

FCC TEST REPORT (15.407)

REPORT NO.: RF940620L09
MODEL NO.: GN-WI01HT
RECEIVED: May 16, 2005
TESTED: May 16 ~ Jul. 01, 2005
ISSUED: Jul. 05, 2005

APPLICANT: GIGA-BYTE TECHNOLOGY CO., LTD.

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0528
ILAC MRA



No. 2177-01

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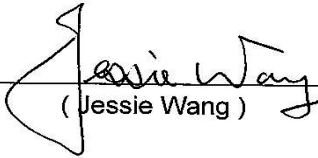
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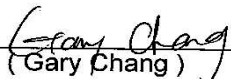


1. CERTIFICATION

PRODUCT: Mini PCI Wireless Adapter
BRAND NAME: GIGABYTE
MODEL NO.: GN-WI01HT
APPLICANT: GIGA-BYTE TECHNOLOGY CO., LTD.
TEST SAMPLE: R&D SAMPLE
TESTED: May 16 ~ Jul. 01, 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 : , **DATE:** Jul. 05, 2005
(Jessie Wang)

TECHNICAL
ACCEPTANCE : , **DATE:** Jul. 05, 2005
Responsible for RF (Gary Chang)

APPROVED BY : , **DATE:** Jul. 05, 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 -18.62dB at 0.201MHz
15.407(b/1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.18dB at 10500.00MHz
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.

2.1 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz ~ 30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~ 1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Mini PCI Wireless Adapter
MODEL NO.	GN-WI01HT
POWER SUPPLY	3.3Vdc from host equipment
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 (Turbo mode: up to 108Mbps *see Note 2) 802.11a: 54/48/36/24/18/12/9/6Mbps (Turbo mode: up to 108Mbps *see Note 2)
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 for Normal mode / 1 for Turbo mode 802.11a: 13 for Normal mode / 5 for Turbo mode
CHANNEL SPACING	802.11b & 802.11g: 5MHz 802.11a: 20MHz for Normal mode / 40MHz for Turbo mode
OUTPUT POWER	45.082mW for 802.11b 46.026mW for 802.11g 29.854mW for 5.150 ~ 5.350GHz 28.379mW for 5.725 ~ 5.850GHz
ANTENNA TYPE	Dipole Antenna with 1.8dBi gain for 2.4GHz band Dipole Antenna with 1.2dBi gain for 5.0GHz band
DATA CABLE	NA
I/O PORTS	NA
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. This EUT is capable of providing data rates of up to 108 Mbps in Turbo mode depending upon reception quality.
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.

4.

3.2 DESCRIPTION OF TEST MODES

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

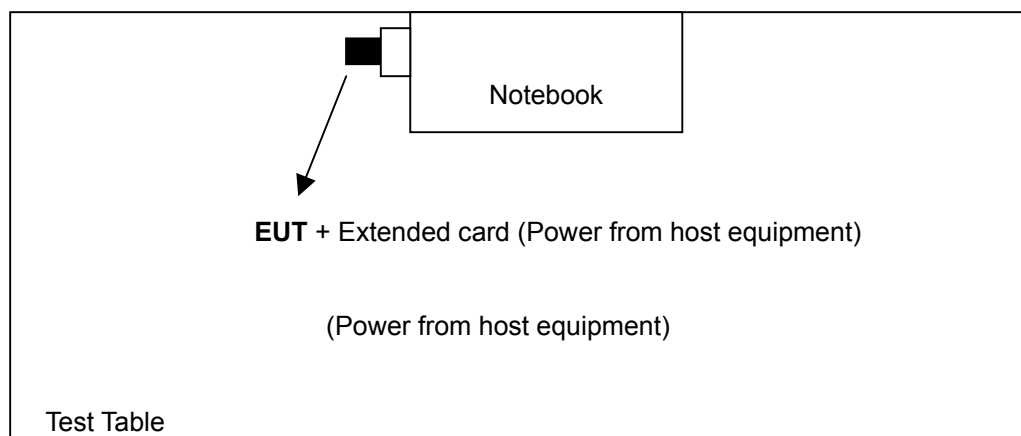
Eight channels are provided to this EUT for normal mode.

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

Three channels are provided to this EUT for turbo mode.

Channel	Frequency
1	5210 MHz
2	5250 MHz
3	5290 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

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, rotatable angle of EUT 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, rotatable angle of EUT 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
802.11a Turbo	1 to 3	1, 2, 3	OFDM	BPSK	12

**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
802.11a Turbo	1 to 3	1, 3	OFDM	BPSK	12

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
802.11a Turbo	1 to 3	1, 2, 3	OFDM	BPSK	12

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an Mini PCI Wireless Adapter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

ANSI C63.4-2003

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

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

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

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

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

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN SCHWARZBECK	NNBL 8226-2	8226-142	May 02, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

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



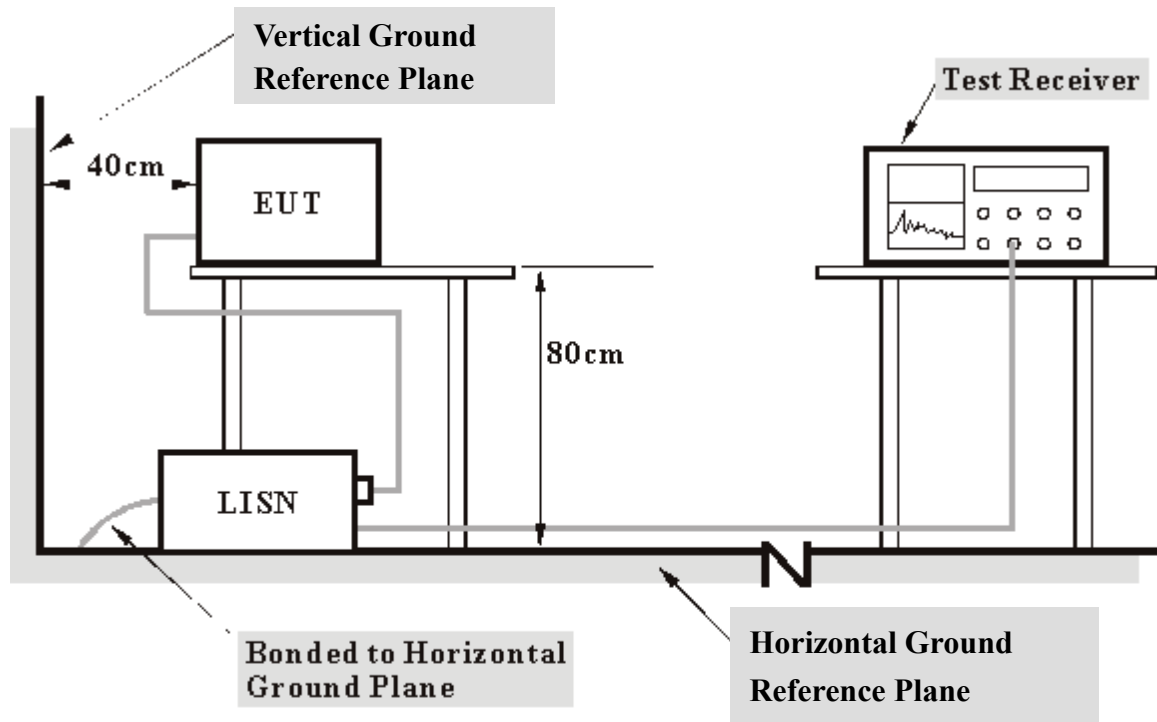
4.1.3 TEST PROCEDURES

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 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. Plugged the EUT to the Notebook via the extended card system placed on a testing table.
- b. The Notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to its screen.
- d. Steps c were repeated.

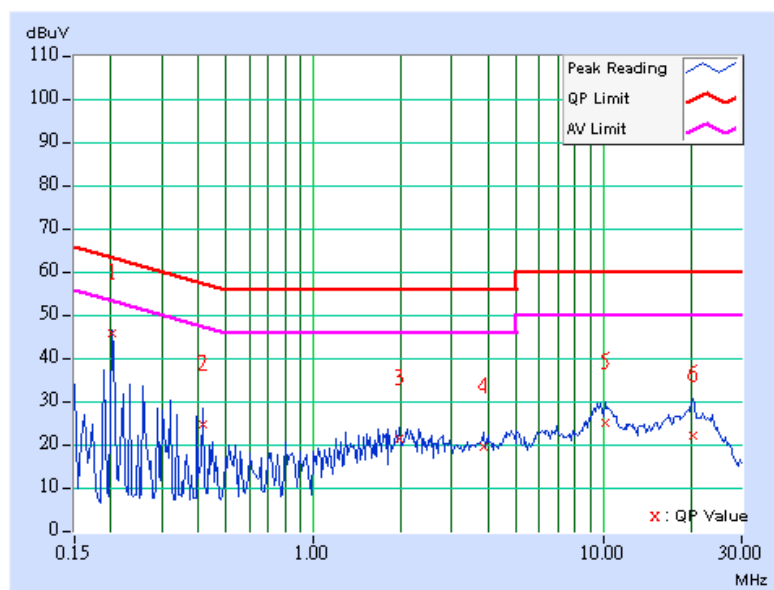
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	PHASE	Line 1
CHANNEL	Channel 8	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Richard Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.11	44.83	-	44.94	-	63.58	53.58	-18.64	-
2	0.416	0.11	23.62	-	23.73	-	57.54	47.54	-33.80	-
3	1.965	0.26	20.47	-	20.73	-	56.00	46.00	-35.27	-
4	3.859	0.38	18.57	-	18.95	-	56.00	46.00	-37.05	-
5	10.168	0.54	24.19	-	24.73	-	60.00	50.00	-35.27	-
6	20.383	1.05	21.12	-	22.17	-	60.00	50.00	-37.83	-

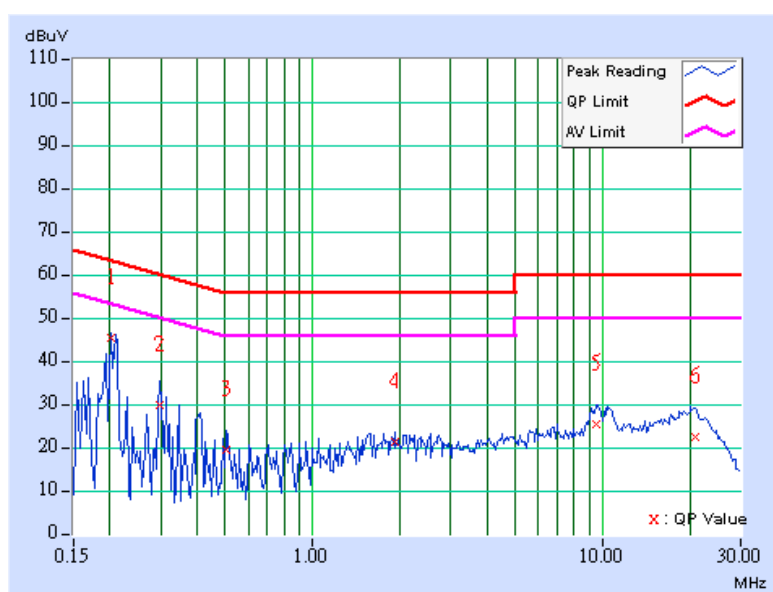
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	PHASE	Line 2
CHANNEL	Channel 8	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	25deg. C, 66%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Richard Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.201	0.11	44.85	-	44.96	-	63.58	53.58	-18.62	-
2	0.298	0.11	29.24	-	29.35	-	60.29	50.29	-30.94	-
3	0.505	0.13	18.82	-	18.95	-	56.00	46.00	-37.05	-
4	1.918	0.26	20.77	-	21.03	-	56.00	46.00	-34.97	-
5	9.492	0.44	24.68	-	25.12	-	60.00	50.00	-34.88	-
6	20.844	0.75	21.72	-	22.47	-	60.00	50.00	-37.53	-

- 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

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

4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May 19, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2006
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 2.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The VCCI Site Registration No. is R-237.

5. The IC Site Registration No. is IC4924-3.

4.2.4 TEST PROCEDURES

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

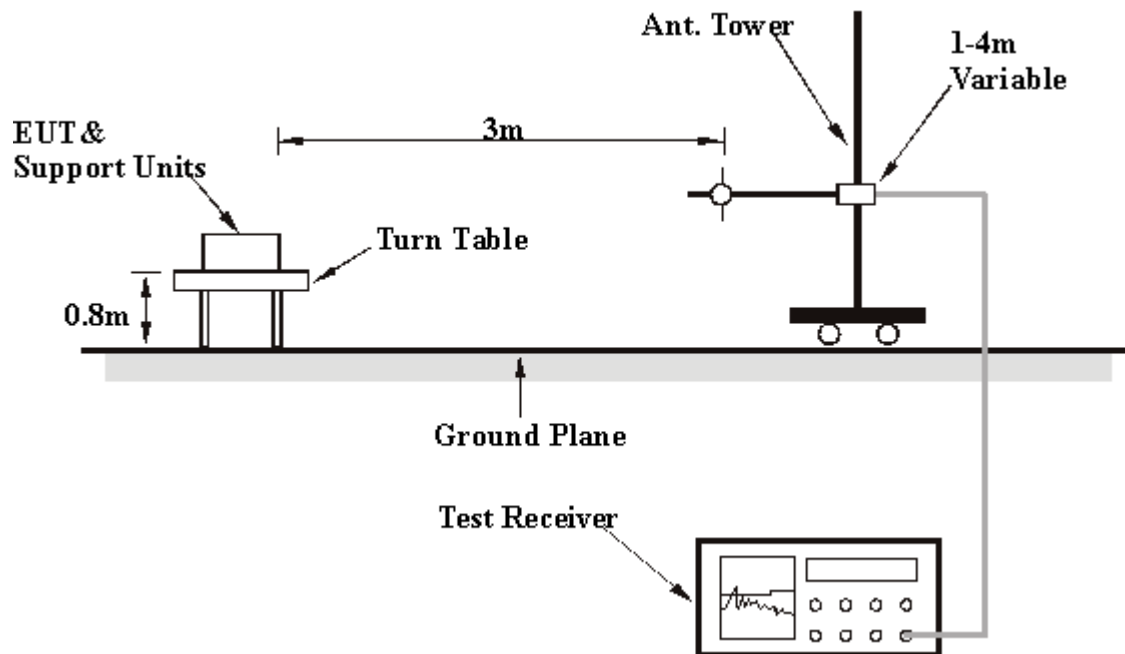
NOTE:

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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 8	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg. C, 60%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Brad Wu		

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	100.06	38.81 QP	43.50	-4.69	1.75 H	10	28.00	10.81
2	135.62	41.34 QP	43.50	-2.16	2.00 H	46	27.44	13.90
3	166.88	41.26 QP	43.50	-2.24	1.50 H	340	27.30	13.96
4	193.82	39.91 QP	43.50	-3.59	1.00 H	178	28.31	11.60
5	332.86	39.44 QP	46.00	-6.56	1.00 H	328	24.48	14.96
6	400.76	39.69 QP	46.00	-6.31	1.75 H	304	23.29	16.40
7	603.38	42.02 QP	46.00	-3.98	1.25 H	304	21.36	20.66

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	34.31	33.75 QP	40.00	-6.25	1.00 V	16	19.55	14.20
2	117.30	40.45 QP	43.50	-3.05	1.50 V	154	27.89	12.56
3	167.96	38.65 QP	43.50	-4.85	1.00 V	130	24.79	13.86
4	204.60	40.74 QP	43.50	-2.76	1.50 V	94	29.52	11.22
5	401.83	39.20 QP	46.00	-6.80	1.50 V	334	22.78	16.43
6	919.17	38.42 QP	46.00	-7.58	1.50 V	328	13.45	24.97

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3453.00	49.58 PK	68.30	-18.72	1.03 H	325	16.16	33.42
2	#5120.00	50.12 PK	74.00	-23.88	1.11 H	260	12.66	37.46
2	#5120.00	43.25 AV	54.00	-10.75	1.11 H	260	5.79	37.46
3	#5150.00	42.53 PK	74.00	-31.47	1.01 H	255	5.05	37.48
4	*5180.00	97.56 PK			1.01 H	255	60.06	37.50
4	*5180.00	88.56 AV			1.01 H	255	51.06	37.50
5	10360.00	63.25 PK	68.30	-5.05	1.05 H	325	15.67	47.58
6	#15540.00	58.25 PK	74.00	-15.75	1.07 H	63	9.56	48.69
6	#15540.00	45.32 AV	54.00	-8.68	1.07 H	63	-3.37	48.69

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	3453.00	50.08 PK	68.30	-18.22	1.35 V	254	16.66	33.42
2	#5120.00	51.02 PK	74.00	-22.98	1.30 V	125	13.56	37.46
2	#5120.00	44.25 AV	54.00	-9.75	1.30 V	125	6.79	37.46
3	#5150.00	51.30 PK	74.00	-22.70	1.80 V	360	13.82	37.48
3	#5150.00	40.77 AV	54.00	-13.23	1.80 V	360	3.29	37.48
4	*5180.00	106.58 PK			1.80 V	360	69.08	37.50
4	*5180.00	96.58 AV			1.80 V	360	59.08	37.50
5	10360.00	65.25 PK	68.30	-3.05	1.36 V	35	17.67	47.58
6	#15540.00	61.51 PK	74.00	-12.49	1.31 V	56	12.83	48.69
6	#15540.00	50.62 AV	54.00	-3.38	1.31 V	56	1.93	48.69

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 4	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3493.00	49.02 PK	68.30	-19.28	1.32 H	254	15.58	33.44
2	#5120.00	50.12 PK	74.00	-23.88	1.52 H	324	12.66	37.46
2	#5120.00	43.52 AV	54.00	-10.48	1.52 H	324	6.06	37.46
3	*5240.00	94.68 PK			1.02 H	248	57.10	37.58
3	*5240.00	84.78 AV			1.02 H	248	47.20	37.58
4	10480.00	49.25 PK	68.30	-19.05	1.10 H	259	1.39	47.86
5	#15720.00	56.12 PK	74.00	-17.88	1.32 H	152	7.88	48.24
5	#15720.00	41.21 AV	54.00	-12.79	1.32 H	152	-7.03	48.24

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	3493.00	51.23 PK	68.30	-17.07	1.45 V	247	17.79	33.44
2	#5120.00	52.18 PK	74.00	-21.82	1.32 V	125	14.72	37.46
2	#5120.00	45.89 AV	54.00	-8.11	1.32 V	125	8.43	37.46
3	*5240.00	106.31 PK			1.25 V	315	68.73	37.58
3	*5240.00	97.36 AV			1.25 V	315	59.78	37.58
4	10480.00	51.25 PK	68.30	-17.05	1.25 V	320	3.39	47.86
5	#15720.00	66.15 PK	74.00	-7.85	1.14 V	52	17.91	48.24
5	#15720.00	51.92 AV	54.00	-2.08	1.14 V	52	3.68	48.24

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3506.00	48.96 PK	68.30	-19.34	1.09 H	248	15.50	33.46
2	#5120.00	49.12 PK	74.00	-24.88	1.02 H	314	11.66	37.46
3	*5260.00	96.12 PK			1.08 H	325	58.52	37.60
3	*5260.00	86.35 AV			1.08 H	325	48.75	37.60
4	10520.00	48.02 PK	68.30	-20.28	1.04 H	278	0.10	47.92
5	#15780.00	56.25 PK	74.00	-17.75	1.14 H	245	8.17	48.08
5	#15780.00	43.36 AV	54.00	-10.64	1.14 H	245	-4.72	48.08

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	3506.00	51.12 PK	68.30	-17.18	1.35 V	19	17.66	33.46
2	#5120.00	49.41 PK	74.00	-24.59	1.25 V	19	11.95	37.46
2	#5120.00	39.17 AV	54.00	-14.83	1.25 V	19	1.71	37.46
3	*5260.00	106.36 PK			1.29 V	136	68.76	37.60
3	*5260.00	97.42 AV			1.29 V	136	59.82	37.60
4	10520.00	51.23 PK	68.30	-17.07	1.30 V	109	3.31	47.92
5	#15780.00	66.33 PK	74.00	-7.67	1.25 V	93	18.25	48.08
5	#15780.00	51.86 AV	54.00	-2.14	1.25 V	93	3.78	48.08

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 8	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3546.00	48.26 PK	68.30	-20.04	1.05 H	325	14.69	33.57
2	#5120.00	49.68 PK	74.00	-24.32	1.32 H	255	12.22	37.46
3	*5320.00	95.25 PK			1.08 H	32	57.58	37.67
3	*5320.00	85.12 AV			1.08 H	32	47.45	37.67
4	#5350.00	47.55 PK	74.00	-26.45	1.08 H	32	9.86	37.69
4	#5350.00	37.25 AV	54.00	-16.75	1.08 H	32	-0.44	37.69
5	#10640.00	53.11 PK	74.00	-20.89	1.09 H	351	5.18	47.93
5	#10640.00	39.58 AV	54.00	-14.42	1.09 H	351	-8.35	47.93
6	#15960.00	57.58 PK	74.00	-16.42	1.25 H	255	9.95	47.63
6	#15960.00	42.15 AV	54.00	-11.85	1.25 H	255	-5.48	47.63

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	3546.00	50.25 PK	68.30	-18.05	1.32 V	35	16.68	33.57
2	#5120.00	51.02 PK	74.00	-22.98	1.20 V	70	13.56	37.46
2	#5120.00	44.01 AV	54.00	-9.99	1.20 V	70	6.55	37.46
3	*5320.00	104.25 PK			1.32 V	36	66.58	37.67
3	*5320.00	94.12 AV			1.32 V	36	56.45	37.67
4	#5350.00	48.25 PK	74.00	-25.75	1.22 V	69	10.56	37.69
4	#5350.00	38.12 AV	54.00	-15.88	1.22 V	69	0.43	37.69
5	#10640.00	63.25 PK	74.00	-10.75	1.35 V	325	15.32	47.93
5	#10640.00	49.25 AV	54.00	-4.75	1.35 V	325	1.32	47.93
6	#15960.00	67.68 PK	74.00	-6.32	1.20 V	69	20.05	47.63
6	#15960.00	52.13 AV	54.00	-1.87	1.20 V	69	4.50	47.63

NOTE:

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

802.11a Turbo OFDM modulation

EUT	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3473.00	49.12 PK	68.30	-19.18	1.05 H	325	15.69	33.43
2	#5120.00	50.10 PK	74.00	-23.90	1.25 H	320	12.64	37.46
2	#5120.00	44.25 AV	54.00	-9.75	1.25 H	320	6.79	37.46
3	#5150.00	46.50 PK	74.00	-27.50	1.30 H	302	9.02	37.48
3	#5150.00	39.37 AV	54.00	-14.63	1.30 H	302	1.89	37.48
4	*5210.00	97.25 PK			1.05 H	32	59.72	37.53
4	*5210.00	90.12 AV			1.05 H	32	52.59	37.53
5	10420.00	65.12 PK	68.30	-3.18	1.35 H	225	17.42	47.70
6	#15630.00	59.21 PK	74.00	-14.79	1.02 H	321	10.77	48.44
6	#15630.00	46.25 AV	54.00	-7.75	1.02 H	321	-2.19	48.44

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	3473.00	51.25 PK	68.30	-17.05	1.32 V	245	17.82	33.43
2	#5120.00	50.35 PK	74.00	-23.65	1.25 V	123	12.89	37.46
2	#5120.00	44.25 AV	54.00	-9.75	1.25 V	123	6.79	37.46
3	#5150.00	55.81 PK	74.00	-18.19	1.50 V	275	18.33	37.48
3	#5150.00	45.93 AV	54.00	-8.07	1.50 V	275	8.45	37.48
4	*5210.00	106.56 PK			1.50 V	275	69.03	37.53
4	*5210.00	96.68 AV			1.50 V	275	59.15	37.53
5	10420.00	67.25 PK	68.30	-1.05	1.25 V	123	19.55	47.70
6	#15630.00	62.61 PK	74.00	-11.39	1.35 V	322	14.17	48.44
6	#15630.00	48.48 AV	54.00	-5.52	1.35 V	322	0.04	48.44

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 2	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3500.00	48.89 PK	68.30	-19.41	1.20 H	324	15.45	33.44
2	#5120.00	48.12 PK	74.00	-25.88	1.02 H	32	10.66	37.46
3	*5250.00	96.58 PK			1.02 H	33	58.99	37.59
3	*5250.00	87.12 AV			1.02 H	33	49.53	37.59
4	10500.00	65.12 PK	68.30	-3.18	1.03 H	35	17.21	47.91
5	#15750.00	64.12 PK	74.00	-9.88	1.10 H	102	15.96	48.16
5	#15750.00	48.12 AV	54.00	-5.88	1.10 H	102	-0.04	48.16

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	3500.00	51.35 PK	68.30	-16.95	1.32 V	256	17.91	33.44
2	#5120.00	50.25 PK	74.00	-23.75	1.21 V	325	12.79	37.46
2	#5120.00	43.65 AV	54.00	-10.35	1.21 V	325	6.19	37.46
3	*5250.00	106.21 PK			1.19 V	325	68.62	37.59
3	*5250.00	96.12 AV			1.19 V	325	58.53	37.59
4	10500.00	67.12 PK	68.30	-1.18	1.35 V	325	19.21	47.91
5	#15750.00	65.18 PK	74.00	-8.82	1.22 V	58	17.02	48.16
5	#15750.00	51.18 AV	54.00	-2.82	1.22 V	58	3.02	48.16

- 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	Mini PCI Wireless Adapter	MEASUREMENT DETAIL	
MODEL	GN-WI01HT	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 3	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg.C, 70%RH, 991hPa
TRANSFER RATE	12Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3526.00	48.90 PK	68.30	-19.40	1.32 H	35	15.39	33.51
2	#5120.00	49.12 PK	74.00	-24.88	1.08 H	325	11.66	37.46
3	*5290.00	96.52 PK			1.32 H	45	58.87	37.65
3	*5290.00	90.12 AV			1.32 H	45	52.47	37.65
4	#5350.00	51.37 PK	74.00	-22.63	1.25 H	354	13.68	37.69
4	#5350.00	44.97 AV	54.00	-9.03	1.25 H	354	7.28	37.69
5	10580.00	62.36 PK	68.30	-5.94	1.02 H	32	14.43	47.93
6	#15870.00	62.32 PK	74.00	-11.68	1.32 H	325	14.47	47.85
6	#15870.00	46.25 AV	54.00	-7.75	1.32 H	325	-1.60	47.85

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	3526.00	51.54 PK	68.30	-16.76	1.35 V	32	18.03	33.51
2	#5120.00	51.12 PK	74.00	-22.88	1.25 V	35	13.66	37.46
2	#5120.00	44.11 AV	54.00	-9.89	1.25 V	35	6.65	37.46
3	*5290.00	106.58 PK			1.29 V	35	68.93	37.65
3	*5290.00	96.12 AV			1.29 V	35	58.47	37.65
4	#5350.00	61.43 PK	74.00	-12.57	1.29 V	35	23.74	37.69
4	#5350.00	50.97 AV	54.00	-3.03	1.29 V	35	13.28	37.69
5	10580.00	65.25 PK	68.30	-3.05	1.39 V	45	17.32	47.93
6	#15870.00	65.73 PK	74.00	-8.27	1.21 V	69	17.88	47.85
6	#15870.00	51.49 AV	54.00	-2.51	1.21 V	69	3.64	47.85

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

4.3 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

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

4.3.2 TEST INSTRUMENTS

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

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

4.3.3 TEST PROCEDURE

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

NOTE:

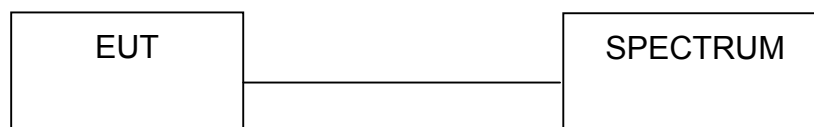
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11a OFDM modulation

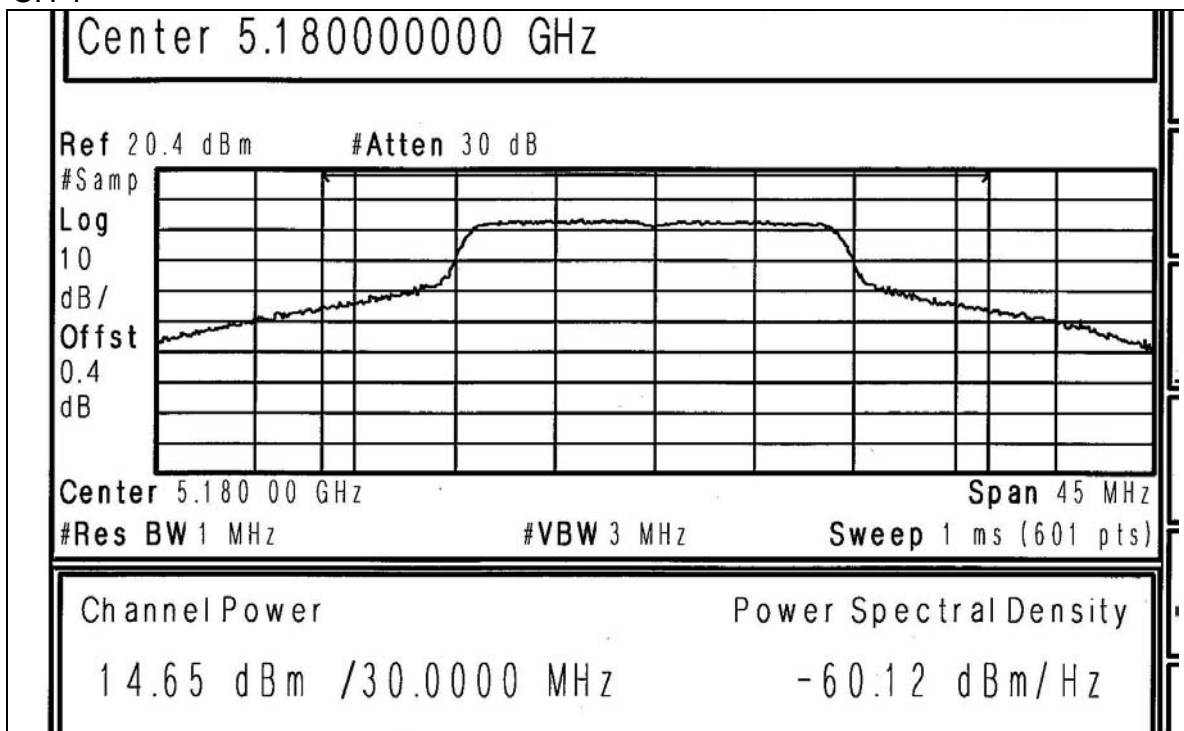
EUT	Mini PCI Wireless Adapter	MODEL	GN-WI01HT
MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg.C, 64%RH, 991hPa
TESTED BY	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	29.174	14.65	17.00	29.25	PASS
4	5240	28.184	14.50	17.00	31.41	PASS
5	5260	29.854	14.75	24.00	31.95	PASS
8	5320	25.235	14.02	24.00	33.03	PASS

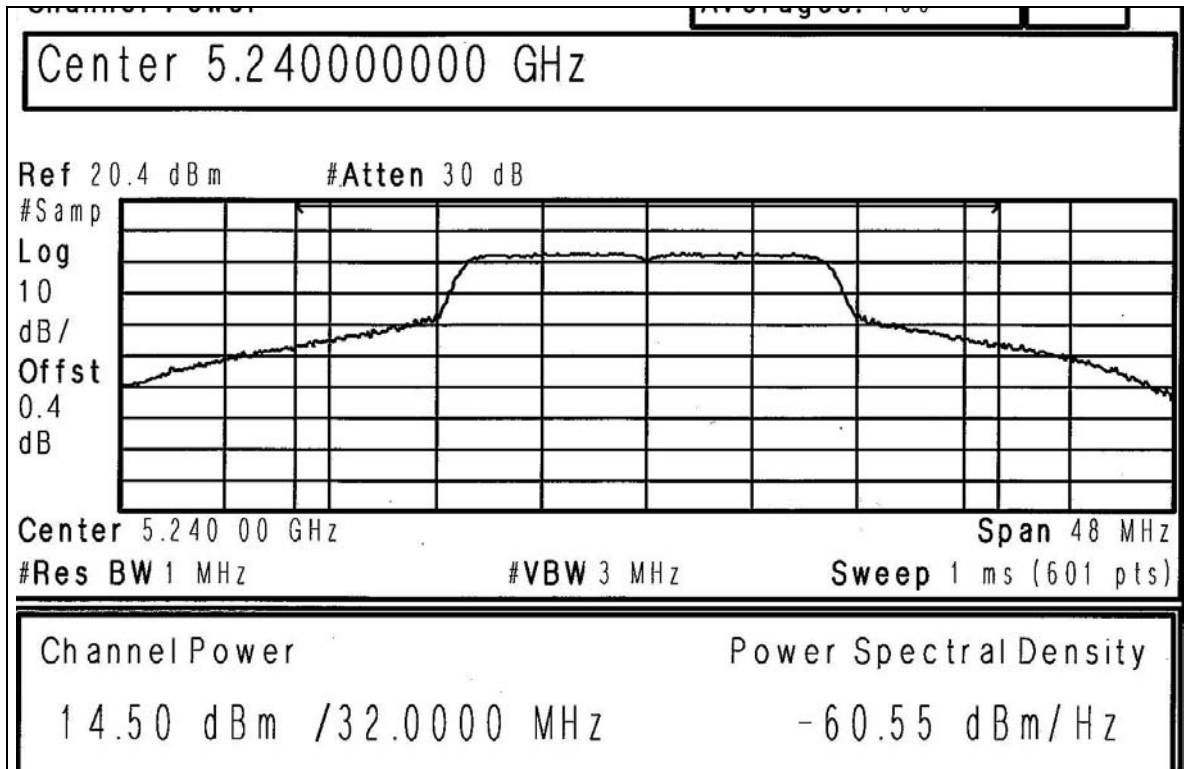
NOTE: The 26dBc Occupied Bandwidth plot, please refer to the following pages.

Peak Power Output:

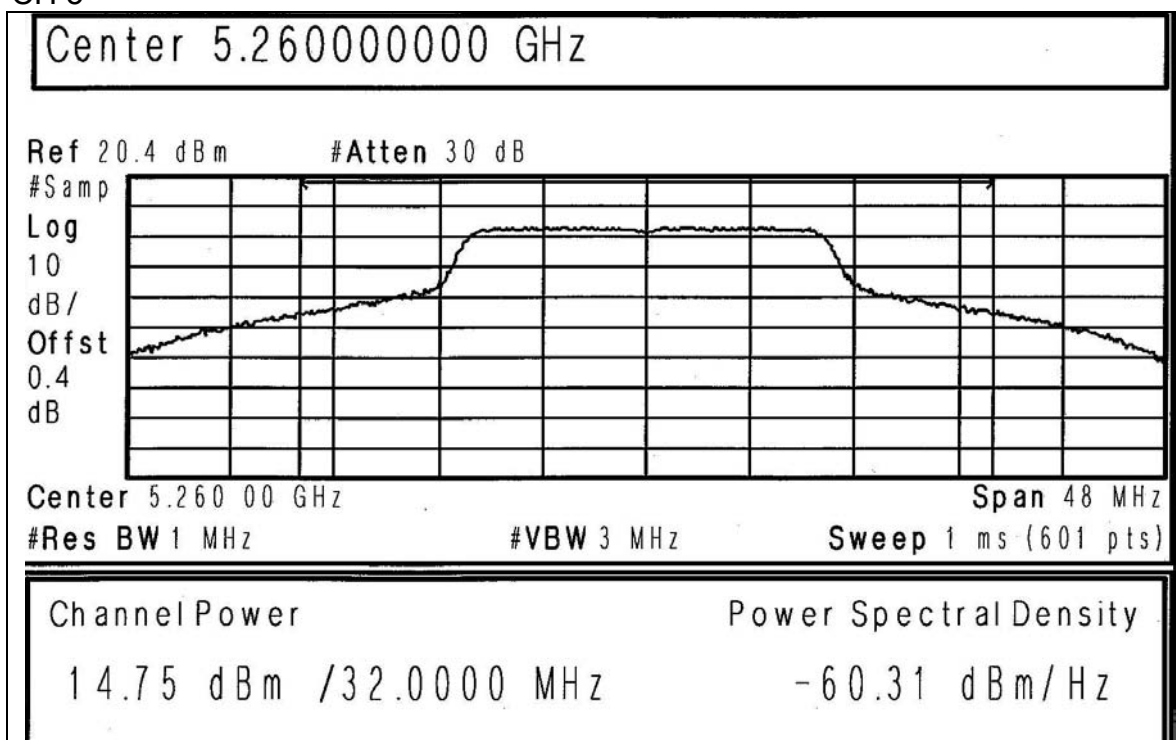
CH 1



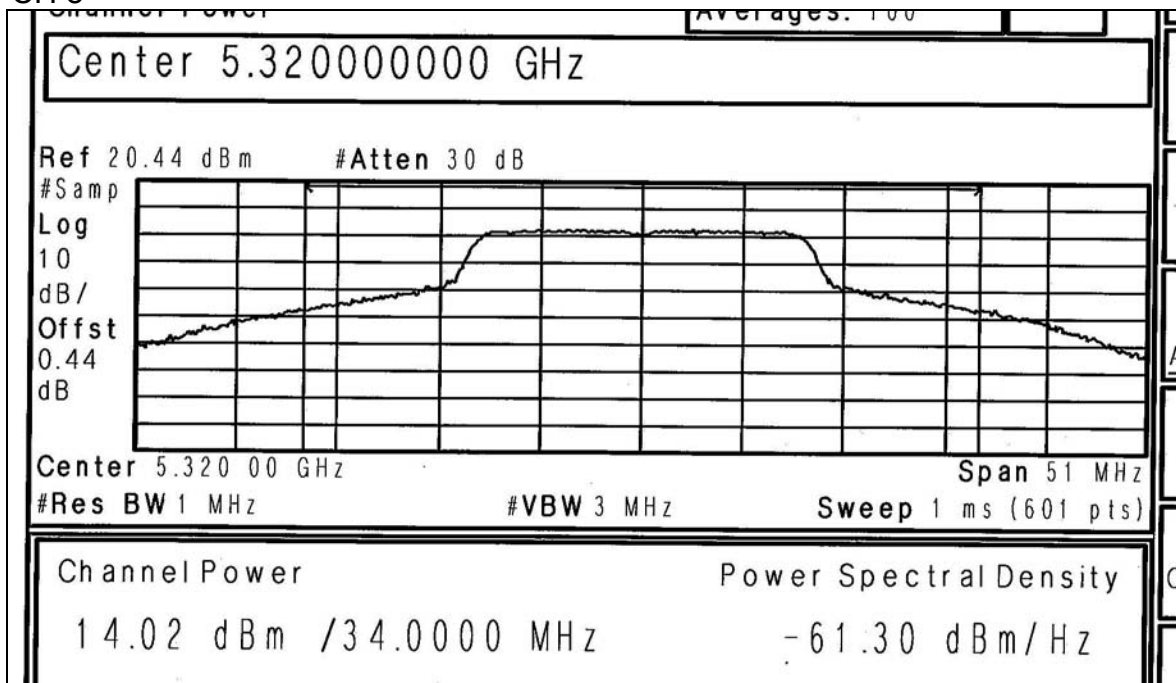
CH 4



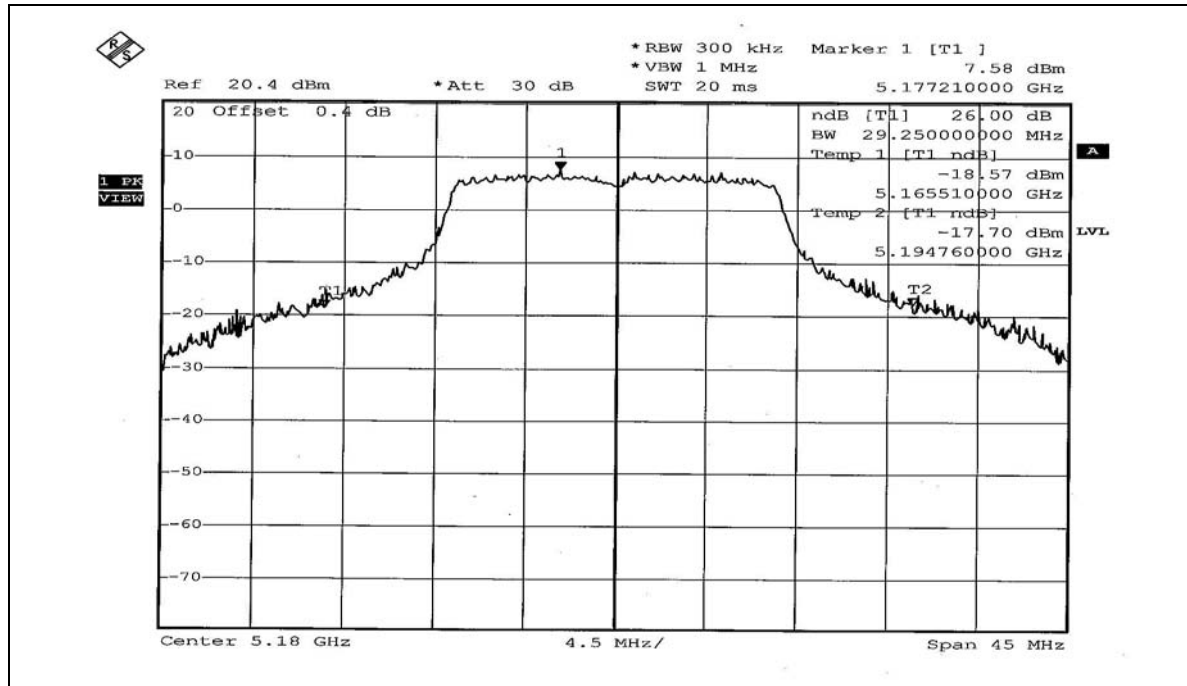
CH 5



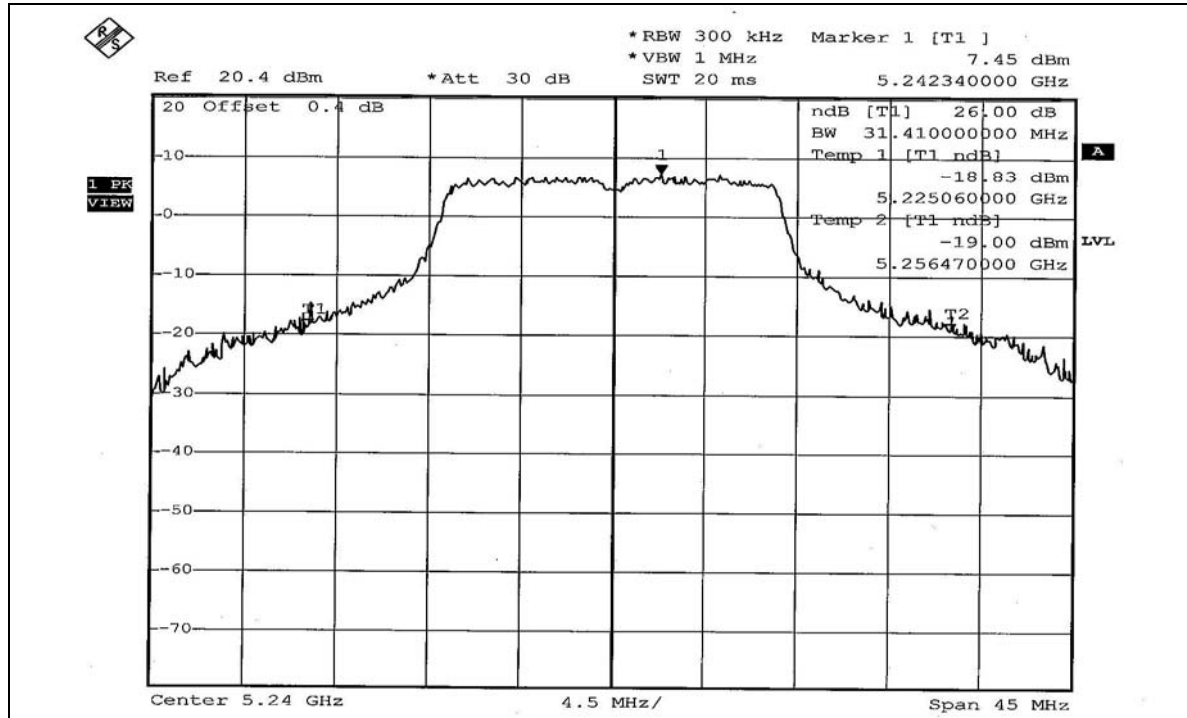
CH 8



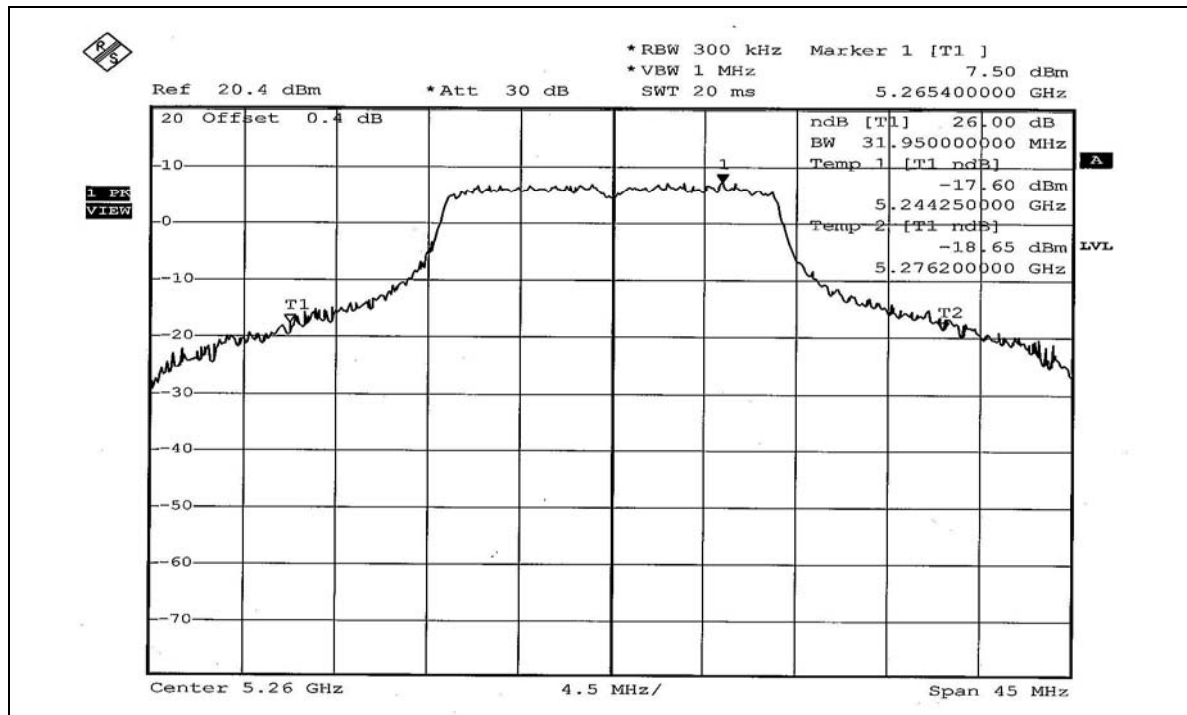
26dB Occupied Bandwidth: CH 1



CH 4



CH 5



CH 8

