

# FCC TEST REPORT

**REPORT NO.:** RF940606A07

**MODEL NO.:** VGP-WRC3

**RECEIVED:** June 6, 2005

**TESTED:** June 10 ~ 16, 2005

**ISSUED:** July 7, 2005

**APPLICANT:** PRIMAX ELECTRONICS LTD.

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**ISSUED BY:** Advance Data Technology Corporation

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**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen,  
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Taiwan, R.O.C.

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0528  
ILAC MRA



No. 2177-01



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## 1. CERTIFICATION

**PRODUCT:** WIRELESS RECEIVER  
**BRAND NAME:** SONY  
**MODEL NO.:** VGP-WRC3  
**TEST SAMPLE:** Engineering Sample  
**TESTED:** June 10 ~ 16, 2005  
**APPLICANT:** PRIMAX ELECTRONICS LTD.  
**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 :** Annie Chang , **DATE:** July 7, 2005  
(Annie Chang)

**TECHNICAL**  
**ACCEPTANCE :** Gary Chang , **DATE:** July 7, 2005  
Responsible for RF (Gary Chang)

**APPROVED BY :** Cody Chang , **DATE:** July 7, 2005  
(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 (Section 15.247)</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 -11.95dB at 10.434MHz
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)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.55dB at 70.82MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB 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:

Measurement	Frequency	Uncertainty
Radiated emissions	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	WIRELESS RECEIVER
<b>MODEL NO.</b>	VGP-WRC3
<b>POWER SUPPLY</b>	5Vdc from host equipment
<b>MODULATION TECHNOLOGY</b>	DSSS
<b>MODULATION TYPE</b>	GFSK
<b>TRANSFER RATE</b>	62.5 kbits / sec.
<b>OUTPUT POWER</b>	-1.23dBm
<b>FREQUENCY RANGE</b>	2402MHz ~ 2479MHz
<b>NUMBER OF CHANNEL</b>	78
<b>ANTENNA TYPE</b>	Printed antenna with -0.58dBi gain
<b>DATA CABLE</b>	N/A
<b>I/O PORTS</b>	USB port
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT is a transceiver.
2. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



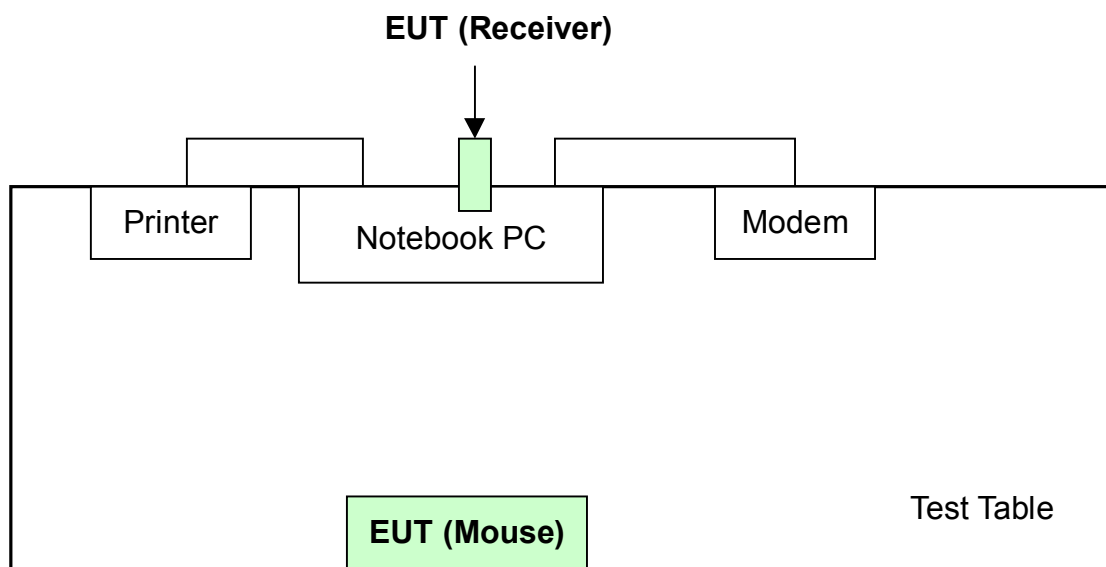
### 3.2 DESCRIPTION OF TEST MODES

Seventy-eight channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2431	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		



### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





**3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:**

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

- Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
0 to 77	0, 39, 77	GFSK

**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.

Available Channel	Tested Channel	Modulation Type
0 to 77	77	GFSK

**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.

Available Channel	Tested Channel	Modulation Type
0 to 77	0, 39, 77	GFSK

**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.

Available Channel	Tested Channel	Modulation Type
0 to 77	0, 77	GFSK



**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.

Available Channel	Tested Channel	Modulation Type
0 to 77	0, 39, 77	GFSK



### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a WIRELESS RECEIVER. 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.

### 3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	12130898320	E2K24CLNS
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414
4	WIRELESS MOUSE	SONY	VGP-WMS50	N/A	EMJM2AC01

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	N/A

**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	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 20, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Jan. 20, 2006
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Shielded Room 3.
  3. The VCCI Site Registration No. is C-2047.



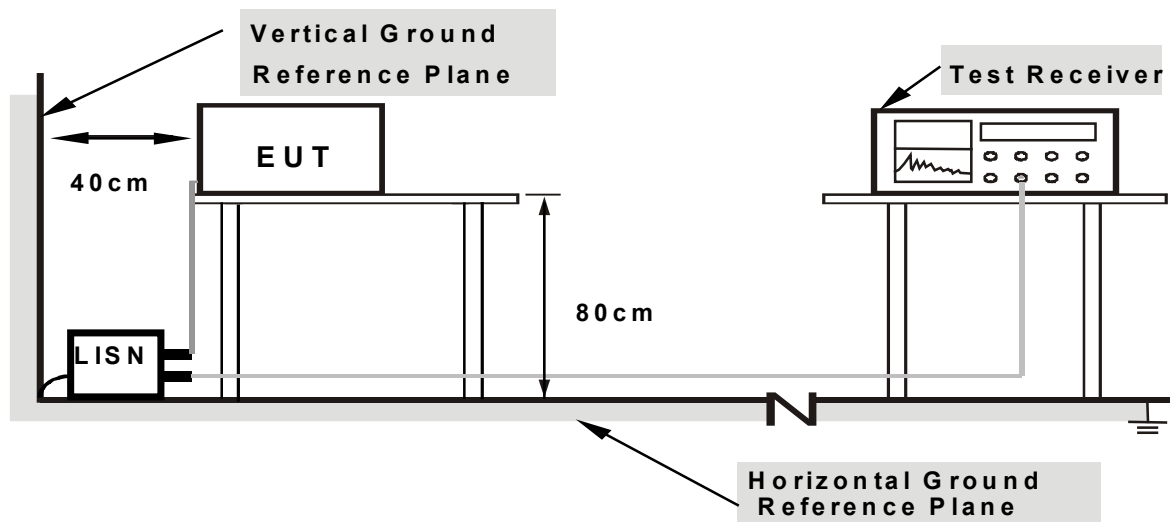
### **4.1.3 TEST PROCEDURE**

- 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 450 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

### **4.1.4 DEVIATION FROM TEST STANDARD**

No deviation

### 4.1.5 TEST SETUP



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

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

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

### 4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT (receiver part) with a Notebook PC on the testing table.
- b. Checked if the transmitter part (EUT) and the receiver part (EUT) were set at the same channel.
- c. Set the EUT for under transmitting condition at specific channel.
- d. The notebook sent "H" messages to the notebook and displayed "H" patterns on its screen.
- e. The notebook system sent "H" messages to modem.
- f. The notebook system sent "H" messages to printer and the printer prints them out.
- g. Repeated d ~ f.



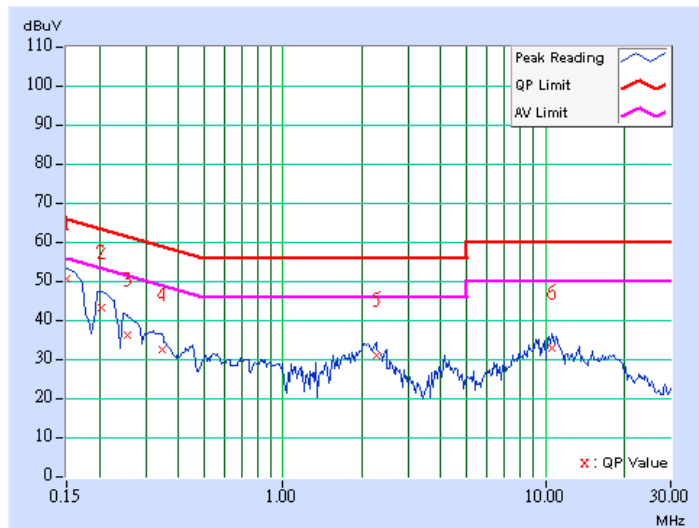
### 4.1.7 TEST RESULTS

#### Conducted Worst-Case Data

EUT	WIRELESS RECEIVER	MEASUREMENT DETAIL	
CHANNEL	Channel 0	MODEL	VGP-WRC3
INPUT POWER (SYSTEM)	120Vac, 60 Hz	MODULATION TYPE	GFSK
ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 994hPa	6dB BANDWIDTH	9kHz
TESTED BY	Gary Chang	PHASE	Line 1

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	0.150	0.10	50.48	-	50.58	-	66.00	56.00	-15.42
2	0.205	0.10	42.84	-	42.94	-	63.42	53.42	-20.48	-
3	0.255	0.10	35.96	-	36.06	-	61.58	51.58	-25.52	-
4	0.345	0.10	32.12	-	32.22	-	59.07	49.07	-26.85	-
5	2.266	0.20	30.96	-	31.16	-	56.00	46.00	-24.84	-
6	10.605	0.31	32.55	-	32.86	-	60.00	50.00	-27.14	-

- 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.



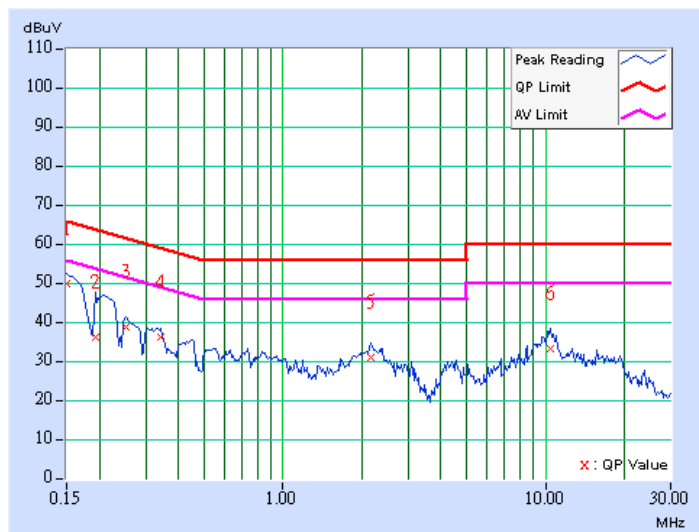




<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 0	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 994hPa	<b>6dB BANDWIDTH</b>	9kHz
<b>TESTED BY</b>	Gary Chang	<b>PHASE</b>	Line 2

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	0.150	0.10	49.45	-	49.55	-	66.00	56.00	-16.45	-
2	0.193	0.10	35.97	-	36.07	-	63.91	53.91	-27.84	-
3	0.252	0.10	38.40	-	38.50	-	61.71	51.71	-23.21	-
4	0.341	0.10	35.96	-	36.06	-	59.17	49.17	-23.11	-
5	2.156	0.20	30.78	-	30.98	-	56.00	46.00	-25.02	-
6	10.426	0.41	33.07	-	33.48	-	60.00	50.00	-26.52	-

- 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.

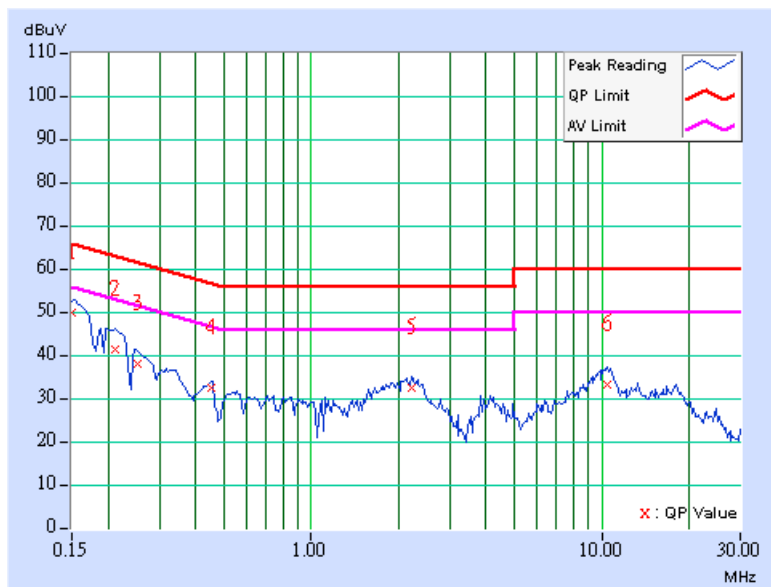




<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 39	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 994hPa	<b>6dB BANDWIDTH</b>	9kHz
<b>TESTED BY</b>	Gary Chang	<b>PHASE</b>	Line 1

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	0.150	0.10	49.70	-	49.80	-	66.00	56.00	-16.20	-
2	0.213	0.10	40.99	-	41.09	-	63.11	53.11	-22.02	-
3	0.252	0.10	37.69	-	37.79	-	61.71	51.71	-23.92	-
4	0.455	0.11	32.11	-	32.22	-	56.79	46.79	-24.57	-
5	2.211	0.20	32.17	-	32.37	-	56.00	46.00	-23.63	-
6	10.469	0.31	33.01	-	33.32	-	60.00	50.00	-26.68	-

- 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.

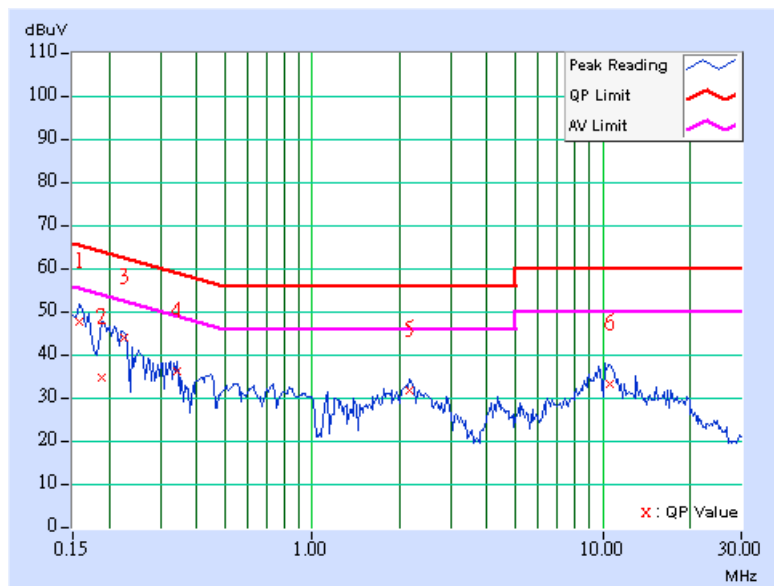




<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 39	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 994hPa	<b>6dB BANDWIDTH</b>	9kHz
<b>TESTED BY</b>	Gary Chang	<b>PHASE</b>	Line 2

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	0.158	0.10	47.41	-	47.51	-	65.58	55.58	-18.07	-
2	0.189	0.10	34.28	-	34.38	-	64.08	54.08	-29.70	-
3	0.224	0.10	43.70	-	43.80	-	62.66	52.66	-18.86	-
4	0.341	0.10	35.92	-	36.02	-	59.17	49.17	-23.15	-
5	2.160	0.20	31.47	-	31.67	-	56.00	46.00	-24.33	-
6	10.547	0.41	32.99	-	33.40	-	60.00	50.00	-26.60	-

- 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.

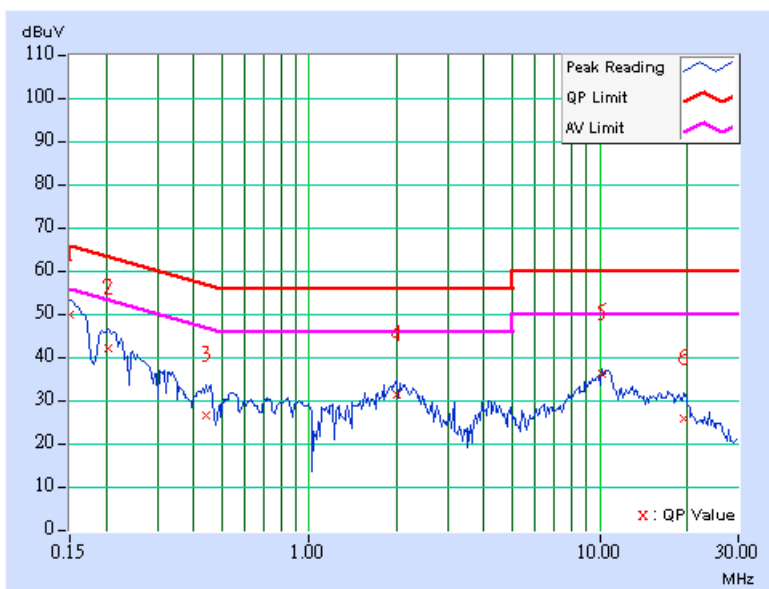




<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 77	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 994hPa	<b>6dB BANDWIDTH</b>	9kHz
<b>TESTED BY</b>	Gary Chang	<b>PHASE</b>	Line 1

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	0.150	0.10	49.35	-	49.45	-	66.00	56.00	-16.55	-
2	0.205	0.10	41.51	-	41.61	-	63.42	53.42	-21.81	-
3	0.443	0.11	26.05	-	26.16	-	57.01	47.01	-30.85	-
4	1.992	0.20	30.68	-	30.88	-	56.00	46.00	-25.12	-
5	10.137	0.30	35.47	-	35.77	-	60.00	50.00	-24.23	-
6	19.410	0.75	25.10	-	25.85	-	60.00	50.00	-34.15	-

- 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.

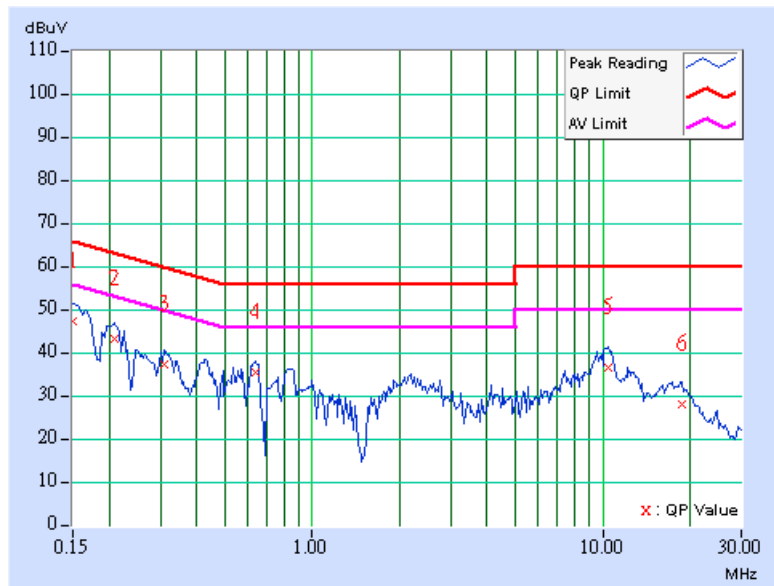




<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 77	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 994hPa	<b>6dB BANDWIDTH</b>	9kHz
<b>TESTED BY</b>	Gary Chang	<b>PHASE</b>	Line 2

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	0.150	0.10	46.70	-	46.80	-	66.00	56.00	-19.20	-
2	0.209	0.10	42.64	-	42.74	-	63.26	53.26	-20.52	-
3	0.310	0.10	36.75	-	36.85	-	59.97	49.97	-23.12	-
4	0.642	0.14	34.74	-	34.88	-	56.00	46.00	-21.12	-
5	10.395	0.41	36.12	-	36.53	-	60.00	50.00	-23.47	-
6	18.766	0.73	27.40	-	28.13	-	60.00	50.00	-31.87	-

- 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	ESI7	838496/016	Jan. 07, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 29, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10631	Nov. 17, 2005
Preamplifier Agilent	8449B	3008A01960	Nov. 14, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA

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



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

#### NOTE:

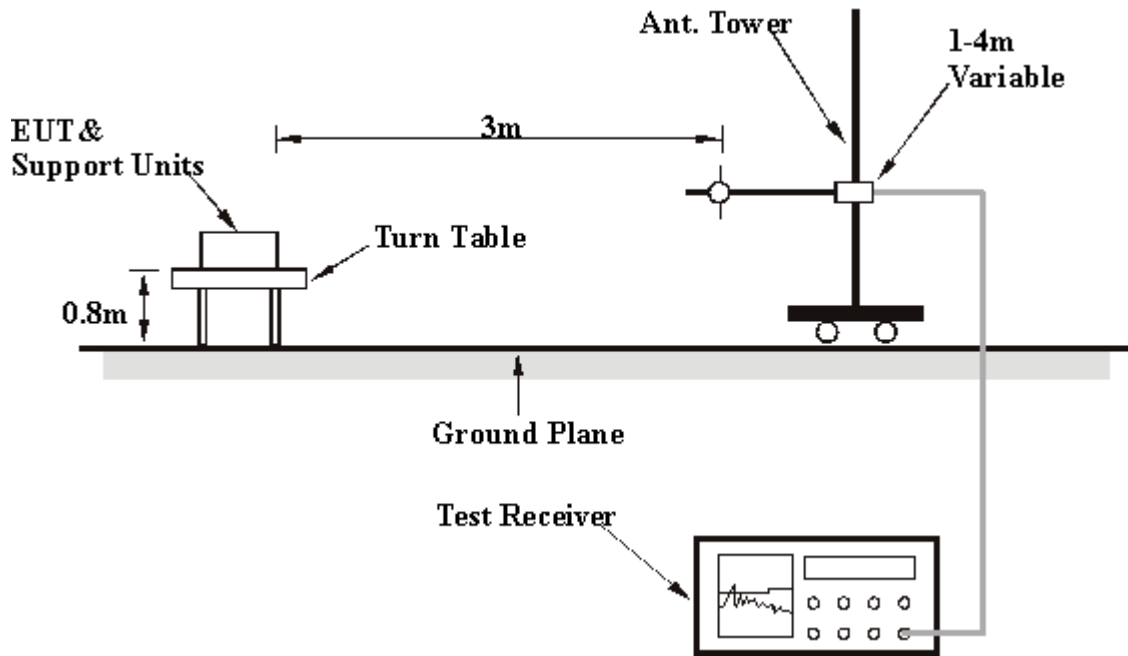
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.

### 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 item 4.1.6.



### 4.2.7 TEST RESULTS

#### Below 1GHz Worst-Case Data

<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 77	<b>MODEL</b>	VGP-WRC3
<b>MODULATION TYPE</b>	GFSK	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 66%RH, 994hPa	<b>TESTED BY</b>	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	55.27	30.71 QP	40.00	-9.29	2.00 H	130	16.63	14.08
2	107.76	26.75 QP	43.50	-16.75	2.00 H	40	15.09	11.67
3	179.68	29.01 QP	43.50	-14.49	3.00 H	163	16.08	12.93
4	261.32	30.09 QP	46.00	-15.91	2.00 H	43	16.78	13.31
5	465.43	29.91 QP	46.00	-16.09	1.00 H	88	11.74	18.18
6	953.35	29.70 QP	46.00	-16.30	3.00 H	262	4.36	25.34

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	23.22 QP	40.00	-16.78	2.00 V	247	8.55	14.67
2	<b>70.82</b>	<b>37.45 QP</b>	<b>40.00</b>	<b>-2.55</b>	<b>2.00 V</b>	<b>250</b>	<b>25.19</b>	<b>12.27</b>
3	123.31	30.31 QP	43.50	-13.19	1.00 V	241	17.19	13.12
4	185.51	32.60 QP	43.50	-10.90	2.00 V	127	20.15	12.45
5	416.83	39.50 QP	46.00	-6.50	2.00 V	250	22.34	17.16
6	599.56	28.69 QP	46.00	-17.31	1.00 V	25	7.87	20.82

- 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.



**1 ~ 25GHz Worst-Case Data**

<b>EUT</b>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 0	<b>MODEL</b>	VGP-WRC3
<b>MODULATION TYPE</b>	GFSK	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 66%RH, 994hPa	<b>TESTED BY</b>	Brad Wu

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	1747.00	42.25 PK	74.00	-31.75	1.02 H	217	12.54	29.71
2	2390.00	43.90 PK	74.00	-30.10	1.47 H	20	12.03	31.87
3	*2402.00	96.67 PK			1.47 H	20	64.75	31.92
3	*2402.00	95.84 AV			1.47 H	20	63.92	31.92
4	4804.00	48.59 PK	74.00	-25.41	1.16 H	159	10.82	37.77

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	1747.00	41.38 PK	74.00	-32.62	1.00 V	327	11.67	29.71
1	1747.00	31.76 AV	54.00	-22.24	1.00 V	327	2.05	29.71
2	2390.00	41.00 PK	74.00	-33.00	1.14 V	352	9.13	31.87
3	*2402.00	93.77 PK			1.14 V	352	61.85	31.92
3	*2402.00	92.72 AV			1.14 V	352	60.80	31.92
4	4804.00	49.52 PK	74.00	-24.48	1.00 V	211	11.75	37.77
4	4804.00	36.95 AV	54.00	-17.05	1.00 V	211	-0.82	37.77

- 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>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 39	<b>MODEL</b>	VGP-WRC3
<b>MODULATION TYPE</b>	GFSK	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 66%RH, 994hPa	<b>TESTED BY</b>	Brad Wu

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	1747.00	41.29 PK	74.00	-32.71	1.03 H	214	11.58	29.71
2	*2441.00	97.15 PK			1.42 H	18	65.08	32.07
2	*2441.00	96.05 AV			1.42 H	18	63.98	32.07
3	4882.00	47.62 PK	74.00	-26.38	1.12 H	134	9.61	38.01

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	1747.00	41.07 PK	74.00	-32.93	1.03 V	215	11.36	29.71
2	*2441.00	93.62 PK			1.22 V	352	61.55	32.07
2	*2441.00	92.80 AV			1.22 V	352	60.73	32.07
3	4882.00	48.62 PK	74.00	-25.38	1.05 V	113	10.61	38.01

- 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>	WIRELESS RECEIVER	<b>MEASUREMENT DETAIL</b>	
<b>CHANNEL</b>	Channel 77	<b>MODEL</b>	VGP-WRC3
<b>MODULATION TYPE</b>	GFSK	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 66%RH, 994hPa	<b>TESTED BY</b>	Brad Wu

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	1747.00	41.28 PK	74.00	-32.72	1.01 H	195	11.57	29.71
2	*2479.00	96.48 PK			1.42 H	19	64.25	32.23
2	*2479.00	95.45 AV			1.42 H	19	63.22	32.23
3	2483.50	47.38 PK	74.00	-26.62	1.42 H	19	15.14	32.24
4	4958.00	48.86 PK	74.00	-25.14	1.12 H	163	10.61	38.25

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	1747.00	41.65 PK	74.00	-32.35	1.12 V	156	11.94	29.71
2	*2479.00	92.76 PK			1.19 V	350	60.53	32.23
2	*2479.00	91.79 AV			1.19 V	350	59.56	32.23
3	2483.50	43.66 PK	74.00	-30.34	1.19 V	350	11.42	32.24
4	4958.00	49.56 PK	74.00	-24.44	1.02 V	47	11.31	38.25

- 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

### 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	FSEK 30	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 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.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

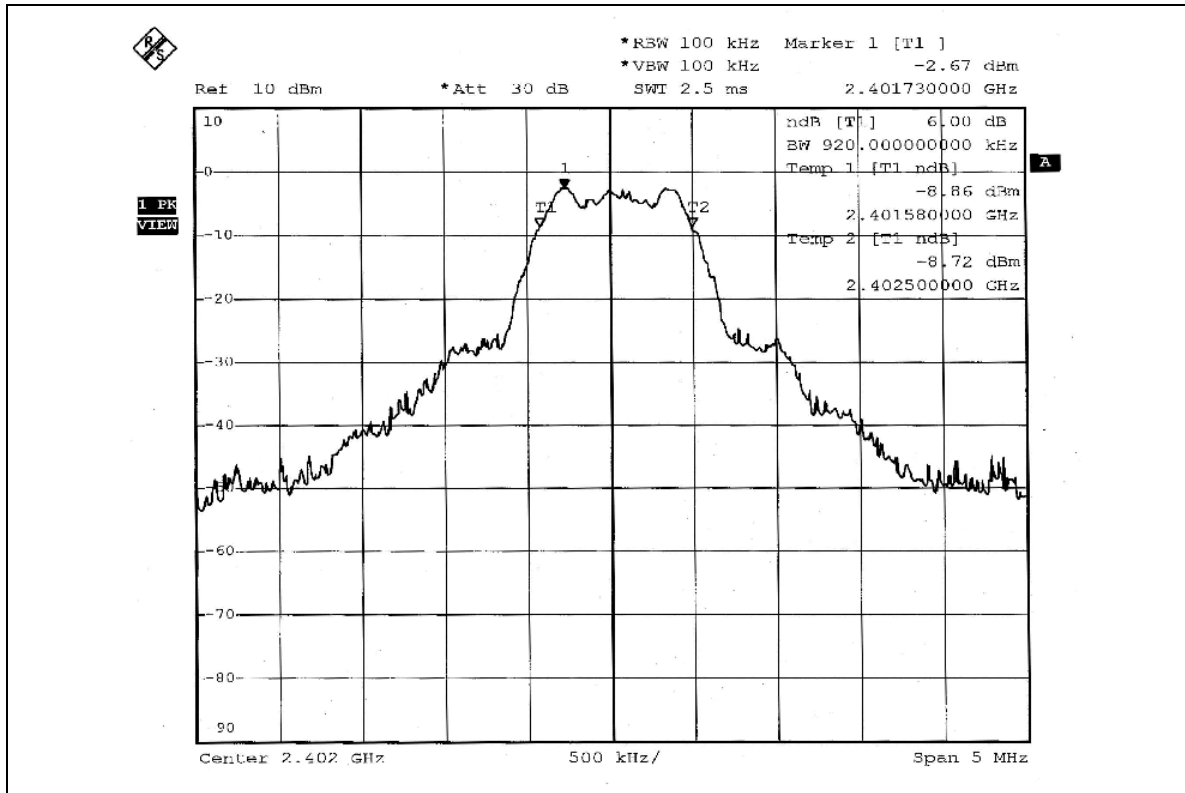


### 4.3.7 TEST RESULTS

<b>EUT</b>	WIRELESS RECEIVER	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 61%RH, 997hPa	<b>TESTED BY</b>	Gary Chang

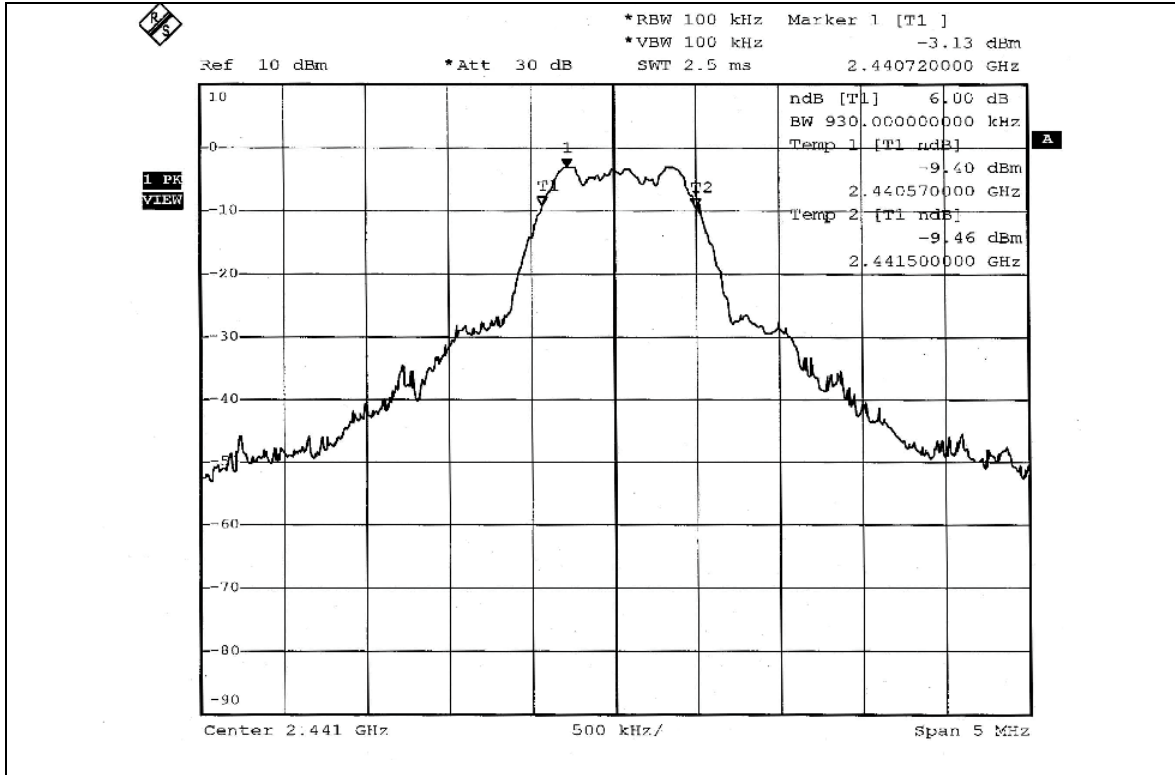
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2402	0.92	0.5	PASS
39	2441	0.93	0.5	PASS
77	2479	0.94	0.5	PASS

#### CH 0

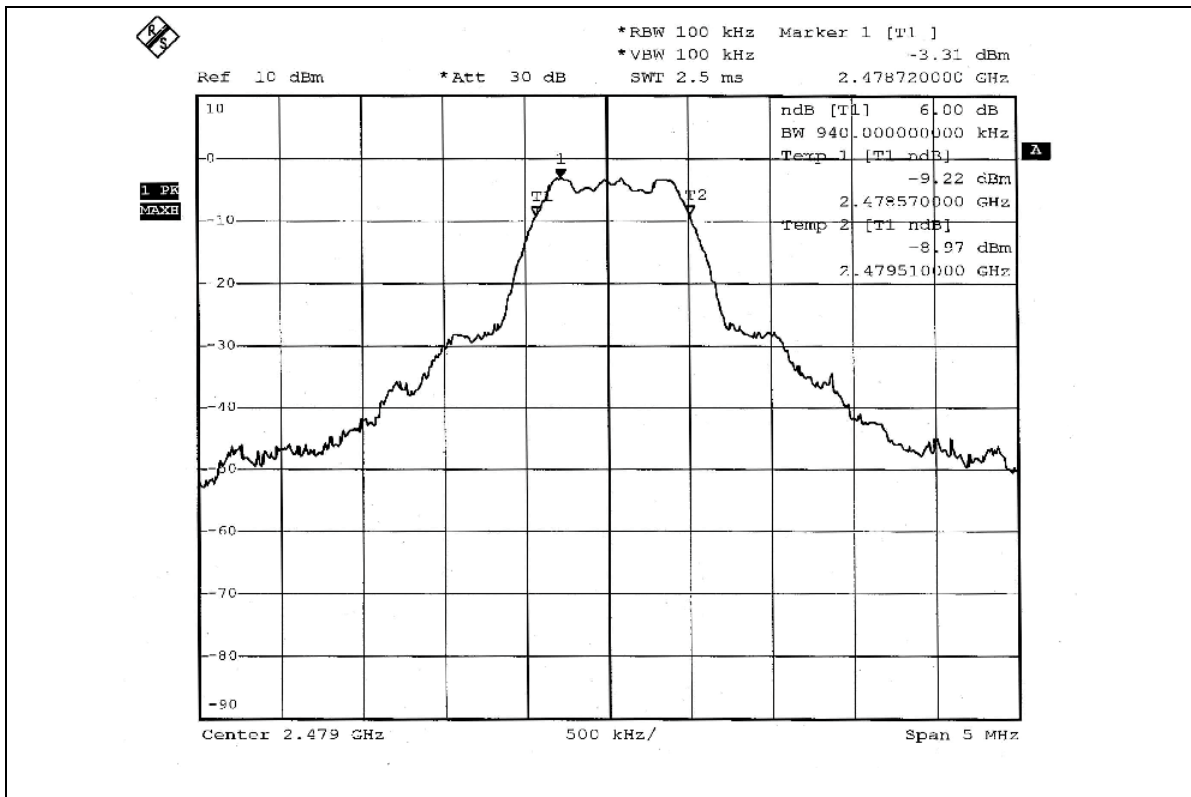




CH 39



CH 77







#### 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 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

**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

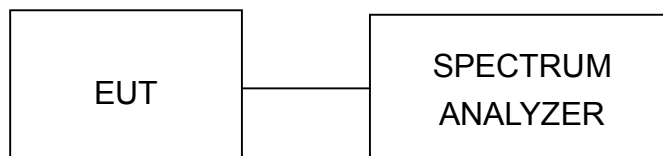
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 1 MHz VBW, the peak value was measured and recorded.
4. Repeat above procedures until all frequencies measured were complete.

Note: The spectrum plots are attached on following pages.

### 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

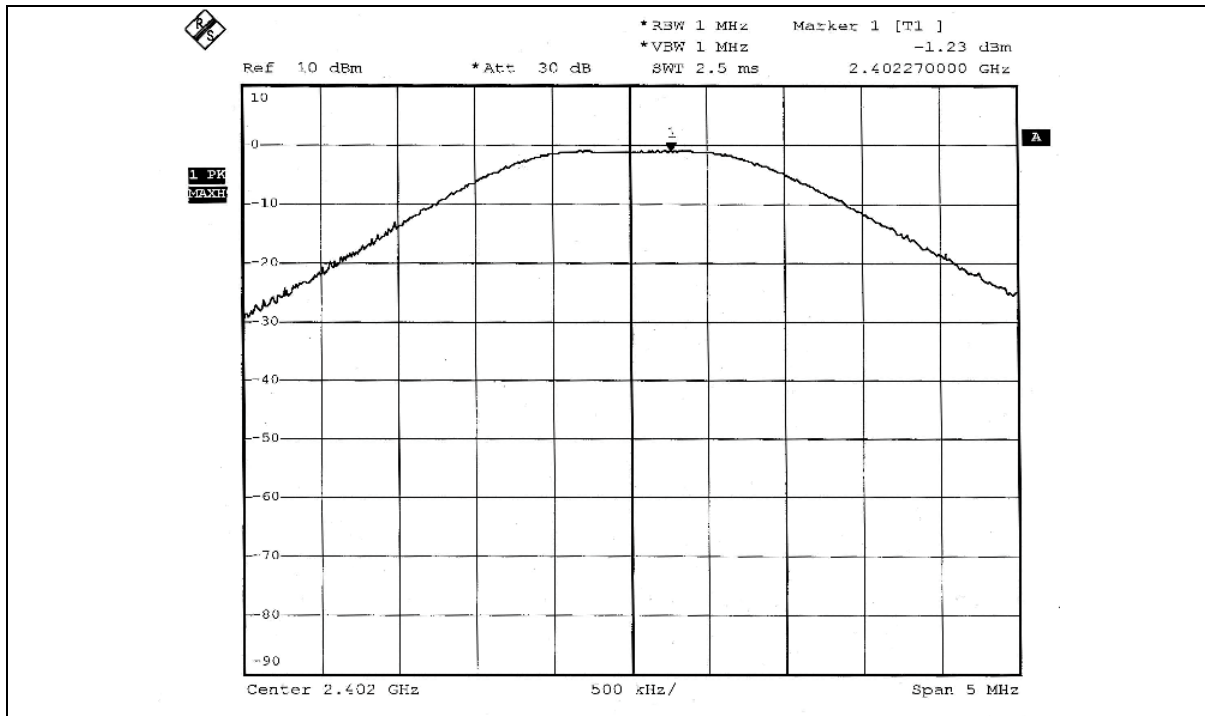


### 4.4.7 TEST RESULTS

<b>EUT</b>	WIRELESS RECEIVER	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 61%RH, 997hPa	<b>TESTED BY</b>	Gary Chang

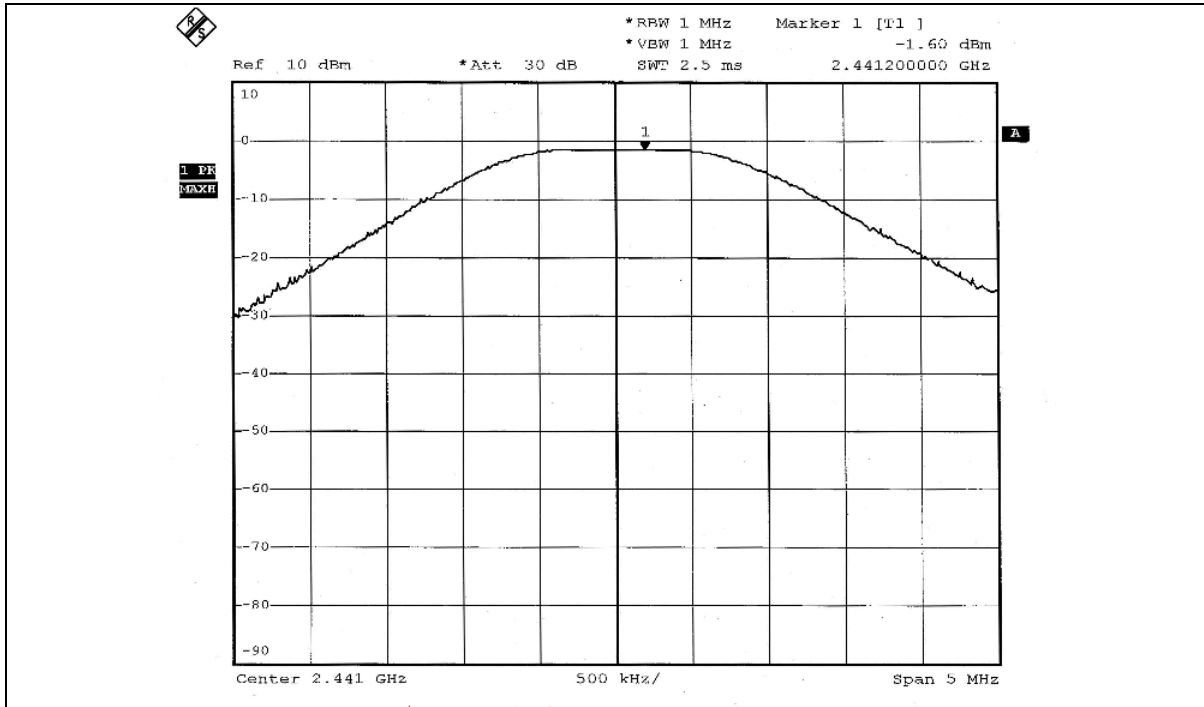
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	-1.23	30	PASS
39	2441	-1.60	30	PASS
77	2479	-1.91	30	PASS

#### Channel 0

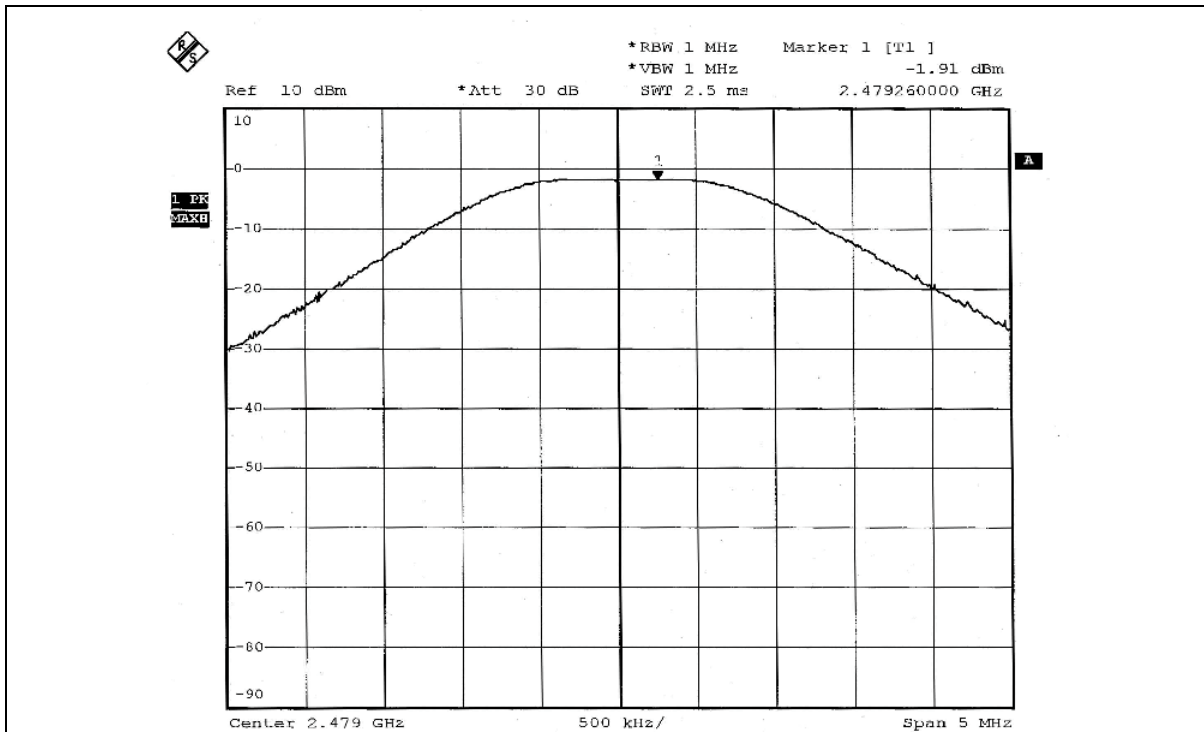




### Channel 39



### Channel 77



## 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
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

### 4.5.3 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.

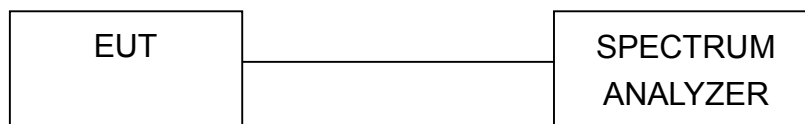
The power spectral density was measured and recorded.

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 CONDITION

Same as Item 4.3.6

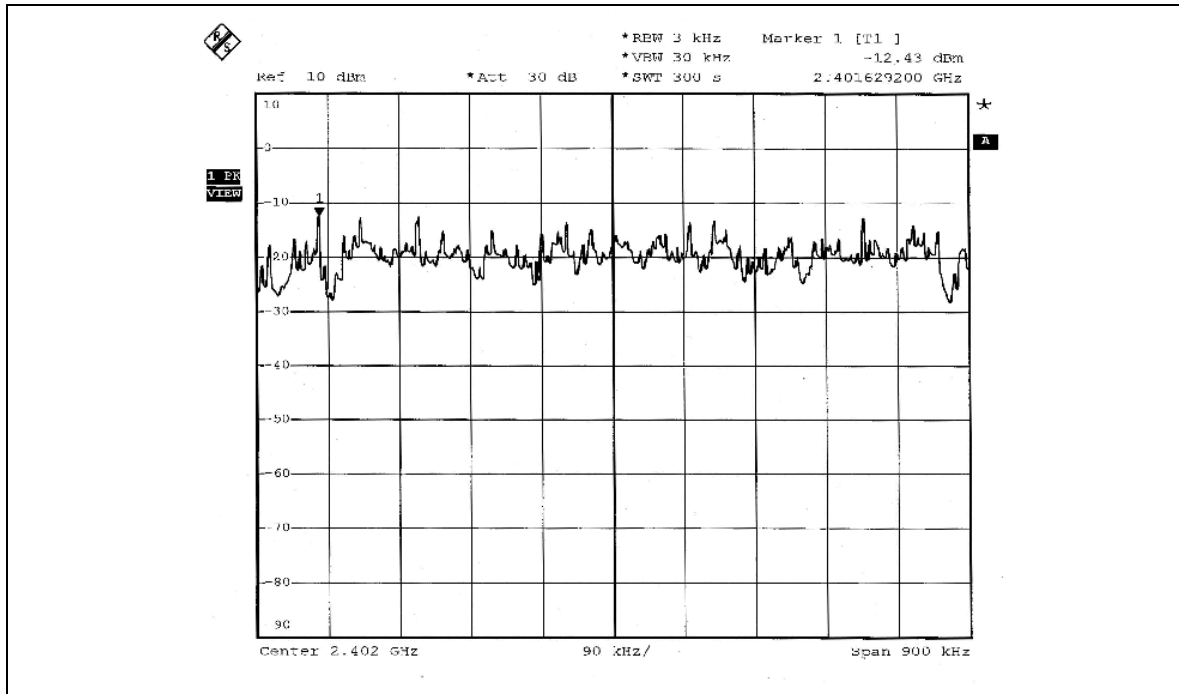


### 4.5.7 TEST RESULTS

<b>EUT</b>	WIRELESS RECEIVER	<b>MODEL</b>	VGP-WRC3
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>MODULATION TYPE</b>	GFSK
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 61%RH, 997hPa	<b>TESTED BY</b>	Gary Chang

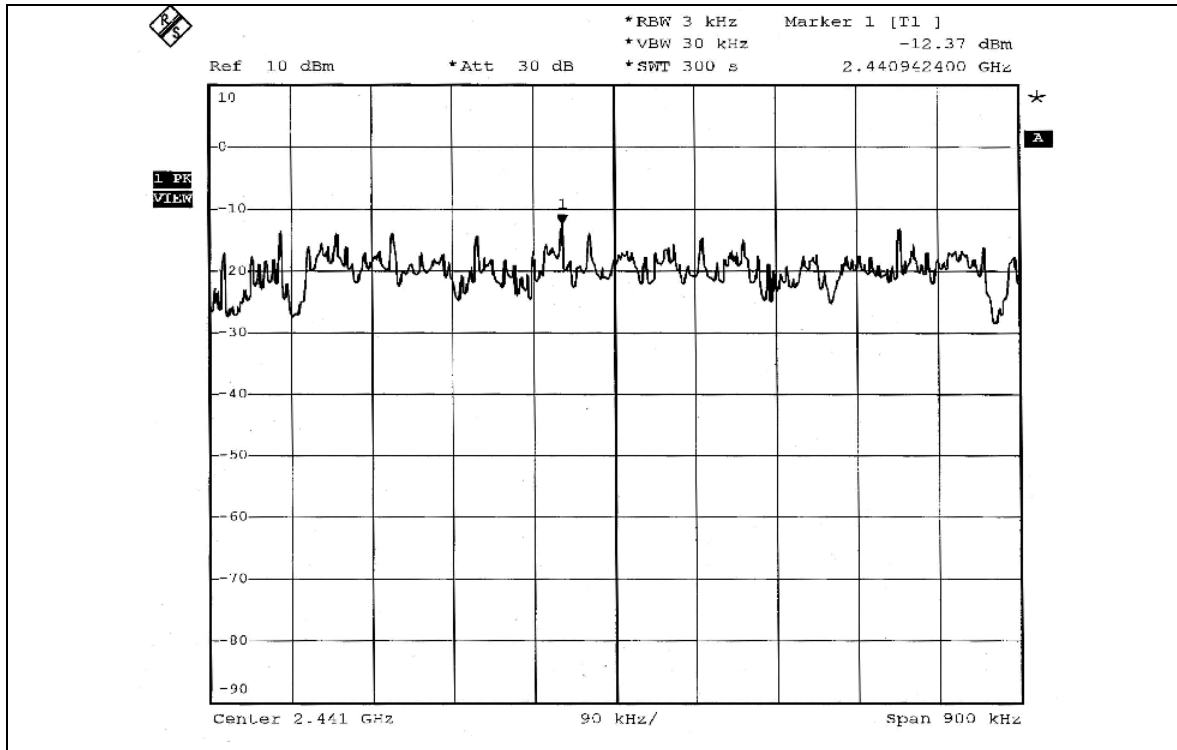
CHANNEL	CHANNEL FREQUENCY (MHz )	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
0	2402	-12.43	8	PASS
39	2441	-12.37	8	PASS
77	2479	-12.90	8	PASS

#### CH 0

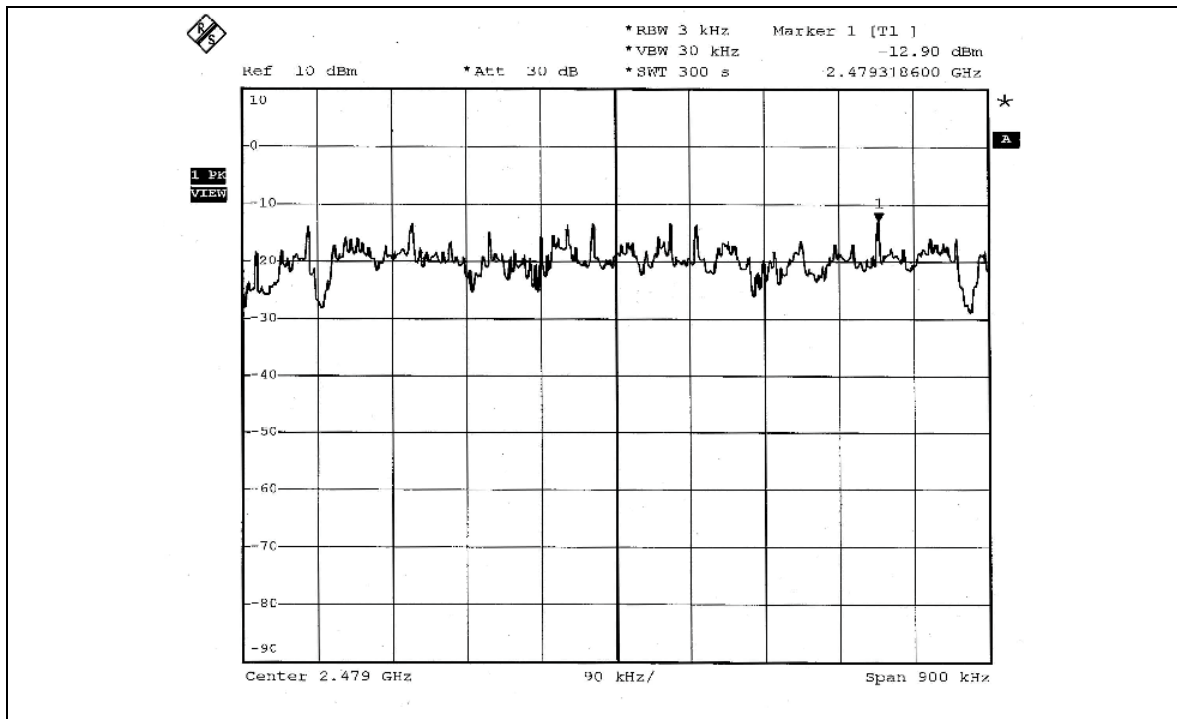




**CH 39**



**CH 77**





## 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
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

### 4.6.3 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 100 kHz and 100 kHz suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz) 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

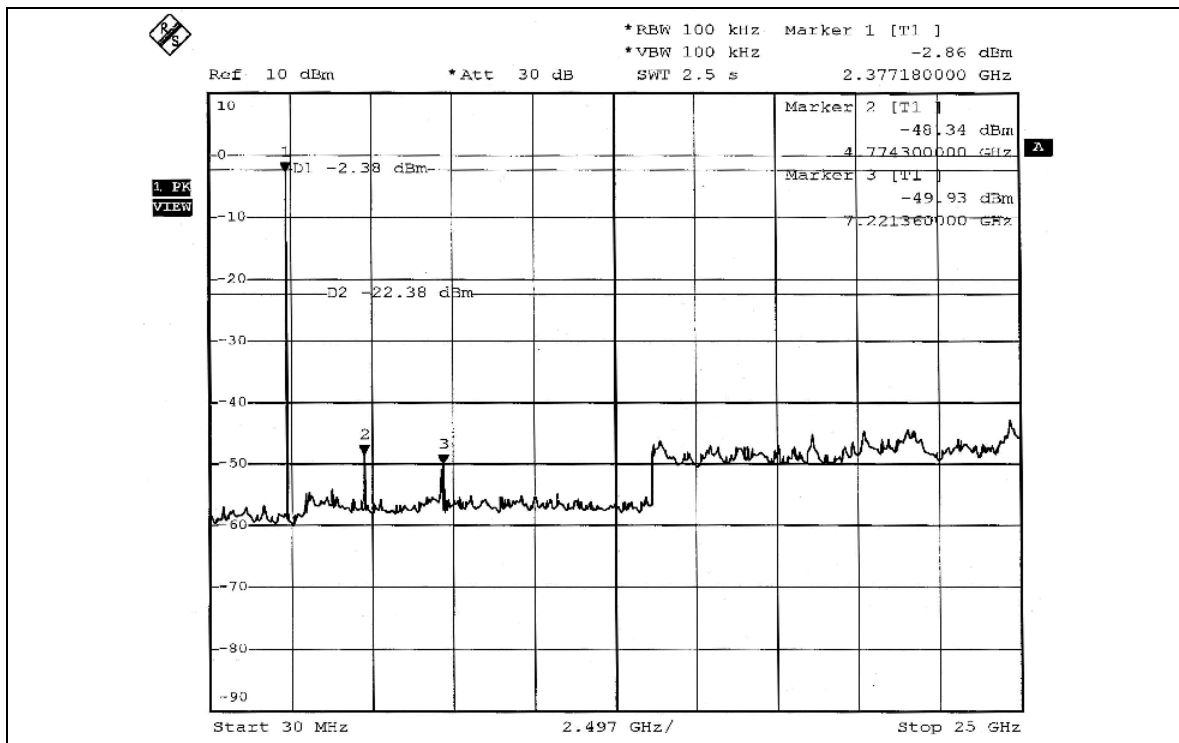
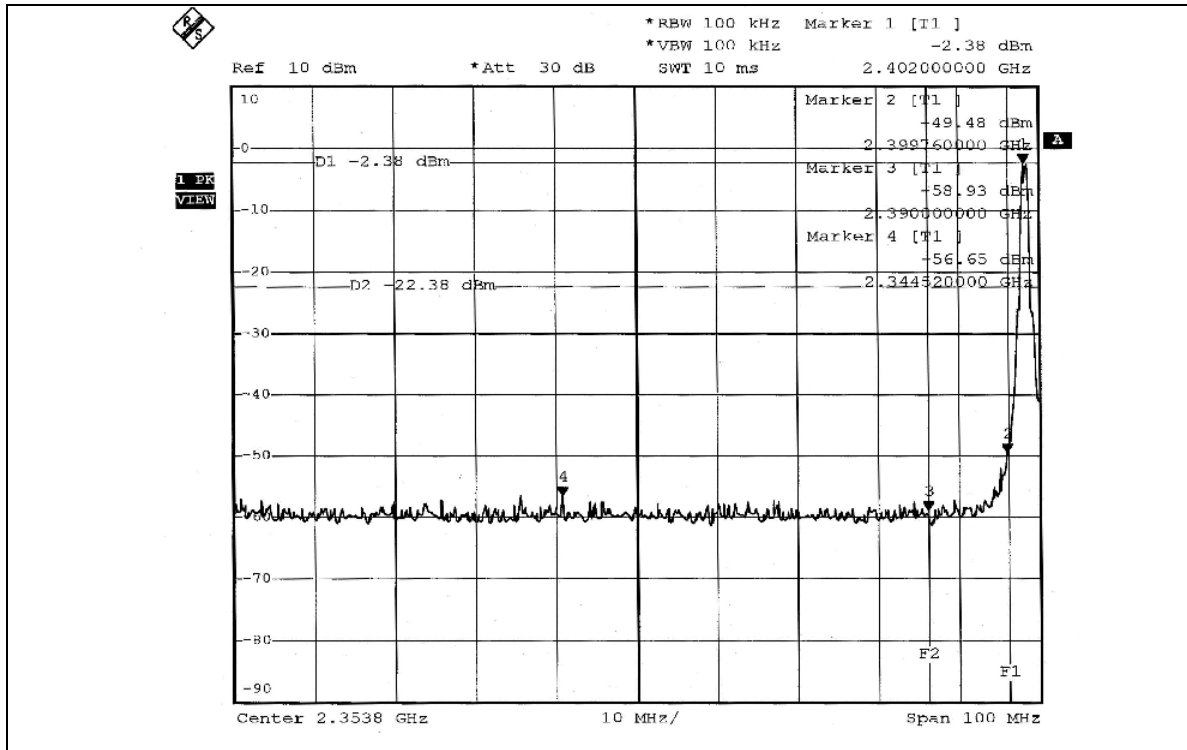
The spectrum plots are attached on the following 4 images. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

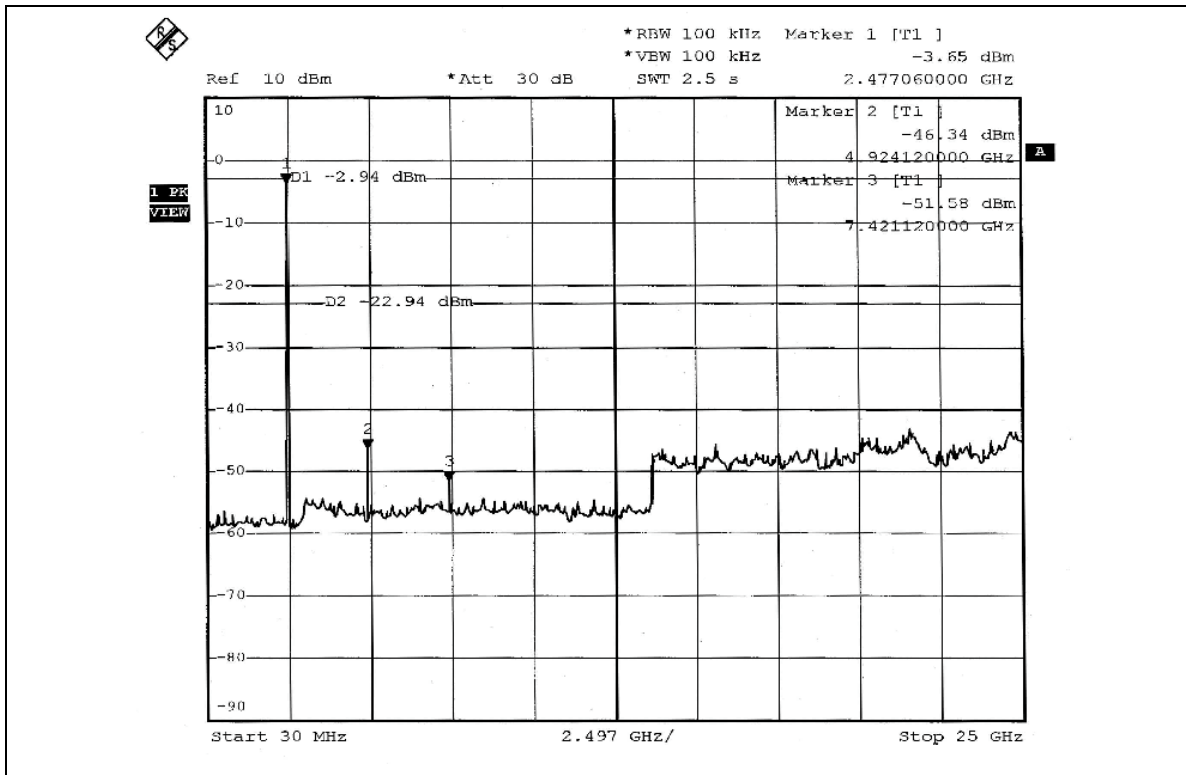
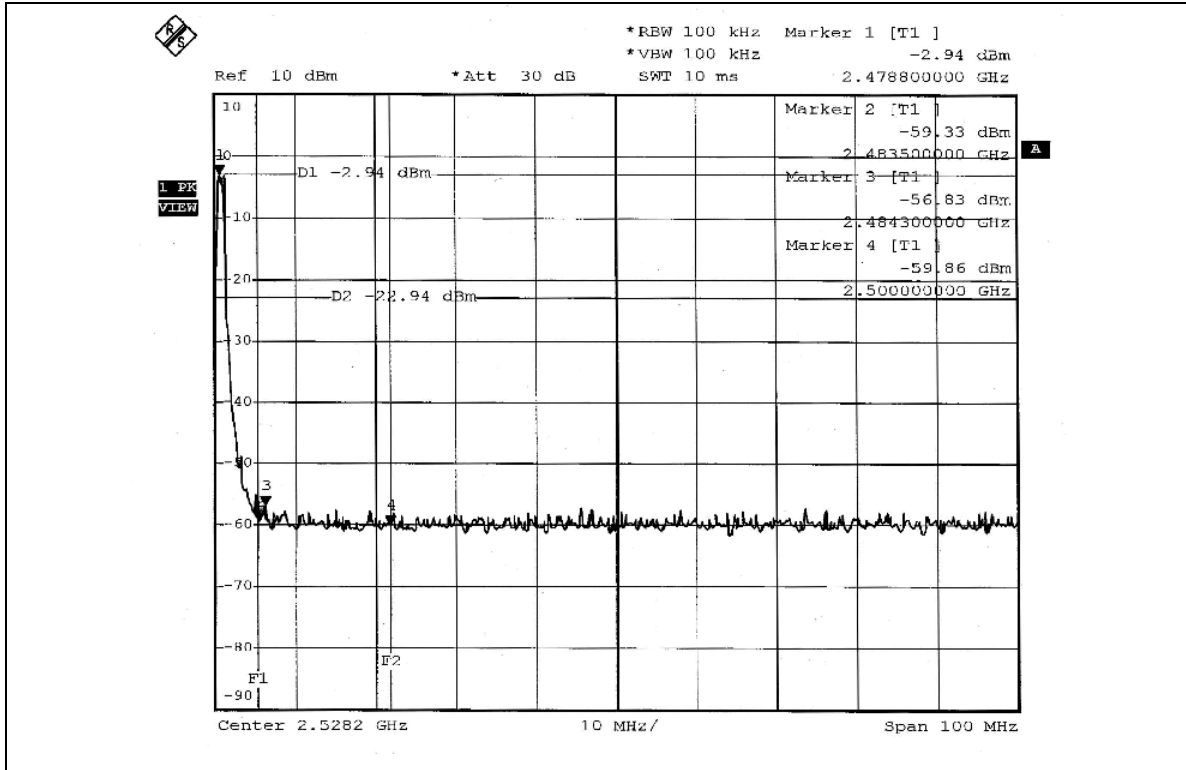
**NOTE 1:** The band edge emission plot on page 42 shows 54.27dBc between carrier maximum power and local maximum emission in restrict band (2.3445GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 96.67dBuV/m (Peak), so the maximum field strength in restrict band is  $96.67 - 54.27 = 42.40$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot of on page 42 shows 54.27dBc between carrier maximum power and local maximum emission in restrict band (2.3445GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 95.84dBuV/m (Average), so the maximum field strength in restrict band is  $95.84 - 54.27 = 41.57$ dBuV/m which is under 54dBuV/m limit.

**NOTE 2:** The band edge emission plot on page 43 shows 53.89dBc between carrier maximum power and local maximum emission in restrict band (2.4843GHz). The emission of carrier strength list in the test result of channel 77 at the item 4.2.7 is 96.48dBuV/m (Peak), so the maximum field strength in restrict band is  $96.48 - 53.89 = 42.59$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 43 shows 53.89dBc between carrier maximum power and local maximum emission in restrict band (2.4843GHz). The emission of carrier strength list in the test result of channel 77 at the item 4.2.7 is 95.45dBuV/m (Average), so the maximum field strength in restrict band is  $95.45 - 53.89 = 41.56$ 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.

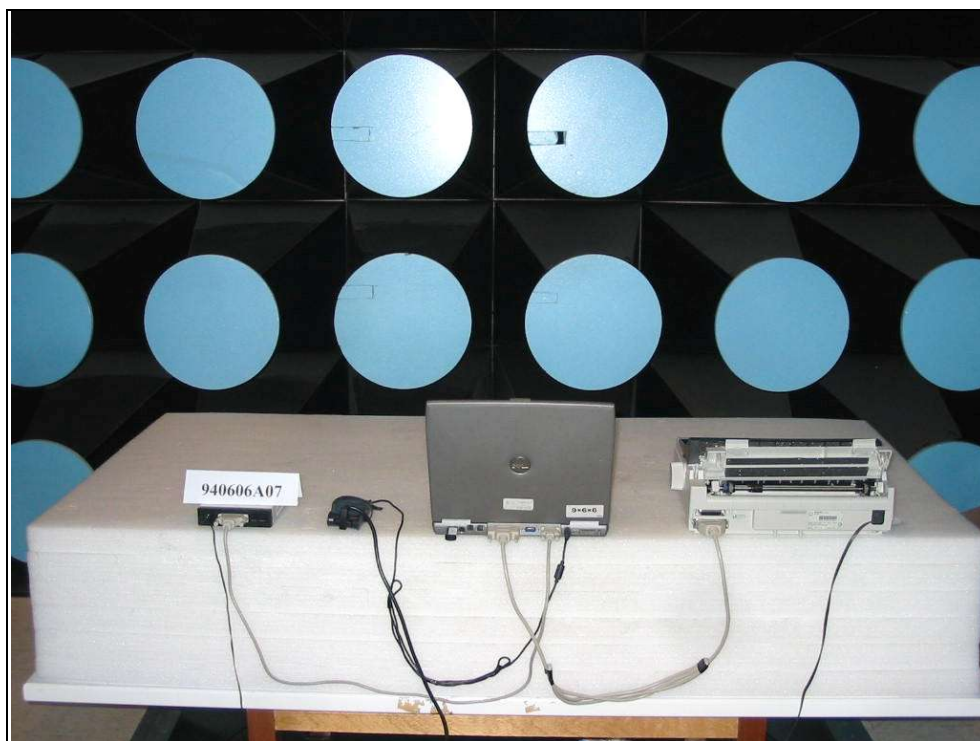
### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is Printed antenna without connector. The maximum Gain of the antenna is  $-0.58\text{dBi}$ .

## 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

**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