

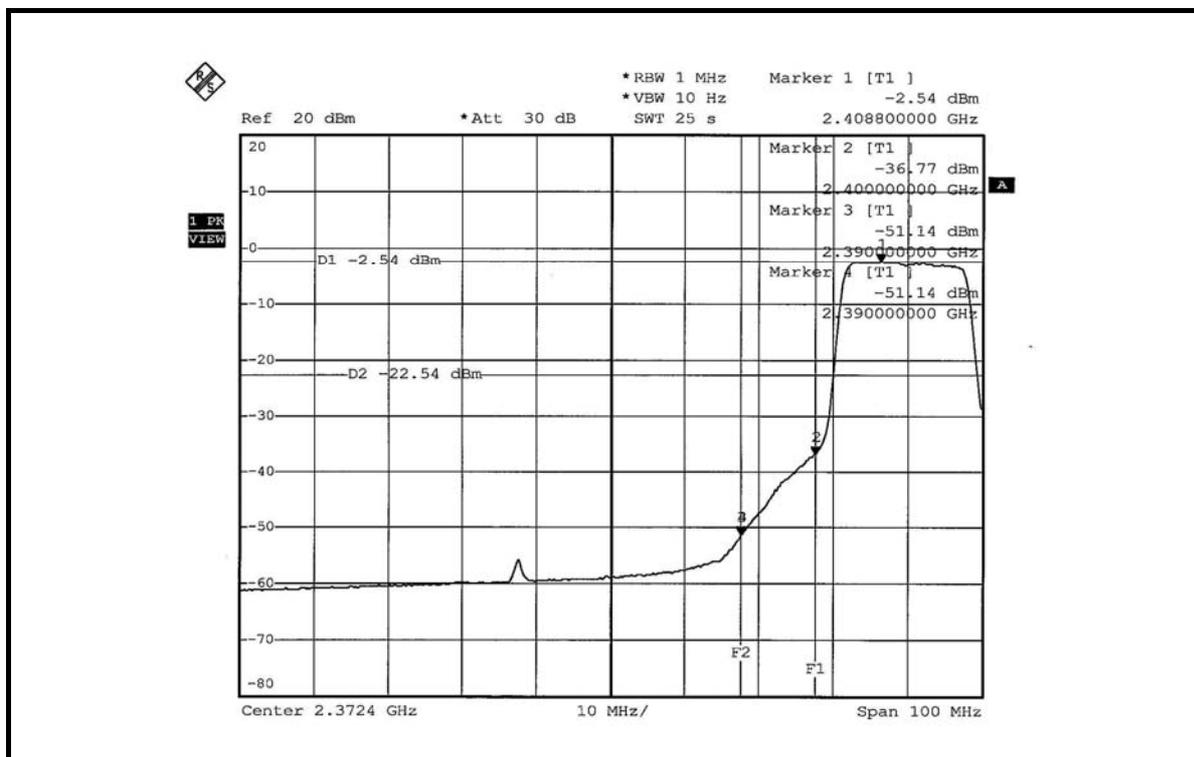
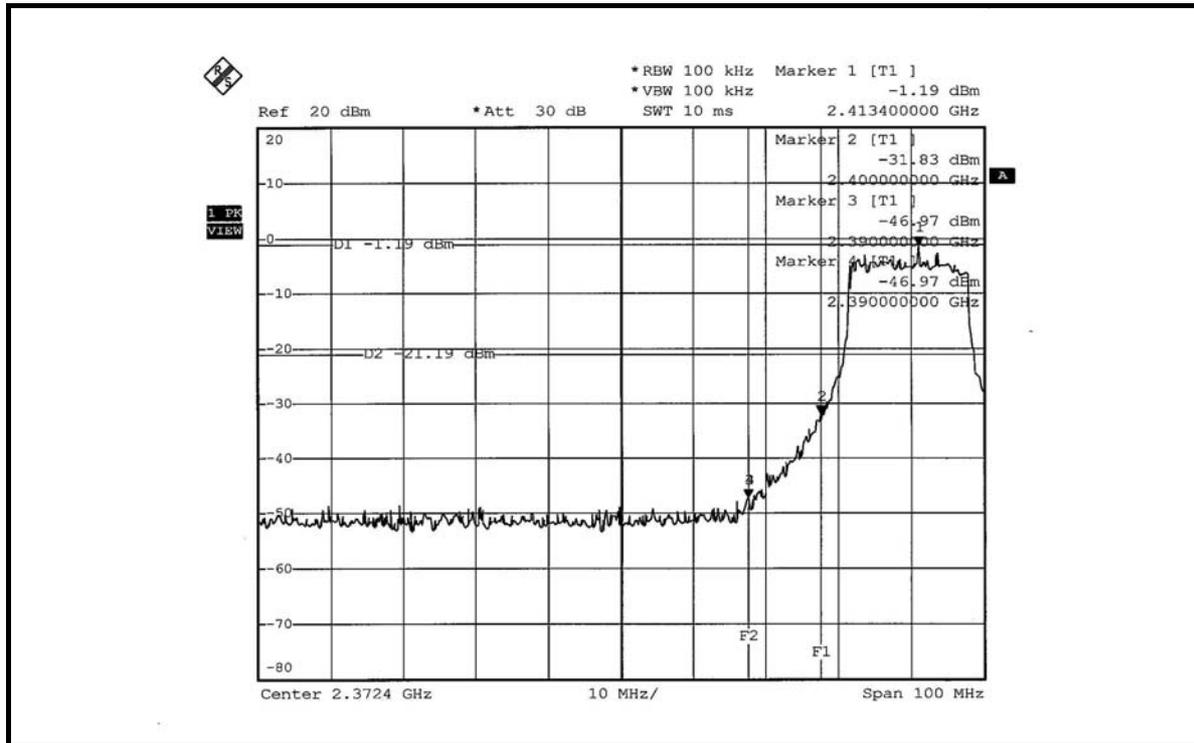
## SINGLE TX: 802.11g OFDM MODULATION

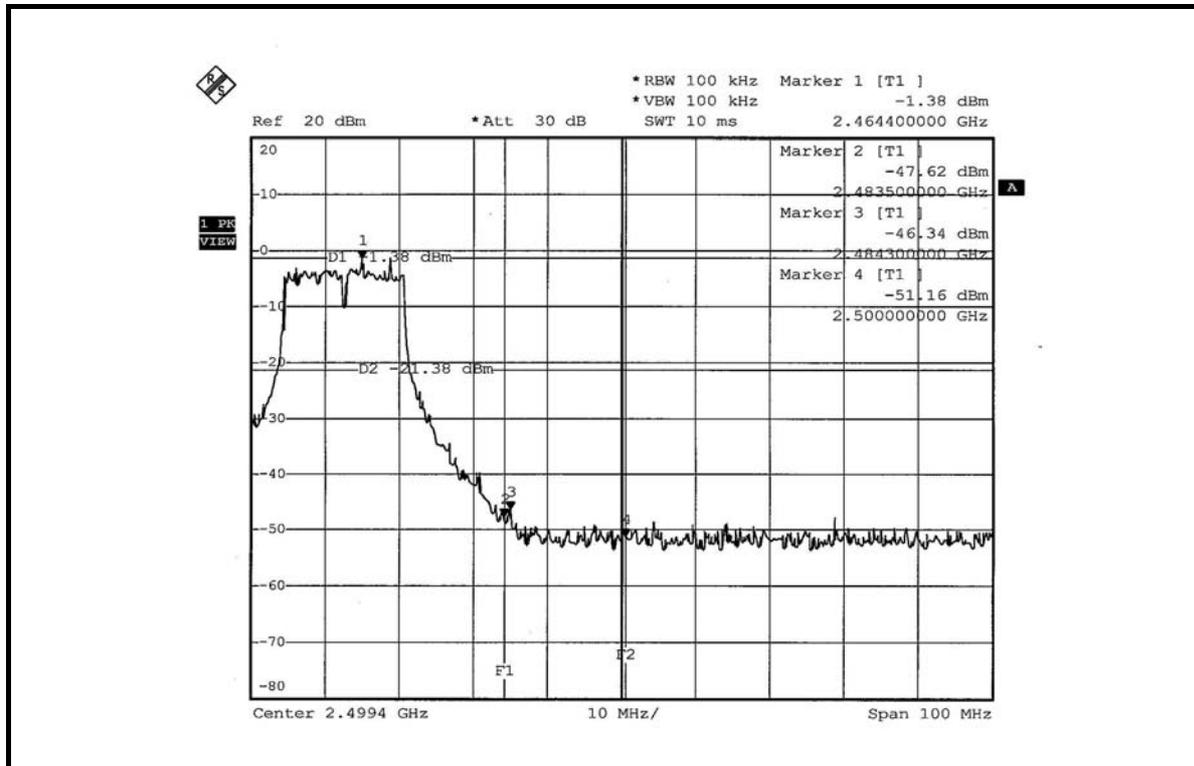
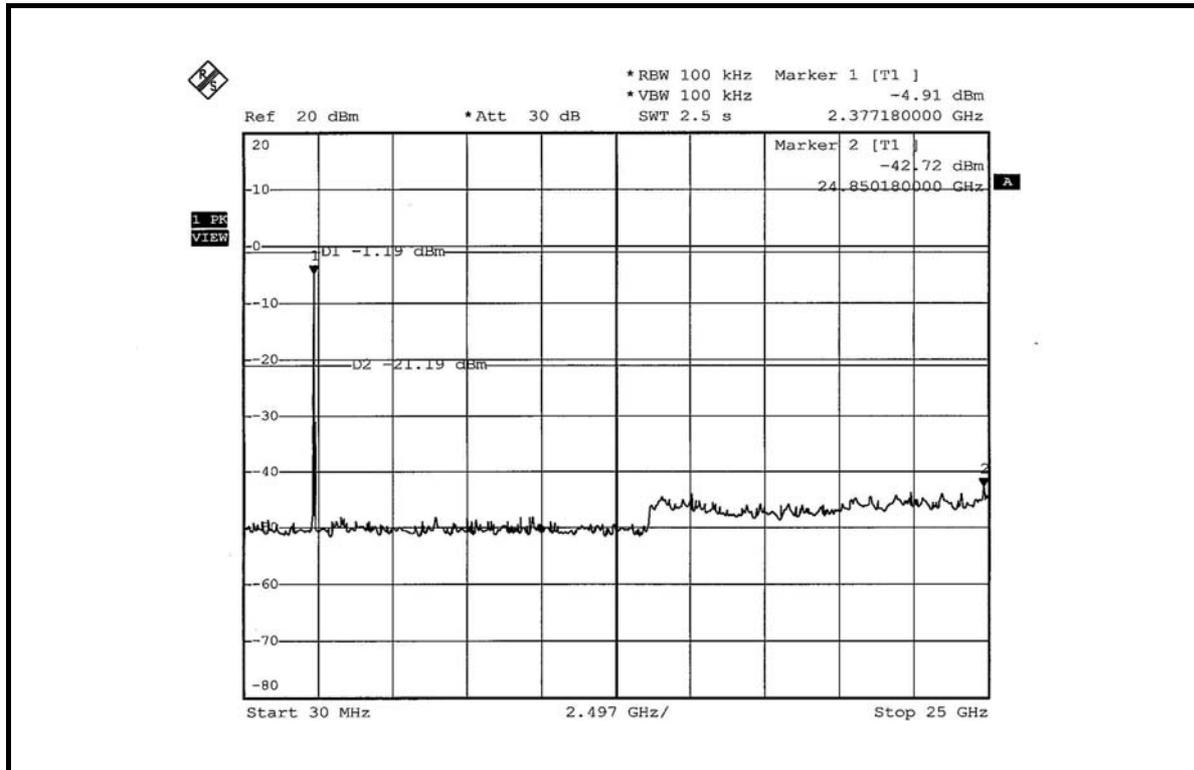
**NOTE 1:** The band edge emission plot on the next page shows 45.78dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 110.41dBuV/m (Peak), so the maximum field strength in restrict band is  $110.41-45.78=64.63$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of on the next page shows 48.60dBc between carrier maximum power and local maximum emission in restrict band (2.39000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 101.38dBuV/m (Average), so the maximum field strength in restrict band is  $101.38-48.60=52.78$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on the next second page shows 44.96dBc between carrier maximum power and local maximum emission in restrict band (2.48430GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 111.16dBuV/m (Peak), so the maximum field strength in restrict band is  $111.16-44.96=66.20$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 49.39dBc between carrier maximum power and local maximum emission in restrict band (2.48350GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 102.07dBuV/m (Average), so the maximum field strength in restrict band is  $102.07-49.39=52.68$ dBuV/m which is under 54dBuV/m limit.









## DUAL TX: 802.11b DSSS & 802.11b DSSS MODULATION

### NOTE 1:

The band edge emission plot on the next page shows 54.42dBc between carrier maximum power and local maximum emission in restrict band (2.3604GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 113.58dBuV/m (Peak), so the maximum field strength in restrict band is  $113.58 - 54.42 = 59.16$ dBuV/m which is under 74dBuV/m limit.

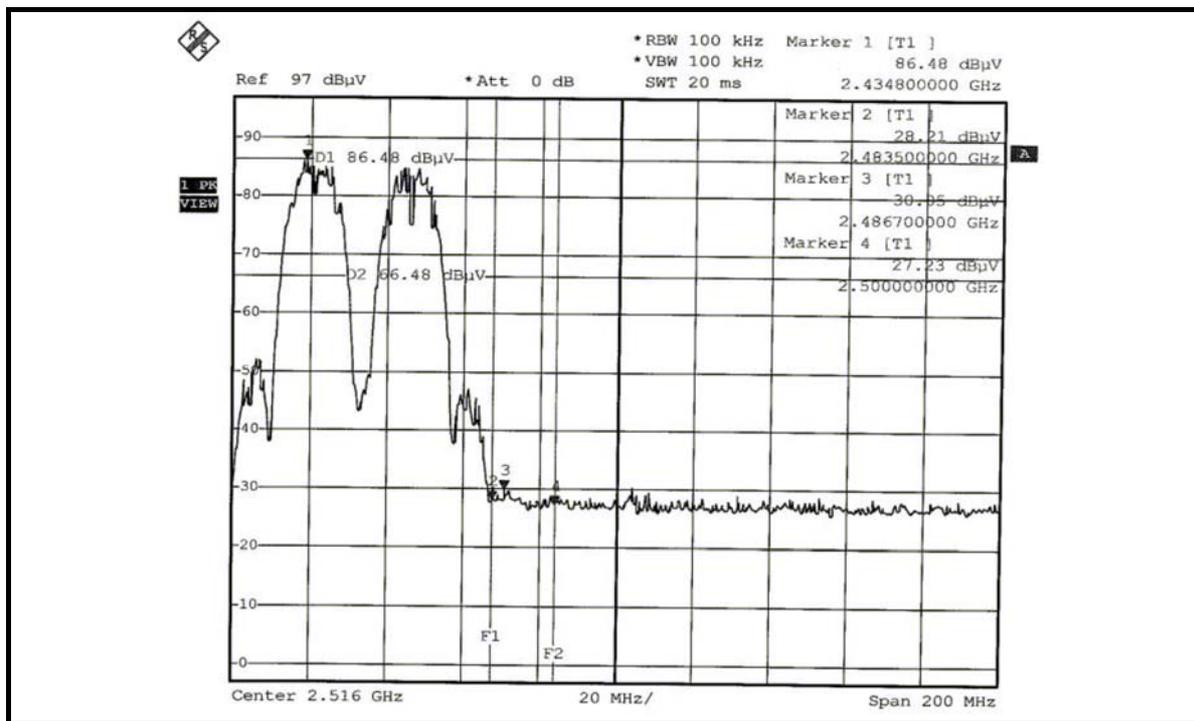
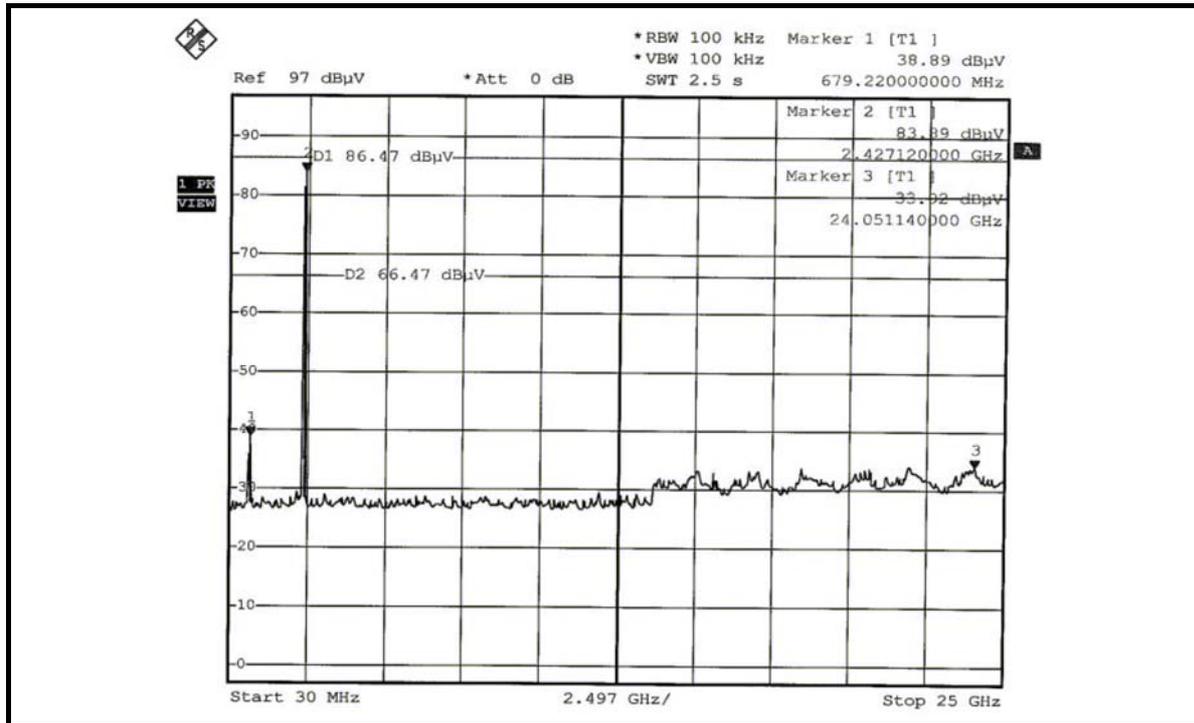
The band edge emission plot of on the next page shows 56.61dBc between carrier maximum power and local maximum emission in restrict band (2.3856GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 109.85dBuV/m (Average), so the maximum field strength in restrict band is  $109.85 - 56.61 = 53.24$ dBuV/m which is under 54dBuV/m limit.

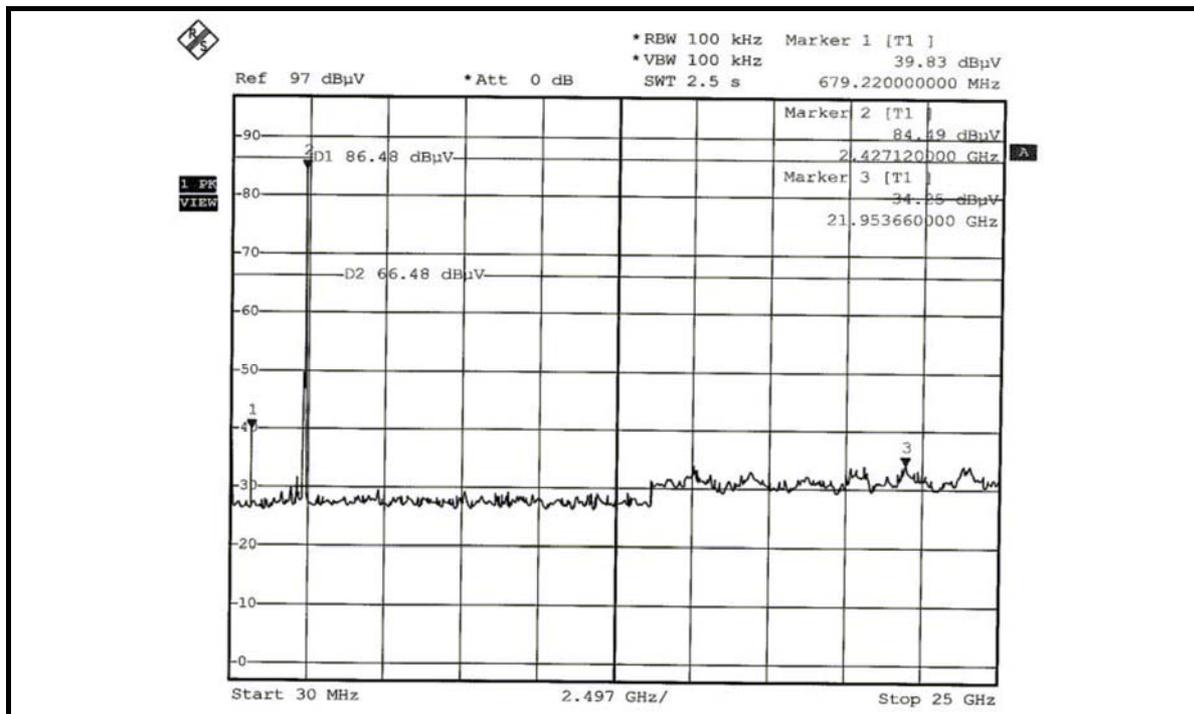
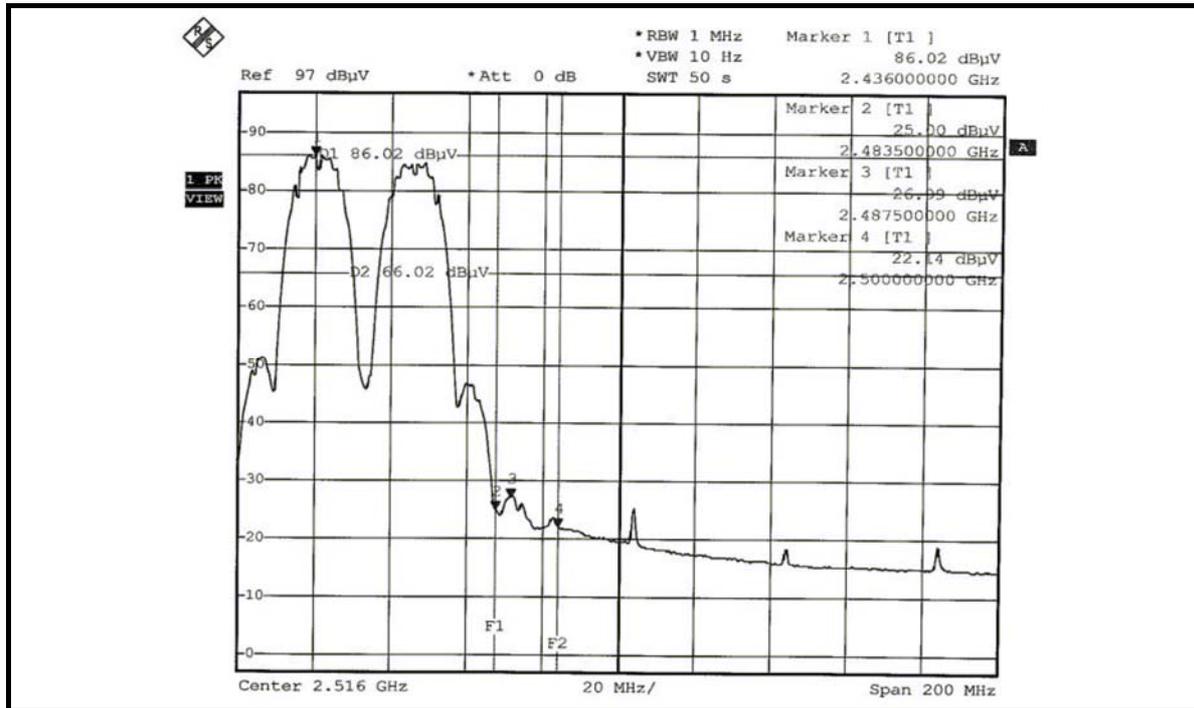
### NOTE 2:

The band edge emission plot on the next second page shows 56.43dBc between carrier maximum power and local maximum emission in restrict band (2.4867GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 113.58dBuV/m (Peak), so the maximum field strength in restrict band is  $113.58 - 56.43 = 57.15$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 59.03dBc between carrier maximum power and local maximum emission in restrict band (2.4875GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 109.87dBuV/m (Average), so the maximum field strength in restrict band is  $109.87 - 59.03 = 50.84$ dBuV/m which is under 54dBuV/m limit.









## DUAL TX: 802.11b DSSS & 802.11g OFDM MODULATION

### NOTE 1:

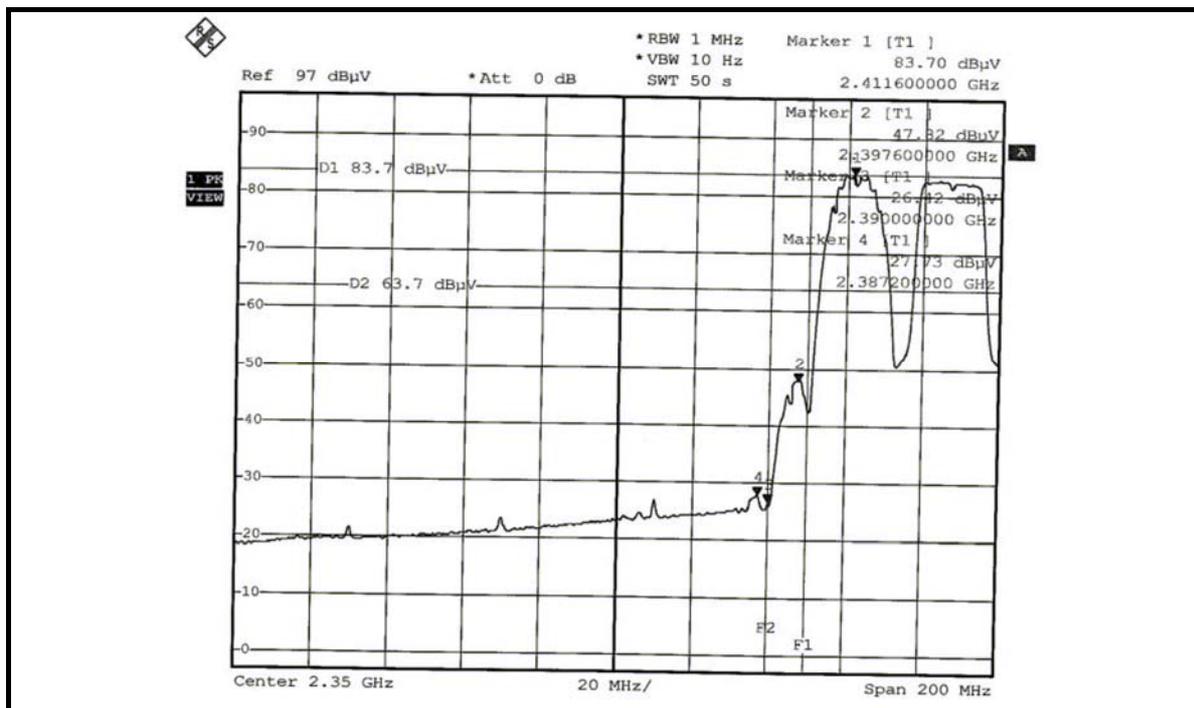
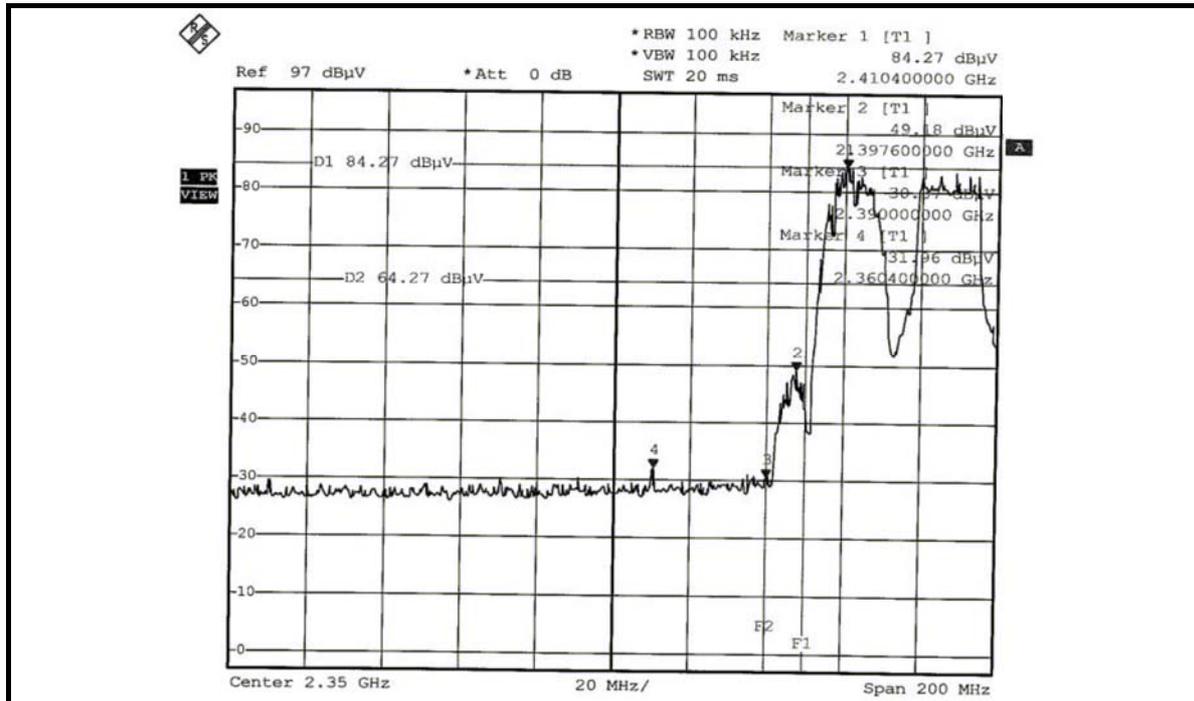
The band edge emission plot on the next page shows 52.31dBc between carrier maximum power and local maximum emission in restrict band (2.3604GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 111.74dBuV/m (Peak), so the maximum field strength in restrict band is  $111.74 - 52.31 = 59.43$ dBuV/m which is under 74dBuV/m limit.

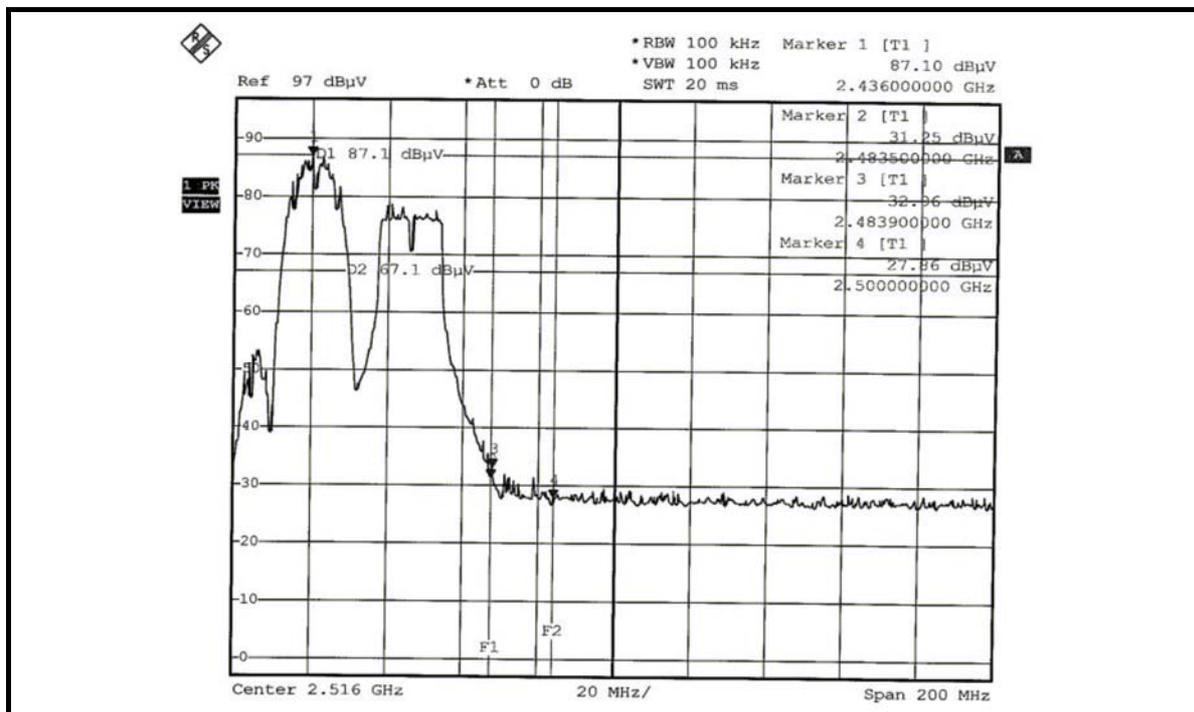
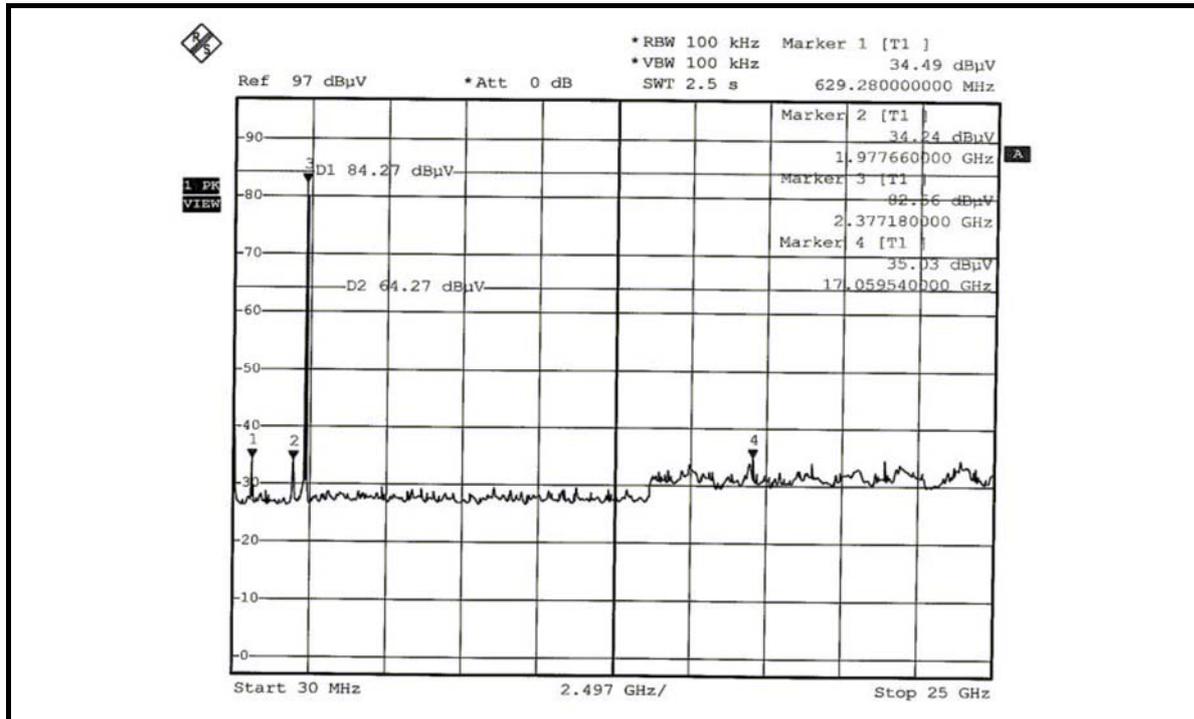
The band edge emission plot of on the next page shows 55.97dBc between carrier maximum power and local maximum emission in restrict band (2.3872GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 108.01dBuV/m (Average), so the maximum field strength in restrict band is  $108.01 - 55.97 = 52.04$ dBuV/m which is under 54dBuV/m limit.

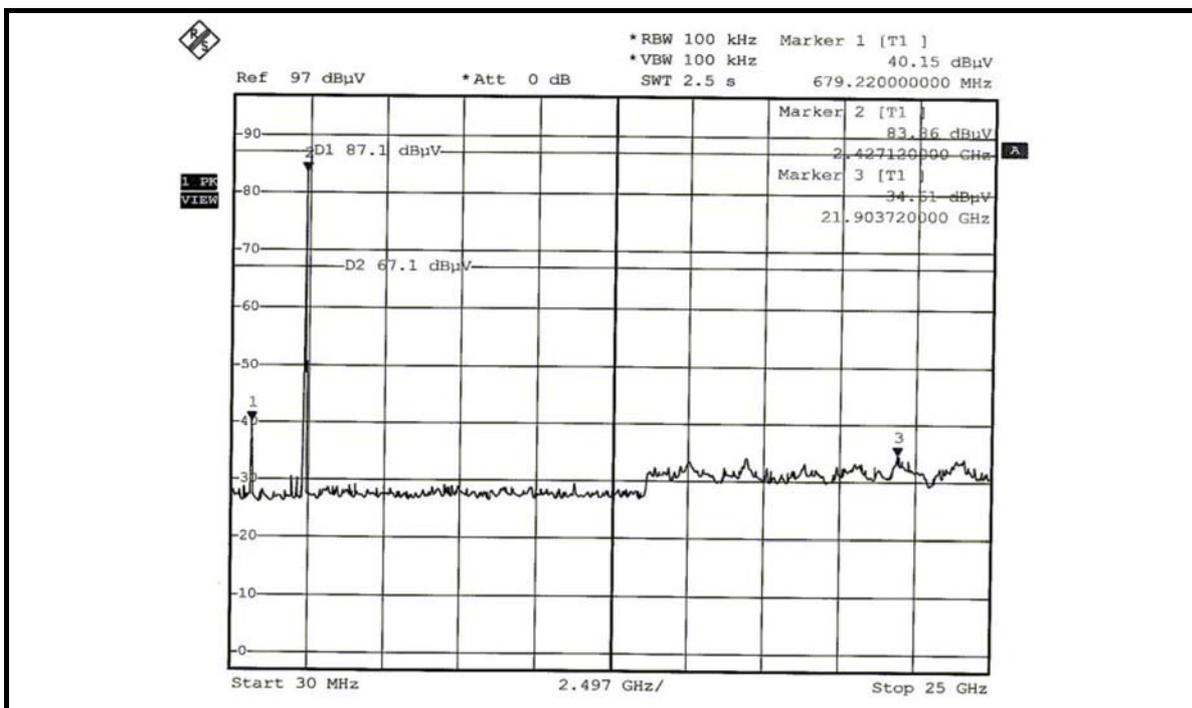
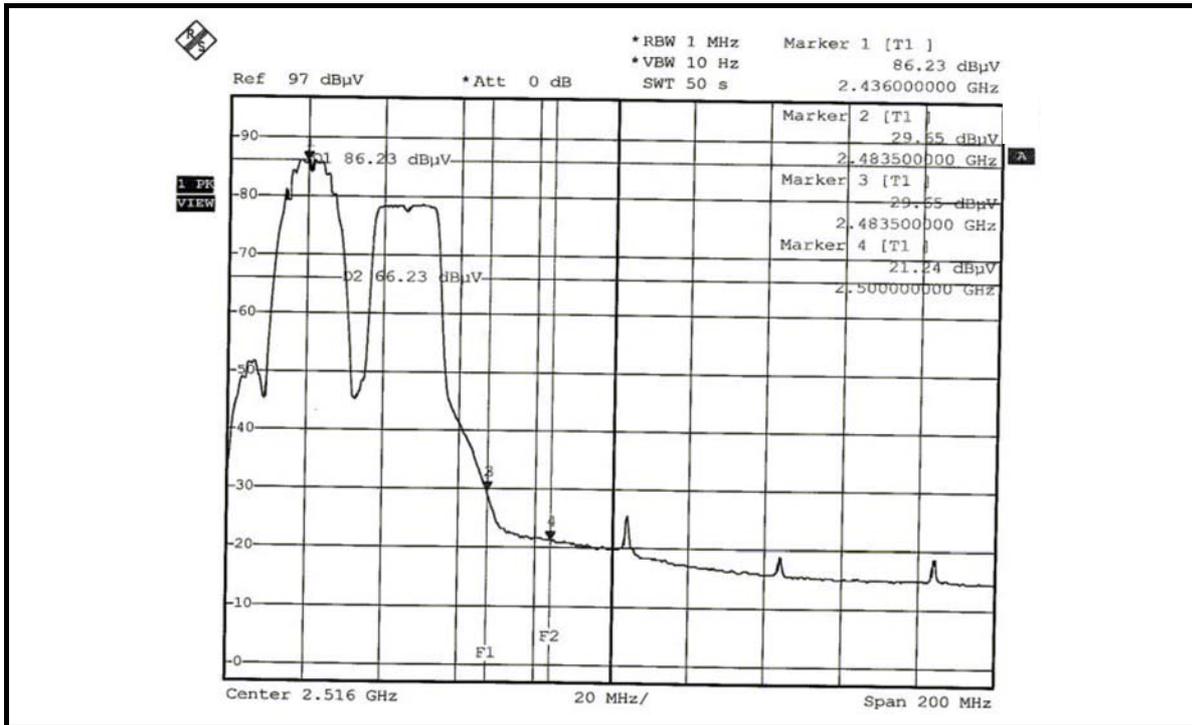
### NOTE 2:

The band edge emission plot on the next second page shows 54.14dBc between carrier maximum power and local maximum emission in restrict band (2.4839GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 113.42dBuV/m (Peak), so the maximum field strength in restrict band is  $113.42 - 54.14 = 59.28$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 56.58dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 109.70dBuV/m (Average), so the maximum field strength in restrict band is  $109.70 - 56.58 = 53.12$ dBuV/m which is under 54dBuV/m limit.









## DUAL TX: 802.11g OFDM & 802.11b DSSS MODULATION

### NOTE 1:

The band edge emission plot on the next page shows 54.90dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 112.89dBuV/m (Peak), so the maximum field strength in restrict band is  $112.89 - 54.90 = 57.99$ dBuV/m which is under 74dBuV/m limit.

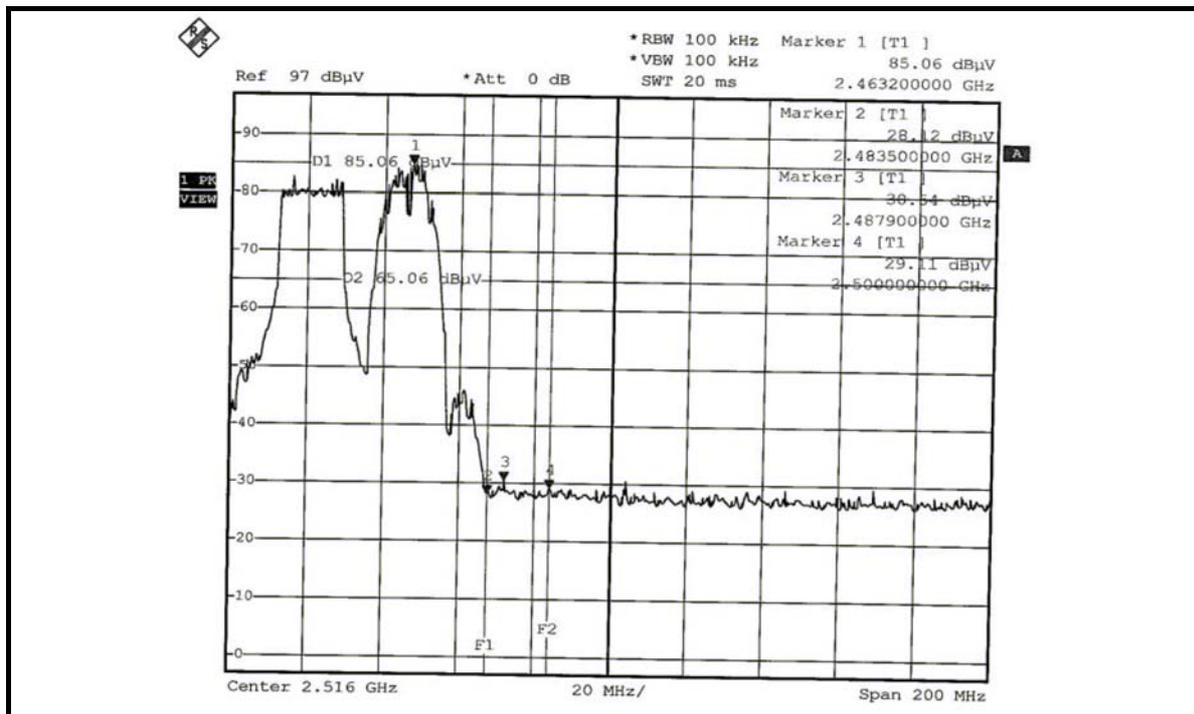
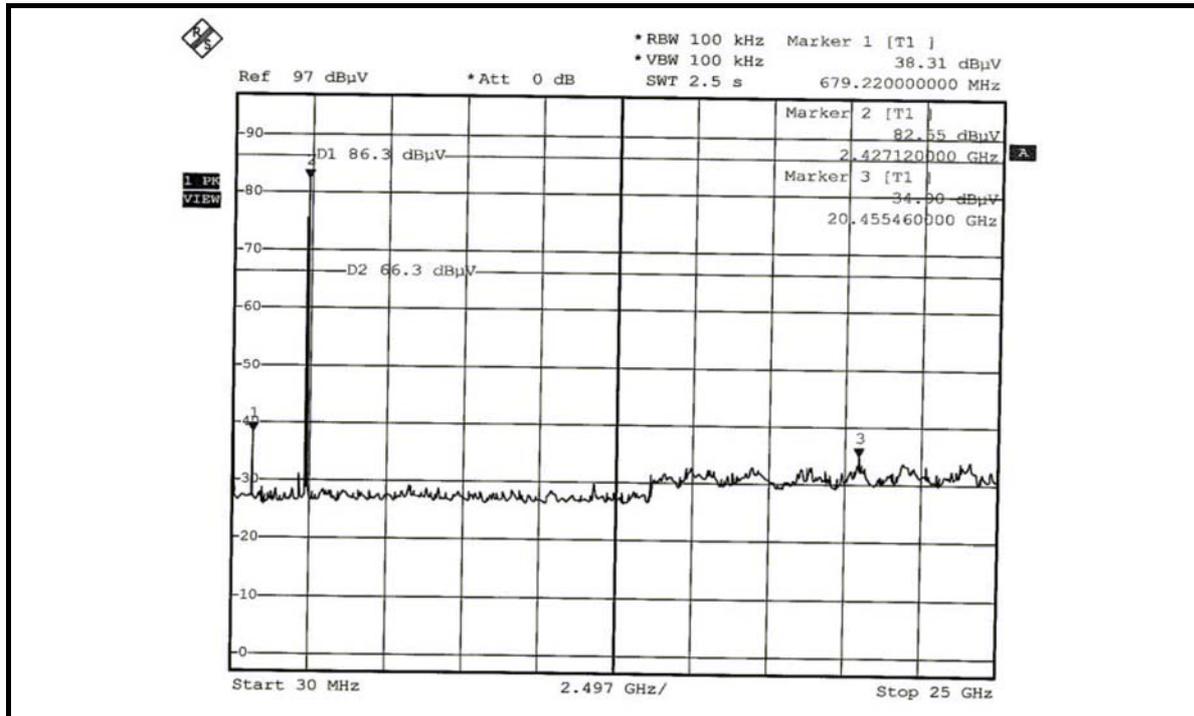
The band edge emission plot of on the next page shows 56.46dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 109.12dBuV/m (Average), so the maximum field strength in restrict band is  $109.12 - 56.46 = 52.66$ dBuV/m which is under 54dBuV/m limit.

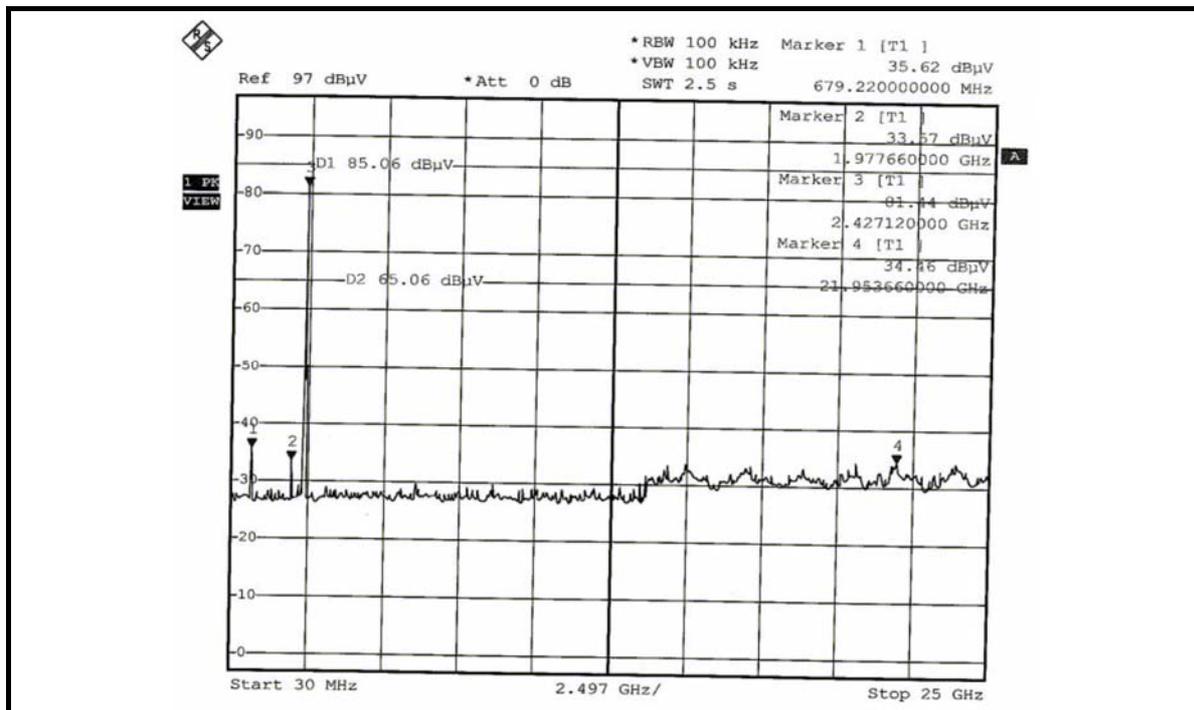
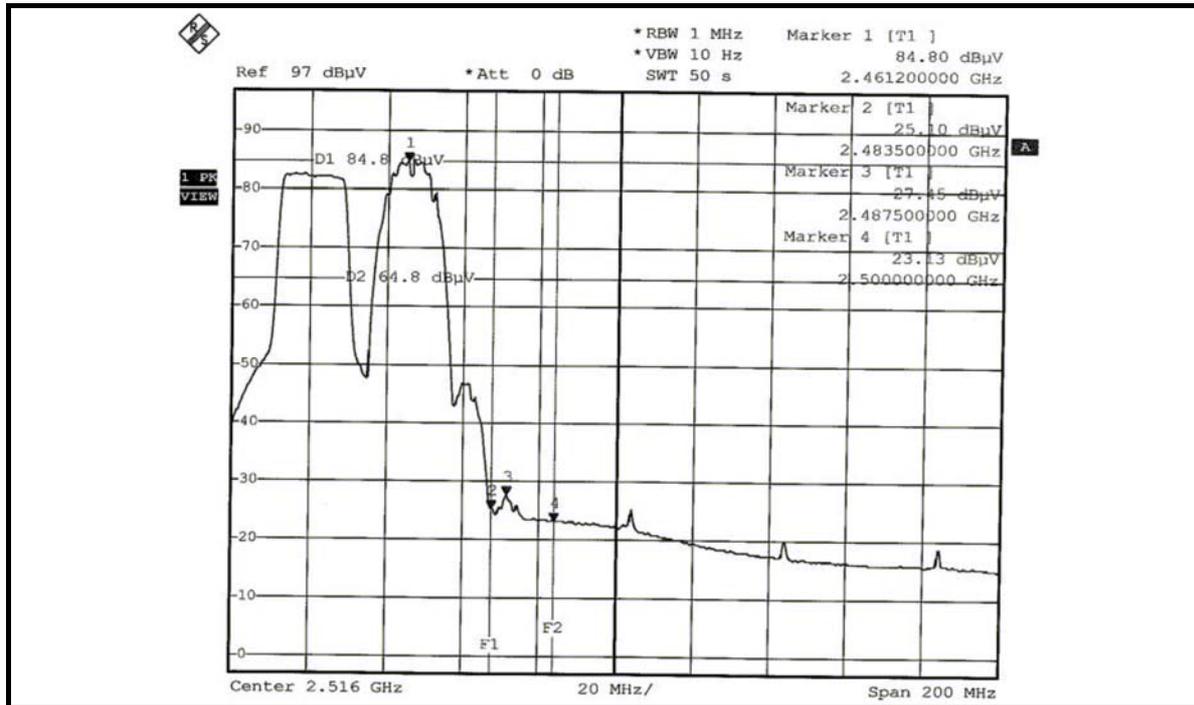
### NOTE 2:

The band edge emission plot on the next second page shows 54.52dBc between carrier maximum power and local maximum emission in restrict band (2.4879GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 115.08dBuV/m (Peak), so the maximum field strength in restrict band is  $115.08 - 54.52 = 60.56$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 57.35dBc between carrier maximum power and local maximum emission in restrict band (2.4875GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 105.91dBuV/m (Average), so the maximum field strength in restrict band is  $105.91 - 57.35 = 48.56$ dBuV/m which is under 54dBuV/m limit.









## DUAL TX: 802.11g OFDM & 802.11g OFDM MODULATION

### NOTE 1:

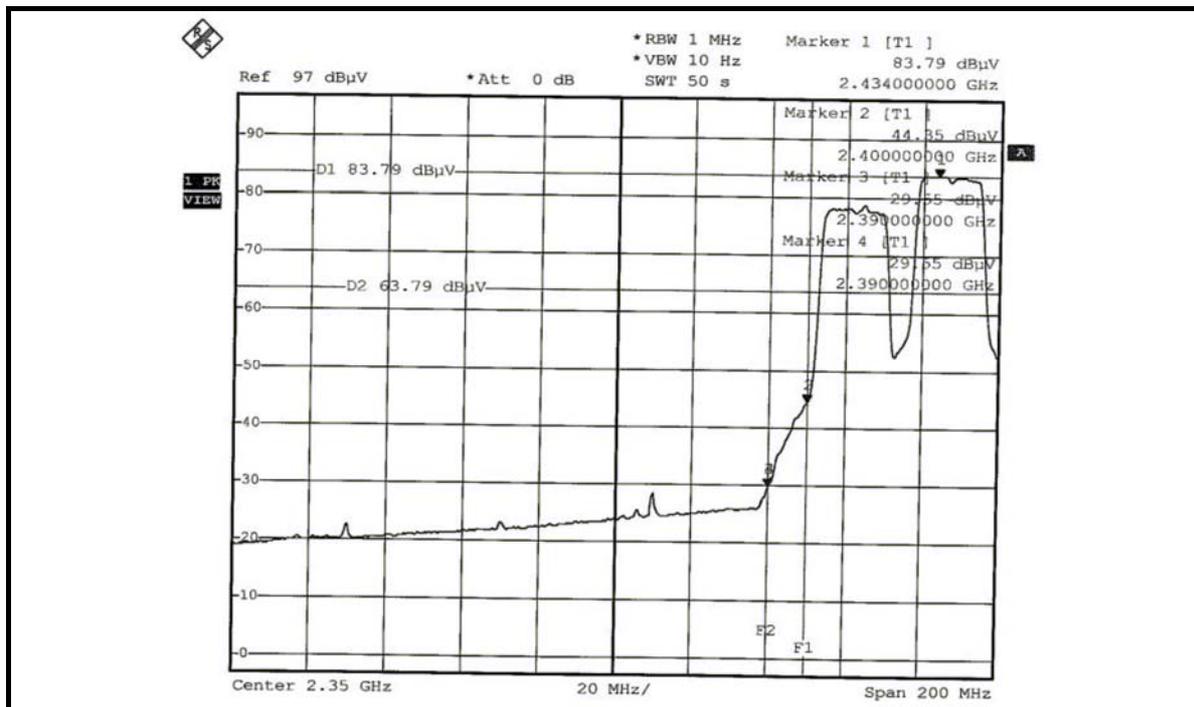
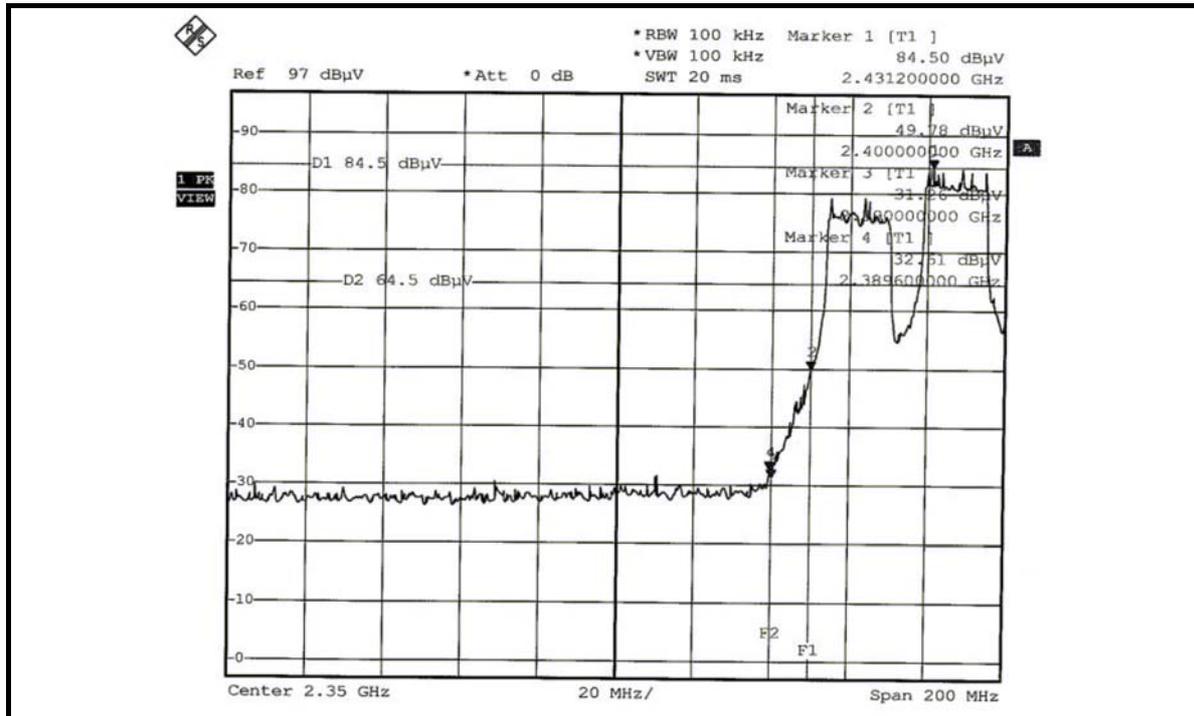
The band edge emission plot on the next page shows 51.89dBc between carrier maximum power and local maximum emission in restrict band (2.3896GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 115.64dBuV/m (Peak), so the maximum field strength in restrict band is  $115.64 - 51.89 = 63.75$ dBuV/m which is under 74dBuV/m limit.

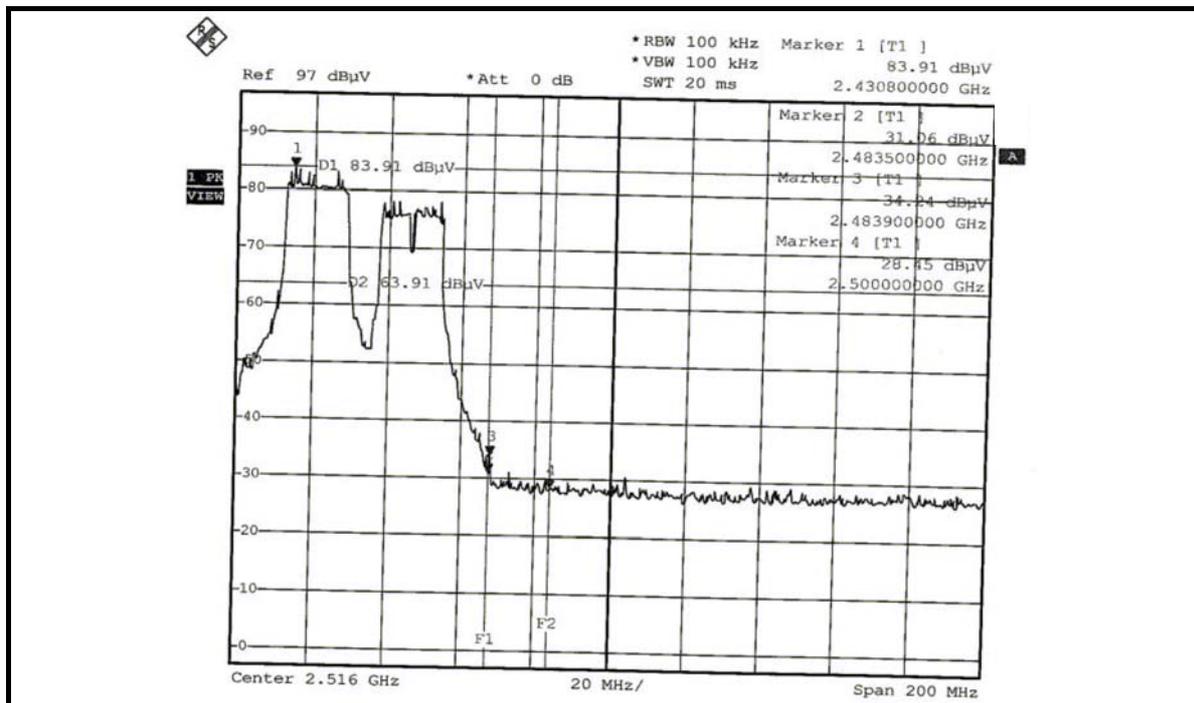
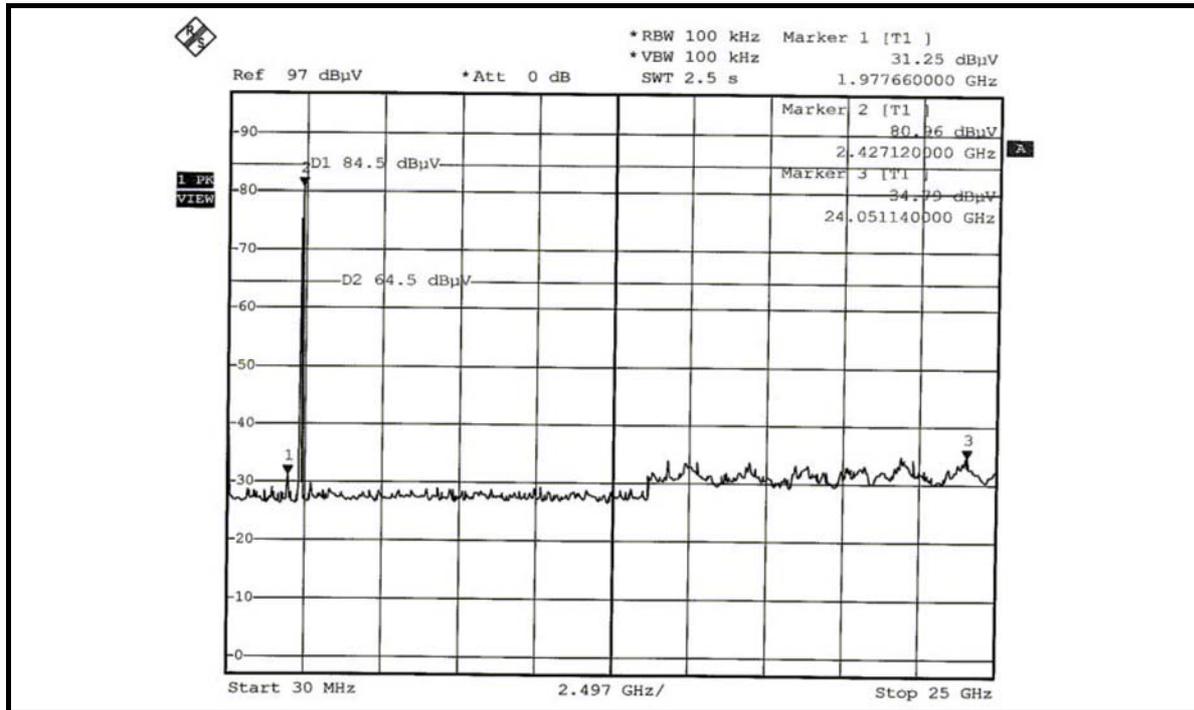
The band edge emission plot of on the next page shows 54.24dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 1 & channel 6 at the item 4.2.7 is 106.51dBuV/m (Average), so the maximum field strength in restrict band is  $106.51 - 54.24 = 52.27$ dBuV/m which is under 54dBuV/m limit.

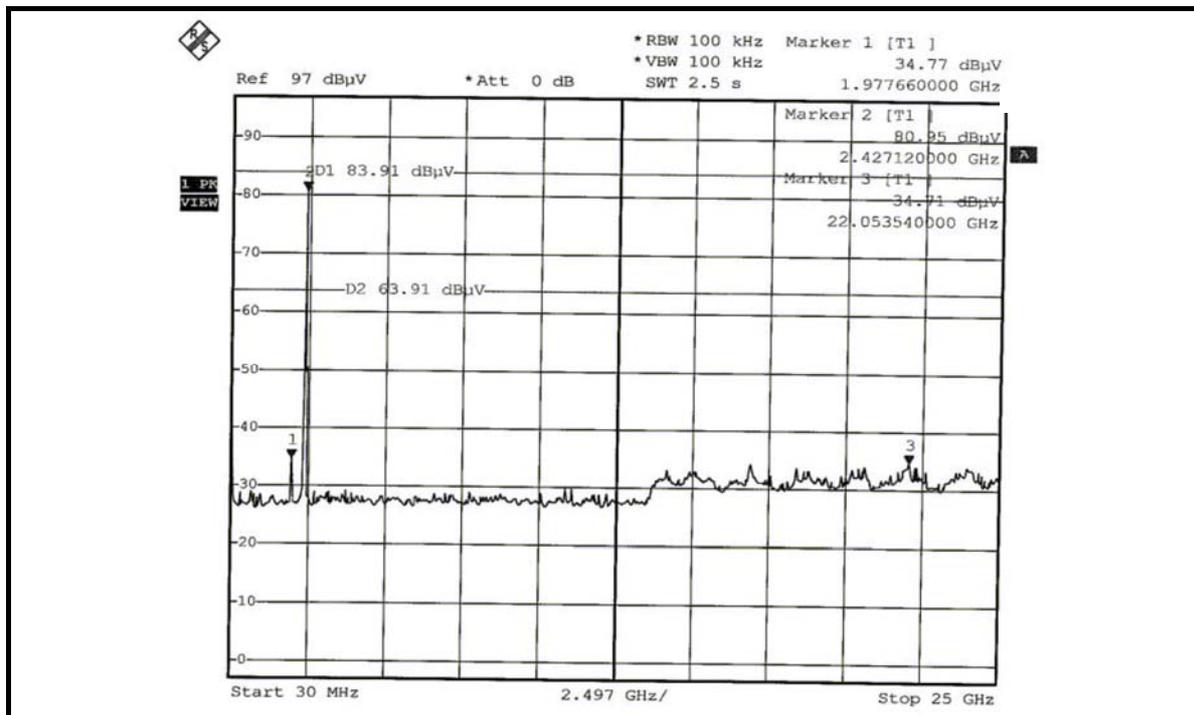
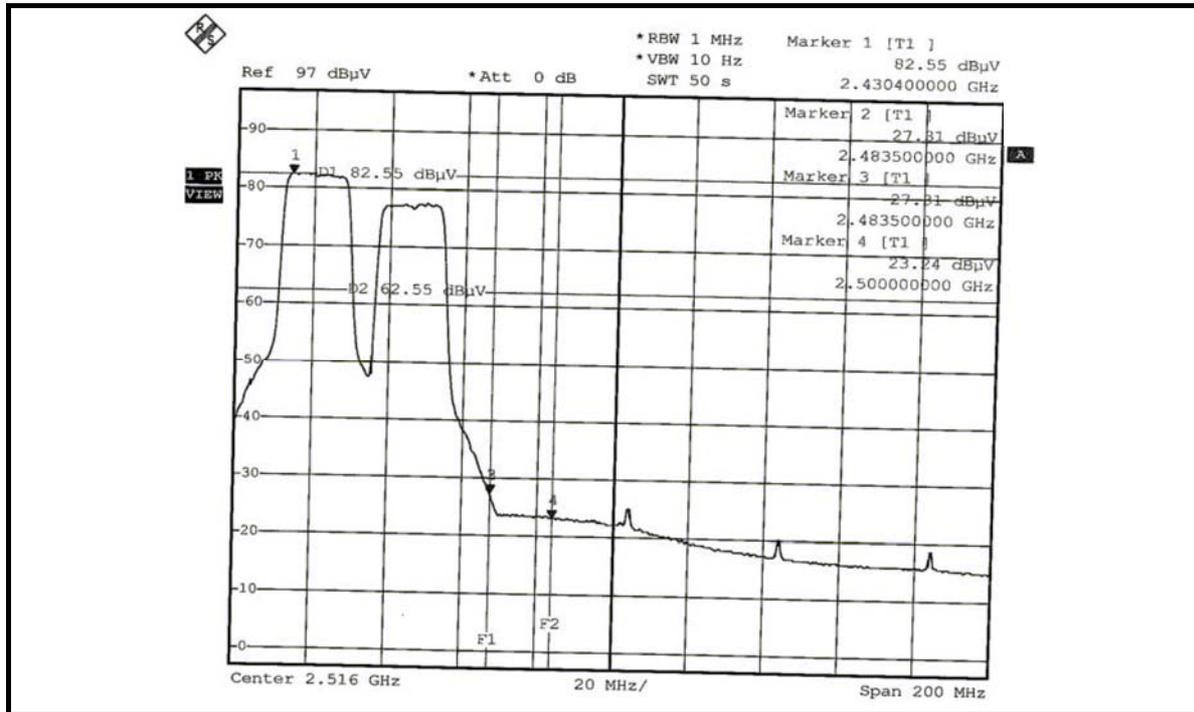
### NOTE 2:

The band edge emission plot on the next second page shows 49.67dBc between carrier maximum power and local maximum emission in restrict band (2.4839GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 115.82dBuV/m (Peak), so the maximum field strength in restrict band is  $115.82 - 49.67 = 66.15$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 55.24dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 & channel 11 at the item 4.2.7 is 106.63dBuV/m (Average), so the maximum field strength in restrict band is  $106.63 - 55.24 = 51.39$ dBuV/m which is under 54dBuV/m limit.









## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Dualband Built-in directional antenna with UFL connector. The maximum Gain of the antenna is 6dBi.



## 5. TEST TYPES AND RESULTS (FOR 802.11a 5725~5850MHz Band)

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 02, 2006
RF signal cable Woken	5D-FB	Cable-HYCO3-01	Jan. 06, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 09, 2007
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 22, 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 2.
  3. The VCCI Site Registration No. is C-2047.

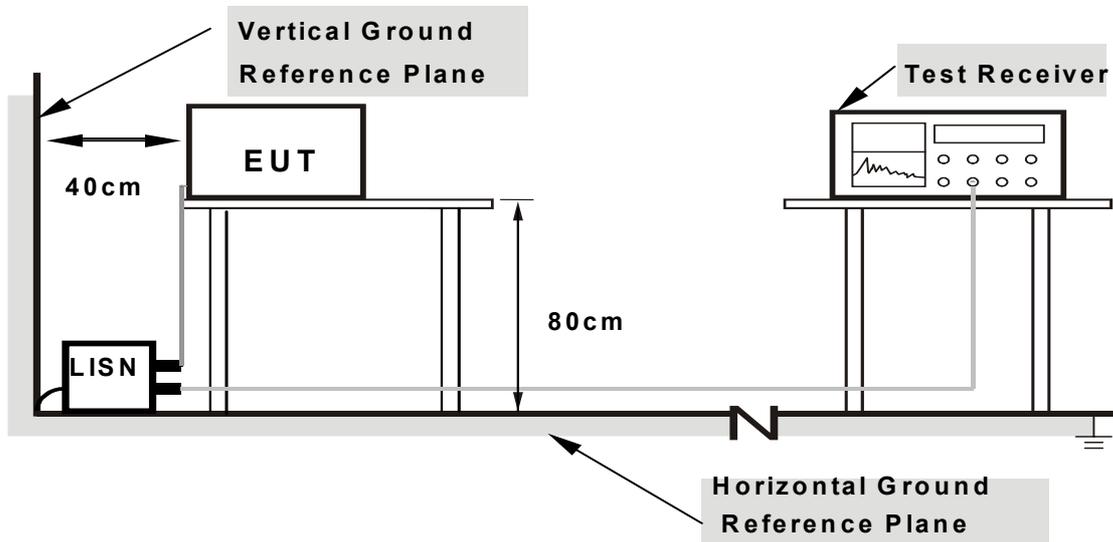
### 5.1.3 TEST PROCEDURES

- 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.

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 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.

### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6

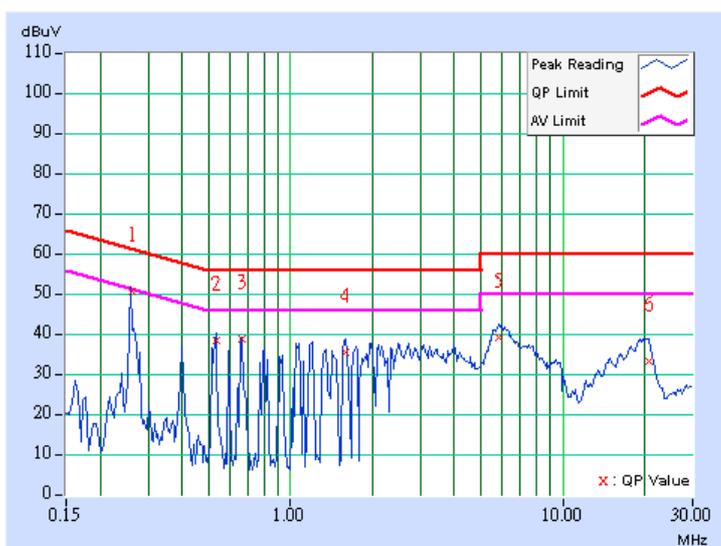
### 5.1.7 TEST RESULTS

#### CONDUCTED WORST-CASE DATA FOR TEST MODE A (ADAPTER MODE):

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.262	0.10	50.02	-	50.12	-	61.37	51.37	-11.25	-
2	0.533	0.10	37.92	-	38.02	-	56.00	46.00	-17.98	-
3	0.662	0.10	38.23	-	38.33	-	56.00	46.00	-17.67	-
4	1.602	0.16	35.08	-	35.24	-	56.00	46.00	-20.76	-
5	5.805	0.37	38.47	-	38.84	-	60.00	50.00	-21.16	-
6	20.695	0.61	32.84	-	33.45	-	60.00	50.00	-26.55	-

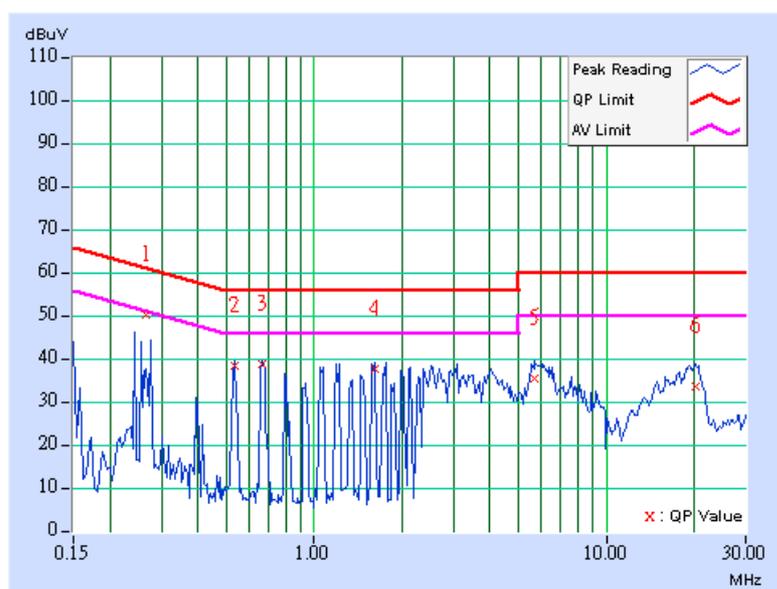
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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 4	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

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	0.267	0.10	49.86	-	49.96	-	61.21	51.21	-11.25	-
2	0.533	0.12	37.84	-	37.96	-	56.00	46.00	-18.04	-
3	0.666	0.14	38.39	-	38.53	-	56.00	46.00	-17.47	-
4	1.609	0.20	37.30	-	37.50	-	56.00	46.00	-18.50	-
5	5.656	0.39	34.99	-	35.38	-	60.00	50.00	-24.62	-
6	20.148	0.57	33.10	-	33.67	-	60.00	50.00	-26.33	-

- 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.

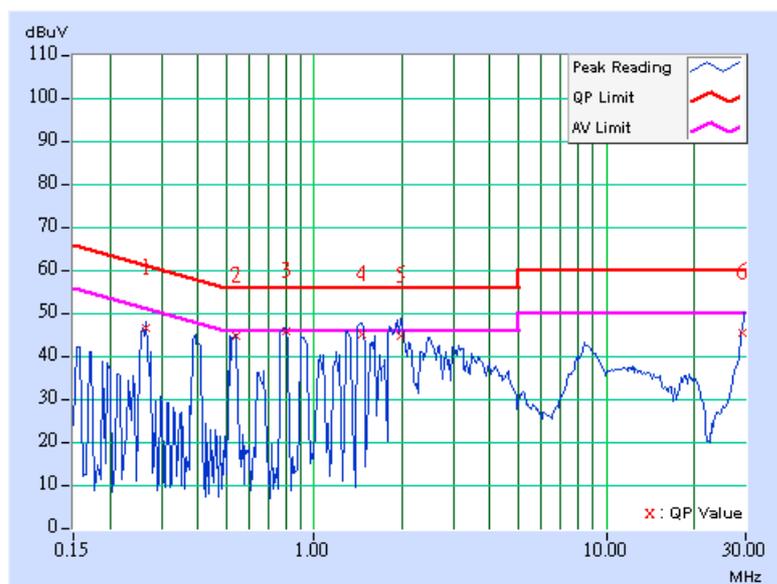


**FOR TEST MODE B (POE MODE):**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

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	0.267	0.10	45.52	-	45.62	-	61.20
2	0.541	0.10	43.50	-	43.60	-	56.00	46.00	-12.40	-
3	0.806	0.10	44.81	-	44.91	-	56.00	46.00	-11.09	-
4	1.453	0.15	43.87	-	44.02	-	56.00	46.00	-11.98	-
5	1.969	0.20	43.55	-	43.75	-	56.00	46.00	-12.25	-
6	29.129	1.26	44.28	-	45.54	-	60.00	50.00	-14.46	-

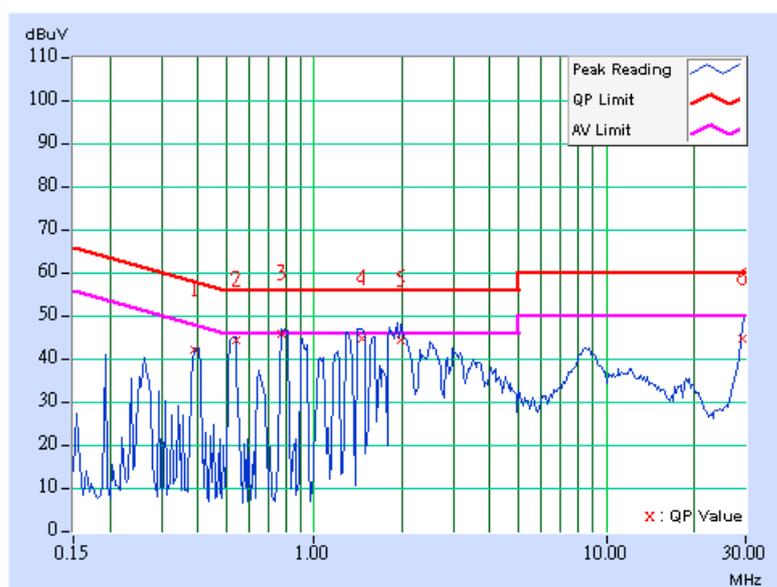
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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 4	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 60%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

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	0.388	0.10	41.27	-	41.37	-	58.10	48.10	-16.73	-
2	0.541	0.12	43.62	-	43.74	-	56.00	46.00	-12.26	-
3	0.775	0.16	44.89	-	45.05	-	56.00	46.00	-10.95	-
4	1.453	0.20	43.85	-	44.05	-	56.00	46.00	-11.95	-
5	1.969	0.20	43.59	-	43.79	-	56.00	46.00	-12.21	-
6	29.133	1.00	43.75	-	44.75	-	60.00	50.00	-15.25	-

- 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.



## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 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.



## 5.2.2 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 4.
  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.

### 5.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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.

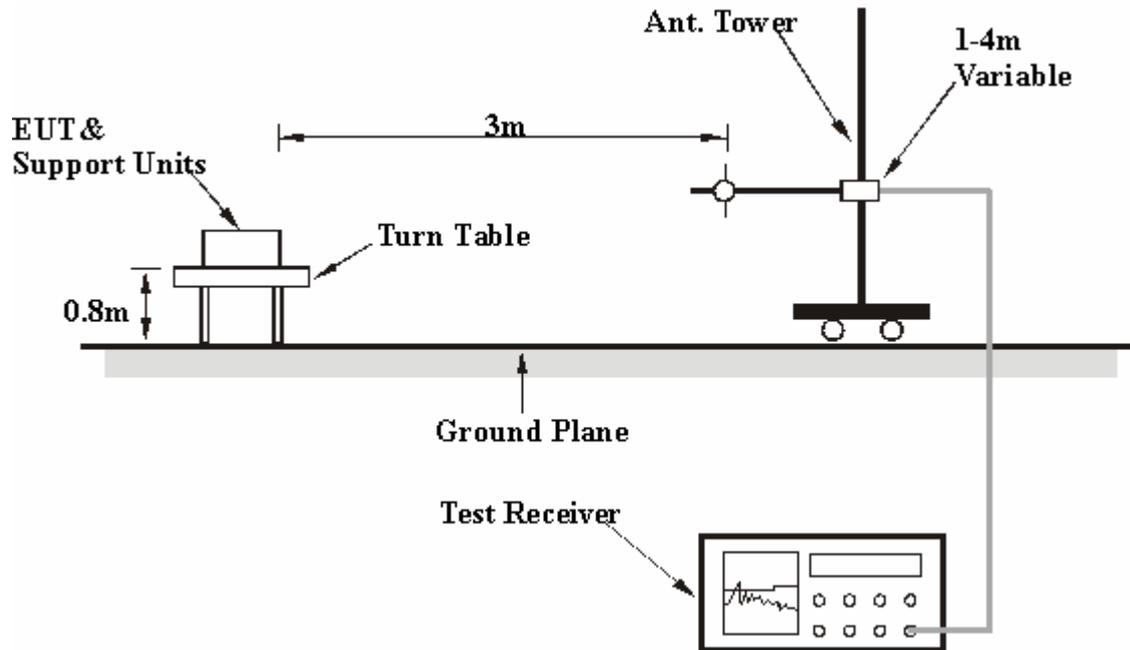
**NOTE:**

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.2.5 TEST SETUP



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

### 5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6



## 5.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA FOR TEST MODE A (ADAPTER MODE):

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
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	249.66	43.91 QP	46.00	-2.09	1.00 H	106	31.48	12.43
2	399.34	38.97 QP	46.00	-7.03	1.00 H	61	21.20	17.78
3	500.42	36.12 QP	46.00	-9.88	1.25 H	196	16.17	19.95
4	667.60	41.11 QP	46.00	-4.89	1.00 H	64	17.63	23.48
5	799.78	40.73 QP	46.00	-5.27	1.00 H	100	14.63	26.11
6	933.91	43.49 QP	46.00	-2.51	1.50 H	160	14.45	29.04

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	31.94	38.36 QP	40.00	-1.64	1.00 V	262	25.78	12.58
2	76.65	38.44 QP	40.00	-1.56	1.50 V	133	27.57	10.87
3	249.66	40.90 QP	46.00	-5.10	1.00 V	316	28.47	12.43
4	366.29	39.39 QP	46.00	-6.61	1.50 V	214	22.73	16.66
5	867.82	38.01 QP	46.00	-7.99	1.00 V	259	11.01	26.99
6	933.91	42.60 QP	46.00	-3.40	1.00 V	283	13.57	29.04

- 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 TEST MODE B (POE MODE):**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
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	68.88	34.12 QP	40.00	-5.88	1.00 H	235	21.28	12.84
2	115.53	42.10 QP	43.50	-1.40	1.00 H	235	30.01	12.09
3	249.66	41.61 QP	46.00	-4.39	1.00 H	208	28.14	13.47
4	667.60	41.18 QP	46.00	-4.82	1.00 H	208	17.55	23.63
5	799.78	44.08 QP	46.00	-1.92	1.00 H	241	18.38	25.70
6	933.91	44.80 QP	46.00	-1.20	1.00 H	226	17.10	27.70

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	35.83	38.92 QP	40.00	-1.08	1.25 V	175	24.93	13.99
2	<b>68.88</b>	<b>38.97 QP</b>	<b>40.00</b>	<b>-1.03</b>	<b>1.25 V</b>	<b>175</b>	<b>26.13</b>	<b>12.84</b>
3	103.87	41.64 QP	43.50	-1.86	1.25 V	175	30.98	10.66
4	138.86	38.26 QP	43.50	-5.24	1.25 V	211	24.58	13.69
5	366.29	42.01 QP	46.00	-3.99	1.25 V	175	25.16	16.85
6	933.91	44.89 QP	46.00	-1.11	1.25 V	184	17.19	27.70

- 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 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, 65%RH, 991hPa
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	#1066.00	48.39 PK	74.00	-25.61	1.04 H	32	20.45	27.94
2	#1066.00	43.97 AV	54.00	-10.03	1.04 H	32	16.03	27.94
3	5725.00	66.86 PK	83.02	-16.16	1.18 H	333	26.67	40.19
4	5725.00	57.98 AV	74.14	-16.16	1.18 H	333	17.79	40.19
5	*5745.00	103.02 PK			1.18 H	333	62.77	40.25
6	*5745.00	94.14 AV			1.18 H	333	53.89	40.25
7	#11490.00	61.10 PK	74.00	-12.90	1.15 H	24	9.26	51.84
8	#11490.00	49.04 AV	54.00	-4.96	1.15 H	24	-2.80	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	#1066.00	50.36 PK	74.00	-23.64	1.21 V	34	22.42	27.94
2	#1066.00	47.29 AV	54.00	-6.71	1.21 V	34	19.35	27.94
3	5725.00	79.84 PK	90.71	-10.87	1.32 V	10	39.65	40.19
4	5725.00	65.20 AV	81.36	-16.16	1.32 V	10	25.01	40.19
5	*5745.00	110.71 PK			1.32 V	10	70.46	40.25
6	*5745.00	101.36 AV			1.32 V	10	61.11	40.25
7	#11490.00	62.19 PK	74.00	-11.81	1.24 V	18	10.34	51.84
8	#11490.00	50.20 AV	54.00	-3.80	1.24 V	18	-1.65	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.
  7. The limit value is defined as per 15.247

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
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	#1066.00	48.56 PK	74.00	-25.44	1.09 H	56	20.62	27.94
2	#1066.00	44.13 AV	54.00	-9.87	1.09 H	56	16.19	27.94
3	*5785.00	104.15 PK			1.16 H	330	63.80	40.35
4	*5785.00	95.28 AV			1.16 H	330	54.93	40.35
5	#11570.00	61.25 PK	74.00	-12.75	1.07 H	231	9.57	51.68
6	#11570.00	49.36 AV	54.00	-4.64	1.07 H	231	-2.32	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	#1066.00	50.68 PK	74.00	-23.32	1.20 V	15	22.74	27.94
2	#1066.00	47.57 AV	54.00	-6.43	1.20 V	15	19.63	27.94
3	*5785.00	112.06 PK			1.17 V	30	71.71	40.35
4	*5785.00	102.33 AV			1.17 V	30	61.98	40.35
5	#11570.00	62.38 PK	74.00	-11.62	1.19 V	258	10.70	51.68
6	#11570.00	50.41 AV	54.00	-3.59	1.19 V	258	-1.27	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.
  7. The limit value is defined as per 15.247

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, 65%RH, 991hPa
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	#1066.00	48.68 PK	74.00	-25.32	1.13 H	68	20.74	27.94
2	#1066.00	44.25 AV	54.00	-9.75	1.13 H	68	16.31	27.94
3	*5805.00	103.46 PK			1.13 H	328	63.06	40.40
4	*5805.00	94.61 AV			1.13 H	328	54.21	40.40
5	5850.00	60.09 PK	83.46	-23.37	1.13 H	328	19.58	40.52
6	5850.00	51.24 AV	74.61	-23.37	1.13 H	328	10.73	40.52
7	#11610.00	53.71 PK	74.00	-20.29	1.10 H	84	2.13	51.58
8	#11610.00	49.22 AV	54.00	-4.78	1.10 H	84	-2.36	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	#1066.00	49.65 PK	74.00	-24.35	1.08 V	255	21.71	27.94
2	#1066.00	46.53 AV	54.00	-7.47	1.08 V	255	18.59	27.94
3	*5805.00	111.84 PK			1.29 V	19	71.44	40.40
4	*5805.00	101.54 AV			1.29 V	19	61.14	40.40
5	5850.00	68.03 PK	91.84	-23.81	1.29 V	19	27.51	40.52
6	5850.00	58.17 AV	81.54	-23.37	1.29 V	19	17.66	40.52
7	#11610.00	54.89 PK	74.00	-19.11	1.12 V	76	3.31	51.58
8	#11610.00	50.36 AV	54.00	-3.64	1.12 V	76	-1.22	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.
  7. The limit value is defined as per 15.247



### 5.3 6dB BANDWIDTH MEASUREMENT

#### 5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 5.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

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

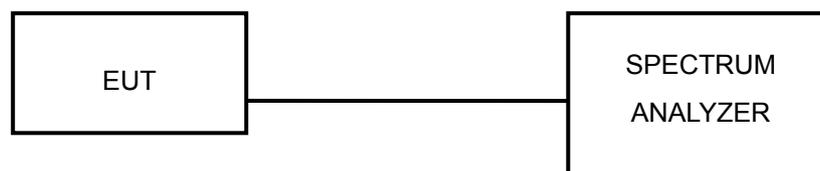
### 5.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.3.5 TEST SETUP



### 5.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

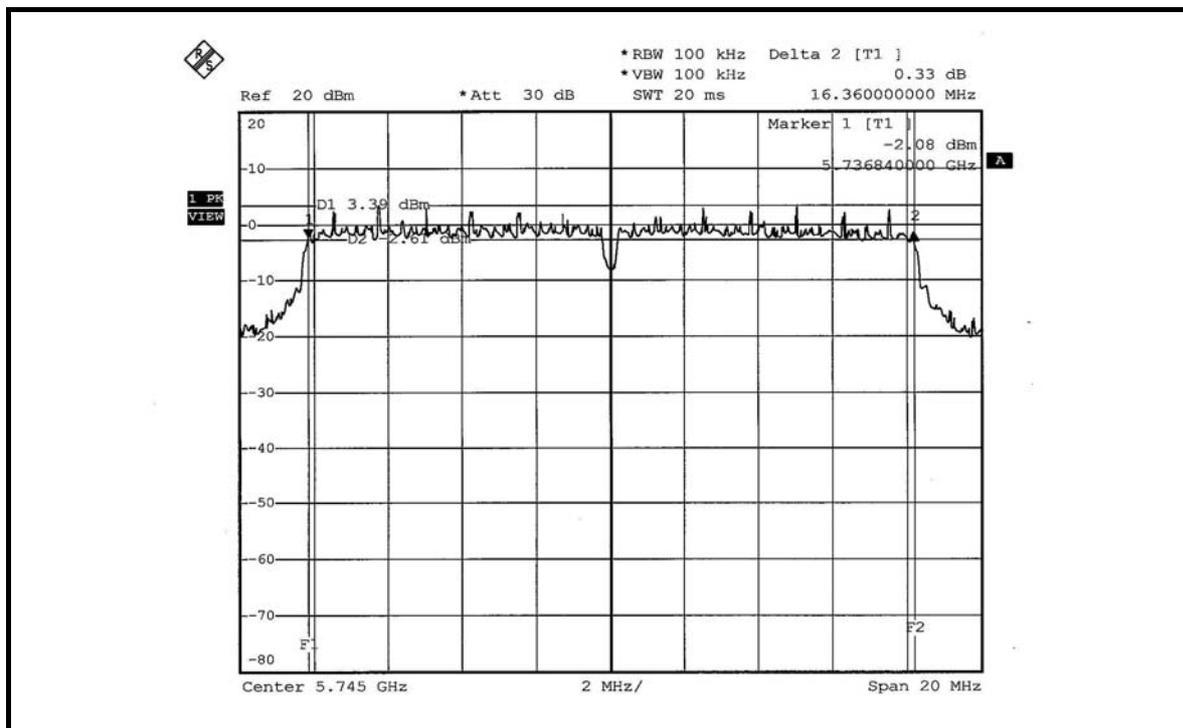
### 5.3.7 TEST RESULTS

#### 802.11a OFDM MODULATION

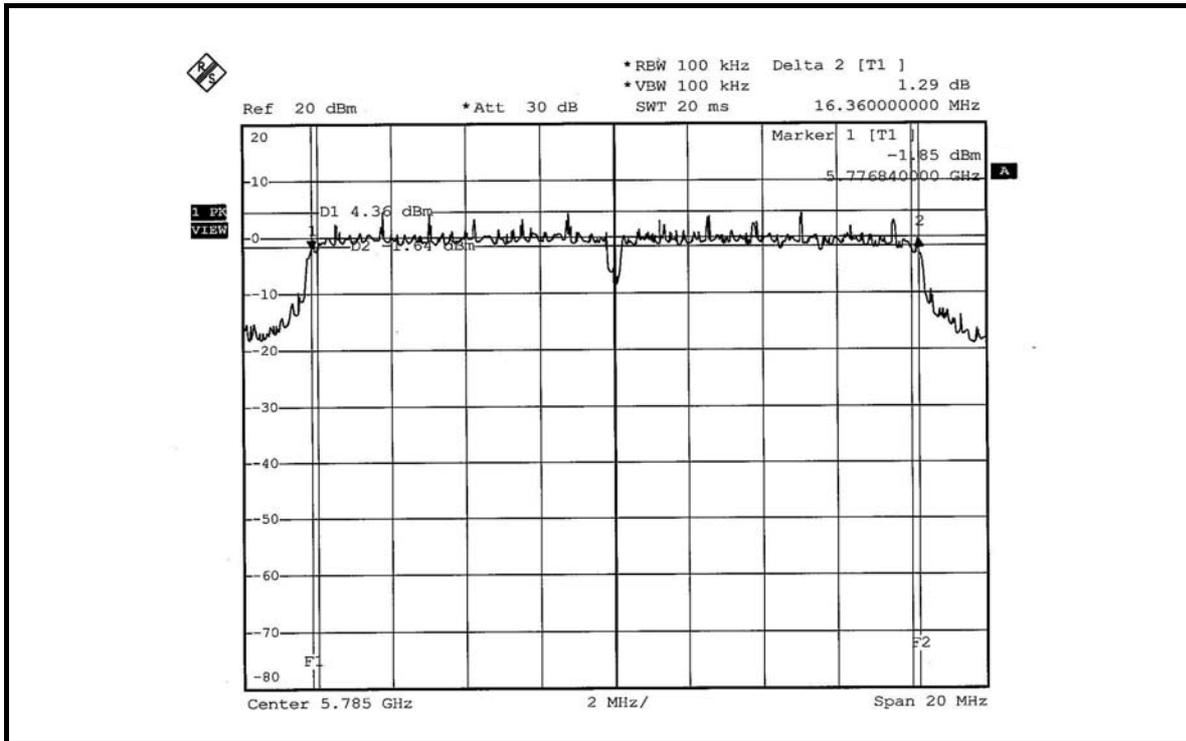
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg.C, 65%RH, 991hPa
<b>TESTED BY</b>	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	5745	16.36	0.5	PASS
3	5785	16.36	0.5	PASS
4	5805	16.36	0.5	PASS

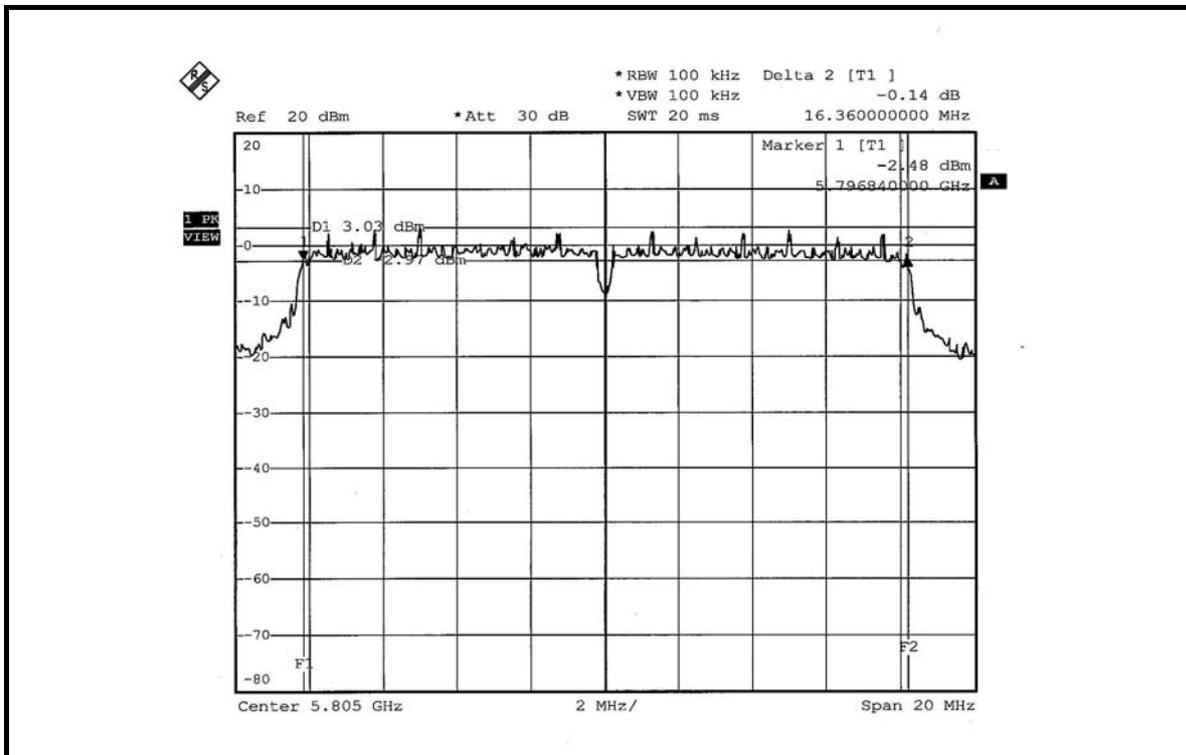
#### CH 1



CH 3



CH 4





## 5.4 MAXIMUM PEAK OUTPUT POWER

### 5.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 5.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 30, 2006
TEKTRONIX OSCILLOSCOPE	TDS 1012	C019167	Jan. 16, 2007
NARDA DETECTOR	4503A	FSCM99899	NA

**NOTE:**

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

### 5.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

### 5.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.4.5 TEST SETUP



### 5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6



### 5.4.7 TEST RESULTS

#### 802.11a OFDM MODULATION

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg.C, 65%RH, 991hPa
<b>TESTED BY</b>	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	5745	63.973	18.06	28	PASS
3	5785	79.799	19.02	28	PASS
4	5805	63.533	18.03	28	PASS

**NOTE:** According to 15.247 (b) (4), the maximum antenna gain 8dBi is higher than 6dBi, so the limit of peak power shall be reduced by 2dB.



## 5.5 POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

**NOTES:**

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

### 5.5.3 TEST PROCEDURE

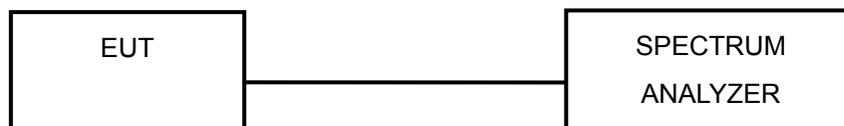
The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time = span/3 kHz. The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span/3 kHz for a full response of the mixer in the spectrum analyzer.

### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.5.5 TEST SETUP



### 5.5.6 EUT OPERATING CONDITION

Same as Item 5.3.6



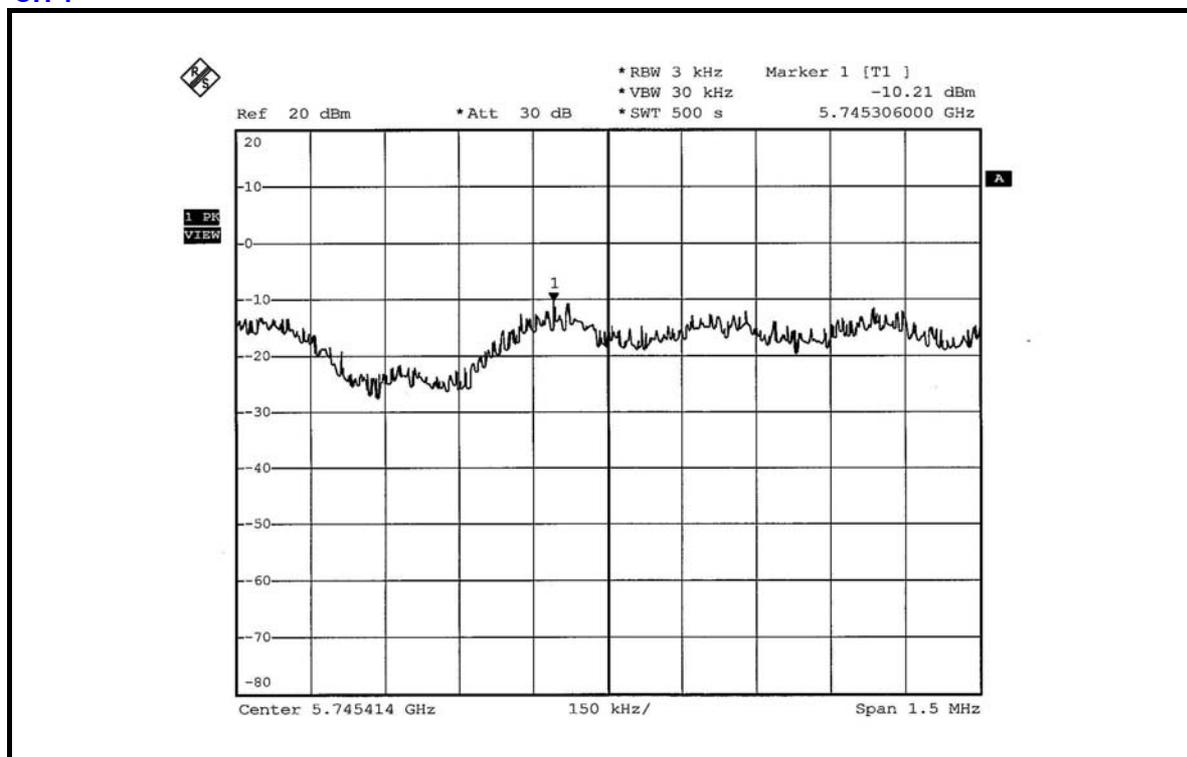
## 5.5.7 TEST RESULTS

### 802.11a OFDM MODULATION

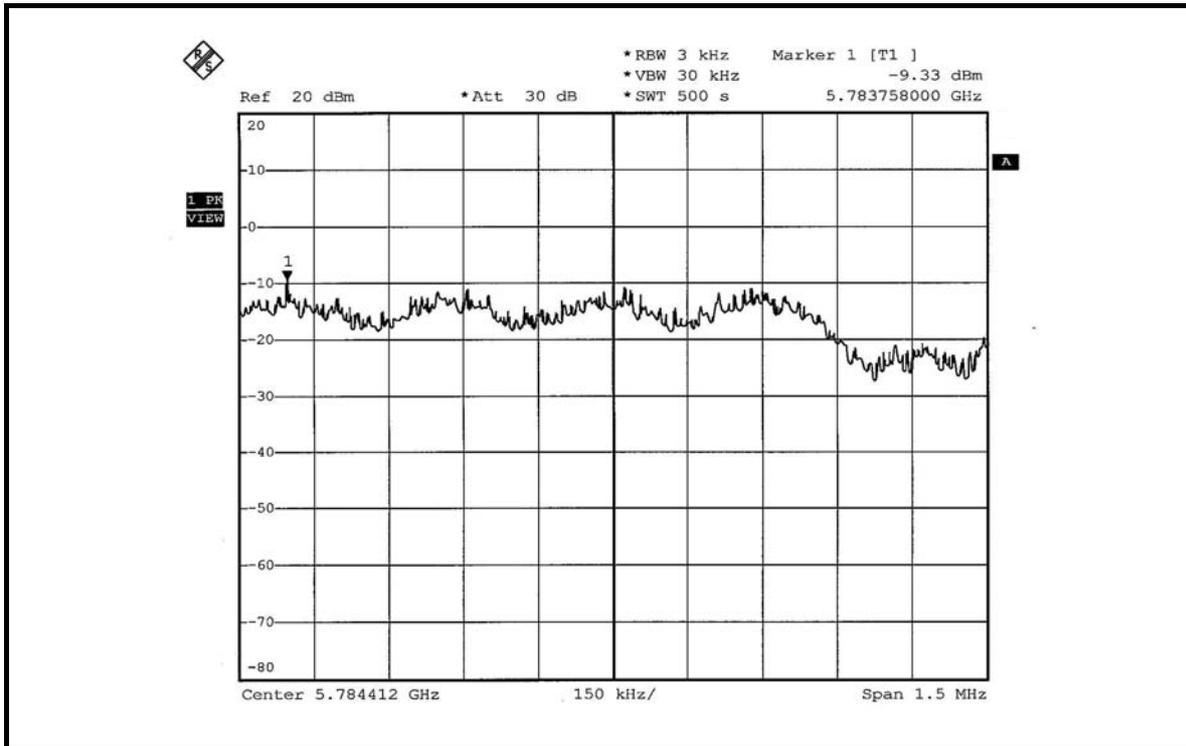
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg.C, 65%RH, 991hPa
<b>TESTED BY</b>	Long Chen		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5745	-10.21	8	PASS
3	5785	-9.33	8	PASS
4	5805	-10.59	8	PASS

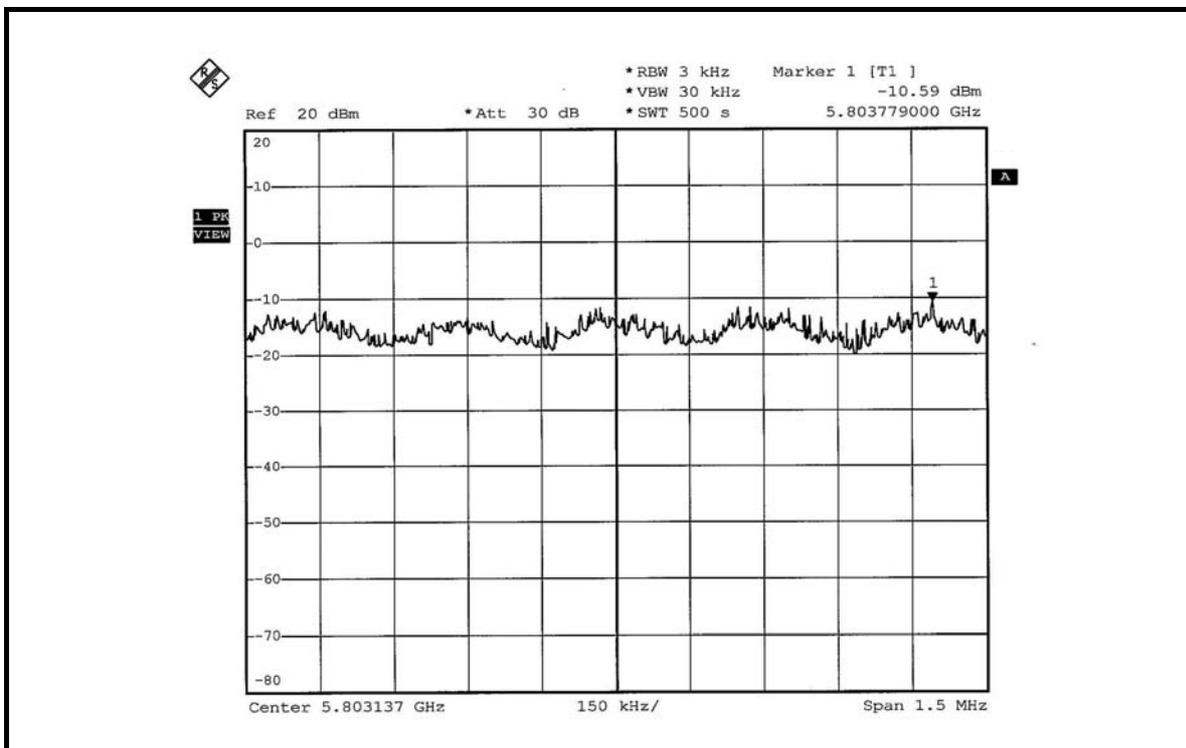
### CH 1



CH 3



CH 4





## 5.6 BAND EDGES MEASUREMENT

### 5.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 5.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

#### NOTES:

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

### 5.6.3 TEST PROCEDURE

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

### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation

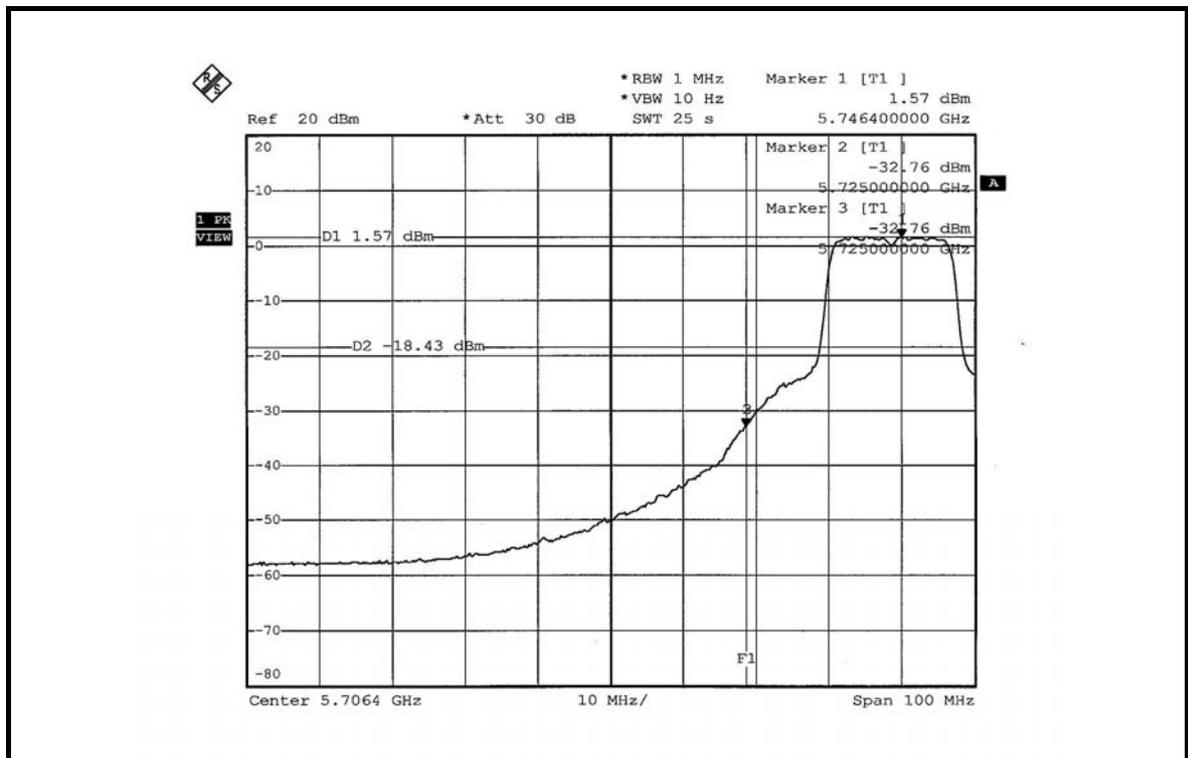
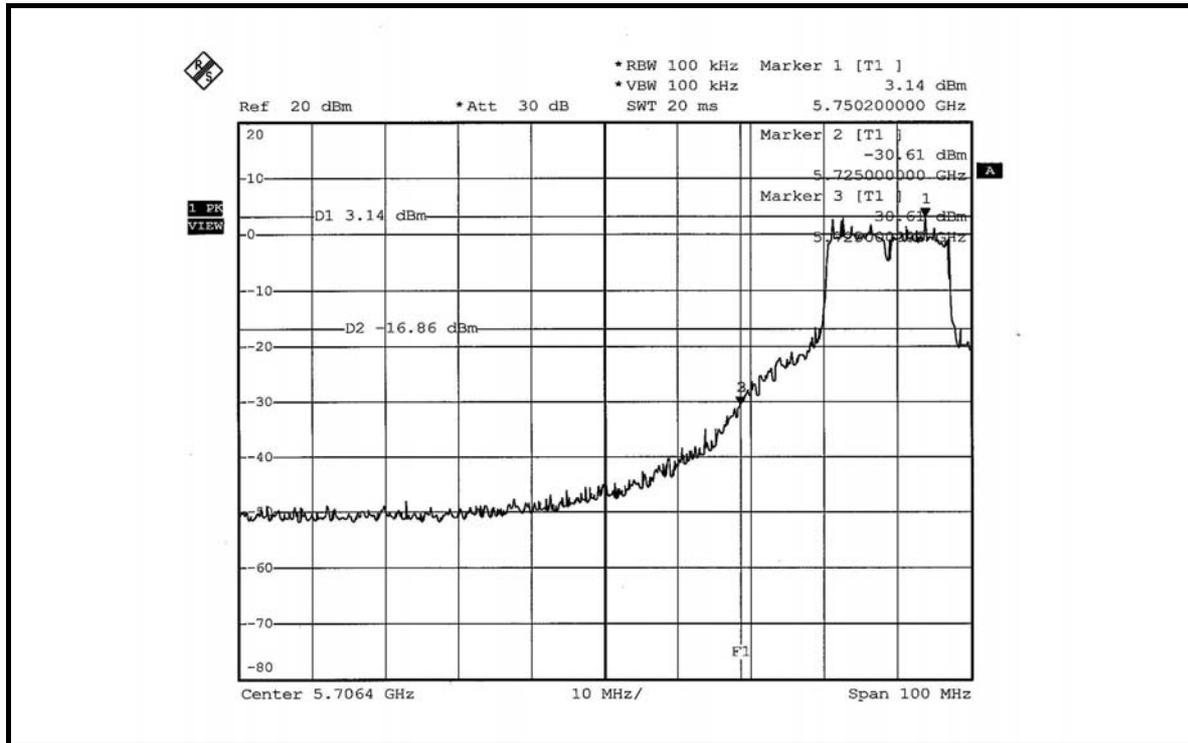


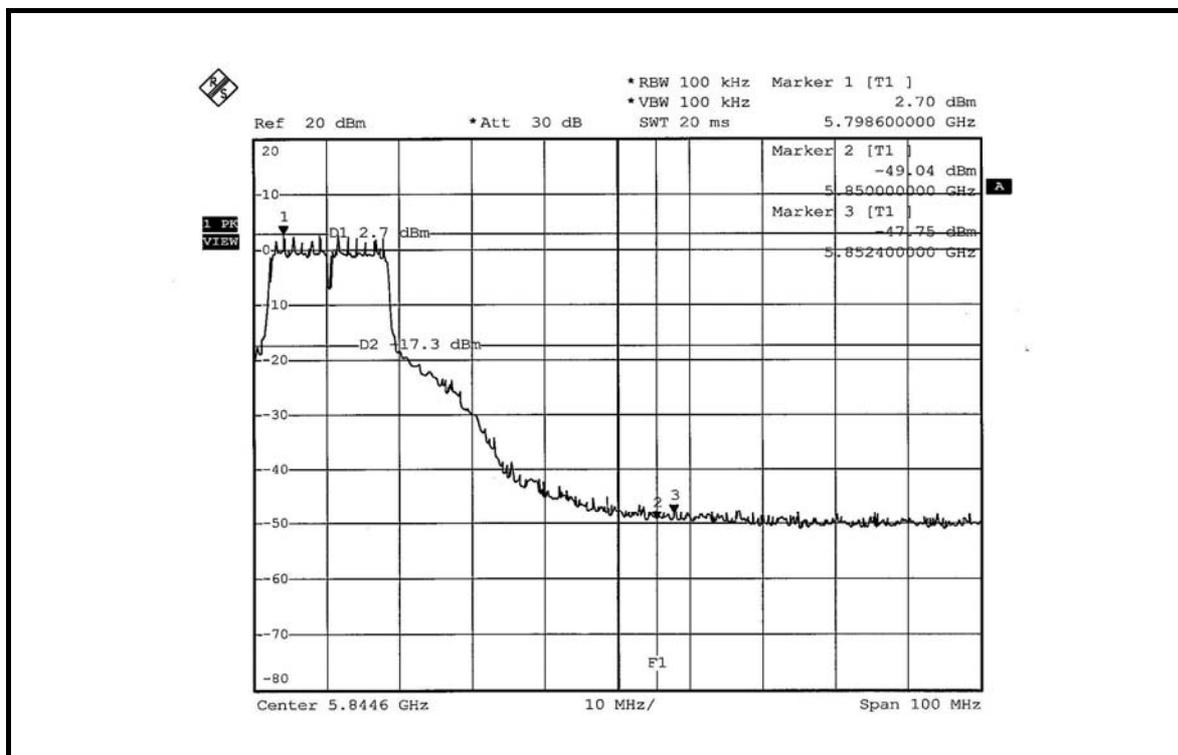
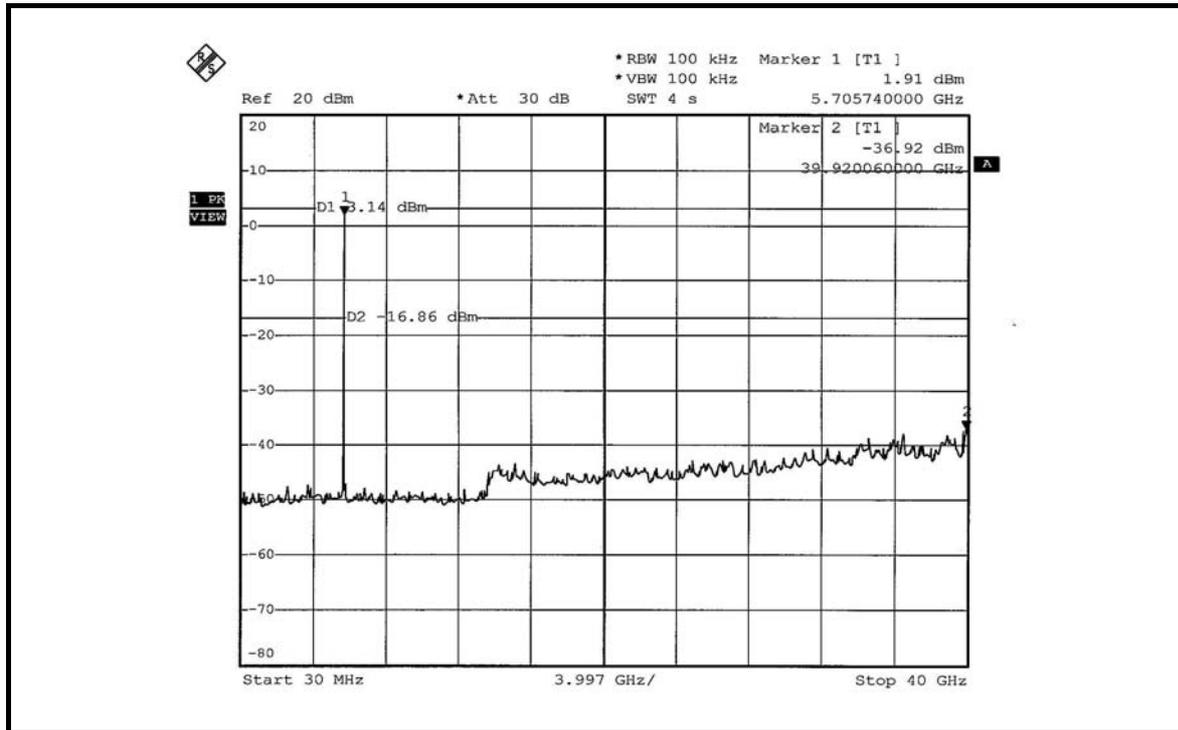
### 5.6.5 EUT OPERATING CONDITION

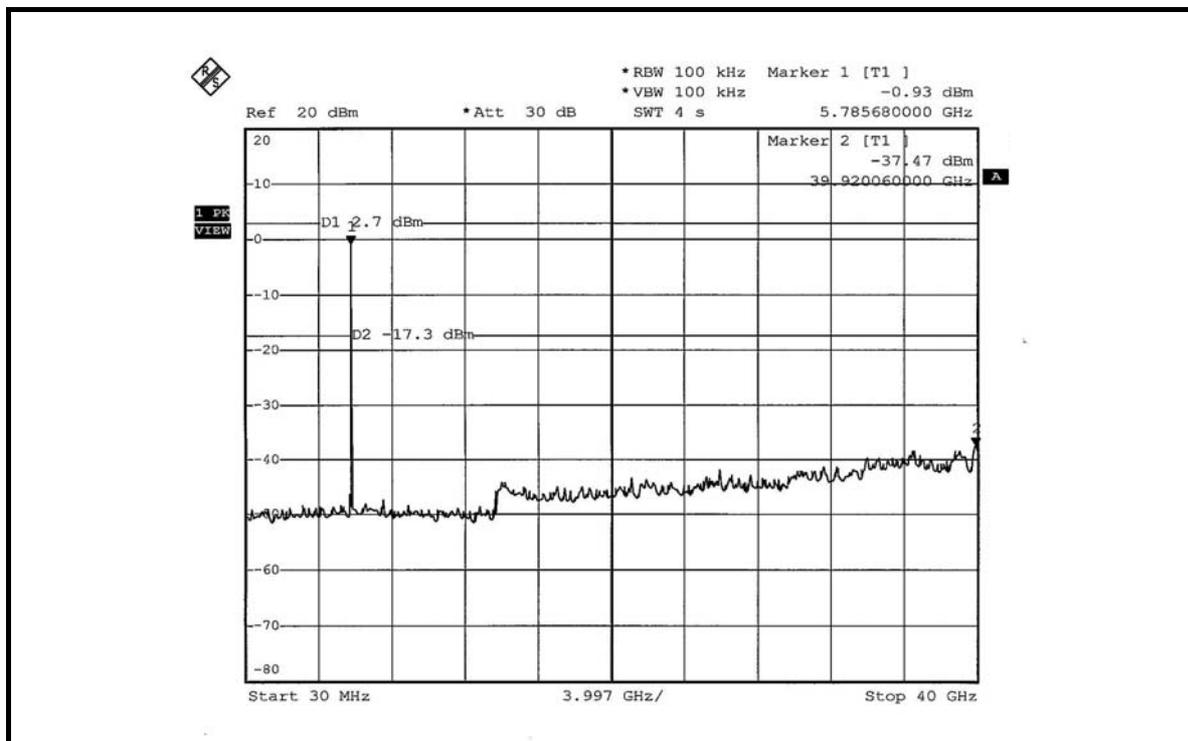
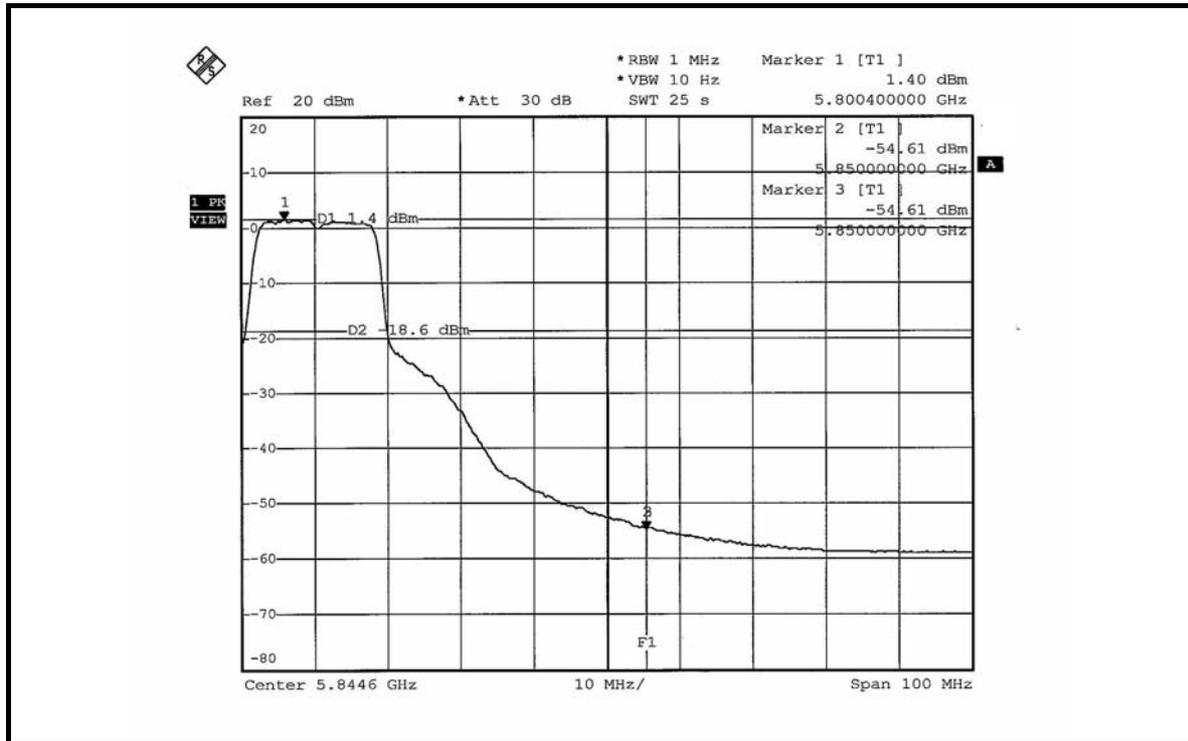
Same as Item 5.9.6

### 5.6.6 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).









## **5.7 ANTENNA REQUIREMENT**

### **5.7.1 STANDARD APPLICABLE**

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

And according to FCC 47 CFR Section 15.247(a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **5.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Dualband Built-in directional antenna with UFL connector. The maximum Gain of the antenna is 8dBi.



## 6. INFORMATION ON THE TESTING LABORATORIES

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

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

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

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

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**

Tel: 886-3-3183232

Fax: 886-3-3185050

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



## **APPENDIX-A**

### **MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

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