

TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Grand ultimate wireless

Model No. : P135, P157, Grand ultimate wireless

FCC ID : PVCP135

Filing Type : Certification

Applicant : **GRANDTEC ELECTRONIC CORP.**
8F-1, No. 16, Jian Ba Rd., Chung Ho City, Taipei Hsien
235, 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.

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History of this test report

Original Report Issue Date: Sep. 20, 2001

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : Grand ultimate wireless

Model No. : P135, P157, Grand ultimate wireless

FCC ID : PVCP135

Applicant : **GRANDTEC ELECTRONIC CORP.**
8F-1, No. 16, Jian Ba Rd., Chung Ho City, Taipei Hsien
235, 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 limits. Testing was carried out on Sep. 12, 2001 at **SPORTON International Inc.** LAB. in Lin Kou.

 Sep. 26, 2001

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

Grand ultimate wireless
8F-1, No. 16, Jian Ba Rd., Chung Ho City, Taipei Hsien 235,
Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: Grand ultimate wireless
Model No.	: P135, P157, Grand ultimate wireless
FCC ID	: PVCP135
Trade Name	: N/A
VGA Data Cable	: Shielded, 1.1m
S-Video Cable	: Non-Shielded, 1.6m
AV Cable	: Non-Shielded, 1.6m
Audio Cable	: Non-Shielded, 0.7m
Power Supply Type	: Linear
AC Power Input	: Wall-mount, 2 pin
DC Power Cable	: Non-Shielded, 1.6m, 2 pin

1.4. Feature of Equipment under Test

- Plug and Display, no software driver required.
- Support four selectable channel Transmitter & Receiver (Composite Video and Stereo Audio), ISM Band from 2414~2468Mhz.
- Supports resolution up to 1280 x 1024
- Simultaneous display on TV, Remote TV and VGA monitor.
- Supports NTSC,NTSC-EIAJ · PAL-N, PAL, PAL-M, PAL-combination-N and SECAM (via RGB OUT) video system.
- Supports CVBS, S-VIDEO or RGB video outputs by switch change.
- Simultaneous RGB and CVBS output signal on RGB out connector.
- True 24 bit, true color digitizer.
- Function keys on converter : MENU, ZOOM, FINE TUNE · SAVE · VIDEO SOURCE · POWER & Position adjustment.
- Menu key supports Freeze , Size, Brightness, Contrast, Hue, Saturation, Video Standard, Flicker , OSD color, Reset.
- DIP Switch supports functions : CHANNEL 1~ CHANNEL 4, RGB enable, YUV enable.
- LED indicator PAL & POWER.
- Adjustable H-SIZE and V-SIZE.
- 64 stages Brightness, Contrast, Hue, Saturation adjustment.
- 16 stages Sharpness, Flicker adjustment.
- Automatic generator COLOR BAR test pattern on output when no VGA input.
- Stereo Audio input from sound card or any Audio device.
- RF frequency : CH1=2414MHz, CH2=2432MHz, CH3=2450MHz, CH4=2468MHz.
- Demodulation Method : FM.
- Frequency Generating : P.L.L..
- Audio Response : 20Hz ~ 20kHz.
- Video Output : 1Vpp/ 75 ohm composite Video.
- RF Output Power : Follow the regulation.
- Distance : Open area is 100 meter, indoor is 30 meter.

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been configured and operated pursuant to ANSI C63.4-1992 in a manner which tended to maximize its emission characteristics in a typical application.
- b. Frequency range investigated: conduction 450 KHz to 30 MHz, radiation 30 MHz to 25000MHz.
- c. The complete test system included SONY Monitor, DELL PS/2 Keyboard, LOGITECH PS/2 Mouse, ACEEX Modem, FIC PC, HP Printer, PURETEK TV, Panasonic VCR and EUT for EMI test.
- d. During testing, the EUT kept transmitting signals.
- e. According to 15.203 of FCC rule, the EUT is designed to ensure that no antenna other than that furnished with the EUT could be used. The antenna is permanently mounted on the EUT.
- f. The EUT has four channels, 2414MHz, 2432MHz, 2450MHz, 2468MHz. The frequency range is more than 10 MHz. According to 15.31 (m) of FCC rule, channel 1 (2414MHz), channel 2 (2432MHz) and channel 4 (2468MHz) were tested.
- g. For conduction test, the emissions test of channel 1 was made by the following three video modes
 1. VGA input, 1280x1024, 60Hz, 64KHz s-video output (mode a)
 2. VGA input, 1024x768, 75Hz, 60KHz AV video output (mode b)
 3. VCR input, AV+S-video output (mode c),the mode c was measured as the worst case. So mode c was used to perform the tests of channel 2 and channel 4.
- h. For radiation test, the emissions test of channel 1 was made by the following three video modes
 1. VGA input, 1280x1024, 60Hz, 64KHz s-video output (mode a)
 2. VGA input, 1024x768, 75Hz, 60KHz AV video output (mode b)
 3. VCR input, AV+S-video output (mode c),the mode b was measured as the worst case. So mode b was used to perform the tests of channel 2 and channel 4.

2.2. Description of Test System

Support Unit 1. -- Monitor (SONY)

FCC ID	: AK8GDM17SE2T
Model No.	: GDM-17SE2T
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 360 degree via metal backshells, 1.15m

Support Unit 2. -- PS/2 Keyboard (DELL)

FCC ID : GYUM92SK
Model No. : AT101(DE8M)
Serial No. : SP0055
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

Support Unit 3. -- Personal Computer (FIC)

FCC ID : N/A
Model No. : P2L97
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0040
Data Cable : Shielded
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. -- Printer (HP)

FCC ID : B94C2642X
Model No. : DeskJet 400
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Braided-Shielded, 360 degree via metal backshells, 1.35m

Support Unit 5. -- PS/2 Mouse (LOGITECH)

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

Support Unit 6. -- TV (PURETEK)

FCC ID : N/A
Model No. : MP5600TV
Serial No. : SP0105
Data Cable : Non-Shielded, 1.6m

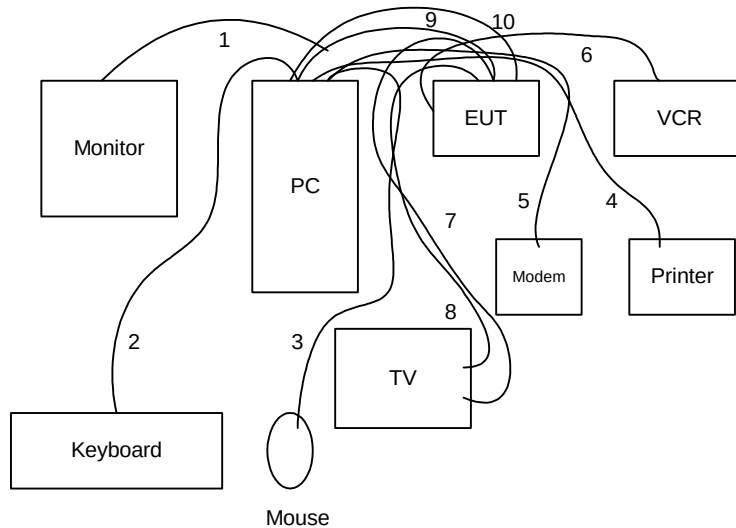
Support Unit 7. -- VCR (Panasonic)

FCC ID : AC0927104AS
Model No. : PV-S7S70
Serial No. : SP0107
Data Cable : Non-Shielded, 1.6m

Support Unit 8. -- Modem (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0015
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

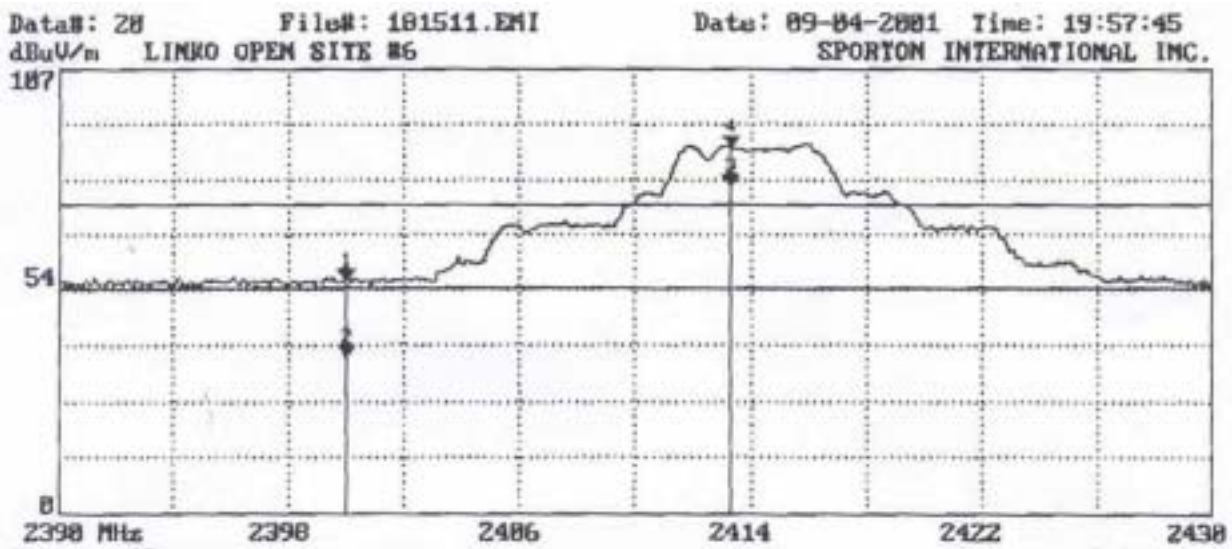
2.3. Connection Diagram of Test System



1. The I/O cable is connected from EUT to the support unit 1.
2. The I/O cable is connected from PC to the support unit 2.
3. The I/O cable is connected from PC to the support unit 5.
4. The I/O cable is connected from PC to the support unit 4.
5. The I/O cable is connected from PC to the support unit 8.
6. The AV cable is connected from EUT to the support unit 7.
7. The S-Video cable is connected from EUT to the support unit 6.
8. The AV cable is connected from EUT to the support unit 6.
9. The VGA cable is connected from PC to the EUT.
10. The Audio Cable is connected from PC to the EUT.

2.4. Band edges measurement

Channel 1

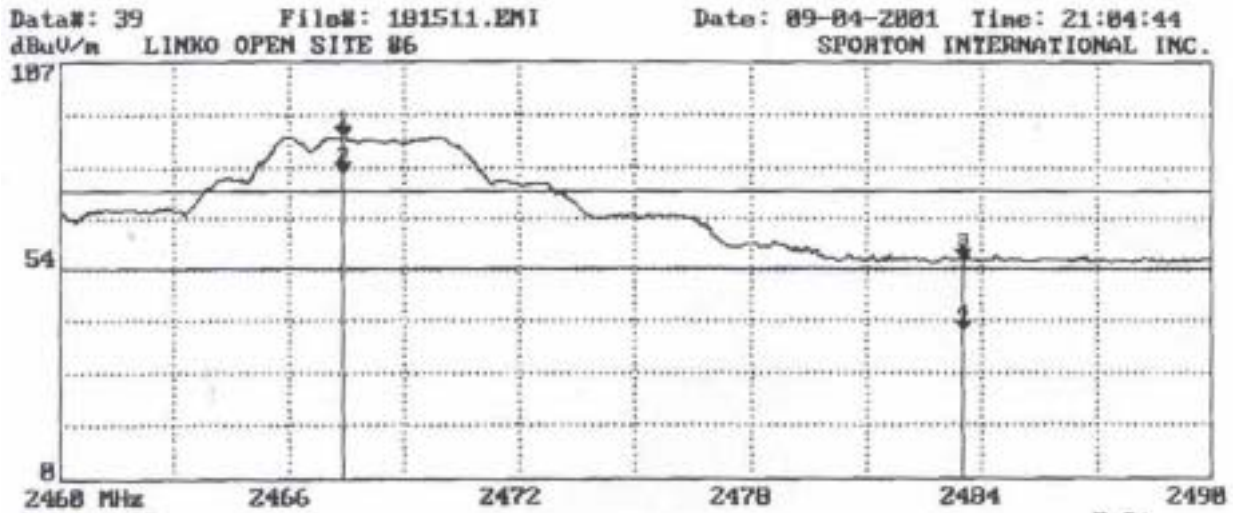


Frequency	Antenna	Cable	Reading	Limits	Emission Level		Margin	Detect
Polarity	Factor	Loss						
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB) Mode
2400.00	H	28.48	6.36	20.98	74.00	5012	55.82 618.02	-18.18 Q.P.
2400.00	H	28.48	6.36	3.00	54.00	501	37.84 77.98	-16.16 A.V.

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Channel 4



Frequency (MHz)	Antenna Polarity	Cable Factor	Cable Loss	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
2483.50	H	28.50	6.48	21.31	74.00 5012	56.29	652.38	-17.71	Q.P.
2483.50	H	28.50	6.48	2.99	54.00 501	37.97	79.16	-16.03	A.V.

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

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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, VCR kept sending color-bar signal to the EUT for VCR input mode.

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 C

4.4. Frequency Range Investigated

a. Conduction: from 450 kHz to 30 MHz

b. Radiation : from 30 MHz to 25 GHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

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.

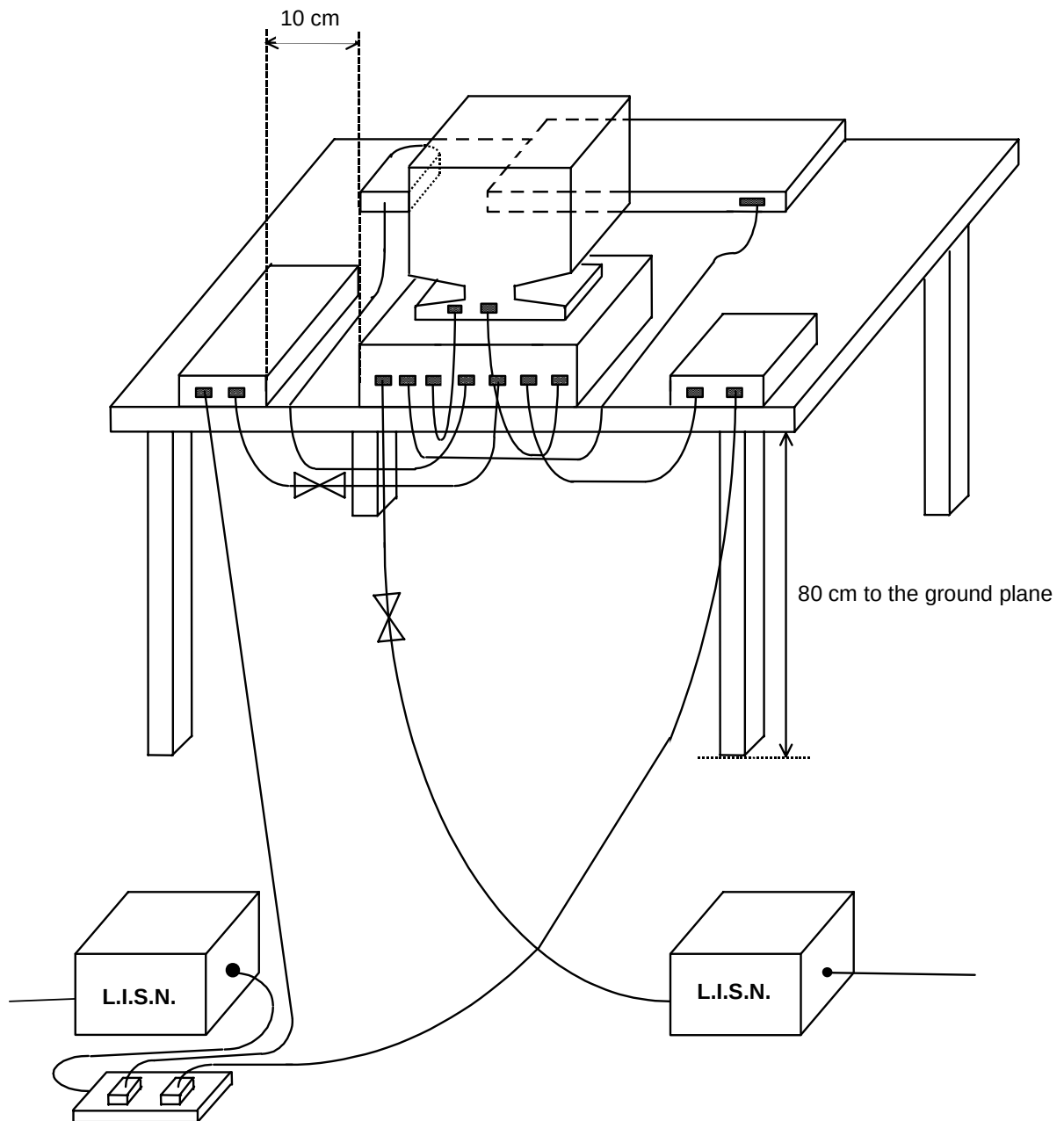
5.1. Major Measuring Instruments

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 : 54 %
- Test Date : Sep. 12, 2001
- Test Mode: CHANNEL 1 (mode a)

The Conducted Emission test was passed at minimum margin **NEUTRAL 21.63 MHz / 39.50 dBuV.**

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.50	L	37.70	76.74	48.00	251.19	-10.30
0.59	L	37.20	72.44	48.00	251.19	-10.80
0.69	L	37.90	78.52	48.00	251.19	-10.10
21.63	L	38.40	83.18	48.00	251.19	-9.60
0.47	N	37.80	77.62	48.00	251.19	-10.20
21.63	N	39.50	94.41	48.00	251.19	-8.50

Test Engineer :



JACKSON HUANG

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 54 %
- Test Date : Sep. 12, 2001
- Test Mode: CHANNEL 1 (mode b)

The Conducted Emission test was passed at minimum margin LINE 23.66 MHz / 39.10 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.47	L	37.80	77.62	48.00	251.19	-10.20
0.58	L	36.80	69.18	48.00	251.19	-11.20
23.66	L	39.10	90.16	48.00	251.19	-8.90
0.48	N	37.50	74.99	48.00	251.19	-10.50
0.56	N	36.90	69.98	48.00	251.19	-11.10
0.68	N	36.70	68.39	48.00	251.19	-11.30

Test Engineer :


JACKSON HUANG

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 54 %
- Test Date : Sep. 12, 2001
- Test Mode: CHANNEL 1 (mode c)

The Conducted Emission test was passed at minimum margin NEUTRAL 5.04 MHz / 46.80 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.49	L	36.70	68.39	48.00	251.19	-11.30
0.61	L	36.70	68.39	48.00	251.19	-11.30
5.04	L	46.20	204.17	48.00	251.19	-1.80
0.67	N	36.50	66.83	48.00	251.19	-11.50
0.78	N	39.30	92.26	48.00	251.19	-8.70
5.04	N	46.80	218.78	48.00	251.19	-1.20

Test Engineer :


JACKSON HUANG

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 54 %
- Test Date : Sep. 12, 2001
- Test Mode: CHANNEL 2 (mode c)

The Conducted Emission test was passed at minimum margin NEUTRAL 5.04 MHz / 46.70 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
4.28	N	37.80	77.62	48.00	251.19	-10.20
5.04	N	46.70	216.27	48.00	251.19	-1.30
0.55	L	37.60	75.86	48.00	251.19	-10.40
0.63	L	36.80	69.18	48.00	251.19	-11.20
0.69	L	37.10	71.61	48.00	251.19	-10.90
5.04	L	45.60	190.55	48.00	251.19	-2.40

Test Engineer :



JACKSON HUANG

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25°C
- Relative Humidity : 54 %
- Test Date : Sep. 12, 2001
- Test Mode: CHANNEL 4 (mode c)

The Conducted Emission test was passed at minimum margin NEUTRAL 5.04 MHz / 45.90 dBuV.

Freq. (MHz)	Line/ Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.49	L	37.50	74.99	48.00	251.19	-10.50
0.57	L	37.20	72.44	48.00	251.19	-10.80
5.04	L	45.40	186.21	48.00	251.19	-2.60
0.50	N	36.60	67.61	48.00	251.19	-11.40
0.55	N	37.10	71.61	48.00	251.19	-10.90
5.04	N	45.90	197.24	48.00	251.19	-2.10

Test Engineer :


JACKSON HUANG

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 25 GHz 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 5.3. 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

- Amplifier (HP 87405A)
Attenuation 0 dB
RF Gain 25 dB
Signal Input 10 MHz to 1.3 GHz
- Spectrum Analyzer (HP 8560E)
Attenuation 0 dB
Start Frequency 30 MHz
Stop Frequency 1000 MHz
Resolution Bandwidth 1 MHz
Video Bandwidth 1 MHz
Signal Input 30 Hz to 2.9 GHz
- Test Receiver (R&S ESVP)
Resolution Bandwidth 120 KHz
Frequency Band 20 MHz to 1.3 GHz
Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode

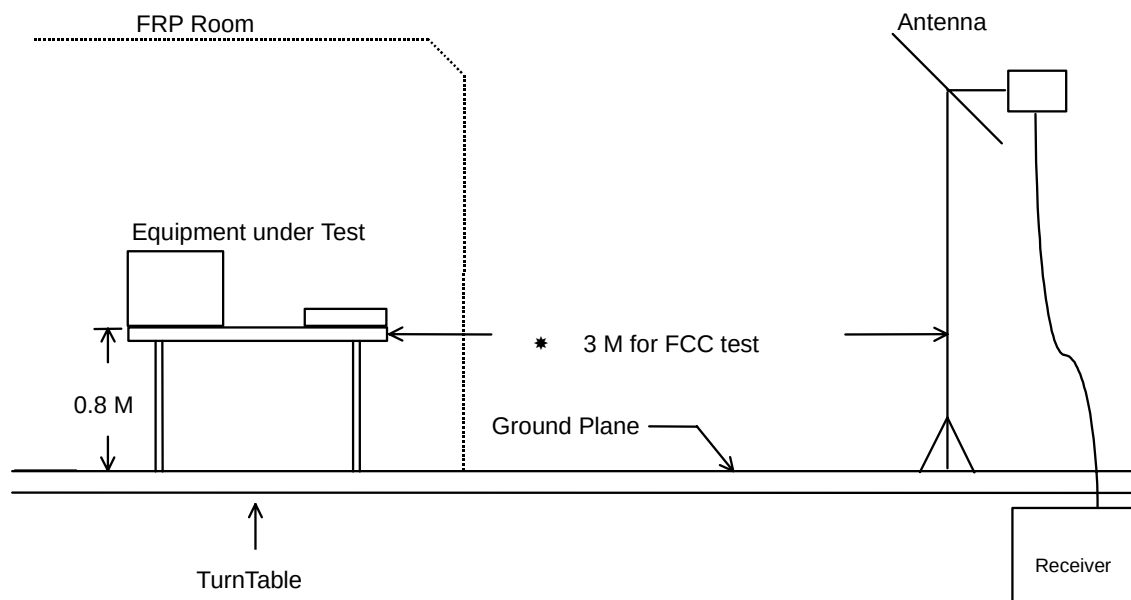
6.1.2. from 1GHz to 25GHz

- Spectrum (R&S FSP30)
Attenuation 0 dB
Start Frequency 1000 MHz
Stop Frequency 25GHz
Resolution Bandwidth 1 MHz
Video Bandwidth For peak mode: 1MHz
For average mode: 300Hz
Signal Input 9 KHz to 30 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 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 or CISPR quasi-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

6.4.1. Test mode : CHANNEL 1 (mode a)

- Test Distance : 3 M
- Temperature : 31°C
- Relative Humidity : 57 %
- Test Date : Sep. 4, 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

48.10 MHz / 38.26 dBuV/m (VERTICAL) Antenna Height 1.2 Meter, Turntable Degree 276 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
40.60	V	11.98	0.52	21.94	40.00 100	34.44	52.72	-5.56	Peak
48.10	V	8.45	0.64	29.17	40.00 100	38.26	81.85	-1.74	Q.P
54.00	V	6.56	0.73	29.08	40.00 100	36.37	65.84	-3.63	Peak
481.70	V	16.82	2.26	21.52	46.00 200	40.60	107.15	-5.40	Peak
566.10	V	17.82	2.39	20.16	46.00 200	40.37	104.35	-5.63	Peak
135.00	H	10.90	1.17	25.83	43.50 150	37.90	78.52	-5.60	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
2413.30	V	28.48	6.38	52.64	114.00	501187	87.50	23713.74	-26.50	Peak
2413.30	V	28.48	6.38	43.30	94.00	50119	78.16	8090.96	-15.84	A.V.
2413.30	H	28.48	6.38	44.10	94.00	50119	78.96	8871.56	-15.04	A.V.
2413.30	H	28.48	6.38	53.50	114.00	501187	88.36	26181.83	-25.64	Peak
4826.00	H/V						-			Peak, A.V.
7239.00	H/V						-			Peak, A.V.
9685.00	H/V						-			Peak, A.V.
12065.00	H/V						-			Peak, A.V.
14478.00	H/V						-			Peak, A.V.
16891.00	H/V						-			Peak, A.V.
19304.00	H/V						-			Peak, A.V.
21717.00	H/V						-			Peak, A.V.
24130.00	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :


JONES JAN

6.4.2. Test mode : CHANNEL 1 (mode b)

- Test Distance : 3 M
- Temperature : 31°C
- Relative Humidity : 57 %
- Test Date : Sep. 4, 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

48.90 MHz / 38.30 dBuV/m (VERTICAL) Antenna Height 1.2 Meter, Turntable Degree 268 °.

- Spurious Emissions:

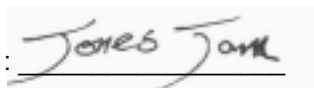
Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
36.90	V	14.02	0.50	19.85	40.00	100	34.37	52.30	-5.63	Peak
48.90	V	8.45	0.64	29.21	40.00	100	38.30	82.22	-1.70	Q.P.
50.80	V	7.78	0.67	27.87	40.00	100	36.32	65.46	-3.68	Peak
484.60	V	16.90	2.28	21.47	46.00	200	40.65	107.77	-5.35	Peak
561.90	V	17.79	2.38	21.85	46.00	200	42.02	126.18	-3.98	Q.P.
899.30	V	19.93	3.16	18.32	46.00	200	41.41	117.63	-4.59	Peak

• Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
2413.30	V	28.48	6.38	52.84	114.00	501187	87.70	24266.10	-26.30	Peak
2413.30	V	28.48	6.38	43.32	94.00	50119	78.18	8109.61	-15.82	A.V.
2413.30	H	28.48	6.38	44.24	94.00	50119	79.10	9015.71	-14.90	A.V.
2413.30	H	28.48	6.38	53.58	114.00	501187	88.44	26424.09	-25.56	Peak
4826.00	H/V						-			Peak, A.V.
7239.00	H/V						-			Peak, A.V.
9685.00	H/V						-			Peak, A.V.
12065.00	H/V						-			Peak, A.V.
14478.00	H/V						-			Peak, A.V.
16891.00	H/V						-			Peak, A.V.
19304.00	H/V						-			Peak, A.V.
21717.00	H/V						-			Peak, A.V.
24130.00	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :


JONES JAN

6.4.3. Test mode : CHANNEL 1 (mode c)

- Test Distance : 3 M
- Temperature : 31°C
- Relative Humidity : 57 %
- Test Date : Sep. 4, 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

901.70 MHz / 42.51 dBuV/m (HORIZONTAL) Antenna Height 1.3 Meter, Turntable Degree 210 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
562.10	V	17.79	2.38	21.08	46.00 200	41.25	115.48	-4.75	Q.P.
483.80	H	16.88	2.27	22.14	46.00 200	41.29	116.01	-4.71	Peak
501.40	H	17.26	2.33	18.80	46.00 200	38.39	83.08	-7.61	Peak
563.70	H	17.80	2.38	21.33	46.00 200	41.51	118.99	-4.49	Peak
802.60	H	19.68	3.01	18.07	46.00 200	40.76	109.14	-5.24	Peak
901.70	H	19.94	3.17	19.40	46.00 200	42.51	133.51	-3.49	Q.P.

FCC TEST REPORT

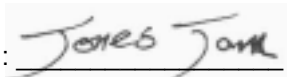
Report No. : F181511

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission Level (uV/m)		Margin (dB)	Detect Mode
2413.30	V	28.48	6.38	53.04	114.00	501187	87.90 24831.33	-26.10	Peak
2413.30	V	28.48	6.38	43.32	94.00	50119	78.18 8109.61	-15.82	A.V.
2413.30	H	28.48	6.38	44.26	94.00	50119	79.12 9036.49	-14.88	A.V.
2413.30	H	28.48	6.38	53.54	114.00	501187	88.40 26302.68	-25.60	Peak
4826.00	H/V						-		Peak, A.V.
7239.00	H/V						-		Peak, A.V.
9685.00	H/V						-		Peak, A.V.
12065.00	H/V						-		Peak, A.V.
14478.00	H/V						-		Peak, A.V.
16891.00	H/V						-		Peak, A.V.
19304.00	H/V						-		Peak, A.V.
21717.00	H/V						-		Peak, A.V.
24130.00	H/V						-		Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :


JONES JAN

6.4.4. Test mode : CHANNEL 2 (mode b)

- Test Distance : 3 M
- Temperature : 31°C
- Relative Humidity : 57 %
- Test Date : Sep. 4, 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

48.30 MHz / 38.60 dBuV/m (VERTICAL) Antenna Height 1.2 Meter, Turntable Degree 196 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
48.30	V	8.45	0.64	29.51	40.00 100	38.60	85.11	-1.40	Q.P.
60.30	V	4.72	0.83	29.80	40.00 100	35.35	58.55	-4.65	Q.P.
484.50	V	16.90	2.28	21.50	46.00 200	40.68	108.14	-5.32	Peak
561.50	V	17.78	2.38	21.52	46.00 200	41.68	121.34	-4.32	Peak
48.10	H	8.45	0.64	29.10	40.00 100	38.19	81.19	-1.81	Q.P.
54.00	H	6.56	0.73	29.34	40.00 100	36.63	67.84	-3.37	Peak

FCC TEST REPORT

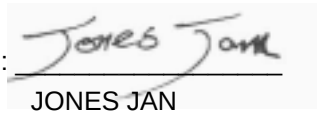
Report No. : F181511

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission Level (uV/m)		Margin (dB)	Detect Mode
2431.20	V	28.49	6.42	42.00	94.00	50119	76.91 7006.48	-17.09	A.V.
2431.20	V	28.49	6.42	51.70	114.00	501187	86.61 21404.25	-27.39	Peak
2431.20	H	28.49	6.42	43.50	94.00	50119	78.41 8327.22	-15.59	A.V.
2431.20	H	28.49	6.42	53.50	114.00	501187	88.41 26332.98	-25.59	Peak
4864.00	H/V						-		Peak, A.V.
4296.00	H/V						-		Peak, A.V.
9728.00	H/V						-		Peak, A.V.
12160.00	H/V						-		Peak, A.V.
14592.00	H/V						-		Peak, A.V.
17024.00	H/V						-		Peak, A.V.
19456.00	H/V						-		Peak, A.V.
21888.00	H/V						-		Peak, A.V.
24320.00	H/V						-		Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :


JONES JAN

6.4.5. Test mode : CHANNEL 4 (mode b)

- Test Distance : 3 M
- Temperature : 31°C
- Relative Humidity : 57 %
- Test Date : Sep. 4, 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

48.90 MHz / 38.60 dBuV/m (VERTICAL) Antenna Height 1.27 Meter, Turntable Degree 226 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level		Margin (dB)	Detect Mode
							(dBuV/m)	(uV/m)		
36.90	V	14.02	0.50	20.22	40.00	100	34.74	54.58	-5.26	Peak
48.90	V	8.45	0.64	29.51	40.00	100	38.60	85.11	-1.40	Q.P.
50.80	V	7.78	0.67	27.75	40.00	100	36.20	64.57	-3.80	Peak
81.90	V	6.73	0.86	27.05	40.00	100	34.64	53.95	-5.36	Peak
484.60	V	16.90	2.28	21.22	46.00	200	40.40	104.71	-5.60	Peak
561.90	V	17.79	2.38	21.86	46.00	200	42.03	126.33	-3.97	Q.P.

FCC TEST REPORT

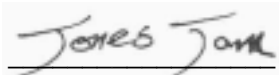
Report No. : F181511

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
2467.40	V	28.49	6.45	41.10	94.00	50119	76.04	6338.70	-17.96	A.V.
2467.40	V	28.49	6.45	50.00	114.00	501187	84.94	17660.38	-29.06	Peak
2467.40	H	28.49	6.45	44.10	94.00	50119	79.04	8953.65	-14.96	A.V.
2467.40	H	28.49	6.45	53.30	114.00	501187	88.24	25822.60	-25.76	Peak
4940.00	H/V						-			Peak, A.V.
7410.00	H/V						-			Peak, A.V.
9880.00	H/V						-			Peak, A.V.
12350.00	H/V						-			Peak, A.V.
14820.00	H/V						-			Peak, A.V.
17290.00	H/V						-			Peak, A.V.
19760.00	H/V						-			Peak, A.V.
22230.00	H/V						-			Peak, A.V.
24700.00	H/V						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :


JONES JAN

7. EMI Suppression Component List

1. A ferrite core is added on the DC output cable.
(As the External photo No.4)
2. Add a gasket on the solder side of PCB to contact lower housing.
(As the Internal photo No.2)
3. Add a gasket on the VGA connector to contact lower housing.
(As the Internal photo No.2)
4. Add a copper foil on the lower housing.
(As the Internal photo No.2)
5. Add a gasket on VGA connector to contact upper housing.
(As the Internal photo No.3)
6. Add a gasket on RCA connector to contact upper housing.
(As the Internal photo No.3)
7. Add a gasket on S-Vido connector to contact upper housing.
(As the Internal photo No.3)
8. Two ferrite cores are added on the VGA cable at two ends.
(As the Internal photo No.5)
9. Two D-sub connectors of the VGA cable are shielded with metal.
(As the Internal photo No.5)

8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.4	0.5
35	15.0	0.5
40	12.5	0.5
45	9.4	0.6
50	7.8	0.7
55	6.3	0.8
60	4.7	0.8
65	4.8	0.8
70	4.9	0.8
75	5.5	0.8
80	6.3	0.8
85	7.4	0.9
90	8.6	1.0
95	9.4	1.0
100	10.1	1.0
110	10.9	1.0
120	11.6	1.0
130	11.1	1.2
140	10.7	1.2
150	9.9	1.0
160	8.9	1.2
170	8.7	1.2
180	8.3	1.2
190	8.1	1.2
200	7.9	1.3
220	9.5	1.5
240	11.0	1.5
260	11.9	1.5
280	12.0	1.7
300	12.2	1.5
320	12.8	1.8
340	13.3	1.7
360	13.9	2.0
380	14.5	2.0
400	15.0	1.8
450	16.1	2.2
500	17.2	2.3
550	17.7	2.3
600	18.1	2.5
650	18.3	2.7
700	18.5	2.8
750	19.1	2.8
800	19.7	3.0
850	19.8	3.2
900	19.9	3.2
950	20.3	3.3
1000	20.6	3.3
1000	24.0	4.1
2000	28.4	5.8
3000	30.0	7.2
4000	32.6	8.6
5000	33.3	10.0
6000	34.3	11.6
7000	35.4	13.5

9. 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	May 29, 2001	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98081	50 ohm / 50 uH	Dec. 06, 2000	Conduction
Spectrum Analyzer (Site 4)	HP	8560E	3728A03190	30Hz - 2.9GHz	Sep. 03, 2001	Radiation
Test Receiver (Site 4)	R&S	ESVP	893610/003	20MHz - 1.3GHz	May 04, 2001	Radiation
Amplifier (Site 4)	HP	87405A	3207A01441	0.1MHz -1.3GHz	Aug. 14, 2001	Radiation
Bilog Antenna (Site 4)	CHASE	CBL6112B	2445	30MHz -2GHz	Feb. 22, 2001	Radiation
Half-wave dipole antenna (Site 4)	EMCO	3121C	9705-1285	28 M - 1GHz	May 16, 2001	Radiation
Turn Table (site 4)	EMCO	2080	9711-1090	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 4)	EMCO	2075	9711-2114	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
Spectrum analyzer	R&S	FSP30	100024	30MHZ~30GHZ	Mar. 31, 2001	Radiation

※ Calibration Interval of instruments listed above is one year.

10. 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 $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	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

$$U = \sqrt{\{(0.3/2)^2 + (2.5^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.7$$

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	±2
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 $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	±0.54	±0.54
combined standard uncertainty Ue(y)	normal	±2.8	±2.2
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.6	±4.4

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.6 \quad \text{for 10m test distance}$$

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 3.1 \quad \text{for 3m test distance}$$