

FCC TEST REPORT (15.407)

REPORT NO.: RF951124L01

MODEL NO.: DCMA-82, DCMA-82 High Power,
DCMA-IHP, DCMA-HP, CM11, CM10-HI,
CM10-H, DCMA-SPI

RECEIVED: Nov. 24, 2006

TESTED: Jan. 09 to 18, 2007

ISSUED: Jan. 19, 2007

APPLICANT: Wistron NeWeb Corp.

ADDRESS: No. 10-1, Li-hsin Road I, Hsinchu Science
Park, Hsinchu 300, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

TEST LOCATION: No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien,
Taiwan, R.O.C.

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No. 2177-01

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1. CERTIFICATION

PRODUCT: High Powered 802.11a/g WLAN Mini-PCI 3A,
Industry High Powered 802.11a/g WLAN Mini-PCI 3A
Commercial High Powered 802.11a/g WLAN Mini-PCI 3A
High Powered 802.11a/b/g WLAN Mini-PCI Module
(Industrial Grade)
High Powered 802.11a/b/g WLAN Mini-PCI Module
Industry High-Power Safety-802.11p WLAN

BRAND NAME: WNC

MODEL NO.: DCMA-82, DCMA-82 High Power, DCMA-IHP,
DCMA-HP, CM11, CM10-HI, CM10-H, DCMA-SPI

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Jan. 09 to 18, 2007

APPLICANT: Wistron NeWeb Corp.

STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.4-2003

The above equipment (Model: DCMA-82) 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 : Carol Liao , **DATE:** Jan. 19, 2007
(Carol Liao)

TECHNICAL
ACCEPTANCE : Hank Chung , **DATE:** Jan. 19, 2007
Responsible for RF (Hank Chung)

APPROVED BY : May Chen , **DATE:** Jan. 19, 2007
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -0.32dB at 2.410MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 299.96MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.150 ~ 5.250GHz and 5.725 ~ 5.850GHz frequencies band. This report was recorded the RF parameters including 5.150 ~ 5.250GHz. For the 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz RF parameters was recorded in another test report.

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:

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

Measurement	Value
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	High Powered 802.11a/g WLAN Mini-PCI 3A, Industry High Powered 802.11a/g WLAN Mini-PCI 3A Commercial High Powered 802.11a/g WLAN Mini-PCI 3A High Powered 802.11a/b/g WLAN Mini-PCI Module (Industrial Grade) High Powered 802.11a/b/g WLAN Mini-PCI Module Industry High-Power Safety-802.11p WLAN
MODEL NO.	DCMA-82, DCMA-82 High Power, DCMA-IHP, DCMA-HP, CM11, CM10-HI, CM10-H, DCMA-SPI
FCC ID	NKRDCMA82
POWER SUPPLY	DC 3.3V 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 802.11j: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 2)
FREQUENCY RANGE	802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.15 ~ 5.25GHz and 5.725 ~ 5.850GHz 802.11j: 4940 ~ 4990MHz
NUMBER OF CHANNEL	802.11b & 802.11g: 11 (1 for 802.11g Turbo mode) 802.11a: 9 (3 for 802.11a Turbo mode) 802.11j: 8(3 for 10MHz System; 5 for 20MHz System)
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz for Normal mode 802.11j: 5MHz and 10MHz
OUTPUT POWER	Please see note 5 (on next page)
ANTENNA TYPE	Please see note 3 (on next page)

NOTE:

1. The EUT operates in 4.9GHz and both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.

2. This EUT is capable of providing data rates of up to 108 Mbps in 802.11a and 802.11g Turbo mode depending upon reception quality.

3. There are four antennas provided to this EUT, please refer to the following table:

For 2.4GHz							
No.	Brand Name	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
1	* Wistron Neweb Corp.	DBA-SSMA-01	1.29	0.5	0.79	dipole	RSMA
2	CUSHCRUFT	SRS2400MRA	2	0.5	1.5	dipole	RSMA
Note: For 2.4GHz antennas, antenna 2 was selected as representative antenna for the test.							
For 5GHz							
No.	Brand Name	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
A	* Wistron Neweb Corp.	DBA-SSMA-01	2.06	0.9	1.16	dipole	RSMA
B	CUSHCRUFT	SRS5150MRA	2	0.9	1.1	dipole	RSMA
C	** HUBER+SUHNER	SPA 5500/40/14/O/V_C	13.5	0.9	12.6	panel	SMA
Note: 1. For 5GHz antennas, antenna A and C were selected as representative antennas for the test.							
2. “*” is a Dual Band antenna can be used in both 2.4GHz and 5GHz.							
3. “**” is an Outdoor Antenna it can only be used in point-to-point applications.							

4. Frequency Range of each Antennas are as followings:

For 2.4GHz	
Antenna No.	Frequency Range
No. 1 & 2	2400MHz ~ 2483.5MHz
For 5GHz	
Antenna No.	Frequency Range
No. A & B	5.15GHz~5.25GHz and 5.725GHz ~ 5.850GHz
No. C	5.725GHz ~ 5.850GHz

5. Peak output power (Unit : mW) :

No.	Model No.	Operating Frequency (MHz)	
		2412MHz ~ 2462MHz	
1	DBA-SSMA-01	363.078	
2	SRS2400MRA	363.078	
No.	Model No.	Operating Frequency (MHz)	
		5150~5250	5725~5850
A	DBA-SSMA-01	29.923	380.189
B	SRS5150MRA	29.923	380.189
C	SPA 5500/40/14/O/V_C	NA	380.189

6. The EUT has eight product names and model names, which are identical to each other in all aspects except for the followings:

Product name	Model name	Description
High Powered 802.11a/g WLAN Mini-PCI 3A	DCMA-82	for market
High Powered 802.11a/g WLAN Mini-PCI 3A	DCMA-82 High Power	
Industry High Powered 802.11a/g WLAN Mini-PCI 3A	DCMA-IHP	
Commercial High Powered 802.11a/g WLAN Mini-PCI 3A	DCMA-HP	
High Powered 802.11a/g WLAN Mini-PCI 3A	CM11	
High Powered 802.11a/b/g WLAN Mini-PCI Module (Industrial Grade)	CM10-HI	
High Powered 802.11a/b/g WLAN Mini-PCI Module	CM10-H	
Industry High-Power Safety-802.11p WLAN	DCMA-SPI	

From the above models, model: **DCMA-82** was selected as representative model for the test and its data was recorded in this report.

7. The EUT has two samples, one is for MMCX connector the other is for U.FL. connector.
8. The two samples were pre-tested in chamber, EUT with MMCX connector, the worse case one, was chosen for final test.
9. 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 5150MHz ~ 5350MHz bands:

Four channels are provided to this EUT for normal mode.

Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz

One channel is provided to this EUT for turbo mode.

Channel	Frequency
1	5210 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

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 4	1	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 4	1	OFDM	BPSK	6

Radiated Emission Test (Above 1 GHz):

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 4	1, 4	OFDM	BPSK	6
802.11a Turbo	1	1	OFDM	BPSK	12

Bandedge Measurement:

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 4	1, 4	OFDM	BPSK	6
802.11a Turbo	1	1	OFDM	BPSK	12

Antenna Port Conducted Measurement:

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 4	1, 4	OFDM	BPSK	6
802.11a Turbo	1	1	OFDM	BPSK	12

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a High Powered 802.11a/g WLAN Mini-PCI 3A. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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

3.4 DESCRIPTION OF SUPPORT UNITS

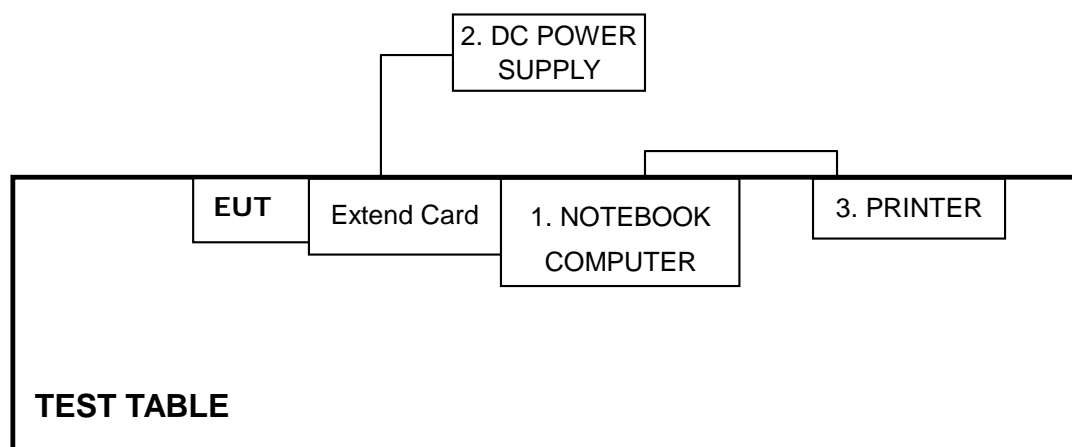
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	C600	6DRV601	FCC DoC
2	DC POWER SUPPLY	GOOD WILL INSTRUMENT CO., LTD.	GPC-3030D	7700087	B94C2642X
3	PRINTER	EPSON	LQ-300+	DCGY047261	B94C2642X
4	Extend Card	ADT	NA	NA	NA

No.	Signal cable description
1	NA
2	NA
3	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
4	NA

Note: 1. All power cords of the above support units are unshielded (1.8m).

3.5 CONFIGURATION OF SYSTEM UNDER TEST



NOTE: 1. Please refer to the photos of test configuration.

4. TEST TYPES AND RESULTS

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	ESCS 30	847124/029	Dec. 14, 2007
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	KNW-407	8/1395/12	Aug. 15, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
 3. The VCCI Con B Registration No. is C-2193.

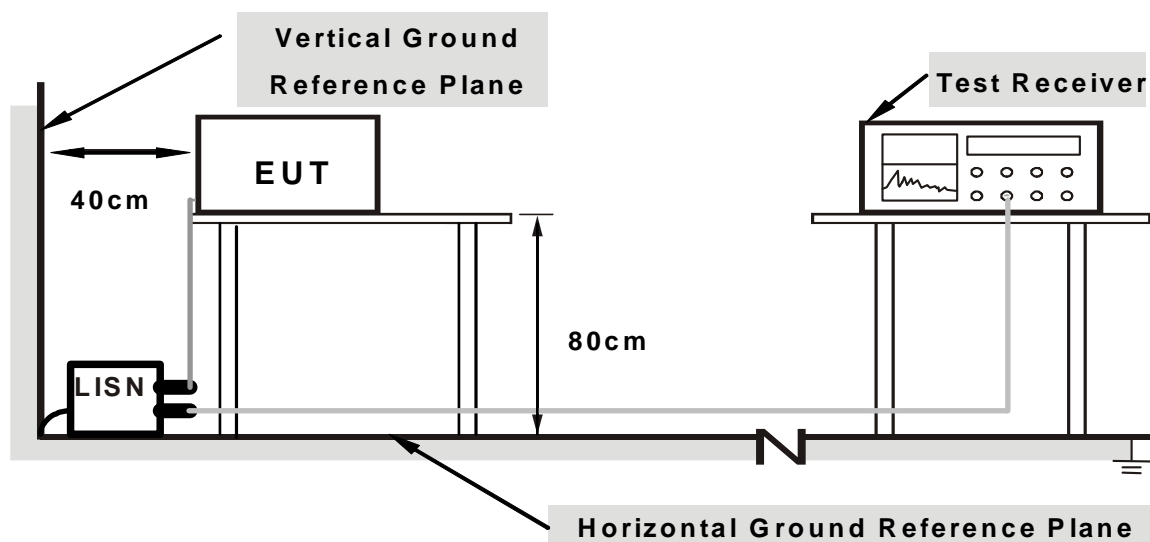
4.1.3 TEST PROCEDURES

- 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
- b. provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission level 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) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

- a. Connect the EUT with the support unit 1 (Notebook computer) which placed on a testing table.
- b. The support unit 1 (Notebook computer) ran a test program “Art 53 b 5” to enable EUT under transmission condition continuously.
- c. Notebook computer sends "H" messages to printer, and the printer prints them on paper.

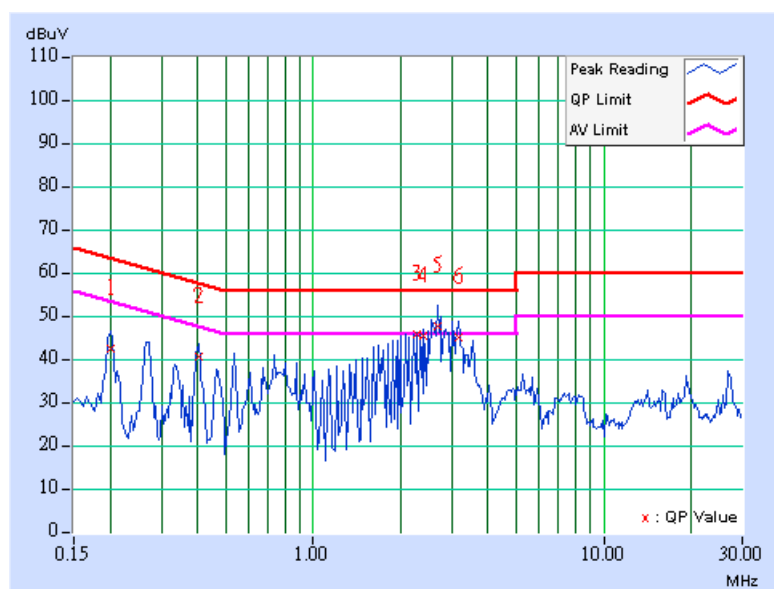
4.1.7 TEST RESULTS

Conducted Worst-Case Data

MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
INPUT POWER	DC 3.3V	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	22deg. C, 50%RH, 955hPa	PHASE	Positive
TESTED BY	Sky Liao		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	9.60	32.88	-	42.48	-	63.58	53.58	-21.10	-
2	0.404	9.60	31.22	-	40.82	-	57.77	47.77	-16.95	-
3	2.273	9.70	36.36	35.46	46.06	45.16	56.00	46.00	-9.94	-0.84
4	2.406	9.70	35.96	-	45.66	-	56.00	46.00	-10.34	-
5	2.678	9.70	38.08	35.73	47.78	45.43	56.00	46.00	-8.22	-0.57
6	3.148	9.70	35.55	-	45.25	-	56.00	46.00	-10.75	-

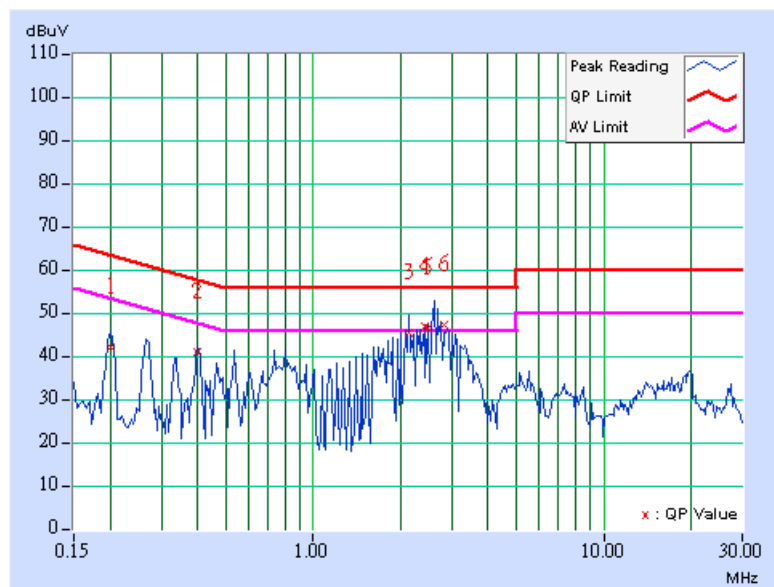
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
INPUT POWER	DC 3.3V	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	22deg. C, 50%RH, 955hPa	PHASE	Negative
TESTED BY	Sky Liao		

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	0.201	9.60	32.48	-	42.08	-	63.58	53.58	-21.50	-
2	0.400	9.60	31.33	-	40.93	-	57.85	47.85	-16.92	-
3	2.145	9.70	35.77	-	45.47	-	56.00	46.00	-10.53	-
4	2.410	9.70	37.25	35.98	46.95	45.68	56.00	46.00	-9.05	-0.32
5	2.477	9.70	36.87	35.73	46.57	45.43	56.00	46.00	-9.43	-0.57
6	2.813	9.70	37.63	35.76	47.33	45.46	56.00	46.00	-8.67	-0.54

- 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:

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

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

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

NOTE:

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

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

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Sep. 18, 2007
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 20, 2007
CHASE Broadband Antenna	VULB9168	138	Dec. 10, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 04, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
R&S Loop Antenna	HFH2-Z2	881058/15	Nov. 29, 2007
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Jul. 15, 2007
Software	ADT_Radiated_V 5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

- Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Biconical and Periodic Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.
7. Loop antenna was used for all emissions below 30 MHz.

4.2.4 TEST PROCEDURES

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

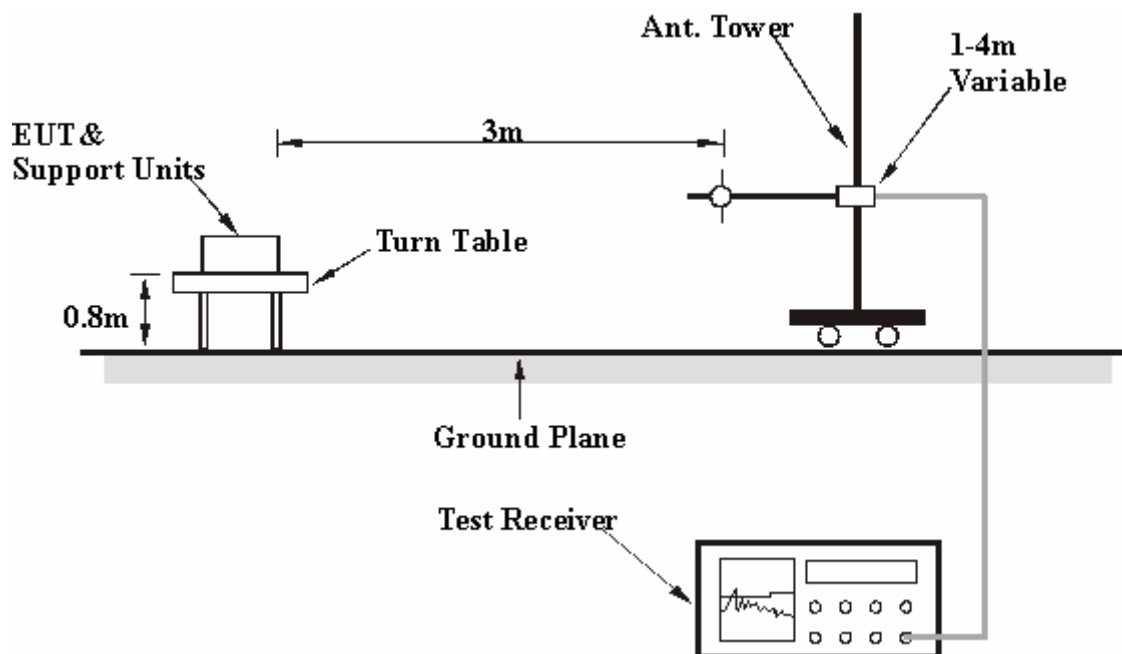
NOTE:

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

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



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

4.2.7 EUT OPERATING CONDITION

- Connect the EUT with the support unit 1 (Notebook computer) which placed on a testing table.
- The support unit 1 (Notebook computer) ran a test program "Art 53 b 5" to enable EUT under transmission condition continuously.
- Notebook computer sends "H" messages to printer, and the printer prints them on paper.

4.2.8 TEST RESULTS –ANTENNA A

Below 1GHz Worst-Case Data

MODE	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH, 965hPa	TESTED BY	Sky Liao

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	66.58	32.60 QP	40.00	-7.40	3.36 H	195	19.60	13.00
2	133.22	38.80 QP	43.50	-4.70	2.64 H	62	25.90	12.90
3	166.64	41.20 QP	43.50	-2.30	1.72 H	348	27.40	13.80
4	168.00	36.70 QP	43.50	-6.80	1.64 H	305	23.00	13.70
5	199.92	37.50 QP	43.50	-6.00	1.15 H	75	25.90	11.60
6	233.18	43.20 QP	46.00	-2.80	1.06 H	14	30.20	13.00
7	299.96	44.60 QP	46.00	-1.40	1.08 H	45	27.80	16.80
8	332.64	44.40 QP	46.00	-1.60	1.02 H	8	27.20	17.20
9	366.40	43.80 QP	46.00	-2.20	1.72 H	128	25.90	17.90
10	566.28	43.50 QP	46.00	-2.50	1.06 H	118	19.90	23.60
11	799.98	36.40 QP	46.00	-9.60	1.02 H	72	8.80	27.60
12	999.91	37.70 QP	54.00	-16.30	1.00 H	27	7.80	29.90

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	66.62	34.80 QP	40.00	-5.20	1.00 V	156	21.80	13.00
2	72.62	34.80 QP	40.00	-5.20	1.00 V	92	22.90	11.90
3	133.36	35.20 QP	43.50	-8.30	1.00 V	252	22.30	12.90
4	166.60	36.90 QP	43.50	-6.60	1.00 V	68	23.10	13.80
5	168.00	39.60 QP	43.50	-3.90	1.00 V	52	25.90	13.70
6	199.96	35.80 QP	43.50	-7.70	1.00 V	28	24.20	11.60
7	233.14	42.10 QP	46.00	-3.90	1.00 V	79	29.10	13.00
8	366.52	41.80 QP	46.00	-4.20	1.00 V	68	23.90	17.90
9	400.00	42.40 QP	46.00	-3.60	1.00 V	174	23.40	19.00
10	433.06	41.30 QP	46.00	-4.70	1.00 V	130	21.30	20.00
11	999.98	42.40 QP	54.00	-11.60	1.00 V	12	12.50	29.90

- 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

802.11a OFDM modulation

MODE	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH, 965hPa	TESTED BY	Sky Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	42.50 PK	74.00	-31.50	1.06 H	251	5.80	36.70
1	#5150.00	27.10 AV	54.00	-26.90	1.06 H	251	-9.60	36.70
2	*5180.00	93.00 PK			1.06 H	251	56.30	36.70
2	*5180.00	82.00 AV			1.06 H	251	45.30	36.70
3	10360.00	57.10 PK	68.30	-11.20	1.27 H	190	11.50	45.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	56.90 PK	74.00	-17.10	1.12 V	90	20.20	36.70
1	#5150.00	41.20 AV	54.00	-12.80	1.12 V	90	4.50	36.70
2	*5180.00	107.40 PK			1.12 V	90	70.70	36.70
2	*5180.00	96.10 AV			1.12 V	90	59.40	36.70
3	10360.00	59.20 PK	68.30	-9.10	1.32 V	160	13.60	45.60

- 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.

MODE	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH, 965hPa	TESTED BY	Sky Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	85.00 PK			1.07 H	250	48.20	36.80
1	*5240.00	74.00 AV			1.07 H	250	37.20	36.80
2	10480.00	56.60 PK	68.30	-11.70	1.16 H	186	10.80	45.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	99.70 PK			1.13 V	27	62.90	36.80
1	*5240.00	88.60 AV			1.13 V	27	51.80	36.80
2	10480.00	58.30 PK	68.30	-10.00	1.38 V	45	12.50	45.70

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

802.11a Turbo OFDM modulation

CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 72%RH, 966hPa	TESTED BY	Sky Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	34.50 PK	74.00	-39.50	1.00 H	250	-2.20	36.70
1	#5150.00	23.80 AV	54.00	-30.20	1.00 H	250	-12.90	36.70
2	*5210.00	86.90 PK			1.00 H	250	50.10	36.80
2	*5210.00	77.20 AV			1.00 H	250	40.40	36.80
3	10420.00	56.10 PK	68.30	-12.20	1.05 H	15	10.50	45.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	48.10 PK	74.00	-25.90	1.10 V	15	11.40	36.70
1	#5150.00	36.70 AV	54.00	-17.30	1.10 V	15	0.00	36.70
2	*5210.00	100.50 PK			1.10 V	15	63.70	36.80
2	*5210.00	90.10 AV			1.10 V	15	53.30	36.80
3	10420.00	56.20 PK	68.30	-12.10	1.30 V	6	10.60	45.70

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

4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

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

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

NOTE:

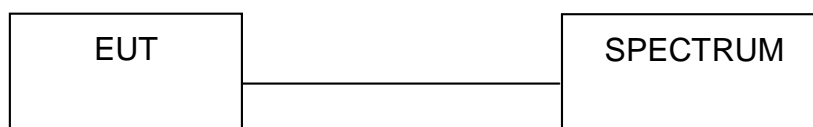
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11a OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 965hPa
TESTED BY	Sky Liao		

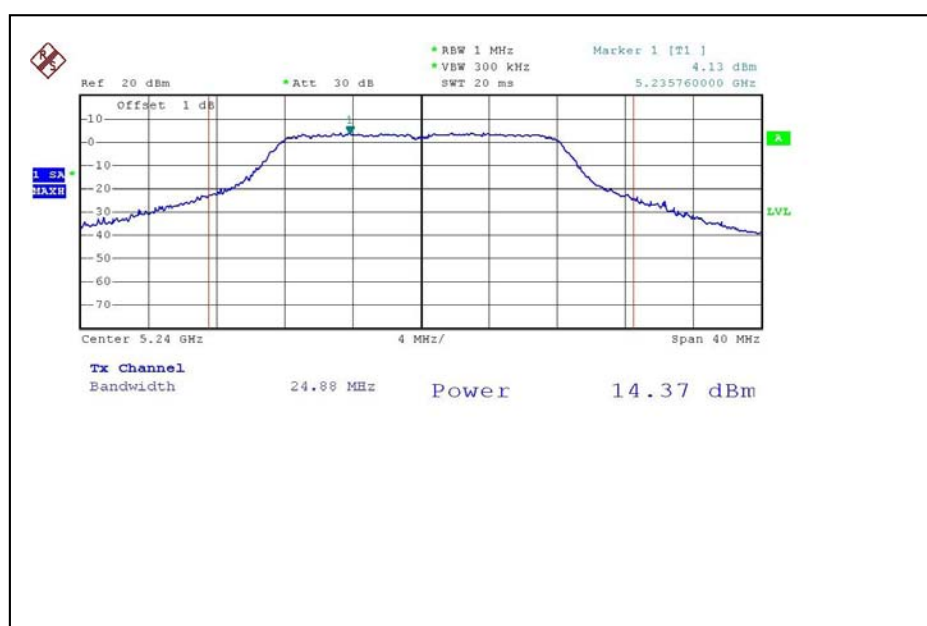
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	14.52	28.314	17	25.76	PASS
4	5240	14.37	27.353	17	24.88	PASS

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

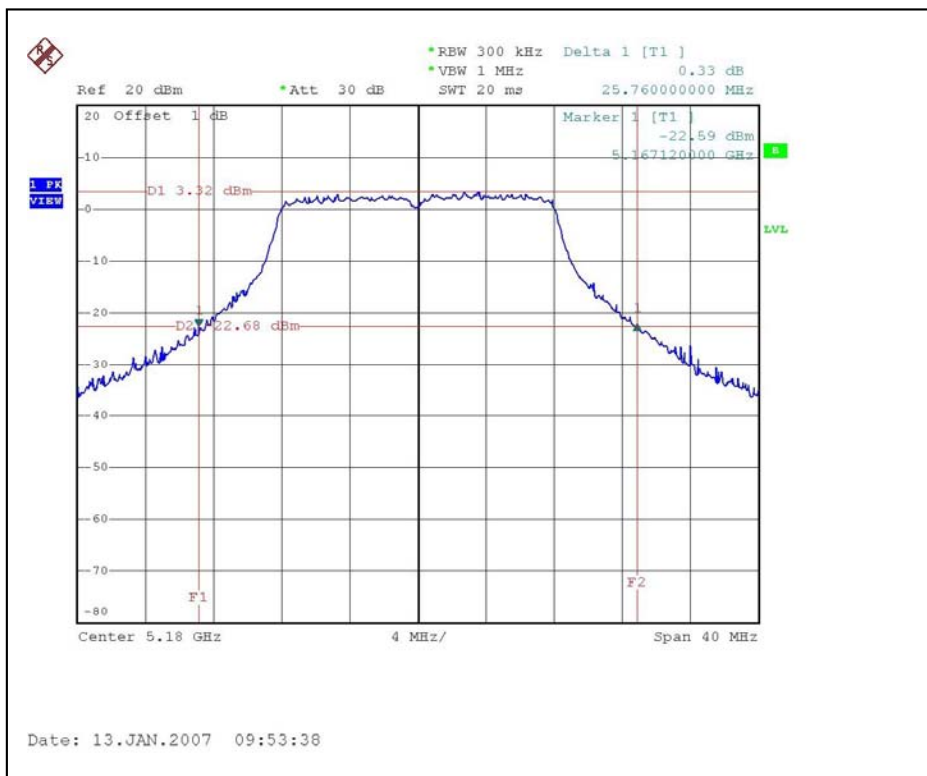
Peak Power Output: CH1



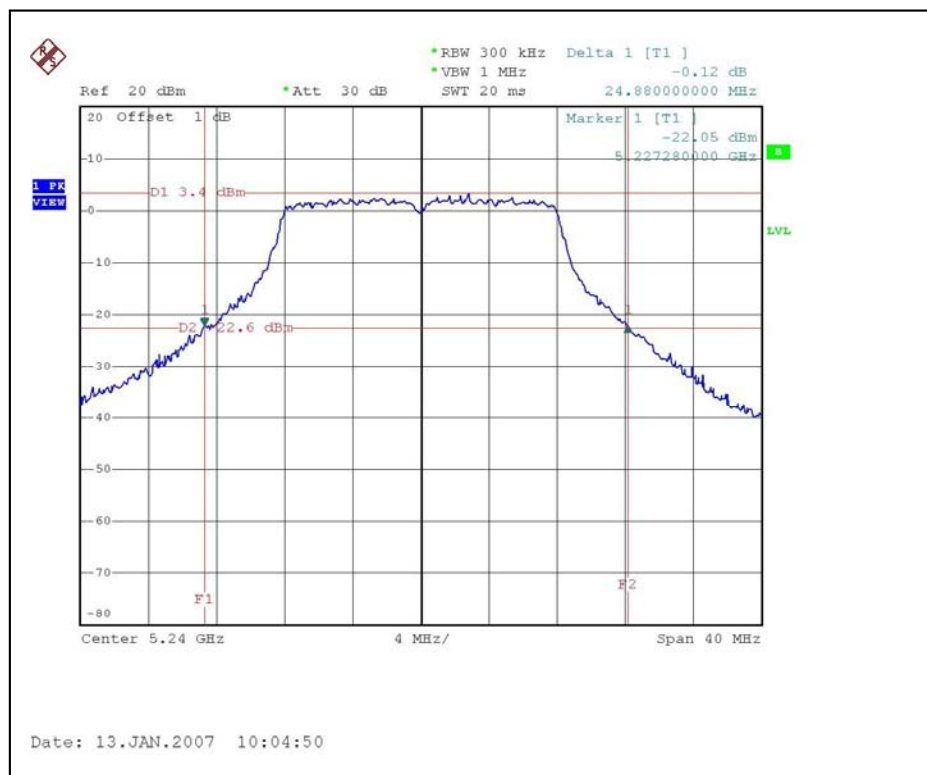
CH4



26dB Occupied Bandwidth: CH1



CH4



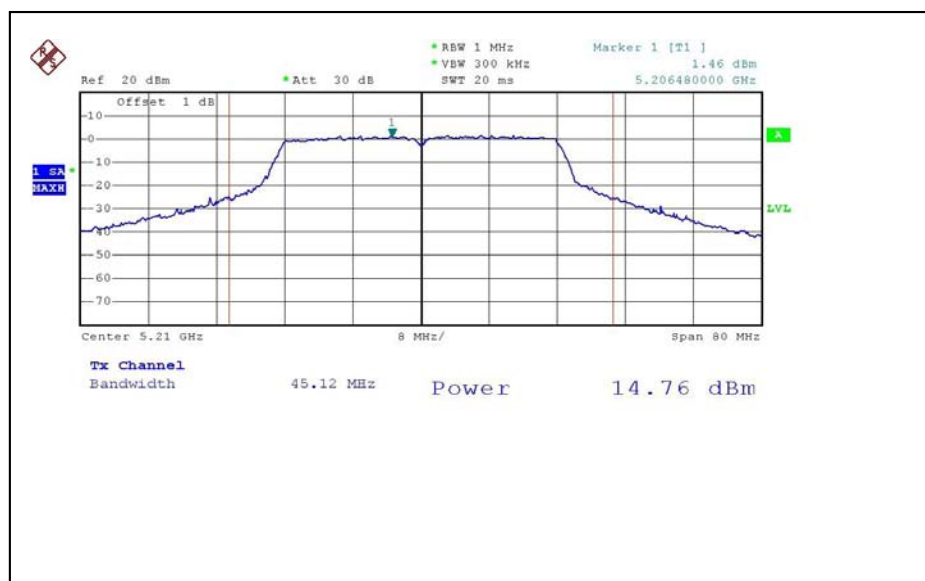
802.11a Turbo OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 966hPa
TESTED BY	Sky Liao		

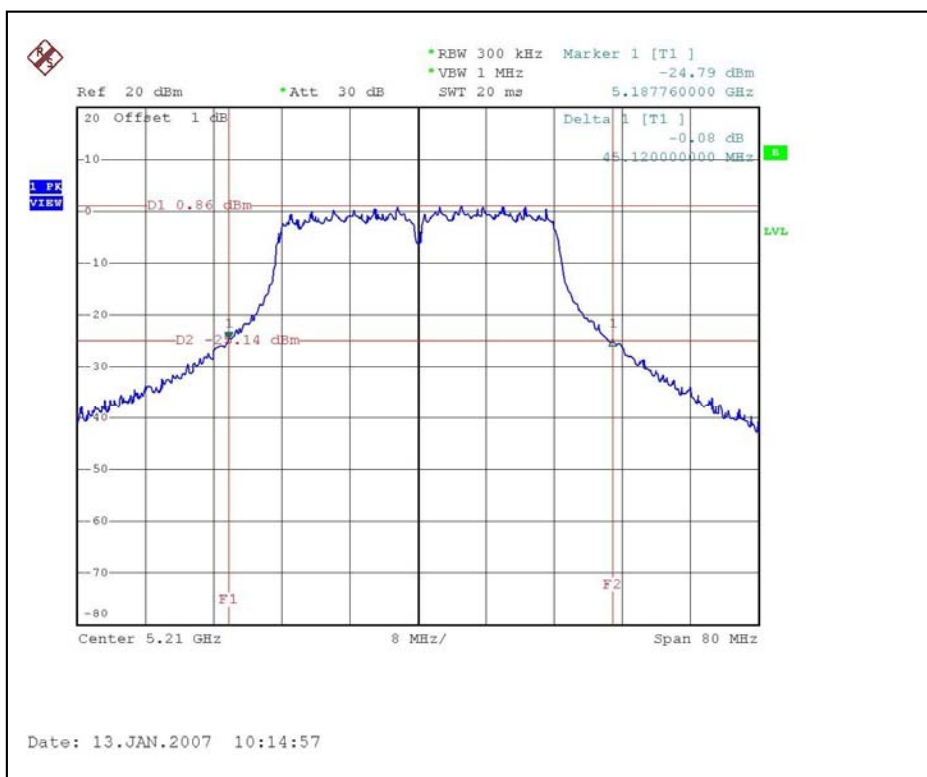
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER OUTPUT (mW)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5210	14.76	29.923	17	45.12	PASS

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

Peak Power Output:
CH1



26dB Occupied Bandwidth: CH1



4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

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

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

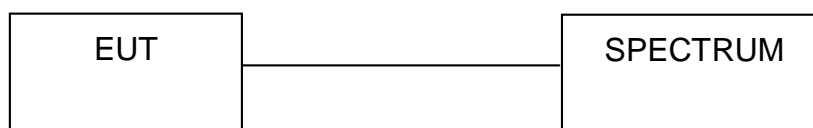
4.4.3 TEST PROCEDURE

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

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

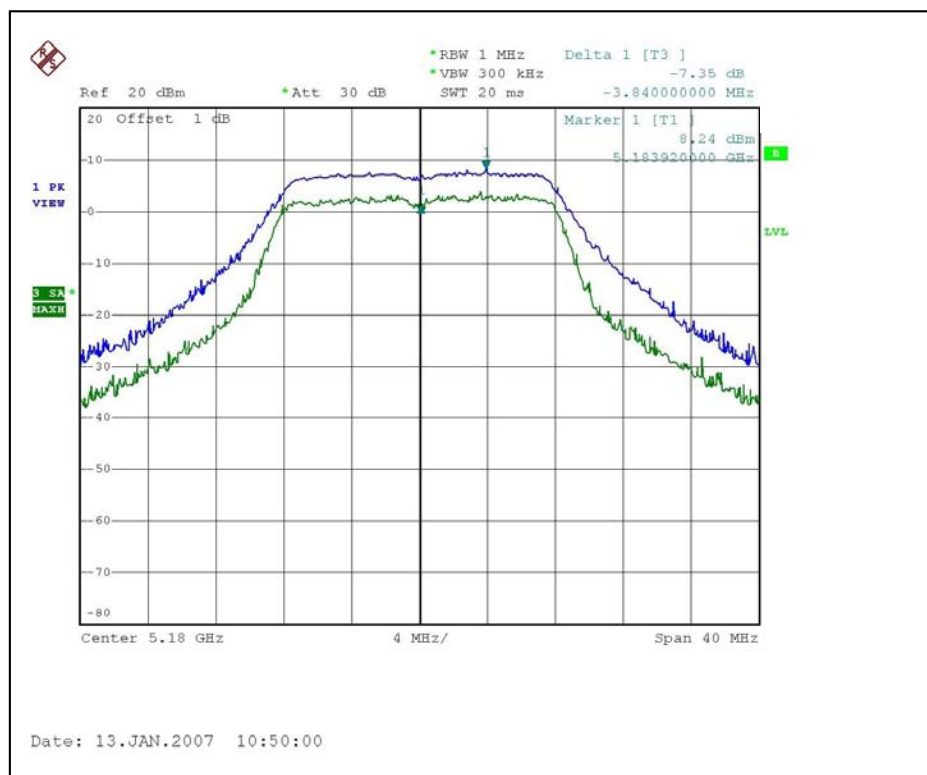
4.4.7 TEST RESULTS

802.11a OFDM modulation

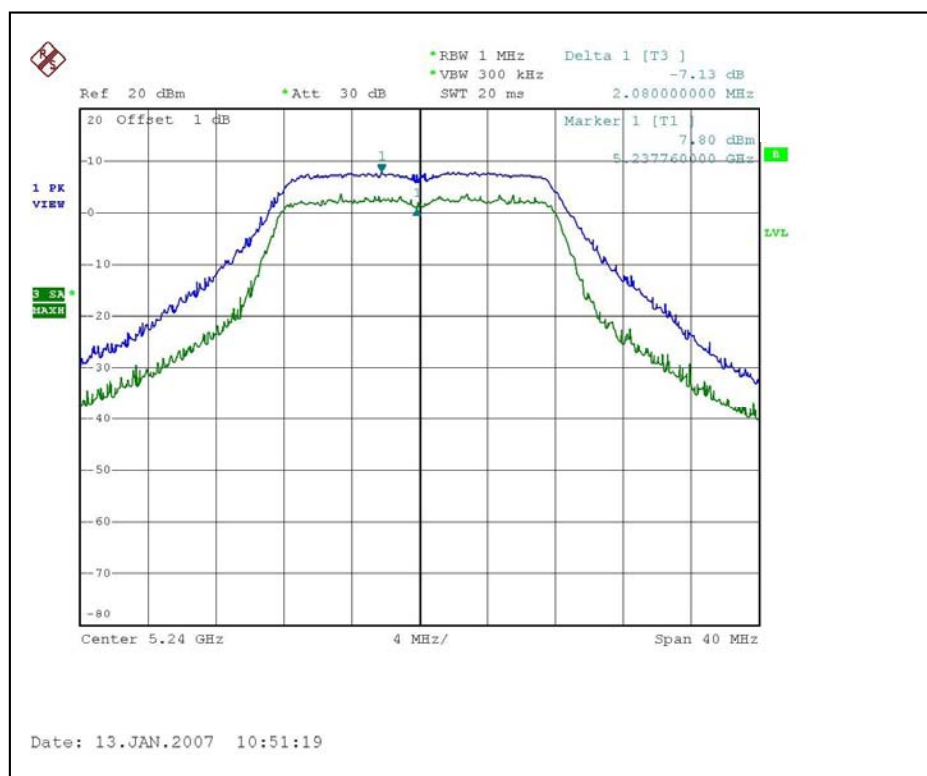
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 965hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	7.35	13	PASS
4	5240	7.13	13	PASS

CH1



CH4

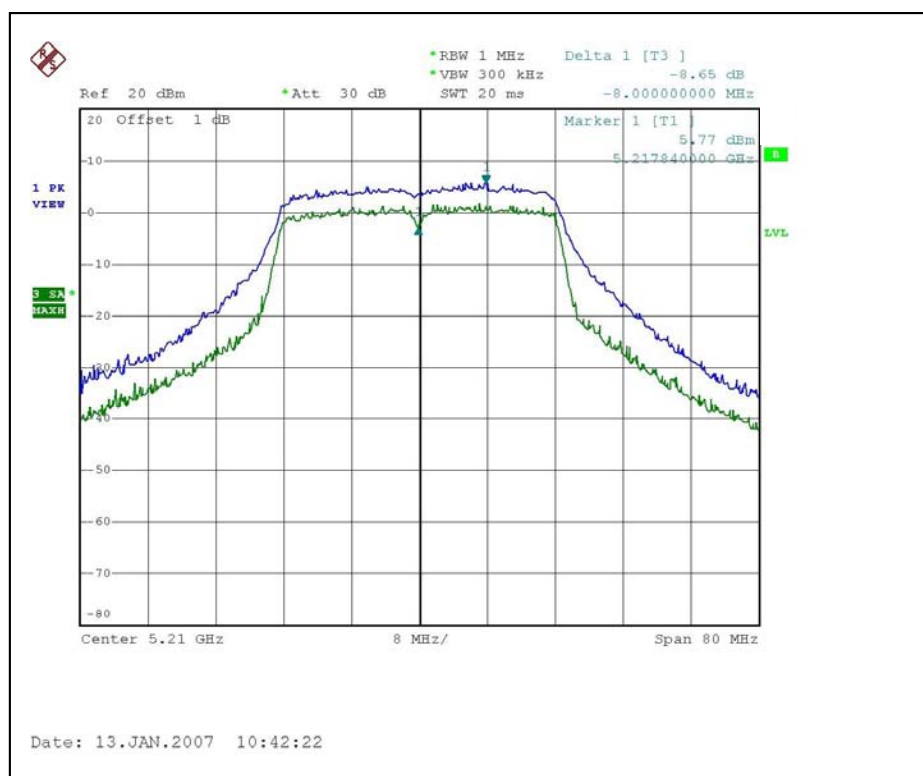


802.11a Turbo OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 965hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5210	8.65	13	PASS

CH1



4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

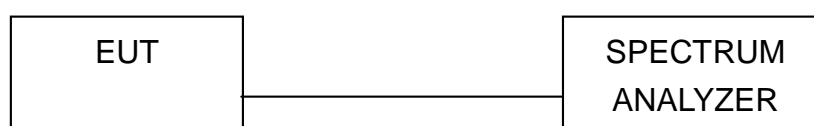
4.5.3 TEST PROCEDURES

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6

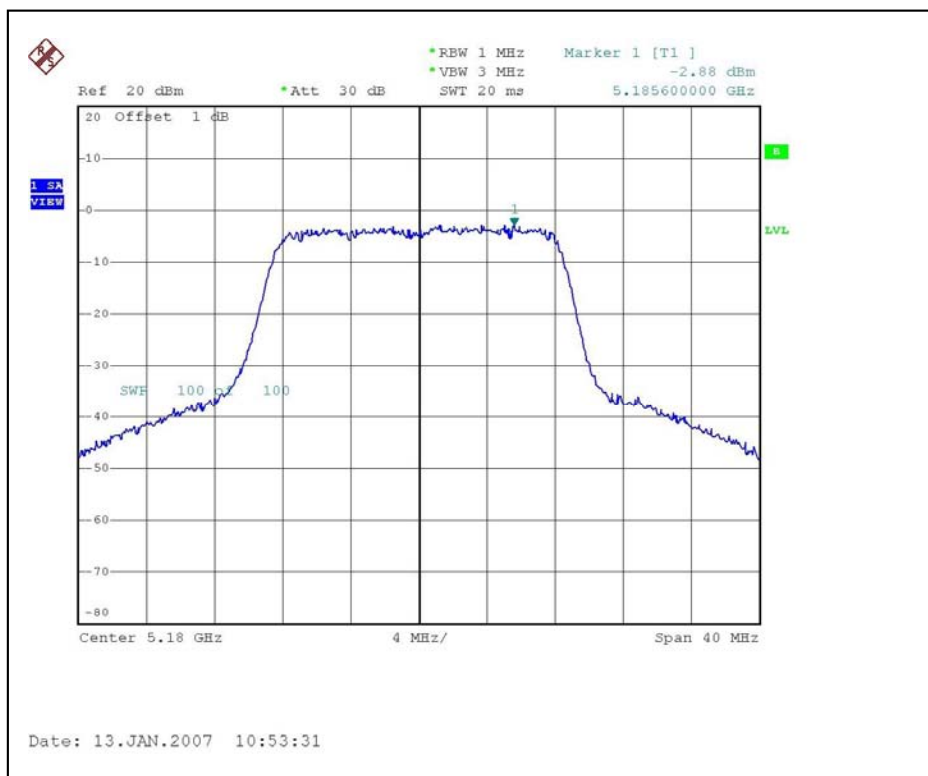
4.5.7 TEST RESULTS

802.11a OFDM modulation

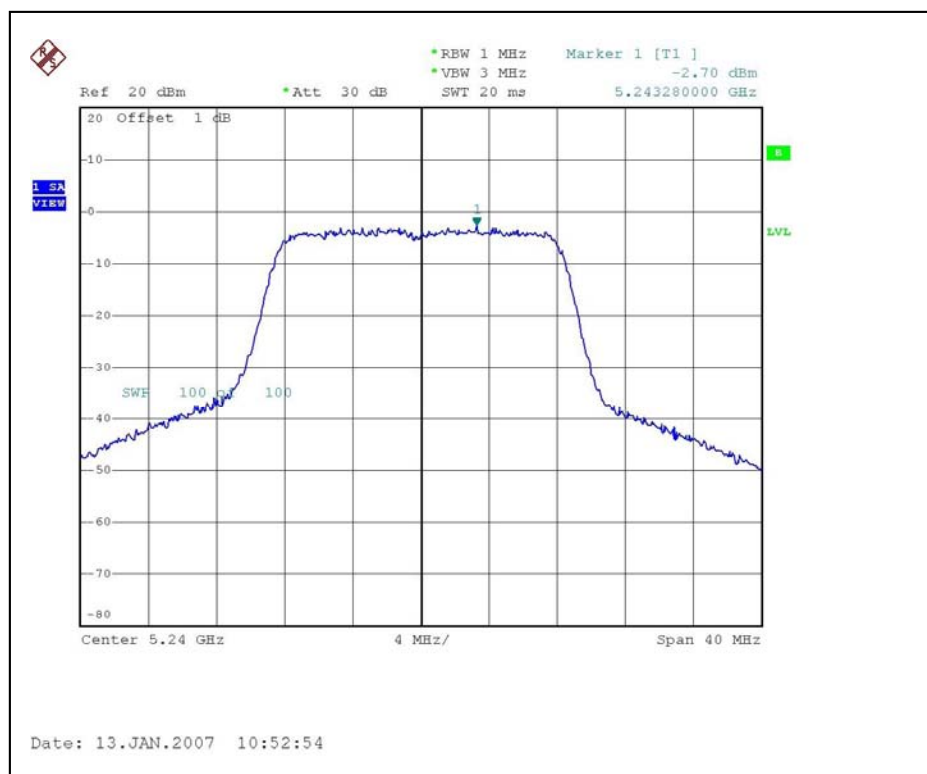
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 965hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-2.88	4	PASS
4	5240	-2.70	4	PASS

CH1



CH4

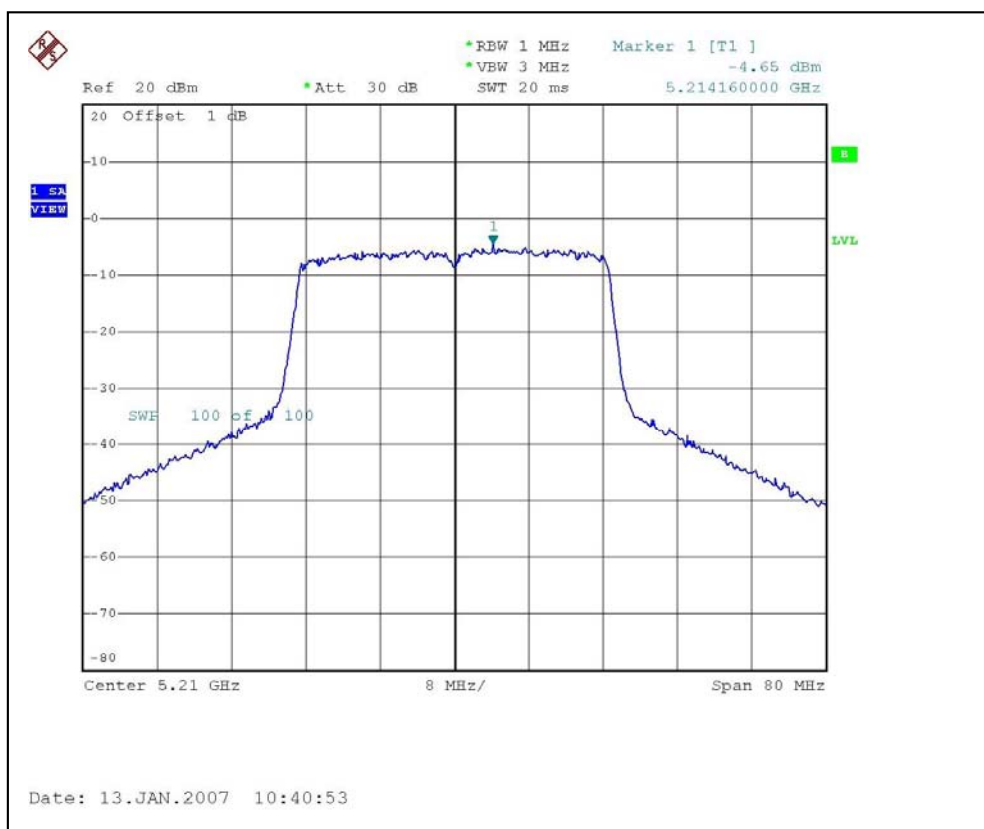


802.11a Turbo OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	12Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg.C, 53%RH, 966hPa
TESTED BY	Sky Liao		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-4.65	4	PASS

CH1



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

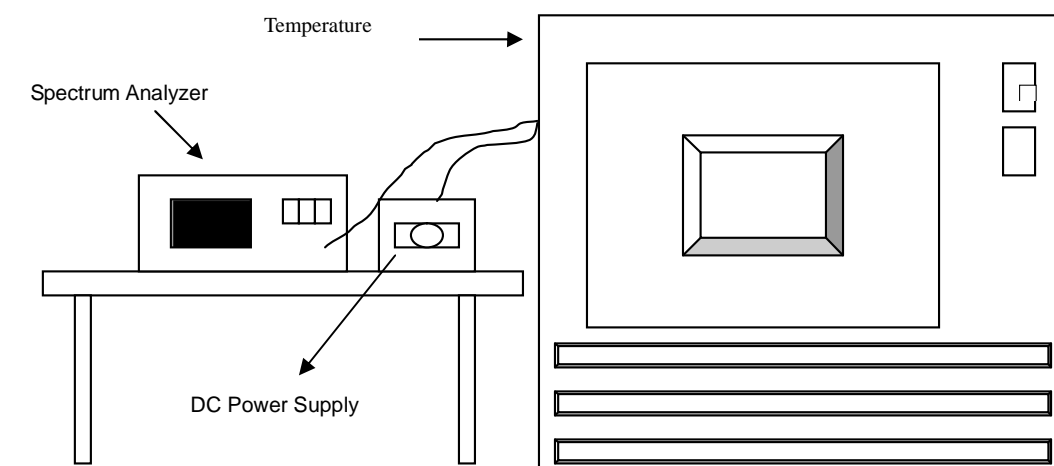
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

Operating frequency: 5240MHz				Limit : $\pm 0.02\%$			
Temp. (°C)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5239.9886	0.000218	5239.9979	0.000040	5239.9973	0.000052
	110	5239.9882	0.000225	5239.9976	0.000046	5239.9977	0.000044
	93.5	5239.9981	0.000036	5239.9979	0.000040	5239.9972	0.000053
40	126.5	5240.0264	0.000504	5240.0267	0.000510	5240.0365	0.000697
	110	5240.0264	0.000504	5240.0266	0.000508	5240.0368	0.000702
	93.5	5240.0266	0.000508	5240.0264	0.000504	5240.0362	0.000691
30	126.5	5239.9922	0.000149	5239.9919	0.000155	5239.9917	0.000158
	110	5239.9927	0.000139	5239.9921	0.000151	5239.9918	0.000156
	93.5	5239.9923	0.000147	5239.9919	0.000155	5239.9916	0.000160
20	126.5	5240.0238	0.000454	5240.0180	0.000344	5240.0180	0.000344
	110	5240.0232	0.000443	5240.0210	0.000401	5240.0190	0.000363
	93.5	5240.0235	0.000448	5240.0180	0.000344	5240.0180	0.000344
10	126.5	5240.0171	0.000326	5240.0068	0.000130	5240.0065	0.000124
	110	5240.0172	0.000328	5240.0072	0.000137	5240.0069	0.000132
	93.5	5240.0071	0.000135	5240.0068	0.000130	5240.0065	0.000124
0	126.5	5240.0124	0.000237	5240.0122	0.000233	5240.0119	0.000227
	110	5240.0124	0.000237	5240.0122	0.000233	5240.0121	0.000231
	93.5	5240.0124	0.000237	5240.0121	0.000231	5240.0118	0.000225
-10	126.5	5240.0116	0.000221	5240.0111	0.000212	5240.0108	0.000206
	110	5240.0116	0.000221	5240.0113	0.000216	5240.0111	0.000212
	93.5	5240.0116	0.000221	5240.0111	0.000212	5240.0108	0.000206
-20	126.5	5240.0206	0.000393	5240.0225	0.000429	5240.0270	0.000515
	110	5240.0204	0.000389	5240.0212	0.000405	5240.0290	0.000553
	93.5	5240.0204	0.000389	5240.0223	0.000426	5240.0270	0.000515
-30	126.5	5240.0272	0.000519	5240.0250	0.000477	5240.0210	0.000401
	110	5240.0265	0.000506	5240.0280	0.000534	5240.0240	0.000458
	93.5	5240.0224	0.000427	5240.0240	0.000458	5240.0220	0.000420

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.7.2 TEST PROCEDURE

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

4.7.3 EUT OPERATING CONDITION

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

4.7.4 TEST RESULTS –ANTENNA A

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

The spectrum plots (Peak RBW=1MHz, VBW=3MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

802.11a OFDM modulation

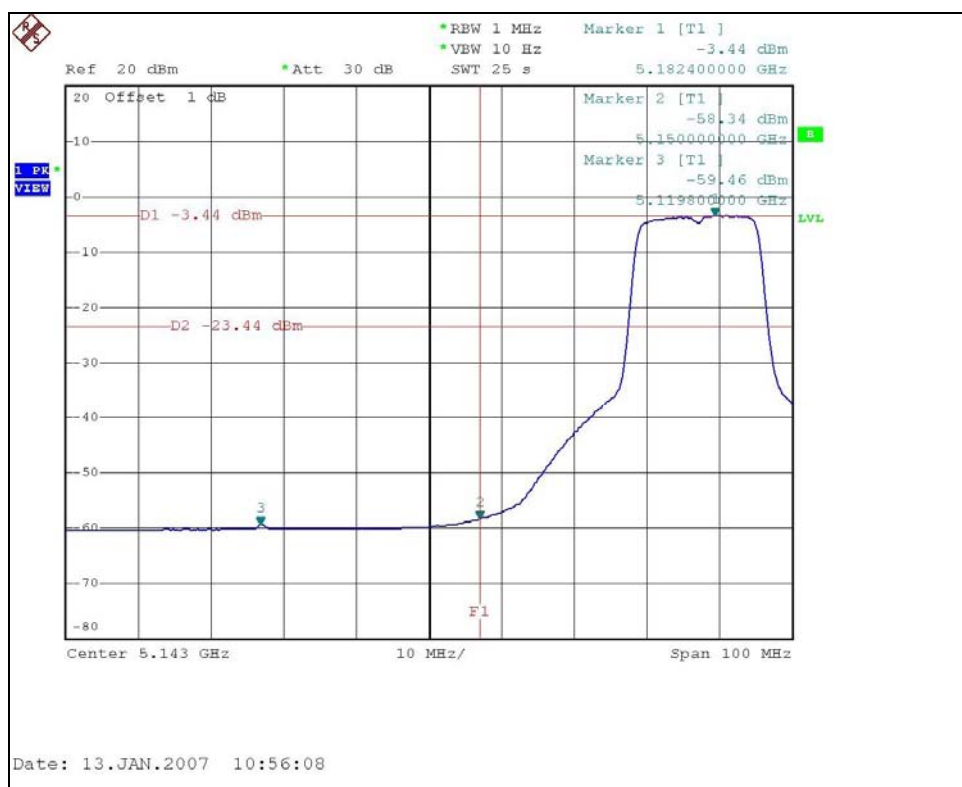
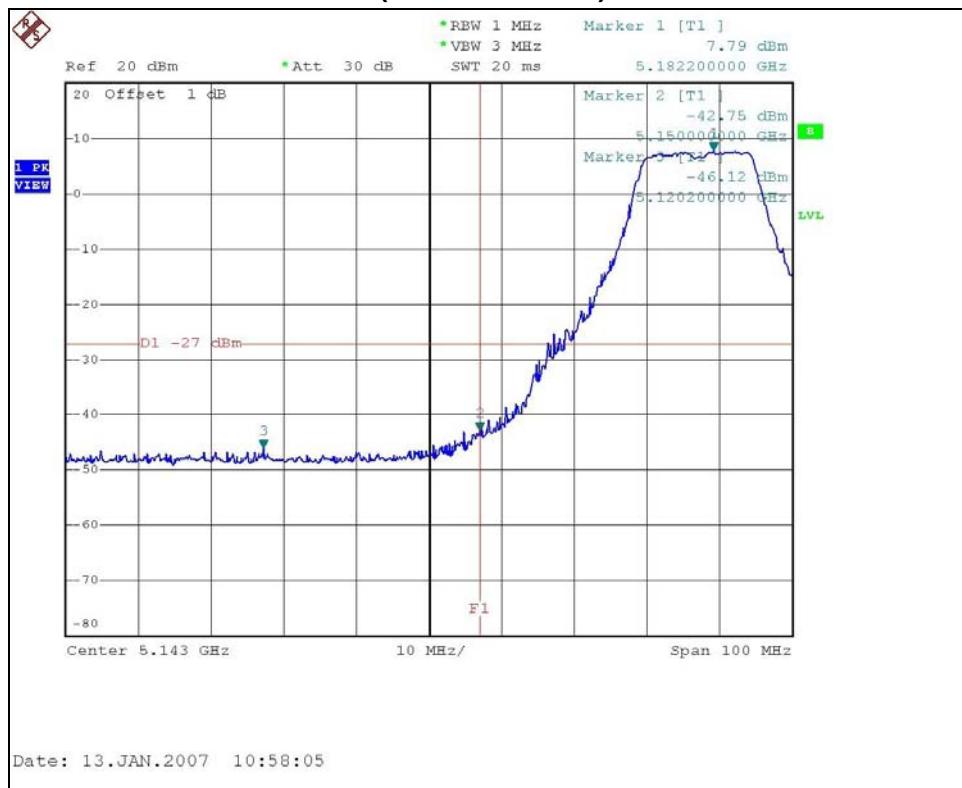
NOTE (Peak):

The band edge emission plot on the following first page shows 50.54dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 107.4dBuV/m (Peak), so the maximum field strength in restrict band is $107.4 - 50.54 = 56.86$ dBuV/m which is under 74dBuV/m limit.

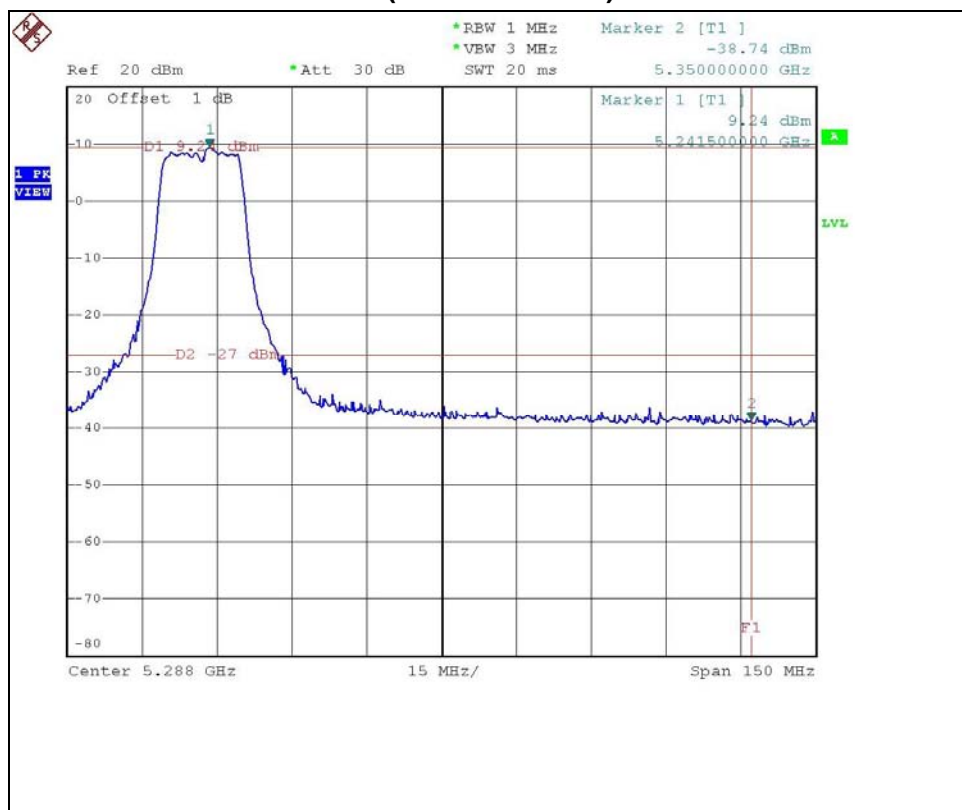
NOTE (Average):

The band edge emission plot on the following second page shows 54.9dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 96.1dBuV/m (Average), so the maximum field strength in restrict band is $96.1 - 54.9 = 41.2$ dBuV/m which is under 54dBuV/m limit.

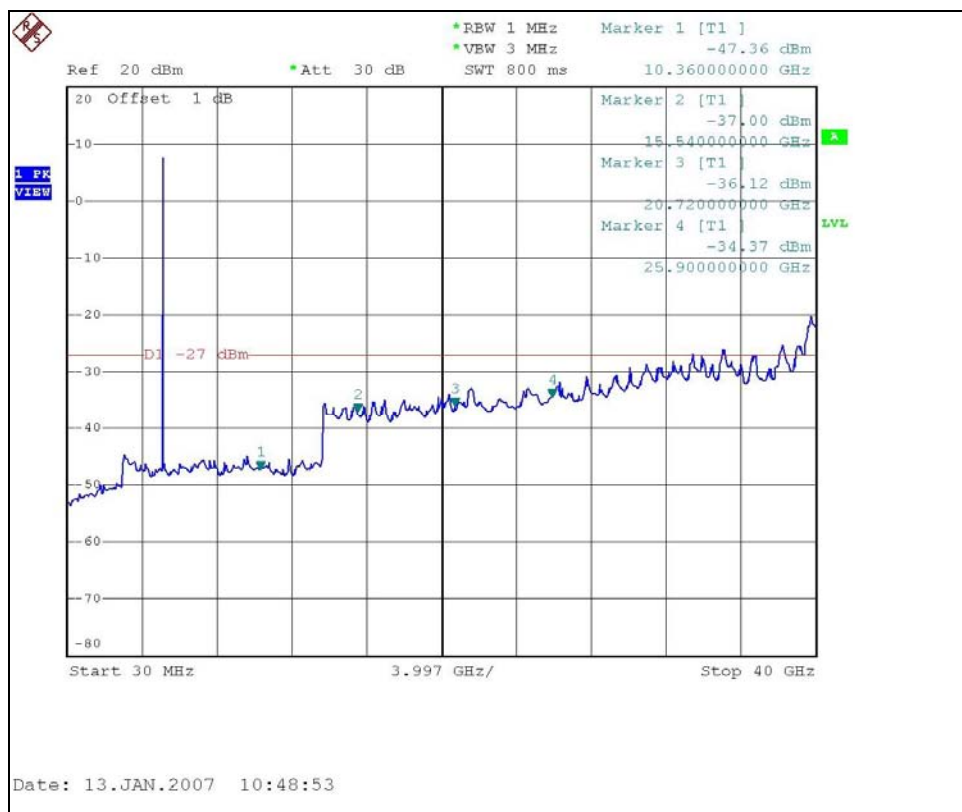
802.11a OFDM modulation(CH 1: 5180MHz)



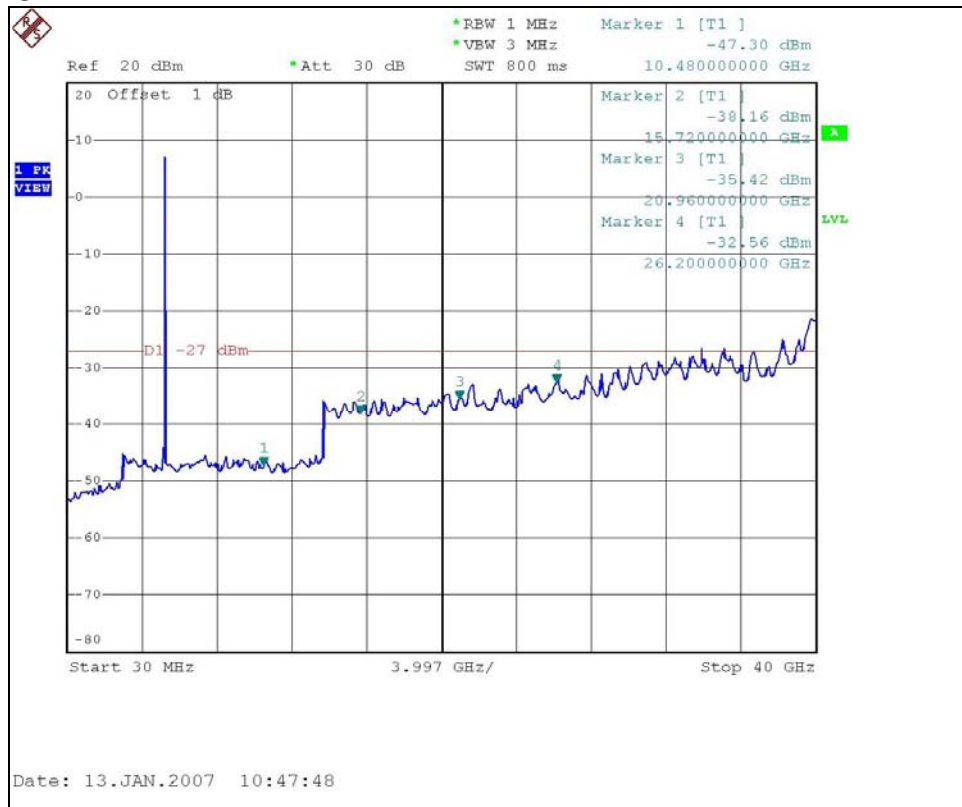
802.11a OFDM modulation (CH 4: 5240MHz)



CH 1



CH 4



802.11a Turbo OFDM modulation

NOTE (Peak):

The band edge emission plot on the following first page shows 52.36dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 107.4dBuV/m (Peak), so the maximum field strength in restrict band is $107.4 - 52.36 = 55.04$ dBuV/m which is under 74dBuV/m limit.

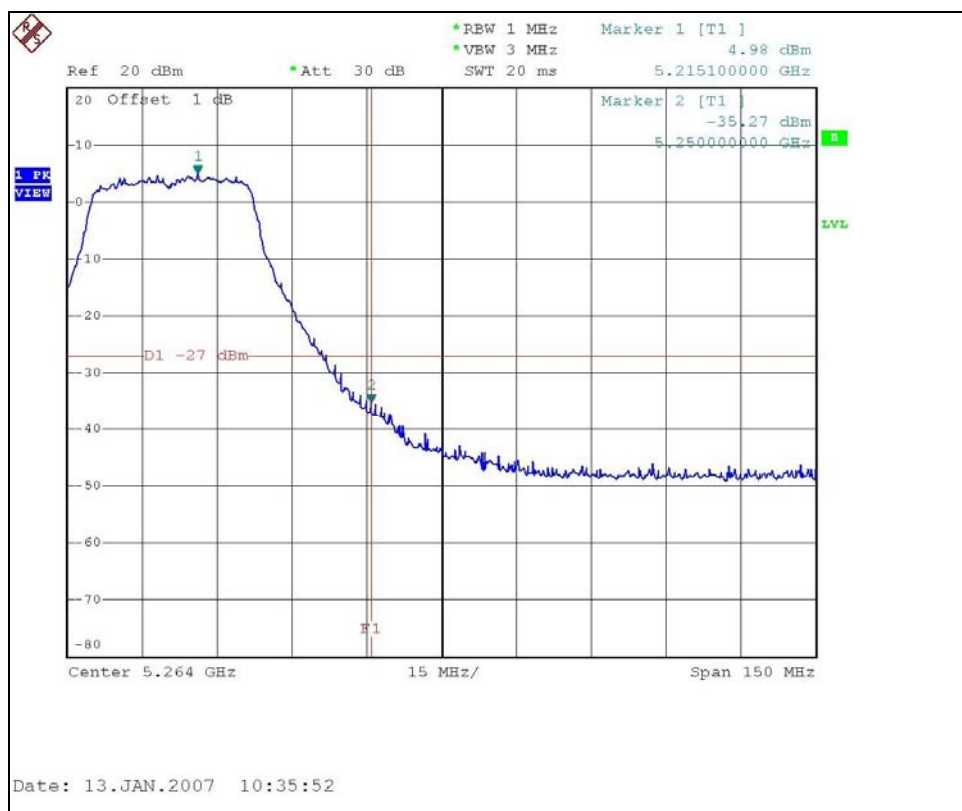
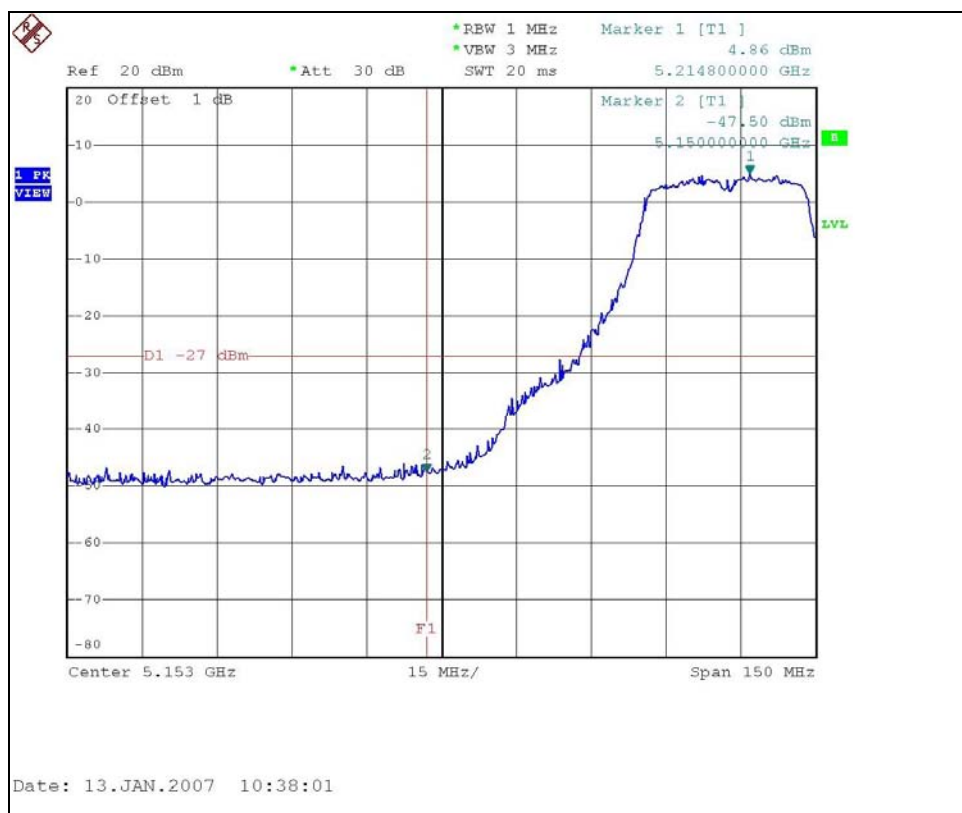
The band edge emission plot on the following first page shows 40.25dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 99.7dBuV/m (Peak), so the maximum field strength in restrict band is $99.7 - 40.25 = 59.45$ dBuV/m which is under 74dBuV/m limit.

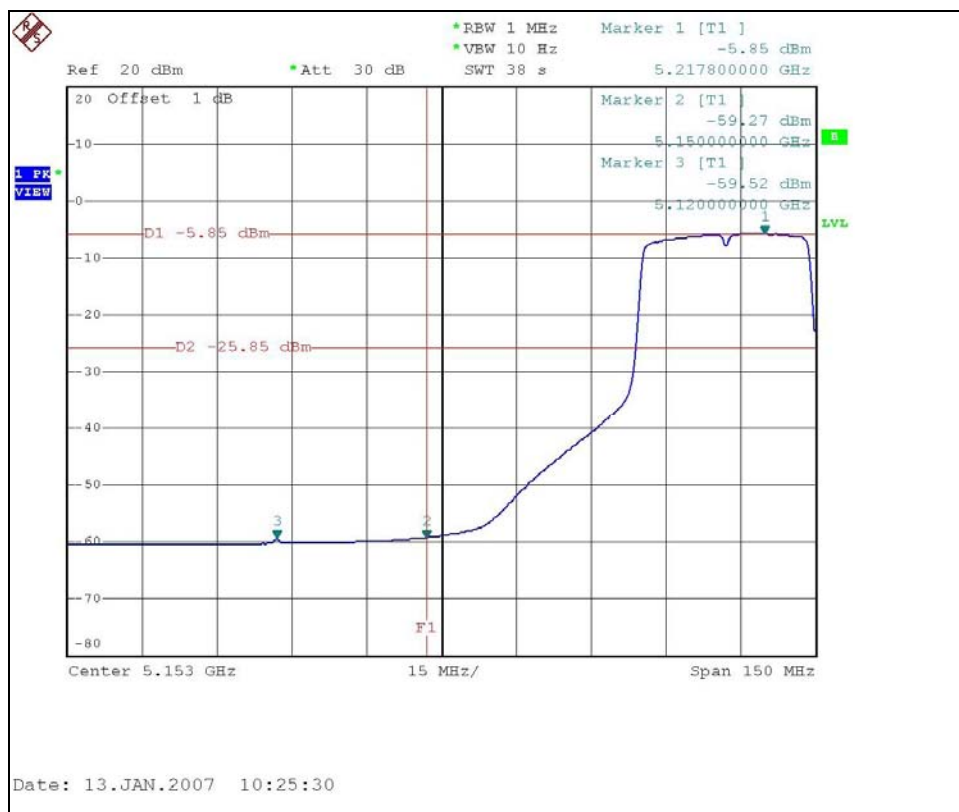
NOTE (Average):

The band edge emission plot on the following second page shows 53.42dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 96.10dBuV/m (Average), so the maximum field strength in restrict band is $96.10 - 53.42 = 42.68$ dBuV/m which is under 54dBuV/m limit.

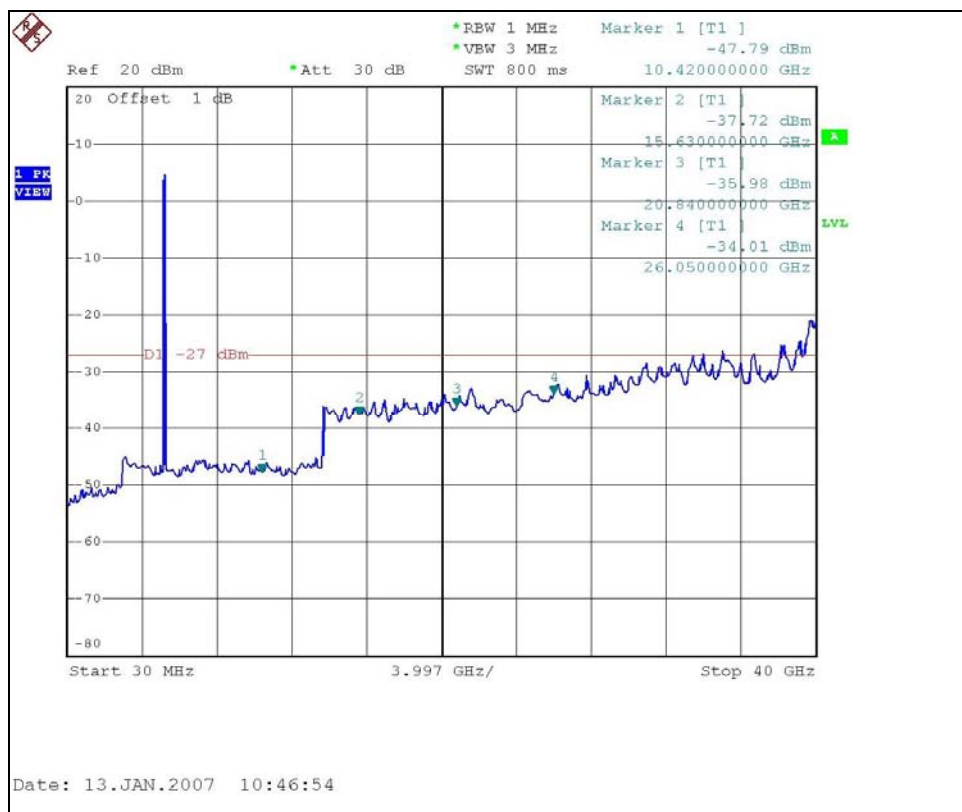
The band edge emission plot on the following second page shows 44.91dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 is 88.6dBuV/m (Average), so the maximum field strength in restrict band is $88.6 - 44.91 = 43.69$ dBuV/m which is under 54dBuV/m limit.

802.11a Turbo OFDM modulation





CH 1



4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

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

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

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as following:

No.	Brand Name	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
A	Wistron Neweb Corp.	DBA-SSMA-01	2.06	0.9	1.16	dipole	RSMA
B	CUSHCRUFT	SRSM5150MRA	2	0.9	1.1	dipole	RSMA
C	HUBER+SUHNER	SPA 5500/40/14/O/N_C	13.5	0.9	12.6	panel	SMA

5. 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, NCC
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

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

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

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.