



# FCC TEST REPORT

**REPORT NO.:** RF931027L05  
**MODEL NO.:** WL UD 2454 17A  
**OEM MODEL NO.:** IS33541-A0 (refer to page 6 for other OEM Models)  
**RECEIVED:** Oct. 15, 2004  
**TESTED:** Oct. 15 ~ Dec. 21, 2004  
**ISSUED:** Dec. 27, 2004

**APPLICANT:** GLOBAL SUN TECHNOLOGY INC.

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**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei,  
Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Kueishan, Taoyuan,  
Taiwan, R.O.C.

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No. 2177-01



0528  
ILAC MRA



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## 1 CERTIFICATION

**PRODUCT :** 802.11g Wireless USB Dongle  
**MODEL NO.:** WL UD 2454 17A  
**OEM MODEL NO.:** IS33541-A0 (refer to page 6 for other OEM Models)  
**BRAND:** GLOBAL SUN  
**OEM BRAND:** ISINE (refer to page 6 for other OEM Brands)  
**APPLICANT :** GLOBAL SUN TECHNOLOGY INC.  
**TESTED:** Oct. 15 ~ Dec. 21, 2004  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**STANDARDS :** FCC Part 15, Subpart C (Section 15.247),  
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 :** Andrea Hsia , **DATE:** Dec. 27, 2004  
( Andrea Hsia )

**TECHNICAL**  
**ACCEPTANCE :** Gary Chang , **DATE:** Dec. 27, 2004  
Responsible for RF ( Gary Chang )

**APPROVED BY :** Cody Chang , **DATE:** Dec. 27, 2004  
( Cody Chang, Deputy Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: FCC Part 15, Subpart C</b>			
<b>Standard Section</b>	<b>Test Type and Limit</b>	<b>Result</b>	<b>REMARK</b>
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -17.31dB at 0.189MHz.
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit : min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -1.07dB at 2390.00MHz.
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	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:

<b>Measurement</b>	<b>Frequency</b>	<b>Uncertainty</b>
Conducted emissions	9k~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.73 dB
	200MHz ~1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	802.11g Wireless USB Dongle
<b>MODEL NO.</b>	WL UD 2454 17A
<b>POWER SUPPLY</b>	5.0Vdc from host equipment
<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 (Turbo mode: up to 108Mbps *see Note 2)
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11
<b>MAXIMUM OUTPUT POWER</b>	50.933mW
<b>ANTENNA TYPE</b>	Chip antenna with 2dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	USB
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
2. This EUT is capable of providing data rates of up to 108Mbps in Turbo Mode depending upon reception quality.
3. The models as below are identical to each other expect for their models due to marketing requirement.

Model Name	Brand	Remark
IS33541-A0	ISINE	OEM
WU 100E	Crypto	OEM
Seyr@cer Wireless USB Stick 108 Mbps	TOPCOM	OEM
WNC-0302USB	Level One	OEM

4. The EUT complies with IEEE 802.11g standards and backwards compatible with IEEE 802.11b products.
5. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

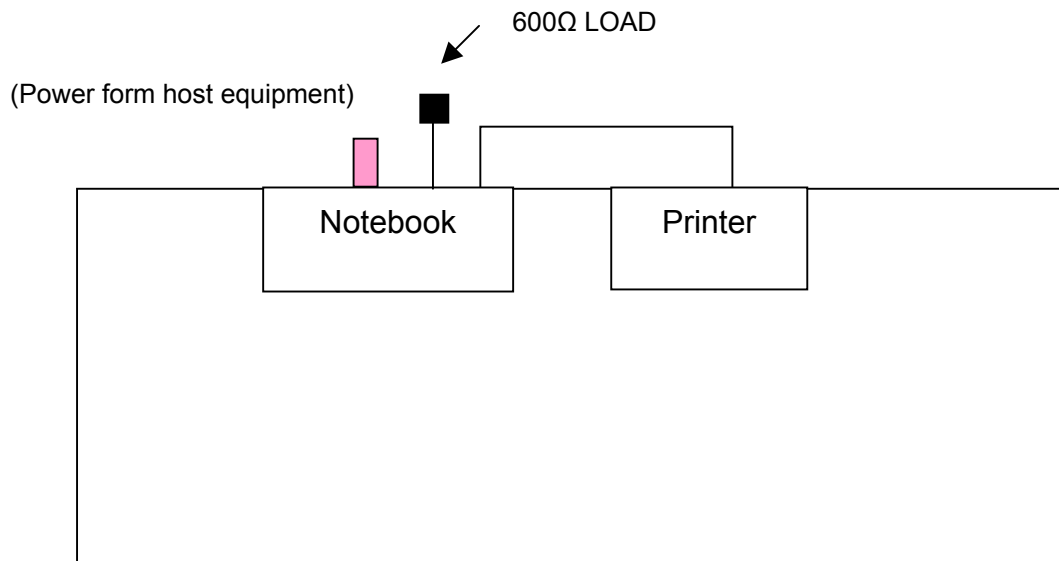
For 802.11b/g: Eleven channels are provided to this EUT for normal mode.

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

For 802.11g: One channel is provided to this EUT for turbo mode.

Channel	Frequency
6	2437 MHz

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





3.2.2 TEST MODE APPLICABILITY:

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

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

**Power Line Conducted Emission Test:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11g	1 to 11	1, 6, 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11g	1 to 11	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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	BPSK	12





**Bandedge Measurement:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	11
802.11g	1 to 11	1, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	BPSK	12

**Antenna Port Conducted Measurement:**

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	11
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11g Turbo	6	6	OFDM	BPSK	12



### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is an 802.11g Wireless USB Dongle. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C. (15.247)**  
**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	Compaq	N800C	470048-515	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	600Ω LOAD	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m shielded cable without core.
3	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	100288	Nov. 06, 2005
RF signal cable Woken	5D-FB	Cable-HyC02-01	Mar. 07, 2005
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Mar. 10, 2005
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Mar. 04, 2005
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.



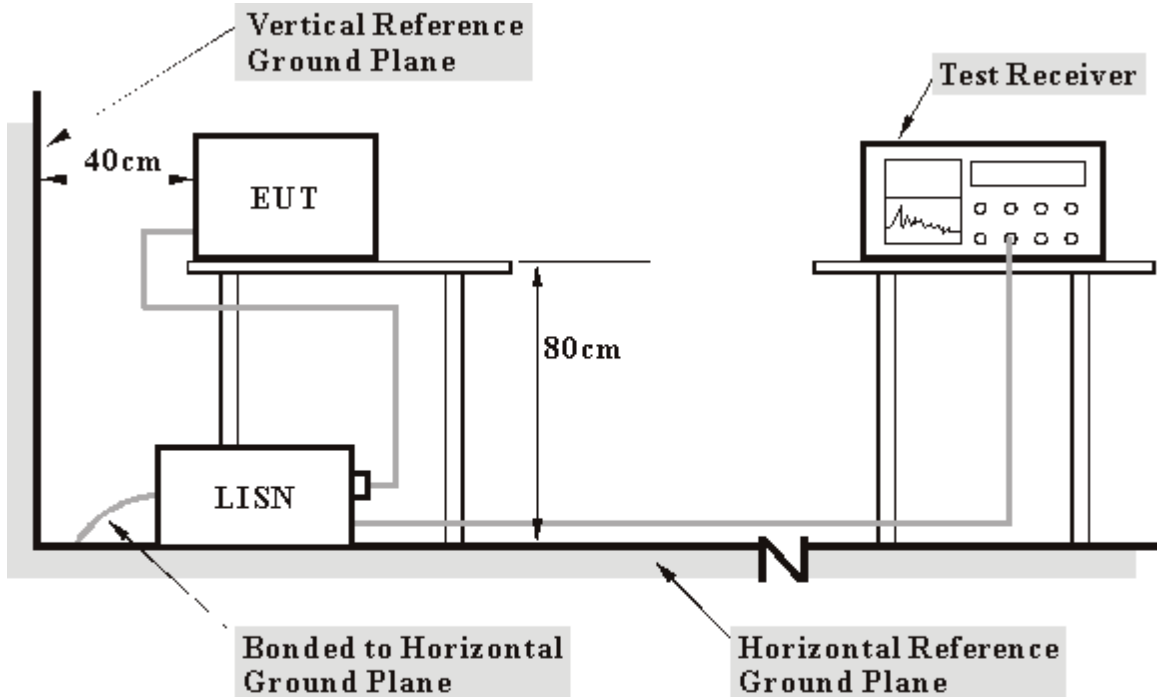
#### 4.1.3 TEST PROCEDURES

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

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



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

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

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Plug the EUT to a Notebook system placed on a testing table.
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system show "H" messages on its screen.
- d. The computer system sent "H" messages to printer, and the printer prints them on paper.
- e. Repeated c ~d.



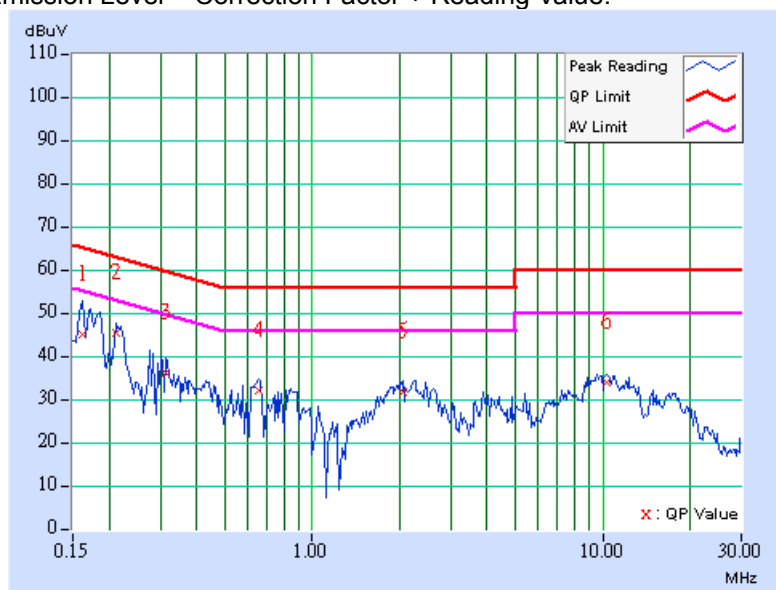
4.1.7 TEST RESULTS

**Conducted Worst-Case Data**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.162	0.10	44.57	-	44.67	-	65.38
2	0.213	0.10	44.84	-	44.94	-	63.11	53.11	-18.17	-
3	0.314	0.11	35.81	-	35.92	-	59.86	49.86	-23.94	-
4	0.658	0.17	31.82	-	31.99	-	56.00	46.00	-24.01	-
5	2.043	0.26	31.37	-	31.63	-	56.00	46.00	-24.37	-
6	10.348	0.54	33.44	-	33.98	-	60.00	50.00	-26.02	-

- 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.

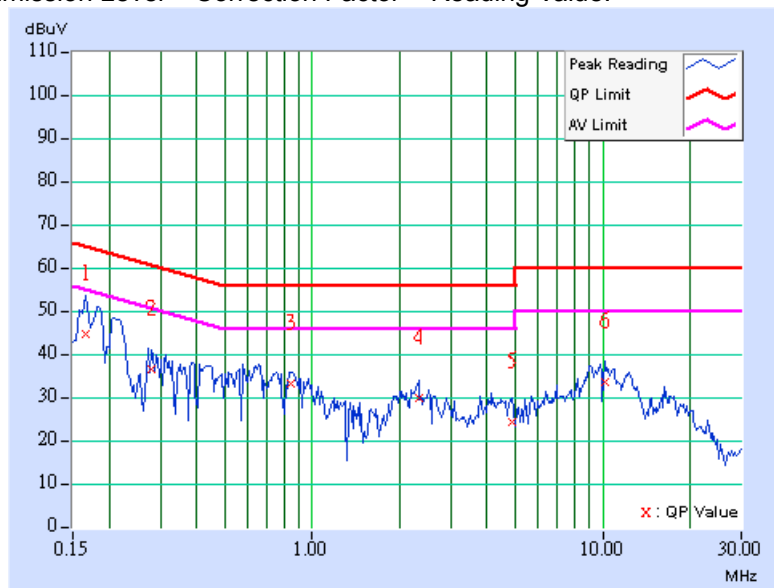




<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.166	0.10	44.27	-	44.37	-	65.18
2	0.279	0.11	36.03	-	36.14	-	60.85	50.85	-24.71	-
3	0.841	0.20	32.87	-	33.07	-	56.00	46.00	-22.93	-
4	2.320	0.26	29.64	-	29.90	-	56.00	46.00	-26.10	-
5	4.871	0.34	24.01	-	24.35	-	56.00	46.00	-31.65	-
6	10.125	0.49	33.28	-	33.77	-	60.00	50.00	-26.23	-

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

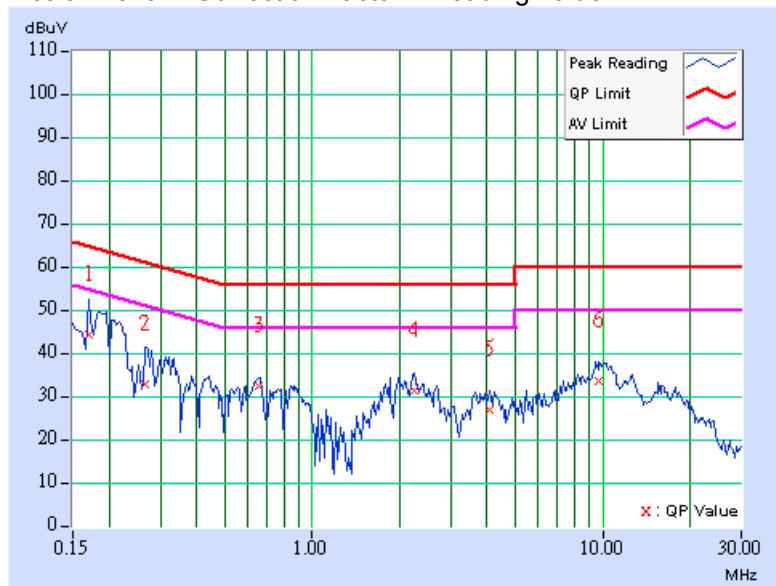




<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.170	0.10	44.00	-	44.10	-	64.98
2	0.267	0.10	32.55	-	32.65	-	61.20	51.20	-28.55	-
3	0.654	0.17	31.97	-	32.14	-	56.00	46.00	-23.86	-
4	2.250	0.27	30.84	-	31.11	-	56.00	46.00	-24.89	-
5	4.102	0.32	26.46	-	26.78	-	56.00	46.00	-29.22	-
6	9.734	0.52	33.09	-	33.61	-	60.00	50.00	-26.39	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
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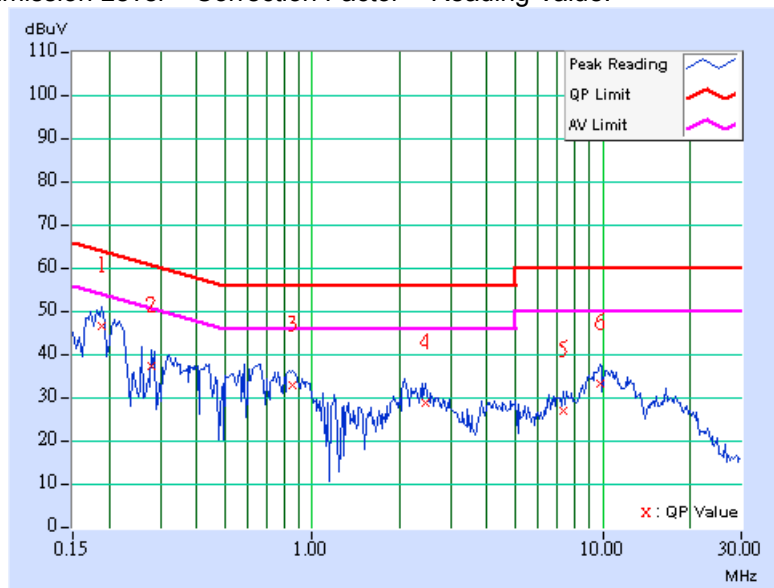




<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.189	0.10	46.24	-	46.34	-	64.08	54.08	-17.74	-
2	0.279	0.11	36.86	-	36.97	-	60.85	50.85	-23.88	-
3	0.857	0.21	32.61	-	32.82	-	56.00	46.00	-23.18	-
4	2.441	0.26	28.49	-	28.75	-	56.00	46.00	-27.25	-
5	7.309	0.43	26.62	-	27.05	-	60.00	50.00	-32.95	-
6	9.816	0.49	32.89	-	33.38	-	60.00	50.00	-26.62	-

- 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.
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  6. Emission Level = Correction Factor + Reading Value.

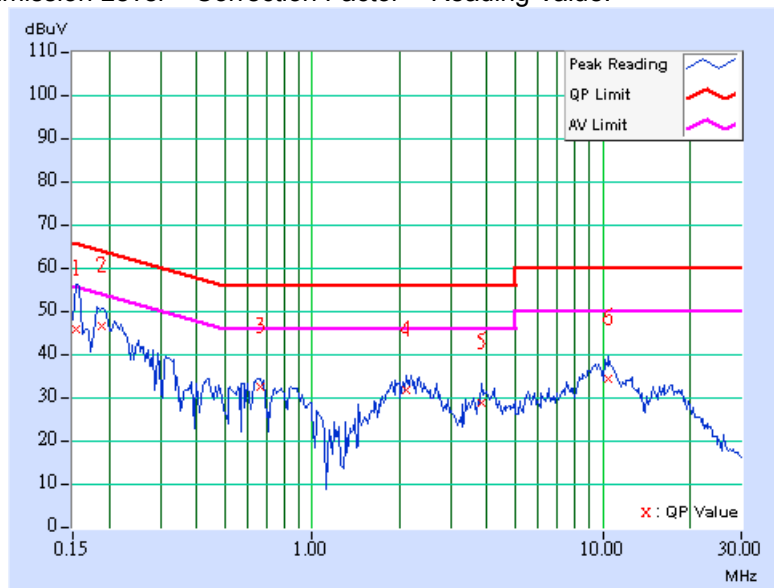




<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.154	0.10	45.36	-	45.46	-	65.79	55.79	-20.32	-
2	0.189	0.10	46.28	-	46.38	-	64.08	54.08	-17.70	-
3	0.662	0.17	31.99	-	32.16	-	56.00	46.00	-23.84	-
4	2.102	0.26	31.29	-	31.55	-	56.00	46.00	-24.45	-
5	3.844	0.31	28.28	-	28.59	-	56.00	46.00	-27.41	-
6	10.453	0.55	33.87	-	34.42	-	60.00	50.00	-25.58	-

- 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.

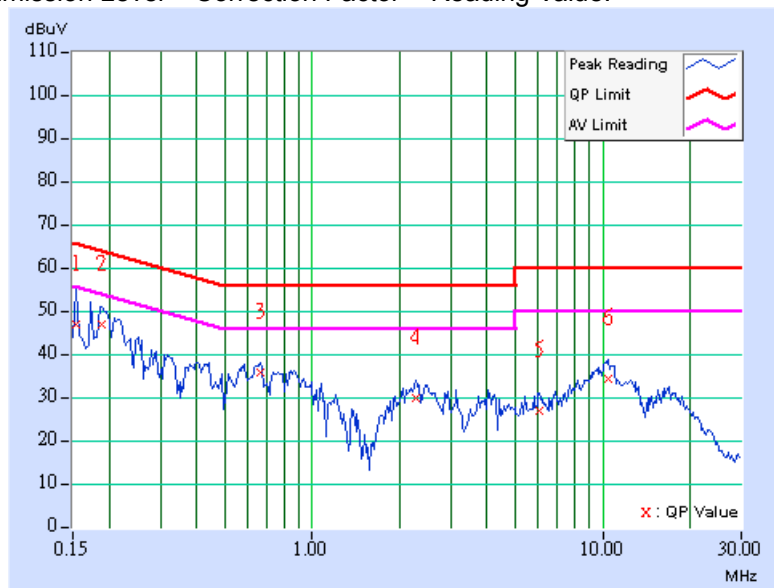




<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 64%RH, 991hPa	<b>TESTED BY</b>	Leo Hung

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	0.154	0.10	46.41	-	46.51	-	65.79	55.79	-19.28	-
<b>2</b>	<b>0.189</b>	<b>0.10</b>	<b>46.67</b>	-	<b>46.77</b>	-	<b>64.08</b>	<b>54.08</b>	<b>-17.31</b>	-
3	0.662	0.16	35.59	-	35.75	-	56.00	46.00	-20.25	-
4	2.262	0.26	29.58	-	29.84	-	56.00	46.00	-26.16	-
5	6.066	0.39	26.39	-	26.78	-	60.00	50.00	-33.22	-
6	10.473	0.50	33.90	-	34.40	-	60.00	50.00	-25.60	-

- 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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Jan. 13, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170241	Feb. 23, 2005
Preamplifier Agilent	8449B	3008A01961	Nov. 09, 2005
Preamplifier Agilent	8447D	2944A10629	Nov. 09, 2005
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218182/4	Mar. 04, 2005
RF signal cable HUBER+SUHNER	SUCOFLEX 104	218194/4	Mar. 04, 2005
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	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 1.
  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 IC4924-2.



#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 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 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

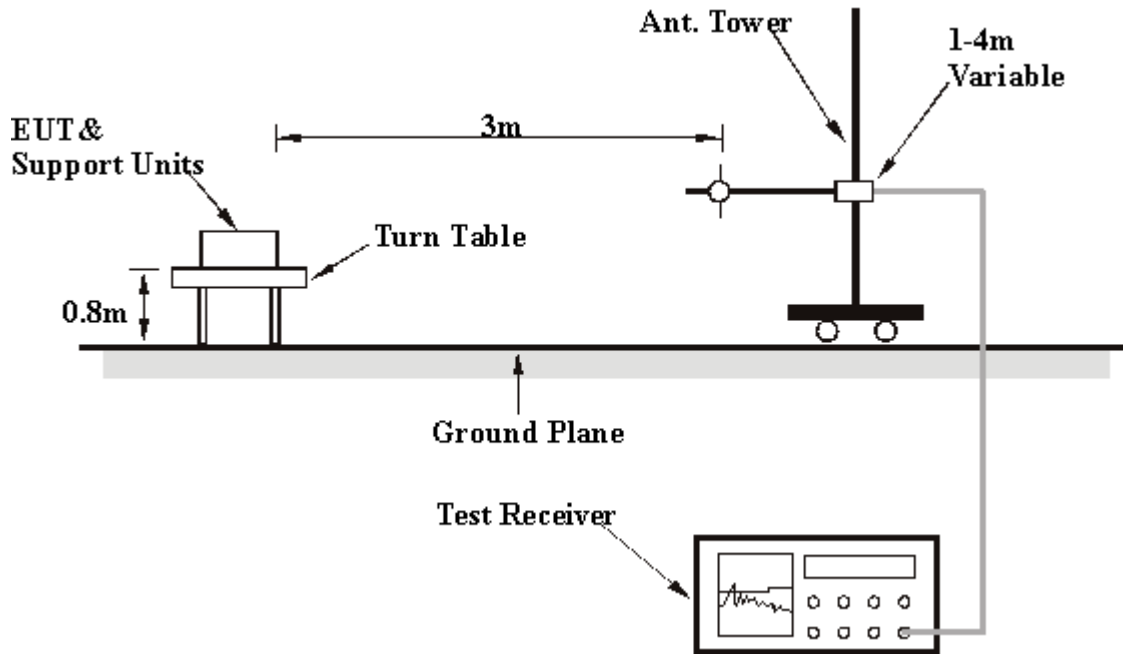
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6



#### 4.2.7 TEST RESULTS

##### Below 1GHz Worst-Case Data

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

##### 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	35.83	23.58 QP	40.00	-16.42	1.00 H	103	9.01	14.57
2	131.08	29.95 QP	43.50	-13.55	1.50 H	211	16.15	13.80
3	173.85	27.11 QP	43.50	-16.39	1.75 H	241	13.55	13.55
4	232.16	28.26 QP	46.00	-17.74	1.25 H	283	15.67	12.59
5	278.82	28.16 QP	46.00	-17.84	1.00 H	247	14.02	14.14
6	360.46	28.91 QP	46.00	-17.09	1.00 H	262	13.03	15.88
7	399.34	35.76 QP	46.00	-10.24	1.00 H	307	19.03	16.74
8	479.04	37.41 QP	46.00	-8.59	1.25 H	70	18.95	18.45
9	599.56	30.67 QP	46.00	-15.33	1.25 H	223	9.67	21.00
10	663.71	36.05 QP	46.00	-9.95	1.25 H	265	14.20	21.85
11	702.59	38.18 QP	46.00	-7.82	1.25 H	301	15.82	22.36
12	720.08	32.69 QP	46.00	-13.31	1.00 H	211	9.89	22.79
13	764.79	30.85 QP	46.00	-15.15	1.00 H	160	7.23	23.62
14	877.54	31.93 QP	46.00	-14.07	1.50 H	217	7.23	24.70
15	961.12	43.55 QP	54.00	-10.45	1.50 H	277	17.87	25.68

- 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.





<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

#### 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	26.52 QP	40.00	-13.48	1.00 V	181	11.95	14.57
2	175.79	33.76 QP	43.50	-9.74	1.00 V	217	20.39	13.37
3	249.66	28.90 QP	46.00	-17.10	1.00 V	199	15.68	13.22
4	290.48	29.41 QP	46.00	-16.59	1.50 V	160	15.06	14.35
5	350.74	32.03 QP	46.00	-13.97	1.25 V	214	16.37	15.67
6	399.34	41.25 QP	46.00	-4.75	1.00 V	199	24.52	16.74
7	442.10	29.21 QP	46.00	-16.79	1.50 V	175	11.35	17.86
8	479.04	31.16 QP	46.00	-14.84	1.50 V	169	12.70	18.45
9	531.52	37.11 QP	46.00	-8.89	1.00 V	190	17.77	19.34
10	584.01	32.98 QP	46.00	-13.02	1.00 V	172	12.40	20.59
11	665.65	34.21 QP	46.00	-11.79	1.50 V	232	12.34	21.87
12	702.59	37.46 QP	46.00	-8.54	1.25 V	145	15.10	22.36
13	766.73	32.22 QP	46.00	-13.78	1.75 V	190	8.59	23.63
14	828.94	28.64 QP	46.00	-17.36	1.25 V	136	4.60	24.03
15	877.54	31.83 QP	46.00	-14.17	1.25 V	280	7.13	24.70

- 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.

**802.11b DSSS modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	2390.00	51.33 PK	74.00	-22.67	1.08 H	18	19.53	31.80
1	2390.00	43.80 AV	54.00	-10.20	1.08 H	18	12.00	31.80
2	*2412.00	110.28 PK			1.08 H	18	78.41	31.87
2	*2412.00	102.75 AV			1.08 H	18	70.88	31.87
3	2688.00	48.75 PK	74.00	-25.25	1.20 H	25	15.85	32.90
3	2688.00	43.47 AV	54.00	-10.53	1.20 H	25	10.57	32.90
4	4824.00	55.88 PK	74.00	-18.12	1.15 H	352	17.77	38.11
4	4824.00	49.39 AV	54.00	-4.61	1.15 H	352	11.28	38.11
5	7236.00	59.82 PK	74.00	-14.18	1.04 H	134	16.77	43.05
5	7236.00	50.60 AV	54.00	-3.40	1.04 H	134	7.55	43.05

**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	2390.00	47.79 PK	74.00	-26.21	1.18 V	347	15.99	31.80
1	2390.00	40.42 AV	54.00	-13.58	1.18 V	347	8.62	31.80
2	*2412.00	105.94 PK			1.18 V	347	74.07	31.87
2	*2412.00	98.57 AV			1.18 V	347	66.70	31.87
3	2688.00	39.61 PK	74.00	-34.39	1.03 V	22	6.71	32.90
3	2688.00	36.98 AV	54.00	-17.02	1.03 V	22	4.08	32.90
4	4824.00	57.71 PK	74.00	-16.29	1.03 V	360	19.60	38.11
4	4824.00	50.62 AV	54.00	-3.38	1.03 V	360	12.51	38.11
5	7236.00	59.28 PK	74.00	-14.72	1.02 V	44	16.23	43.05
5	7236.00	47.83 AV	54.00	-6.17	1.02 V	44	4.78	43.05

- 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.
  5. " \* " : Fundamental frequency.



<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

### 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	*2437.00	110.88 PK			1.07 H	18	78.93	31.95
1	*2437.00	103.74 AV			1.07 H	18	71.79	31.95
2	2688.00	48.30 PK	74.00	-25.70	1.00 H	360	15.40	32.90
2	2688.00	43.82 AV	54.00	-10.18	1.00 H	360	10.92	32.90
3	4874.00	56.85 PK	74.00	-17.15	1.02 H	42	18.57	38.28
3	4874.00	49.70 AV	54.00	-4.30	1.02 H	42	11.42	38.28
4	7311.00	61.22 PK	74.00	-12.78	1.05 H	146	18.25	42.97
4	7311.00	52.55 AV	54.00	-1.45	1.05 H	146	9.58	42.97

### 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	*2437.00	105.34 PK			1.13 V	258	73.39	31.95
1	*2437.00	97.75 AV			1.13 V	258	65.80	31.95
2	2688.00	46.26 PK	74.00	-27.74	1.02 V	37	13.36	32.90
2	2688.00	37.53 AV	54.00	-16.47	1.02 V	37	4.63	32.90
3	4874.00	57.74 PK	74.00	-16.26	1.02 V	360	19.46	38.28
3	4874.00	50.66 AV	54.00	-3.34	1.02 V	360	12.38	38.28
4	7311.00	60.37 PK	74.00	-13.63	1.40 V	42	17.40	42.97
4	7311.00	51.25 AV	54.00	-2.75	1.40 V	42	8.28	42.97

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



<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	*2462.00	112.08 PK			1.05 H	16	80.06	32.02
1	*2462.00	104.54 AV			1.05 H	16	72.52	32.02
2	2483.50	53.35 PK	74.00	-20.65	1.05 H	16	21.26	32.09
2	2483.50	45.81 AV	54.00	-8.19	1.05 H	16	13.72	32.09
3	2688.00	49.86 PK	74.00	-24.14	1.14 H	360	16.96	32.90
3	2688.00	47.85 AV	54.00	-6.15	1.14 H	360	14.95	32.90
4	4924.00	58.18 PK	74.00	-15.82	1.17 H	257	19.69	38.49
4	4924.00	51.32 AV	54.00	-2.68	1.17 H	257	12.83	38.49
5	7386.00	61.83 PK	74.00	-12.17	1.14 H	106	19.29	42.55
5	7386.00	51.96 AV	54.00	-2.04	1.14 H	106	9.42	42.55

**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	*2462.00	106.99 PK			1.22 V	343	74.97	32.02
1	*2462.00	99.80 AV			1.22 V	343	67.78	32.02
2	2483.50	48.26 PK	74.00	-25.74	1.22 V	343	16.17	32.09
2	2483.50	41.07 AV	54.00	-12.93	1.22 V	343	8.98	32.09
3	2688.00	47.65 PK	74.00	-26.35	1.17 V	7	14.75	32.90
3	2688.00	43.30 AV	54.00	-10.70	1.17 V	7	10.40	32.90
4	4924.00	57.02 PK	74.00	-16.98	1.00 V	350	18.53	38.49
4	4924.00	52.29 AV	54.00	-1.71	1.00 V	350	13.80	38.49
5	7386.00	59.66 PK	74.00	-14.34	1.11 V	66	17.12	42.55
5	7386.00	51.08 AV	54.00	-2.92	1.11 V	66	8.54	42.55

- 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.
  5. “ \* “ : Fundamental frequency.

**802.11g OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	2390.00	62.80 PK	74.00	-11.20	1.07 H	22	31.00	31.80
<b>1</b>	<b>2390.00</b>	<b>52.93 AV</b>	<b>54.00</b>	<b>-1.07</b>	<b>1.07 H</b>	<b>22</b>	<b>21.13</b>	<b>31.80</b>
2	*2412.00	108.87 PK			1.07 H	22	77.00	31.87
2	*2412.00	99.00 AV			1.07 H	22	67.13	31.87
3	2688.00	49.34 PK	74.00	-24.66	1.00 H	22	16.44	32.90
3	2688.00	44.57 AV	54.00	-9.43	1.00 H	22	11.67	32.90
4	4824.00	55.20 PK	74.00	-18.80	1.13 H	226	17.09	38.11
4	4824.00	42.17 AV	54.00	-11.83	1.13 H	226	4.06	38.11
5	7236.00	60.38 PK	74.00	-13.62	1.05 H	139	17.33	43.05
5	7236.00	47.20 AV	54.00	-6.80	1.05 H	139	4.15	43.05

**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	2390.00	58.28 PK	74.00	-15.72	1.22 V	344	26.48	31.80
1	2390.00	48.65 AV	54.00	-5.35	1.22 V	344	16.85	31.80
2	*2412.00	104.35 PK			1.22 V	344	72.48	31.87
2	*2412.00	94.72 AV			1.22 V	344	62.85	31.87
3	2688.00	48.21 PK	74.00	-25.79	1.17 V	358	15.31	32.90
3	2688.00	42.38 AV	54.00	-11.62	1.17 V	358	9.48	32.90
4	4824.00	55.92 PK	74.00	-18.08	1.16 V	2	17.81	38.11
4	4824.00	42.91 AV	54.00	-11.09	1.16 V	2	4.80	38.11
5	7236.00	60.77 PK	74.00	-13.23	1.00 V	172	17.72	43.05
5	7236.00	47.74 AV	54.00	-6.26	1.00 V	172	4.69	43.05

- 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.
  5. “ \* “ : Fundamental frequency.



<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	*2437.00	109.48 PK			1.40 H	4	77.53	31.95
1	*2437.00	100.03 AV			1.40 H	4	68.08	31.95
2	2688.00	49.33 PK	74.00	-24.67	1.20 H	22	16.43	32.90
2	2688.00	44.98 AV	54.00	-9.02	1.20 H	22	12.08	32.90
3	4874.00	55.37 PK	74.00	-18.63	1.27 H	221	17.09	38.28
3	4874.00	41.79 AV	54.00	-12.21	1.27 H	221	3.51	38.28
4	7311.00	62.62 PK	74.00	-11.38	1.32 H	134	19.65	42.97
4	7311.00	48.72 AV	54.00	-5.28	1.32 H	134	5.75	42.97

**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	*2437.00	102.95 PK			1.00 V	299	71.00	31.95
1	*2437.00	93.21 AV			1.00 V	299	61.26	31.95
2	2688.00	46.70 PK	74.00	-27.30	1.13 V	358	13.80	32.90
2	2688.00	40.71 AV	54.00	-13.29	1.13 V	358	7.81	32.90
3	4874.00	54.95 PK	74.00	-19.05	1.15 V	12	16.67	38.28
3	4874.00	41.65 AV	54.00	-12.35	1.15 V	12	3.37	38.28
4	7311.00	62.24 PK	74.00	-11.76	1.00 V	171	19.27	42.97
4	7311.00	48.26 AV	54.00	-5.74	1.00 V	171	5.29	42.97

- REMARK:**
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.



<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 60 % RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	*2462.00	108.23 PK			1.06 H	19	76.21	32.02
1	*2462.00	98.95 AV			1.06 H	19	66.93	32.02
2	2483.50	61.73 PK	74.00	-12.27	1.06 H	19	29.64	32.09
2	2483.50	52.45 AV	54.00	-1.55	1.06 H	19	20.36	32.09
3	2688.00	50.55 PK	74.00	-23.45	1.19 H	24	17.65	32.90
3	2688.00	46.36 AV	54.00	-7.64	1.19 H	24	13.46	32.90
4	4924.00	53.82 PK	74.00	-20.18	1.14 H	255	15.33	38.49
4	4924.00	41.02 AV	54.00	-12.98	1.14 H	255	2.53	38.49
5	7386.00	60.24 PK	74.00	-13.76	1.14 H	104	17.70	42.55
5	7386.00	46.37 AV	54.00	-7.63	1.14 H	104	3.83	42.55

**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	*2462.00	104.03 PK			1.00 V	296	72.01	32.02
1	*2462.00	93.89 AV			1.00 V	296	61.87	32.02
2	2483.50	57.53 PK	74.00	-16.47	1.00 V	296	25.44	32.09
2	2483.50	47.39 AV	54.00	-6.61	1.00 V	296	15.30	32.09
3	2688.00	46.34 PK	74.00	-27.66	1.02 V	34	13.44	32.90
3	2688.00	39.76 AV	54.00	-14.24	1.02 V	34	6.86	32.90
4	4924.00	55.20 PK	74.00	-18.80	1.00 V	360	16.71	38.49
4	4924.00	41.56 AV	54.00	-12.44	1.00 V	360	3.07	38.49
5	7386.00	60.12 PK	74.00	-13.88	1.06 V	163	17.58	42.55
5	7386.00	45.93 AV	54.00	-8.07	1.06 V	163	3.39	42.55

- REMARK:**
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.



**802.11g Turbo OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	12Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 62%RH, 991hPa	<b>TESTED BY</b>	Match Tsui

**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	2390.00	60.13 PK	74.00	-13.87	1.07 H	18	28.33	31.80
1	2390.00	48.14 AV	54.00	-5.86	1.07 H	18	16.34	31.80
2	*2437.00	104.36 PK			1.07 H	18	72.41	31.95
2	*2437.00	95.28 AV			1.07 H	18	63.33	31.95
3	2483.50	60.37 PK	74.00	-13.63	1.07 H	18	28.28	32.09
3	2483.50	48.75 AV	54.00	-5.25	1.07 H	18	16.66	32.09
4	2688.00	47.80 PK	74.00	-26.20	1.23 H	126	14.90	32.90
4	2688.00	43.78 AV	54.00	-10.22	1.23 H	126	10.88	32.90
5	4874.00	50.21 PK	74.00	-23.79	1.16 H	206	11.92	38.28
5	4874.00	36.96 AV	54.00	-17.04	1.16 H	206	-1.33	38.28

**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	2390.00	57.26 PK	74.00	-16.74	1.00 V	341	25.46	31.80
1	2390.00	46.24 AV	54.00	-7.76	1.00 V	341	14.44	31.80
2	*2437.00	99.92 PK			1.00 V	341	67.97	31.95
2	*2437.00	90.46 AV			1.00 V	341	58.51	31.95
3	2483.50	57.10 PK	74.00	-16.90	1.00 V	341	25.01	32.09
3	2483.50	46.62 AV	54.00	-7.38	1.00 V	341	14.53	32.09
4	2688.00	45.31 PK	74.00	-28.69	1.08 V	256	12.41	32.90
4	2688.00	39.63 AV	54.00	-14.37	1.08 V	256	6.73	32.90
5	4874.00	48.75 PK	74.00	-25.25	1.10 V	206	10.46	38.28
5	4874.00	35.87 AV	54.00	-18.13	1.10 V	206	-2.42	38.28

- 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.





### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

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

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

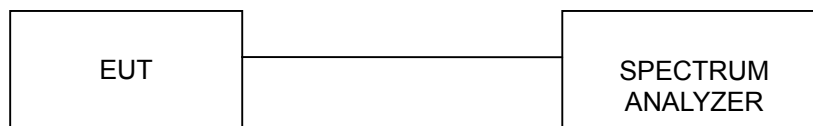
#### 4.3.3 TEST PROCEDURE

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

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



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

#### 4.3.6 EUT OPERATING CONDITIONS

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



## 4.3.7 TEST RESULTS

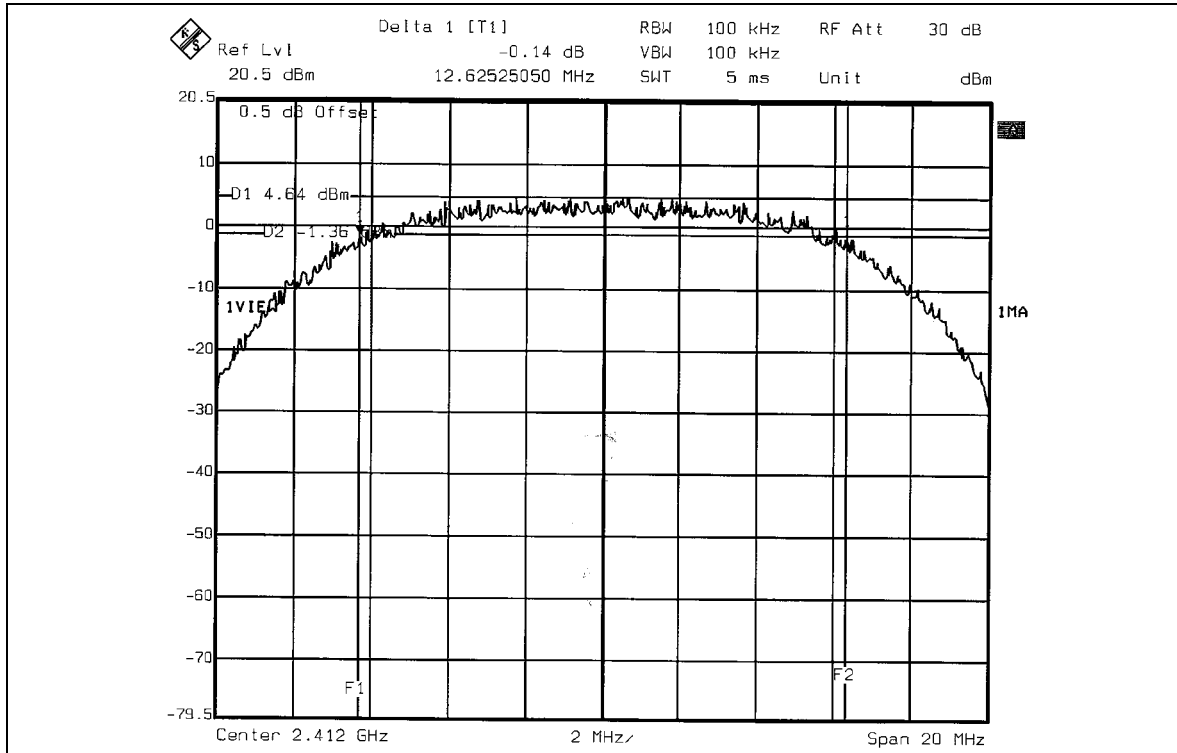
**802.11b DSSS modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

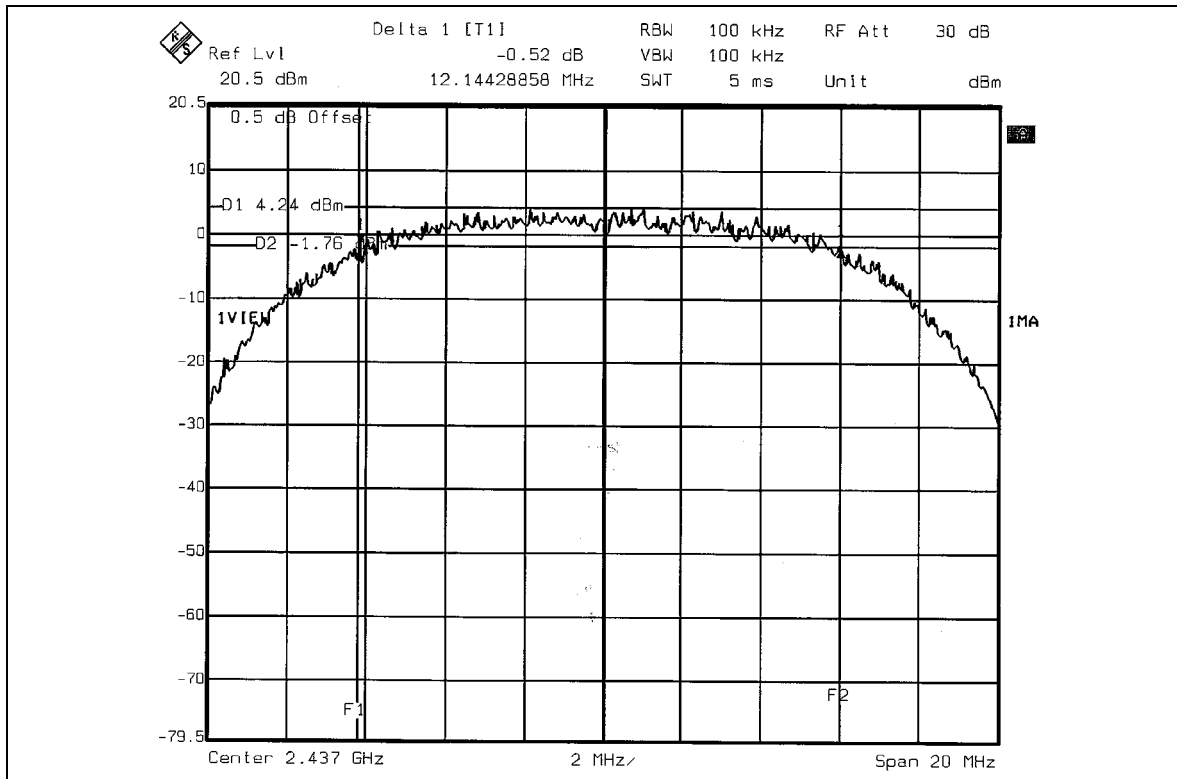
<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	12.63	0.5	PASS
6	2437	12.14	0.5	PASS
11	2462	12.42	0.5	PASS



### CH1

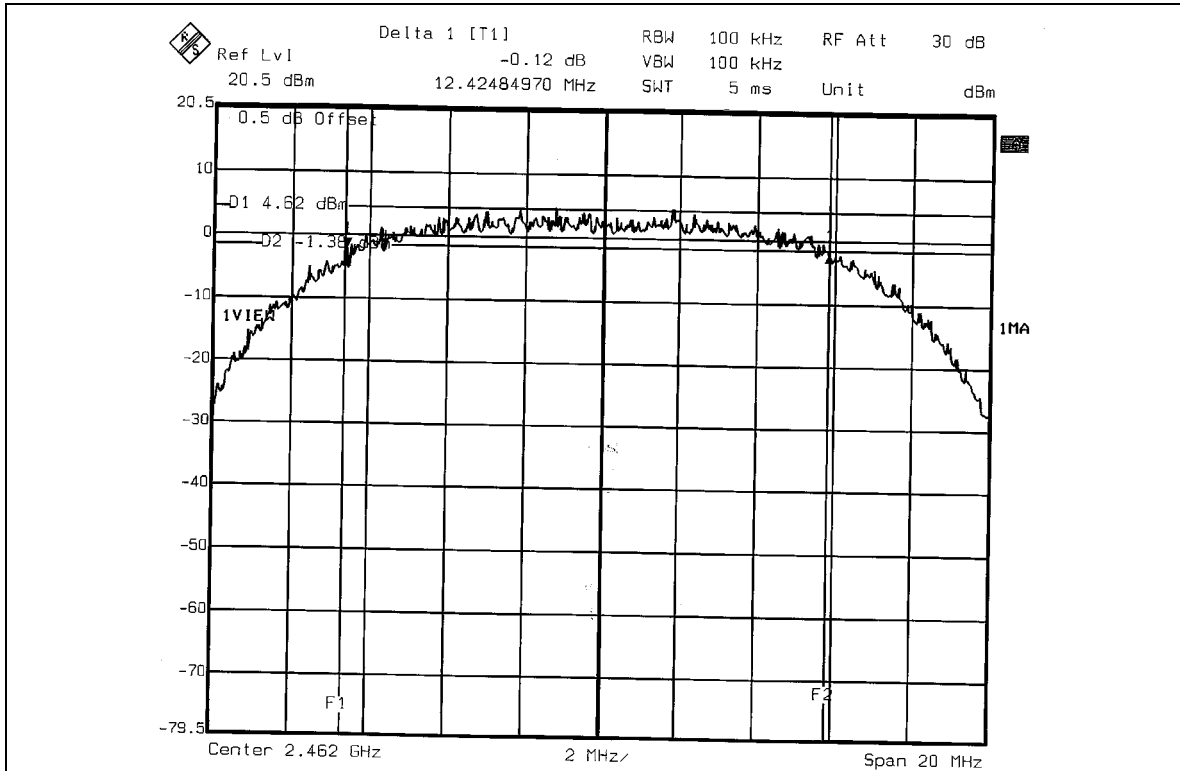


### CH6





CH11



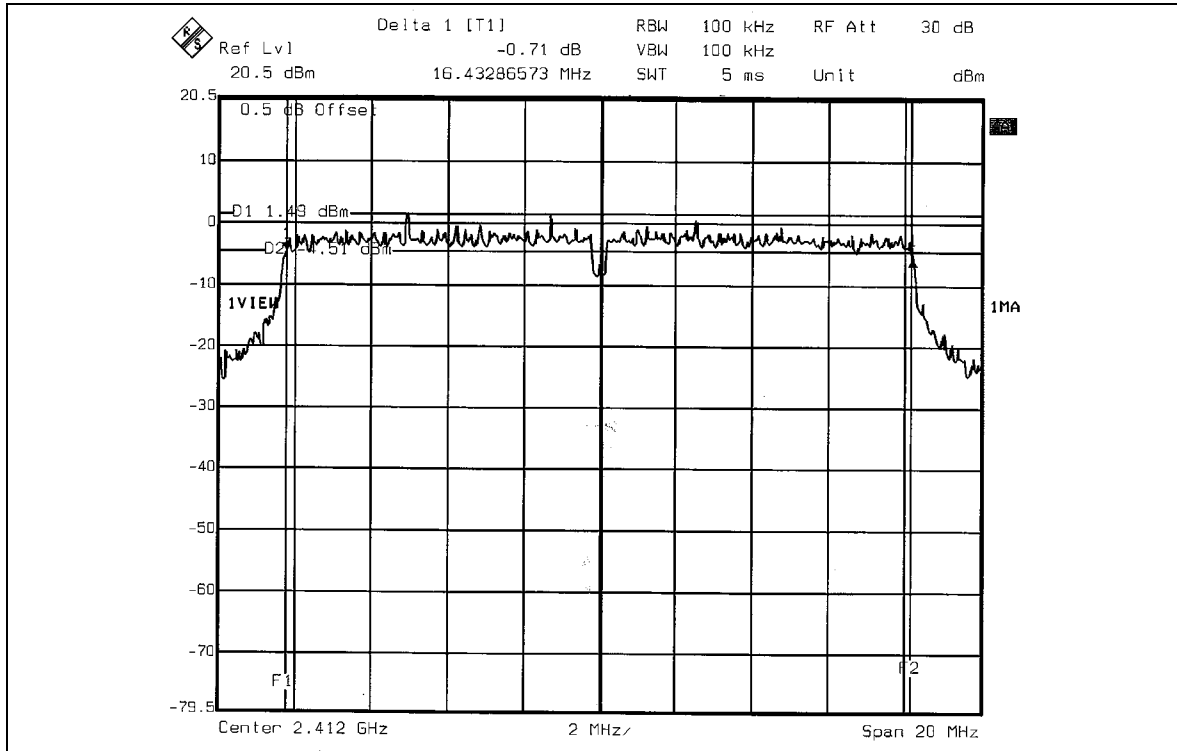
**802.11g OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

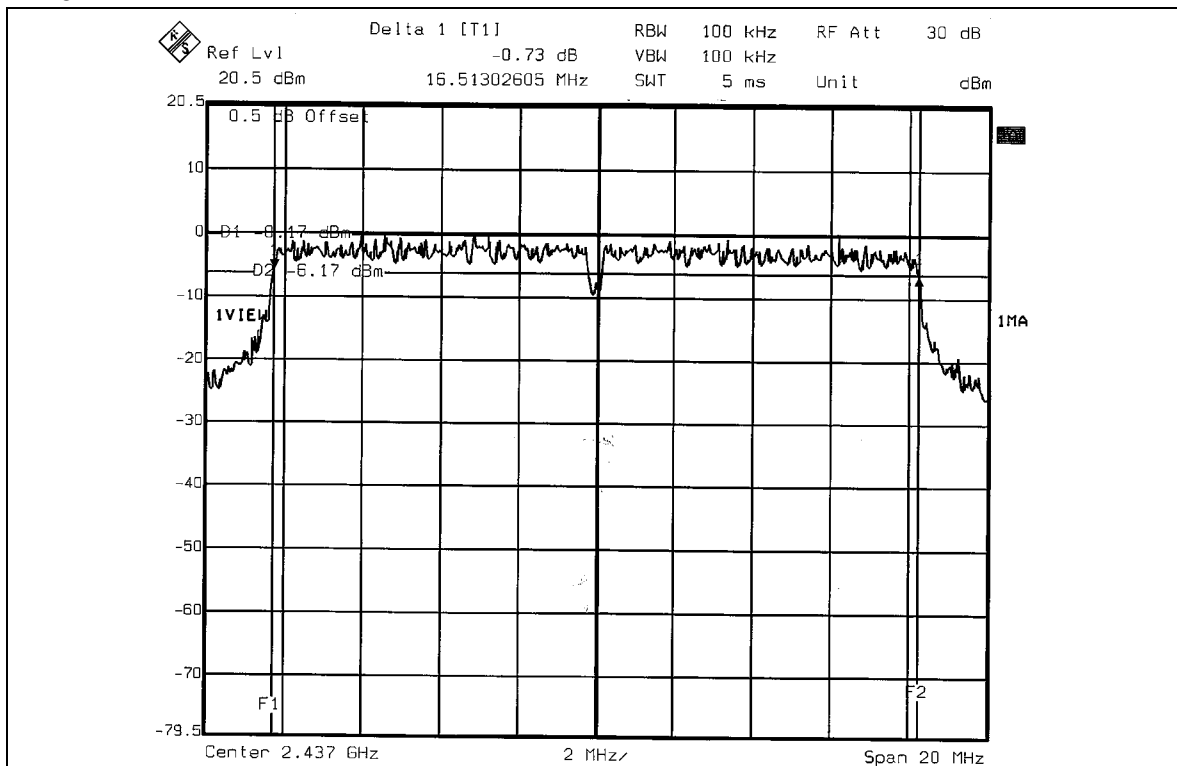
<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6 dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	16.43	0.5	PASS
6	2437	16.51	0.5	PASS
11	2462	16.39	0.5	PASS



**CH1**

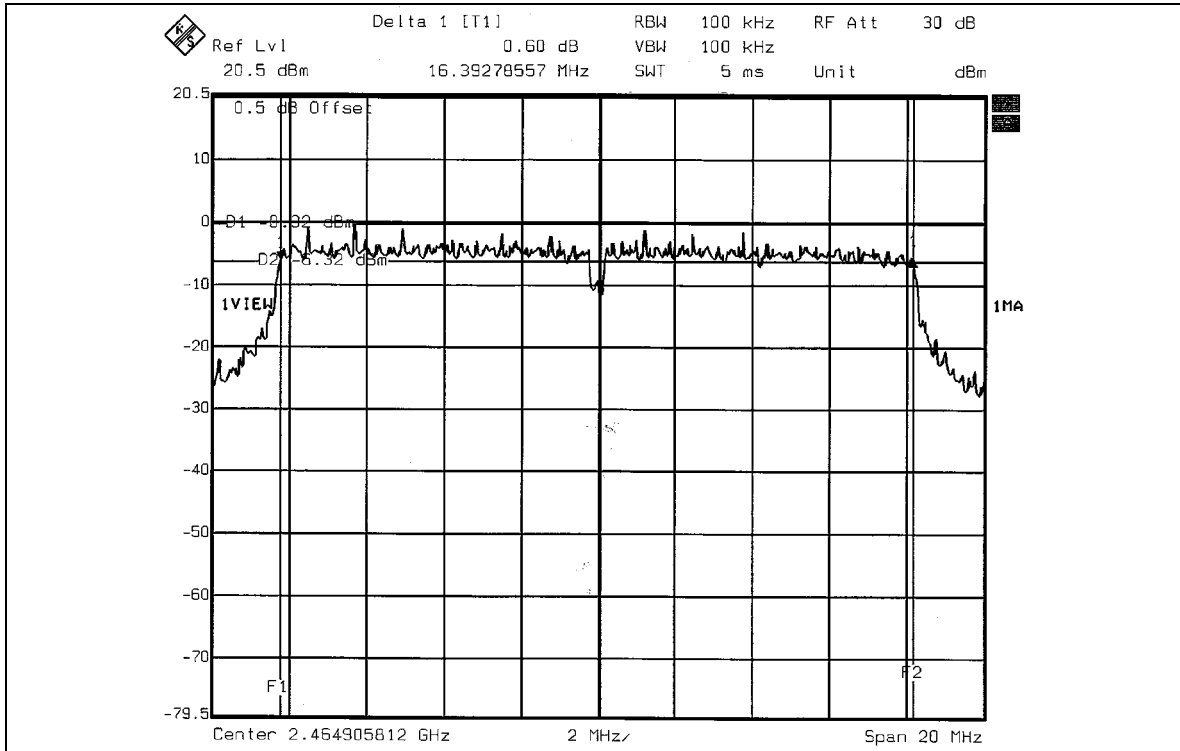


**CH6**





CH11







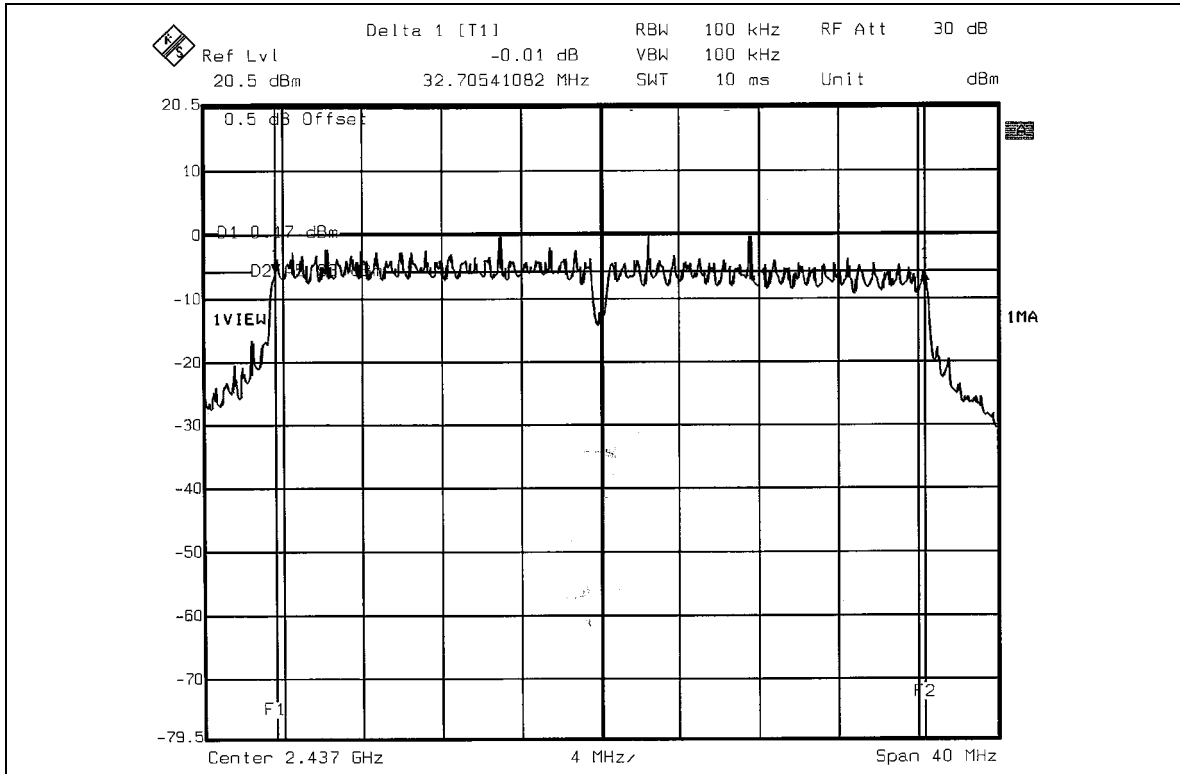
**802.11g Turbo OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	12Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6 dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
6	2437	32.71	0.5	PASS



CH6





#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm. .

##### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 06, 2005
TEKTRONIX OSCILLOSCOPE	TDS 220	C019167	Feb. 1, 2005
NARDA DETECTOR	4503A	FSCM99899	NA

**NOTE:**

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

#### 4.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to peak 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 peak reading on oscilloscope. Record the power level.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



## 4.4.7 TEST RESULTS

**802.11b DSSS modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	50.933	17.07	30	PASS
6	2437	50.466	17.03	30	PASS
11	2462	50.466	17.03	30	PASS

**802.11g OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	50.699	17.05	30	PASS
6	2437	50.816	17.06	30	PASS
11	2462	40.365	16.06	30	PASS



**802.11g Turbo OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	12Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (mW)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
6	2437	50.234	17.01	30	PASS



## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

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

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

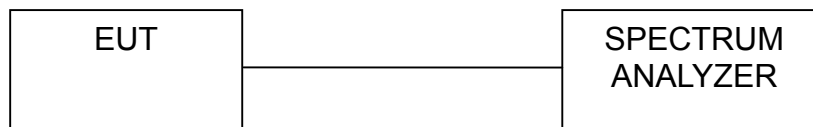
#### 4.5.3 TEST PROCEDURE

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 3kHz RBW and 30kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITIONS

Same as 4.3.6





4.5.7 TEST RESULTS

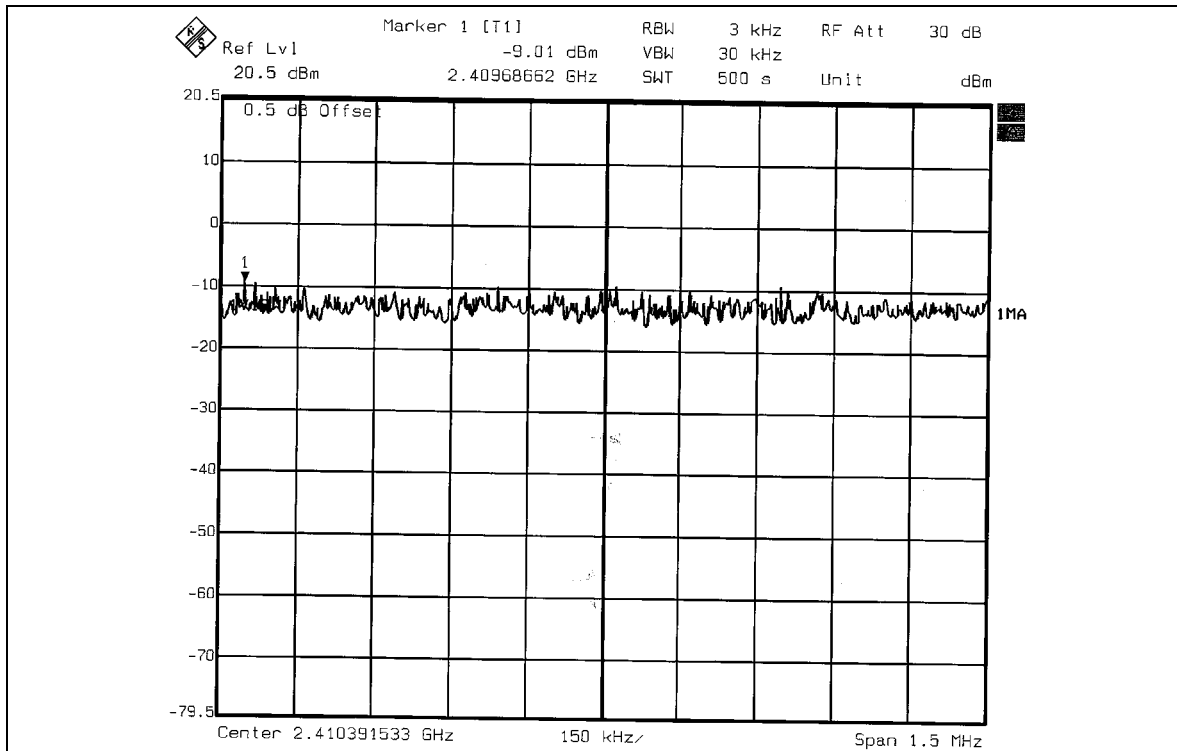
**802.11b DSSS modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	11Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

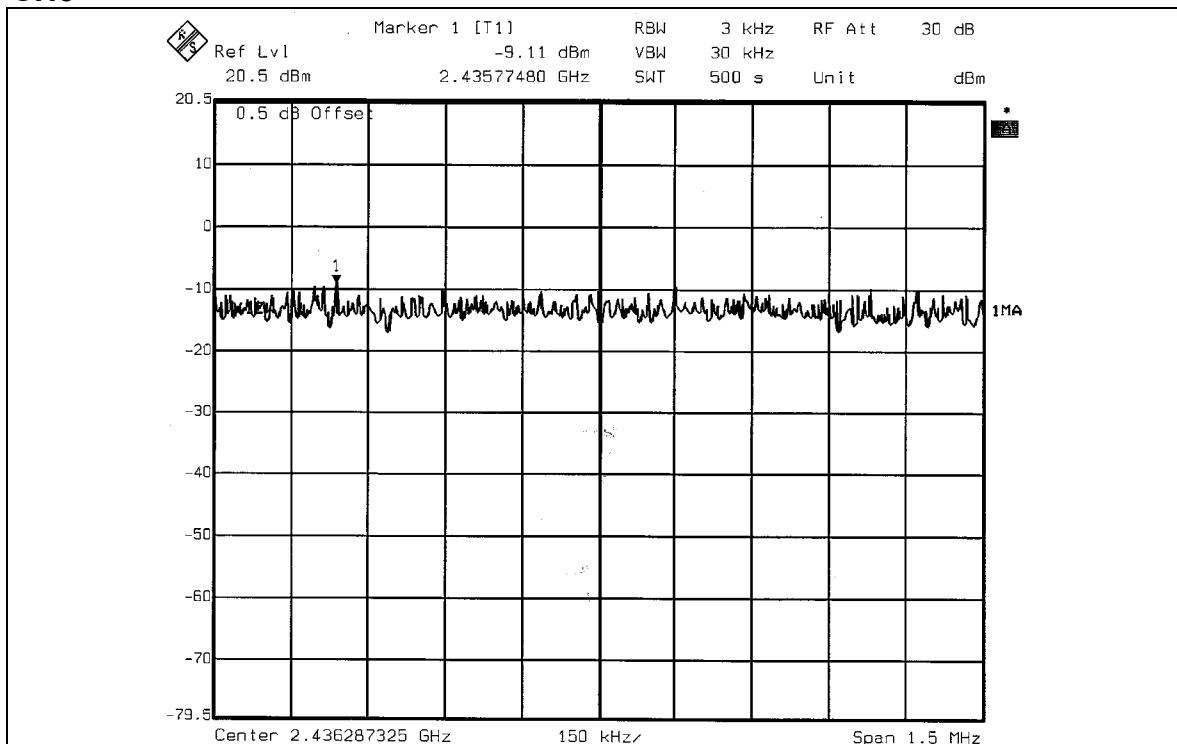
<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3 kHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-9.01	8	PASS
6	2437	-9.11	8	PASS
11	2462	-9.63	8	PASS



CH1

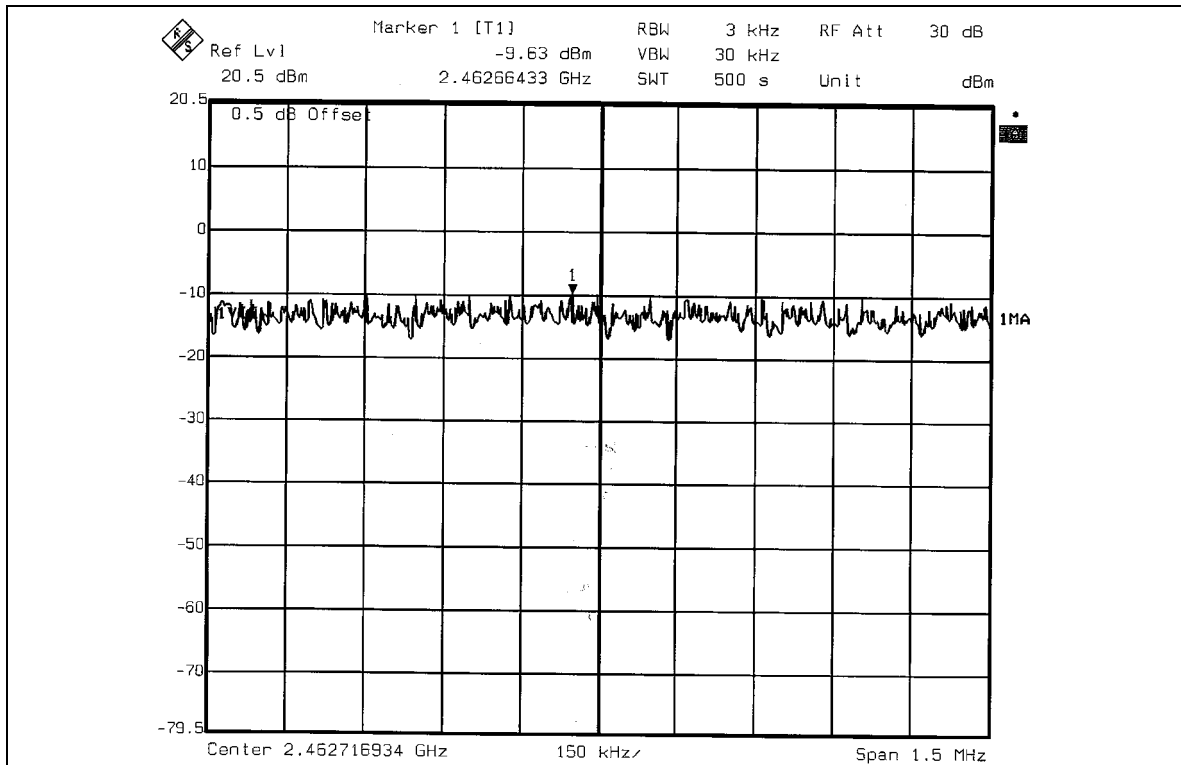


CH6





CH11



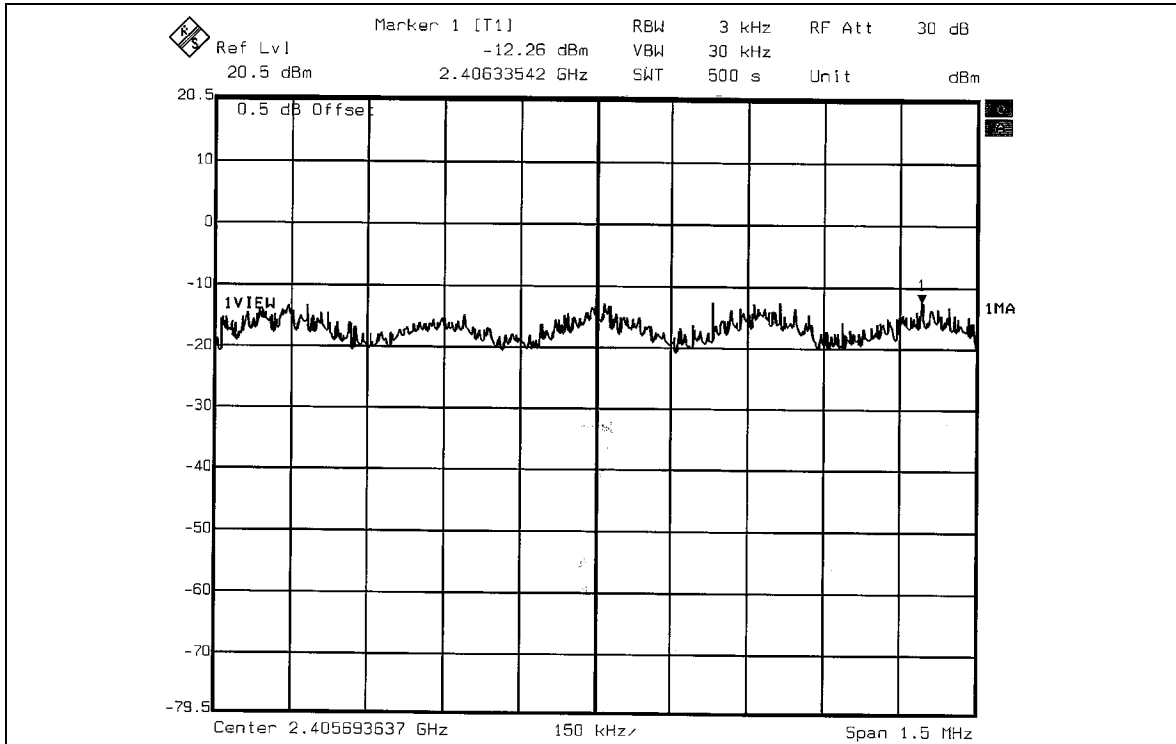
**802.11g OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

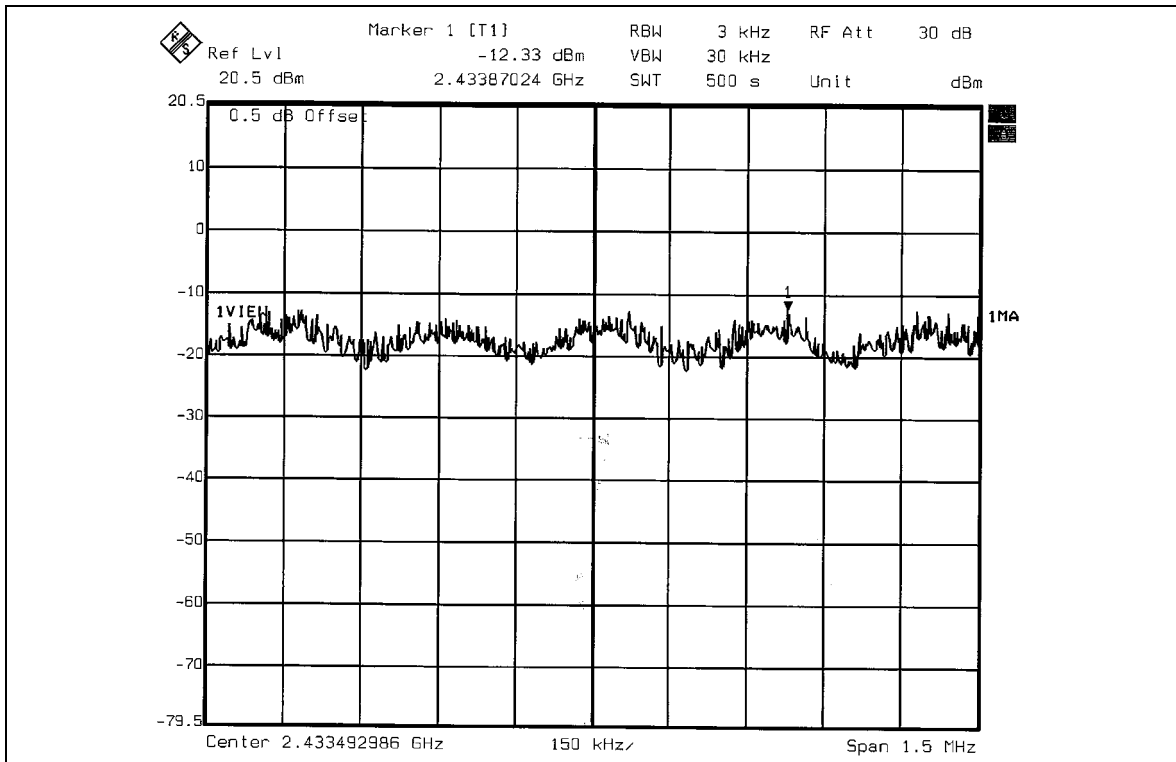
<b>CHANNEL NUMBER</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3KHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-12.26	8	PASS
6	2437	-12.33	8	PASS
11	2462	-13.93	8	PASS



### CH1

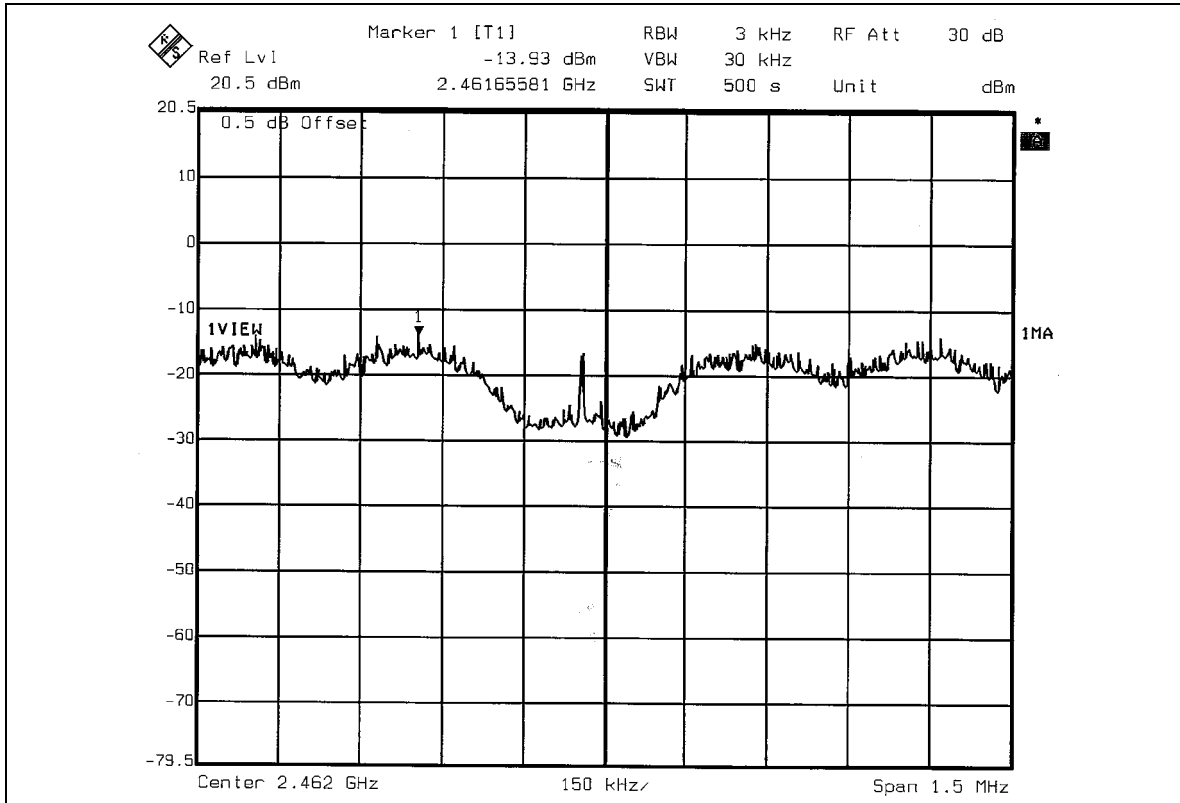


### CH6





CH11





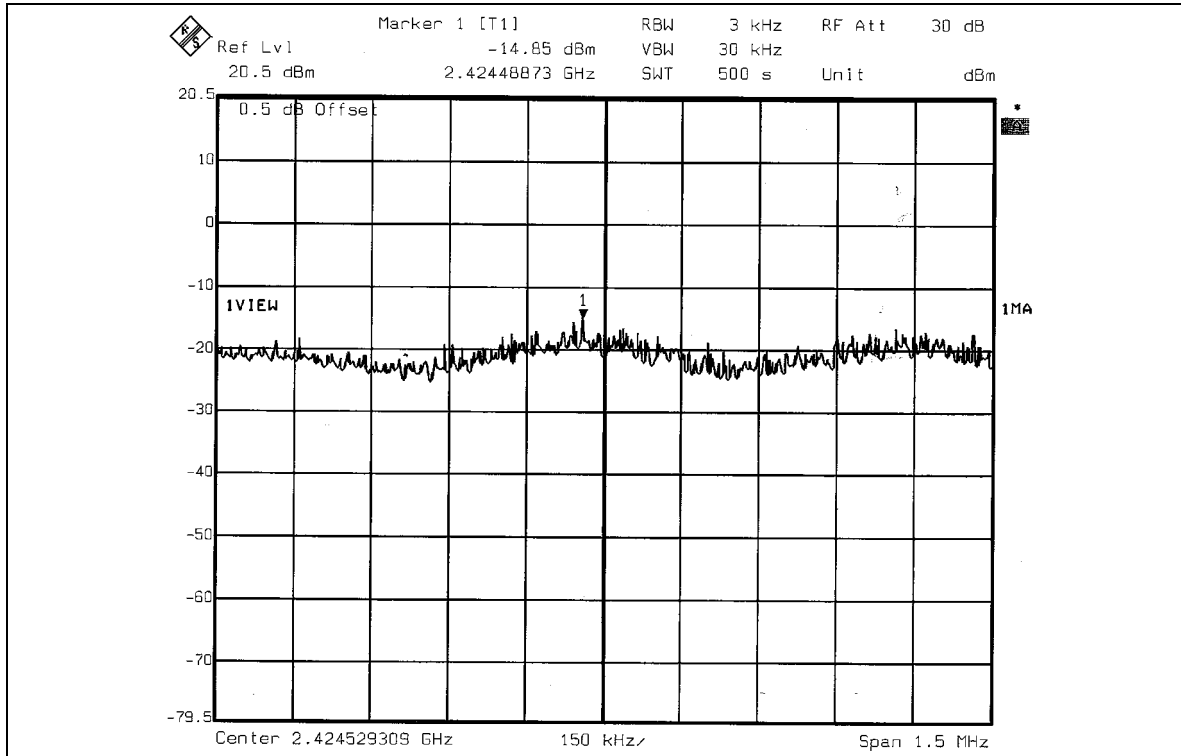
**802.11g Turbo OFDM modulation**

<b>EUT</b>	802.11g Wireless USB Dongle	<b>MODEL</b>	WL UD 2454 17A
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	12Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Leo Hung		

<b>CHANNEL NUMBER</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3KHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
6	2437	-14.85	8	PASS



CH6







## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

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

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

### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded. The spectrum plots (Peak RBW=VBW=100kHz ; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6



#### 4.6.6 TEST RESULTS

The spectrum plots are attached on the following 18 images. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

#### **802.11b DSSS modulation**

**NOTE 1:** The band edge emission plot of DSSS technique on page 57 shows 54.36dBc between carrier maximum power and local maximum emission in restrict band (2.3724GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 110.28dBuV/m (Peak), so the maximum field strength in restrict band is  $110.28 - 54.36 = 55.92$  dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of DSSS technique on page 57 shows 57.55dBc 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 at the item 4.2.7 is 102.75dBuV/m (Average), so the maximum field strength in restrict band is  $102.75 - 57.55 = 45.20$  dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot of DSSS technique on page 58 shows 56.22dBc between carrier maximum power and local maximum emission in restrict band (2.4985GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 112.08dBuV/m (Peak), so the maximum field strength in restrict band is  $112.08 - 56.22 = 55.86$  dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of DSSS technique on page 59 shows 58.30dBc between carrier maximum power and local maximum emission in restrict band (2.5000GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 104.54dBuV/m (Average), so the maximum field strength in restrict band is  $104.54 - 58.30 = 46.24$  dBuV/m which is under 54dBuV/m limit.



## 802.11g OFDM modulation

**NOTE 1:** The band edge emission plot of OFDM technique on page 60 shows 40.13dBc 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 at the item 4.2.7 is 108.87dBuV/m (Peak), so the maximum field strength in restrict band is  $108.87 - 40.13 = 68.74$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of OFDM technique on page 60 shows 48.27dBc between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 99.00dBuV/m (Average), so the maximum field strength in restrict band is  $99.00 - 48.27 = 50.73$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot of OFDM technique on page 61 shows 48.27dBc 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 11 at the item 4.2.7 is 108.23dBuV/m (Peak), so the maximum field strength in restrict band is  $108.23 - 48.27 = 59.96$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of OFDM technique on page 62 shows 49.37dBc 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 11 at the item 4.2.7 is 98.95dBuV/m (Average), so the maximum field strength in restrict band is  $98.95 - 49.37 = 49.58$ dBuV/m which is under 54dBuV/m limit.

## 802.11g Turbo OFDM modulation

**NOTE 1:** The band edge emission plot of OFDM technique on page 63 shows 48.53dBc between carrier maximum power and local maximum emission in restrict band (2.3832GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 104.36dBuV/m (Peak), so the maximum field strength in restrict band is  $104.36 - 48.53 = 55.83$ dBuV/m which is under 74dBuV/m limit.

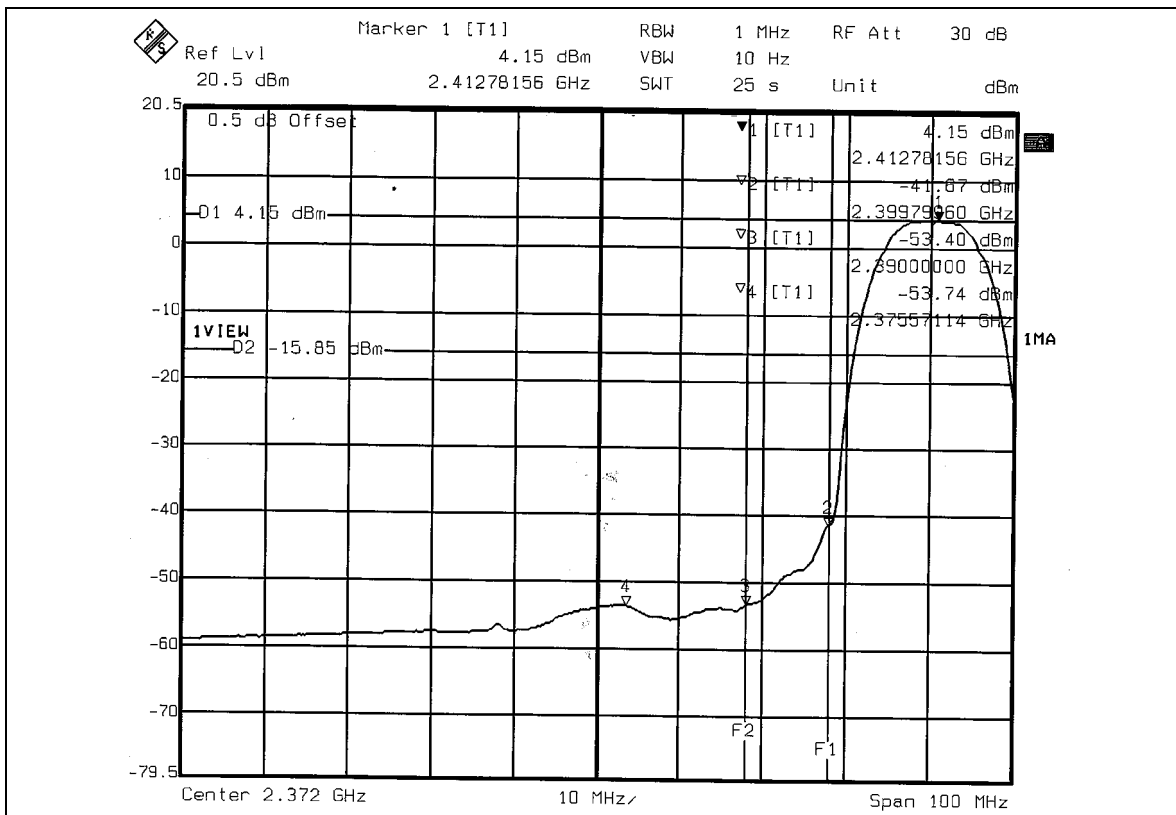
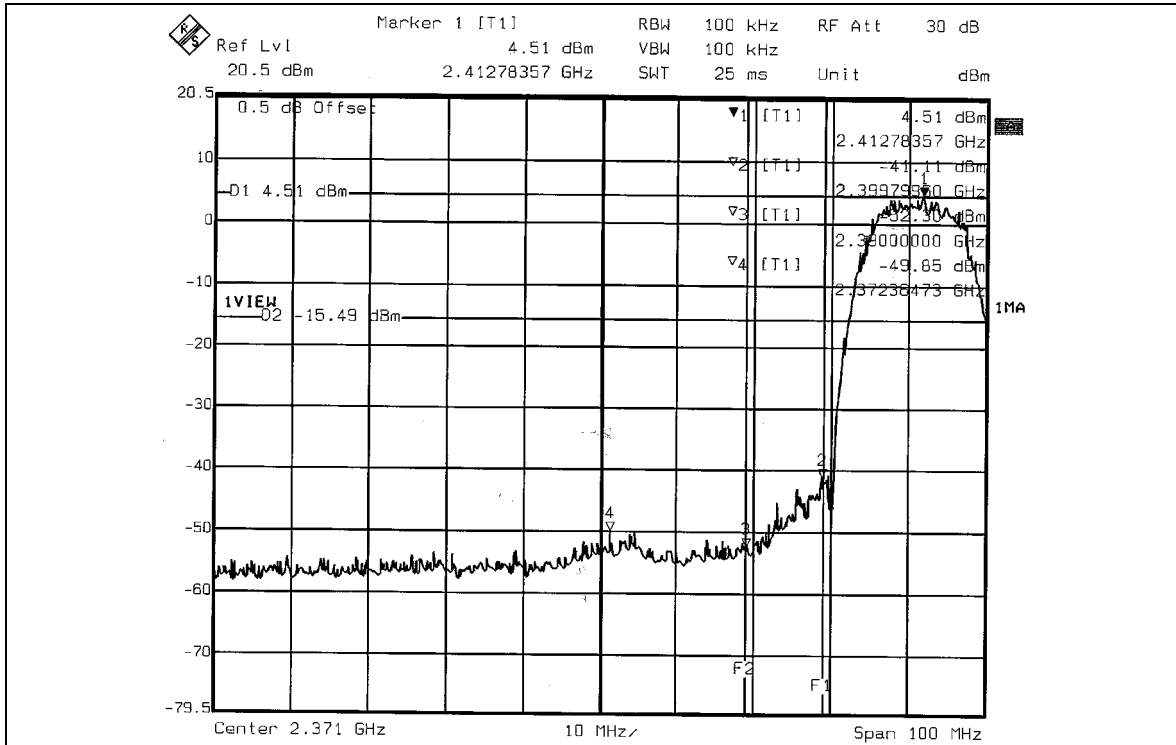
The band edge emission plot of OFDM technique on page 63 shows 47.85dBc between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 95.28dBuV/m (Average), so the maximum field strength in restrict band is  $95.28 - 47.85 = 47.43$ dBuV/m which is under 54dBuV/m limit.

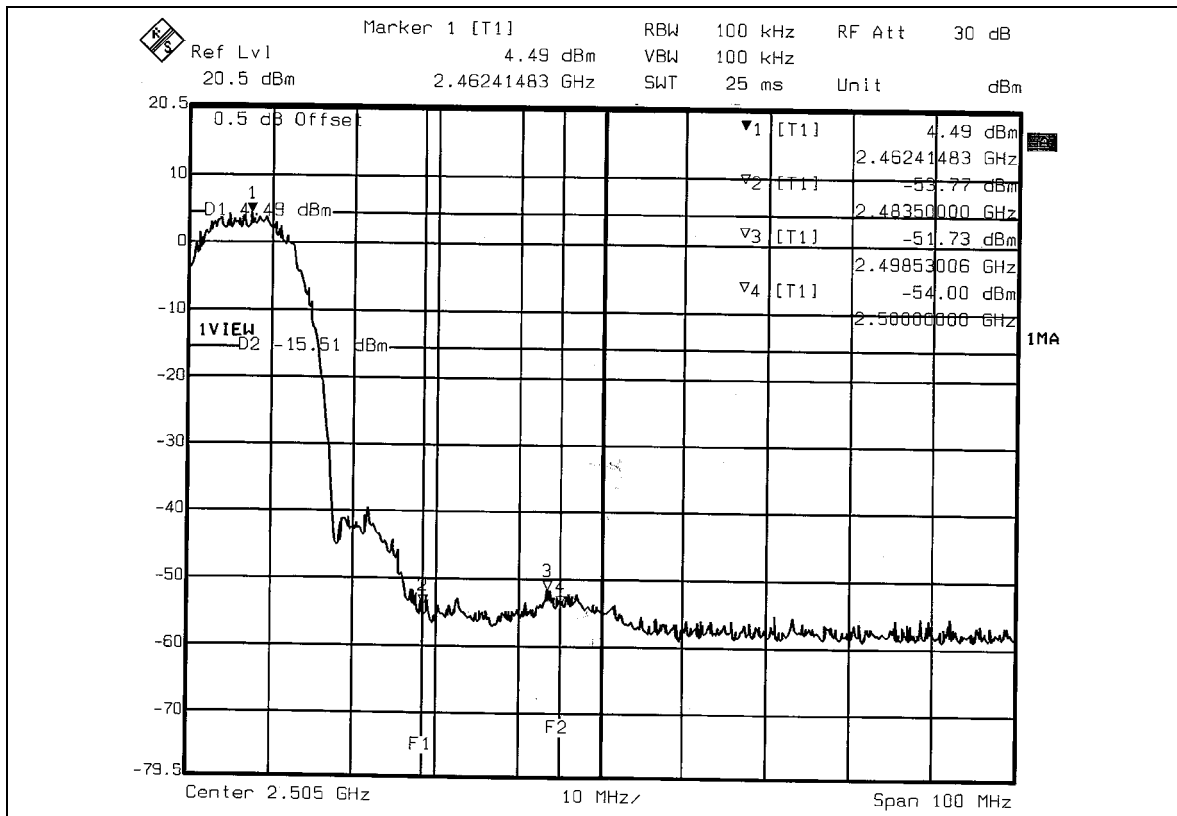
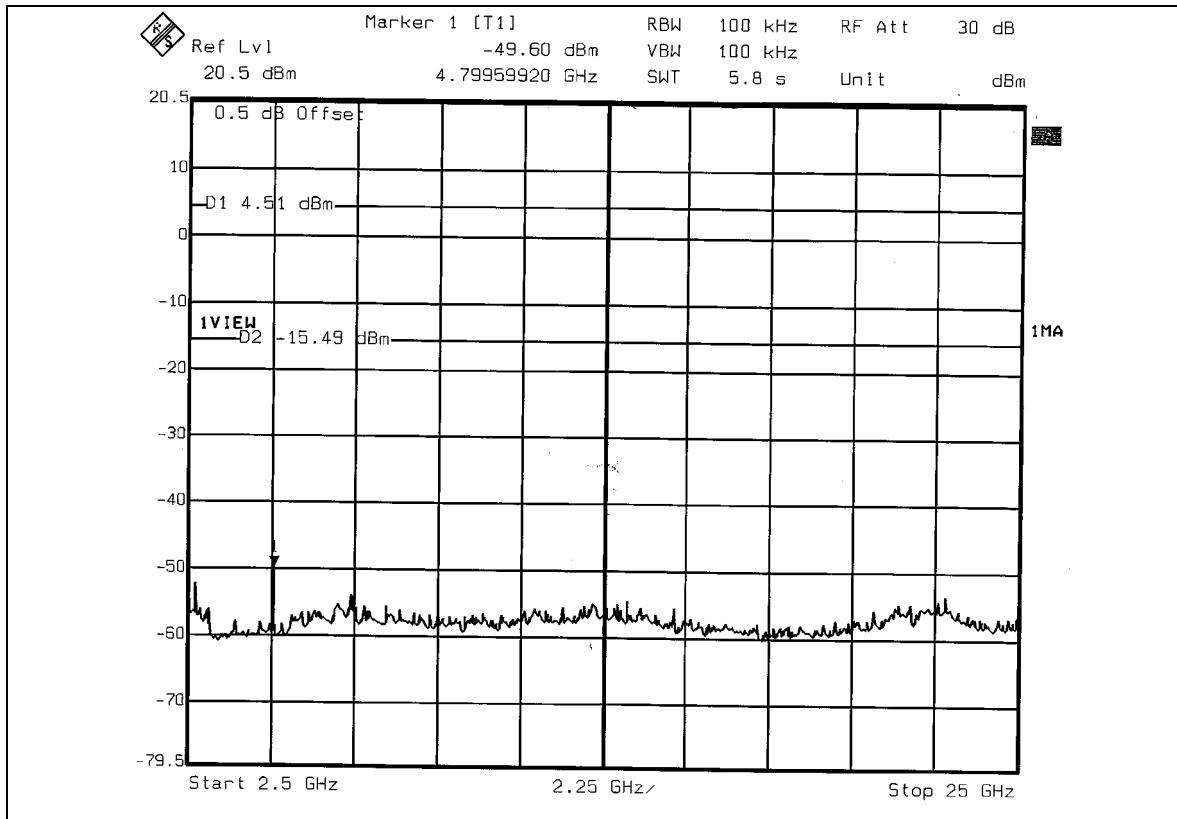
**NOTE 2:** The band edge emission plot of OFDM technique on page 64 shows 48.00dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 104.36dBuV/m (Peak), so the maximum field strength in restrict band is  $104.36 - 48.00 = 56.36$ dBuV/m which is under 74dBuV/m limit.

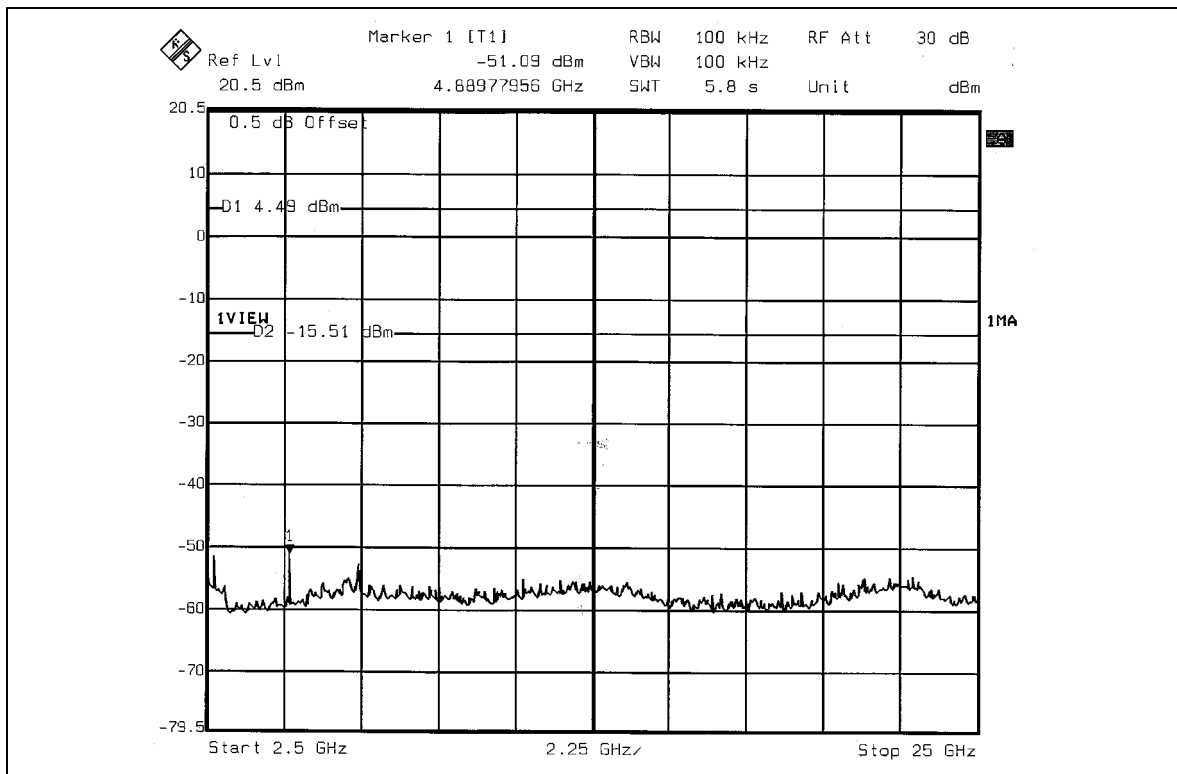
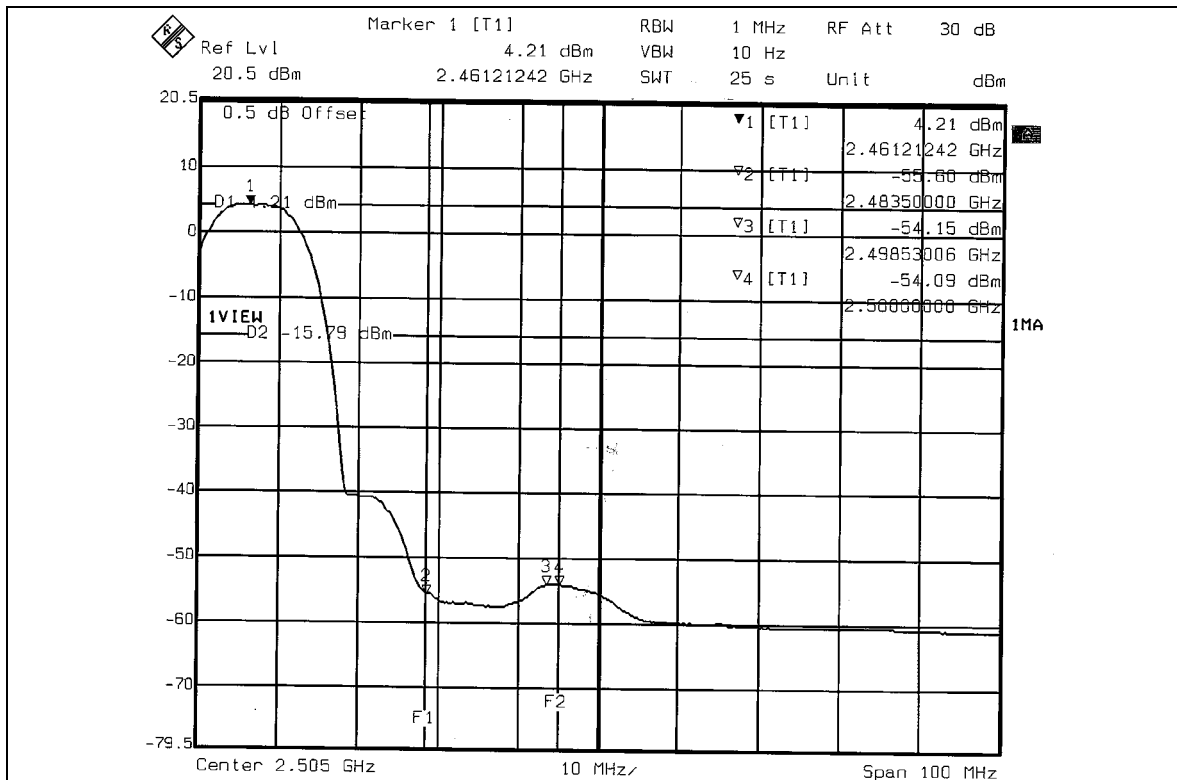
The band edge emission plot of OFDM technique on page 65 shows 49.46dBc between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 6 at the item 4.2.7 is 95.28dBuV/m (Average), so the maximum field strength in restrict band is  $95.28 - 49.46 = 45.82$ dBuV/m which is under 54dBuV/m limit.



802.11b DSSS modulation

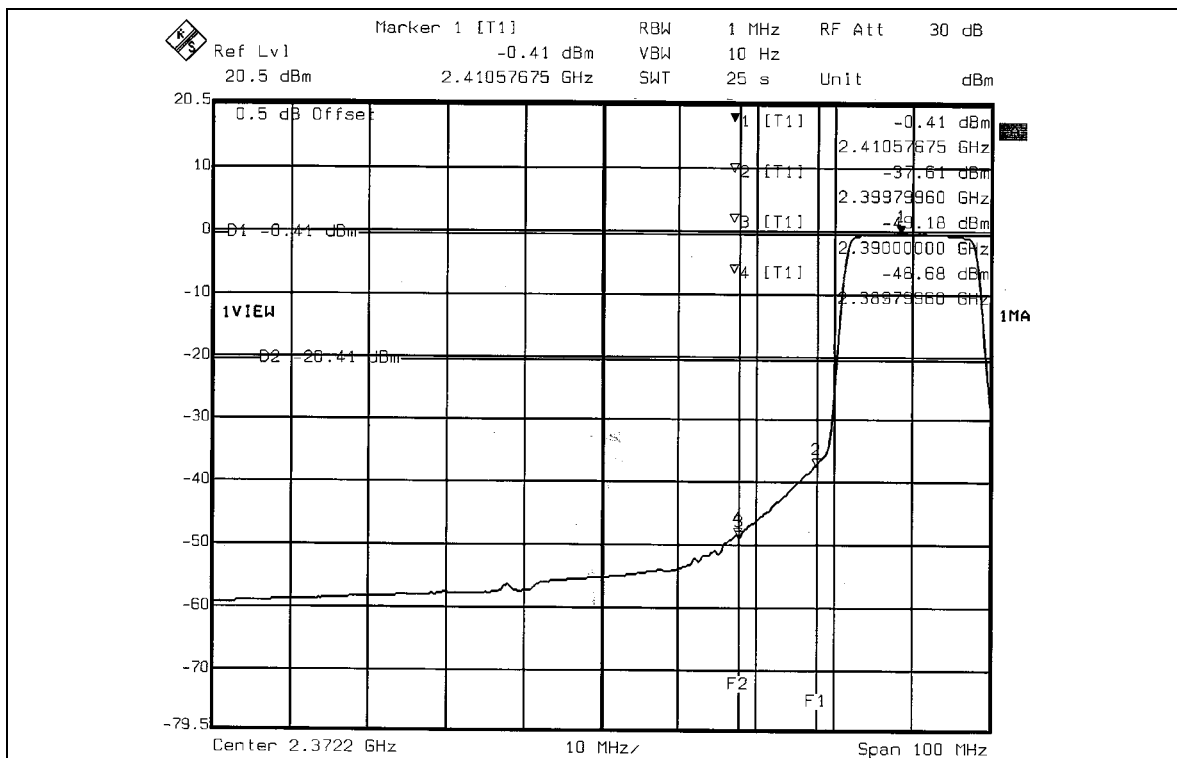
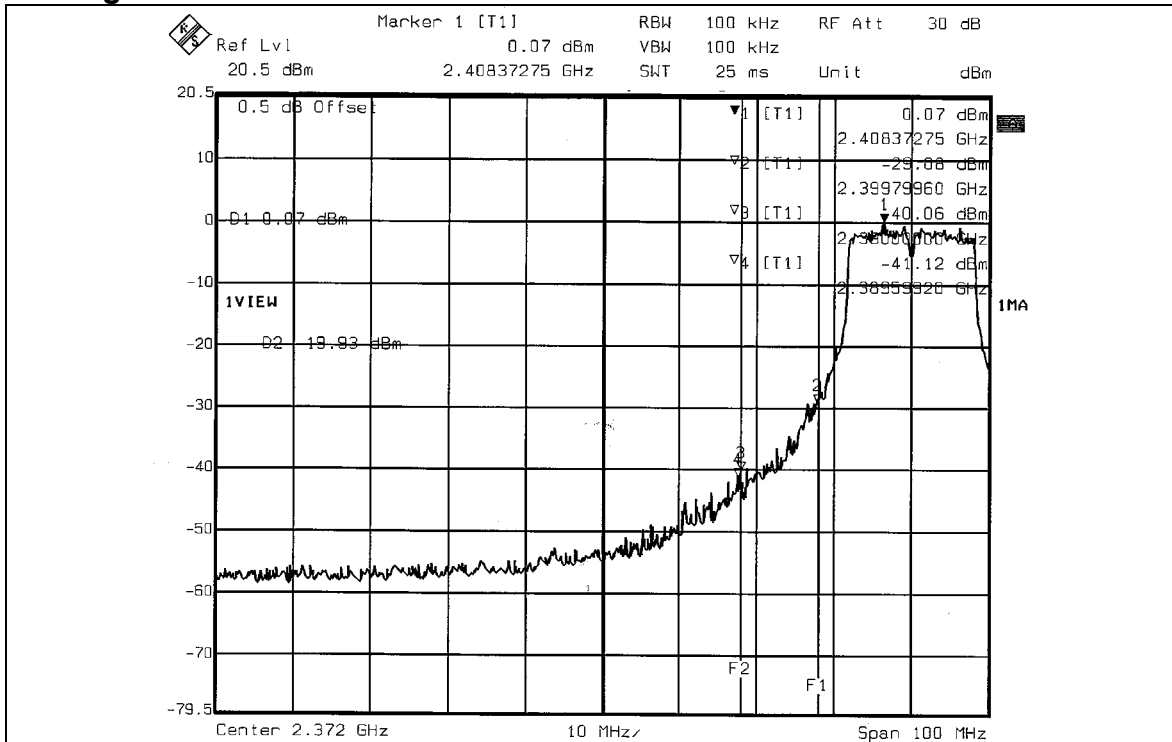


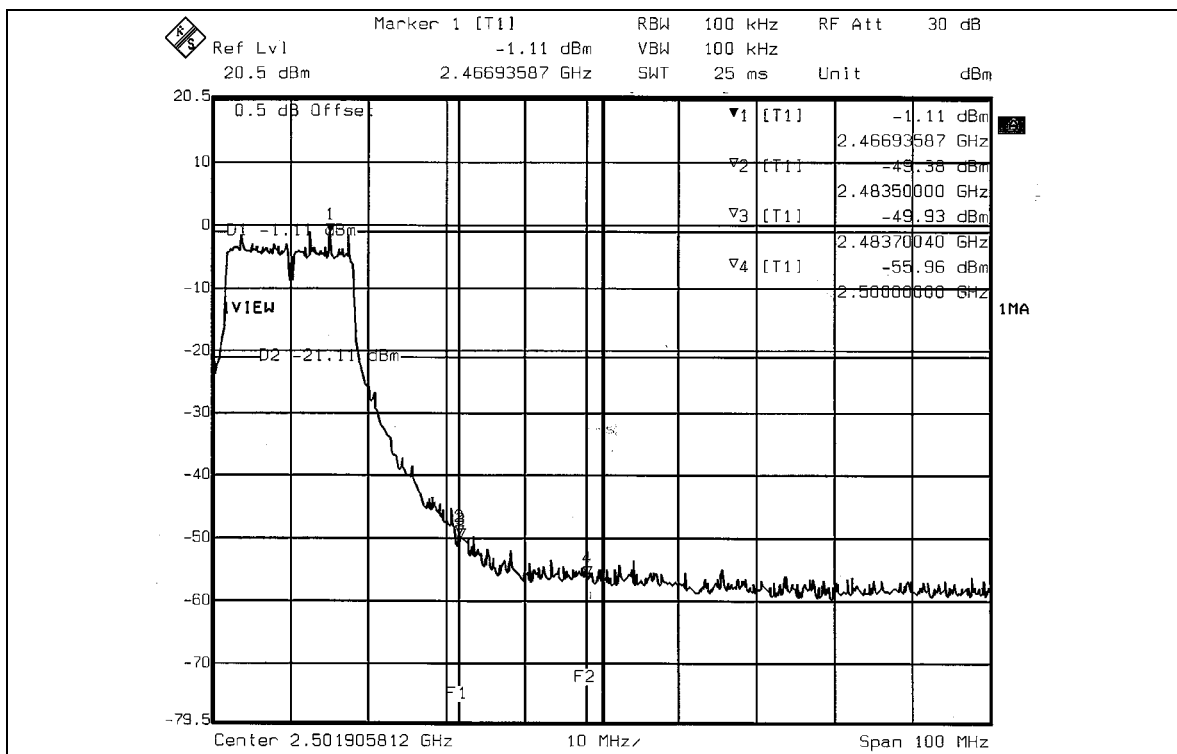
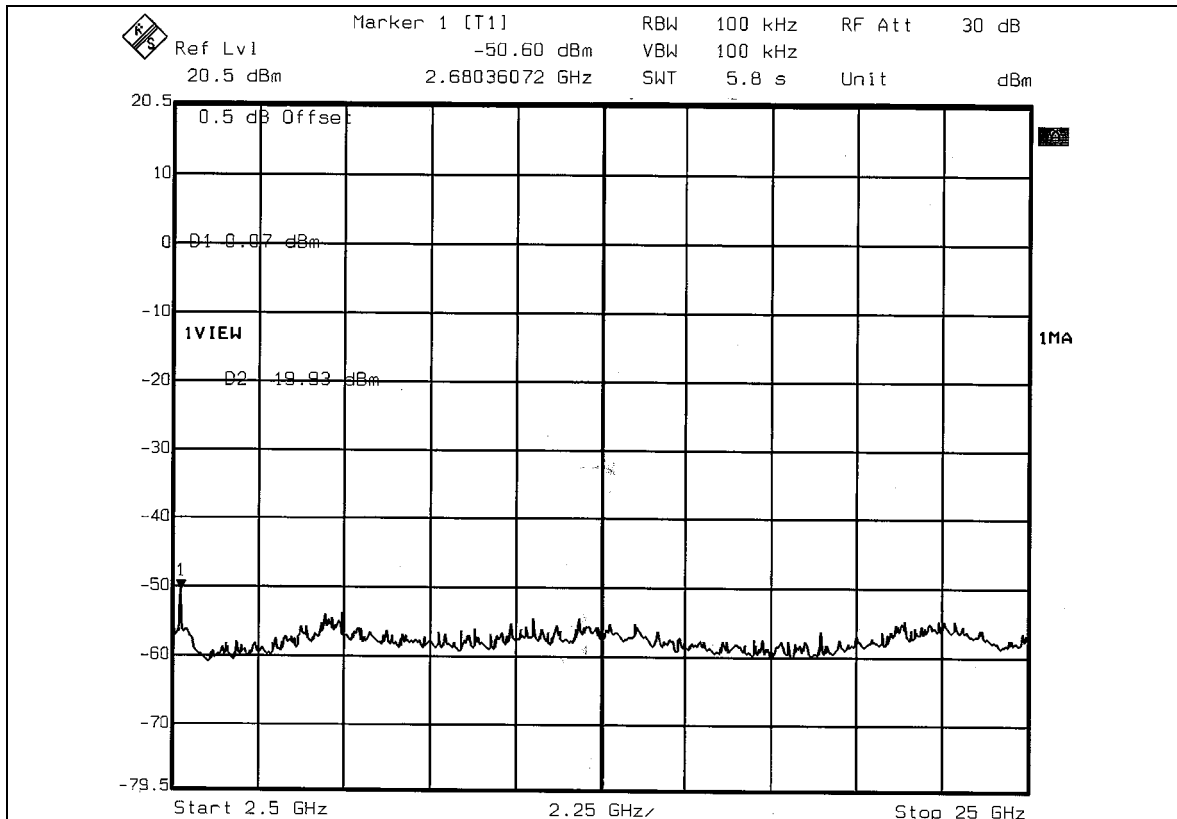




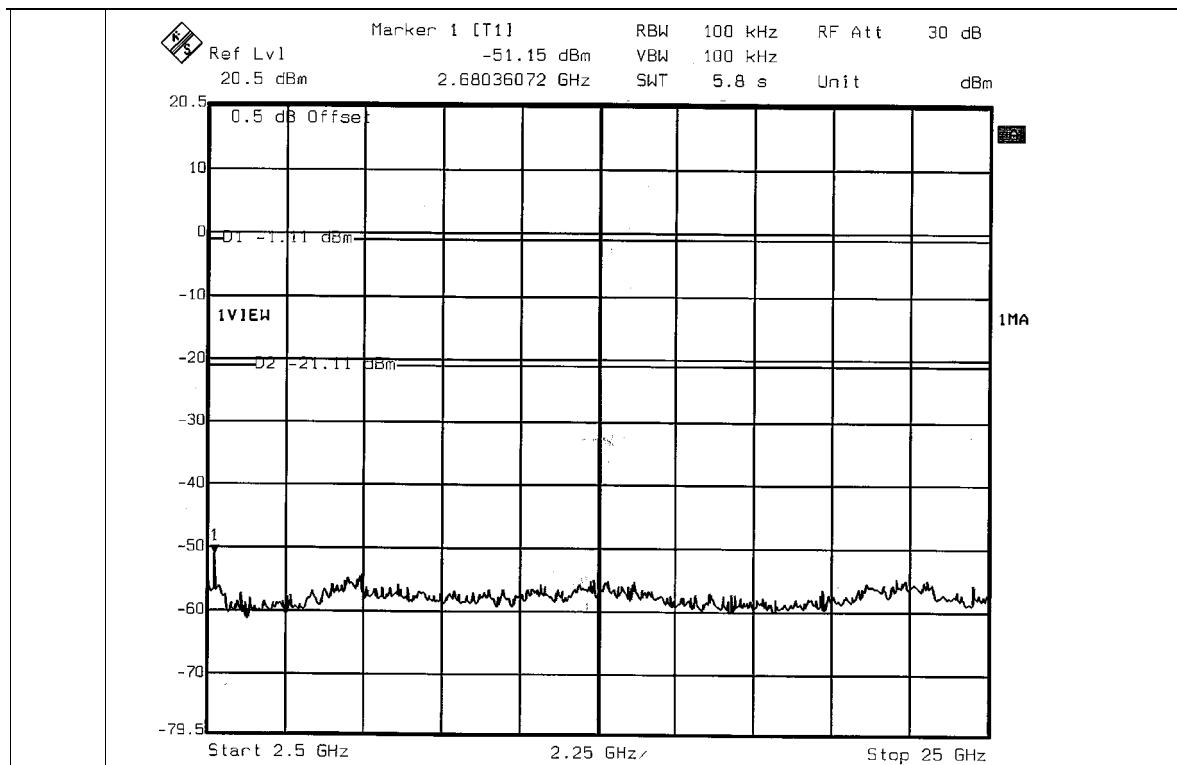
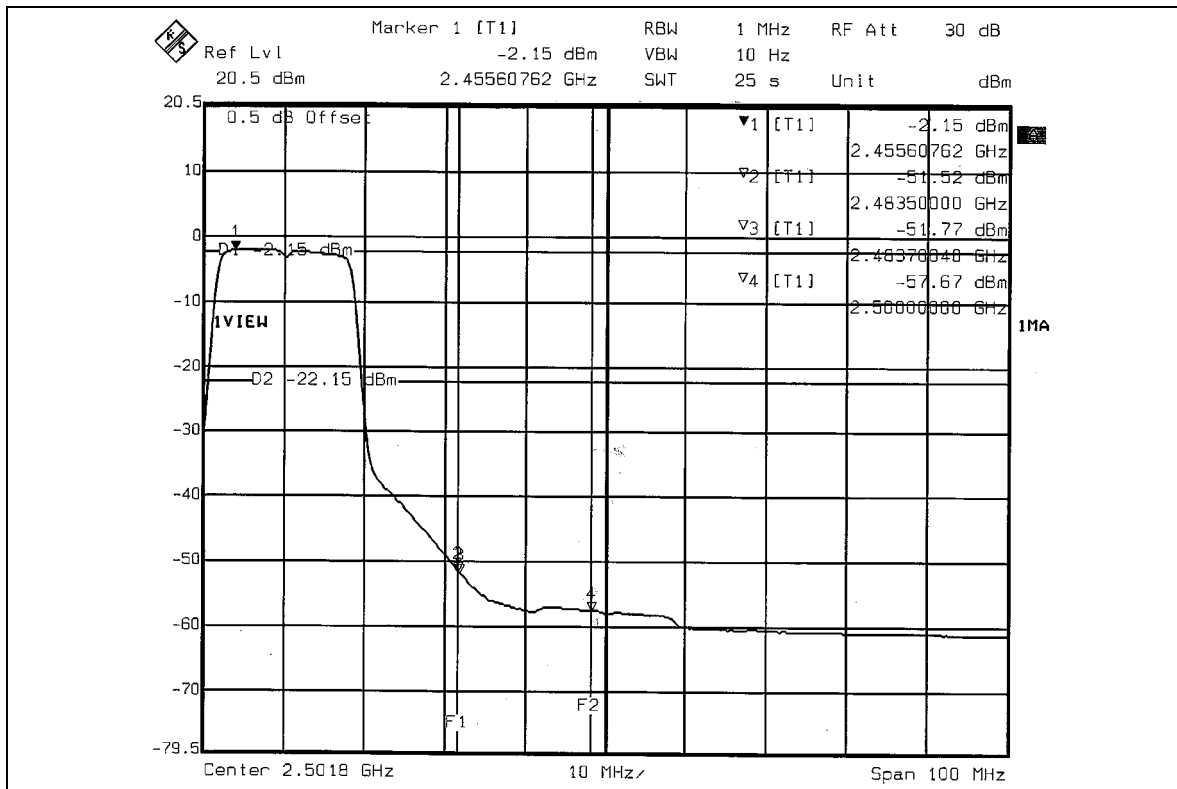


### 802.11g OFDM modulation



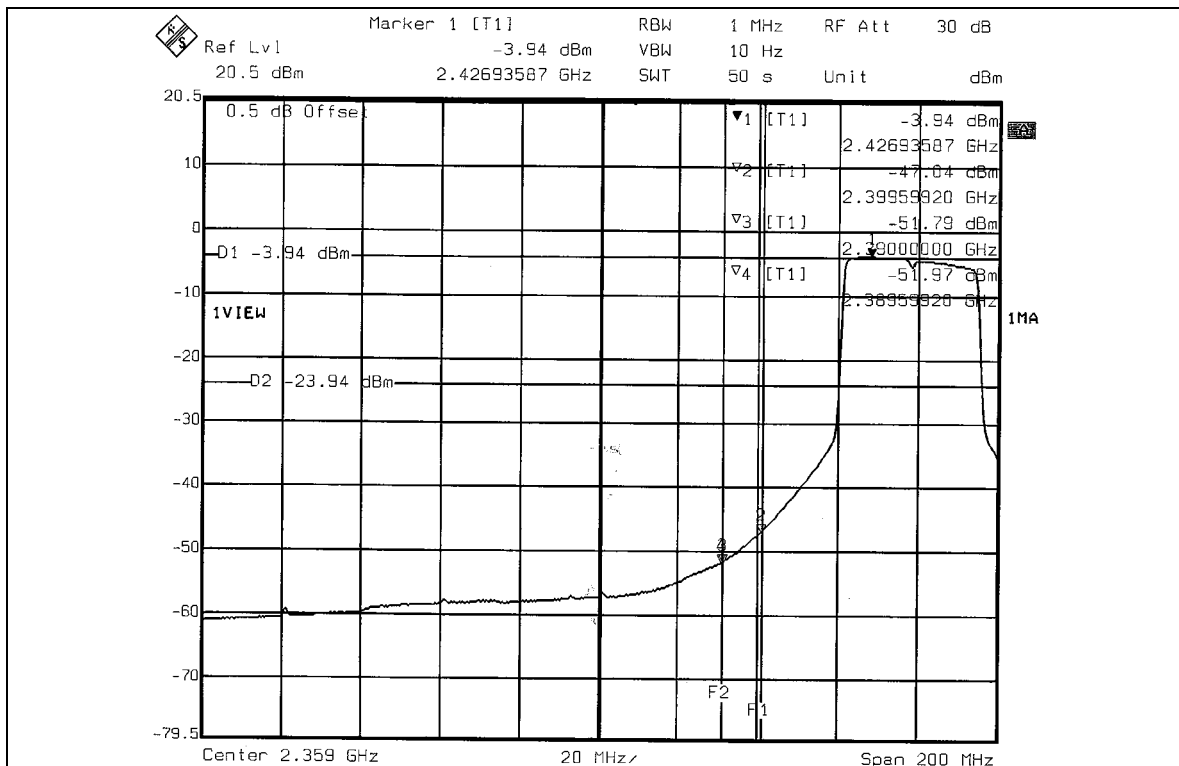
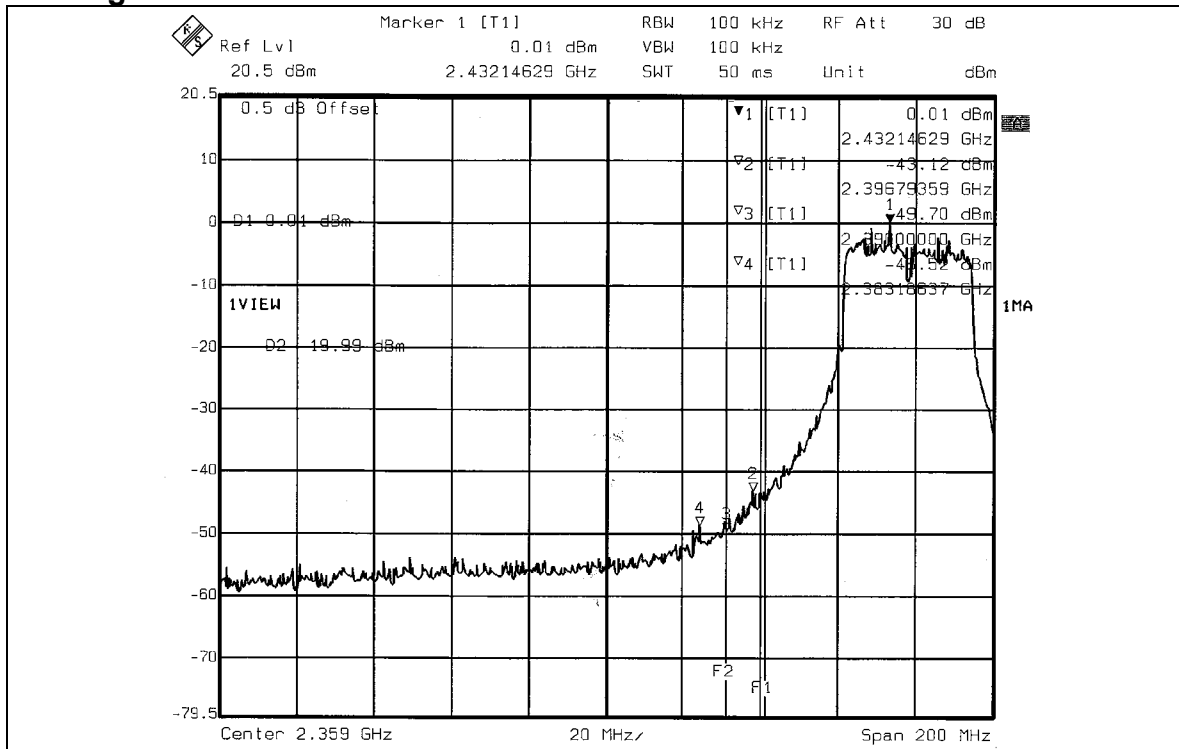


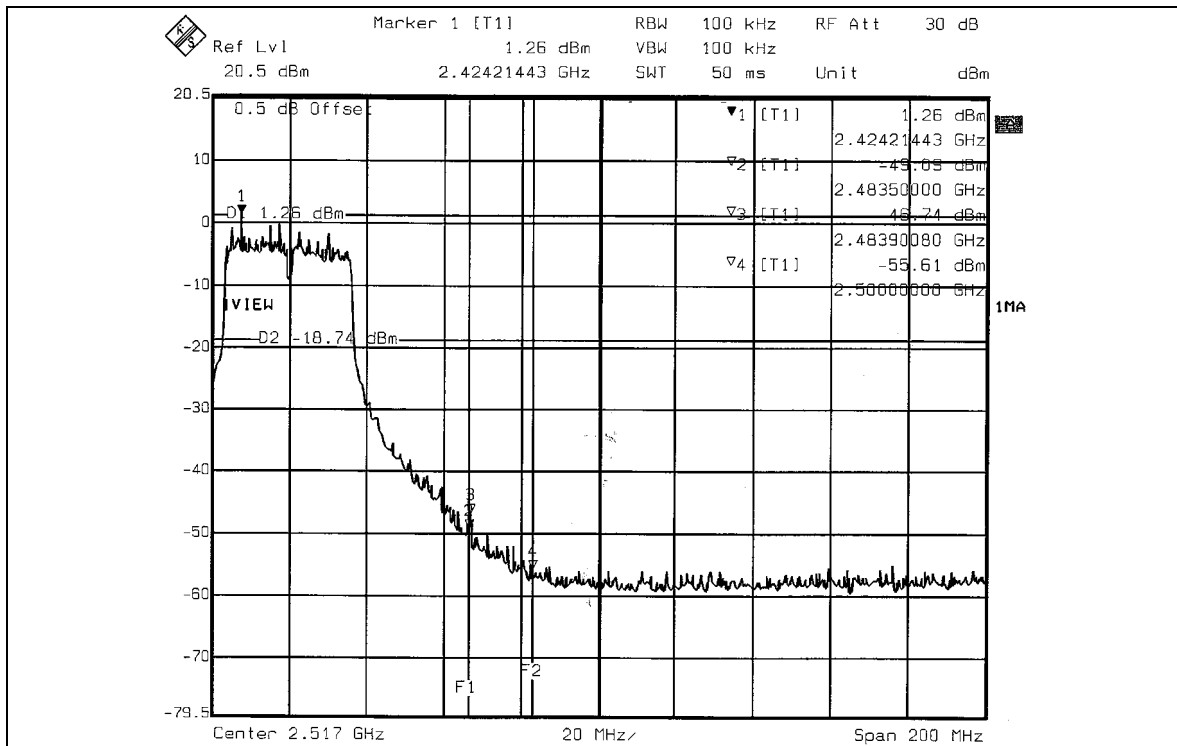
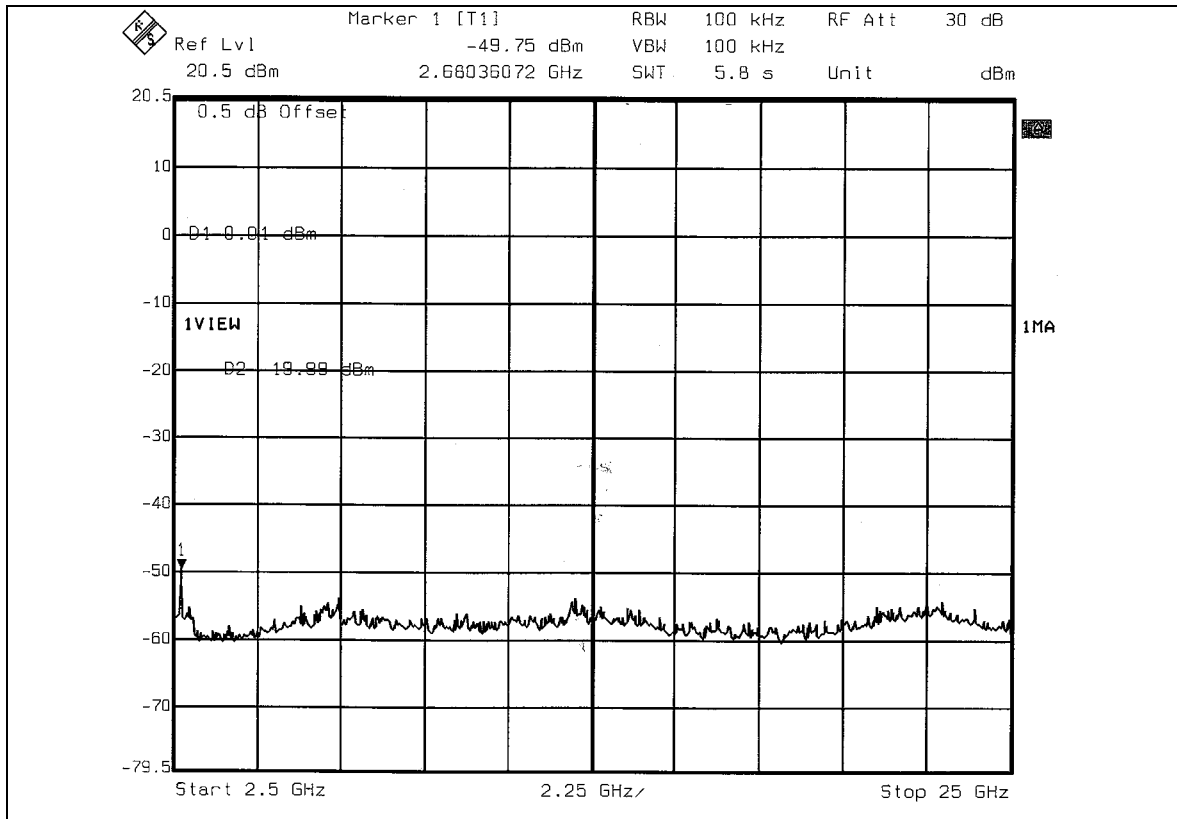


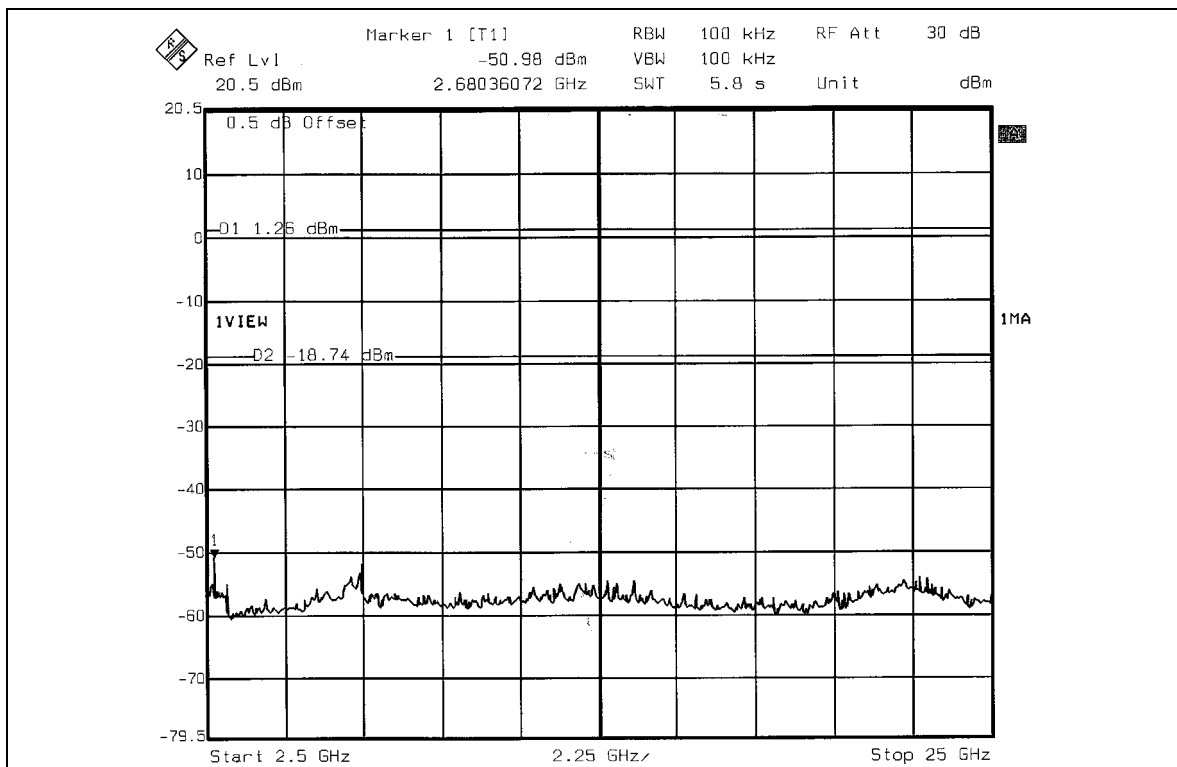
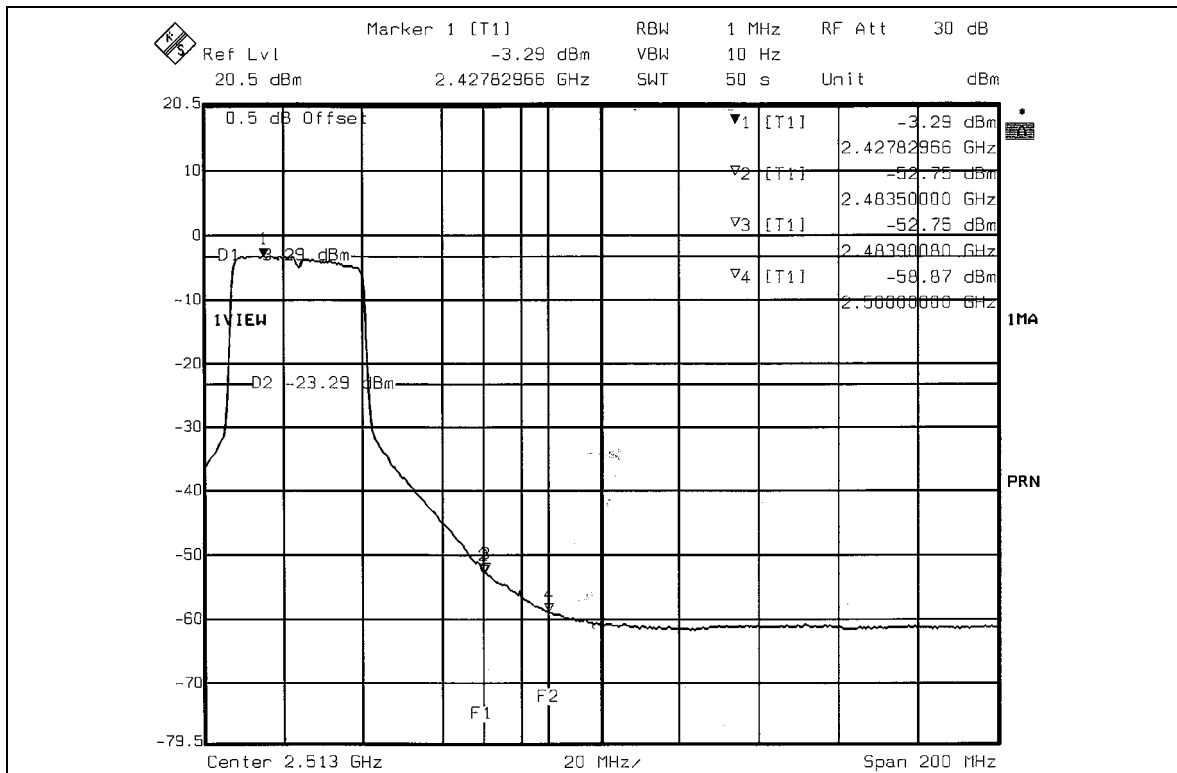




### 802.11g Turbo OFDM modulation









## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

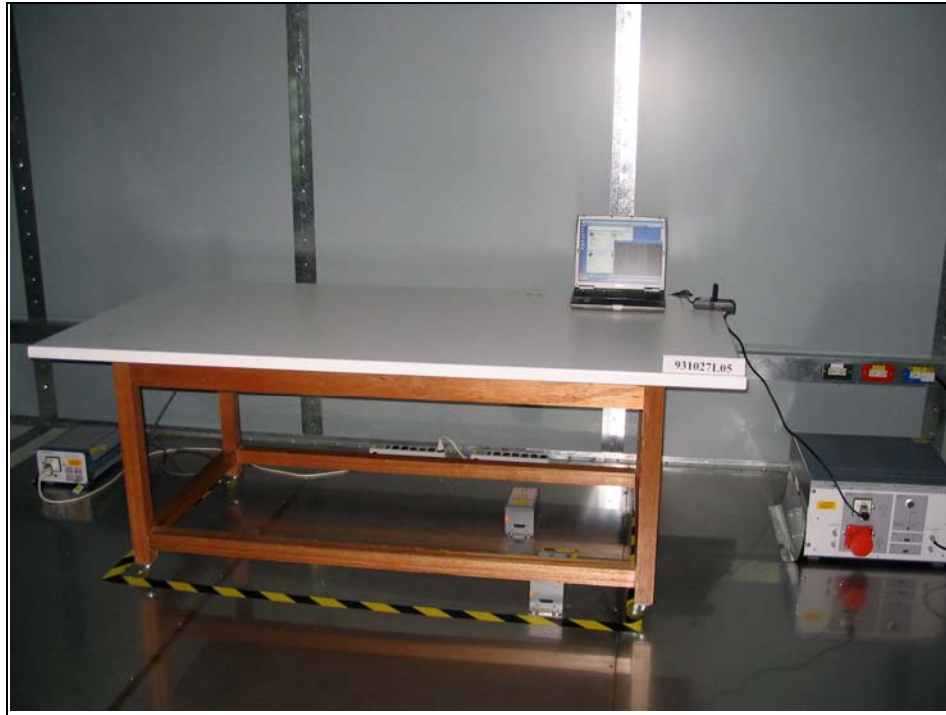
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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.

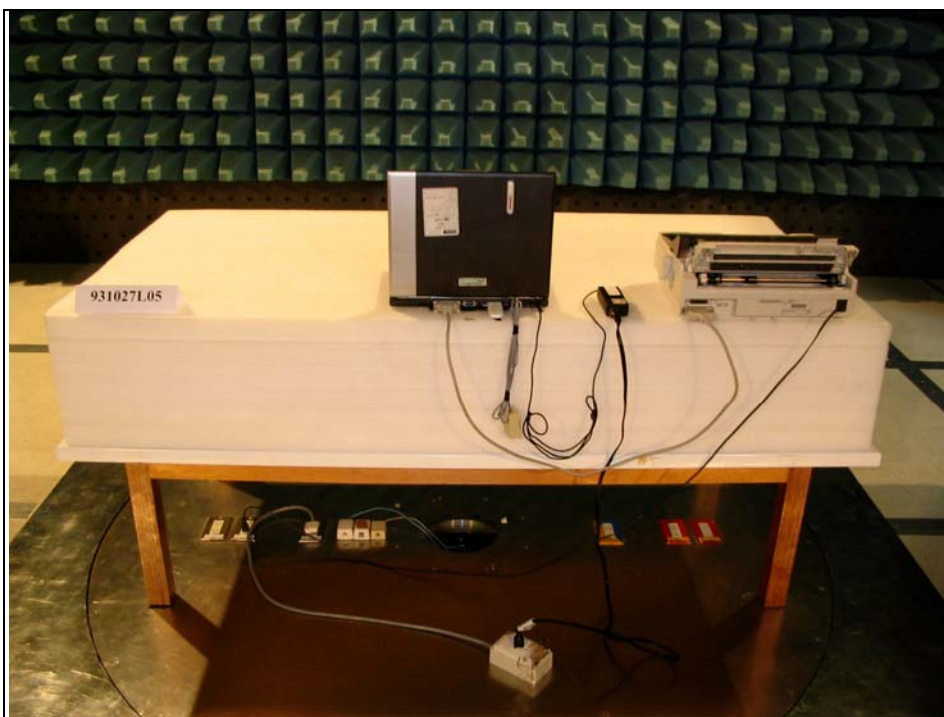
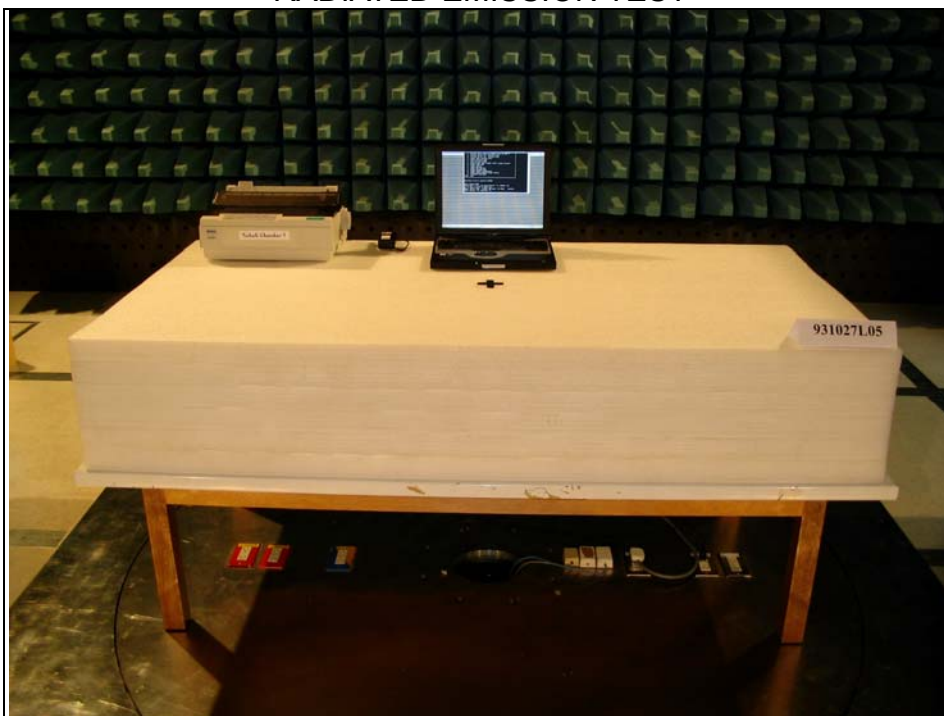
### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna type used in this product is chip antenna without antenna connector. The maximum Gain of this antenna is only 2dBi.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



### RADIATED EMISSION TEST





## 6 INFORMATION ON THE TESTING LABORATORIES

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

<b>USA</b>	FCC, NVLAP, 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, DGT
<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: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

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

Tel: 886-3-3183232

Fax: 886-3-3185050

**Linko RF Lab.**

Tel: 886-3-3270910

Fax: 886-3-3270892

**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.