FCC TEST REPORT (15.407)

REPORT NO.: RF940804H03
MODEL NO.: RBT-4102
RECEIVED: Aug. 03, 2005
TESTED: Aug. 25 to Sep.30, 2005
ISSUED: Oct. 07, 2005

APPLICANT: Enterasys Networks, Inc.

ADDRESS: 50 Minuteman Road Andover, MA 01810

ISSUED BY: Advance Data Technology Corporation

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

0536 No. 2177-01
ILAC MRA

Table of Contents

1. CERTIFICATION

PRODUCT:	Multi-Channel Access Point
BRAND NAME:	Enterasys
MODEL NO.:	RBT-4102
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Aug. 25 to Sep.30, 2005
APPLICANT:	Enterasys Networks, Inc.
STANDARDS:	FCC Part 15, Subpart E (Section 15.407) ANSI C63.4-2003

The above equipment (Model: RBT-4102) 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 :  , **DATE:** Oct. 07, 2005

(Midoli Peng)

TECHNICAL ACCEPTANCE :  , **DATE:** Oct. 07, 2005

Responsible for RF

(Hank Chung)

APPROVED BY :  , **DATE:** Oct. 07, 2005

(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	**Test Type**	**Result**	**Remark**
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is –4.83dB at 0.272MHz
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 –0.50dB at 5350.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.

NOTE:

1. The EUT was operating in 2.412 ~ 2.462GHz, 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz frequencies band. This report was recorded the RF parameters including 5.150 ~ 5.350GHz. For the 2.412 ~ 2.462GHz and 5.725 ~ 5.850GHz RF parameters was recorded in another test report.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Multi-Channel Access Point
MODEL NO.	RBT-4102
POWER SUPPLY	DC 48V from power adapter or POE (Power over Ethernet)
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: 2412 ~ 2462MHz 802.11a: 5.15 ~ 5.35GHz 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 for Normal mode
OUTPUT POWER	Please see note 4 (on next three page)
DATA CABLE	NA
ANTENNA TYPE	Please see note 3 (on next page)
I/O PORTS	Console Port x1, LAN Port x1
ASSOCIATED DEVICES	NA

NOTE:

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

2. The EUT was operated with the following power adapter or POE:

ADAPTER	
BRAND:	Enterasys
MODEL:	50-24000-050
INPUT:	AC 100-250V, 0.4A max, 47-63Hz 16cm/ shield/ without core
OUTPUT:	DC 48V, 0.25A , 1.5m/ nonshield/ with one core

POE (for test only)	
BRAND:	Enterasys
MODEL:	AP-PSBIAS-T-1P-AF
INPUT:	AC100~240V, 0.34~0.17A, 60/50Hz
OUTPUT:	DC 48V

3. The EUT must be supplied with a antenna as following table could be chosen:

For 802.11b/g(2400 ~ 2483.5MHz)

Item	SPEC No.	Model No.	Product Description	Antenna Gain	Remark	Connector
1	NA	RBT4K-AG-IA	2.4-4.9/5.8 GHz, 8ft of cable RPSMA Indoor Antenna.	2dBi	Omni	RPSMA

For 802.11a (5725 ~ 5850MHz band)

Item	SPEC No.	Model No.	Product Description	Antenna Gain	Remark	Connector
1	NA	RBT4K-AG-IA	2.4-4.9/5.8 GHz, 8ft of cable RPSMA Indoor Antenna.	4dBi	Omni	RPSMA
2	8910605	RBTES-AH-P23M	5.8GHz GHz Directional Antenna Assy Outdoor Antenna..	23 dBi	Point to point Directional	Reverse N
3	8910606	RBTES-AH-M10M	5.8GHz GHz Omni Antenna Assy Outdoor Antenna.	10 dBi	Omni	Reverse N

For 802.11a (5150 ~ 5350MHz band)

Item	SPEC No.	Model No.	Product Description	Antenna Gain	Remark	Connector
1	NA	RBT4K-AG-IA	2.4-4.9/5.8 GHz, 8ft of cable RPSMA Indoor Antenna.	4dBi	Omni	RPSMA

Note: The above antennas which with Reverse N connector will tested with a Pig Tail Cable (Model No.: RBT4K-AG-PT20F, SMA female RP - N female RP) .

4. Peak output power (Unit : dBm) :

For 802.11b/g(2400 ~ 2483.5MHz)

Item	SPEC No.	Model No.	Maximum Peak output power (Unit : dBm)
1	NA	RBT4K-AG-IA	25

For 802.11a (5725 ~ 5850MHz band)

Item	SPEC No.	Model No.	Maximum Peak output power (Unit : dBm)
1	NA	RBT4K-AG-IA	23.63
2	8910605	RBTES-AH-P23M	23.63
3	8910606	RBTES-AH-M10M	23.63

For 802.11a (5150 ~ 5350MHz band)

Item	SPEC No.	Model No.	Maximum Peak output power (Unit : dBm)	
			Operating Frequency (5150~5250MHz)	Operating Frequency (5250~5350MHz)
1	NA	RBT4K-AG-IA	16.62	23.07

5. 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

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 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz
RE≥1G: Radiated Emission above 1GHz APCM: Antenna Port Conducted Measurement

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

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

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

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

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 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	1, 4, 5, 8	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 Multi-Channel 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.

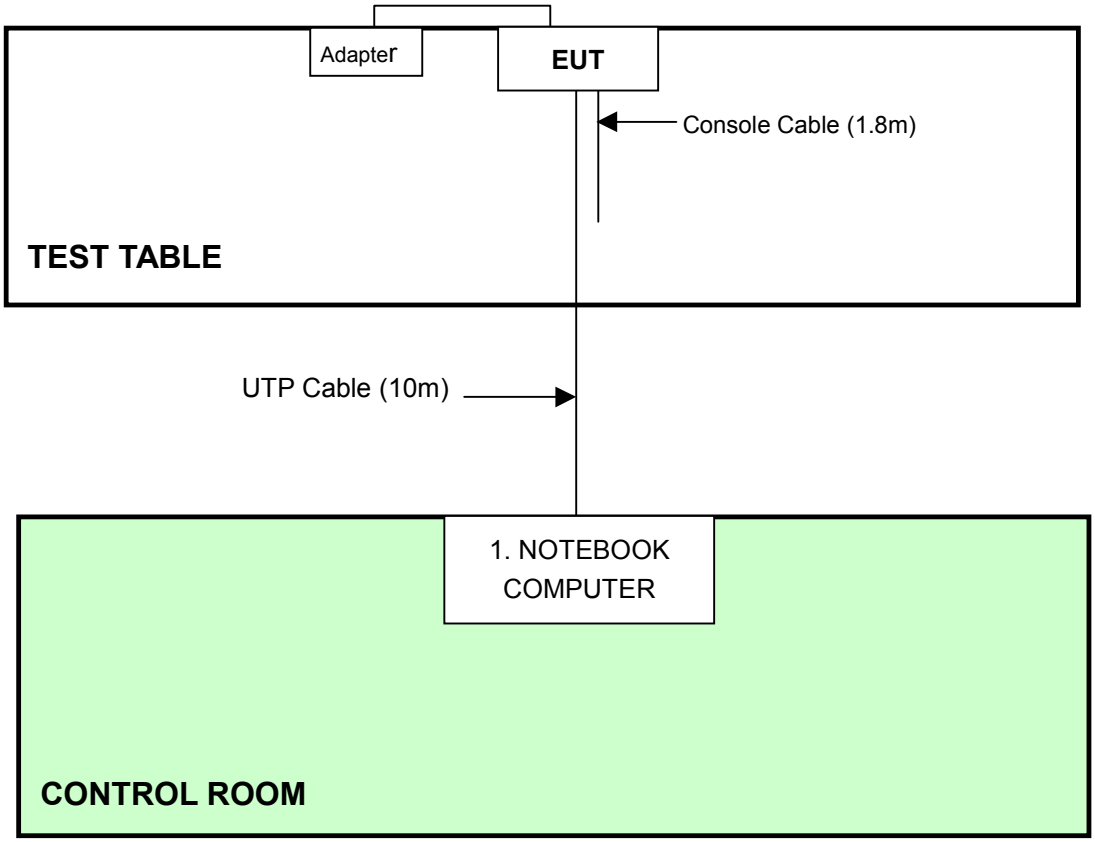
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP01L	TW-09c748-12800-165-3171	FCC DoC

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

NOTE: All power cords of the above support units are non shielded (1.8m).

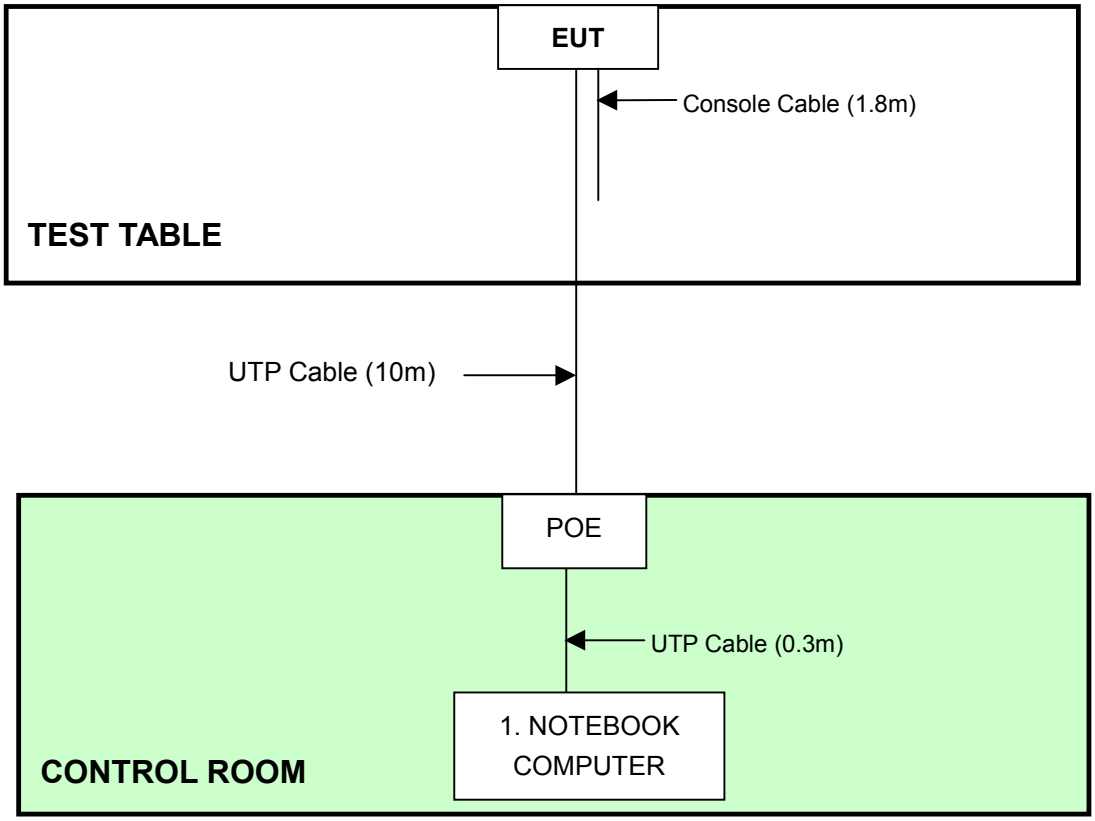
3.5 CONFIGURATION OF SYSTEM UNDER TEST

With adapter test mode :



NOTE: 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration in Item 6 also.

With POE test mode :



NOTE: 1. Support unit 1 was kept in the control room during the test.
2. Please refer to the photos of test configuration in Item 6 also.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 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
ROHDE & SCHWARZ Test Receiver	ESCS 30	847124/029	Dec. 07, 2005
ROHDE & SCHWARZ LISN (for EUT)	ESHS-Z5	848773/004	Nov. 08, 2005
KYORITSU LISN (for peripheral)	KNW-407	8/1395/12	Jul. 19, 2006
RF Cable (JETBAO)	RG233/U	Cable_CA_01	Jul. 19, 2006
Terminator(for KYORITSU)	50	3	Oct. 12, 2005
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 The measurement uncertainty is 2.53 dB, which is calculated as per the document CISPR 16-4 This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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.

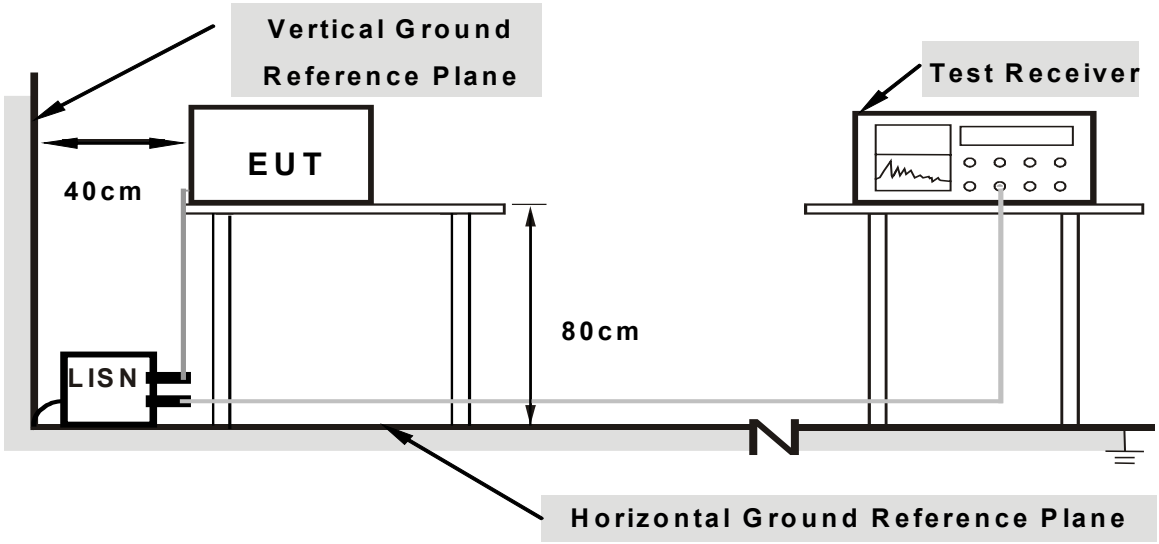
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.

b. Prepared other computer systems to act as a communication partner and placed them outside of testing area.

c. The communication partner run test program “ART 48B5” to enable EUT under transmission/receiving condition continuously at specific channel frequency via UTP cable and wireless.

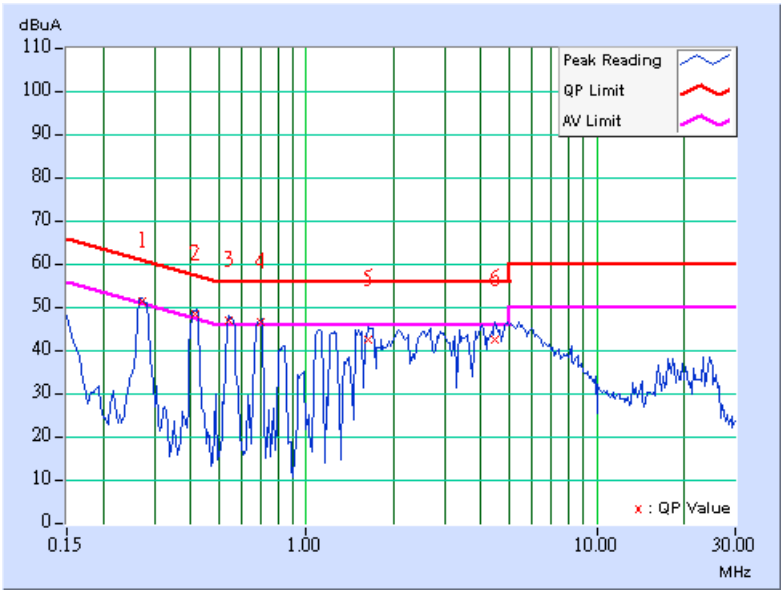
4.1.7 TEST RESULTS

Conducted Worst-Case Data (Adapter Mode)

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
TEST MODE	With Adapter	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120VAC, 60 HZ	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 961hPa	**TESTED BY**	Phoenix Huang

No	Freq.	Corr. 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	**0.272**	**0.16**	**50.92**	**46.06**	**51.08**	**46.22**	**61.05**	**51.05**	**-9.97**	**-4.83**
2	0.416	0.17	47.95	41.92	48.12	42.09	57.53	47.53	-9.41	-5.44
3	0.541	0.18	46.69	38.78	46.87	38.96	56.00	46.00	-9.13	-7.04
4	0.702	0.19	46.24	36.70	46.43	36.89	56.00	46.00	-9.57	-9.11
5	1.642	0.23	42.24	-	42.47	-	56.00	46.00	-13.53	-
6	4.465	0.47	42.30	-	42.77	-	56.00	46.00	-13.23	-

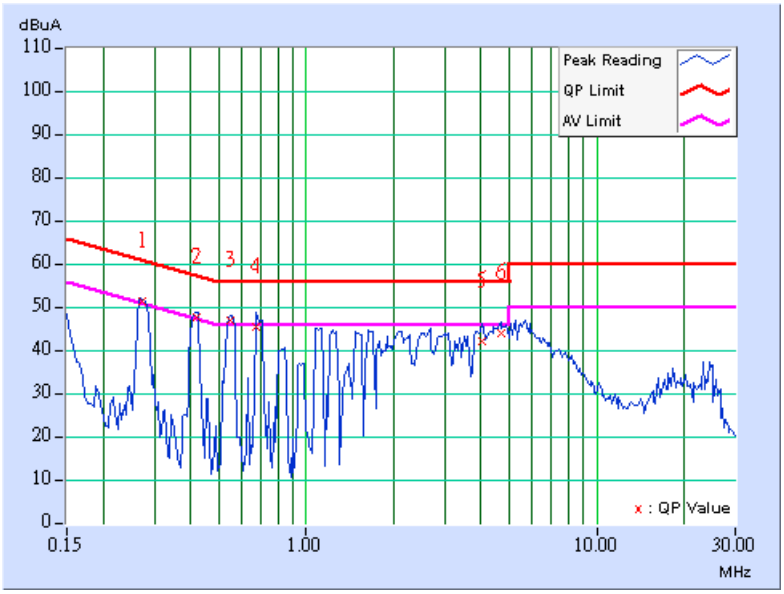
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Multi-Channel Access Point	MODEL	RBT-4102
TEST MODE	With Adapter	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 961hPa	TESTED BY	Phoenix Huang

No	Freq.	Corr. 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	0.271	0.16	50.89	-	51.05	-	61.09	51.09	-10.04	-
2	0.418	0.17	47.26	-	47.43	-	57.48	47.48	-10.05	-
3	0.546	0.18	46.61	38.09	46.79	38.27	56.00	46.00	-9.21	-7.73
4	0.675	0.18	44.99	-	45.17	-	56.00	46.00	-10.83	-
5	4.023	0.45	41.90	-	42.35	-	56.00	46.00	-13.65	-
6	4.670	0.47	43.70	-	44.17	-	56.00	46.00	-11.83	-

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

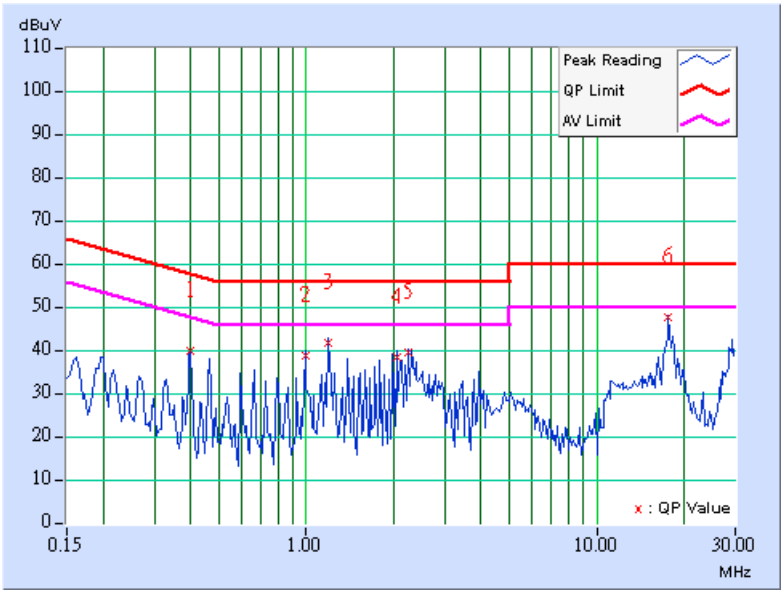


Conducted Worst-Case Data (POE)

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
TEST MODE	With POE	**6dB BANDWIDTH**	9 kHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120VAC, 60 HZ	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	26DEG. C, 63%RH, 961hPa	**TESTED BY**	Phoenix Huang

No	Freq.	Corr. 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	0.399	0.17	38.79	-	38.96	-	57.88	47.88	-18.92	-
2	0.998	0.20	37.69	-	37.89	-	56.00	46.00	-18.11	-
3	1.195	0.21	40.68	-	40.89	-	56.00	46.00	-15.11	-
4	2.056	0.26	37.49	-	37.75	-	56.00	46.00	-18.25	-
5	2.252	0.28	38.42	-	38.70	-	56.00	46.00	-17.30	-
6	17.694	1.17	46.44	-	47.61	-	60.00	50.00	-12.39	-

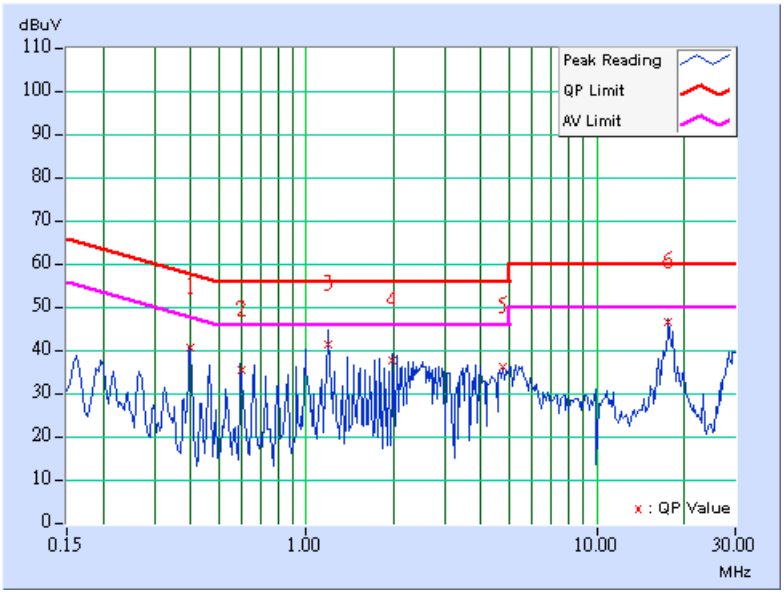
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Multi-Channel Access Point	MODEL	RBT-4102
TEST MODE	With POE	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 63%RH, 961hPa	TESTED BY	Phoenix Huang

No	Freq.	Corr. 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	0.399	0.17	39.79	-	39.96	-	57.88	47.88	-17.92	-
2	0.598	0.18	34.50	-	34.68	-	56.00	46.00	-21.32	-
3	1.196	0.21	40.51	-	40.72	-	56.00	46.00	-15.28	-
4	1.989	0.25	36.92	-	37.17	-	56.00	46.00	-18.83	-
5	4.773	0.48	35.30	-	35.78	-	56.00	46.00	-20.22	-
6	17.695	1.02	45.81	-	46.83	-	60.00	50.00	-13.17	-

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

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

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 07, 2006
HP Pre_Amplifier	8449B	3008A01922	Oct. 13, 2005
ROHDE & SCHWARZ Test Receiver	ESCS30	100287	Dec. 08, 2005
CHASE Broadband Antenna	VULB9168	138	Dec. 21, 2005
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 11, 2005
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 30, 2006
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 26, 2006
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 26, 2006
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek) 1GHz-20GHz	SF102	22054-2	Nov. 15. 2005
RF Cable(RICHTEC)	9913-30M	STCCAB-30M-1GHz-021	Jul. 16, 2006
Software	ADT_Radiated_V 5.14	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	NA

Note: 1. The calibration interval of the above test instruments is 12 months (36 months for Tunable Periodic Antenna)and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824-3.
7. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~20GHz)	1.88 dB

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 camber. 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.

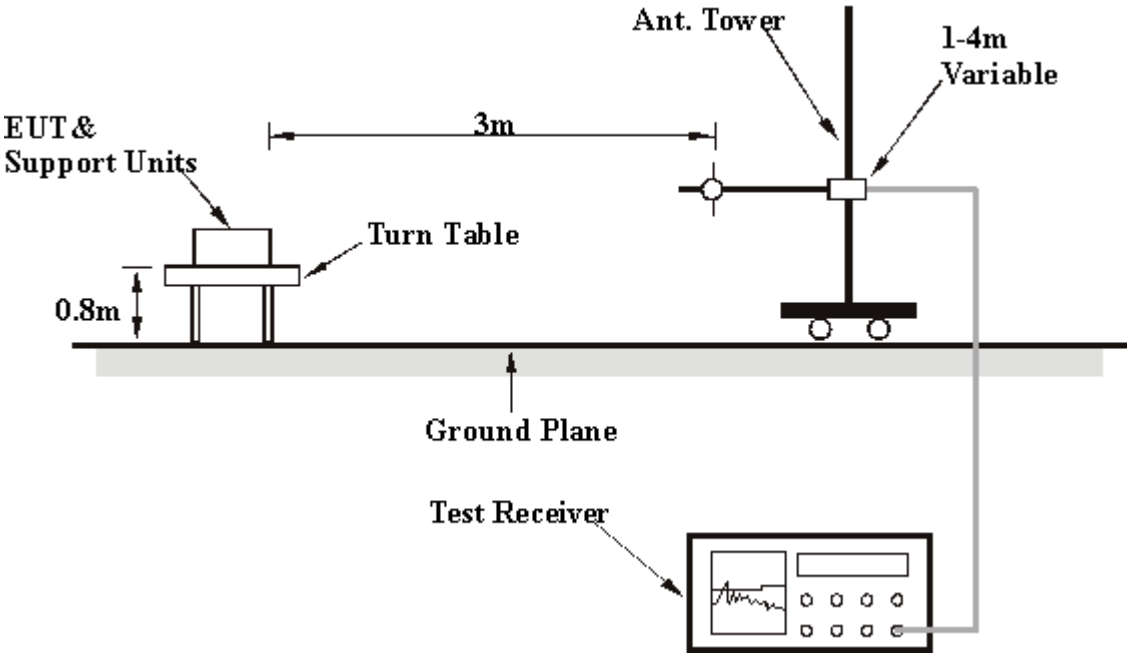
NOTE:

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 (Adapter Mode)

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
TEST MODE	With Adapter	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH, 966hPa	**TESTED BY**	Wen Yu

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	125.00	16.00 QP	43.50	-27.50	1.69 H	321	4.10	11.90
2	150.00	20.40 QP	43.50	-23.10	1.63 H	225	7.00	13.40
3	200.00	23.50 QP	43.50	-20.00	1.61 H	266	12.30	11.20
4	250.00	23.10 QP	46.00	-22.90	1.59 H	141	9.80	13.30
5	375.00	24.70 QP	46.00	-21.30	1.56 H	351	7.10	17.60
6	400.00	26.60 QP	46.00	-19.40	1.41 H	51	8.20	18.40
7	500.00	31.00 QP	46.00	-15.00	1.38 H	307	10.10	20.90
8	625.00	25.80 QP	46.00	-20.20	1.36 H	256	2.00	23.80
9	825.00	30.20 QP	46.00	-15.80	1.25 H	156	3.20	27.00
10	990.00	34.70 QP	54.00	-19.30	1.00 H	217	5.80	28.90

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	125.00	23.90 QP	43.50	-19.60	1.00 V	38	12.00	11.90
2	150.00	27.50 QP	43.50	-16.00	1.00 V	45	14.10	13.40
3	200.00	29.70 QP	43.50	-13.80	1.00 V	203	18.50	11.20
4	250.00	25.30 QP	46.00	-20.70	1.00 V	8	12.00	13.30
5	375.00	25.40 QP	46.00	-20.60	1.00 V	310	7.80	17.60
6	400.00	26.20 QP	46.00	-19.80	1.00 V	42	7.80	18.40
7	500.00	31.00 QP	46.00	-15.00	1.03 V	267	10.10	20.90
8	625.00	27.60 QP	46.00	-18.40	1.08 V	139	3.80	23.80
9	825.00	29.70 QP	46.00	-16.30	1.12 V	236	2.70	27.00
10	990.00	39.00 QP	54.00	-15.00	1.18 V	159	10.10	28.90

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

Below 1GHz Worst-Case Data (POE Mode)

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
TEST MODE	With POE	**FREQUENCY RANGE**	Below 1000MHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH, 966hPa	**TESTED BY**	Wen Yu

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	125.00	15.60 QP	43.50	-27.90	1.00 H	36	3.70	11.90
2	150.00	20.70 QP	43.50	-22.80	1.58 H	112	7.30	13.40
3	200.00	24.20 QP	43.50	-19.30	1.57 H	58	13.00	11.20
4	250.00	23.60 QP	46.00	-22.40	1.44 H	345	10.30	13.30
5	375.00	24.80 QP	46.00	-21.20	1.36 H	31	7.20	17.60
6	400.00	25.70 QP	46.00	-20.30	1.38 H	129	7.30	18.40
7	500.00	30.10 QP	46.00	-15.90	1.32 H	247	9.20	20.90
8	625.00	26.90 QP	46.00	-19.10	1.26 H	192	3.10	23.80
9	825.00	30.50 QP	46.00	-15.50	1.19 H	304	3.50	27.00
10	990.00	35.60 QP	54.00	-18.40	1.00 H	203	6.70	28.90

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	125.00	24.30 QP	43.50	-19.20	1.00 V	137	12.40	11.90
2	150.00	23.30 QP	43.50	-20.20	1.00 V	136	9.90	13.40
3	200.00	33.70 QP	43.50	-9.80	1.00 V	131	22.50	11.20
4	250.00	25.60 QP	46.00	-20.40	1.00 V	315	12.30	13.30
5	375.00	24.80 QP	46.00	-21.20	1.00 V	238	7.20	17.60
6	400.00	25.20 QP	46.00	-20.80	1.00 V	72	6.80	18.40
7	500.00	28.60 QP	46.00	-17.40	1.07 V	273	7.70	20.90
8	625.00	29.10 QP	46.00	-16.90	1.09 V	13	5.30	23.80
9	825.00	32.00 QP	46.00	-14.00	1.10 V	168	5.00	27.00
10	990.00	36.20 QP	54.00	-17.80	1.19 V	58	7.30	28.90

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

802.11a OFDM modulation

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
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	27deg. C, 70%RH, 966hPa	**TESTED BY**	Wen Yu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	67.90 PK	74.00	-6.10	1.07 H	259	30.90	37.00
1	#5150.00	53.40 AV	54.00	-0.60	1.07 H	259	16.40	37.00
2	*5180.00	112.00 PK			1.07 H	259	75.00	37.00
2	*5180.00	101.70 AV			1.07 H	259	64.70	37.00
3	10360.00	53.50 PK	68.30	-14.80	1.03 H	251	8.80	44.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	56.60 PK	74.00	-17.40	1.03 V	163	19.60	37.00
1	#5150.00	42.50 AV	54.00	-11.50	1.03 V	163	5.50	37.00
2	*5180.00	100.70 PK			1.03 V	163	63.70	37.00
2	*5180.00	90.80 AV			1.03 V	163	53.80	37.00
3	10360.00	55.40 PK	68.30	-12.90	1.47 V	255	10.70	44.70

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	Multi-Channel Access Point	**MODEL**	RBT-4102
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	27deg. C, 70%RH, 966hPa	**TESTED BY**	Wen Yu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	112.20 PK			1.07 H	267	75.20	37.00
1	*5240.00	101.50 AV			1.07 H	267	64.50	37.00
2	10480.00	54.40 PK	68.30	-13.90	1.04 H	260	9.40	45.00

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	*5240.00	100.90 PK			1.65 V	175	63.90	37.00
1	*5240.00	91.10 AV			1.65 V	175	54.10	37.00
2	10480.00	56.10 PK	68.30	-12.20	1.48 V	253	11.10	45.00

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	Multi-Channel Access Point	**MODEL**	RBT-4102
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	27deg. C, 70%RH, 966hPa	**TESTED BY**	Wen Yu

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	3417.00	44.10 PK	68.30	-24.20	1.30 H	228	11.10	32.90
2	#4317.00	43.90 PK	74.00	-30.10	1.31 H	211	9.40	34.40
2	#4317.00	30.30 AV	54.00	-23.70	1.31 H	211	-4.20	34.40
3	*5260.00	118.00 PK			1.04 H	265	81.00	37.00
3	*5260.00	107.60 AV			1.04 H	265	70.60	37.00
4	10520.00	54.80 PK	68.30	-13.50	1.00 H	257	9.60	45.20

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	3417.00	44.00 PK	68.30	-24.30	1.40 V	169	11.00	32.90
2	#4317.00	43.80 PK	74.00	-30.20	1.29 V	183	9.30	34.40
2	#4317.00	30.40 AV	54.00	-23.60	1.29 V	183	-4.10	34.40
3	*5260.00	107.60 PK			1.66 V	157	70.60	37.00
3	*5260.00	96.90 AV			1.66 V	157	59.90	37.00
4	10520.00	57.10 PK	68.30	-11.20	1.51 V	251	11.90	45.20

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	Multi-Channel Access Point	**MODEL**	RBT-4102
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	27deg. C, 70%RH, 966hPa	**TESTED BY**	Wen Yu

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	3482.00	43.80 PK	68.30	-24.50	1.33 H	226	10.80	33.00
2	#4373.00	43.70 PK	74.00	-30.30	1.29 H	210	9.20	34.50
2	#4373.00	30.70 AV	54.00	-23.30	1.29 H	210	-3.80	34.50
3	*5320.00	115.90 PK			1.03 H	266	78.90	37.00
3	*5320.00	104.40 AV			1.03 H	266	67.40	37.00
4	#5350.00	66.70 PK	74.00	-7.30	1.03 H	266	29.70	37.00
4	**#5350.00**	**53.50 AV**	**54.00**	**-0.50**	**1.03 H**	**266**	**16.50**	**37.00**
5	#10640.00	55.00 PK	74.00	-19.00	1.03 H	250	8.70	46.30
5	#10640.00	42.30 AV	54.00	-11.70	1.03 H	250	-4.00	46.30

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	3482.00	43.90 PK	68.30	-24.40	1.43 V	171	10.90	33.00
2	#4373.00	43.40 PK	74.00	-30.60	1.30 V	188	8.90	34.50
2	#4373.00	30.50 AV	54.00	-23.50	1.30 V	188	-4.00	34.50
3	*5320.00	105.50 PK			1.42 V	246	68.50	37.00
3	*5320.00	94.70 AV			1.42 V	246	57.70	37.00
4	#5350.00	56.30 PK	74.00	-17.70	1.42 V	246	19.30	37.00
4	#5350.00	42.60 AV	54.00	-11.40	1.42 V	246	5.60	37.00
5	#10640.00	57.40 PK	74.00	-16.60	1.46 V	250	11.10	46.30
5	#10640.00	43.90 AV	54.00	-10.10	1.46 V	250	-2.40	46.30

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

4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

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

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

4.3.3 TEST PROCEDURE

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

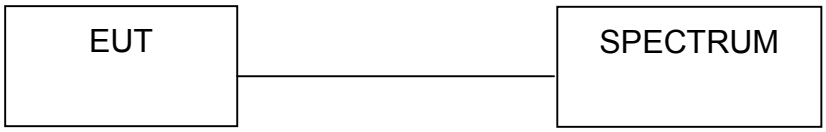
NOTE:
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

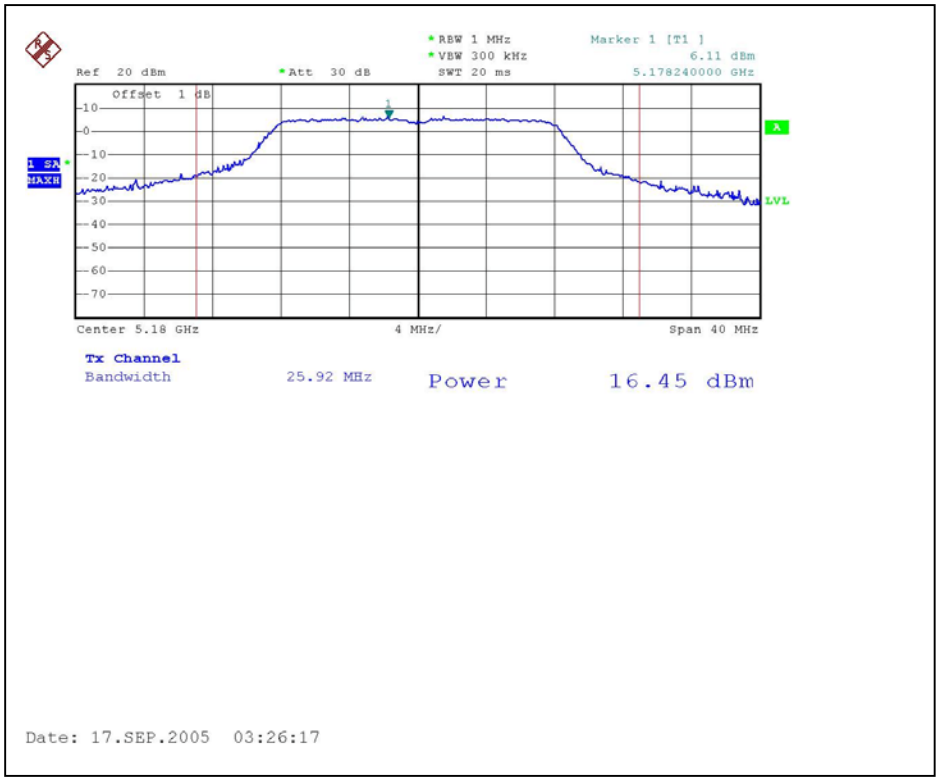
802.11a OFDM modulation

EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 966hPa
TESTED BY	Rex Huang		

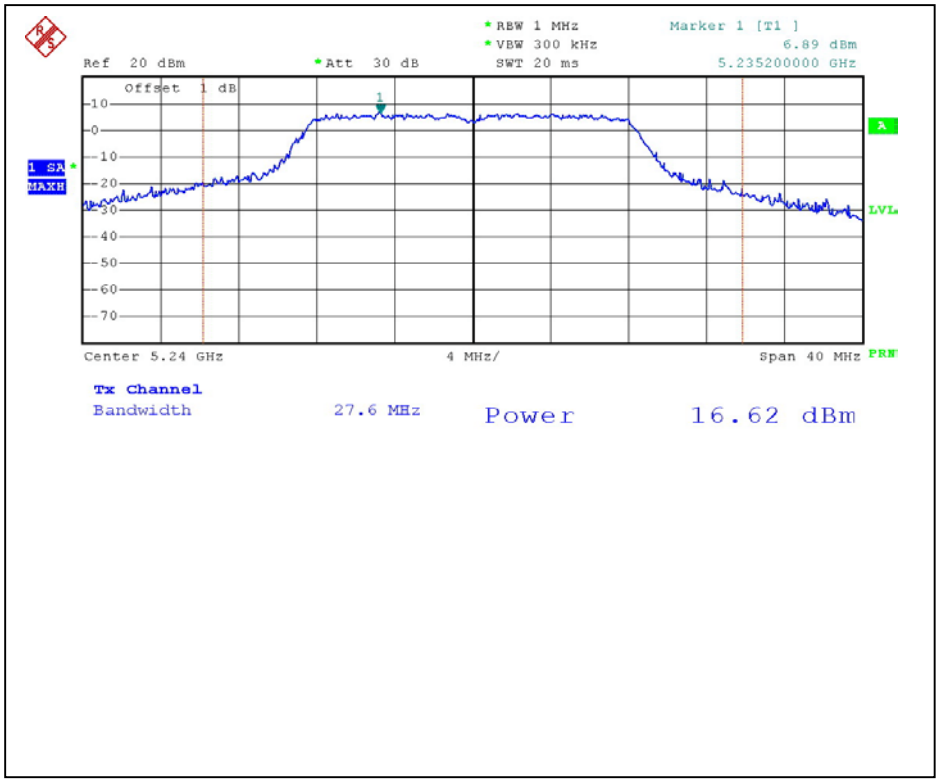
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	16.45	17	25.92	PASS
4	5240	16.62	17	27.6	PASS
5	5260	23.07	24	36	PASS
8	5320	20.45	24	29.92	PASS

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

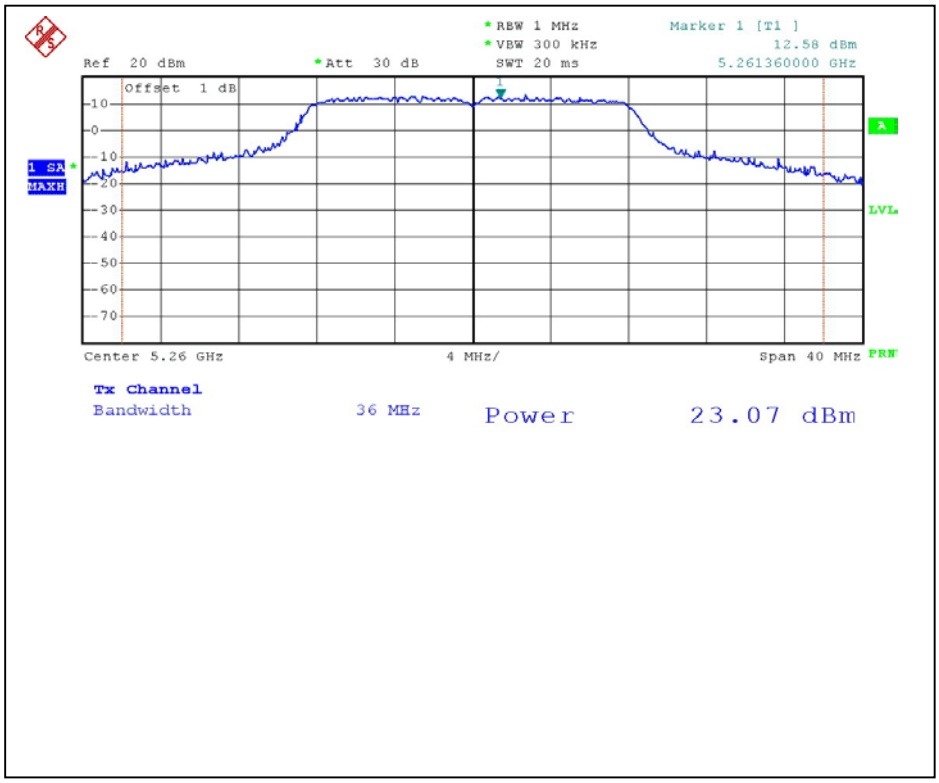
Peak Power Output:
CH1



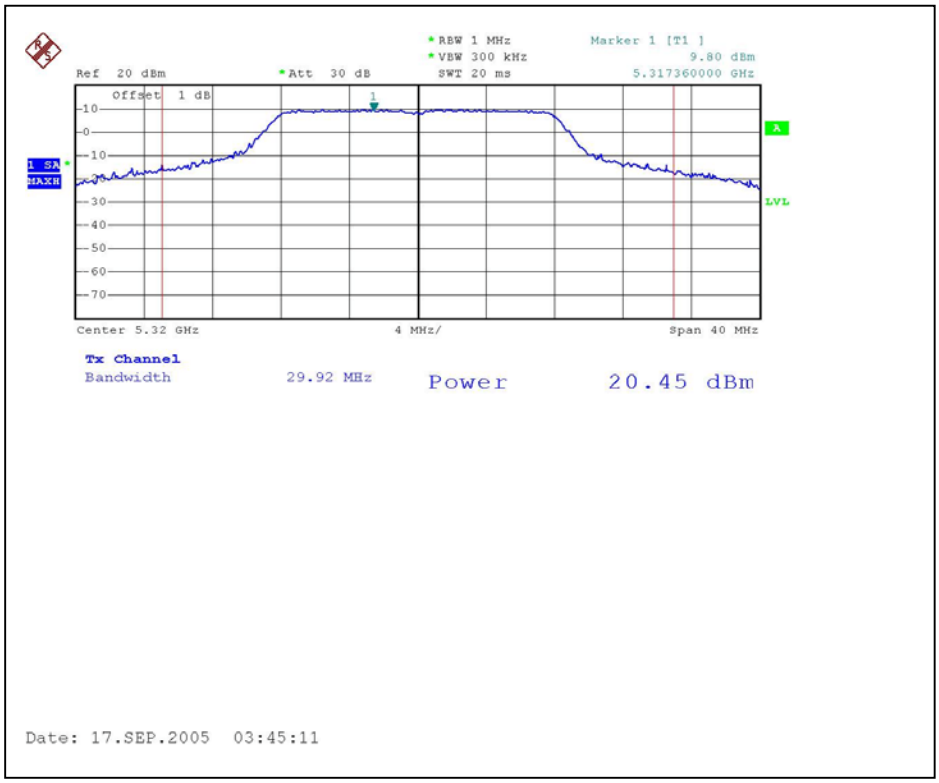
CH4



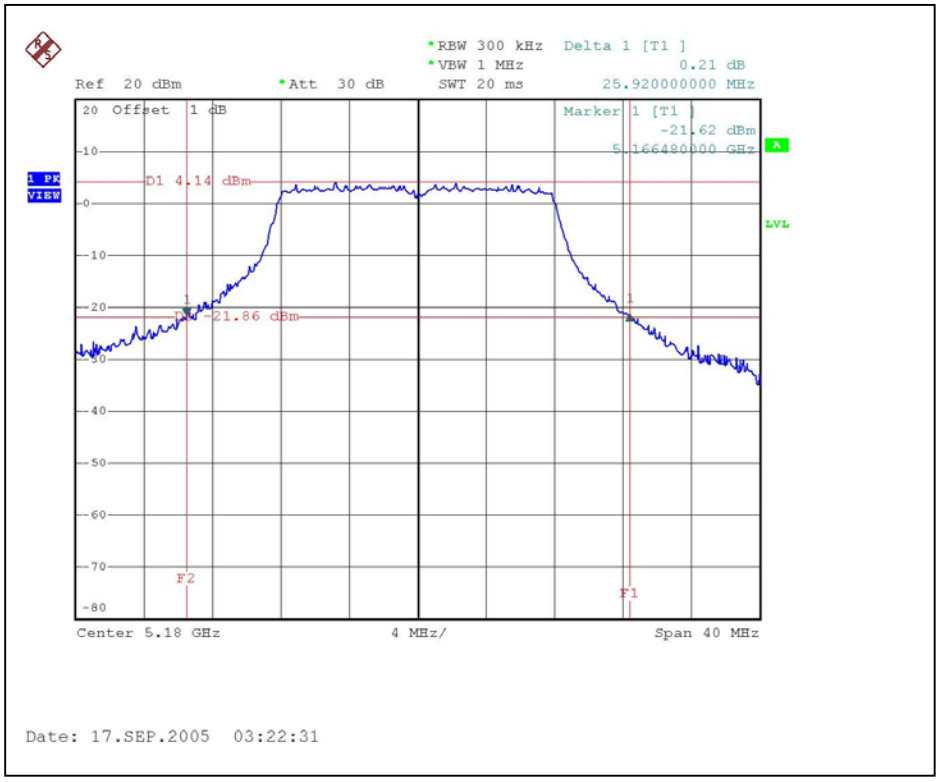
CH5


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Marker 1 [T1]
12.58 dBm
5.261360000 GHz
Ref 20 dBm
Att 30 dB
Offset 1 dB
1 SA
MAXH
LVL
Center 5.26 GHz
4 MHz/
Span 40 MHz
PRN
Tx Channel
Bandwidth
36 MHz
Power
23.07 dBm

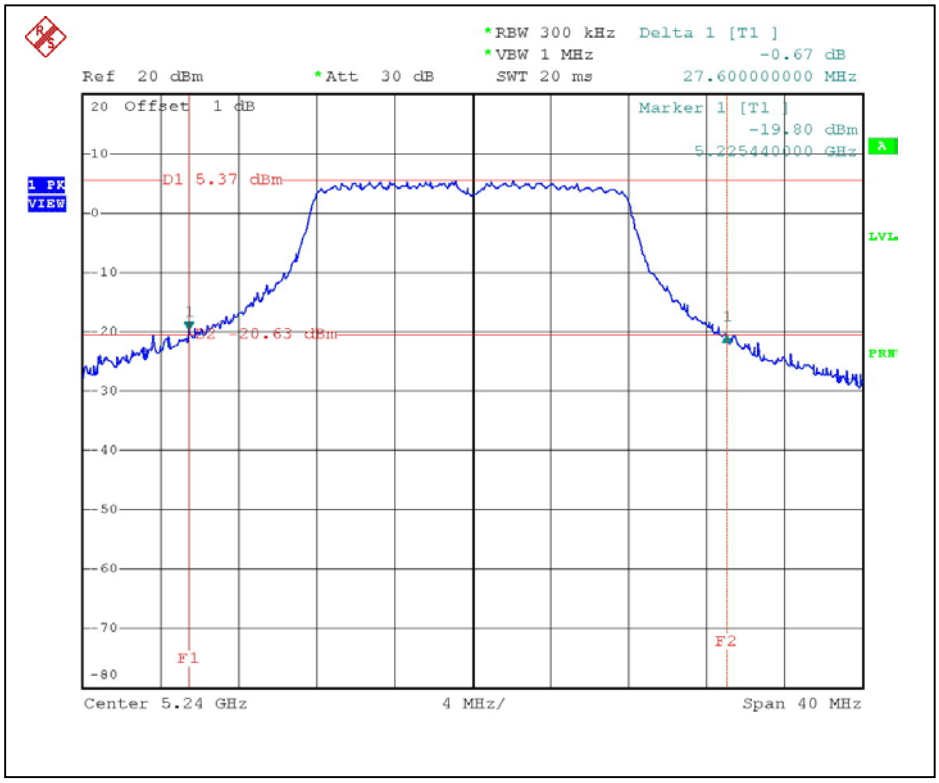
CH8


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Marker 1 [T1]
9.80 dBm
5.317360000 GHz
Ref 20 dBm
Att 30 dB
Offset 1 dB
1 SA
MAXH
LVL
Center 5.32 GHz
4 MHz/
Span 40 MHz
Tx Channel
Bandwidth
29.92 MHz
Power
20.45 dBm
Date: 17.SEP.2005 03:45:11

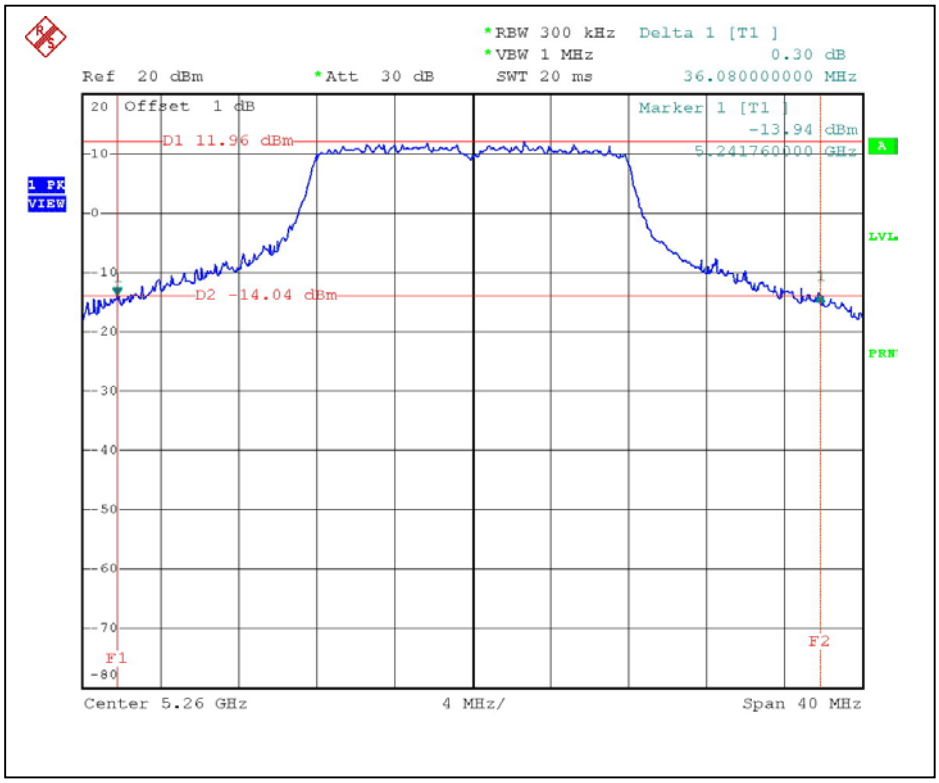
26dB Occupied Bandwidth:
CH1



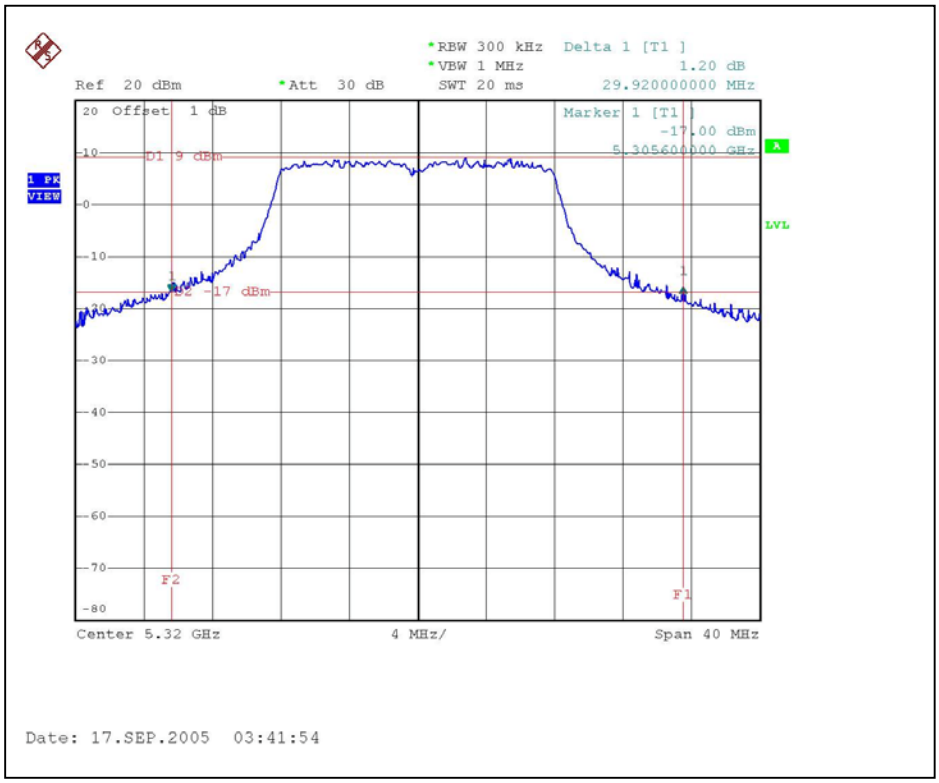
CH4



CH5


*RBW 300 kHz
Delta 1 [T1]
*VBW 1 MHz
0.30 dB
Ref 20 dBm
*Att 30 dB
SWT 20 ms
36.080000000 MHz
20 Offset 1 dB
Marker 1 [T1]
-13.94 dBm
D1 11.96 dBm
5.241760000 GHz
1 PK VIEW
D2 -14.04 dBm
LVL
PRN
F1
F2
Center 5.26 GHz
4 MHz/
Span 40 MHz

CH8


*RBW 300 kHz
Delta 1 [T1]
*VBW 1 MHz
1.20 dB
Ref 20 dBm
*Att 30 dB
SWT 20 ms
29.920000000 MHz
20 Offset 1 dB
Marker 1 [T1]
-17.00 dBm
D1 9 dBm
5.305600000 GHz
1 PK VIEW
D2 -17 dBm
LVL
F2
F1
Center 5.32 GHz
4 MHz/
Span 40 MHz
Date: 17.SEP.2005 03:41:54

4.4 PEAK POWER EXCURSION MEASUREMENT

4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

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

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

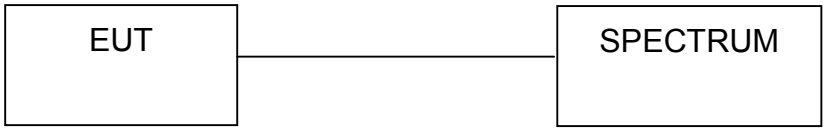
4.4.3 TEST PROCEDURE

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

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

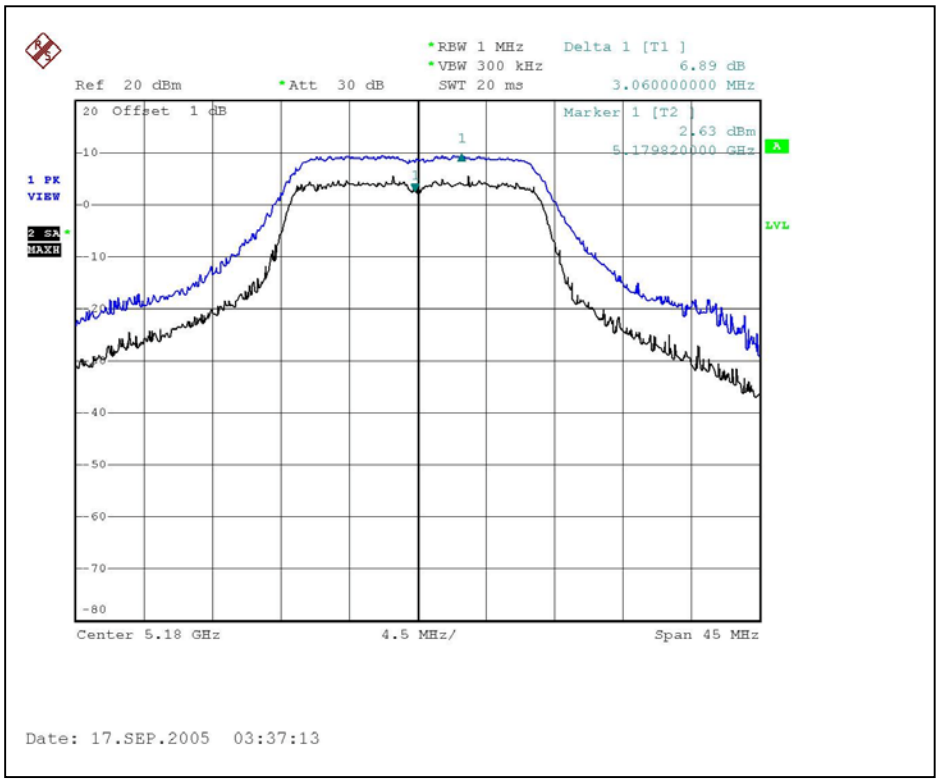
4.4.7 TEST RESULTS

802.11a OFDM modulation

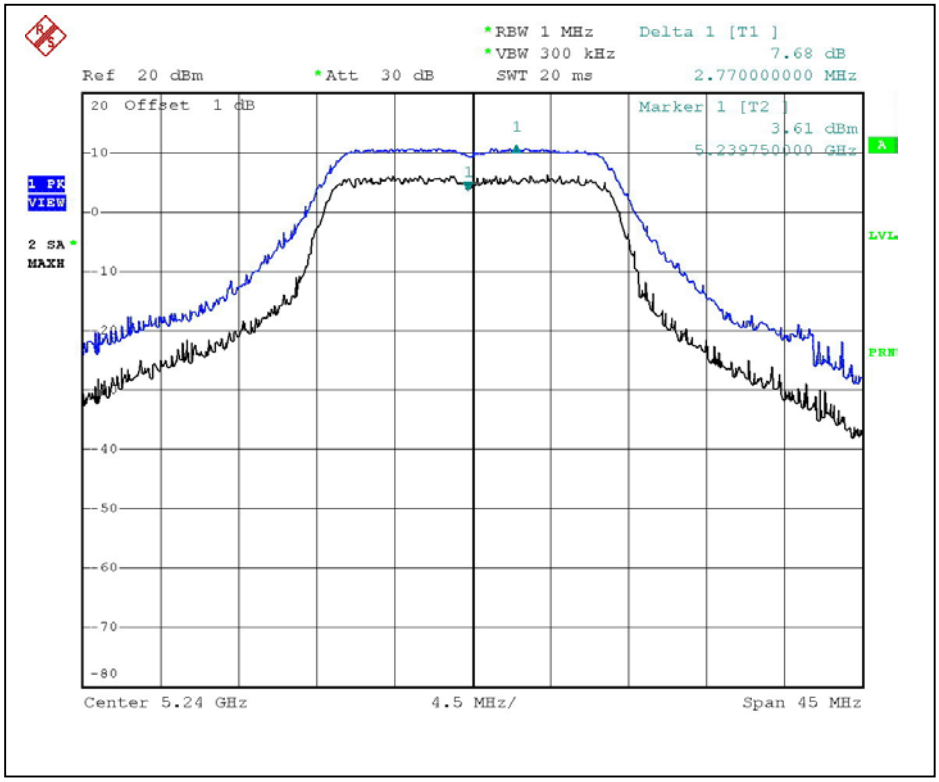
EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 966hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	6.89	13	PASS
4	5240	7.68	13	PASS
5	5260	7.65	13	PASS
8	5320	6.98	13	PASS

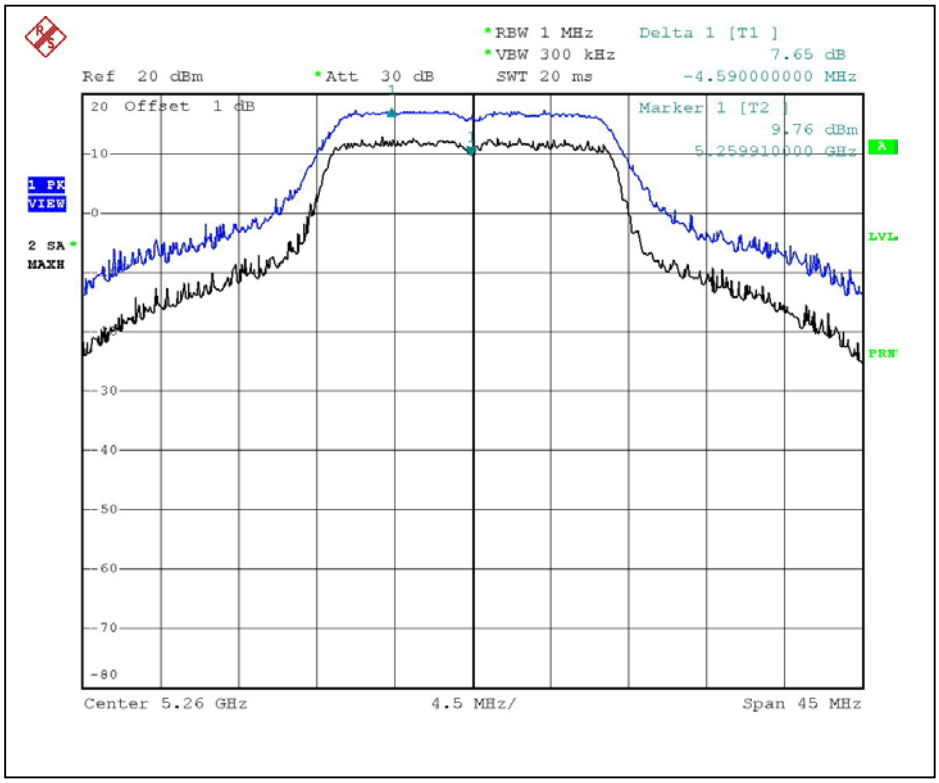
CH1


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
6.89 dB
3.060000000 MHz
Ref 20 dBm
*Att 30 dB
20 Offset 1 dB
Marker 1 [T2]
2.63 dBm
5.179820000 GHz
1 PK
VIEW
2 SA
MAXH
LVL
Center 5.18 GHz
4.5 MHz/
Span 45 MHz
Date: 17.SEP.2005 03:37:13

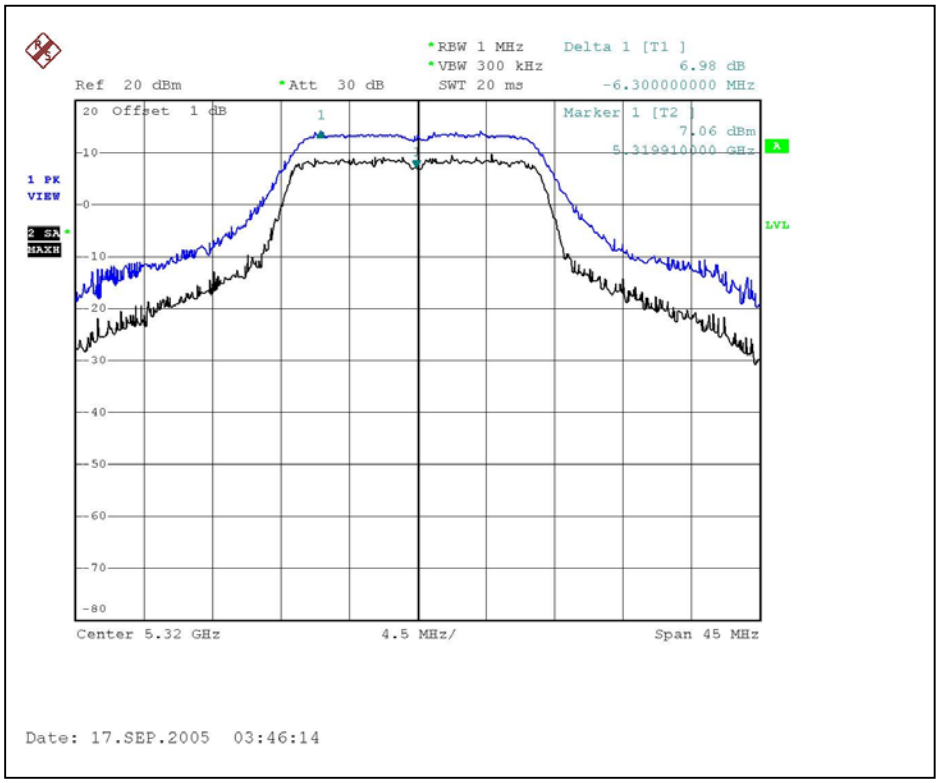
CH4


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
7.68 dB
2.770000000 MHz
Ref 20 dBm
*Att 30 dB
20 Offset 1 dB
Marker 1 [T2]
3.61 dBm
5.239750000 GHz
2 SA
MAXH
LVL
Center 5.24 GHz
4.5 MHz/
Span 45 MHz

CH5


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
7.65 dB
-4.590000000 MHz
Ref 20 dBm
Att 30 dB
20 Offset 1 dB
Marker 1 [T2]
9.76 dBm
5.259910000 GHz
1 PK VIEW
2 SA MAXH
LVL
PRN
Center 5.26 GHz
4.5 MHz/
Span 45 MHz

CH8


RBW 1 MHz
VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
6.98 dB
-6.300000000 MHz
Ref 20 dBm
Att 30 dB
20 Offset 1 dB
Marker 1 [T2]
7.06 dBm
5.319910000 GHz
1 PK VIEW
2 SA MAXH
LVL
Center 5.32 GHz
4.5 MHz/
Span 45 MHz
Date: 17.SEP.2005 03:46:14

4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

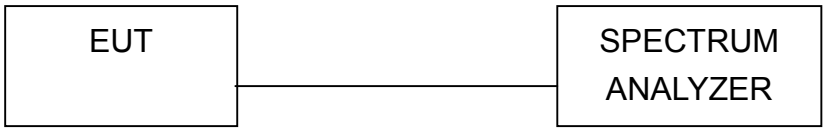
4.5.3 TEST PROCEDURES

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6

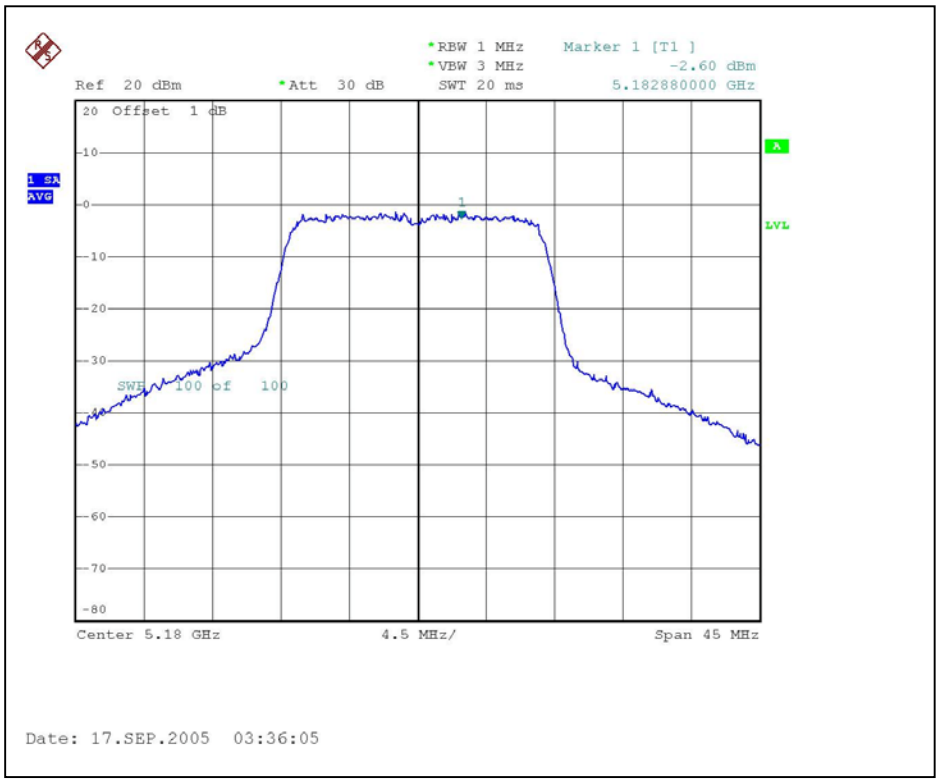
4.5.7 TEST RESULTS

802.11a OFDM modulation

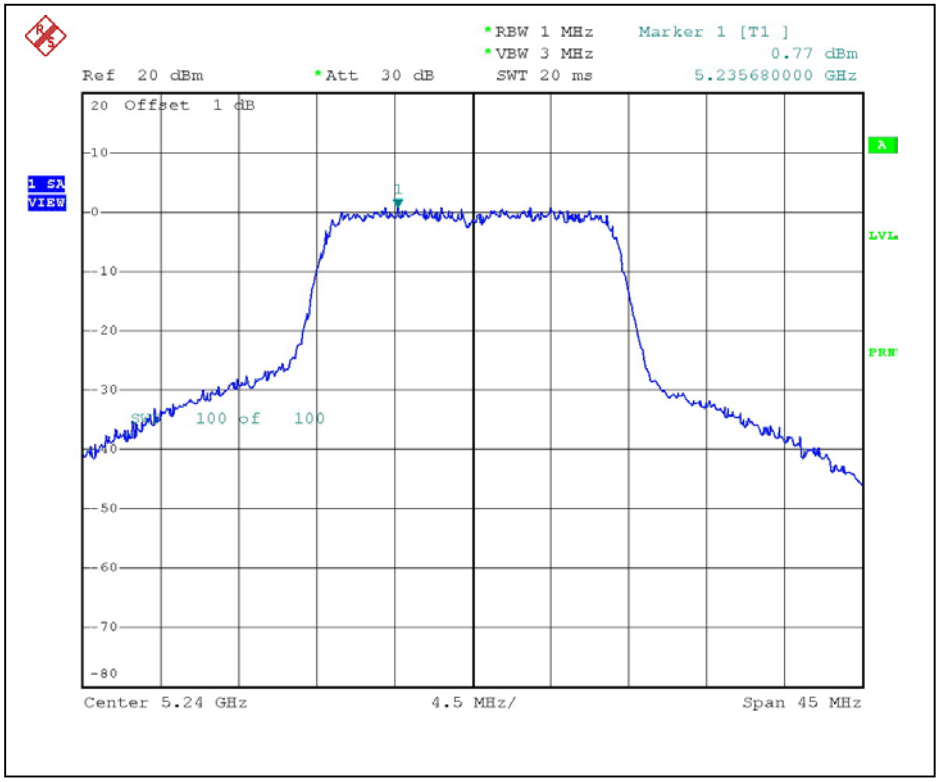
EUT	Multi-Channel Access Point	**MODEL**	RBT-4102
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg.C, 65%RH, 966hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-2.6	4	PASS
4	5240	0.77	4	PASS
5	5260	6.94	11	PASS
8	5320	2.72	11	PASS

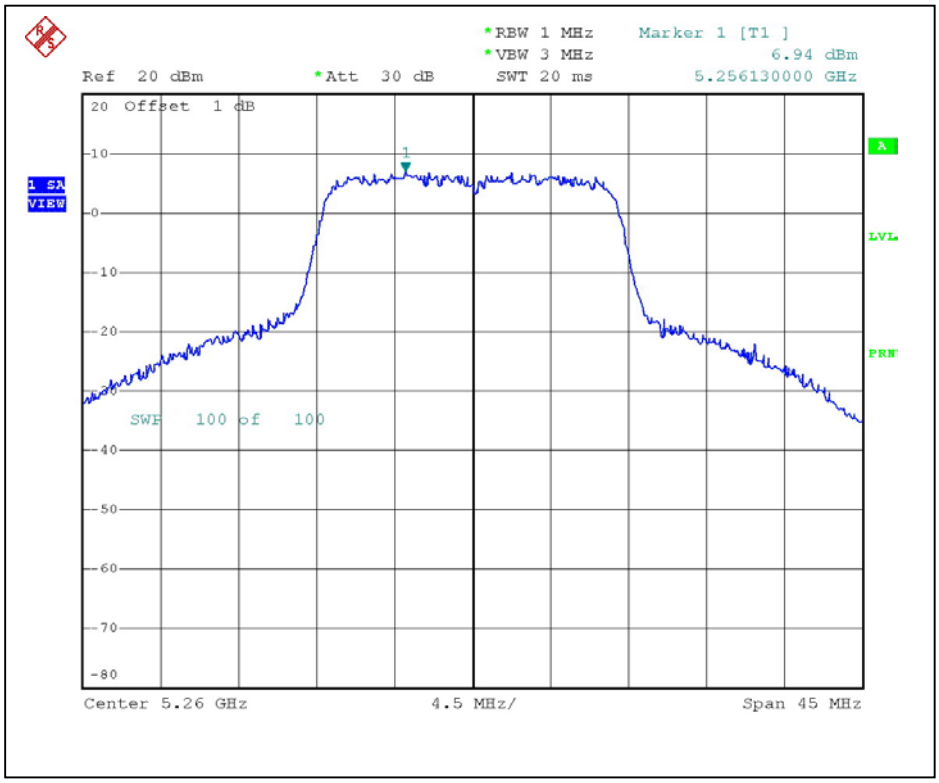
CH1


*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-2.60 dBm
5.182880000 GHz
Ref 20 dBm
*Att 30 dB
20 Offset 1 dB
1 SA AVG
A
LVL
SWP 100 of 100
Center 5.18 GHz
4.5 MHz/
Span 45 MHz
Date: 17.SEP.2005 03:36:05

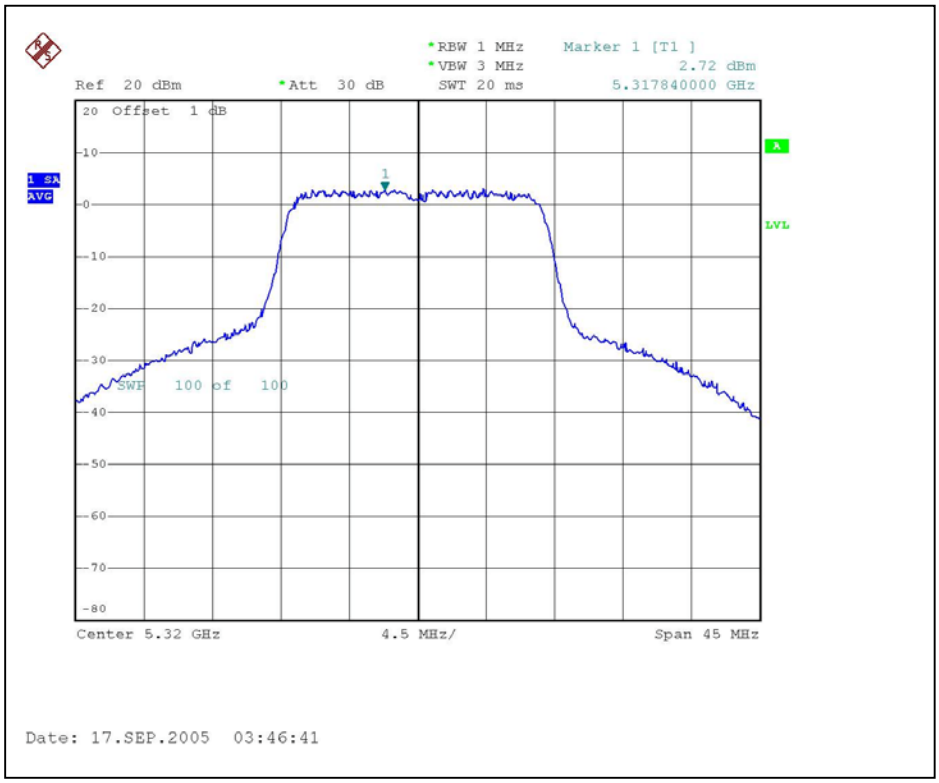
CH4


*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
0.77 dBm
5.235680000 GHz
Ref 20 dBm
*Att 30 dB
20 Offset 1 dB
1 SA VIEW
A
LVL
PRN
SWP 100 of 100
Center 5.24 GHz
4.5 MHz/
Span 45 MHz

CH5


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
6.94 dBm
5.256130000 GHz
Ref 20 dBm
Att 30 dB
20 Offset 1 dB
SWP 100 of 100
Center 5.26 GHz
4.5 MHz/
Span 45 MHz

CH8


RBW 1 MHz
VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
2.72 dBm
5.317840000 GHz
Ref 20 dBm
Att 30 dB
20 Offset 1 dB
SWP 100 of 100
Center 5.32 GHz
4.5 MHz/
Span 45 MHz
Date: 17.SEP.2005 03:46:41

4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

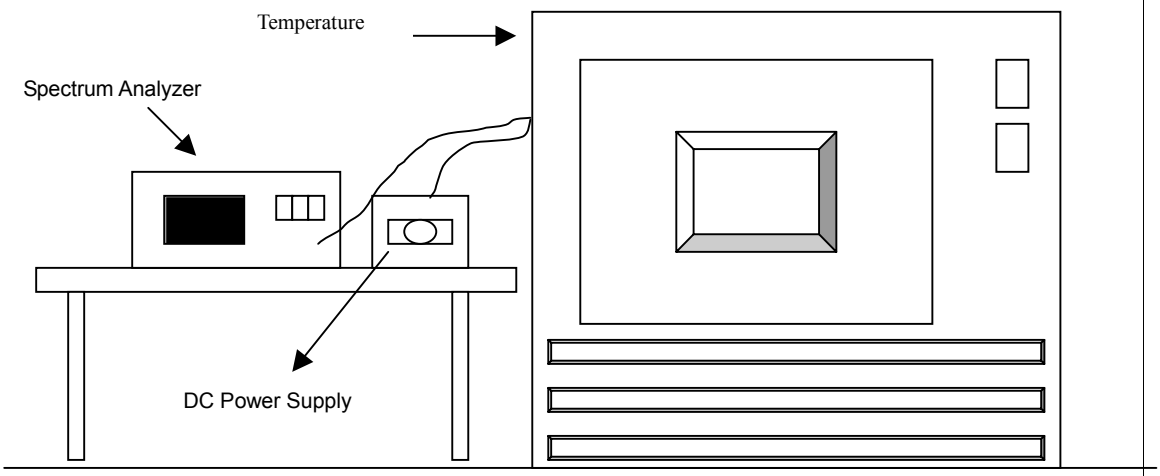
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

Operating frequency: 5320MHz				Limit : ± 0.02%			
Temp. (℃)	Power supply (VAC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5319.9868	0.000248	5319.9876	0.000233	5319.9887	0.000212
	110	5319.9875	0.000235	5319.9893	0.000201	5319.9912	0.000165
	93.5	5319.9933	0.000126	5319.9924	0.000143	5319.9916	0.000158
40	126.5	5320.0085	0.000160	5320.0076	0.000143	5320.0058	0.000109
	110	5320.0078	0.000147	5320.0072	0.000135	5320.0064	0.000120
	93.5	5320.0081	0.000152	5320.0074	0.000139	5320.0069	0.000130
30	126.5	5320.0246	0.000462	5320.0258	0.000485	5320.0262	0.000492
	110	5320.0254	0.000477	5320.0273	0.000513	5320.0286	0.000538
	93.5	5320.0240	0.000451	5320.0246	0.000462	5320.0272	0.000511
20	126.5	5320.0128	0.000241	5320.0116	0.000218	5320.0104	0.000195
	110	5320.0124	0.000233	5320.0122	0.000229	5320.0111	0.000209
	93.5	5320.0122	0.000229	5320.0106	0.000199	5320.0114	0.000214
10	126.5	5319.9952	0.000090	5319.9946	0.000102	5319.9942	0.000109
	110	5319.9948	0.000098	5319.9943	0.000107	5319.9916	0.000158
	93.5	5319.9938	0.000117	5319.9926	0.000139	5319.9886	0.000214
0	126.5	5320.0241	0.000453	5320.0224	0.000421	5320.0216	0.000406
	110	5320.0233	0.000438	5320.0215	0.000404	5320.0204	0.000383
	93.5	5320.0228	0.000429	5320.0219	0.000412	5320.0198	0.000372
-10	126.5	5320.0115	0.000216	5320.0109	0.000205	5320.0101	0.000190
	110	5320.0117	0.000220	5320.0113	0.000212	5320.0104	0.000195
	93.5	5320.0123	0.000231	5320.0134	0.000252	5320.0143	0.000269
-20	126.5	5320.0328	0.000617	5320.0321	0.000603	5320.0313	0.000588
	110	5320.0318	0.000598	5320.0311	0.000585	5320.0294	0.000553
	93.5	5320.031	0.000583	5320.0289	0.000543	5320.0268	0.000504
-30	126.5	5320.0312	0.000586	5320.0302	0.000568	5320.0296	0.000556
	110	5320.0306	0.000575	5320.0298	0.000560	5320.0284	0.000534
	93.5	5320.0281	0.000528	5320.0268	0.000504	5320.0266	0.000500

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Nov. 23, 2005

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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

4.7.2 TEST PROCEDURE

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

4.7.3 EUT OPERATING CONDITION

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

4.7.4 TEST RESULTS

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 filed 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

NOTE (Peak):

The band edge emission plot on the following first page shows 40.94dBc 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 112.0dBuV/m (Peak), so the maximum field strength in restrict band is 112.0-40.94=71.06dBuV/m which is under 74dBuV/m limit.

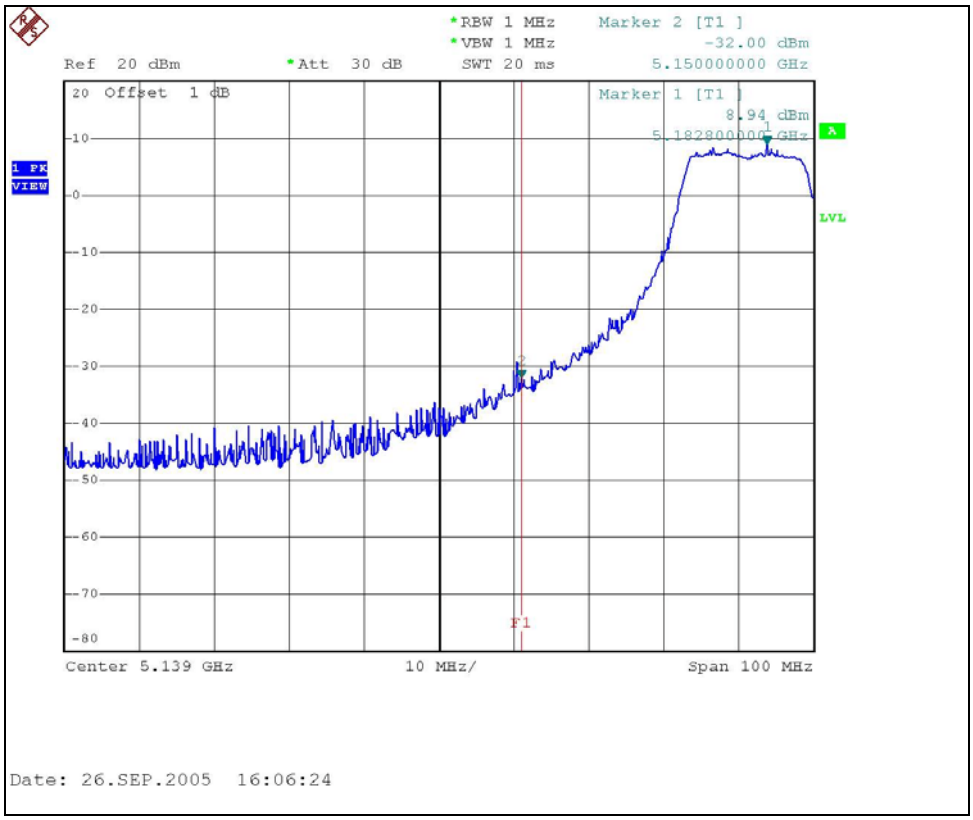
The band edge emission plot on the following first page shows 45.97dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 115.9dBuV/m (Peak), so the maximum field strength in restrict band is 115.9-45.97=69.93dBuV/m which is under 74dBuV/m limit.

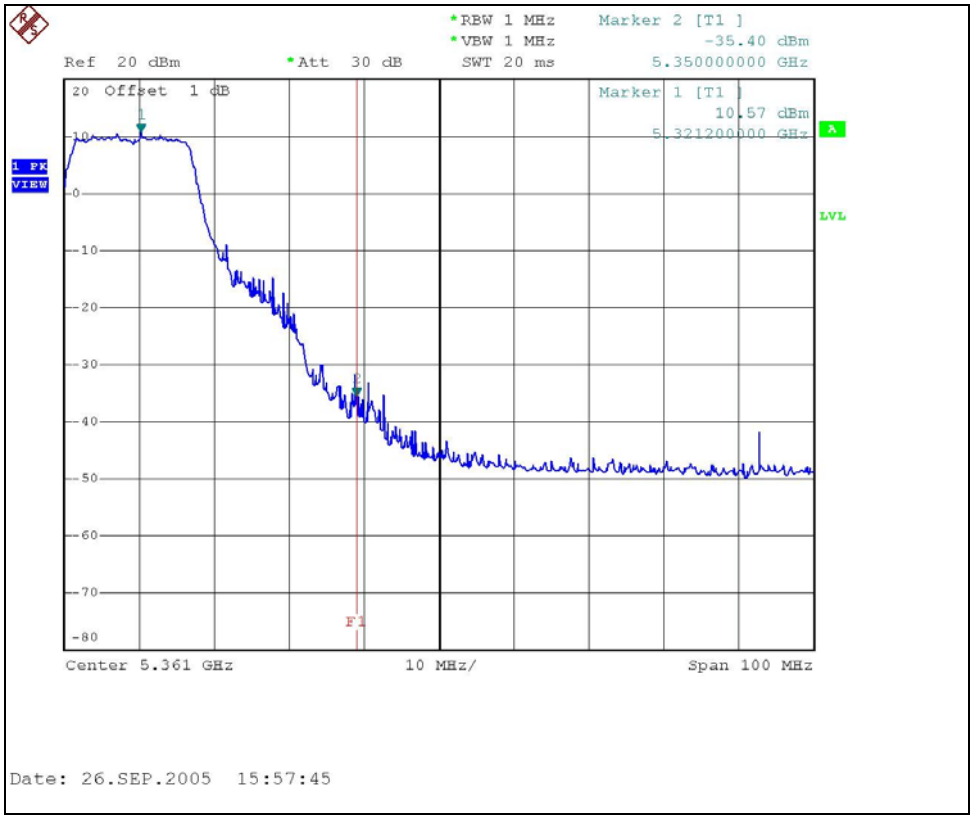
NOTE (Average):

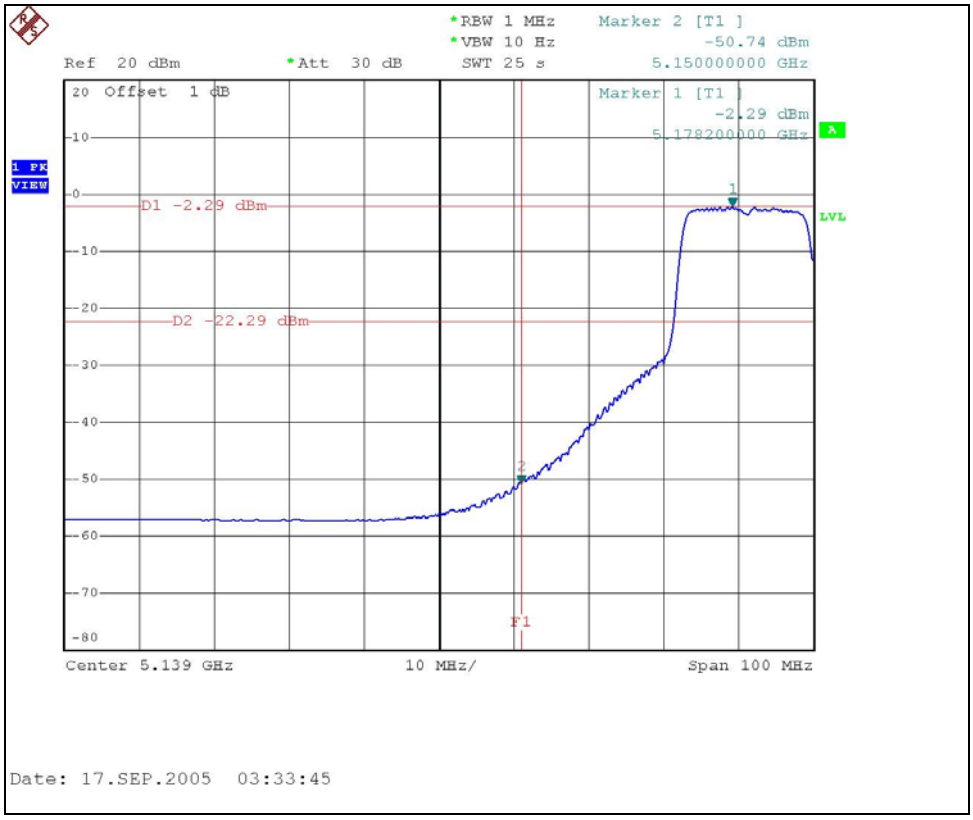
The band edge emission plot on the following second page shows 48.45dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 101.7dBuV/m (Average), so the maximum field strength in restrict band is 101.7-48.45=53.25dBuV/m which is under 54dBuV/m limit.

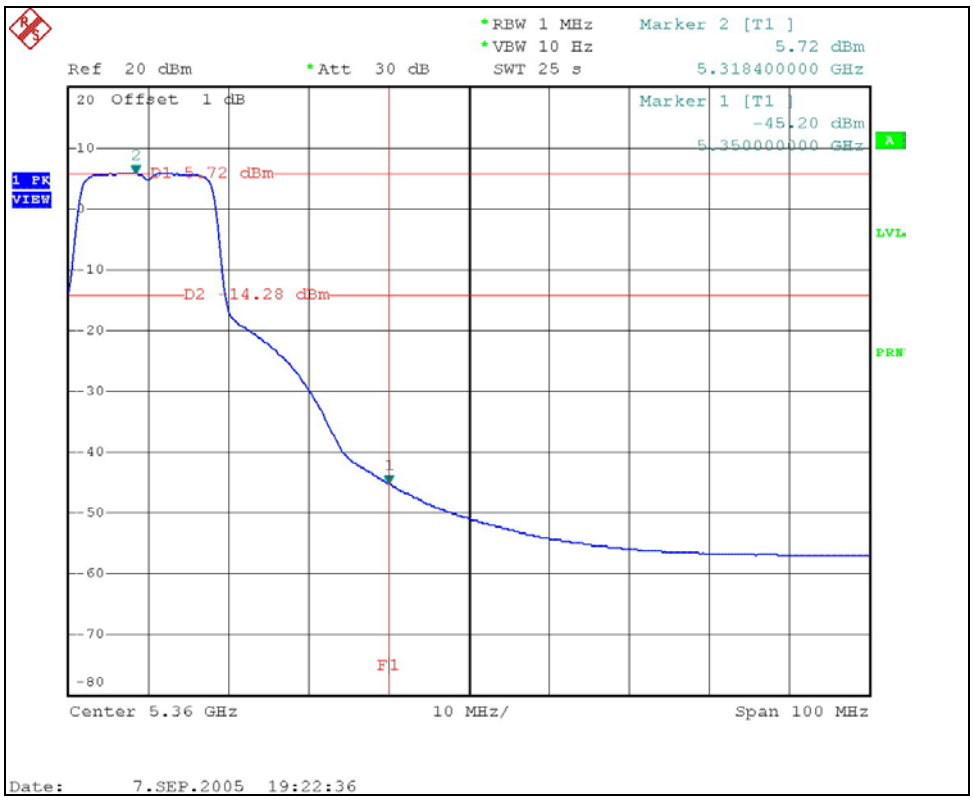
The band edge emission plot on the following second page shows 50.92dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 104.4dBuV/m (Average), so the maximum field strength in restrict band is 104.4-50.92=53.48dBuV/m which is under 54dBuV/m limit.

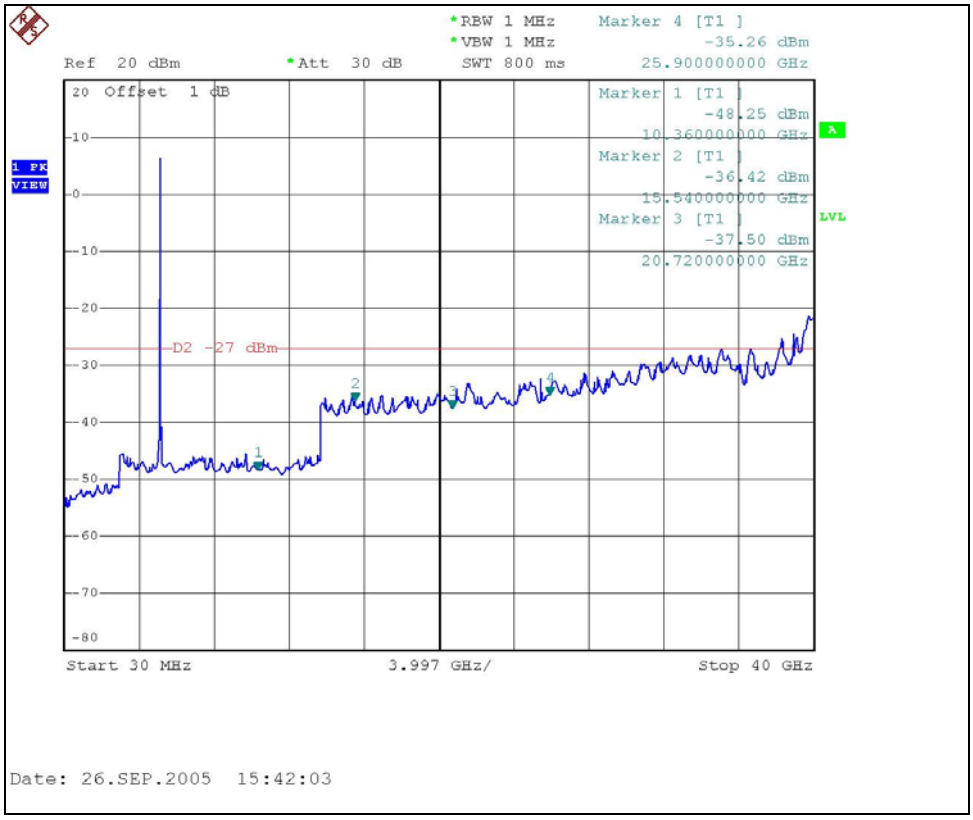
802.11a OFDM modulation

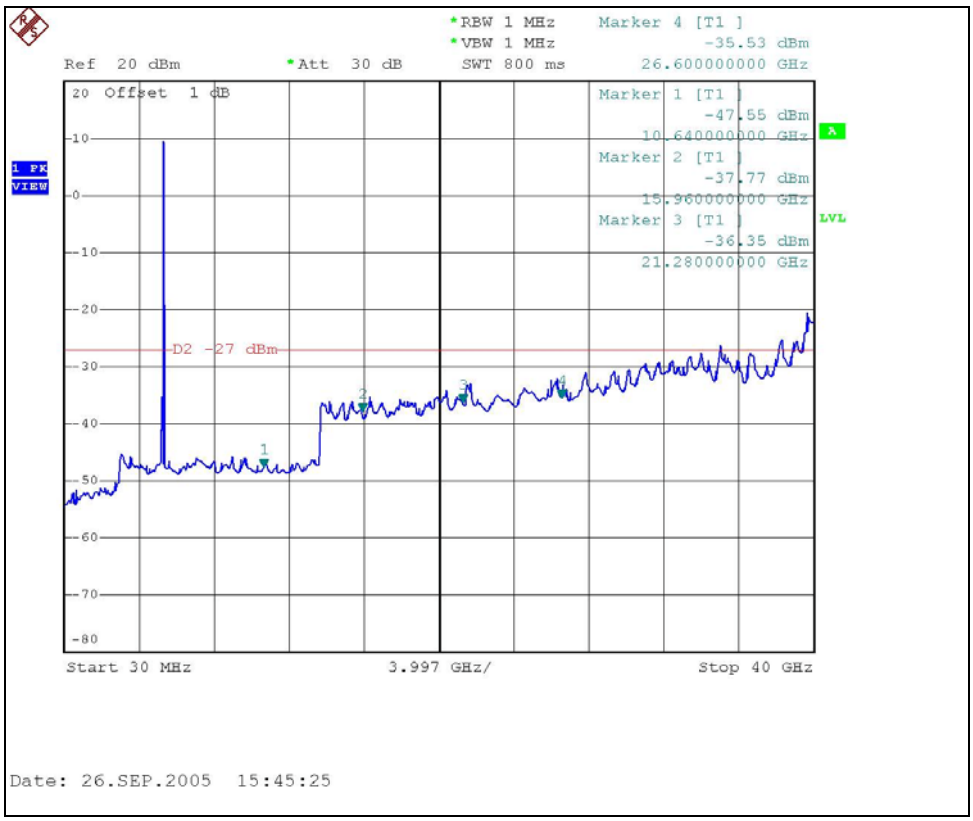





*RBW 1 MHz
*VBW 10 Hz
Ref 20 dBm
*Att 30 dB
SWT 25 s
Marker 2 [T1]
-50.74 dBm
5.150000000 GHz
Marker 1 [T1]
-2.29 dBm
5.178200000 GHz
20 Offset 1 dB
1 PK VIEW
D1 -2.29 dBm
D2 -22.29 dBm
LVL
F1
Center 5.139 GHz
10 MHz/
Span 100 MHz
Date: 17.SEP.2005 03:33:45


*RBW 1 MHz
*VBW 10 Hz
Ref 20 dBm
*Att 30 dB
SWT 25 s
Marker 2 [T1]
5.72 dBm
5.318400000 GHz
Marker 1 [T1]
-45.20 dBm
5.350000000 GHz
20 Offset 1 dB
1 PK VIEW
D1 5.72 dBm
D2 -14.28 dBm
LVL
PRN
F1
Center 5.36 GHz
10 MHz/
Span 100 MHz
Date: 7.SEP.2005 19:22:36


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 800 ms
Marker 4 [T1]
-35.26 dBm
25.900000000 GHz
20 Offset 1 dB
Marker 1 [T1]
-48.25 dBm
10.360000000 GHz
Marker 2 [T1]
-36.42 dBm
15.540000000 GHz
Marker 3 [T1]
-37.50 dBm
20.720000000 GHz
D2 -27 dBm
Start 30 MHz
3.997 GHz/
Stop 40 GHz
Date: 26.SEP.2005 15:42:03


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 800 ms
Marker 4 [T1]
-35.53 dBm
26.600000000 GHz
20 Offset 1 dB
Marker 1 [T1]
-47.55 dBm
10.640000000 GHz
Marker 2 [T1]
-37.77 dBm
15.960000000 GHz
Marker 3 [T1]
-36.35 dBm
21.280000000 GHz
D2 -27 dBm
Start 30 MHz
3.997 GHz/
Stop 40 GHz
Date: 26.SEP.2005 15:45:25

4.8 ANTENNA REQUIREMENT

4.8.1 STANDARD APPLICABLE

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

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

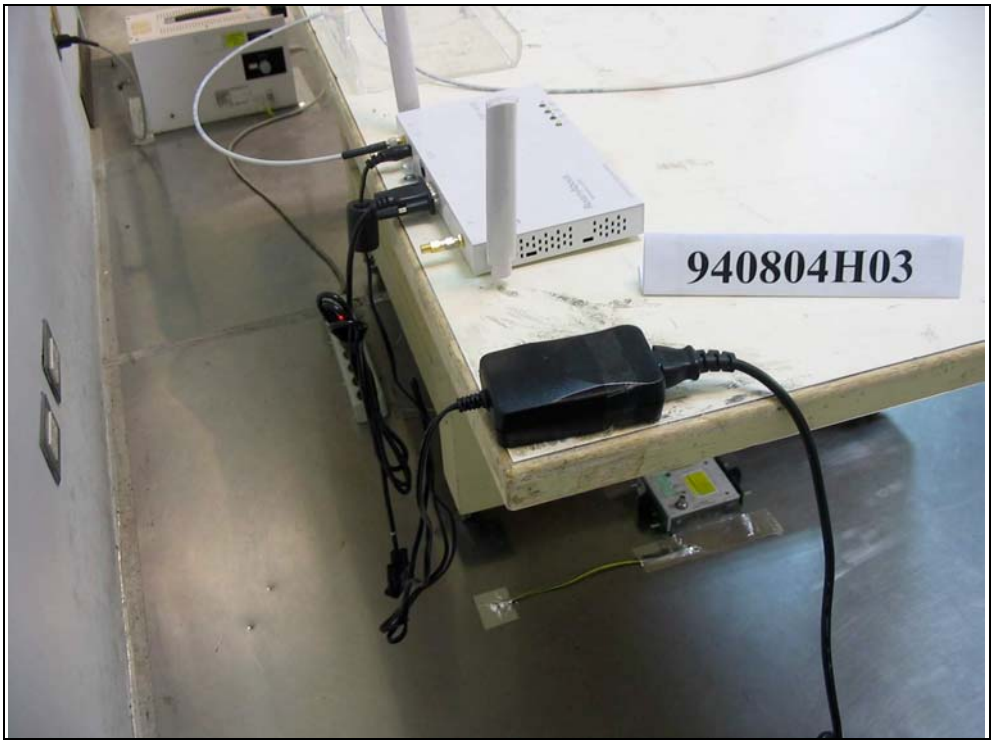
4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antennas used in this product are as following:

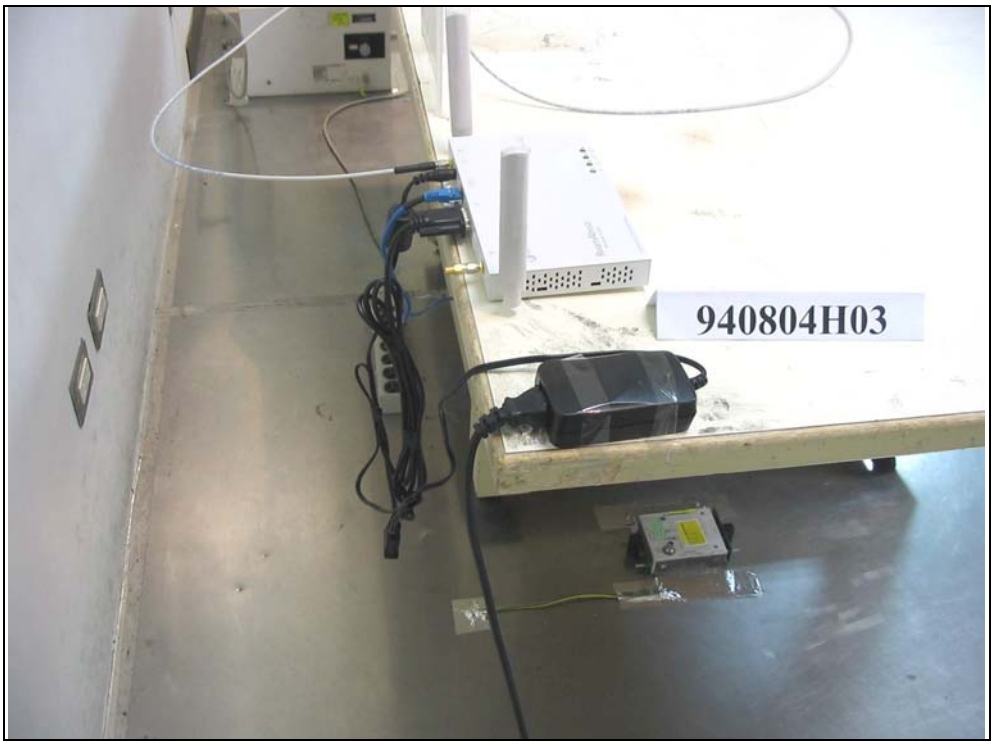
Item	SPEC No.	Model No.	Product Description	Antenna Gain	Remark	Connector
1	NA	RBT4K-AG-IA	2.4-4.9/5.8 GHz, 8ft of cable RPSMA Indoor Antenna.	4dBi	Omni	RPSMA

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST (With Adapter)



CONDUCTED EMISSION TEST (WITH POE)



RADIATED EMISSION TEST (Antenna: RBT4K-AG-IA + Adapter)

RADIATED EMISSION TEST (Antenna: RBT4K-AG-IA + POE)

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

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

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

APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.