1.6A, 50-60Hz
Output Power	19Vdc, 3.42A
Power Cord	AC 1.8 m non-shielded cable without core DC 1.6 m non-shielded cable with 1 core

2. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
3. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
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

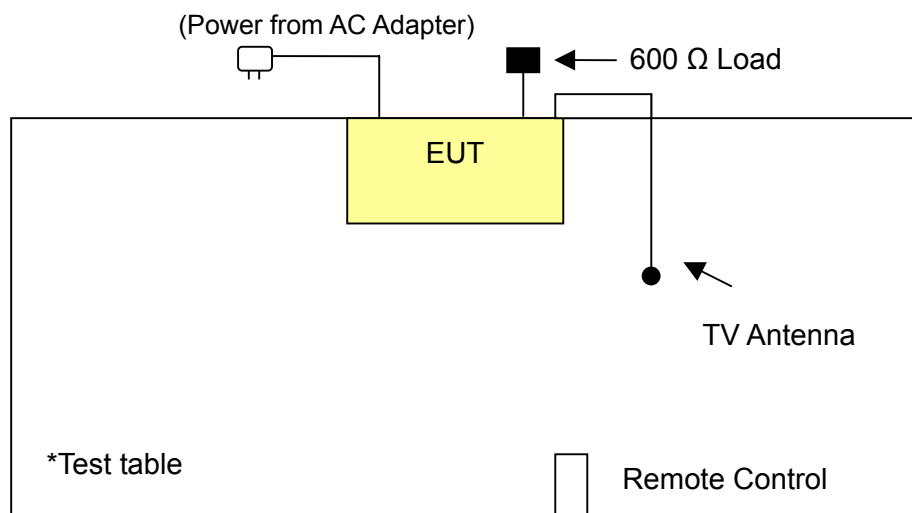
Operated in 5150 ~ 5250MHz, 5250MHz ~ 5350MHz bands:

Eight channels are provided to this EUT.

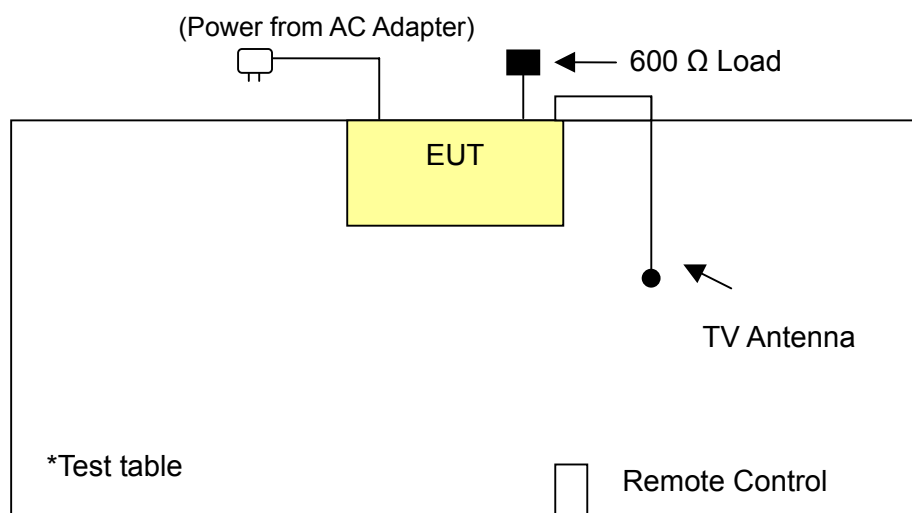
Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz
5	5260 MHz
6	5280 MHz
7	5300 MHz
8	5320 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

MODE A: Adapter: LI SHIN



MODE B: Adapter: LITE-ON



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
A	√	√	√	√	Adapter: LI SHIN
B	√	√	-	-	Adapter: LITE-ON

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
 RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement
 “-” : Mean no effect

Power Line Conducted Emission Test:

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11a	1 to 8	5	OFDM	BPSK	6
B	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 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)
A	802.11a	1 to 8	5	OFDM	BPSK	6
B	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 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



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

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



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. 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	600 Ω LOAD	NA	NA	NA	NA

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

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

4. TEST TYPES AND RESULTS (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. 11, 2006
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May. 02, 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.

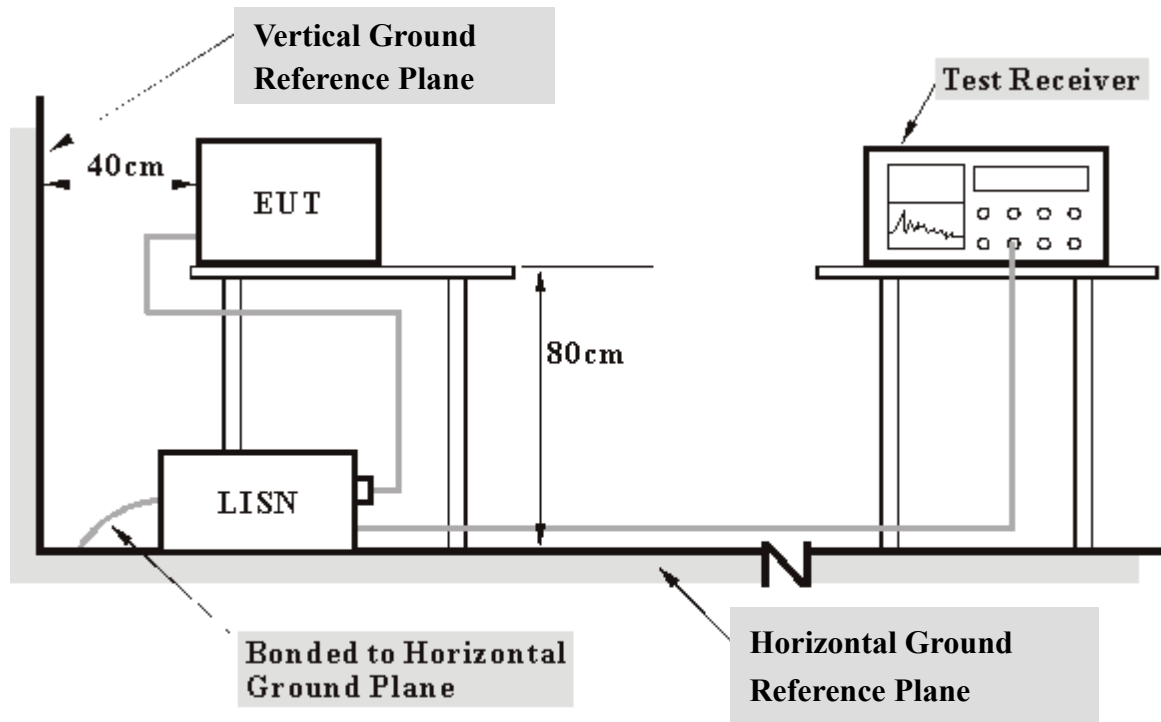
4.1.3 TEST PROCEDURES

- 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. Placed the EUT on a testing table.
- b. The EUT ran a test program (provided by manufacturer) to enable all functions under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to its screen.
- d. Step c was repeated.

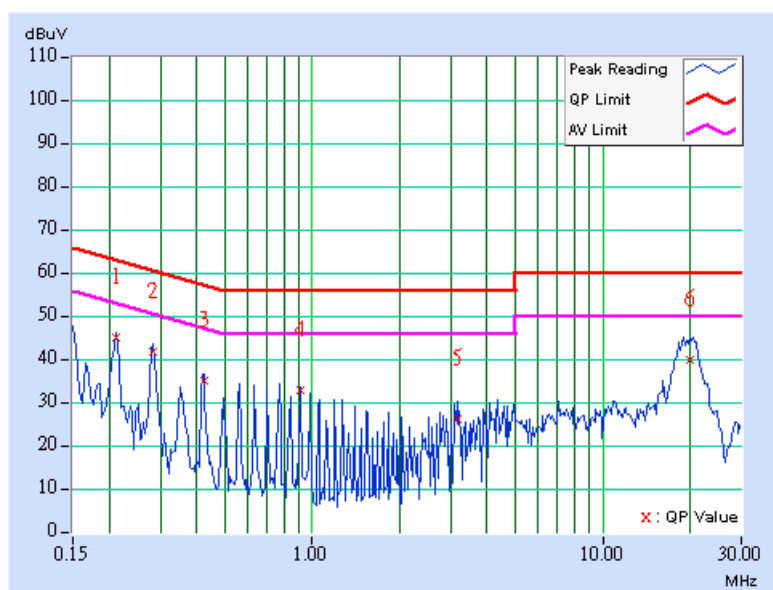
4.1.7 TEST RESULTS

Conducted Worst-Case Data _Adapter from LI SHIN

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A		

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	0.213	0.11	44.09	-	44.20	-	63.11	53.11	-18.91	-
2	0.283	0.11	40.78	-	40.89	-	60.73	50.73	-19.84	-
3	0.423	0.12	34.02	-	34.14	-	57.38	47.38	-23.25	-
4	0.912	0.22	32.04	-	32.26	-	56.00	46.00	-23.74	-
5	3.164	0.34	25.37	-	25.71	-	56.00	46.00	-30.29	-
6	19.996	1.03	38.91	-	39.94	-	60.00	50.00	-20.06	-

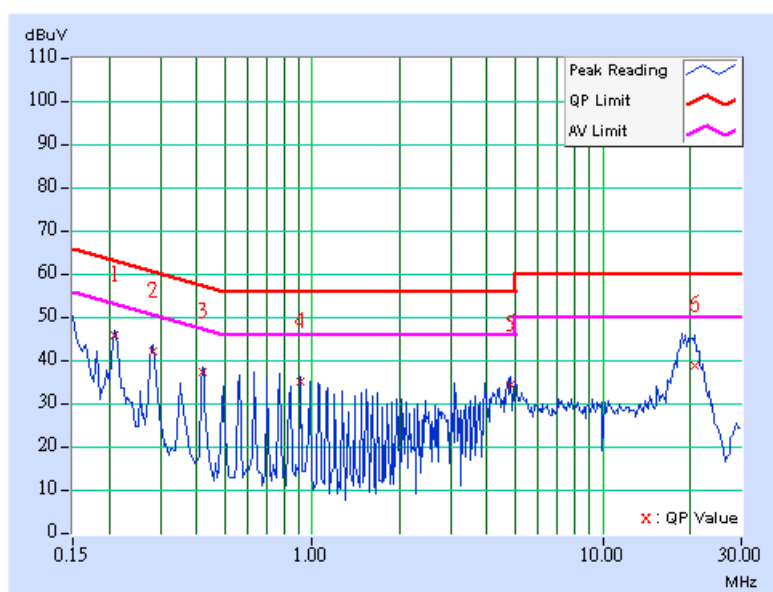
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A		

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	0.209	0.11	45.04	-	45.15	-	63.26	53.26	-18.11	-
2	0.283	0.11	41.42	-	41.53	-	60.73	50.73	-19.20	-
3	0.420	0.11	36.53	-	36.64	-	57.46	47.46	-20.81	-
4	0.912	0.22	34.58	-	34.80	-	56.00	46.00	-21.20	-
5	4.836	0.40	33.57	-	33.97	-	56.00	46.00	-22.03	-
6	20.883	0.75	38.27	-	39.02	-	60.00	50.00	-20.98	-

- 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.

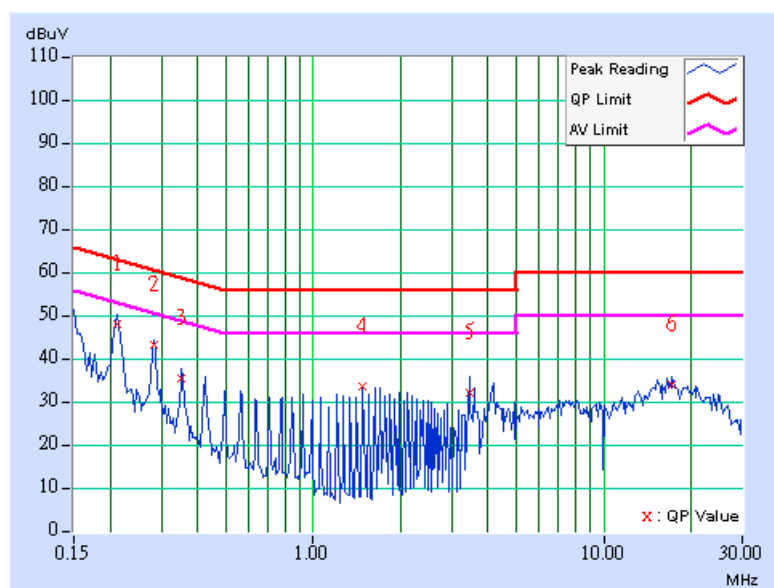


Conducted Worst-Case Data _Adapter from LITE-ON

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	B		

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	0.213	0.11	47.34	-	47.45	-	63.11	53.11	-15.66	-
2	0.283	0.11	42.47	-	42.58	-	60.73	50.73	-18.15	-
3	0.353	0.11	34.94	-	35.05	-	58.89	48.89	-23.84	-
4	1.484	0.25	33.11	-	33.36	-	56.00	46.00	-22.64	-
5	3.461	0.35	31.36	-	31.71	-	56.00	46.00	-24.29	-
6	17.242	0.77	33.26	-	34.03	-	60.00	50.00	-25.97	-

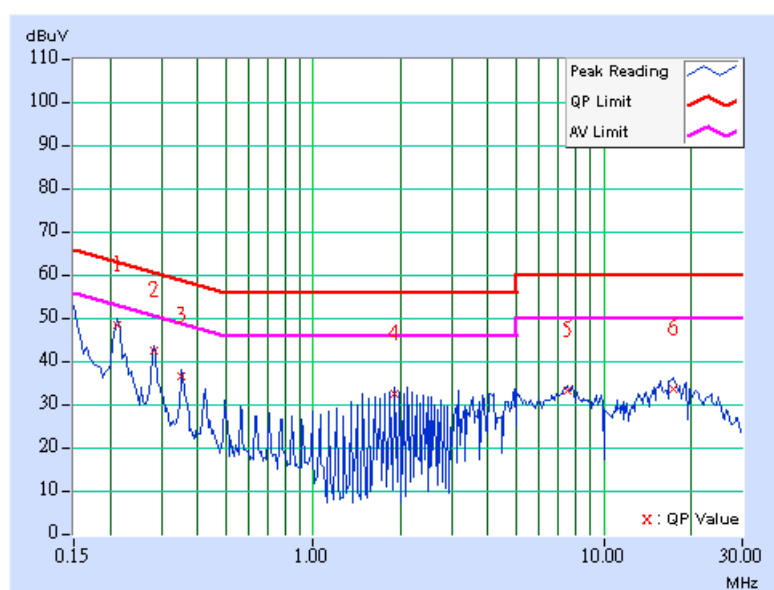
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	B		

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	0.213	0.11	47.83	-	47.94	-	63.11	53.11	-15.17	-
2	0.283	0.11	42.09	-	42.20	-	60.73	50.73	-18.53	-
3	0.353	0.11	36.22	-	36.33	-	58.89	48.89	-22.56	-
4	1.906	0.26	32.16	-	32.42	-	56.00	46.00	-23.58	-
5	7.492	0.42	32.66	-	33.08	-	60.00	50.00	-26.92	-
6	17.457	0.59	33.26	-	33.85	-	60.00	50.00	-26.15	-

- 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

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



4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 01, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 04, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 01, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8449B	3008A01960	Nov. 09, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA
26GHz ~ 40GHz Amplifier	AMF-6F-2600400	923362	Mar. 13, 2006

- 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 3.
 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 IC4924-4.

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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

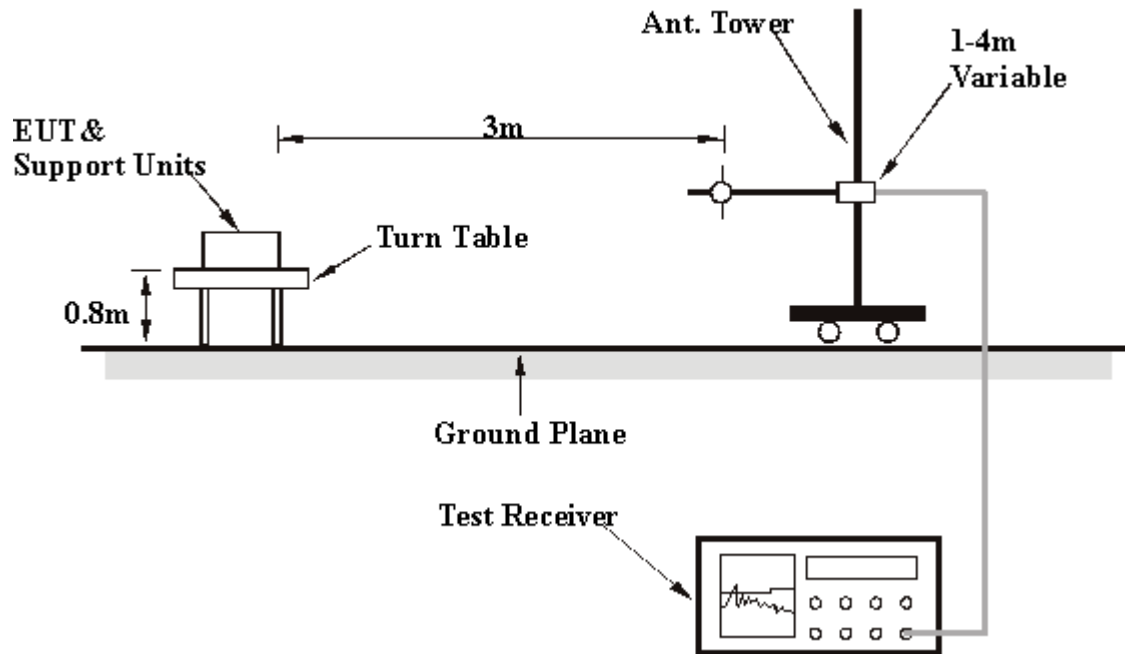
NOTE:

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 1 kHz 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 _Adapter from LI SHIN

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	A		

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	160.24	30.71 QP	43.50	-12.79	1.00 H	193	17.84	12.87
2	185.51	28.09 QP	43.50	-15.41	1.00 H	211	16.73	11.35
3	220.50	32.10 QP	46.00	-13.90	1.50 H	196	21.02	11.08
4	241.88	33.77 QP	46.00	-12.23	1.75 H	196	21.92	11.85
5	566.51	31.80 QP	46.00	-14.20	1.00 H	244	10.54	21.26
6	834.77	29.06 QP	46.00	-16.94	1.25 H	223	3.25	25.81
7	900.86	31.73 QP	46.00	-14.27	1.00 H	211	5.90	25.83

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	61.10	30.09 QP	40.00	-9.91	1.00 V	199	17.34	12.76
2	70.82	30.91 QP	40.00	-9.09	1.25 V	199	19.38	11.53
3	119.42	27.15 QP	43.50	-16.35	1.00 V	223	15.50	11.65
4	158.30	31.30 QP	43.50	-12.20	1.75 V	187	18.43	12.87
5	191.34	28.77 QP	43.50	-14.73	1.00 V	187	17.82	10.95
6	566.51	32.29 QP	46.00	-13.71	1.50 V	199	11.03	21.26
7	599.56	34.97 QP	46.00	-11.03	1.00 V	199	12.91	22.06
8	700.64	31.48 QP	46.00	-14.52	1.25 V	193	7.95	23.53
9	762.85	29.93 QP	46.00	-16.07	1.00 V	193	5.30	24.63
10	797.84	29.22 QP	46.00	-16.78	1.00 V	220	4.39	24.83
11	830.88	33.06 QP	46.00	-12.94	2.00 V	205	7.36	25.70
12	900.86	34.41 QP	46.00	-11.59	1.00 V	223	8.58	25.83
13	912.53	29.17 QP	46.00	-16.83	1.50 V	214	3.04	26.13

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



Below 1GHz Worst-Case Data _Adapter from LITE-ON

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Jay Hsu	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TEST MODE	B		

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	138.86	29.31 QP	43.50	-14.19	1.00 H	205	16.61	12.70
2	185.51	28.85 QP	43.50	-14.65	1.25 H	214	17.50	11.35
3	220.50	31.22 QP	46.00	-14.78	1.50 H	217	20.14	11.08
4	241.88	31.53 QP	46.00	-14.47	1.25 H	193	19.68	11.85
5	566.51	31.20 QP	46.00	-14.80	1.25 H	208	9.94	21.26
6	599.56	31.07 QP	46.00	-14.93	1.25 H	208	9.01	22.06
7	624.83	31.46 QP	46.00	-14.54	1.75 H	115	8.94	22.52
8	828.94	30.92 QP	46.00	-15.08	1.25 H	193	5.27	25.65
9	900.86	31.59 QP	46.00	-14.41	1.25 H	214	5.76	25.83

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	59.16	31.59 QP	40.00	-8.41	1.00 V	238	18.69	12.91
2	64.99	27.75 QP	40.00	-12.25	1.00 V	187	15.44	12.32
3	119.42	27.50 QP	43.50	-16.00	1.50 V	190	15.85	11.65
4	138.86	31.44 QP	43.50	-12.06	1.00 V	235	18.74	12.70
5	191.34	29.03 QP	43.50	-14.47	1.00 V	238	18.08	10.95
6	599.56	34.99 QP	46.00	-11.01	1.75 V	187	12.93	22.06
7	696.75	31.36 QP	46.00	-14.64	1.00 V	178	7.88	23.48
8	766.73	30.62 QP	46.00	-15.38	1.25 V	202	5.97	24.65
9	830.88	32.54 QP	46.00	-13.46	1.00 V	226	6.84	25.70
10	900.86	34.83 QP	46.00	-11.17	2.00 V	190	9.00	25.83

- 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 TEST MODE		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1871.00	44.61 PK	68.30	-23.69	1.07 H	314	15.58	29.03
2	#5150.00	55.08 PK	74.00	-18.92	1.31 H	207	18.01	37.07
2	#5150.00	46.05 AV	54.00	-7.95	1.31 H	207	8.98	37.07
3	*5180.00	104.22 PK			1.31 H	207	67.10	37.12
3	*5180.00	95.19 AV			1.31 H	207	58.07	37.12
4	10360.00	58.77 PK	68.30	-9.53	1.07 H	114	11.49	47.29

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	1871.00	43.68 PK	68.30	-24.62	1.01 V	24	14.65	29.03
2	#5150.00	58.44 PK	74.00	-15.60	1.17 V	201	21.37	37.07
2	#5150.00	49.27 AV	54.00	-4.73	1.17 V	201	12.20	37.07
3	*5180.00	107.58 PK			1.17 V	201	70.46	37.12
3	*5180.00	98.41 AV			1.17 V	201	61.29	37.12
4	10360.00	60.51 PK	68.30	-7.79	1.00 V	187	13.23	47.29

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1871.00	45.57 PK	68.30	-22.73	1.05 H	211	16.54	29.03
2	*5240.00	104.73 PK			1.30 H	208	67.49	37.24
2	*5240.00	95.61 AV			1.30 H	208	58.37	37.24
3	10480.00	59.23 PK	68.30	-9.07	1.00 H	82	11.67	47.56

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	1871.00	44.58 PK	68.30	-23.72	1.12 V	201	15.55	29.03
2	*5240.00	107.89 PK			1.15 V	199	70.65	37.24
2	*5240.00	98.73 AV			1.15 V	199	61.49	37.24
3	10480.00	60.67 PK	68.30	-7.63	1.02 V	24	13.11	47.56

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1871.00	45.87 PK	68.30	-22.43	1.03 H	247	16.84	29.03
2	*5260.00	104.53 PK			1.30 H	206	67.24	37.29
2	*5260.00	95.52 AV			1.30 H	206	58.23	37.29
3	10520.00	59.23 PK	68.30	-9.07	1.01 H	76	11.58	47.65

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	1871.00	43.97 PK	68.30	-24.33	1.17 V	213	14.94	29.03
2	*5260.00	108.08 PK			1.06 V	200	70.79	37.29
2	*5260.00	98.60 AV			1.06 V	200	61.31	37.29
3	10520.00	60.87 PK	68.30	-7.43	1.03 V	192	13.22	47.65

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 8	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg.C, 65%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	1871.00	45.36 PK	68.30	-22.94	1.12 H	29	16.33	29.03
2	*5320.00	104.84 PK			1.27 H	196	67.44	37.40
2	*5320.00	95.92 AV			1.27 H	196	58.52	37.40
3	#5350.00	57.37 PK	74.00	-16.63	1.27 H	196	19.94	37.43
3	#5350.00	48.45 AV	54.00	-5.55	1.27 H	196	11.02	37.43
4	#10640.00	58.61 PK	74.00	-15.39	1.12 H	37	10.82	47.79
4	#10640.00	45.56 AV	54.00	-8.44	1.12 H	37	-2.23	47.79

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	1871.00	43.79 PK	68.30	-24.51	1.03 V	246	14.76	29.03
2	*5320.00	108.29 PK			1.04 V	200	70.89	37.40
2	*5320.00	98.14 AV			1.04 V	200	60.74	37.40
3	#5350.00	60.32 PK	74.00	-13.68	1.04 V	200	22.89	37.43
3	#5350.00	51.17 AV	54.00	-2.83	1.04 V	200	13.74	37.43
4	#10640.00	60.47 PK	74.00	-13.53	1.03 V	223	12.68	47.79
4	#10640.00	47.58 AV	54.00	-6.42	1.03 V	223	-0.21	47.79

- 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. 14, 2006

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:

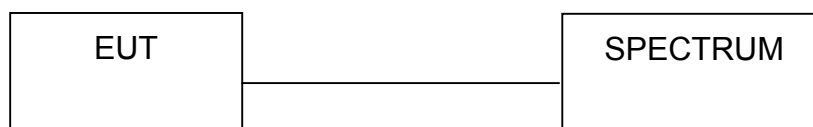
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

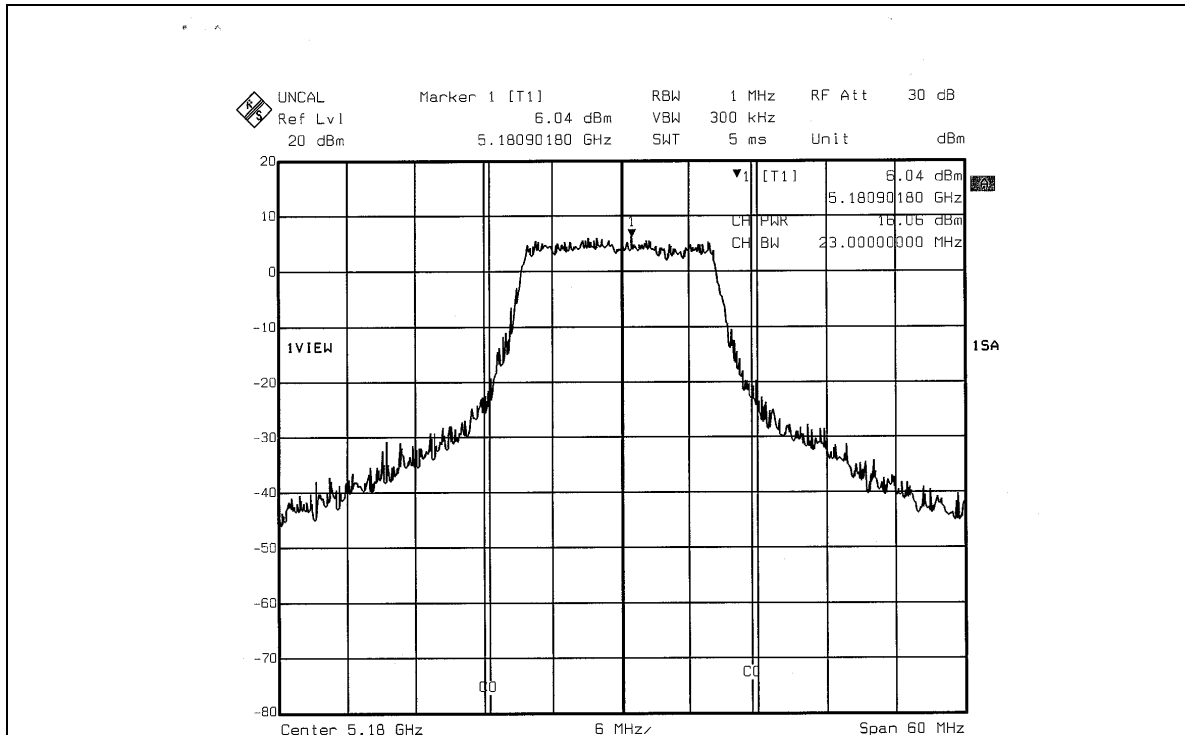
802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 54%RH, 991hPa
TESTED BY	Long Chen		

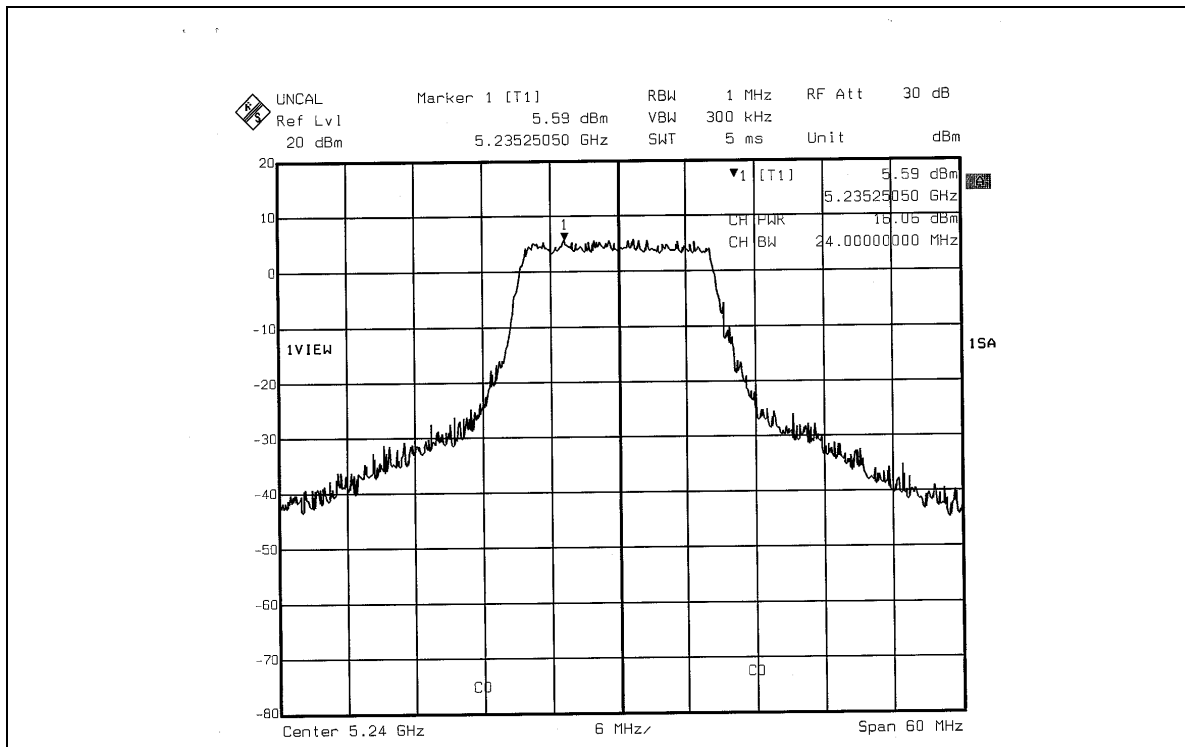
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	40.365	16.06	17.00	22.77	PASS
4	5240	40.365	16.06	17.00	23.09	PASS
5	5260	39.811	16.00	24.00	23.33	PASS
8	5320	40.458	16.07	24.00	23.17	PASS

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

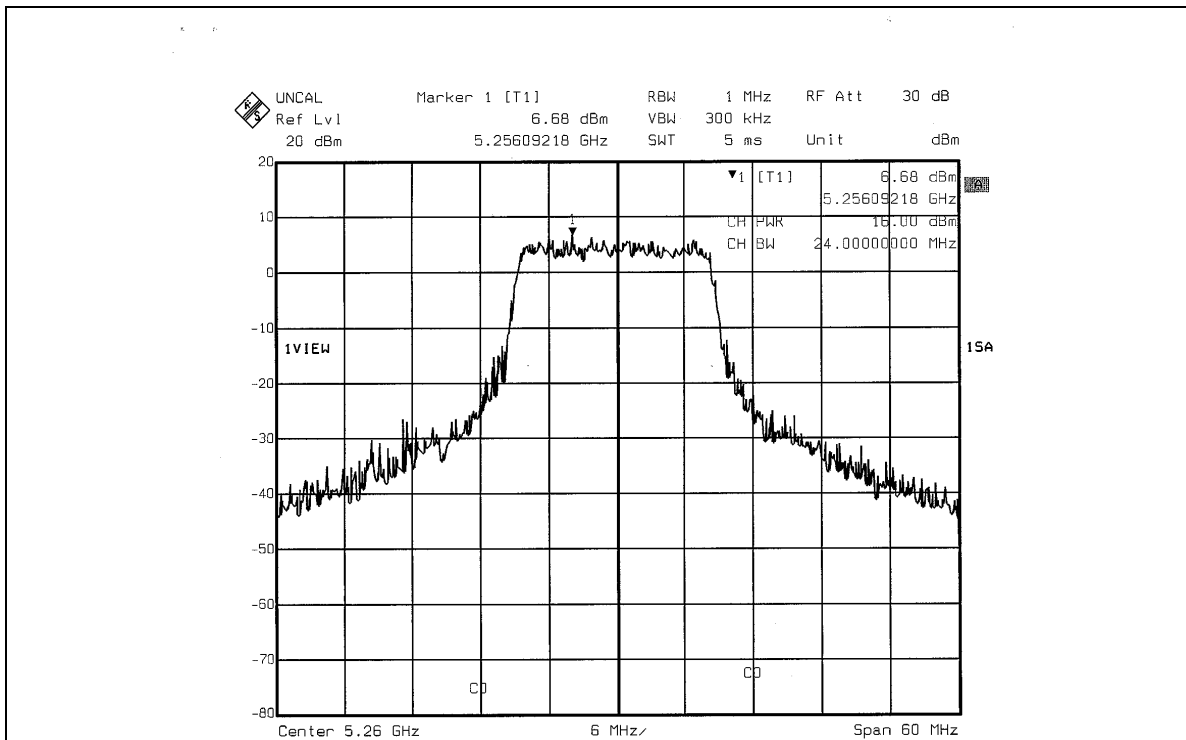
Peak Power Output: CH 1



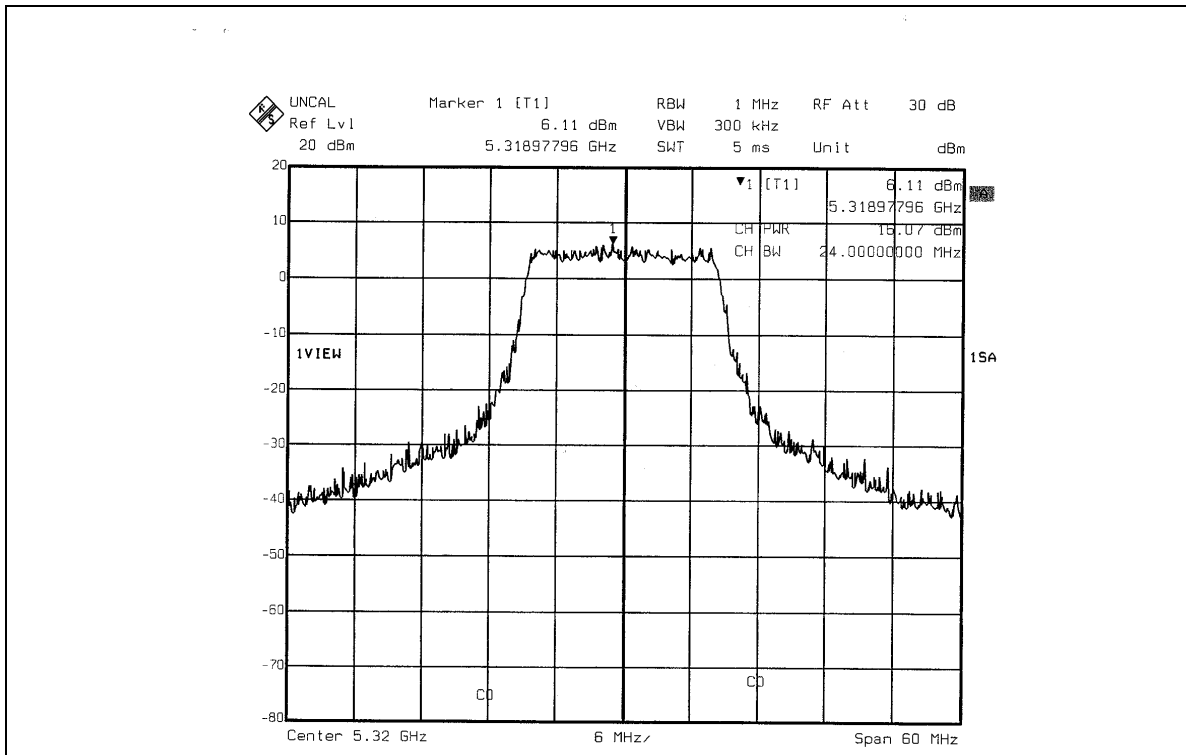
CH 4



CH 5

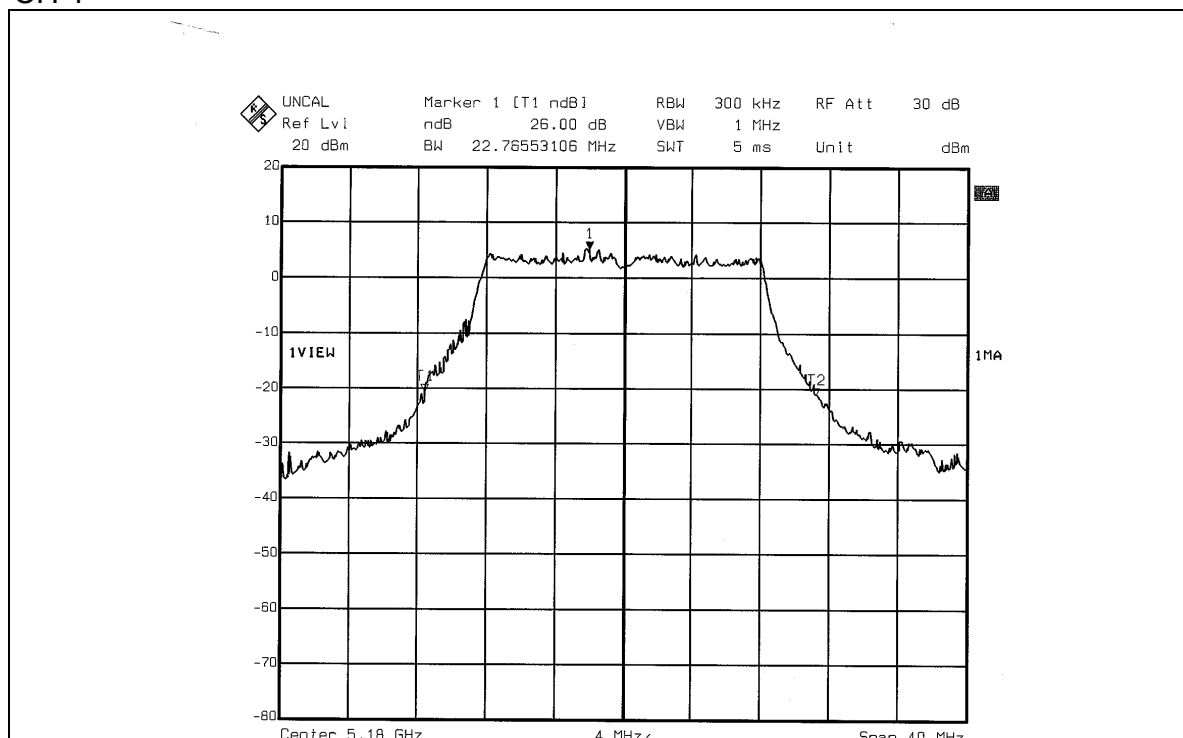


CH 8

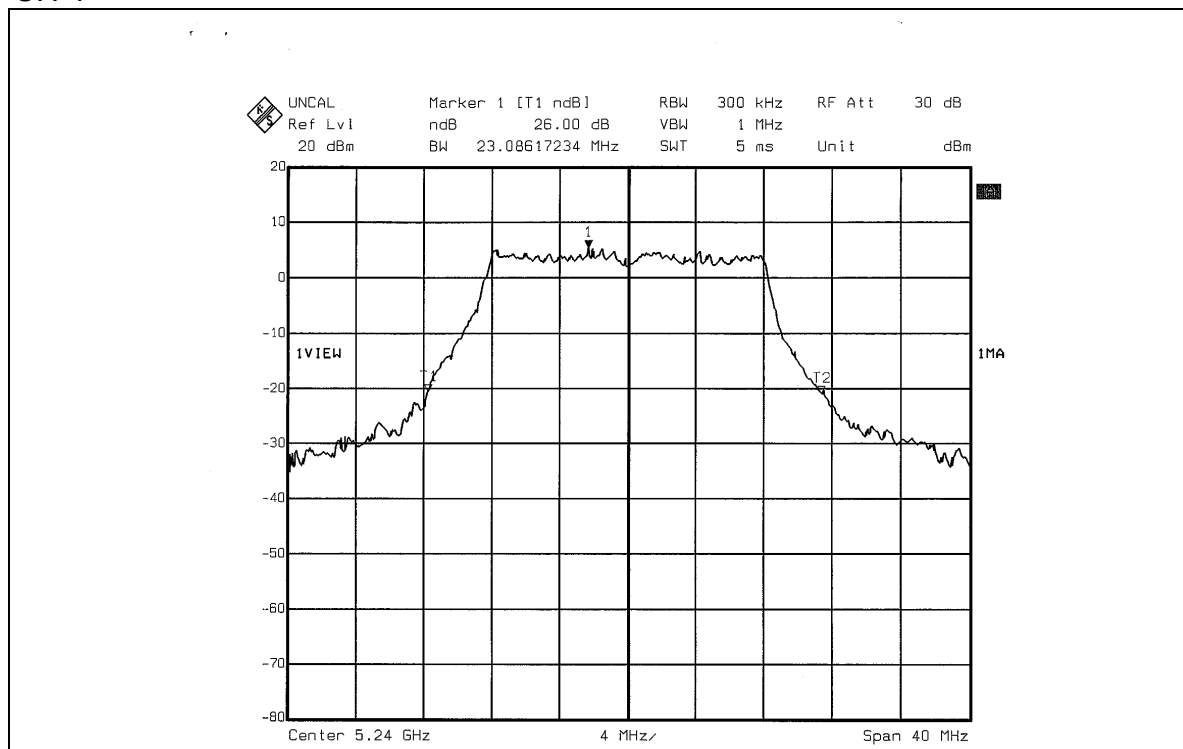


26dB Occupied Bandwidth:

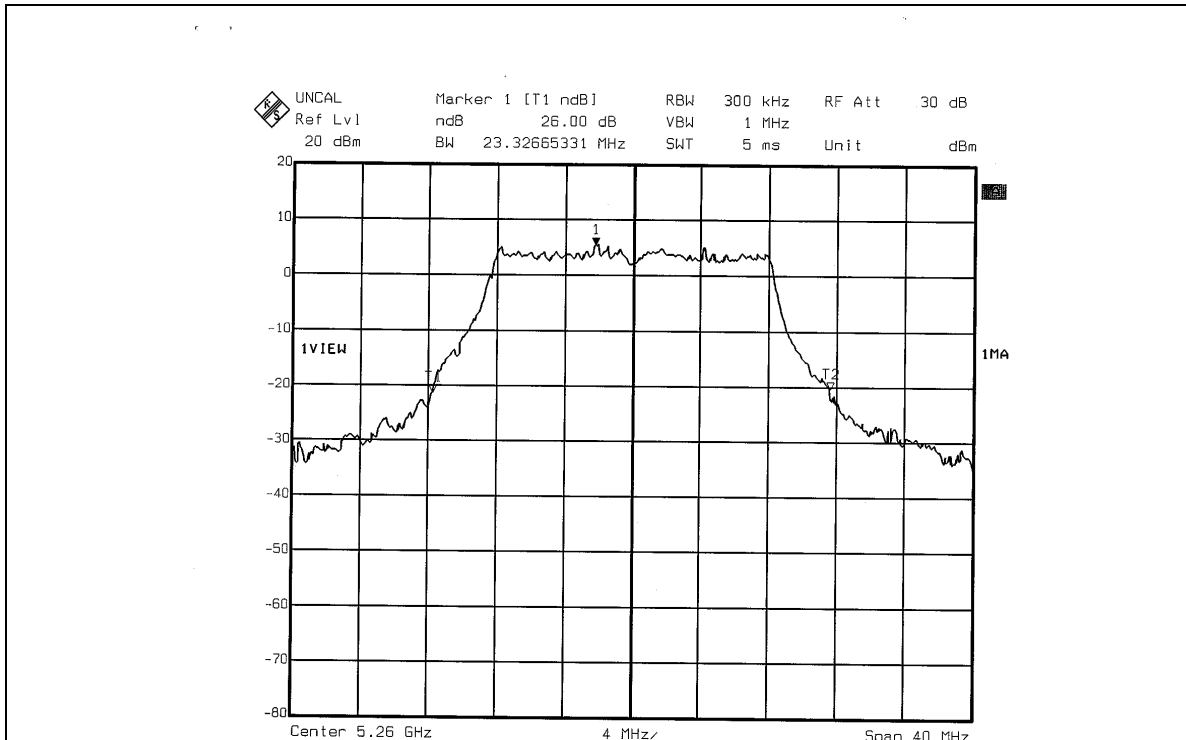
CH 1



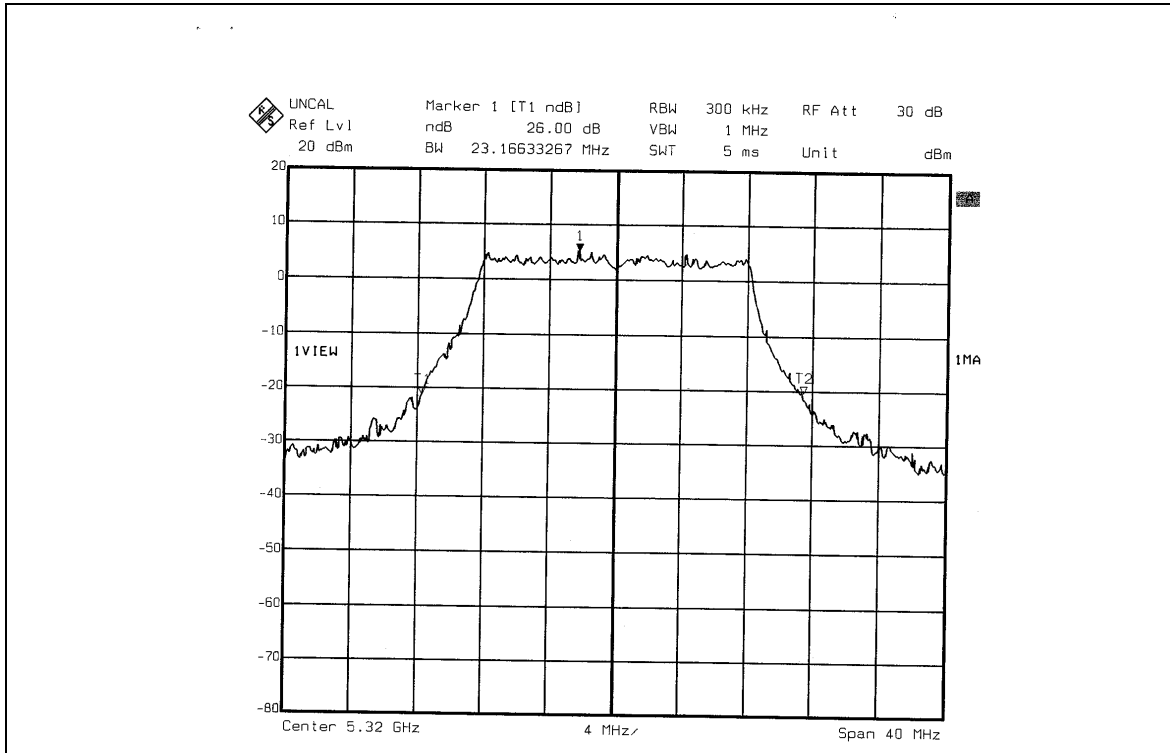
CH 4



CH 5



CH 8





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. 14, 2006

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

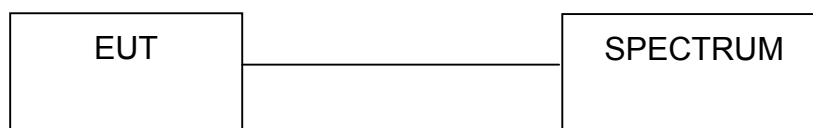
4.4.3 TEST PROCEDURE

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.



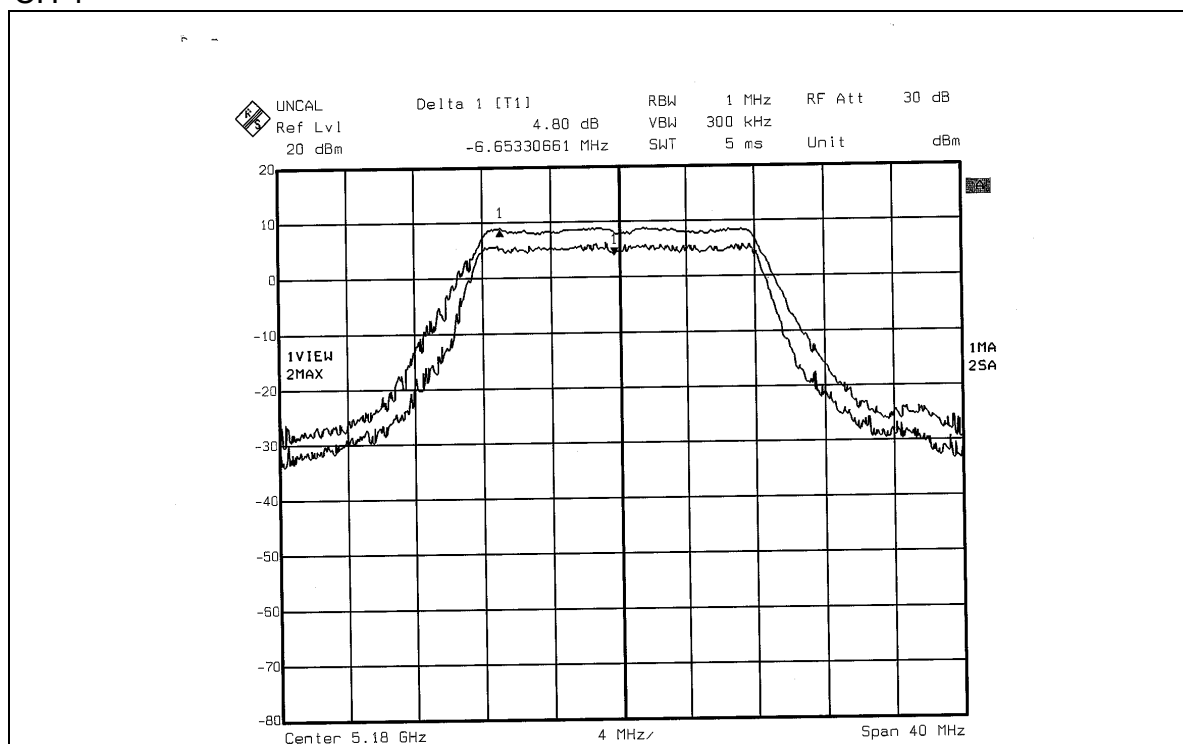
4.4.7 TEST RESULTS

802.11a OFDM modulation

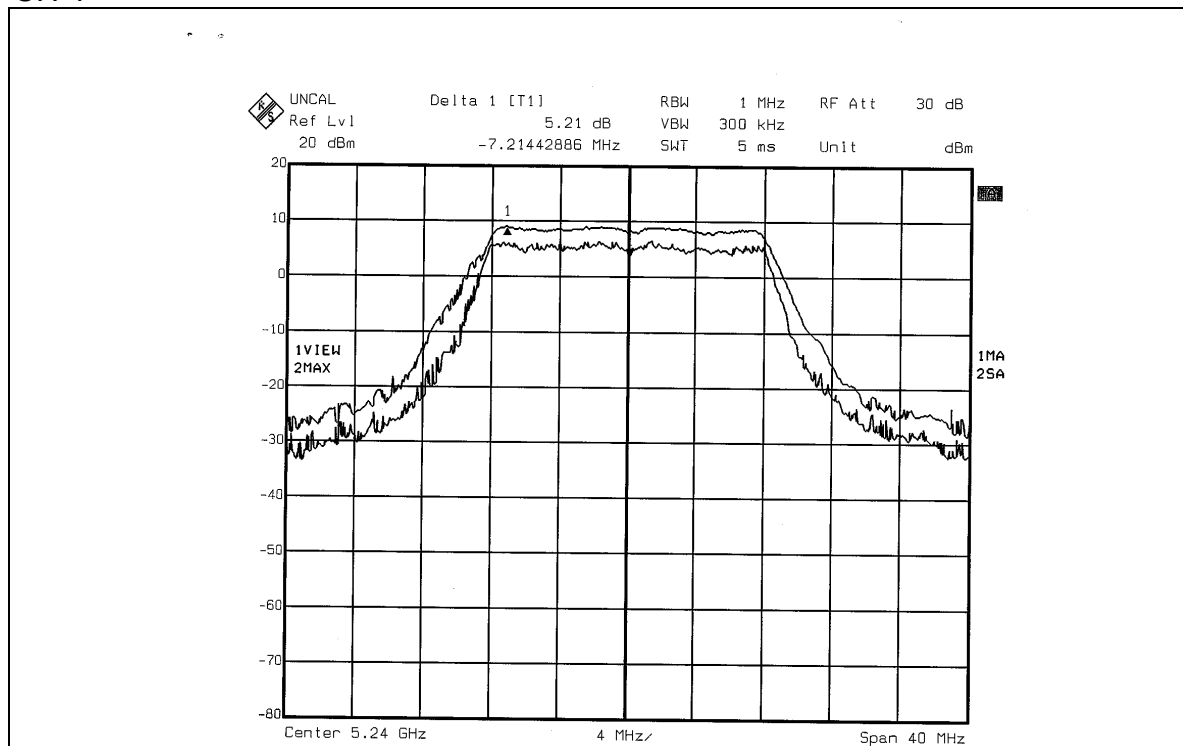
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 54%RH, 991hPa
TESTED BY	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	4.80	13	PASS
4	5240	5.21	13	PASS
5	5260	5.28	13	PASS
8	5320	5.25	13	PASS

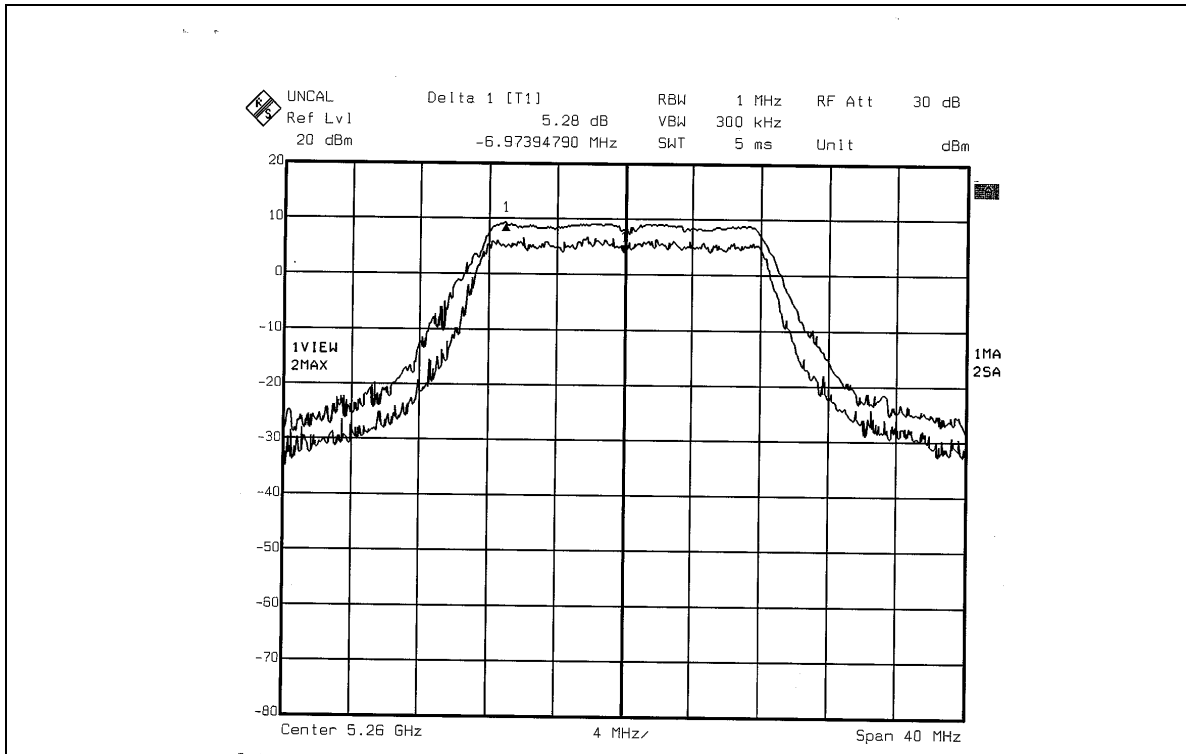
CH 1



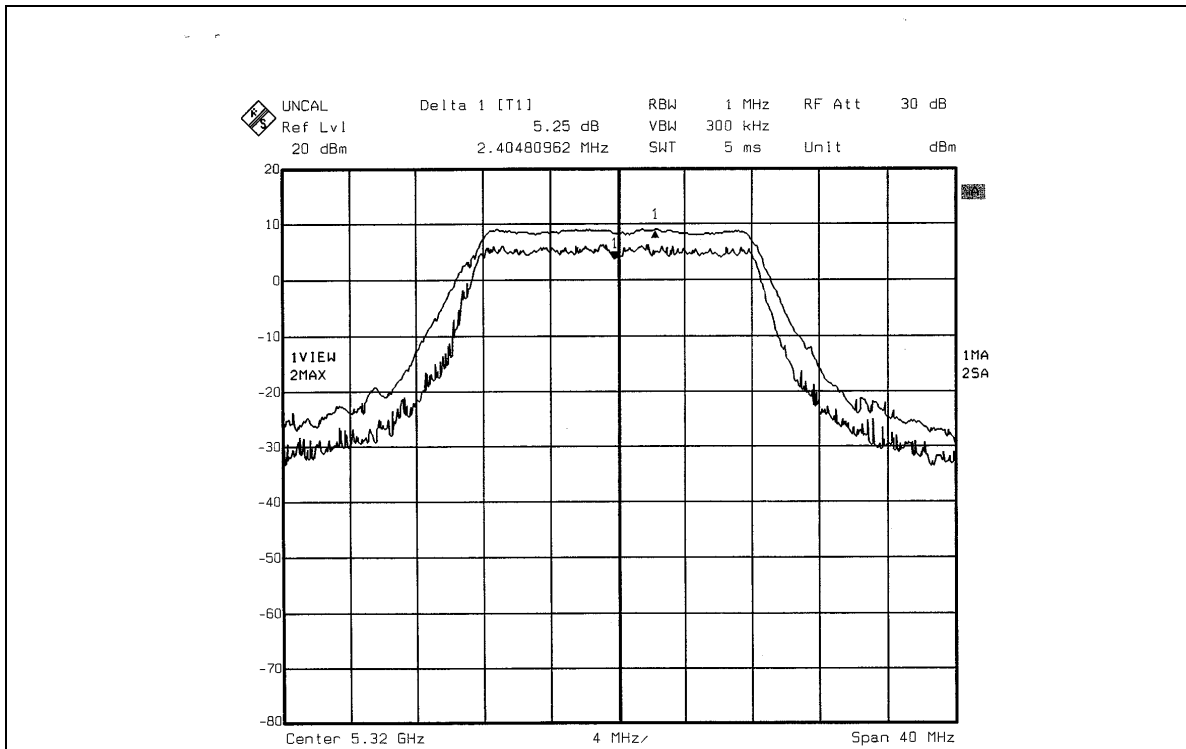
CH 4



CH 5



CH 8





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. 14, 2006

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

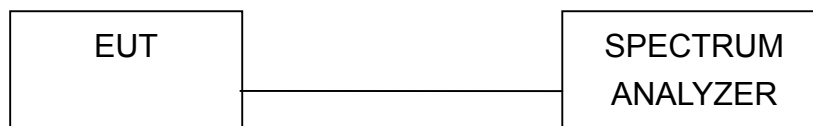
4.5.3 TEST PROCEDURES

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



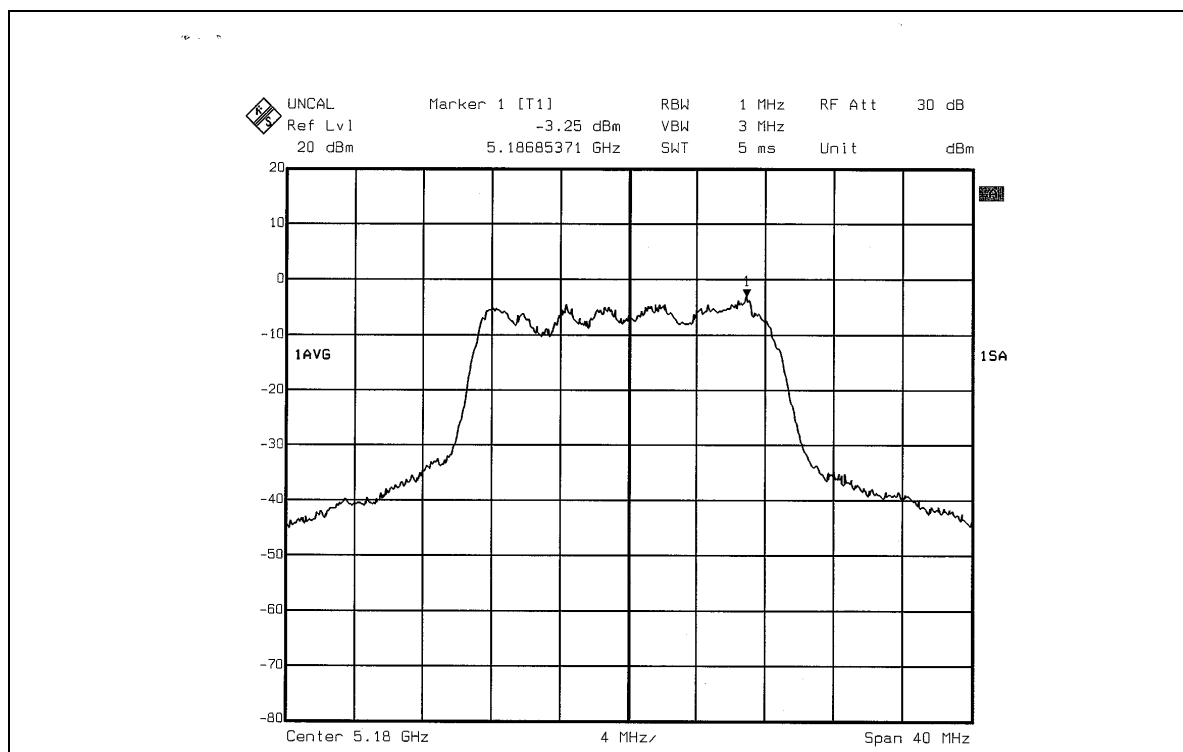
4.5.7 TEST RESULTS

802.11a OFDM modulation

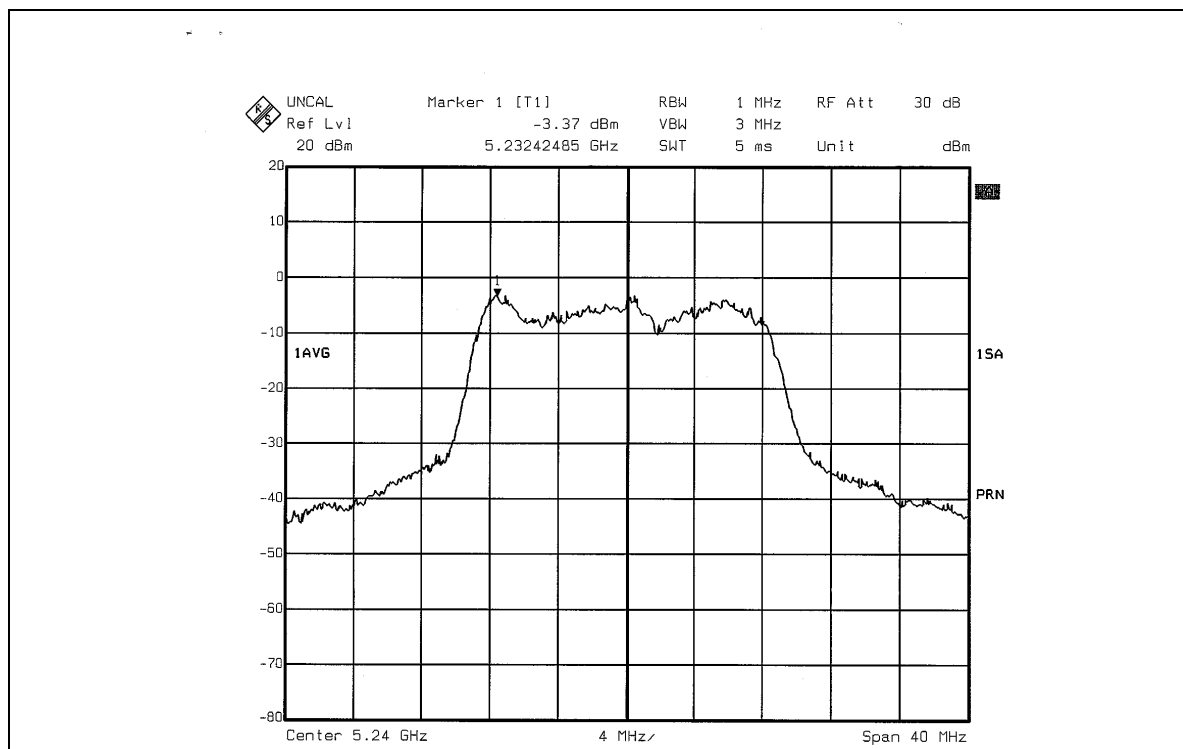
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	23deg.C, 54%RH, 991hPa
TESTED BY	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-3.25	4	PASS
4	5240	-3.37	4	PASS
5	5260	-3.34	11	PASS
8	5320	-3.39	11	PASS

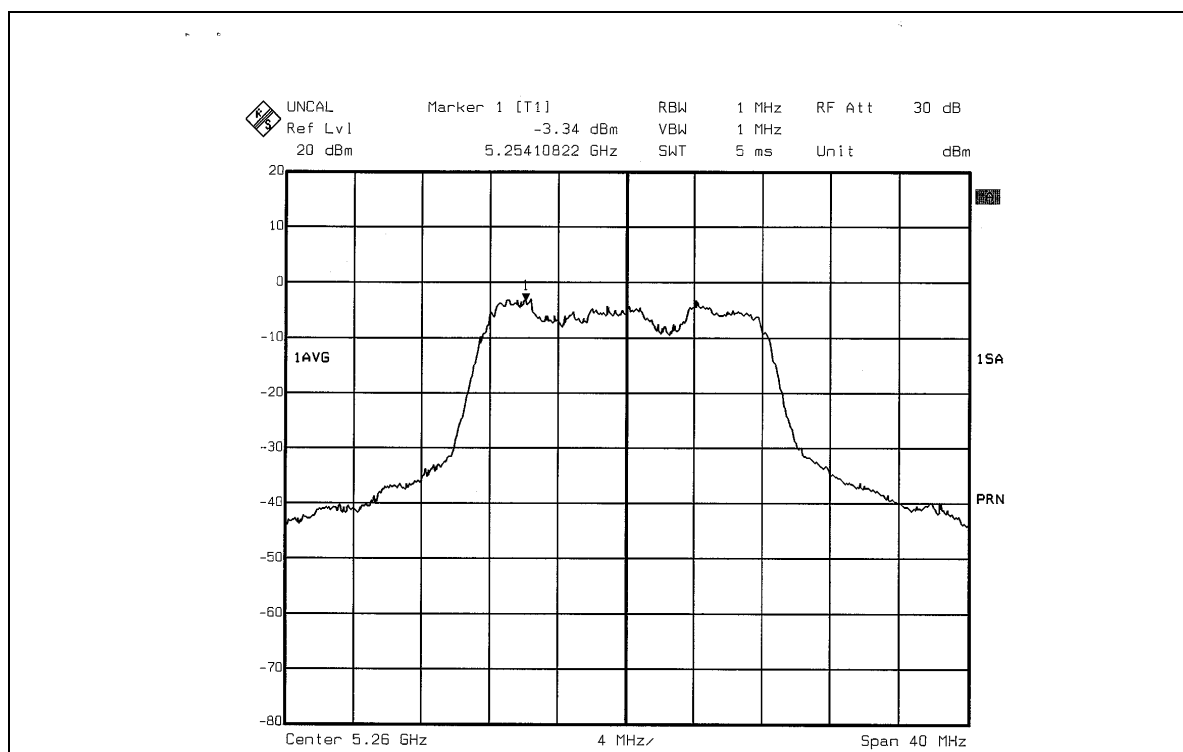
CH 1



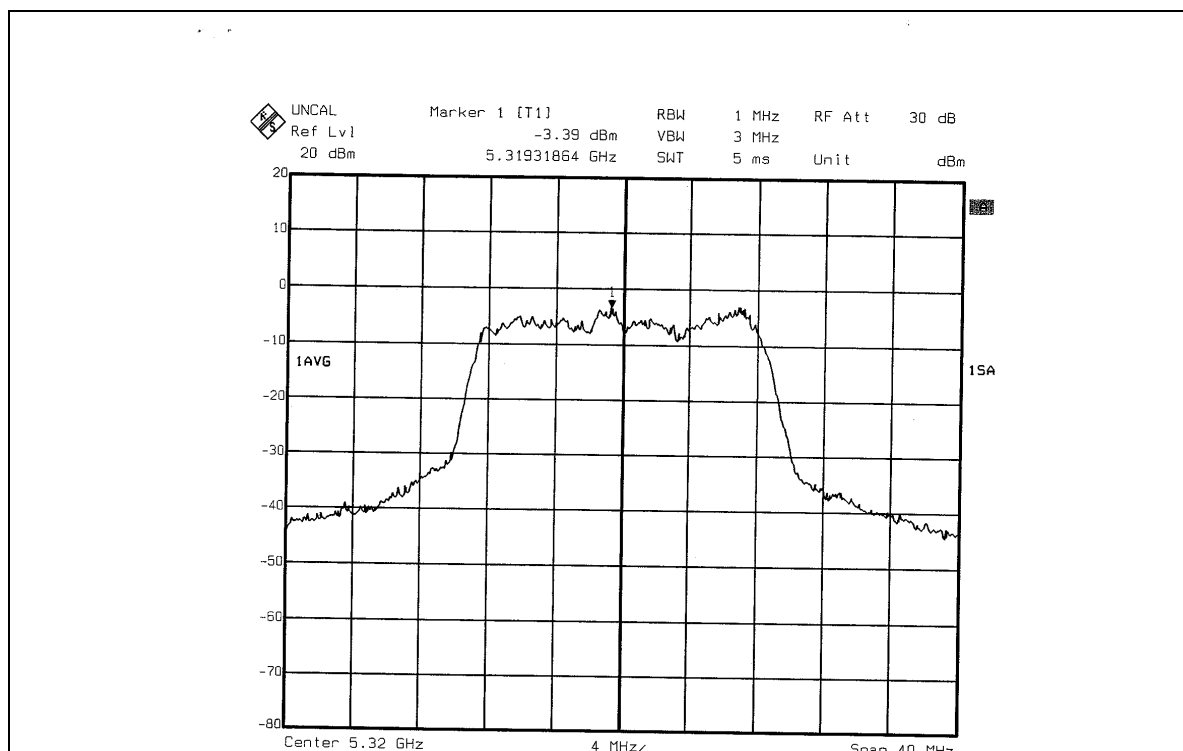
CH 4



CH 5



CH 8



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	Aug. 14, 2006
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jul. 18, 2006

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

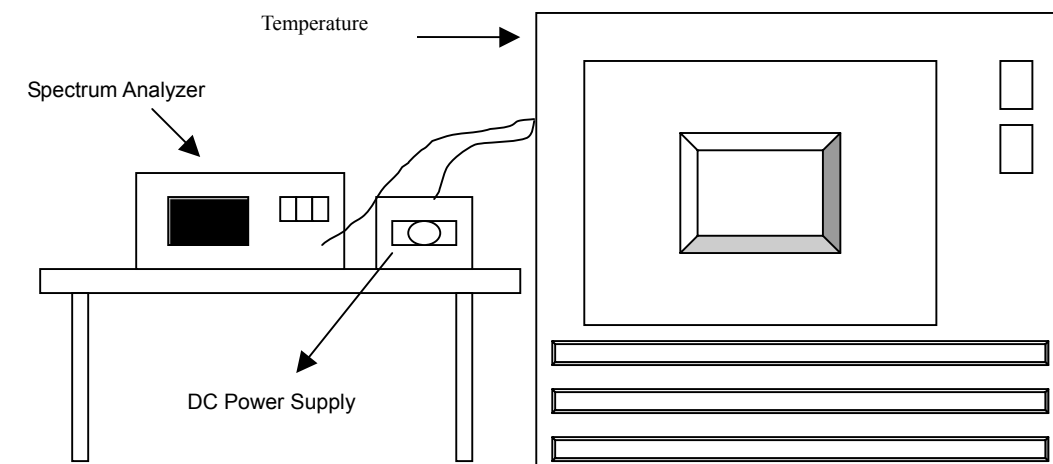
4.6.3 TEST PROCEDURE

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	126.5	5319.9881	-0.0002237	5319.9884	-0.0002180	5319.9886	-0.0002143	5319.9887	-0.0002124
	110.0	5319.9866	-0.0002519	5319.9869	-0.0002462	5319.9860	-0.0002632	5319.9861	-0.0002613
	93.5	5319.9853	-0.0002763	5319.9851	-0.0002801	5319.9852	-0.0002782	5319.9858	-0.0002669
40	126.5	5319.9931	-0.0001297	5319.9939	-0.0001147	5319.9938	-0.0001165	5319.9935	-0.0001222
	110.0	5319.9975	-0.0000470	5319.9978	-0.0000414	5319.9971	-0.0000545	5319.9976	-0.0000451
	93.5	5319.9994	-0.0000113	5319.9990	-0.0000188	5319.9993	-0.0000132	5319.9994	-0.0000113
30	126.5	5320.0011	0.0000207	5320.0013	0.0000244	5320.0010	0.0000188	5320.0011	0.0000207
	110.0	5320.0015	0.0000282	5320.0016	0.0000301	5320.0017	0.0000320	5320.0018	0.0000338
	93.5	5320.0013	0.0000244	5320.0014	0.0000263	5320.0015	0.0000282	5320.0016	0.0000301
20	126.5	5320.0068	0.0001278	5320.0061	0.0001147	5320.0065	0.0001222	5320.0060	0.0001128
	110.0	5320.0062	0.0001165	5320.0060	0.0001128	5320.0063	0.0001184	5320.0073	0.0001372
	93.5	5320.0071	0.0001G33 5	5320.0074	0.0001391	5320.0076	0.0001429	5320.0077	0.0001447
10	126.5	5320.0102	0.0001917	5320.0109	0.0002049	5320.0110	0.0002068	5320.0104	0.0001955
	110.0	5320.0105	0.0001974	5320.0109	0.0002049	5320.0108	0.0002030	5320.0103	0.0001936
	93.5	5320.0100	0.0001880	5320.0108	0.0002030	5320.0107	0.0002011	5320.0108	0.0002030
0	126.5	5320.0123	0.0002312	5320.0121	0.0002274	5320.0121	0.0002274	5320.0122	0.0002293
	110.0	5320.0124	0.0002331	5320.0124	0.0002331	5320.0125	0.0002350	5320.0128	0.0002406
	93.5	5320.0139	0.0002613	5320.0132	0.0002481	5320.0125	0.0002350	5320.0131	0.0002462
-10	126.5	5320.0152	0.0002857	5320.0155	0.0002914	5320.0153	0.0002876	5320.0156	0.0002932
	110.0	5320.0141	0.0002650	5320.0142	0.0002669	5320.0149	0.0002801	5320.0148	0.0002782
	93.5	5320.0160	0.0003008	5320.0159	0.0002989	5320.0162	0.0003045	5320.0168	0.0003158
-20	126.5	5320.0201	0.0003778	5320.0203	0.0003816	5320.0210	0.0003947	5320.0208	0.0003910
	110.0	5320.0218	0.0004098	5320.0216	0.0004060	5320.0214	0.0004023	5320.0213	0.0004004
	93.5	5320.0219	0.0004117	5320.0217	0.0004079	5320.0220	0.0004135	5320.0221	0.0004154
-30	126.5	5320.0285	0.0005357	5320.0292	0.0005489	5320.0285	0.0005357	5320.0293	0.0005508
	110.0	5320.0292	0.0005489	5320.0293	0.0005508	5320.0291	0.0005470	5320.0298	0.0005602
	93.5	5320.0294	0.0005526	5320.0299	0.0005620	5320.0293	0.0005508	5320.0297	0.0005583



4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006

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=1kHz) are attached on the following pages.

802.11a OFDM modulation

Channel 1 (5180MHz)

The band edge emission plot on the next page shows 44.59dBc 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 107.58dBuV/m (Peak), so the maximum field strength in restrict band is $107.58-44.59=62.99$ dBuV/m which is under 74dBuV/m limit.

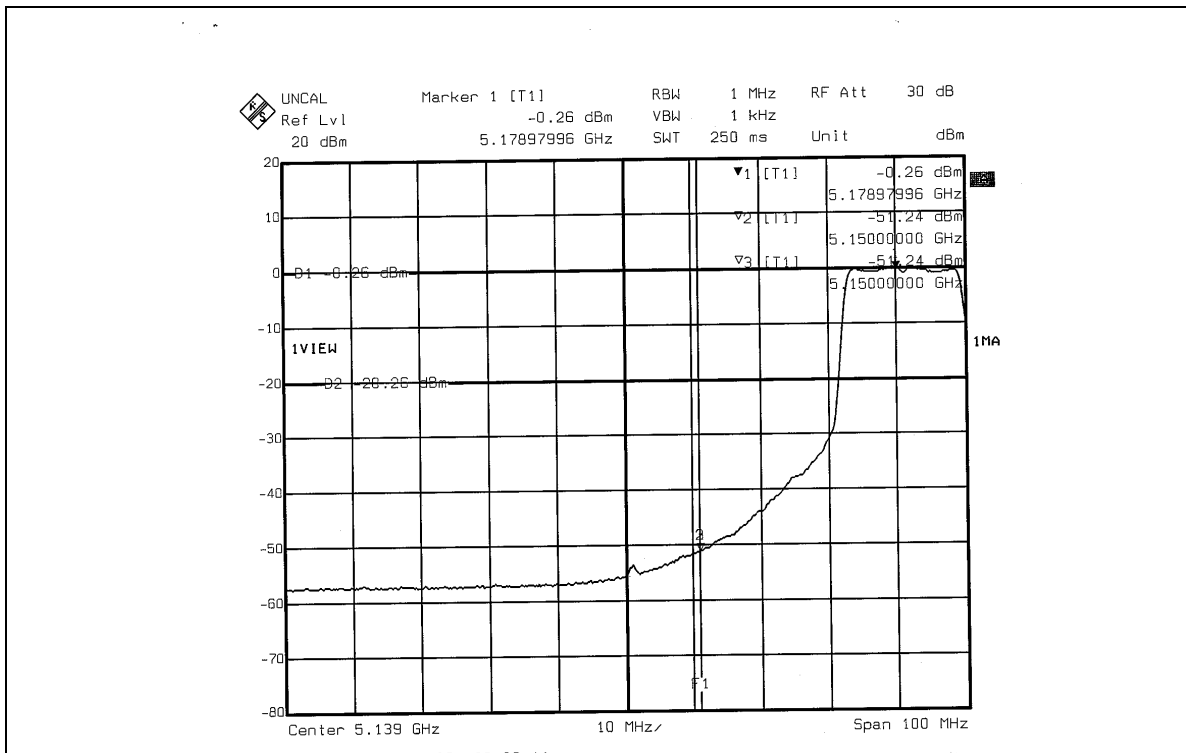
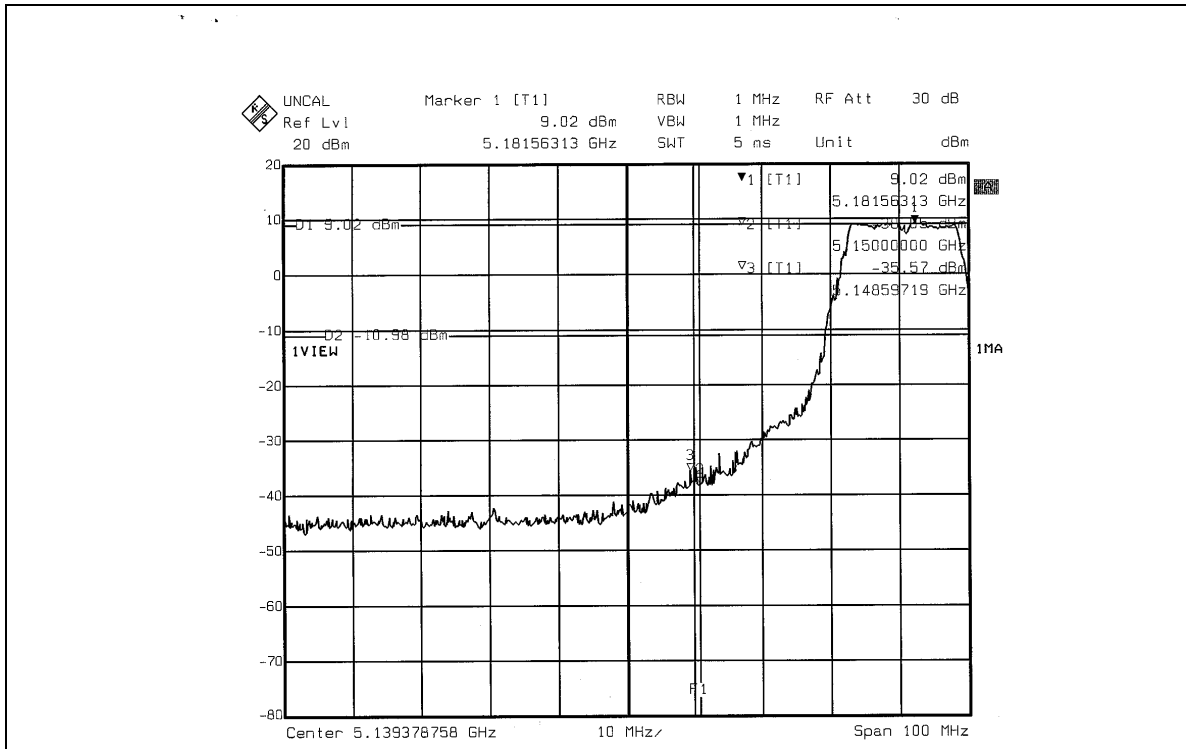
The band edge emission plot on the next page shows 50.98dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 98.41dBuV/m (Average), so the maximum field strength in restrict band is $98.41-50.98=47.43$ dBuV/m which is under 54dBuV/m limit.

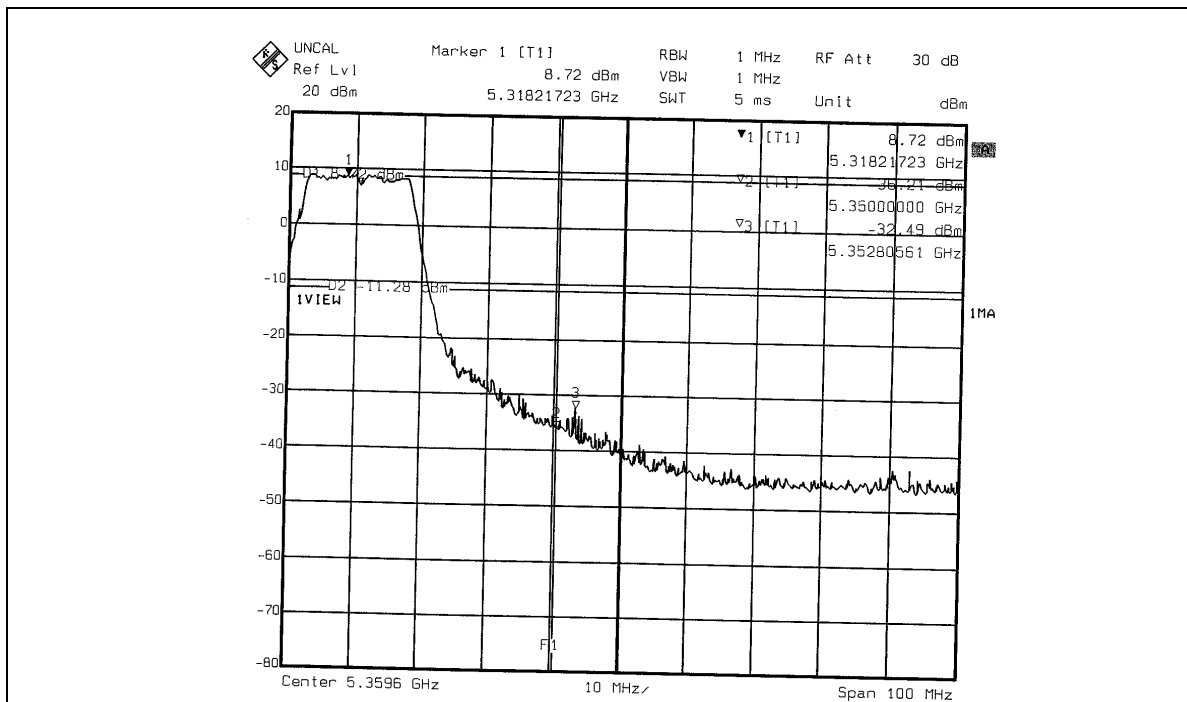
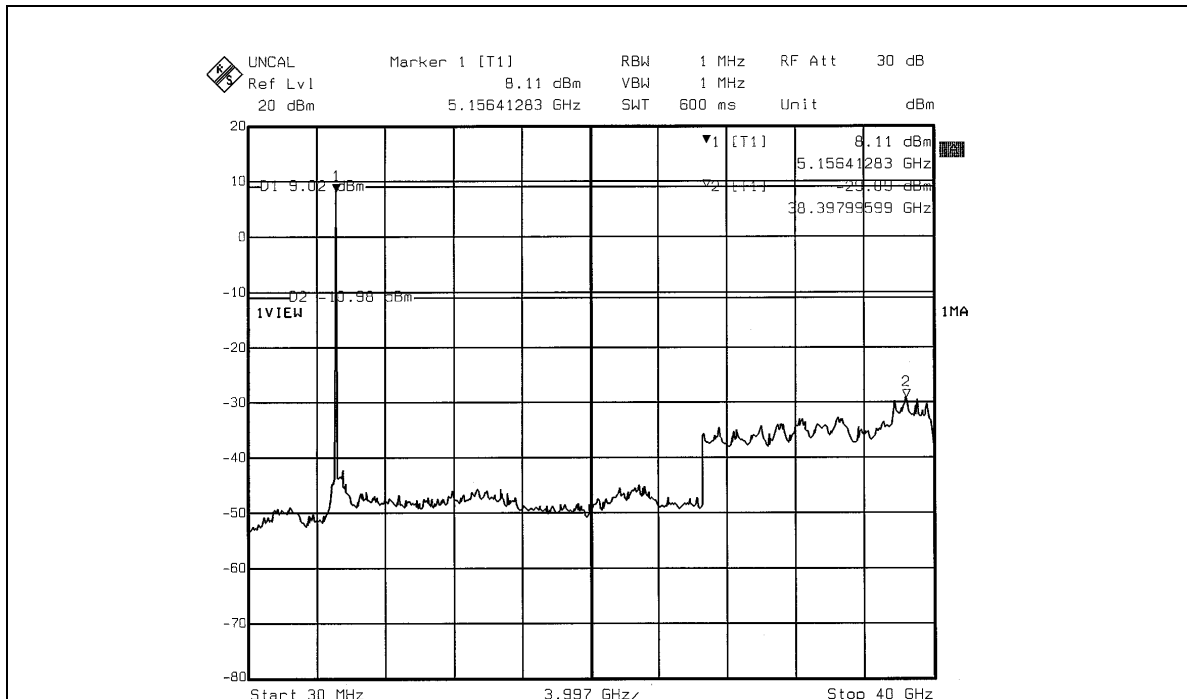
Channel 8 (5320MHz)

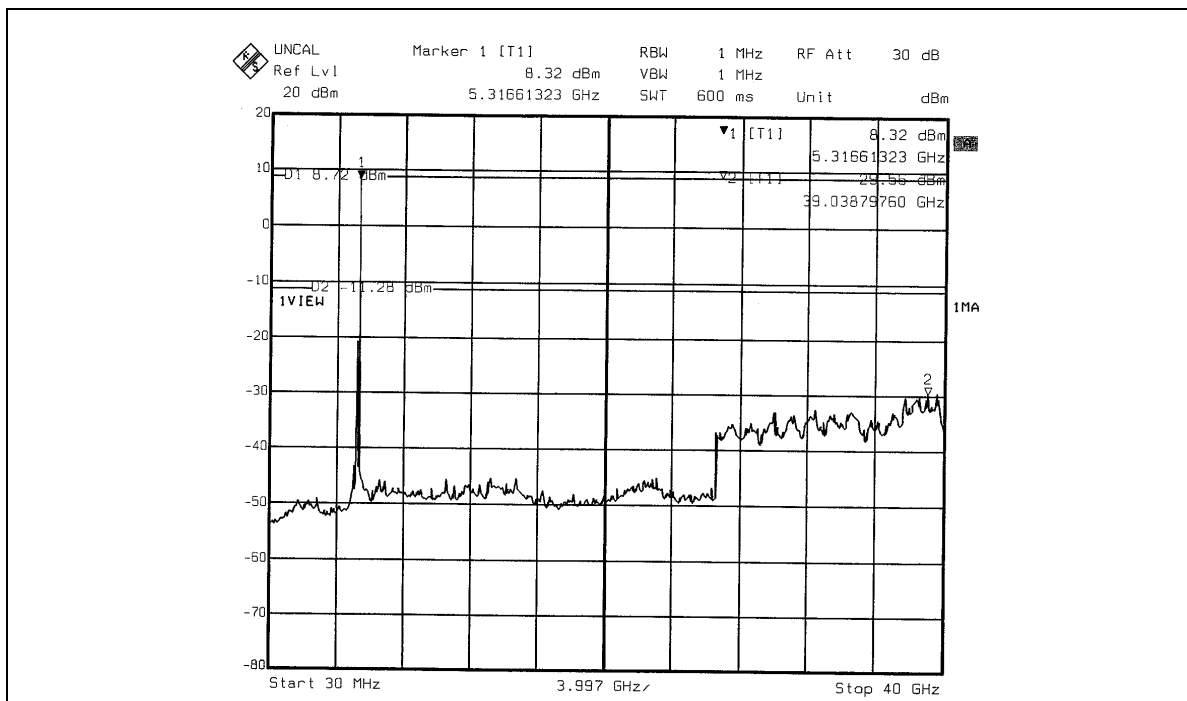
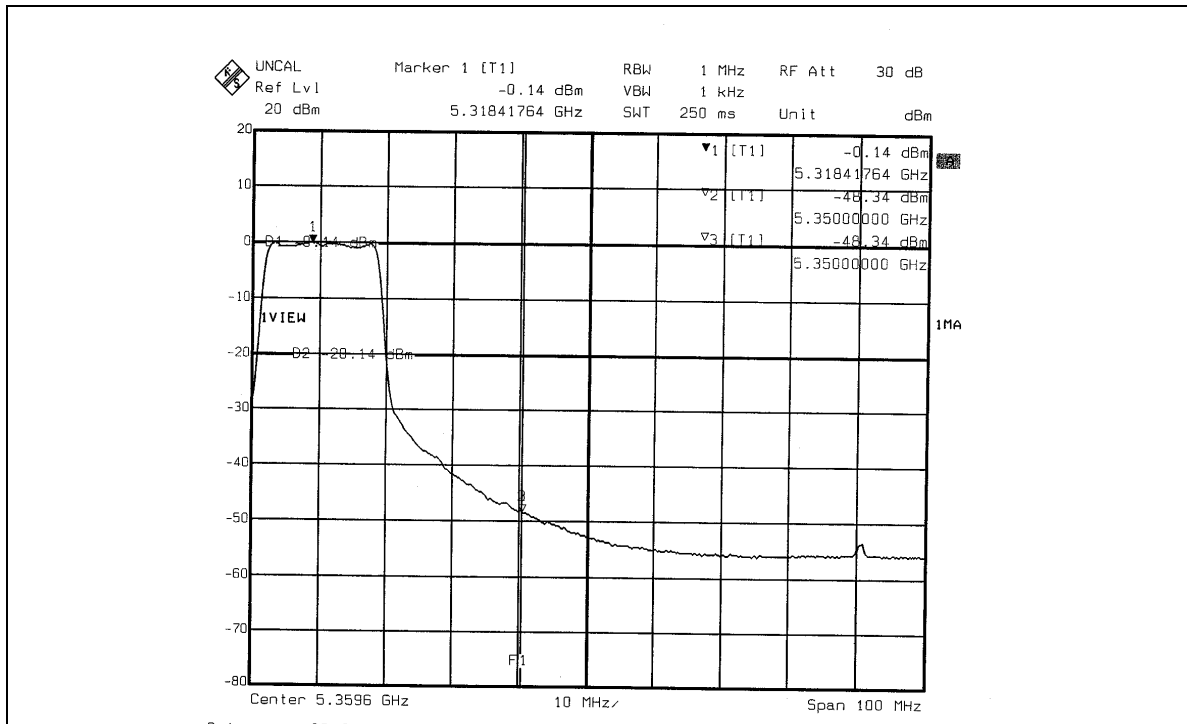
The band edge emission plot on the next second page shows 41.21dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 108.29dBuV/m (Peak), so the maximum field strength in restrict band is $108.29-41.21=67.08$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 48.20dBc 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 98.14dBuV/m (Average), so the maximum field strength in restrict band is $98.14-48.20=49.94$ dBuV/m which is under 54dBuV/m limit.

802.11a 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 PIFA antenna with UFL connector. The maximum Gain with cable loss of the antenna is -4.08dBi .

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

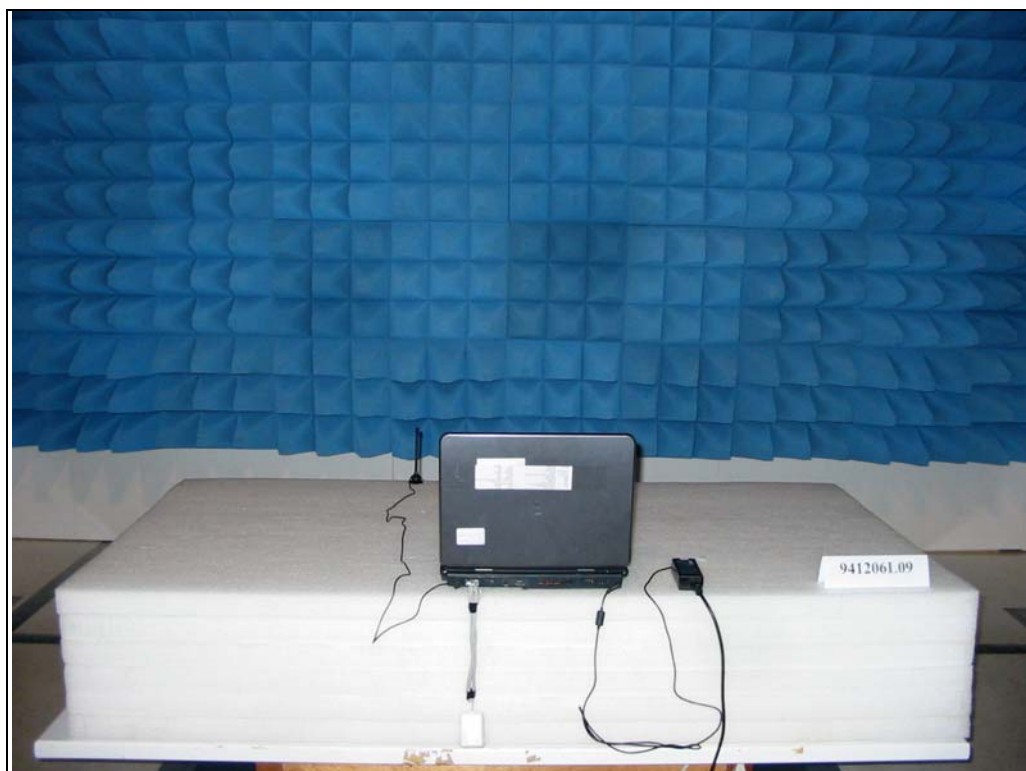
MODE A



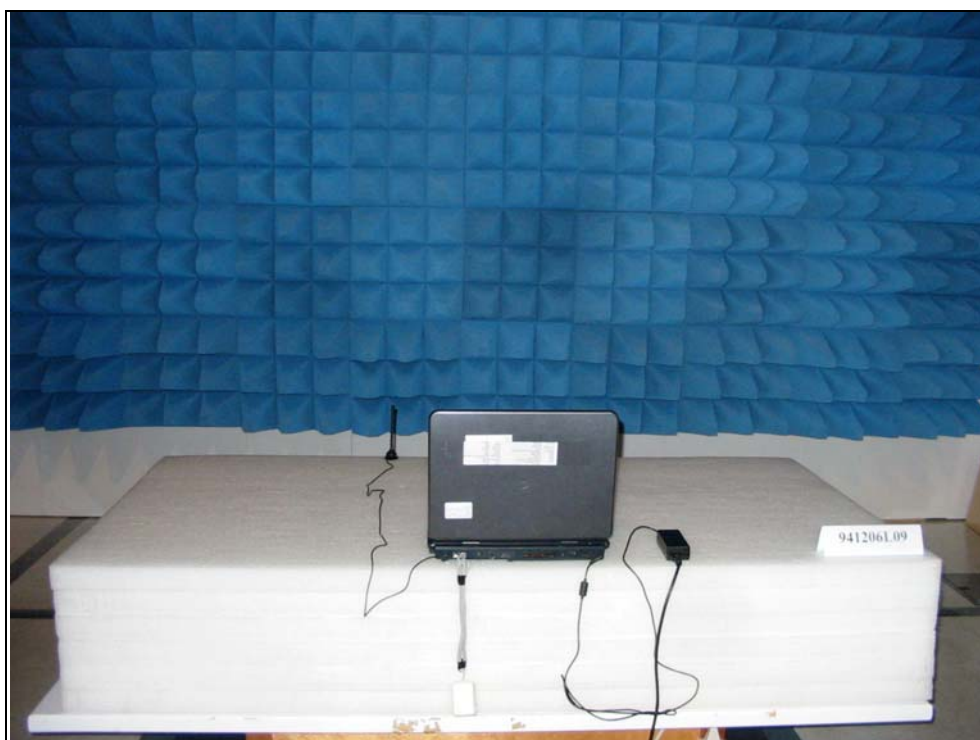
MODE B



RADIATED EMISSION TEST MODE A



MODE B





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, 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



APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.