

# FCC TEST REPORT

**REPORT NO.:** RF940314L15

**MODEL NO.:** SP-922

**RECEIVED:** Mar. 15, 2005

**TESTED:** Mar. 23 ~ Apr. 08, 2005

**ISSUED:** Apr. 12, 2005

**APPLICANT:** SENAO INTERNATIONAL CO., LTD.

**ADDRESS:** 2F, NO. 531 CHUNG CHENG RD., HSIN-TIEN, TAIPEI, TAIWAN, R. O. C.

**ISSUED BY:** Advance Data Technology Corporation

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

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

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ILAC MRA



No. 2177-01

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## 1 CERTIFICATION

**PRODUCT :** Digital 4-line cordless phone system  
**MODEL NO. :** SP-922  
**BRAND NAME :** EnGenius  
**APPLICANT :** SENAO INTERNATIONAL CO., LTD.  
**TESTED :** Mar. 23 ~ Apr. 08, 2005  
**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 :** Candice Chen, **DATE:** Apr. 12, 2005  
( Candice Chen )

**TECHNICAL**  
**ACCEPTANCE :** Gary Chang, **DATE:** Apr. 12, 2005  
Responsible for RF ( Gary Chang )

**APPROVED BY :** Cody Chang, **DATE:** Apr. 12, 2005  
( Cody Chang, Deputy Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -14.87 dB at 0.193 MHz
15.247(a)(1) (iii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1) (iii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)	1. Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, whichever is greater 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -12.55 dB at 1805.00 MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit

## 2.1 GENERAL DESCRIPTION OF EUT

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Digital 4-line cordless phone system
<b>MODEL NO.</b>	SP-922
<b>POWER SUPPLY</b>	7Vdc from power adapter for the Base
<b>MODULATION TYPE</b>	MSK
<b>FREQUENCY RANGE</b>	902.5155MHz ~ 927.5972MHz
<b>NUMBER OF CHANNEL</b>	50
<b>OUTPUT POWER</b>	790.679mW
<b>ANTENNA TYPE</b>	Dipole antenna with 2dBi gain for the Base
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	RJ11, Audio-In
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The Base was powered by the following adapter:

<b>BRAND:</b>	EnGenius
<b>MODEL :</b>	AM-0701000D
<b>INPUT :</b>	120Vac, 60Hz, 30W
<b>OUTPUT :</b>	7Vdc, 1000mA
<b>POWER LINE :</b>	DC 1.8m non-shielded without core

2. 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.

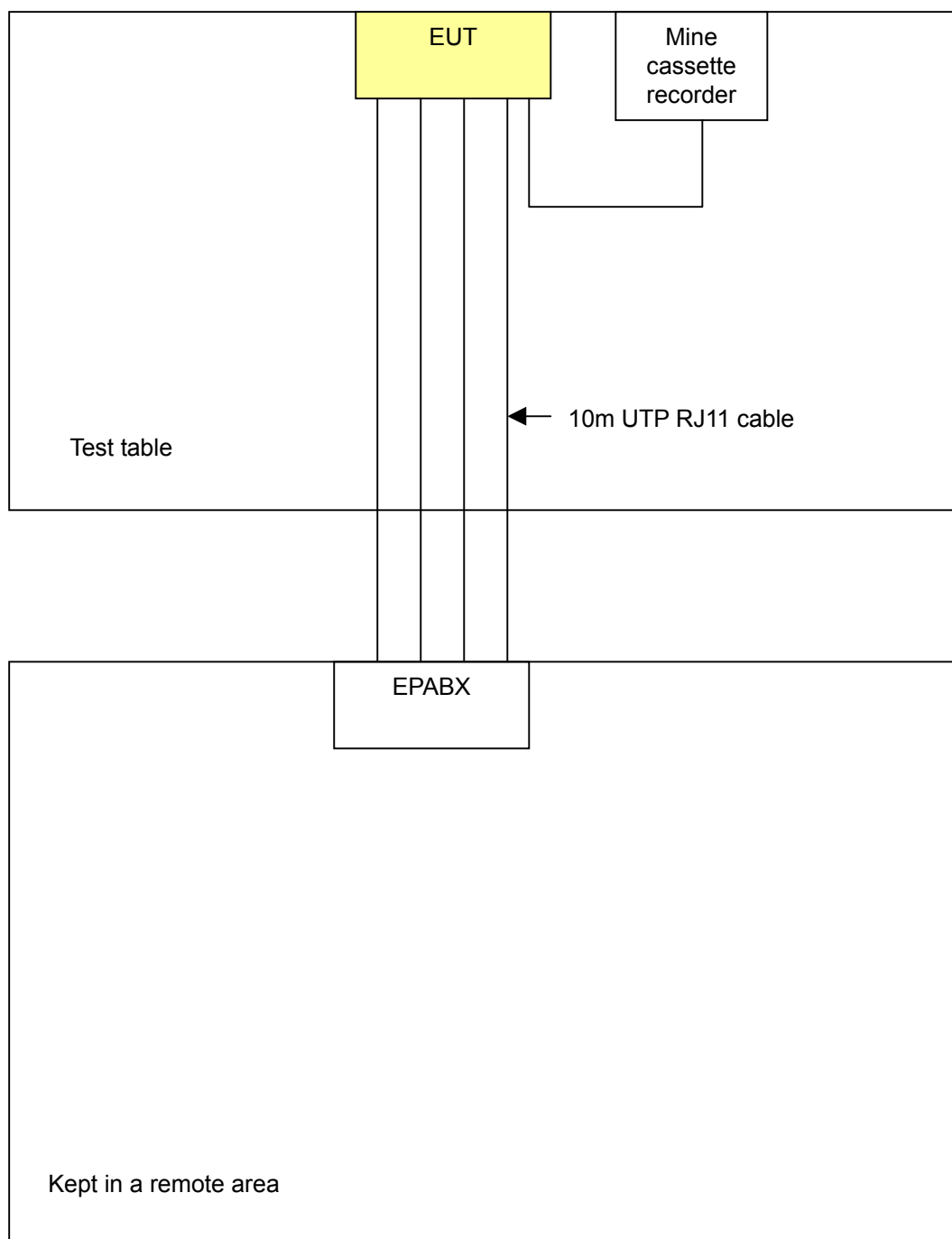
### 3.2 DESCRIPTION OF TEST MODES

There are 50 channels provided to this EUT.

CH	Frequency	CH	Frequency	CH	Frequency
1	902.5155	8	905.7519	20	912.2245
2	902.9200	19	911.8200	43	924.3608
4	903.7291	42	923.9563	36	920.7199
10	906.9655	34	919.9109	24	914.2473
23	913.4382	21	912.6291	3	903.3246
50	927.5972	46	925.5745	7	905.3473
49	927.1926	41	923.1472	16	910.2018
48	926.7881	33	919.5063	35	920.3154
45	925.1699	18	911.0109	22	913.0336
40	922.7427	39	922.3381	47	926.3836
31	917.8881	30	917.4836	44	924.7654
14	909.3927	12	907.7746	37	921.5290
15	909.7973	25	915.0563	26	915.4609
32	919.1018	5	904.5382	6	904.9428
17	910.6064	13	908.1791	29	917.0791
38	921.9336	28	916.6745	11	907.3700
27	915.8654	9	906.1564		



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

Available Channel	Tested Channel	Modulation Type
1 to 50	1, 25, 50	MSK

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

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 to 50	1, 25, 50	MSK

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

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations..
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 to 50	1, 25, 50	MSK

**Bandedge Measurement:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 to 50	1, 25, 50	MSK

**Antenna Port Conducted Measurement:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 to 50	1, 25, 50	MSK

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Digital 4-line cordless phone system. 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	EPABX	VIDAR-SMS	EASYSWITCH PX-4	95080110	N/A
2	MINE CASSETTE RECORDER	PANASONIC	RQ-L11	C1-010051	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	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 (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

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



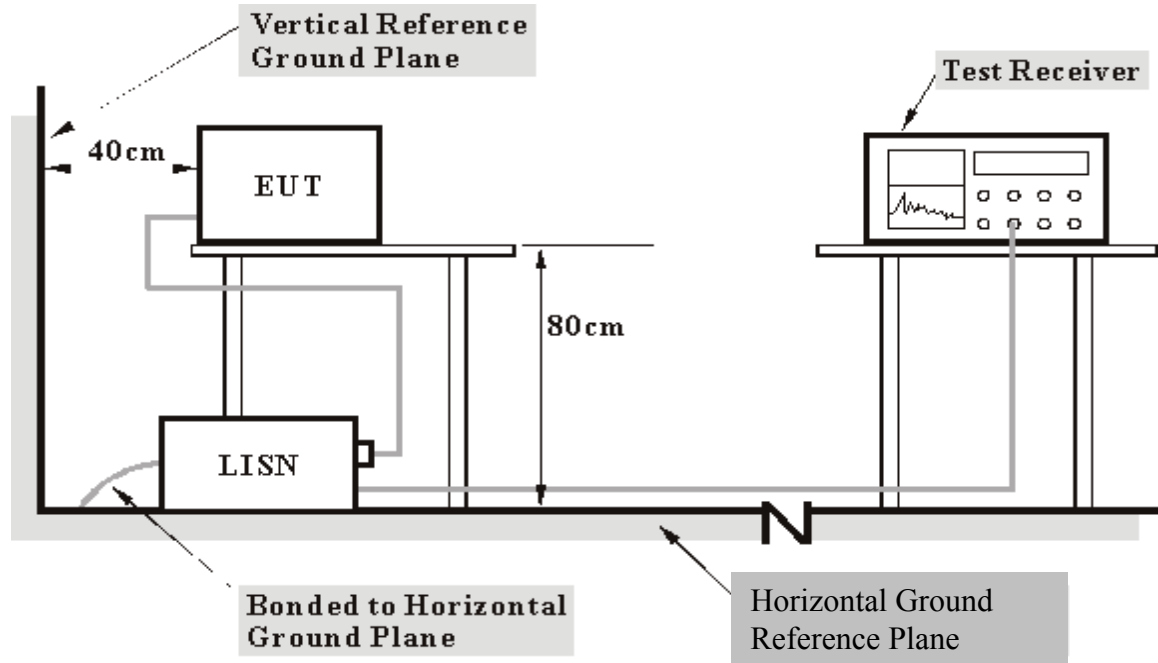
#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels (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

- Placed the EUT on the testing table.
- Run the test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously channel frequency.

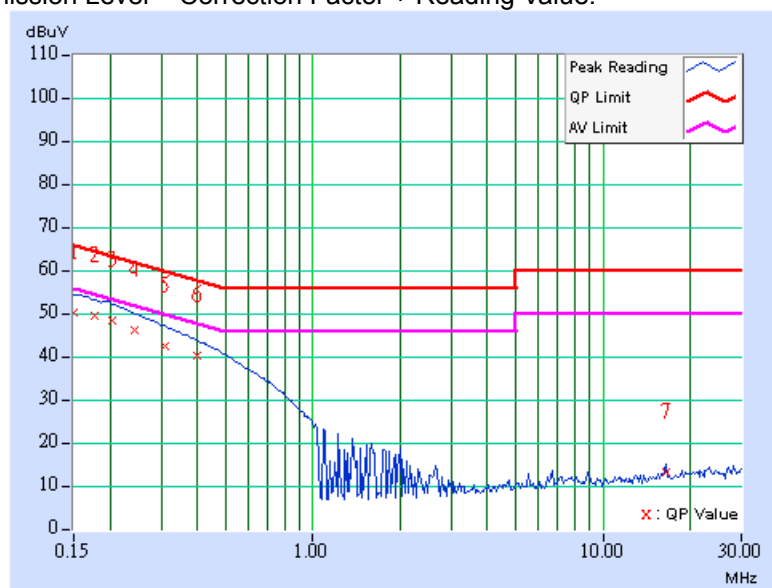
## 4.1.7 TEST RESULTS

**Conducted Worst-Case Data**

<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 1
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	49.77	-	49.87	-	66.00	56.00	-16.13	-
2	0.177	0.11	49.05	-	49.16	-	64.61	54.61	-15.45	-
3	0.205	0.11	47.92	-	48.03	-	63.42	53.42	-15.39	-
4	0.244	0.11	45.63	-	45.74	-	61.97	51.97	-16.23	-
5	0.310	0.11	41.97	-	42.08	-	59.97	49.97	-17.88	-
6	0.400	0.12	39.71	-	39.83	-	57.85	47.85	-18.03	-
7	16.441	0.72	12.73	-	13.45	-	60.00	50.00	-46.55	-

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

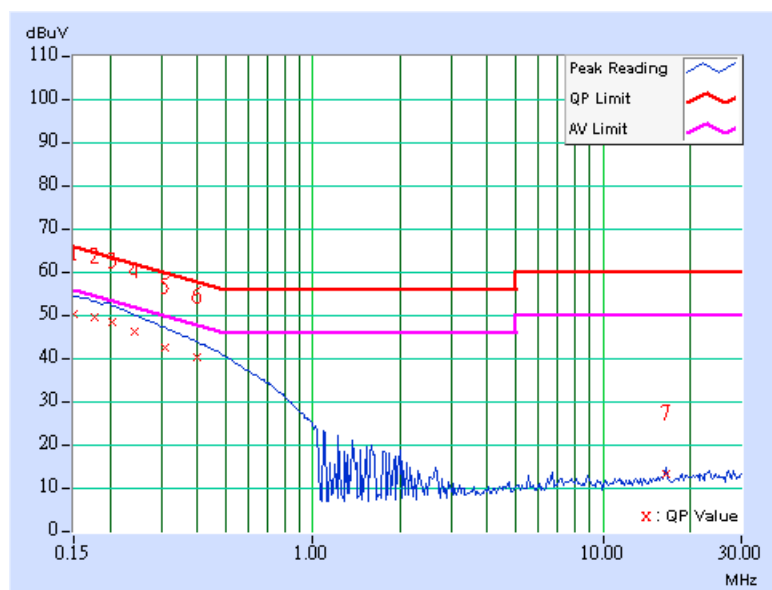




<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 2
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	49.77	-	49.87	-	66.00	56.00	-16.13	-
2	0.177	0.10	49.05	-	49.15	-	64.61	54.61	-15.46	-
3	0.205	0.10	47.92	-	48.02	-	63.42	53.42	-15.40	-
4	0.244	0.10	45.63	-	45.73	-	61.97	51.97	-16.24	-
5	0.310	0.10	41.97	-	42.07	-	59.97	49.97	-17.89	-
6	0.400	0.11	39.71	-	39.82	-	57.85	47.85	-18.04	-
7	16.441	0.53	12.73	-	13.26	-	60.00	50.00	-46.74	-

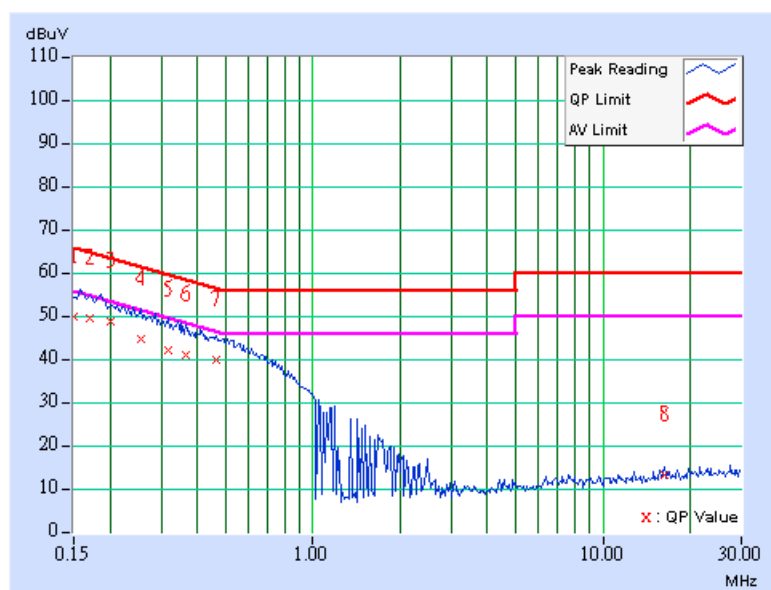
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 1
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	49.44	-	49.54	-	66.00	56.00	-16.46	-
2	0.170	0.10	48.88	-	48.98	-	64.98	54.98	-16.00	-
3	0.201	0.11	48.26	-	48.37	-	63.58	53.58	-15.21	-
4	0.255	0.11	44.20	-	44.31	-	61.58	51.58	-17.27	-
5	0.318	0.11	41.42	-	41.53	-	59.76	49.76	-18.23	-
6	0.365	0.12	40.26	-	40.38	-	58.62	48.62	-18.24	-
7	0.466	0.12	39.11	-	39.23	-	56.58	46.58	-17.35	-
8	16.293	0.71	12.72	-	13.43	-	60.00	50.00	-46.57	-

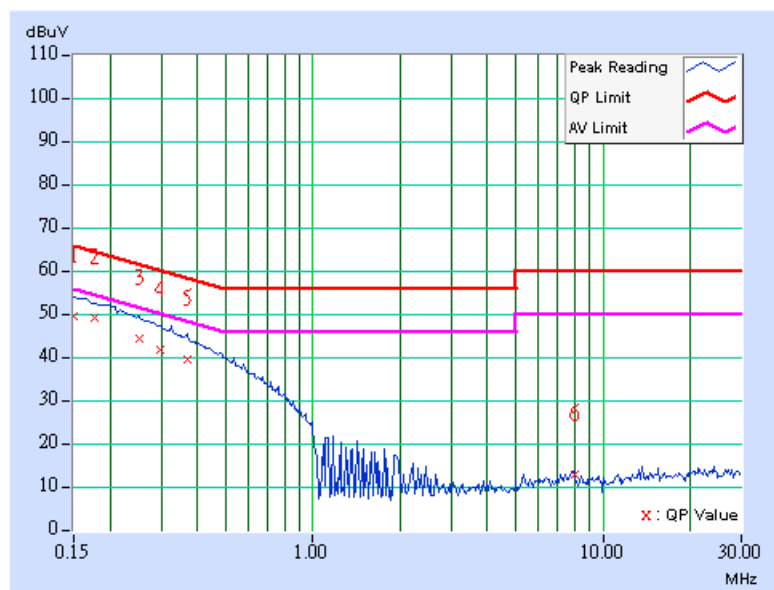
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
3. The emission levels of other frequencies were very low against the limit.  
4. Margin value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



<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 2
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	49.08	-	49.18	-	66.00	56.00	-16.82	-
2	0.177	0.10	48.77	-	48.87	-	64.61	54.61	-15.74	-
3	0.252	0.10	44.12	-	44.22	-	61.71	51.71	-17.48	-
4	0.298	0.10	41.53	-	41.63	-	60.29	50.29	-18.65	-
5	0.369	0.11	39.32	-	39.43	-	58.53	48.53	-19.10	-
6	7.965	0.38	12.61	-	12.99	-	60.00	50.00	-47.01	-

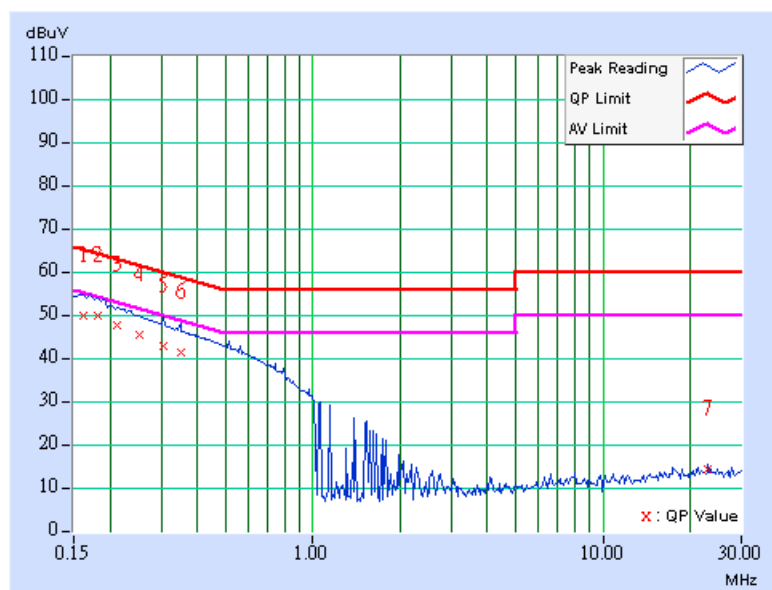
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 1
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	0.162	0.10	49.11	-	49.21	-	65.38	55.38	-16.16	-
2	0.181	0.11	48.99	-	49.10	-	64.43	54.43	-15.33	-
3	0.213	0.11	46.77	-	46.88	-	63.11	53.11	-16.23	-
4	0.252	0.11	44.42	-	44.53	-	61.71	51.71	-17.17	-
5	0.306	0.11	41.75	-	41.86	-	60.07	50.07	-18.21	-
6	0.349	0.11	40.58	-	40.69	-	58.98	48.98	-18.29	-
7	23.020	1.04	13.44	-	14.48	-	60.00	50.00	-45.52	-

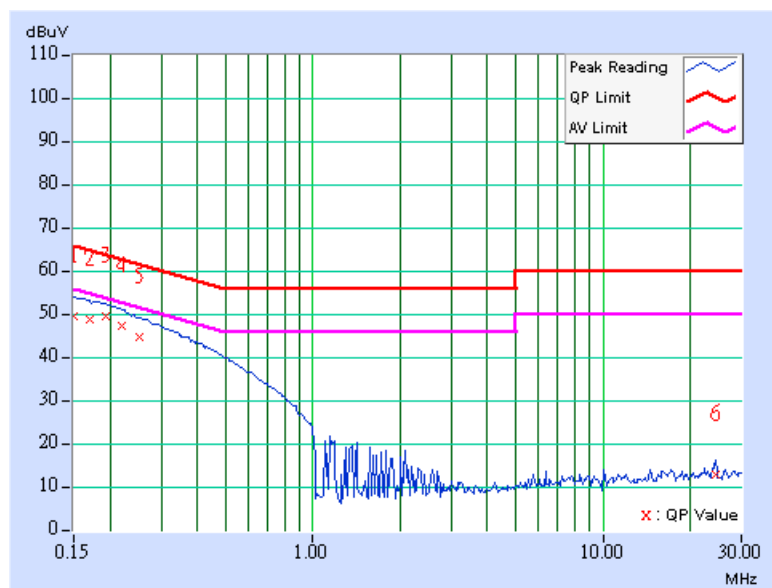
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60 Hz
<b>MODULATION TYPE</b>	MSK	<b>PHASE</b>	Line 2
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 73% RH, 991 hPa	<b>6dB BANDWIDTH</b>	9 kHz
<b>TESTED BY</b>	Scott Yang		

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	49.10	-	49.20	-	66.00	56.00	-16.80	-
2	0.170	0.10	48.44	-	48.54	-	64.98	54.98	-16.45	-
<b>3</b>	<b>0.193</b>	<b>0.10</b>	<b>48.94</b>	-	<b>49.04</b>	-	<b>63.91</b>	<b>53.91</b>	<b>-14.87</b>	-
4	0.220	0.10	46.96	-	47.06	-	62.81	52.81	-15.75	-
5	0.252	0.10	44.18	-	44.28	-	61.71	51.71	-17.42	-
6	24.410	0.61	12.25	-	12.86	-	60.00	50.00	-47.14	-

- 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.



## 4.2 NUMBER OF HOPPING FREQUENCY USED

### 4.2.1 LIMIT OF HOPPING FREQUENCY USED

The system shall use at least 50 hopping frequencies.

### 4.2.2 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.



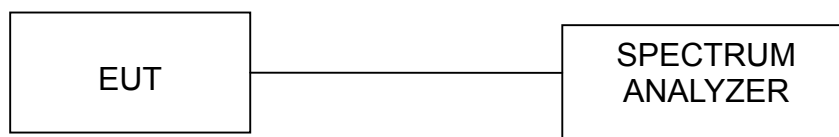
#### 4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

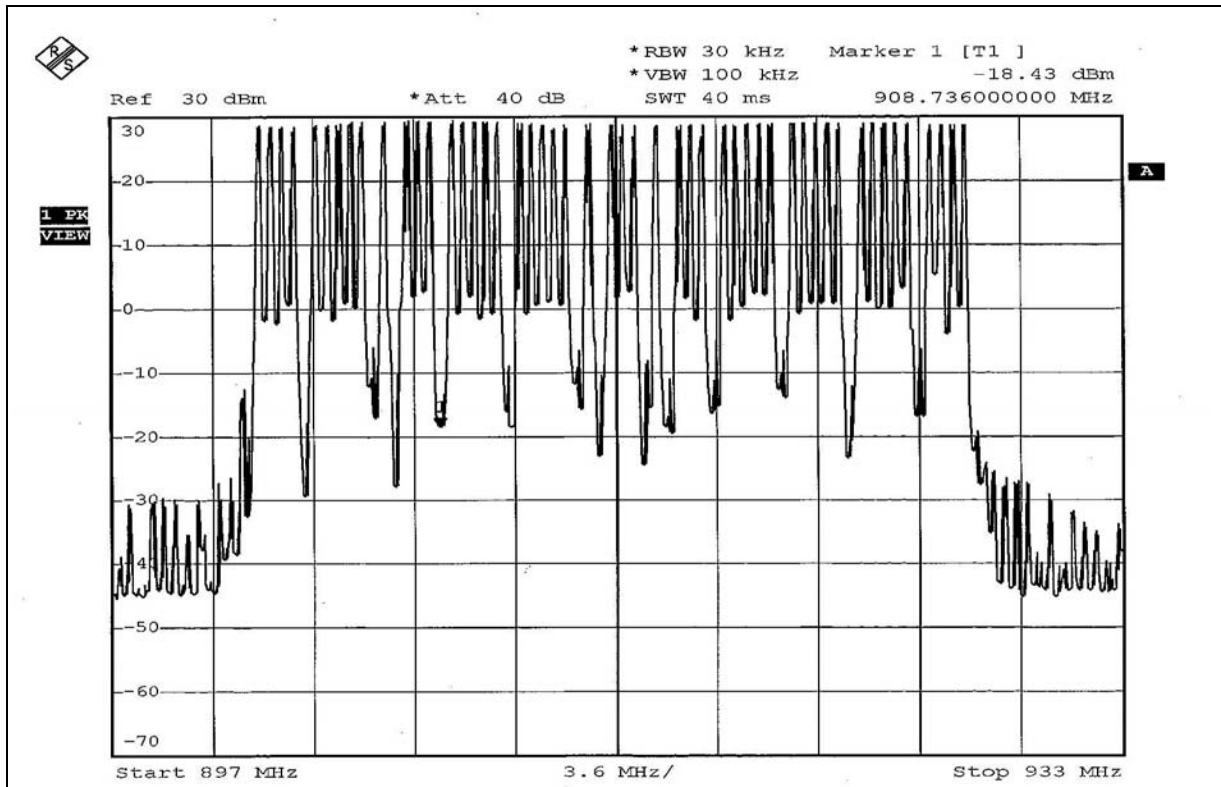
#### 4.2.5 TEST SETUP



#### 4.2.6 TEST RESULTS

There are 50 hopping frequencies in the hopping mode. Please refer to following page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.







### 4.3 DWELL TIME ON EACH CHANNEL

#### 4.3.1 LIMIT OF DWELL TIME USED

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

#### 4.3.2 TEST INSTRUMENTS

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

**NOTES:**

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

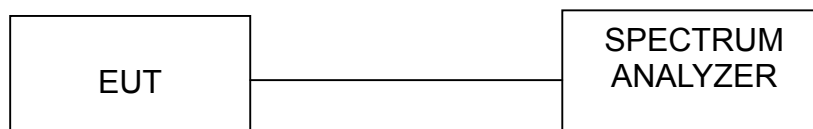
#### 4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

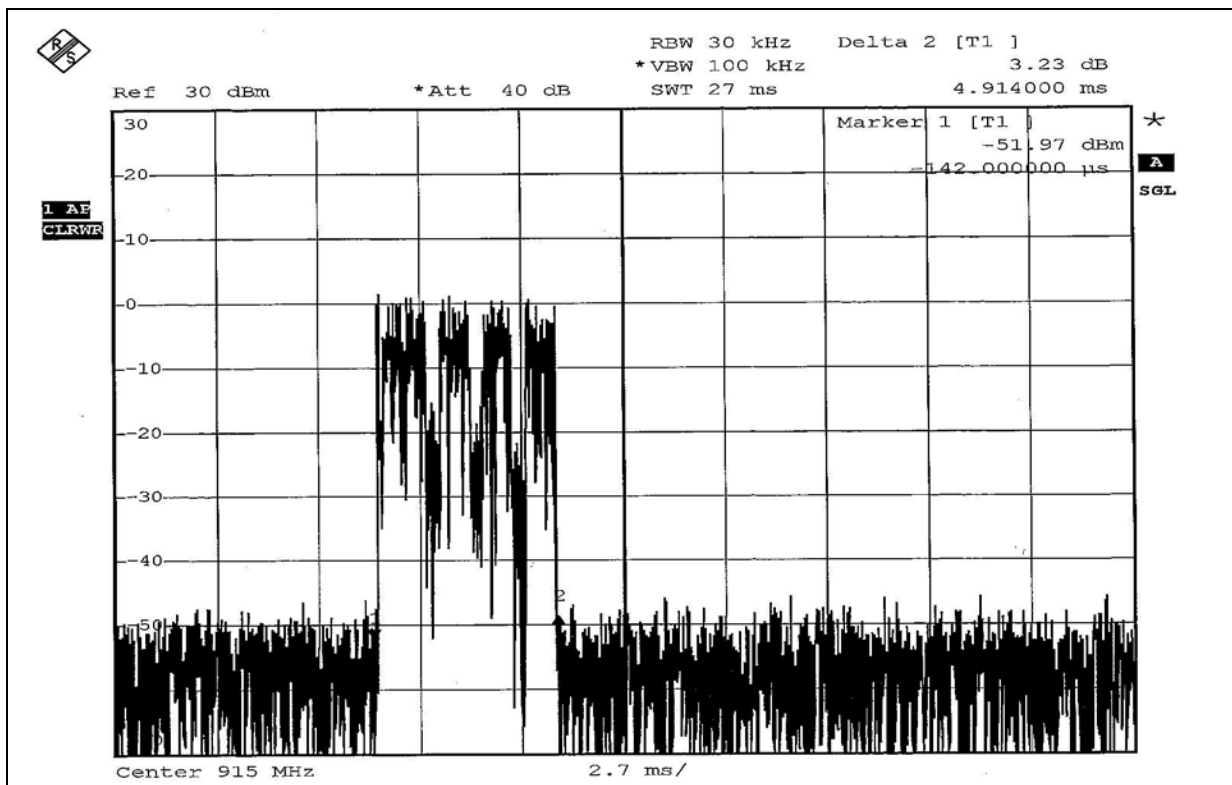
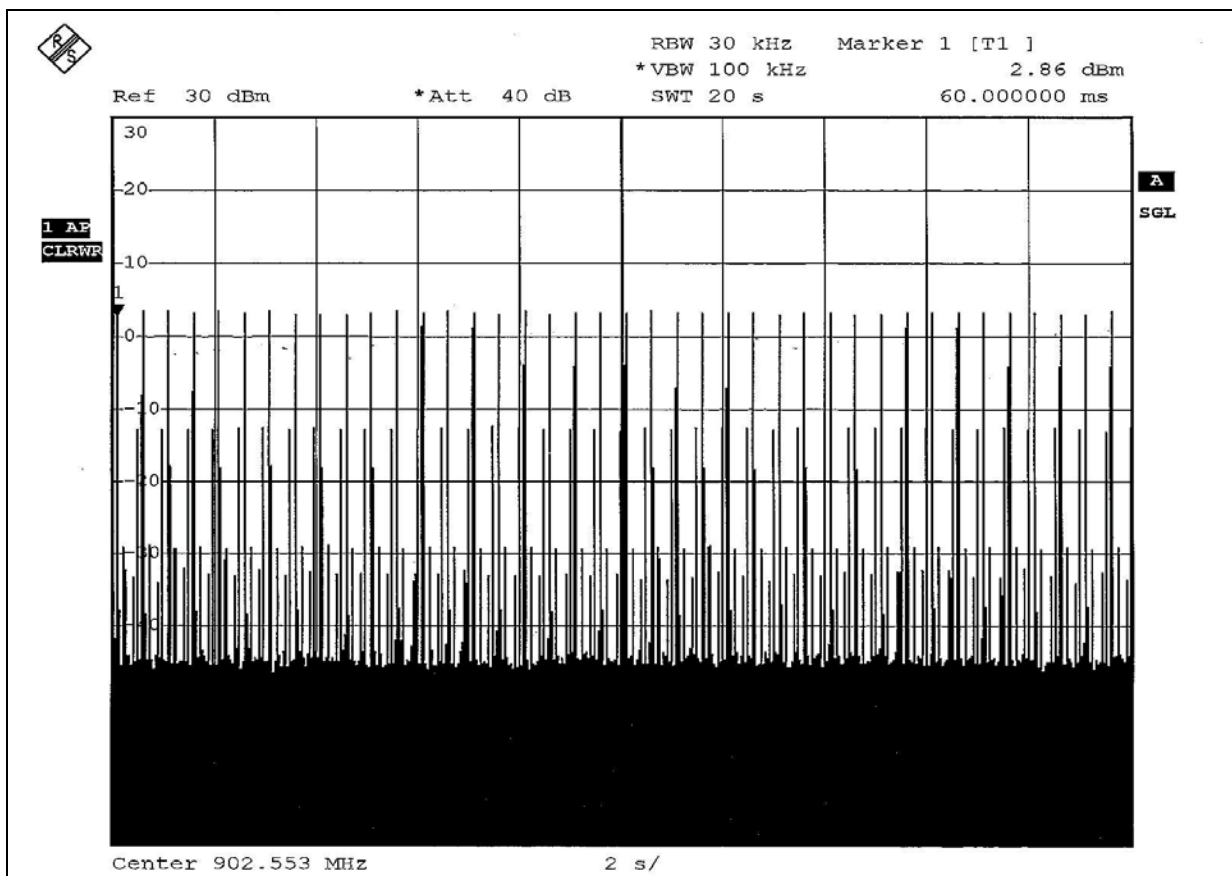
#### 4.3.5 TEST SETUP



## 4.3.6 TEST RESULTS

Number of transmission in a 20 (50Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
40 (times / 20 sec)	4.914	196.56	400

Test plots of the transmitting time slot are shown on the following 1 page.



#### 4.4 CHANNEL BANDWIDTH

##### 4.4.1 LIMITS OF CHANNEL BANDWIDTH

The maximum allowed 20dB bandwidth of the hopping channel is 500kHz.

##### 4.4.2 TEST INSTRUMENTS

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

NOTES:

- 1.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 PROCEDURE

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. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITION

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

## 4.4.7 TEST RESULTS

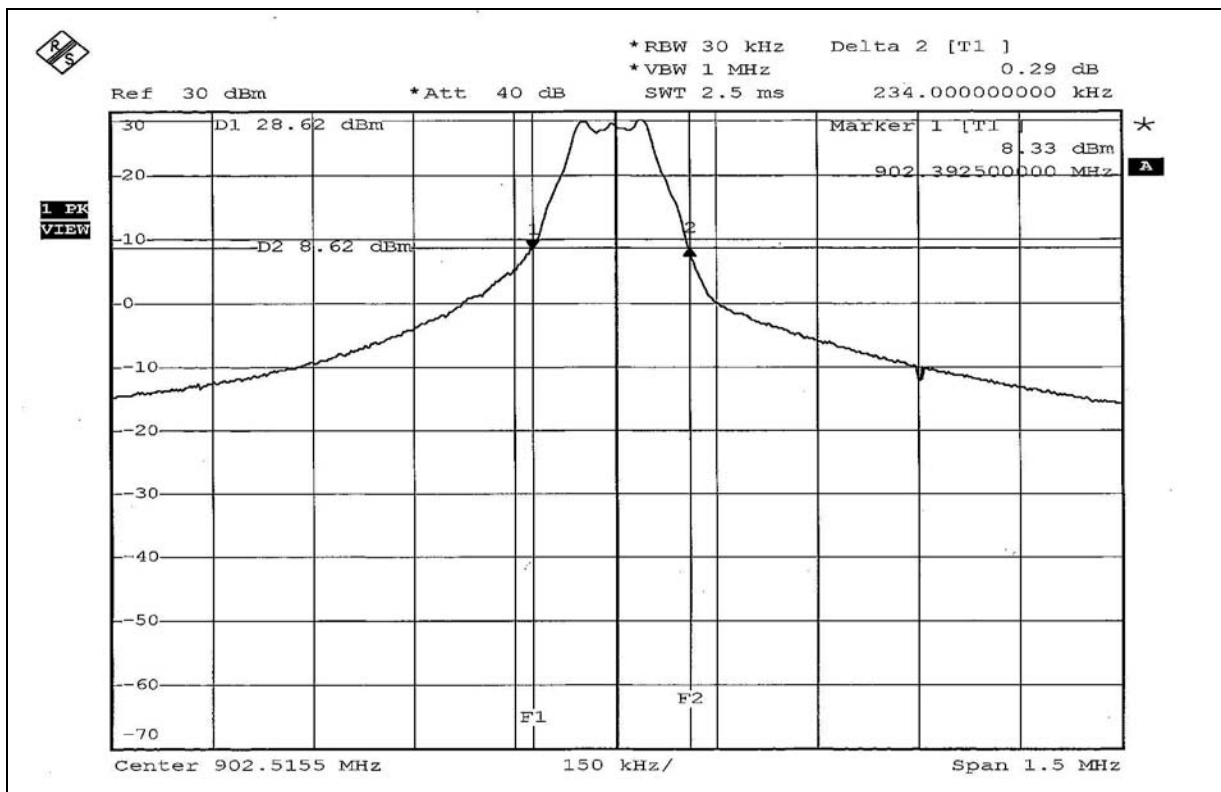
<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	MSK
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 62%RH, 991 hPa	<b>TESTED BY</b>	Long Chen

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>20dB BANDWIDTH (kHz)</b>	<b>MAXIMUM LIMIT (kHz)</b>	<b>PASS/FAIL</b>
1	902.5155	234.00	250	PASS
25	915.8654	237.00	250	PASS
50	927.5972	237.00	250	PASS

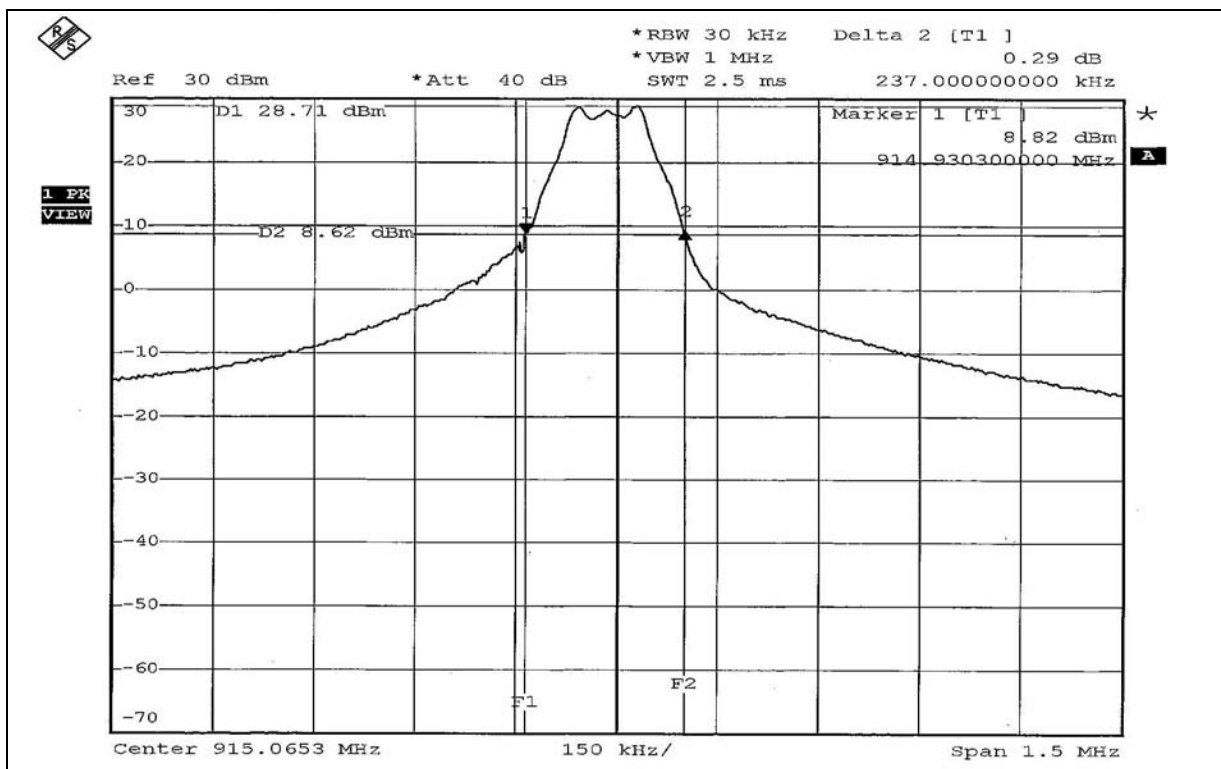
**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.



## Channel 1



## Channel 25



\*RBW 30 kHz Delta 2 [T1 ]  
 \*VBW 1 MHz 0.27 dB  
 Ref 30 dBm \*Att 40 dB SWT 2.5 ms 237.00000000 kHz

D1 28.59 dBm  
 D2 8.59 dBm  
 Marker 1 [T1]  
 8.93 dBm  
 927.471200000 MHz

F1 F2  
 Center 927.5972 MHz 150 kHz/ Span 1.5 MHz



## 4.5 HOPPING CHANNEL SEPARATION

### 4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25kHz or 20dB bandwidth (whichever is greater).

### 4.5.2 TEST INSTRUMENTS

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

#### NOTES:

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

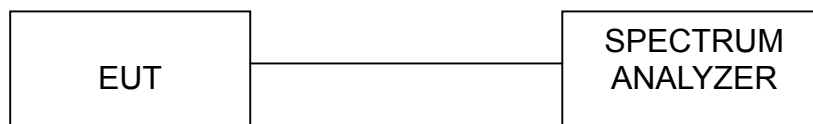
#### 4.5.3 TEST PROCEDURES

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.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP

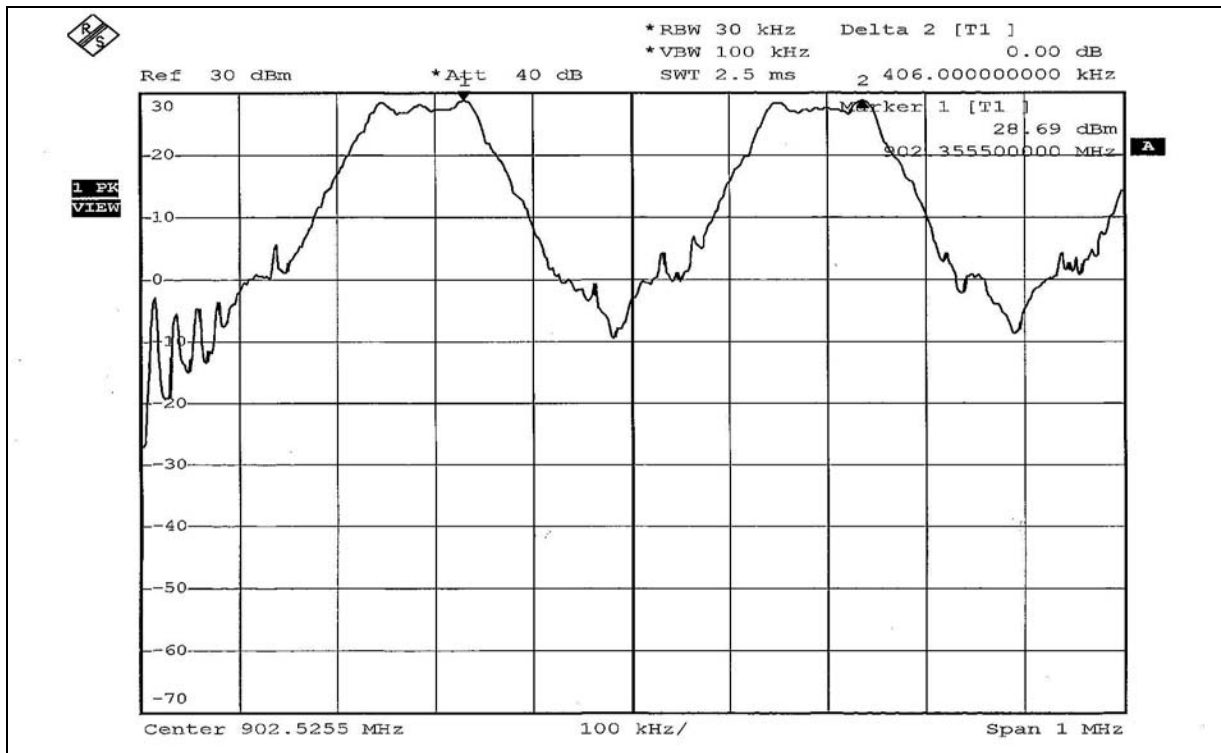


## 4.5.6 TEST RESULTS

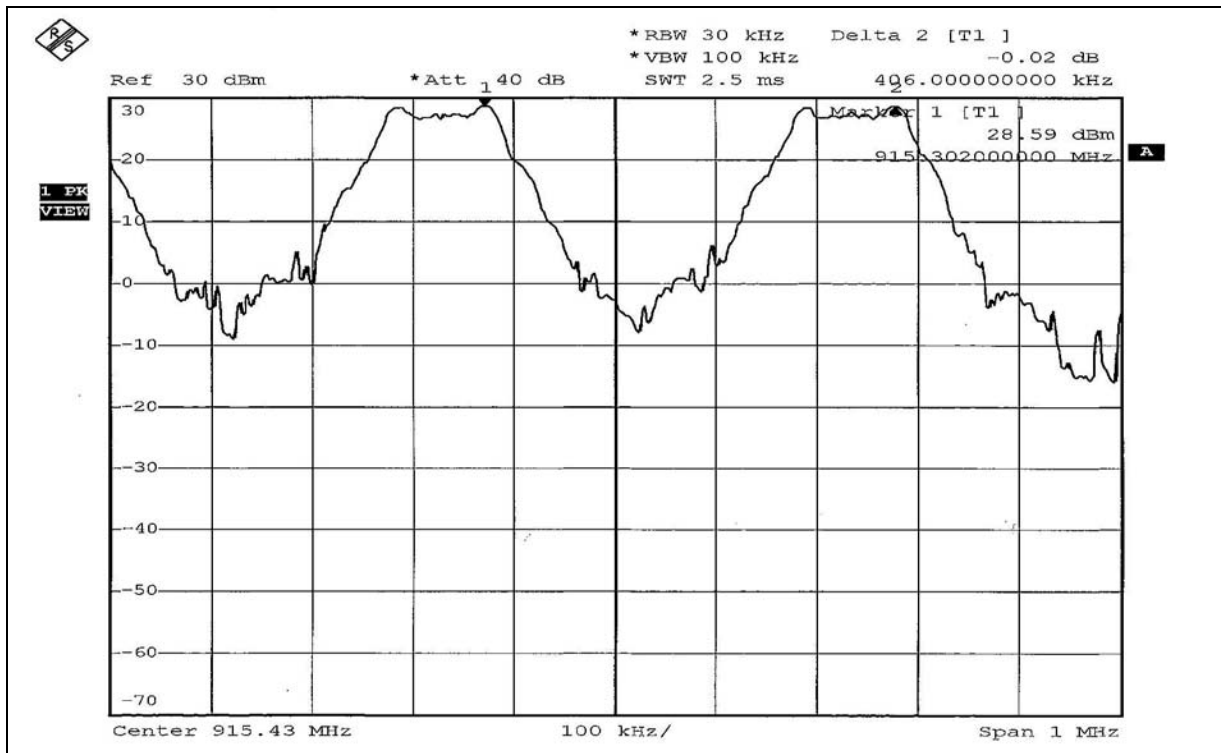
<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	MSK
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 62%RH, 991 hPa	<b>TESTED BY</b>	Long Chen

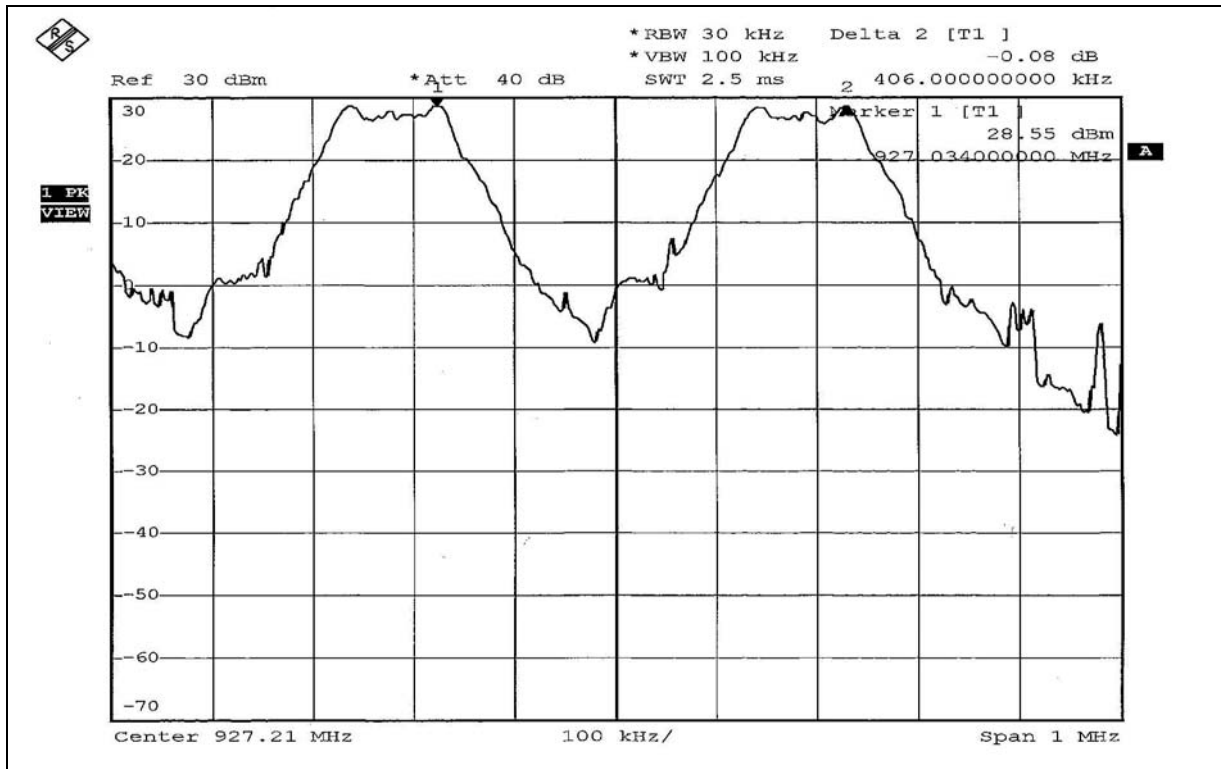
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Adjacent Channel Separation (kHz)</b>	<b>Minimum Limit (kHz)</b>	<b>Pass / Fail</b>
1	902.5155	406.00	234.00	PASS
25	915.8654	406.00	237.00	PASS
50	927.5972	406.00	237.00	PASS

## Channel 1



## Channel 25



**Channel 50**



#### 4.6 MAXIMUM PEAK OUTPUT POWER

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

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYSEER	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.





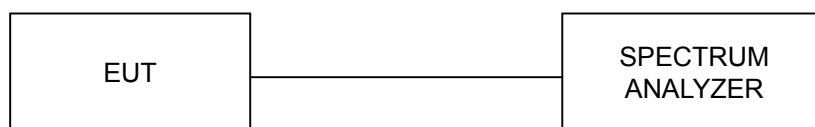
#### 4.6.3 TEST PROCEDURES

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 3 MHz RBW and 3 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

#### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



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

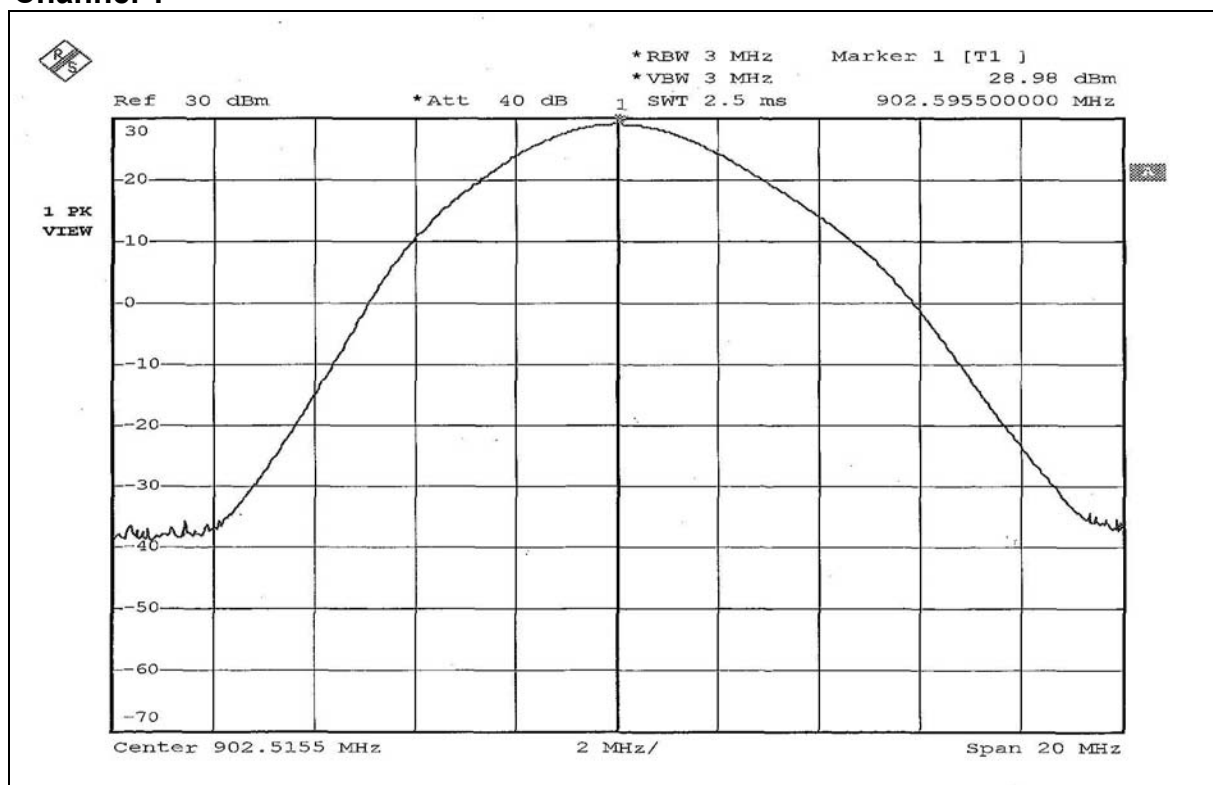
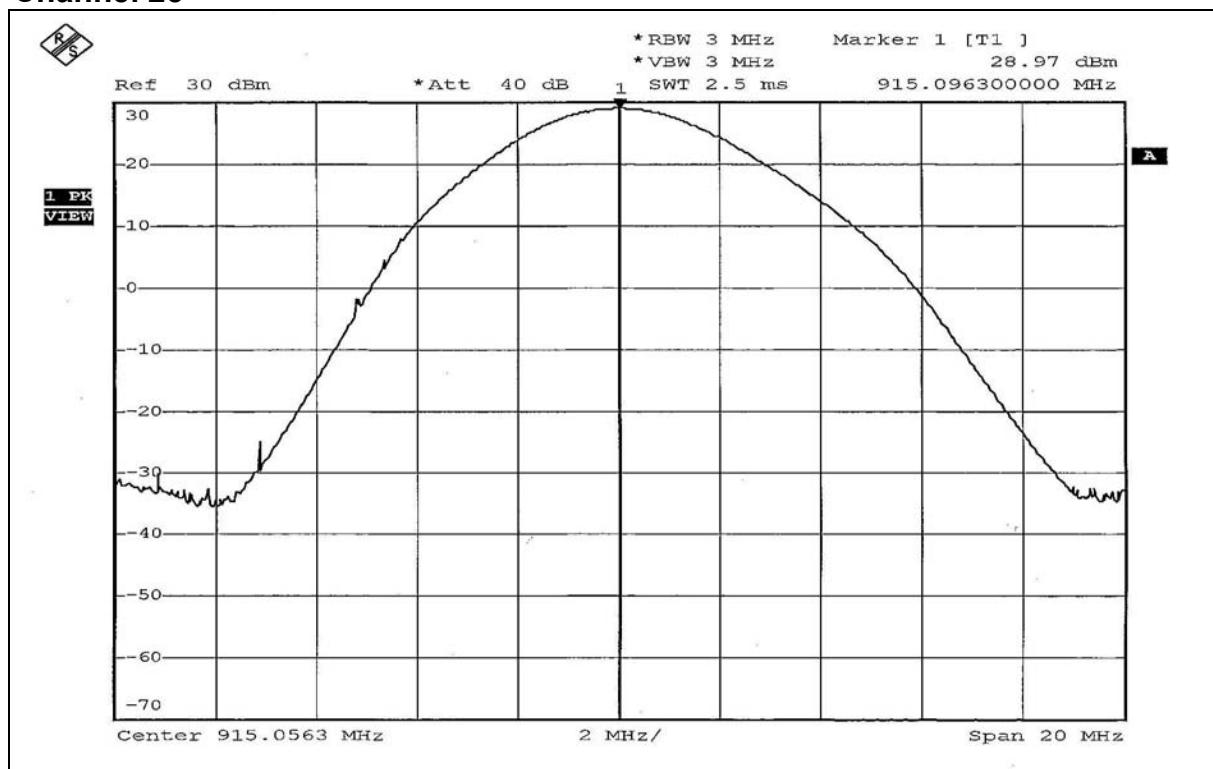
#### 4.6.6 EUT OPERATING CONDITION

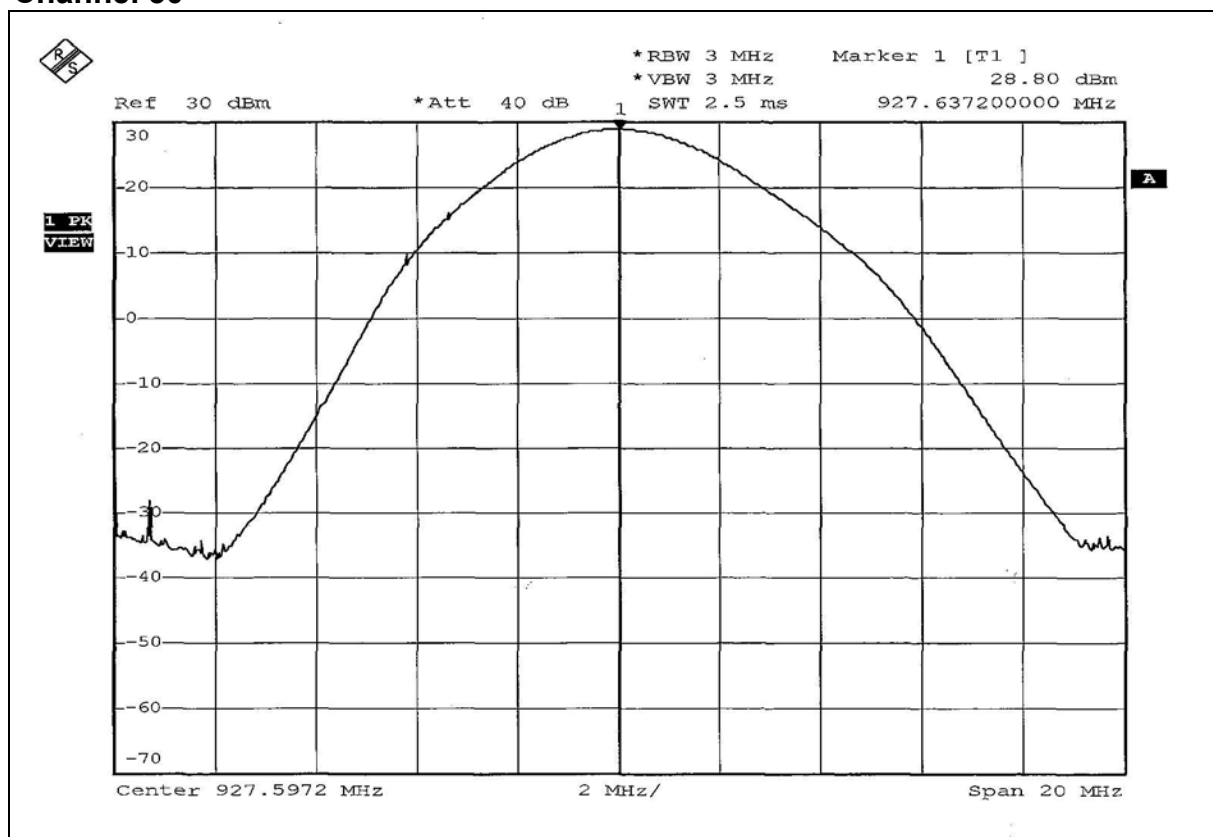
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.6.7 TEST RESULTS

<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>MODULATION TYPE</b>	MSK
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 62%RH, 991 hPa	<b>TESTED BY</b>	Long Chen

<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>
1	902.5155	790.679	28.98	30	PASS
25	915.8654	788.860	28.97	30	PASS
50	927.5972	758.578	28.80	30	PASS

**Channel 1****Channel 25**

**Channel 50**

## 4.7 RADIATED EMISSION MEASUREMENT

### 4.7.1 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.

## 4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 08, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jun. 03, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2005
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC4924-3.

#### 4.7.3 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:**

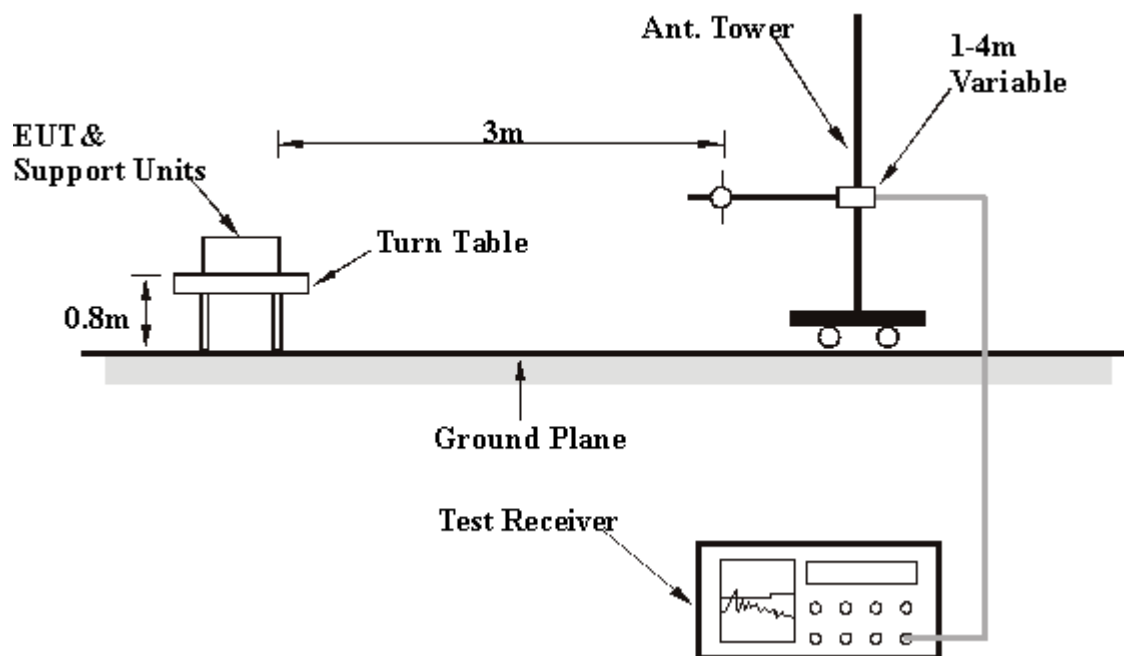
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above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

#### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation



#### 4.7.5 TEST SETUP



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

#### 4.7.6 EUT OPERATING CONDITIONS

Same as 4.1.6

## 4.7.7 TEST RESULTS

## Below 1GHz Worst-Case Data

<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 65% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Long Chen		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	414.89	56.07 QP	98.09	-42.02	2.00 H	322	39.06	17.02
2	488.76	54.14 QP	98.09	-43.95	1.50 H	304	35.70	18.43
3	659.82	36.44 QP	98.09	-61.65	1.00 H	304	14.72	21.72
4	887.25	49.64 QP	98.09	-48.45	1.00 H	148	24.78	24.85
5	935.85	38.41 QP	98.09	-59.68	1.50 H	187	12.94	25.47
6	976.67	38.19 QP	98.09	-59.90	1.50 H	208	12.54	25.64

**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	414.89	53.54 QP	106.07	-52.53	1.00 V	343	35.88	17.66
2	488.76	51.60 QP	106.07	-54.47	1.00 V	94	32.47	19.13
3	688.98	37.69 QP	106.07	-68.38	1.25 V	310	14.89	22.80
4	887.25	59.14 QP	106.07	-46.93	1.00 V	16	33.47	25.67
5	935.85	45.76 QP	106.07	-60.31	1.00 V	253	19.44	26.32
6	976.67	43.64 QP	106.07	-62.43	1.25 V	52	17.02	26.62

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 65% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	243.83	37.91 QP	85.85	-47.94	1.00 H	334	24.34	13.57
2	426.55	53.82 QP	85.85	-32.03	2.00 H	310	35.83	17.99
3	488.76	51.36 QP	85.85	-34.49	1.75 H	298	32.23	19.13
4	688.98	36.04 QP	85.85	-49.81	1.00 H	346	13.24	22.80
5	898.92	57.88 QP	85.85	-27.97	1.00 H	169	32.00	25.88
6	931.96	58.69 QP	85.85	-27.16	1.50 H	193	32.41	26.28

#### 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	426.55	51.26 QP	106.79	-55.53	1.00 V	340	33.27	17.99
2	488.76	49.53 QP	106.79	-57.26	1.00 V	82	30.39	19.13
3	885.31	34.18 QP	106.79	-72.61	1.75 V	136	8.54	25.64
4	898.92	67.38 QP	106.79	-39.41	1.00 V	265	41.49	25.88
5	931.96	65.70 QP	106.79	-41.09	1.50 V	58	39.42	26.28
6	949.46	35.68 QP	106.79	-71.11	1.00 V	253	9.20	26.48

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 65% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	243.83	37.95 QP	100.09	-62.14	1.00 H	322	24.38	13.57
2	440.16	47.76 QP	100.09	-52.33	2.00 H	10	29.40	18.37
3	488.76	46.90 QP	100.09	-53.19	1.75 H	295	27.76	19.13
4	685.09	31.34 QP	100.09	-68.75	1.00 H	340	8.60	22.74
5	939.74	48.56 QP	100.09	-51.53	1.50 H	190	22.20	26.37
6	945.57	53.53 QP	100.09	-46.56	1.50 H	190	27.10	26.43

#### 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	294.37	32.03 QP	106.90	-74.87	2.00 V	208	17.11	14.93
2	440.16	45.81 QP	106.90	-61.09	1.00 V	337	27.44	18.37
3	486.81	43.71 QP	106.90	-63.17	1.00 V	100	24.60	19.11
4	896.97	39.03 QP	106.90	-67.87	1.00 V	43	13.18	25.85
5	939.74	54.48 QP	106.90	-52.42	1.00 V	262	28.11	26.37
6	945.57	59.90 QP	106.90	-47.00	1.25 V	67	33.46	26.43

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*902.55	118.09 PK			1.54 H	343	92.16	25.93
1	*902.55	104.11 AV			1.54 H	343	78.18	25.93

#### 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	*902.55	126.07 PK			1.12 V	34	100.14	25.93
1	*902.55	112.09 AV			1.12 V	34	86.16	25.93

#### 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*915.09	119.83 PK			1.64 H	347	79.77	26.08
1	*915.09	105.85 AV			1.64 H	347	93.75	26.08

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*915.09	126.79 PK			1.17 V	33	100.71	26.08
1	*915.09	112.81 AV			1.17 V	33	86.73	26.08

#### MARKS:

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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.55	120.09 PK			1.64 H	345	93.86	26.22
1	*927.55	106.11 AV			1.64 H	345	79.89	26.22

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.55	126.90 PK			1.10 V	356	100.67	26.22
1	*927.55	112.92 AV			1.10 V	356	86.70	26.22

#### 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 58% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<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	1805.00	51.40 PK	74.00	-22.60	1.00 H	65	21.55	29.85
1	1805.00	37.60 AV	54.00	-16.40	1.00 H	65	7.75	29.85
2	2707.50	44.38 PK	74.00	-29.62	1.20 H	115	11.48	32.90
3	3610.00	51.25 PK	74.00	-22.75	1.28 H	167	16.63	34.62
3	3610.00	37.45 AV	54.00	-16.55	1.28 H	167	2.83	34.62
4	4512.50	47.78 PK	74.00	-26.22	1.35 H	252	10.94	36.84
4	4512.50	33.98 AV	54.00	-20.02	1.35 H	252	-2.86	36.84
5	5415.00	50.60 PK	74.00	-23.40	1.00 H	20	11.53	39.07
5	5415.00	36.80 AV	54.00	-17.20	1.00 H	20	-2.27	39.07
6	6317.50	52.80 PK	74.00	-21.20	1.16 H	80	11.41	41.39
6	6317.50	39.00 AV	54.00	-15.00	1.16 H	80	-2.39	41.39

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 1	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 58% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Brad Wu		

<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	1805.00	55.24 PK	74.00	-18.76	1.53 V	206	25.39	29.85
<b>1</b>	<b>1805.00</b>	<b>41.45 AV</b>	<b>54.00</b>	<b>-12.55</b>	<b>1.53 V</b>	<b>206</b>	<b>11.59</b>	<b>29.85</b>
2	2707.50	45.19 PK	74.00	-28.81	1.53 V	0	12.29	32.90
3	3610.00	50.91 PK	74.00	-23.09	1.00 V	0	16.29	34.62
3	3610.00	37.11 AV	54.00	-16.89	1.00 V	0	2.49	34.62
4	4512.50	49.17 PK	74.00	-24.83	1.06 V	120	12.33	36.84
4	4512.50	35.37 AV	54.00	-18.63	1.06 V	120	-1.47	36.84
5	5415.00	49.62 PK	74.00	-24.38	1.12 V	203	10.55	39.07
5	5415.00	35.82 AV	54.00	-18.18	1.12 V	203	-3.25	39.07
6	6317.50	53.91 PK	74.00	-20.09	1.03 V	100	12.52	41.39
6	6317.50	40.11 AV	54.00	-13.89	1.03 V	100	-1.28	41.39

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 58% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<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	1830.00	52.33 PK	74.00	-21.67	1.00 H	326	22.42	29.91
1	1830.00	38.53 AV	54.00	-15.47	1.00 H	326	8.62	29.91
2	2745.00	45.51 PK	74.00	-28.49	1.08 H	215	12.51	33.00
2	2745.00	31.71 AV	54.00	-22.29	1.08 H	215	-1.29	33.00
3	3660.00	110.08 PK	74.00	36.08	1.00 H	201	75.33	34.75
3	3660.00	37.44 AV	54.00	-16.56	1.00 H	201	2.69	34.75
4	4575.00	48.79 PK	74.00	-25.21	1.12 H	201	11.75	37.04
4	4575.00	34.99 AV	54.00	-19.01	1.12 H	201	-2.05	37.04
5	5490.00	50.11 PK	74.00	-23.89	1.09 H	146	10.92	39.19
5	5490.00	36.31 AV	54.00	-17.69	1.09 H	146	-2.88	39.19
6	6405.00	52.68 PK	74.00	-21.32	1.21 H	205	10.83	41.85
6	6405.00	38.88 AV	54.00	-15.12	1.21 H	205	-2.97	41.85

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 25	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 58% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Brad Wu		

#### 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	1830.00	53.68 PK	74.00	-20.32	1.11 V	220	23.77	29.91
1	1830.00	39.88 AV	54.00	-14.12	1.11 V	220	9.97	29.91
2	2745.00	46.27 PK	74.00	-27.73	1.09 V	25	13.27	33.00
2	2745.00	32.47 AV	54.00	-21.53	1.09 V	25	-0.53	33.00
3	3660.00	49.92 PK	74.00	-24.08	1.14 V	350	15.17	34.75
3	3660.00	36.12 AV	54.00	-17.88	1.14 V	350	1.37	34.75
4	4575.00	48.84 PK	74.00	-25.16	1.25 V	8	11.80	37.04
4	4575.00	35.04 AV	54.00	-18.96	1.25 V	8	-2.00	37.04
5	5490.00	51.02 PK	74.00	-22.98	1.02 V	112	11.83	39.19
5	5490.00	37.22 AV	54.00	-16.78	1.02 V	112	-1.97	39.19
6	6405.00	53.20 PK	74.00	-20.80	1.06 V	119	11.35	41.85
6	6405.00	39.40 AV	54.00	-14.60	1.06 V	119	-2.45	41.85

- 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>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Long Chen		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1885.00	50.68 PK	74.00	-23.32	1.55 H	7	20.18	30.49
1	1885.00	36.70 AV	54.00	-17.30	1.55 H	7	6.20	30.49
2	2782.79	46.58 PK	74.00	-27.42	1.25 H	142	12.90	33.68
2	2782.79	32.60 AV	54.00	-21.40	1.25 H	142	-1.08	33.68
3	3709.97	51.79 PK	74.00	-22.21	1.37 H	202	16.32	35.47
3	3709.97	37.81 AV	54.00	-16.19	1.37 H	202	2.34	35.47
4	4638.12	49.66 PK	74.00	-24.34	1.11 H	214	11.80	37.87
4	4638.12	35.68 AV	54.00	-18.32	1.11 H	214	-2.18	37.87
5	5564.09	49.47 PK	74.00	-24.53	1.06 H	57	9.95	39.52
5	5564.09	35.49 AV	54.00	-18.51	1.06 H	57	-4.03	39.52
6	6492.85	50.62 PK	74.00	-23.38	1.17 H	320	8.34	42.28
6	6492.85	36.64 AV	54.00	-17.36	1.17 H	320	-5.64	42.28

- 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.

<b>EUT</b>	Digital 4-line cordless phone system	<b>MODEL</b>	SP-922
<b>CHANNEL</b>	Channel 50	<b>MODULATION TYPE</b>	MSK
<b>INPUT POWER (SYSTEM)</b>	120 Vac, 60Hz	<b>FREQUENCY RANGE</b>	1~25 GHz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Peak (PK) Average (AV)
<b>TESTED BY</b>	Long Chen		

#### 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	1855.10	51.88 PK	74.00	-22.12	1.52 V	258	21.47	30.42
1	1855.10	37.90 AV	54.00	-16.10	1.52 V	258	7.48	30.42
2	2782.65	47.57 PK	74.00	-26.43	1.25 V	195	13.89	33.68
3	3710.20	54.29 PK	74.00	-19.71	1.09 V	179	18.82	35.47
3	3710.20	40.31 AV	54.00	-13.69	1.09 V	179	4.84	35.47
4	4637.75	49.57 PK	74.00	-24.43	1.11 V	158	11.71	37.87
4	4637.75	35.59 AV	54.00	-18.41	1.11 V	158	-2.27	37.87
5	5565.30	49.08 PK	74.00	-24.92	1.14 V	69	9.56	39.52
5	5565.30	35.10 AV	54.00	-18.90	1.14 V	69	-4.42	39.52
6	6492.85	52.74 PK	74.00	-21.26	1.05 V	277	10.46	42.28
6	6492.85	38.76 AV	54.00	-15.24	1.05 V	277	-3.52	42.28

- 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.

## 4.8 BAND EDGES MEASUREMENT

### 4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RBW).

### 4.8.2 TEST INSTRUMENTS

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

#### NOTES:

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

### 4.8.3 TEST PROCEDURE

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

### 4.8.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.8.5 EUT OPERATING CONDITION

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

#### 4.8.6 TEST RESULTS

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

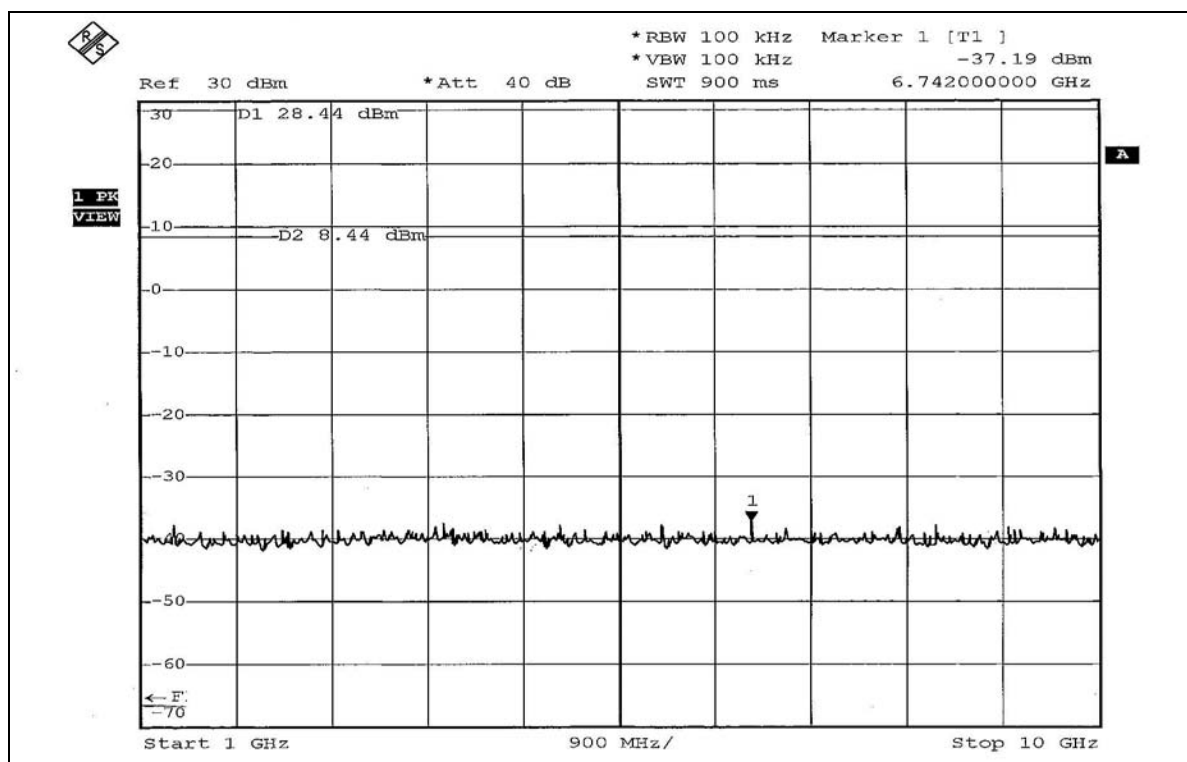
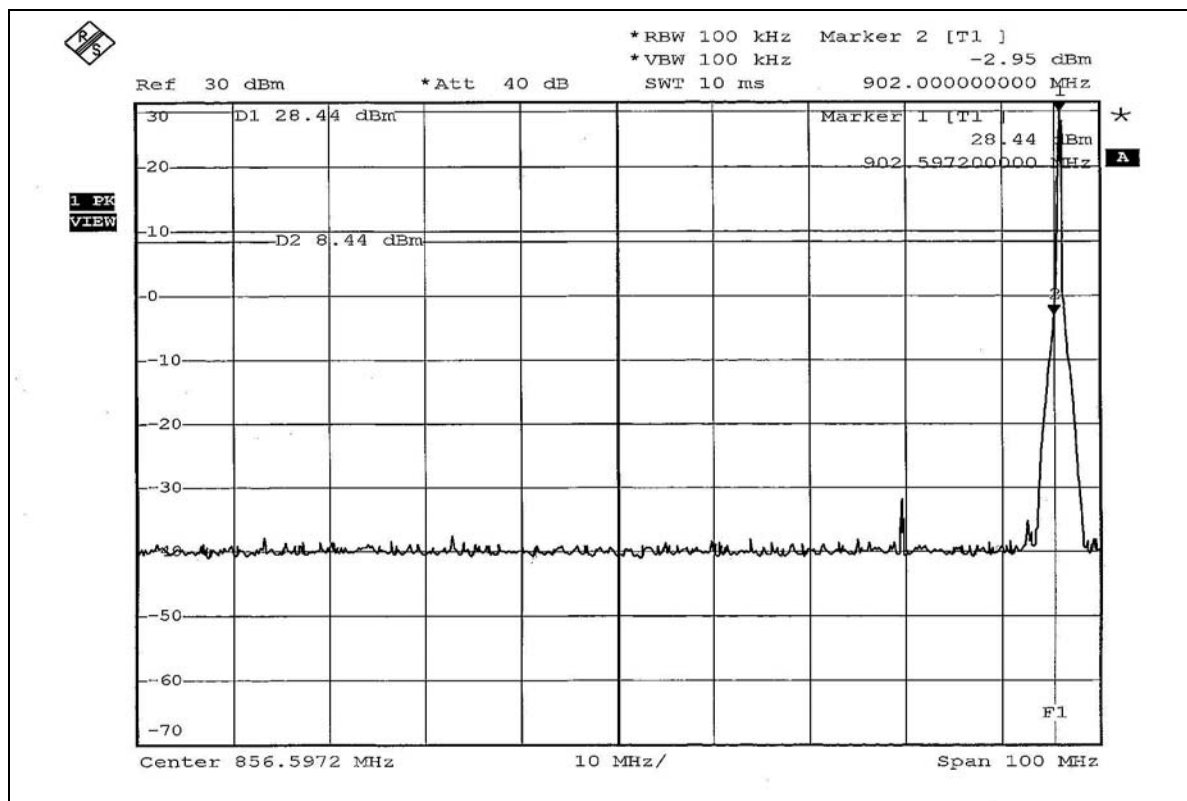
#### MSK modulation

**NOTE 1:** The band edge emission plot on page 64 show 31.39dBc delta between carrier maximum power and local maximum emission in band edge (902.5972GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.7.7 is 126.07dBuV/m (Peak), so the maximum field strength in restrict band is  $126.07 - 31.39 = 94.68$ dBuV/m which is under the 20dB of Fundamental frequency.

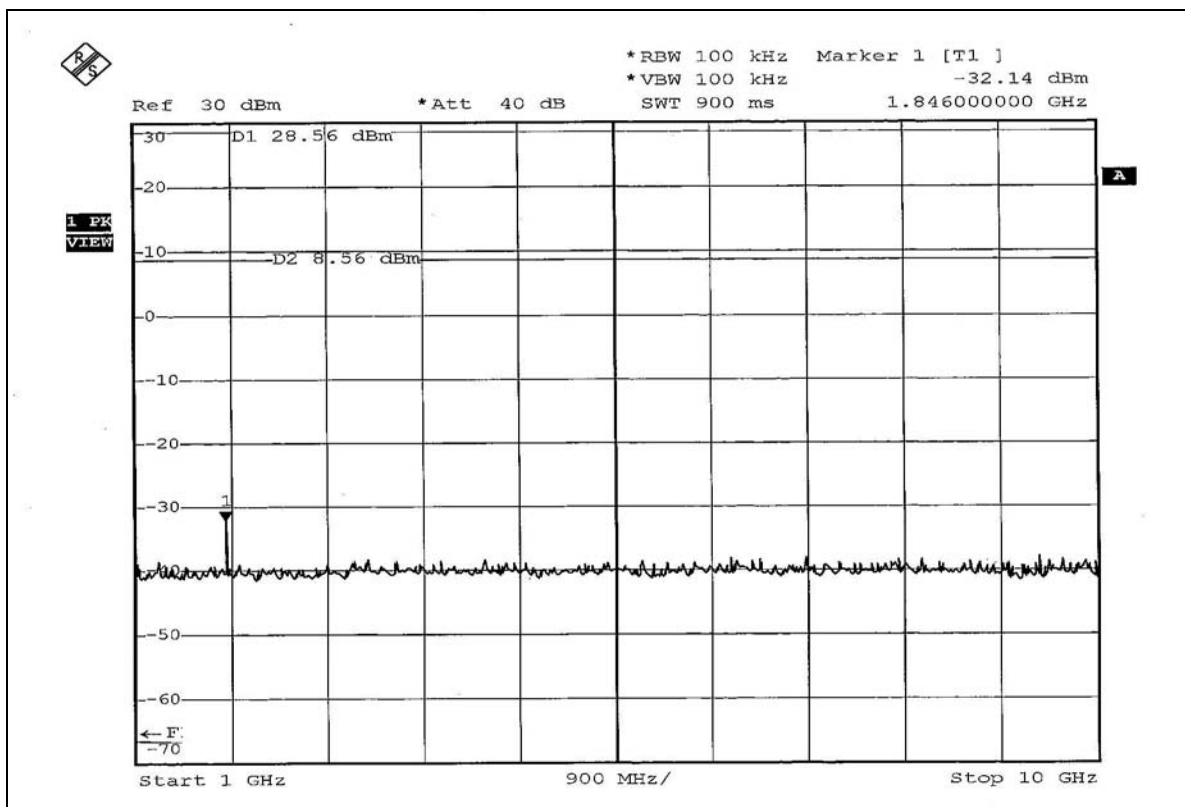
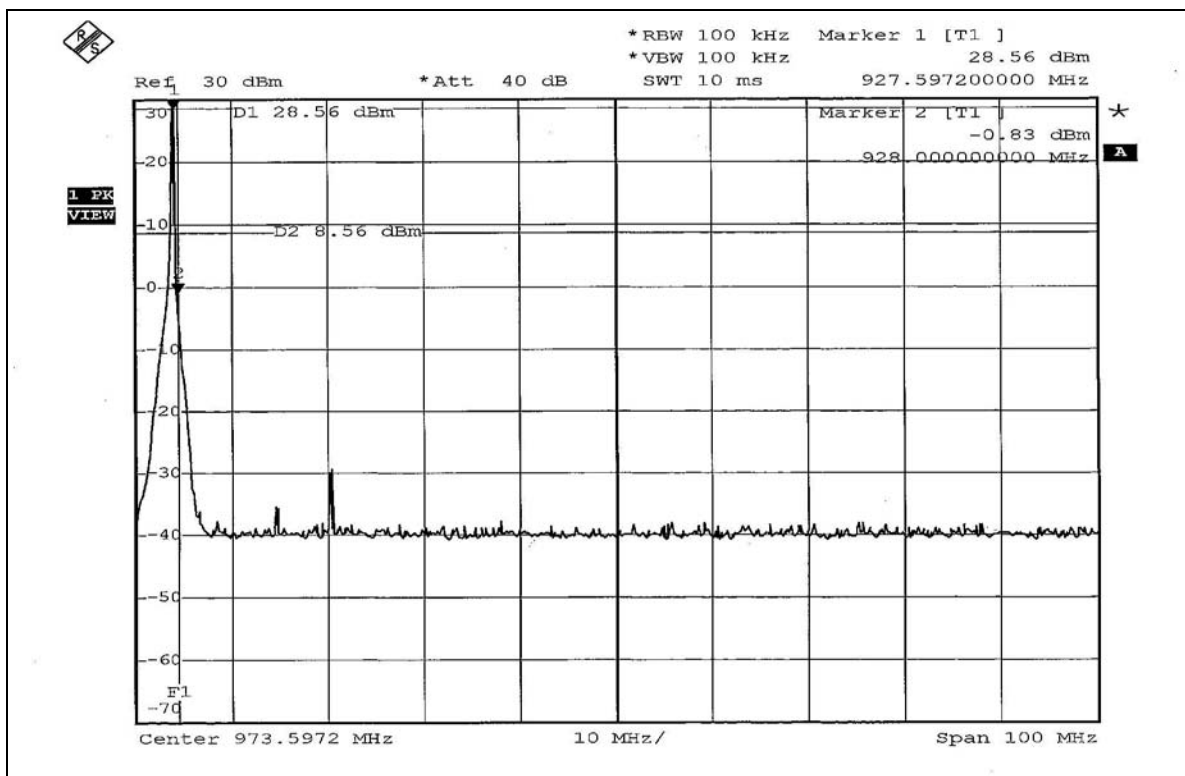
The band edge emission plot on page 64 show 29.39dBc delta between carrier maximum power and local maximum emission in band edge (928.0000GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.7.7 is 112.09dBuV/m (Average), so the maximum field strength in restrict band is  $112.09 - 29.39 = 82.70$ dBuV/m which is under the 20dB of Fundamental frequency.

**NOTE 2:** The band edge emission plot on the page 65 show 31.39dBc delta between carrier maximum power and local maximum emission in band edge (902.5972GHz). The emission of carrier strength list in the test result of channel 50 at the item 4.7.7 is 126.90dBuV/m (Peak), so the maximum field strength in restrict band is  $126.90 - 31.39 = 95.51$ dBuV/m which is under the 20dB of Fundamental frequency.

The band edge emission plot on the page 65 show 29.39dBc delta between carrier maximum power and local maximum emission in band edge (928.0000GHz). The emission of carrier strength list in the test result of channel 50 at the item 4.7.7 is 112.92dBuV/m (Average), so the maximum field strength in restrict band is  $112.92 - 29.39 = 83.53$ dBuV/m which is under the 20dB of Fundamental frequency.









## **4.9 ANTENNA REQUIREMENT**

### **4.9.1 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 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **4.9.2 ANTENNA CONNECTED CONSTRUCTION**

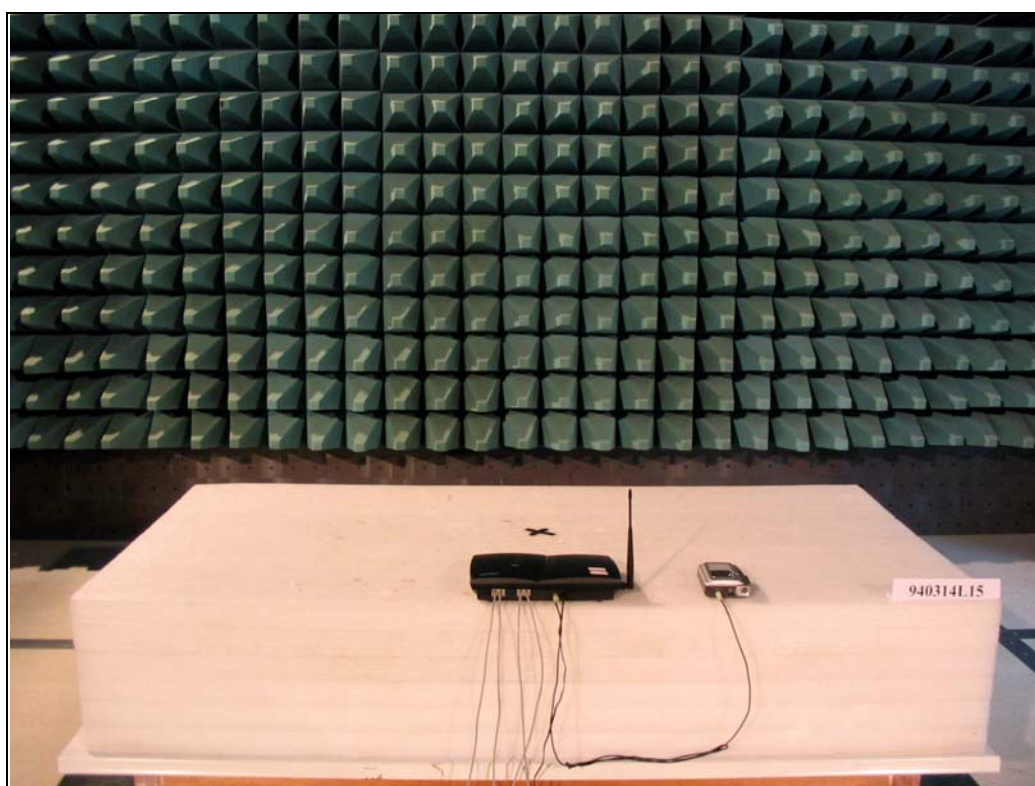
The antenna used in this product is Dipole Antenna with Reverse TNC antenna connector. The maximum Gain of this antenna is only 2.0dBi.

## 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:

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