

# FCC Part 15 EMI TEST REPORT of

E.U.T. : 2.4G Cordless Telephone  
System (Base)

MODEL : 27831XXX-D,  
TC27831XXX-D

(XXX represents any number or letter for marketing purposes)

FCC ID. : G9H2-7831D

for

APPLICANT : Thomson Inc.

ADDRESS : 101 W. 103rd Street Indianapolis, IN 46290,  
U.S.A.

Test Performed by

**ELECTRONICS TESTING CENTER, TAIWAN**  
NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG,  
TAIPEI HSIEN, TAIWAN, R.O.C.

TEL : (02)26023052 FAX: (02)26010910

http : // [www.etc.org.tw](http://www.etc.org.tw) ; e-mail : [r00@etc.org.tw](mailto:r00@etc.org.tw)

Report Number : 08-03-RBF-029-01

# TEST REPORT CERTIFICATION

Applicant : Thomson Inc.  
101 W. 103rd Street Indianapolis, IN 46290, U.S.A.

Manufacturer : Huiyang CCT Telecommunications Products Co., Ltd.  
CCT Techonology Park, San He Economic Development Zone,  
Huiyang District, Huizhou City, Guangdong Province, PRC

Description of EUT

a) Type of EUT : 2.4G Cordless Telephone System (Base)

b) Trade Name : GE, RCA

c) Model No. : 27831XXX-D, TC27831XXX-D  
(XXX represents any number or letter for marketing purposes)

d) Power Supply : Adaptor: I/P: 120Vac, 60Hz, 2.4W or 5W; O/P: 7.5Vdc, 150mA


e) Frequency Range : 924.045MHz-926.219MHz


Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (2007) and Part 2  
section 2.1043

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.  
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Apr. 09, 2008

Test Engineer :   
(Falcon Shi)

Approve & Authorized Signer :   
Will Yauo, Manager  
EMC Dept. II of ELECTRONICS  
TESTING CENTER, TAIWAN

<b>Table of Contents</b>	<b>Page</b>
<b>1 GENERAL INFORMATION .....</b>	<b>1</b>
1.1 Product Description.....	1
1.2 Characteristics of Device .....	1
1.3 Test Methodology .....	2
1.4 Test Facility.....	2
<b>2 PROVISIONS APPLICABLE .....</b>	<b>3</b>
2.1 Definition .....	3
2.2 Requirement for Compliance .....	4
2.3 Restricted Bands of Operation .....	6
2.4 Labeling Requirement.....	6
2.5 User Information .....	7
<b>3 SYSTEM TEST CONFIGURATION .....</b>	<b>8</b>
3.1 Justification .....	8
3.2 Devices for Tested System.....	8
<b>4 RADIATED EMISSION MEASUREMENT.....</b>	<b>9</b>
4.1 Applicable Standard.....	9
4.2 Measurement Procedure.....	9
4.3 Measuring Instrument .....	11
4.4 Radiated Emission Data .....	12
4.4.1 Tx Portion .....	12
4.4.2 Other Emissions .....	18
4.5 Field Strength Calculation .....	21
4.6 Photos of Radiation Measuring Setup.....	22
<b>5 CONDUCTED EMISSION MEASUREMENT .....</b>	<b>24</b>
5.1 Standard Applicable.....	24
5.2 Measurement Procedure.....	24
5.3 Conducted Emission Data .....	25
5.4 Result Data Calculation .....	37
5.5 Conducted Measurement Equipment .....	37
5.6 Photos of Conduction Measuring Setup.....	38
<b>6 ANTENNA REQUIREMENT .....</b>	<b>40</b>
6.1 Standard Applicable.....	40
6.2 Antenna Construction.....	40
<b>7 BAND EDGES MEASUREMENT .....</b>	<b>41</b>

7.1 Standard Applicable .....	41
7.2 Measurement Procedure.....	41
7.3 Measurement Equipment .....	41
7.4 Measurement Data .....	41

# 1 GENERAL INFORMATION

## 1.1 Product Description

- a) Type of EUT : 2.4G Cordless Telephone System (Base)
- b) Trade Name : GE, RCA
- c) Model No. : 27831XXX-D, TC27831XXX-D  
(XXX represents any number or letter for marketing purposes)
- d) Power Supply : Adaptor: I/P: 120Vac, 60Hz, 2.4W or 5W; O/P: 7.5Vdc, 150mA

## 1.2 Characteristics of Device

This device is the base unit of a 40-channel 2.4GHz cordless telephone. It provides connection to PSTN (Public Switched Telephone Network). The connection between base and handset unit employs 902 – 928 MHz frequency bands and 2.4GHz frequency bands. The base unit transmits 902 – 928 MHz frequency signal to handset unit. The handset unit transmits 2.4GHz frequency signal to base unit.

CH No	Base Tx Frequency	Base Rx Frequency	CH No	Base Tx Frequency	Base Rx Frequency
1	924045144	2402483934	21	925159727	2404155809
2	924100873	2402567528	22	925215457	2404239402
3	924156603	2402651121	23	925271186	2404322996
4	924212332	2402734715	24	925326915	2404406590
5	924268061	2402818309	25	925382644	2404490184
6	924323790	2402901903	26	925438373	2404573777
7	924379519	2402985496	27	925494102	2404657371
8	924435248	2403069090	28	925549831	2404740965
9	924490977	2403152684	29	925605561	2404824558
10	924546707	2403236278	30	925661290	2404908152
11	924602436	2403319871	31	925717019	2404991746
12	924658165	2403403465	32	925772748	2405075340
13	924713894	2403487059	33	925828477	2405158933
14	924769623	2403570652	34	925884206	2405242527
15	924825352	2403654246	35	925939936	2405326121
16	924881082	2403737840	36	925995665	2405409715
17	924936811	2403821434	37	926051394	2405493308
18	924992540	2403905027	38	926107123	2405576902
19	925048269	2403988621	39	926162852	2405660496
20	925103998	2404072215	40	926218581	2405744090

## DIGITAL SECURITY SYSTEM

The cordless phone uses a digital security system to provide protection against false ringing, unauthorized access, and charges to your phone line.

When the handset is placed in the base, the unit verifies its security code. After a power outage or battery replacement, the handset should be placed in the base for about 20 seconds to reset the code.

### **1.3 Test Methodology**

For 2.4G Cordless Telephone System (Base), both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003). Other required measurements were illustrated in separate sections of this test report for details.

### **1.4 Test Facility**

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO.34, LIN 5, DINGFU TSUEN, LINKOU SHIANG TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Oct. 20, 2005.

FCC Registered Test Site number 90589(DINGFU TSUEN).

## 2 PROVISIONS APPLICABLE

### 2.1 Definition

**Unintentional radiator:**

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

**Class A Digital Device:**

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

**Class B Digital Device :**

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

**Intentional radiator:**

A device that intentionally generates and emits radio frequency energy by radiation or induction.

## 2.2 Requirement for Compliance

### (1) Conducted Emission Requirement

Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency MHz	Quasi Peak dB $\mu$ V	Average dB $\mu$ V
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

\* Decreases with the logarithm of the frequency

### (2) Radiated Emission Requirement

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB $\mu$ V/m	Radiated $\mu$ V/m
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.



For intentional radiator device, per §15.249(a), the field strength of emissions shall comply with the following :

Frequency MHz	Distance Meters	Fundamental		Harmonic	
		dB $\mu$ V/m	mV/m	dB $\mu$ V/m	$\mu$ V/m
902 - 928	3	94	50	54	500
2400 - 2483.5	3	94	50	54	500
5725 - 5875	3	94	50	54	500
24000 - 24250	3	108	250	68	2500

In accordance with §15.249(d), limits shown in above table are based on average limits for frequencies above 1000 MHz, and frequencies below 1000 MHz are based on quasi peak. However, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20 dB.

### **(3) Spurious in Out Band Requirement**

For intentional device, according to §15.249 (c), emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of fundamental or to the general radiated emission limits in §15.209.

### **(4) Antenna Requirement**

For intentional device, according to §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.

## 2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

## 2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

### 3 SYSTEM TEST CONFIGURATION

#### 3.1 Justification

All measurement were intentional to maximum the emissions from EUT by varying the connection cables, therefore, the test result is sure to meet the applicable requirement.

#### 3.2 Devices for Tested System

Device	Manufacturer	Model / FCC ID	Description
*2.4G Cordless Telephone System (Base)	Huiyang CCT Telecommunications Products Co., Ltd..	27831XXX-D, TC27831XXX-D (XXX represents any number or letter for marketing purposes)/G9H2-7831D	1.8m Unshielded AC Adaptor Power Cord 1.5m RJ-11 signal line

Remark “\*” means equipment under test.

## 4 RADIATED EMISSION MEASUREMENT

### 4.1 Applicable Standard

For intentional radiators, according to §15.249 (a), operation within the frequency band of 902 to 928 Mhz the fundamental field strength shall not exceed 94 dBuV/m and the harmonics shall not exceed 54 dBuV/m. For out band emission except for harmonics shall be comply with §15.209 or at least attenuated by 50 dB below the level of the fundamental.

### 4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

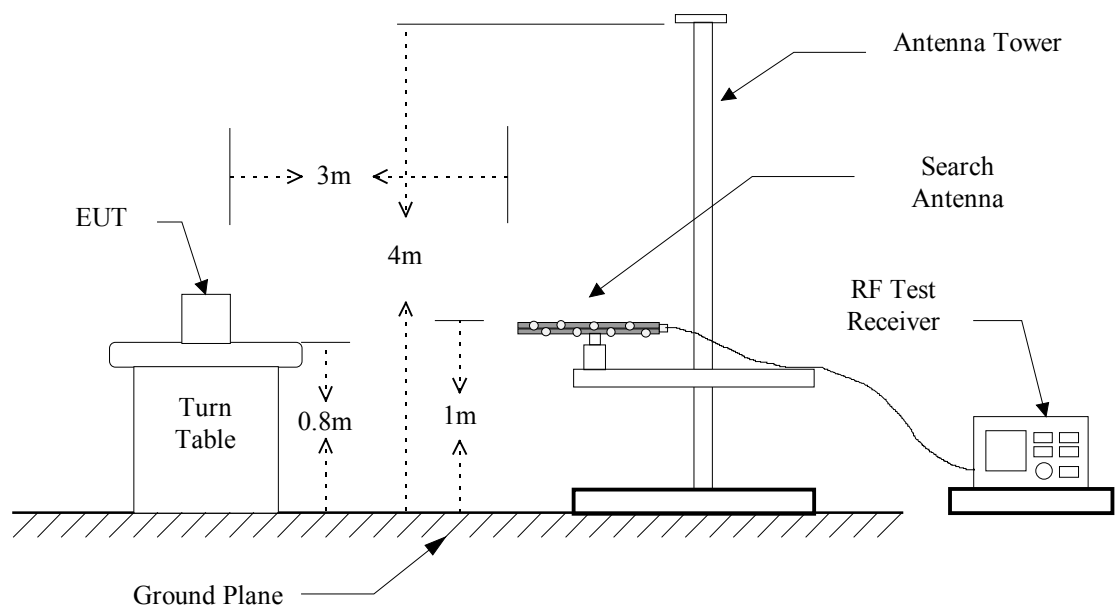
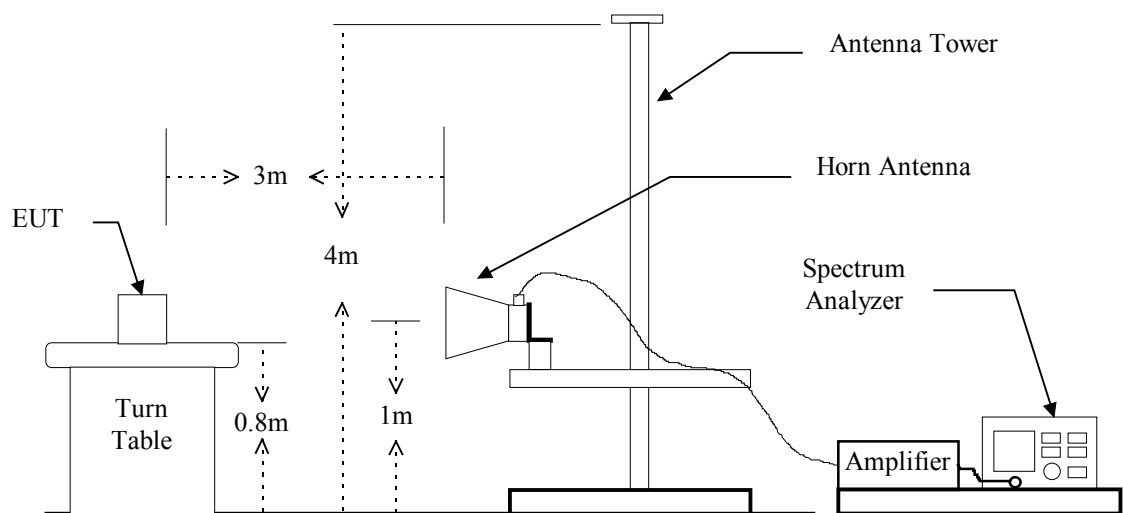


Figure 2 : Frequencies measured above 1 GHz configuration



### 4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement:

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
RF Test Receiver	Rohde & Schwarz	ESCS 30	2008/01/26	2009/01/25
Spectrum	Advantest	R3162	2008/01/30	2009/01/29
Bi-Log Antenna	Schaffner	CBL 6111C	2007/05/24	2008/05/23
Log periodic Antenna	EMCO	3146	2007/10/25	2008/10/24
Biconical Antenna	EMCO	3110	2007/12/21	2008/12/20
Double Ridged Antenna	EMCO	3115	2007/05/18	2008/05/17
Preamplifier	Hewlett-Packard	8449B	2007/09/20	2008/09/19
Amplifier	Hewlett-Packard	83051A	2007/05/28	2008/05/27
Preamplifier	Hewlett-Packard	8447D	2007/09/20	2008/09/19
Spectrum	Rohde & Schwarz	FSP40	2007/08/13	2008/08/12
Spectrum Analyzer	Hewlett-Packard	8564E	2008/04/10	2009/04/09

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

## 4.4 Radiated Emission Data

### 4.4.1 Tx Portion

#### A) CH 01

Operation Mode : Receiving / TransmittingFundamental Frequency : 924.043MHz ( Local Frequency : 2402.520MHz )Test Date : Apr. 04, 2008      Temperature : 19 °C      Humidity : 65 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H	V						
924.043	82.1	87.5	2.5	90.0	94.0	-4.0	96	1.6

*Note :*

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.



Operation Mode : Harmonics & Other SpuriousFundamental Frequency : 924.043MHz ( Local Frequency : 2402.520MHz )Test Date : Apr. 04, 2008 Temperature : 19 °C Humidity : 65 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg (Deg.)	Ant. High (m)
	H		V			Peak	Ave	Peak	Ave.			
	Peak	Ave	Peak	Ave								
* 2402.483	---	---	---	---	-3.1	---	---	94.0	94.0	---	---	---
* 4804.966	---	---	---	---	2.5	---	---	94.0	94.0	---	---	---
* 7207.449	---	---	---	---	5.7	---	---	94.0	94.0	---	---	---
* 9609.932	---	---	---	---	7.2	---	---	74.0	54.0	---	---	---
* 12012.415	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
1848.200	45.3	***	46.2	***	-10.0	36.2	***	74.0	54.0	-17.8	102	1.2
2772.357	---	---	---	---	-1.9	---	---	74.0	54.0	---	---	---
3696.514	---	---	---	---	0.8	---	---	74.0	54.0	---	---	---
4620.671	---	---	---	---	2.2	---	---	74.0	54.0	---	---	---
5544.828	---	---	---	---	4.4	---	---	74.0	54.0	---	---	---
6468.985	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7393.142	---	---	---	---	6.0	---	---	74.0	54.0	---	---	---
8317.299	---	---	---	---	6.7	---	---	74.0	54.0	---	---	---
9241.456	---	---	---	---	7.1	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
6. Remark “\*” means the local oscillator frequency.

**B) CH 20**Operation Mode : Receiving / TransmittingFundamental Frequency : 925.097MHz ( Local Frequency : 2404.050MHz )Test Date : Apr. 04, 2008      Temperature : 24 °C      Humidity : 53 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H	V						
925.097	81.3	87.0	2.5	89.5	94.0	-4.5	37	1.8

*Note :*

- 1. Remark “---” means that the emissions level is too low to be measured.*
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.*

Operation Mode : Harmonics & Other SpuriousFundamental Frequency : 925.097MHz ( Local Frequency : 2404.050MHz )Test Date : Apr. 04, 2008 Temperature : 19 °C Humidity : 65 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg (Deg.)	Ant. High (m)
	H		V			Peak	Ave	Peak	Ave.			
	Peak	Ave	Peak	Ave								
* 2405.660	---	---	---	---	-3.1	---	---	94.0	94.0	---	---	---
* 4811.320	---	---	---	---	2.6	---	---	94.0	94.0	---	---	---
* 7216.980	---	---	---	---	5.7	---	---	94.0	94.0	---	---	---
* 9622.640	---	---	---	---	7.2	---	---	74.0	54.0	---	---	---
* 12028.300	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
1850.080	46.8	***	46.5	***	-10.0	36.8	***	74.0	54.0	-17.2	92	1.4
2775.063	---	---	---	---	-1.9	---	---	74.0	54.0	---	---	---
3700.046	---	---	---	---	0.8	---	---	74.0	54.0	---	---	---
4625.029	---	---	---	---	2.2	---	---	74.0	54.0	---	---	---
5550.012	---	---	---	---	4.4	---	---	74.0	54.0	---	---	---
6474.995	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7399.978	---	---	---	---	6.0	---	---	74.0	54.0	---	---	---
8324.961	---	---	---	---	6.7	---	---	74.0	54.0	---	---	---
9249.944	---	---	---	---	7.1	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
6. Remark “\*” means the local oscillator frequency.

**C) CH 40**Operation Mode : Receiving / TransmittingFundamental Frequency : 926.216MHz ( Local Frequency : 2405.770MHz )Test Date : Apr. 04, 2008      Temperature : 19 °C      Humidity : 65 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	H	V						
926.216	82.4	88.9	2.5	91.4	94.0	-2.6	91	1.6

*Note :*

- 1. Remark “---” means that the emissions level is too low to be measured.*
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.*

Operation Mode : Harmonics & Other SpuriousFundamental Frequency : 926.216MHz ( Local Frequency : 2405.770MHz )Test Date : Apr. 04, 2008 Temperature : 19 °C Humidity : 65 %

Frequency  (MHz)	Reading (dBuV)				Factor (dB)  Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg (Deg.)	Ant. High (m)
	H		V			Peak	Ave	Peak	Ave.			
	Peak	Ave	Peak	Ave								
* 2409.004	---	---	---	---	-3.0	---	---	94.0	94.0	---	---	---
* 4818.008	---	---	---	---	2.6	---	---	94.0	94.0	---	---	---
* 7227.012	---	---	---	---	5.8	---	---	94.0	94.0	---	---	---
* 9636.016	---	---	---	---	7.3	---	---	74.0	54.0	---	---	---
* 12045.020	---	---	---	---	9.2	---	---	74.0	54.0	---	---	---
1852.470	46.2	***	46.3	***	-10.0	36.3	***	74.0	54.0	-17.7	78	1.4
2778.724	---	---	---	---	-1.9	---	---	74.0	54.0	---	---	---
3704.978	---	---	---	---	0.8	---	---	74.0	54.0	---	---	---
4631.232	---	---	---	---	2.2	---	---	74.0	54.0	---	---	---
5557.486	---	---	---	---	4.4	---	---	74.0	54.0	---	---	---
6483.740	---	---	---	---	4.5	---	---	74.0	54.0	---	---	---
7409.994	---	---	---	---	6.1	---	---	74.0	54.0	---	---	---
8336.248	---	---	---	---	6.7	---	---	74.0	54.0	---	---	---
9262.502	---	---	---	---	7.1	---	---	74.0	54.0	---	---	---

Note :

1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark “\*\*\*” means that Peak result is meet average limit.
3. Remark “---” means that the emissions level is too low to be measured.
4. Item “Margin” referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
6. Remark “\*” means the local oscillator frequency.

**4.4.2 Other Emissions****A) Adaptor 1**Operation Mode : Base ChargingTest Date : Mar. 30, 2008      Temperature : 22 °C      Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
150.870	V	37.2	-10.0	27.2	43.5	-16.3	67	1.0
164.150	V	33.7	-9.3	24.4	43.5	-19.1	196	1.0
201.000	H	33.8	-7.0	26.8	43.5	-16.7	183	1.6
219.160	H	32.6	-5.9	26.7	46.0	-19.3	126	1.2
254.120	V	32.2	-3.9	28.3	46.0	-17.7	113	1.0
260.790	V	33.4	-3.9	29.5	46.0	-16.5	162	1.1

Operation Mode : Base On LineTest Date : Mar. 30, 2008      Temperature : 22 °C      Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
131.250	V	38.0	-11.4	26.6	43.5	-16.9	162	1.0
194.700	V	34.7	-7.8	26.9	43.5	-16.6	214	1.2
260.580	V	32.6	-3.9	28.7	46.0	-17.3	39	1.1
279.210	V	32.6	-2.8	29.8	46.0	-16.2	36	1.1
461.020	V	47.1	-5.1	42.0	46.0	-4.0	28	1.2
805.400	V	38.5	0.9	39.4	46.0	-6.6	267	1.1

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**B) Adaptor 2**Operation Mode : Base ChargingTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
150.690	V	34.8	-10.0	24.8	43.5	-18.7	36	1.0
200.370	V	32.0	-7.1	24.9	43.5	-18.6	138	1.0
221.970	H	31.6	-5.7	25.9	46.0	-20.1	121	1.6
242.490	V	33.2	-4.4	28.8	46.0	-17.2	29	1.2
805.400	V	39.2	0.9	40.1	46.0	-5.9	36	1.4
912.500	H	35.6	2.3	37.9	46.0	-8.1	44	1.8

Operation Mode : Base On LineTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
150.690	H	34.9	-10.0	24.9	43.5	-18.6	120	1.5
253.290	V	32.7	-3.9	28.8	46.0	-17.2	133	1.0
282.720	V	32.0	-2.5	29.5	46.0	-16.5	144	1.0
461.700	H	45.4	-5.1	40.3	46.0	-5.7	136	1.6
805.420	H	41.1	0.9	42.0	46.0	-4.0	138	1.4
912.530	H	42.4	2.3	44.7	46.0	-1.3	206	1.3

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

**C) Adaptor 3**Operation Mode : Base ChargingTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
150.690	H	35.1	-10.0	25.1	43.5	-18.4	55	1.5
201.180	H	34.3	-7.0	27.3	43.5	-16.2	83	1.1
246.810	V	31.6	-4.1	27.5	46.0	-18.5	28	1.1
279.210	V	32.1	-2.8	29.3	46.0	-16.7	21	1.0
803.300	V	40.2	0.8	41.0	46.0	-5.0	29	1.1
912.500	H	36.4	2.3	38.7	46.0	-7.3	76	1.5

Operation Mode : Base On LineTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
150.690	H	34.1	-10.0	24.1	43.5	-19.4	25	1.6
160.410	H	38.8	-9.5	29.3	43.5	-14.2	84	1.0
176.340	H	33.1	-9.1	24.0	43.5	-19.5	136	1.0
277.050	H	32.1	-3.0	29.1	46.0	-16.9	27	1.1
461.720	H	46.9	-5.1	41.8	46.0	-4.2	28	1.1
805.400	H	39.9	0.9	40.8	46.0	-5.2	39	1.2

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.



## 4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss (if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

$$\textbf{Result} = \textbf{Reading} + \textbf{Corrected Factor}$$

where Corrected Factor

$$= \text{Antenna FACTOR} + \text{Cable Loss} + \text{High Pass Filter Loss} - \text{Amplifier Gain}$$

## 4.6 Photos of Radiation Measuring Setup

**Mode: Base Charging**



**Mode: Base on Line**



## 5 CONDUCTED EMISSION MEASUREMENT

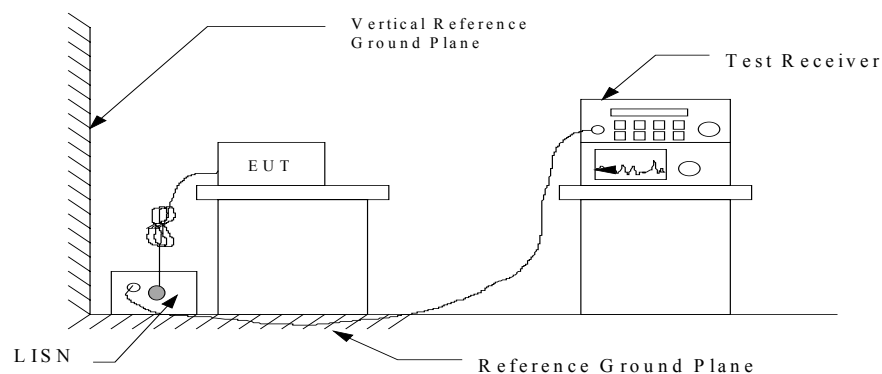
### 5.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to §15.107(a) and §15.207(a) respectively .

### 5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then records the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



### 5.3 Conducted Emission Data

#### A. Adaptor 1

Operation Mode : Base ChargingTest Date : Mar. 30, 2008      Temperature : 22 °C      Humidity : 63 %

Neutral

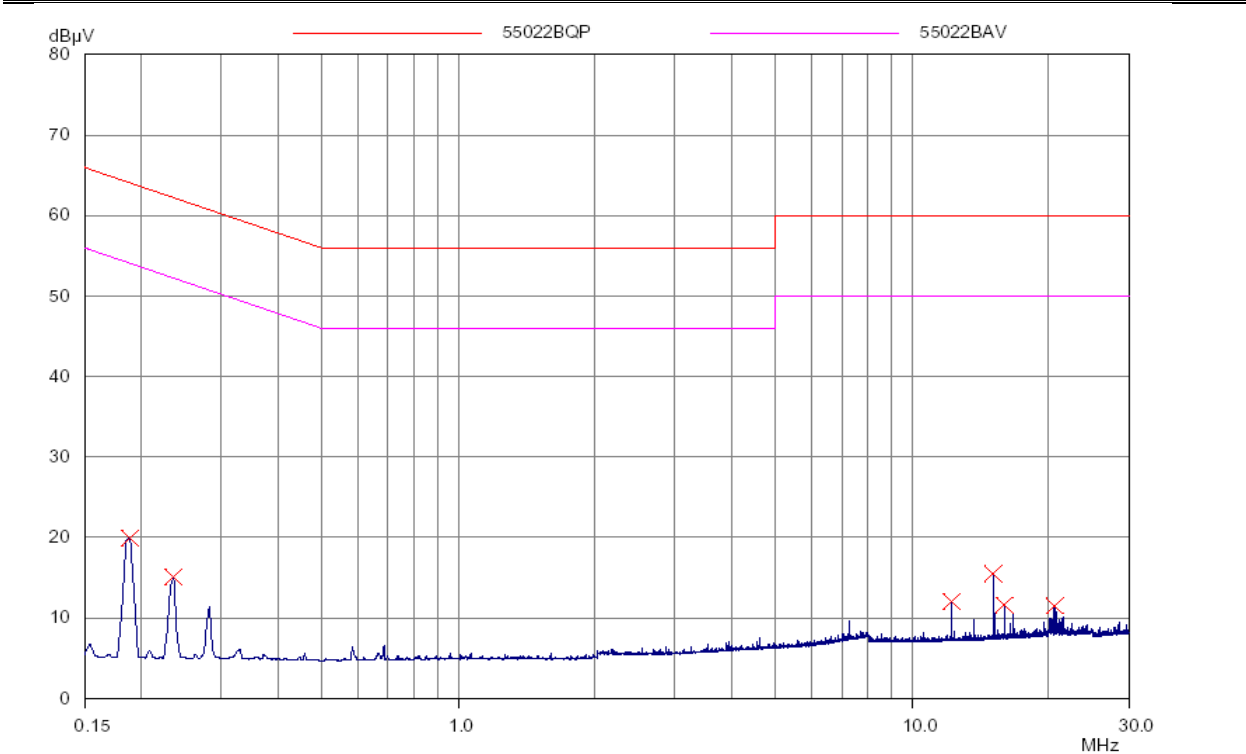
Frequency (MHz)	Meter Reading (dB $\mu$ V)		Factor (dB)	Result (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB $\mu$ V)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.189	19.9	----	0.2	20.1	----	64.1	54.1	-44.0	----
0.235	15.0	----	0.2	15.2	----	62.3	52.3	-47.1	----
12.238	12.0	----	0.9	12.9	----	60.0	50.0	-47.1	----
15.117	15.5	----	1.1	16.6	----	60.0	50.0	-43.4	----
16.000	11.6	----	1.2	12.8	----	60.0	50.0	-47.2	----
20.625	11.6	----	1.4	13.0	----	60.0	50.0	-47.0	----

Line

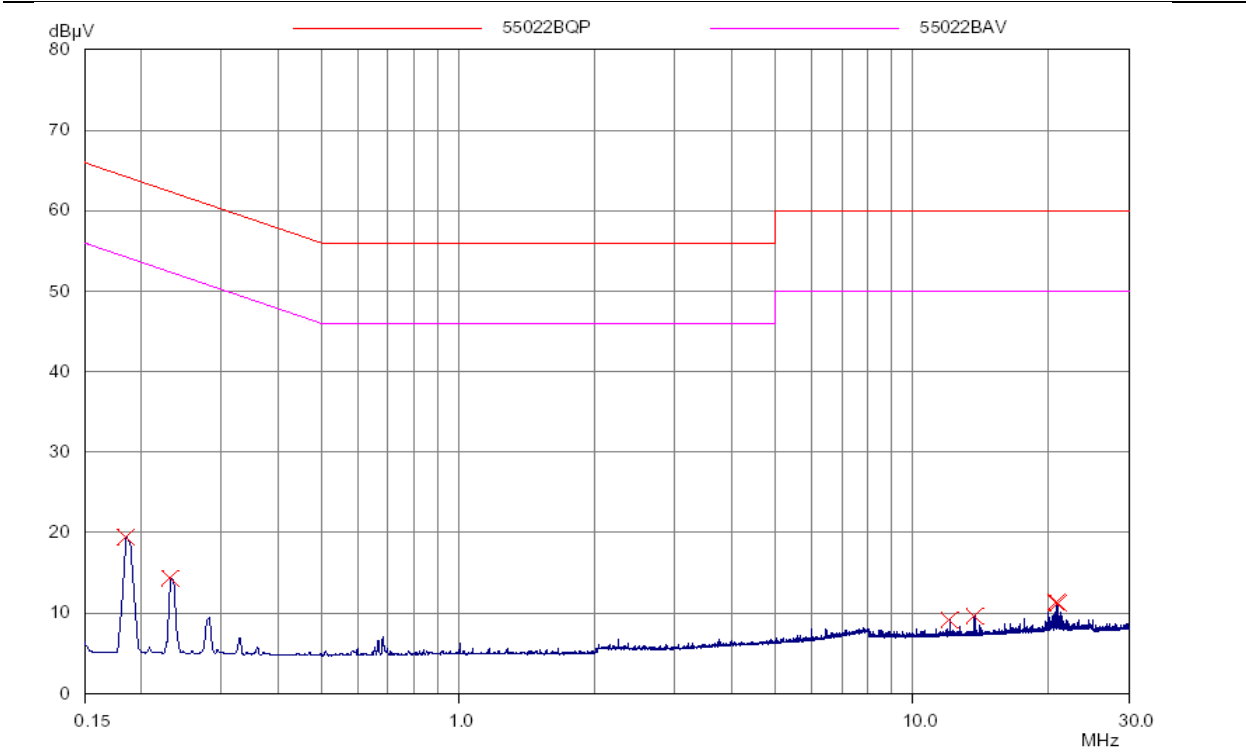
Frequency (MHz)	Meter Reading (dB $\mu$ V)		Factor (dB)	Result (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB $\mu$ V)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	19.4	----	0.2	19.6	----	64.3	54.3	-44.7	----
0.232	14.3	----	0.2	14.5	----	62.4	52.4	-47.9	----
12.109	9.1	----	0.9	10.0	----	60.0	50.0	-50.0	----
13.742	9.5	----	1.0	10.5	----	60.0	50.0	-49.5	----
20.816	11.3	----	1.4	12.7	----	60.0	50.0	-47.3	----
21.000	11.2	----	1.4	12.6	----	60.0	50.0	-47.4	----

*Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.*

Neutral



Line



Operation Mode : Base On LineTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Neutral

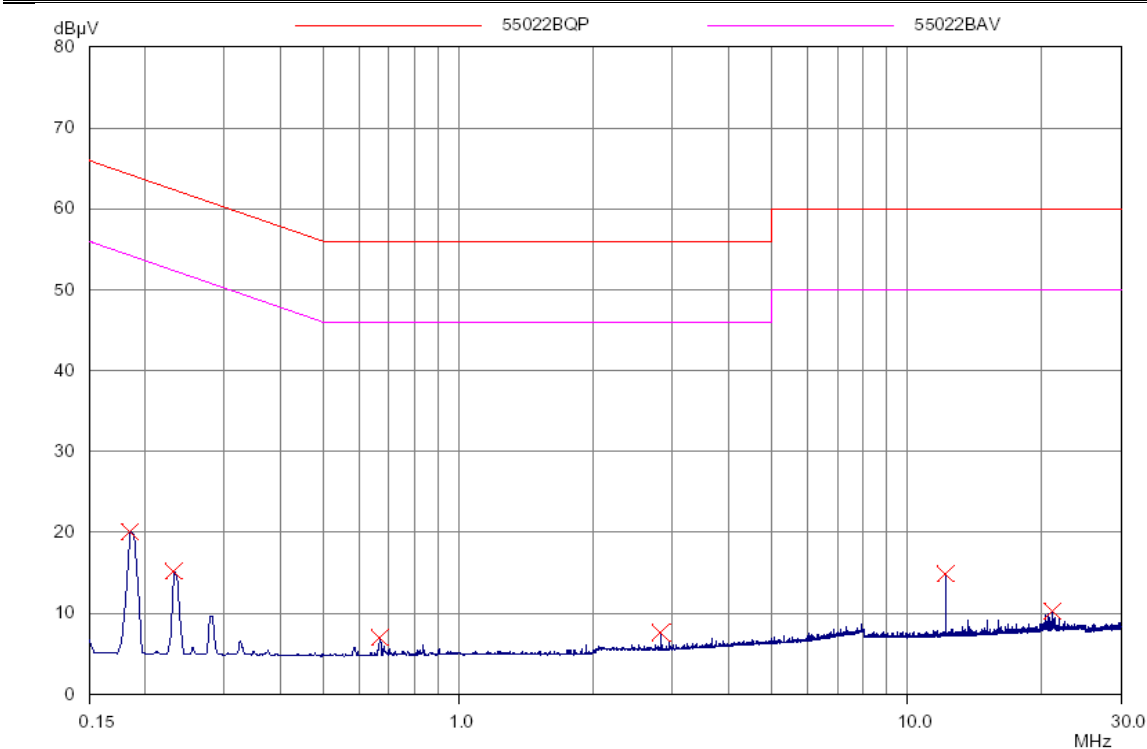
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	20.1	----	0.2	20.3	----	64.3	54.3	-44.0	----
0.232	15.2	----	0.2	15.4	----	62.4	52.4	-47.0	----
0.669	6.9	----	0.3	7.2	----	56.0	46.0	-48.8	----
2.832	7.6	----	0.5	8.1	----	56.0	46.0	-47.9	----
12.175	14.8	----	0.9	15.7	----	60.0	50.0	-44.3	----
21.136	10.2	----	1.4	11.6	----	60.0	50.0	-48.4	----

Line

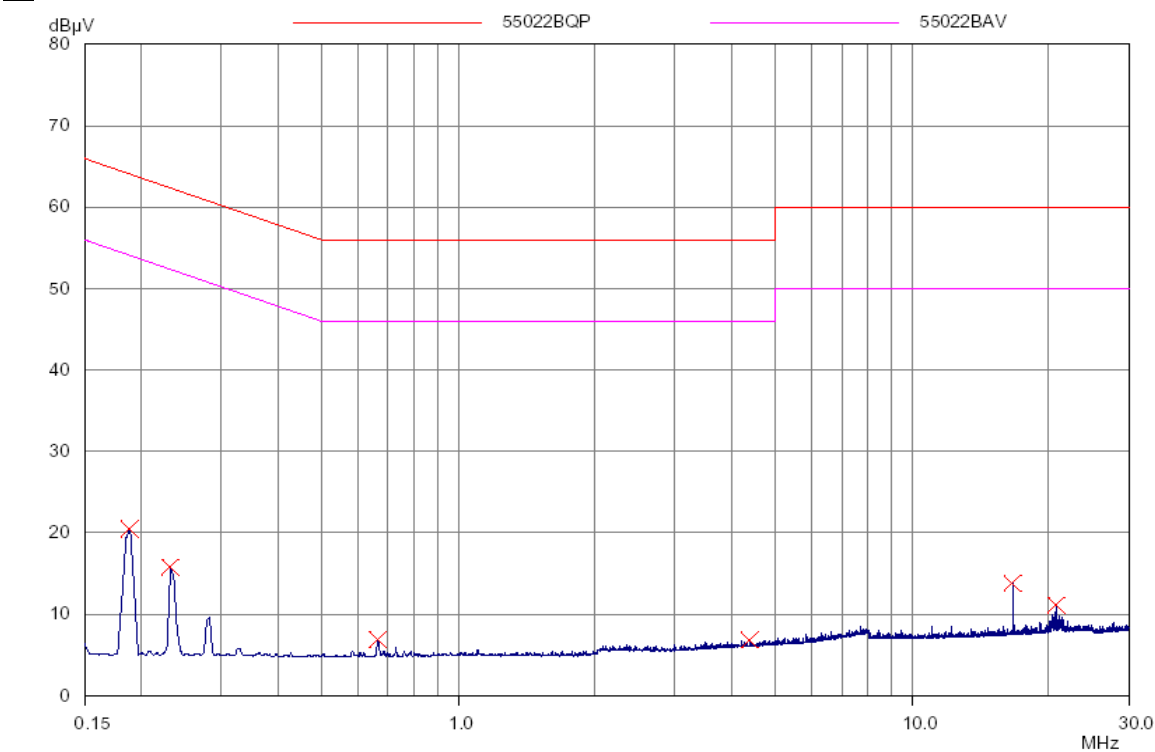
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.189	20.4	----	0.2	20.6	----	64.1	54.1	-43.5	----
0.232	15.7	----	0.2	15.9	----	62.4	52.4	-46.5	----
0.665	6.8	----	0.3	7.1	----	56.0	46.0	-48.9	----
4.386	6.8	----	0.6	7.4	----	56.0	46.0	-48.6	----
16.660	13.8	----	1.2	15.0	----	60.0	50.0	-45.0	----
20.812	11.1	----	1.4	12.5	----	60.0	50.0	-47.5	----

Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.

Neutral



Line





**B. Adaptor 2**Operation Mode : Base ChargingTest Date : Mar. 30, 2008      Temperature : 22 °C      Humidity : 63 %

Neutral

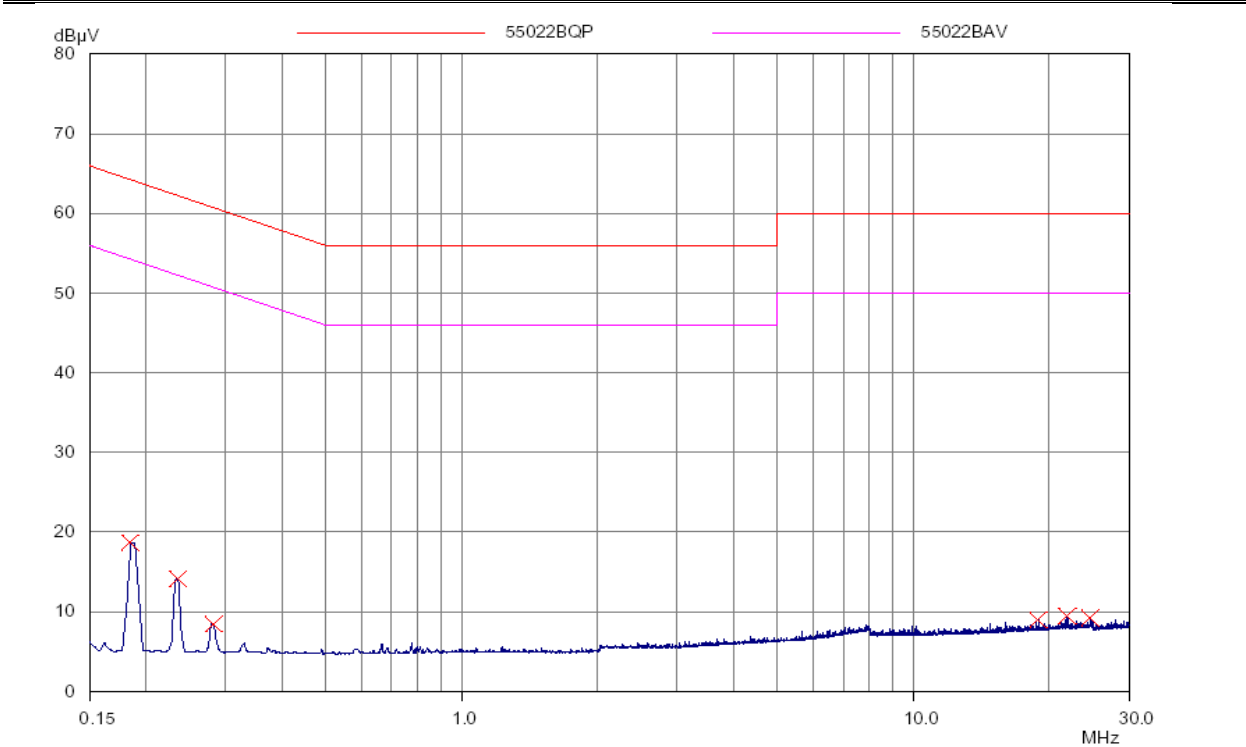
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	18.6	----	0.2	18.8	----	64.3	54.3	-45.5	----
0.235	14.1	----	0.2	14.3	----	62.3	52.3	-48.0	----
0.282	8.4	----	0.2	8.6	----	60.8	50.8	-52.1	----
18.921	8.9	----	1.3	10.2	----	60.0	50.0	-49.8	----
21.933	9.4	----	1.4	10.8	----	60.0	50.0	-49.2	----
24.605	9.2	----	1.5	10.7	----	60.0	50.0	-49.3	----

Line

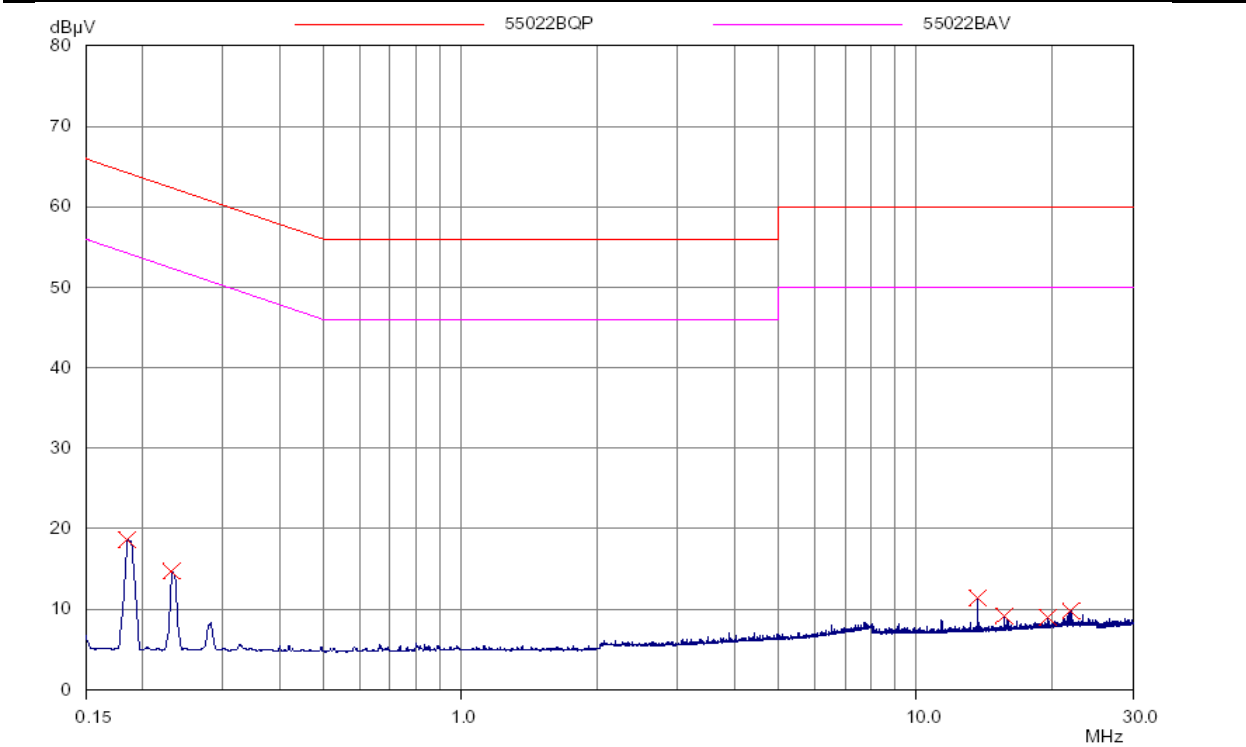
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	18.6	----	0.2	18.8	----	64.3	54.3	-45.5	----
0.232	14.7	----	0.2	14.9	----	62.4	52.4	-47.5	----
13.703	11.4	----	1.0	12.4	----	60.0	50.0	-47.6	----
15.679	9.2	----	1.1	10.3	----	60.0	50.0	-49.7	----
19.635	8.9	----	1.4	10.3	----	60.0	50.0	-49.7	----
21.988	9.8	----	1.4	11.2	----	60.0	50.0	-48.8	----

*Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.*

Neutral



Line



Operation Mode : Base On LineTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Neutral

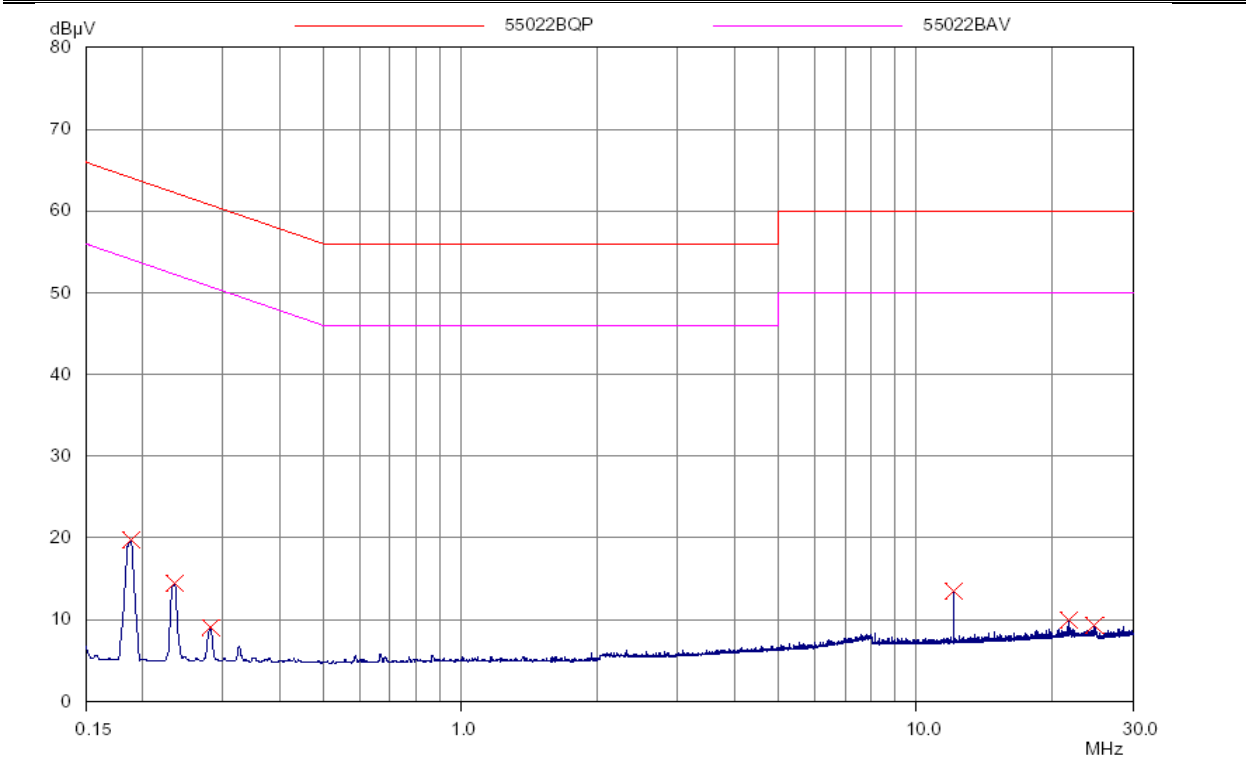
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.189	19.7	----	0.2	19.9	----	64.1	54.1	-44.2	----
0.235	14.3	----	0.2	14.5	----	62.3	52.3	-47.8	----
0.282	9.0	----	0.2	9.2	----	60.8	50.8	-51.5	----
12.136	13.4	----	0.9	14.3	----	60.0	50.0	-45.7	----
21.753	9.9	----	1.4	11.3	----	60.0	50.0	-48.7	----
24.767	9.3	----	1.5	10.8	----	60.0	50.0	-49.2	----

Line

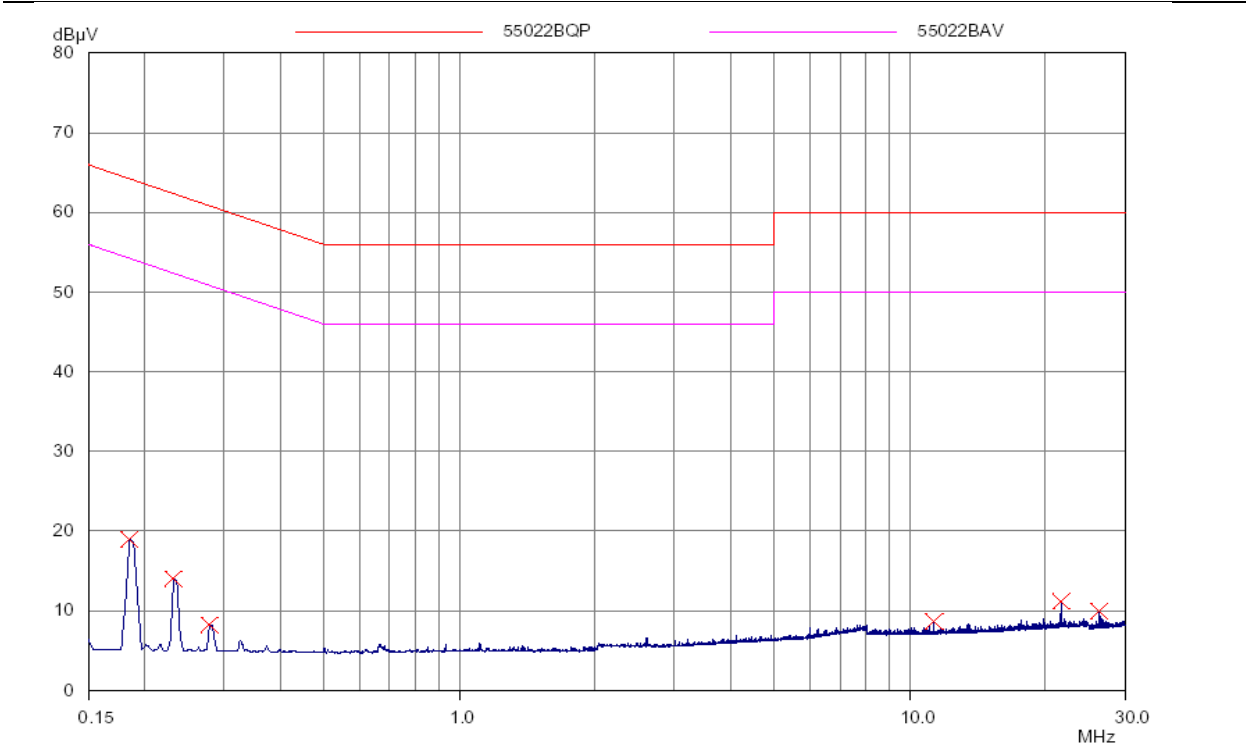
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	18.9	----	0.2	19.1	----	64.3	54.3	-45.2	----
0.232	13.9	----	0.2	14.1	----	62.4	52.4	-48.3	----
0.278	8.2	----	0.2	8.4	----	60.9	50.9	-52.4	----
11.328	8.6	----	0.9	9.5	----	60.0	50.0	-50.5	----
21.703	11.2	----	1.4	12.6	----	60.0	50.0	-47.4	----
26.351	9.9	----	1.7	11.6	----	60.0	50.0	-48.4	----

Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.

Neutral



Line



**C. Adaptor 3**Operation Mode : Base ChargingTest Date : Mar. 30, 2008      Temperature : 22 °C      Humidity : 63 %

Neutral

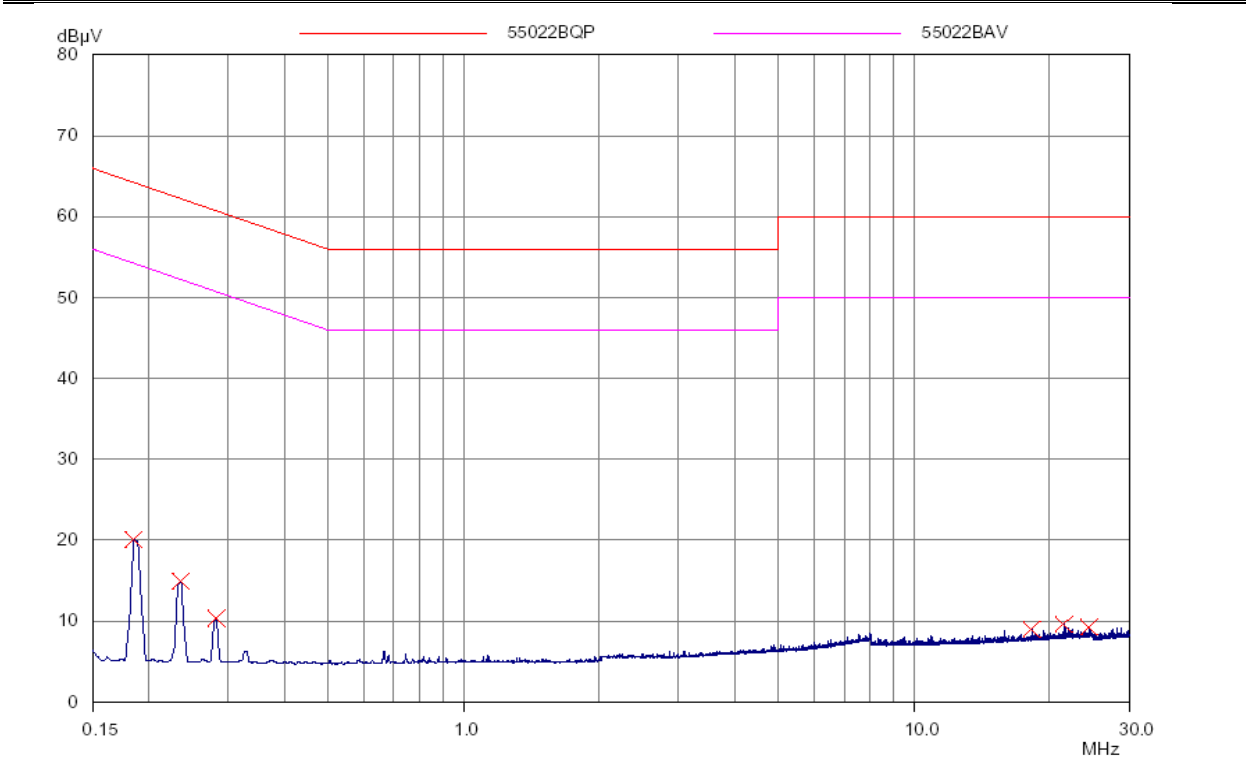
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	20.0	----	0.2	20.2	----	64.3	54.3	-44.1	----
0.235	14.8	----	0.2	15.0	----	62.3	52.3	-47.3	----
0.282	10.3	----	0.2	10.5	----	60.8	50.8	-50.2	----
18.257	8.9	----	1.3	10.2	----	60.0	50.0	-49.8	----
21.527	7.6	----	1.4	9.0	----	60.0	50.0	-51.0	----
24.429	9.2	----	1.5	10.7	----	60.0	50.0	-49.3	----

Line

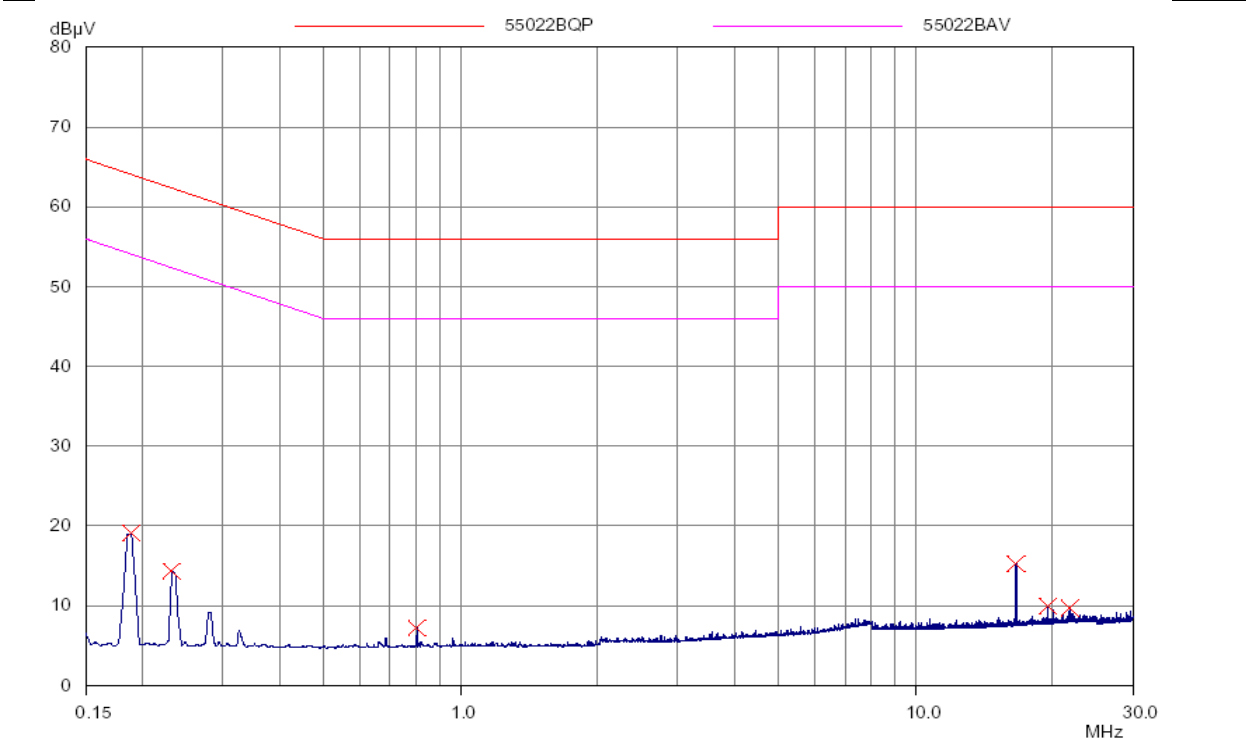
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.189	19.0	----	0.2	19.2	----	64.1	54.1	-44.9	----
0.232	14.3	----	0.2	14.5	----	62.4	52.4	-47.9	----
0.802	7.2	----	0.3	7.5	----	56.0	46.0	-48.5	----
16.617	15.3	----	1.2	16.5	----	60.0	50.0	-43.5	----
19.554	9.9	----	1.4	11.3	----	60.0	50.0	-48.7	----
21.839	9.7	----	1.4	11.1	----	60.0	50.0	-48.9	----

*Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.*

Neutral



Line



Operation Mode : Base On LineTest Date : Mar. 30, 2008 Temperature : 22 °C Humidity : 63 %

Neutral

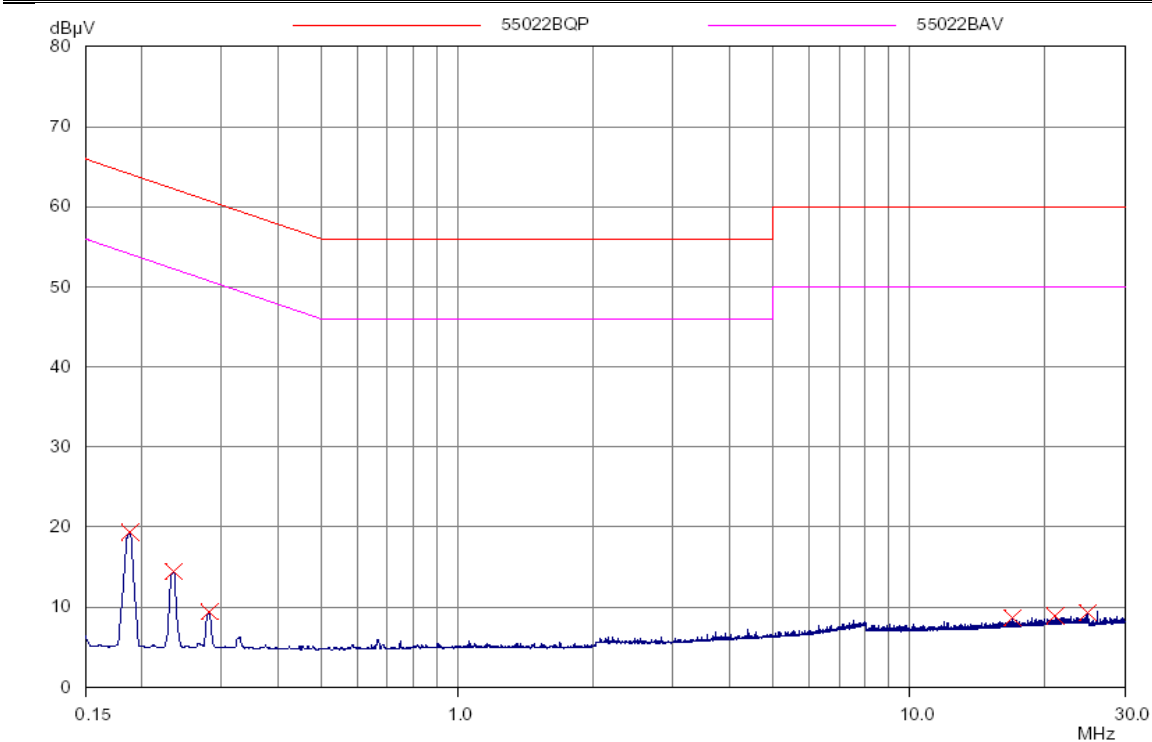
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.189	19.3	----	0.2	19.5	----	64.1	54.1	-44.6	----
0.235	14.4	----	0.2	14.6	----	62.3	52.3	-47.7	----
0.282	9.4	----	0.2	9.6	----	60.8	50.8	-51.1	----
16.964	8.6	----	1.2	9.8	----	60.0	50.0	-50.2	----
21.097	8.8	----	1.4	10.2	----	60.0	50.0	-49.8	----
24.902	9.2	----	1.5	10.7	----	60.0	50.0	-49.3	----

Line

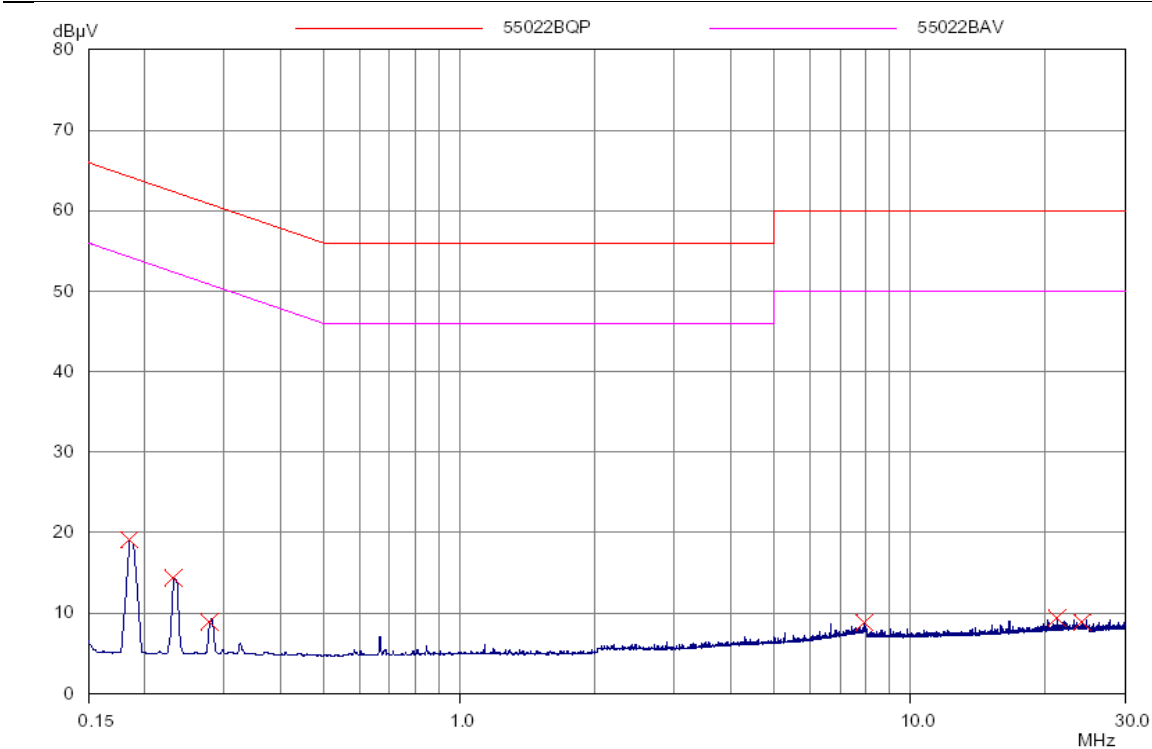
Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	19.1	----	0.2	19.3	----	64.3	54.3	-45.0	----
0.232	14.3	----	0.2	14.5	----	62.4	52.4	-47.9	----
0.278	8.8	----	0.2	9.0	----	60.9	50.9	-51.8	----
7.941	8.8	----	0.7	9.5	----	60.0	50.0	-50.5	----
21.199	8.4	----	1.4	9.8	----	60.0	50.0	-50.2	----
24.074	8.4	----	1.5	9.9	----	60.0	50.0	-50.1	----

Note : 1. The expanded uncertainty of the conducted emission tests is 2.45 dB.

Neutral



Line





## 5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$\text{RESULT} = \text{READING} + \text{LISN FACTOR}$$

Assume a receiver reading of 22.5 dB  $\mu$  V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB  $\mu$  V.

$$\text{RESULT} = 22.5 + 0.1 = 22.6 \text{ dB } \mu \text{ V}$$

$$\begin{aligned} \text{Level in } \mu \text{ V} &= \text{Common Antilogarithm}[(22.6 \text{ dB } \mu \text{ V})/20] \\ &= 13.48 \mu \text{ V} \end{aligned}$$

## 5.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2007/12/27	2008/12/25
LISN	EMCO	3625/2	2007/10/19	2008/10/17
LISN	Rohde & Schwarz	ESH2-Z5	2007/09/21	2008/09/19

## 5.6 Photos of Conduction Measuring Setup

**Mode: Base Charging**



**Mode: Base On Line**



## **6 ANTENNA REQUIREMENT**

### **6.1 Standard Applicable**

According to §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.

### **6.2 Antenna Construction**

1. The antenna for 902 – 928 MHz transmitting is permanently attached, no consideration of replacement.
2. The antenna for 2.4GHz receiving is permanently attached, no consideration of replacement.

## 7 BAND EDGES MEASUREMENT

### 7.1 Standard Applicable

According to 15.249(c), out band emission except for harmonics shall be comply with § 15.209 or at least attenuated by 50 dB below the level of the fundamental.

### 7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument 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. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat above procedures until all measured frequencies were complete.

### 7.3 Measurement Equipment

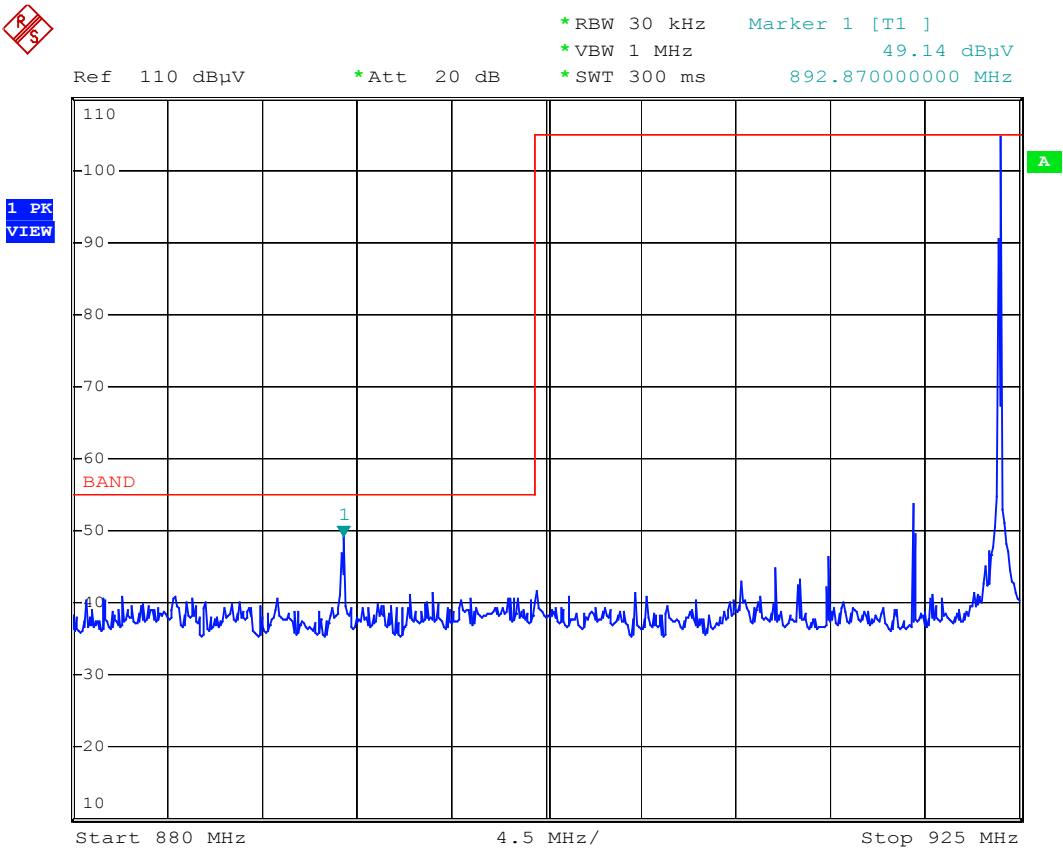
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2007/08/13	2008/08/11
Attenuator	Weinschel Engineering	1	N/A	N/A

### 7.4 Measurement Data

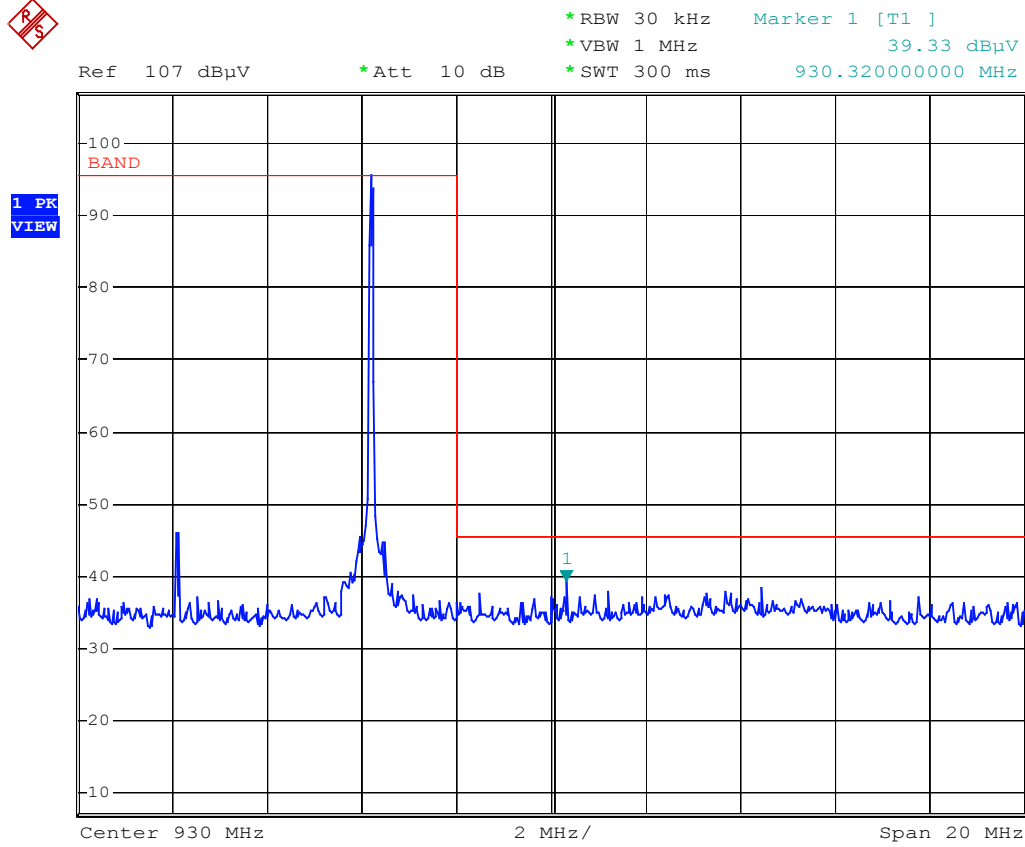
#### **Test Result:**

1. Lower band edge: Emission radiated outside of the lower band edge is attenuated by at least 50dB below the level of the fundamental. The maximum is 49.14dBuV at 892.870MHz that complies with the limits.
2. Upper band edge: Emission radiated outside of the upper band edge is attenuated by at least 50dB below the level of the fundamental. The maximum is 39.33 dBuV at 930.320MHz that complies with the limits.

**Note :** The expanded uncertainty of the band edges tests is 1000Hz.



Date: 4.APR.2008    15:12:16



Date: 4.APR.2008 15:05:24