

# FCC TEST REPORT

 REPORT NO.:
 RF920407H04

 MODEL NO.:
 F5D6130, F5D6232, F5D6330

 RECEIVED:
 Apr. 07, 2003

 TESTED:
 Apr. 09 to May 05, 2003

### **APPLICANT: Belkin Corporation**

ADDRESS: 501, West Walnut Street, Compton CA 90220-5221 USA

**ISSUED BY:** Advance Data Technology Corporation

LAB 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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Lab Code: 200376-0



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#### CERTIFICATION 1

PRODUCT :	Wireless Access Point, Mobile Wireless Gateway Router, Wireless Ethernet Adapter
MODEL NO. :	F5D6130, F5D6232, F5D6330
BRAND :	Belkin
APPLICANT :	Belkin Corporation
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.247),
	ANSI C63.4-1992

We, Advance Data Technology Corporation, hereby certify that one sample of the designation has been tested in our facility from Apr. 09 to May 05, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

CHECKED BY: Amanda Chu, DATE: May 21, 2003 (Amanda Chu)

APPROVED BY:

\_, **DATE**: <u>May 21, 2003</u>

(Eric Lin, Manager)



# **2** SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C						
Standard Section	Test Type and Limit	Result	REMARK			
	AC Power Conducted Emission		Meet the requirement of limit			
15.207		PASS	Minimum passing margin is –7.81dBuV at 0.451MHz			
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz		Meet the requirement of limit			
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit			
	Radiated Emissions		Meet the requirement of limit			
15.247(c)	Limit: Table 15.209	PASS	Minimum passing margin is –1.4dBuV at 7310.00MHz			
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit			
15.247(c)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit			



# **3** GENERAL INFORMATION

### 3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Access Point, Mobile Wireless Gateway Router, Wireless Ethernet Adapter
MODEL NO.	F5D6130, F5D6232, F5D6330
POWER SUPPLY	5.0VDC from AC Adapter
	DBPSK for 1Mbps
MODULATION TYPE	DQPSK for 2Mbps
	CCK for 5.5/11Mbps
RADIO TECHNOLOGY	DSSS
TRANSFER RATE	1/2/5.5/11Mbps
FREQUENCY RANGE	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
OUTPUT POWER	16.00dBm
DATA CABLE	NA
ANTENNA TYPE	Fixable Dipole Antenna
I/O PORTS	RJ 45 Port x 1
ASSOCIATED DEVICES	NA

#### NOTE:

1. The EUT has three model names which are identical to others in all aspects except for the followings:

Model No.	Product Name:	Note	Brand
F5D6130	Wireless Access Point	LAN port x 1	
F5D6232	Mobile Wireless Gateway Router	WAN port x 1	Belkin
F5D6330	Wireless Ethernet Adapter	LAN port x 1	



2. The EUT was powered by the following power adapters:

Brand:	DVE
Model No.:	DSA-0051-03 FEU
Input power :	100-240Vac 50/60Hz 0.2A
Output power :	+5Vdc 1.0A

Brand:	DVE		
Model No.:	DSA-0051-03		
Input power :	100-240Vac 50/60Hz 0.2A		
Output power :	+5Vdc 1.0A		

3. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

#### Eleven channels are provided to this EUT.

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		

#### NOTE:

1. Below 1 GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for final test.

2. Above 1 GHz, the channel 1, 6, and 11 were tested individually.

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless Access Point. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

### 47 CFR FCC Part 15, Subpart C. (15.247)

### ANSI C63.4 : 1992

All tests 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 47 CFR Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



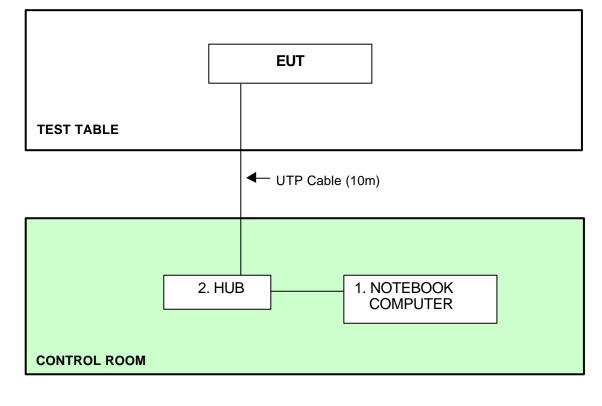
# 3.4 DESCRIPTION OF SUPPORT UNITS

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	DELL	PP01L	TW-09C748-12800-	FCC DoC
	COMPUTER			17Q-C504	
2	HUB	AVSYS	110H8	01-20E-000002	FCC DoC

No.	Signal cable description
1	NA
2	NA

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



**NOTE:** 1. Support units 1&2 were kept in the control room during the test.

2. Please refer to the photos of test configuration in Item 5 also.



# 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

#### **NOTES**: (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.

### 4.1.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ	ESCS 30	847124/029	Nov. 17, 2003
Test Receiver			
ROHDE & SCHWARZ LISN	ESHS-Z5	848773/004	Nov. 13, 2003
(for EUT)			
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	July 23, 2003
RF Cable (JETBAO)	RG233/U	Cable_CA_01	July 03, 2003
Terminator (for KYORITSU)	50	#1	April 11, 2004
Software	Cond-V2e	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. A.

3. The VCCI Con A Registration No. is C-817.

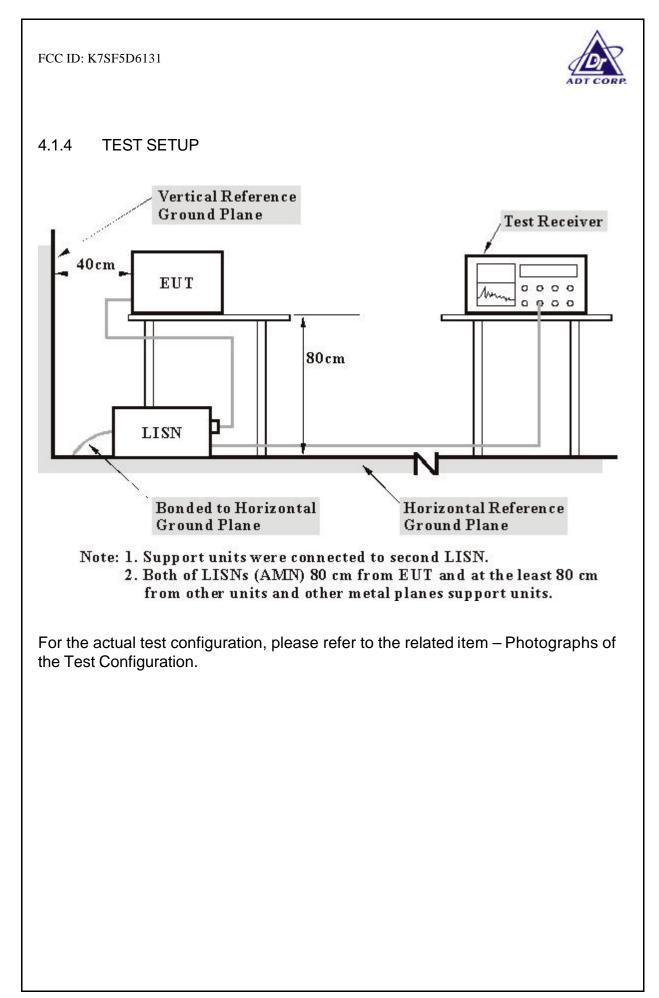


# 4.1.2 TEST PROCEDURES

- 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 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

# 4.1.3 DEVIATION FROM TEST STANDARD

No deviation





# 4.1.5 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared another computer system to act as a communication partner and placed it outside of testing area.
- c. The communication partner run a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency via one RJ 45 cable and wireless.
- d. The communication partner sent data to EUT by command "PING".



#### **TEST RESULTS** 4.1.6

EUT	Wireless Access Point	ess Point MODEL	
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	24 deg. C, 57%RH, 978 hPa	TESTED BY	Tony Chen

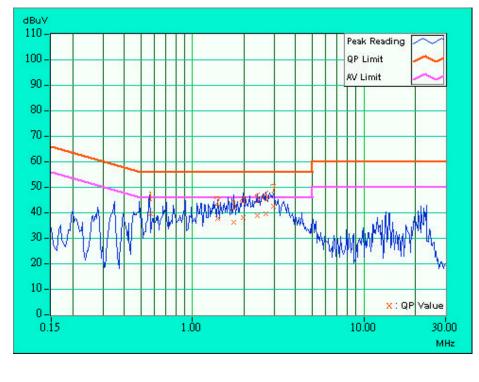
No	Freq.	Corr. Factor	Reading [dB	g Value (uV)]		on Level (uV)]		nit (uV)]	Mar (d	-
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.567	0.10	39.41	-	39.51	-	56.00	46.00	-16.49	-
2	1.404	0.10	37.54	-	37.64	-	56.00	46.00	-18.36	-
3	1.748	0.10	36.27	-	36.37	-	56.00	46.00	-19.63	-
4	1.966	0.10	38.06	-	38.16	-	56.00	46.00	-17.84	-
5	2.384	0.12	38.81	-	38.93	-	56.00	46.00	-17.07	-
6	2.673	0.13	39.57	-	39.70	-	56.00	46.00	-16.30	-
7	2.982	0.15	42.60	-	42.75	-	56.00	46.00	-13.25	-

NOTES: (1) "\*": Undetectable

(2) Q.P. and AV. are abbreviations of quasi-peak and average.
(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

(4) The emission levels of other frequencies were very low against the limit.

- (5) Correction Factor = Insertion loss + Cable loss
- (6) Margin value = Emission level Limit value





EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 1	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 55%RH, 978 hPa	TESTED BY	Tony Chen

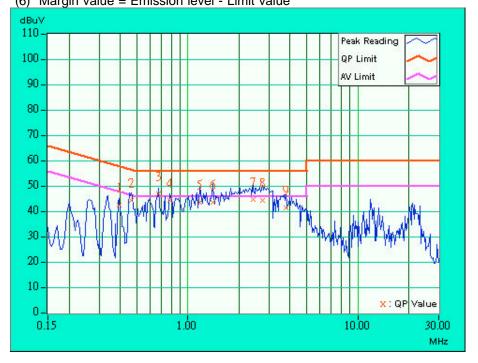
No	Freq. Factor		Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.392	0.10	42.40	-	42.50	-	58.02	48.02	-15.52	-
2	0.463	0.10	44.24	-	44.34	-	56.65	46.65	-12.31	-
3	0.673	0.10	46.90	35.37	47.00	35.47	56.00	46.00	-9.00	-10.53
4	0.787	0.10	44.12	-	44.22	-	56.00	46.00	-11.78	-
5	1.181	0.10	43.52	-	43.62	-	56.00	46.00	-12.38	-
6	1.404	0.10	43.70	-	43.80	-	56.00	46.00	-12.20	-
7	2.412	0.12	44.63	-	44.75	-	56.00	46.00	-11.25	-
8	2.748	0.14	44.24	-	44.38	-	56.00	46.00	-11.62	-
9	3.770	0.19	41.28	-	41.47	-	56.00	46.00	-14.53	-

NOTES: (1) "\*": Undetectable

(2) Q.P. and AV. are abbreviations of quasi-peak and average.

(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

- (4) The emission levels of other frequencies were very low against the limit.
- (5) Correction Factor = Insertion loss + Cable loss
- (6) Margin value = Emission level Limit value





EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 55%RH, 978 hPa	TESTED BY	Tony Chen

No	Freq.	Corr. Factor	Reading [dB	g Value (uV)]		on Level (uV)]		mit (uV)]	Mar (d	-
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.873	0.10	38.01	-	38.11	-	56.00	46.00	-17.89	-
2	1.349	0.10	39.73	-	39.83	-	56.00	46.00	-16.17	-
3	1.752	0.10	39.38	-	39.48	-	56.00	46.00	-16.52	-
4	2.021	0.10	38.46	-	38.56	-	56.00	46.00	-17.44	-
5	2.490	0.12	41.47	-	41.59	-	56.00	46.00	-14.41	-
6	2.759	0.14	42.95	-	43.09	-	56.00	46.00	-12.91	-
7	2.978	0.15	43.23	-	43.38	-	56.00	46.00	-12.62	-

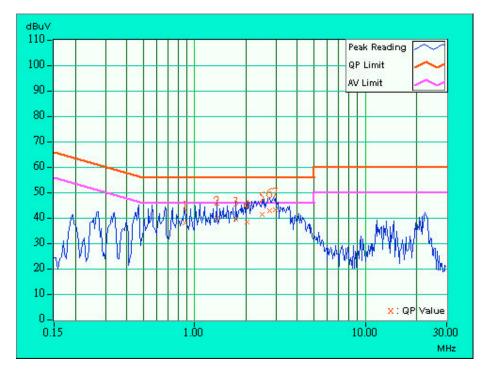
NOTES: (1) "\*": Undetectable

(2) Q.P. and AV. are abbreviations of quasi-peak and average.

(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

(4) The emission levels of other frequencies were very low against the limit.

- (5) Correction Factor = Insertion loss + Cable loss
- (6) Margin value = Emission level Limit value



Report No.: RF920407H04 ADT No. 920407H04



EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 6	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 55%RH, 978 hPa	TESTED BY	Tony Chen

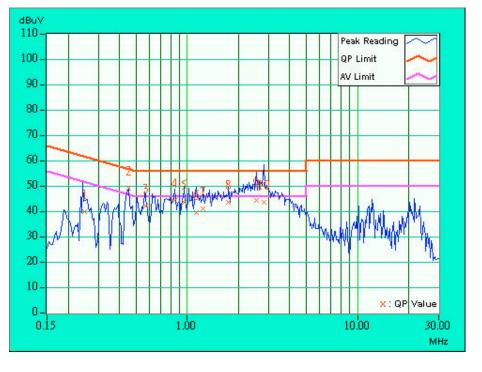
No	IMH71		Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.249	0.10	39.79	-	39.89	-	61.80	51.80	-21.91	-
2	0.451	0.10	48.95	36.17	49.05	36.27	56.86	46.86	-7.81	-10.59
3	0.569	0.10	41.91	-	42.01	-	56.00	46.00	-13.99	-
4	0.845	0.10	44.42	-	44.52	-	56.00	46.00	-11.48	-
5	0.955	0.10	43.73	-	43.83	-	56.00	46.00	-12.17	-
6	1.127	0.10	39.51	-	39.61	-	56.00	46.00	-16.39	-
7	1.244	0.10	41.08	-	41.18	-	56.00	46.00	-14.82	-
8	1.744	0.10	43.71	-	43.81	-	56.00	46.00	-12.19	-
9	2.545	0.13	44.40	-	44.53	-	56.00	46.00	-11.47	-
10	2.810	0.14	43.41	-	43.55	-	56.00	46.00	-12.45	-
NOT	ES: (1) "*":	Undetecta	ble							

(2) Q.P. and AV. are abbreviations of quasi-peak and average.

(3) "-": The Quasi-peak reading value also meets an average limit, thus (4) The emission levels of other frequencies were very low against the limit.

(5) Correction Factor = Insertion loss + Cable loss

(6) Margin value = Emission level - Limit value





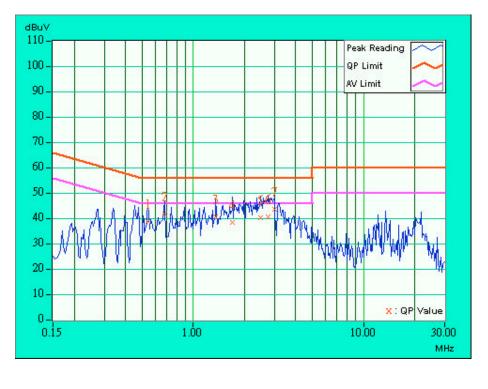
EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 55%RH, 978 hPa	TESTED BY	Tony Chen

No	Freq.	Corr. Factor	Reading [dB (	g Value (uV)]	Emissic [dB	on Level (uV)]		nit (uV)]	Mar (d	-
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.545	0.10	38.90	-	39.00	-	56.00	46.00	-17.00	-
2	0.677	0.10	41.60	-	41.70	-	56.00	46.00	-14.30	-
3	1.357	0.10	40.44	-	40.54	-	56.00	46.00	-15.46	-
4	1.697	0.10	38.35	-	38.45	-	56.00	46.00	-17.55	-
5	2.482	0.12	40.33	-	40.45	-	56.00	46.00	-15.55	-
6	2.767	0.14	40.64	-	40.78	-	56.00	46.00	-15.22	-
7	2.990	0.15	43.61	-	43.76	-	56.00	46.00	-12.24	-

NOTES: (1) "\*": Undetectable

(2) Q.P. and AV. are abbreviations of quasi-peak and average.
(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

- (4) The emission levels of other frequencies were very low against the limit.
- (5) Correction Factor = Insertion loss + Cable loss
- (6) Margin value = Emission level Limit value





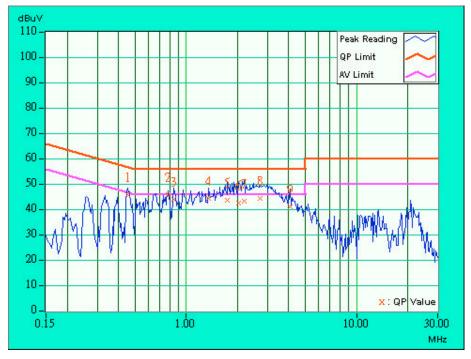
EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 11	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 55%RH, 978 hPa	TESTED BY	Tony Chen

No	Freq.	Freq. Factor		Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.455	0.10	45.54	-	45.64	-	56.79	46.79	-11.15	-	
2	0.787	0.10	45.66	-	45.76	-	56.00	46.00	-10.24	-	
3	0.845	0.10	43.96	-	44.06	-	56.00	46.00	-11.94	-	
4	1.353	0.10	44.36	-	44.46	-	56.00	46.00	-11.54	-	
5	1.752	0.10	43.37	-	43.47	-	56.00	46.00	-12.53	-	
6	2.033	0.10	42.50	-	42.60	-	56.00	46.00	-13.40	-	
7	2.201	0.11	42.99	-	43.10	-	56.00	46.00	-12.90	-	
8	2.701	0.14	44.13	-	44.27	-	56.00	46.00	-11.73	-	
9	4.078	0.21	41.06	-	41.27	-	56.00	46.00	-14.73	-	

#### NOTES: (1) "\*": Undetectable

(1) 1. Ondetectable
(2) Q.P. and AV. are abbreviations of quasi-peak and average.
(3) "-": The Quasi-peak reading value also meets an average limit, thus measurement with the average detector is unnecessary.

- The emission levels of other frequencies were very low against the limit. Correction Factor = Insertion loss + Cable loss
- (4) The emission levels of other frequencies we
  (5) Correction Factor = Insertion loss + Cable I
  (6) Margin value = Emission level Limit value





### 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies	Field Strength of Fundamental				
(MHz)	uV/m	dBuV/m			
30-88	100	40.0			
88-216	150	43.5			
216-960	200	46.0			
Above 960	500	54.0			

#### NOTE:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level  $(dBuV/m) = 20 \log Emission level (uV/m)$ .
- 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
HP Spectrum Analyzer	8590L	3829A02338	Sep. 10, 2003
*ADVANTEST Spectrum Analyzer	R3271A	85060311	May 21, 2003
CHASE RF Pre_Amplifier	CPA9232	1001	Mar. 02, 2004
*HP Pre_Amplifier	8449B	3008A01281	Jun. 12, 2003
*ROHDE & SCHWARZ	ESCS 30	100027	May 23, 2003
Test Receiver			
*CHASE Broadband Antenna	CBL6112B	2502	Jun. 28, 2003
*Schwarzbeck Horn_Antenna	BBHA9120-D1	D123	Jul. 31, 2003
SCHWARZBECK Tunable Dipole Antenna	UHAP	897	Mar. 07, 2005
SCHWARZBECK Tunable Dipole Antenna	VHAP	880	Mar. 07, 2005
*RF Switches	MP59B	M50867	Jul. 26, 2003
*RF Cable(JETBAO)	BELDN RG-214	Cable_OA_01	Jul. 26, 2003
*Software	AS60P8	NA	NA
*EMCO Antenna Tower	2075-2	9712-2124	NA
*EMCO Turn Table	2081-1.53	9712-2030	NA
*CORCOM AC Filter	MRI2030	107/108	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Tunable Dipole Antenna) and the calibrations are traceable to NML/ROC and NIST/USA.

2. \* = These equipment are used for the final measurement.

- 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 4. The test was performed in ADT Open Site No. A.5. The VCCI Site Registration No. is R-782.
- 6. The FCC Site Registration No. is 91097.



# 4.2.3 TEST PROCEDURES

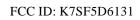
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on 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 10 dB 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 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

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

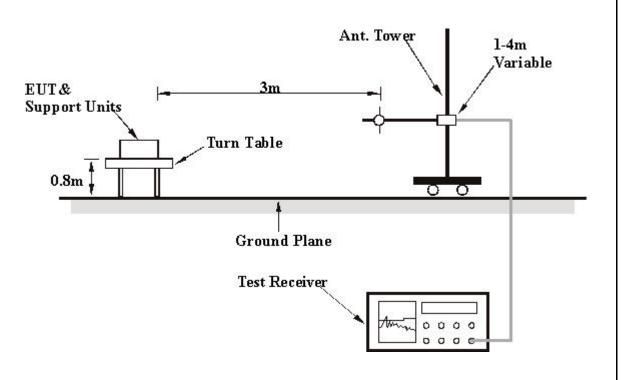
### 4.2.4 DEVIATION FROM TEST STANDARD

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

EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 11	FREQUENCY	30-1000 MHz
INPUT POWER	400)/	RANGE DETECTOR	
(SYSTEM)	120Vac, 60Hz	FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21 deg. C, 63%RH, 978 hPa	TESTED BY	Tony Chen

	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	75.01	22.9 QP	40.00	-17.10	4.00 H	157	15.70	7.20		
2	125.01	25.6 QP	43.50	-17.90	3.82 H	68	11.20	14.50		
3	250.01	26.3 QP	46.00	-19.70	2.89 H	160	12.30	14.00		
4	375.01	33.5 QP	46.00	-12.50	2.90 H	228	15.90	17.60		
5	440.02	30.9 QP	46.00	-15.10	2.88 H	142	12.10	18.80		
6	450.03	34.4 QP	46.00	-11.60	1.00 H	298	15.50	18.90		
7	500.01	34.7 QP	46.00	-11.30	1.92 H	257	14.50	20.20		
8	625.01	36.6 QP	46.00	-9.40	1.74 H	133	14.60	22.00		
9	750.01	40.2 QP	46.00	-5.80	1.00 H	11	17.10	23.10		
10	875.01	40.0 QP	46.00	-6.00	1.00 H	258	16.10	24.00		

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
	Freq.	Emission	Limit	Margin	Antenna	Table	Raw	Correction			
No.	No.	Level	(dBuV/m)	(dB)	Height	Angle	Value	Factor			
(MHz)	(dBuV/m)	(ubuv/iii)	(ub)	(m)	(Degree)	(dBuV)	(dB/m)				
1	44.02	32.2 QP	40.00	-7.80	1.00 V	221	20.80	11.40			
2	75.03	34.5 QP	40.00	-5.50	1.00 V	74	27.20	7.20			
3	125.01	28.6 QP	43.50	-14.90	1.00 V	280	14.10	14.50			
4	132.01	31.6 QP	43.50	-11.90	1.00 V	315	16.90	14.70			
5	250.01	27.2 QP	46.00	-18.80	1.00 V	116	13.20	14.00			
6	375.01	29.6 QP	46.00	-16.40	1.00 V	91	12.00	17.60			
7	440.03	30.9 QP	46.00	-15.10	1.00 V	135	12.10	18.80			
8	500.01	31.4 QP	46.00	-14.60	2.11 V	184	11.20	20.20			
9	625.01	31.0 QP	46.00	-15.00	2.33 V	199	9.00	22.00			
10	750.02	33.9 QP	46.00	-12.10	1.66 V	204	10.80	23.10			
11	875.02	33.4 QP	46.00	-12.60	1.89 V	201	9.40	24.00			

REMARKS:

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. The limit value is defined as per 15.247



EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 1	FREQUENCY	Above 1000 MHz
MODE		RANGE	
INPUT POWER	120Vac, 60Hz	DETECTOR	Peak(PK)
(SYSTEM)	120 vac, 00112	FUNCTION Average (AV)	
ENVIRONMENTAL CONDITIONS	24 deg. C, 59%RH, 978 hPa	TESTED BY	Tony Chen

	ANTEN	NA POLARI	TY & TE	ST DIST	ANCE: I	HORIZO	NTAL 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	2038.00	42.2 PK	74.00	-31.80	1.28 H	41	13.20	28.90
2	2351.00	45.7 PK	74.00	-28.30	1.26 H	37	15.20	30.60
3	*2412.00	97.0 PK			1.31 H	51	67.10	29.90
3	*2412.00	93.2 AV			1.31 H	51	63.40	28.90
4	2499.00	42.4 PK	74.00	-31.60	1.00 H	44	11.30	31.10
5	4075.00	37.3 PK	74.00	-36.70	1.10 H	84	3.40	34.00
6	7237.00	52.1 PK	74.00	-21.90	1.76 H	49	10.40	41.70
6	7237.00	43.9 AV	54.00	-10.10	1.76 H	49	2.20	30.60
7	9648.00	56.2 PK	77.00	-20.80	1.64 H	128	11.30	44.90
7	9648.00	52.7 AV	73.20	-20.50	1.64 H	128	7.80	29.90

	ANTE	NNA POLAI	RITY & T	EST DIS	STANCE	: VERTI	CAL AT 3	Μ
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	2038.00	42.8 PK	74.00	-31.20	1.54 V	7	13.80	28.90
2	2389.00	61.4 PK	74.00	-12.60	1.35 V	49	27.90	33.50
2	2389.00	52.5 AV	54.00	-1.50	1.35 V	49	19.00	28.90
3	*2412.00	106.9 PK			1.01 V	39	77.00	29.90
3	*2412.00	102.3 AV			1.01 V	39	72.40	33.50
4	2494.00	52.3 PK	74.00	-21.70	1.29 V	34	18.40	33.90
4	2494.00	43.1 AV	54.00	-10.90	1.29 V	34	9.20	29.90
5	4075.00	39.9 PK	74.00	-34.10	1.78 V	79	6.00	34.00
6	4824.00	41.2 PK	74.00	-32.80	1.12 V	301	4.90	36.20
7	7236.00	57.3 PK	74.00	-16.70	1.82 V	75	15.60	41.70
7	7236.00	50.9 AV	54.00	-3.10	1.82 V	75	9.30	33.90
8	9648.00	59.7 PK	86.90	-27.20	1.57 V	45	14.80	44.90
8	9648.00	57.3 AV	83.30	-25.00	1.57 V	45	12.40	34.00

#### REMARKS:

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. The limit value is defined as per 15.247

6. " \* " : Fundamental frequency



EUT	Wireless Access Point	MODEL	F5D6130
MODE	Channel 6	FREQUENCY	Above 1000 MHz
		RANGE	Above 1000 Minz
INPUT POWER	120Vac, 60Hz	DETECTOR	Peak(PK)
(SYSTEM)		FUNCTION	Average (AV)
ENVIRONMENTAL CONDITIONS	24 deg. C, 59%RH, 978 hPa	TESTED BY	Tony Chen

	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	2063.00	44.8 PK	74.00	-29.20	1.00 H	40	15.80	29.10		
2	2358.00	45.6 PK	74.00	-28.40	1.01 H	38	14.90	30.60		
3	*2437.00	98.0 PK			1.04 H	44	68.00	30.00		
3	*2437.00	95.2 AV			1.04 H	44	65.30	29.10		
4	2494.00	45.0 PK	74.00	-29.00	1.00 H	45	11.10	33.90		
5	4126.00	41.7 PK	74.00	-32.30	1.49 H	24	7.60	34.10		
6	7308.00	52.7 PK	74.00	-21.30	1.57 H	48	11.00	41.80		
6	7308.00	46.7 AV	54.00	-7.30	1.57 H	48	5.00	30.60		
7	9747.00	57.7 PK	78.00	-20.30	1.82 H	17	13.00	44.60		
7	9747.00	53.6 AV	75.20	-21.60	1.82 H	17	9.00	30.00		

	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	2063.00	45.8 PK	74.00	-28.20	1.17 V	8	16.80	29.10			
2	2358.00	57.8 PK	74.00	-16.20	1.38 V	40	27.20	30.60			
2	2358.00	48.6 AV	54.00	-5.40	1.38 V	40	17.90	29.10			
3	*2437.00	109.1 PK			1.04 V	34	79.10	30.00			
3	*2437.00	104.9 AV			1.04 V	34	74.90	30.60			
4	2494.00	54.4 PK	74.00	-19.60	1.25 V	36	20.50	33.90			
4	2494.00	45.6 AV	54.00	-8.40	1.25 V	36	11.70	30.00			
5	4126.00	42.2 PK	74.00	-31.80	1.55 V	14	8.10	34.10			
6	7310.00	60.4 PK	74.00	-13.60	1.45 V	58	18.60	41.80			
6	7310.00	52.6 AV	54.00	-1.40	1.45 V	58	10.90	33.90			
7	9748.00	65.7 PK	89.10	-23.40	1.23 V	14	21.10	44.60			
7	9748.00	62.9 AV	84.90	-22.00	1.23 V	14	18.30	34.10			

#### REMARKS:

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. The limit value is defined as per 15.247
- 6. " \* " : Fundamental frequency



EUT	Wireless Access Point MODEL		F5D6130	
MODE	Channel 11	FREQUENCY	Above 1000 MHz	
		RANGE	Above 1000 MHz	
INPUT POWER	120Vac, 60Hz	DETECTOR	Peak(PK)	
(SYSTEM)		FUNCTION	Average (AV)	
ENVIRONMENTAL CONDITIONS	24 deg. C, 59%RH, 978 hPa	TESTED BY	Tony Chen	

	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	2088.00	41.7 PK	74.00	-32.30	1.00 H	25	12.50	29.20		
2	2352.00	46.4 PK	74.00	-27.60	1.03 H	100	15.80	30.60		
3	*2462.00	96.3 PK			1.00 H	317	66.20	30.10		
3	*2462.00	93.6 AV			1.00 H	317	63.50	29.20		
4	2498.00	45.0 PK	74.00	-29.00	1.43 H	100	13.40	31.60		
5	4176.00	40.5 PK	74.00	-33.50	1.22 H	24	6.30	34.20		
6	7388.00	48.8 PK	74.00	-25.20	1.84 H	72	7.00	41.80		
7	9848.00	53.0 PK	76.30	-23.30	1.06 H	107	8.70	44.40		
7	9848.00	47.1 AV	73.60	-25.50	1.06 H	107	2.80	30.60		

	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	2088.00	43.3 PK	74.00	-30.70	1.56 V	69	14.10	29.20	
2	2352.00	56.2 PK	74.00	-17.80	1.07 V	39	25.60	30.60	
2	2352.00	47.0 AV	54.00	-7.00	1.07 V	39	16.40	29.20	
3	*2462.00	105.4 PK			1.00 V	38	75.30	30.10	
3	*2462.00	101.0 AV			1.00 V	38	70.90	30.60	
4	2492.00	60.4 PK	74.00	-13.60	1.28 V	34	25.40	35.00	
4	2492.00	50.5 AV	54.00	-3.50	1.28 V	34	15.40	30.10	
5	4176.00	42.8 PK	74.00	-31.20	1.00 V	2	8.60	34.20	
6	7388.00	53.1 PK	74.00	-20.90	1.13 V	22	11.20	41.80	
6	7388.00	48.6 AV	54.00	-5.40	1.13 V	22	6.70	35.00	
7	9848.00	59.4 PK	85.40	-26.00	1.28 V	29	15.00	44.40	
7	9848.00	56.3 AV	81.00	-24.70	1.28 V	29	11.90	34.20	

REMARKS:

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. The limit value is defined as per 15.2476. " \* " : 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
R&S SPECTRUM ANALYZER	FSP	1093.4495.30	Dec. 19, 2003

#### NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

### 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.



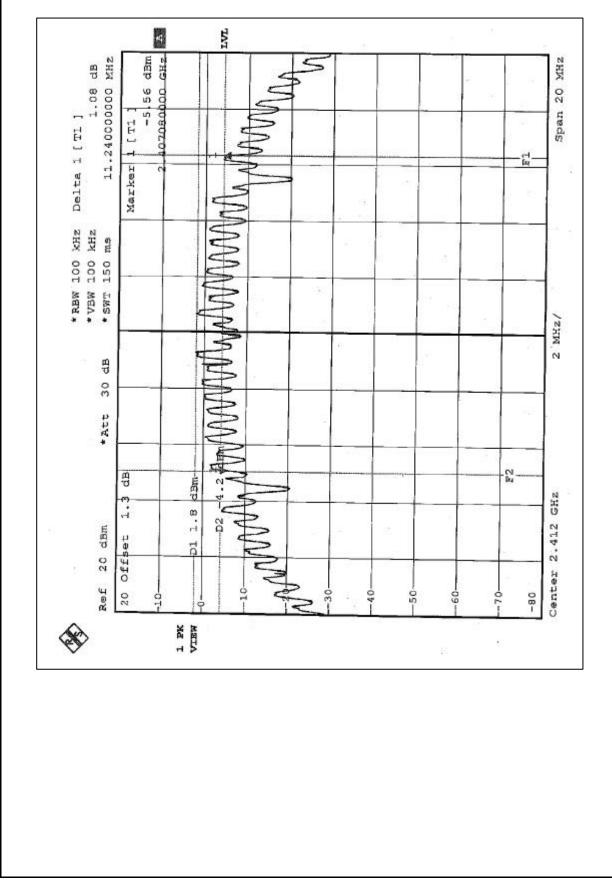
# 4.3.7 TEST RESULTS

EUT	Wireless Access Point	MODEL	F5D6130	
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 64%RH, 978 hPa	
TEST BY	Hank Chung			

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.24	0.5	PASS
6	2437	11.12	0.5	PASS
11	2462	11.16	0.5	PASS

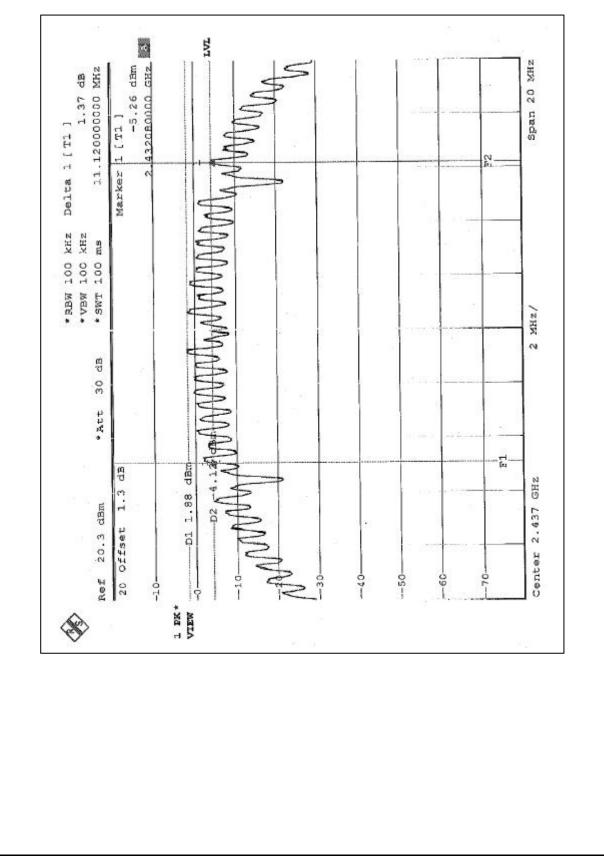


CH1



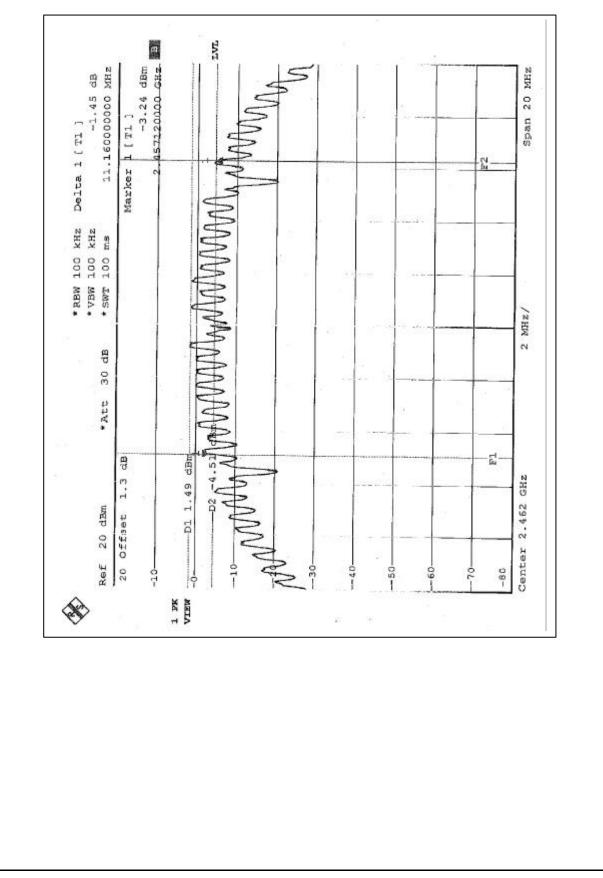


CH6





CH11





### 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
SINGLE CHANNEL POWER METER	NRVS	100026	Mar. 06, 2004
PEAK POWER SENSOR	NRV-Z32	100013	Mar. 06, 2004

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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 PROCEDURES

The transmitter output was connected to the peak power meter.

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.4.5 TEST SETUP



# 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

6

11



PASS

PASS

30

30

# 4.4.7 TEST RESULTS

2437

2462

EUT		Wireless Access Point		MODEL		F5D6130	
INPUT POW (SYSTEM)	INPUT POWER (SYSTEM) 120Vac, 60Hz					4deg.C, 64%RH, 78 hPa	
TEST BY	TEST BY Hank Chung						
CHANNEL PEAK PO CHANNEL FREQUENCY OUTPU (MHz) (dBm		Л	PEAK POW LIMIT (dBm)	ER	PASS/FAIL		
1		2412	16.1 30			PASS	

16.12

16.02



# 4.4.8 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

# 4.4.9 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP	1093.4495.30	Dec. 19, 2003

#### NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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



# 4.4.10 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.

# 4.4.11 DEVIATION FROM TEST STANDARD

No deviation

# 4.4.12 TEST SETUP



# 4.4.13 EUT OPERATING CONDITION

Same as Item 4.3.6

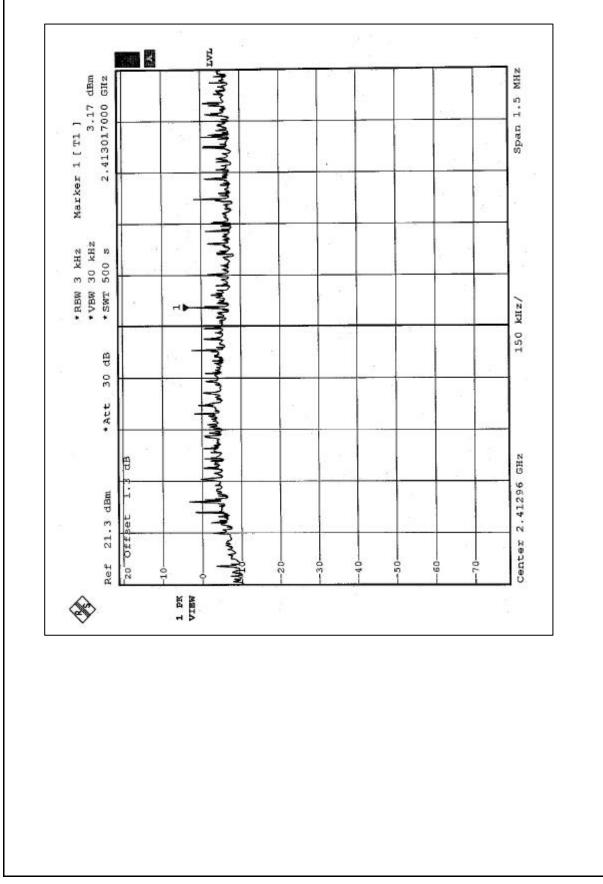


# 4.4.14 TEST RESULTS

EUT	Wireless Access Point		MODEL		F5D6130	
INPUT POWER (SYSTEM)	120Vac, 60Hz		ENVIRONMENTAL CONDITIONS		18deg. C, 69%RH, 978 hPa	
TEST BY     Hank Chung						
CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)		OWER LEVEL 3 kHz BW (dBm)	L	XIMUM IMIT dBm)	PASS/FAIL
1	2412		2.87		8	PASS
6	2437		-0.64		8	PASS
11	2462		-0.21		8	PASS

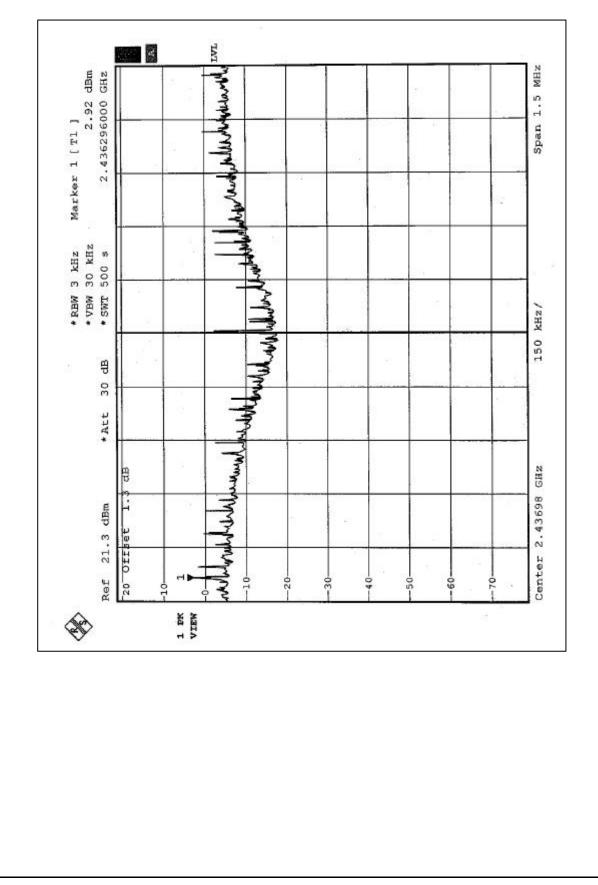


CH1



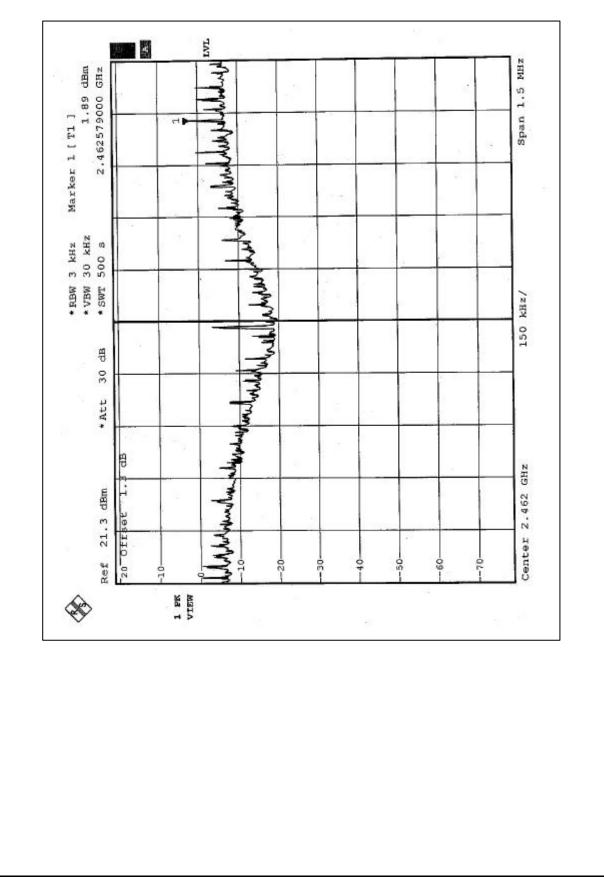


CH6





CH11





# 4.5 BAND EDGES MEASUREMENT

### 4.5.1 LIMITS OF BAND EDGES MEASUREMENT

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

# 4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP	1093.4495.30	Dec. 19, 2003

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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 PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose 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 was measured and recorded.

# 4.5.4 DEVIATION FROM TEST STANDARD

No deviation



# 4.5.5 EUT OPERATING CONDITION

Same as Item 4.3.6

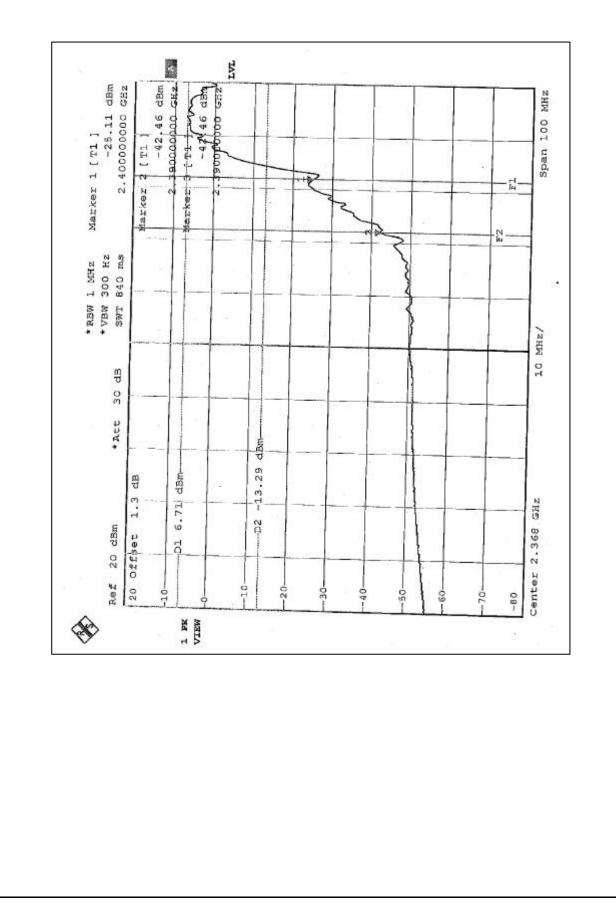
# 4.5.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(C).

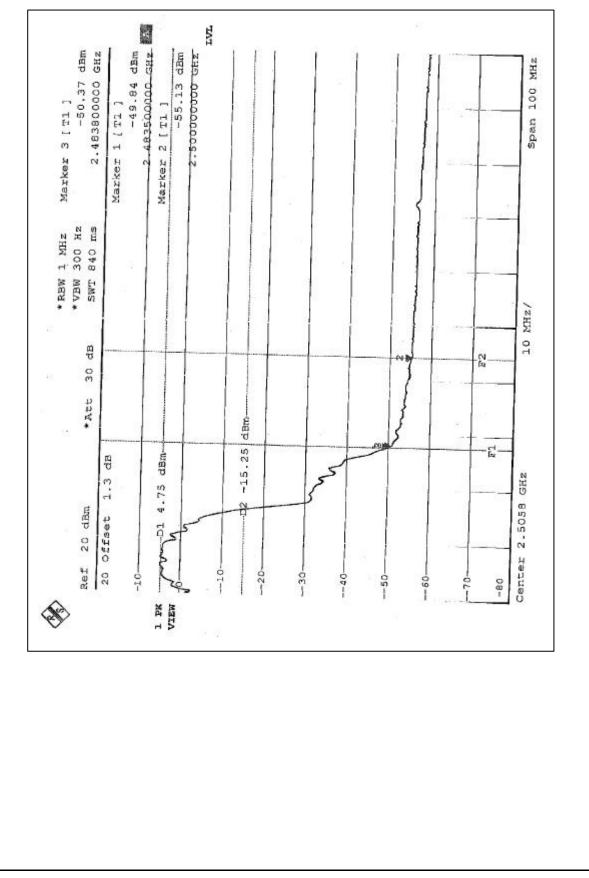
**NOTE (1):** The band edge emission plot on the following first page shows 49.17dB delta between carrier maximum power and local maximum emission in restrict band (2.390GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.3dBuV/m, so the maximum field strength in restrict band is 102.3-49.17=53.13dBuV/m which is under 54 dBuV/m limit.

**NOTE (2):** The band edge emission plot on the following second page shows 54.59dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 101.0dBuV/m, so the maximum field strength in restrict band is 101.0-54.59=46.41dBuV/m which is under 54 dBuV/m limit.











# 4.6 ANTENNA REQUIREMENT

### 4.6.1 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.

## 4.6.2 ANTENNA CONNECTED CONSTRUCTION

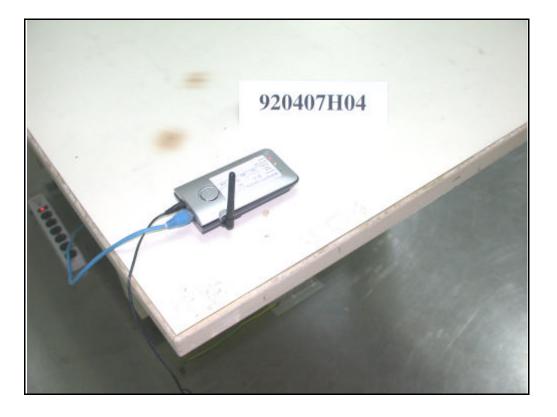
The antenna used in this product is Fixable Dipole Antenna without connector. The maximum Gain of the antenna is 2dBi.

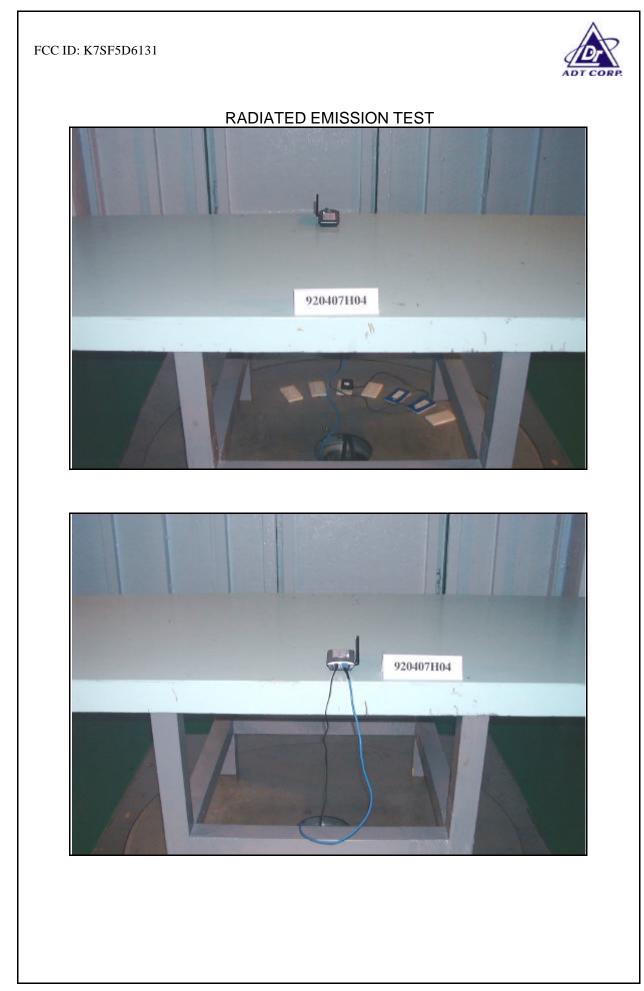


# **5** PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST









#### 6 **INFORMATION ON THE TESTING LABORATORIES**

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	<b>TUV</b> Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

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:

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The address and road map of all our labs can be found in our web site also.