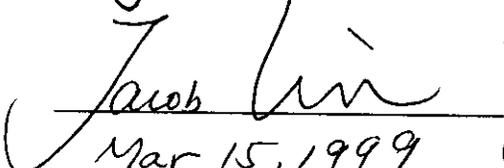


***EXHIBIT C***

***Test Report***

Report No.	S2515966
Specifications Test Method	FCC Part 15 Class B, Certification ANSI C63.4 1992
Applicant Address	6-7-35, Kitashinagawa Shinagawa Ku, Tokyo, Japan.
Applicant Items tested Model No.	Sony Corporation 25-Channel Cordless Telephone SP-111, SP-121
Results Sample received data	<b>Compliance</b> (As detailed within this report) 02/08/1999 (month / day / year)
Prepared by	 project engineer
Authorized by	 Vice General Manager (Jacob Lin )
Issue date	Mar. 15, 1999 (month / day / year)
<b>Modifications</b>	<b>None</b>
Tested by	Training Research Co., Ltd.
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan
Open site at	No. 5-3, Lane 21, Yen Chiu Yuan Rd., Sec. 4, Taipei, Taiwan

**Conditions of issue:**

- (1) This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.**
- (2) This report must not be used by the client to claim product endorsement by NVLAP or nay agency of U.S. Government.**

★ FCC ID : AK8SPP121

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## ***Chapter 1 Introduction***

### ***Description of EUT :***

This is a 25-channel cordless telephone which is normally used at home with RJ11C jack.

### ***Connections of EUT :***

While testing, the **Base's jack** connected to a PABX simulator via a 7' RJ11C telephone cable when the base is tested. And the antenna is fully extended. The antenna is keep vertical while testing. At this time, the handset is remotely located.

**Handset** is put in the center of turn table, and the base is remotely located when the handset is tested. The Y axis position as photography showed is the worst case placed.

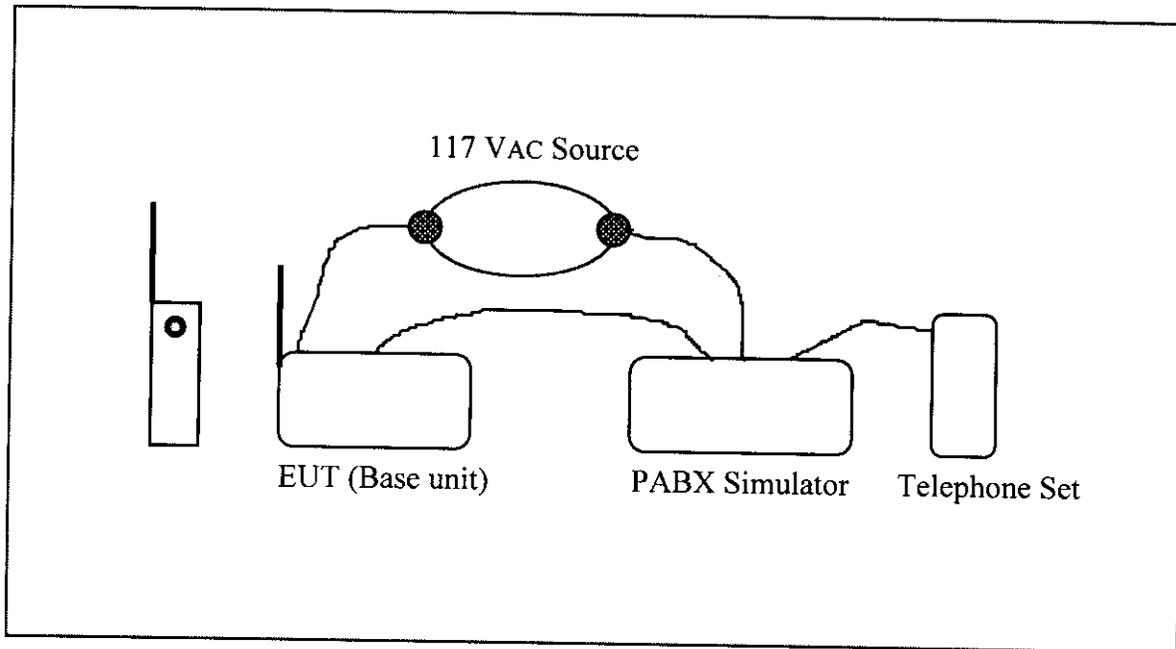
The other terminal of PABX is also connected with a telephone set via a 7' RJ11C telephone cable.

All the telephone cables are non-shielded.

### ***Test method :***

- (1) Conducted test : (Base only)  
Select channel 1 , 25 separately , then start testing.
- (2) Radiated test :  
Handset and Base are tested separated by each channel 1 and 25.

**Configuration of test setup**



**Connections :**

\*Line jack of base --- PABX Simulator

***List of support equipment***

**PABX** : **King Design**  
Model No. : KD8705-A  
Serial No. : GV101101186  
Power type : 110 VAC 50/60 Hz  
Power cord : Non - Shielded

***Description of automatic channel selection mechanism :***

Questions:

- (1) Does the device check both frequencies in the channel if attempts to link to ?
- (2) How many channels does the device attempt to link to ?
- (3) What happens when all of the channels are busy ?
- (4) When the device finds a busy channel, does it scan both frequencies in the next channel that attempting to link to ?

Answers:

- (1) Yes, By checking RX-PLL frequencies.
- (2) 25 channels.
- (3) The hand set will send out error alarm, then turn off power.
- (4) Yes, The device will checks frequencies. (Next channel = Now channel + 3)

## **Chapter 2 Conducted emission test**

### **Test condition and setup :**

All the equipment is placed and setup according to the ANSI C63.4 - 1992. The EUT is assembled on a wooden table which is 80 cm high, is placed 40 cm from the back-wall which is a vertical conducting plane. LISN 1 is for EUT , LISN 2 is for support equipment. They are all placed on the conductive ground .The EUT's LISN connect a line switch box for selecting L1 or L2 , then connect to a preamplifier and spectrum.

The spectrum scans from 450KHz to 30MHz. Conducted emission levels are detected at max. peak mode . But if the max. peak mode failed, it will be measured by CISPER's quasi-peak detection mode.

### **List of test Instrument :**

Instrument Name	Model No.	Brand	Serial No.	<u>Calibration Date</u>	
				Last time	Next time
Spectrum analyzer	8591EM	H P	3619A00821	10/29/98	10/29/99
LISN (EUT)	3825/2	EMCO	9411-2284	05/15/98	05/15/99
LISN (Support E.)	3825/2	EMCO	9210-2007	05/15/98	05/15/99
Preamplifier	8447F	H P	2944A03706	05/13/98	05/15/99
Line switch box	AC1-003	TRC	-----	05/15/98	05/15/99
Line selector	AC1-002	TRC	-----	05/15/98	05/15/99

The level of confidence of 95%, the uncertainty of measurement of radiated emission is  $\pm 4.96$  dB.

### **Test Result : Pass (Appendix A)**

### *Chapter 3 Radiated emission test*

***Test condition and setup :***

***Pretest :*** Prior to the final test (OATS test), the EUT is placed in a shielded enclosure, and scan from 30MHz to 1GHz. This is done to ensure the radiation exactly emits from the EUT.

***Final test :*** Final radiation measurements is made on a **3 meter**, open-field test site. The EUT is placed on a nonconductive table which is 0.8 cm height, the top surface is 1.0 x 1.5 meter. All the placement is according to ANSI C63.4 - 1992.

The spectrum is examined from 30 MHz to 1000 MHz measured by HP spectrum.

The Chase whole range Antenna is used to measure frequency from 30 MHz to 1GHz. Measure more than six top marked frequencies generated from pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meter to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer's 6dB bandwidth is set to 120 K Hz, and the EUT is measured at quasi-peak mode.

***List of test Instrument :***

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next</u>
Spectrum analyzer	8568B	H P	3004A18617	05/15/98	05/15/99
Quasi-peak Adapter	85650A	H P	2521A00984	05/15/98	05/15/99
RF Pre-selector	85685A	H P	2947A01011	05/15/98	05/15/99
Spectrum analyzer	8591EM	H P	3710A01203	01/29/99	01/29/00
Antenna (30M-2G Hz)	3142	EMCO	1296	06/10/98	06/10/99
Open test side (Antenna, Amplify, cable calibrated together)				05/15/98	05/15/99

The level of confidence of 95%, the uncertainty of measurement of radiated emission is  $\pm 4.96$  dB.

***Test Result : Pass (Appendix B)***

## **Chapter 4 Verify Frequencies and Channels**

### **Verify the Frequency Pairs**

<b>Channel</b>	<b>Handset (MHz)</b>	<b>Base (MHz)</b>	<b>Channel</b>	<b>Handset (MHz)</b>	<b>Base (MHz)</b>
1	48.760	43.720	14	49.460	44.460
2	48.840	43.740	15	49.500	44.480
3	48.860	43.820	16	49.670	46.610
4	48.920	43.840	17	49.845	46.630
5	49.019	43.920	18	49.860	46.670
6	49.080	43.960	19	49.770	46.710
7	49.100	44.120	20	49.875	46.730
8	49.160	44.160	21	49.830	46.770
9	49.200	44.180	22	49.890	46.830
10	49.240	44.200	23	49.930	46.870
11	49.280	44.320	24	49.990	46.930
12	49.360	44.360	25	49.970	46.970
13	49.400	44.400			

### **Verify the “Automatic Channel Selection Mechanism”**

1. Using another cordless phone (EUT 1) which was set at channel one (43.72), then using 2.5 kHz modulation signal to the handset’s microphone.
2. Turn on the handset of EUT 2, recorded the frequency of base.
3. Then push the “Channel” button which is set for channel - scanning and listened to the handset if the 2.5 kHz can heard on the handset of EUT 2.
4. Repeated step 3 more than 30 times, then checked if channel one get recorded.
5. Adjusted the channel to 15, repeated all step again.

**Result : EUT 2 was unable to occupy the channel being used.**

## Chapter 5 Occupied bandwidth test

### Test condition and setup :

#### Handset :

- (1) Setup as the configuration (4 -1) next page.
- (2) **Press "Talk " button to link and select Channel 1(or 2,3,4,5).**
- (3) Centered the selected frequency and Setup the spectrum Span=40KHz or 50KHz, RB=300Hz; Setup the frequency of modulation meter.
- (4) Setup the SG=2.5KHz and take the handset as close as to the output speaker.
- (5) Plot the carrier without modulation.
- (6) Turn on the Amplify and adjust the output level until getting the max. deviation (D) read from modulation meter. (Be sure the  $D < 100$  Hz when SG no output)
- (7) Adjust the SG level until getting 85% max. deviation. (i.e.  $0.85 \times D$  KHz )
- (8) Plot the modulation bandwidth, 26 dB down from the unmodulation carrier.
- (9) Turn the output level to zero and off the amplify.
- (10) **Select Handset to Channel 25 (or 24,23,22,21).**
- (11) Repeat the procedure (3) to (9).

#### Base :

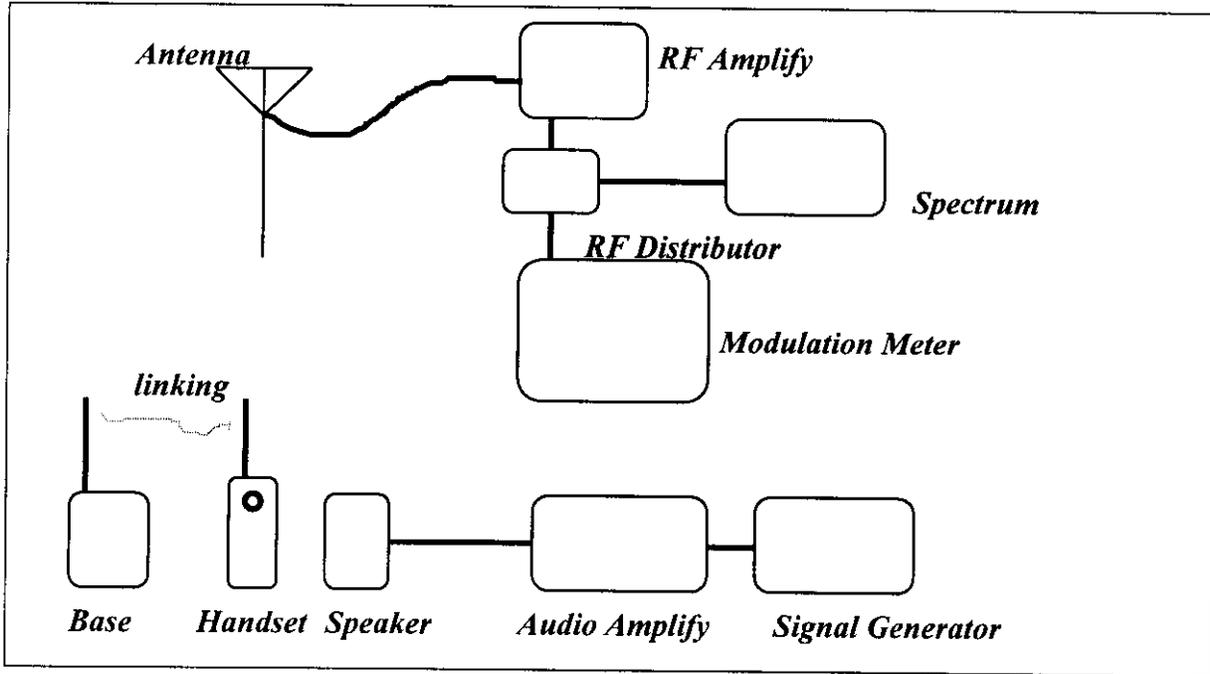
- (1) Setup as the configuration (4-2) next page and dial "1" to mute the dial tone.
- (2) **Press "Talk " button to link and select Channel 1 (or 2,3,4,5)**
- (3) Centered frequency at selected channel and Repeat the step (5)-(9) of handset.
- (4) **Select Handset to Channel 25(or 24,23,21)**
- (5) Centered frequency at selected channel and Repeat the step (5)-(9) of handset.

### List of test Instrument :

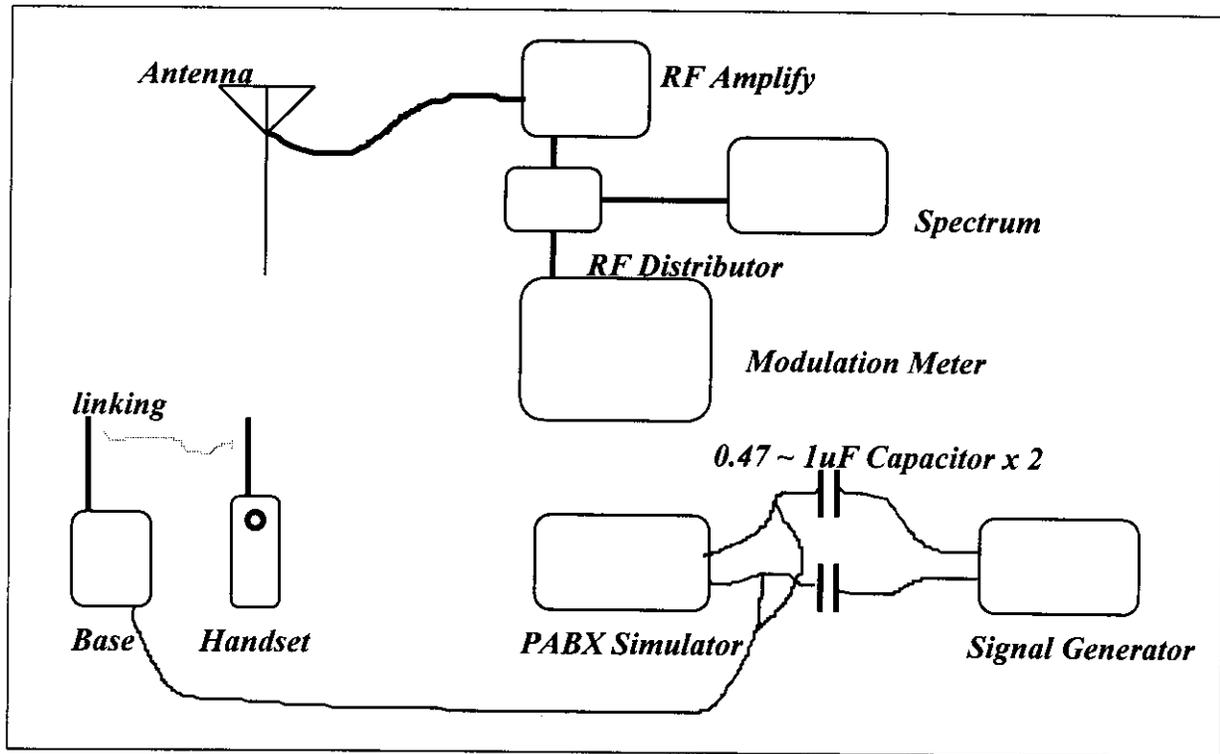
<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Remark</u>
Spectrum Analyzer	8591A	HP	1.8GHz
Signal Generator	8116A	HP	50MHz
RF Amplify	TIA-1000-1R8	Mini-Circuits	35dB
Modulation Meter	AMM2000	Farnell	
Antenna (30M Hz -300 Hz)	3110	EMCO	300MHz
Audio Amplify	A-305	Pioneer	

### Test Result : Pass ( Appendix C )

**Configuration of occupied BW test for Handset : (4-1)**



**Configuration of occupied BW test for Base : (4-2)**



## **Chapter 6 Frequency Stability Measurement**

### **Test condition and setup :**

#### **Item 1 : Temperature variation**

- (1) Setup as the configuration (5-1) next page.
- (2) Put the handset and base into the chamber.
- (3) Set handset and base to channel 1, and verify the frequency on spectrum.
- (4) Setup Spectrum, set counter on ,Decrease the Span until the reading is correct.
- (5) Turn on the chamber and set the temperature to  $-20^{\circ}\text{C}$ .
- (6) Keeping the setting temperature 10 min. and record the frequency by counter on.
- (7) Set the temperature to  $25^{\circ}\text{C}$  and repeat Step (6).
- (8) Set the temperature to  $50^{\circ}\text{C}$  and repeat Step (6), then turn off the chamber.
- (9) Set handset and base to channel 25, and verify the frequency on spectrum.
- (10) Repeat Step (5) to (9). (Temperature can be set up from  $50^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$ )

#### **Item 2 : Power Voltage variation**

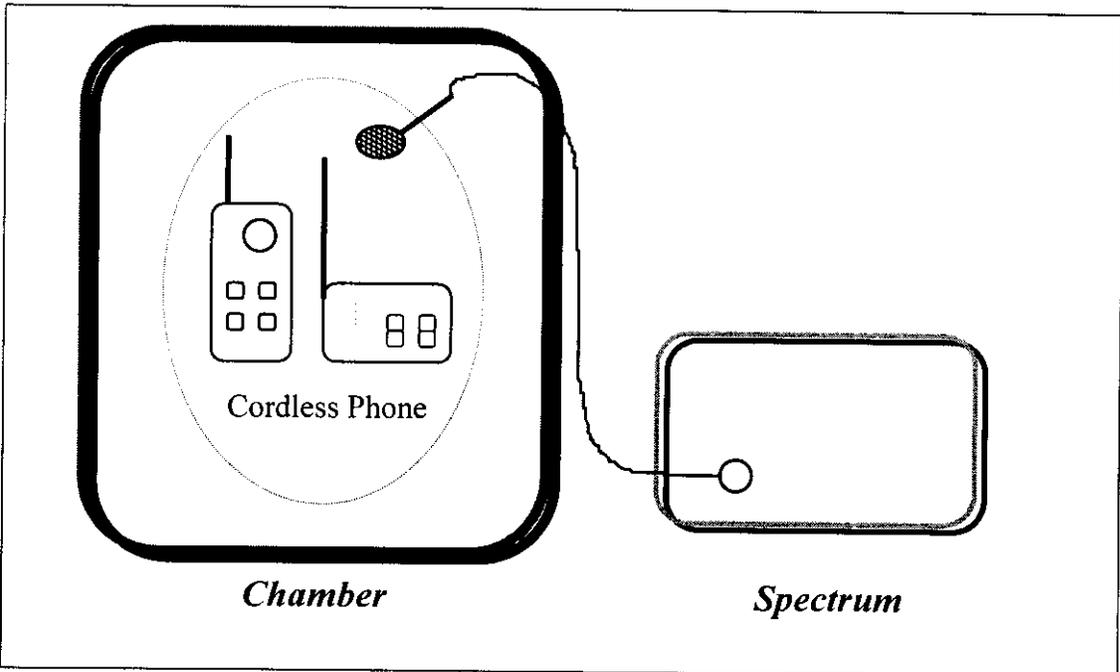
- (1) Setup as the configuration (5-2) next page.
- (2) Do the step (3),(4) of Item 1 test.
- (3) Base: Adjust the auto-transformer to 102, 120, 138 VAC and record the frequency separately.
- (4) Adjust the auto-transformer to Endpoint voltage and record the voltage.
- (5) Handset: Adjust the power supply to 3.06,3.6,4.14VDC and record the frequency separately.
- (6) Adjust the power supply to Endpoint voltage and record the voltage.
- (7) Set handset and base to channel 25, and verify the frequency on spectrum.
- (8) Repeat Step (3) to (6).

### **List of test Instrument :**

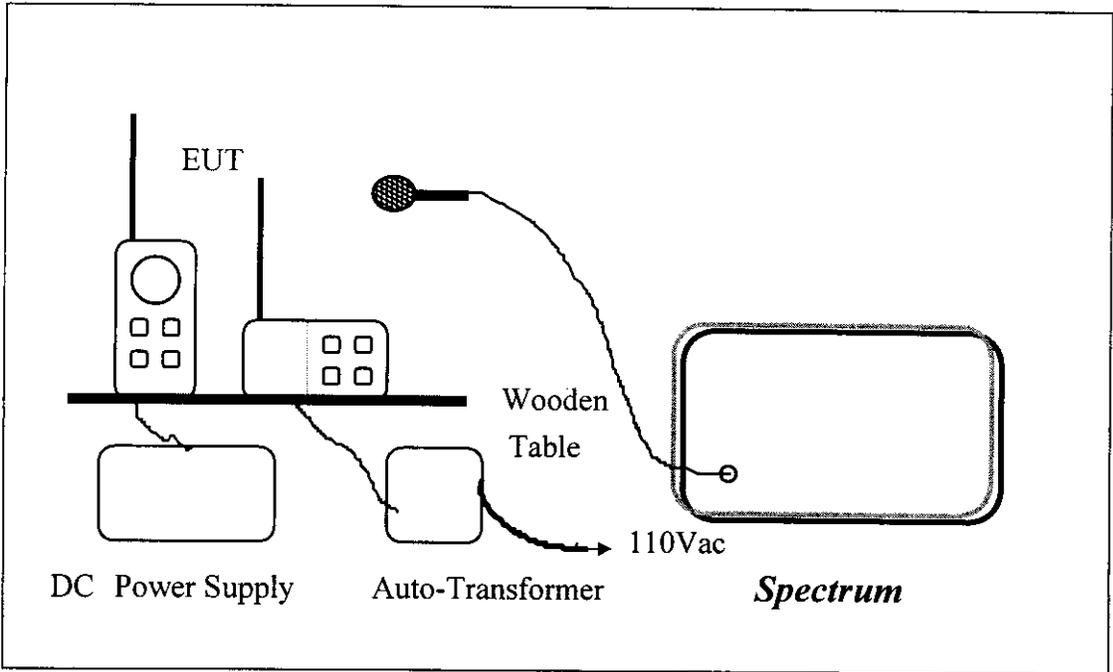
<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Remark</u>
Spectrum Analyzer	8591A	H P	1.8GHz
Temperature Chamber	THS-MV2	King Son	
Near field Probe	7405-901	EMCO	
Power Supply			
Auto Transformer	Powerstat	Supprior Elec. Co.	

### **Test Result : Pass (Appendix D)**

**Configuration of Temperature variation test : (5-1)**



**Configuration of Voltage variation test : (5-2)**



**Appendix A**

**Conducted Emission Test Result : ( Channel 1 )**

Testing room : Temperature : 23° C

Humidity : 65 %

**Line 1**

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
764.00	20.55	48.00	-27.45
783.00	20.30	48.00	-27.70
***			

**Line 2**

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
***			

*All the emissions are under limit 20 dB.*

**Conducted Emission Test Result : ( Channel 25 )**

Testing room : Temperature : 23° C

Humidity : 65 %

***Line 1***

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
***			

***Line 2***

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
***			

***All the emissions are under limit 20 dB.***

**Conducted Emission Test Result : ( Charging )**

Testing room : Temperature : 23° C

Humidity : 65 %

**Line 1**

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
769.00	20.90	48.00	-27.10
***			

**Line 2**

<i>Frequency (KHz)</i>	<i>Amplitude (dBuV)</i>	<i>Limit (dBuV)</i>	<i>Margin (dB)</i>
***			

*All the emissions are under limit 20 dB.*



**Radiated Emission Test Result : (Base CH1 - Vertical)**

Test Conditions:

Testing room : Temperature : 21 ° C Humidity : 69 % RH

Testing site : Temperature : 19 ° C Humidity : 82 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBuV	m	degree	dB/m	dBuV/m	dBuV/m	dB

43.719	88.90	1.00	223	-12.88	76.02	80.00	-3.98
87.439	34.30	1.00	126	-15.43	18.87	40.00	-21.13
131.159	37.30	1.00	185	-15.52	21.78	43.50	-21.72



**Radiated Emission Test Result : (Base CH25 – Vertical)**

Test Conditions:

Testing room : Temperature : 21 ° C      Humidity : 69 % RH

Testing site : Temperature : 19 ° C      Humidity : 82 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBuV	m	degree	dB/m	dBuV/m	dBuV/m	dB

46.969	85.80	1.00	195	-13.82	71.98	80.00	-8.02
93.941	50.00	1.00	105	-15.08	34.92	43.50	-8.58
140.911	41.00	1.00	148	-14.85	26.15	43.50	-17.35
187.883	48.30	1.00	142	-12.55	35.75	43.50	-7.75
234.855	36.80	1.00	159	-10.56	26.24	46.00	-19.76
***							

**Radiated Emission Test Result : (Handset CH1 – Horizontal)**

Test Conditions:

Testing room : Temperature : 21 ° C      Humidity : 70 % RH

Testing site : Temperature : 19 ° C      Humidity : 82 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBuV	m	degree	dB/m	dBuV/m	dBuV/m	dB

48.761	64.00	1.00	158	-14.34	49.66	80.00	-30.34
***							

**Radiated Emission Test Result : (Handset CH1 - Vertical)**

Test Conditions:

Testing room : Temperature : 21 ° C      Humidity : 70 % RH

Testing site : Temperature : 19 ° C      Humidity : 82 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBuV	m	degree	dB/m	dBuV/m	dBuV/m	dB

48.761	79.90	1.00	226	-14.34	65.56	80.00	-14.44
51.925	39.20	1.00	109	-15.01	24.19	40.00	-15.81
146.280	39.60	1.00	237	-14.59	25.01	43.50	-18.49
***							



**Radiated Emission Test Result : (Handset CH25 - Vertical)**

Test Conditions:

Testing room : Temperature : 21 ° C Humidity : 65 % RH

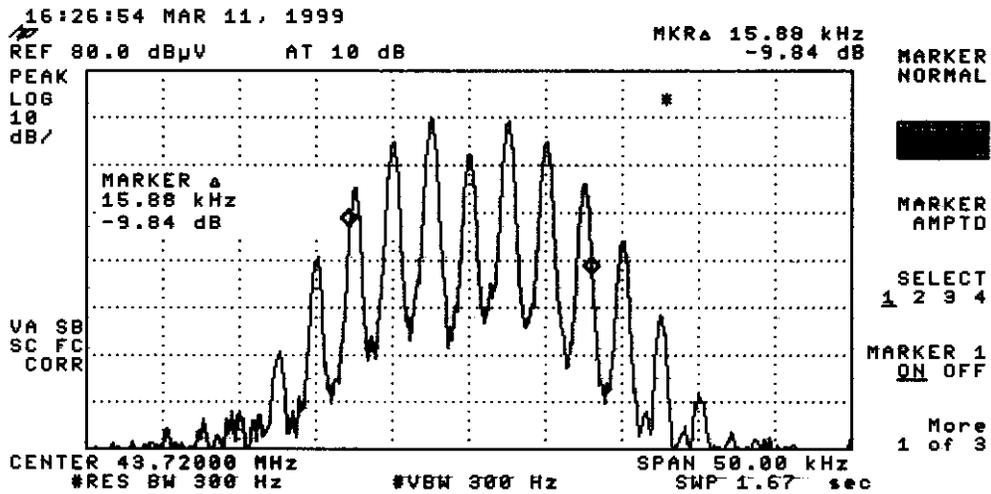
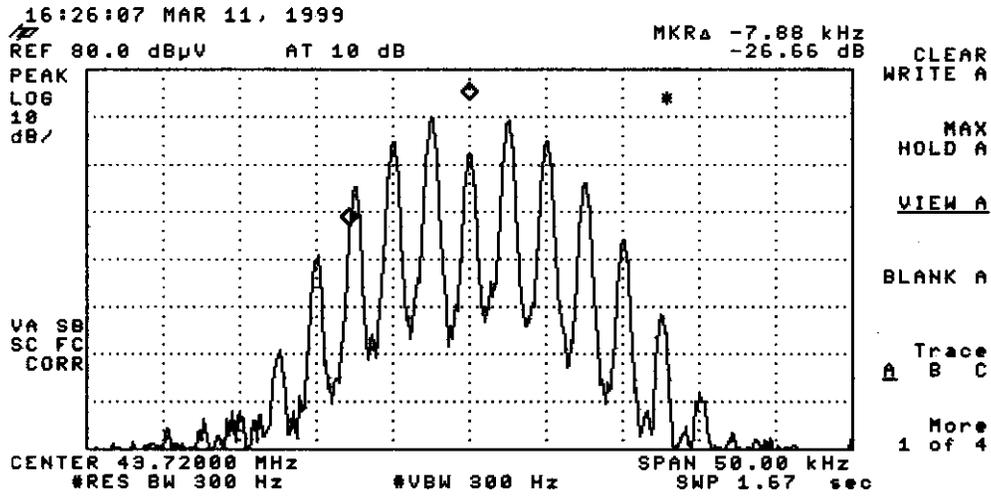
Testing site : Temperature : 19 ° C Humidity : 82 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBuV	m	degree	dB/m	dBuV/m	dBuV/m	dB

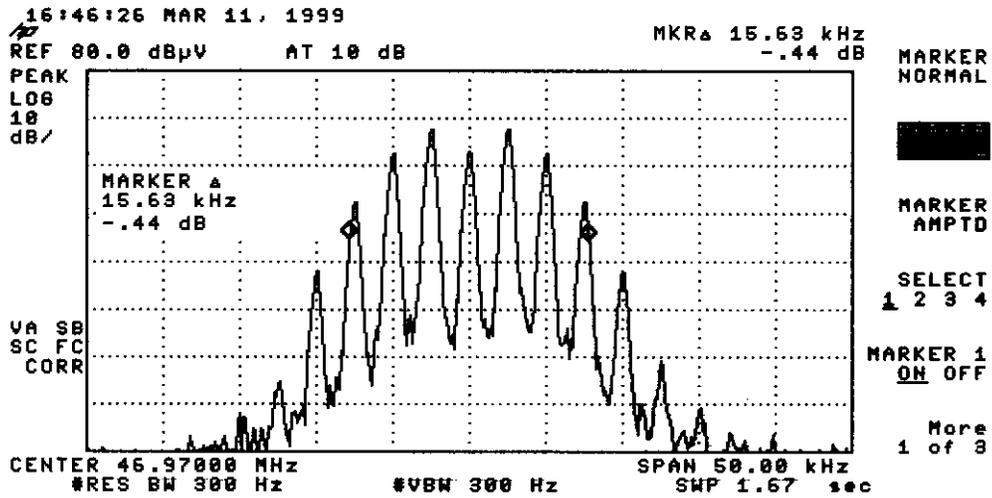
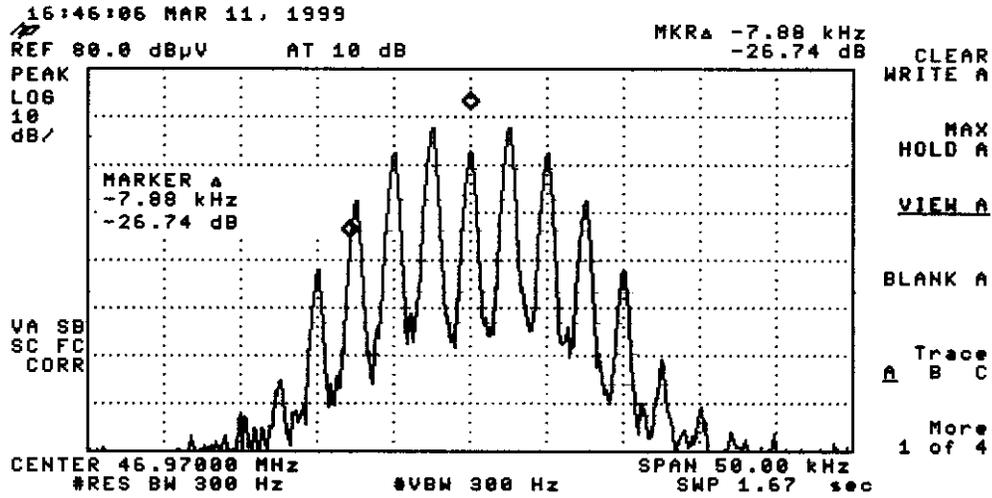
49.971	81.60	1.00	233	-14.69	66.91	80.00	-13.09
63.633	45.20	1.00	181	-16.45	28.75	40.00	-11.25
99.942	43.70	1.00	257	-14.90	28.80	43.50	-14.70
149.912	35.90	1.00	108	-14.40	21.50	43.50	-22.00
***							

### Appendix C

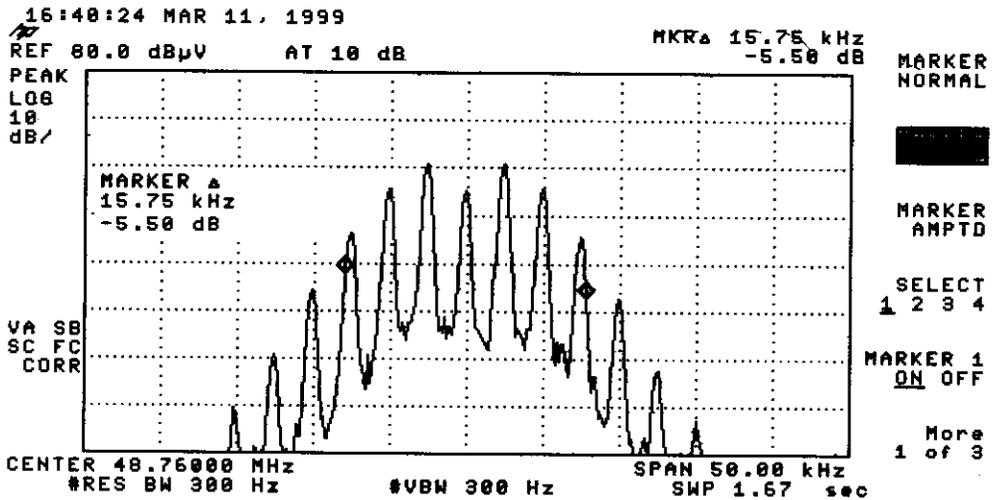
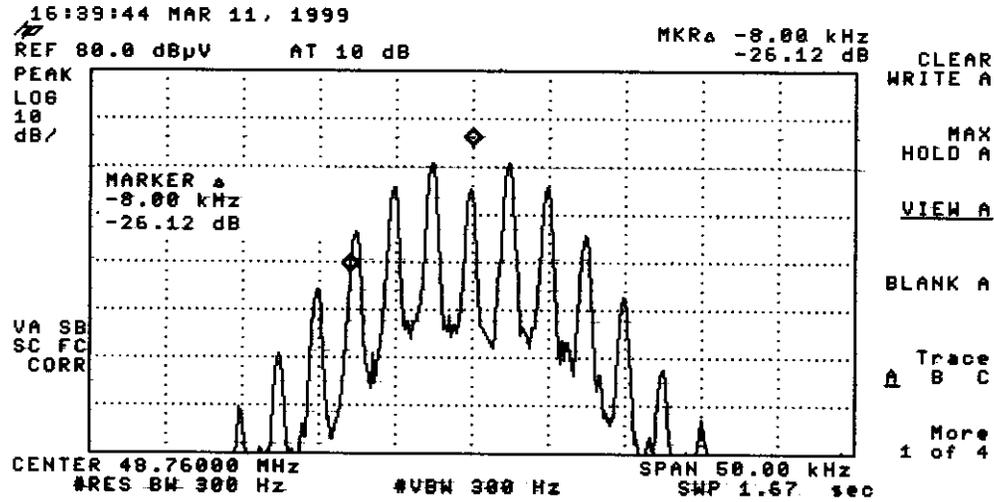
Occupied BW plots : BASE CH01



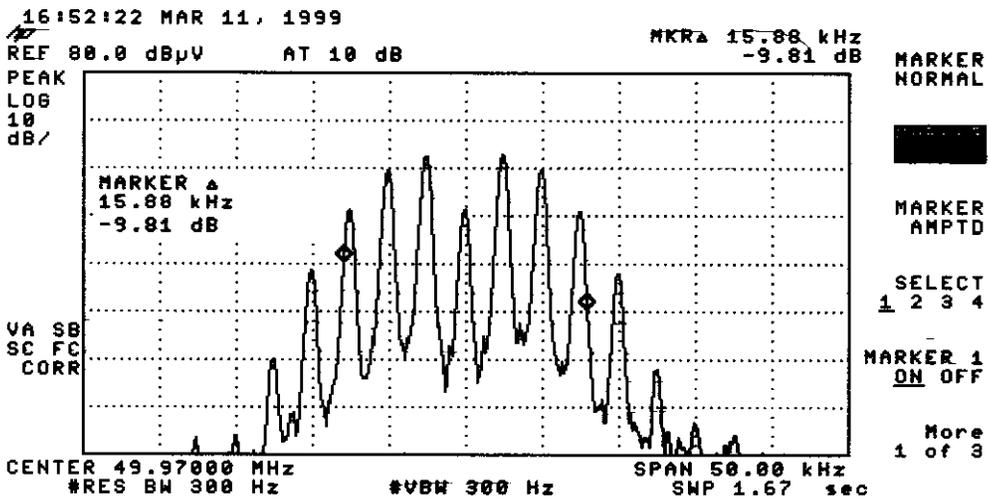
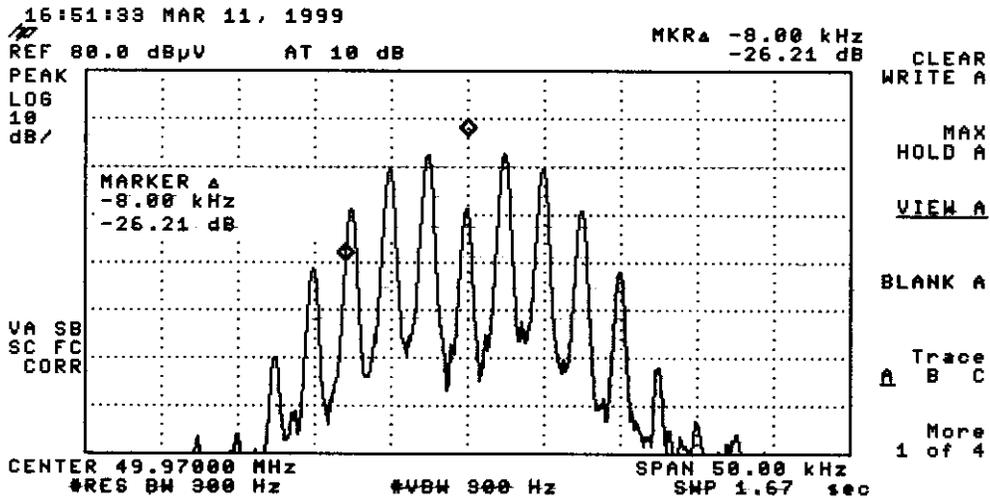
Occupied BW plots : BASE CH25



Occupied BW plots : **HANDSET CH01**



Occupied BW plots : **HANDSET CH25**



## Appendix D

### Frequency Stability at Temperature Variation (CH 1)

DEVICE TESTED	TEMP. (°C)	TIME (MIN.)	FREQUENCY (MHz)	TOLERANCE (MHz)
BASE	-20	2	43.71998	43.71563 ~ 43.72437
BASE	-20	5	43.71997	43.71563 ~ 43.72437
BASE	-20	10	43.71992	43.71563 ~ 43.72437
HS	-20	2	48.75997	48.75513 ~ 48.76487
HS	-20	5	48.75997	48.75513 ~ 48.76487
HS	-20	10	48.75996	48.75513 ~ 48.76487
BASE	25	2	43.72000	43.71563 ~ 43.72437
BASE	25	5	43.72000	43.71563 ~ 43.72437
BASE	25	10	43.72000	43.71563 ~ 43.72437
HS	25	2	48.76000	48.75513 ~ 48.76487
HS	25	5	48.76000	48.75513 ~ 48.76487
HS	25	10	48.76000	48.75513 ~ 48.76487
BASE	50	2	43.71999	43.71563 ~ 43.72437
BASE	50	5	43.71999	43.71563 ~ 43.72437
BASE	50	10	43.71998	43.71563 ~ 43.72437
HS	50	2	48.75999	48.75513 ~ 48.76487
HS	50	5	48.75998	48.75513 ~ 48.76487
HS	50	10	48.75996	48.75513 ~ 48.76487

**Frequency Stability at Temperature Variation (CH 25)**

<b>DEVICE TESTED</b>	<b>TEMP. (°C)</b>	<b>TIME (MIN.)</b>	<b>FREQUENCY (MHz)</b>	<b>TOLERANCE (MHz)</b>
BASE	-20	2	46.97003	46.96530 ~ 46.97469
BASE	-20	5	46.97002	46.96530 ~ 46.97469
BASE	-20	10	46.96997	46.96530 ~ 46.97469
HS	-20	2	49.97000	49.96500 ~ 49.97499
HS	-20	5	49.97004	49.96500 ~ 49.97499
HS	-20	10	49.97005	49.96500 ~ 49.97499
BASE	25	2	46.97002	46.96530 ~ 46.97469
BASE	25	5	46.97002	46.96530 ~ 46.97469
BASE	25	10	46.97002	46.96530 ~ 46.97469
HS	25	2	49.97000	49.96500 ~ 49.97499
HS	25	5	49.97000	49.96500 ~ 49.97499
HS	25	10	49.97000	49.96500 ~ 49.97499
BASE	50	2	46.97003	46.96530 ~ 46.97469
BASE	50	5	46.97003	46.96530 ~ 46.97469
BASE	50	10	46.97005	46.96530 ~ 46.97469
HS	50	2	49.97002	49.96500 ~ 49.97499
HS	50	5	49.97003	49.96500 ~ 49.97499
HS	50	10	49.97005	49.96500 ~ 49.97499

**Frequency Stability at Voltage Variation (CH 1)**

<b>Power Supply</b>	<b>Frequency (MHz)</b>	<b>Tolerance (MHz)</b>
Base 102 AC (85%)	43.72001	43.71462 ~ 43.72437
Base 120 AC (100%)	43.72000	43.71462 ~ 43.72437
Base 138 AC (120%)	43.72002	43.71462 ~ 43.72437
Base END-POINT	76.0 V	
Handset 3.06 DC (85%)	*	48.75512 ~ 48.76487
Handset 3.60 DC (100%)	48.760000	48.75512 ~ 48.76487
Handset 4.14 DC (120%)	48.760000	48.75512 ~ 48.76487
Handset END-POINT	3.15 V	

“\*”: The power is under “End-point” voltage.

**Frequency Stability at Voltage Variation (CH 25)**

<b>Power Supply</b>	<b>Frequency (MHz)</b>	<b>Tolerance (MHz)</b>
Base 102 AC (85%)	46.97000	46.96530 ~ 46.97469
Base 120 AC (100%)	46.97000	46.96530 ~ 46.97469
Base 138 AC (120%)	46.97001	46.96530 ~ 46.97469
End-point Voltage	76.00 V	
Handset 3.06 DC (85%)	*	49.96530 ~ 49.97469
Handset 3.60 DC (100%)	49.97002	49.96530 ~ 49.97469
Handset 4.14 DC (120%)	49.97002	49.96530 ~ 49.97469
End-point Voltage	3.15 V	

“\*”: The power is under “End-point” voltage.

*Follow chart of channel selection*