

FCC TEST REPORT (15.407)

REPORT NO.: RF9940418L08
MODEL NO.: P-780
(refer to page 7 for other model)
RECEIVED: Apr. 06, 2004
TESTED: Apr. 06 ~ Apr. 22, 2005
ISSUED: Apr. 26, 2005

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0528
ILAC MRA



No. 2177-01

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1. CERTIFICATION

PRODUCT: Dual Band Outdoor Access Point
BRAND NAME: Gemtek Systems
MODEL NO.: P-780
(refer to page 7 for other model)
APPLICANT: Gemtek Technology Co., Ltd.
TEST SAMPLE: Engineering Sample
TESTED: Apr. 06 ~ Apr. 22, 2005
STANDARDS: FCC Part 15, Subpart E (Section 15.407)
ANSI C63.4-2003

The above equipment has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Windy Chou , **DATE:** Apr. 26, 2005
(Windy Chou)

TECHNICAL
ACCEPTANCE : Gary Chang , **DATE:** Apr. 26, 2005
Responsible for
RF
(Gary Chang)

APPROVED BY : Cody Chang , **DATE:** Apr. 26, 2005
(Cody Chang, 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 -10.40dB at 0.474MHz
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 -1.17dB at 788.40MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Dual Band Outdoor Access Point
MODEL NO.	P-780
POWER SUPPLY	48.0Vdc from POE
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
FREQUENCY RANGE	802.11b & 802.11g: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz
NUMBER OF CHANNEL	802.11b & 802.11g: 11 802.11a: 13
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz
OUTPUT POWER	28.576mW for 802.11b 42.364mW for 802.11g 14.521MW FOR 5.150 ~ 5.350GHZ 25.410mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	Refer to NOTE 5 below
DATA CABLE	1.8m antenna cable without core
I/O PORTS	RJ45
ASSOCIATED DEVICES	NA

NOTE:

1. The POE is for support unit only.
2. The models as below are identical to each except other except for their model name and product name due to marketing requirement.

Model name	Product name
P-780	Dual Band Outdoor Access Point
P-785	Hotspot-in-a-Box

*The EUT was designed with two radio cards.

3. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
4. There are two 11a/g/b mini PCI card in the EUT. Both of them have the function of transmitting simultaneously.

5. There are three combinations of antenna type provided to this EUT. Please refer to following table.

No.	Model	Antenna type	Gain (dBi)	
			2.4GHz	5GHz
1	A-807	Omni dual band	4.5	7
2	A-308	Omni single band	8	-
3	A-408	Omni single band	-	8

6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

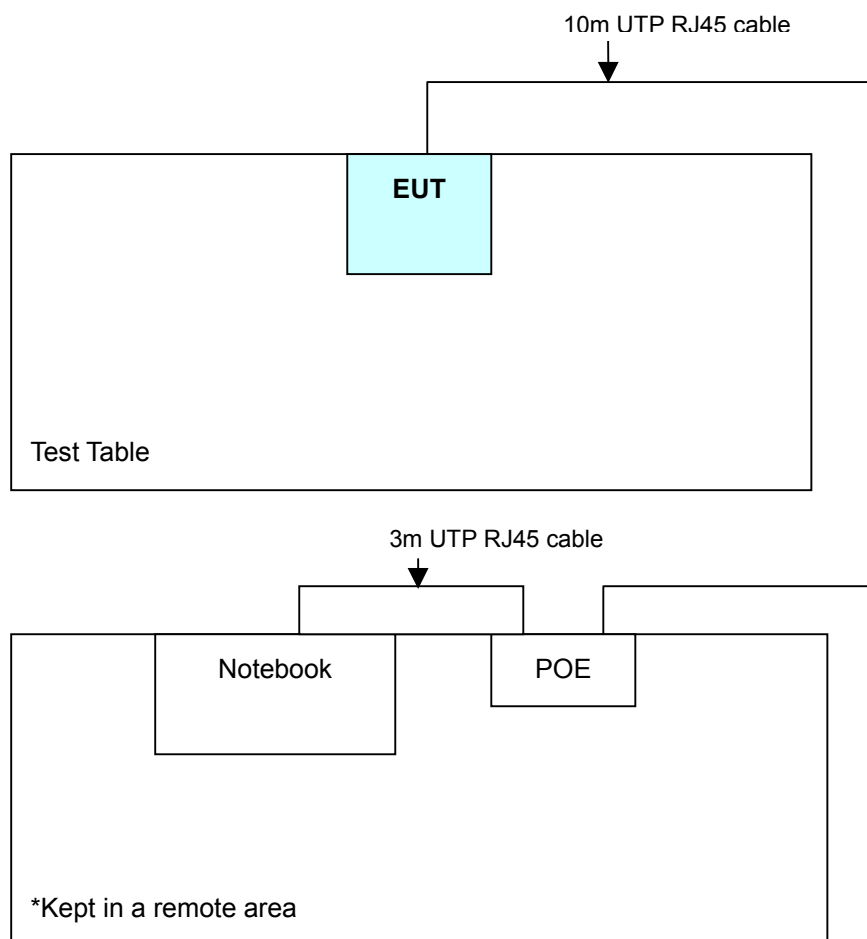
3.2 DESCRIPTION OF TEST MODES

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

Eight channels are provided to this EUT for normal mode.

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

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
1	Note 1	X	X	Note 2	A-807 antenna with 7dBi gain (for 5GHz dual band)
2	Note 1	X	X	Note 2	A-408 antenna with 8dBi gain (for 5GHz single band)

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

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

Note 1: Pre-scan shown antenna has no effect for Conducted Emission test.

Note 2: Conducted RF measurement is independent of antenna.

Power Line Conducted Emission Test:

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
2	802.11a	1 to 8	5	OFDM	BPSK	6

Radiated Emission Test (Below 1 GHz):

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1, 2	802.11a	1 to 8	5	OFDM	BPSK	6



Radiated Emission Test (Above 1 GHz):

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
1, 2	802.11a	1 to 8	1, 4, 5, 8	OFDM	BPSK	6

Bandedge Measurement:

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 8	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 8	1, 4, 5, 8	OFDM	BPSK	6



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS

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

NOTE: 1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 act as a communication partner to transfer data.

4. TEST TYPES AND RESULTS (5150 ~ 5350MHz Band)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

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



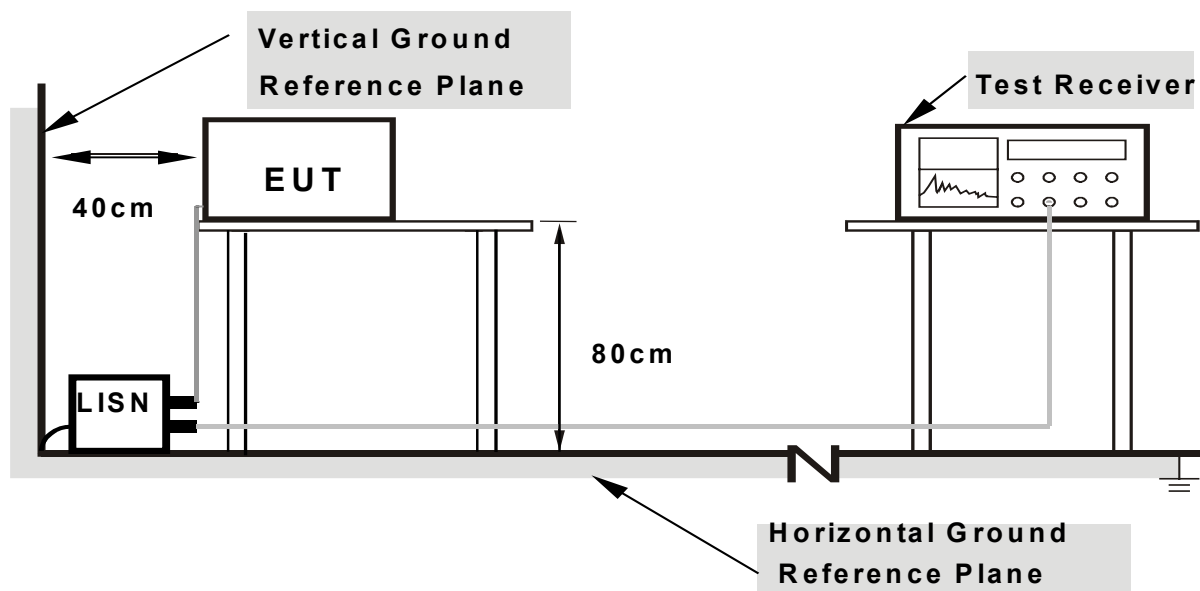
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 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

Same as 4.1.6

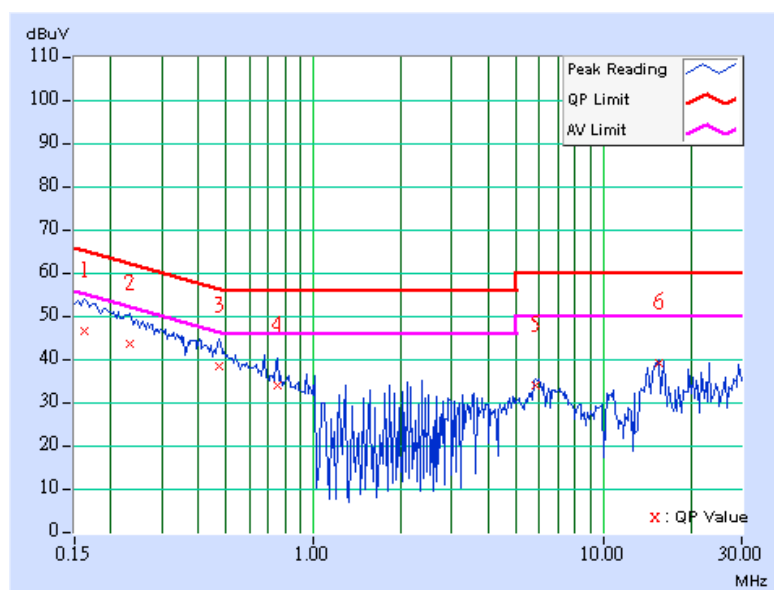
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line 1
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa	TESTED BY	Gary Chang

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	0.162	0.11	45.97	19.19	46.08	19.30	65.38	55.38	-19.30	-36.08
2	0.232	0.11	43.17	15.79	43.28	15.90	62.38	52.38	-19.10	-36.48
3	0.474	0.13	37.78	35.91	37.91	36.04	56.44	46.44	-18.53	-10.40
4	0.748	0.19	33.30	-	33.49	-	56.00	46.00	-22.51	-
5	5.836	0.44	33.51	-	33.95	-	60.00	50.00	-26.05	-
6	15.617	0.61	38.79	-	39.40	-	60.00	50.00	-20.60	-

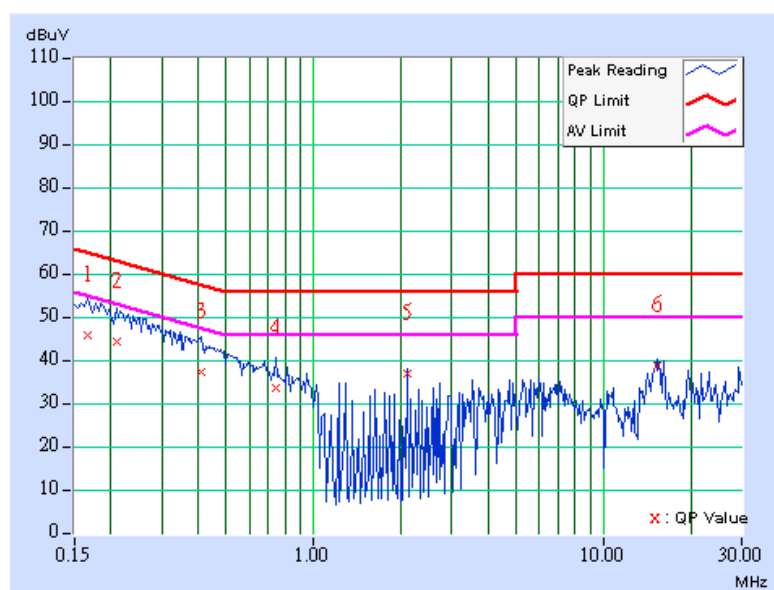
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line 2
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa	TESTED BY	Gary Chang

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	0.166	0.11	45.59	20.06	45.70	20.17	65.18	55.18	-19.48	-35.01
2	0.209	0.11	43.92	27.06	44.03	27.17	63.26	53.26	-19.23	-26.09
3	0.408	0.11	37.01	-	37.12	-	57.69	47.69	-20.57	-
4	0.744	0.18	33.42	-	33.60	-	56.00	46.00	-22.40	-
5	2.102	0.27	36.64	34.55	36.91	34.82	56.00	46.00	-19.09	-11.18
6	15.254	0.46	38.34	-	38.80	-	60.00	50.00	-21.20	-

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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



4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (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

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



4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 07, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 29, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10631	Nov. 17, 2005
Preamplifier Agilent	8449B	3008A01960	Nov. 14, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The IC Site Registration No. is IC4924-4.



4.2.4 TEST PROCEDURES

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

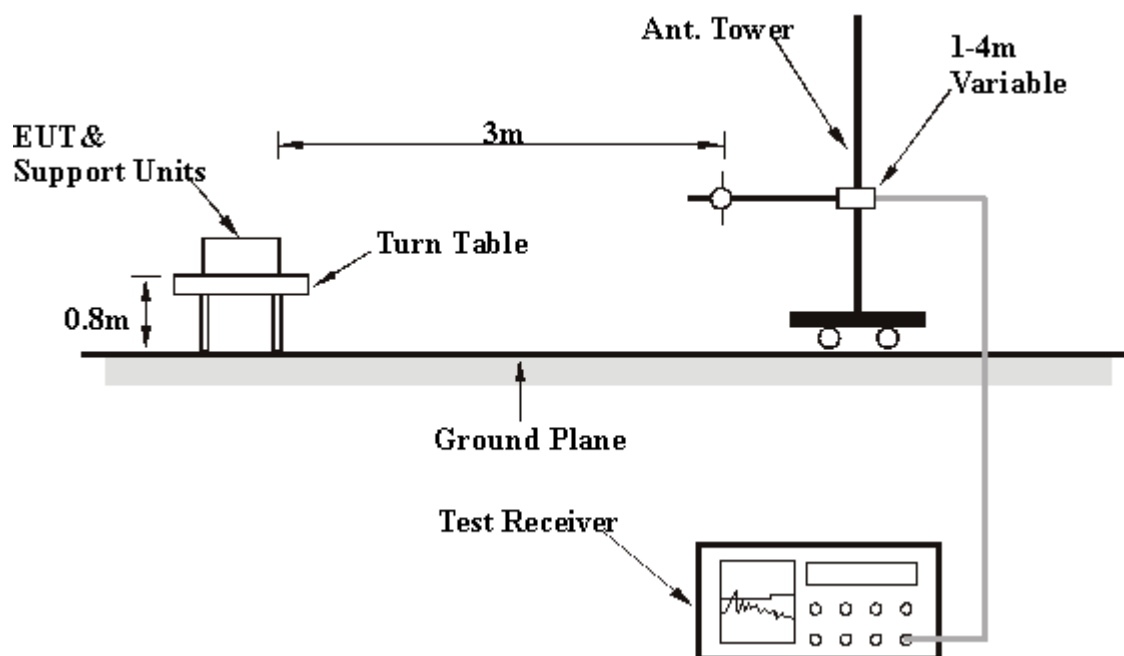
NOTE:

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 and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 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

Same as 4.1.6

4.2.8 TEST RESULTS

Below 1GHz Worst-Case Data with test mode 1

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	1 (5GHz dual band(for antenna: A-807))		

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	309.92	44.45 QP	46.00	-1.55	1.00 H	211	29.82	14.63
2	533.47	38.09 QP	46.00	-7.91	2.00 H	301	18.92	19.17
3	667.60	38.35 QP	46.00	-7.65	1.00 H	205	16.69	21.66
4	733.69	44.57 QP	46.00	-1.43	1.00 H	208	21.73	22.84
5	778.40	44.83 QP	46.00	-1.17	1.00 H	208	21.47	23.36
6	823.11	35.47 QP	46.00	-10.53	1.00 H	199	11.80	23.67

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	43.61	38.72 QP	40.00	-1.28	1.00 V	43	23.33	15.39
2	309.92	40.24 QP	46.00	-5.76	1.00 V	157	25.61	14.63
3	533.47	43.98 QP	46.00	-2.02	1.00 V	199	24.81	19.17
4	578.18	38.23 QP	46.00	-7.77	1.00 V	355	18.00	20.23
5	733.69	36.69 QP	46.00	-9.31	1.00 V	184	13.85	22.84
6	778.40	39.47 QP	46.00	-6.53	1.00 V	172	16.11	23.36

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

Below 1GHz Worst-Case Data with test mode 2

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	2 (5GHz single band(for antenna: A-704))		

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	134.97	40.50 QP	43.50	-3.00	2.00 H	163	26.46	14.04
2	309.92	44.00 QP	46.00	-2.00	1.00 H	199	29.37	14.63
3	554.85	40.28 QP	46.00	-5.72	1.00 H	316	20.68	19.59
4	667.60	39.85 QP	46.00	-6.15	1.00 H	205	18.19	21.66
5	733.69	44.71 QP	46.00	-1.29	1.00 H	193	21.87	22.84
6	778.40	44.58 QP	46.00	-1.42	1.00 H	208	21.21	23.36

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	59.16	35.39 QP	40.00	-4.61	1.00 V	280	21.70	13.69
2	133.03	41.20 QP	43.50	-2.30	1.00 V	49	27.32	13.89
3	309.92	41.08 QP	46.00	-4.92	1.00 V	175	26.45	14.63
4	554.85	43.99 QP	46.00	-2.01	1.00 V	355	24.39	19.59
5	733.69	37.92 QP	46.00	-8.08	1.00 V	313	15.08	22.84
6	778.40	40.93 QP	46.00	-5.07	1.00 V	40	17.57	23.36

- 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 with test mode 1

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	1 (5GHz dual band(for antenna: A-807))		

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	#1108.00	44.15 PK	74.00	-29.85	1.24 H	146	16.45	27.70
2	#5150.00	40.80 PK	74.00	-33.20	1.42 H	306	2.20	38.60
2	#5150.00	30.74 AV	54.00	-23.26	1.42 H	306	-7.86	38.60
3	*5180.00	91.80 PK			1.42 H	306	53.14	38.66
3	*5180.00	81.74 AV			1.42 H	306	43.08	38.66
4	6907.00	55.26 PK	68.30	-13.04	1.12 H	255	11.80	43.46

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	#1108.00	48.53 PK	74.00	-25.47	1.08 V	133	20.83	27.70
2	#5150.00	57.87 PK	74.00	-16.13	1.28 V	338	19.27	38.60
2	#5150.00	47.74 AV	54.00	-6.26	1.28 V	338	9.14	38.60
3	*5180.00	108.97 PK			1.28 V	338	70.31	38.66
3	*5180.00	98.84 AV			1.28 V	338	60.18	38.66
4	6907.00	61.25 PK	68.30	-7.05	1.75 V	263	17.79	43.46

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

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	1 (5GHz dual band(for antenna: A-807))		

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	#1108.00	46.21 PK	74.00	-27.79	1.10 H	158	18.51	27.70
2	*5240.00	92.37 PK			1.23 H	296	53.60	38.77
2	*5240.00	81.73 AV			1.23 H	296	42.96	38.77
3	6986.00	55.87 PK	68.30	-12.43	1.24 H	211	12.23	43.64

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	#1108.00	47.58 PK	74.00	-26.42	1.09 V	213	19.88	27.70
1	#1108.00	43.66 AV	54.00	-10.34	1.09 V	213	15.96	27.70
2	*5240.00	109.53 PK			1.05 V	308	70.76	38.77
2	*5240.00	99.17 AV			1.05 V	308	60.40	38.77
3	6986.00	60.11 PK	68.30	-8.19	1.70 V	211	16.47	43.64

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

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	1 (5GHz dual band(for antenna: A-807))		

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	#1108.00	47.56 PK	74.00	-26.44	1.12 H	253	19.86	27.70
2	*5260.00	92.64 PK			1.24 H	300	53.82	38.82
2	*5260.00	81.84 AV			1.24 H	300	43.02	38.82
3	7013.00	55.61 PK	68.30	-12.69	1.52 H	288	11.91	43.70

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	#1108.00	49.63 PK	74.00	-24.37	1.14 V	182	21.93	27.70
2	*5260.00	111.87 PK			1.06 V	313	73.05	38.82
2	*5260.00	100.89 AV			1.06 V	313	62.07	38.82
3	7013.00	60.23 PK	68.30	-8.07	1.58 V	227	16.53	43.70

- 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.

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 8	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	1 (5GHz dual band(for antenna: A-807))		

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	#1108.00	47.22 PK	74.00	-26.78	1.21 H	250	19.52	27.70
2	*5320.00	93.90 PK			1.00 H	282	54.97	38.93
2	*5320.00	83.56 AV			1.00 H	282	44.63	38.93
3	#5350.00	41.78 PK	74.00	-32.22	1.00 H	282	2.80	38.98
4	7093.00	55.29 PK	68.30	-13.01	1.14 H	138	11.39	43.90

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	#1108.00	48.69 PK	74.00	-25.31	1.53 V	214	20.99	27.70
2	*5320.00	113.39 PK			1.04 V	315	74.46	38.93
2	*5320.00	102.07 AV			1.04 V	315	63.14	38.93
3	#5350.00	61.27 PK	74.00	-12.73	1.04 V	315	22.30	38.98
3	#5350.00	49.95 AV	54.00	-4.05	1.04 V	315	10.98	38.98
4	7093.00	60.58 PK	68.30	-7.72	1.81 V	244	16.68	43.90

- 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 OFDM modulation with test mode 2

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	2 (5GHz single band(for antenna: A-704))		

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	#1066.00	43.91 PK	74.00	-30.09	1.04 H	168	16.36	27.55
1	#1066.00	39.25 AV	54.00	-14.75	1.04 H	168	11.70	27.55
2	#5150.00	36.95 PK	74.00	-37.05	1.61 H	192	-1.65	38.60
3	*5180.00	87.95 PK			1.61 H	192	49.29	38.66
3	*5180.00	77.67 AV			1.61 H	192	39.01	38.66
4	6907.00	54.16 PK	68.30	-14.14	1.09 H	213	10.70	43.46

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	#1066.00	45.58 PK	74.00	-28.42	1.00 V	43	18.03	27.55
1	#1066.00	41.17 AV	54.00	-12.83	1.00 V	43	13.62	27.55
2	#5150.00	59.28 PK	74.00	-14.72	1.12 V	294	20.68	38.60
2	#5150.00	49.10 AV	54.00	-4.90	1.12 V	294	10.50	38.60
3	*5180.00	110.28 PK			1.12 V	294	71.62	38.66
3	*5180.00	100.16 AV			1.12 V	294	61.50	38.66
4	6907.00	60.34 PK	68.30	-7.96	1.84 V	294	16.88	43.46

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

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	2 (5GHz single band(for antenna: A-704))		

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	#1108.00	44.25 PK	74.00	-29.75	1.09 H	147	16.55	27.70
1	#1108.00	40.39 AV	54.00	-13.61	1.09 H	147	12.69	27.70
2	*5240.00	88.95 PK			1.58 H	193	50.18	38.77
2	*5240.00	77.82 AV			1.58 H	193	39.05	38.77
3	6986.00	54.67 PK	68.30	-13.63	1.23 H	257	11.03	43.64

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	#1108.00	46.46 PK	74.00	-27.54	1.04 V	213	18.76	27.70
1	#1108.00	42.10 AV	54.00	-11.90	1.04 V	213	14.40	27.70
2	*5240.00	110.93 PK			1.26 V	104	72.16	38.77
2	*5240.00	100.63 AV			1.26 V	104	61.86	38.77
3	6986.00	60.45 PK	68.30	-7.85	1.87 V	298	16.81	43.64

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

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 5	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	2 (5GHz single band(for antenna: A-704))		

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	#1108.00	46.15 PK	74.00	-27.85	1.04 H	169	18.45	27.70
1	#1108.00	42.73 AV	54.00	-11.27	1.04 H	169	15.03	27.70
2	*5260.00	90.10 PK			1.33 H	266	51.28	38.82
2	*5260.00	79.75 AV			1.33 H	266	40.93	38.82
3	7013.00	54.49 PK	68.30	-13.81	1.46 H	251	10.79	43.70

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	#1108.00	48.53 PK	74.00	-25.47	1.12 V	200	20.83	27.70
1	#1108.00	44.66 AV	54.00	-9.34	1.12 V	200	16.96	27.70
2	*5260.00	113.38 PK			1.22 V	299	74.56	38.82
2	*5260.00	102.39 AV			1.22 V	299	63.57	38.82
3	7013.00	60.13 PK	68.30	-8.17	1.79 V	288	16.43	43.70

- 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.

EUT	Dual Band Outdoor Access Point	MODEL	P-780
CHANNEL	Channel 8	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	21deg. C, 64%RH, 991hPa	TESTED BY	Brad Wu
TEST MODE	2 (5GHz single band(for antenna: A-704))		

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	#1108.00	45.16 PK	74.00	-28.84	1.28 H	244	17.46	27.70
1	#1108.00	41.19 AV	54.00	-12.81	1.28 H	244	13.49	27.70
2	*5320.00	92.28 PK			1.10 H	267	53.35	38.93
2	*5320.00	81.48 AV			1.10 H	267	42.55	38.93
3	#5350.00	40.18 PK	74.00	-33.82	1.10 H	267	1.20	38.98
4	7093.00	54.12 PK	68.30	-14.18	1.04 H	211	10.22	43.90

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	#1108.00	47.26 PK	74.00	-26.74	1.64 V	233	19.56	27.70
1	#1108.00	43.55 AV	54.00	-10.45	1.64 V	233	15.85	27.70
2	*5320.00	114.82 PK			1.20 V	254	75.89	38.93
2	*5320.00	103.53 AV			1.20 V	254	64.60	38.93
3	#5350.00	62.71 PK	74.00	-11.29	1.20 V	254	23.73	38.98
3	#5350.00	51.40 AV	54.00	-2.60	1.20 V	254	12.42	38.98
4	7093.00	59.65 PK	68.30	-8.65	1.92 V	285	15.75	43.90

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

4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

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

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

4.3.3 TEST PROCEDURE

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

NOTE:

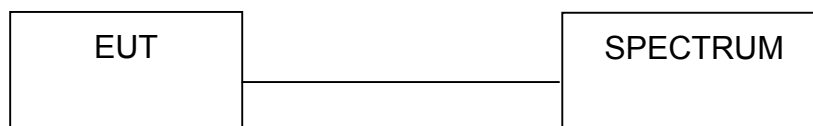
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11a OFDM modulation

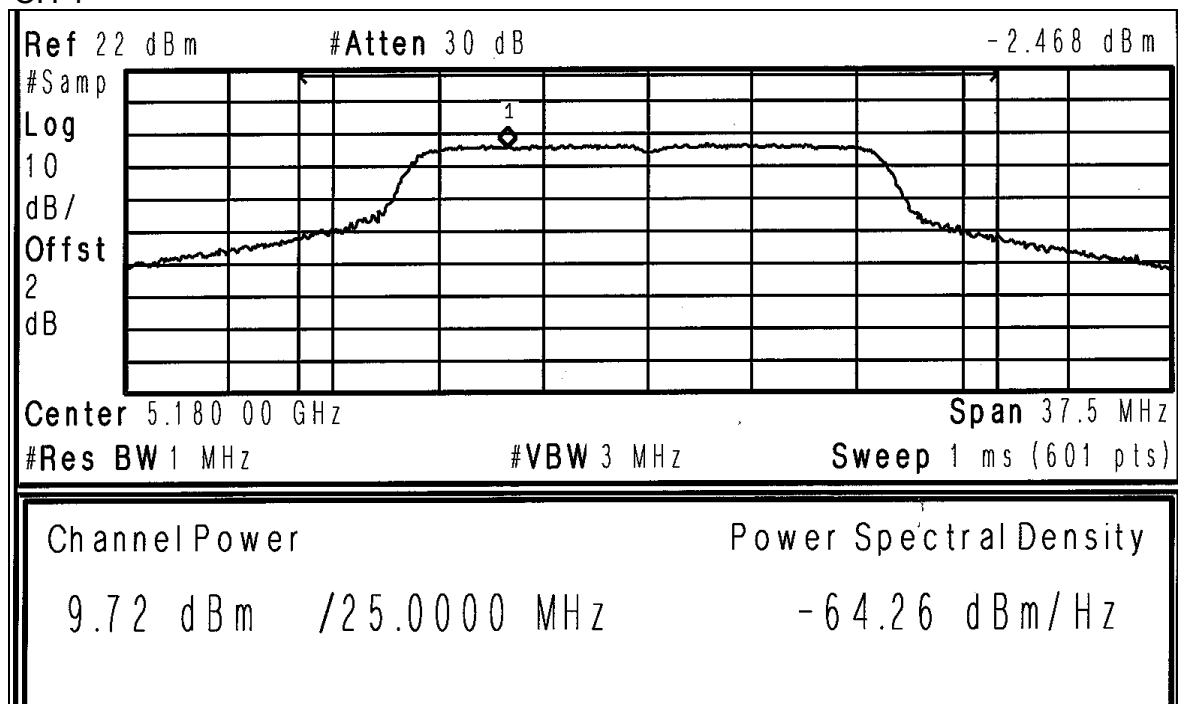
EUT	Dual Band Outdoor Access Point	MODEL	P-780
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	9.376	9.72	17.00	24.56	PASS
4	5240	8.913	9.50	17.00	23.76	PASS
5	5260	11.995	10.79	24.00	23.60	PASS
8	5320	14.521	11.62	24.00	24.96	PASS

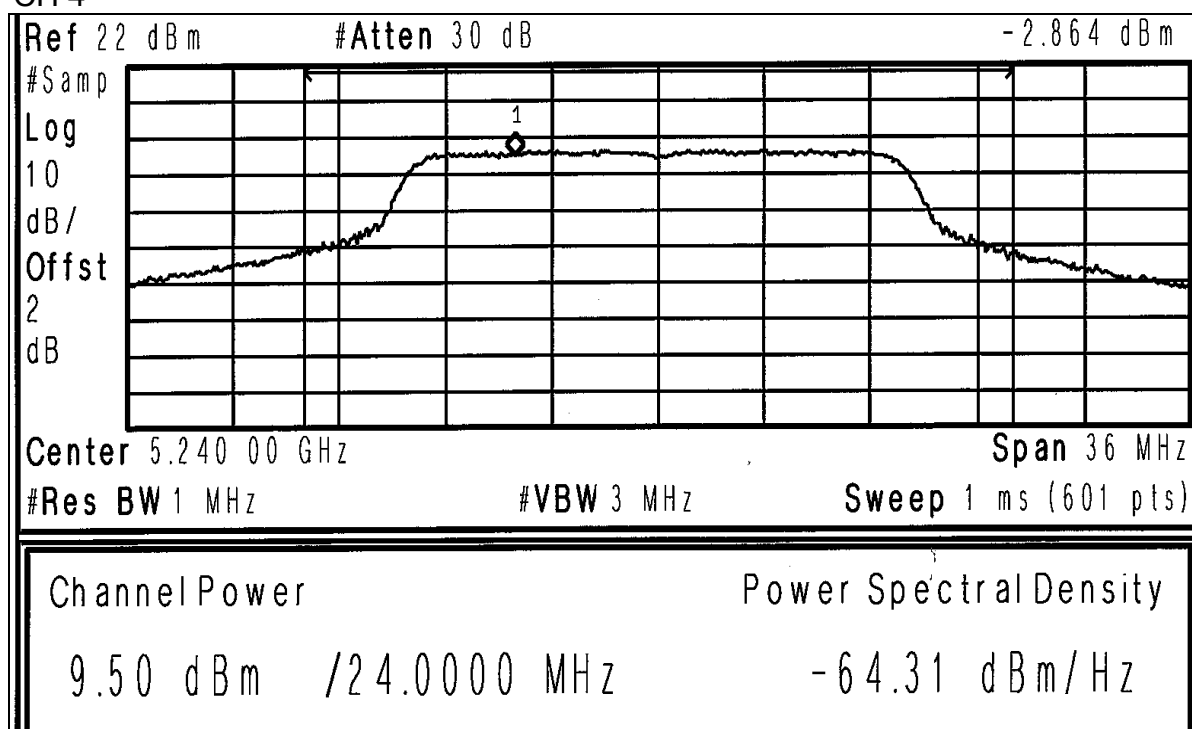
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:

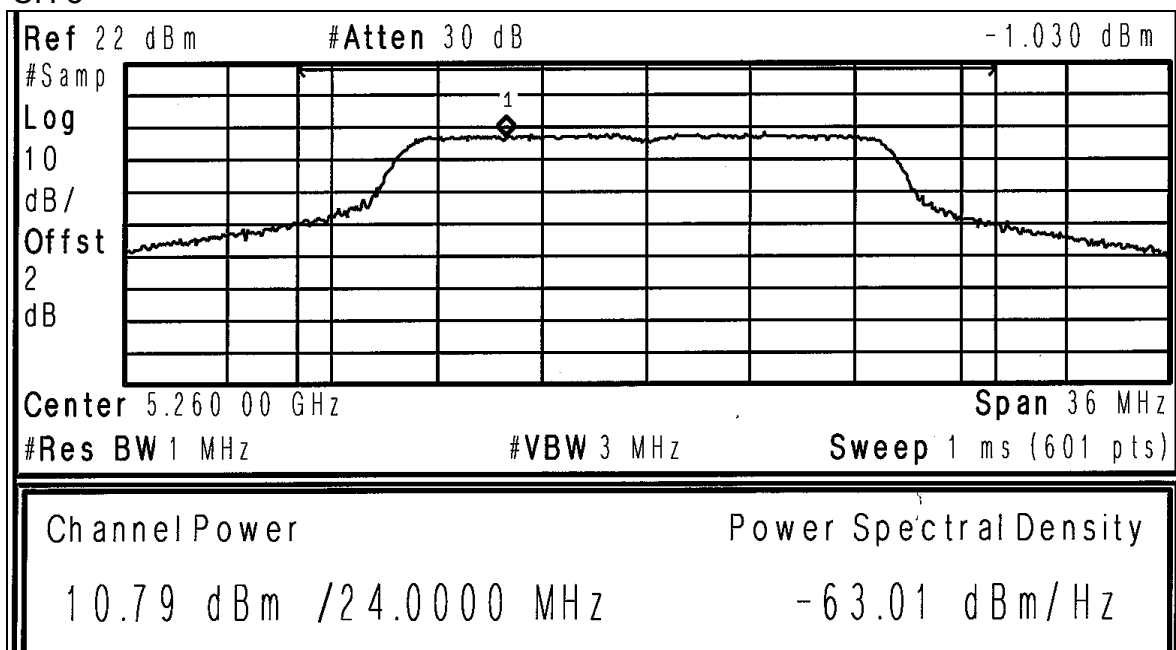
CH 1



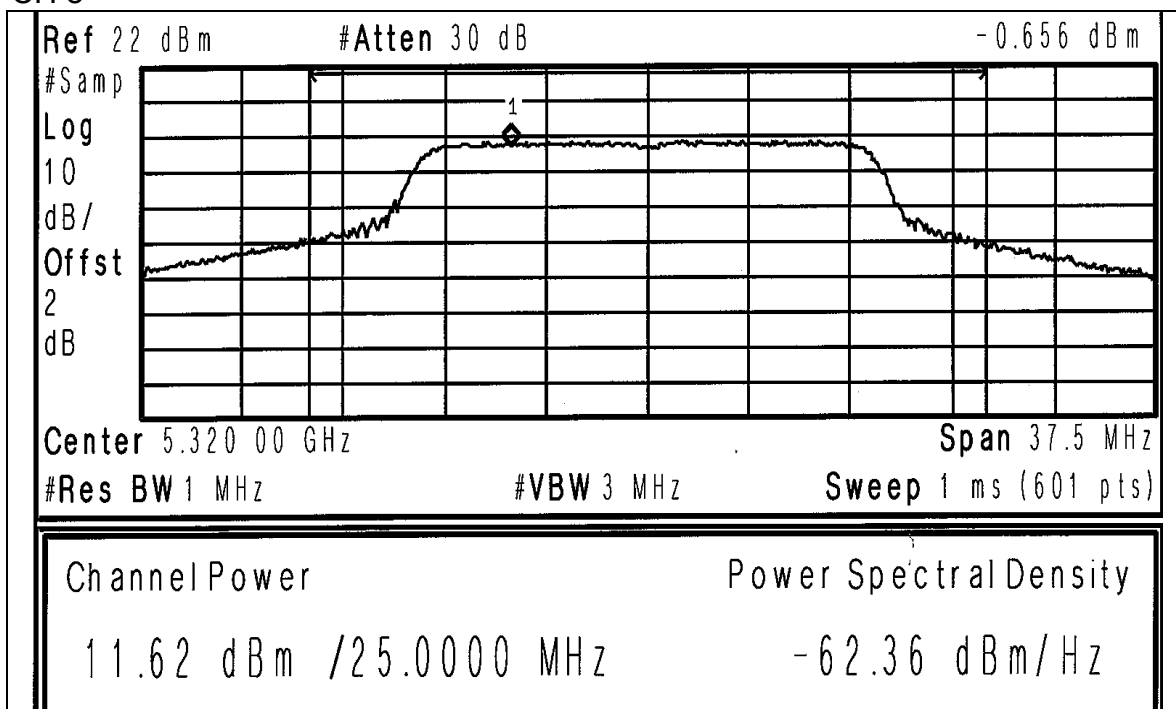
CH 4



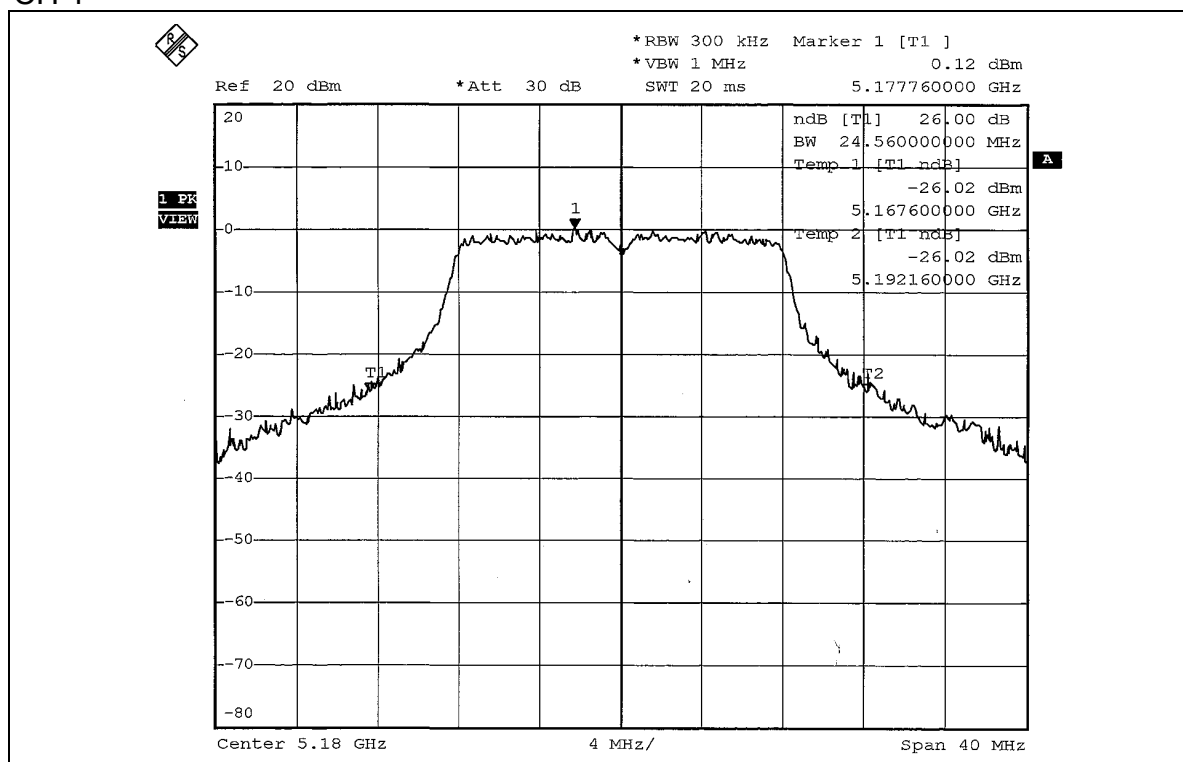
CH 5



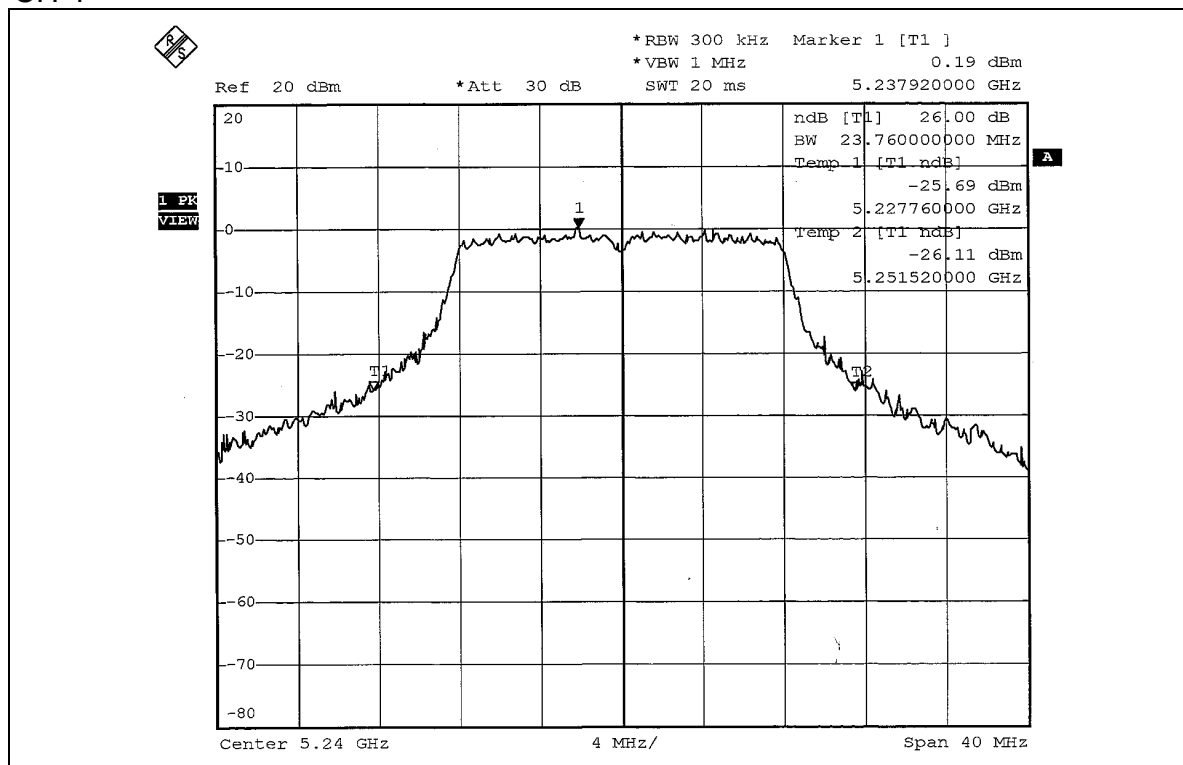
CH 8



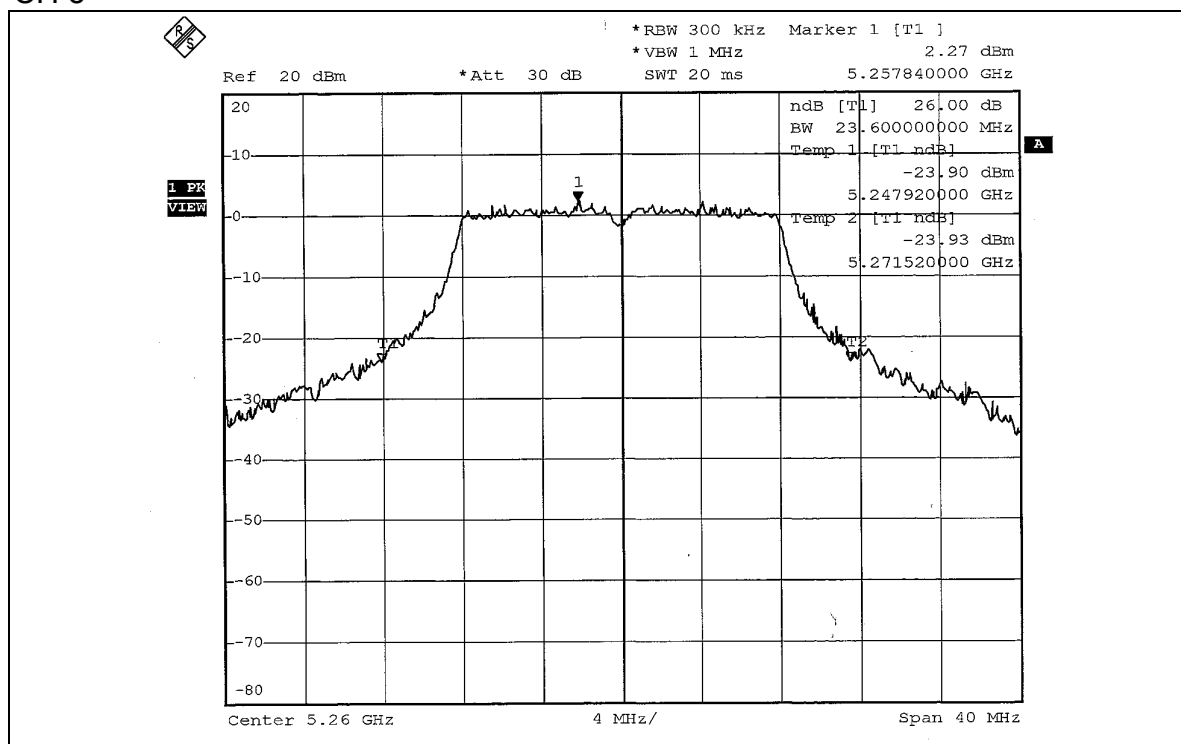
26dB Occupied Bandwidth: CH 1



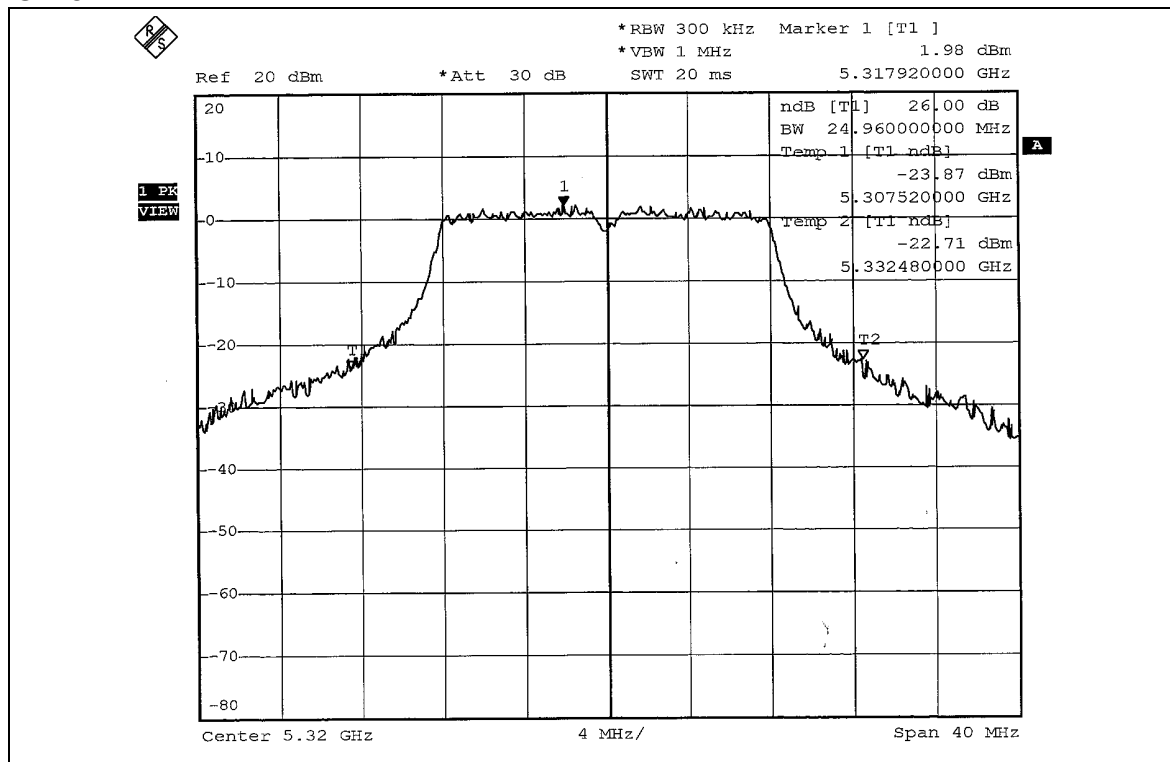
CH 4



CH 5



CH 8



4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

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

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

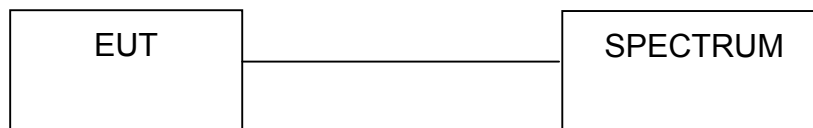
4.4.3 TEST PROCEDURE

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

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



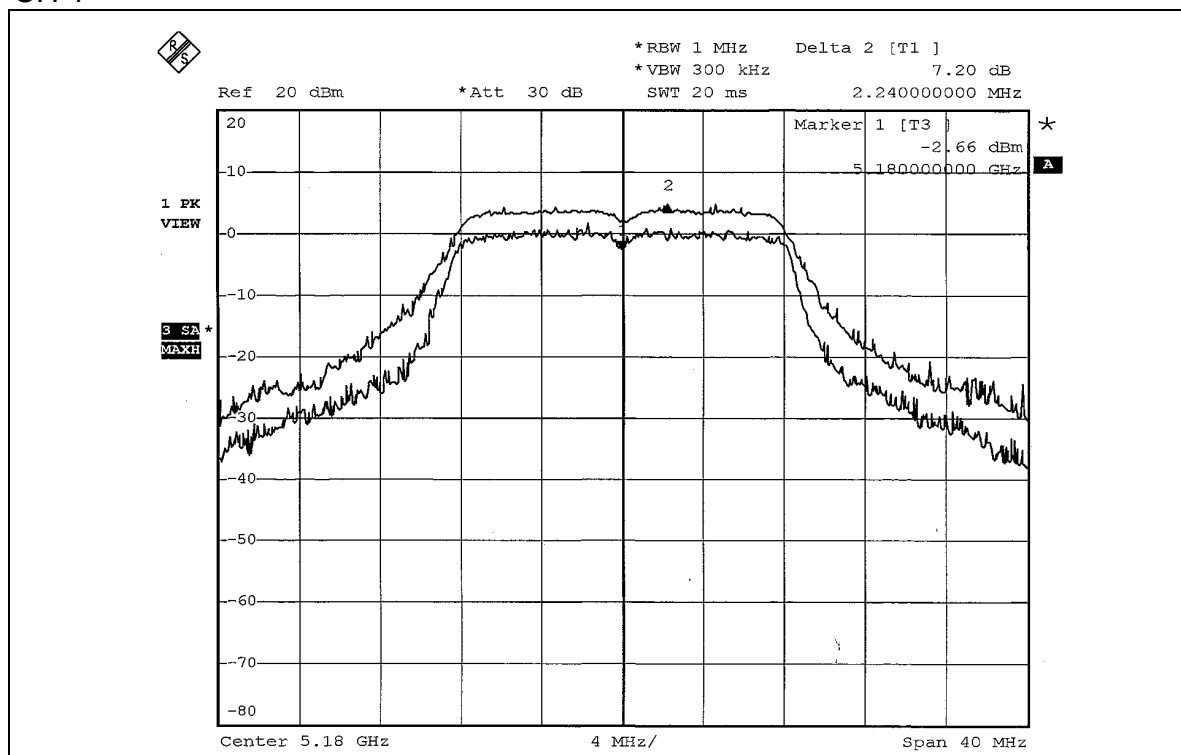
4.4.7 TEST RESULTS

802.11a OFDM modulation

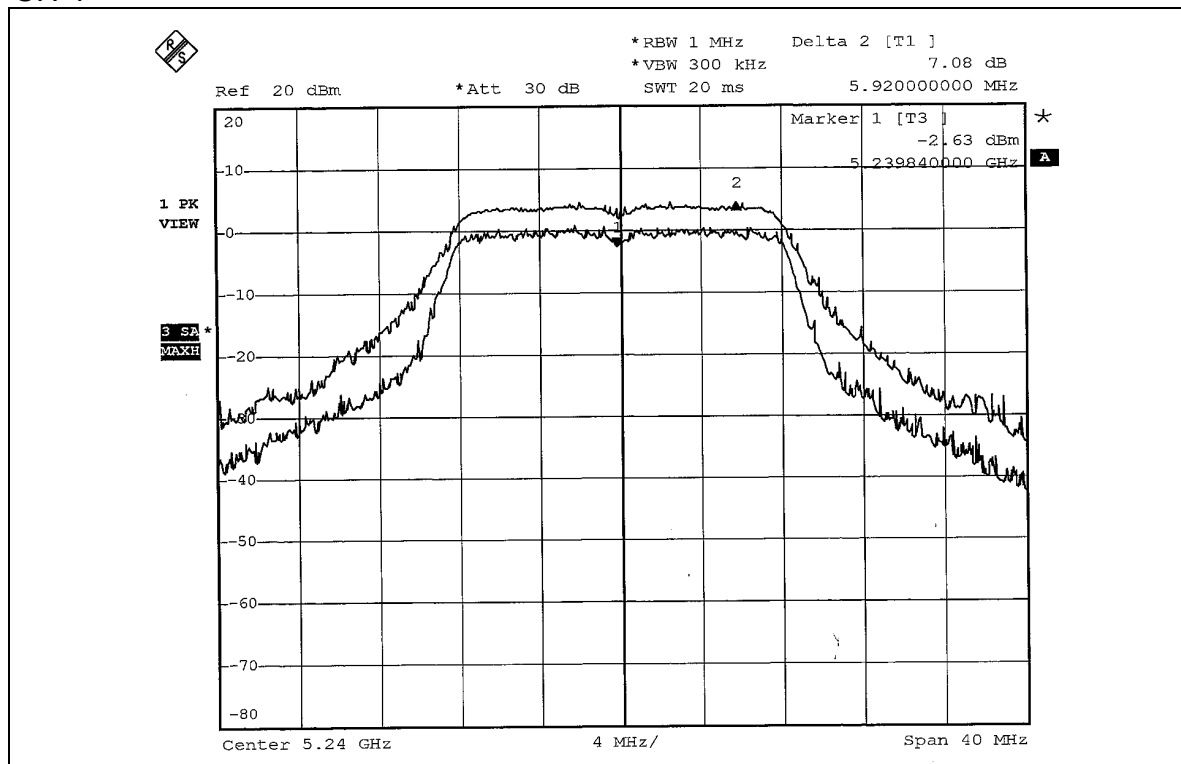
EUT	Dual Band Outdoor Access Point	MODEL	P-780
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	7.20	13	PASS
4	5240	7.08	13	PASS
5	5260	6.68	13	PASS
8	5320	6.29	13	PASS

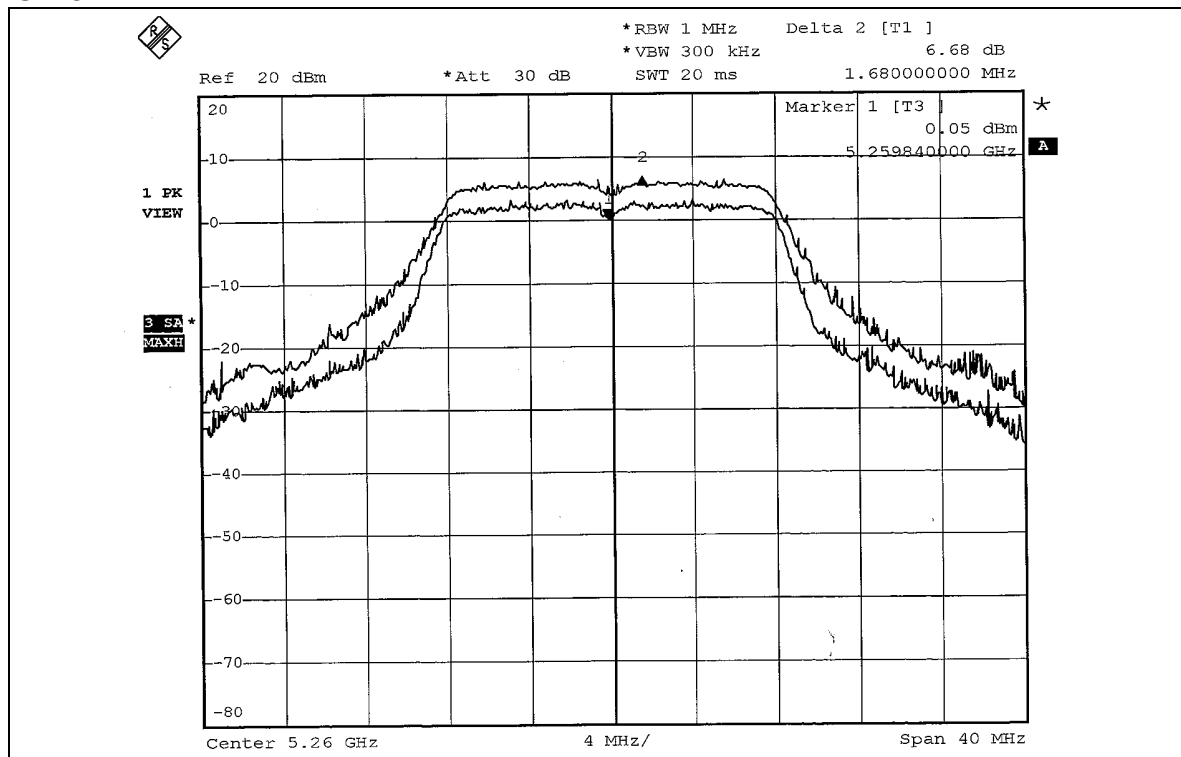
CH 1



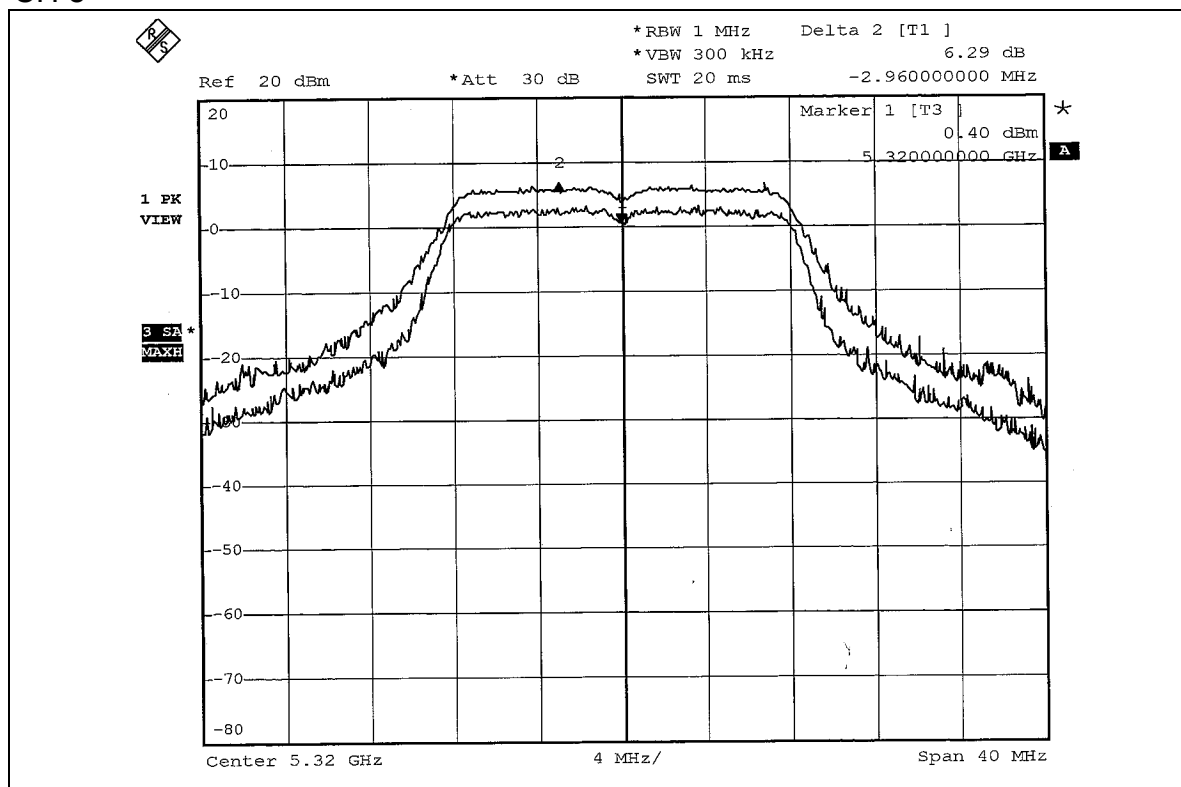
CH 4



CH 5



CH 8



4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

4.5.3 TEST PROCEDURES

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 5.3.6

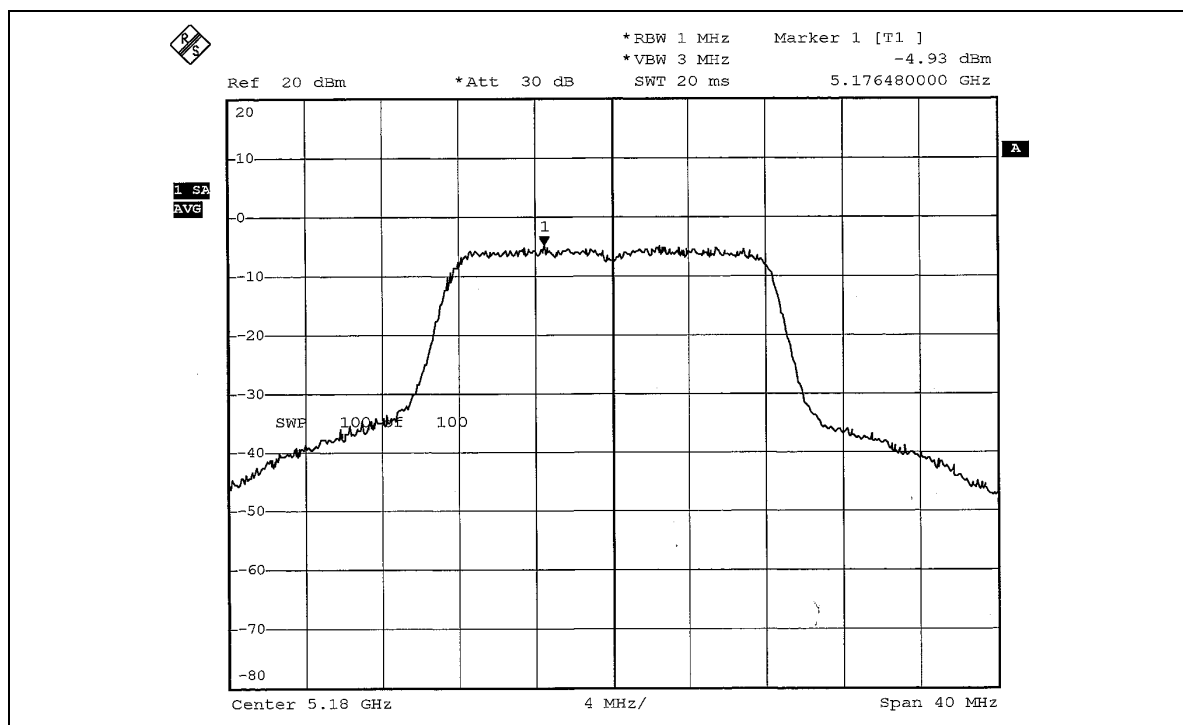
4.5.7 TEST RESULTS

802.11a OFDM modulation

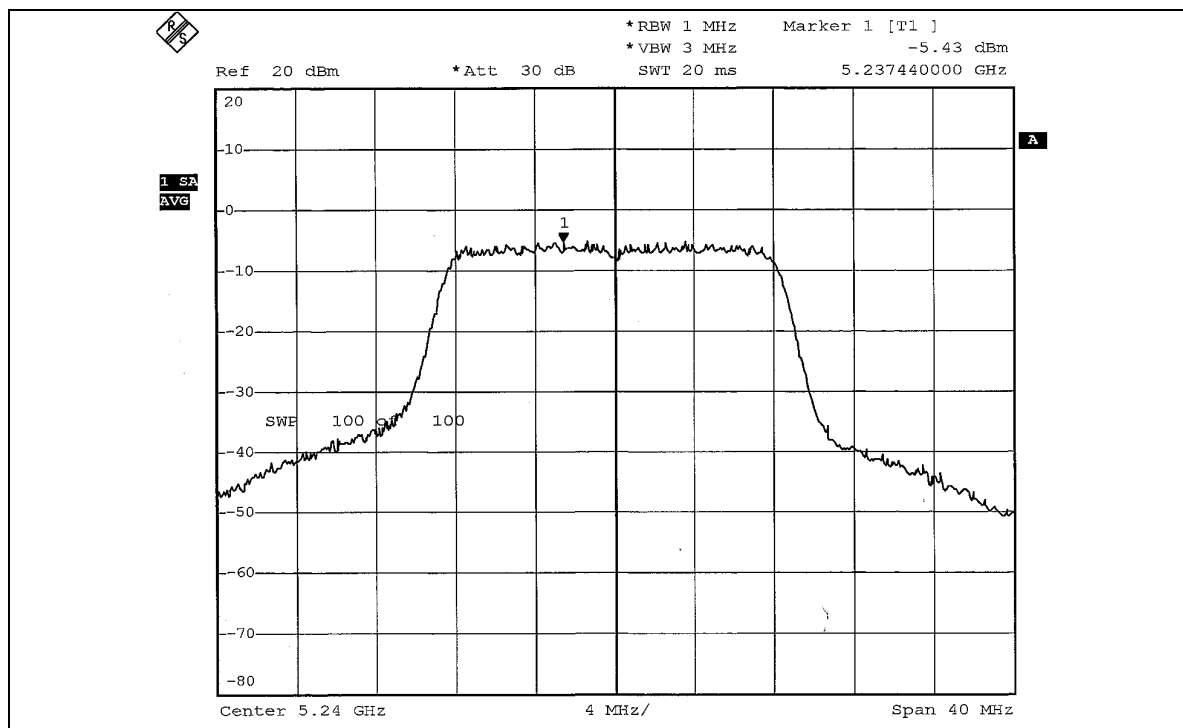
EUT	Dual Band Outdoor Access Point	MODEL	P-780
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	24deg.C, 57%RH, 991hPa
TESTED BY	Gary Chang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-4.93	4	PASS
4	5240	-5.43	4	PASS
5	5260	-2.83	11	PASS
8	5320	-2.56	11	PASS

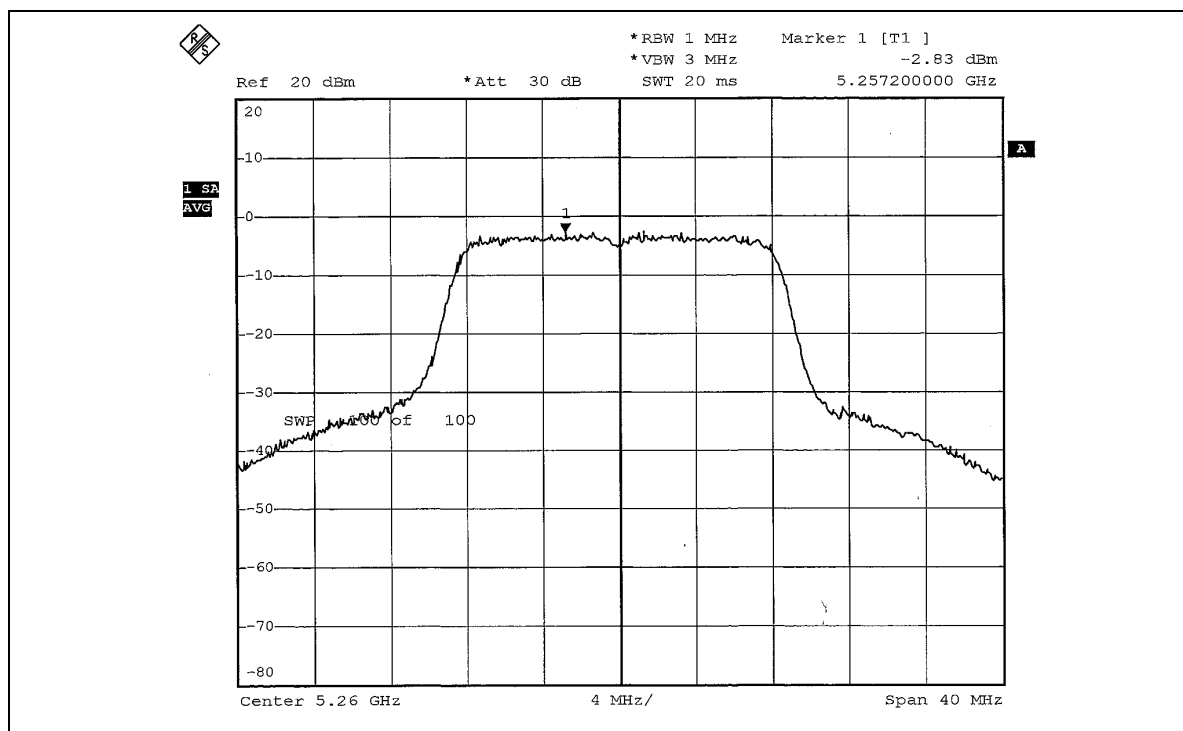
CH 1



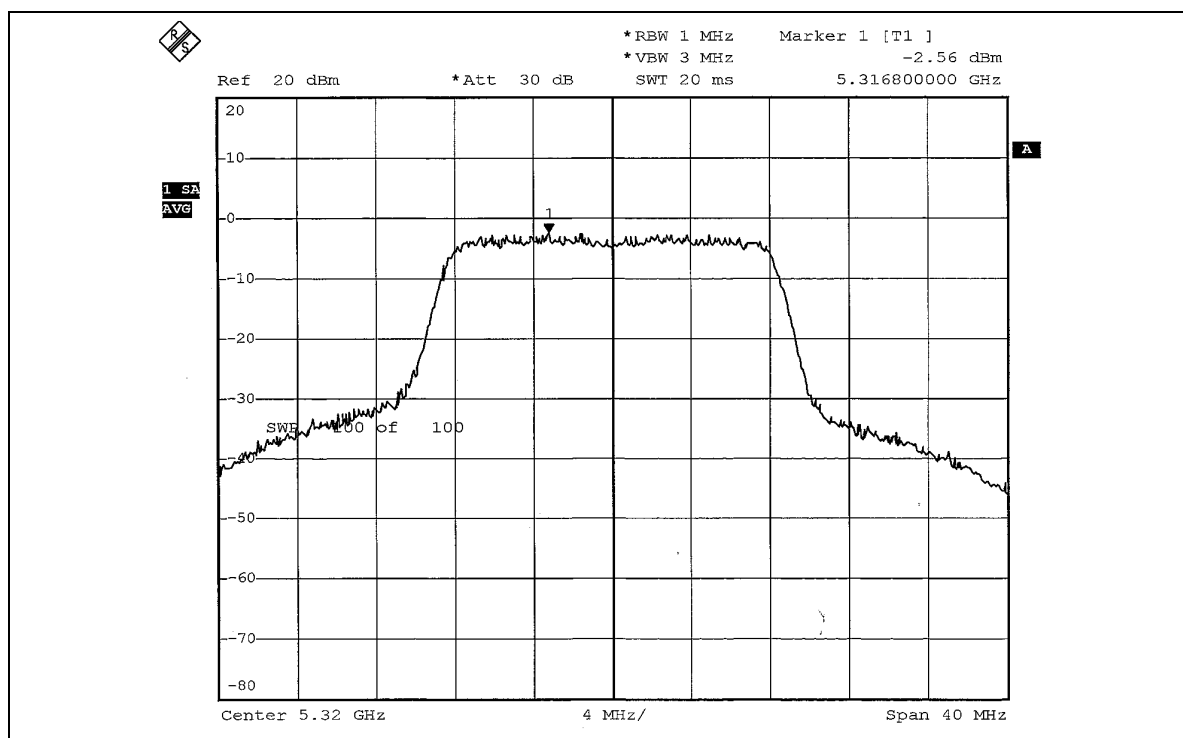
CH 4



CH 5



CH 8



4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Aug. 12, 2005
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W901030	Aug. 12, 2005

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

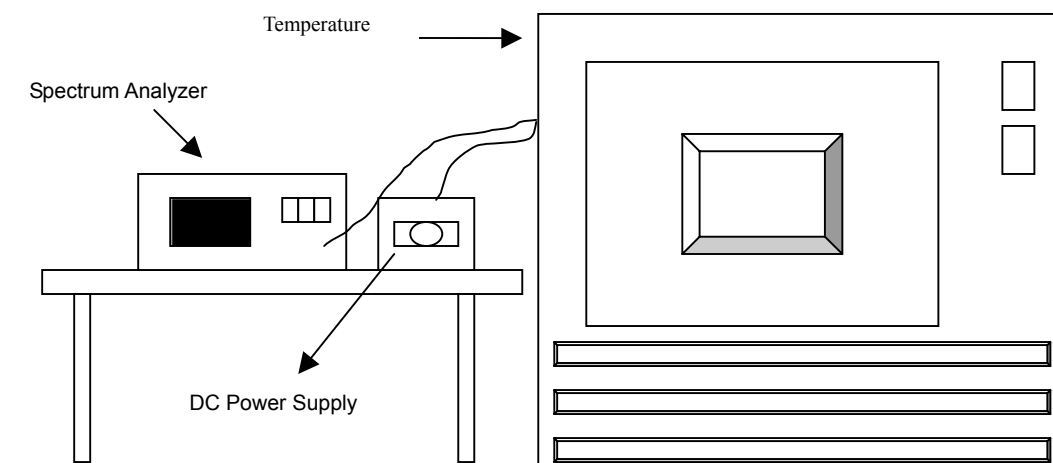
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.1.6

4.6.7 TEST RESULTS

For Test Mode 1

Operating frequency: 5320MHz									
Limit : $\pm 0.015\%$									
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5320.0321	0.0006034	5320.0322	0.0006053	5320.0326	0.0006128	5320.0327	0.0006147
	120	5320.0325	0.0006109	5320.0325	0.0006109	5320.0329	0.0006184	5320.0321	0.0006034
	102	5320.0324	0.0006090	5320.0326	0.0006128	5320.0324	0.0006090	5320.0326	0.0006128
40	138	5320.0285	0.0005357	5320.0287	0.0005395	5320.0285	0.0005357	5320.0288	0.0005414
	120	5320.0281	0.0005282	5320.0285	0.0005357	5320.0286	0.0005376	5320.0281	0.0005282
	102	5320.0284	0.0005338	5320.0289	0.0005432	5320.0283	0.0005320	5320.0286	0.0005376
30	138	5320.0215	0.0004041	5320.0216	0.0004060	5320.0215	0.0004041	5320.0217	0.0004079
	120	5320.0218	0.0004098	5320.0211	0.0003966	5320.0211	0.0003966	5320.0216	0.0004060
	102	5320.0217	0.0004079	5320.0218	0.0004098	5320.0216	0.0004060	5320.0214	0.0004023
20	138	5320.0182	0.0003421	5320.0185	0.0003477	5320.0186	0.0003496	5320.0182	0.0003421
	120	5320.0185	0.0003477	5320.0182	0.0003421	5320.0189	0.0003553	5320.0184	0.0003459
	102	5320.0189	0.0003553	5320.0187	0.0003515	5320.0185	0.0003477	5320.0186	0.0003496
10	138	5320.0120	0.0002256	5320.0126	0.0002368	5320.0127	0.0002387	5320.0131	0.0002462
	120	5320.0125	0.0002350	5320.0124	0.0002331	5320.0120	0.0002256	5320.0132	0.0002481
	102	5320.0124	0.0002331	5320.0128	0.0002406	5320.0125	0.0002350	5320.0129	0.0002425
0	138	5320.0092	0.0001729	5320.0095	0.0001786	5320.0094	0.0001767	5320.0098	0.0001842
	120	5320.0096	0.0001805	5320.0092	0.0001729	5320.0097	0.0001823	5320.0096	0.0001805
	102	5320.0991	0.0018628	5320.0091	0.0001711	5320.0093	0.0001748	5320.0097	0.0001823
-10	138	5320.0051	0.0000959	5320.0051	0.0000959	5320.0062	0.0001165	5320.0058	0.0001090
	120	5320.0057	0.0001071	5320.0059	0.0001109	5320.0067	0.0001259	5320.0057	0.0001071
	102	5320.0054	0.0001015	5320.0061	0.0001147	5320.0065	0.0001222	5320.0053	0.0000996
-20	138	5319.9982	-0.0000338	5319.9985	-0.0000282	5319.9982	-0.0000338	5319.9984	-0.0000301
	120	5319.9985	-0.0000282	5319.9984	-0.0000301	5319.9986	-0.0000263	5319.9987	-0.0000244
	102	5319.9984	-0.0000301	5319.9987	-0.0000244	5319.9988	-0.0000226	5319.9982	-0.0000338
-30	138	5319.9875	-0.0002350	5319.9876	-0.0002331	5319.9873	-0.0002387	5319.9876	-0.0002331
	120	5319.9872	-0.0002406	5319.9872	-0.0002406	5319.9871	-0.0002425	5319.9874	-0.0002368
	102	5319.9874	-0.0002368	5319.9874	-0.0002368	5319.9873	-0.0002387	5319.9877	-0.0002312

For Test Mode 2

Operating frequency: 5320MHz						Limit : $\pm 0.015\%$			
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5320.0357	0.0006711	5320.0352	0.0006617	5320.0355	0.0006673	5320.0352	0.0006617
	120	5320.0351	0.0006598	5320.0357	0.0006711	5320.0356	0.0006692	5320.0356	0.0006692
	102	5320.0356	0.0006692	5320.0354	0.0006654	5320.0358	0.0006729	5320.0351	0.0006598
40	138	5320.0285	0.0005357	5320.0284	0.0005338	5320.0289	0.0005432	5320.0284	0.0005338
	120	5320.0284	0.0005338	5320.0286	0.0005376	5320.0284	0.0005338	5320.0286	0.0005376
	102	5320.0287	0.0005395	5320.0287	0.0005395	5320.0286	0.0005376	5320.0281	0.0005282
30	138	5320.0186	0.0003496	5320.0188	0.0003534	5320.0183	0.0003440	5320.0185	0.0003477
	120	5320.0183	0.0003440	5320.0187	0.0003515	5320.0185	0.0003477	5320.0186	0.0003496
	102	5320.0175	0.0003289	5320.0189	0.0003553	5320.0186	0.0003496	5320.0184	0.0003459
20	138	5320.0915	0.0017199	5320.0911	0.0017124	5320.0910	0.0017105	5320.0915	0.0017199
	120	5320.0910	0.0017105	5320.0914	0.0017180	5320.0914	0.0017180	5320.0913	0.0017162
	102	5320.0912	0.0017143	5320.0915	0.0017199	5320.0918	0.0017256	5320.0917	0.0017237
10	138	5319.9982	-0.0000338	5319.9985	-0.0000282	5319.9982	-0.0000338	5319.9980	-0.0000376
	120	5319.9982	-0.0000338	5319.9981	-0.0000357	5319.9987	-0.0000244	5319.9985	-0.0000282
	102	5319.9983	-0.0000320	5319.9980	-0.0000376	5319.9981	-0.0000357	5319.9981	-0.0000357
0	138	5319.9912	-0.0001654	5319.9915	-0.0001598	5319.9913	-0.0001635	5319.9911	-0.0001673
	120	5319.9913	-0.0001635	5319.9916	-0.0001579	5319.9914	-0.0001617	5319.9912	-0.0001654
	102	5319.9915	-0.0001598	5319.9912	-0.0001654	5319.9916	-0.0001579	5319.9918	-0.0001541
-10	138	5319.9845	-0.0002914	5319.9846	-0.0002895	5319.9842	-0.0002970	5319.9840	-0.0003008
	120	5319.9847	-0.0002876	5319.9847	-0.0002876	5319.9845	-0.0002914	5319.9842	-0.0002970
	102	5319.9845	-0.0002922	5319.9851	-0.0002801	5319.9847	-0.0002876	5319.9844	-0.0002932
-20	138	5319.9811	-0.0003553	5319.9810	-0.0003571	5319.9812	-0.0003534	5319.9815	-0.0003477
	120	5319.9812	-0.0003534	5319.9815	-0.0003477	5319.9813	-0.0003515	5319.9812	-0.0003534
	102	5319.9818	-0.0003421	5319.9816	-0.0003459	5319.9815	-0.0003477	5319.9811	-0.0003553
-30	138	5319.9785	-0.0004041	5319.9788	-0.0003985	5319.9780	-0.0004135	5319.9782	-0.0004098
	120	5319.9782	-0.0004098	5319.9785	-0.0004041	5319.9782	-0.0004098	5319.9784	-0.0004060
	102	5319.9781	-0.0004117	5319.9782	-0.0004098	5319.9785	-0.0004041	5319.9783	-0.0004079



4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

4.7.2 TEST PROCEDURE

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

4.7.3 EUT OPERATING CONDITION

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

4.7.4 TEST RESULTS

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

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

802.11a OFDM modulation

For Test Mode 1

Channel 1 (5180MHz)

The band edge emission plot on page 57 shows 46.42Bc 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 108.97dBuV/m (Peak), so the maximum field strength in restrict band is $108.97 - 46.42 = 62.55$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 57 shows 51.34dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 98.84dBuV/m (Average), so the maximum field strength in restrict band is $98.84 - 51.34 = 47.50$ dBuV/m which is under 54dBuV/m limit.

Channel 8 (5320MHz)

The band edge emission plot on page 59 shows 48.47dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 113.39dBuV/m (Peak), so the maximum field strength in restrict band is $113.39 - 48.47 = 64.92$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 59 shows 52.28dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 102.07dBuV/m (Average), so the maximum field strength in restrict band is $102.07 - 52.28 = 49.79$ dBuV/m which is under 54dBuV/m limit.

**For Test Mode 2****Channel 1 (5180MHz)**

The band edge emission plot on page 57 shows 46.42Bc 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 110.28dBuV/m (Peak), so the maximum field strength in restrict band is $110.28 - 46.42 = 63.86$ dBuV/m which is under 74dBuV/m limit.

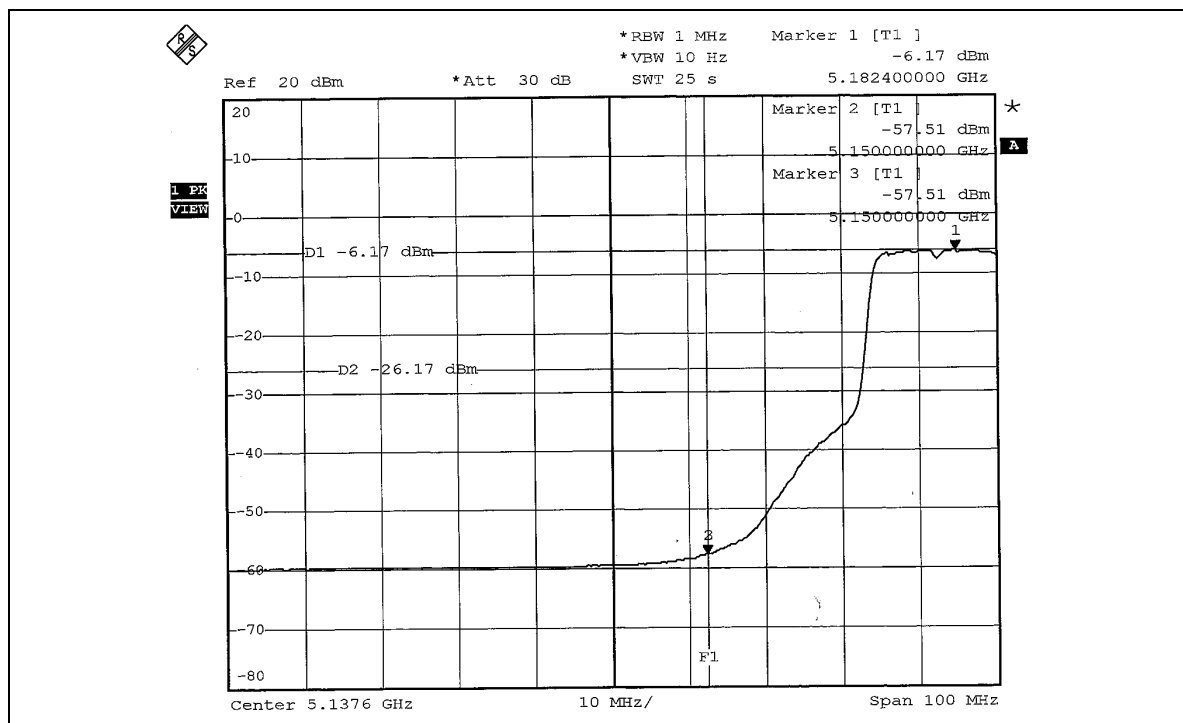
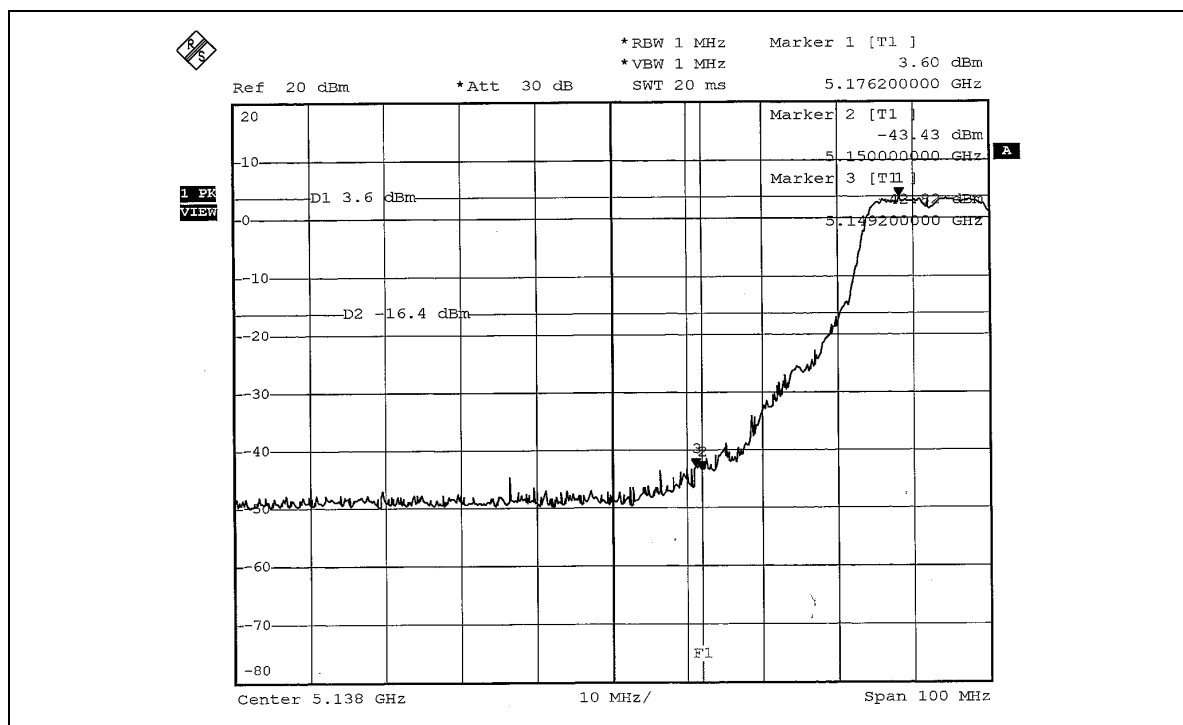
The band edge emission plot on page 57 shows 51.34dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 100.16dBuV/m (Average), so the maximum field strength in restrict band is $100.16 - 51.34 = 48.82$ dBuV/m which is under 54dBuV/m limit.

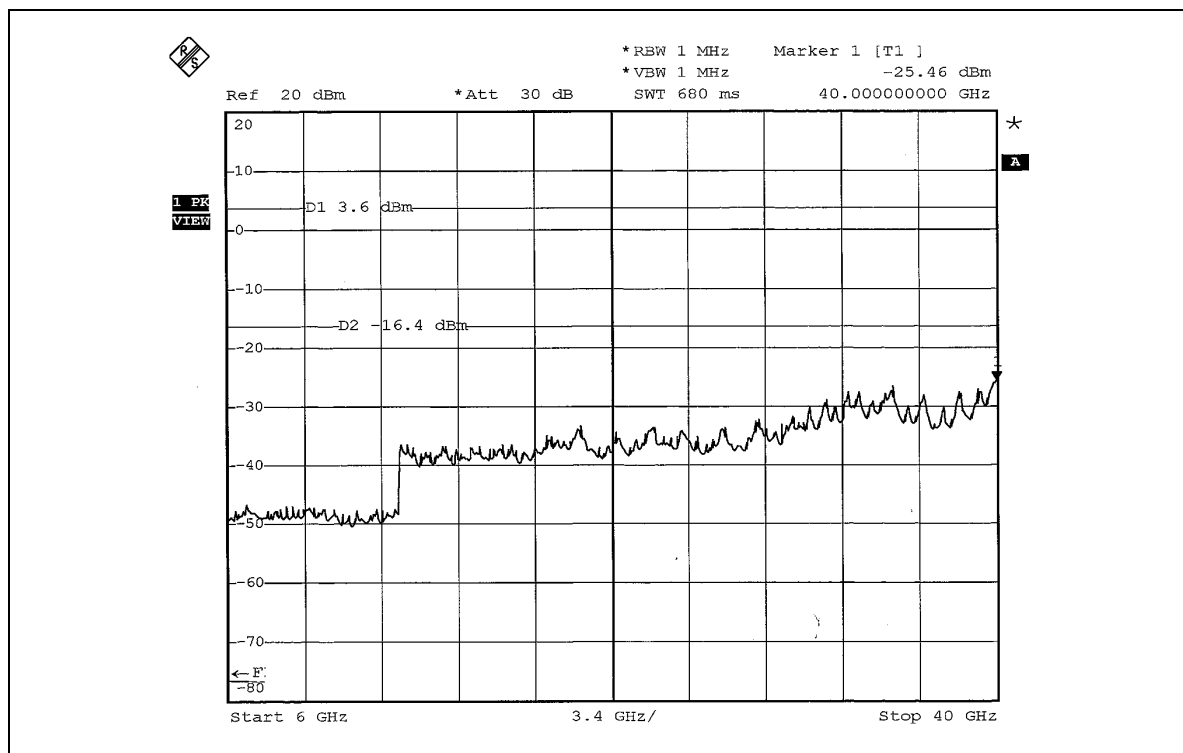
Channel 8 (5320MHz)

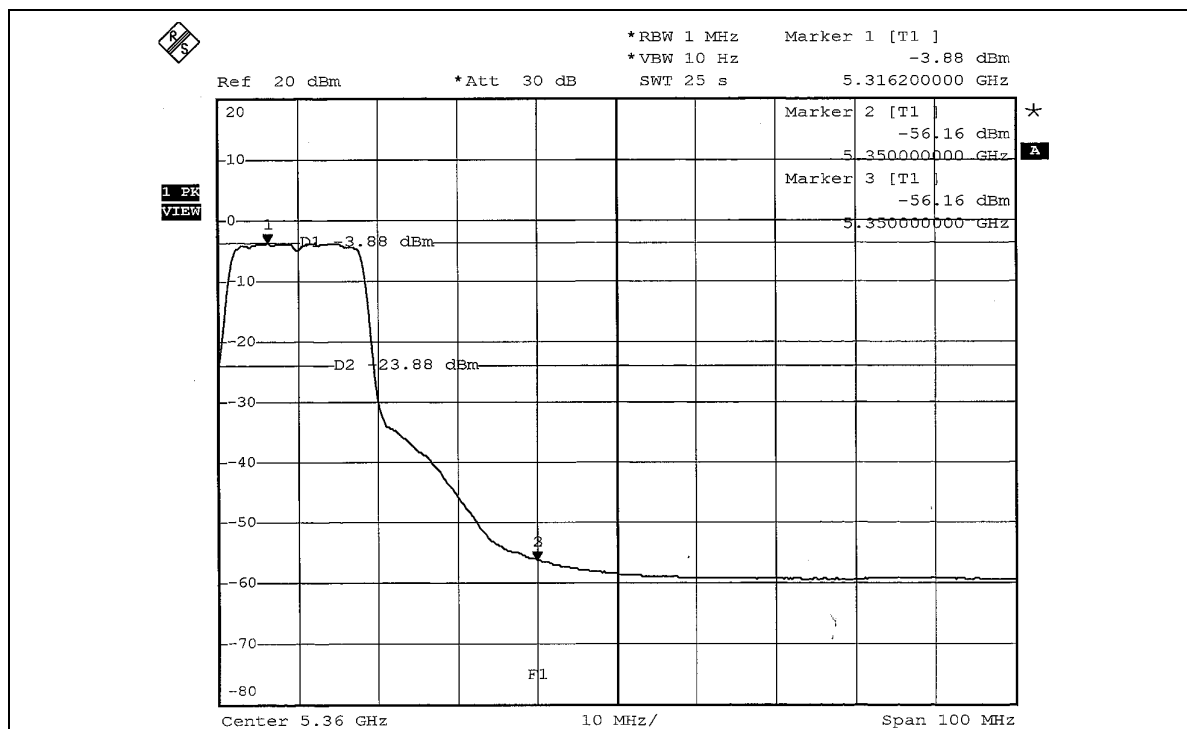
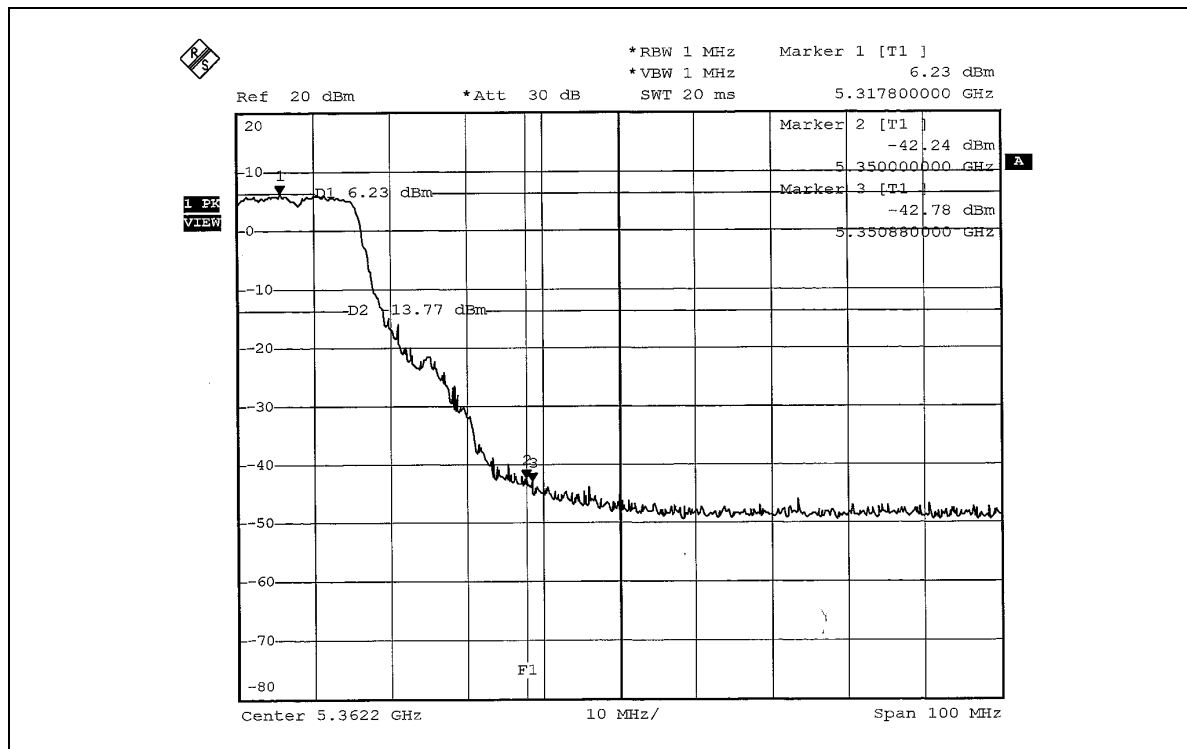
The band edge emission plot on page 59 shows 48.47dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 114.82dBuV/m (Peak), so the maximum field strength in restrict band is $114.82 - 48.47 = 66.35$ dBuV/m which is under 74dBuV/m limit.

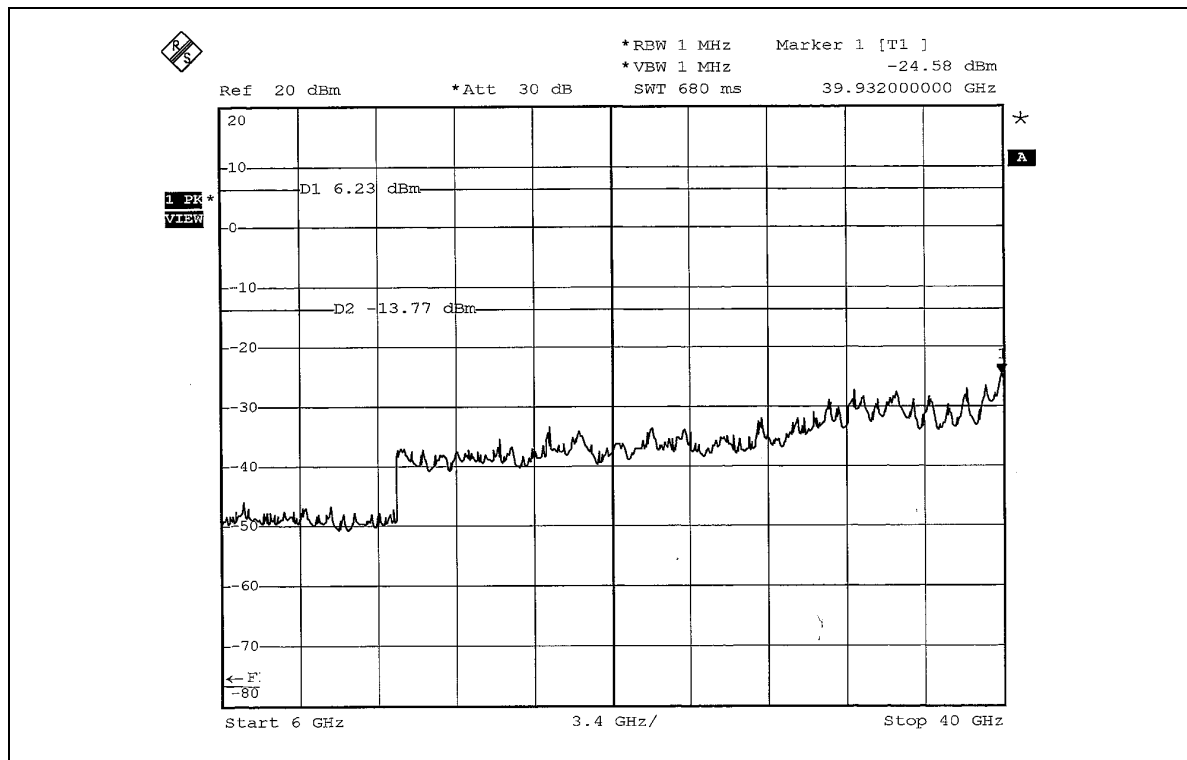
The band edge emission plot on page 59 shows 52.28dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 103.53dBuV/m (Average), so the maximum field strength in restrict band is $103.53 - 52.28 = 51.25$ dBuV/m which is under 54dBuV/m limit.

802.11a OFDM modulation











4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

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

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

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Omni antenna with N-type connector. The maximum Gain of the antenna is 8.0dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

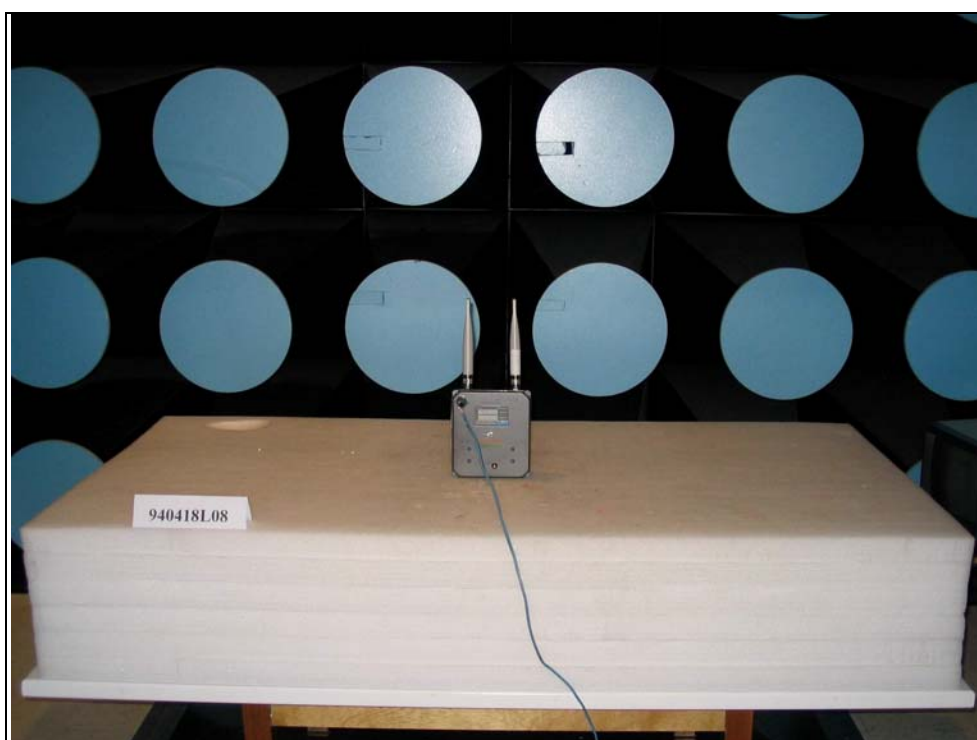
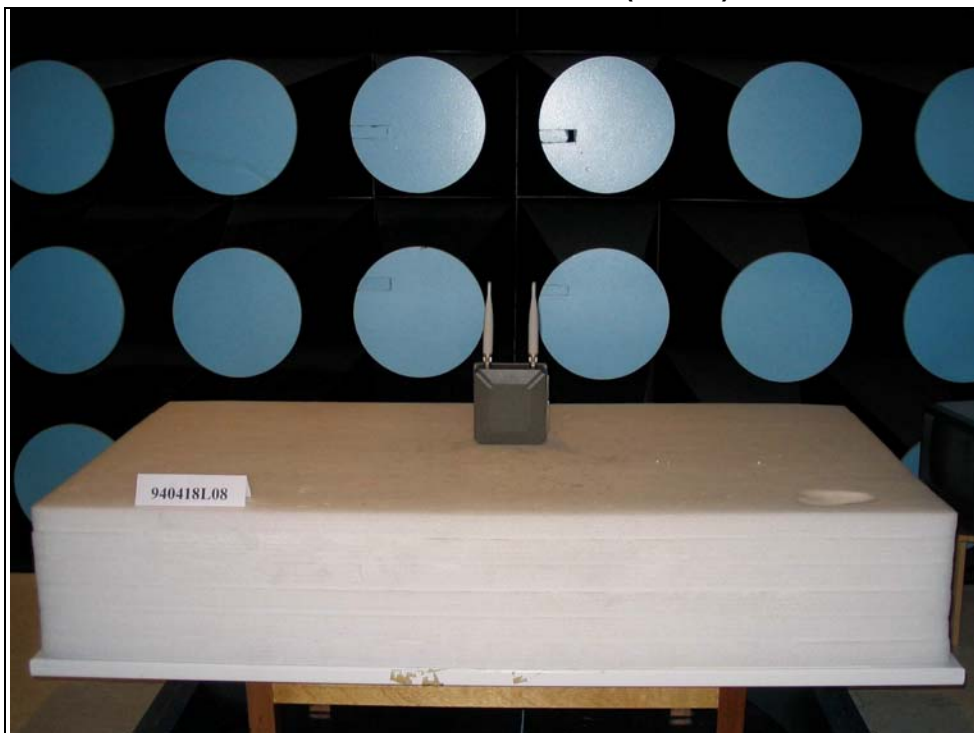
CONDUCTED EMISSION TEST
For Dual Band Antenna (A-807)



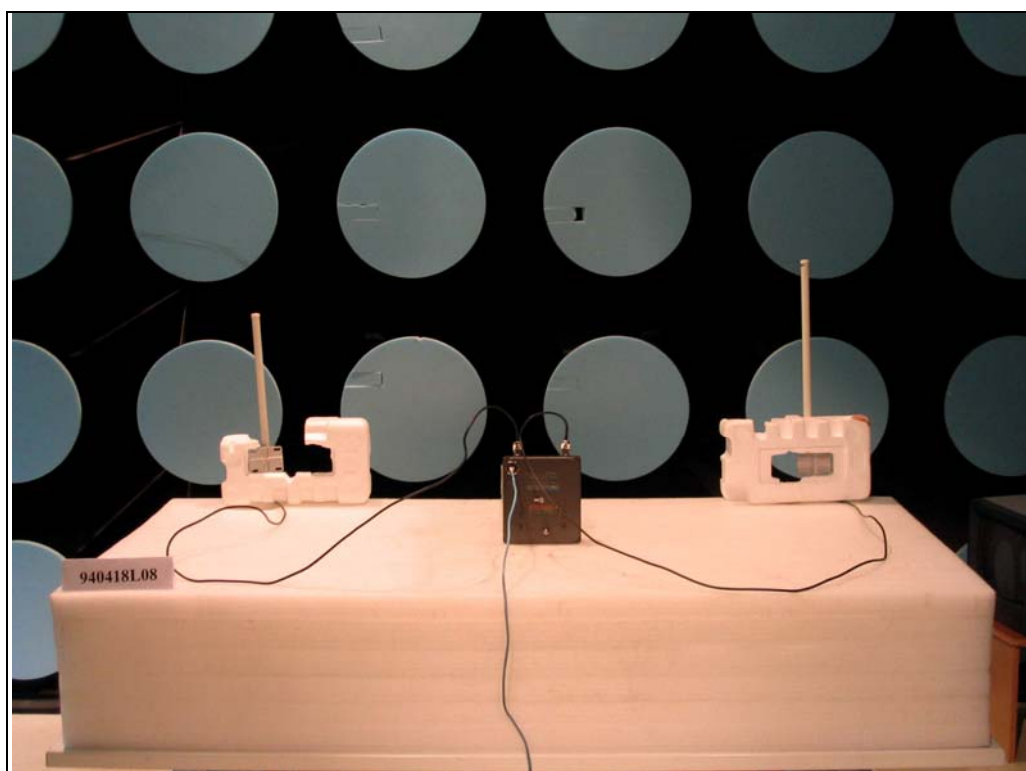
For Single Band Antenna (A-308, A-408)



**RADIATED EMISSION TEST
For Dual Band Antenna (A-807)**



For Single Band Antenna (A-308, A-408)



6. INFORMATION ON THE TESTING LABORATORIES

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

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

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

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

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Fax: 886-3-3185050

Linko RF Lab.

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