



## RFI / EMI TEST REPORT

**APPLICANT** : SOLID YEAR CO., LTD.

**E. U. T.** : USB KEYBOARD WITH HUB

**TRADE NAME** : N/A

**FCC ID** : L2BACEKEY298H

**REGULATION** : CFR 47 , Part 15 Subpart B , **Class B**

**TEST SITE** : PEP Testing Laboratory

**TEST ENGINEER** : *Tong Wang*

**TEST DATE** : *DEC / 28 / 1998*

**ISSUED DATE** : JAN. / 12 / 1999

**REPORT No.** : 980577

# FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road  
Columbia, MD 21046  
Telephone: 301-725-1585 (ext-218)  
Facsimile: 301-344-2050

November 25, 1996

IN REPLY REFER TO  
31040/SIT  
1300F2

PEP Testing Laboratory  
12-3 Fl., No. 27-1, Lane 169  
Kang-Ning St., Hsi-chi Town  
Taipei Hsien, Taiwan, R.O.C.

Attention: M. Y. Tsui

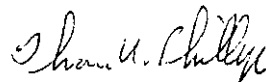
Re: Measurement facility located at above address  
(3 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,



Thomas W. Phillips  
Electronics Engineer  
Customer Service Branch

Enclosure:  
PAL PN



# PEP Testing Laboratory

REPORT NO. : 980577

## VERIFICATION

### **WE HEREBY VERIFY THAT:**

The E. U. T. listed below has completed RFI testing by PEP Testing Laboratory and the interference emissions can pass **FCC Class B** limitations.

The tested configurations and the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4 - 1992.

Any data in this RFI report is " **reference** " only.

**APPLICANT : SOLID YEAR CO., LTD.\***  
**PRODUCT : USB KEYBOARD WITH HUB \***  
**FCC ID : L2BACEKEY298H \***  
**MODEL : ACK-298H \***

M. Y. TSUI

Manager

### **PEP Testing Laboratory**

12-3FL., NO. 27-1, Lane 169, Kang-Ning St.,  
Hsi-Chi, Taipei Hsien, Taiwan, R. O. C.  
TEL : 886-2-6922097 FAX : 886-2-6956236



## TABLE OF CONTENTS

<b><u>1. GENERAL</u></b>	<b>4</b>
1.1 General Information	
1.2 Place of Measurement	
1.3 Labeling Requirements	
1.4 Information to User	
<b><u>2. CONDUCTED EMISSIONS TEST</u></b>	<b>7</b>
2.1 Setup of the Test Facilities	
2.2 Test Procedures	
<b><u>3. RADIATED EMISSIONS TEST</u></b>	<b>9</b>
3.1 Setup of the Test Facilities	
3.2 Test Procedures	
<b><u>4. DESCRIPTION FOR EUT TESTING CONFIGURATION</u></b>	<b>11</b>
<b><u>5. SUPPORTING DEVICES TO TEST</u></b>	<b>12</b>
<b><u>6. TEST CONFIGURATION</u></b>	<b>15</b>
** Conducted Emission Test Photo. and Data	
** Radiated Emission Test Photo. and Data	
<b><u>7. APPENDIX</u></b>	
A. Photos of EUT Appearance	22
B. List of Test Equipment	23



## 1. GENERAL

### 1.1 GENERAL INFORMATION:

APPLICANT : SOLID YEAR CO., LTD.

NO. 3, PAO CHI LANE, CHUANG YA  
TSUN SIU SHUI HSIANG, CHANGHWA  
HSIEN, TAIWAN, R. O. C.

MANUFACTURER : SOLID YEAR CO., LTD.

NO. 3, PAO CHI LANE, CHUANG YA  
TSUN SIU SHUI HSIANG, CHANGHWA  
HSIEN, TAIWAN, R. O. C.

MEASUREMENT PROCEDURE : ANSI C63 , 4 - 1992

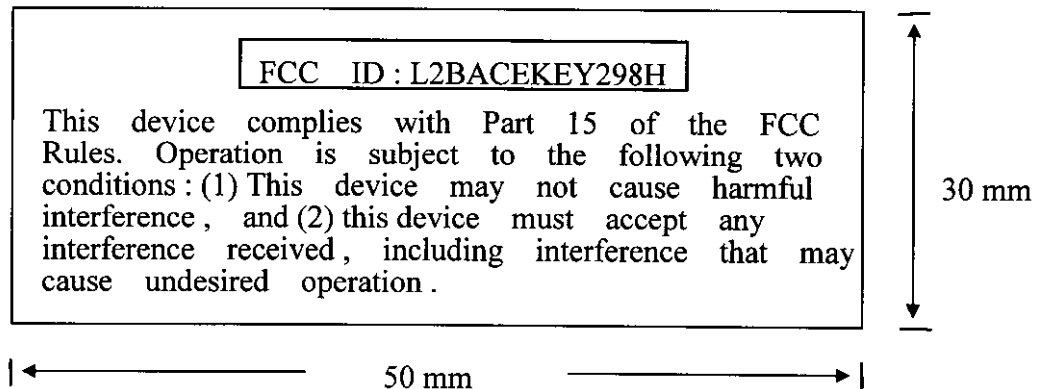
TESTED FOR COMPLIANCE WITH : Title 47 of CFR  
Part 15 , Subpart B , Class B

### 1.2 PLACE OF MEASUREMENT PEP Testing Laboratory



## 1.3 LABELING REQUIREMENT

A FCC ID label shall be permanently attached and conspicuously located on the equipment :





## 1.4 INFORMATION TO THE USER

The following FCC statement should be declared in a conspicuous location in the user's manual.

### Federal Communications Commission (FCC) Statement

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 communications. 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.

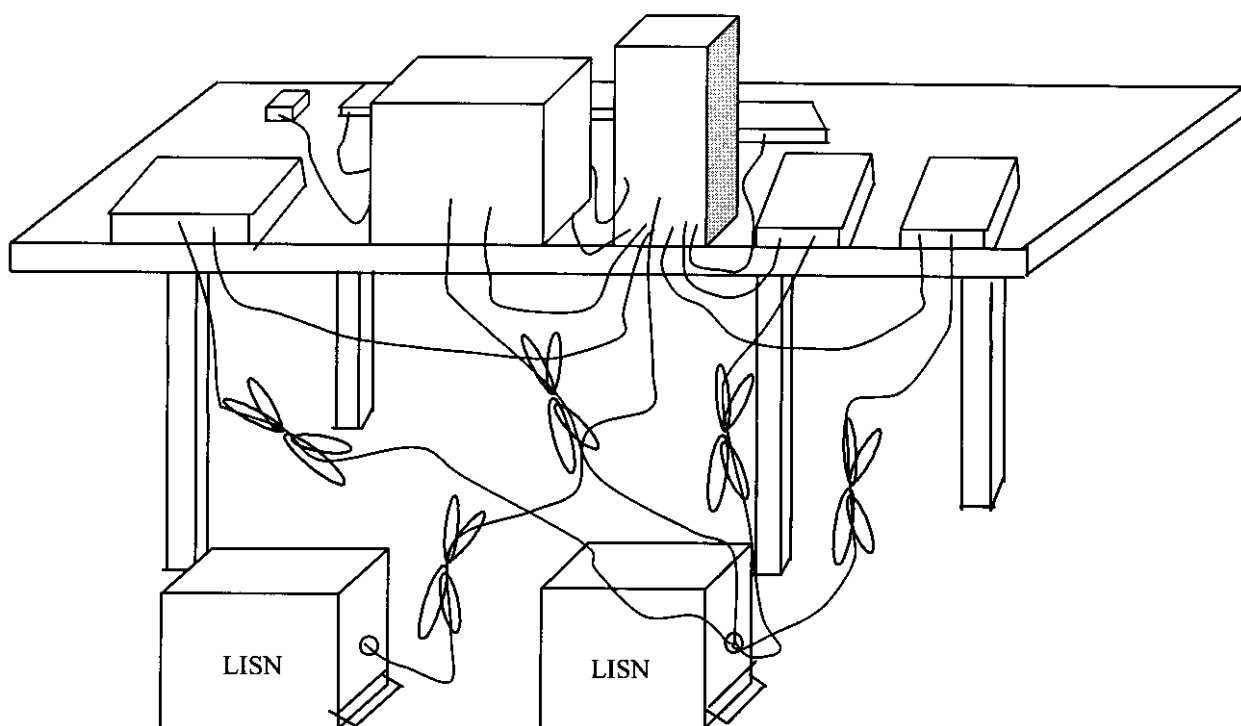
Warning : A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

Use only shielded cables to connect I/O devices to this equipment.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

## 2. CONDUCTION EMISSIONS TEST

### 2.1 GENERAL SETUP OF THE TEST FACILITIES







## 2.2 TEST PROCEDURES

The system was setup as described above, with the EMI diagnostic software.

Both the line of power cord, hot and neutral, were run with the EMI tests software.

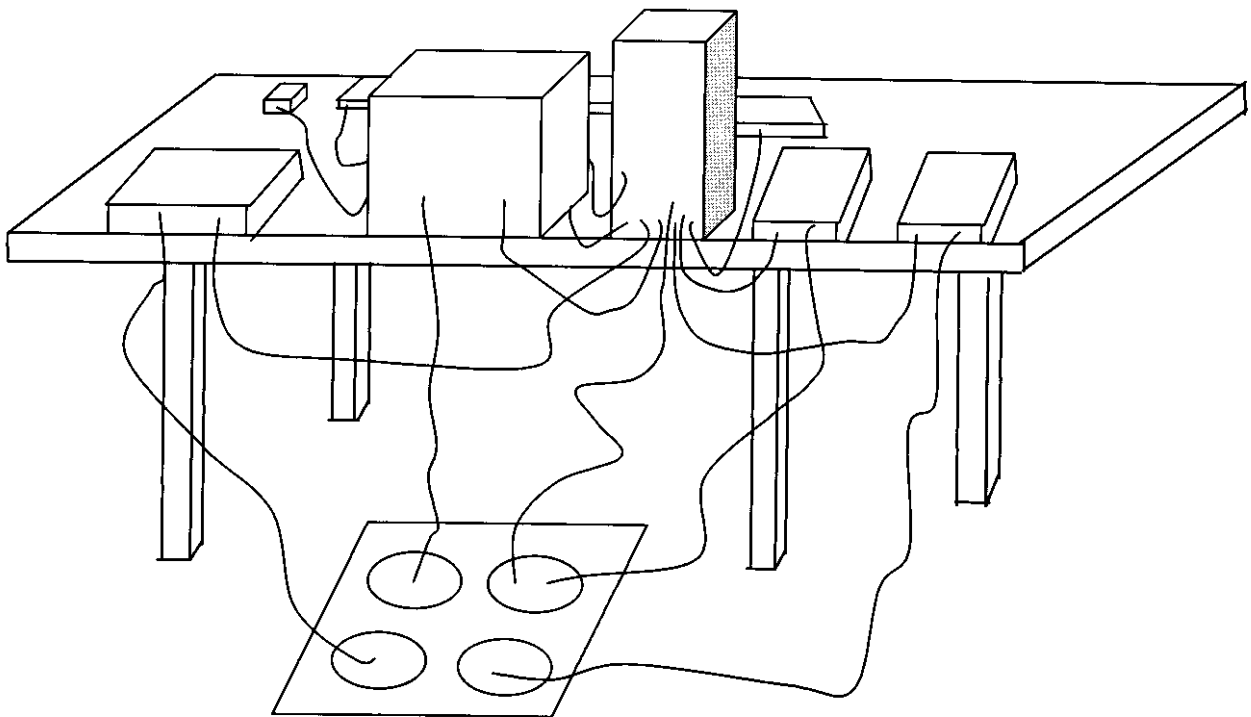
To get the maximum power line conducted emission, we changed the configuration by varying the monitor power cord fed from floor outlet and from the outlet on the power supply of this computer.

The highest emissions were recorded in the RFI test report.



## 3. RADIATED EMISSIONS TEST

### 3.1 GENERAL SETUP OF THE FACILITIES





## 3.2 TEST PROCEDURES

Radiated emissions test was carried out by **PEP Testing Laboratory** at the open field test site authorized by FCC.

The EUT and supporting equipments were setup with the EMI diagnostic software.

- a. setting up the EUT under normally position, and scanning it from 30 MHz to 1000 MHz, then recording those narrow band noises which cannot be 6 dBuV below lower bound. Both horizontal and vertical antenna are measured from 1 meter height to 4.0 meter height, and turntable rotate 360 degrees.
- b. fixing the EUT rear face to antenna and antenna 1.0 meter height. We adjusted I/O cables to find the highest coupling noise and moved the height of antenna from 1 to 4 meters, then rotated the turntable simultaneously.
- c. checking following step b. all points which were recorded in step a.
- d. changing the peripherals position, and routine steps a. b. c.

The highest emissions were recorded in the RFI test report.



## 4. DESCRIPTION FOR EUT TESTING CONFIGURATION

### **\*\* TEST PROCEDURE ----**

- (A) The EUT is USB keyboard , FCC ID: L2BACEKEY298H , with two USB connectors , for more detail information about the EUT , please refer user's manual .
- (B) The EUT connected to USB port on the PC and additional two USB ports on the EUT were terminated by USB keyboard and USB mouse under test . The EUT was enabled by FCC " H" pattern program and the worst case data provided in this RFI report .
- (C) After the EUT was set up , we did the conducted emission test in the shielded room and the worst case placement finding as the ANSI C63.4 requirement ; similarly , the radiated emission test was done at the open field site .
- (D) If the peak value of the noise can't under Non-consumer equipment limit 3 dBuV more , we'll change Biconical antenna or Log-periodic antenna for Dipole antenna and record its Quasi-Peak value , making sure it can under 6 dBuV at least .
- (E) In the RFI test report , we provided the worst conducted emission testing data and radiated emission test data.



## 5. SUPPORTING DEVICES TO TEST

### **SUPPORT UNIT 1. ---- PERSONAL COMPUTER**

Manufacturer : ASUS Inc.  
Model Number : P2L97  
Power Supply Type : Switching  
Power Cord : Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1.2m  
FCC ID : N/A

### **SUPPORT UNIT 2. ---- MONITOR**

Manufacturer : Acer Peripherals Inc.  
Model Number : 7134T  
Power Supply Type : Switching  
Power Cord : Shielded, Detachable, 1.2m  
Data Cable : Shielded, Undetachable, 1m  
FCC ID : JVP7134T

### **SUPPORT UNIT 3. ---- PRINTER**

Manufacturer : Hewlett-Packard Singapore Pte Ltd.  
Model Number : C2642A  
Power Supply Type : Linear  
Power Cord : Non-Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1m. 2464  
FCC ID : N/A



## **SUPPORT UNIT 4. ----MODEM × 2**

Manufacturer : ACEEX  
Model Number : 1414  
Power Supply Type : Linear  
Power Cord : Non-Shielded, Detachable, 1.2m  
Data Cable : Shielded, Detachable, 1m  
FCC ID : IFAXDM1414

## **SUPPORT UNIT 5. ---- KEYBOARD**

Manufacturer : Acer Peripherals Inc.  
Model Number : 6311-KW  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, Undetachable, 1.2m  
FCC ID : JVPKBS-WIN

## **SUPPORT UNIT 6. ---- USB KEYBOARD**

Manufacturer : I-Mac  
Model Number : M2452  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, Undetachable, 1m  
FCC ID : N/A



## **SUPPORT UNIT 7. ---- USB MOUSE**

Manufacturer : I-Mac  
Model Number : M2450  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, Undetachable, 1m  
FCC ID : N/A

## **SUPPORT UNIT 8. ---- MOUSE**

Manufacturer : ACER  
Model Number : M-S34  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, Undetachable, 1m  
FCC ID : DZL211029

## **EQUIPMENT UNDER TEST ----USB KEYBOARD WITH HUB**

Manufacturer : SOLID YEAR CO., LTD.  
Model Number : ACK-298H  
Data Cable : Shielded, Undetachable, 1.2m  
FCC ID : L2BACEKEY298H



## 6. TEST CONFIGURATION

**Radiated emission detector function :**

**(1) 30MHZ~1GHZ : Quasi-Peak Value**

**Resolution BW : 120KHZ Video BW : 300KHZ**

**(2) above 1GHZ : Quasi-Peak value and Average Value**

**Resolution BW : 1MHZ Video BW : 1MHZ**

**\* either Q. P. or average value will be recorded  
in the report**

**Conducted emission detector function :**

**(1) 450KHZ~30MHZ : Quasi-Peak Value**

**Resolution BW : 9KHZ Video BW : 30KHZ**

**The else descriptions : N/A**

**Conducted Emission Test Photo. : Page 15**

**Test Data : Hot 16**

**Neutral 17**

**Radiated Emission Test Photo. : Page 18**

**Test Data : Horizontal 19**

**Vertical 20**





## CONDUCTED EMISSIONS TEST DATA

Note : HOT LINE TEST

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
1.011	32.73	-15.27	48.00	30.88	0.10	1.75	0.00
1.898	28.65	-19.35	48.00	26.77	0.10	1.78	0.00
7.601	24.46	-23.54	48.00	22.20	0.41	1.85	0.00
8.340	24.93	-23.07	48.00	22.63	0.44	1.86	0.00
11.118	24.56	-23.44	48.00	22.17	0.55	1.83	0.00
12.891	28.36	-19.64	48.00	25.89	0.62	1.85	0.00
13.659	31.95	-16.05	48.00	29.42	0.66	1.87	0.00
14.634	29.04	-18.96	48.00	26.46	0.69	1.89	0.00
16.023	28.42	-19.58	48.00	25.79	0.73	1.90	0.00
18.594	23.96	-24.04	48.00	21.22	0.77	1.97	0.00

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



## CONDUCTED EMISSIONS TEST DATA

**Note : NEUTRAL LINE TEST**

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
0.657	36.59	-11.41	48.00	34.73	0.10	1.76	0.00
1.396	33.79	-14.21	48.00	31.93	0.10	1.76	0.00
8.340	25.77	-22.23	48.00	23.47	0.44	1.86	0.00
8.842	26.01	-21.99	48.00	23.68	0.46	1.87	0.00
12.831	27.67	-20.33	48.00	25.20	0.62	1.85	0.00
13.570	31.80	-16.20	48.00	29.28	0.65	1.87	0.00
14.841	28.76	-19.24	48.00	26.17	0.70	1.90	0.00
16.377	27.10	-20.90	48.00	24.46	0.73	1.91	0.00
18.239	24.86	-23.14	48.00	22.13	0.77	1.96	0.00
18.830	23.68	-24.32	48.00	20.92	0.78	1.98	0.00

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



## RADIATED EMISSIONS TEST DATA

Antenna polarization : HORIZONTAL ; Test distance : 3 m ;

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
120.018	30.52	-12.98	43.50	37.56	11.80	1.16	20.00
132.108	22.83	-20.67	43.50	29.26	12.27	1.29	20.00
168.028	26.97	-16.53	43.50	32.24	13.18	1.55	20.00
216.035	32.26	-13.74	46.00	34.02	16.30	1.94	20.00
240.041	30.75	-15.25	46.00	30.32	18.30	2.13	20.00
264.046	23.87	-22.13	46.00	22.14	19.39	2.35	20.00
336.056	22.54	-23.46	46.00	25.32	14.48	2.74	20.00
432.072	27.71	-18.29	46.00	27.26	17.51	2.94	20.00
480.082	39.16	- 6.84	46.00	38.50	17.54	3.13	20.00
528.090	35.20	-10.80	46.00	33.74	18.14	3.32	20.00

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



## RADIATED EMISSIONS TEST DATA

Antenna polarization : VERTICAL ; Test distance : 3 m ;

Freq. (MHz)	Level (dB)	Over Limit (dB)	Limit Line (dB)	Read Level (dB)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)
132.018	26.57	-16.93	43.50	33.00	12.27	1.29	20.00
144.024	31.88	-11.62	43.50	37.76	12.72	1.40	20.00
204.040	36.92	- 6.58	43.50	39.88	15.20	1.83	20.00
216.038	33.92	-12.08	46.00	35.68	16.30	1.94	20.00
228.040	28.13	-17.87	46.00	28.72	17.38	2.03	20.00
240.047	31.81	-14.19	46.00	31.38	18.30	2.13	20.00
336.056	24.90	-21.10	46.00	27.68	14.48	2.74	20.00
408.064	23.49	-22.51	46.00	23.60	17.06	2.83	20.00
432.071	29.57	-16.43	46.00	29.12	17.51	2.94	20.00
528.084	38.88	- 7.12	46.00	37.42	18.14	3.32	20.00

Note :

1. Level = Read Level + Probe Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line



# PEP Testing Laboratory

REPORT NO. : 980577

## List of Test Equipment

Instrument	Model No.	Cal. Due Date	S/N
R&S Receiver	ESVS30(30M~1GHZ)	Apr. 21, 1999	863342/012
R&S Receiver	ESBI (20~5GHZ)	Feb. 12, 1999	845658/003
Spectrum Analyzer	HP8591A(9K~1.8GHZ)	Apr. 15, 1999	3225A03039
Spectrum Analyzer	R3261A (9K~2.6GHZ)	Dec. 03 1999	91720076
EMCO L.I.S.N.	3825/2 (10K~30MHZ)	Apr. 15, 1999	9311-2150
L.I.S.N.	KNW-242(10K~30MHZ)	Jan. 31, 1999	8-837-7
R & S L.I.S.N.	ESH3-Z5(9K~30MHZ)	Jul. 09, 1999	844982/039
Anritsu Pre-Amp.	MH648A(100K~1.4GHZ)	Sep. 20, 1999	M40076
R & S Pre-Amp.	ESMI-Z7(20M~7GHZ)	Feb. 12, 1999	6/2278/011
COM-Power Horn Antenna	AH-118 (1G~18GHZ)		10056
EMCO Dipole Antenna	3121C (20M~1GHZ)	May. 22, 1999	9611-1230
EMCO Biconical Antenna	3110B (30M~300M)	Mar. 10, 1999	2932
EMCO Log-Periodic Antenna	3146A (300M~1GHZ)	Apr. 14, 1999	1384