FCC TEST REPORT

for

47 CFR, Part 2, and Part 15, Subpart B Class A

Equipment	:	IPC
Model No.	:	AMB-2427
FCC ID	:	N/A
Filing Type	:	Verification
Applicant	:	**AAEON TECHNOLOGY INC.** 5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien City, Taipei, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

Table of Contents

Certificate No. : F0N2805

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 2, and Part 15, Subpart B Class A

Equipment	:	IPC
Model No.	:	AMB-2427
FCC ID	:	N/A
Applicant	:	**AAEON TECHNOLOGY INC.** 5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien City, Taipei, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was ***passed*** both radiated and conducted emission class **A** limits. Testing was carried out on Apr. 13, 2001 at **SPORTON International Inc.** LAB. in Lin Kou.

K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

AAEON TECHNOLOGY INC.
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien
City, Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: IPC
Model No.	: AMB-2427
FCC ID	: N/A
Trade Name	: AAEON
STP DATA CABLE	: Shielded, 10m
SCSI DATA CABLE	: Double-Shielded, 0.3m
Data cable	: Please see section 2.2 of this test report for details
Power Supply Type	: Switching
AC Power Cord	: Non-Shielded, 1.8m, 3 pin

1.4. Feature of Equipment under Test

- Construction : Heavy-duty steel chassis & NEMA 4/12 aluminum alloy front panel.
- Display : 12.1" SVGA (800 x 600) color TFT LCD
- CPU : Celeron 366MHz
- Memory : 32MB SDRAM (Up to 768MB)
- LCD/CRT controller : C&T 69000 VGA controller with 2MB SDRAM embedded CRT & LCD panel support.
- Network (LAN) : Realtek RTL8139B 10/100 Base-T Ethernet controller (optional)
- I/O ports :
  -2 serial ports : 1 x RS-232, 1 x RS-232/422/485 (jumper select)
  -1 parallel port (supports ECP/EPP)
  -1 PS/2 keyboard interface
  -1 PS/2 mouse interface
- Disk Drive Housing : Slim 24x CD-ROM, 1.44M FDD and 3.5" HDD
- USB connector : Dual USB pin header
- Expansion Slots : 7 ISA/PCI slots
- Front panel color : RAL-7035 (white)
- Mounting : Rack mount. 7U height
- HDD : Quantum/Fireball^{TM}

- FDD : TEAC/FD-235HF/1.44MB
- CDROM : VINTECH/VIN-S24A
- POWER : MORETEC/MPE-9003/235W

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.

b. The remote workstation, HITACHI Monitor, DELL PS/2 Keyboard, HP Printer and ACEEX Modem were connected to the EUT for EMI test. The remote workstation included SONY Monitor, DELL PS/2 Keyboard, LOGITECH PS/2 Mouse and FIC PC

d. Frequency range investigated: conduction 450 KHz to 30 MHz, radiation 30 MHz to 2000MHz.

2.2. Description of Test System

Support Unit 1. -- Monitor (HITACHI) – for local workstation

FCC ID	: N/A
Model No.	: CM753ET
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0176
Data Cable	: Shielded, 1.15m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- PS/2 Keyboard (DELL) – for local and remote workstation

FCC ID	: GYUM92SK
Model No.	: AT101(DE8M)
Serial No.	: SP0054
Data Cable	: Shielded, 1.9m

Support Unit 3. -- Printer (HP) – for local workstation

FCC ID	: B94C2642X
Model No.	: DeskJet 400
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Braided-Shielded, 1.35m

Support Unit 4. -- Modem (ACEEX) – for local workstation

FCC ID	: IFAXDM1414
Model No.	: DM1414
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0015
Data Cable	: Shielded, 1.15m

Support Unit 5. -- Monitor (SONY) – for remote workstation

FCC ID	: AK8GDM17SE2T
Model No.	: GDM-17SE2T
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 1.15m

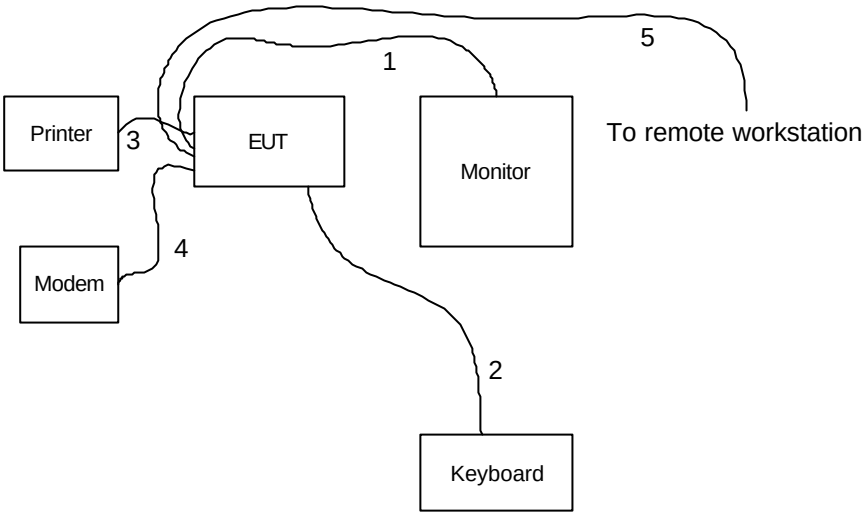
Support Unit 6. -- PS/2 Mouse (LOGITECH) – for remote workstation

FCC ID	: DZL211029
Model No.	: M-S34
Serial No.	: SP0108
Data Cable	: Shielded, 1.7m

Support Unit 7. -- Personal Computer (FIC) – for remote workstation

FCC ID	: N/A
Model No.	: P2L97
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Data Cable	: Shielded
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3. Connection Diagram of Test System



1. The I/O cable is connected from EUT to the support unit 1.
2. The I/O cable is connected from EUT to the support unit 2.
3. The I/O cable is connected from EUT to the support unit 3.
4. The I/O cable is connected from EUT to the support unit 4.
5. The STP cable is connected from EUT to the remote workstation.

3. Test Software

An executive program, EMITEST.EXE under WIN 98, which generates a complete line of continuously repeating " H" pattern was used as the test software.

The program was executed as follows :

a. Turn on the power of all equipment.
b. The PC reads the test program from the floppy disk drive and runs it.
c. The PC sends " H" messages to the monitor, and the monitor displays " H" patterns on the screen.
d. The PC sends " H" messages to the printer, then the printer prints them on the paper.
e. The PC sends " H" messages to the modem.
f. The PC sends " H" messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
g. Repeat the steps from b to f.

At the same time, LAN.BAT was executed to link with the remote workstation to receive and transmit data by STP Data Cable.

4. General Information of Test

4.1. Test Facility

This test was carried out by SPORTON International Inc.

Test Site Location : No. 30-2, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.
TEL : 886-2-2601-1640
FAX : 886-2-2601-1695

4.2. Standard for Methods of Measurement

ANSI C63.4-1992

4.3. Test in Compliance with

FCC Part 15, Subpart B Class A

4.4. Frequency Range Investigated

a. Conduction: from 450 kHz to 30 MHz
b. Radiation : from 30 MHz to 2,000 MHz

4.5. Test Distance

a. The test distance of radiated emission from antenna to EUT is 10M. (30M ~ 1GHz),
b. The test distance of radiated emission from antenna to EUT is 3 M. (1G Hz~ 2GHz),

5. Test of Conducted Powerline

Conducted Emissions were measured from 450 kHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

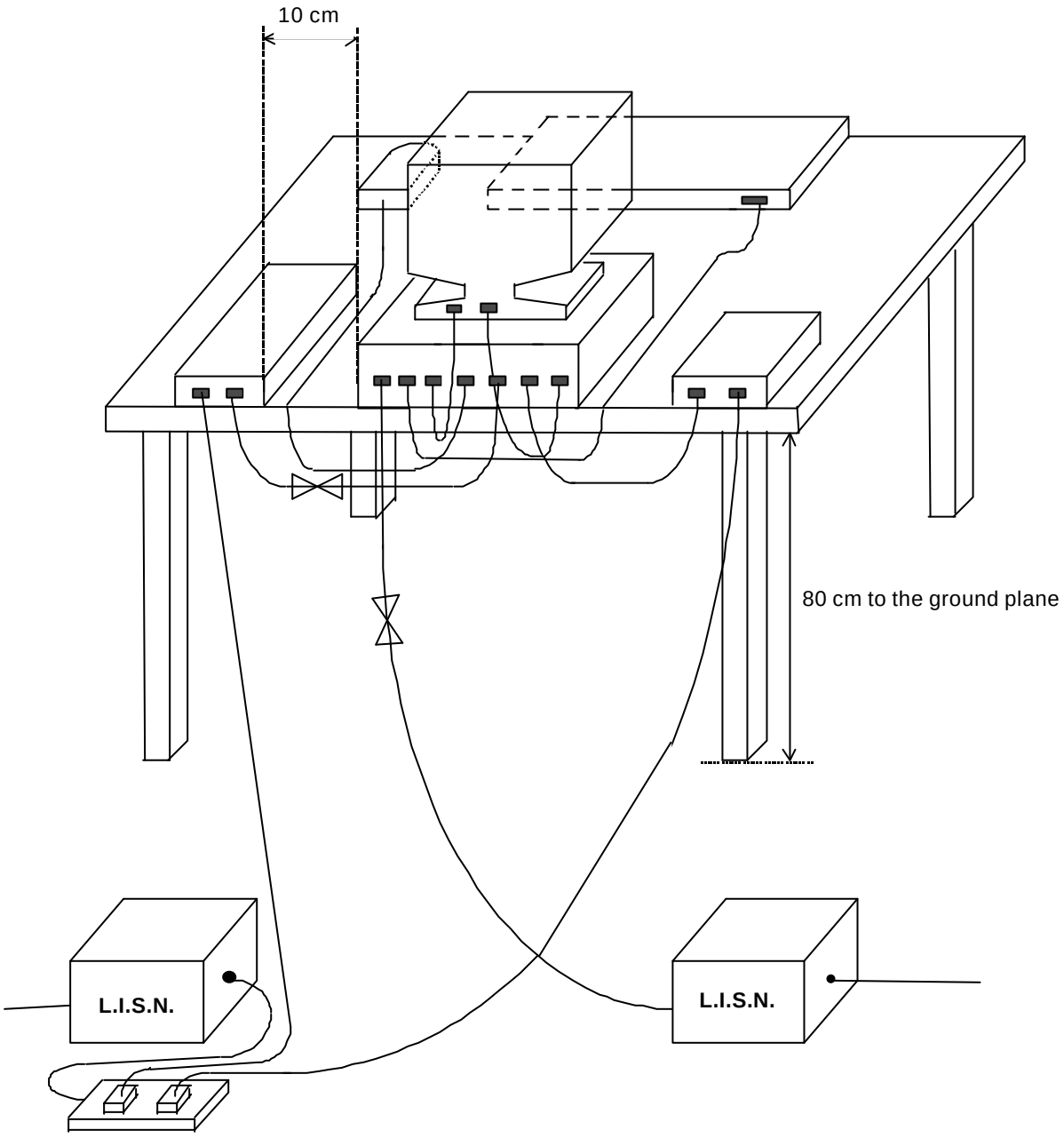
5.1. Major Measuring Instruments

Test Receiver	HP 8591EM
Attenuation	0 dB
Start Frequency	0.45 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

5.2. Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connect to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 450 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
i. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be retested one by one using the quasi-peak method and reported.

5.3. Typical Test Setup Layout of Conducted Powerline



5.4. Test Result of AC Powerline Conducted Emission

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 56 %
- Test Date : Apr. 13, 2001

The Conducted Emission test was passed at minimum margin

LINE 16.507 MHz / 53.90 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading (dBuV)	(uV)	Limits (dBuV)	(uV)	Margin (dB)
0.504	L	35.20	57.54	60.00	1000.00	-24.80
0.775	L	34.30	51.88	60.00	1000.00	-25.70
16.507	L	53.90	495.45	69.50	2985.38	-15.60
24.760	L	43.80	154.88	69.50	2985.38	-25.70
0.776	N	34.50	53.09	60.00	1000.00	-25.50
16.507	N	53.80	489.78	69.50	2985.38	-15.70

Test Engineer : Aldrich

Aldrich Hong

5.5. Photographs of Conducted Powerline Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW

REAR VIEW

SIDE VIEW

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 2,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Major Measuring Instruments

6.1.1. from 30MHz to 1GHz

- Spectrum Analyzer (HP 8568B)
  Attenuation 0 dB
  Start Frequency 30 MHz
  Stop Frequency 1000 MHz
  Resolution Bandwidth 1 MHz
  Video Bandwidth 1 MHz
  Signal Input 100 Hz to 1.5 GHz

- Quasi-Peak Adapter (HP 85650A)
  Resolution Bandwidth 120 KHz
  Frequency Band 30 MHz to 1 GHz
  Quasi-Peak Detector ON for Quasi-Peak Mode
  OFF for Peak Mode

- Amplifier (HP 8447D)
  Attenuation 0 dB
  RF Gain 25 dB
  Signal Input 0.1 MHz to 1.3 GHz

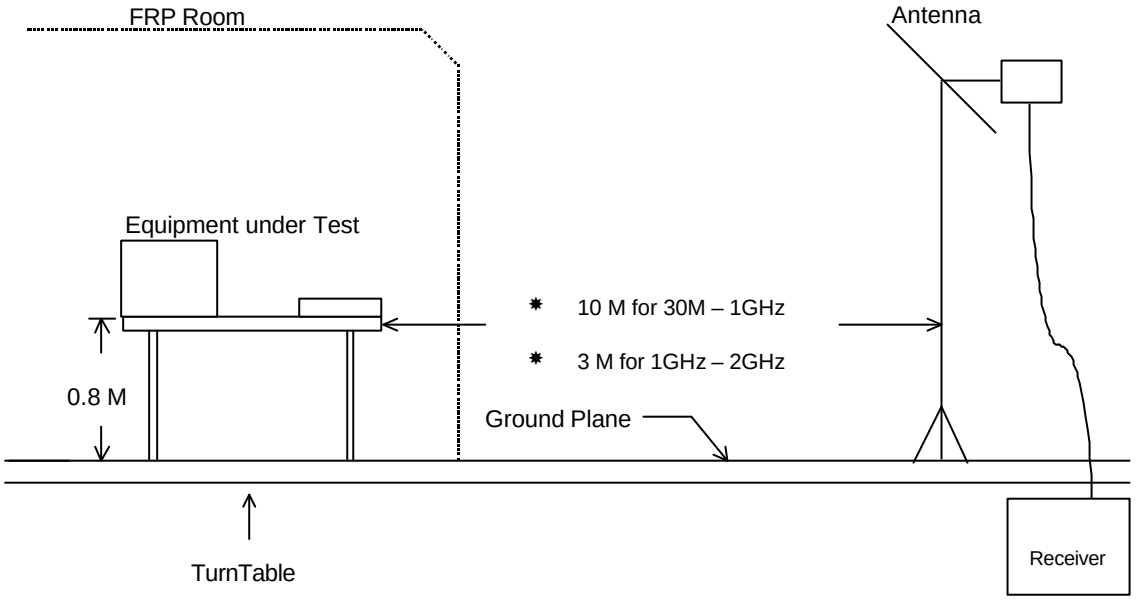
6.1.2. from 1GHz to 2GHz

- Receiver (HP 8546A)
  Attenuation 0 dB
  Start Frequency 1000 MHz
  Stop Frequency 2000 MHz
  Resolution Bandwidth 1 MHz
  Video Bandwidth 1 MHz
  Signal Input 9 KHz to 6.5 GHz

6.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

- Frequency Range of Test : from 30 MHz to 1,000 MHz
- Test Distance : 10 M
- Temperature : 32°C
- Relative Humidity : 45 %
- Test Date : Apr. 13, 2001
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin

426.400 MHz / 41.95 dBuV (VERTICAL) Antenna Height 3 Meter, Turntable Degree 214 °.

- Test Distance : 10M for 30MHz ~ 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission	Level	Margin
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
167.826	V	9.23	1.78	25.46	53.50	473.15	36.47	66.60	-17.03
235.200	V	11.33	2.26	25.41	56.90	699.84	39.00	89.13	-17.90
355.200	V	15.08	2.94	22.95	56.90	699.84	40.97	111.82	-15.93
433.600	V	16.68	3.27	19.31	56.90	699.84	39.26	91.83	-17.64
452.800	V	17.20	3.41	20.95	56.90	699.84	41.56	119.67	-15.34
426.400	H	16.46	3.22	22.27	56.90	699.84	41.95	125.17	-14.95

Test Distance : 3M for 1GHz ~ 2GHz

Remark: Frequency from 1000MHz to 2000MHz, the emission emitted by the EUT is too low to be measured

Test Engineer : 

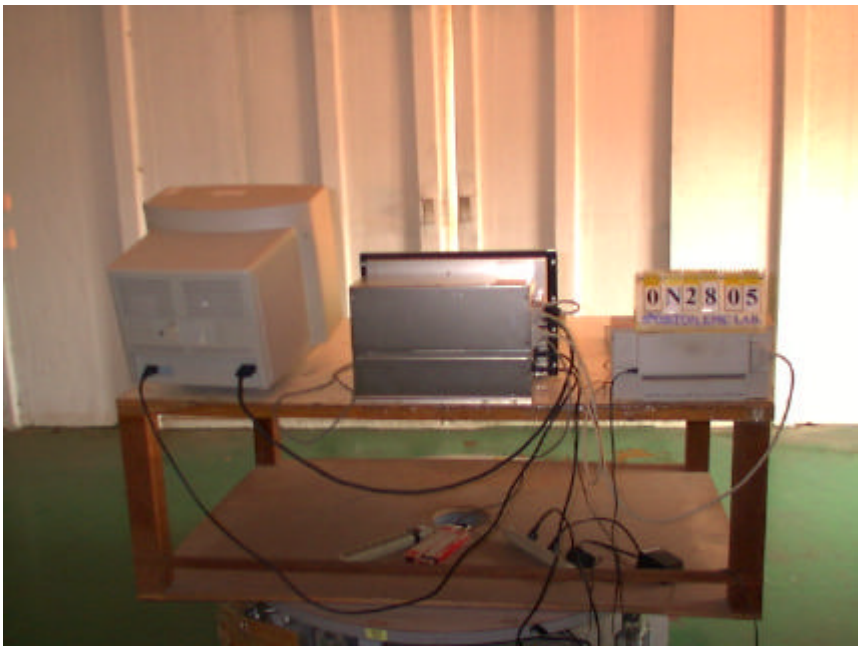
KENNY CHUANG

6.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW

REAR VIEW



7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Remark
30	17.6	0.7	10m
35	15.2	0.8	10m
40	13.6	0.9	10m
45	10.4	0.9	10m
50	8.3	0.9	10m
55	7.9	0.9	10m
60	7.5	0.9	10m
65	7.2	1.0	10m
70	6.8	1.1	10m
75	7.0	1.1	10m
80	7.1	1.2	10m
85	7.7	1.3	10m
90	8.4	1.3	10m
95	10.0	1.3	10m
100	11.5	1.3	10m
110	12.1	1.4	10m
120	12.6	1.5	10m
130	11.9	1.6	10m
140	11.2	1.7	10m
150	10.2	1.7	10m
160	9.4	1.7	10m
170	9.2	1.8	10m
180	9.8	1.9	10m
190	9.6	1.9	10m
200	9.4	2.0	10m
220	10.5	2.1	10m
240	11.6	2.3	10m
260	12.5	2.4	10m
280	13.4	2.6	10m
300	14.2	2.7	10m
320	14.5	2.7	10m
340	14.8	2.8	10m
360	15.1	3.0	10m
380	15.4	3.1	10m
400	15.7	3.1	10m
450	17.1	3.4	10m
500	18.4	3.8	10m
550	18.5	4.1	10m
600	18.6	4.2	10m
650	18.1	4.4	10m
700	17.7	4.7	10m
750	18.6	5.1	10m
800	19.4	5.2	10m
850	21.8	5.5	10m
900	23.8	5.7	10m
950	22.9	6.2	10m
1000	22.0	6.2	10m
1000	17.8	0.8	3m
2000	27.2	5.8	3m

LKOP5

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver (site 2)	HP	8591EM	3710A00187	9 KHz – 1.8 GHz	Sep. 16. 2000	Conduction
LISN (Support Unit) (site 2)	AFJ	AFJ LT32	32030012050	50 ohm / 50 uH	Jun. 10, 2000	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98081	50 ohm / 50 uH	Dec. 06, 2000	Conduction
Spectrum Analyzer (site 5)	HP	8568B	2634A03000	100Hz – 1.5GHz	Nov. 22, 2000	Radiation
Quasi-peak Adapter (site 5)	HP	85650A	2521A00821	9KHz -1GHz	Nov. 22, 2000	Radiation
Amplifier (Site 5)	HP	8447D	2944A09073	0.1MHz -1.3GHz	Sep. 17, 2000	Radiation
Bilog Antenna (Site 5)	CHASE	CBL6112A	2288	30MHz -2GHz	Jan. 30, 2001	Radiation
Half-wave dipole antenna (Site 5)	EMCO	3121C	9705-1285	28 M - 1GHz	May 17, 2000	Radiation
Turn Table (site 5)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 5)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation
Receiver	HP	8546A	3325A00108	9KHz~6.5GHz	Dec.14, 2000	Radiation
Horn Antenna	EMCO	3115	4976	1GHz~18GHz	Jun. 21, 2000	Radiation

9. Uncertainty of Test Site

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2.5
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	**normal**	**±1.7**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±3.4**

U= √{(0.3/2)² +(2.5² +1.5² +0.2²)/3+(0.2)² /2}=1.7

Uncertainty of Radiated Emission Measurement

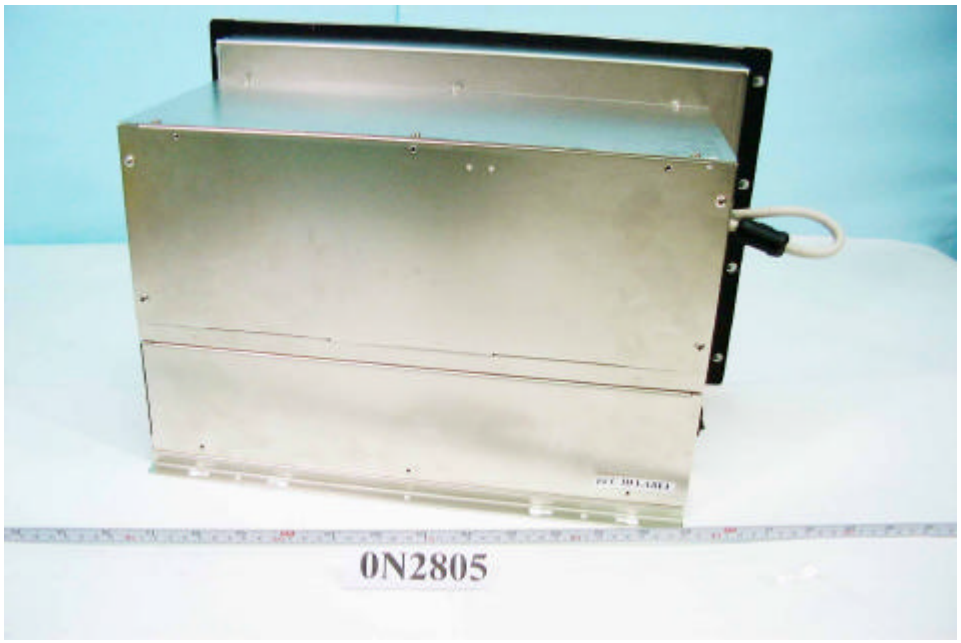
Contribution	**Probability Distribution**	3m	10m
Antenna factor calibration	normal(k=2)	±1.6	±1.6
cable loss calibration	normal(k=2)	±0.3	±0.3
RCV/SPA specification	rectangular	±2.5	±2.5
Antenna Directivity	rectangular	±3	±0.5
Antenna Factor V.S. Height	rectangular	±2	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25	±0.25
site imperfection	rectangular	±2	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54	±0.54
combined standard uncertainty Ue(y)	**normal**	**±2.9**	**±2.4**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±5.8**	**±4.8**

U= √{(1.6/2)² +(0.3/2)² +(3² +0.5² +2² +0.25² +2²)/3+(0.54)² /2}=2.4 for 10m test distance

U= √{(1.6/2)² +(0.3/2)² +(3² +3² +2² +0.25² +2²)/3+(0.54)² /2}=2.9 for 3m test distance

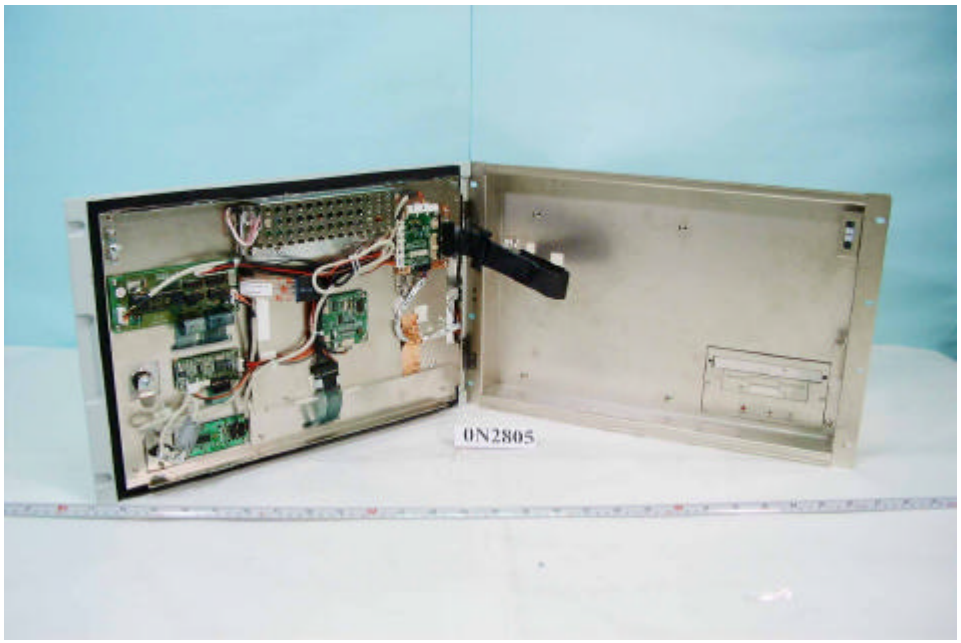
APPENDIX A. Photographs of EUT

0N2805-01.jpg

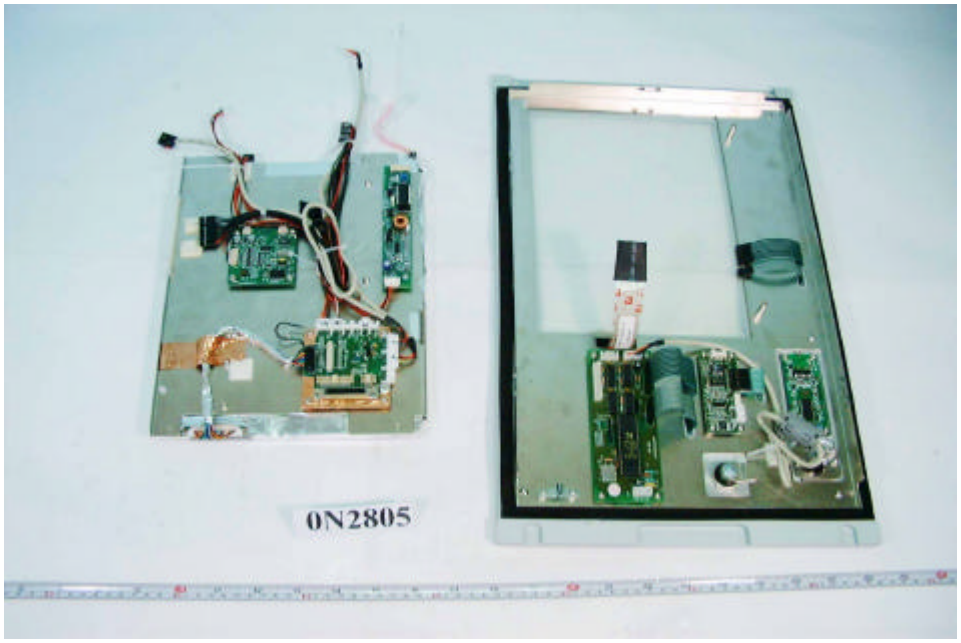


0N2805-02.jpg

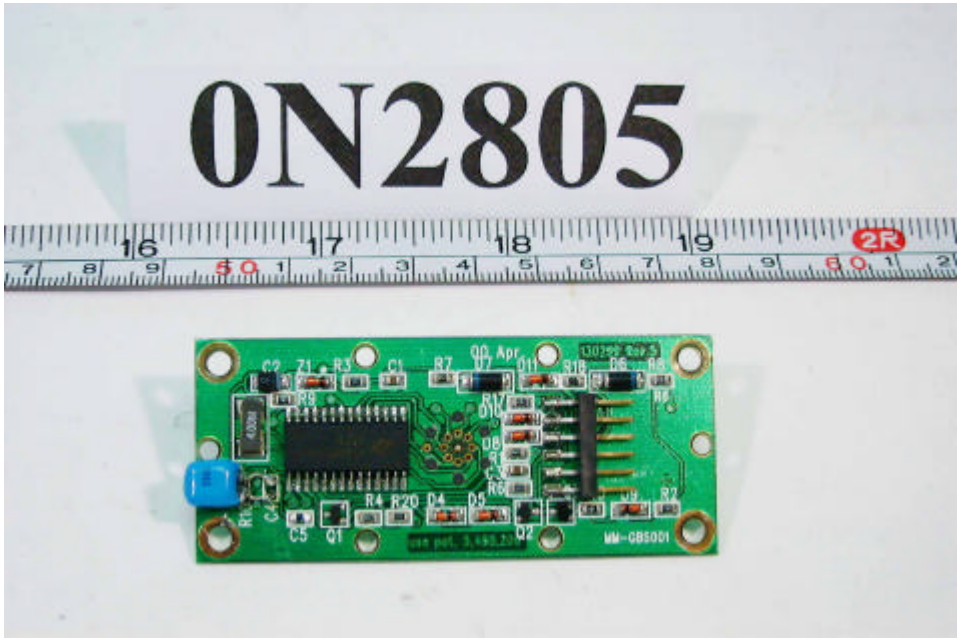
0N2805-03.jpg



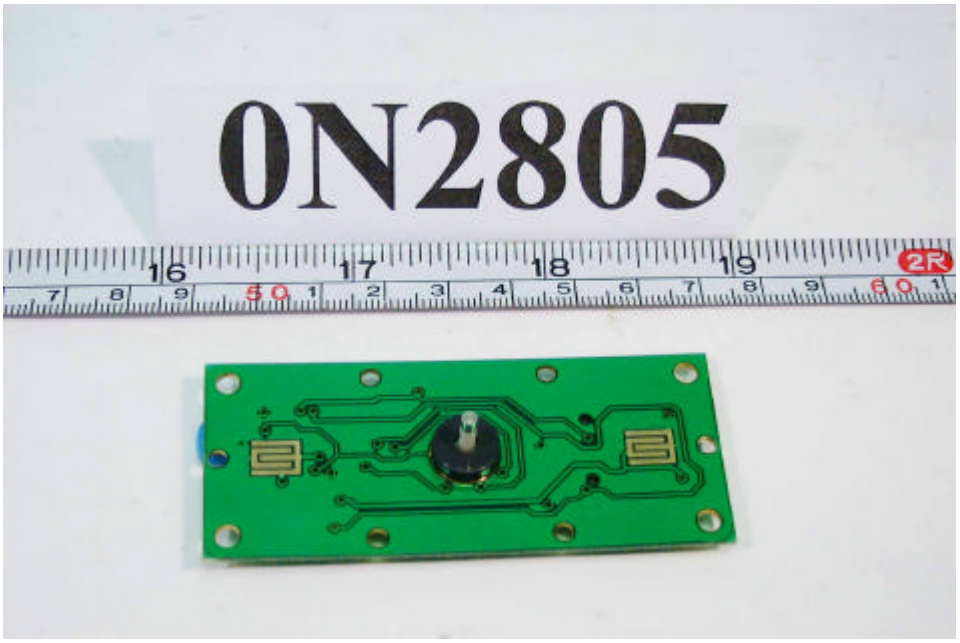
0N2805-04.jpg



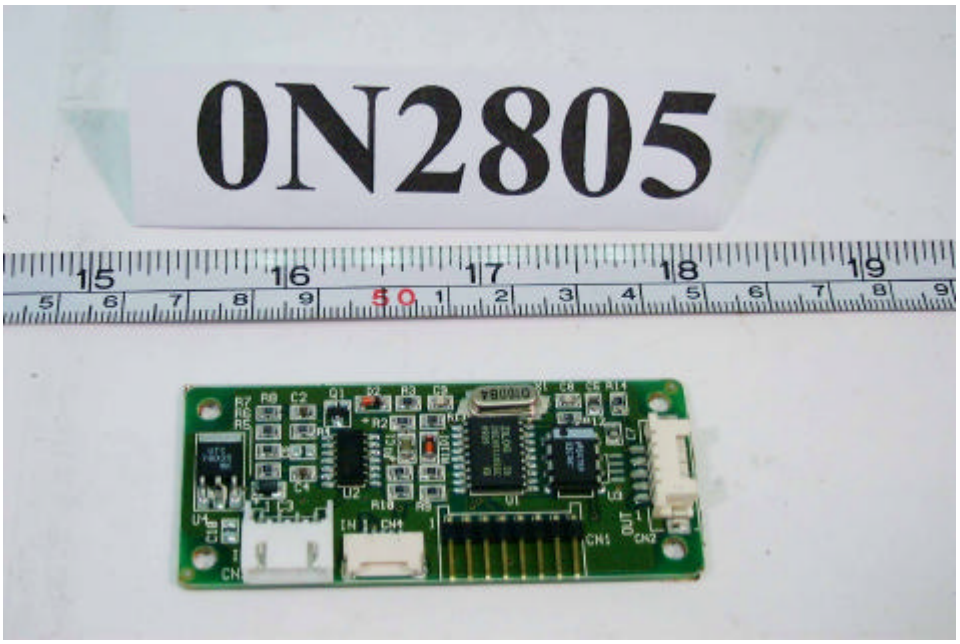
0N2805-05.jpg



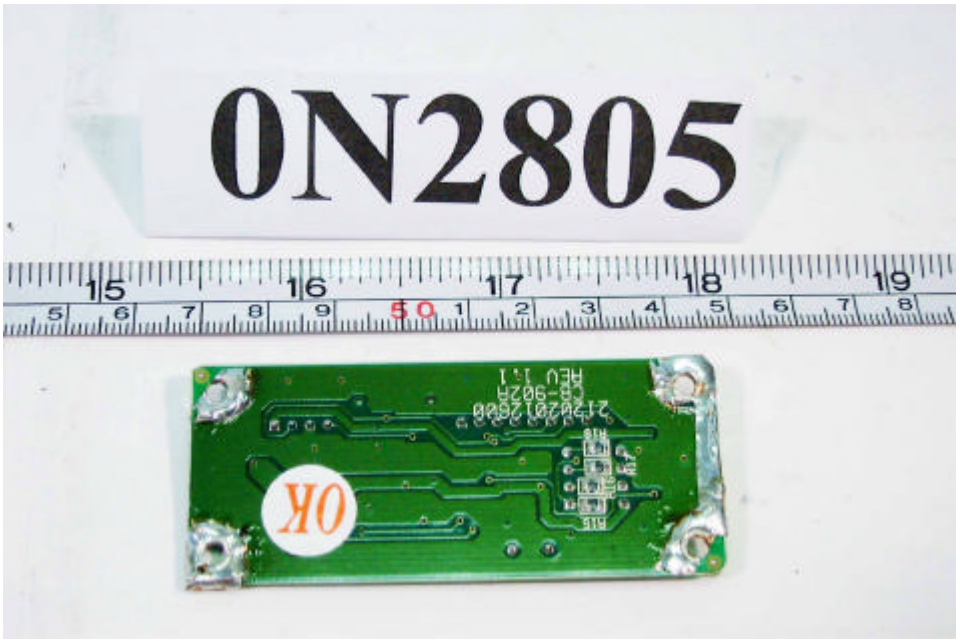
0N2805-06.jpg



0N2805-07.jpg

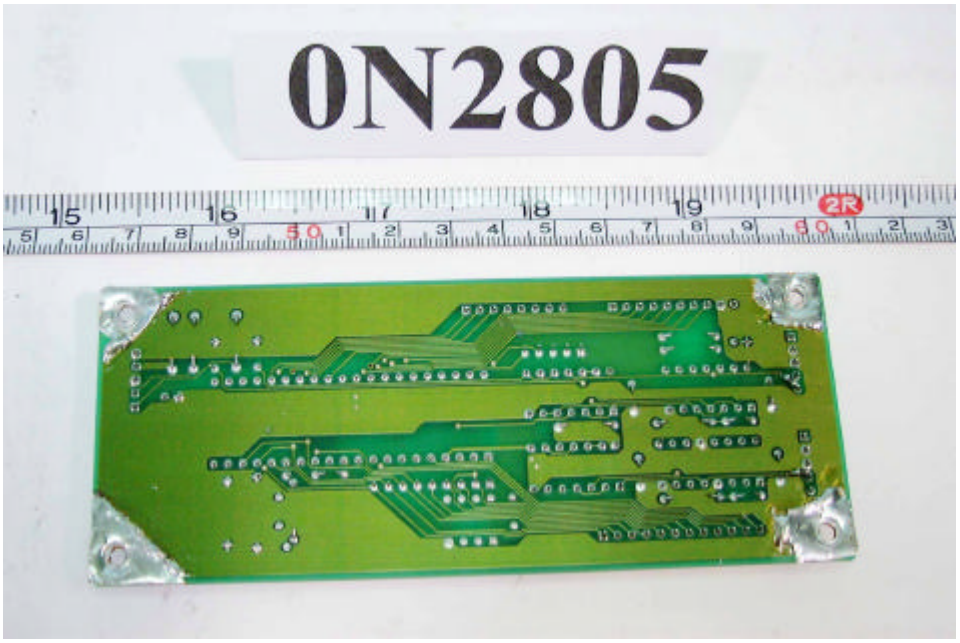


0N2805-08.jpg

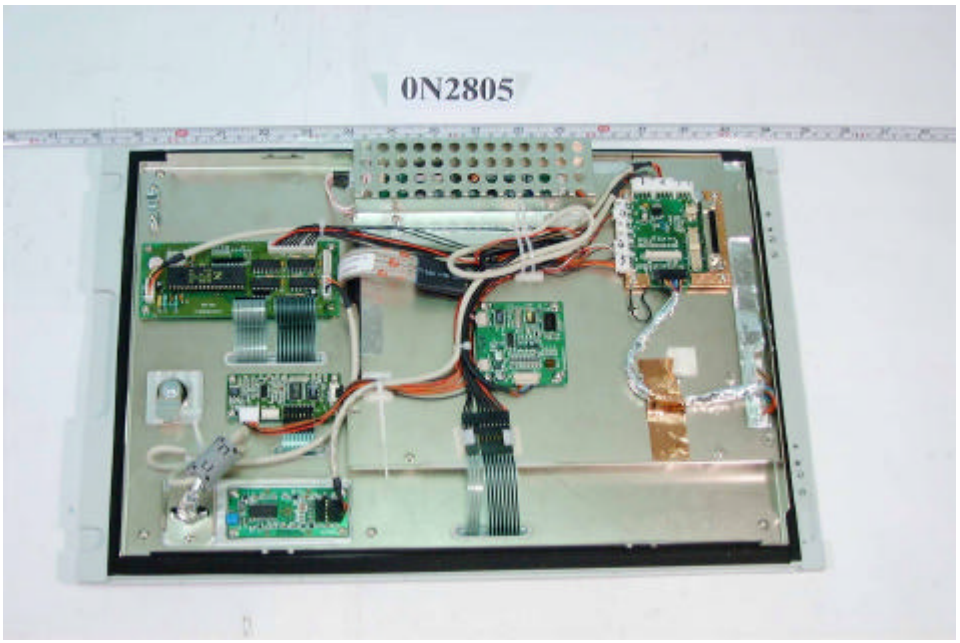


0N2805-09.jpg

0N2805-10.jpg

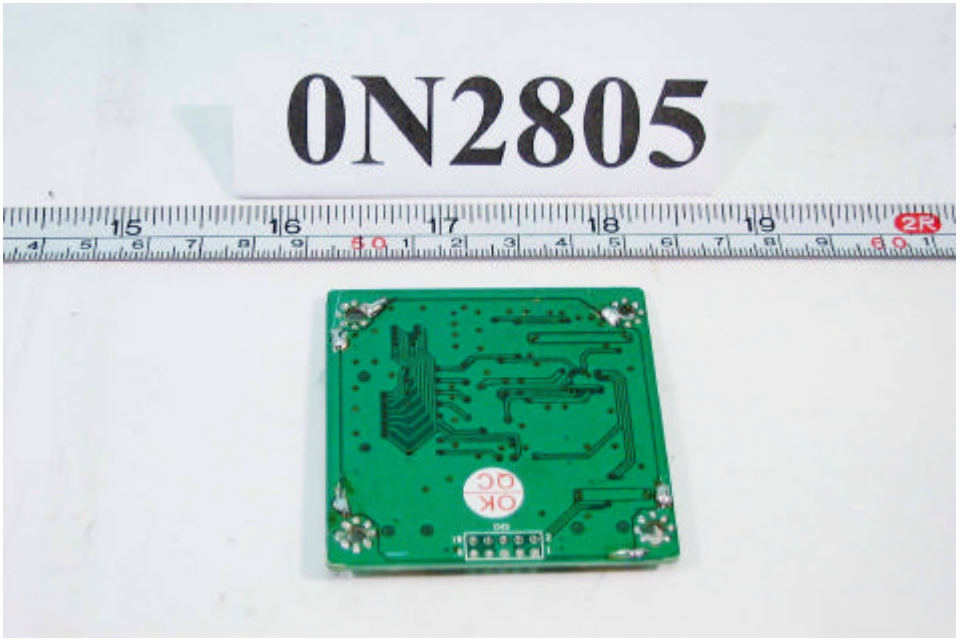


0N2805-11.jpg

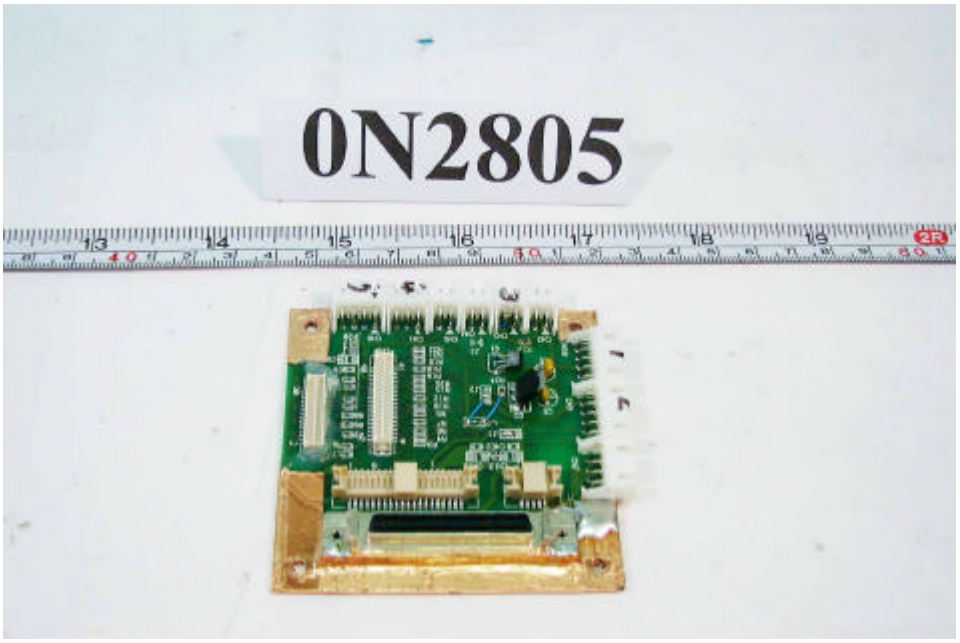


0N2805-12.jpg

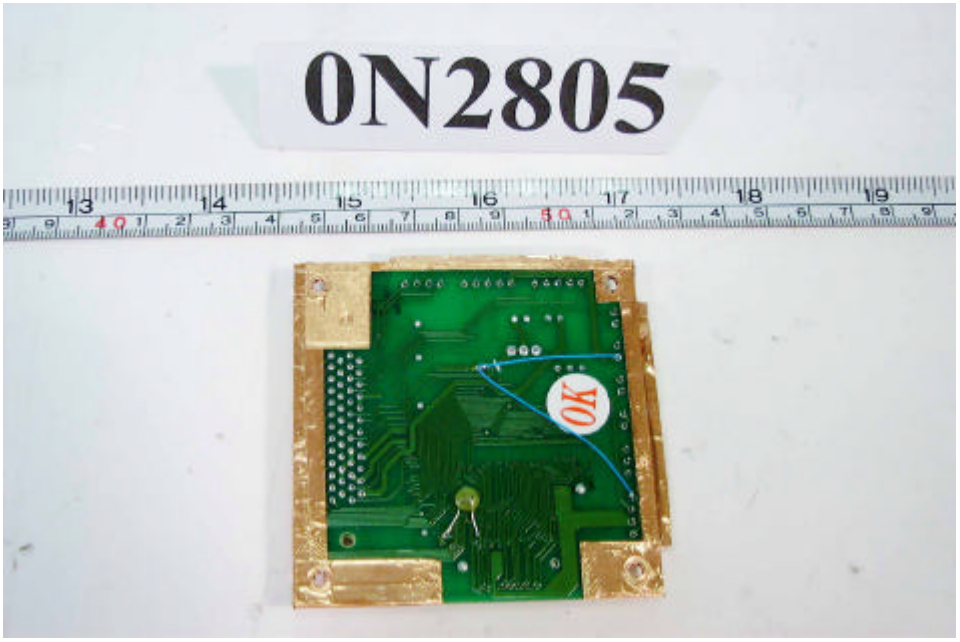
0N2805-13.jpg



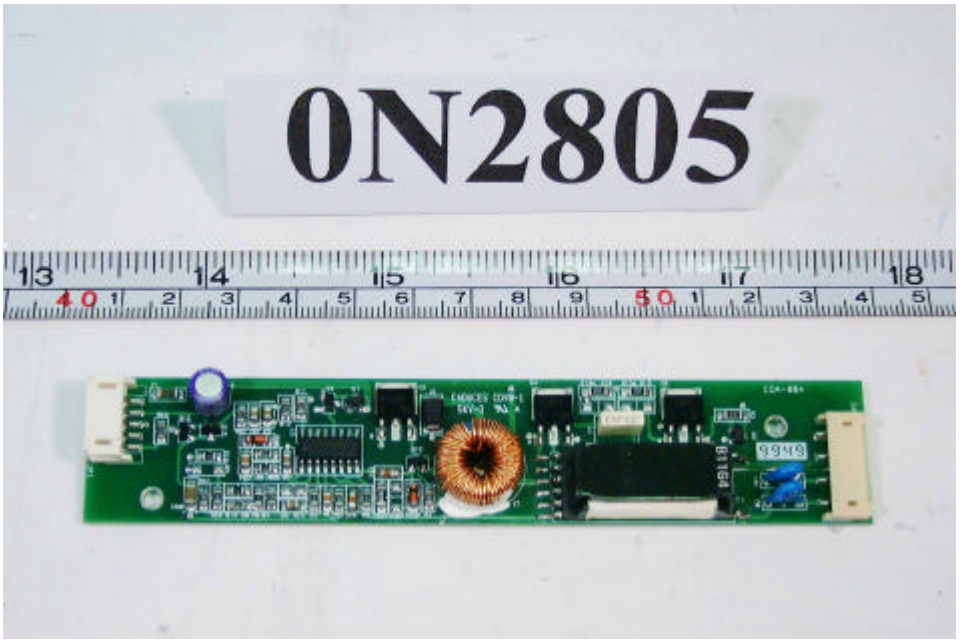
0N2805-14.jpg



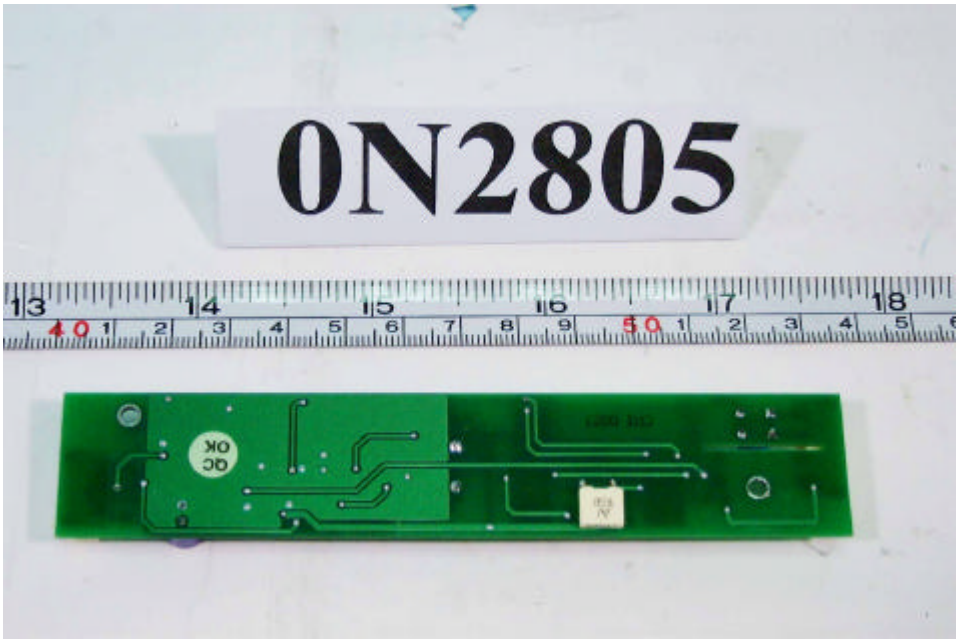
0N2805-15.jpg



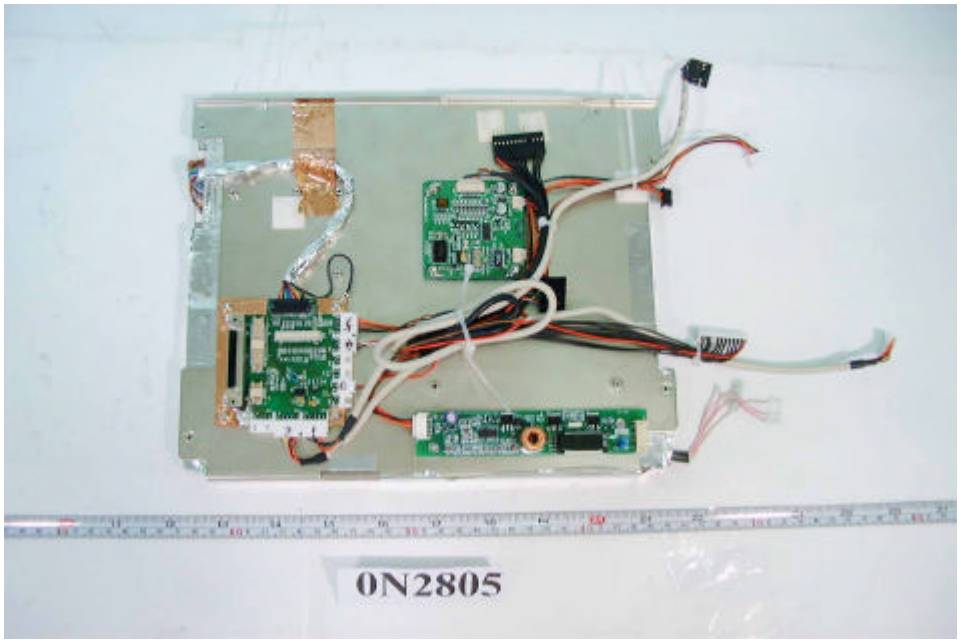
0N2805-16.jpg



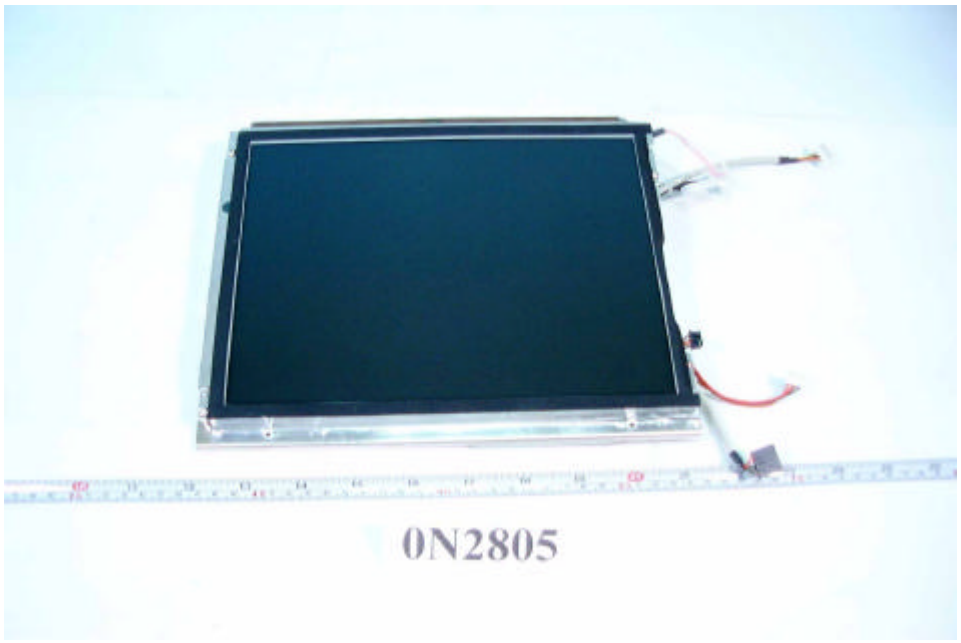
0N2805-17.jpg



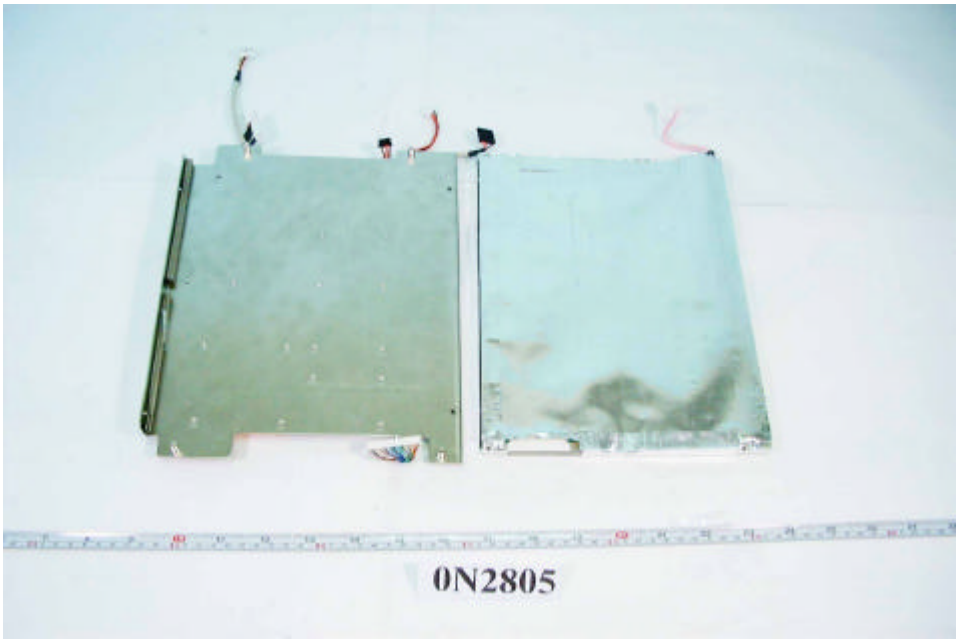
0N2805-18.jpg



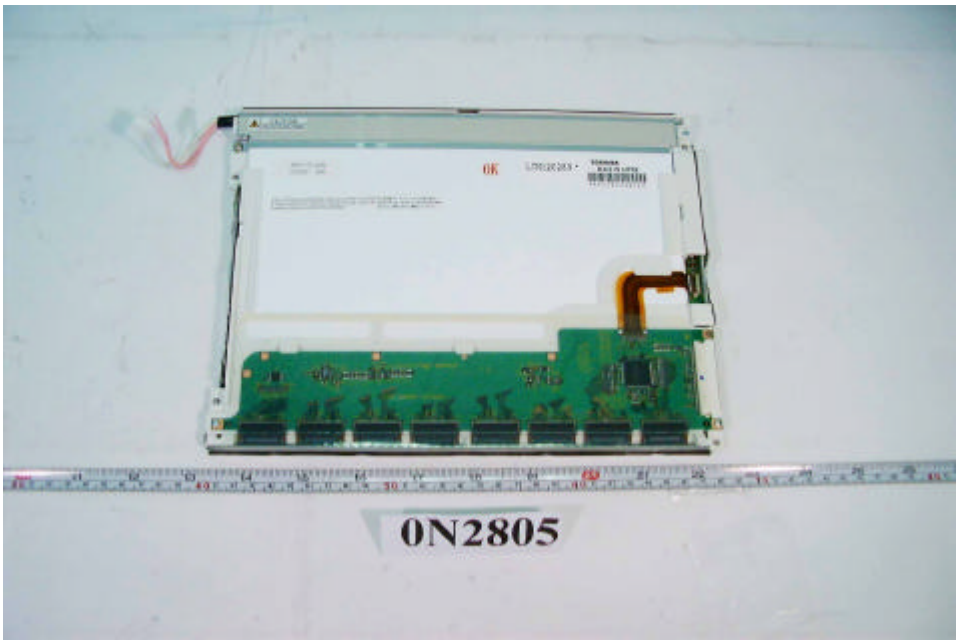
0N2805-19.jpg



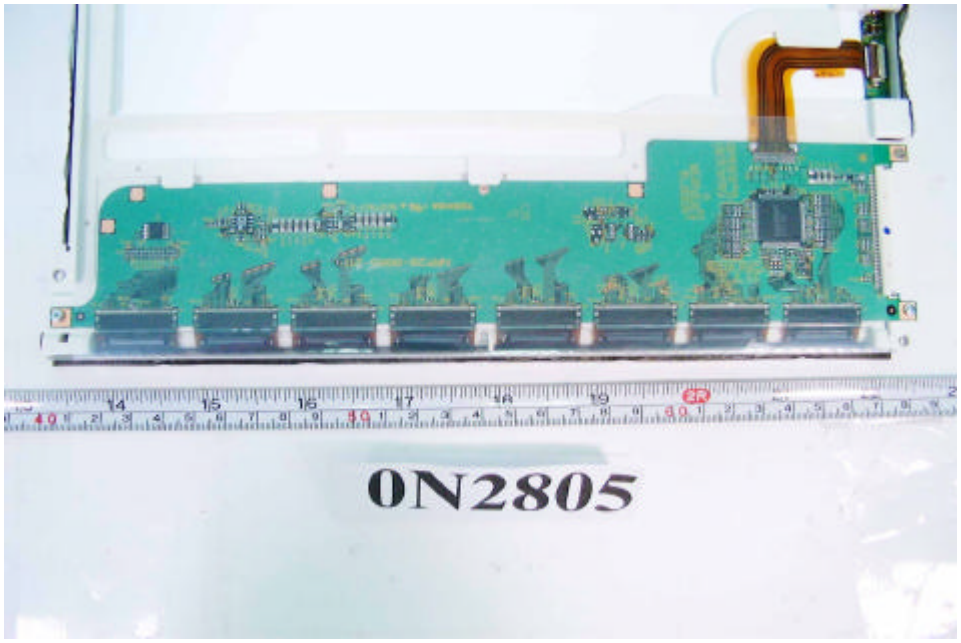
0N2805-20.jpg



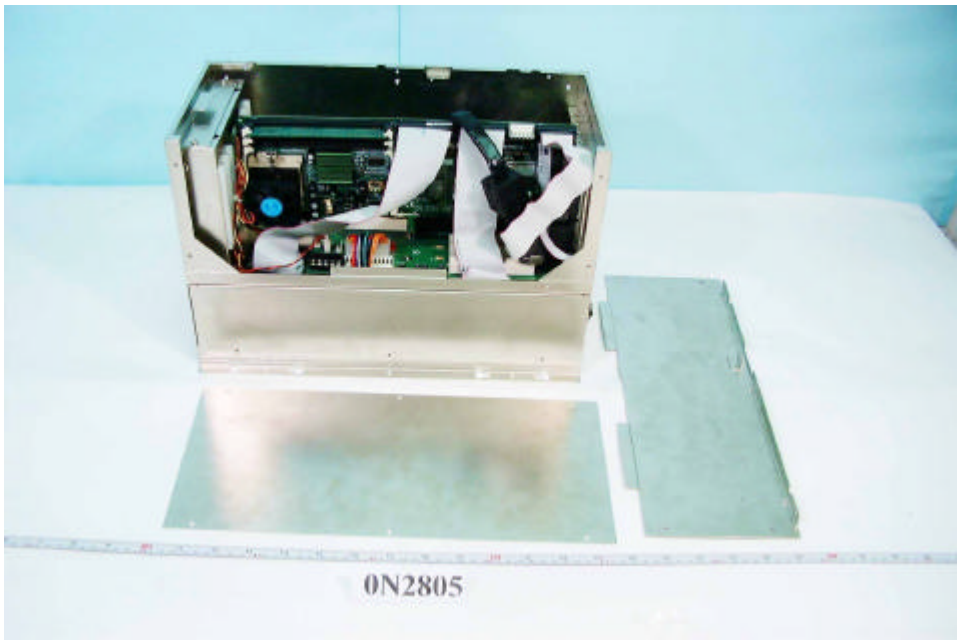
0N2805-21.jpg



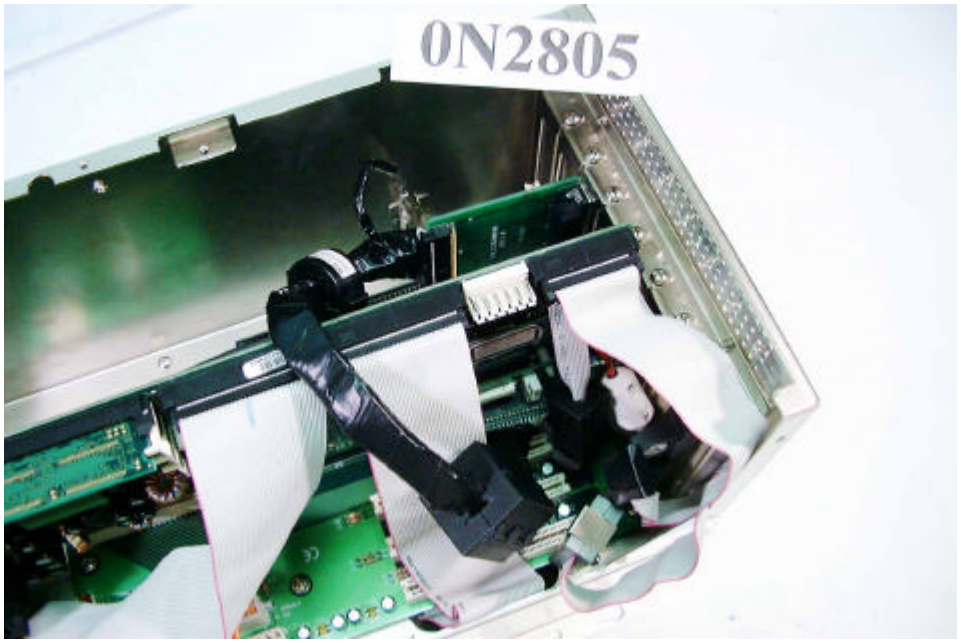
0N2805-22.jpg



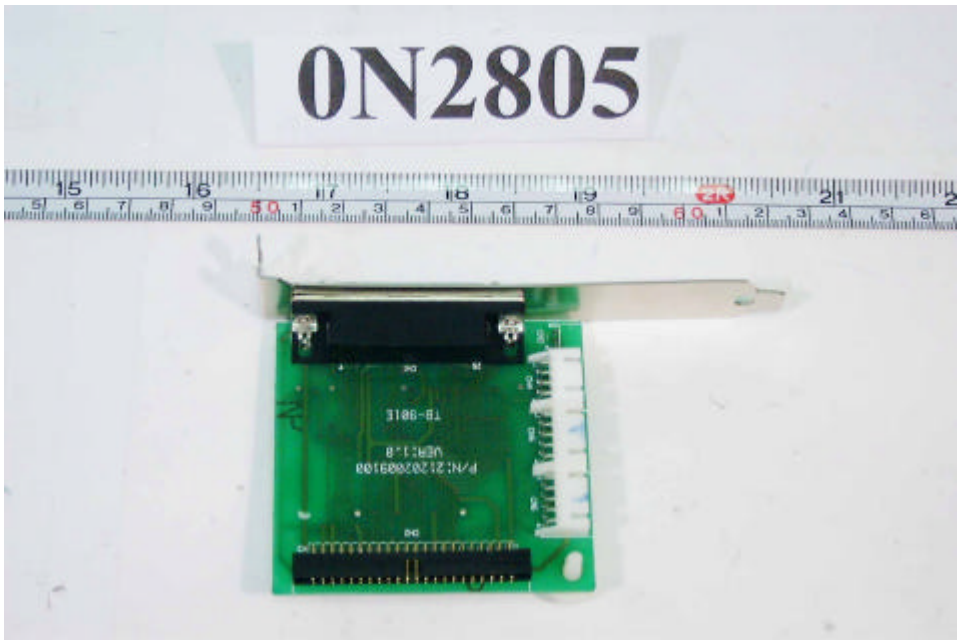
0N2805-23.jpg



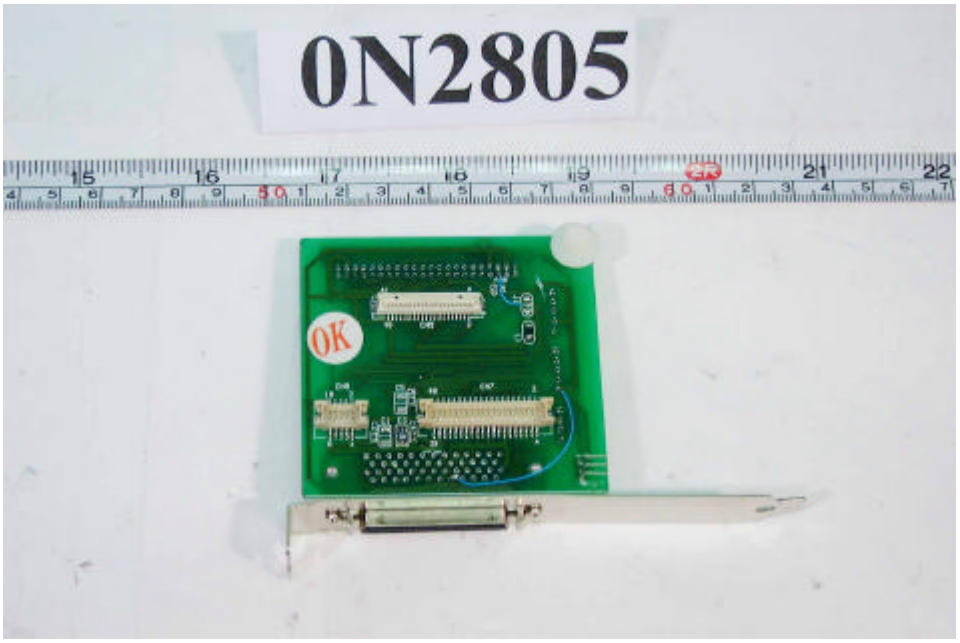
0N2805-24.jpg



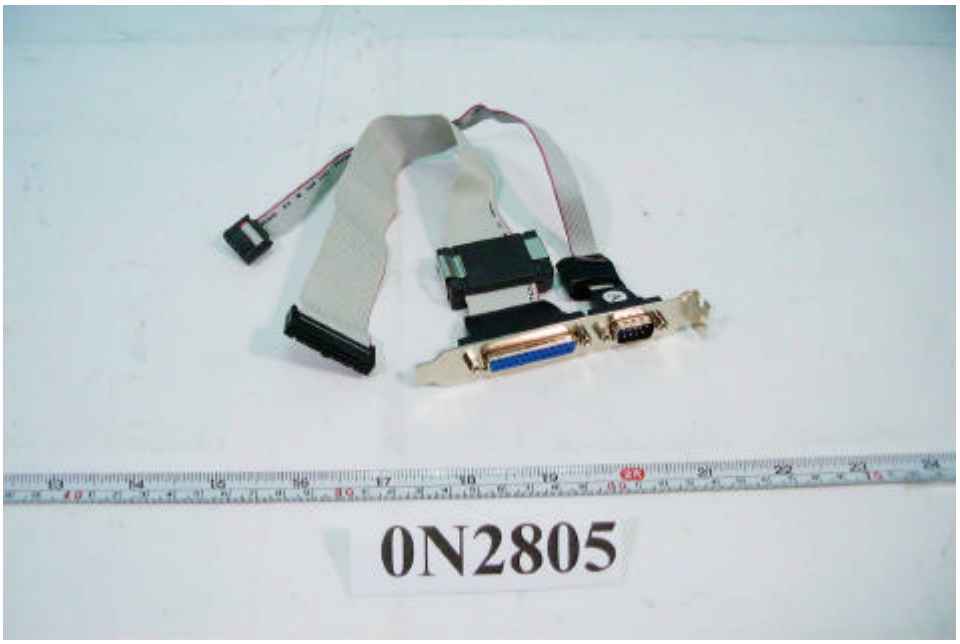
0N2805-25.jpg



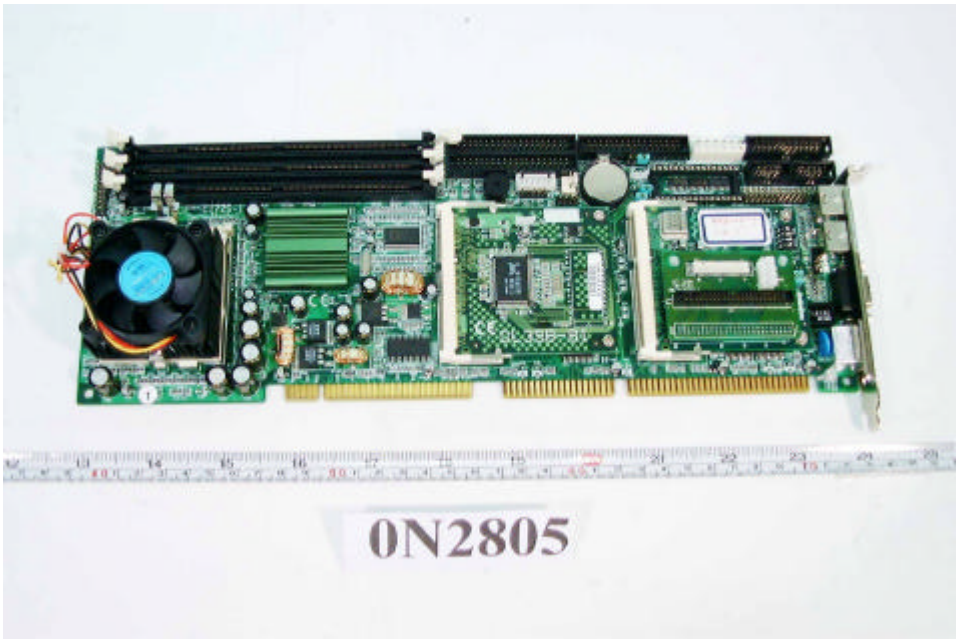
0N2805-26.jpg



0N2805-27.jpg



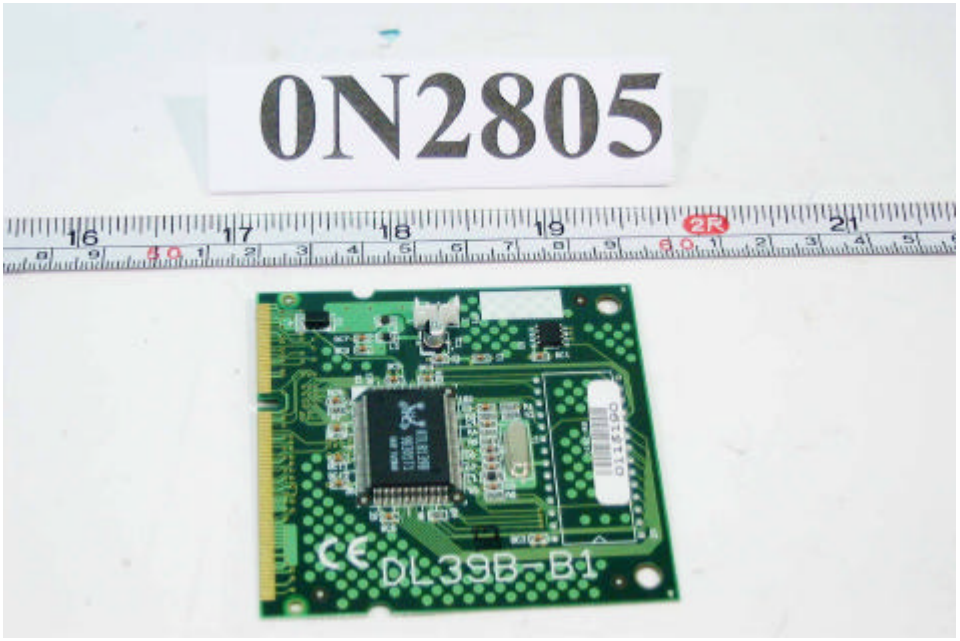
0N2805-28.jpg



0N2805-29.jpg

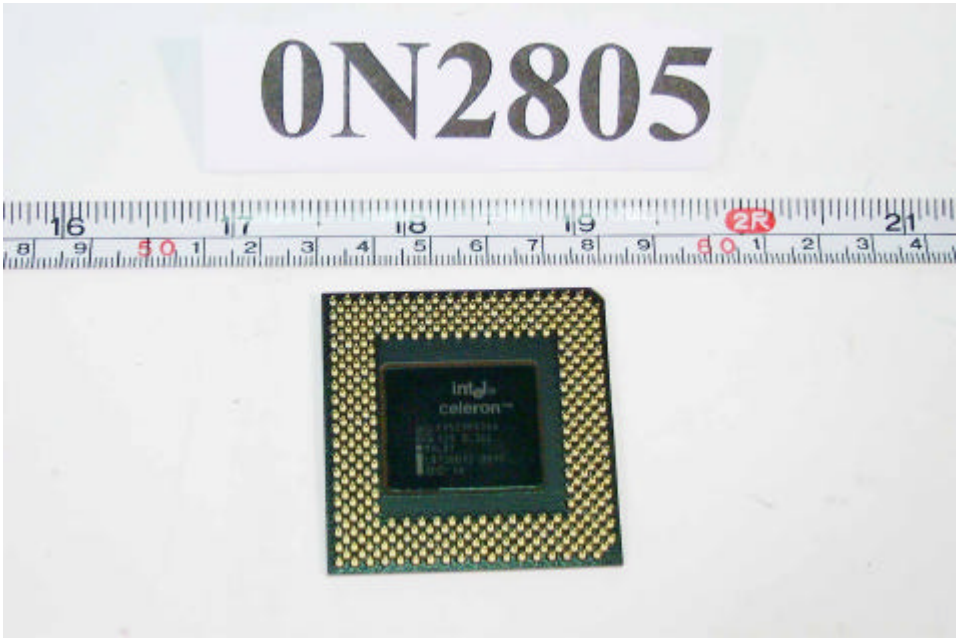
0N2805-30.jpg

0N2805-31.jpg



0N2805-32.jpg

0N2805-33.jpg

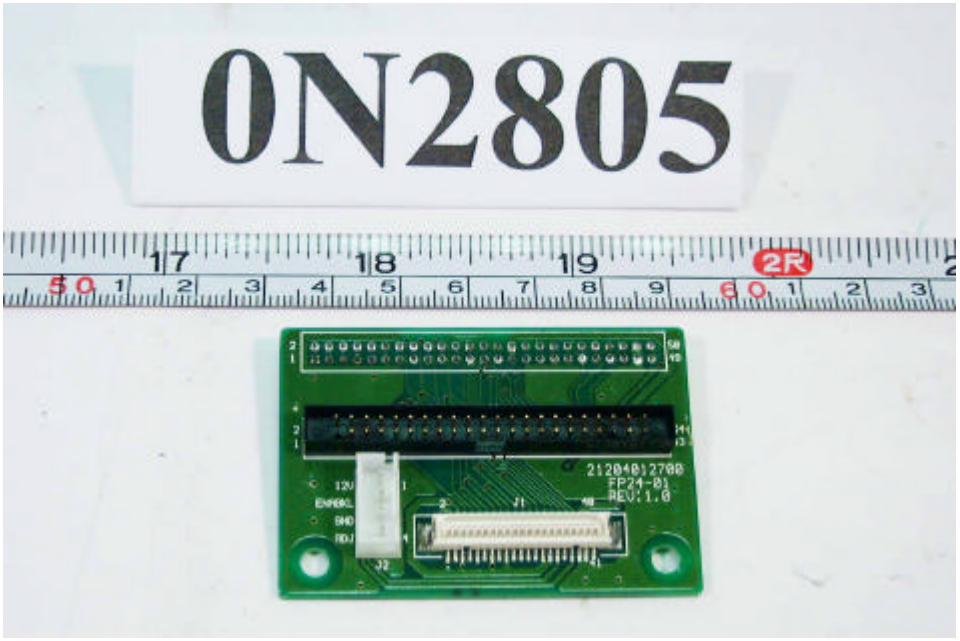


0N2805-34.jpg

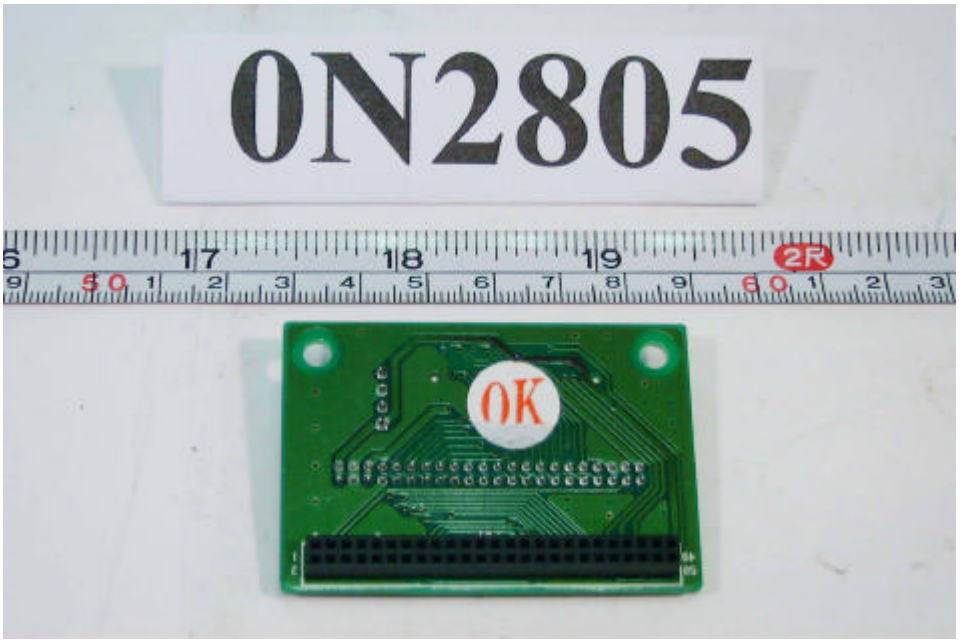
0N2805-35.jpg

0N2805-36.jpg

0N2805-37.jpg



0N2805-38.jpg

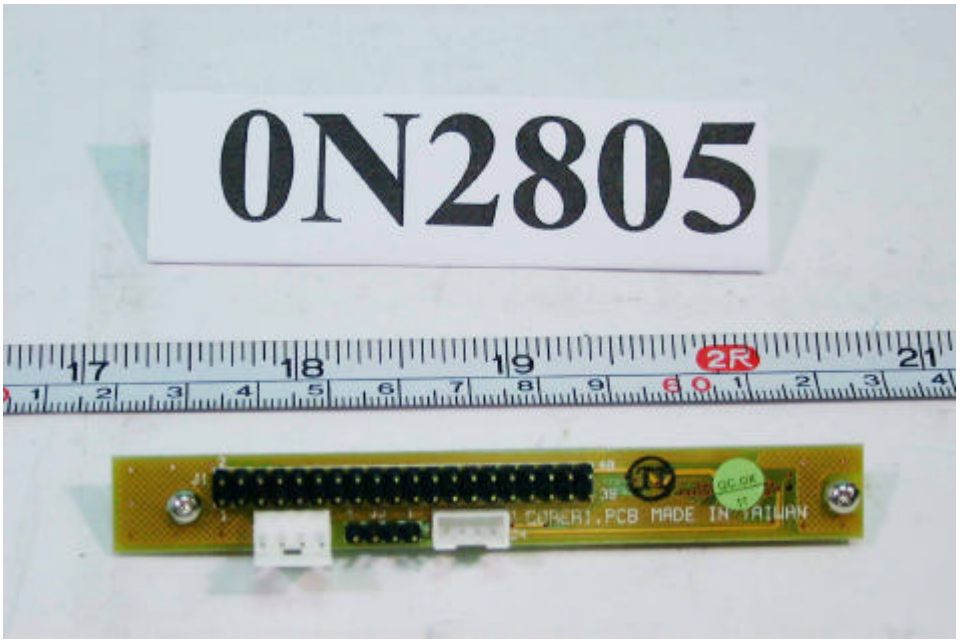


0N2805-39.jpg

0N2805-40.jpg

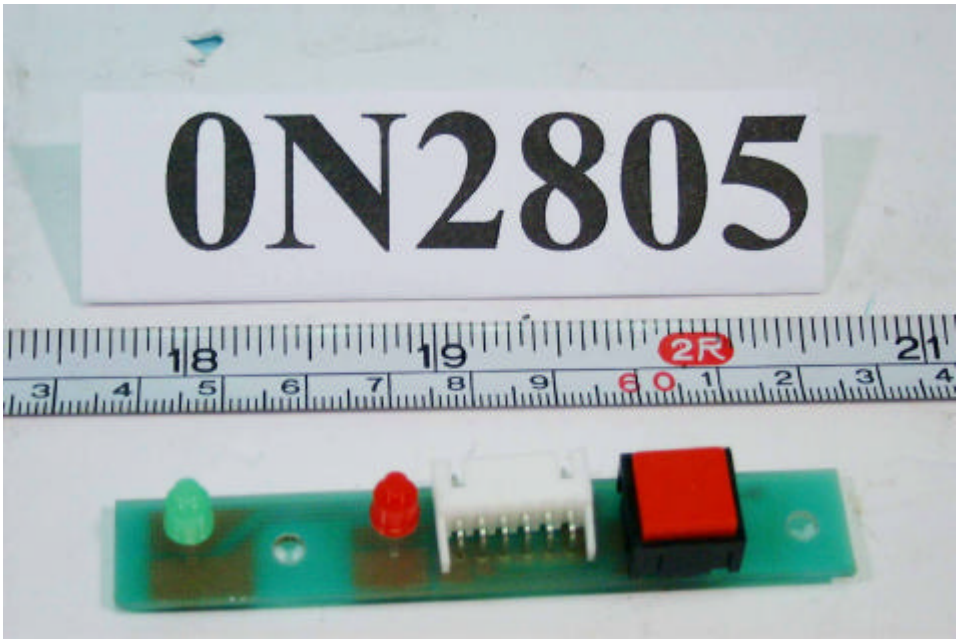
0N2805-41.jpg

0N2805-42.jpg

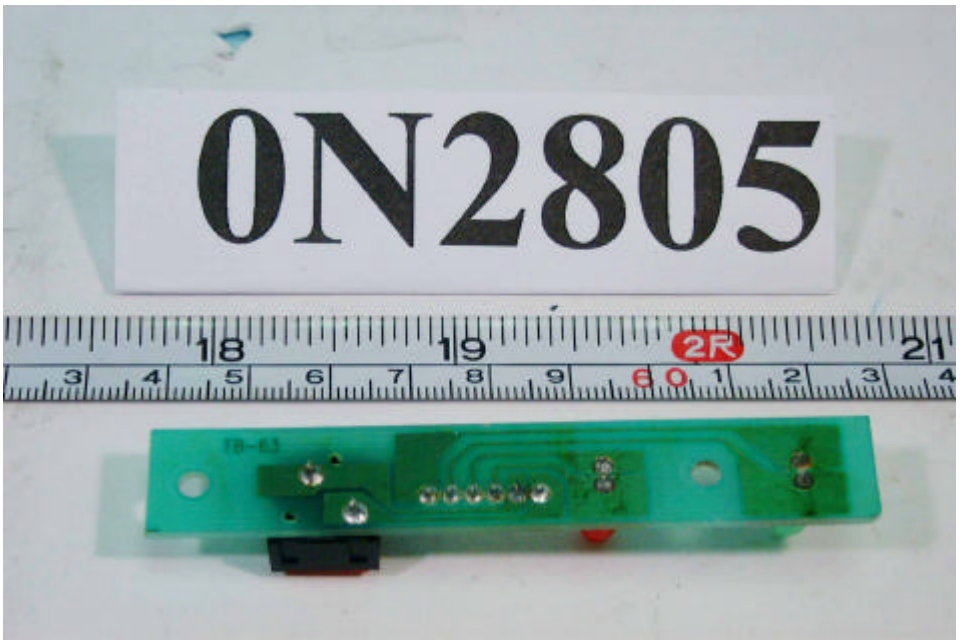


0N2805-43.jpg

0N2805-44.jpg



0N2805-45.jpg

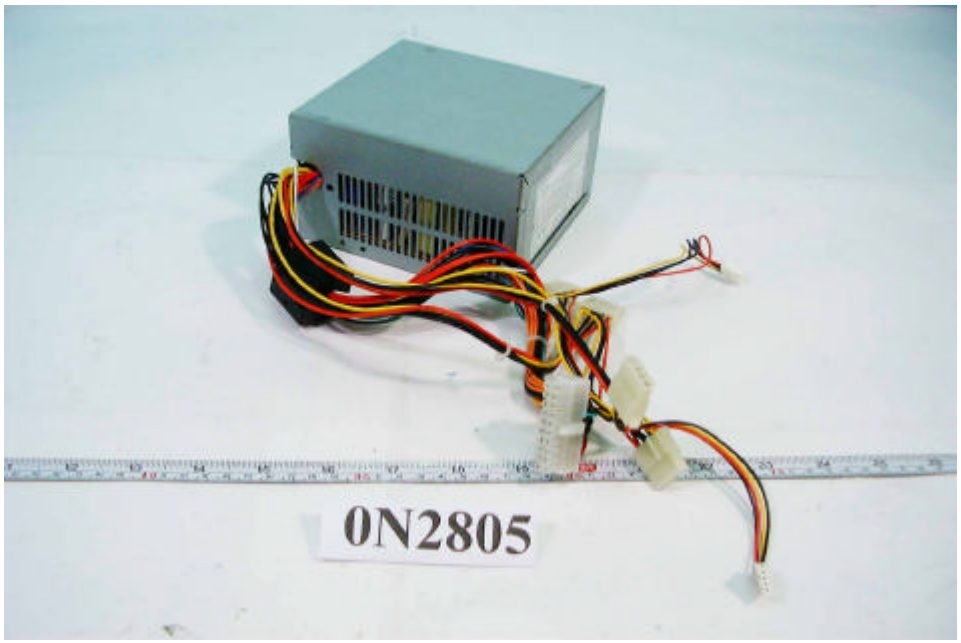


0N2805-46.jpg

0N2805-47.jpg

0N2805-48.jpg

0N2805-49.jpg



0N2805-50.jpg