

FCC TEST REPORT (15.247)

REPORT NO.: RF950609L14
MODEL NO.: WMIA-166AG(R)
RECEIVED: Apr. 05, 2006
TESTED: Apr. 05 ~ Jun. 30, 2006
ISSUED: Jul. 04, 2006

APPLICANT: Gemtek Technology Co., Ltd.

ADDRESS: No.1, Jen Ai Road, Hsinchu Industrial Park,
Hukou Hsinchu, Taiwan, R.O.C. 303

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 120 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.....	5
2.	SUMMARY OF TEST RESULTS.....	6
2.1	MEASUREMENT uncertainty	6
3.	GENERAL INFORMATION	7
3.1	GENERAL DESCRIPTION OF EUT	7
3.2	DESCRIPTION OF TEST MODES	8
3.2.1	CONFIGURATION OF SYSTEM UNDER TEST	9
3.2.2	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:	10
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	14
3.4	DESCRIPTION OF SUPPORT UNITS.....	14
4.	TEST TYPES AND RESULTS (802.11b & g 2412~2462MHz Band)	15
4.1	CONDUCTED EMISSION MEASUREMENT	15
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	15
4.1.2	TEST INSTRUMENTS.....	15
4.1.3	TEST PROCEDURES	16
4.1.4	DEVIATION FROM TEST STANDARD	16
4.1.5	TEST SETUP	17
4.1.6	EUT OPERATING CONDITIONS.....	17
4.1.7	TEST RESULTS	18
4.2	Radiated Emission Measurement	26
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	26
4.2.2	TEST INSTRUMENTS.....	27
4.2.3	TEST PROCEDURES	28
4.2.4	DEVIATION FROM TEST STANDARD	28
4.2.5	TEST SETUP	29
4.2.6	EUT OPERATING CONDITIONS.....	29
4.2.7	TEST RESULTS	30
4.3	6dB BANDWIDTH MEASUREMENT	39
4.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	39
4.3.2	TEST INSTRUMENTS.....	39
4.3.3	TEST PROCEDURE.....	40
4.3.4	DEVIATION FROM TEST STANDARD	40
4.3.5	TEST SETUP	40
4.3.6	EUT OPERATING CONDITIONS.....	40
4.3.7	TEST RESULTS	41
4.4	MAXIMUM PEAK OUTPUT POWER.....	49
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	49
4.4.2	INSTRUMENTS.....	49
4.4.1	TEST PROCEDURES	50
4.4.2	DEVIATION FROM TEST STANDARD	50
4.4.3	TEST SETUP	50
4.4.4	EUT OPERATING CONDITIONS.....	50

4.4.3	TEST RESULTS	51
4.5	POWER SPECTRAL DENSITY MEASUREMENT	52
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	52
4.5.2	TEST INSTRUMENTS	52
4.5.3	TEST PROCEDURE	53
4.5.4	DEVIATION FROM TEST STANDARD	53
4.5.5	TEST SETUP	53
4.5.6	EUT OPERATING CONDITION	53
4.5.7	TEST RESULTS	54
4.6	BAND EDGES MEASUREMENT	62
4.6.1	LIMITS OF BAND EDGES MEASUREMENT	62
4.6.2	TEST INSTRUMENTS	62
4.6.3	TEST PROCEDURE	62
4.6.4	DEVIATION FROM TEST STANDARD	62
4.6.5	EUT OPERATING CONDITION	62
4.6.6	TEST RESULTS	63
4.7	ANTENNA REQUIREMENT	75
4.7.1	STANDARD APPLICABLE	75
4.7.2	ANTENNA CONNECTED CONSTRUCTION	75
5.	TEST TYPES AND RESULTS (802.11a 5725~5850MHz Band)	76
5.1	CONDUCTED EMISSION MEASUREMENT	76
5.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	76
5.1.2	TEST INSTRUMENTS	76
5.1.3	TEST PROCEDURES	77
5.1.4	DEVIATION FROM TEST STANDARD	77
5.1.5	TEST SETUP	78
5.1.6	EUT OPERATING CONDITIONS	78
5.1.7	TEST RESULTS	79
5.2	Radiated Emission Measurement	81
5.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	81
5.2.2	TEST INSTRUMENTS	82
5.2.3	TEST PROCEDURES	83
5.2.4	DEVIATION FROM TEST STANDARD	83
5.2.5	TEST SETUP	84
5.2.6	EUT OPERATING CONDITIONS	84
5.2.7	TEST RESULTS	85
5.3	6dB BANDWIDTH MEASUREMENT	92
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT	92
5.3.2	TEST INSTRUMENTS	92
5.3.3	TEST PROCEDURE	93
5.3.4	DEVIATION FROM TEST STANDARD	93
5.3.5	TEST SETUP	93
5.3.6	EUT OPERATING CONDITIONS	93
5.3.7	TEST RESULTS	94

5.4	MAXIMUM PEAK OUTPUT POWER	99
5.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	99
5.4.2	INSTRUMENTS	99
5.4.3	TEST PROCEDURES	100
5.4.4	DEVIATION FROM TEST STANDARD	100
5.4.5	TEST SETUP	100
5.4.6	EUT OPERATING CONDITIONS	100
5.4.7	TEST RESULTS	101
5.5	POWER SPECTRAL DENSITY MEASUREMENT	102
5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	102
5.5.2	TEST INSTRUMENTS	102
5.5.3	TEST PROCEDURE	103
5.5.4	DEVIATION FROM TEST STANDARD	103
5.5.5	TEST SETUP	103
5.5.6	EUT OPERATING CONDITION	103
5.5.7	TEST RESULTS	104
5.6	BAND EDGES MEASUREMENT	109
5.6.1	LIMITS OF BAND EDGES MEASUREMENT	109
5.6.2	TEST INSTRUMENTS	109
5.6.3	TEST PROCEDURE	109
5.6.4	DEVIATION FROM TEST STANDARD	109
5.6.5	EUT OPERATING CONDITION	110
5.6.6	TEST RESULTS	110
5.7	ANTENNA REQUIREMENT	117
5.7.1	STANDARD APPLICABLE	117
5.7.2	ANTENNA CONNECTED CONSTRUCTION	117
6.	INFORMATION ON THE TESTING LABORATORIES	118
	APPENDIX-A..	A-1

1. CERTIFICATION

PRODUCT: 11A/G mini PCI module
MODEL NO.: WMIA-166AG(R)
APPLICANT: Gemtek Technology Co., Ltd.
BRAND NAME: Gemtek
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Apr. 05 ~ Jun. 30, 2006
STANDARDS: FCC Part 15, Subpart C (Section 15.247),
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 Wendy Liao , **DATE:** Jul. 04, 2006
(Wendy Liao)

TECHNICAL
ACCEPTANCE : Long Chen , **DATE:** Jul. 04, 2006
Responsible for RF (Long Chen)

APPROVED BY : Gary Chang , **DATE:** Jul. 04, 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 C (Section 15.247)			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -16.91dB at 0.150MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit : min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.33dB at 2483.50MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

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

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

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	11A/G mini PCI module
MODEL NO.	WMIA-166AG(R)
FCC ID	MXF-M950606AG
POWER SUPPLY	3.3Vdc from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK 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 (up to 108Mbps in 802.11g & 802.11a turbo mode)
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 for Normal mode / 1 for Turbo mode 802.11a: 13 for Normal mode / 5 for Turbo mode
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz for Normal mode / 40MHz for Turbo mode
OUTPUT POWER	79.433mW for 802.11b 126.183mW for 802.11g 25.586mW for 5.150 ~ 5.350GHz 100.925mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	Dipole antenna with 4dBi gain for 2.4GHz Dipole antenna with 5dBi gain for 5GHz
DATA CABLE	NA
I/O PORTS	NA

NOTE:

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
2. The EUT is capable of providing data rates of up to 108Mbps in 802.11g & 802.11a turbo mode depending upon reception quality.
3. 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 2400 ~ 2483.5MHz band:

For 802.11b/g: Eleven channels are provided to this EUT for normal mode.

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

For 802.11g: One channel is provided to this EUT for turbo mode.

Channel	Frequency
6	2437 MHz

Operated in 5725 ~ 5850MHz band:

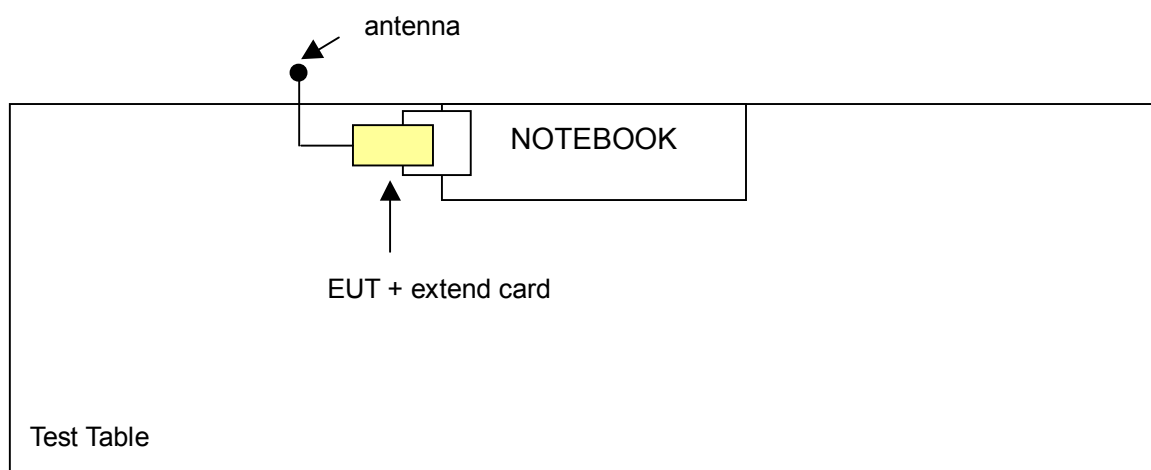
For 802.11a: Five channels are provided to this EUT for normal mode.

Channel	Frequency
1	5745 MHz
2	5765 MHz
3	5785 MHz
4	5805 MHz
5	5825 MHz

For 802.11a: Two channels are provided to this EUT for turbo mode.

Channel	Frequency
1	5760 MHz
2	5800 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

For 802.11b/g

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

Where PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates 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)
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	QPSK	12

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.

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

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)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	QPSK	12

Bandedge Measurement:

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

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

Antenna Port Conducted Measurement:

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

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

For 802.11a

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	-

Where PLC: Power Line Conducted Emission
RE≥1G: Radiated Emission above 1GHz

RE<1G RE: Radiated Emission below 1GHz
APCM: Antenna Port Conducted Measurement

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates 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 5	3	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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 5	3	OFDM	BPSK	6
802.11a Turbo	1 to 2	2	OFDM	QPSK	12

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 5	1, 3, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	QPSK	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 5	1, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	QPSK	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 5	1, 3, 5	OFDM	BPSK	6
802.11a Turbo	1 to 2	1, 2	OFDM	QPSK	12

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 C. (15.247)

ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	9954115984	E2K24CLNS

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 (802.11b & g 2412~2462MHz 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	100291	Nov. 11, 2006
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 07, 2007
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.

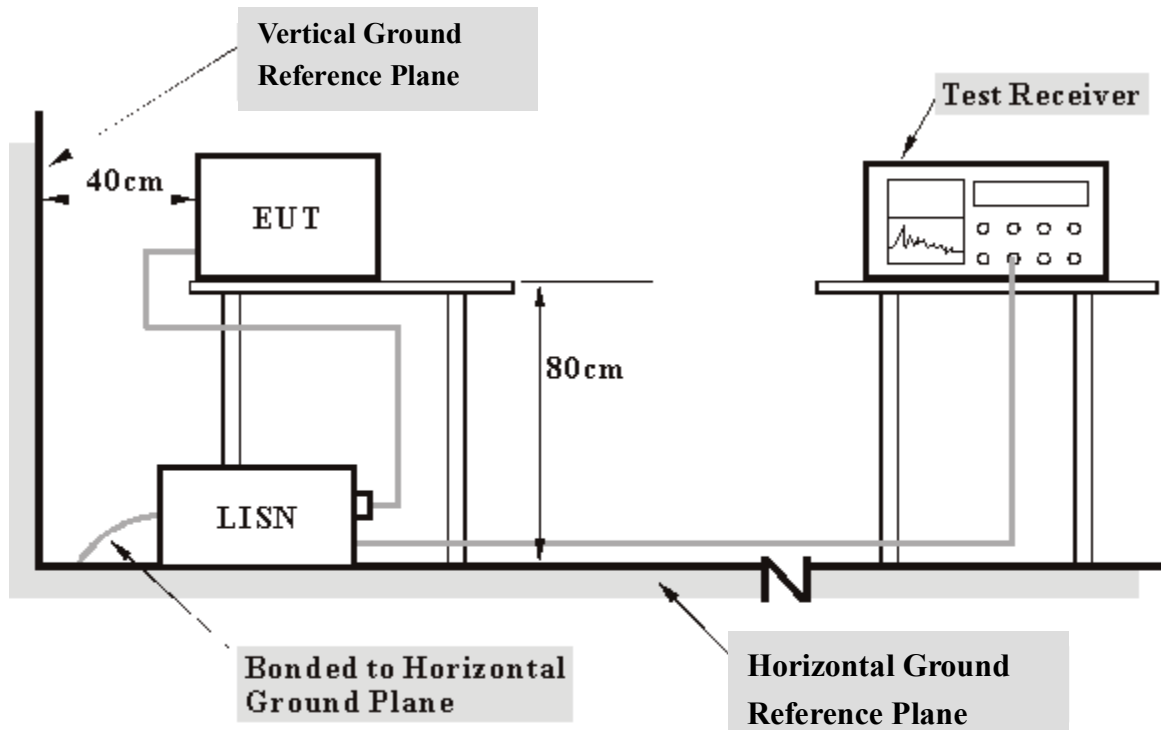
4.1.3 TEST PROCEDURES

- 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

- Connected the EUT into the notebook system and placed on a testing table.
- The computer system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The notebook system displayed “H” messages on its screen.
- Repeated item c.

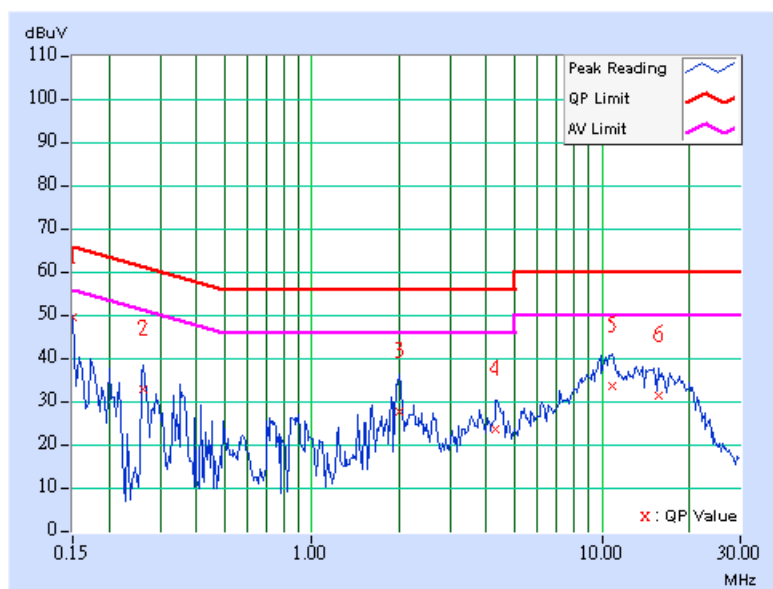
4.1.7 TEST RESULTS

Conducted Worst-Case Data (Normal mode)

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

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	0.150	0.10	48.99	-	49.09	-	66.00	56.00	-16.91	-
2	0.263	0.10	32.20	-	32.30	-	61.33	51.33	-29.03	-
3	2.000	0.20	27.06	-	27.26	-	56.00	46.00	-28.74	-
4	4.281	0.47	23.03	-	23.50	-	56.00	46.00	-32.50	-
5	10.840	0.49	33.23	-	33.72	-	60.00	50.00	-26.28	-
6	15.664	0.66	30.89	-	31.55	-	60.00	50.00	-28.45	-

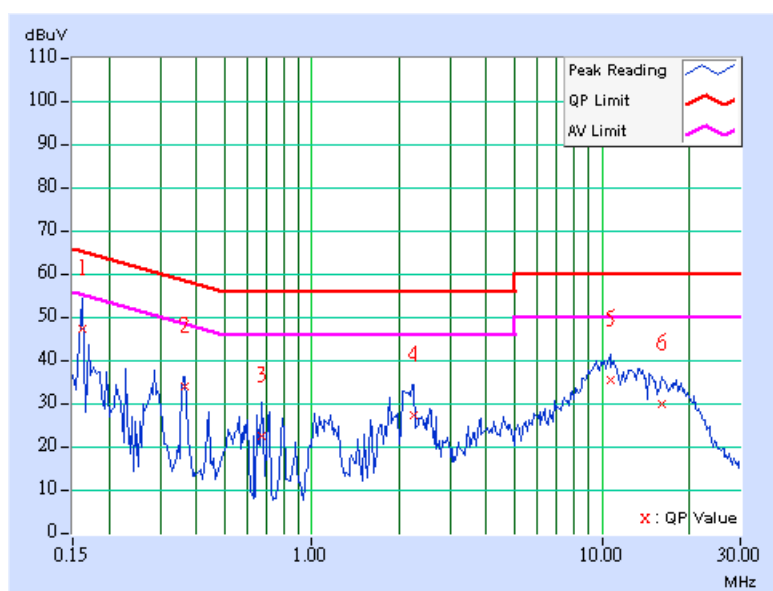
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 1	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.162	0.10	46.80	-	46.90	-	65.38	55.38	-18.48	-
2	0.365	0.10	33.63	-	33.73	-	58.62	48.62	-24.89	-
3	0.673	0.10	21.86	-	21.96	-	56.00	46.00	-34.04	-
4	2.238	0.22	26.92	-	27.14	-	56.00	46.00	-28.86	-
5	10.668	0.47	34.82	-	35.29	-	60.00	50.00	-24.71	-
6	16.094	0.55	29.58	-	30.13	-	60.00	50.00	-29.87	-

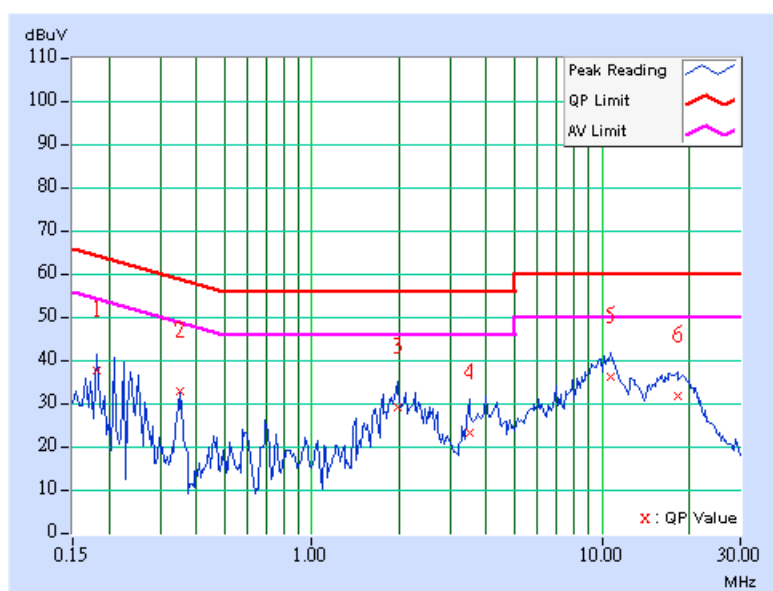
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 6	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	37.01	-	37.11	-	64.43	54.43	-27.32	-
2	0.349	0.10	32.23	-	32.33	-	58.98	48.98	-26.65	-
3	1.973	0.20	28.43	-	28.63	-	56.00	46.00	-27.37	-
4	3.504	0.40	22.67	-	23.07	-	56.00	46.00	-32.93	-
5	10.762	0.49	35.58	-	36.07	-	60.00	50.00	-23.93	-
6	18.336	0.76	30.96	-	31.72	-	60.00	50.00	-28.28	-

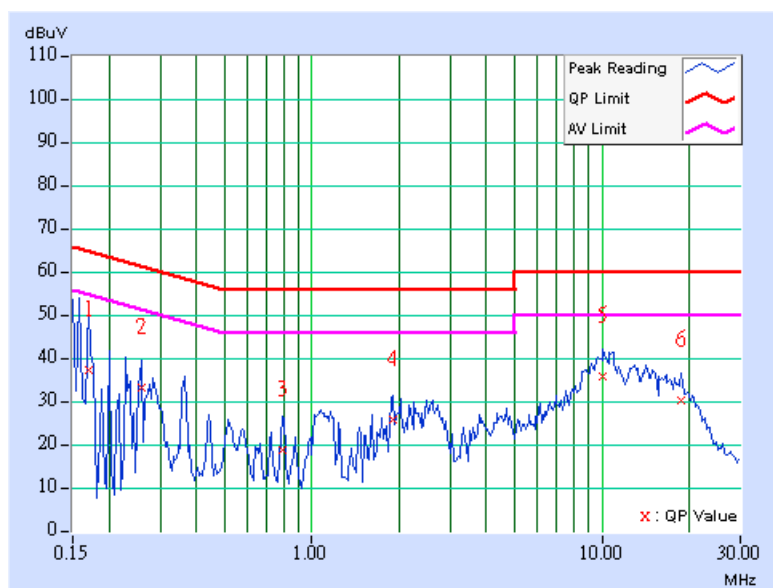
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 6	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.170	0.10	36.75	-	36.85	-	64.98	54.98	-28.13	-
2	0.258	0.10	32.85	-	32.95	-	61.49	51.49	-28.54	-
3	0.791	0.10	18.40	-	18.50	-	56.00	46.00	-37.50	-
4	1.895	0.19	25.46	-	25.65	-	56.00	46.00	-30.35	-
5	10.016	0.46	35.31	-	35.77	-	60.00	50.00	-24.23	-
6	18.750	0.61	29.72	-	30.33	-	60.00	50.00	-29.67	-

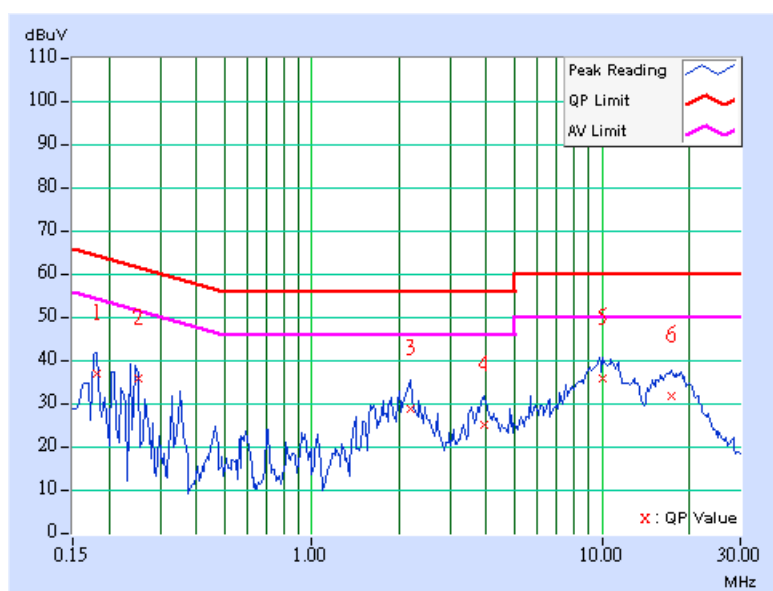
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	36.16	-	36.26	-	64.43	54.43	-28.17	-
2	0.252	0.10	35.02	-	35.12	-	61.71	51.71	-26.59	-
3	2.191	0.23	28.11	-	28.34	-	56.00	46.00	-27.66	-
4	3.922	0.46	24.60	-	25.06	-	56.00	46.00	-30.94	-
5	10.047	0.46	35.27	-	35.73	-	60.00	50.00	-24.27	-
6	17.344	0.72	31.25	-	31.97	-	60.00	50.00	-28.03	-

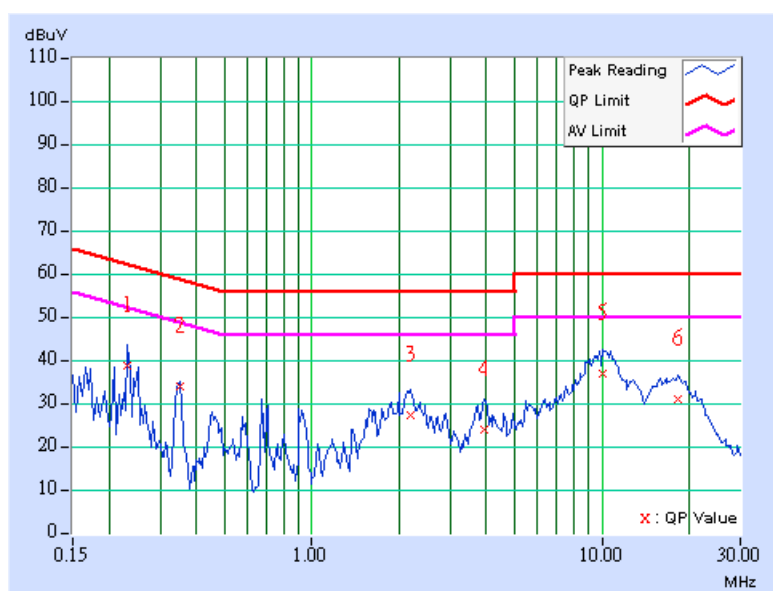
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 11	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.232	0.10	38.11	-	38.21	-	62.38	52.38	-24.17	-
2	0.349	0.10	33.62	-	33.72	-	58.98	48.98	-25.26	-
3	2.188	0.22	26.72	-	26.94	-	56.00	46.00	-29.06	-
4	3.930	0.36	23.50	-	23.86	-	56.00	46.00	-32.14	-
5	10.105	0.46	36.51	-	36.97	-	60.00	50.00	-23.03	-
6	18.273	0.60	30.57	-	31.17	-	60.00	50.00	-28.83	-

- 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.

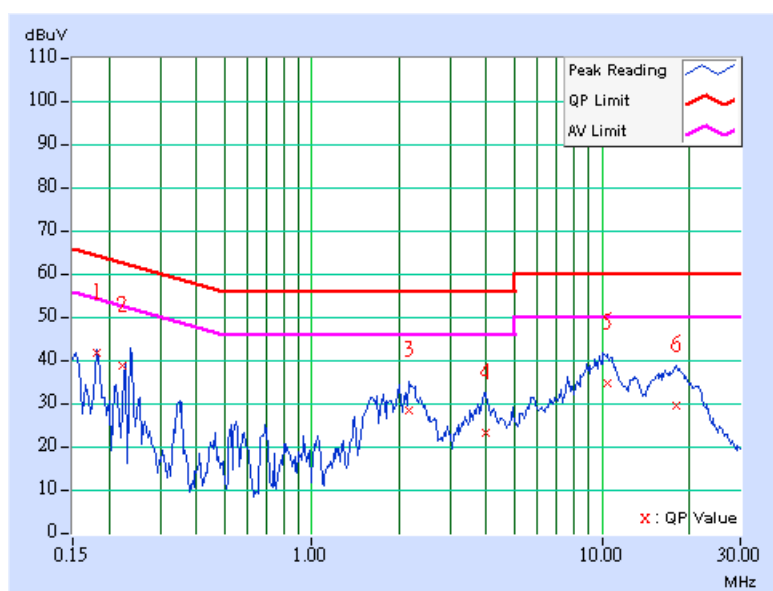


Conducted Worst-Case Data (Turbo mode)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	PHASE	Line 1
MODULATION TYPE	QPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.10	40.95	-	41.05	-	64.43	54.43	-23.38	-
2	0.222	0.10	38.10	-	38.20	-	62.75	52.75	-24.55	-
3	2.156	0.22	27.92	-	28.14	-	56.00	46.00	-27.86	-
4	3.973	0.47	22.70	-	23.17	-	56.00	46.00	-32.83	-
5	10.438	0.47	33.99	-	34.46	-	60.00	50.00	-25.54	-
6	18.020	0.75	28.96	-	29.71	-	60.00	50.00	-30.29	-

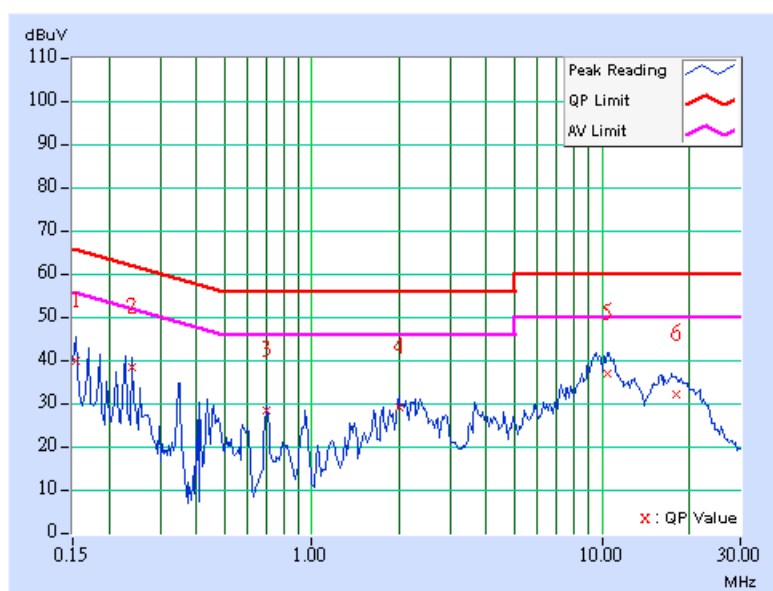
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 6	PHASE	Line 2
MODULATION TYPE	QPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.10	39.29	-	39.39	-	65.79	55.79	-26.40	-
2	0.240	0.10	37.97	-	38.07	-	62.10	52.10	-24.03	-
3	0.701	0.10	27.75	-	27.85	-	56.00	46.00	-28.15	-
4	2.000	0.20	28.73	-	28.93	-	56.00	46.00	-27.07	-
5	10.418	0.47	36.43	-	36.90	-	60.00	50.00	-23.10	-
6	17.980	0.59	31.73	-	32.32	-	60.00	50.00	-27.68	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 01, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 04, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 01, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 19, 2007
Preamplifier Agilent	8449B	3008A01960	Nov. 09, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219268/4	Dec. 20, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	230129/4	Dec. 20, 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	900619	Nov. 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.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 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.

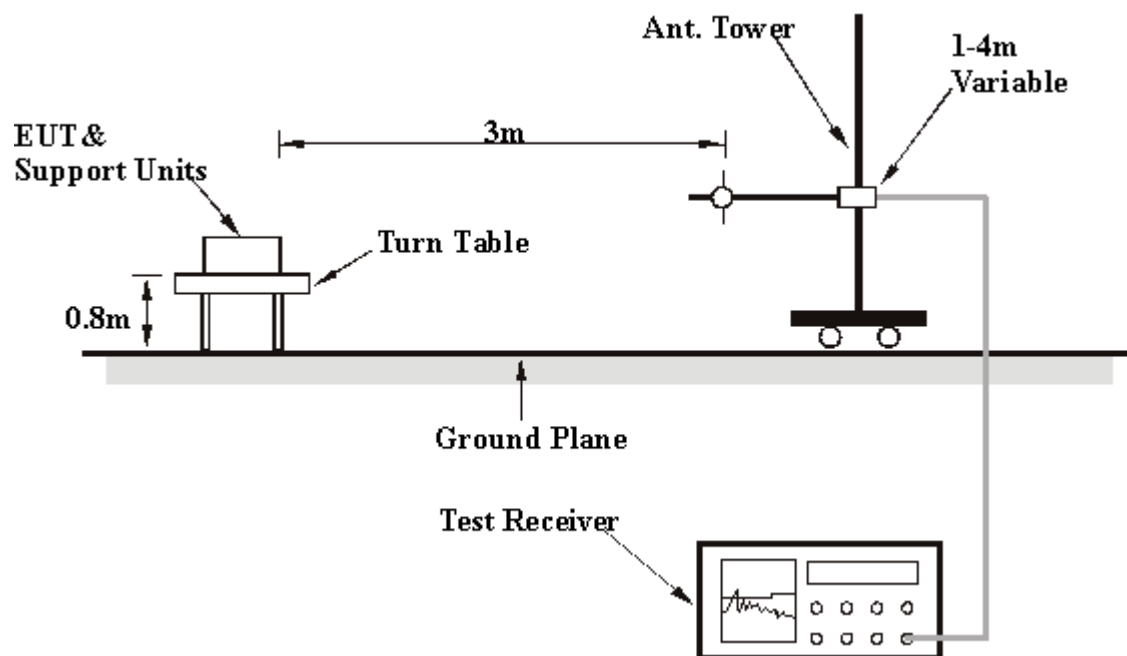
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

Below 1GHz Worst-Case Data (Normal mode)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24eg. C, 64RH, 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	133.03	41.33 QP	43.50	-2.17	1.25 H	46	28.78	12.55
2	166.07	42.08 QP	43.50	-1.42	1.50 H	46	29.25	12.83
3	199.12	41.90 QP	43.50	-1.60	1.25 H	46	31.09	10.81
4	232.16	38.13 QP	46.00	-7.87	1.00 H	196	26.29	11.84
5	265.21	39.13 QP	46.00	-6.87	1.00 H	181	25.83	13.31
6	331.30	38.28 QP	46.00	-7.72	1.00 H	184	22.42	15.86

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	133.03	35.31 QP	43.50	-8.19	1.25 V	10	22.76	12.55
2	166.07	34.06 QP	43.50	-9.44	1.00 V	211	21.23	12.83
3	199.12	34.73 QP	43.50	-8.77	1.00 V	142	23.92	10.81
4	331.30	30.25 QP	46.00	-15.75	1.25 V	70	14.39	15.86
5	399.34	28.52 QP	46.00	-17.48	1.25 V	64	10.74	17.78
6	739.52	30.79 QP	46.00	-15.21	1.00 V	106	5.35	25.44

- 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 (Turbo mode)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	QPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	24eg. C, 64RH, 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	133.03	35.01 QP	43.50	-8.49	1.25 H	166	22.46	12.55
2	164.13	36.42 QP	43.50	-7.08	1.00 H	22	23.45	12.97
3	199.12	41.38 QP	43.50	-2.12	1.00 H	88	30.57	10.81
4	232.16	37.36 QP	46.00	-8.64	1.00 H	166	25.52	11.84
5	267.15	41.41 QP	46.00	-4.59	1.50 H	85	27.78	13.63
6	331.30	39.71 QP	46.00	-6.29	1.00 H	169	23.85	15.86

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	99.98	31.90 QP	43.50	-11.60	1.25 V	331	22.91	9.00
2	133.03	31.67 QP	43.50	-11.83	1.00 V	175	19.12	12.55
3	199.12	31.59 QP	43.50	-11.91	1.00 V	169	20.78	10.81
4	265.21	29.25 QP	46.00	-16.75	1.25 V	112	15.95	13.31
5	333.25	30.34 QP	46.00	-15.66	1.25 V	130	14.45	15.89
6	517.92	28.67 QP	46.00	-17.33	1.00 V	136	8.35	20.32

REMARKS:

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

802.11b DSSS modulation

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	2390.00	42.38 PK	74.00	-31.62	1.02 H	167	10.28	32.10
1	2390.00	39.54 AV	54.00	-14.46	1.02 H	167	7.44	32.10
2	*2412.00	96.45 PK			1.02 H	167	64.27	32.18
2	*2412.00	93.61 AV			1.02 H	167	61.43	32.18
3	3216.00	46.11 PK	74.00	-27.89	1.08 H	9	11.73	34.38
3	3216.00	36.46 AV	54.00	-17.54	1.08 H	9	2.08	34.38
4	4824.00	48.87 PK	74.00	-25.13	1.10 H	211	10.24	38.63
4	4824.00	37.70 AV	54.00	-16.30	1.10 H	211	-0.93	38.63

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	2390.00	58.22 PK	74.00	-15.78	1.59 V	5	26.12	32.10
1	2390.00	48.21 AV	54.00	-5.79	1.59 V	5	16.11	32.10
2	*2412.00	105.92 PK			1.59 V	5	73.74	32.18
2	*2412.00	102.28 AV			1.59 V	5	70.10	32.18
3	3216.00	47.41 PK	74.00	-26.59	1.00 V	96	13.03	34.38
3	3216.00	39.17 AV	54.00	-14.83	1.00 V	96	4.79	34.38
4	4824.00	50.25 PK	74.00	-23.75	1.00 V	201	11.62	38.63
4	4824.00	43.44 AV	54.00	-10.56	1.00 V	201	4.81	38.63

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	*2437.00	98.57 PK			1.05 H	169	66.30	32.27
1	*2437.00	95.76 AV			1.05 H	169	63.49	32.27
2	3248.00	49.57 PK	74.00	-24.43	1.14 H	29	15.16	34.41
2	3248.00	39.98 AV	54.00	-14.02	1.14 H	29	5.57	34.41
3	4874.00	50.96 PK	74.00	-23.04	1.06 H	19	12.19	38.77
3	4874.00	40.17 AV	54.00	-13.83	1.06 H	19	1.40	38.77

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	*2437.00	108.23 PK			1.58 V	13	75.96	32.27
1	*2437.00	104.57 AV			1.58 V	13	72.30	32.27
2	3248.00	47.23 PK	74.00	-26.77	1.14 V	34	12.82	34.41
2	3248.00	40.94 AV	54.00	-13.06	1.14 V	34	6.53	34.41
3	4874.00	55.12 PK	74.00	-18.88	1.13 V	233	16.35	38.77
3	4874.00	50.65 AV	54.00	-3.35	1.13 V	233	11.88	38.77

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	*2462.00	96.56 PK			1.05 H	172	64.20	32.36
1	*2462.00	93.72 AV			1.05 H	172	61.36	32.36
2	2483.50	44.53 PK	74.00	-29.47	1.05 H	172	12.09	32.44
2	2483.50	41.78 AV	54.00	-12.22	1.05 H	172	9.34	32.44
3	3282.00	47.97 PK	74.00	-26.03	1.13 H	17	13.53	34.44
3	3282.00	38.29 AV	54.00	-15.71	1.13 H	17	3.85	34.44
4	4924.00	50.17 PK	74.00	-23.83	1.04 H	198	11.27	38.90
4	4924.00	39.07 AV	54.00	-14.93	1.04 H	198	0.17	38.90

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	*2462.00	106.07 PK			1.60 V	8	73.71	32.36
1	*2462.00	102.40 AV			1.60 V	8	70.04	32.36
2	2483.50	60.47 PK	74.00	-13.53	1.60 V	8	28.03	32.44
2	2483.50	50.45 AV	54.00	-3.55	1.60 V	8	18.01	32.44
3	3282.00	48.95 PK	74.00	-25.05	1.06 V	28	14.51	34.44
3	3282.00	40.72 AV	54.00	-13.28	1.06 V	28	6.28	34.44
4	4924.00	53.69 PK	74.00	-20.31	1.12 V	44	14.79	38.90
4	4924.00	46.87 AV	54.00	-7.13	1.12 V	44	7.97	38.90

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

802.11g OFDM modulation (Normal mode)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	2390.00	60.03 PK	74.00	-13.97	1.49 H	4	27.93	32.10
1	2390.00	43.40 AV	54.00	-10.60	1.49 H	4	11.30	32.10
2	*2412.00	100.76 PK			1.49 H	4	68.58	32.18
2	*2412.00	91.13 AV			1.49 H	4	58.95	32.18
3	3216.00	46.25 PK	74.00	-27.75	1.13 H	12	11.87	34.38
3	3216.00	36.74 AV	54.00	-17.26	1.13 H	12	2.36	34.38
4	4824.00	48.95 PK	74.00	-25.05	1.04 H	209	10.32	38.63
4	4824.00	37.86 AV	54.00	-16.14	1.04 H	209	-0.77	38.63

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	2390.00	67.76 PK	74.00	-6.24	1.29 V	15	35.66	32.10
1	2390.00	51.72 AV	54.00	-2.28	1.29 V	15	19.62	32.10
2	*2412.00	108.96 PK			1.29 V	15	76.78	32.18
2	*2412.00	99.45 AV			1.29 V	15	67.27	32.18
3	3216.00	46.25 PK	74.00	-27.75	1.07 V	103	11.87	34.38
3	3216.00	38.02 AV	54.00	-15.98	1.07 V	103	3.64	34.38
4	4824.00	48.13 PK	74.00	-25.87	1.09 V	66	9.50	38.63
4	4824.00	41.26 AV	54.00	-12.74	1.09 V	66	2.63	38.63

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	*2437.00	103.92 PK			1.50 H	7	71.65	32.27
1	*2437.00	94.25 AV			1.50 H	7	61.98	32.27
2	3248.00	47.39 PK	74.00	-26.61	1.07 H	26	12.98	34.41
2	3248.00	37.85 AV	54.00	-16.15	1.07 H	26	3.44	34.41
3	4874.00	49.87 PK	74.00	-24.13	1.08 H	132	11.10	38.77
3	4874.00	38.72 AV	54.00	-15.28	1.08 H	132	-0.05	38.77

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	*2437.00	111.87 PK			1.30 V	19	79.60	32.27
1	*2437.00	102.31 AV			1.30 V	19	70.04	32.27
2	3248.00	46.59 PK	74.00	-27.41	1.09 V	114	12.18	34.41
2	3248.00	38.36 AV	54.00	-15.64	1.09 V	114	3.95	34.41
3	4874.00	48.24 PK	74.00	-25.76	1.14 V	75	9.47	38.77
3	4874.00	41.39 AV	54.00	-12.61	1.14 V	75	2.62	38.77

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	*2462.00	100.64 PK			1.50 H	6	68.28	32.36
1	*2462.00	91.01 AV			1.50 H	6	58.65	32.36
2	2483.50	60.14 PK	74.00	-13.86	1.47 H	9	27.70	32.44
2	2483.50	43.57 AV	54.00	-10.43	1.47 H	9	11.13	32.44
3	3282.00	46.68 PK	74.00	-27.32	1.12 H	168	12.24	34.44
3	3282.00	38.52 AV	54.00	-15.48	1.12 H	168	4.08	34.44
4	4924.00	48.59 PK	74.00	-25.41	1.22 H	84	9.69	38.90
4	4924.00	41.73 AV	54.00	-12.27	1.22 H	84	2.83	38.90

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	*2462.00	108.84 PK			1.30 V	24	76.48	32.36
1	*2462.00	99.32 AV			1.30 V	24	66.96	32.36
2	2483.50	67.59 PK	74.00	-6.41	1.30 V	24	35.15	32.44
2	2483.50	51.50 AV	54.00	-2.50	1.30 V	24	19.06	32.44
3	3282.00	46.39 PK	74.00	-27.61	1.09 V	142	11.95	34.44
3	3282.00	38.17 AV	54.00	-15.83	1.09 V	142	3.73	34.44
4	4924.00	48.36 PK	74.00	-25.64	1.14 V	53	9.46	38.90
4	4924.00	41.47 AV	54.00	-12.53	1.14 V	53	2.57	38.90

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

802.11g OFDM modulation (Turbo mode)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	QPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	2390.00	54.07 PK	74.00	-19.93	1.45 H	14	21.97	32.10
1	2390.00	44.38 AV	54.00	-9.62	1.45 H	14	12.28	32.10
2	*2437.00	101.80 PK			1.45 H	14	69.53	32.27
2	*2437.00	92.11 AV			1.45 H	14	59.84	32.27
3	2483.50	54.23 PK	74.00	-19.77	1.45 H	14	21.79	32.44
3	2483.50	44.54 AV	54.00	-9.46	1.45 H	14	12.10	32.44
4	3248.00	48.59 PK	74.00	-25.41	1.12 H	34	14.18	34.41
4	3248.00	38.92 AV	54.00	-15.08	1.12 H	34	4.51	34.41
5	4874.00	50.29 PK	74.00	-23.71	1.13 H	127	11.52	38.77
5	4874.00	39.17 AV	54.00	-14.83	1.13 H	127	0.40	38.77

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	2390.00	68.08 PK	74.00	-5.92	1.02 V	26	35.98	32.10
1	2390.00	52.51 AV	54.00	-1.49	1.02 V	26	20.41	32.10
2	*2437.00	109.66 PK			1.27 V	29	77.39	32.27
2	*2437.00	100.24 AV			1.27 V	29	67.97	32.27
3	2483.50	67.00 PK	74.00	-7.00	1.25 V	30	34.56	32.44
3	2483.50	52.67 AV	54.00	-1.33	1.25 V	30	20.23	32.44
4	3248.00	48.62 PK	74.00	-25.38	1.00 V	222	14.21	34.41
4	3248.00	42.01 AV	54.00	-11.99	1.00 V	222	7.60	34.41
5	4874.00	50.49 PK	74.00	-23.51	1.05 V	27	11.72	38.77
5	4874.00	37.18 AV	54.00	-16.82	1.05 V	27	-1.59	38.77

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

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

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

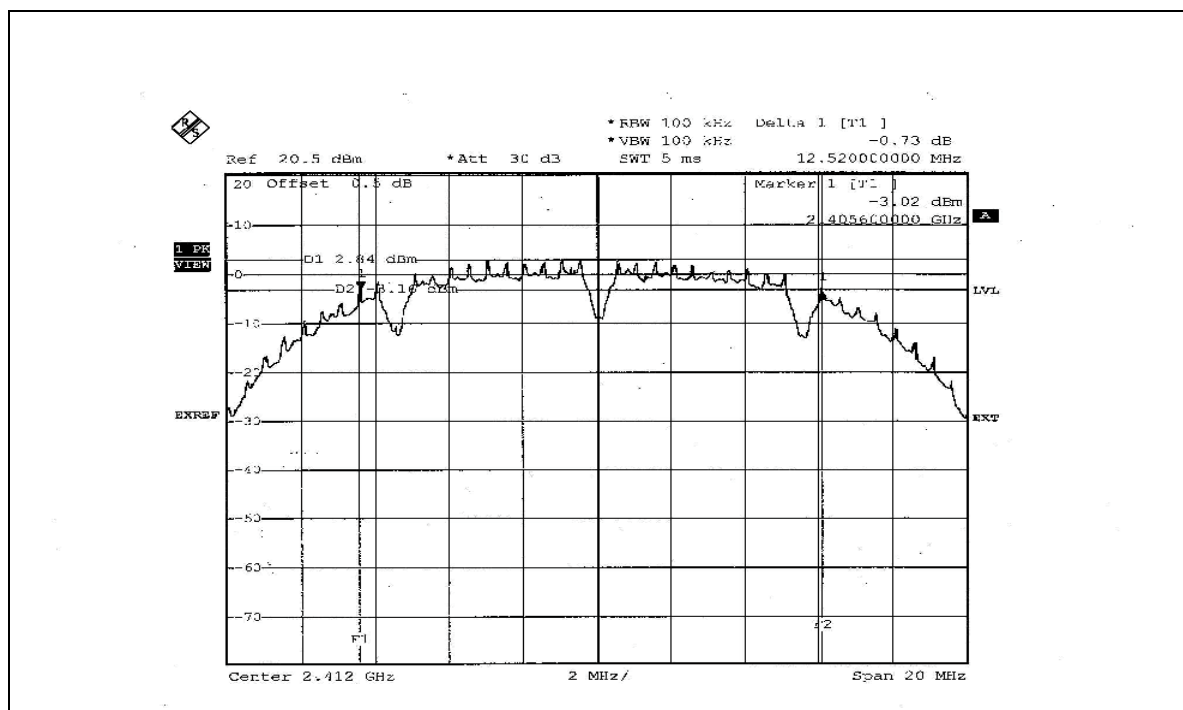
4.3.7 TEST RESULTS

802.11b DSSS modulation

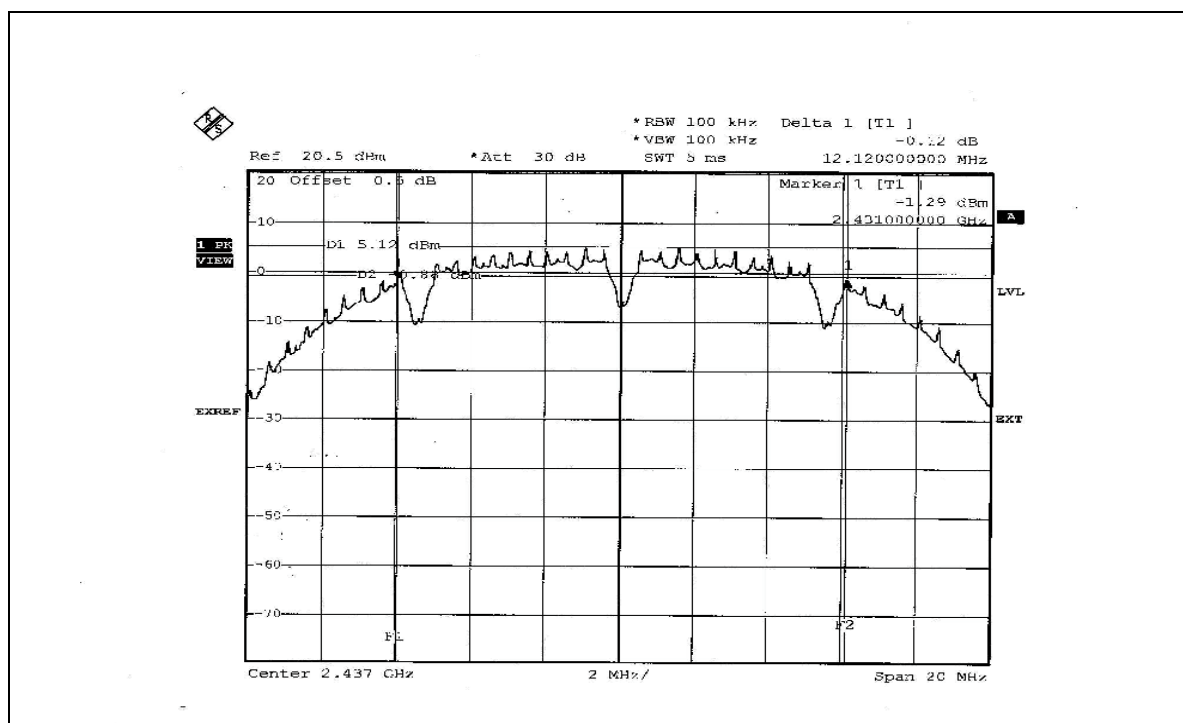
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	12.52	0.5	PASS
6	2437	12.12	0.5	PASS
11	2462	12.60	0.5	PASS

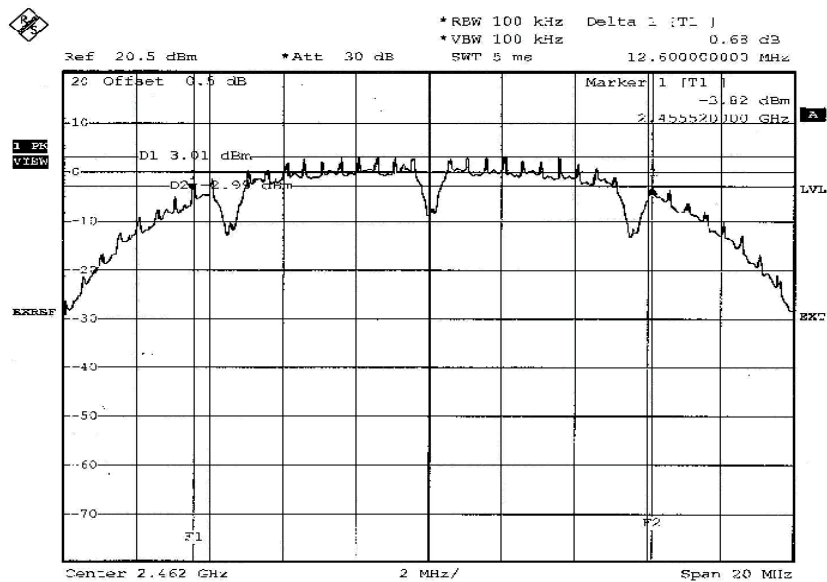
CH 1



CH 6



CH 11

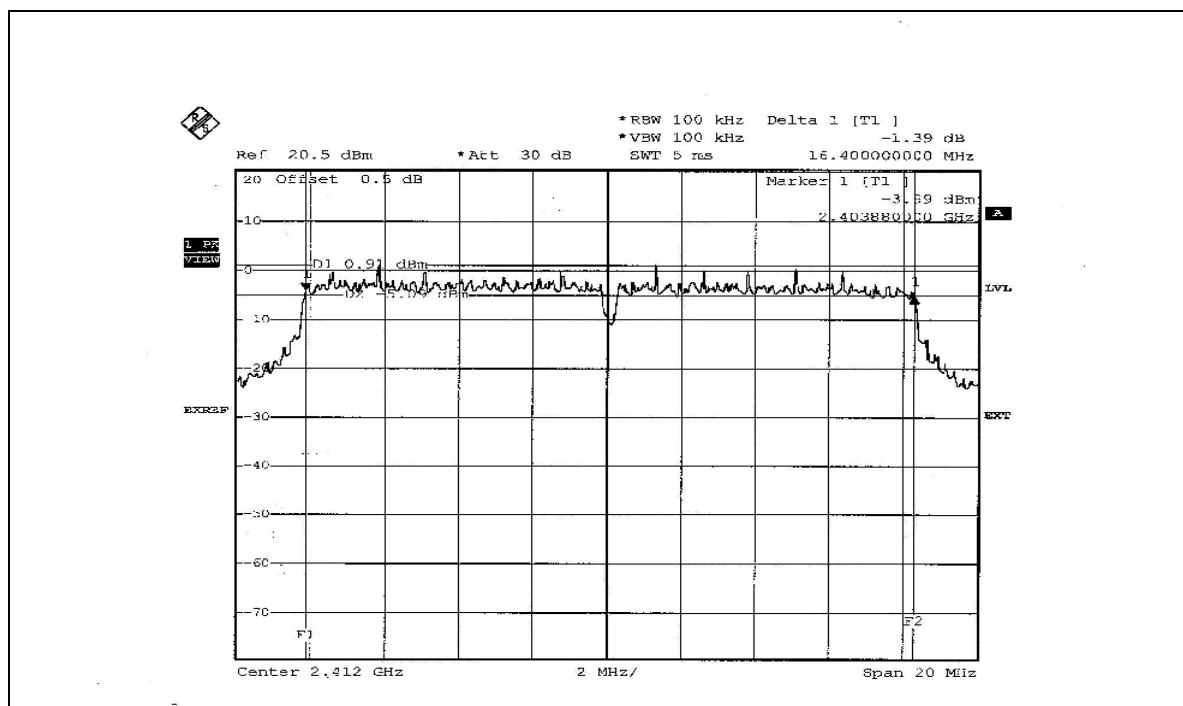


802.11g OFDM modulation

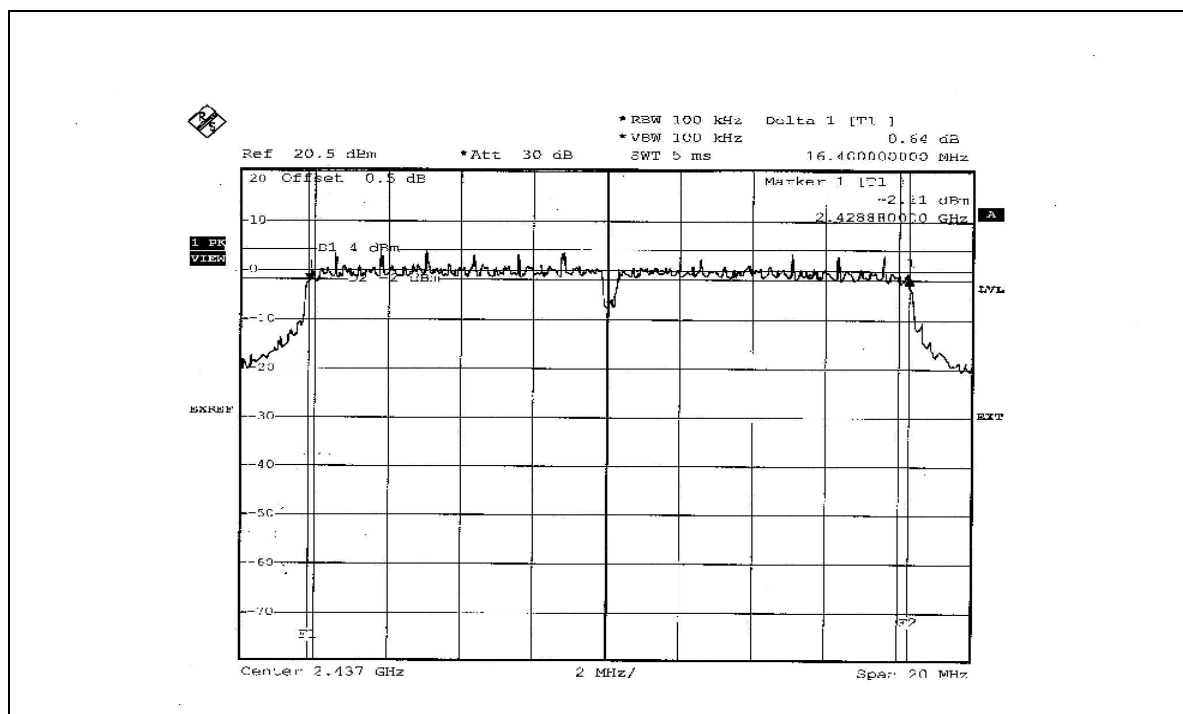
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.40	0.5	PASS
6	2437	16.40	0.5	PASS
11	2462	16.48	0.5	PASS

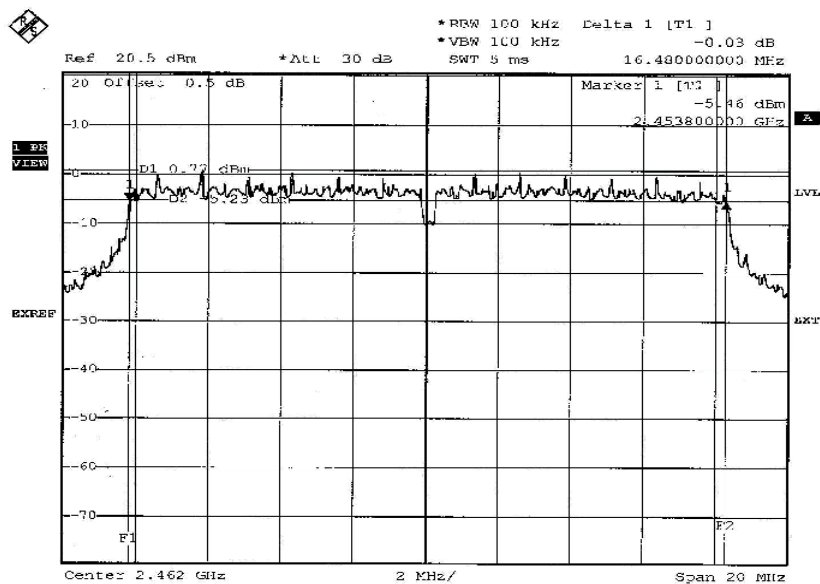
CH 1



CH 6



CH 11



802.11g Turbo OFDM modulation

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
6	2437	32.56	0.5	PASS

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2006
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Jan. 16, 2007
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

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

4.4.1 TEST PROCEDURES

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

4.4.2 DEVIATION FROM TEST STANDARD

No deviation

4.4.3 TEST SETUP



4.4.4 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.3 TEST RESULTS

802.11b DSSS modulation

MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	50.234	17.01	30	PASS
6	2437	79.433	19.00	30	PASS
11	2462	50.119	17.00	30	PASS

802.11g OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	63.533	18.03	30	PASS
6	2437	126.183	21.01	30	PASS
11	2462	63.533	18.03	30	PASS

802.11g Turbo OFDM modulation

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
6	2437	100.462	20.02	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

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

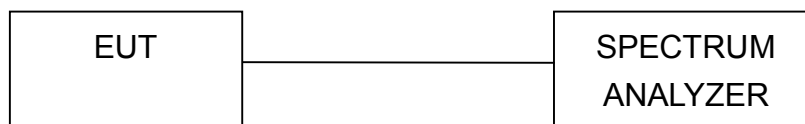
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

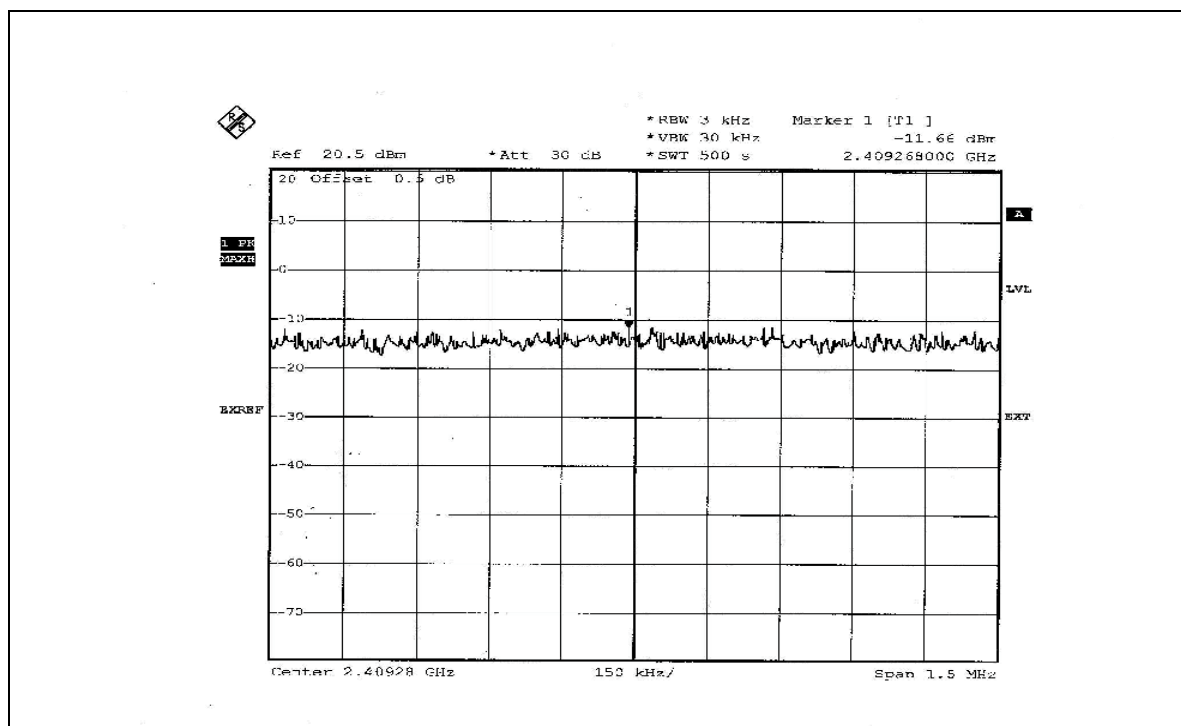
4.5.7 TEST RESULTS

802.11b DSSS modulation

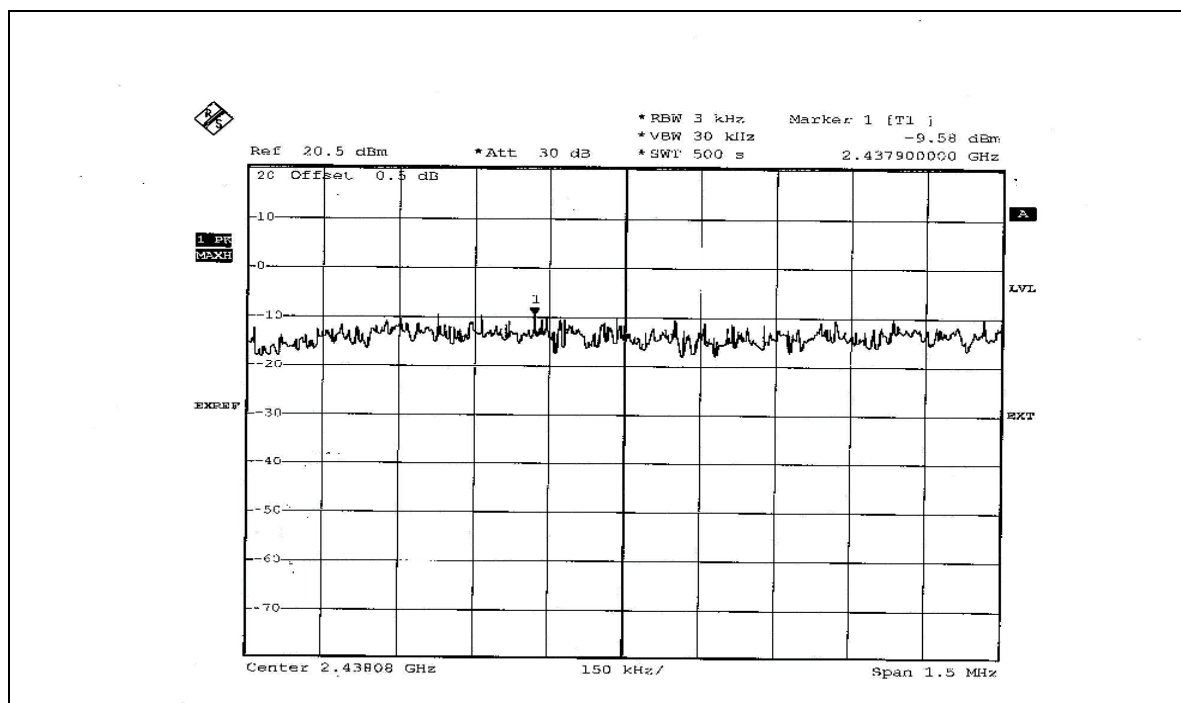
MODULATION TYPE	DBPSK	TRANSFER RATE	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-11.66	8	PASS
6	2437	-9.58	8	PASS
11	2462	-11.65	8	PASS

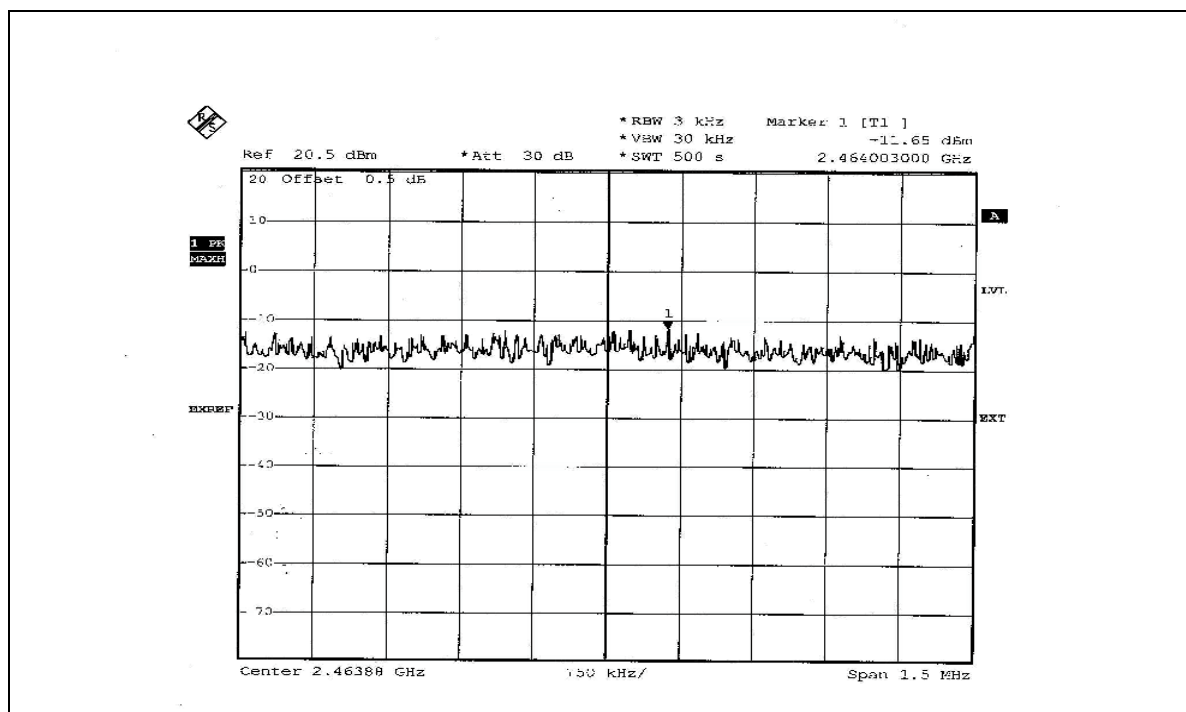
CH 1



CH 6



CH 11

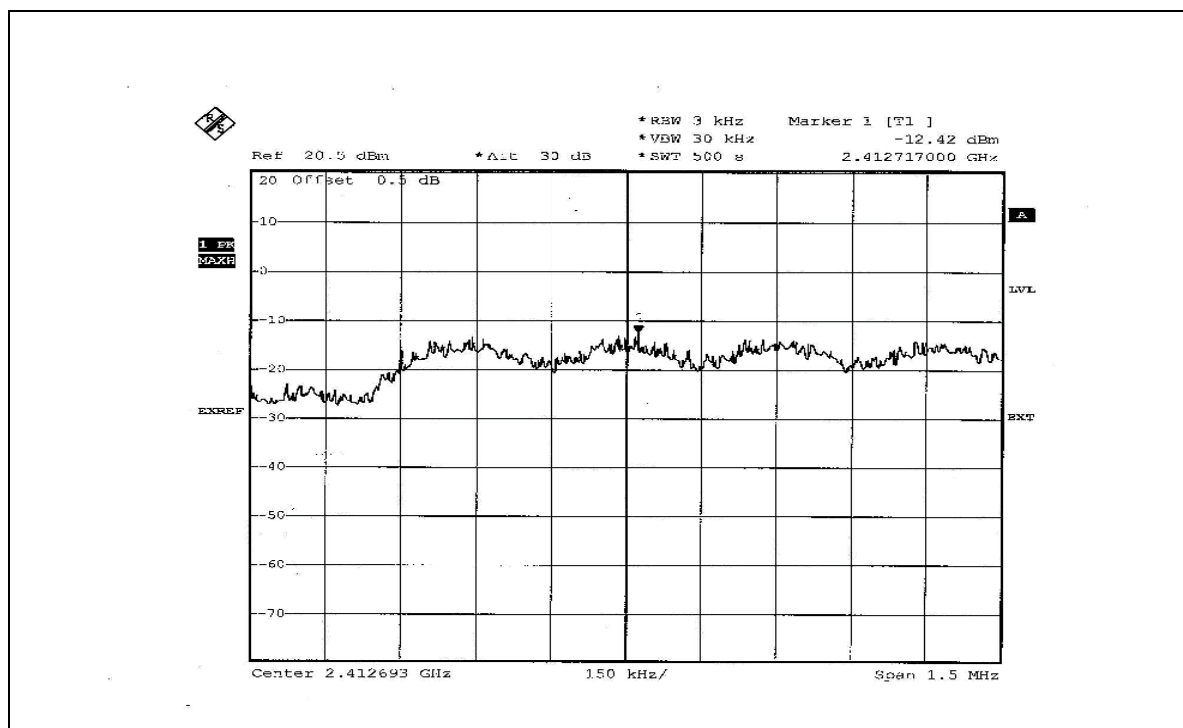


802.11g OFDM modulation

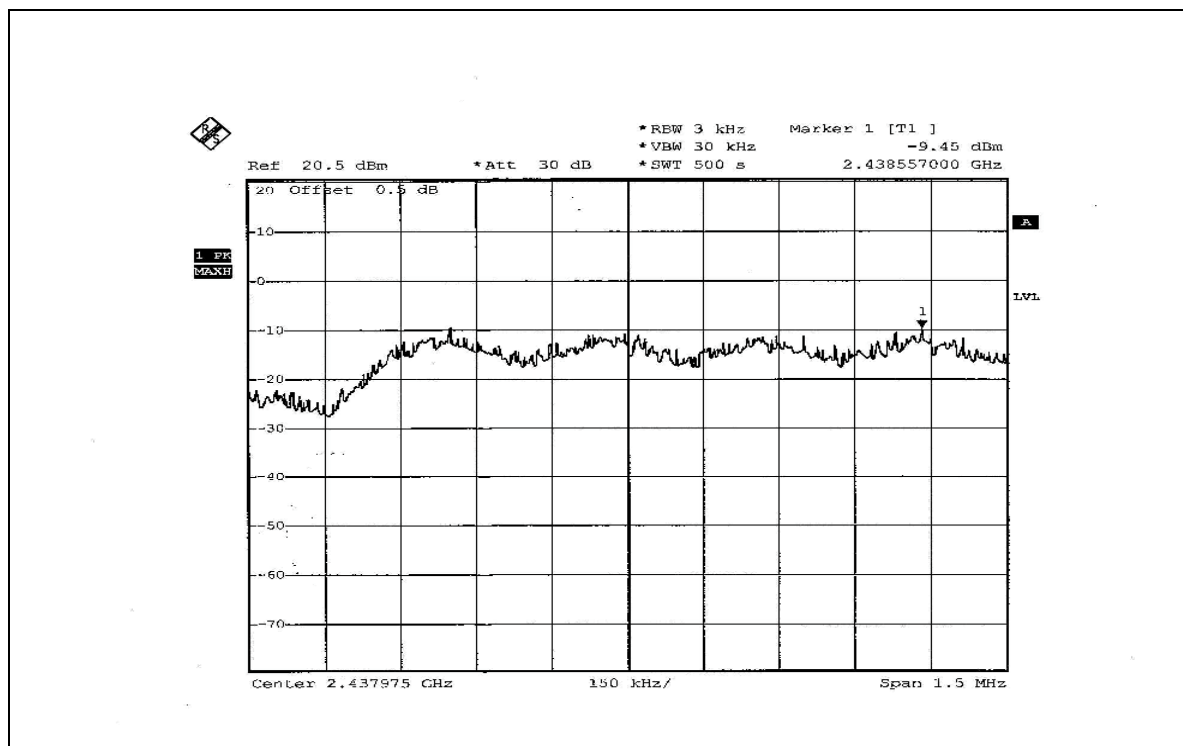
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-12.42	8	PASS
6	2437	-9.45	8	PASS
11	2462	-12.19	8	PASS

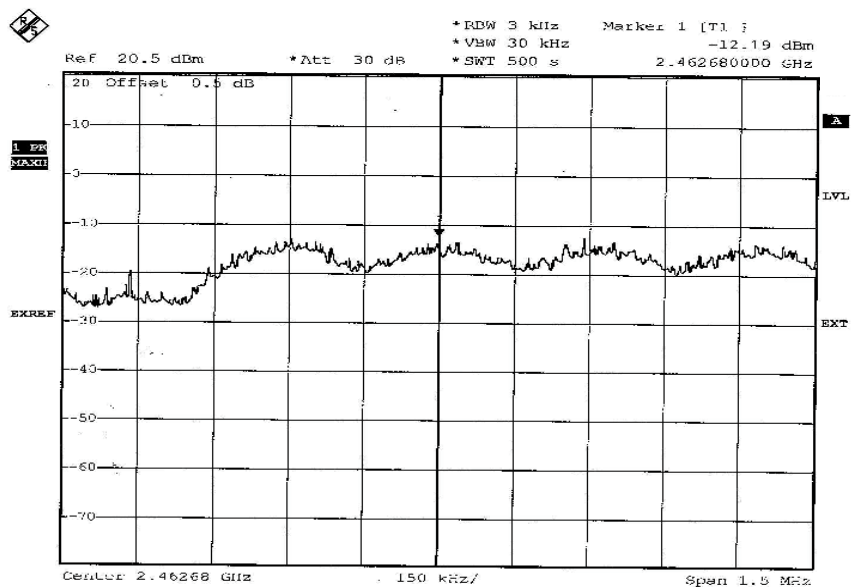
CH 1



CH 6



CH 11

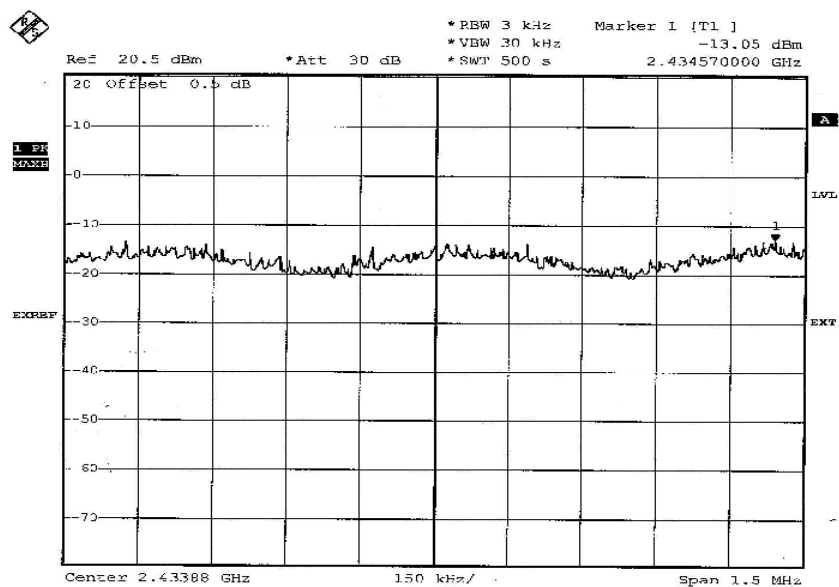


802.11g Turbo OFDM modulation

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
6	2437	-13.05	8	PASS

CH 6



4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

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

4.6.3 TEST PROCEDURE

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

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.6 TEST RESULTS

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

802.11b DSSS modulation

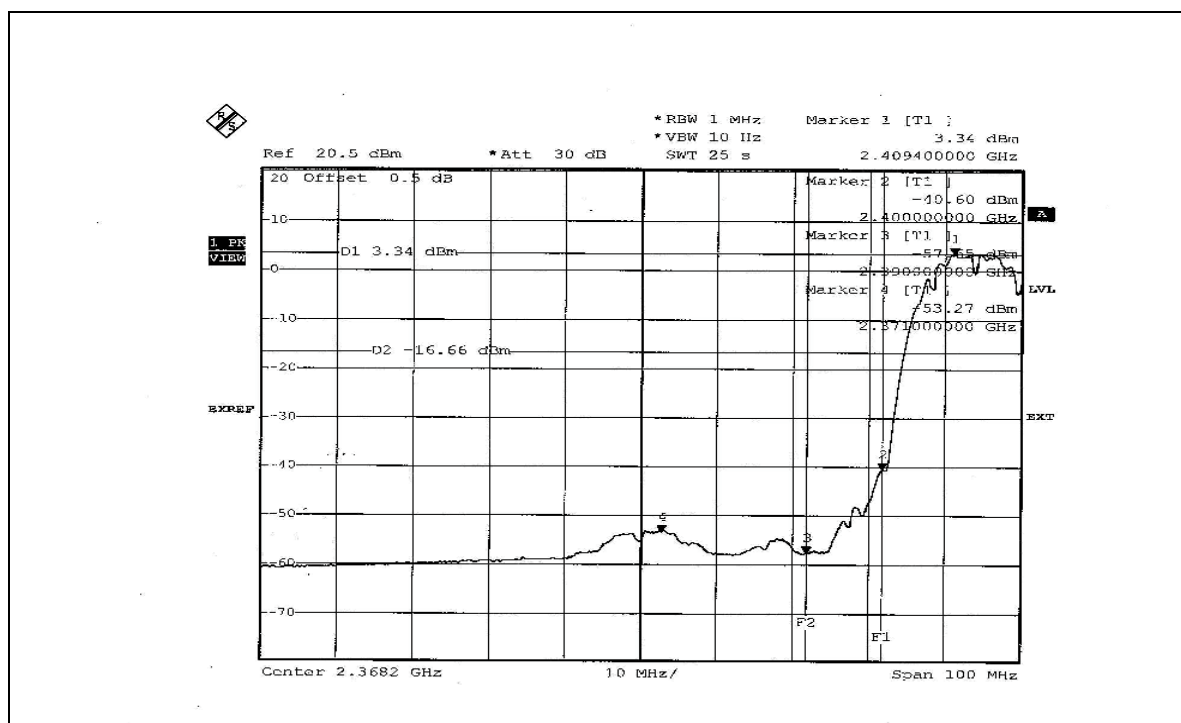
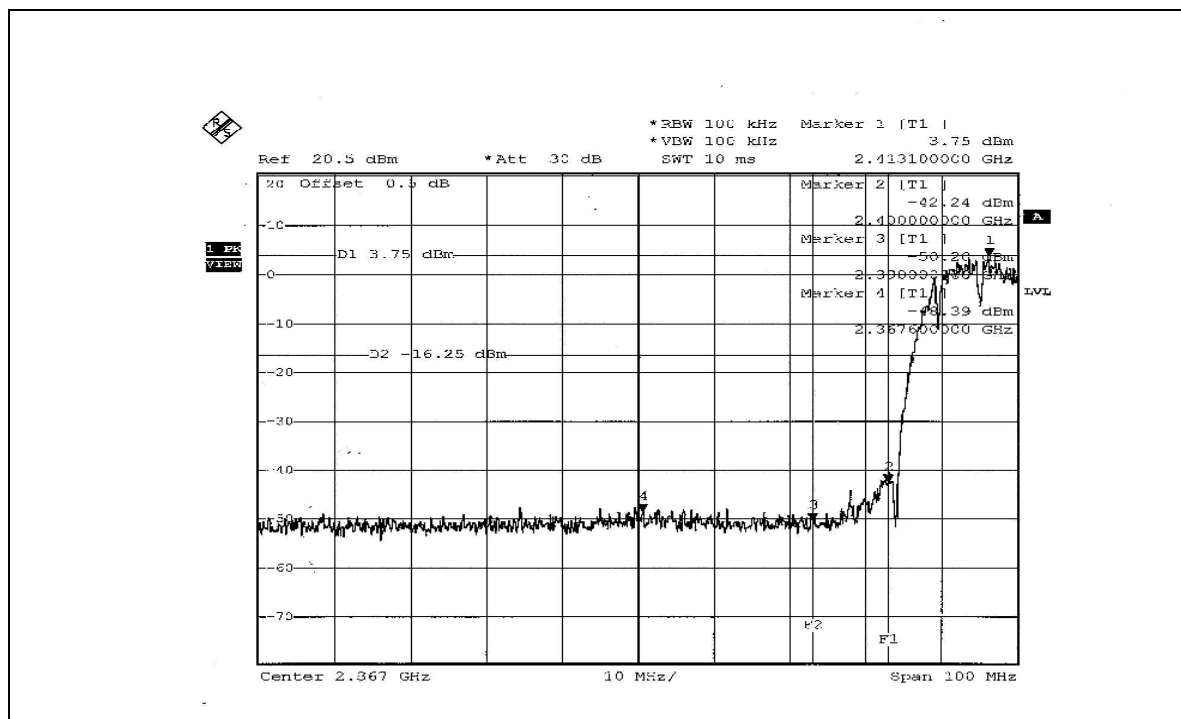
NOTE 1: The band edge emission plot on the next page shows 52.14dBc between carrier maximum power and local maximum emission in restrict band (2.3676GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 105.92dBuV/m (Peak), so the maximum field strength in restrict band is $105.92 - 52.14 = 53.78$ dBuV/m which is under 74dBuV/m limit.

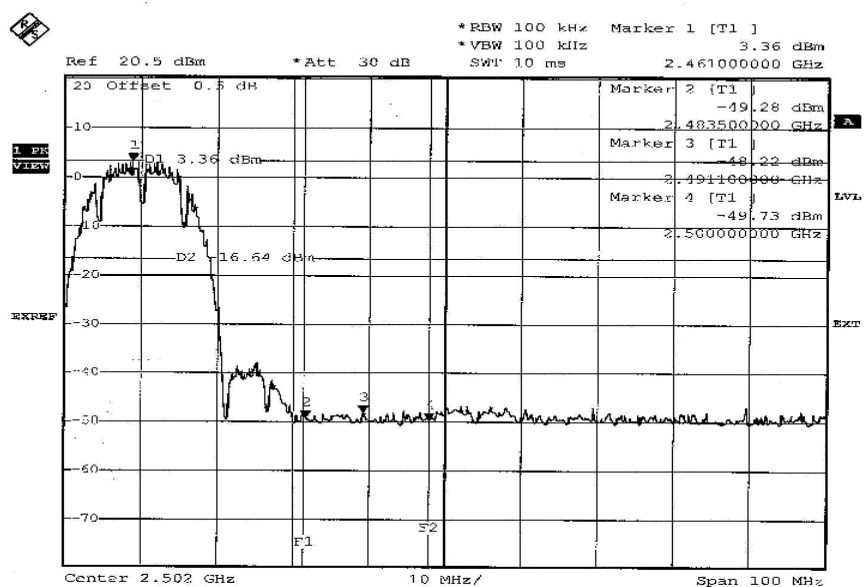
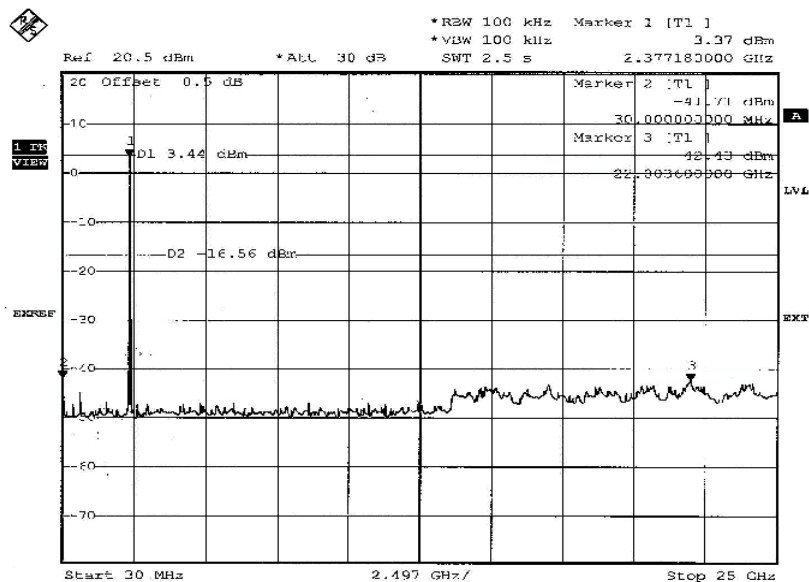
The band edge emission plot of on the next page shows 56.61dBc between carrier maximum power and local maximum emission in restrict band (2.3710GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.28dBuV/m (Average), so the maximum field strength in restrict band is $102.28 - 56.61 = 45.67$ dBuV/m which is under 54dBuV/m limit.

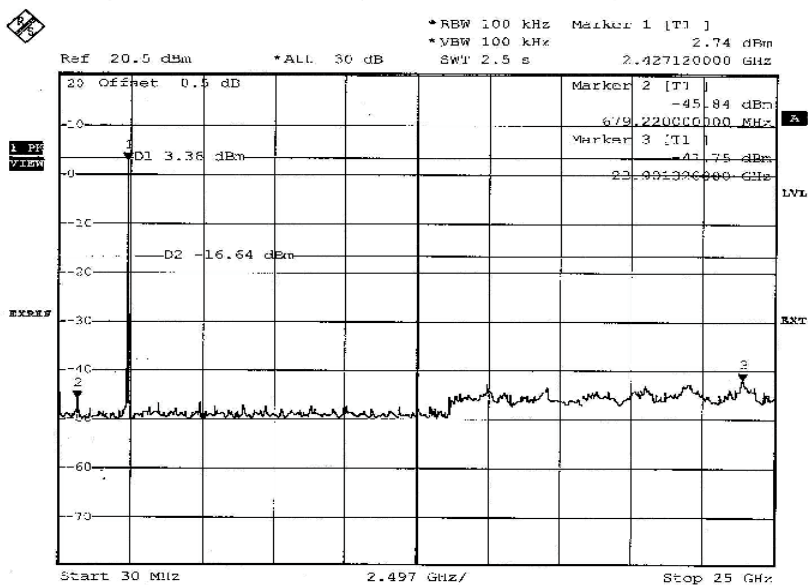
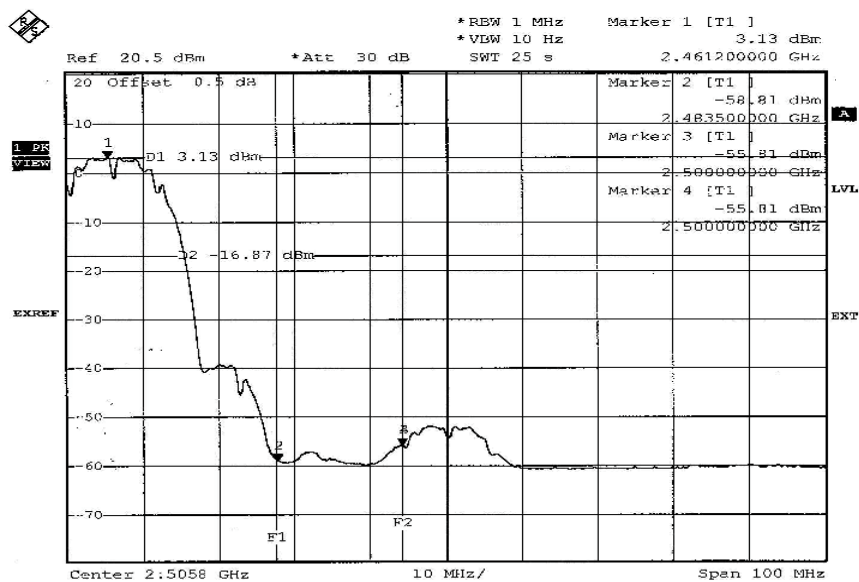
NOTE 2: The band edge emission plot on the next second page shows 51.58dBc between carrier maximum power and local maximum emission in restrict band (2.4911GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 106.07dBuV/m (Peak), so the maximum field strength in restrict band is $106.07 - 51.58 = 54.49$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 58.94dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 102.40dBuV/m (Average), so the maximum field strength in restrict band is $102.40 - 58.94 = 43.46$ dBuV/m which is under 54dBuV/m limit.

802.11b DSSS modulation







802.11g OFDM modulation

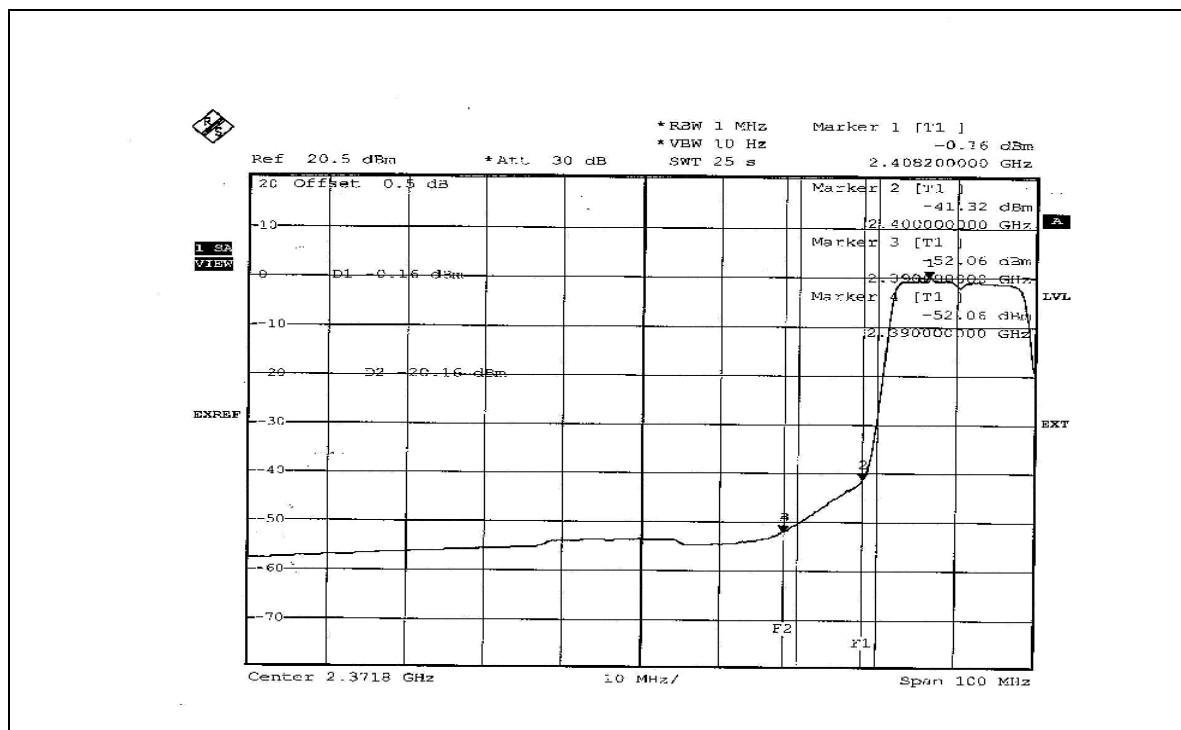
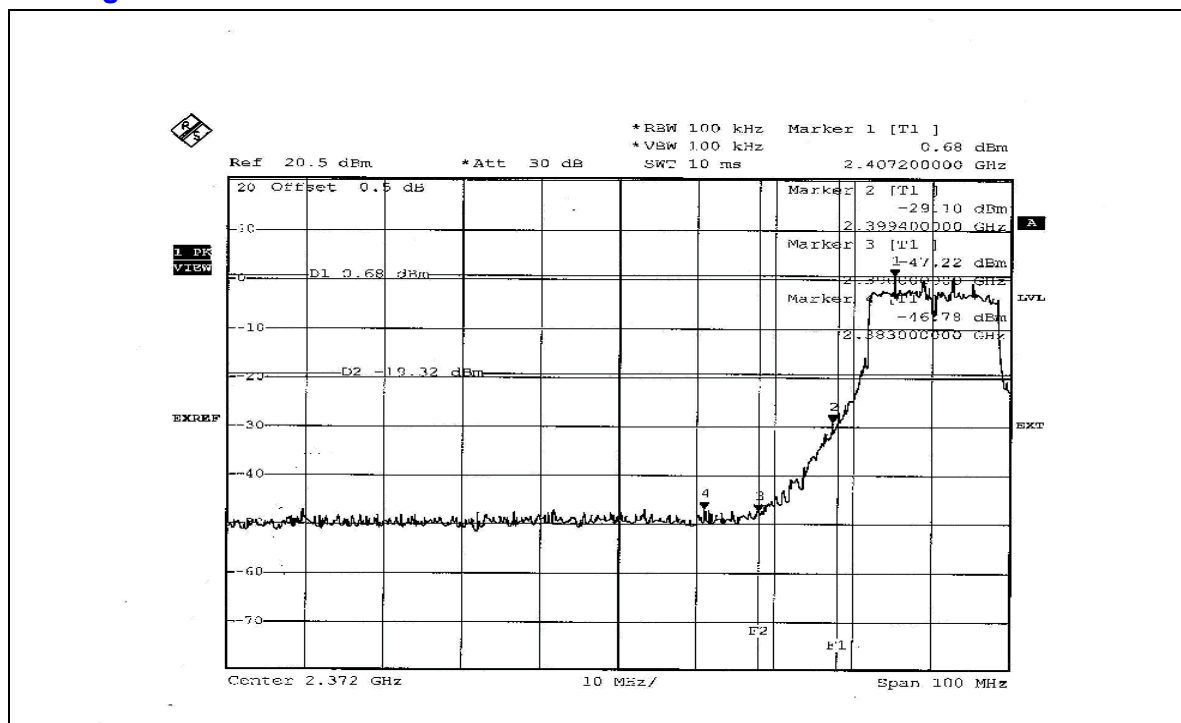
NOTE 1: The band edge emission plot on the next page shows 47.46dBc between carrier maximum power and local maximum emission in restrict band (2.38300GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 108.96dBuV/m (Peak), so the maximum field strength in restrict band is $108.96 - 47.46 = 61.50$ dBuV/m which is under 74dBuV/m limit.

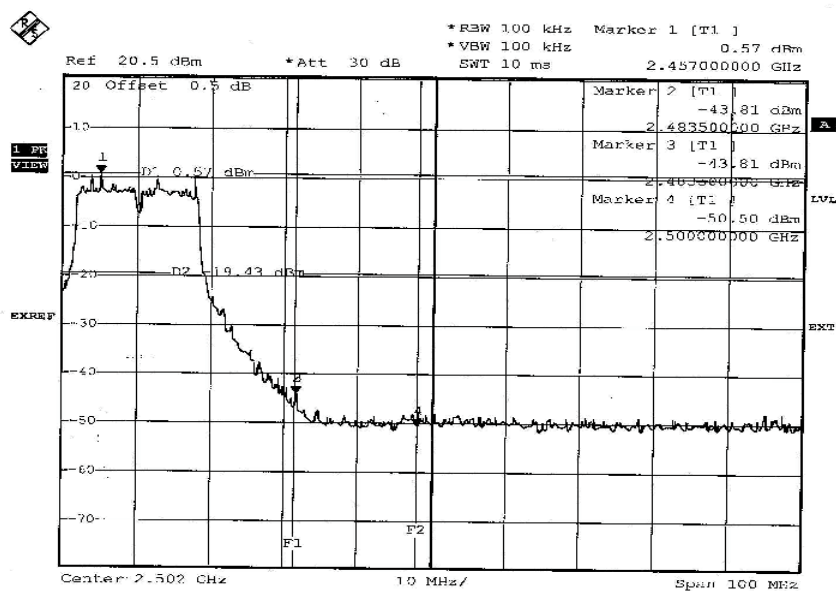
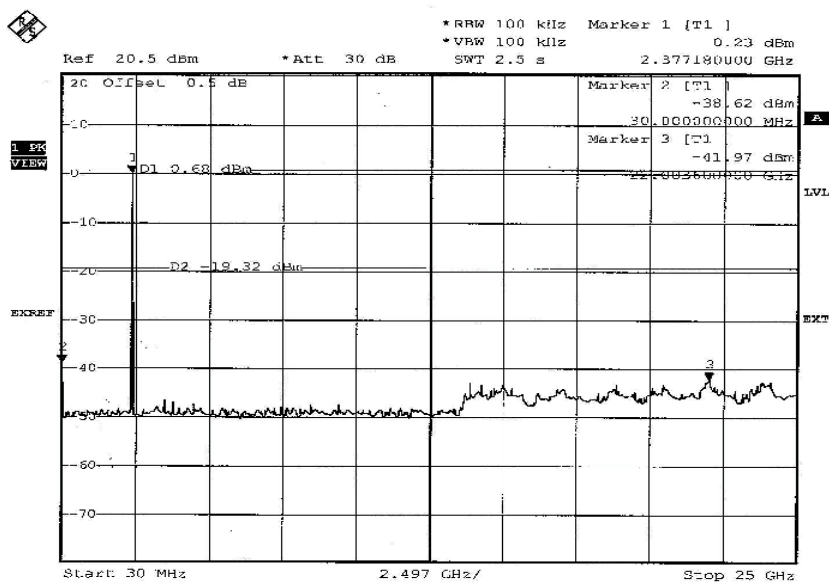
The band edge emission plot of on the next page shows 51.90dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 99.45dBuV/m (Average), so the maximum field strength in restrict band is $99.45 - 51.90 = 47.55$ dBuV/m which is under 54dBuV/m limit.

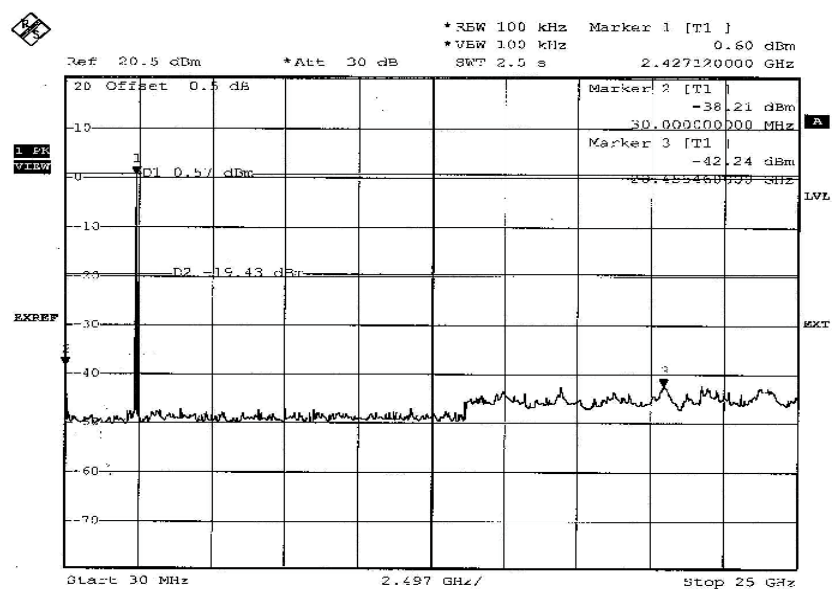
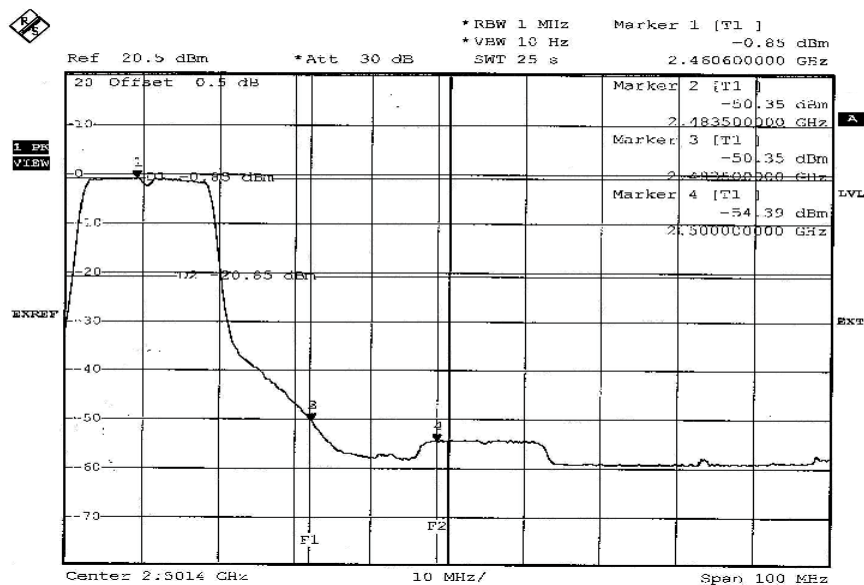
NOTE 2: The band edge emission plot on the next second page shows 44.38dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 108.84dBuV/m (Peak), so the maximum field strength in restrict band is $108.84 - 44.38 = 64.46$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 49.50dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 99.32dBuV/m (Average), so the maximum field strength in restrict band is $99.32 - 49.50 = 49.82$ dBuV/m which is under 54dBuV/m limit.

802.11g OFDM modulation







802.11g Turbo OFDM modulation

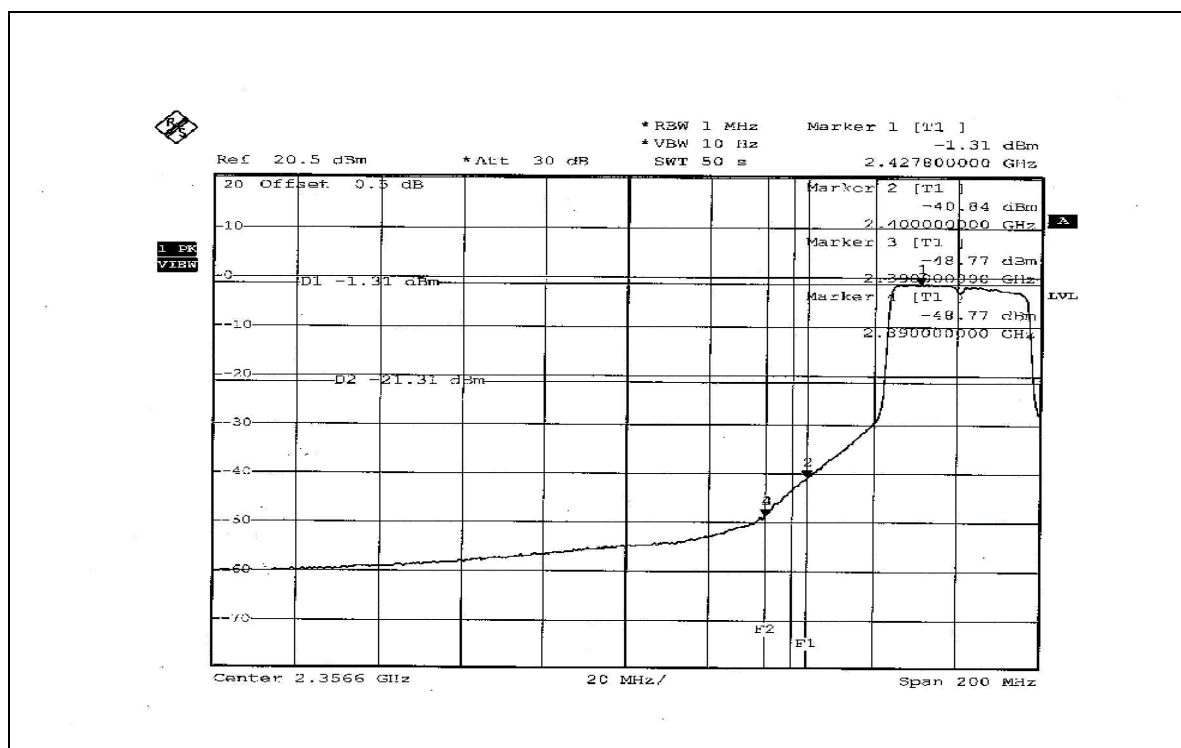
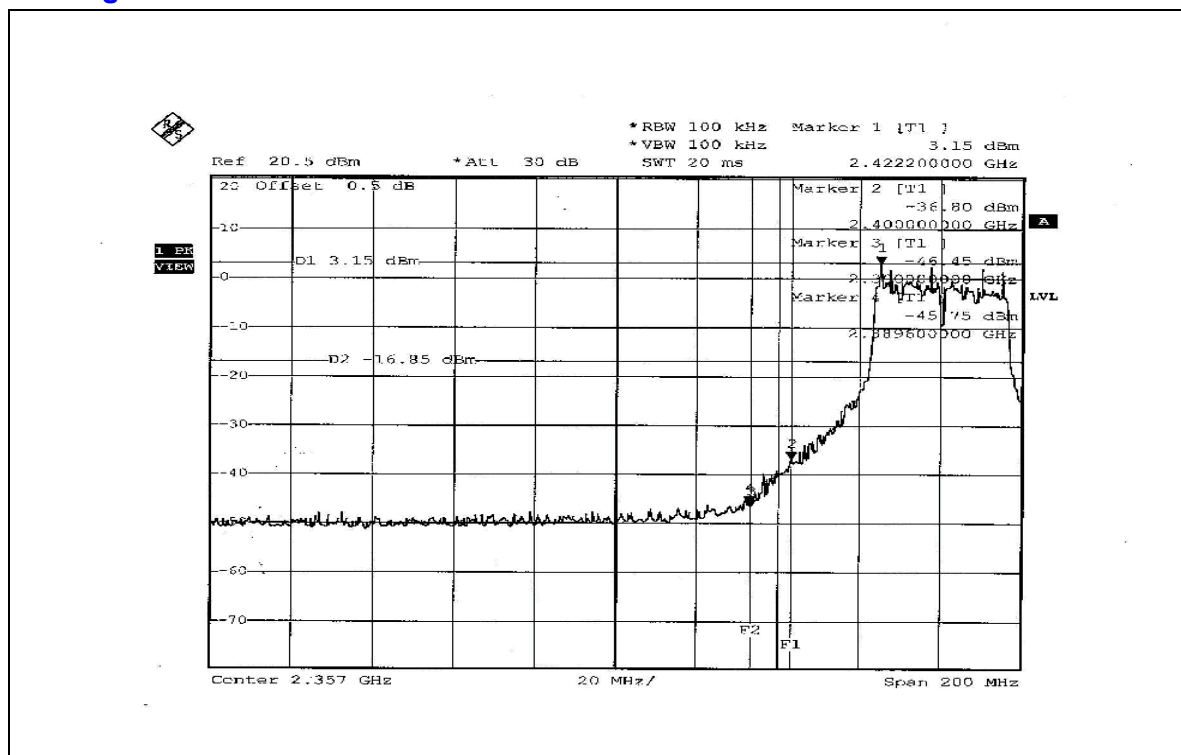
NOTE 1: The band edge emission plot on the next page shows 48.90dBc between carrier maximum power and local maximum emission in restrict band (2.38960GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 109.66dBuV/m (Peak), so the maximum field strength in restrict band is $109.66 - 48.90 = 60.76$ dBuV/m which is under 74dBuV/m limit.

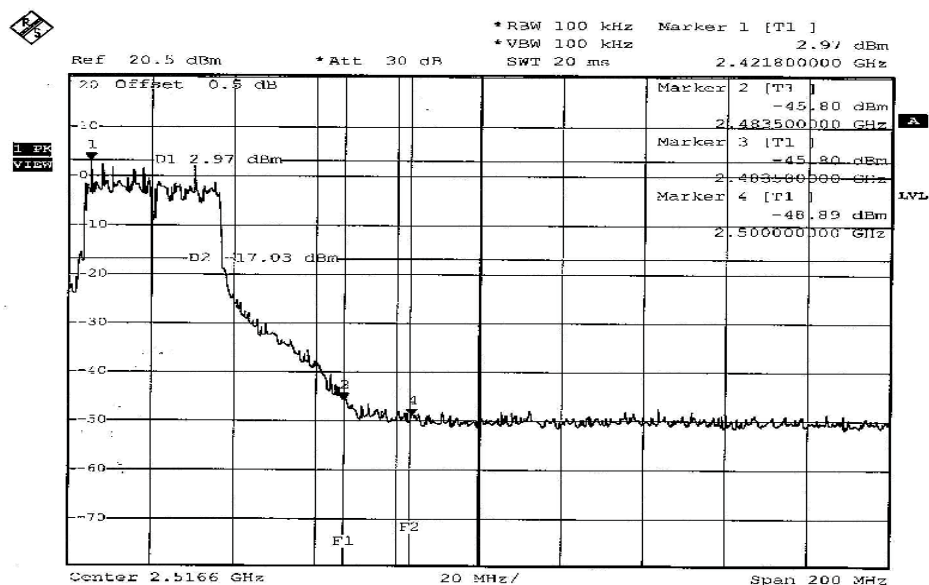
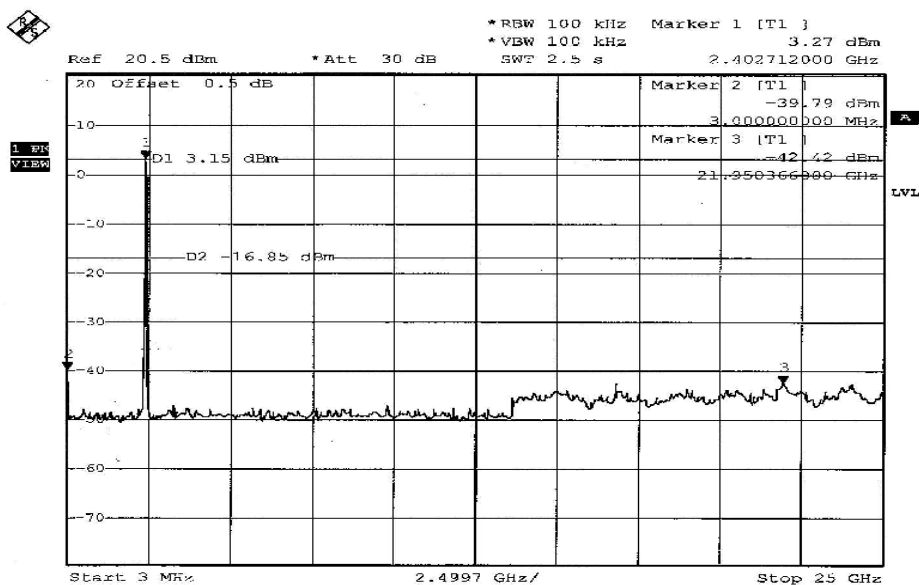
The band edge emission plot of on the next page shows 47.46dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 100.24dBuV/m (Average), so the maximum field strength in restrict band is $100.24 - 47.46 = 52.78$ dBuV/m which is under 54dBuV/m limit.

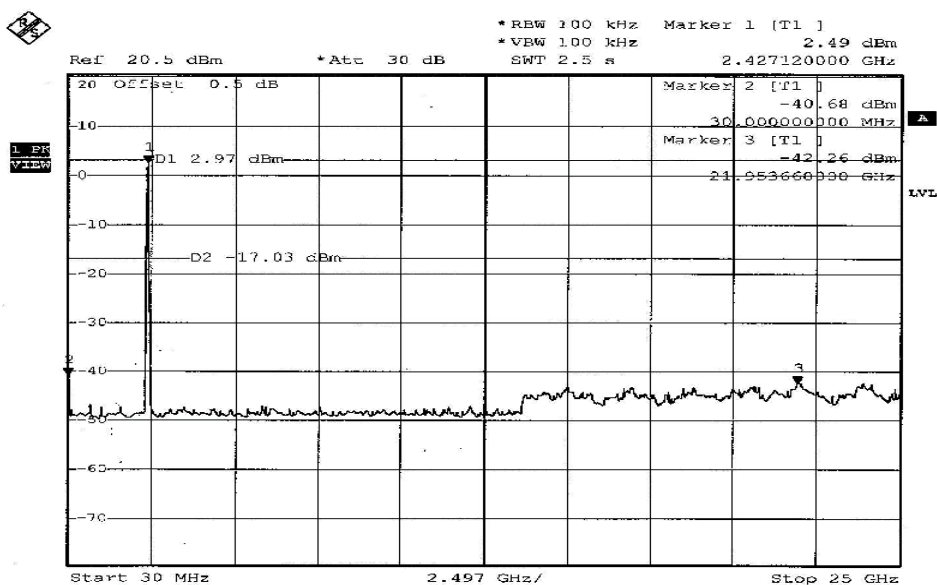
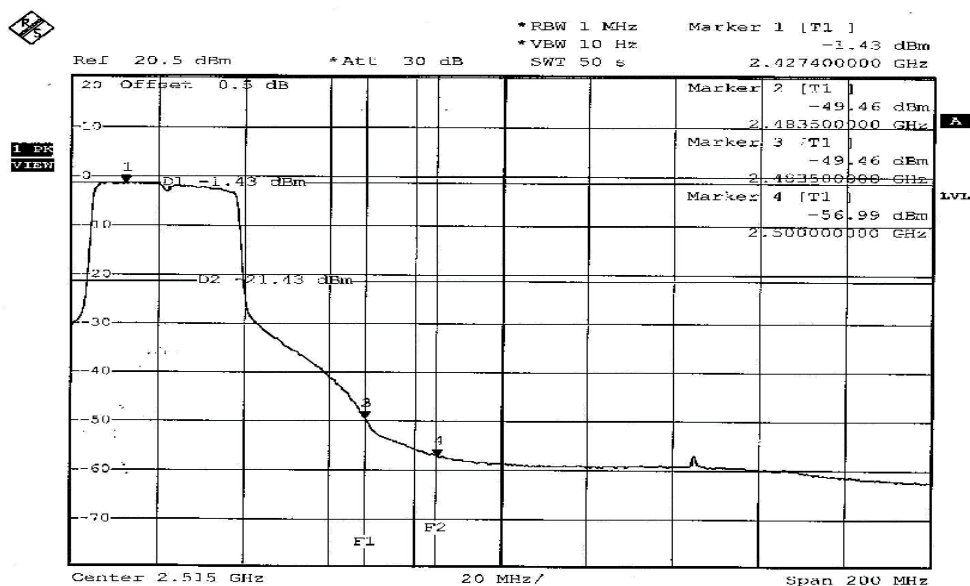
NOTE 2: The band edge emission plot on the next second page shows 48.77dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 109.66dBuV/m (Peak), so the maximum field strength in restrict band is $109.66 - 48.77 = 60.89$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 48.03dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 100.24dBuV/m (Average), so the maximum field strength in restrict band is $100.24 - 48.03 = 52.21$ dBuV/m which is under 54dBuV/m limit.

802.11g Turbo OFDM modulation







4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

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

4.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole antenna with Reverse SMA connector. The maximum Gain with the antenna is 4dBi.

5. TEST TYPES AND RESULTS (802.11a 5725~5850MHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 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:**
- The lower limit shall apply at the transition frequencies.
 - The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 - 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.

5.1.2 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. 06, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 07, 2007
Software ADT	ADT_Cond_V3	NA	NA

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

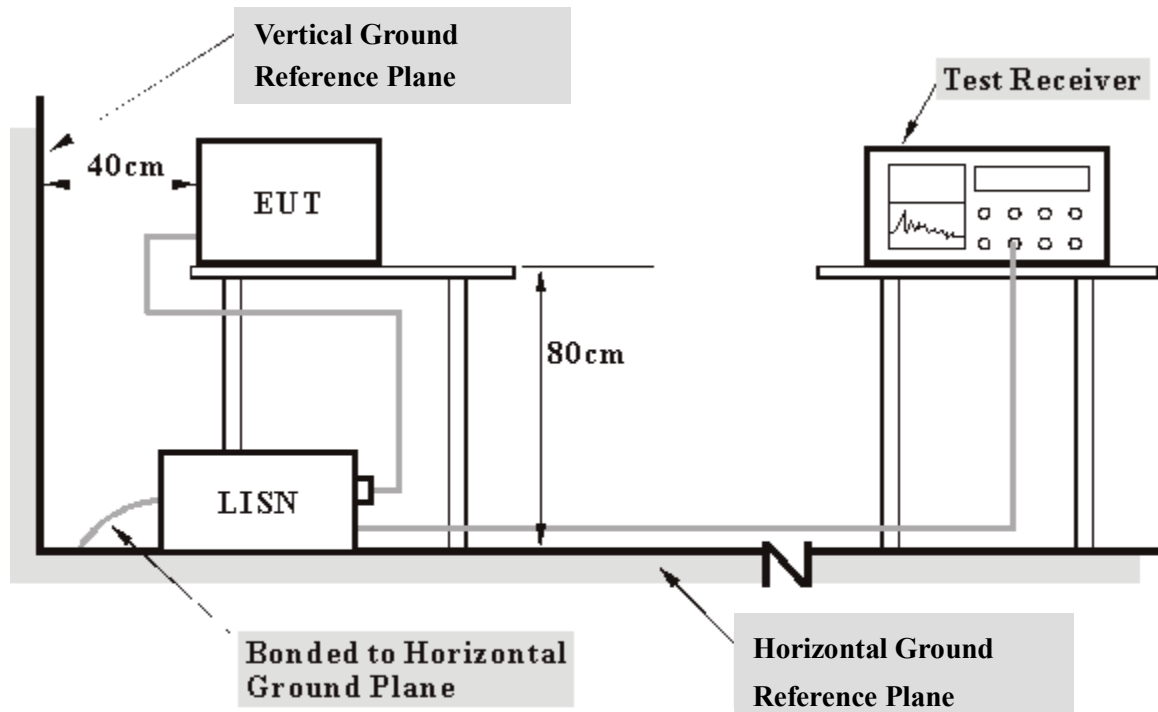
5.1.3 TEST PROCEDURES

- 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.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 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.

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6

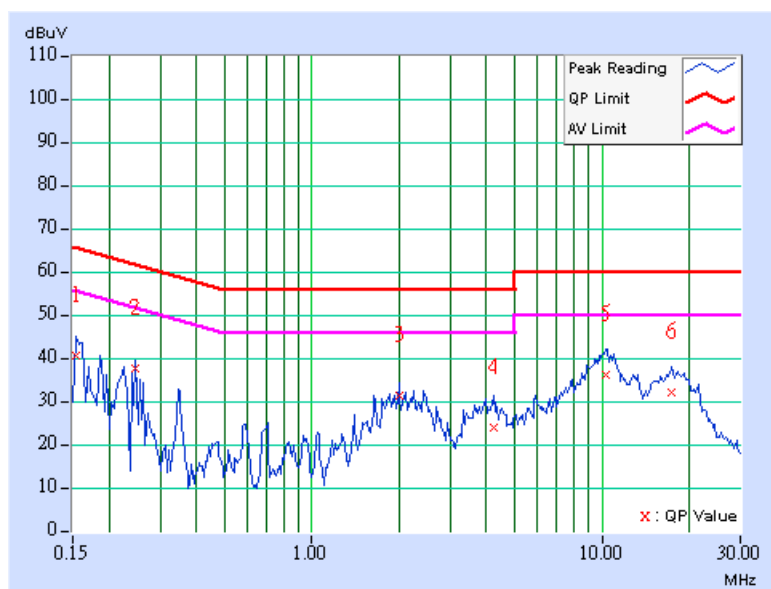
5.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.10	40.17	-	40.27	-	65.79	55.79	-25.52	-
2	0.248	0.10	36.87	-	36.97	-	61.84	51.84	-24.87	-
3	2.004	0.20	30.77	-	30.97	-	56.00	46.00	-25.03	-
4	4.223	0.47	23.41	-	23.88	-	56.00	46.00	-32.12	-
5	10.363	0.47	35.45	-	35.92	-	60.00	50.00	-24.08	-
6	17.445	0.73	31.46	-	32.19	-	60.00	50.00	-27.81	-

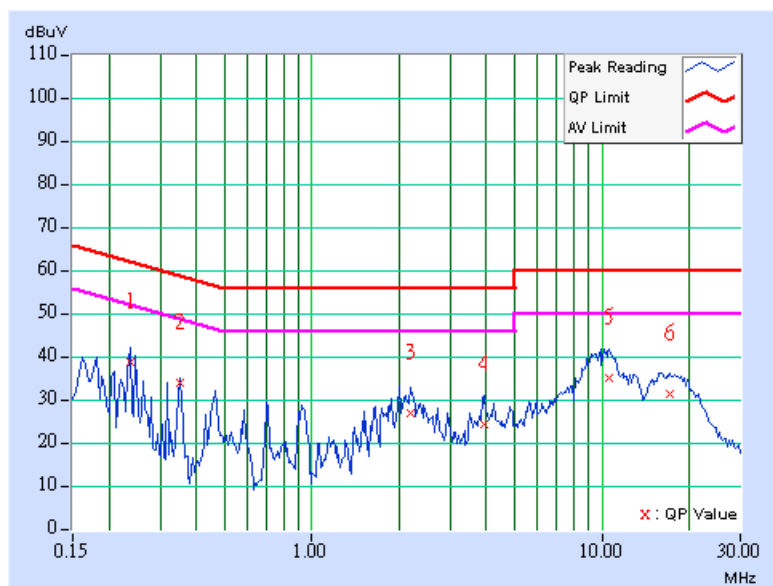
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = 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 3	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
TESTED BY	Long Chen	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.236	0.10	38.48	-	38.58	-	62.24	52.24	-23.66	-
2	0.349	0.10	33.50	-	33.60	-	58.98	48.98	-25.38	-
3	2.191	0.22	26.64	-	26.86	-	56.00	46.00	-29.14	-
4	3.918	0.36	23.73	-	24.09	-	56.00	46.00	-31.91	-
5	10.621	0.47	34.63	-	35.10	-	60.00	50.00	-24.90	-
6	17.070	0.57	30.85	-	31.42	-	60.00	50.00	-28.58	-

- 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.



5.2 RADIATED EMISSION MEASUREMENT

5.2.1 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.

5.2.2 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. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 01, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 19, 2007
Preamplifier Agilent	8449B	3008A01960	Nov. 09, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219268/4	Dec. 20, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	230129/4	Dec. 20, 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	900619	Nov. 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.

5.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 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.

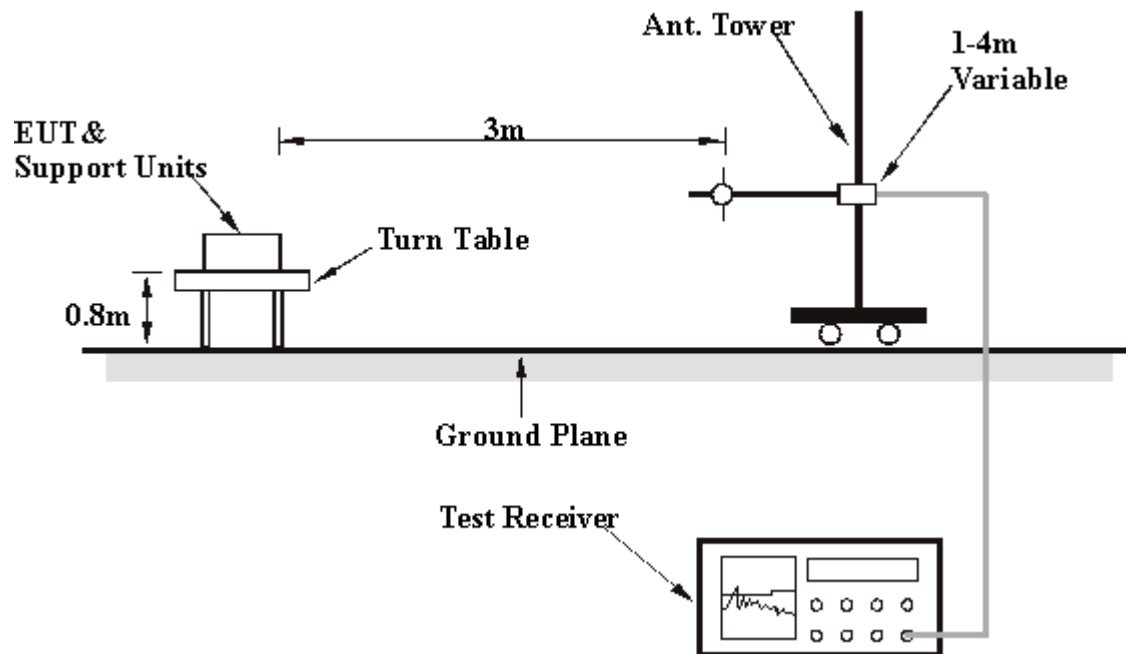
NOTE:

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 10Hz for Average detection (AV) at frequency above 1GHz.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



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

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

5.2.7 TEST RESULTS

Below 1GHz Worst-Case Data

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	133.03	36.74 QP	43.50	-6.76	1.25 H	169	24.19	12.55
2	166.07	41.31 QP	43.50	-2.19	1.00 H	187	28.47	12.83
3	199.12	41.87 QP	43.50	-1.63	1.00 H	187	31.06	10.81
4	232.16	38.87 QP	46.00	-7.13	1.25 H	163	27.03	11.84
5	267.15	39.23 QP	46.00	-6.77	1.00 H	172	25.60	13.63
6	333.25	38.11 QP	46.00	-7.89	1.50 H	166	22.22	15.89

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	133.03	33.62 QP	43.50	-9.88	1.25 V	316	21.07	12.55
2	199.12	33.63 QP	43.50	-9.87	1.00 V	142	22.82	10.81
3	333.25	29.24 QP	46.00	-16.76	1.00 V	100	13.36	15.89
4	399.34	31.67 QP	46.00	-14.33	1.25 V	133	13.89	17.78
5	440.16	32.04 QP	46.00	-13.96	1.00 V	94	13.52	18.52
6	665.65	32.64 QP	46.00	-13.36	1.25 V	253	9.20	23.44

- 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
802.11a Turbo OFDM modulation

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	QPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	142.75	41.03 QP	43.50	-2.47	1.50 H	220	27.60	13.43
2	181.62	38.05 QP	43.50	-5.45	1.00 H	85	26.28	11.77
3	199.12	41.66 QP	43.50	-1.84	1.50 H	349	30.85	10.81
4	232.16	38.58 QP	46.00	-7.42	1.00 H	187	26.74	11.84
5	265.21	41.90 QP	46.00	-4.10	1.00 H	349	28.60	13.31
6	331.30	40.05 QP	46.00	-5.95	1.00 H	349	24.19	15.86

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	166.07	28.59 QP	43.50	-14.91	1.25 V	208	15.76	12.83
2	199.12	32.22 QP	43.50	-11.28	1.00 V	151	21.41	10.81
3	232.16	28.77 QP	46.00	-17.23	1.00 V	133	16.93	11.84
4	267.15	29.55 QP	46.00	-16.45	1.25 V	112	15.92	13.63
5	331.30	29.17 QP	46.00	-16.83	1.50 V	124	13.31	15.86
6	465.43	28.32 QP	46.00	-17.68	1.00 V	289	9.24	19.08

- 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 CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	5725.00	67.23 PK	85.84	-18.61	1.15 H	171	27.04	40.19
1	5725.00	57.44 AV	76.05	-18.61	1.15 H	171	17.25	40.19
2	*5745.00	105.84 PK			1.15 H	171	65.59	40.25
2	*5745.00	96.05 AV			1.15 H	171	55.80	40.25
3	#11490.00	62.48 PK	74.00	-11.52	1.00 H	21	10.63	51.84
3	#11490.00	49.19 AV	54.00	-4.81	1.00 H	21	-2.66	51.84

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	5725.00	86.17 PK	95.21	-9.04	1.03 V	222	45.98	40.19
1	5725.00	66.87 AV	85.48	-18.61	1.03 V	222	26.68	40.19
2	*5745.00	115.21 PK			1.03 V	222	74.96	40.25
2	*5745.00	105.48 AV			1.03 V	222	65.23	40.25
3	#11490.00	64.77 PK	74.00	-9.23	1.03 V	247	12.92	51.84
3	#11490.00	51.33 AV	54.00	-2.67	1.03 V	247	-0.52	51.84

- 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.
 7. The limit value is defined as per 15.247

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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	*5785.00	103.31 PK			1.14 H	173	62.96	40.35
1	*5785.00	93.51 AV			1.14 H	173	53.16	40.35
2	#11570.00	62.23 PK	74.00	-11.77	1.04 H	16	10.55	51.68
2	#11570.00	49.03 AV	54.00	-4.97	1.04 H	16	-2.65	51.68

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	*5785.00	112.78 PK			1.03 V	230	72.43	40.35
1	*5785.00	103.02 AV			1.03 V	230	62.67	40.35
2	#11570.00	62.69 PK	74.00	-11.31	1.05 V	27	11.01	51.68
2	#11570.00	50.16 AV	54.00	-3.84	1.05 V	27	-1.52	51.68

- 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.
 7. The limit value is defined as per 15.247

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	24deg. C, 64%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	*5825.00	103.14 PK			1.13 H	170	62.69	40.45
1	*5825.00	93.32 AV			1.13 H	170	52.87	40.45
2	5850.00	60.27 PK	83.14	-22.87	1.02 H	229	19.76	40.52
2	5850.00	50.45 AV	73.32	-22.87	1.02 H	229	9.94	40.52
3	#11650.00	62.46 PK	74.00	-11.54	1.01 H	23	10.98	51.48
3	#11650.00	49.28 AV	54.00	-4.72	1.01 H	23	-2.20	51.48

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	*5825.00	112.51 PK			1.02 V	229	72.06	40.45
1	*5825.00	102.82 AV			1.02 V	229	62.37	40.45
2	5850.00	74.45 PK	92.51	-18.06	1.02 V	229	33.94	40.52
2	5850.00	59.95 AV	82.82	-22.87	1.02 V	229	19.43	40.52
3	#11650.00	63.71 PK	74.00	-10.29	1.09 V	46	12.23	51.48
3	#11650.00	51.34 AV	54.00	-2.66	1.09 V	46	-0.14	51.48

- 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.
 7. The limit value is defined as per 15.247

802.11a Turbo OFDM modulation

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	QPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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)
1	5725.00	68.97 PK	83.56	-14.59	1.38 H	29	28.78	40.19
1	5725.00	59.28 AV	73.87	-14.59	1.38 H	29	19.09	40.19
2	*5760.00	103.56 PK			1.38 H	29	63.27	40.29
2	*5760.00	93.87 AV			1.38 H	29	53.58	40.29
3	#11520.00	62.41 PK	74.00	-11.59	1.07 H	203	10.61	51.80
3	#11520.00	49.22 AV	54.00	-4.78	1.07 H	203	-2.58	51.80

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)
1	5725.00	83.45 PK	91.25	-7.80	1.04 V	228	43.26	40.19
1	5725.00	67.92 AV	82.16	-14.24	1.04 V	228	27.73	40.19
2	*5760.00	111.25 PK			1.04 V	228	70.96	40.29
2	*5760.00	102.16 AV			1.04 V	228	61.87	40.29
3	#11520.00	64.53 PK	74.00	-9.47	1.41 V	35	12.73	51.80
3	#11520.00	51.36 AV	54.00	-2.64	1.41 V	35	-0.44	51.80

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB).
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.
7. The limit value is defined as per 15.247.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	QPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	12Mbps	ENVIRONMENTAL CONDITIONS	24deg. C, 64%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)
1	*5800.00	103.12 PK			1.40 H	23	62.73	40.39
1	*5800.00	93.45 AV			1.40 H	23	53.06	40.39
2	5850.00	64.11 PK	83.12	-19.01	1.40 H	23	23.59	40.52
2	5850.00	54.44 AV	73.45	-19.01	1.40 H	23	13.92	40.52
3	#11600.00	61.24 PK	74.00	-12.76	1.01 H	95	9.63	51.61
3	#11600.00	48.06 AV	54.00	-5.94	1.01 H	95	-3.55	51.61

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)
1	*5800.00	110.90 PK			1.12 V	226	70.51	40.39
1	*5800.00	101.79 AV			1.12 V	226	61.40	40.39
2	5850.00	74.50 PK	90.90	-16.40	1.12 V	226	33.99	40.52
2	5850.00	62.78 AV	81.79	-19.01	1.12 V	226	22.27	40.52
3	#11600.00	62.45 PK	74.00	-11.55	1.13 V	242	10.84	51.61
3	#11600.00	49.20 AV	54.00	-4.80	1.13 V	242	-2.41	51.61

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB).
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.
7. The limit value is defined as per 15.247.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 TEST INSTRUMENTS

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

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

5.3.3 TEST PROCEDURE

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

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

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

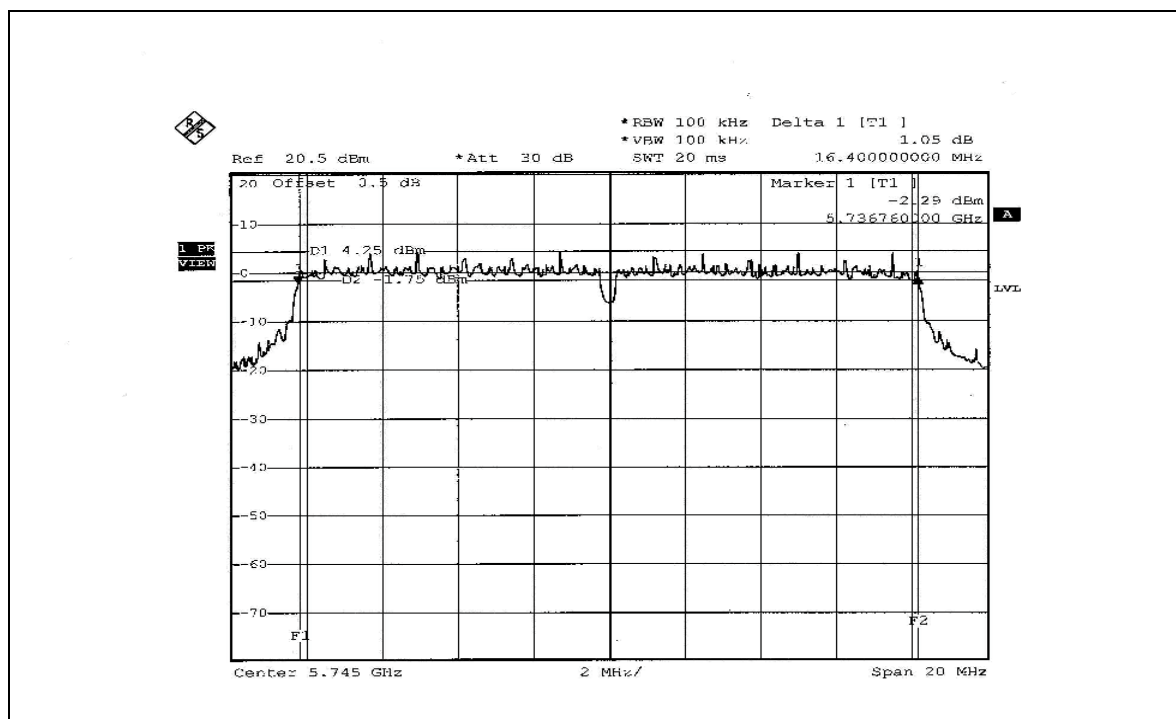
5.3.7 TEST RESULTS

802.11a OFDM modulation

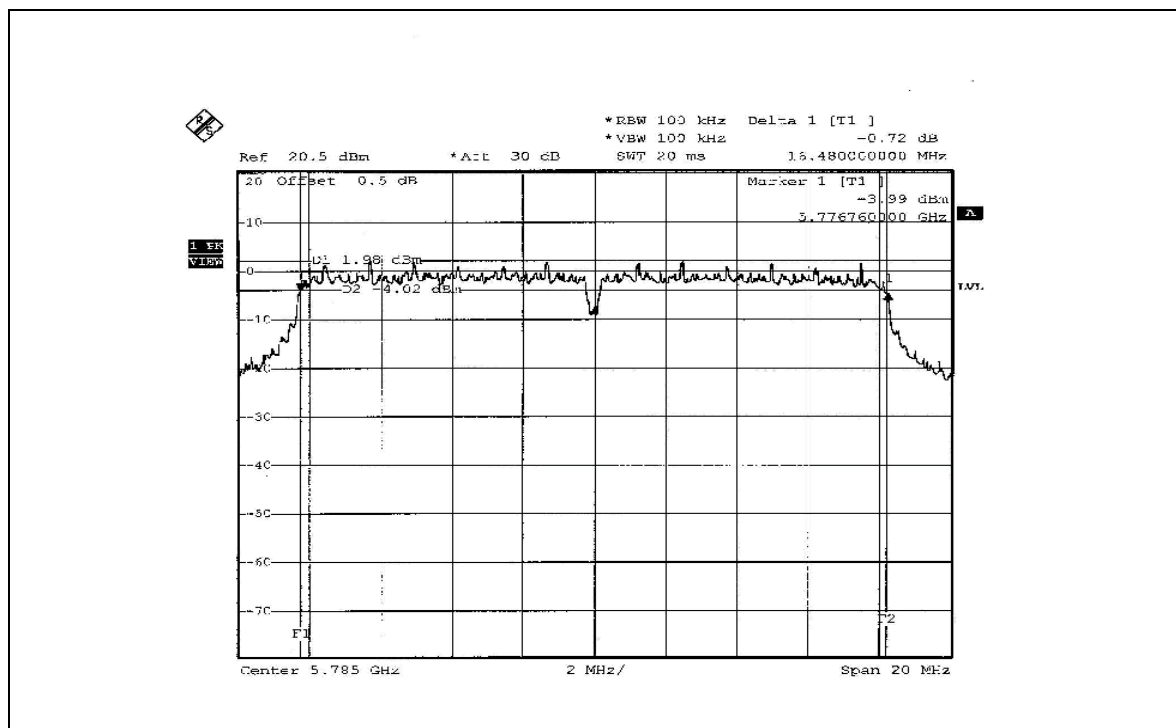
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5745	16.40	0.5	PASS
3	5785	16.48	0.5	PASS
5	5825	16.48	0.5	PASS

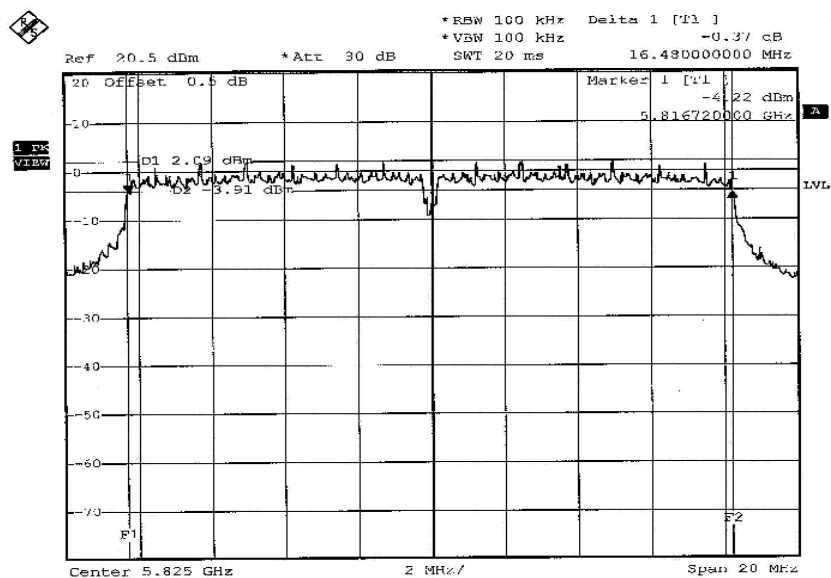
CH 1



CH 3



CH 5

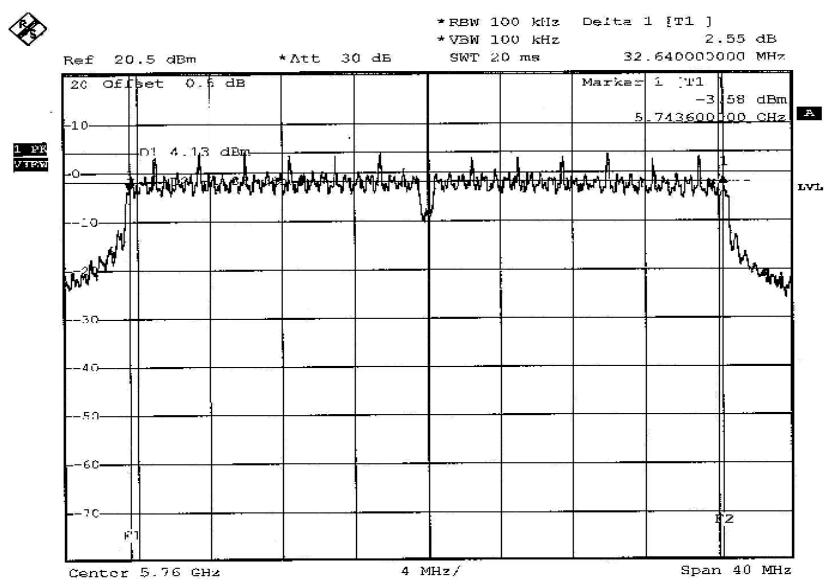


802.11a Turbo OFDM modulation

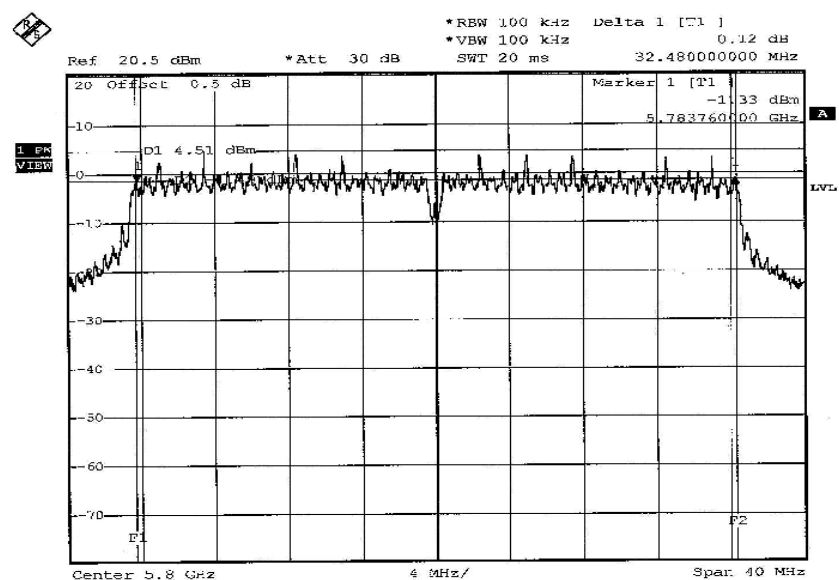
MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5760	32.64	0.5	PASS
2	5800	32.48	0.5	PASS

CH 1



CH 2



5.4 MAXIMUM PEAK OUTPUT POWER

5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

5.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 14, 2006
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2006
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Jan. 16, 2007
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

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

5.4.3 TEST PROCEDURES

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

5.4.4 DEVIATION FROM TEST STANDARD

No deviation

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6

5.4.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	100.693	20.03	30	PASS
3	5785	63.680	18.04	30	PASS
5	5825	63.387	18.02	30	PASS

802.11a Turbo OFDM modulation

MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5760	100.925	20.04	30	PASS
2	5800	100.231	20.01	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST INSTRUMENTS

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

NOTES:

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

5.5.3 TEST PROCEDURE

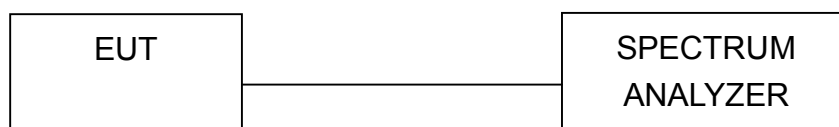
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

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

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

Same as Item 5.3.6

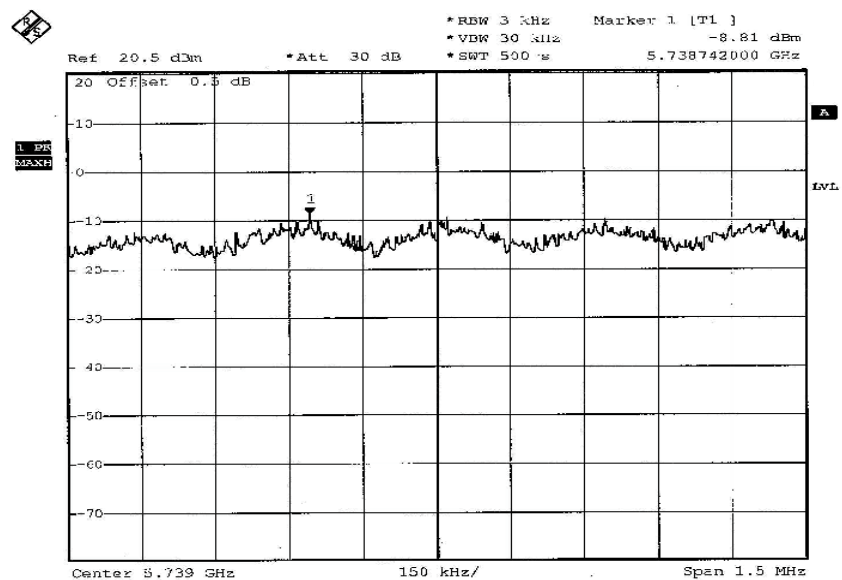
5.5.7 TEST RESULTS

802.11a OFDM modulation

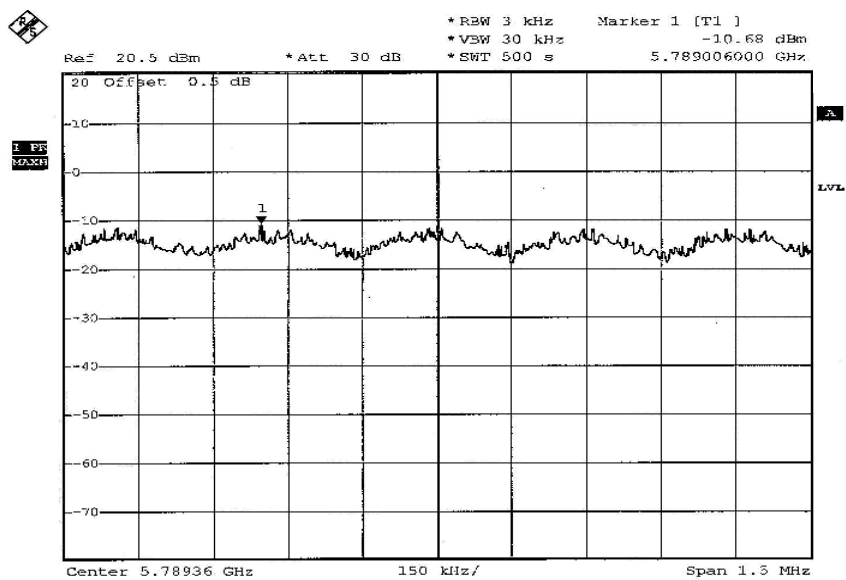
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5745	-8.81	8	PASS
3	5785	-10.68	8	PASS
5	5825	-10.66	8	PASS

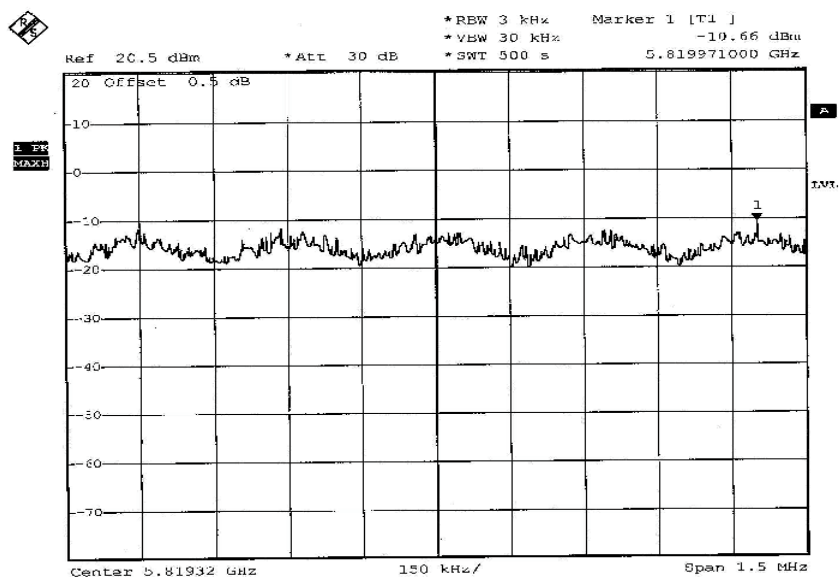
CH 1



CH 3



CH 5

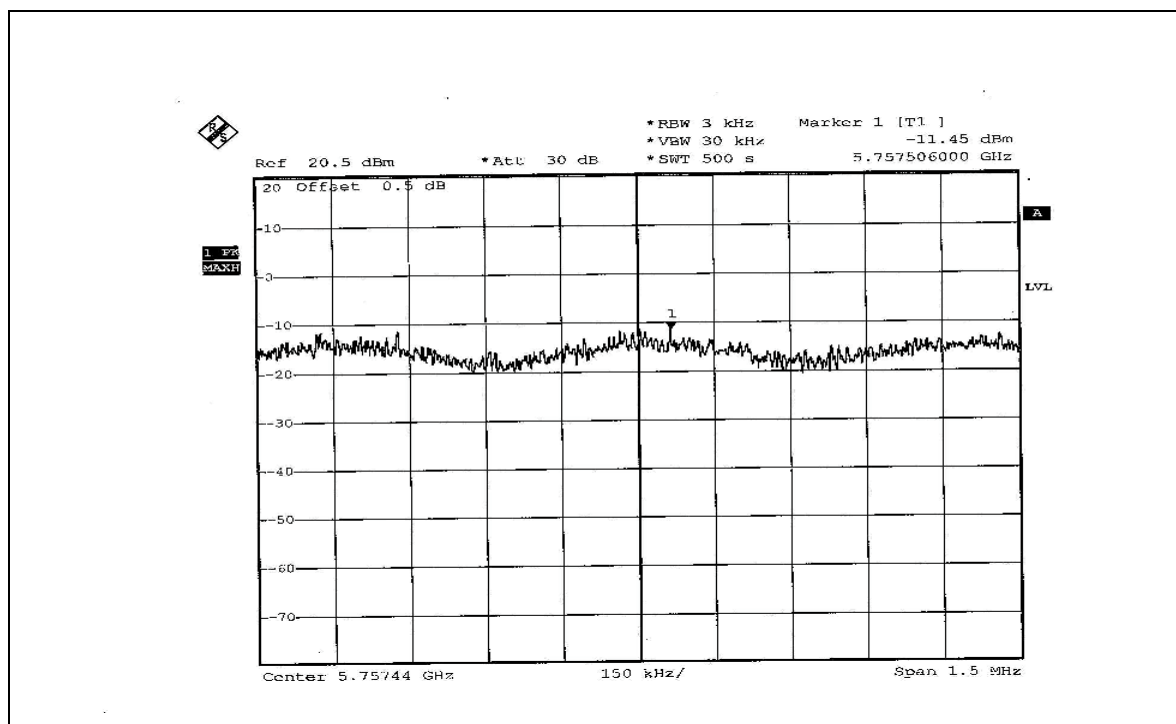


802.11a Turbo OFDM modulation

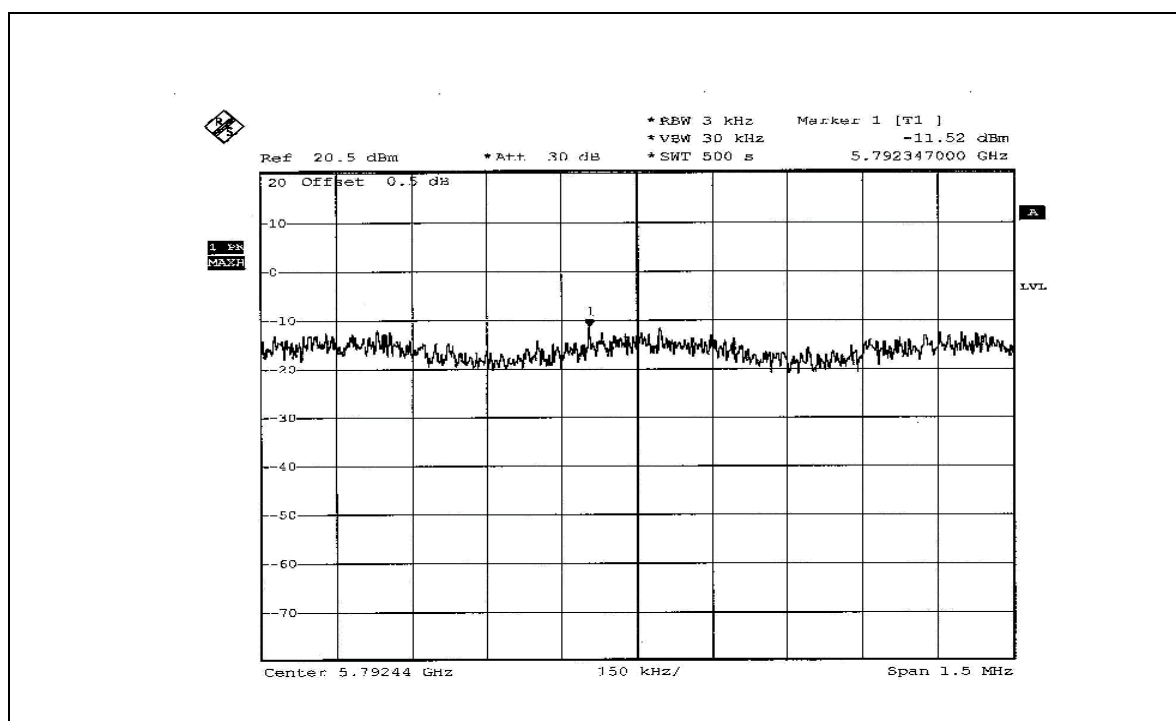
MODULATION TYPE	QPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5760	-11.45	8	PASS
2	5800	-11.52	8	PASS

CH 1



CH 2



5.6 BAND EDGES MEASUREMENT

5.6.1 LIMITS OF BAND EDGES MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

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

NOTES:

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

5.6.3 TEST PROCEDURE

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

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

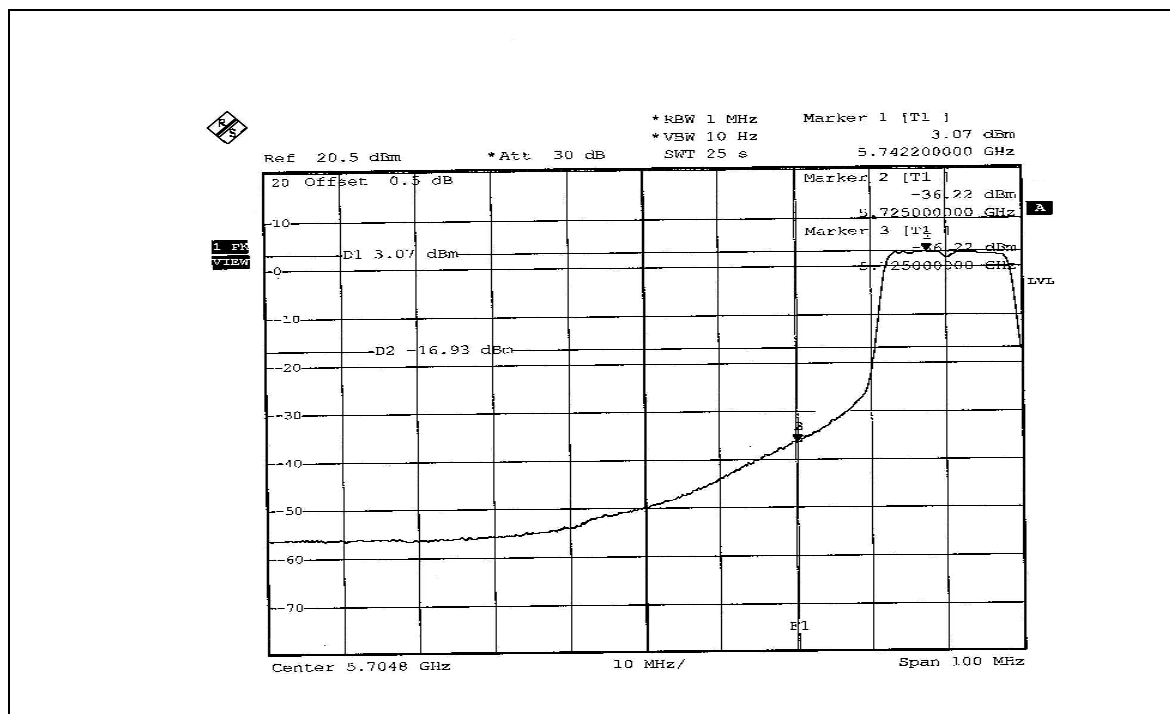
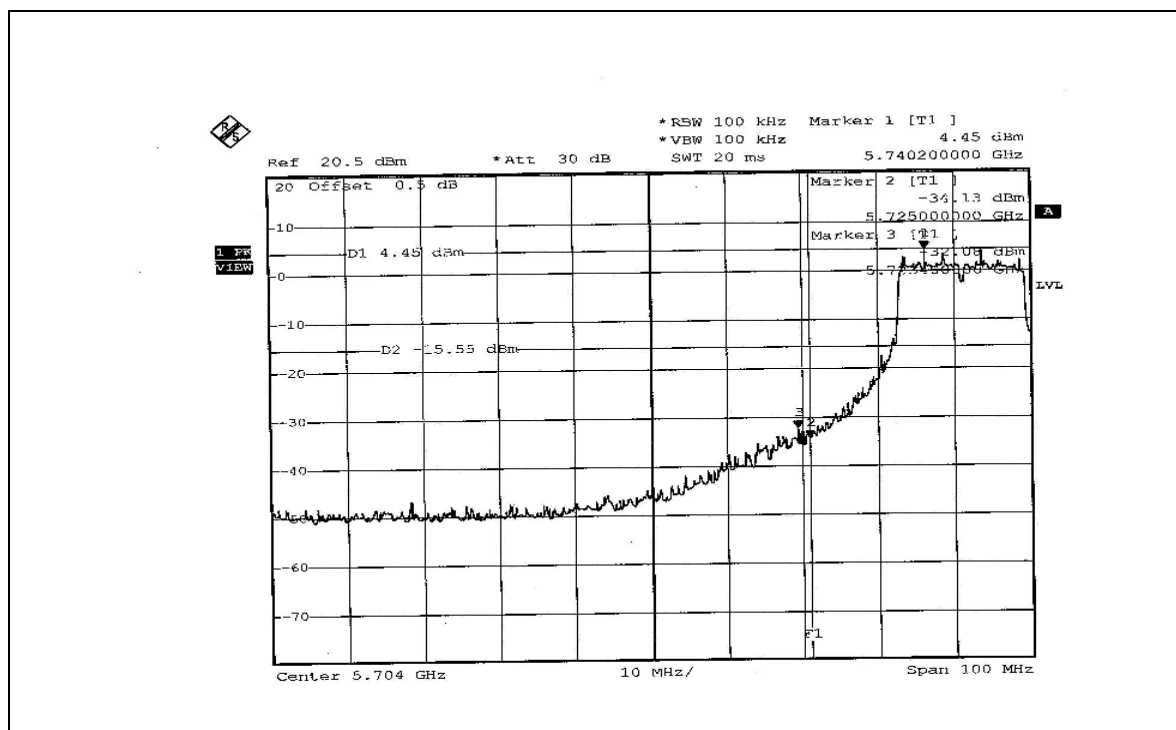
5.6.5 EUT OPERATING CONDITION

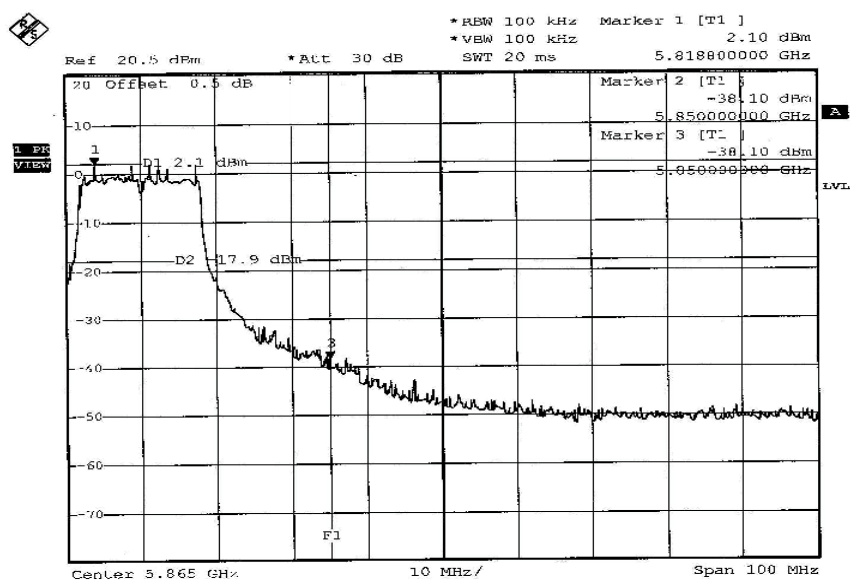
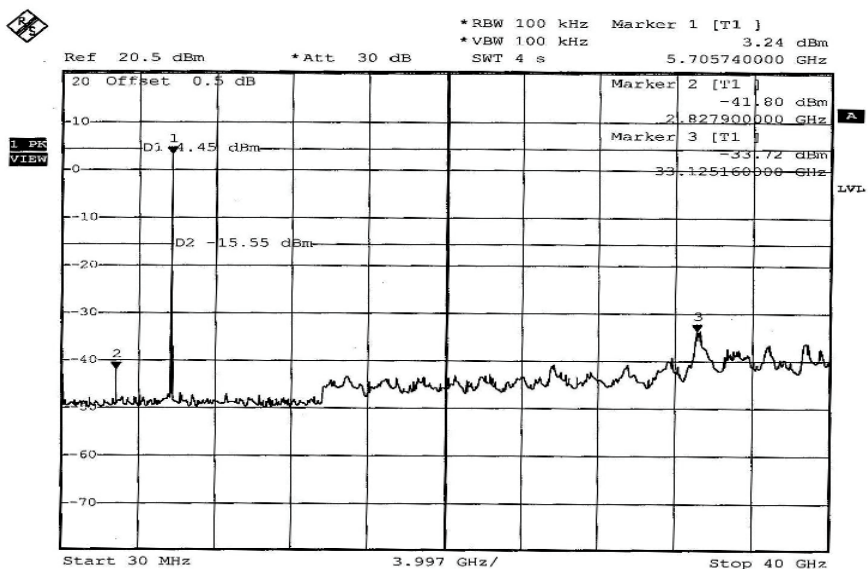
Same as Item 5.9.6

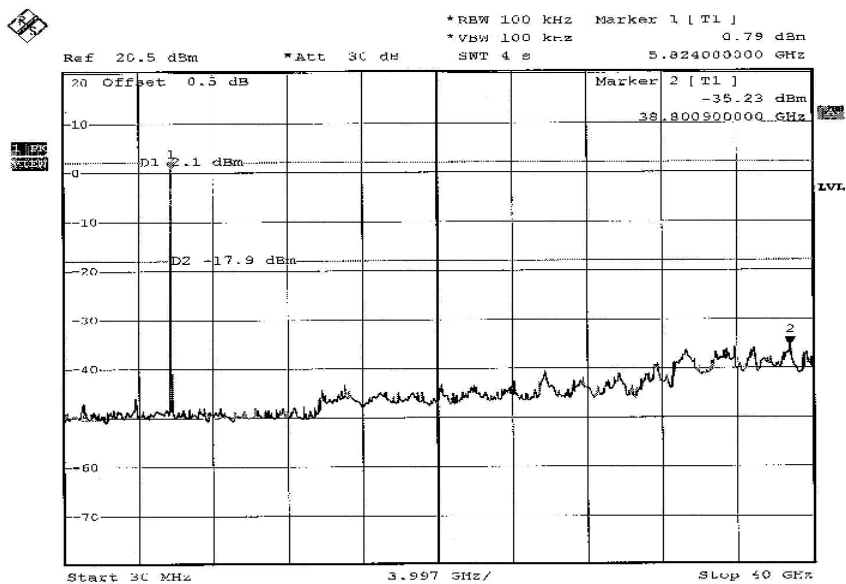
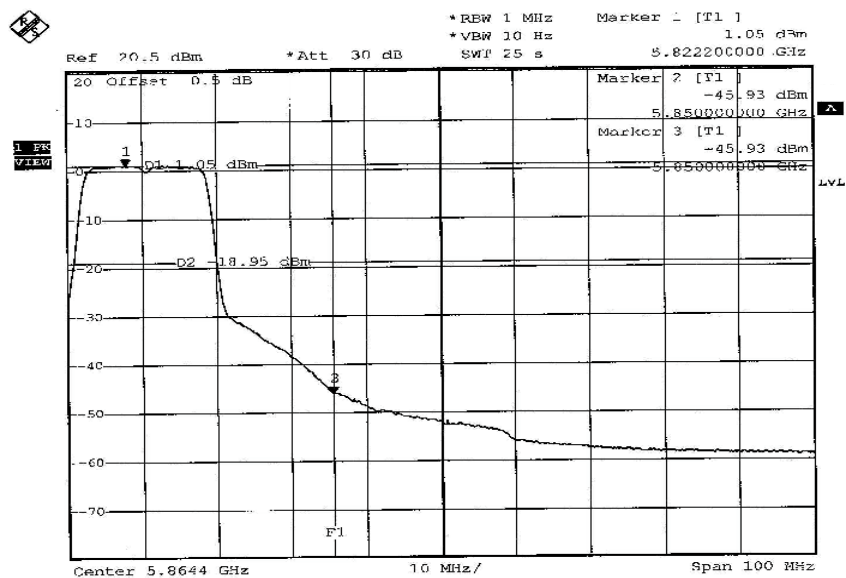
5.6.6 TEST RESULTS

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

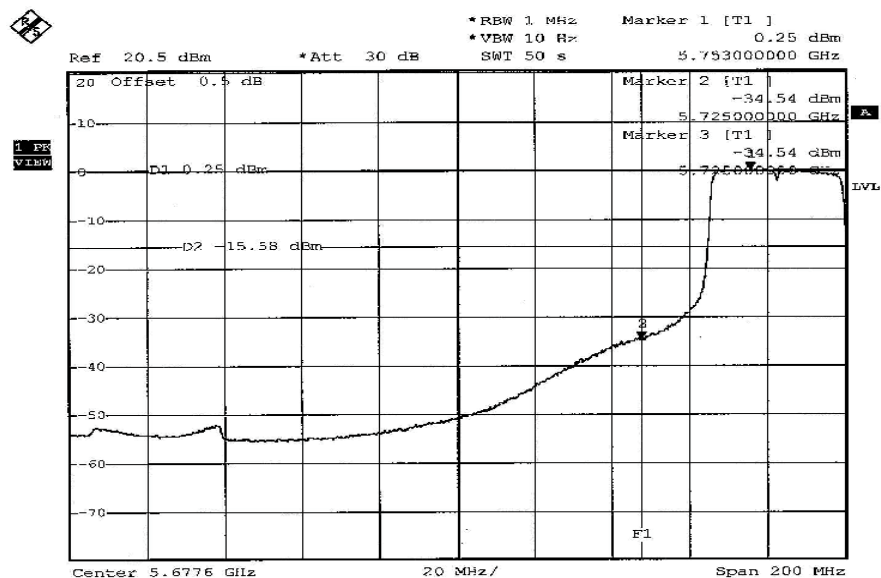
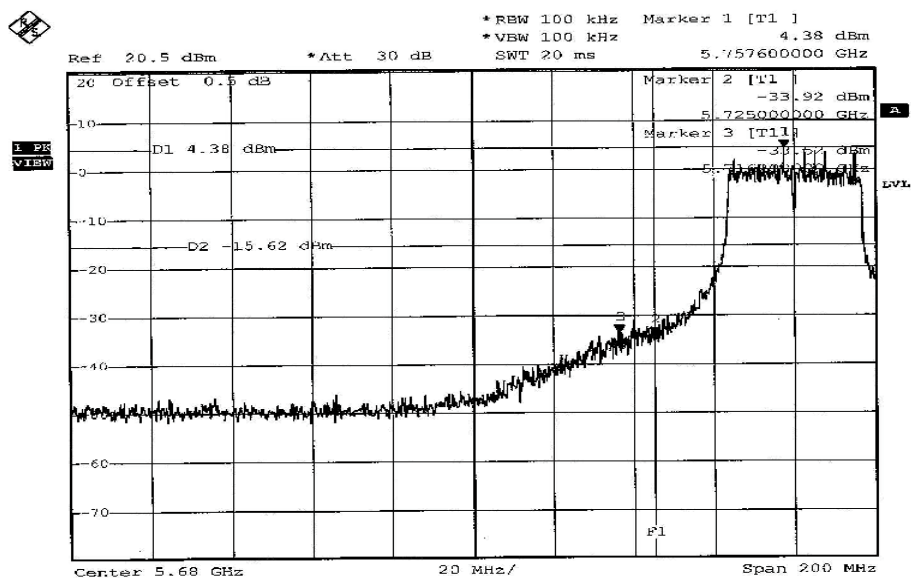
802.11a OFDM modulation

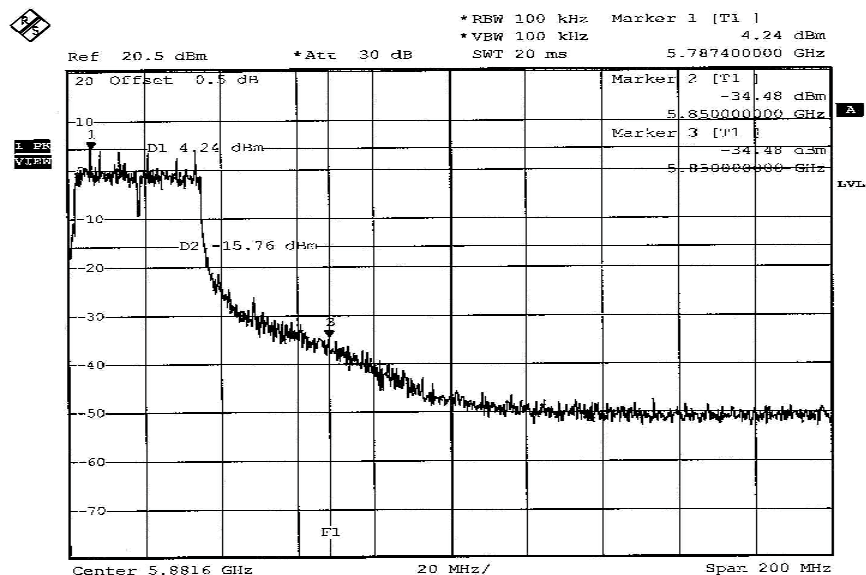
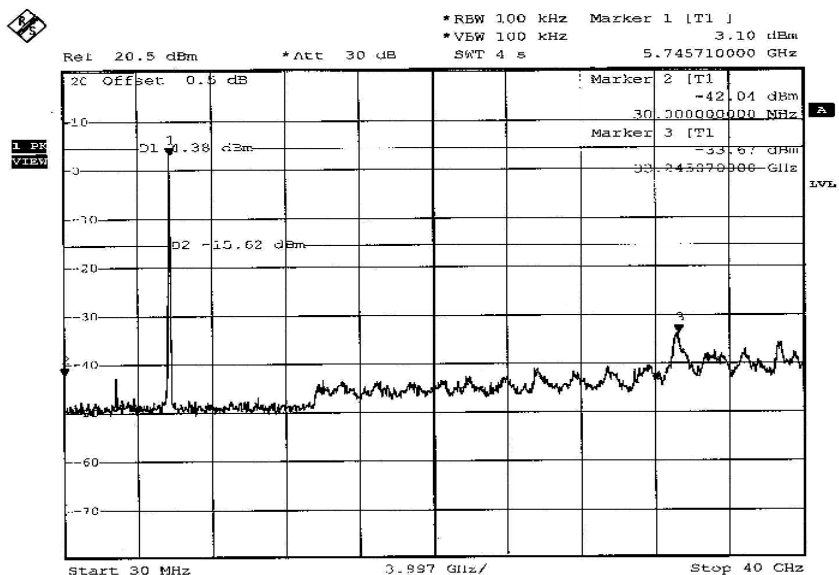


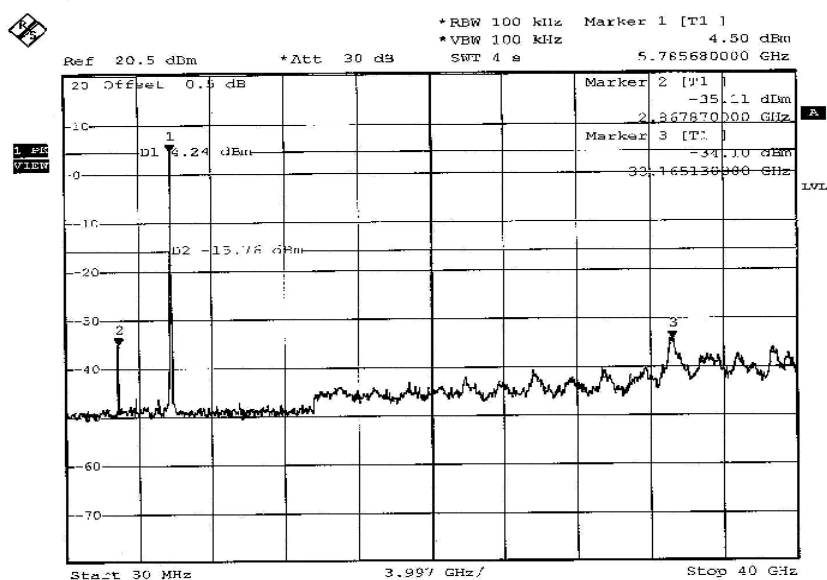
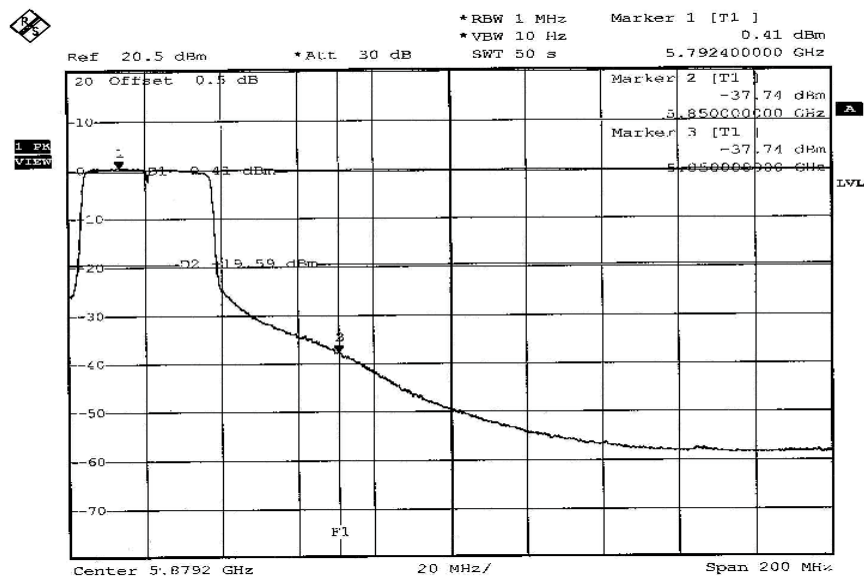




802.11a Turbo OFDM modulation







5.7 ANTENNA REQUIREMENT

5.7.1 STANDARD APPLICABLE

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

And according to FCC 47 CFR Section 15.247(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.

5.7.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Dipole antenna with Reverse SMA connector. The maximum Gain with antenna is 5dBi.

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: 886-2-26051924

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

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.