



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF940301L04B

**MODEL NO.:** CB3000

**RECEIVED:** Apr. 18, 2006

**TESTED:** May 16 ~ Jul. 04, 2006

**ISSUED:** Jul. 06, 2006

**APPLICANT:** SYMBOL TECHNOLOGIES, INC.

**ADDRESS:** One Symbol Plaza, Holtsville, NY 11742-1300, U.S.A.

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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# 1. CERTIFICATION

**PRODUCT:** Client Bridge 3000 Series  
**MODEL:** CB3000  
**BRAND:** Symbol  
**APPLICANT:** SYMBOL TECHNOLOGIES, INC.  
**TESTED:** May 16 ~ Jul. 04, 2006  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**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** : Rennie Wang , **DATE:** Jul. 06, 2006  
Rennie Wang

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE:** Jul. 06, 2006  
Responsible for RF Long Chen

**APPROVED BY** : Gary Chang , **DATE:** Jul. 06, 2006  
Gary Chang / Supervisor

## 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 -14.55dB at 0.158MHz
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 -1.01dB at 5150.00MHz
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	3.62 dB
	200MHz ~ 1000MHz	3.64 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	Client Bridge 3000 Series
<b>MODEL NO.</b>	CB3000
<b>FCC ID</b>	H9PCB3000
<b>POWER SUPPLY</b>	12Vdc from AC adapter
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	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
<b>FREQUENCY RANGE</b>	802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.725 ~ 5.850GHz (per standard 15.247) 802.11a: 5.15 ~ 5.35GHz and 5.725 ~ 5.825GHz (per standard 15.407)
<b>NUMBER OF CHANNEL</b>	802.11b & 802.11g: 11 802.11a: 8 for 5.15 ~ 5.35GHz, 4 for 5.725 ~ 5.825GHz (per standard 15.407) 802.11a: 5 for 5.725 ~ 5.850GHz (per standard 15.247)
<b>CHANNEL SPACING</b>	802.11b & 802.11g: 5MHz 802.11a: 20MHz
<b>OUTPUT POWER</b>	93.756mW for 2412 ~ 2462MHz 21.478mW for 5.150 ~ 5.350GHz 82.794mW for 5.725 ~ 5.850GHz (per standard 15.247) 44.978mW for 5.725 ~ 5.825GHz (per standard 15.407)
<b>ANTENNA TYPE</b>	Refer to NOTE 2
<b>DATA CABLE</b>	1.8m non-shielded RJ45 cable without core
<b>I/O PORTS</b>	RJ45
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. This report is prepared for FCC class II permissive change. The model in this report is identical to the original application one. The differences are adding five antennas to this EUT for the test.

2. The following antennas were provided to this EUT.

Item	Antenna Type	Model	Gain (dBi)		Antenna connector
			2.4G	5G	
1	Patch	ML-2499-SD3-01	3.5	-	RP-BNC FEMALE
2	Dipole	ML-2499-HPA3-01	3.3	-	RP-BNC FEMALE
3	Dipole	ML-5299-HPA1-01	-	5.0	RP-SMA FEMALE
4	Panel	ML-5299-WPNA1-01	-	13.0	RP-SMA FEMALE
5	Yagi	ML-2499-BYGA2-01	13.9	-	Type N-Female

3. The EUT was operated with following power adapter:

<b>BRAND:</b>	LEADER ELECTRONICS INC.
<b>MODEL:</b>	IU15-2120100-WP
<b>INPUT:</b>	100~240Vac, 50-60Hz, 0.5A
<b>OUTPUT:</b>	12Vdc, 1.0A
<b>POWER LINE:</b>	DC 1.8m non-shielded cable without core

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

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.

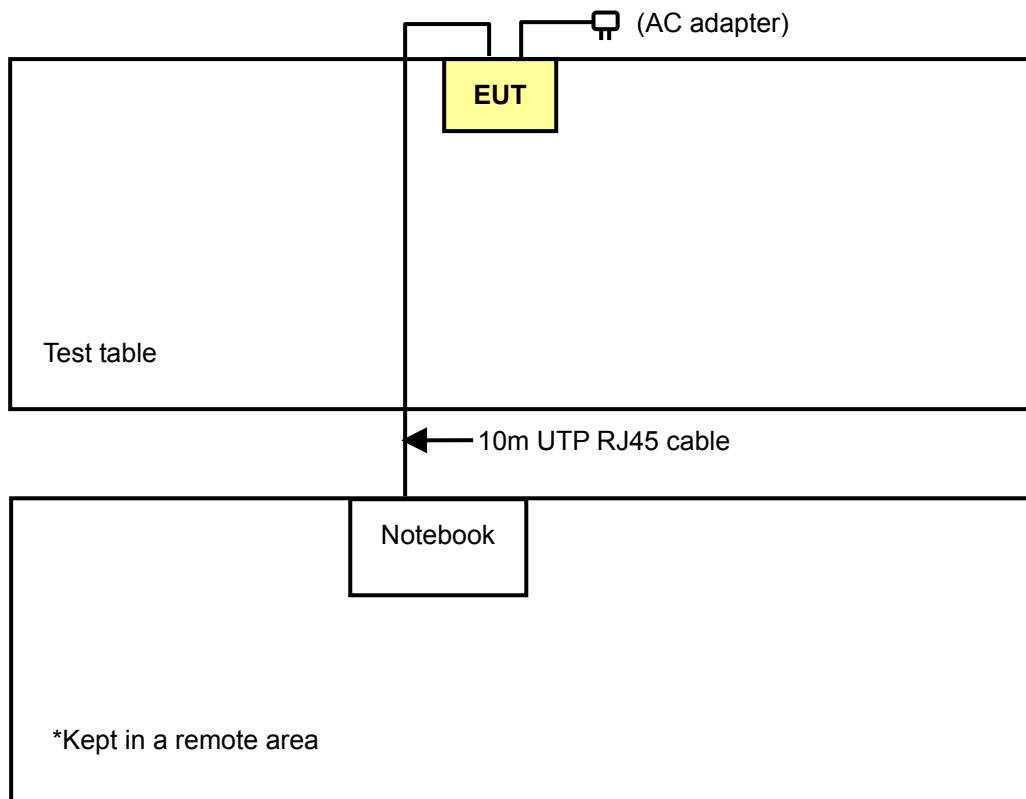
### 3.2 DESCRIPTION OF TEST MODES

Operated in 5GHz bands:

Twelve channels are provided to this EUT.

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
9	5745 MHz
10	5765 MHz
11	5785 MHz
12	5805 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	
A	√	√	√	√	Antenna item 3 (refer to NOTE 2 of section 3.1)
B	√	√	√	√	Antenna item 4 (refer to NOTE 2 of section 3.1)

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.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11a	1 to 12	11	OFDM	BPSK	6

#### **Radiated Emission Test (Below 1 GHz):**

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11a	1 to 12	11	OFDM	BPSK	6

#### **Radiated Emission Test (Above 1 GHz):**

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

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11a	1 to 12	1, 4, 5, 8, 9, 11, 12	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.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11a	1 to 12	1, 8, 9, 12	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.

EUT configure mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11a	1 to 12	1, 4, 5, 8, 9, 11, 12	OFDM	BPSK	6

**3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is a RF product. 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

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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. 11, 2006
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 07, 2007
Software ADT	ADT_Cond_V3	NA	NA

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

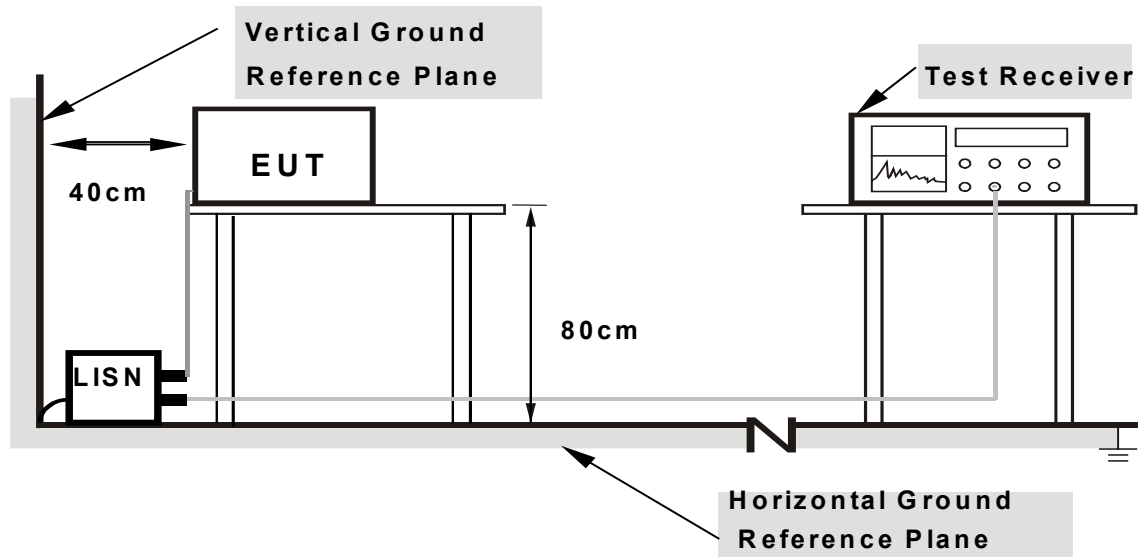
#### 4.1.3 TEST PROCEDURES

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

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



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

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Prepared another notebook system to act as a communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a UTP cable and run a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".

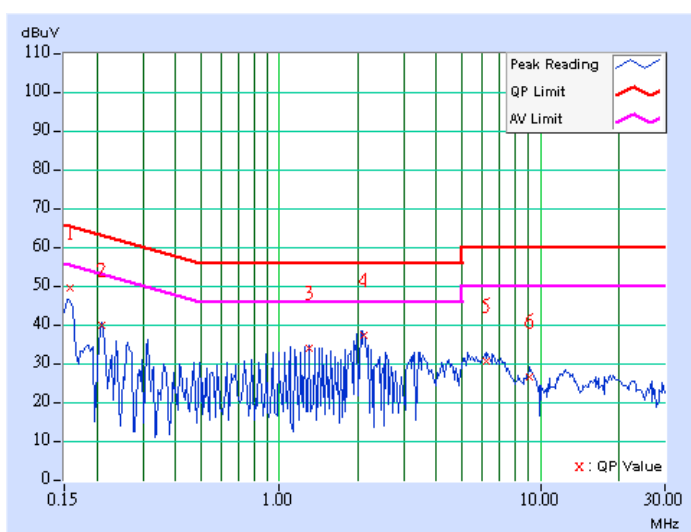
#### 4.1.7 TEST RESULTS

##### CONDUCTED WORST-CASE DATA FOR ANTENNA ITEM 3 (5.0dBi gain)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa
TESTED BY	Whisky Chang	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.158	0.10	49.23	-	49.33	-	65.58	55.58	-16.25	-
2	0.209	0.10	39.36	-	39.46	-	63.26	53.26	-23.80	-
3	1.309	0.20	33.54	-	33.74	-	56.00	46.00	-22.26	-
4	2.095	0.21	37.00	-	37.21	-	56.00	46.00	-18.79	-
5	6.180	0.47	30.39	-	30.86	-	60.00	50.00	-29.14	-
6	9.113	0.46	26.23	-	26.69	-	60.00	50.00	-33.31	-

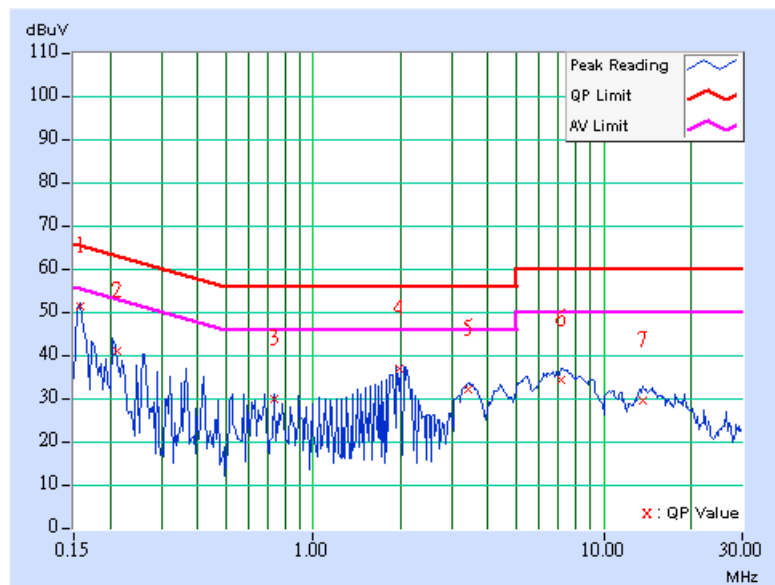
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa
TESTED BY	Whisky Chang	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.158	0.10	50.93	-	51.03	-	65.58	55.58	-14.55	-
2	0.211	0.10	40.70	-	40.80	-	63.16	53.16	-22.36	-
3	0.732	0.10	29.42	-	29.52	-	56.00	46.00	-26.48	-
4	1.990	0.20	36.65	-	36.85	-	56.00	46.00	-19.15	-
5	3.404	0.32	31.75	-	32.07	-	56.00	46.00	-23.93	-
6	7.121	0.42	33.95	-	34.37	-	60.00	50.00	-25.63	-
7	13.721	0.51	28.96	-	29.47	-	60.00	50.00	-30.53	-

- 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.



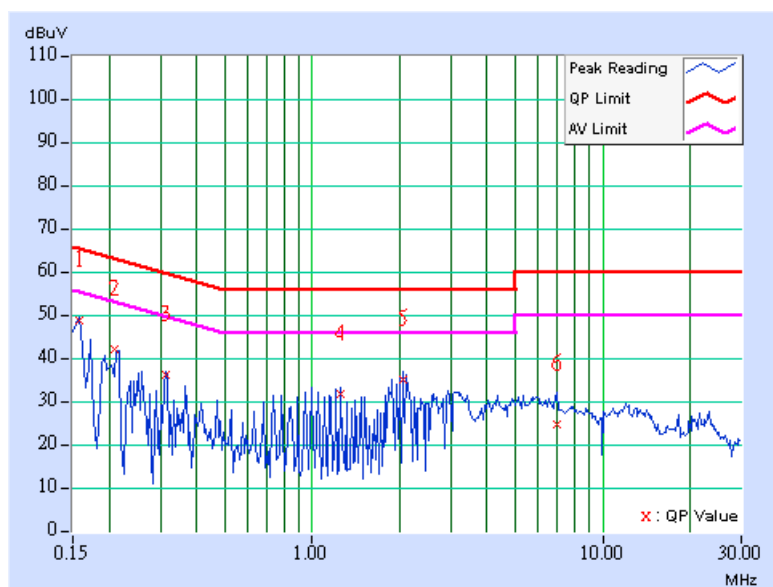


**FOR ANTENNA ITEM 4 (13.0dBi gain)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.158	0.10	48.25	-	48.35	-	65.58	55.58	-17.23	-
2	0.209	0.10	41.70	-	41.80	-	63.25	53.25	-21.45	-
3	0.314	0.10	35.92	-	36.02	-	59.86	49.86	-23.84	-
4	1.258	0.20	31.56	-	31.76	-	56.00	46.00	-24.24	-
5	2.047	0.21	34.57	-	34.78	-	56.00	46.00	-21.22	-
6	6.918	0.47	24.45	-	24.92	-	60.00	50.00	-35.08	-

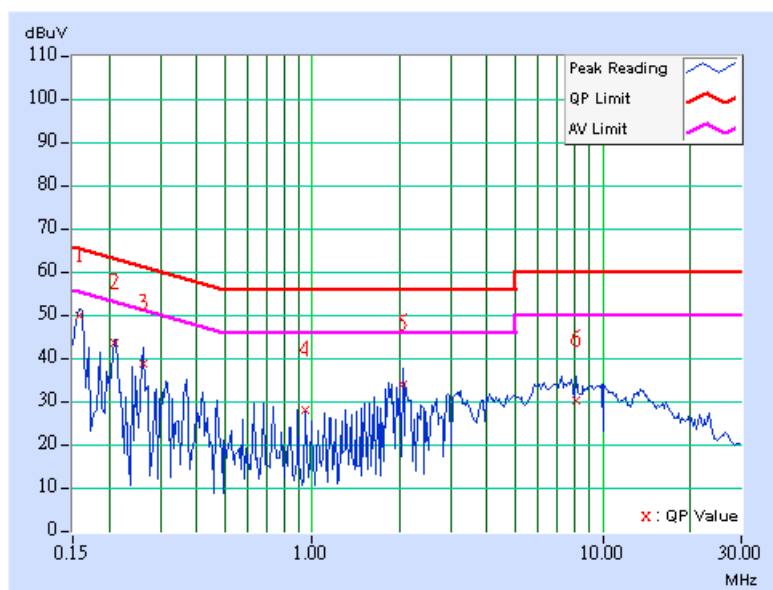
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
TESTED BY	Match Tsui	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	0.158	0.10	49.54	-	49.64	-	65.58
2	0.210	0.10	43.40	-	43.50	-	63.21	53.21	-19.71	-
3	0.263	0.10	38.50	-	38.60	-	61.33	51.33	-22.73	-
4	0.943	0.10	27.72	-	27.82	-	56.00	46.00	-28.18	-
5	2.043	0.20	33.81	-	34.01	-	56.00	46.00	-21.99	-
6	8.074	0.43	30.03	-	30.46	-	60.00	50.00	-29.54	-

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



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

**NOTE:**

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

#### 4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

**NOTE:**

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

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



#### 4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 01, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 04, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 01, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 19, 2007
Preamplifier Agilent	8449B	3008A01960	Nov. 09, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219268/4	Dec. 20, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	230129/4	Dec. 20, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA

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

#### 4.2.4 TEST PROCEDURES

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

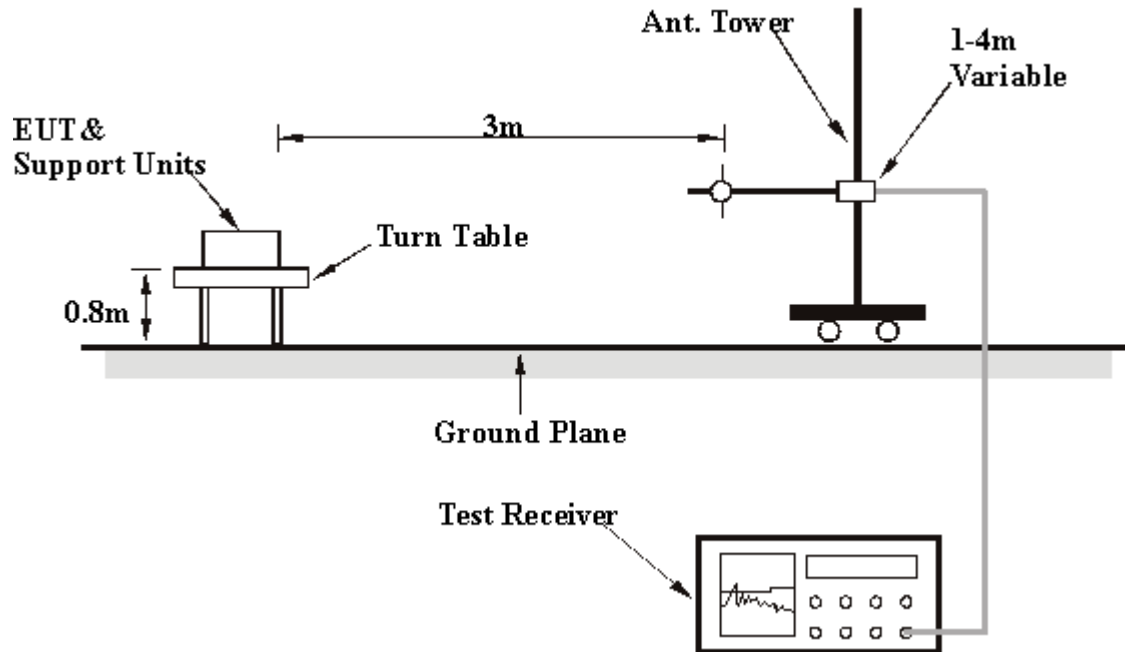
**NOTE:**

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

### RADIATED WORST-CASE DATA: BELOW 1GHz

#### FOR ANTENNA ITEM 3 (5.0dBi gain)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	269.10	38.98 QP	46.00	-7.02	1.00 H	229	25.02	13.96
2	360.46	37.68 QP	46.00	-8.32	1.00 H	199	21.21	16.47
3	539.30	34.16 QP	46.00	-11.84	1.25 H	163	13.38	20.78
4	630.66	35.22 QP	46.00	-10.78	1.25 H	163	12.32	22.90
5	720.08	39.58 QP	46.00	-6.42	1.00 H	211	14.78	24.80
6	751.18	42.17 QP	46.00	-3.83	1.25 H	184	16.38	25.79

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	45.55	32.73 QP	40.00	-7.27	1.00 V	355	17.62	15.11
2	249.66	31.42 QP	46.00	-14.58	1.50 V	145	19.00	12.43
3	500.42	34.86 QP	46.00	-11.14	1.25 V	274	14.91	19.95
4	624.83	32.78 QP	46.00	-13.22	1.00 V	262	9.95	22.83
5	720.08	38.39 QP	46.00	-7.61	1.50 V	70	13.59	24.80
6	751.18	39.66 QP	46.00	-6.34	1.25 V	214	13.87	25.79

- 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.





**FOR ANTENNA ITEM 4 (13.0dBi gain)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	269.10	38.09 QP	46.00	-7.91	1.25 H	217	24.13	13.96
2	360.46	34.68 QP	46.00	-11.32	1.00 H	304	18.22	16.47
3	539.30	34.14 QP	46.00	-11.86	1.25 H	175	13.37	20.78
4	630.66	35.43 QP	46.00	-10.57	1.25 H	190	12.53	22.90
5	720.08	39.18 QP	46.00	-6.82	1.25 H	214	14.38	24.80
6	751.18	42.54 QP	46.00	-3.46	1.25 H	214	16.75	25.79

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	43.61	35.50 QP	40.00	-4.50	1.00 V	328	20.50	15.01
2	249.66	30.27 QP	46.00	-15.73	1.25 V	127	17.85	12.43
3	269.10	31.78 QP	46.00	-14.22	1.25 V	280	17.82	13.96
4	624.83	34.27 QP	46.00	-11.73	1.00 V	253	11.43	22.83
5	720.08	35.65 QP	46.00	-10.35	1.25 V	235	10.85	24.80
6	751.18	39.58 QP	46.00	-6.42	1.25 V	208	13.78	25.79

- 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

### FOR ANTENNA ITEM 3 (5.0dBi gain)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	51.57 PK	74.00	-22.43	1.05 H	195	12.29	39.28
2	#5150.00	38.33 AV	54.00	-15.67	1.05 H	195	-0.95	39.28
3	*5180.00	93.46 PK			1.05 H	195	54.15	39.31
4	*5180.00	82.90 AV			1.05 H	195	43.59	39.31
5	10360.00	62.41 PK	68.30	-5.89	1.06 H	221	12.14	50.27

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	65.36 PK	74.00	-8.64	1.00 V	348	26.08	39.28
2	#5150.00	51.74 AV	54.00	-2.26	1.00 V	348	12.46	39.28
3	*5180.00	107.25 PK			1.01 V	17	67.94	39.31
4	*5180.00	96.32 AV			1.01 V	17	57.01	39.31
5	10360.00	64.85 PK	68.30	-3.45	1.02 V	24	14.58	50.27

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	93.24 PK			1.06 H	192	53.88	39.36
2	*5240.00	82.71 AV			1.06 H	192	43.35	39.36
3	10480.00	62.27 PK	68.30	-6.03	1.01 H	19	11.69	50.58

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	*5240.00	107.22 PK			1.02 V	15	67.86	39.36
2	*5240.00	96.06 AV			1.02 V	15	56.70	39.36
3	10480.00	64.71 PK	68.30	-3.59	1.07 V	9	14.13	50.58

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	95.87 PK			1.04 H	201	56.49	39.38
2	*5260.00	85.28 AV			1.04 H	201	45.90	39.38
3	10520.00	62.53 PK	68.30	-5.77	1.07 H	129	11.83	50.70

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	*5260.00	109.87 PK			1.02 V	20	70.49	39.38
2	*5260.00	98.93 AV			1.02 V	20	59.55	39.38
3	10520.00	64.62 PK	68.30	-3.68	1.05 V	29	13.92	50.70

- 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 TEST CONDITION		MEASUREMENT DETAIL	
<b>CHANNEL</b>	Channel 8	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TRANSFER RATE</b>	6Mbps	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz

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	95.93 PK			1.07 H	199	56.50	39.43
2	*5320.00	85.36 AV			1.07 H	199	45.93	39.43
3	#5350.00	52.23 PK	74.00	-21.77	1.07 H	199	12.77	39.46
4	#5350.00	39.76 AV	54.00	-14.24	1.07 H	199	0.30	39.46
5	#10640.00	63.29 PK	74.00	-10.71	1.01 H	62	12.30	50.99
6	#10640.00	49.98 AV	54.00	-4.02	1.01 H	62	-1.01	50.99

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	110.03 PK			1.08 V	11	70.60	39.43
2	*5320.00	99.55 AV			1.08 V	11	60.12	39.43
3	#5350.00	65.97 PK	74.00	-8.03	1.08 V	11	26.51	39.46
4	#5350.00	52.31 AV	54.00	-1.69	1.08 V	11	12.85	39.46
5	#10640.00	64.73 PK	74.00	-9.27	1.01 V	204	13.74	50.99
6	#10640.00	51.22 AV	54.00	-2.78	1.01 V	204	0.23	50.99

- 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 TEST CONDITION		MEASUREMENT DETAIL	
<b>CHANNEL</b>	Channel 9	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TRANSFER RATE</b>	6Mbps	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz

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	5715.00	52.35 PK	68.30	-15.95	1.11 H	225	13.33	39.02
2	5725.00	63.75 AV	78.30	-14.55	1.11 H	225	24.73	39.02
3	*5745.00	95.68 PK			1.08 H	235	56.63	39.05
4	*5745.00	84.42 AV			1.08 H	235	45.37	39.05
5	#11490.00	62.02 PK	74.00	-11.98	1.18 H	245	11.96	50.06
6	#11490.00	46.68 AV	54.00	-7.32	1.18 H	245	-3.38	50.06

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	5715.00	63.30 PK	68.30	-5.00	1.05 V	305	24.28	39.02
2	5725.00	76.62 AV	78.30	-1.68	1.05 V	305	37.60	39.02
3	*5745.00	106.45 PK			1.06 V	269	67.40	39.05
4	*5745.00	95.38 AV			1.06 V	269	56.33	39.05
5	#11490.00	64.28 PK	74.00	-9.72	1.05 V	152	14.22	50.06
6	#11490.00	48.89 AV	54.00	-5.11	1.05 V	152	-1.17	50.06

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	*5785.00	102.89 PK			1.10 H	207	62.54	40.35
2	*5785.00	91.72 AV			1.10 H	207	51.37	40.35
3	#11570.00	65.24 PK	74.00	-8.76	1.12 H	200	13.56	51.68
4	#11570.00	49.86 AV	54.00	-4.14	1.12 H	200	-1.82	51.68

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	*5785.00	113.76 PK			1.08 V	267	73.41	40.35
2	*5785.00	102.91 AV			1.08 V	267	62.56	40.35
3	#11570.00	67.52 PK	74.00	-6.48	1.03 V	212	15.84	51.68
4	#11570.00	52.11 AV	54.00	-1.89	1.03 V	212	0.43	51.68

- 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 TEST CONDITION		MEASUREMENT DETAIL	
<b>CHANNEL</b>	Channel 12	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TRANSFER RATE</b>	6Mbps	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz

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	*5805.00	95.58 PK			1.12 H	233	56.47	39.11
2	*5805.00	84.39 AV			1.12 H	233	45.28	39.11
3	5825.00	65.29 PK	78.30	-13.01	1.05 H	235	26.15	39.14
4	#11610.00	62.35 PK	74.00	-11.65	1.08 H	241	12.89	49.46
5	#11610.00	47.01 AV	54.00	-6.99	1.08 H	241	-2.45	49.46

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5805.00	106.49 PK			1.05 V	274	67.38	39.11
2	*5805.00	95.29 AV			1.05 V	274	56.18	39.11
3	5825.00	76.18 PK	78.30	-2.12	1.18 V	265	37.04	39.14
4	#11610.00	65.49 PK	74.00	-8.51	1.03 V	126	16.03	49.46
5	#11610.00	50.15 AV	54.00	-3.85	1.03 V	126	0.69	49.46

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



**FOR ANTENNA ITEM 4 (13.0dBi gain)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	49.85 PK	74.00	-24.15	1.08 H	22	12.03	37.82
2	#5150.00	39.15 AV	54.00	-14.85	1.08 H	22	1.33	37.82
3	*5180.00	97.74 PK			1.02 H	11	59.87	37.87
4	*5180.00	87.08 AV			1.02 H	11	49.21	37.87
5	10360.00	61.99 PK	68.30	-6.31	1.05 H	33	12.92	49.07

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	64.18 PK	74.00	-9.82	1.32 V	351	26.36	37.82
2	#5150.00	<b>52.99 AV</b>	<b>54.00</b>	<b>-1.01</b>	<b>1.32 V</b>	<b>351</b>	<b>15.17</b>	<b>37.82</b>
3	*5180.00	113.02 PK			1.32 V	351	75.15	37.87
4	*5180.00	101.24 AV			1.32 V	351	63.37	37.87
5	10360.00	62.97 PK	68.30	-5.33	1.00 V	0	13.90	49.07

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	97.96 PK			1.02 H	16	59.95	38.01
2	*5240.00	87.53 AV			1.02 H	16	49.52	38.01
3	10480.00	63.49 PK	68.30	-4.81	1.07 H	45	14.34	49.15

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	113.38 PK			1.23 V	328	75.37	38.01
2	*5240.00	102.05 AV			1.23 V	328	64.04	38.01
3	10480.00	64.82 PK	68.30	-3.48	1.05 V	7	15.67	49.15

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 5	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	97.89 PK			1.03 H	7	59.82	38.07
2	*5260.00	87.45 AV			1.03 H	7	49.38	38.07
3	10520.00	63.56 PK	68.30	-4.74	1.04 H	26	14.34	49.22

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	113.42 PK			1.20 V	315	75.35	38.07
2	*5260.00	102.17 AV			1.20 V	315	64.10	38.07
3	10520.00	64.93 PK	68.30	-3.37	1.04 V	3	15.71	49.22

- 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 TEST CONDITION		MEASUREMENT DETAIL	
<b>CHANNEL</b>	Channel 8	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TRANSFER RATE</b>	6Mbps	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz

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	97.36 PK			1.04 H	16	59.14	38.22
2	*5320.00	86.85 AV			1.04 H	16	48.63	38.22
3	#5350.00	50.11 PK	74.00	-23.89	1.06 H	12	11.83	38.28
4	#5350.00	39.65 AV	54.00	-14.35	1.06 H	12	1.37	38.28
5	#10640.00	63.12 PK	74.00	-10.88	1.05 H	15	13.61	49.51
6	#10640.00	49.85 AV	54.00	-4.15	1.05 H	15	0.34	49.51

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	112.61 PK			1.28 V	342	74.39	38.22
2	*5320.00	101.06 AV			1.28 V	342	62.84	38.22
3	#5350.00	63.88 PK	74.00	-10.12	1.27 V	341	25.60	38.28
4	#5350.00	52.42 AV	54.00	-1.58	1.27 V	341	14.14	38.28
5	#10640.00	64.85 PK	74.00	-9.15	1.08 V	35	15.34	49.51
6	#10640.00	51.32 AV	54.00	-2.68	1.08 V	35	1.81	49.51

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 9	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	5715.00	52.85 PK	68.30	-15.45	1.01 H	308	12.68	40.17
2	5725.00	65.64 AV	78.30	-12.66	1.01 H	308	25.45	40.19
3	*5745.00	96.64 PK			1.01 H	308	56.39	40.25
4	*5745.00	86.22 AV			1.01 H	308	45.97	40.25
5	#11490.00	59.62 PK	74.00	-14.38	1.09 H	221	7.77	51.84
6	#11490.00	46.87 AV	54.00	-7.13	1.09 H	221	-4.98	51.84

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	5715.00	63.88 PK	68.30	-4.42	1.06 V	4	23.71	40.17
2	5725.00	76.67 AV	78.30	-1.63	1.06 V	4	36.48	40.19
3	*5745.00	107.67 PK			1.04 V	4	67.42	40.25
4	*5745.00	97.35 AV			1.04 V	4	57.10	40.25
5	#11490.00	60.85 PK	74.00	-13.15	1.03 V	192	9.01	51.84
6	#11490.00	48.02 AV	54.00	-5.98	1.03 V	192	-3.82	51.84

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 64%RH, 991hPa
TESTED BY	Brad Wu	INPUT POWER (SYSTEM)	120Vac, 60 Hz

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	*5785.00	108.34 PK			1.00 H	312	67.99	40.35
2	*5785.00	97.53 AV			1.00 H	312	57.18	40.35
3	#11570.00	60.63 PK	74.00	-13.37	1.03 H	209	8.95	51.68
4	#11570.00	47.74 AV	54.00	-6.26	1.03 H	209	-3.94	51.68

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	*5785.00	119.24 PK			1.05 V	6	78.89	40.35
2	*5785.00	108.67 AV			1.05 V	6	68.32	40.35
3	#11570.00	61.42 PK	74.00	-12.58	1.09 V	231	9.74	51.68
4	#11570.00	48.71 AV	54.00	-5.29	1.09 V	231	-2.97	51.68

- 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 TEST CONDITION		MEASUREMENT DETAIL	
<b>CHANNEL</b>	Channel 12	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>MODULATION TYPE</b>	BPSK	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TRANSFER RATE</b>	6Mbps	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz

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	*5805.00	96.72 PK			1.02 H	311	56.32	40.40
2	*5805.00	86.31 AV			1.02 H	311	45.91	40.40
3	5825.00	65.12 PK	78.30	-13.18	1.02 H	311	24.67	40.45
4	5835.00	52.72 AV	68.30	-15.58	1.02 H	311	12.24	40.48
5	#11610.00	59.83 PK	74.00	-14.17	1.03 H	206	8.25	51.58
6	#11610.00	47.06 AV	54.00	-6.94	1.03 H	206	-4.52	51.58

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	*5805.00	107.87 PK			1.04 V	6	67.47	40.40
2	*5805.00	97.43 AV			1.04 V	6	57.03	40.40
3	5825.00	76.27 PK	78.30	-2.03	1.04 V	7	35.82	40.45
4	5835.00	63.87 AV	68.30	-4.43	1.04 V	7	23.39	40.48
5	#11610.00	60.92 PK	74.00	-13.08	1.06 V	202	9.34	51.58
6	#11610.00	48.14 AV	54.00	-5.86	1.06 V	202	-3.44	51.58

- 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
SPECTRUM ANALYZER	E4446A	MY44360128	Dec. 06, 2006

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



#### 4.3.3 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:**

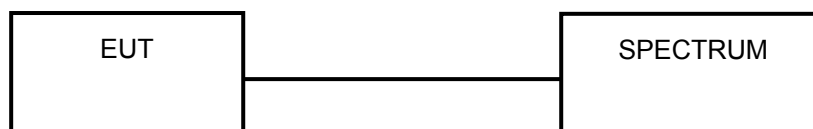
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

#### FOR ANTENNA ITEM 3 (5.0dBi gain)

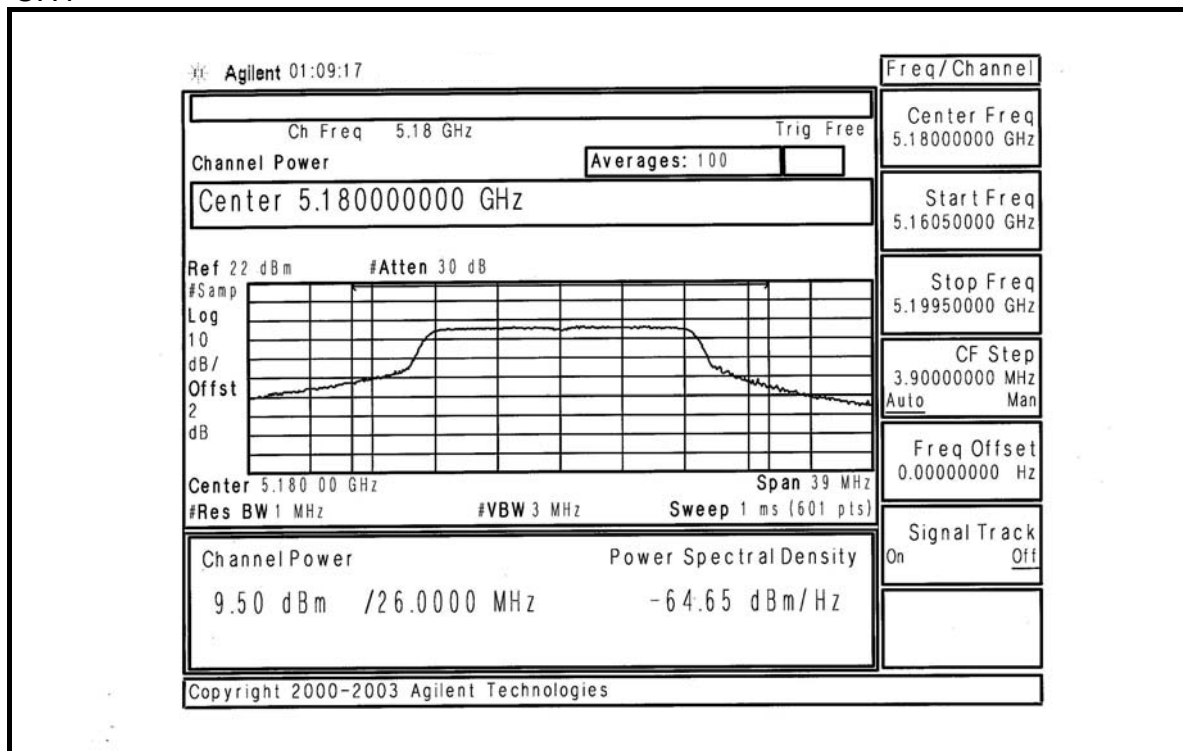
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg.C, 63%RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	8.913	9.50	17.00	25.62	PASS
4	5240	8.995	9.54	17.00	25.34	PASS
5	5260	19.770	12.96	24.00	25.62	PASS
8	5320	21.478	13.32	24.00	26.32	PASS
9	5745	9.226	9.65	30.00	26.18	PASS
11	5785	39.902	16.01	30.00	38.79	PASS
12	5805	11.749	10.70	30.00	27.44	PASS

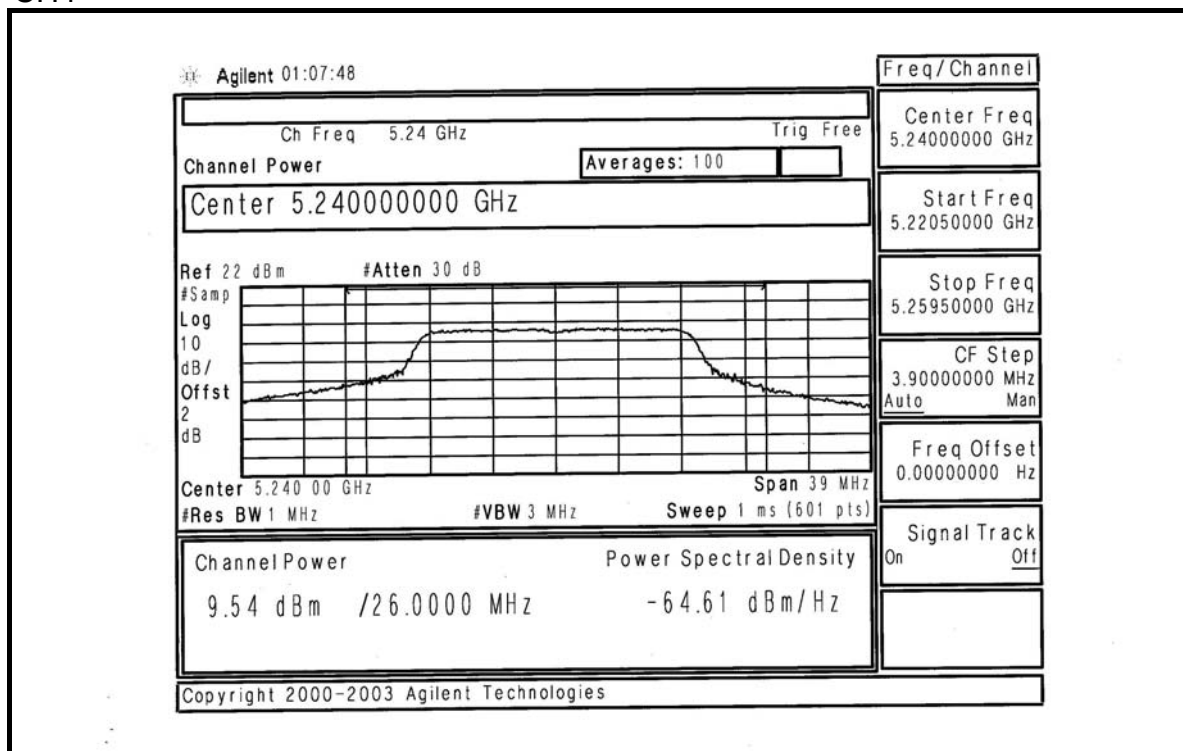
**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.



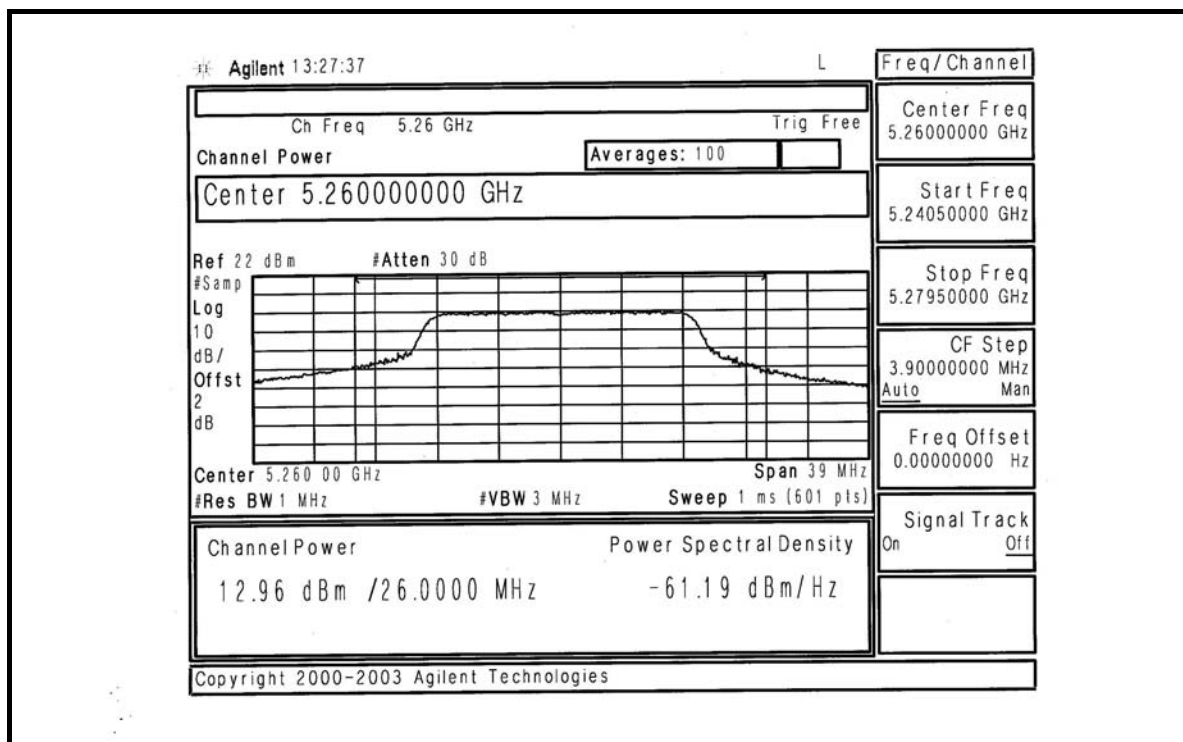
### Peak Power Output: CH1



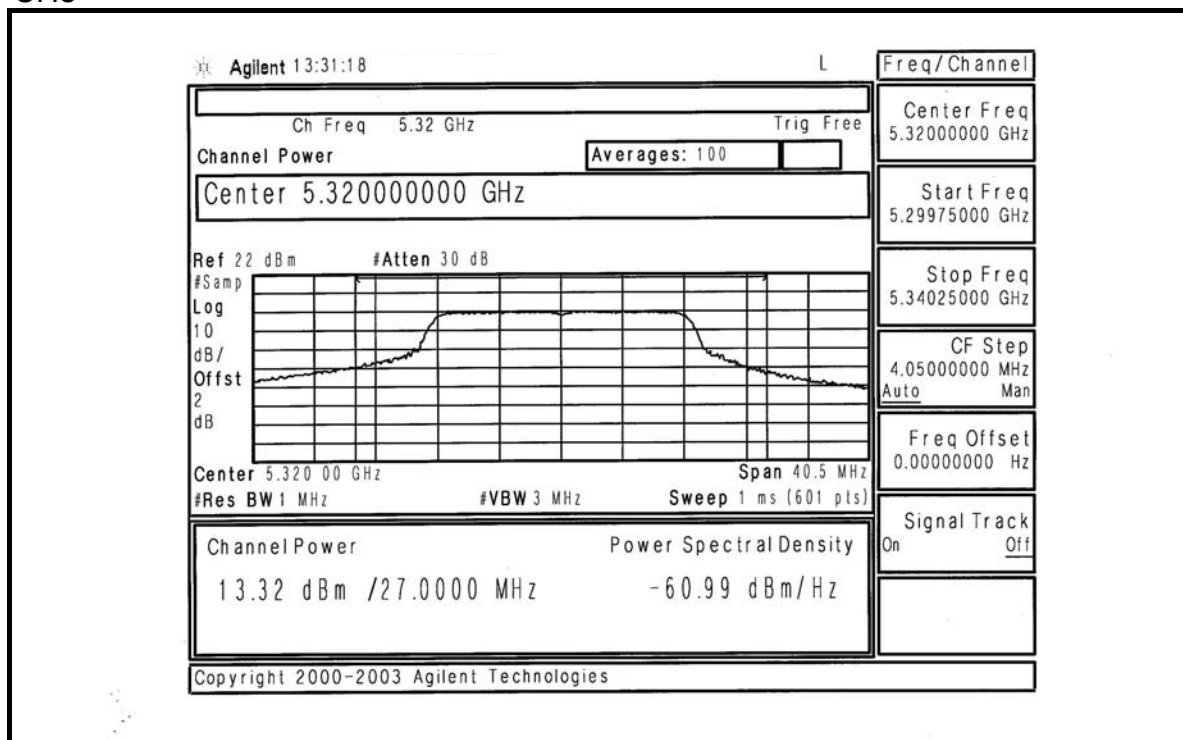
### CH4



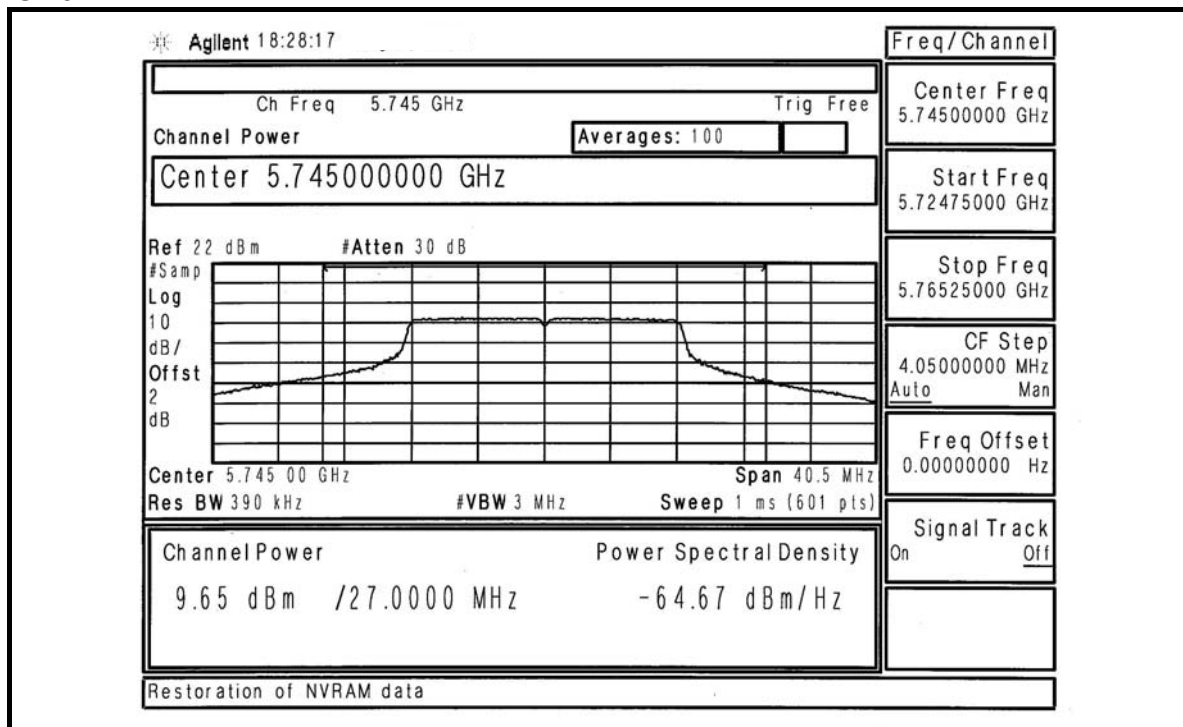
CH5



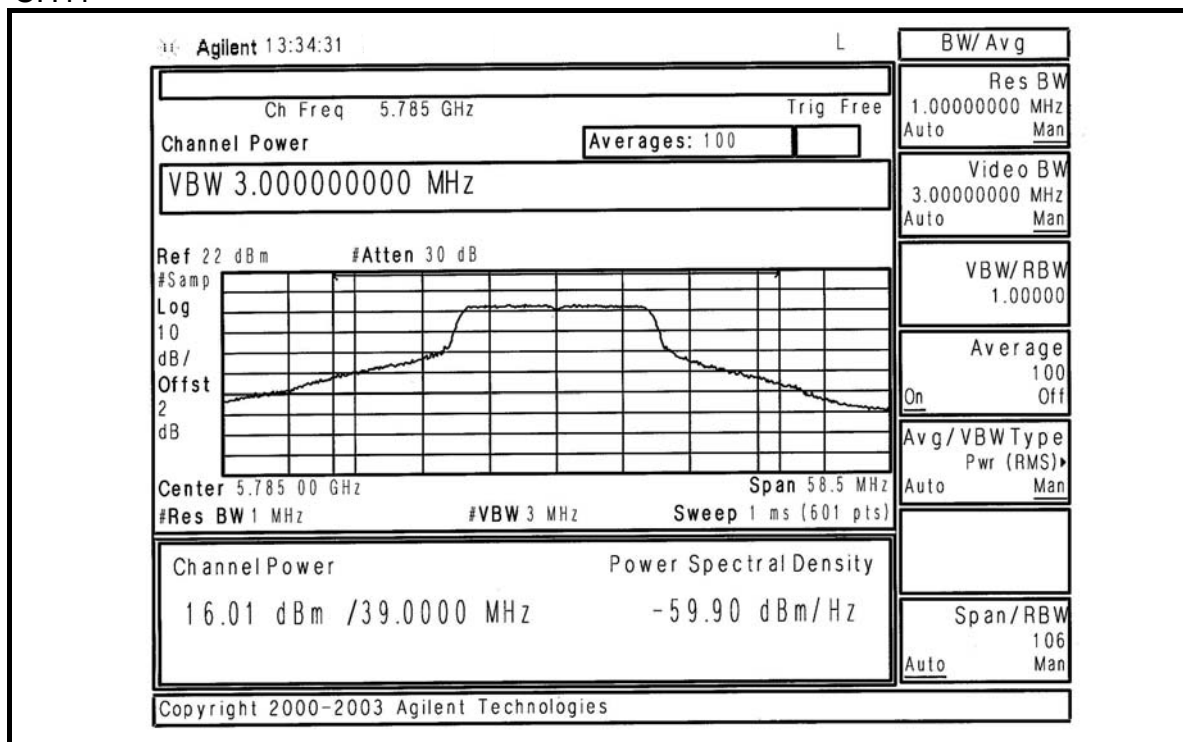
CH8



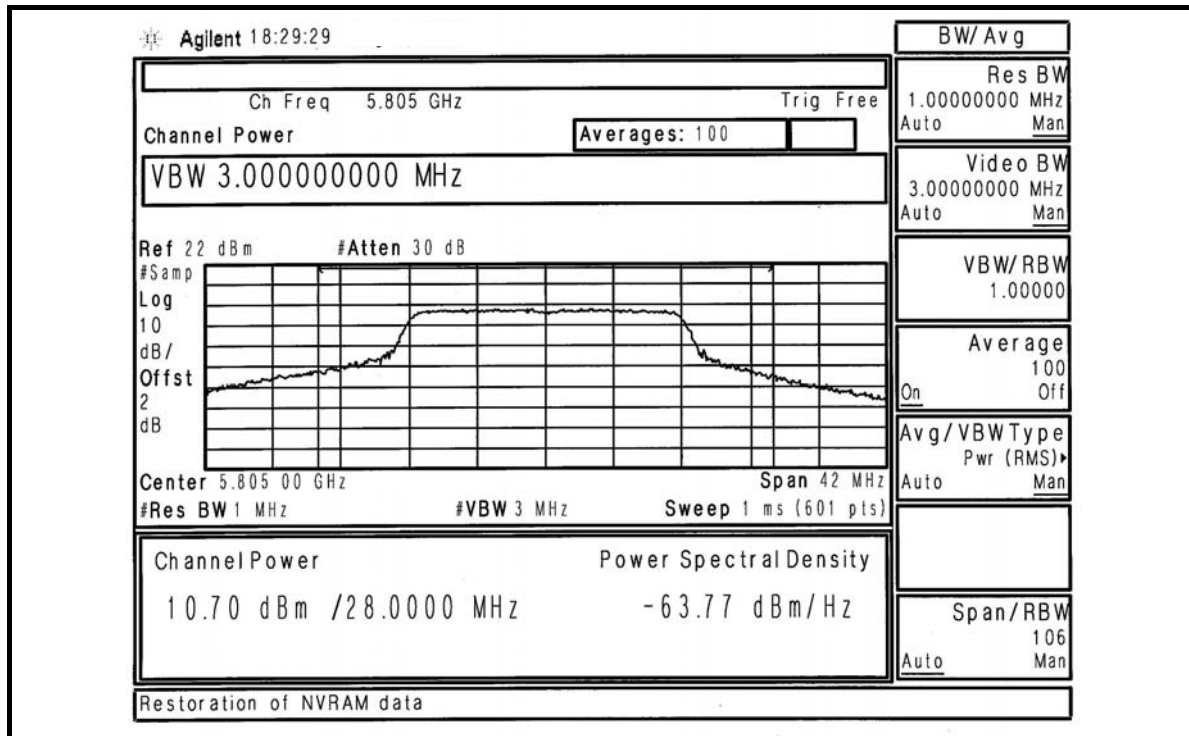
### CH9



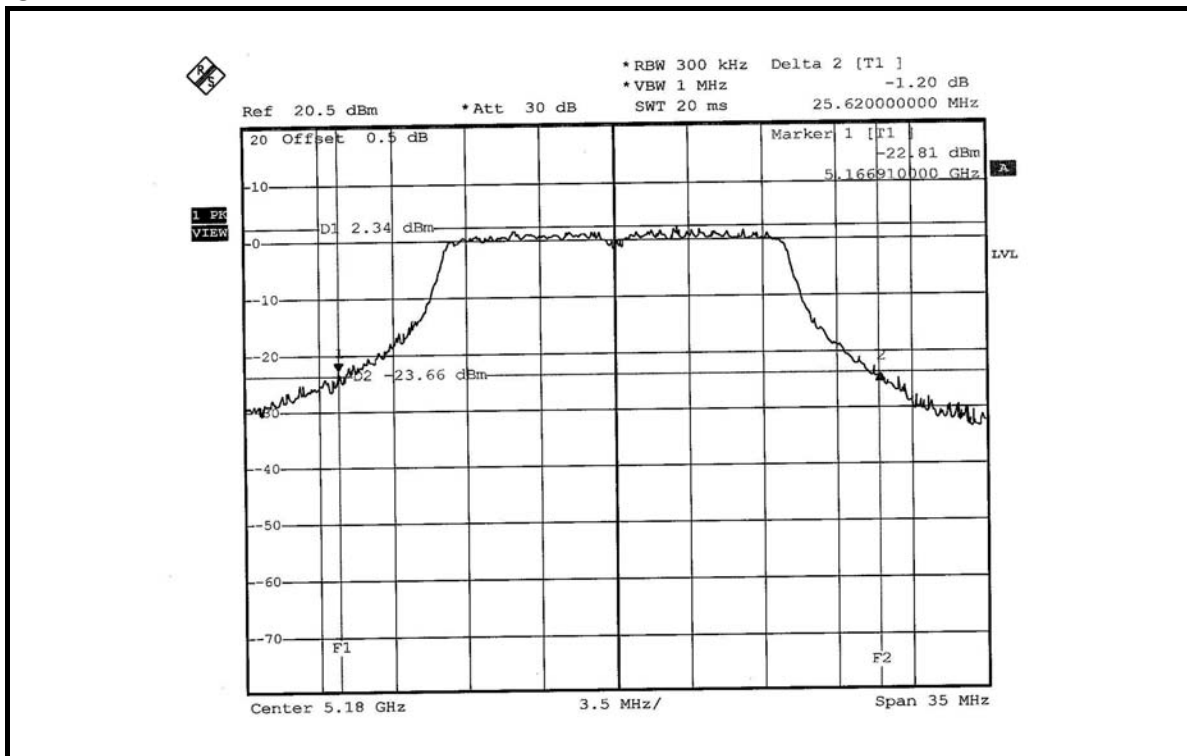
### CH11



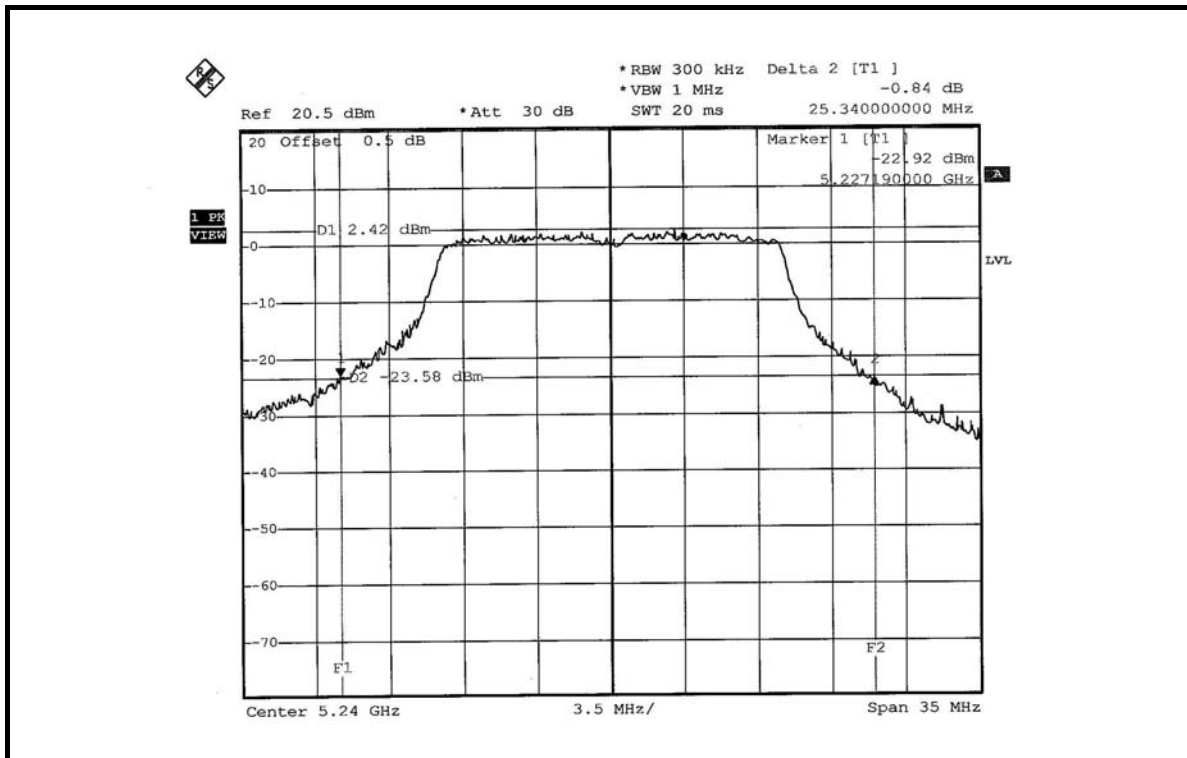
CH12



26dB Occupied Bandwidth:  
CH1

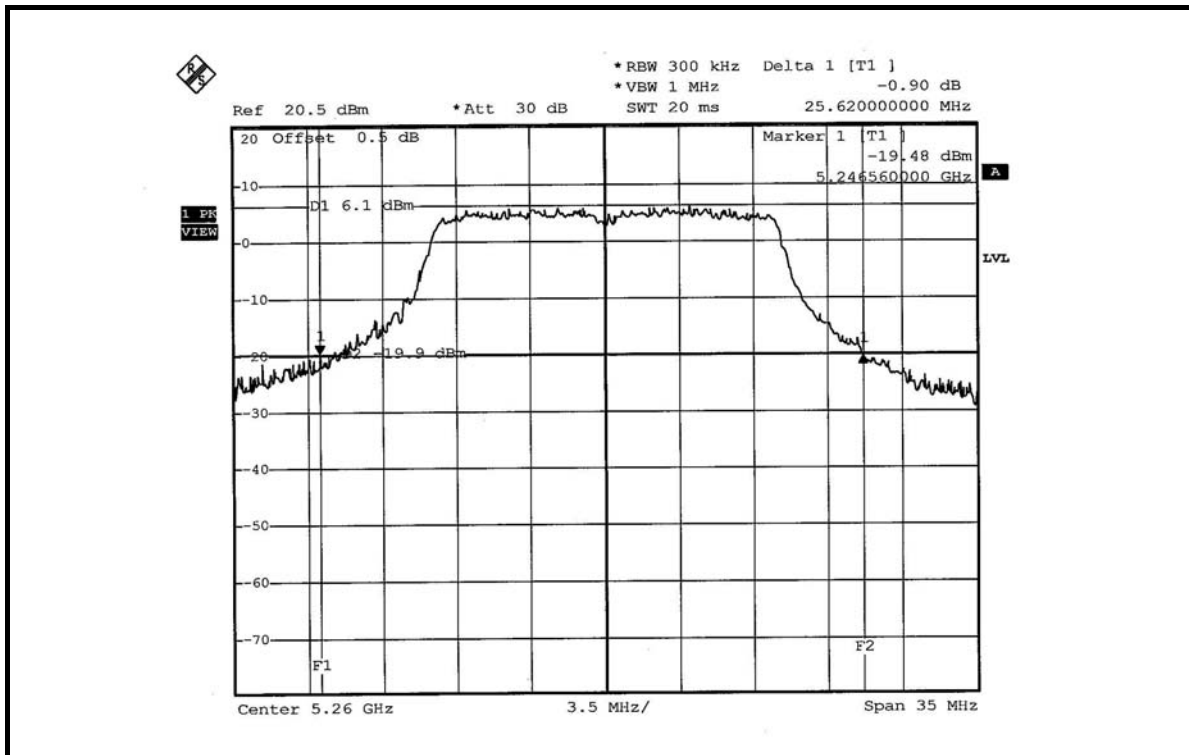


CH4

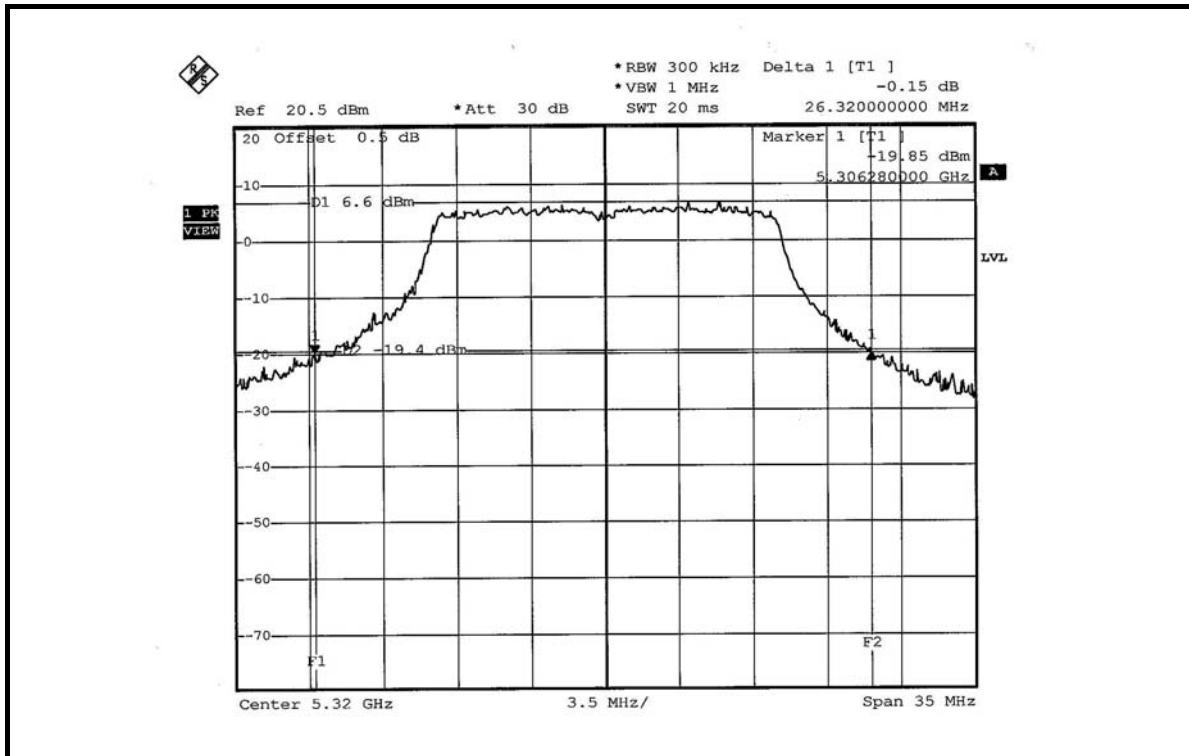




### CH5

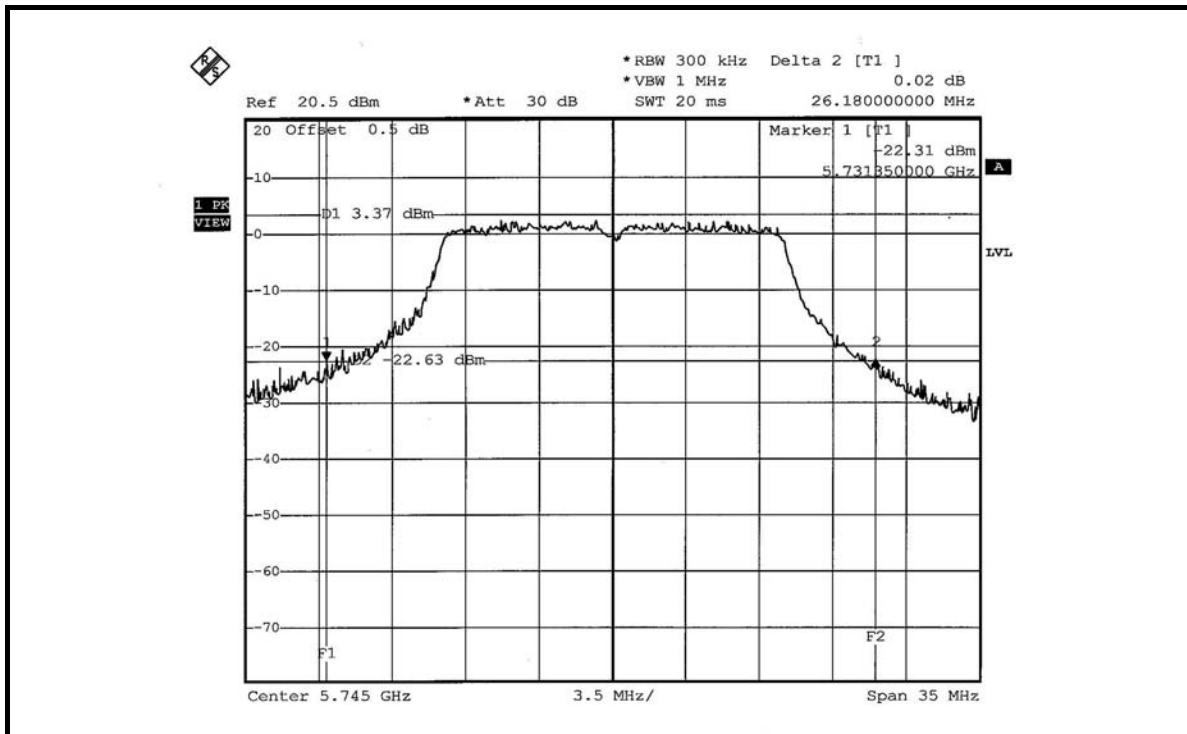


### CH8

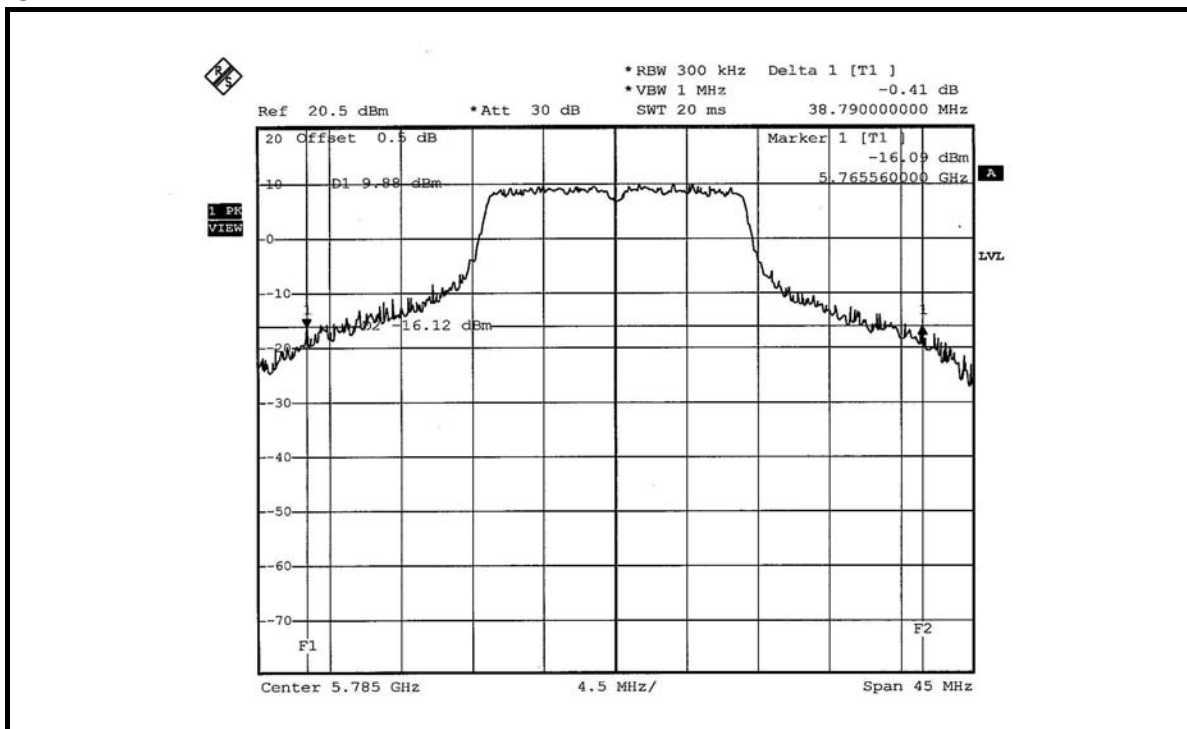




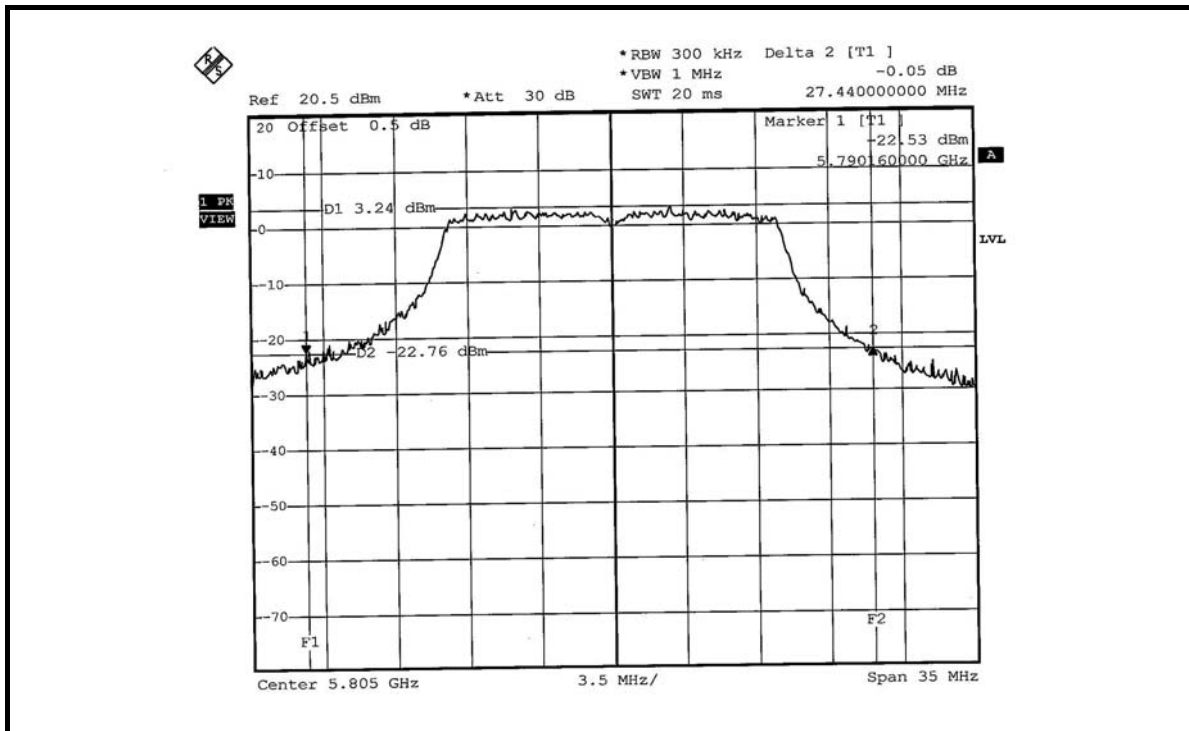
CH9



CH11



CH12





**FOR ANTENNA ITEM 4 (13.0dBi gain)**

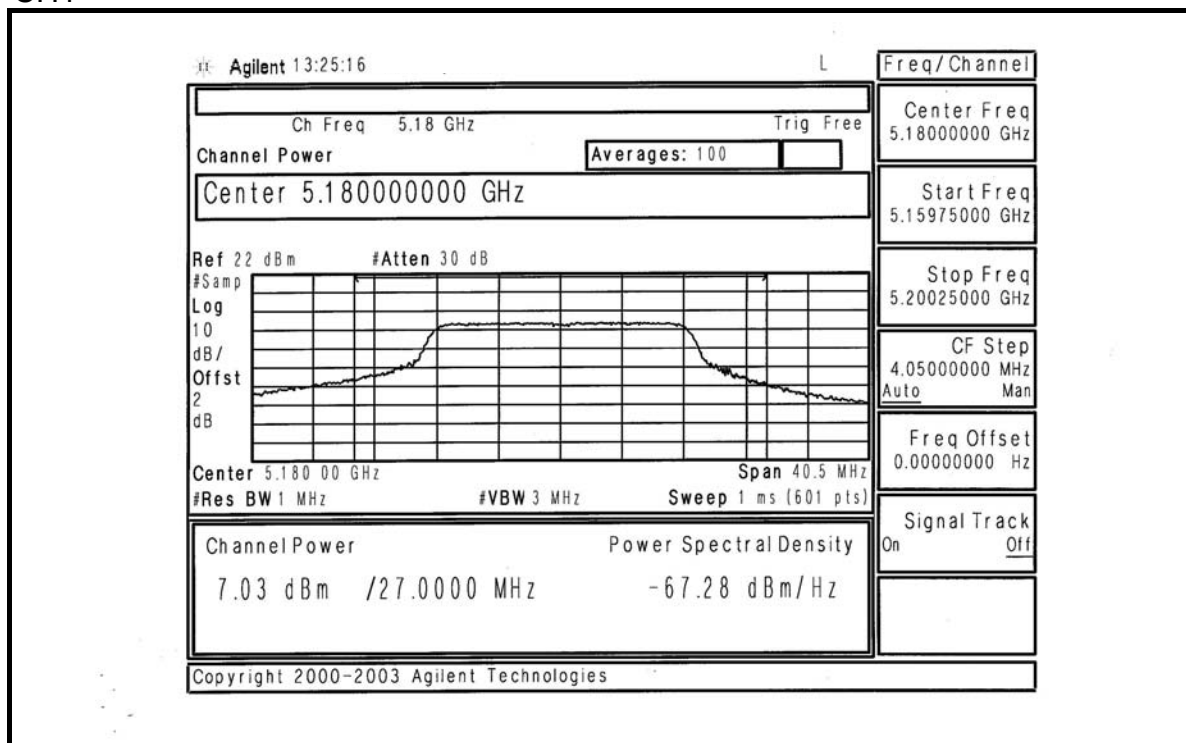
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	22deg.C, 63%RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	5.047	7.03	10.00	26.18	PASS
4	5240	5.546	7.44	10.00	24.99	PASS
5	5260	5.105	7.08	17.00	25.41	PASS
8	5320	5.105	7.08	17.00	26.11	PASS
9	5745	5.082	7.06	23.00	26.81	PASS
11	5785	44.978	16.53	23.00	39.51	PASS
12	5805	5.070	7.05	23.00	25.55	PASS

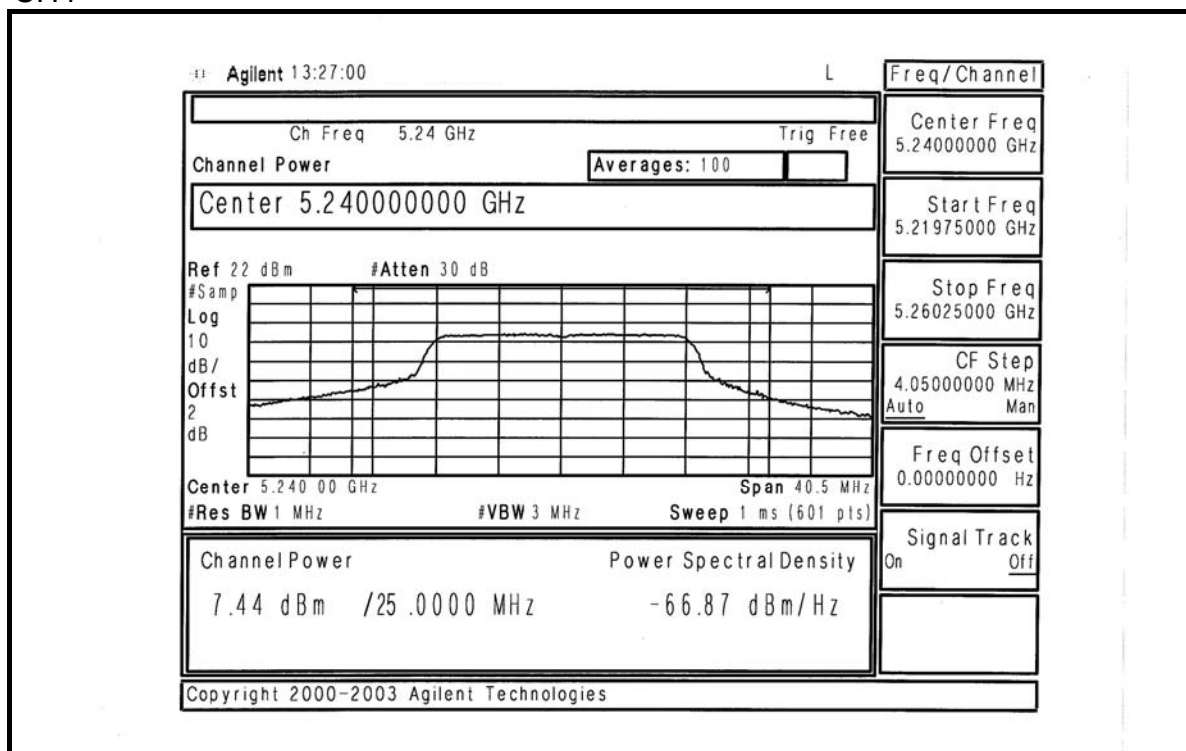
**NOTE1:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.

**NOTE2:** According to 15.407 (a) (1) (2) (3), the maximum antenna gain 13dBi is higher than 6dBi, so the limit of peak power shall be reduced by 7dB.

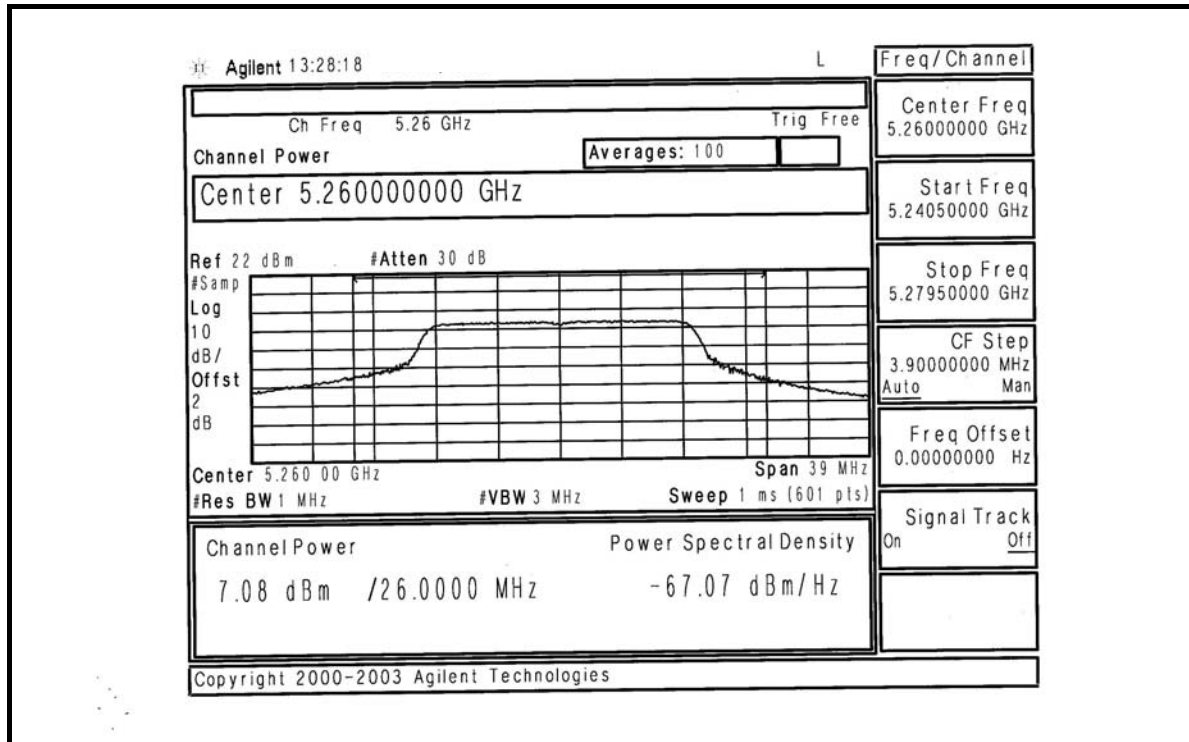
Peak Power Output:  
CH1



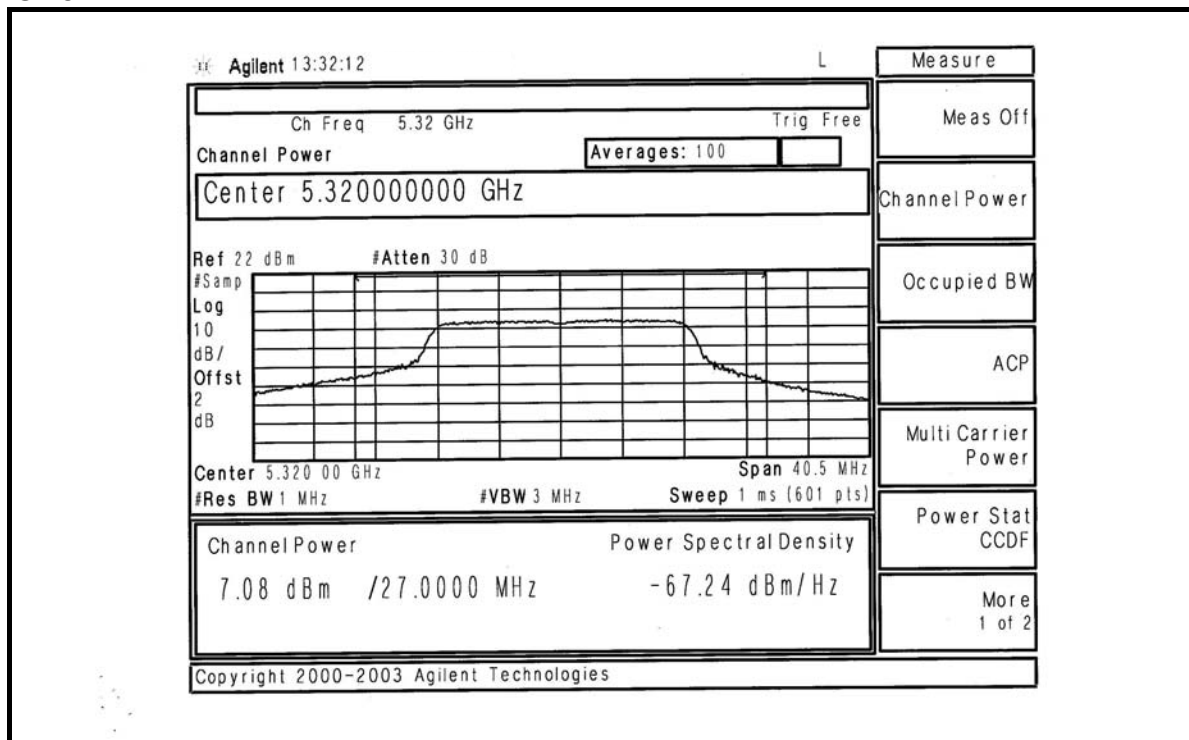
CH4



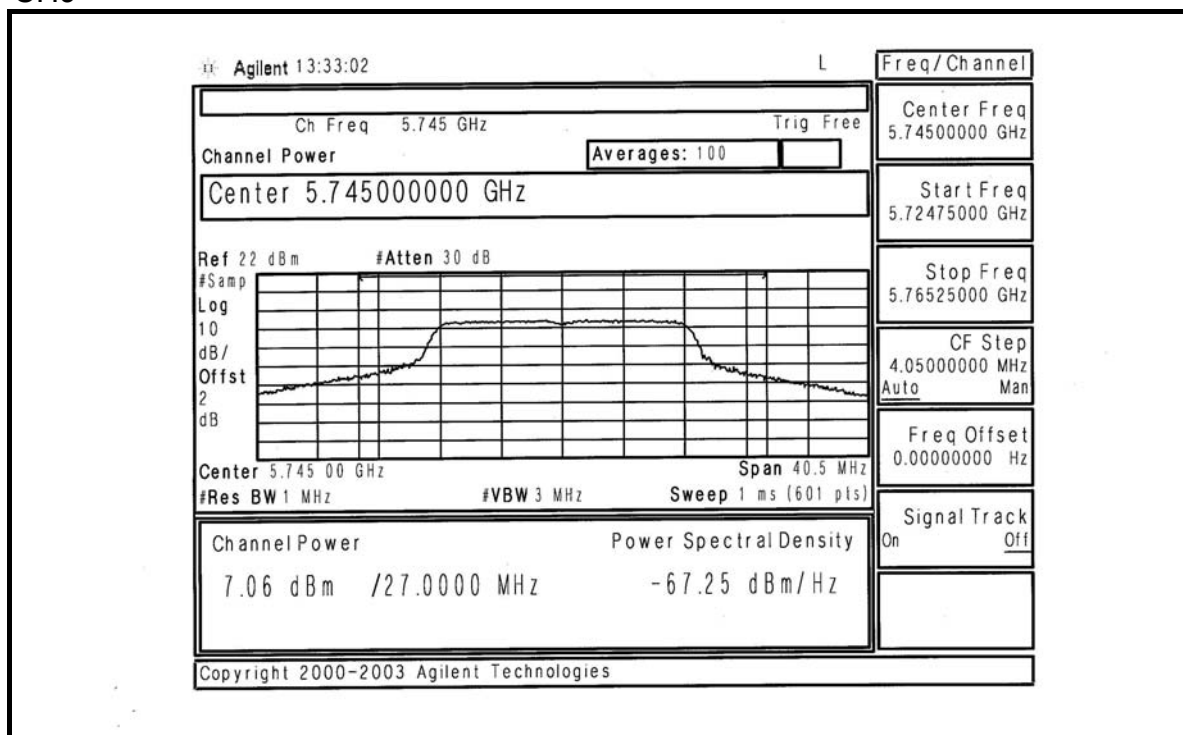
CH5



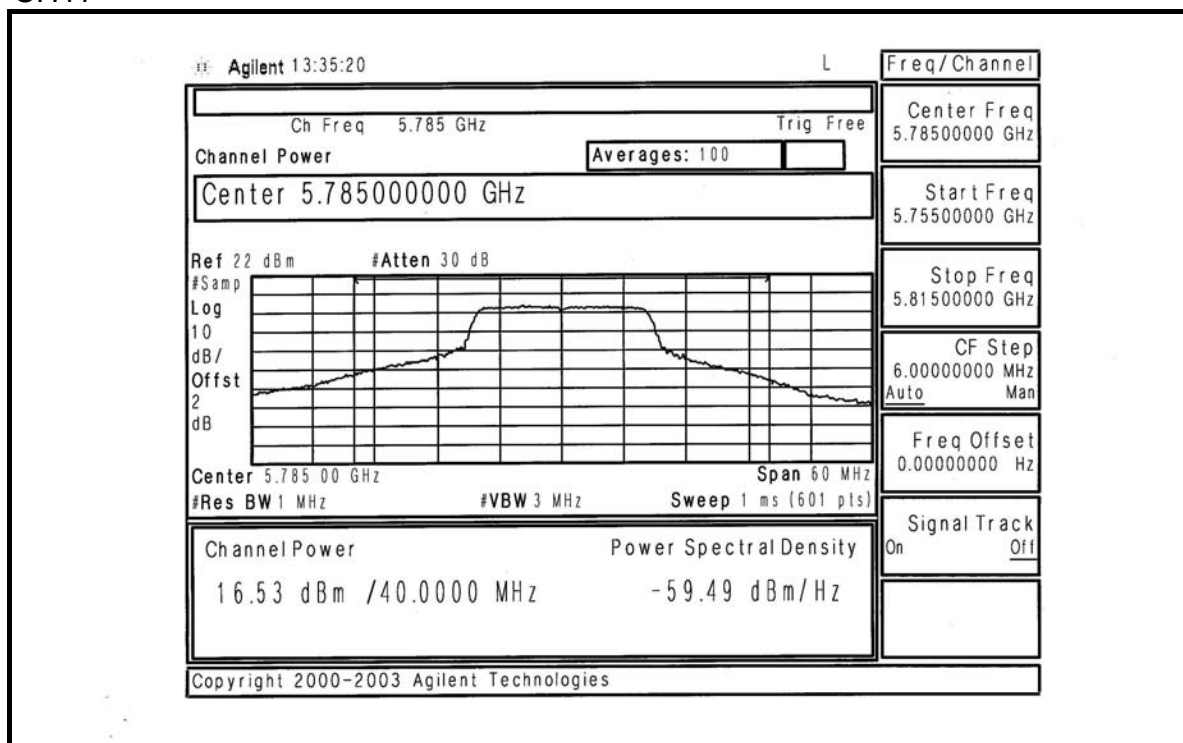
CH8



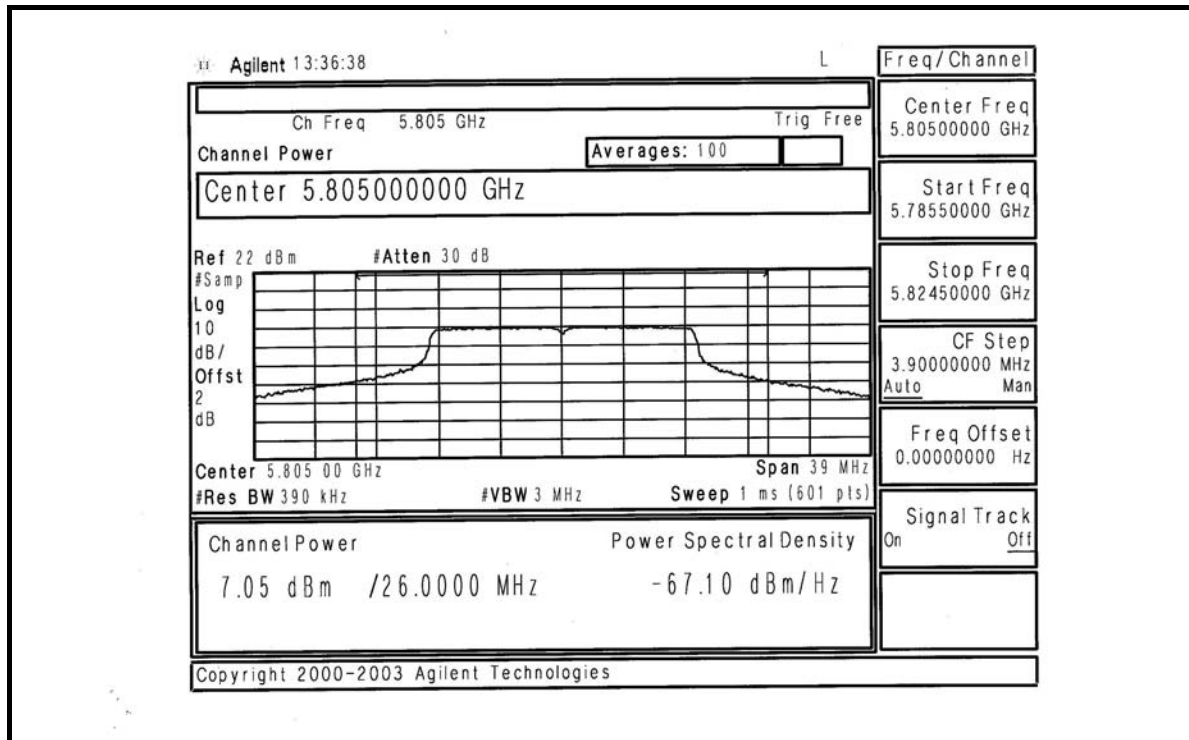
## CH9



## CH11

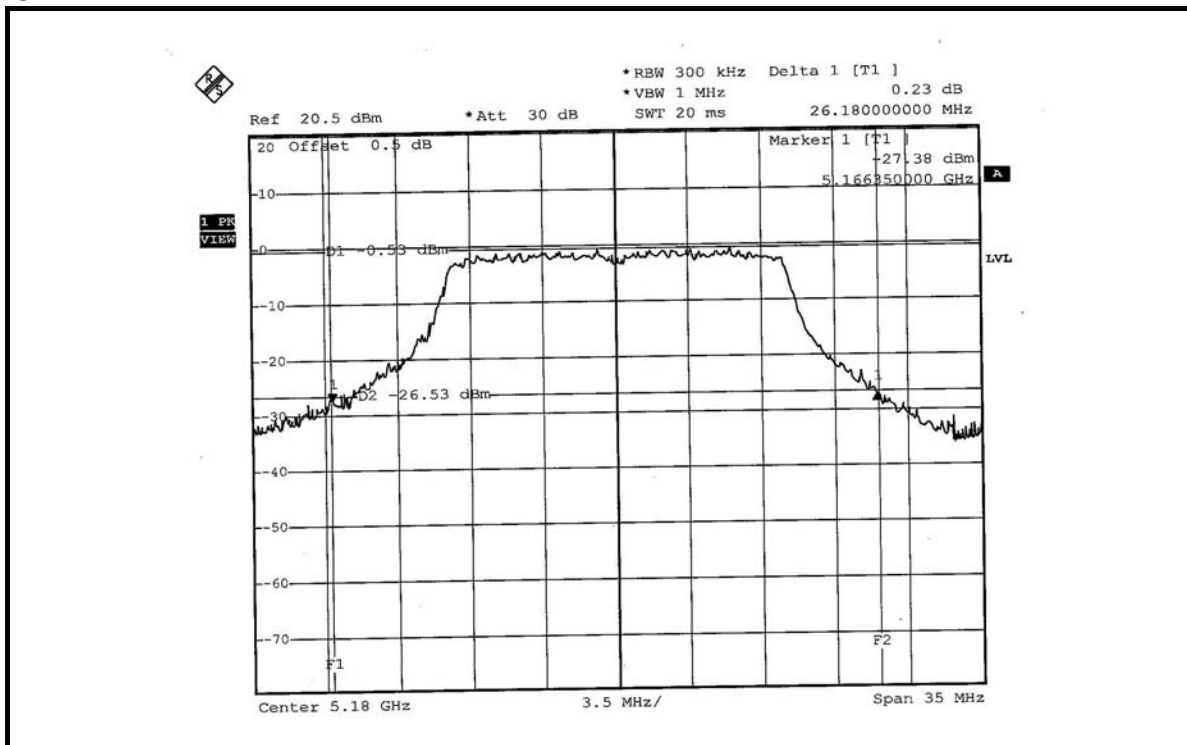


CH12

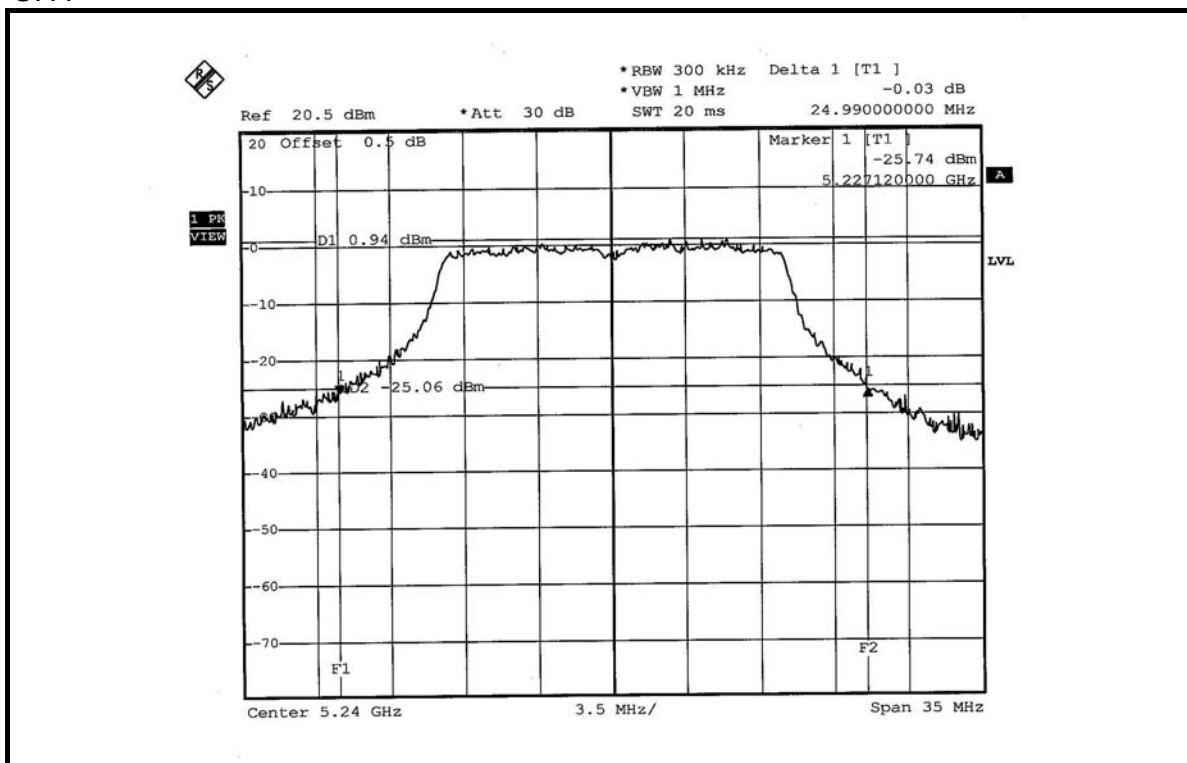




26dB Occupied Bandwidth:  
CH1

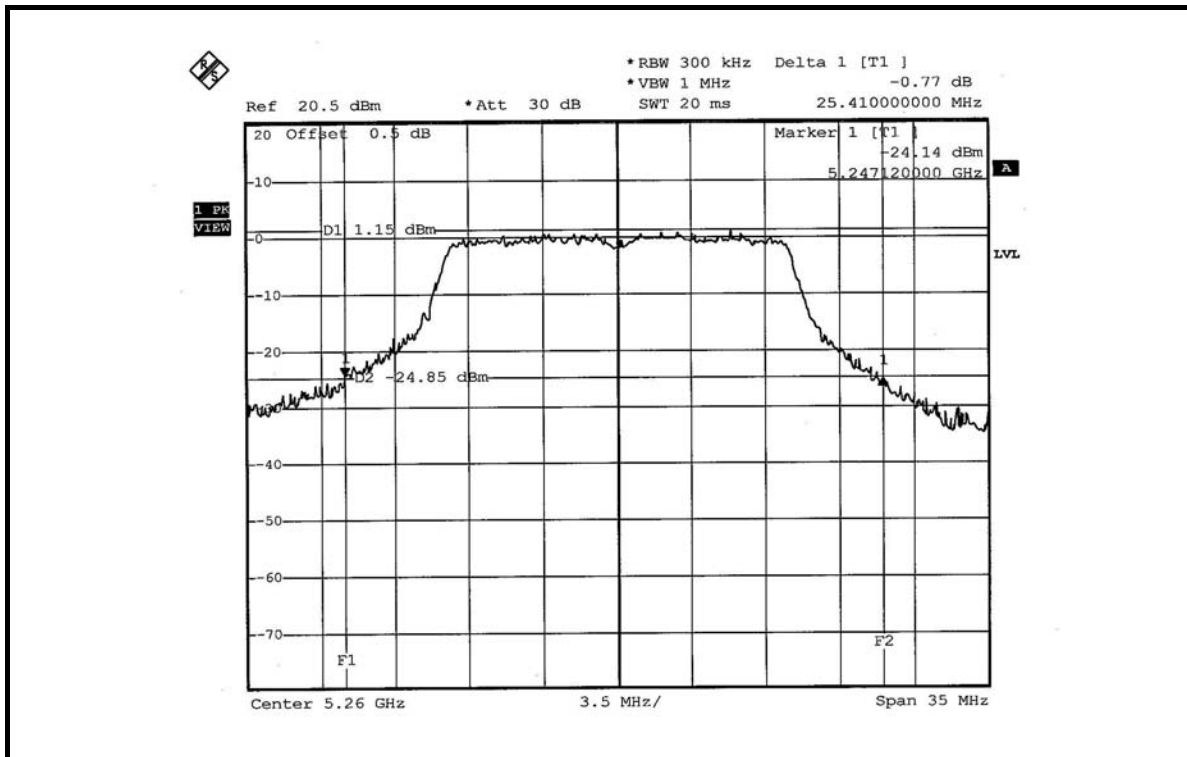


CH4

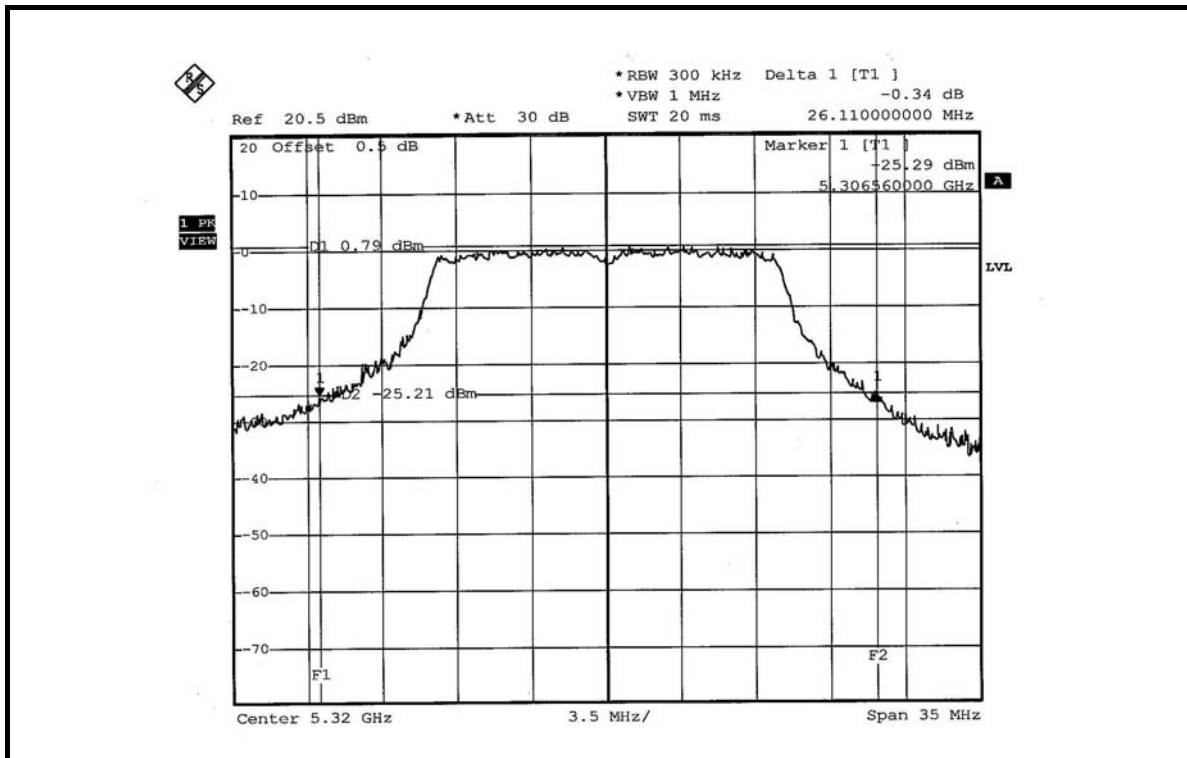




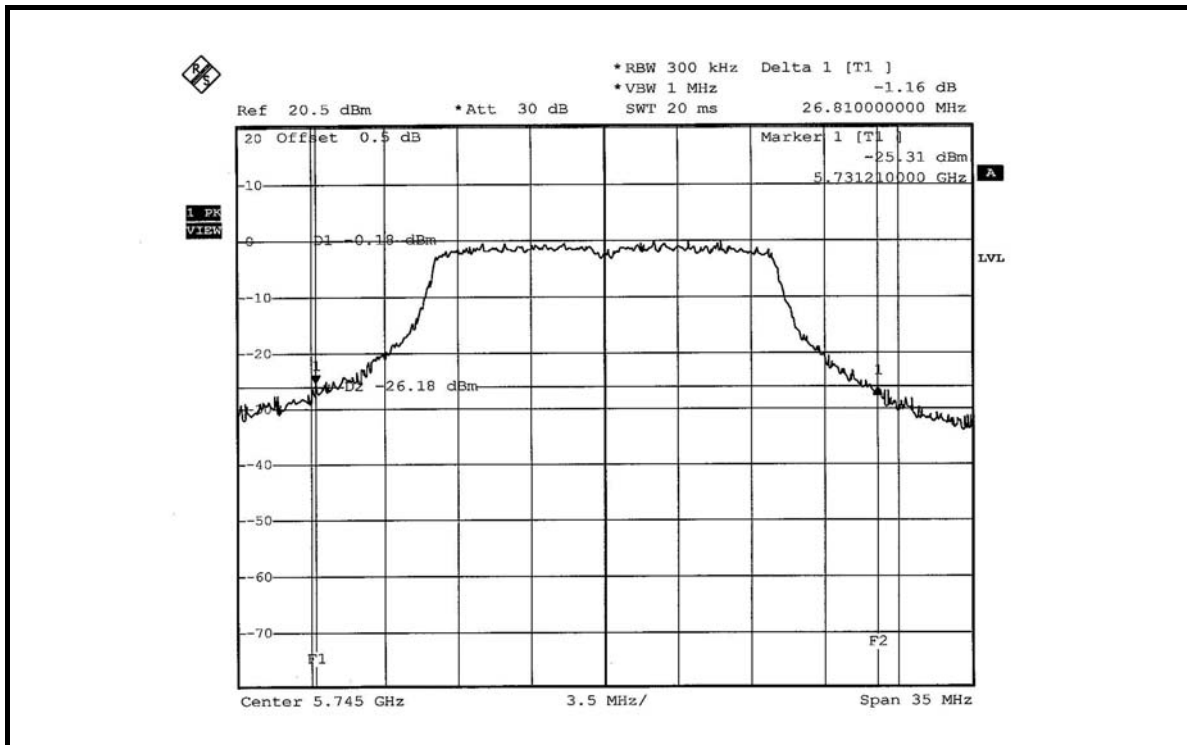
CH5



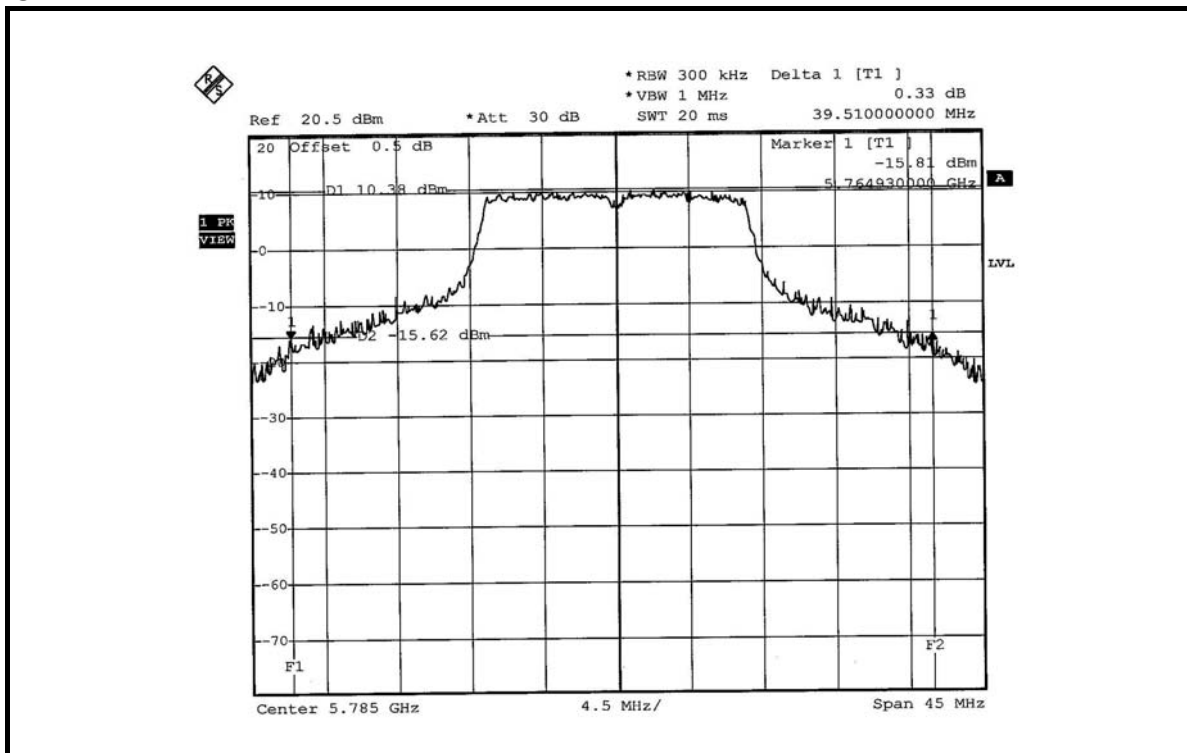
CH8



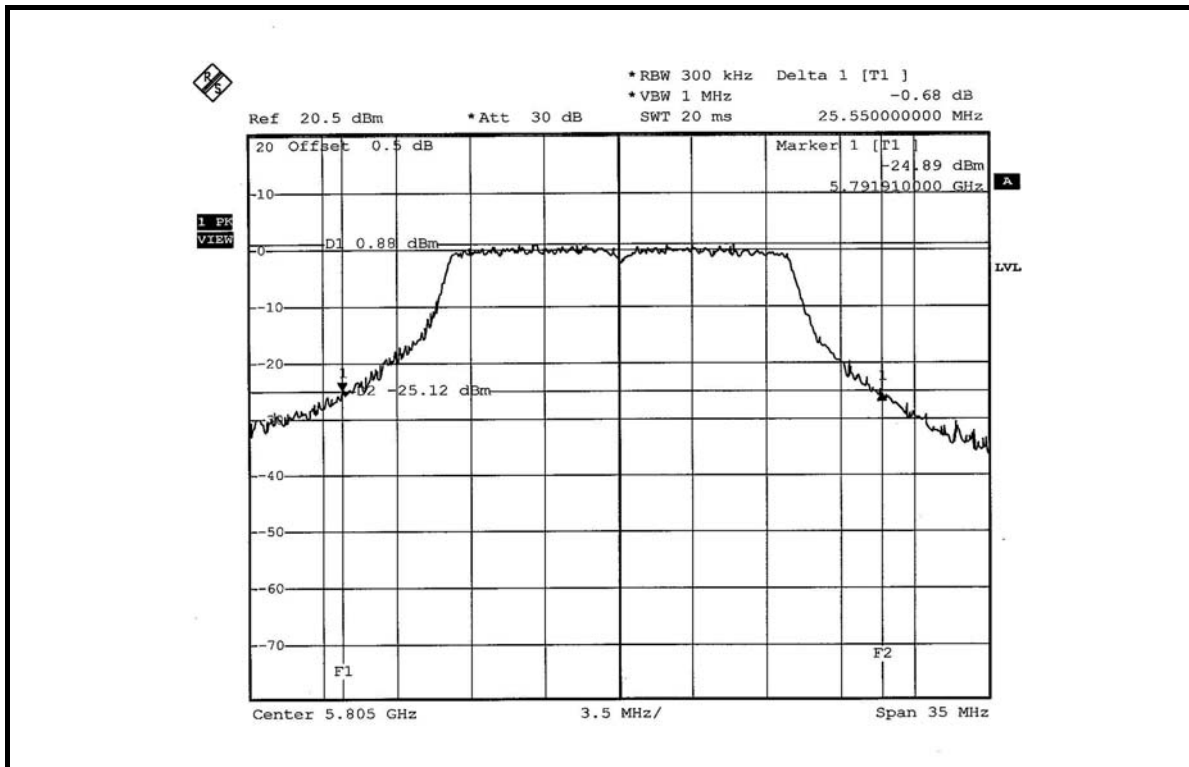
### CH9



### CH11



CH12





## 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	FSEK 30	100049	Aug. 14, 2006

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