

TECOM CO., LTD.  
FCC ID.: D6XIBM4900  
EUT : 4 LINE NOKSU WITH CORDLESS HANDSET

## ***Exhibit A ..... Technical Report, Diagram***

### **Applicant Name And Address**

***Their full name and mailing address is given below:***

***Name*** : ***TECOM CO., LTD.***

***Address*** : ***23, R & D Rd. 2, SCIENCE-BASED INDUSTRIAL PARK,  
HSIN-CHU, TAIWAN, R.O.C.***

***Model No.*** : ***IBM-4900***

***Brand Name*** : ***IBM***

TECOM CO., LTD.  
FCC ID.: D6XIBM4900  
EUT : 4 LINE NOKSU WITH CORDLESS HANDSET

## ***Exhibit C ..... Measurement Report***

# EMI TEST REPORT

FCC ID. : D6XIBM4900

Product : 4 LINE NOKSU WITH CORDLESS HANDSET

Model No. : IBM-4900

Applicant : TECOM CO., LTD.

Manufacturer : TECOM CO., LTD.  
IN-TEC GLOBAL PTE LTD.  
PCI LIMITED.

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C  
(1997)

Report Number : ET88S-06-071

Issued Date : Jun. 07, 1999

The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product. This report shall not be reproduced except in full, without the approval of ETC.

BSMI ISO 9002 and Guide 25.

TÜV Product Service ISO9002 and EN45001.

NIST NVLAP Accredited Laboratory for FCC Part 15/ CISPR 22/ AS/NZS 3548.

CNLA ISO/ IEC Guide 25.

NEMKO, FIMKO , SGS , TÜV Laboratory Assessment.

FCC, VCCI Registered.

## TEST REPORT CERTIFICATION

Applicant : TECOM CO., LTD.  
23, R&D ROAD 2, SCIENCE-BASED INDUSTRIAL PARK,  
HSIN-CHU, TAIWAN, R.O.C.

Manufacturer : TECOM CO., LTD.  
23, R&D ROAD 2, SCIENCE-BASED INDUSTRIAL PARK,  
HSIN-CHU, TAIWAN, R.O.C.

IN-TEC GLOBAL PTE LTD.  
NO. 10 JALAN HASIL,  
KAWASAN PERINDUSTRIAN JALAN HASIL 81200, TAMPOI,  
JOHOR BAHRU, JOHOR MALAYSIA

PCI LIMITED.  
PT PRIMA CIRCULITAMA INDONESIA  
J1. RE MARTADINATA, SEKUPANG, BATAM  
ANDREW WOO K.S.

Description of EUT : 4 LINE NOKSU WITH CORDLESS HANDSET

a) Brand Name : IBM

b) Model No. : IBM-4900

c) FCC ID. : D6XIBM4900

d) Power Supply : Base unit:  
AC Adapter  
(Model: 411204003C0, I/P: 120VAC, 60Hz  
O/P: 12VDC, 0.4A)

Handset:  
Ni-MH Battery  
DC 3.6V, 1200mA/hrs, P/N:AC9401

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (1997)

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

Test Date :

Mar. 15, 1999

Test Engineer :

Approve & Authorized

Signer :

Win-Po Tsai, Supervisor, NVLAP Signatory

EMC Dept. of ELECTRONICS  
TESTING CENTER, TAIWAN

## **TABLE OF CONTENTS**

|                                         |    |
|-----------------------------------------|----|
| TEST REPORT CERTIFICATION               | 2  |
| TABLE OF CONTENTS                       | 3  |
| 1. GENERAL INFORMATION                  | 5  |
| 1.1 Characteristics of Device           | 5  |
| 1.2 Test Methodology                    | 5  |
| 1.3 Test Facility                       | 5  |
| 2. PROVISIONS APPLICABLE                | 6  |
| 2.1 Class Definition                    | 6  |
| 2.2 Class Limitations                   | 6  |
| 2.3 Restricted Bands of Operation       | 8  |
| 2.4 Labelling Requirement               | 9  |
| 2.5 User Information                    | 9  |
| 3. SYSTEM TEST CONFIGURATION            | 10 |
| 3.1 EUT configuration and operating     | 10 |
| 3.2 Tested System Details               | 10 |
| 3.3 Modification                        | 10 |
| 4. RADIATED EMISSION MEASUREMENT        | 11 |
| 4.1 Applicable Standard                 | 11 |
| 4.2 Measurement Procedure               | 11 |
| 4.3 Radiated Emission Data              | 13 |
| 4.4 Field Strength Calculation          | 20 |
| 4.5 Radiated Measuring Equipment        | 20 |
| 4.6 Photos of Radiation Measuring Setup | 21 |
| 4.6 Photos of Radiation Measuring Setup | 22 |
| 5. CONDUCTED EMISSION MEASUREMENT       | 23 |
| 5.1 Applicable Standard                 | 23 |
| 5.2 Measurement Procedure               | 23 |
| 5.3 Conducted Emission Data             | 24 |

# **ETC** ELECTRONICS TESTING CENTER(ETC), TAIWAN

|     |                                      |    |
|-----|--------------------------------------|----|
| 5.4 | Result Data Calculation              | 30 |
| 5.5 | Conducted Measurement Equipment      | 30 |
| 5.6 | Photos of Conduction Measuring Setup | 31 |
| 6.  | ANTENNA REQUIREMENT                  | 32 |
| 6.1 | Applicable Standard                  | 32 |
| 6.2 | Antenna Construction                 | 32 |
| 7.  | BAND EDGES MEASUREMENT               | 33 |
| 7.1 | Applicable Standard                  | 33 |
| 7.2 | Measurement Procedure                | 33 |
| 7.3 | Measurement Equipment                | 33 |
| 7.4 | Measurement Data                     | 34 |

## **1. GENERAL INFORMATION**

### **1.1 Characteristics of Device**

The IBM-4900 consists of one base unit and one cordless handset provides RF links for intercom and outside call.

### **1.2 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4, Radiated testing was performed at an antenna to EUT distance of 3 meters.

### **1.3 Test Facility**

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data is located at No. 8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kui-Shan Hsiang, Taoyuan, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated July 07, 1998.

## 2. PROVISIONS APPLICABLE

### 2.1 Class Definition

**Unintentional radiator:**

A device that intentionally generates and emits 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 marketed 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 or 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 Class Limitations

(1) Conducted Emission Requirement

For unintentional device, according to § 15.107(a) Line Conducted Emission Limit is as following :

| Frequency<br>MHZ | Emissions<br>uV | Emissions<br>dBuV |
|------------------|-----------------|-------------------|
| 0.45 - 30.0      | 250             | 48.0              |

**(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<br>MHZ | Distance<br>Meters | Radiated<br>uV/m | Radiated<br>dBuV/m |
|------------------|--------------------|------------------|--------------------|
| 30 - 88          | 3                  | 100              | 40.0               |
| 88 - 216         | 3                  | 150              | 43.5               |
| 216 - 960        | 3                  | 200              | 46.0               |
| above 960        | 3                  | 500              | 54.0               |

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 radiated emissions comply with the following values :

| Frequency<br>MHZ | Distance<br>Meters | Fundamental |      | Harmonic |      |
|------------------|--------------------|-------------|------|----------|------|
|                  |                    | dBuV/m      | mV/m | dBuV/m   | uV/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  | 54       | 2500 |

In according with § 15.249(d), limits shown in above table are based on average limits for frequencies above 1000MHz, and frequencies below 1000MHz 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) 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.

**(4) Band edges measurement**

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 radiated emission limits in § 15.209.

**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     | 4.5-5.25    |
| 0.490 - 0.510     | 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       |                       |               |             |

## 2.4 Labelling 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 (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 EUT configuration and operating

For both radiated and conducted emissions, the system was configured for testing in a typical fashion as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation.

#### 3.2 Tested System Details

The Tested System Detail equipment, plus description of all cables used in the tested system are :

| Description                                | Model No.   | FCC ID.    | Manufacturer                                         | Cable                                    |
|--------------------------------------------|-------------|------------|------------------------------------------------------|------------------------------------------|
| 4 LINE NOKSU<br>WITH CORDLESS<br>HANDSET * | IBM-4900    | D6XIBM4900 | TECOM/<br>IN-TEC GLOBAL<br>PTE LTD./<br>PCI Limited. | Telephone Line<br>1.8m x 3<br>Unshielded |
| Adapter *                                  | 411204003C0 | ----       | ----                                                 | DC Line<br>3.0m Unshielded               |
| Telephone<br>Analyzer                      | 1076-A      | ----       | SYSGRATION LTD.                                      | Power cord<br>1.5m Unshielded            |

Note : “\*” means equipment under test.

#### 3.3 Modification

(If any deviation from additions to or exclusions from test method must be stated)

N/A

## **4. RADIATED EMISSION MEASUREMENT**

### **4.1 Applicable Standard**

For intentional radiator digital devices, 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 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 & 2.
- (2). For emission frequencies measurement is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured.
- (3). 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 the 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.
- (4). Repeat step 3 until all frequencies need to be measured were complete.
- (5). Repeat step 4 with search antenna in vertical polarized orientations.
- (6). Check the frequency of the highest emission with varying the placement of cables associated with EUT to obtain the worst case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

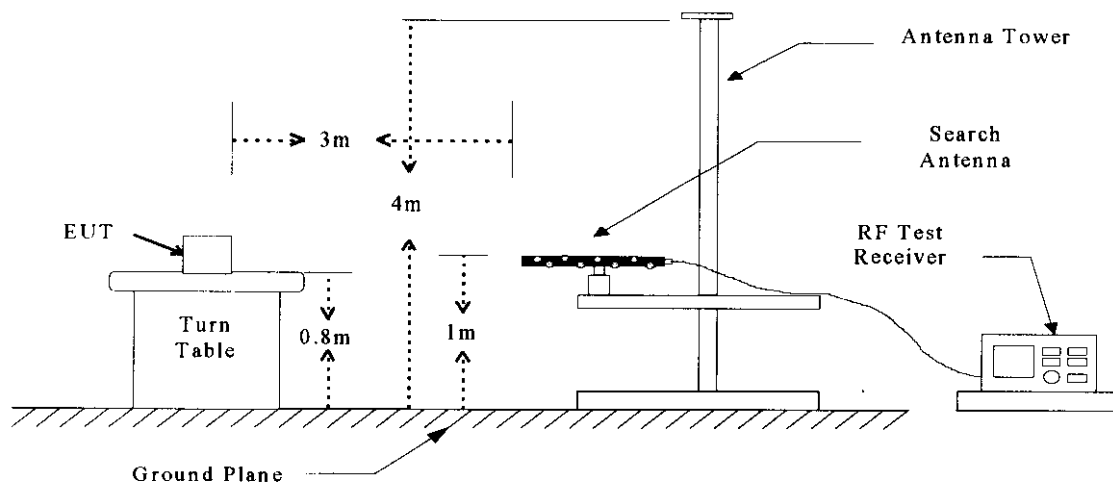
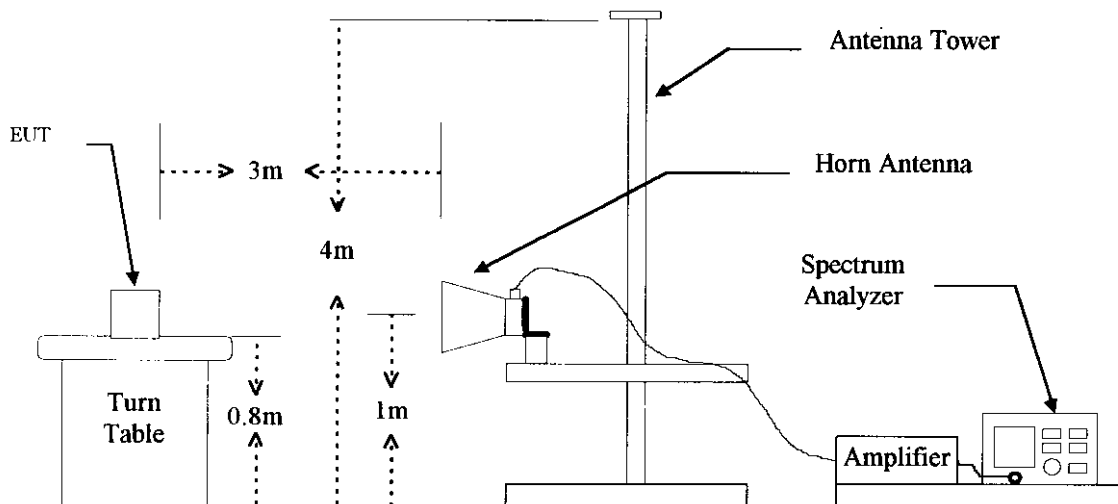


Figure 2 : Frequencies measured above 1 GHz configuration



### 4.3 Radiated Emission Data

#### 4.3.1 Fundamental and Harmonics

Operation Mode : Transmitting

(1) Base, voice channel 1

Test Date : Mar. 15, 1998

Temperature: 27 °C

Humidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
| 903.225                          | 52.1                      | 51.0  | 30.4                       | 82.5                  | 81.4  | 94.0              | -11.5             |
| 1806.450                         | 54.8                      | 54.5  | -5.5                       | 49.3                  | 49.0  | 54.0              | -4.8              |
| 2709.675                         | 45.4                      | 45.8  | -2.0                       | 43.4                  | 43.8  | 54.0              | -10.2             |
| 3612.900                         | 44.4                      | 44.0  | 0.6                        | 45.0                  | 44.6  | 54.0              | -9.0              |
| 4516.125                         | ----                      | ----  | 2.1                        | ----                  | ----  | 54.0              | ----              |
| 5419.350                         | 32.7                      | ----  | 4.3                        | 37.0                  | ----  | 54.0              | -17.0             |
| 6322.575                         | ----                      | 35.0  | 4.5                        | ----                  | 39.5  | 54.0              | -14.5             |
| 7225.800                         | ----                      | ----  | 5.8                        | ----                  | ----  | 54.0              | ----              |
| 8129.025                         | ----                      | ----  | 6.2                        | ----                  | ----  | 54.0              | ----              |
| 9032.250                         | ----                      | ----  | 6.9                        | ----                  | ----  | 54.0              | ----              |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.  
2. "----" means the noise is too low to be measured.

(2) Base, voice channel 41

Test Date : Mar. 15, 1998Temperature: 27 °CHumidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
|                                  |                           |       |                            |                       |       |                   |                   |
| 915.225                          | 51.3                      | 49.5  | 30.4                       | 81.7                  | 79.9  | 94.0              | -12.3             |
| 1830.450                         | 51.8                      | 52.2  | -5.5                       | 46.3                  | 46.7  | 54.0              | -7.4              |
| 2745.675                         | 48.1                      | 43.4  | -2.0                       | 46.1                  | 41.4  | 54.0              | -7.9              |
| 3660.900                         | 42.1                      | 43.8  | 0.6                        | 42.7                  | 44.4  | 54.0              | -9.6              |
| 4576.125                         | ----                      | ----  | 2.1                        | ----                  | ----  | 54.0              | ----              |
| 5491.350                         | ----                      | ----  | 4.3                        | ----                  | ----  | 54.0              | ----              |
| 6406.575                         | 32.2                      | ----  | 4.5                        | 36.7                  | ----  | 54.0              | -17.3             |
| 7321.800                         | ----                      | ----  | 5.9                        | ----                  | ----  | 54.0              | ----              |
| 8237.025                         | ----                      | ----  | 6.3                        | ----                  | ----  | 54.0              | ----              |
| 9152.250                         | ----                      | ----  | 7.0                        | ----                  | ----  | 54.0              | ----              |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.  
2. "----" means the noise is too low to be measured.

(3) Base, voice channel 80

Test Date : Mar. 15, 1998

Temperature: 27 °C

Humidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
| 926.900                          | 56.9                      | 54.5  | 30.4                       | 87.3                  | 84.9  | 94.0              | -6.7              |
| 1853.800                         | 52.9                      | 53.3  | -5.5                       | 47.4                  | 47.8  | 54.0              | -6.2              |
| 2780.702                         | 45.1                      | 48.0  | -1.9                       | 43.2                  | 46.1  | 54.0              | -7.9              |
| 3707.605                         | 39.8                      | 37.9  | 0.8                        | 40.6                  | 38.7  | 54.0              | -13.4             |
| 4634.505                         | ----                      | ----  | 2.3                        | ----                  | ----  | 54.0              | ----              |
| 5561.406                         | ----                      | ----  | 4.4                        | ----                  | ----  | 54.0              | ----              |
| 6488.304                         | ----                      | 33.3  | 4.5                        | ----                  | 37.8  | 54.0              | -16.2             |
| 7415.203                         | 34.1                      | ----  | 6.0                        | 40.1                  | ----  | 54.0              | -13.9             |
| 8342.101                         | ----                      | ----  | 6.4                        | ----                  | ----  | 54.0              | ----              |
| 9269.010                         | ----                      | ----  | 7.1                        | ----                  | ----  | 54.0              | ----              |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.

2. "----" means the noise is too low to be measured.

(4) Handset, voice channel 1

Test Date : Mar. 15, 1998Temperature: 27 °CHumidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
| 903.225                          | 60.4                      | 58.2  | 30.4                       | 90.8                  | 88.6  | 94.0              | -3.2              |
| 1806.450                         | 50.9                      | 51.1  | -5.7                       | 45.2                  | 45.4  | 54.0              | -8.6              |
| 2709.675                         | 49.7                      | 54.0  | -2.0                       | 47.7                  | 52.0  | 54.0              | -2.0              |
| 3612.900                         | 46.4                      | 46.5  | 0.5                        | 46.9                  | 47.0  | 54.0              | -7.0              |
| 4516.125                         | ----                      | 41.5  | 2.1                        | ----                  | 43.6  | 54.0              | -10.4             |
| 5419.350                         | ----                      | ----  | 4.2                        | ----                  | ----  | 54.0              | ----              |
| 6322.575                         | ----                      | ----  | 4.5                        | ----                  | ----  | 54.0              | ----              |
| 7225.800                         | ----                      | ----  | 5.8                        | ----                  | ----  | 54.0              | ----              |
| 8129.025                         | 42.8                      | ----  | 6.2                        | 49.0                  | ----  | 54.0              | -5.0              |
| 9032.250                         | ----                      | ----  | 6.9                        | ----                  | ----  | 54.0              | ----              |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.

2. "----" means the noise is too low to be measured.

(5) Handset, voice channel 41

Test Date : Mar. 15, 1998Temperature: 27 °CHumidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
| 915.235                          | 59.8                      | 57.4  | 30.4                       | 90.2                  | 87.8  | 94.0              | -3.8              |
| 1830.470                         | 46.7                      | 49.0  | -5.5                       | 41.2                  | 43.5  | 54.0              | -10.5             |
| 2745.705                         | 45.6                      | 46.8  | -2.0                       | 43.6                  | 44.8  | 54.0              | -9.2              |
| 3660.940                         | 46.0                      | 47.7  | 0.6                        | 46.6                  | 48.3  | 54.0              | -5.7              |
| 4576.175                         | ----                      | ----  | 2.1                        | ----                  | ----  | 54.0              | ----              |
| 5491.410                         | ----                      | ----  | 4.3                        | ----                  | ----  | 54.0              | ----              |
| 6406.645                         | ----                      | ----  | 4.5                        | ----                  | ----  | 54.0              | ----              |
| 7321.880                         | ----                      | ----  | 5.9                        | ----                  | ----  | 54.0              | ----              |
| 8237.115                         | ----                      | ----  | 6.3                        | ----                  | ----  | 54.0              | ----              |
| 9152.350                         | ----                      | ----  | 7.0                        | ----                  | ----  | 54.0              | ----              |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.

2. "----" means the noise is too low to be measured.

# ETC ELECTRONICS TESTING CENTER(ETC), TAIWAN

(6) Handset, voice channel 80

Test Date : Mar. 15, 1998

Temperature: 27 °C

Humidity: 70%

| Emission<br>Frequency<br><br>( MHz ) | Meter Reading<br><br>( dBuV ) |       | CORR'd<br>Factor<br><br>( dB ) | Results<br><br>( dBuV/m ) |       | Limit<br><br>(dBuV/m) | Margins<br><br>( dB ) |
|--------------------------------------|-------------------------------|-------|--------------------------------|---------------------------|-------|-----------------------|-----------------------|
|                                      | HOR.                          | VERT. |                                | HOR.                      | VERT. |                       |                       |
|                                      |                               |       |                                |                           |       |                       |                       |
| 926.930                              | 59.9                          | 59.0  | 30.4                           | 90.3                      | 89.4  | 94.0                  | -3.7                  |
| 1853.860                             | 49.2                          | 50.0  | -5.5                           | 43.7                      | 44.5  | 54.0                  | -9.5                  |
| 2780.790                             | 48.4                          | 50.9  | -1.9                           | 46.5                      | 49.0  | 54.0                  | -5.0                  |
| 3707.720                             | 43.0                          | 45.1  | 0.8                            | 43.8                      | 45.9  | 54.0                  | -8.2                  |
| 4634.650                             | ----                          | ----  | 2.3                            | ----                      | ----  | 54.0                  | ----                  |
| 5561.580                             | ----                          | ----  | 4.4                            | ----                      | ----  | 54.0                  | ----                  |
| 6488.512                             | ----                          | ----  | 4.5                            | ----                      | ----  | 54.0                  | ----                  |
| 7415.445                             | ----                          | ----  | 5.9                            | ----                      | ----  | 54.0                  | ----                  |
| 8342.375                             | ----                          | ----  | 6.3                            | ----                      | ----  | 54.0                  | ----                  |
| 9269.300                             | ----                          | ----  | 7.1                            | ----                      | ----  | 54.0                  | ----                  |

Note: 1. Measuring data shown on above table is according to section (2) of 2.2 of this report.

2. "----" means the noise is too low to be measured.

## 4.3.2 Spurious Emission

Operation Mode : Always

Test Date : Mar. 15, 1998Temperature: 27 °CHumidity: 70%

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(dBuV/m) | Margins<br>( dB ) |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|-------------------|-------------------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                   |                   |
| 56.478                           | ----                      | 29.2  | 7.8                        | ----                  | 37.0  | 40.0              | -3.0              |
| 115.213                          | ----                      | 30.8  | 9.4                        | ----                  | 40.2  | 43.5              | -3.3              |
| 192.919                          | ----                      | 21.1  | 12.3                       | ----                  | 33.4  | 43.5              | -10.1             |

Note: 1. Measuring data shown on above table was derived with quasi peak detector function.

2. "----" means the noise is too low to be measured.

#### 4.4 Field Strength Calculation

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

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

where

$$\text{Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

#### 4.5 Radiated Measuring Equipment

The following instrument are used for radiated emissions measurement :

| Equipment         | Manufacturer    | Model No. | Serial No. | Calibrated until |
|-------------------|-----------------|-----------|------------|------------------|
| EMI Test Receiver | Hewlett-Packard | 8546A     | 3411A00192 | Nov. 04, 1999    |
| Spectrum Analyzer | Advantest       | R3271     | 1505001    | Aug. 24, 1999    |
| Horn Antenna      | EMCO            | 3115      | 9107-3729  | Apr. 22, 1999    |
| BiconiLog Antenna | EMCO            | 3142      | 9702-1142  | Aug. 20, 1999    |

Note: The standards used to perform this calibration are traceable to NML/ROC and NIST/USA.

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

| Frequency Band<br>(MHz) | Instrument        | Function   | Resolution<br>bandwidth | Video<br>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                   | Auto               |

## 5. CONDUCTED EMISSION MEASUREMENT

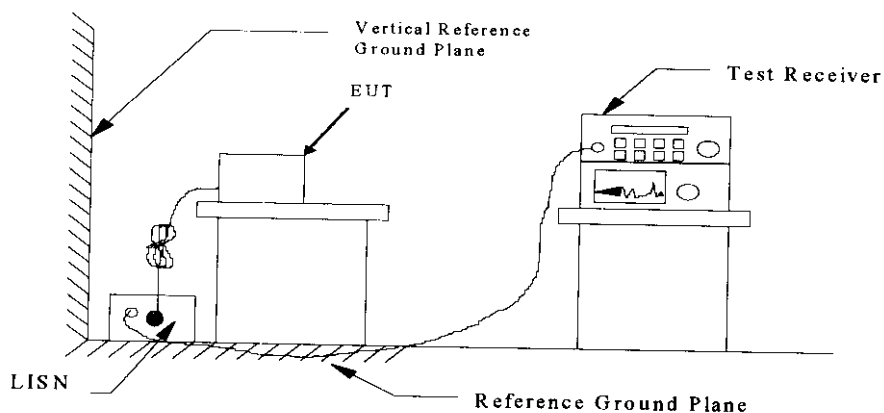
### 5.1 Applicable Standard

For intentional digital devices, Line Conducted Emission Limits are in accordance to § 15.207(a).

### 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 4 to 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 record 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 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

#### (1) Charging unit

Operation Mode : Charging

Test Date : Mar. 04,1999

Temperature : 24 °C

Humidity : 70%

| Frequency | Reading    |      | LISN   | Results    |      | Limit      | Margins |
|-----------|------------|------|--------|------------|------|------------|---------|
|           | dB $\mu$ V |      |        | dB $\mu$ V |      |            |         |
| MHz       | L1         | L2   | Factor | L1         | L2   | dB $\mu$ V | dB      |
| 0.450     | 33.2       | 32.3 | 0.1    | 33.3       | 32.4 | 48.0       | -14.7   |
| 0.732     | ----       | 26.9 | 0.1    | ----       | 27.0 | 48.0       | -21.0   |
| 0.750     | 28.4       | ---- | 0.1    | 28.5       | ---- | 48.0       | -19.5   |
| 5.621     | 22.5       | 20.4 | 0.2    | 22.7       | 20.6 | 48.0       | -25.3   |
| 25.010    | ----       | 17.7 | 0.5    | ----       | 18.2 | 48.0       | -29.8   |
| 25.479    | 23.8       | ---- | 0.5    | 24.3       | ---- | 48.0       | -23.7   |

Note :

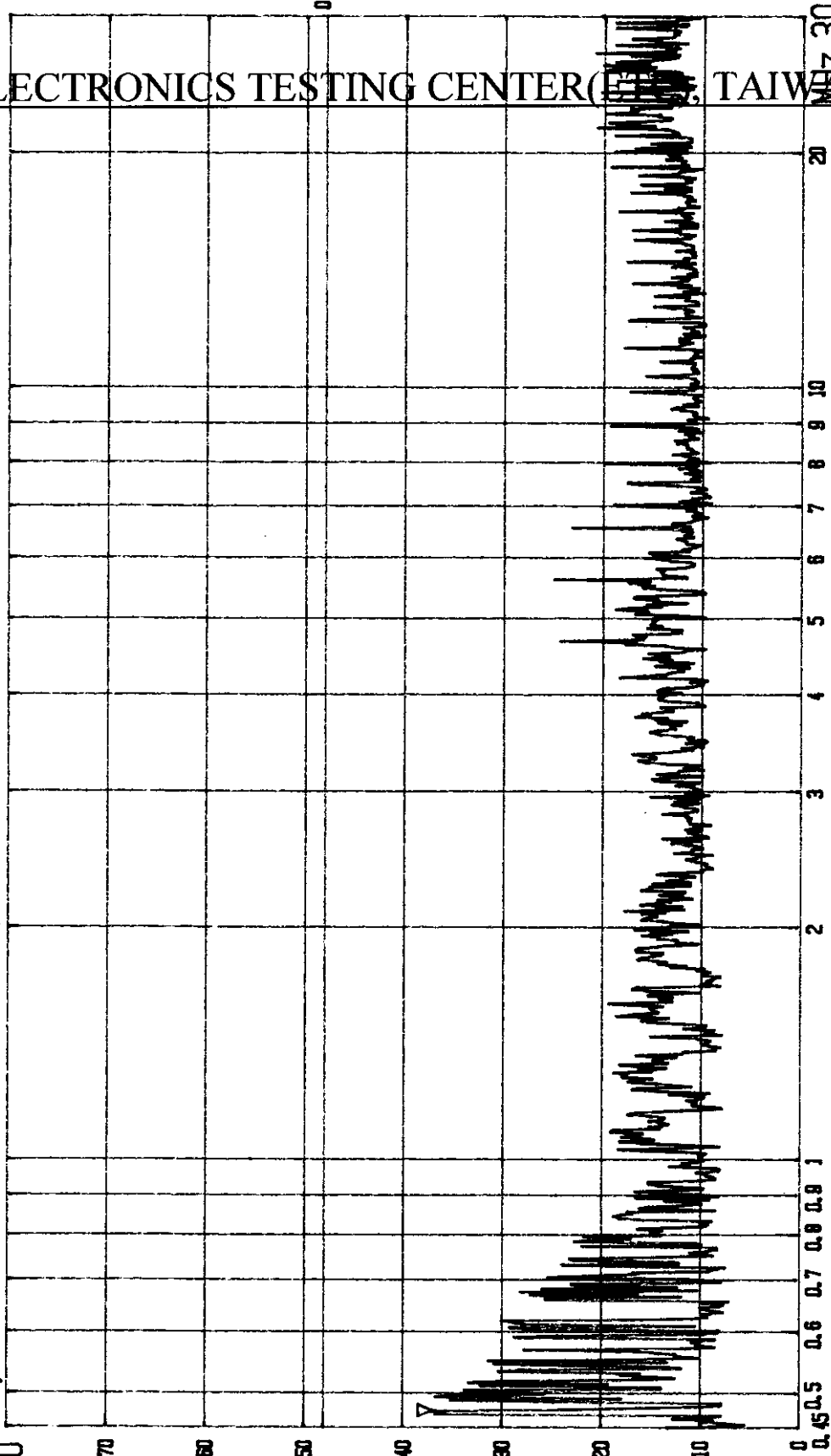
(1) “----” means the noise is too low to be measured.

(2) The full frequency range scanning test data is shown in next two pages.

ETC

ELECTRONICS TESTING CENTER (ETC), TAIWAN

dBuV 80 70 60 50 40 30 20 10 0  
Mkr 0.473705MHz 37.0dBuV

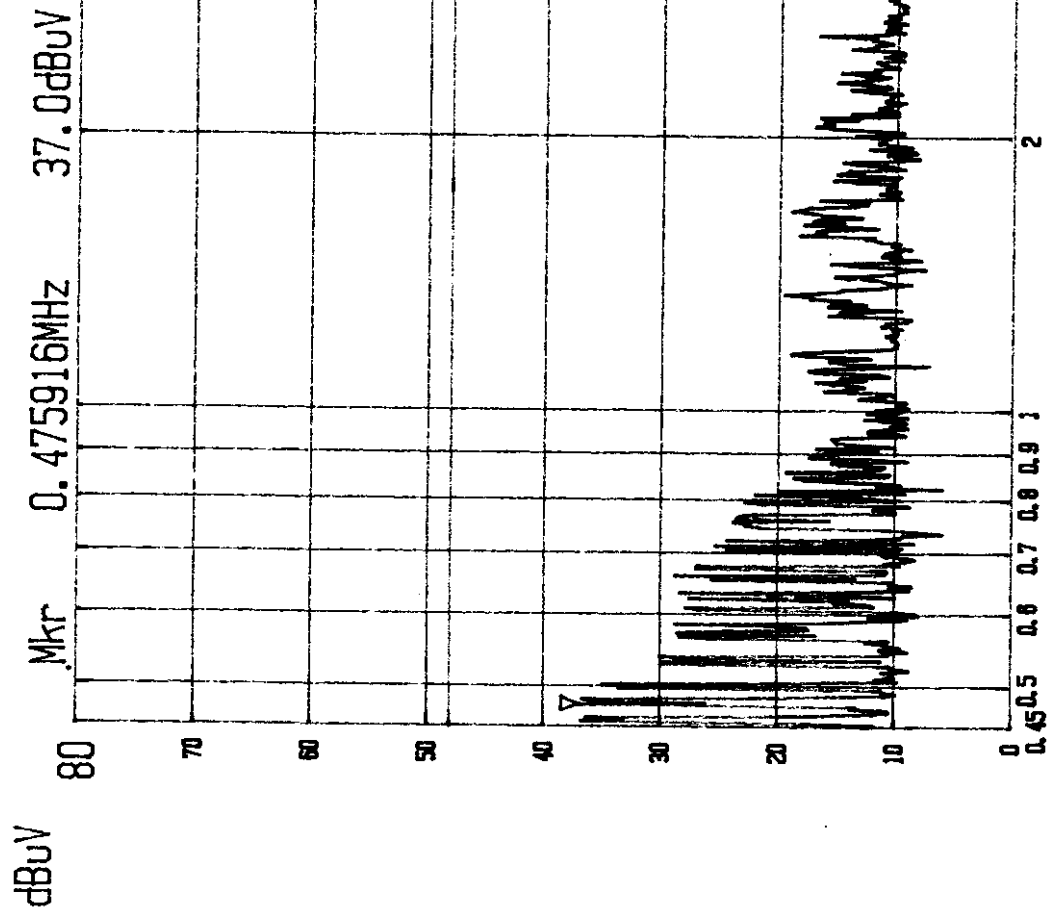


--- Date 04.MAR.'99 Time 16:49:46  
FCC CLASS B LINE: L1  
MODE: CHARGING

ETC

ELECTRONICS TESTING CENTER(ETC)

TAIWAN



----- Date 04. MAR. '99 Time 16:45:43  
FCC CLASS B LINE: L2  
MODE: CHARGING

# **ETC** ELECTRONICS TESTING CENTER(ETC), TAIWAN

(2) Base, voice channel 40

Operation Mode : On line

Test Date : Mar. 04, 1999

Temperature : 24 °C

Humidity : 70%

| Frequency | Reading    |      | LISN   | Results    |      | Limit      | Margins |
|-----------|------------|------|--------|------------|------|------------|---------|
|           | dB $\mu$ V |      |        | dB $\mu$ V |      |            |         |
| MHz       | L1         | L2   | Factor | L1         | L2   | dB $\mu$ V | dB      |
| 0.450     | 32.7       | 32.1 | 0.1    | 32.8       | 32.2 | 48.0       | -15.2   |
| 0.729     | ----       | 26.8 | 0.1    | ----       | 26.9 | 48.0       | -21.1   |
| 0.749     | 28.1       | ---- | 0.1    | 28.2       | ---- | 48.0       | -19.8   |
| 7.158     | 31.7       | 32.9 | 0.3    | 32.0       | 33.2 | 48.0       | -14.8   |
| 10.739    | 41.9       | 42.6 | 0.4    | 42.3       | 43.0 | 48.0       | -5.0    |
| 25.057    | 37.6       | 33.1 | 0.5    | 38.1       | 33.6 | 48.0       | -9.9    |
| 27.008    | 34.9       | 31.2 | 0.5    | 35.4       | 31.7 | 48.0       | -12.7   |

Note :

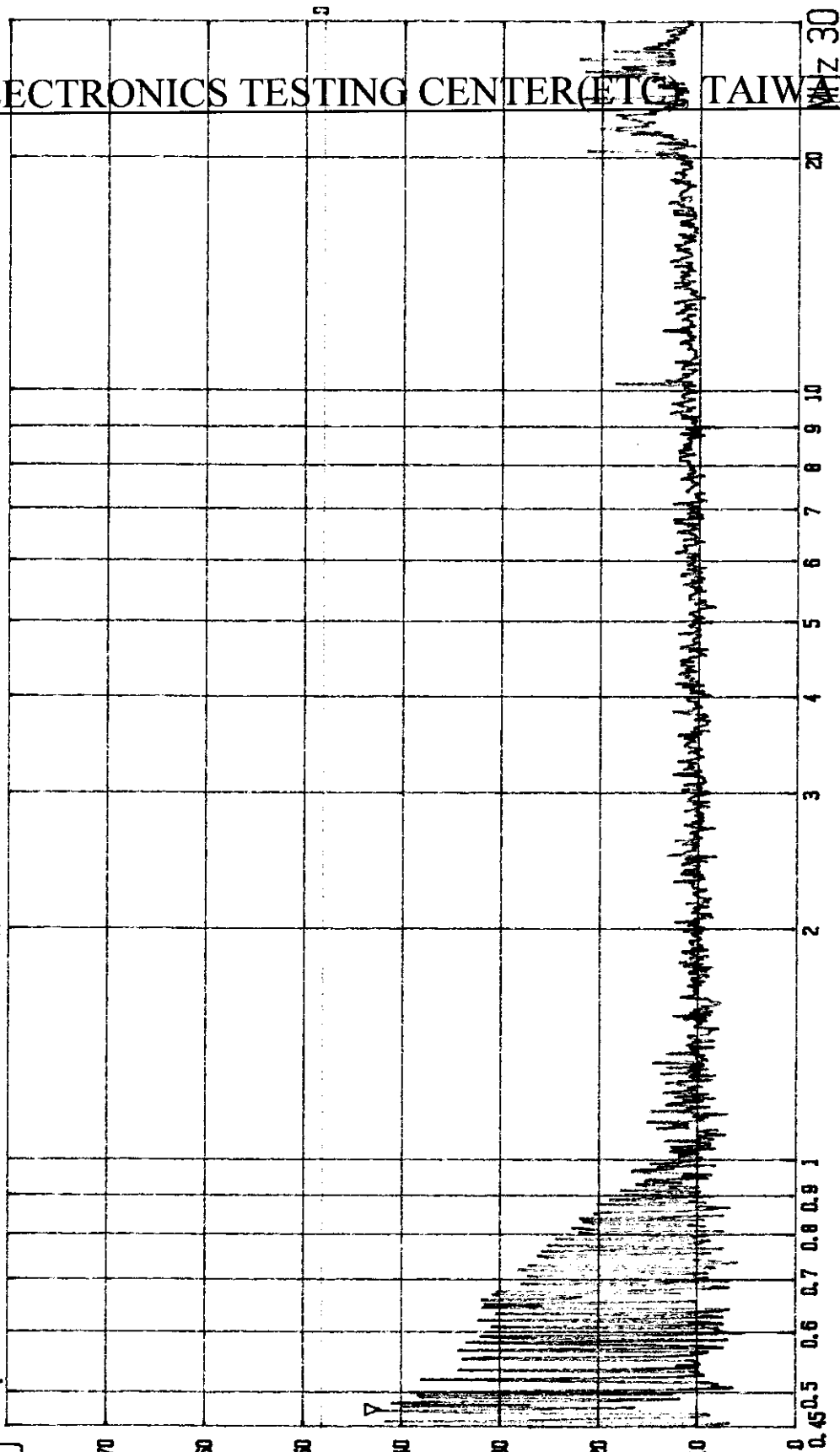
(1) "----" means the noise is too low to be measured.

(2) The full frequency range scanning test data is shown in next two pages.

ETC

ELECTRONICS TESTING CENTER(ETC) TAIWAN

dBuV 80 70 60 50 40 30 20 10 0  
Mkr 0.473705MHz 42.2dBuV



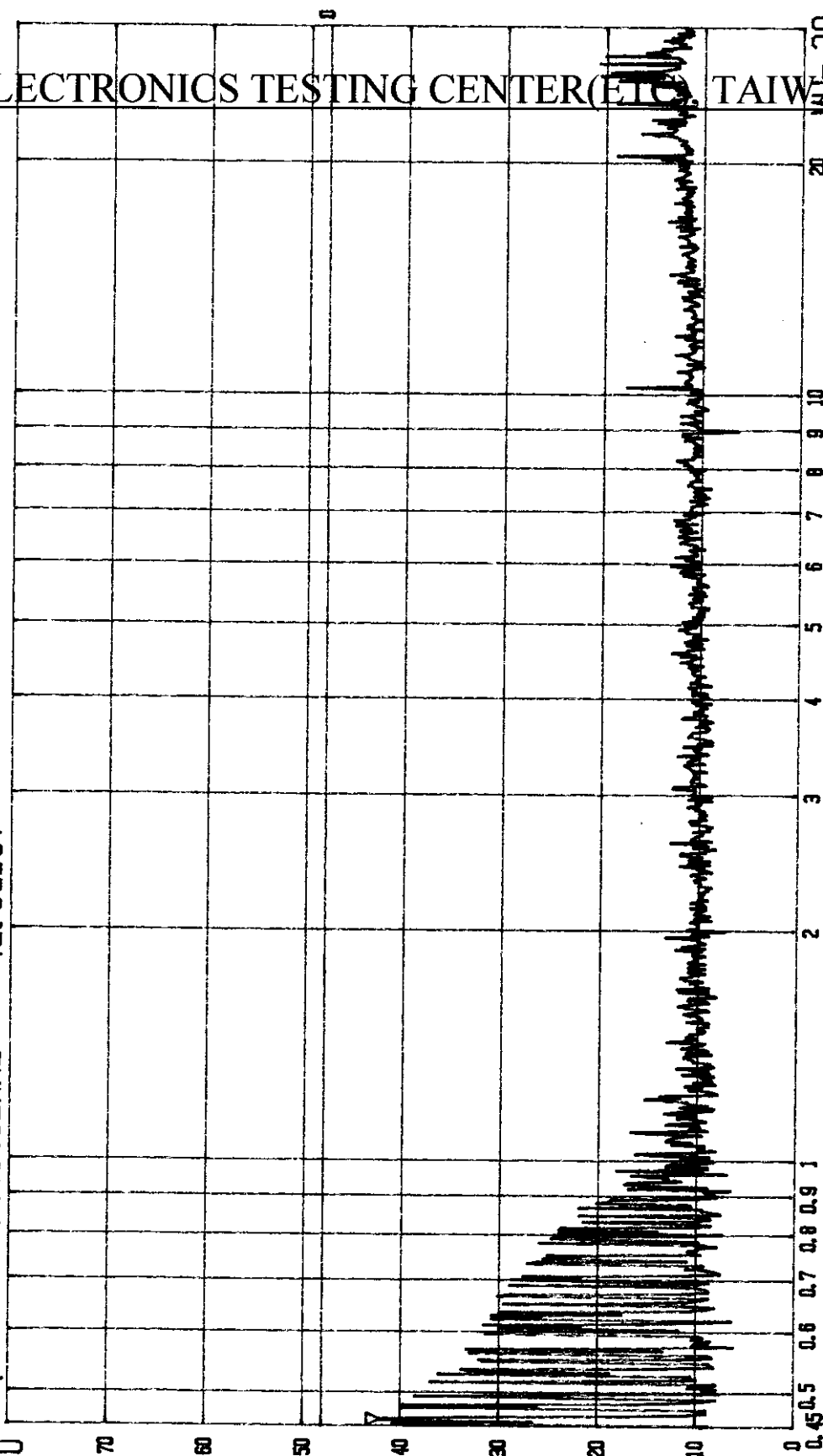
!---- Date 04.MAR.'99 Time 16:34:32  
FCC CLASS B  
POWER LINE : L1

ETC

ELECTRONICS TESTING CENTER(ETC)

TAIWAN

dBuV 80 70 60 50 40 30 20 10 0  
Mkr 0.458482MHz 42.0dBuV



!---- Date 04. MAR. '99 Time 16:39:29  
FCC CLASS B MODE: ON LINE  
POWER LINE : L2

#### 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 field strength 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. | Serial No. | Calibrated until |
|--------------------------------------|-------------------|-----------|------------|------------------|
| EMI Test Receiver                    | Rohde and Schwarz | ESH3      | 894718/018 | Jan. 20, 2000    |
| Line Impedance Stabilization Network | Telemeter         | NNB-2/16E | ----       | Nov. 02, 1999    |
| Line Impedance Stabilization Network | EMCO              | 3825/2    | 9704-2677  | Oct. 29, 1999    |

Note: The standards used to perform this calibration are traceable to NML/ROC and NIST/USA.

## **6. ANTENNA REQUIREMENT**

### **6.1 Applicable Standard**

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**

The antenna is permanently mounted on RF box, no consideration of replacement.

## **7. BAND EDGES MEASUREMENT**

### **7.1 Applicable Standard**

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 radiated emission limits in § 15.209.

### **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) 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) Set RES BW 100KHz and VBW 300KHz with a convenient frequency span.
- (4) 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.
- (5) Repeat above procedures until all measured frequencies were complete.

### **7.3 Measurement Equipment**

| <b>Equipment</b>  | <b>Manufacturer</b> | <b>Model No.</b> | <b>Serial No.</b> | <b>Calibrated until</b> |
|-------------------|---------------------|------------------|-------------------|-------------------------|
| EMI Test Receiver | Hewlett-Packard     | 8546A            | 3411A00192        | Dec. 04, 1998           |
| Plotter           | Hewlett-Packard     | 7470A            | 2308A69929        | N/A                     |

# ETC ELECTRONICS TESTING CENTER(ETC), TAIWAN



MKR 903.17 MHz  
76.20 dBμV

REF 90.0 dBμV AT 10 dB

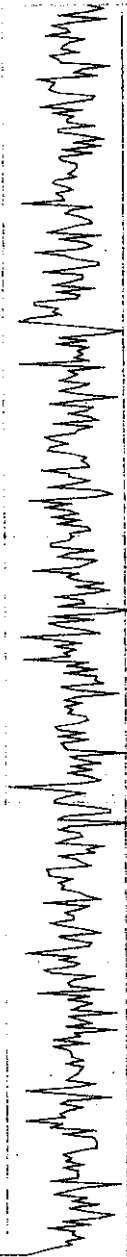
PEAK  
LOG  
10  
dB/

Measurement Data  
(1) Base, voice channel 1

MARKER  
903.17 MHz  
76.20 dBμV

VA SB  
SC FC  
CORR  
A

START 902.00 MHz  
#RES BW 100 kHz  
STOP 928.00 MHz  
#VBW 300 kHz  
SWP 20.0 msec





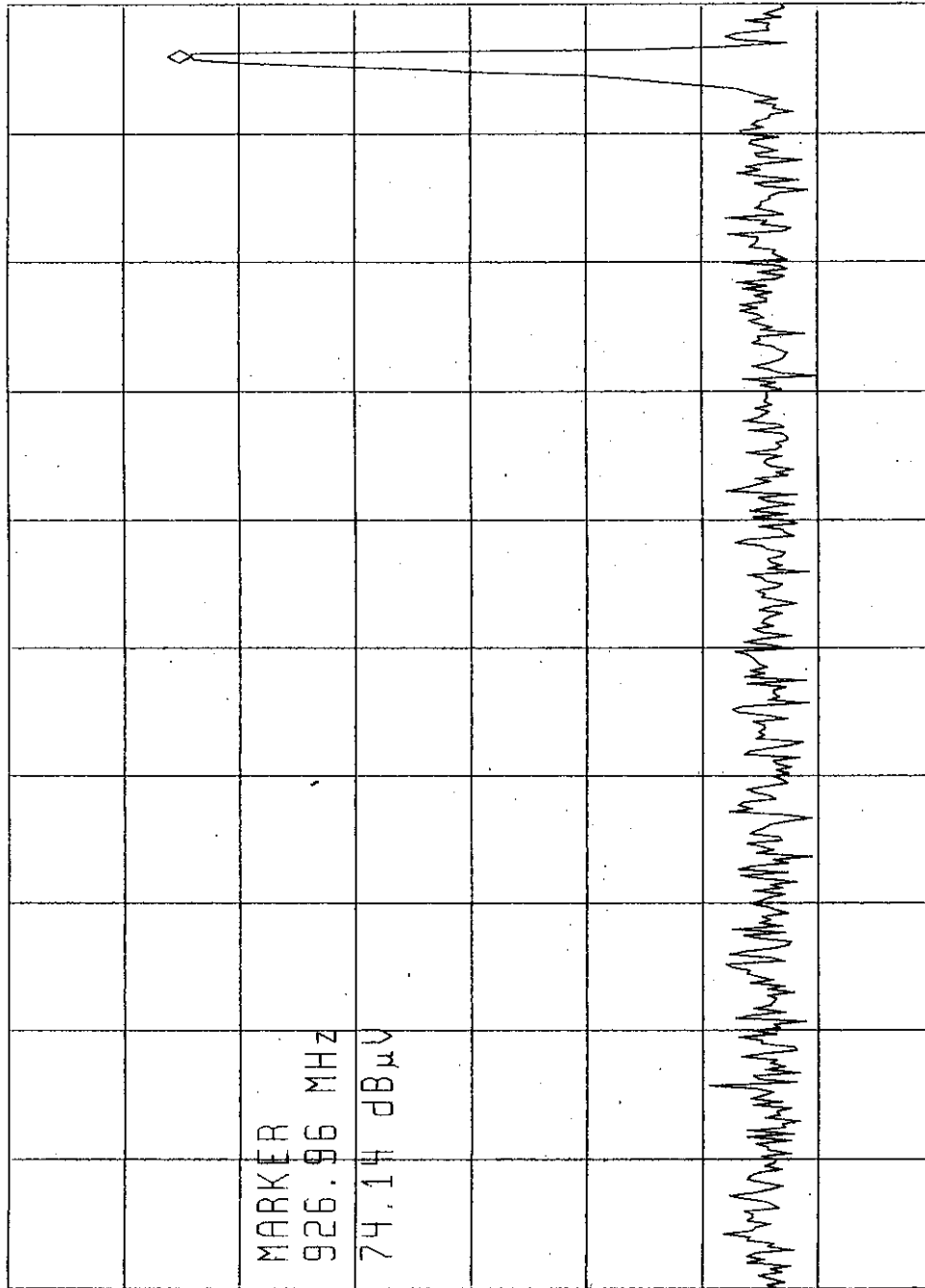
MKR 926.96 MHz  
74.14 dBμV

AT 10 dB

REF 90.0 dBμV

PEAK  
LOG  
10  
dB/

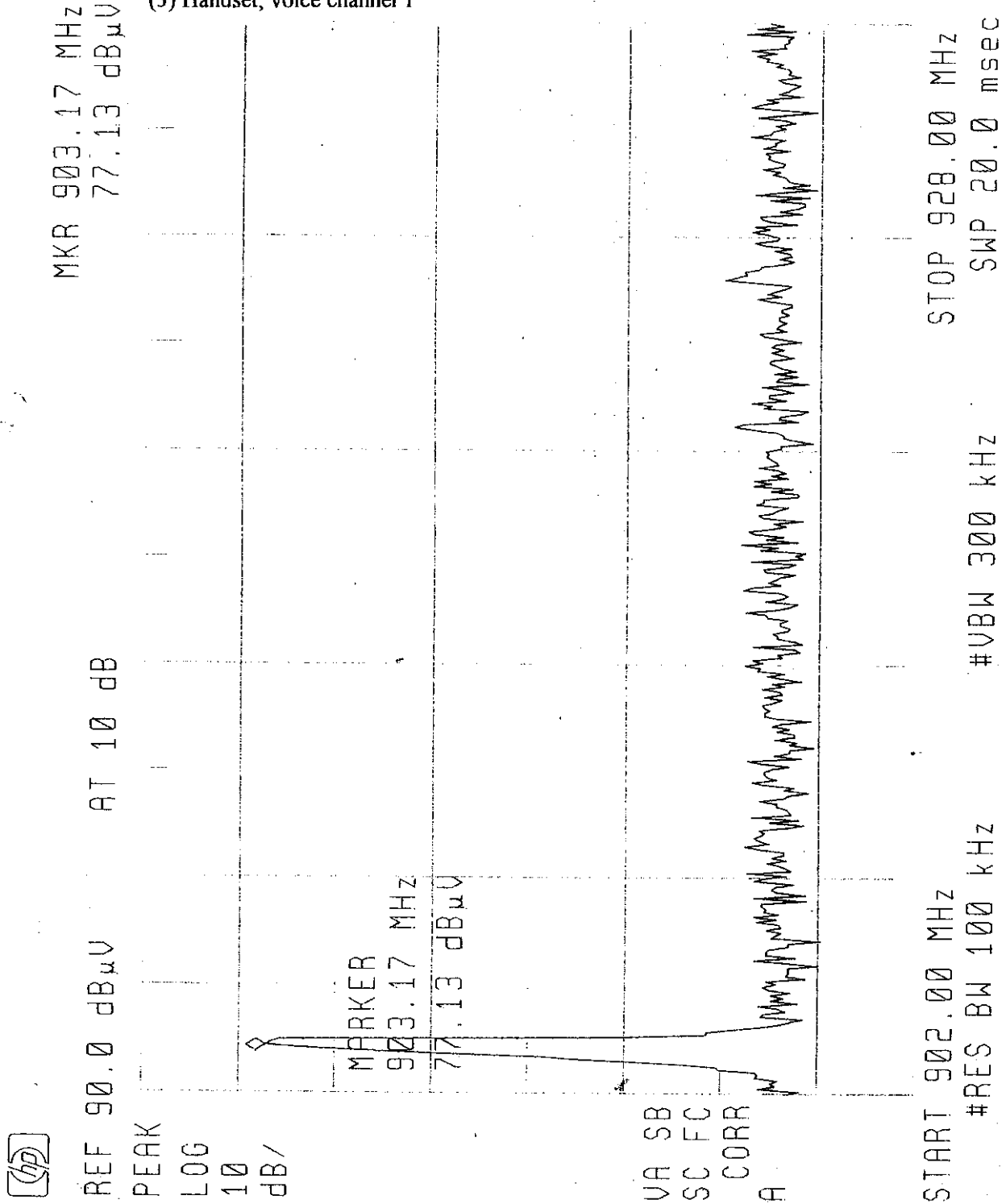
(2) Base, voice channel 80



VA SB  
SC FC  
CORR

START 902.00 MHz STOP 928.00 MHz  
#RES BW 100 kHz #VBW 300 kHz SWP 20.0 msec

(3) Handset, voice channel 1



MR 926.90 MHz  
71.12 dBμV

(4) Handset, voice channel 80

AT 10 dB

REF 90.0 dBμV

PEAK

LOG

10

dB/

MARKER  
926.90 MHz  
71.12 dBμV

VA SB  
SC FC  
CORR

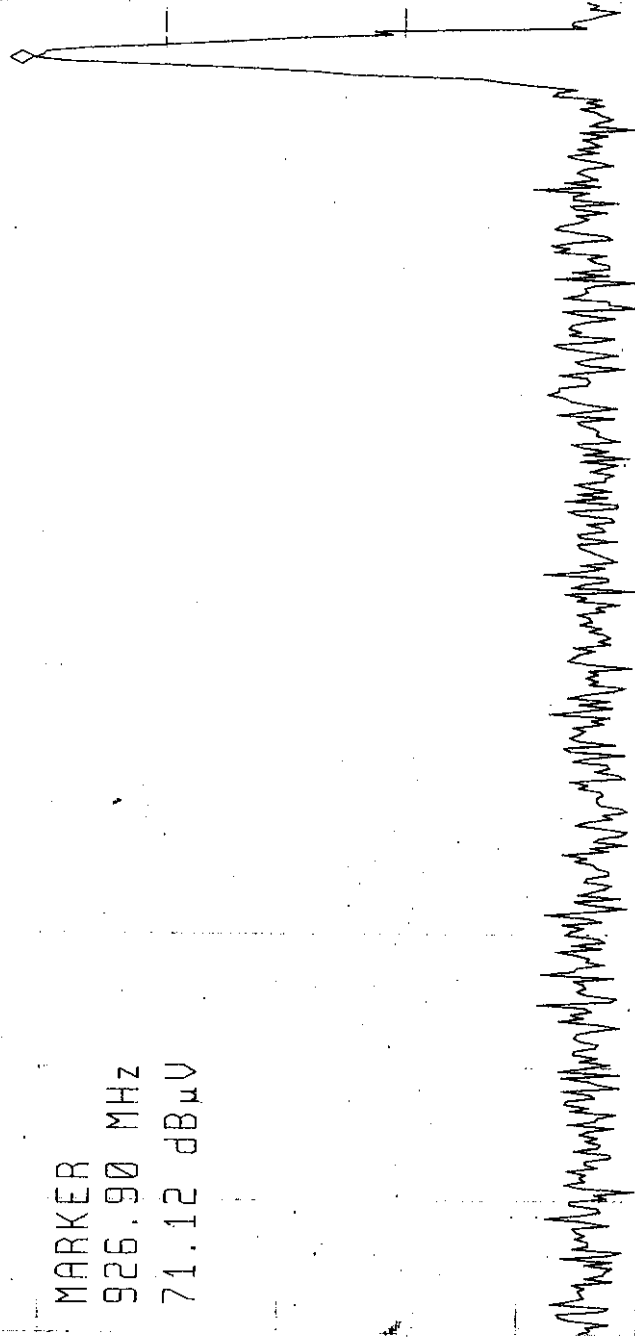
START 902.00 MHz

#RES BW 100 kHz

#VBW 300 kHz

STOP 928.00 MHz

SWP 20.0 msec



## ***Exhibit D ..... Equipment ID. Label***

- 1. A label of FCC ID. in the next page will be affixed to the appropriate side of the device.*