

# FCC TEST REPORT (15.247)

**REPORT NO.:** RF950518H03A

**MODEL NO.:** WMP-D16

**RECEIVED:** March 16, 2007

**TESTED:** March 22, 2007

**ISSUED:** March 26, 2007

**APPLICANT:** Alpha Networks Inc.

**ADDRESS:** No.8 Li-shing 7th Rd., Science-based Industrial  
Park, Hsinchu, 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:** IEEE802.11a/b/g mini PCI card  
**BRAND NAME:** Alpha  
**MODEL NO.:** WMP-D16  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** March 22, 2007  
**APPLICANT:** Alpha Networks Inc.  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247),  
ANSI C63.4-2003

The above equipment (Model: WMP-D16) 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 :** Midoli Peng , **DATE:** March 26, 2007  
( Midoli Peng )

**TECHNICAL ACCEPTANCE :** Moris Lin , **DATE:** March 26, 2007  
Responsible for RF ( Moris Lin )

**APPROVED BY :** Hank Chung , **DATE:** March 26, 2007  
(Hank Chung, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11a, 5725~5850MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	Test Type and Limit	Result	Remark
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -6.24dB at 217.38MHz
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

### NOTE:

1. The EUT was operating in 5.150 ~ 5.250GHz and 5.725 ~ 5.850GHz frequencies band. This report was recorded the RF parameters including 5.725 ~ 5.850GHz. For the 5.150 ~ 5.250GHz RF parameters was recorded in another test report.
2. This report is prepared for FCC class II permissive change. Only radiated emission, Maximum Peak Output Power and Band Edge Measurement were presented in this test report.

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	IEEE802.11a/b/g mini PCI card
<b>MODEL NO.</b>	WMP-D16
<b>FCC ID</b>	RRK2005090049-1
<b>POWER SUPPLY</b>	DC 3.3V from host equipment
<b>MODULATION TYPE</b>	64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	OFDM
<b>TRANSFER RATE</b>	802.11a: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	802.11a: 5.15 ~ 5.25GHz and 5.725 ~ 5.850GHz
<b>NUMBER OF CHANNEL</b>	802.11a: 9
<b>CHANNEL SPACING</b>	802.11a: 20MHz for Normal mode
<b>OUTPUT POWER</b>	For FCC15.247: 87.096mW For FCC15.407: 45.604mW
<b>ANTENNA TYPE</b>	Please see note 1

#### NOTE:

- This report is prepared for FCC class II permissive change. The difference compared with the Report No.:RF950518H03 design is as the following:
  - ❏ Cancel Original model of WMP-D18 (with Turbo feature).
  - ❏ Cancel Original frequency: 5250MHz-5350MHz.

- u Add one antenna for 5GHz. (Only apply 5150MHz-5250MHz & 5725MHz-5850MHz band)

Original Report (Report No.:RF950518H03)						
For 2.4GHz						
No.	Model No.	Gain (dBi)		Antenna Type		Connector
1	WSS001	2		Dipole		RP-SMA(M)
2	WPB002-3	4.5		PCB		MHF
<b>Note:</b> Antenna 1 is connected with Main port of EUT Antenna 2 is connected with AUX port of EUT						
For 5GHz						
No.	Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
1	SAA04-220080	5	1.8	3.2	Dipole	RP-N plug
<b>Note:</b> Antenna 1 is connected with Main port of EUT						
Add one new antenna						
< Only apply 5150MHz-5250MHz & 5725MHz-5850MHz band >						
Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector	RF cable
MAF94192	<b>3</b>	<b>0.785</b>	<b>2.215</b>	PIFA	I-PEX MHF	<b>100 mm</b>
	3	0.785	2.215			100 mm
	3	1.1	1.9			120 mm
	3	1.5	1.5			160 mm
<b>Note:</b> 1. There will have four conditions for this antenna. 2. The bold type was chose for test.						

2. 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 5725 ~ 5850MHz band:

Five channels are provided to this EUT.

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

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

Where PLC: Power Line Conducted Emission

RE<1G RE: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

#### **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	5	OFDM	BPSK	6

#### **Radiated Emission Test (Above 1 GHz):**

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

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

#### **Bandedge Measurement:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 5	1, 5	OFDM	BPSK	6

#### **Antenna Port Conducted Measurement:**

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

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

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is an IEEE802.11a/b/g mini PCI card. 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

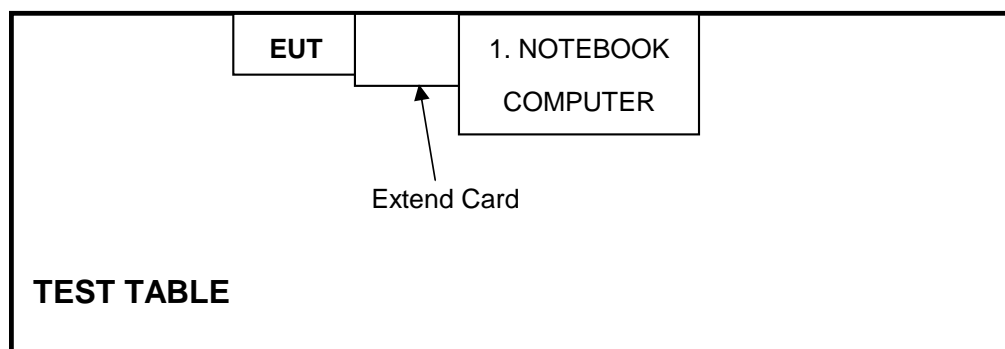
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	HP	HSTNN-S19C	WFY93-WQ98K-BH 87F-KD366-RB773	DoC
2	Extend Card	ADT	NA	NA	NA

No.	Signal cable description
1	NA
2	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 (802.11a, 5725~5850MHz Band)

### 4.1 RADIATED EMISSION MEASUREMENT

#### 4.1.1 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.

#### 4.1.2 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	VULB 9168	138	July 17, 2007
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2008
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
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. The following table is for the measurement uncertainty, which is calculated as per the document 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)	3.89 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

#### 4.1.3 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 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.

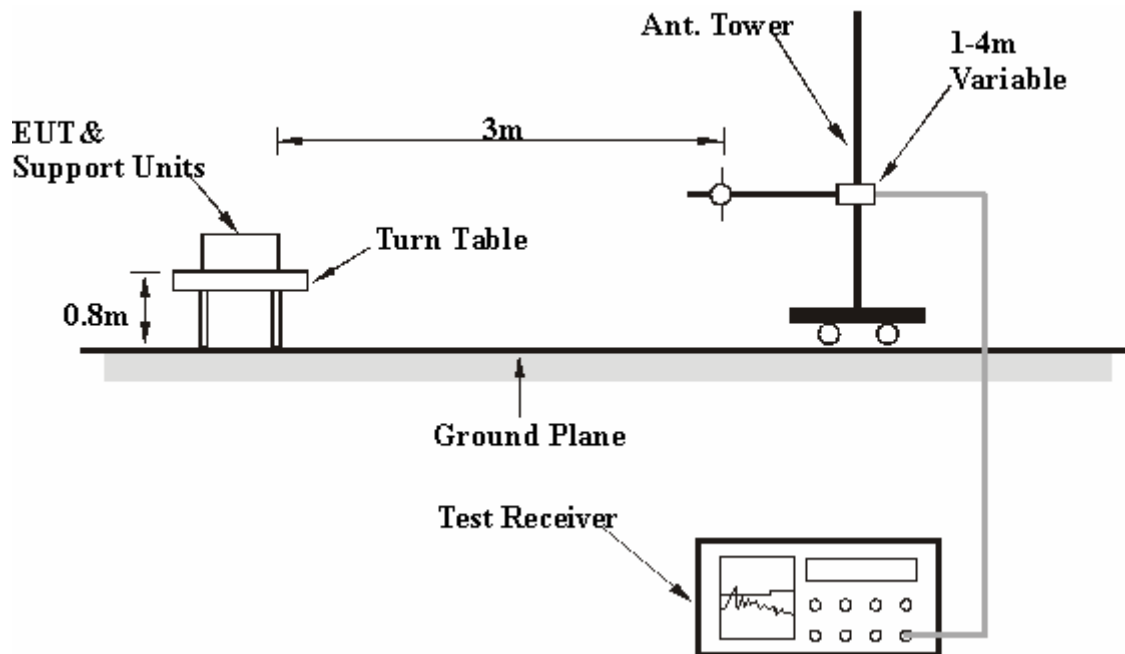
**NOTE:**

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.
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.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



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

#### 4.1.6 EUT OPERATING CONDITIONS

- 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 52 Build 13” to enable EUT under transmission condition continuously.

#### 4.1.7 TEST RESULTS

##### Below 1GHz Worst-Case Data

<b>MODULATION TYPE</b>	BPSK	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 955hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Eric Lee		

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	129.52	37.73 QP	43.50	-5.77	1.45 H	20	25.36	12.37
2	193.38	34.96 QP	43.50	-8.54	1.53 H	170	24.07	10.89
3	199.79	33.12 QP	43.50	-10.38	1.25 H	31	21.97	11.15
4	209.88	34.40 QP	43.50	-9.10	1.84 H	231	22.72	11.68
5	<b>217.38</b>	<b>39.76 QP</b>	<b>46.00</b>	<b>-6.24</b>	<b>1.16 H</b>	<b>148</b>	<b>27.69</b>	<b>12.07</b>
6	268.99	30.91 QP	46.00	-15.09	1.26 H	149	15.70	15.21
7	301.00	34.88 QP	46.00	-11.12	1.09 H	344	18.88	16.00
8	368.88	34.48 QP	46.00	-11.52	1.49 H	268	16.92	17.56
9	399.99	29.31 QP	46.00	-16.69	1.58 H	184	10.61	18.70
10	426.88	34.47 QP	46.00	-11.53	1.24 H	0	15.56	18.91

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	114.62	36.81 QP	43.50	-6.69	1.29 V	240	24.73	12.08
2	118.92	34.14 QP	43.50	-9.36	1.52 V	95	21.93	12.21
3	133.49	37.01 QP	43.50	-6.49	1.00 V	4	24.58	12.43
4	199.74	32.19 QP	43.50	-11.31	1.67 V	20	21.05	11.14
5	229.00	34.93 QP	46.00	-11.07	1.36 V	233	22.24	12.69
6	231.38	39.18 QP	46.00	-6.82	1.36 V	178	26.37	12.81
7	267.01	31.19 QP	46.00	-14.81	1.31 V	145	16.06	15.13
8	280.00	35.25 QP	46.00	-10.75	1.37 V	89	19.76	15.49
9	339.30	37.71 QP	46.00	-8.29	1.29 V	253	21.04	16.67
10	420.80	35.48 QP	46.00	-10.52	1.08 V	20	16.61	18.87

- 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

<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 955hPa	<b>TESTED BY</b>	Eric Lee

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	#3830.00	46.90 PK	74.00	-27.10	1.43 H	82	12.96	33.94
2	#3830.00	41.90 AV	54.00	-12.10	1.43 H	82	7.96	33.94
3	*5745.00	101.91 PK			1.48 H	242	63.65	38.26
4	*5745.00	92.91 AV			1.48 H	242	54.65	38.26
5	#11490.00	41.25 PK	74.00	-32.75	1.68 H	326	-5.71	46.96
6	#11490.00	30.14 AV	54.00	-23.86	1.68 H	326	-16.82	46.96

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	#3830.00	49.32 PK	74.00	-24.68	1.47 V	245	15.38	33.94
2	#3830.00	42.56 AV	54.00	-11.44	1.47 V	245	8.62	33.94
3	*5745.00	103.56 PK			1.11 V	110	65.30	38.26
4	*5745.00	96.56 AV			1.11 V	110	58.30	38.26
5	#11490.00	43.35 PK	74.00	-30.65	1.02 V	323	-3.61	46.96
6	#11490.00	33.00 AV	54.00	-21.00	1.02 V	323	-13.96	46.96

- 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

<b>CHANNEL</b>	Channel 3	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 955hPa	<b>TESTED BY</b>	Eric Lee

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	#3856.60	46.58 PK	74.00	-27.42	1.47 H	56	12.55	34.03
2	#3856.60	42.25 AV	54.00	-11.75	1.47 H	56	8.22	34.03
3	*5785.00	101.50 PK			1.51 H	250	63.21	38.30
4	*5785.00	92.53 AV			1.51 H	250	54.24	38.30
5	#11570.00	40.25 PK	74.00	-33.75	1.68 H	9	-6.67	46.92
6	#11570.00	30.65 AV	54.00	-23.35	1.68 H	9	-16.27	46.92

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	#3856.60	49.99 PK	74.00	-24.01	1.20 V	24	18.27	31.72
2	#3856.60	43.23 AV	54.00	-10.77	1.20 V	24	11.51	31.72
3	*5785.00	103.16 PK			1.12 V	130	64.86	38.30
4	*5785.00	95.94 AV			1.12 V	130	57.64	38.30
5	#11570.00	44.23 PK	74.00	-29.77	1.36 V	325	-2.70	46.92
6	#11570.00	33.65 AV	54.00	-20.35	1.36 V	325	-13.27	46.92

- 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



<b>CHANNEL</b>	Channel 5	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 955hPa	<b>TESTED BY</b>	Eric Lee

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	#3883.30	47.42 PK	74.00	-26.58	1.14 H	52	13.30	34.12
2	#3883.30	42.65 AV	54.00	-11.35	1.14 H	52	8.53	34.12
3	*5825.00	101.22 PK			1.50 H	260	62.87	38.35
4	*5825.00	92.22 AV			1.50 H	260	53.87	38.35
5	#11650.00	40.24 PK	74.00	-33.76	1.58 H	224	-6.62	46.86
6	#11650.00	30.35 AV	54.00	-23.65	1.58 H	224	-16.51	46.86

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	#3883.30	50.24 PK	74.00	-23.76	1.69 V	163	16.12	34.12
2	#3883.30	43.23 AV	54.00	-10.77	1.69 V	163	9.11	34.12
3	*5825.00	102.59 PK			1.11 V	110	64.24	38.35
4	*5825.00	95.34 AV			1.11 V	110	56.99	38.35
5	#11650.00	43.36 PK	74.00	-30.64	1.54 V	24	-3.50	46.86
6	#11650.00	33.68 AV	54.00	-20.32	1.54 V	24	-13.18	46.86

- 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

## 4.2 MAXIMUM PEAK OUTPUT POWER

### 4.2.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 4.2.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43321031	July 26, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jun. 21, 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.

#### 4.2.3 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



#### 4.2.6 EUT OPERATING CONDITIONS

Same as Item 4.1.6

## 4.2.7 TEST RESULTS

### 802.11a OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg. C, 53%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

Antenna (Gain : 3 dBi) + Antenna Cable (0.785dB loss)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	85.114	19.3	30	PASS
3	5785	85.114	19.3	30	PASS
5	5825	87.096	19.4	30	PASS

### 4.3 BAND EDGES MEASUREMENT

#### 4.3.1 LIMITS OF BAND EDGES MEASUREMENT

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

#### 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

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 MHz bandwidth from band edge. The band edges was measured and recorded.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

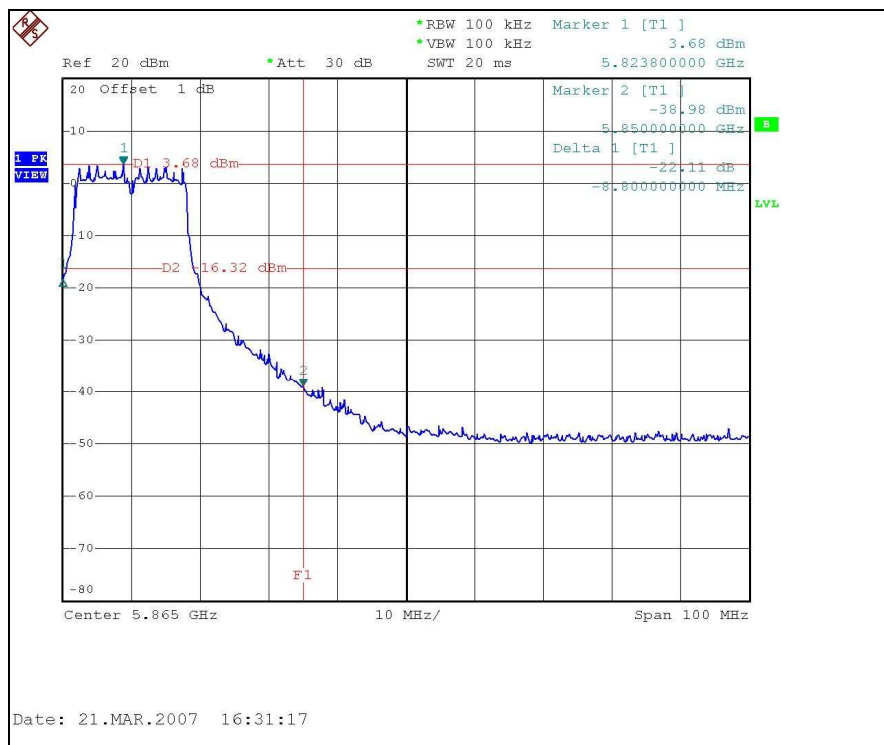
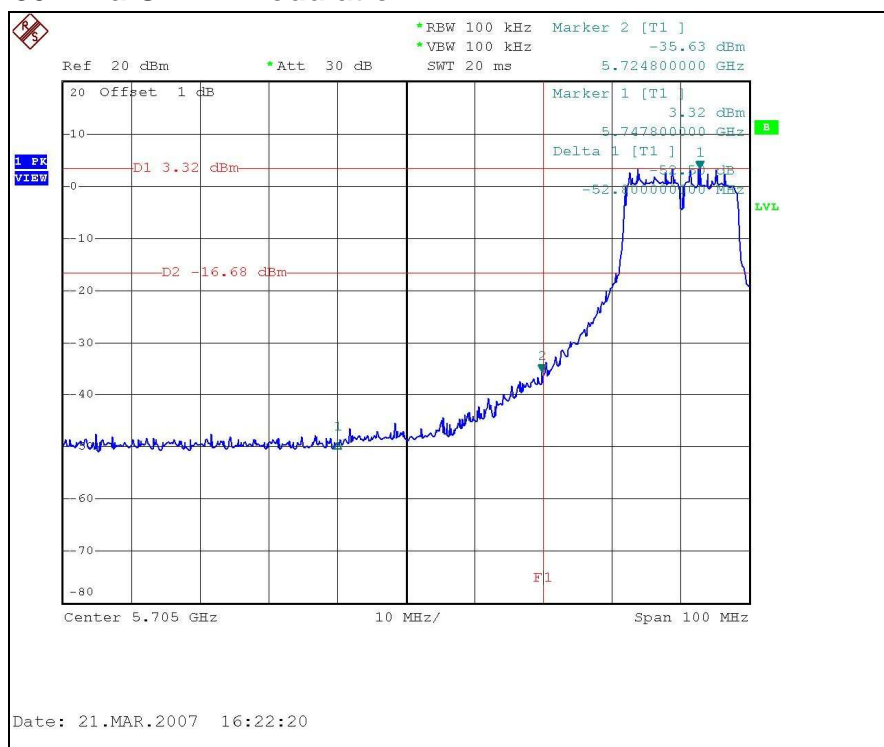
#### 4.3.5 EUT OPERATING CONDITION

Same as Item 4.1.6

#### 4.3.6 TEST RESULTS

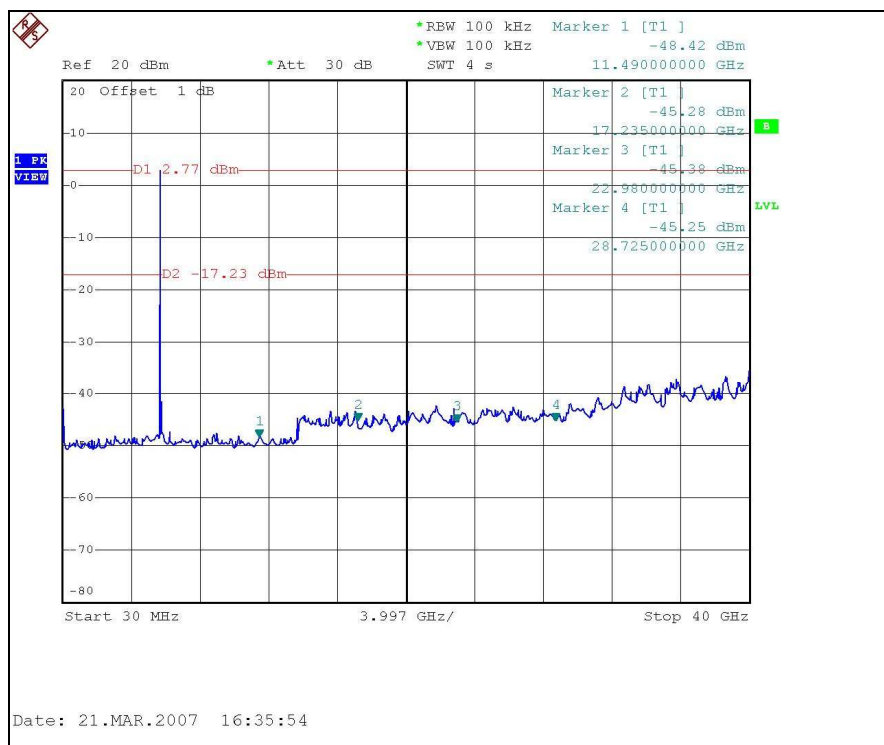
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

## 802.11a OFDM modulation

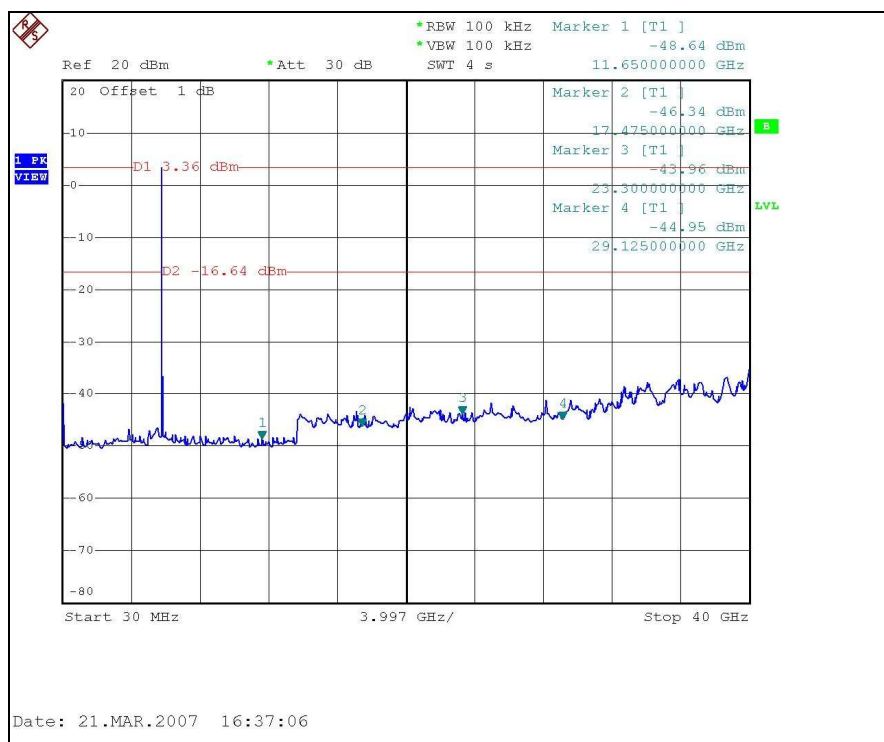




## CH 1



## CH 5



## 4.4 ANTENNA REQUIREMENT

### 4.4.1 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.

### 4.4.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is as following:

Model No.	Gain (dBi)	Cable Loss (dB)	Net Gain (dB)	Antenna Type	Connector
MAF94192	3	0.785	2.215	PIFA	I-PEX MHF

## 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.

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	CNLA, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB , GOST-ASIA(MOU)
<b>Russia</b>	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](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

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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](http://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.