



FCC ID: H4IKB27RF002

Issued on Sep. 02, 2004

Report No. : F3N1703

FCC TEST REPORT

CATEGORY: Portable End Product
PRODUCT NAME: RF Wireless Keyboard
FCC ID.: H4IKB27RF002
FILING TYPE: Certification
MODEL NAME: SK-7265

APPLICANT: **Lite-On Technology Corporation**
22F, No. 392, Ruey Kuang Road, Neihu, Taipei 114, Taiwan,
R.O.C.

MANUFACTURER: The same as Applicant.

ISSUED BY: **SPORTON INTERNATIONAL INC.**
6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien,
Taiwan, R.O.C.

Statements:

The test result in this report refers exclusively to the presented test model / sample.

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Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA, NVLAP or any agency of U.S. government.

The test equipment used to perform the test are calibrated and traceable to NML/ROC or NIST/USA.

Dr. Alan Lane
Vice General Manager
Sporton International Inc.



SPORTON International Inc.

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1. General Description of Equipment under Test

1.1. Applicant

Lite-On Technology Corporation
22F, No. 392, Ruey Kuang Road, Neihu, Taipei 114,
Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

This product is a RF Wireless Keyboard. The technical data has been listed on section " Features of Equipment under Test ".

1.4. Features of Equipment under Test

ITEMS	DESCRIPTION
Host/Radio Interface	USB
Type of Modulation	FSK
Number of Channels	1
Frequency Band	27MHz
Carrier Frequency of each channel	27.145MHz
Bandwidth of each channel	10kHz
Maximum Output Power to Antenna	10dBm
Type of Antenna	Loop-wire
Power Rating (DC/AC, Voltage)	3VDC (battery)



2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been associated with notebook and peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The complete test system included COMPAQ Notebook, VIEWSONIC Monitor, LITE-ON Receiver, COMPAQ PS/2 Mouse, EPSON Printer and EUT for EMI test.
- c. Frequency range investigated: radiation 30 MHz to 1000MHz.

2.2. Description of Test System

Support Unit 1. -- Notebook (COMPAQ)

FCC ID : N/A
Model No. : PRESARIO 1500
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0127
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (VIEWSONIC)

FCC ID : N/A
Model No. : VCDTS21553-3P
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0051
Data Cable : Shielded, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- Receiver (LITE-ON)

FCC ID : N/A
Model No. : SK-7265
Serial No. : SP0054
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.



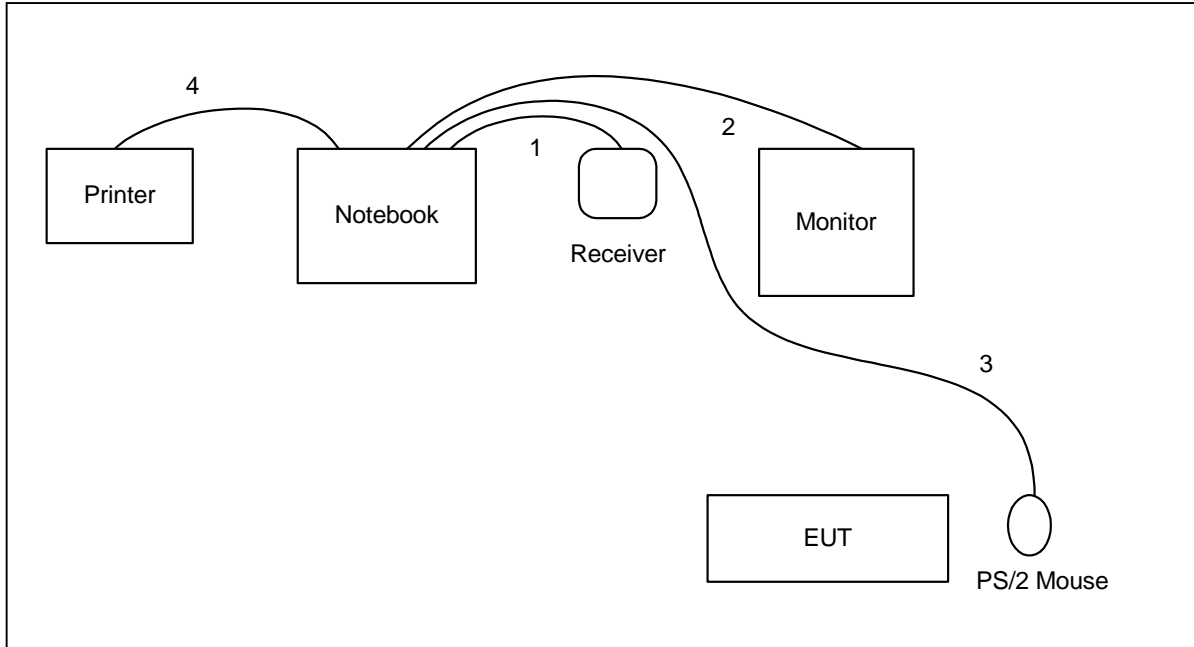
Support Unit 4. – PS/2 Mouse (COMPAQ)

FCC ID : N/A
Model No. : M-S69
Serial No. : SP0041
Data Cable : Shielded, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Printer (EPSON)

FCC ID : N/A
Model No. : STYLUS COLOR 680
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Shielded, 1.35m
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

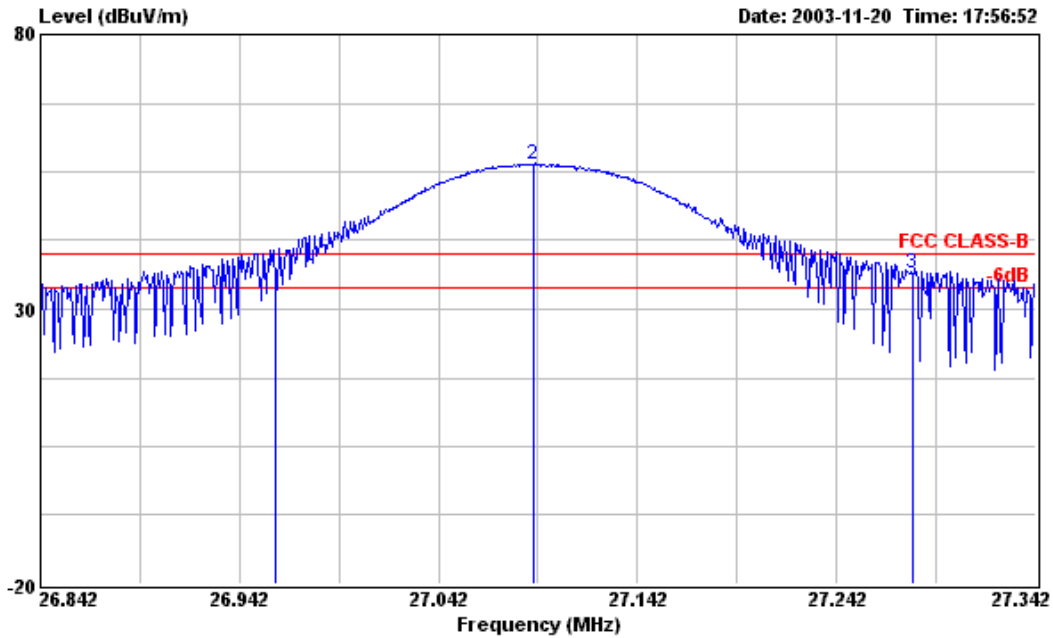


1. The USB cable is connected from the Notebook to the support unit 3.
2. The I/O cable is connected from the Notebook to the support unit 2.
3. The I/O cable is connected from the Notebook to the support unit 4.
4. The I/O cable is connected from the Notebook to the support unit 5.



2.4. Band edge compliance plot per 15.227(b).

<HORIZONTAL>

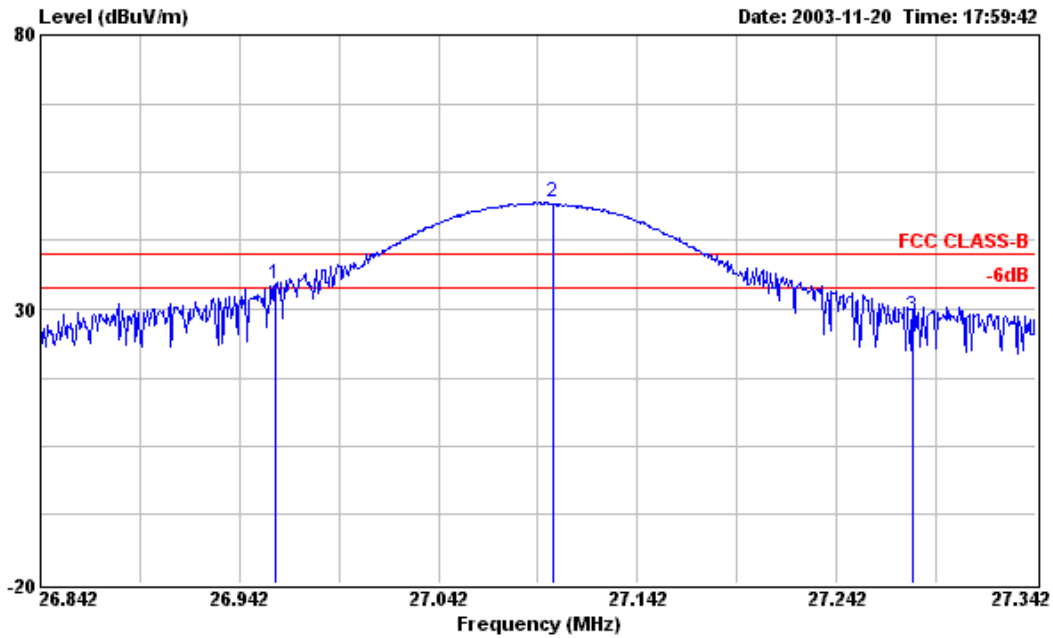


Conformation of the fundamental frequency

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Margin (dB)
26.960	H	16.62	0.86	19.23	69.54	2999.16	36.71	68.47	-32.83
27.090	H	16.62	0.86	38.98	80.00	10000.00	56.46	665.27	-23.54
27.280	H	16.62	0.86	19.15	69.54	2999.16	36.63	67.84	-32.91



<VERTICAL>



Conformation of the fundamental frequency

Frequency (MHz)	Antenna Polarity	Cable Factor	Cable Loss	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Margin (dB)
26.960	V	16.62	0.86	16.93	69.54	2999.16	34.41	52.54	-35.13
27.100	V	16.62	0.86	32.02	80.00	10000.00	49.50	298.54	-30.50
27.280	V	16.62	0.86	11.33	69.54	2999.16	28.81	27.57	-40.73



3. Test Software

An executive programs, EMCTEST.EXE under WIN XP, which generate 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 hard 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 internal Hard Disk, and the Hard Disk reads and writes the message.
- f. Repeat the steps from c to e.

At the same time, the EUT kept transmitting signals at fixed frequency.



4. General Information of Test

4.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1St Road, Hwa Ya Technology Park,
Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.

TEL : 886-3-3273456

FAX : 886-3-3180055

Test Site No. : 03CH03-HY

4.2. Test Voltage

DC 3V

4.3. Standard for Methods of Measurement

ANSI C63.4-2001

4.4. Frequency Range Investigated

FCC Part 15, Subpart C 15.227

4.5. Frequency Range Investigated

Radiation: from 30 MHz to 1000 MHz

4.6. Test Distance

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



5. Test of Conducted Powerline

This EUT is battery powered.

So Conducted Powerline test is not applicable to this equipment.



6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1 GHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-2001. The EUT was placed on a nonmetallic stand, 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

- Amplifier (HP 8447D)
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz

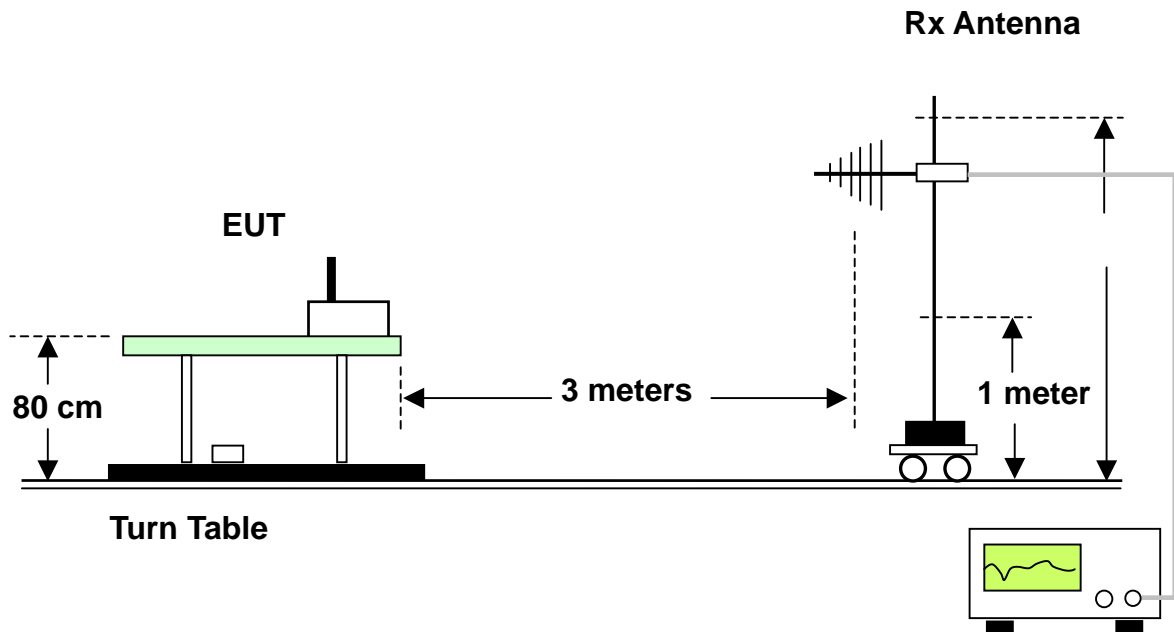
- Test Receiver (SCHAFFNER SCR3501)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 K – 1 GHz
 - Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode



6.2. Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. 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.
5. 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.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 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 3 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

- Test Distance: 3 M
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	Below 1 GHz	Temperature	26 deg. C	Tested By	Jay Zhong
Freq. Range	30MHz~1GHz	Humidity	74%		

(A) Polarization: Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	38.370	28.30	-11.70	40.00	43.73	11.53	1.07	28.03	Peak	---	---
2	216.570	24.90	-21.10	46.00	41.15	8.83	2.55	27.63	Peak	---	---
3	243.570	26.68	-19.32	46.00	40.40	11.07	2.73	27.52	Peak	---	---
1	458.900	29.71	-16.29	46.00	38.86	15.45	3.73	28.33	Peak	---	---
2	623.400	30.88	-15.12	46.00	37.82	17.46	4.38	28.78	Peak	---	---
3	758.500	28.43	-17.57	46.00	33.81	18.47	4.91	28.76	Peak	---	---

(B) Polarization: Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	38.370	29.09	-10.91	40.00	44.52	11.53	1.07	28.03	Peak	100	110
2	91.020	27.06	-16.44	43.50	44.47	8.84	1.67	27.92	Peak	---	---
3	216.570	21.93	-24.07	46.00	38.18	8.83	2.55	27.63	Peak	---	---
1	458.900	26.06	-19.94	46.00	35.21	15.45	3.73	28.33	Peak	---	---
2	623.400	27.12	-18.88	46.00	34.06	17.46	4.38	28.78	Peak	---	---
3	897.800	32.84	-13.16	46.00	36.56	19.41	5.18	28.31	Peak	---	---

Test Engineer: Jay
Jay Zhong

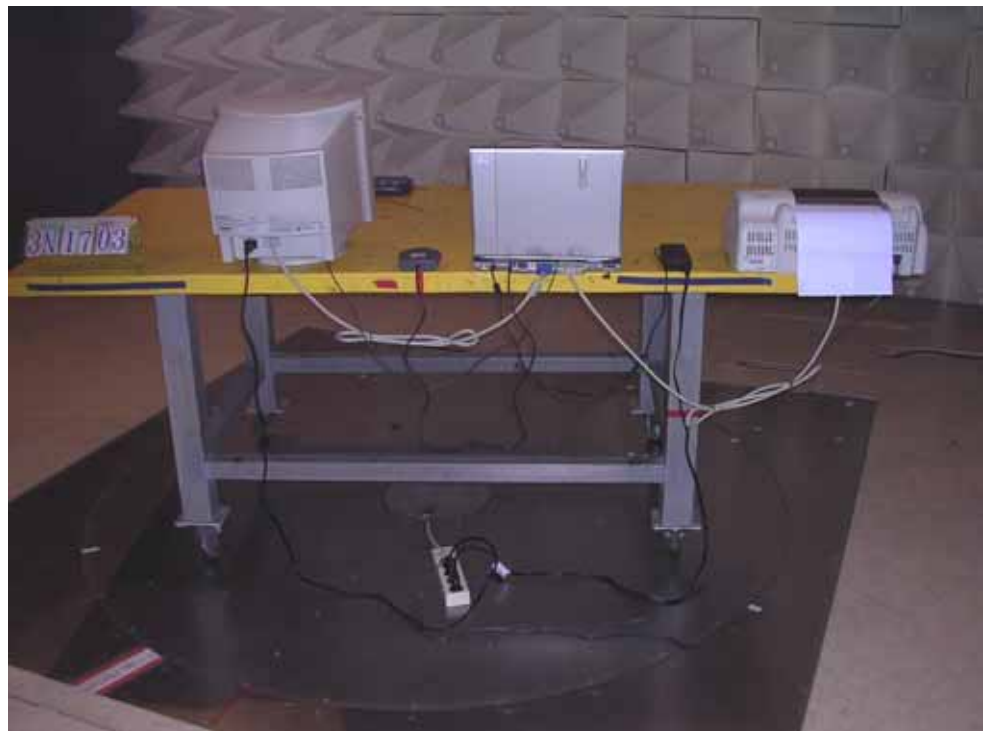
6.5. Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW





7. EMI Suppression Component List

No EMI suppression components.



8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	0.92
35	13.63	1.05
40	11.11	1.08
45	10.59	1.15
50	6.47	1.29
55	5.83	1.63
60	5.18	1.30
65	4.81	1.36
70	4.43	1.43
75	5.10	1.48
80	5.91	1.53
85	7.33	1.61
90	8.74	1.69
95	9.05	1.67
100	9.36	1.76
110	9.65	1.80
120	9.97	1.90
130	10.51	1.61
140	10.32	2.14
150	9.42	2.16
160	8.09	2.16
170	7.43	1.99
180	7.60	2.39
190	7.43	2.38
200	7.26	2.46
220	9.11	2.59
240	10.88	2.68
260	11.75	2.91
280	11.55	2.92
300	11.36	2.99
320	12.03	3.03
340	12.69	3.22
360	13.33	3.28
380	14.00	3.80
400	14.63	3.80
450	15.33	3.69
500	16.03	3.93
550	16.65	3.56
600	17.29	4.15
650	17.64	4.58
700	18.00	4.73
750	18.39	4.71
800	18.79	4.99
850	19.10	5.24
900	19.42	5.38
950	19.58	5.57
1000	19.75	5.62



9. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)

Calibration Interval of instruments listed above is one year.



10. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±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
combined standard uncertainty $U_e(y)$	normal	±2.7
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±5.4

$$U = \{ (1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2) / 3 + (0.54)^2 / 2 \} = 2.2 \text{ for 10m test distance}$$

$$U = \{ (1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2) / 3 + (0.54)^2 / 2 \} = 2.7 \text{ for 3m test distance}$$

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
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 $U_e(y)$	normal	±1.66
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±3.32

$$U = \{ (0.3/2)^2 + (2^2 + 1.5^2 + 0.2^2) / 3 + (0.2)^2 / 2 \} = 1.66$$

APPENDIX A. Photographs of EUT







