FCC TEST REPORT (15.407)

REPORT NO.:	RF940120A01
MODEL NO.:	R15D
RECEIVED:	Jan. 20, 2005
TESTED:	Jan. 22 ~ 27, 2005
ISSUED:	April 4, 2005

APPLICANT:	TWINHEAD INTERNATIONAL CORP.
ADDRESS:	10F, No. 550, Rueiguang Rd., Neihu Chiu, Taipei, Taiwan 114, R.O.C.

ISSUED BY:	Advance Data Technology Corporation
LAB LOCATION:	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

ACCREDITED
No. 2177-01

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1. CERTIFICATION

PRODUCT:	Notebook PC
BRAND NAME:	Twinhead
MODEL NO.:	R15D
APPLICANT:	TWINHEAD INTERNATIONAL CORP.
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Jan. 22 ~ 27, 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 : Annie Chang , **DATE:** April 4, 2005
(Annie Chang)

TECHNICAL ACCEPTANCE : , **DATE:** April 4, 2005
Responsible for EMI
(Jun Wu)

APPROVED BY : , **DATE:** April 4, 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 –11.05dB at 2.826MHz
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 –3.08dB at 716.19MHz
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 a Notebook PC (including wireless LAN card).
2. The EUT as operates in 2.412~2.462GHz, 5.150~5.350GHz and 5.725~5.850GHz frequencies band. This test report was recorded the RF parameters including 5.150~5.350GHz. For the2.412~2.462GHz and 5.725~5.850GHz RF parameters was recorded in another test report.

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Uncertainty
Conducted emissions	2.45 dB
Radiated emissions	3.74 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Notebook PC
MODEL NO.	R15D
POWER SUPPLY	20Vdc from power adapter
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
OUTPUT POWER	802.11b: 40.365mW 802.11g: 25.293mW 802.11a: 26.062mW for 5.150 ~ 5.350GHz 802.11a: 25.003mW for 5.725 ~ 5.850GHz
Antenna Type	PIFA antenna (UFL connector) For 2.412 ~ 2.462GHz frequency band: Antenna gain: 2.27dBi gain For 5.150 ~ 5.350GHz frequency band: Antenna gain: –2.35dBi gain For 5.725 ~ 5.850GHz frequency band: Antenna gain: –1.31dBi gain
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	N/A

NOTE:

1. The EUT is a Notebook PC (including wireless LAN card) which operates in both of the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.

2. The Notebook PC was powered by the following adapter:

Brand	LI SHIN
Model	LSE9802A2060
AC I/P	100-240V, 50/60Hz 1.5A
DC O/P	20V, 3.0A 60W MAX
Power Line	Non-shielded AC 1.5m, Shielded DC 1.5m with one core

3. 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.

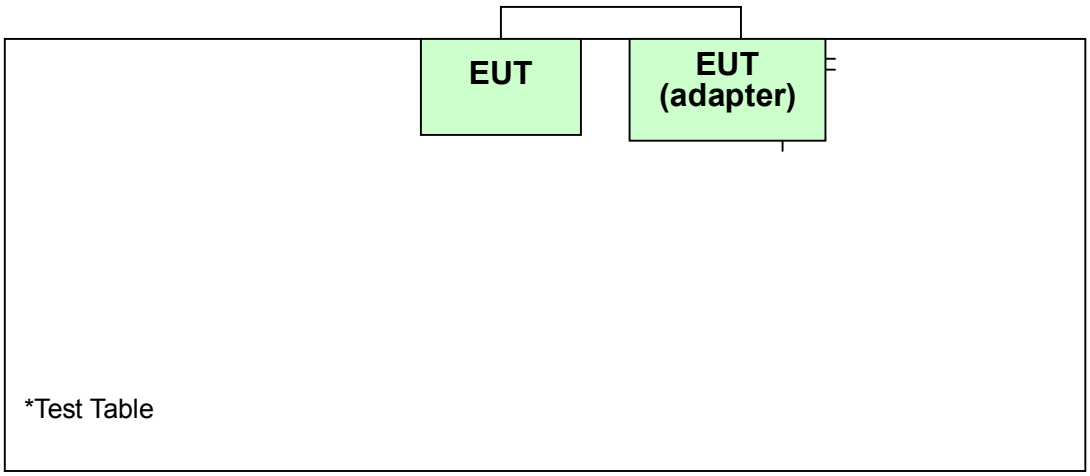
3.2 DESCRIPTION OF TEST MODES

Operated in frequency range 5150 ~ 5250MHz, 5250MHz ~ 5350MHz:

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:

Applicable to				Description
PLC	RE<1G	RE≥1G	APCM	
x	x	x	x	

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	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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
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.

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, 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 Notebook PC (including wireless LAN card). 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 its power adapter.

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 (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS 30	828765/002	July 4, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	835239/001	Mar. 31, 2005
LISN With Adapter (for EUT)	AD10	C09Ada-001	Mar. 31, 2005
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	835239/002	Apr. 18, 2005
ROHDE & SCHWARZ 4-wire ISN	ENY41	935154/007	Apr. 20, 2005
ROHDE & SCHWARZ 2-wire ISN	ENY22	833823/026	Apr. 20, 2005
Software	ADT_Cond_V7.3.2	NA	NA
Software	ADT_ISN_V7.3.2	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	May 9, 2005
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 17, 2005

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. 9.
3. The VCCI Site Registration No. C-1312.

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.

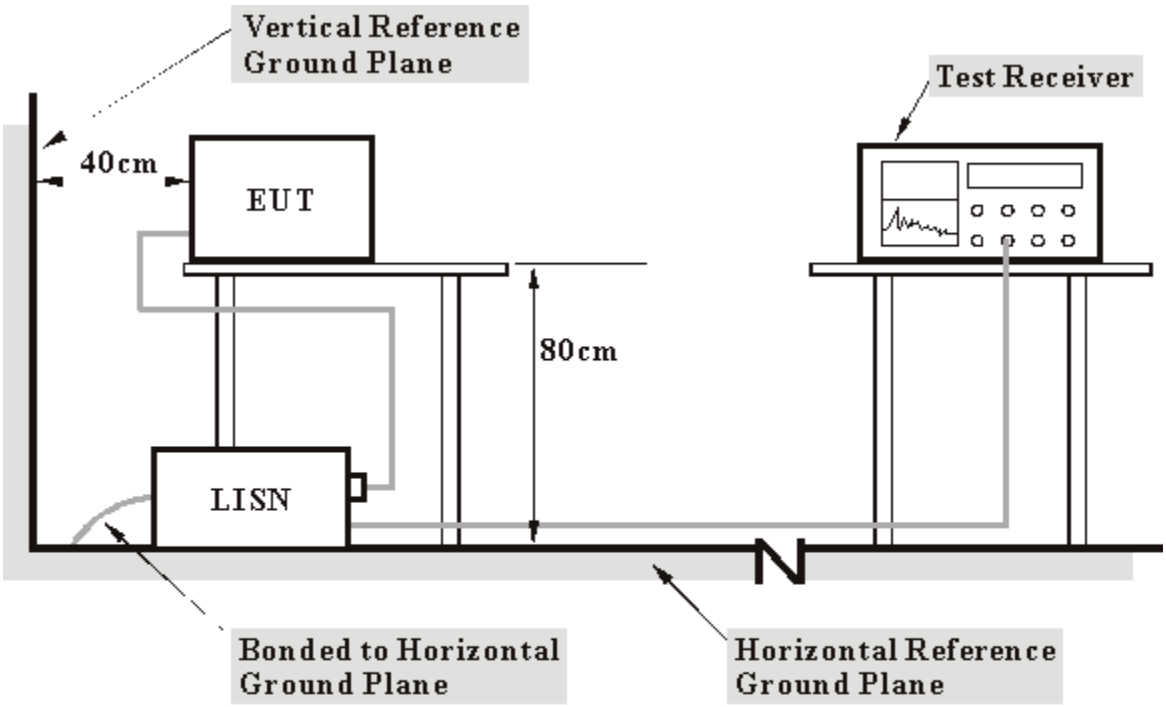
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.6 EUT OPERATING CONDITIONS

a. Turned on the power of all equipment.
b. EUT ran a test program to enable to transmit/receive condition continuously at specific channel frequency.
c. EUT sent “H” messages to its screen.
d. Step c was repeated.

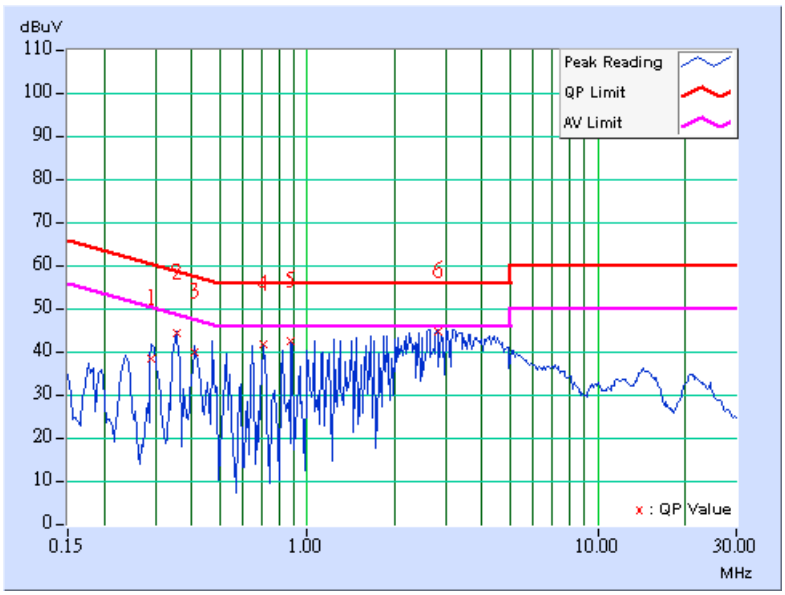
4.1.7 TEST RESULTS

Conducted Worst Case Data

EUT	Notebook PC	**MODEL NO.**	R15D
CHANNEL	5	**6dB BANDWIDTH**	9kHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 1004 hPa	**TESTED BY**	Jamison Chan

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	0.291	0.20	38.45	-	38.65	-	60.50	50.50	-21.85	-
2	0.354	0.20	44.20	-	44.40	-	58.87	48.87	-14.47	-
3	0.411	0.20	39.78	-	39.98	-	57.63	47.63	-17.65	-
4	0.708	0.20	41.78	-	41.98	-	56.00	46.00	-14.02	-
5	0.882	0.20	42.44	-	42.64	-	56.00	46.00	-13.36	-
6	**2.826**	**0.24**	**44.71**	**-**	**44.95**	**-**	**56.00**	**46.00**	**-11.05**	**-**

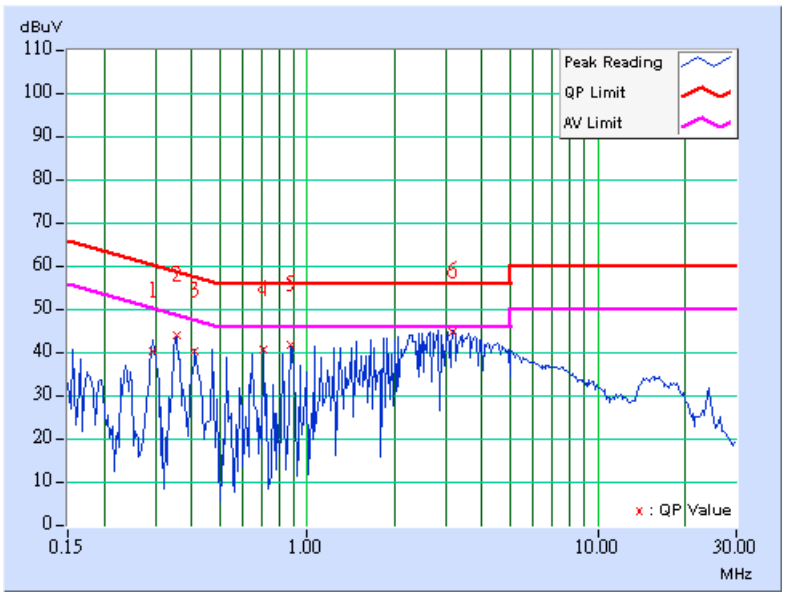
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Notebook PC	**MODEL NO.**	R15D
CHANNEL	5	**6dB BANDWIDTH**	9kHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 1004 hPa	**TESTED BY**	Jamison Chan

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	0.294	0.20	40.13	-	40.33	-	60.41	50.41	-20.08	-
2	0.354	0.20	43.86	-	44.06	-	58.87	48.87	-14.81	-
3	0.411	0.20	40.18	-	40.38	-	57.63	47.63	-17.25	-
4	0.708	0.20	40.55	-	40.75	-	56.00	46.00	-15.25	-
5	0.882	0.20	41.48	-	41.68	-	56.00	46.00	-14.32	-
6	3.180	0.30	44.46	-	44.76	-	56.00	46.00	-11.24	-

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
HP Spectrum Analyzer	8590L	3544A01176	May. 31, 2005
HP Preamplifier	8447D	2944A08485	Apr. 26, 2005
HP Preamplifier	8449B	3008A01924	Sep. 19, 2005
HP Preamplifier	8449B	3008A01638	Sep. 30, 2005
SCHAFFNER TEST RECEIVER	SCR 3501	408	Jan. 03, 2006
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 03, 2006
SCHWARZBECK Tunable Dipole Antenna SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	NA 977	Oct. 29, 2005
CHASE BILOG Antenna	CBL6112A	2221	Oct 19, 2005
EMCO Horn Antenna	3115	6714	Oct. 28, 2005
EMCO Horn Antenna	3115	9312-4192	Feb. 28, 2006
EMCO Turn Table	1060	1115	NA
CHANCE Tower	CM-AT40	CM-A010	NA
Software	ADT_Radiated_V7.5.14	NA	NA
ADT RF Switches	EM-H-01-1	1002	Dec. 02, 2005
TIMES RF cable	LMR-600	CABLE-ST5-01	Dec. 02, 2005

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 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. 5.
4. The VCCI Site Registration No. R-1039.

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 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.

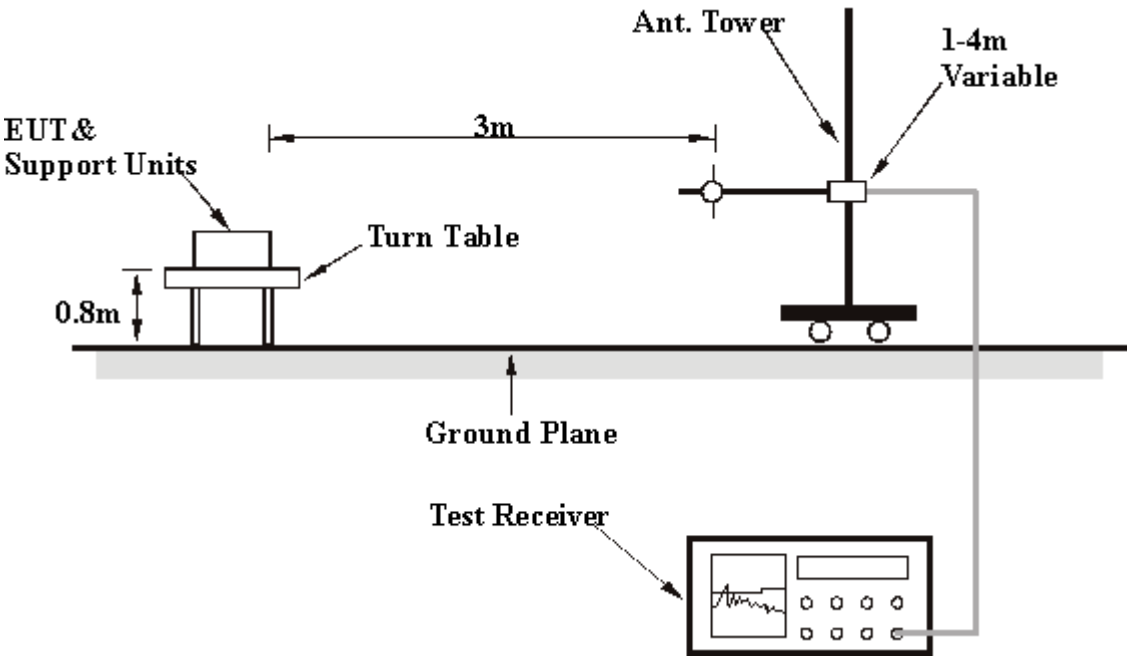
NOTE:

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

EUT	Notebook PC	MODEL NO.	R15D
CHANNEL	5	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	21 deg. C, 61% RH, 1004 hPa	TESTED BY	Jamison Chan

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	222.44	42.34 QP	46.00	-3.66	1.00 H	136	30.65	11.69
2	325.47	40.83 QP	46.00	-5.17	1.00 H	91	24.74	16.09
3	391.56	41.99 QP	46.00	-4.01	1.00 H	67	23.91	18.08
4	455.71	42.12 QP	46.00	-3.88	1.00 H	109	22.96	19.16
5	552.91	36.36 QP	46.00	-9.64	2.01 H	111	15.03	21.33
6	585.95	42.00 QP	46.00	-4.00	3.00 H	61	19.90	22.10
7	685.09	40.12 QP	46.00	-5.88	1.23 H	211	16.87	23.25
8	716.19	41.69 QP	46.00	-4.31	1.03 H	175	18.08	23.61
9	836.71	37.13 QP	46.00	-8.87	1.00 H	253	12.55	24.58

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	228.28	41.20 QP	46.00	-4.80	2.00 V	328	29.15	12.05
2	358.52	42.05 QP	46.00	-3.95	2.00 V	10	25.21	16.84
3	455.71	42.61 QP	46.00	-3.39	1.25 V	355	23.45	19.16
4	552.91	40.55 QP	46.00	-5.45	1.00 V	190	19.22	21.33
5	652.04	42.81 QP	46.00	-3.19	1.25 V	127	19.96	22.85
6	**716.19**	**42.92 QP**	**46.00**	**-3.08**	**1.75 V**	**58**	**19.31**	**23.61**
7	782.28	41.06 QP	46.00	-4.94	1.75 V	52	16.88	24.18

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	Notebook PC	**MODEL**	R15D
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	21 deg. C, 61% RH, 1004 hPa	**TESTED BY**	Jamison Chan

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	46.27 PK	74.00	-27.73	1.48 H	177	7.67	38.60
1	#5150.00	36.01 AV	54.00	-17.99	1.48 H	177	-2.59	38.60
2	*5180.00	98.12 PK			1.48 H	177	59.46	38.66
2	*5180.00	87.86 AV			1.48 H	177	49.20	38.66
3	10360.00	54.79 PK	74.00	-19.21	1.23 H	185	5.37	49.42
3	10360.00	44.60 AV	54.00	-9.40	1.23 H	185	-4.82	49.42

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	44.50 PK	74.00	-29.50	1.00 V	293	5.90	38.60
1	#5150.00	33.51 AV	54.00	-20.49	1.00 V	293	-5.09	38.60
2	*5180.00	96.35 PK			1.00 V	293	57.69	38.66
2	*5180.00	85.36 AV			1.00 V	293	46.70	38.66
3	10360.00	56.36 PK	74.00	-17.64	1.01 V	308	6.94	49.42
3	10360.00	45.12 AV	54.00	-8.88	1.01 V	308	-4.30	49.42

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	Notebook PC	MODEL	R15D
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	21 deg. C, 61% RH, 1004 hPa	TESTED BY	Jamison Chan

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	99.71 PK			2.31 H	176	60.94	38.77
1	*5240.00	89.04 AV			2.31 H	176	50.27	38.77
2	10480.00	56.05 PK	74.00	-17.95	1.98 H	184	6.33	49.72
2	10480.00	45.24 AV	54.00	-8.76	1.98 H	184	-4.48	49.72

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	97.94 PK			1.02 V	303	59.17	38.77
1	*5240.00	87.05 AV			1.02 V	303	48.28	38.77
2	10480.00	55.94 PK	74.00	-18.06	1.11 V	291	6.22	49.72
2	10480.00	46.40 AV	54.00	-7.60	1.11 V	291	-3.32	49.72

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

EUT	Notebook PC	MODEL	R15D
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	21 deg. C, 61% RH, 1004 hPa	TESTED BY	Jamison Chan

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	*5260.00	103.09 PK			1.00 H	335	64.27	38.82
1	*5260.00	89.80 AV			1.00 H	335	50.98	38.82
2	10520.00	55.42 PK	74.00	-18.58	1.02 H	289	5.63	49.79
2	10520.00	45.03 AV	54.00	-8.97	1.02 H	289	-4.76	49.79

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	*5260.00	101.55 PK			1.03 V	301	62.73	38.82
1	*5260.00	90.62 AV			1.03 V	301	51.80	38.82
2	10520.00	57.03 PK	74.00	-16.97	1.07 V	284	7.24	49.79
2	10520.00	45.90 AV	54.00	-8.10	1.07 V	284	-3.89	49.79

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

EUT	Notebook PC	MODEL	R15D
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	21 deg. C, 61% RH, 1004 hPa	TESTED BY	Jamison Chan

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	*5320.00	102.34 PK			1.86 H	175	63.41	38.93
1	*5320.00	92.42 AV			1.86 H	175	53.49	38.93
2	#5350.00	48.79 PK	74.00	-25.21	1.86 H	175	9.81	38.98
2	#5350.00	38.87 AV	54.00	-15.13	1.86 H	175	-0.11	38.98
3	10640.00	56.08 PK	74.00	-17.92	1.56 H	185	6.18	49.90
3	10640.00	45.82 AV	54.00	-8.18	1.56 H	185	-4.08	49.90

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	*5320.00	99.34 PK			1.00 V	357	60.41	38.93
1	*5320.00	89.26 AV			1.00 V	357	50.33	38.93
2	#5350.00	45.79 PK	74.00	-28.21	1.00 V	357	6.81	38.98
2	#5350.00	35.71 AV	54.00	-18.29	1.00 V	357	-3.27	38.98
3	10640.00	56.48 PK	74.00	-17.52	1.11 V	215	6.58	49.90
3	10640.00	46.82 AV	54.00	-7.18	1.11 V	215	-3.08	49.90

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
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Mar 18. 2006
ROHDE & SCHWARZ Signal Generator	SMR40	100231	Mar. 9. 2006
Tektronix Oscilloscope	TDS1012	C019167	Feb. 01. 2006
Narda Detector	4503A	FSCM99899	NA

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

4.3.3 TEST PROCEDURE

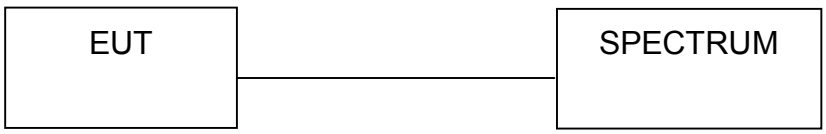
1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 3MHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

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

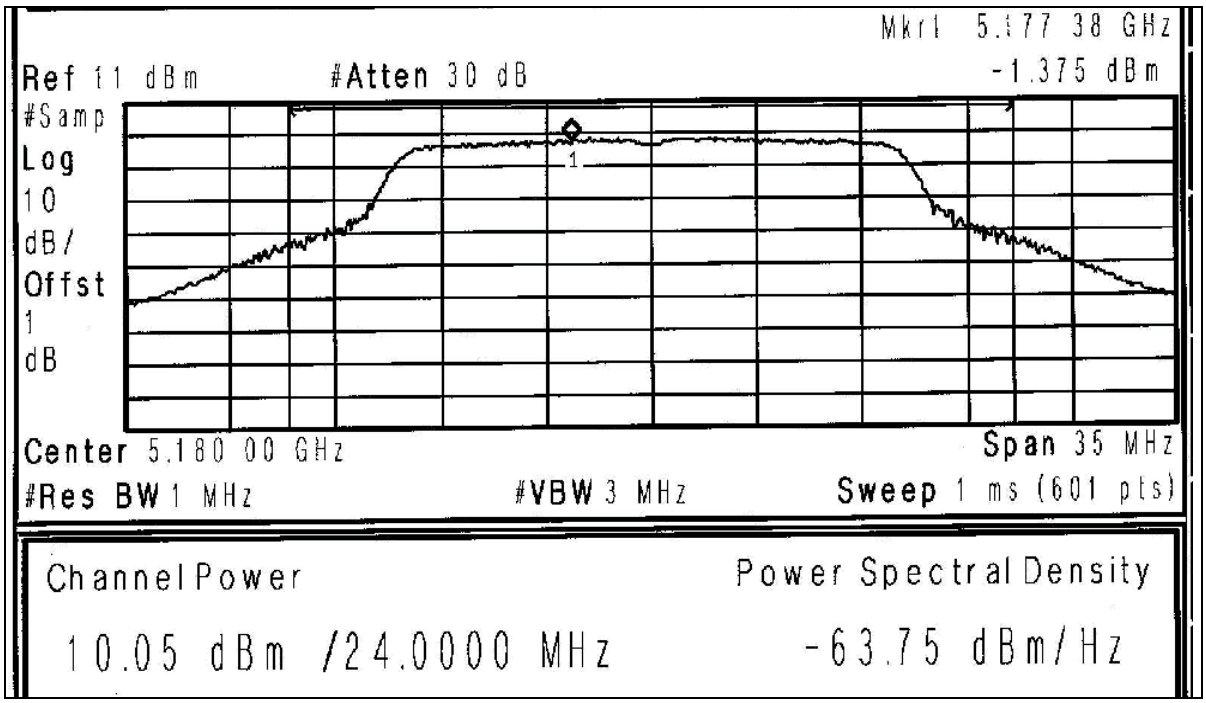
EUT	Notebook PC	MODEL	R15D
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 1004 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	10.116	10.05	17.00	23.92	PASS
4	5240	11.041	10.43	17.00	23.84	PASS
5	5260	26.062	14.16	24.00	23.60	PASS
8	5320	24.491	13.89	24.00	23.84	PASS

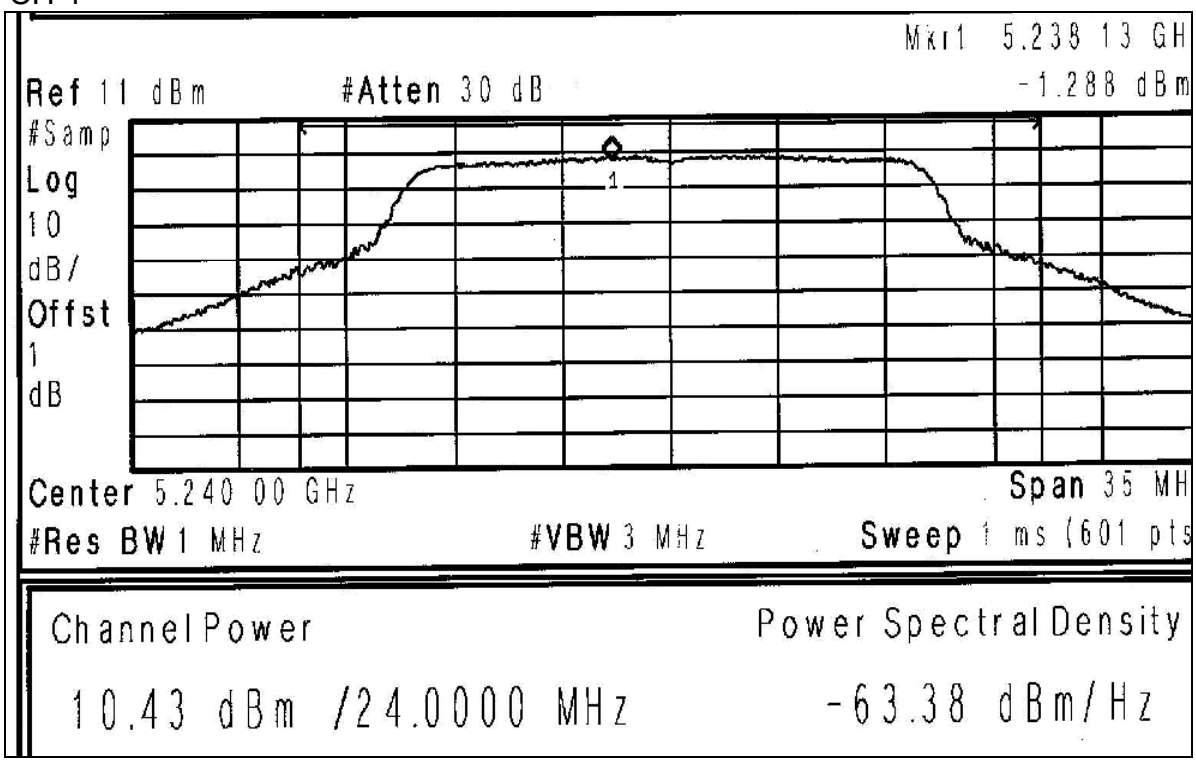
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:

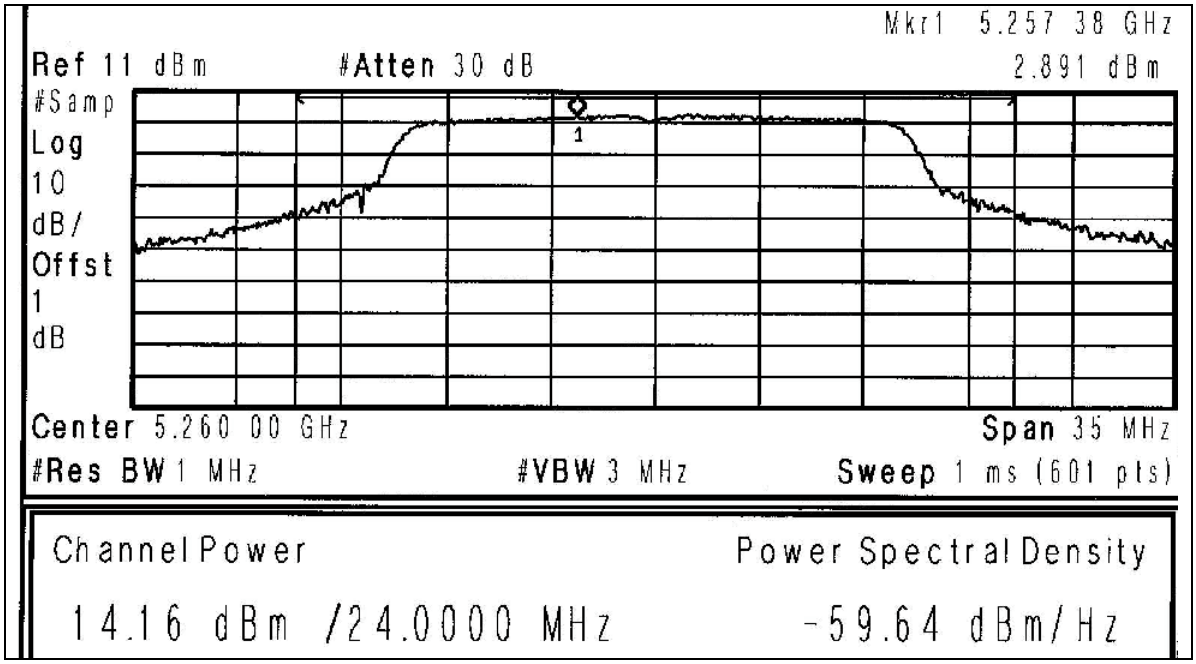
CH 1



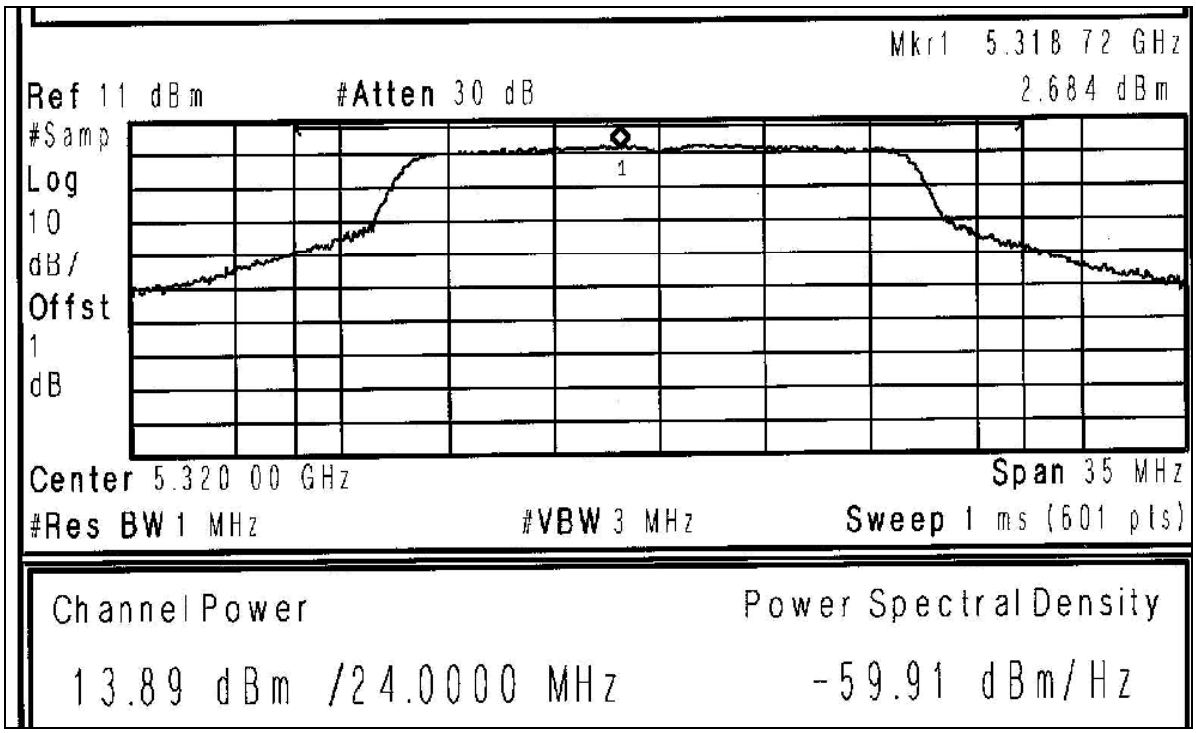
CH 4



CH 5

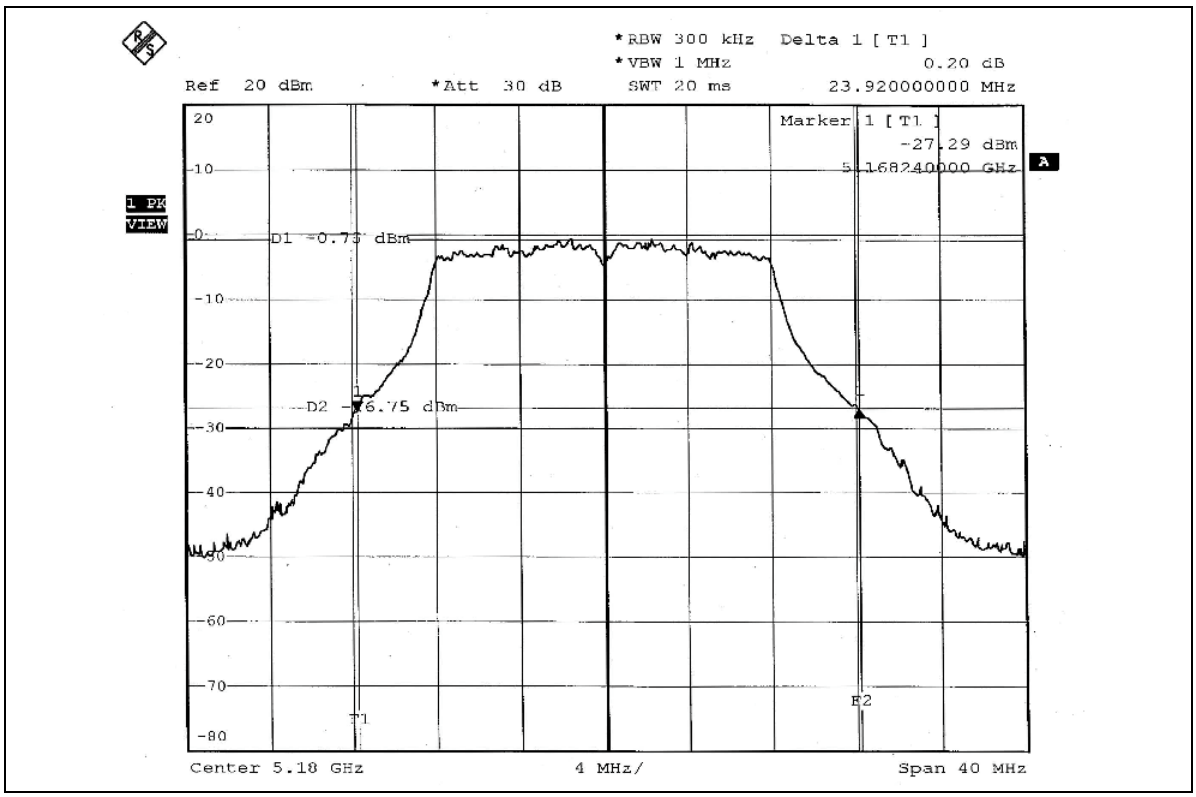

Mkr1 5.257 38 GHz
Ref 11 dBm
#Atten 30 dB
2.891 dBm
#Samp
Log
10
dB/
Offst
1
dB
Center 5.260 00 GHz
Span 35 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 1 ms (601 pts)
Channel Power
14.16 dBm /24.0000 MHz
Power Spectral Density
-59.64 dBm/Hz

CH 8

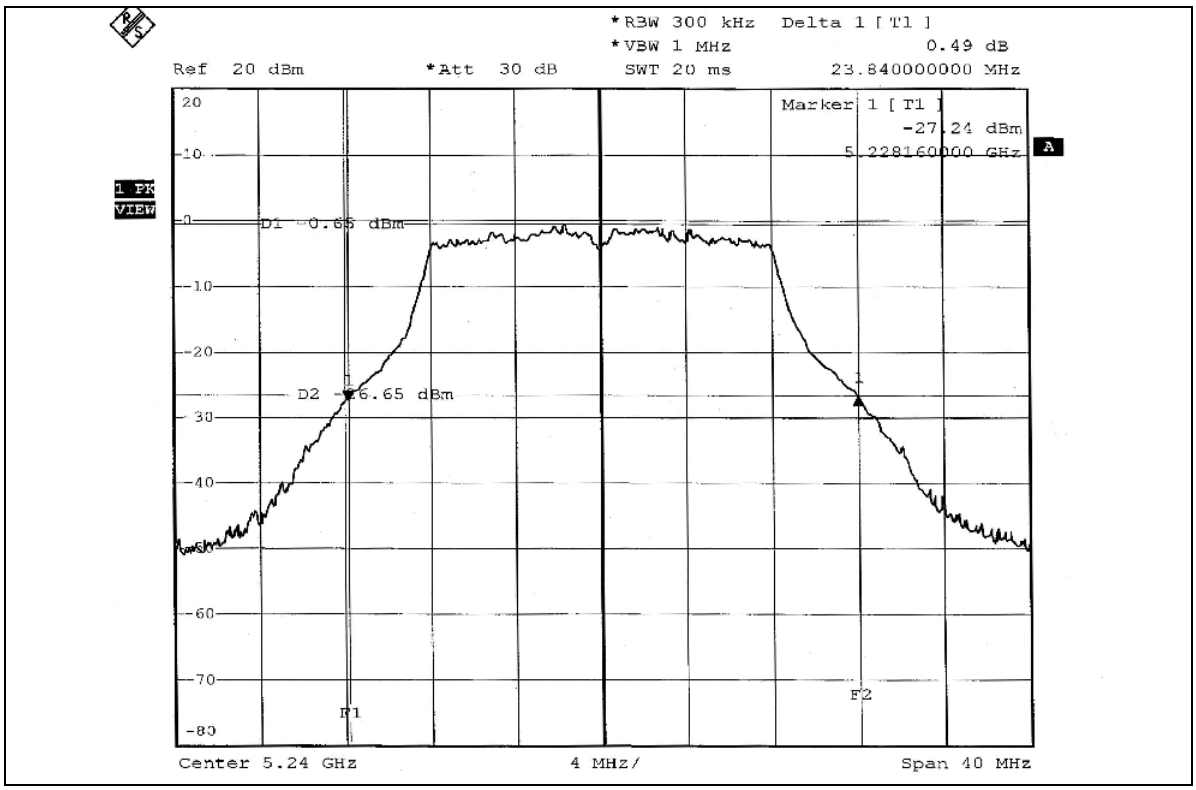

Mkr1 5.318 72 GHz
Ref 11 dBm
#Atten 30 dB
2.684 dBm
#Samp
Log
10
dB/
Offst
1
dB
Center 5.320 00 GHz
Span 35 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 1 ms (601 pts)
Channel Power
13.89 dBm /24.0000 MHz
Power Spectral Density
-59.91 dBm/Hz

26dB Occupied Bandwidth:

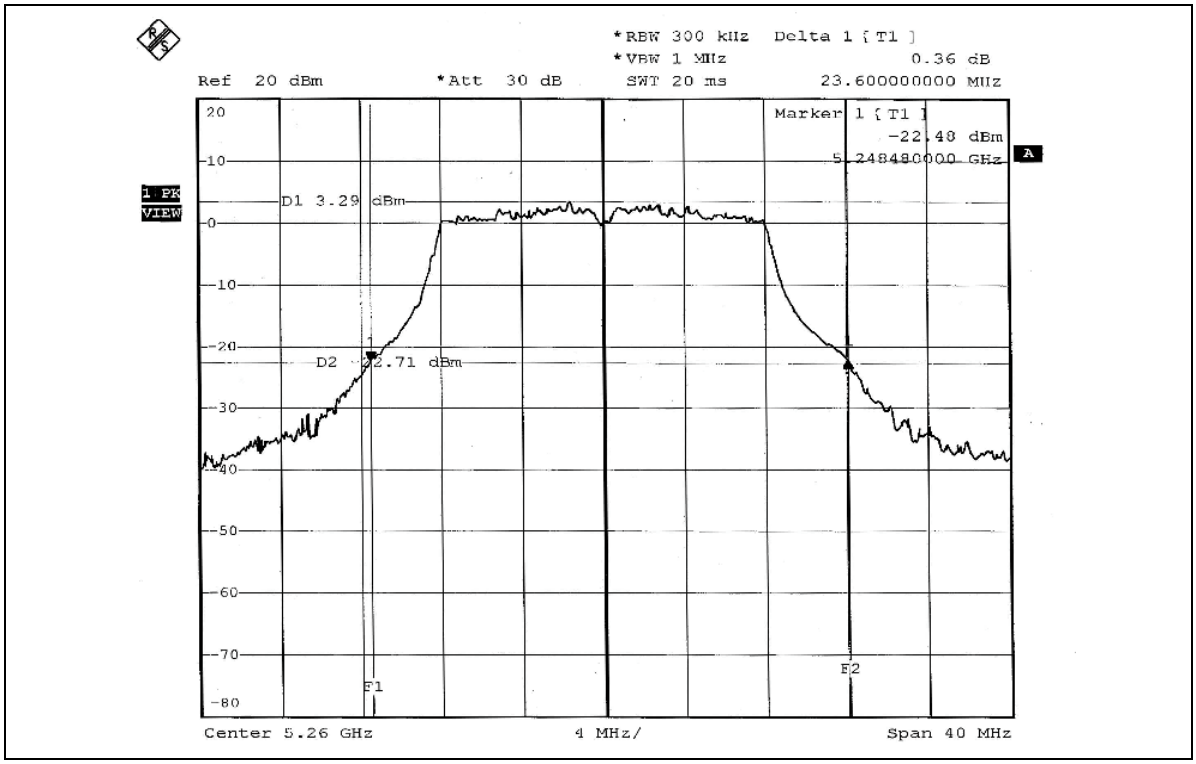
CH 1



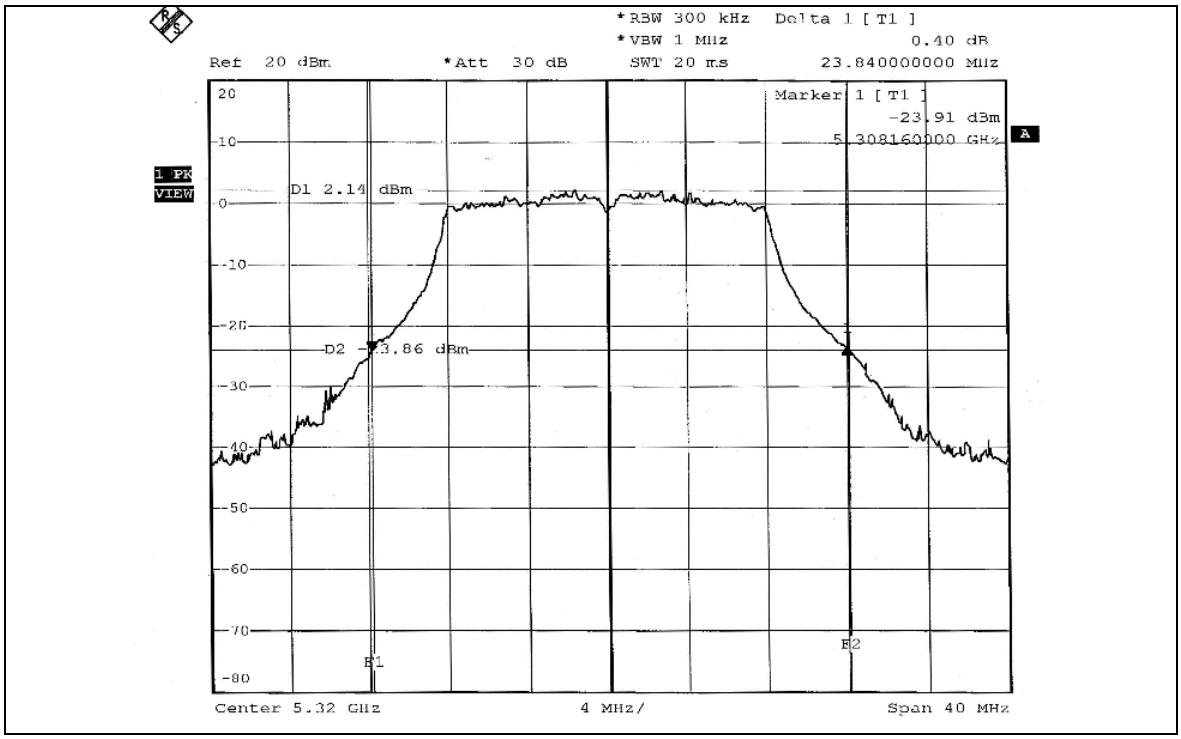
CH 4



CH 5


*RBW 300 kHz
*VBW 1 MHz
SWT 20 ms
Delta 1 [T1]
0.36 dB
23.600000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-22.48 dBm
5.248480000 GHz
1 PK
VIEW
D1 3.29 dBm
D2 -22.71 dBm
F1
F2
Center 5.26 GHz
4 MHz/
Span 40 MHz

CH 8


*RBW 300 kHz
*VBW 1 MHz
SWT 20 ms
Delta 1 [T1]
0.40 dB
23.840000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T1]
-23.91 dBm
5.308160000 GHz
1 PK
VIEW
D1 2.14 dBm
D2 -23.86 dBm
F1
F2
Center 5.32 GHz
4 MHz/
Span 40 MHz

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	FSP 40	100036	Mar 18. 2006

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

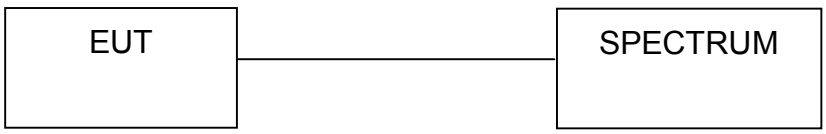
4.4.3 TEST PROCEDURE

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.

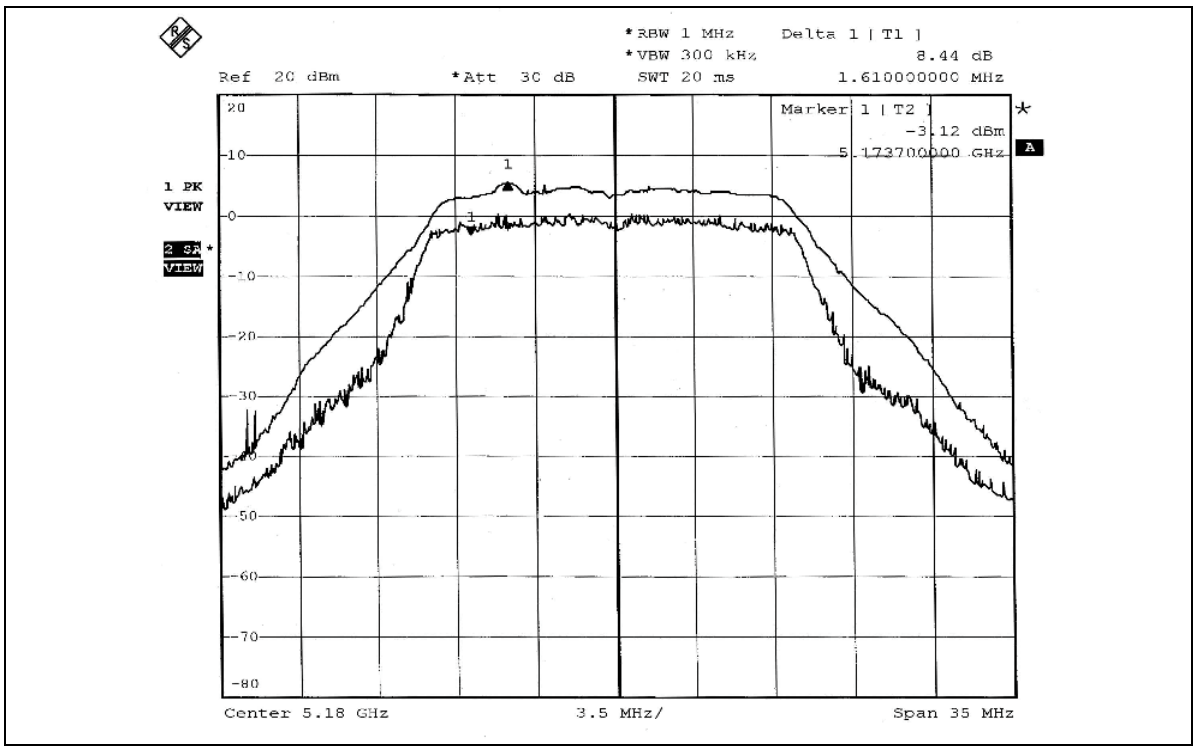
4.4.7 TEST RESULTS

802.11a OFDM modulation

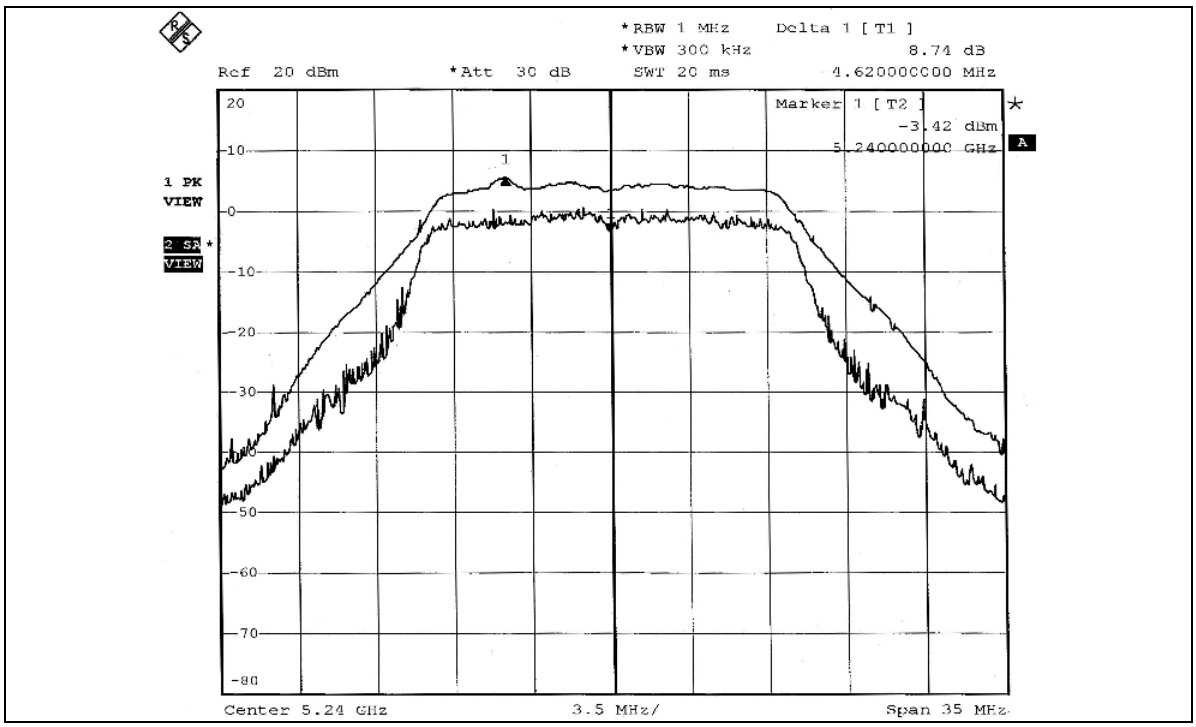
EUT	Notebook PC	**MODEL**	R15D
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 1004 hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	8.44	13	PASS
4	5240	8.74	13	PASS
5	5260	7.97	13	PASS
8	5320	8.10	13	PASS

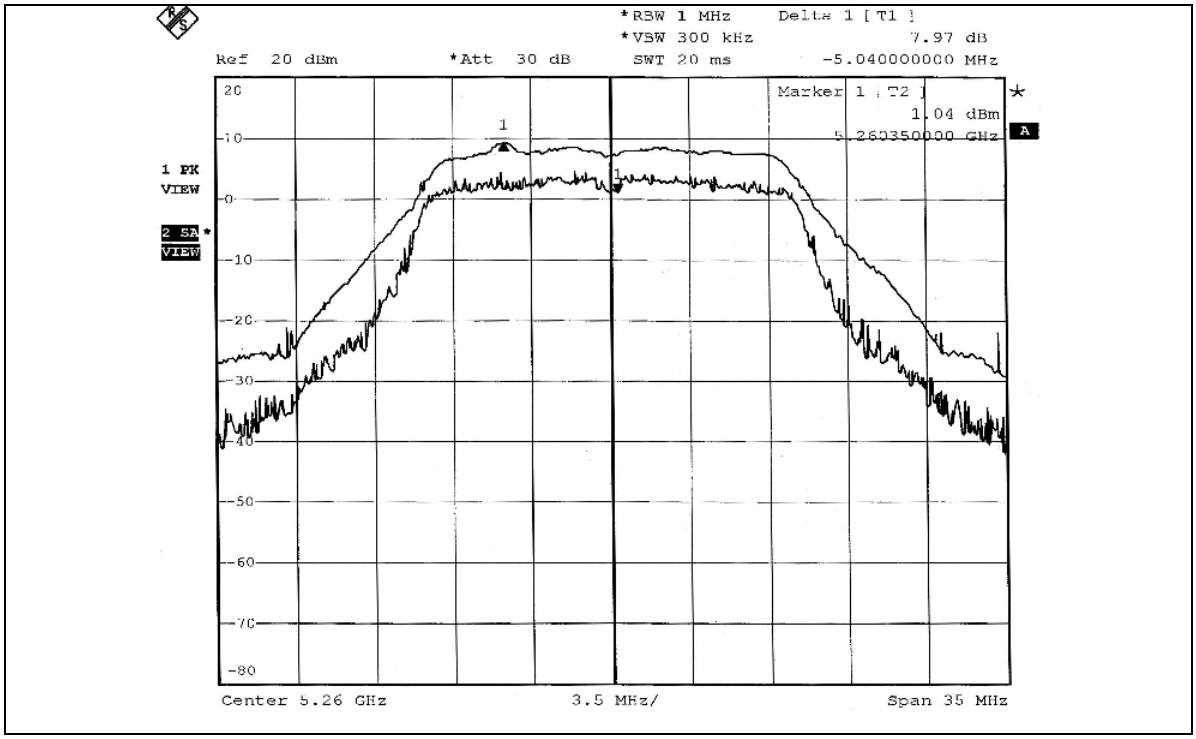
CH 1


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
8.44 dB
1.610000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T2]
-3.12 dBm
5.173700000 GHz
1 PK
VIEW
2 SR
VIEW
Center 5.18 GHz
3.5 MHz/
Span 35 MHz

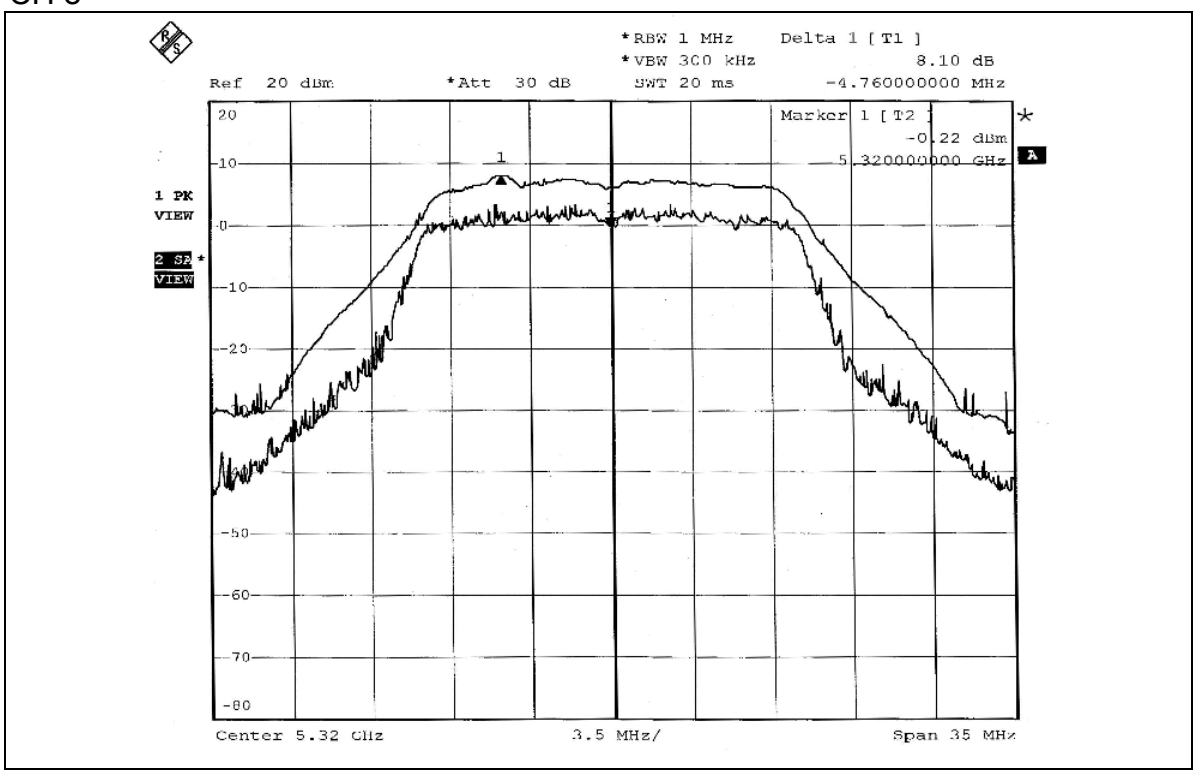
CH 4


*RBW 1 MHz
*VBW 300 kHz
SWT 20 ms
Delta 1 [T1]
8.74 dB
4.620000000 MHz
Ref 20 dBm
*Att 30 dB
Marker 1 [T2]
-3.42 dBm
5.240000000 GHz
1 PK
VIEW
2 SR
VIEW
Center 5.24 GHz
3.5 MHz/
Span 35 MHz

CH 5


*RBW 1 MHz
*VBW 300 kHz
Ref 20 dBm
*Att 30 dB
SWT 20 ms
Delta 1 [T1]
7.97 dB
-5.040000000 MHz
Marker 1 [T2]
1.04 dBm
5.260350000 GHz
1 PK
VIEW
2 SA
VIEW
Center 5.26 GHz
3.5 MHz/
Span 35 MHz

CH 8


*RBW 1 MHz
*VBW 300 kHz
Ref 20 dBm
*Att 30 dB
SWT 20 ms
Delta 1 [T1]
8.10 dB
-4.760000000 MHz
Marker 1 [T2]
-0.22 dBm
5.320000000 GHz
1 PK
VIEW
2 SA
VIEW
Center 5.32 GHz
3.5 MHz/
Span 35 MHz

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	FSP 40	100036	Mar 18. 2006

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

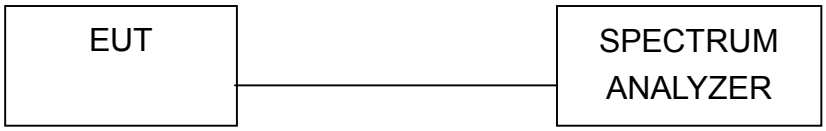
4.5.3 TEST PROCEDURES

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

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

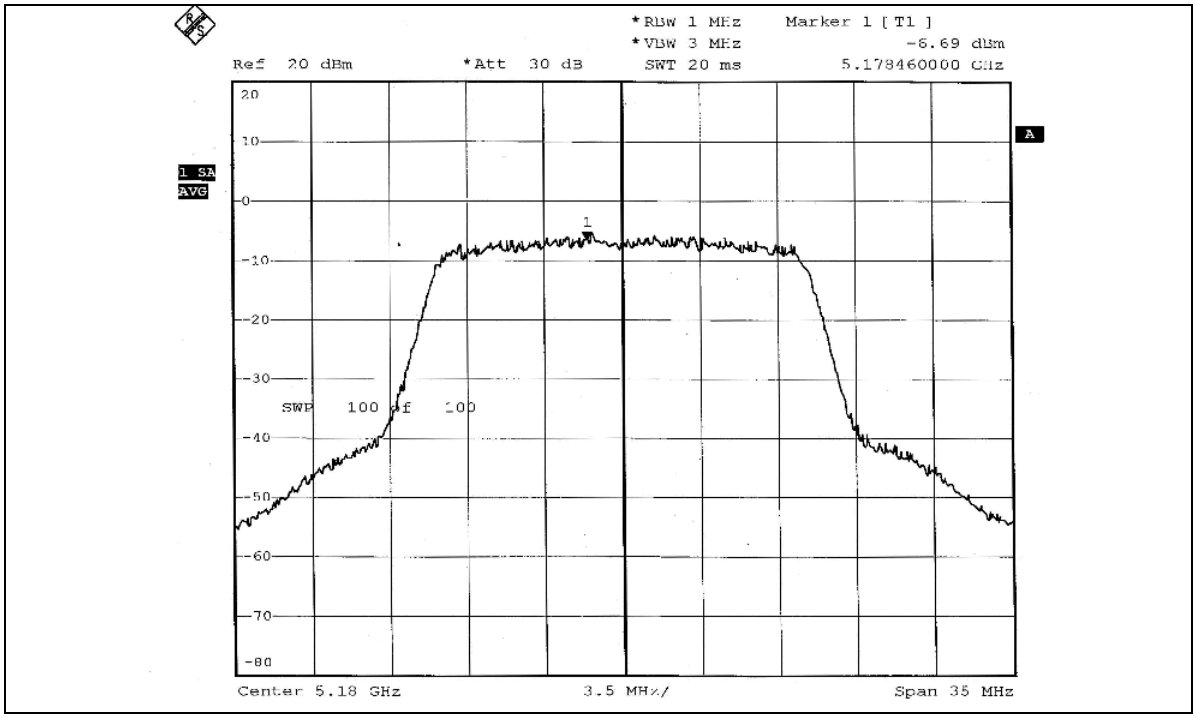
4.5.7 TEST RESULTS

802.11a OFDM modulation

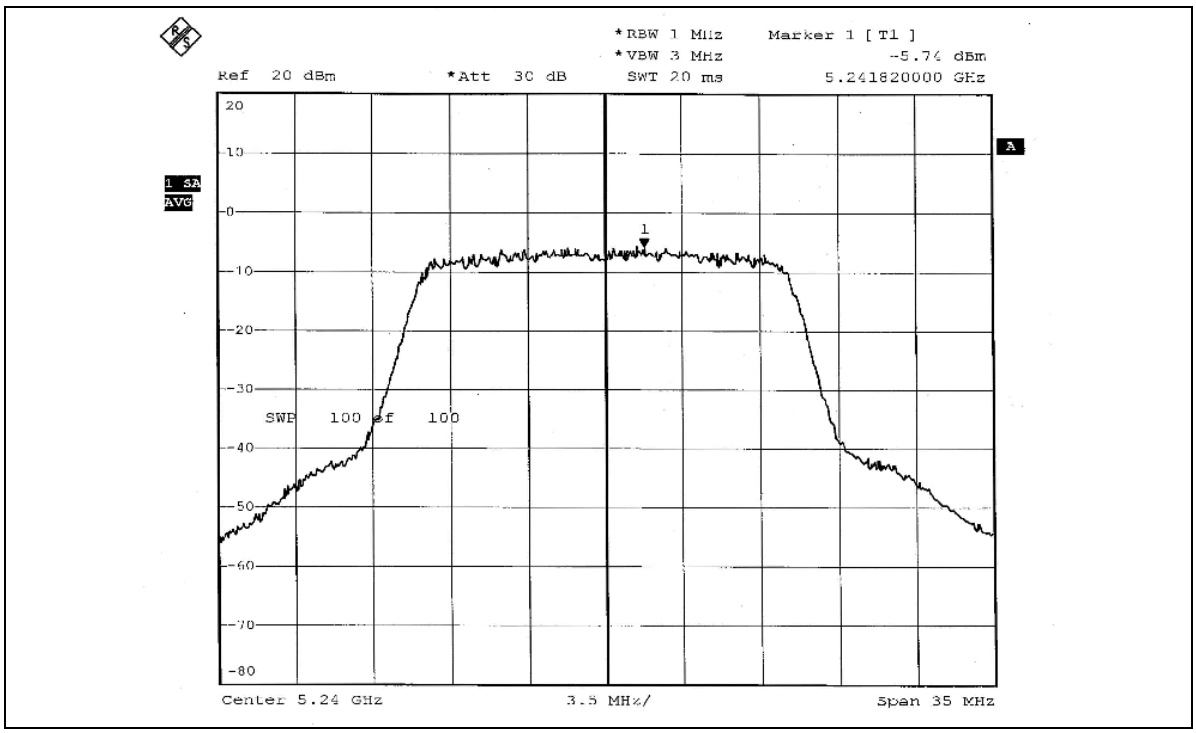
EUT	Notebook PC	MODEL	R15D
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 1004 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Jamison Chan		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-6.69	4	PASS
4	5240	-5.74	4	PASS
5	5260	-1.72	11	PASS
8	5320	-1.58	11	PASS

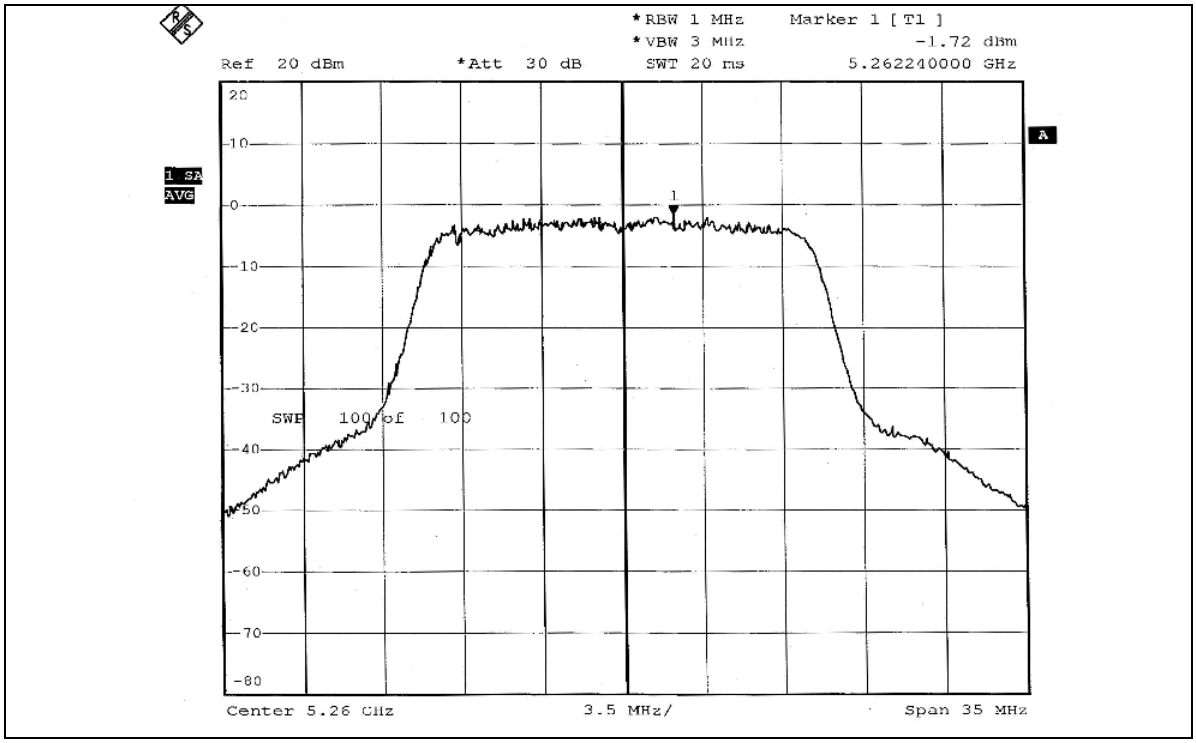
CH 1


*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-6.69 dBm
5.178460000 GHz
Ref 20 dBm
*Att 30 dB
1 SA
AVG
A
SWP 100 of 100
Center 5.18 GHz
3.5 MHz/
Span 35 MHz

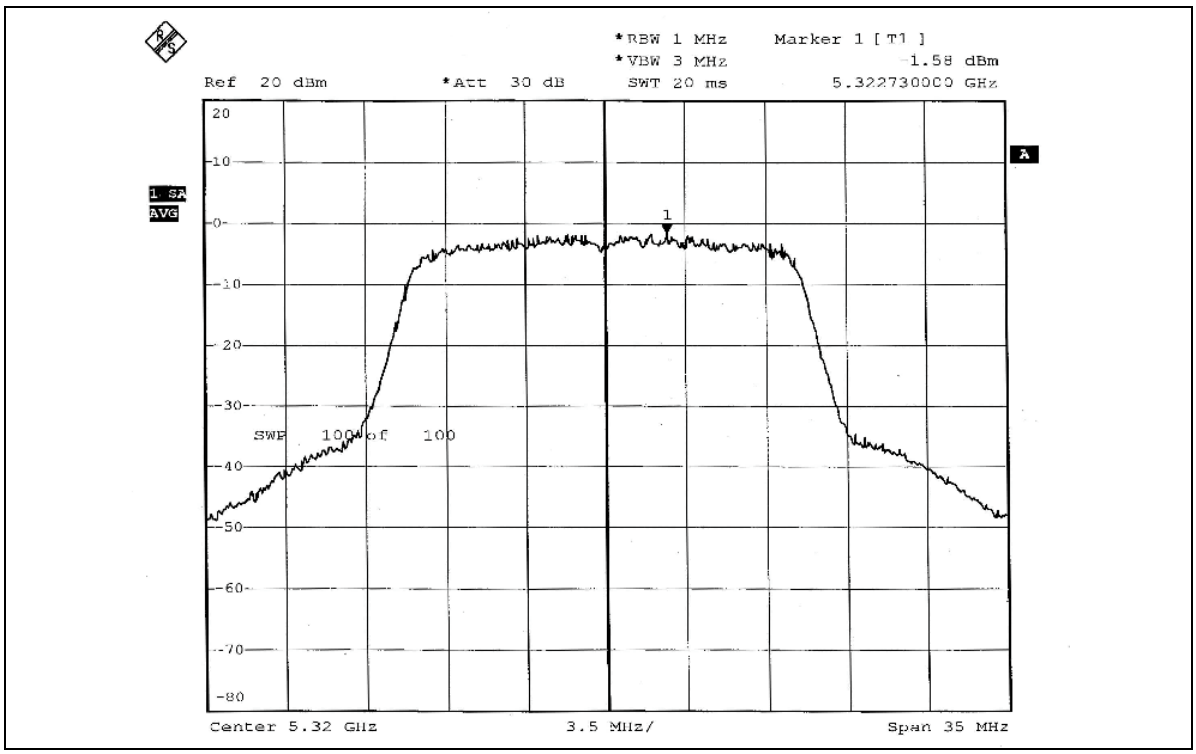
CH 4


*RBW 1 MHz
*VBW 3 MHz
SWT 20 ms
Marker 1 [T1]
-5.74 dBm
5.241820000 GHz
Ref 20 dBm
*Att 30 dB
1 SA
AVG
A
SWP 100 of 100
Center 5.24 GHz
3.5 MHz/
Span 35 MHz

CH 5


*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-1.72 dBm
Ref 20 dBm
*Att 30 dB
SWT 20 ms
5.262240000 GHz
1 SA
AVG
A
SWP 100 of 100
Center 5.26 GHz
3.5 MHz/
Span 35 MHz

CH 8


*RBW 1 MHz
Marker 1 [T1]
*VBW 3 MHz
-1.58 dBm
Ref 20 dBm
*Att 30 dB
SWT 20 ms
5.322730000 GHz
1 SA
AVG
A
SWP 100 of 100
Center 5.32 GHz
3.5 MHz/
Span 35 MHz

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
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.

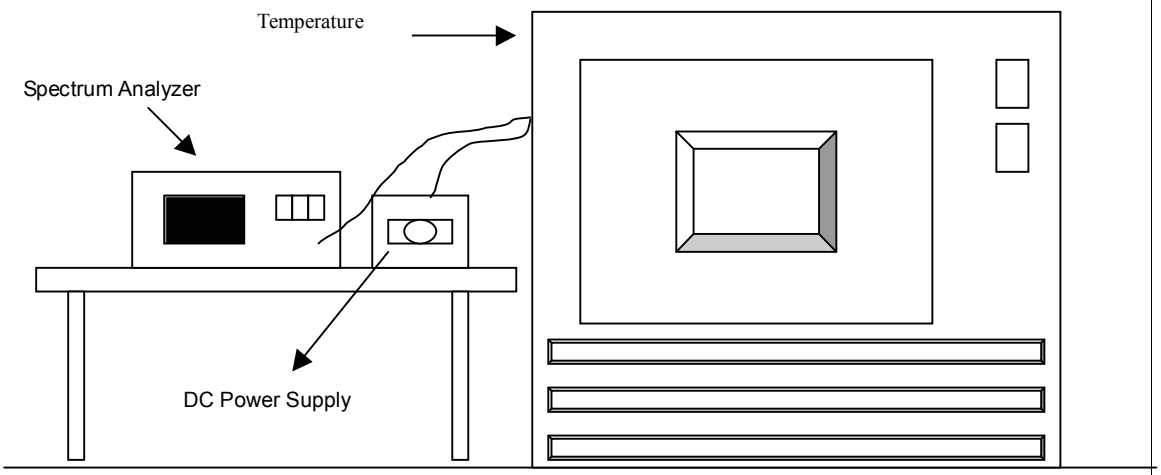
4.6.3 TEST PROCEDURE

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

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 : ± 0.015%			
Temp. (℃)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5320.0288	0.000541	5320.0312	0.000586	5320.0326	0.000613	5320.0330	0.000620
	120	5320.0290	0.000545	5320.0312	0.000586	5320.0318	0.000598	5320.0326	0.000613
	102	5320.0292	0.000549	5320.0326	0.000613	5320.0332	0.000624	5320.0328	0.000617
40	138	5320.0315	0.000592	5320.0273	0.000513	5320.0298	0.000560	5320.0197	0.000370
	120	5320.0320	0.000602	5320.0286	0.000538	5320.0272	0.000511	5320.0220	0.000414
	102	5320.0250	0.000470	5320.0198	0.000372	5320.0212	0.000398	5320.0186	0.000350
30	138	5320.0120	0.000226	5320.0108	0.000203	5320.0096	0.000180	5320.0112	0.000211
	120	5320.0298	0.000560	5320.0322	0.000605	5320.0286	0.000538	5320.0312	0.000586
	102	5320.0208	0.000391	5320.0214	0.000402	5320.0218	0.000410	5320.0216	0.000406
20	138	5320.0102	0.000192	5320.0098	0.000184	5320.0108	0.000203	5320.0086	0.000162
	120	5320.0012	0.000023	5320.0018	0.000034	5320.0023	0.000043	5320.0012	0.000023
	102	5320.0800	0.001504	5320.0720	0.001353	5320.034	0.000639	5320.0052	0.000098
10	138	5320.0131	0.000246	5320.0124	0.000233	5320.0126	0.000237	5320.0098	0.000184
	120	5320.0130	0.000244	5319.9970	0.000056	5320.0100	0.000188	5320.0112	0.000211
	102	5320.0129	0.000242	5320.0134	0.000252	5320.0102	0.000192	5320.0084	0.000158
0	138	5320.0129	0.000242	5320.0126	0.000237	5320.0134	0.000252	5320.0138	0.000259
	120	5320.0276	0.000519	5320.0283	0.000532	5320.0222	0.000417	5320.0266	0.000500
	102	5320.0220	0.000414	5320.0212	0.000398	5320.0196	0.000368	5320.0188	0.000353
-10	138	5320.0250	0.000470	5320.0248	0.000466	5320.0212	0.000398	5320.0196	0.000368
	120	5320.0185	0.000348	5320.0174	0.000327	5320.0168	0.000316	5320.0222	0.000417
	102	5320.0251	0.000190	5320.0246	0.000462	5320.0256	0.000481	5320.0274	0.000515
-20	138	5320.0101	0.000585	5320.0098	0.000184	5320.0122	0.000229	5320.0112	0.000211
	120	5320.0311	0.000585	5320.0302	0.000568	5320.0278	0.000523	5320.0288	0.000541
	102	5320.0273	0.000513	5320.0266	0.000500	5320.0197	0.000370	5320.0185	0.000348
-30	138	5320.0390	0.000733	5320.0310	0.000583	5320.0287	0.000539	5320.0273	0.000513
	120	5320.0361	0.000679	5320.0352	0.000662	5320.0328	0.000617	5320.0334	0.000628
	102	5320.0199	0.000374	5320.0188	0.000353	5320.0194	0.000365	5320.0222	0.000417

4.7 BAND EDGES MEASUREMENT

4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100036	Mar 18. 2006

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 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

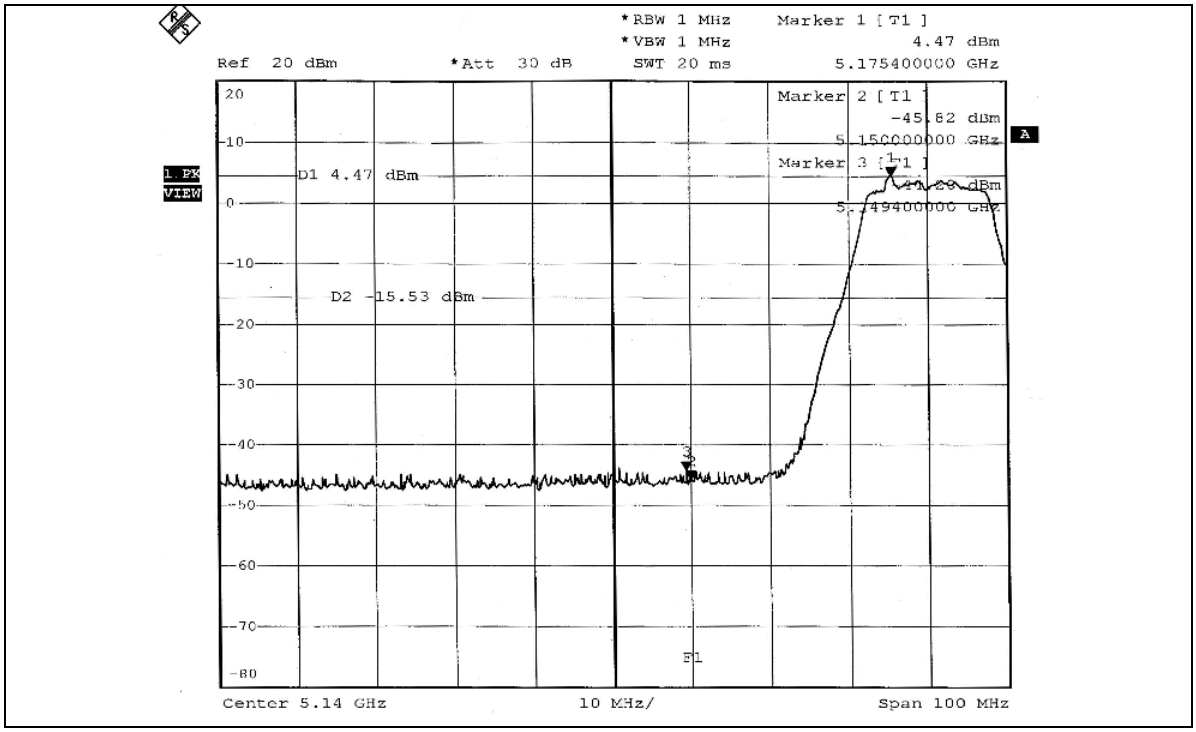
Channel 1 (5180MHz)
The band edge emission plot on page 48 shows 48.67dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 98.12dBuV/m (Peak), so the maximum field strength in restrict band is 98.12-48.67=49.45dBuV/m which is under 74dBuV/m limit.

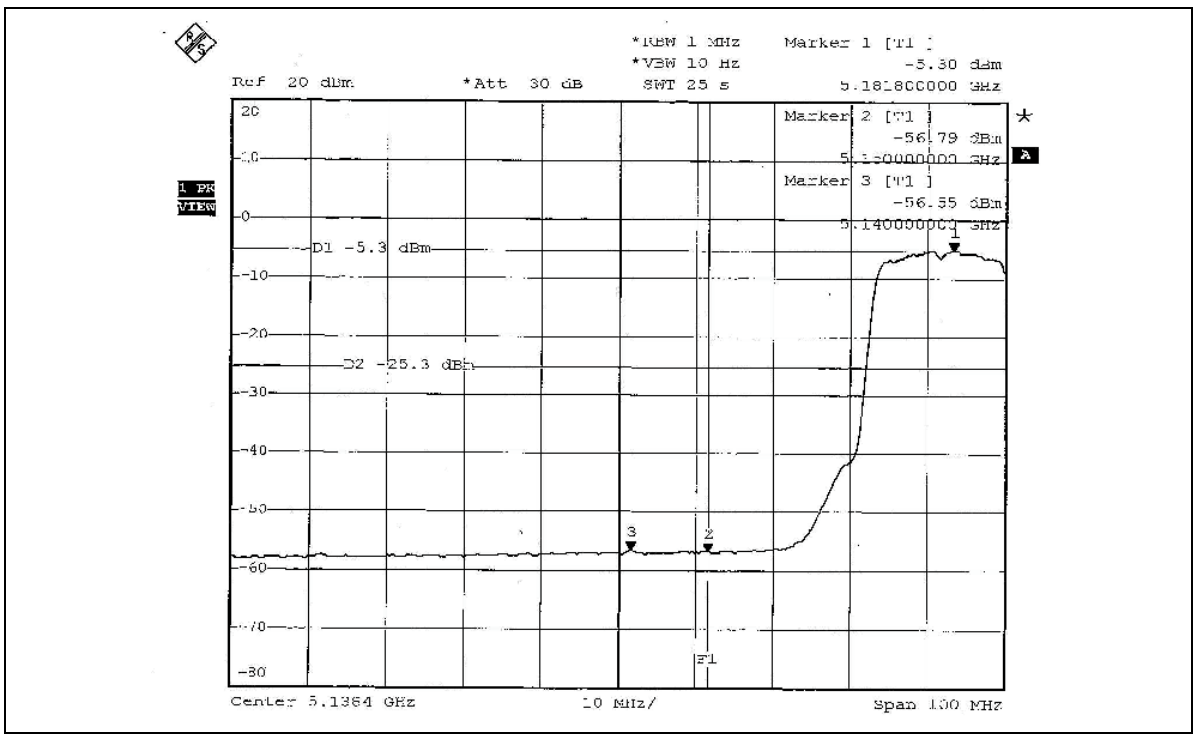
The band edge emission plot on page 48 shows 51.25dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 87.86dBuV/m (Average), so the maximum field strength in restrict band is 87.86-51.25=36.61dBuV/m which is under 54dBuV/m limit.

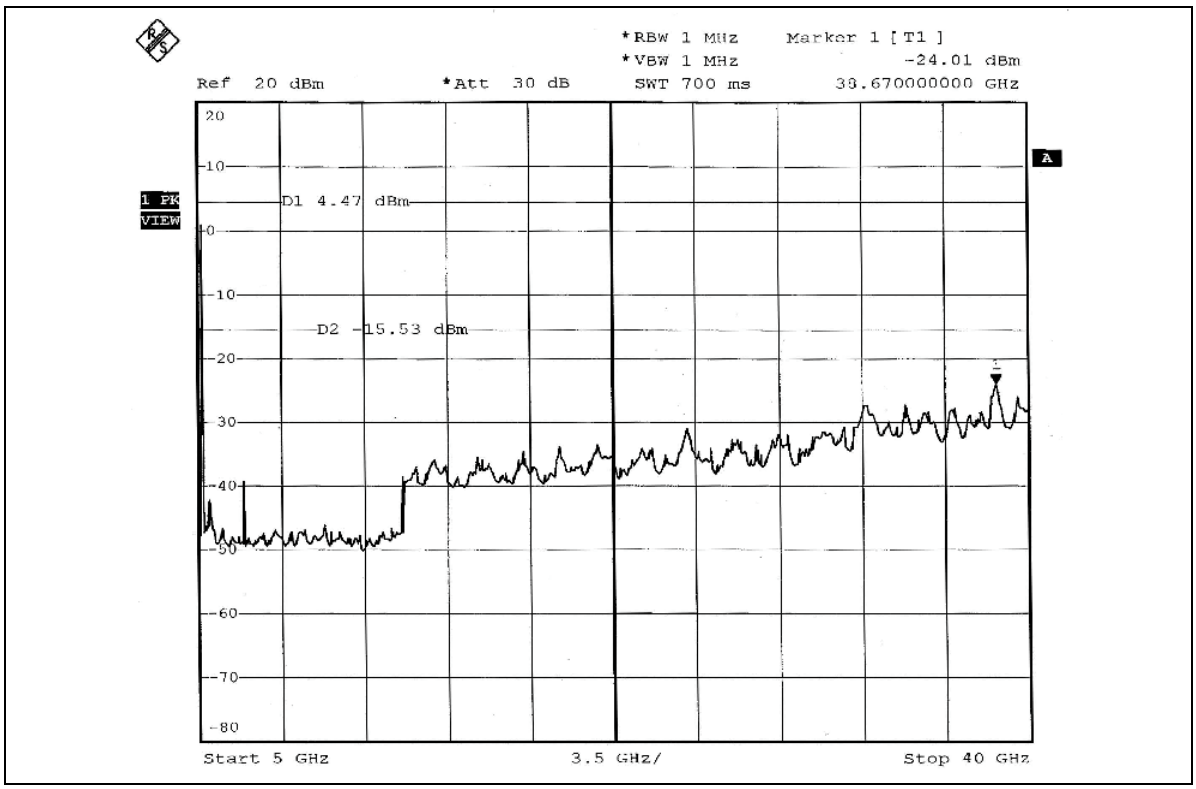
Channel 8 (5320MHz)
The band edge emission plot on page 49 shows 50.16dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 102.34dBuV/m (Peak), so the maximum field strength in restrict band is 102.34-50.16=52.18dBuV/m which is under 74dBuV/m limit.

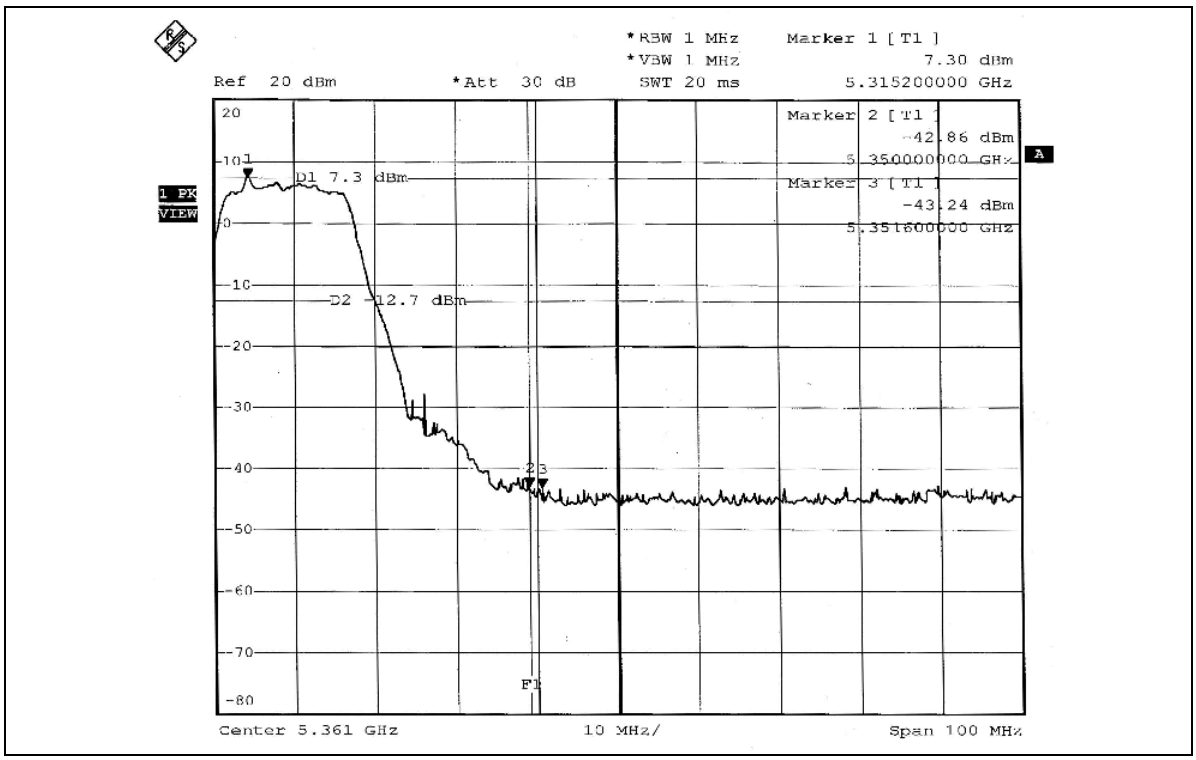
The band edge emission plot on page 50 shows 53.39dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 92.42dBuV/m (Average), so the maximum field strength in restrict band is 92.42-53.39=39.03dBuV/m which is under 54dBuV/m limit.

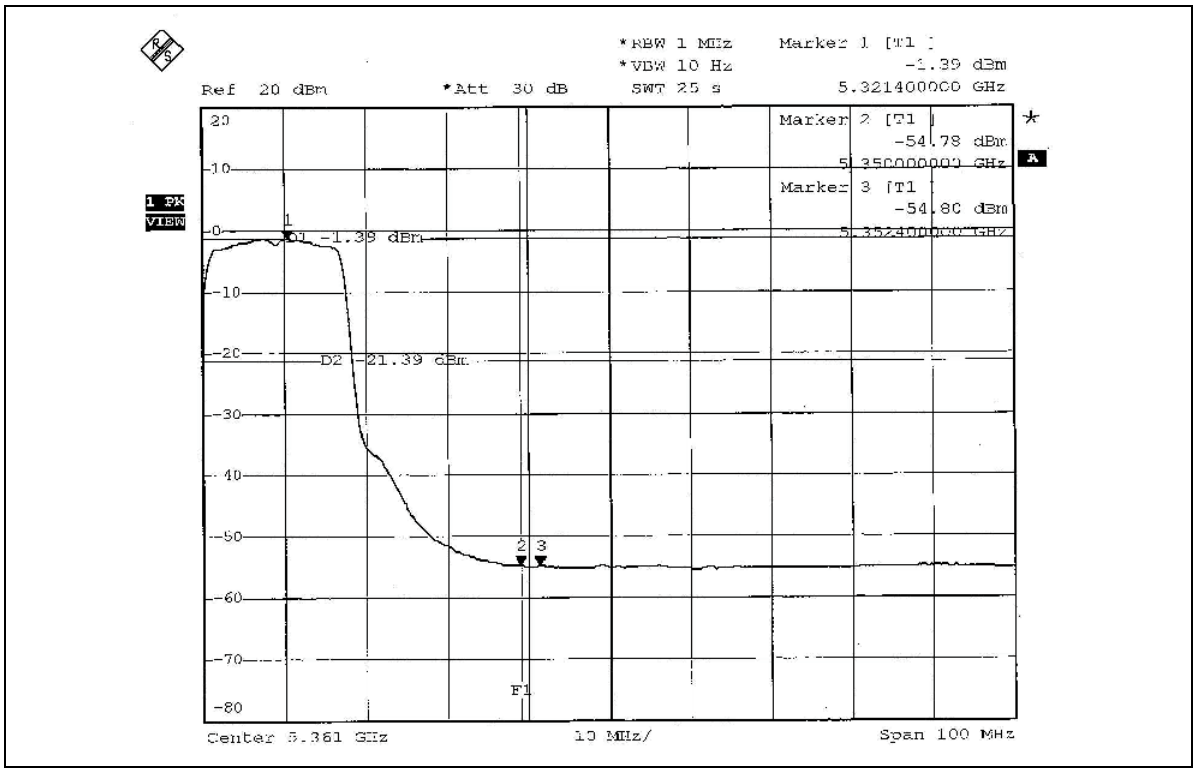
802.11a OFDM modulation

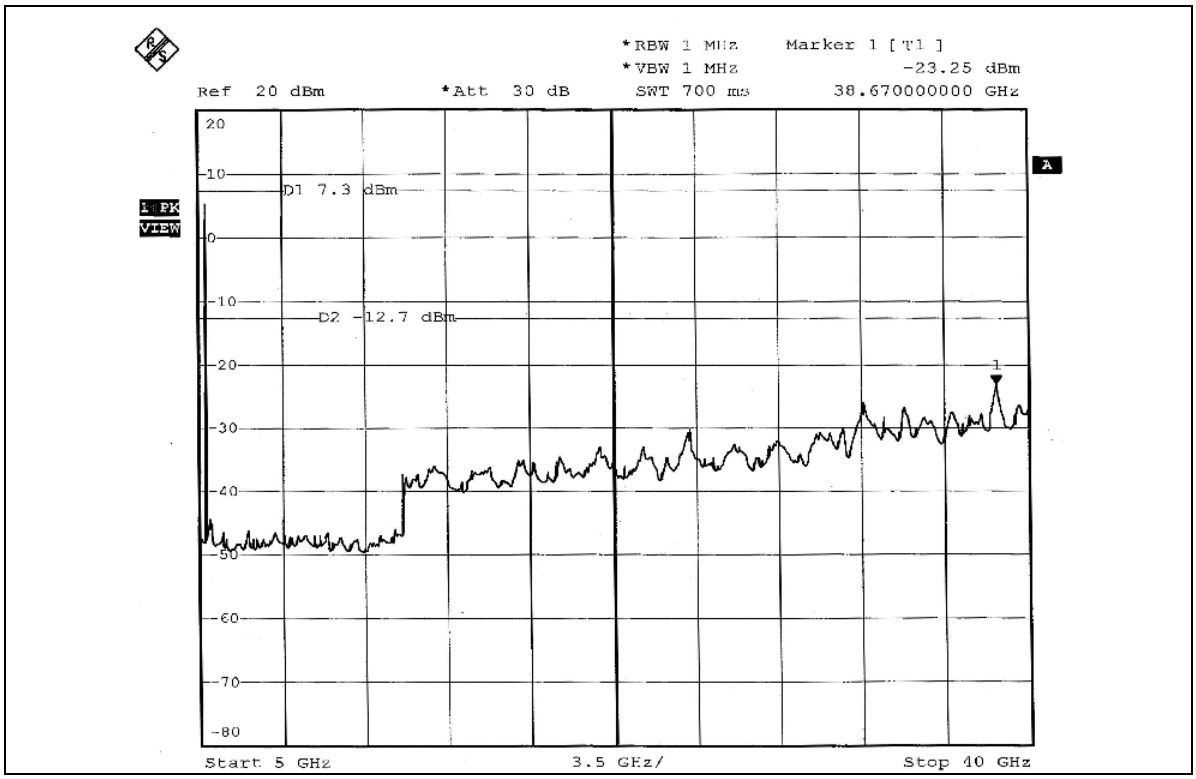





*RBW 1 MHz
*VBW 1 MHz
SWT 700 ms
Marker 1 [T1]
-24.01 dBm
38.670000000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
VIEW
D1 4.47 dBm
D2 -15.53 dBm
A
Start 5 GHz
3.5 GHz/
Stop 40 GHz


*RBW 1 MHz
*VBW 1 MHz
SWT 20 ms
Marker 1 [T1]
7.30 dBm
5.315200000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
-42.86 dBm
5.350000000 GHz
Marker 3 [T1]
-43.24 dBm
5.351600000 GHz
1 PK
VIEW
D1 7.3 dBm
D2 -12.7 dBm
A
Center 5.361 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 10 Hz
Ref 20 dBm
*Att 30 dB
SWT 25 s
Marker 1 [T1]
-1.39 dBm
5.321400000 GHz
Marker 2 [T1]
-54.78 dBm
Marker 3 [T1]
-54.80 dBm
1 PK
VIEW
D1 -1.39 dBm
D2 -21.39 dBm
Center 5.361 GHz
10 MHz/
Span 100 MHz


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 700 ms
Marker 1 [T1]
-23.25 dBm
38.670000000 GHz
1 PK
VIEW
D1 7.3 dBm
D2 -12.7 dBm
Start 5 GHz
3.5 GHz/
Stop 40 GHz

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 PIFA antenna with UFL connector. The maximum Gain of the antenna is –2.35dBi.

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST

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:

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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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Email: service@adt.com.tw
Web Site: www.adt.com.tw

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