FCC TEST REPORT

for

47 CFR, Part 2, Part 15 Subpart B and CISPR PUB. 22

Equipment : USB Optical Mouse

Model No. : MS22U

FCC ID : FKD46AMS22U

Filing Type : Certification

Applicant : **MONTEREY INTERNATIONAL CORP.**
NO. 28, WU-CHUN 6 TH RD., WU-KU IND. PARK, TAIPEI HSIEN, TAIWAN, R.O.C.

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SPORTON International Inc.

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

Table of Contents

History of this test report

Original Report Issue Date: Sep. 17, 2002

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F281405

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 2, Part 15 Subpart B and CISPR PUB. 22

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Applicant : **MONTEREY INTERNATIONAL CORP.**
NO. 28, WU-CHUN 6 TH RD., WU-KU IND. PARK, TAIPEI HSIEN, 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 **Aug. 16, 2002** at **SPORTON International Inc.** LAB.

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

MONTEREY INTERNATIONAL CORP.
NO. 28, WU-CHUN 6TH RD., WU-KU IND. PARK, TAIPEI HSIEN, TAIWAN, R.O.C.

1.2 Manufacturer

Same as 1.1.

1.3 Basic Description of Equipment under Test

Equipment	: USB Optical Mouse
Model No.	: MS22U
FCC ID	: FKD46AMS22U
Trade Name	: MONTEREY
USB Cable	: Shielded, 1.3m
Power Supply Type	: From PC
AC Power Input	: N/A

1.4 Feature of Equipment under Test

- Description: Optical mouse
- Interface: USB
- High resolution 800 CPI;
- Optical surface scanning, can be used virtually on any surface without a mouse pad;
- Without mouse ball so that cleaning is not necessary;
- Very precise cursor movement;
- System requirements: PC for IBM XT/AT, 386, 486, and Pentium compatibles;
- Supporting OS: Windows 95, 98, 98SE,2000, NT or XP;

3. Electrical Specification :

- Power Requirement
  Operation Current : 68.6mA
  Sleep Current : 443 μ A
  Operation Voltage : 5.0V
- Mouse Tracking Performance
  Tracking Resolution: 800 DPI Optical Type
  Mouse Tracking Speed: 12.5m/sec
  Tracking Life: 250 KM

4. Mechanical Specification :

- Appearance Dimension :125.5*63*37.85mm
- Weight : 95.5grams.(cable included)
- Force & Feeling:
  Left and Right Buttons → 75±20g
  Wheel Buttons →60±25g

- Travel:
  Left and Right Buttons → 0.35mm
  Wheel Buttons →0.35mm
- Cable Length : 1500mm

2. Test Configuration of Equipment under Test

2.1 Test Manner

a. The EUT has been associated with personal computer and 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 complete test included HP PC, HITACHI Monitor, MICROSOFT PS/2 Keyboard, HP Printer, ACEEX Modem and EUT for EMI test.
c. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 1000MHz.

2.2 Description of Test System

Support Unit 1. -- Personal Computer (HP)

FCC ID	: N/A
Model No.	: VECTRA VL420 DT
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0040
Data Cable	: Shielded, 360 degree via metal backshells
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (HITACHI)

FCC ID	: N/A
Model No.	: CM769ET-301
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0013
Data Cable	: Shielded, 360 degree via metal backshells, 1.5m

Support Unit 3. -- PS/2 Keyboard (MICROSOFT)

FCC ID	: N/A
Model No.	: 56TWTA
Serial No.	: SP0014
Data Cable	: Shielded, 360 degree via metal backshells, 1.95m

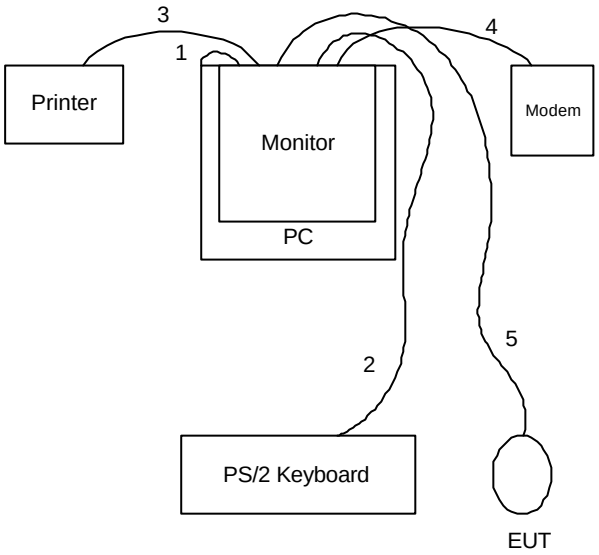
Support Unit 4. -- Printer (HP)

FCC ID	: B94C2642X
Model No.	: C2642A
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0014
Data Cable	: Shielded, 360 degree via metal backshells, 1.2m

Support Unit 5. -- 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 PC to the support unit 2.
2. The I/O cable is connected from PC to the support unit 3.
3. The I/O cable is connected from PC to the support unit 4.
4. The I/O cable is connected from PC to the support unit 5.
5. The USB cable is connected from PC to the EUT.

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 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 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 c to f.

4. General Information of Test

4.1 Test Facility

Test Site Location : No. 3, Lane 238, Kang Lo Street, Nei Hwu District, Taipei 11424, Taiwan, R.O.C.
TEL : 886-2-2631-4739
FAX : 886-2-2631-9740

Test Site No : CN01, ON02

4.2 Standard for Methods of Measurement

ANSI C63.4-1992

4.3 Test in Compliance with

CISPR PUB. 22 and FCC Part 15, Subpart B Class B

4.4 Frequency Range Investigated

a. Conduction: from 150 kHz to 30 MHz
b. Radiation : from 30 MHz to 1000 MHz

4.5 Test Distance

The test distance of radiated emission from antenna to EUT is 10 M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 150 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	(R&S ESH3)
Attenuation	10 dB
Start Frequency	0.15 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.

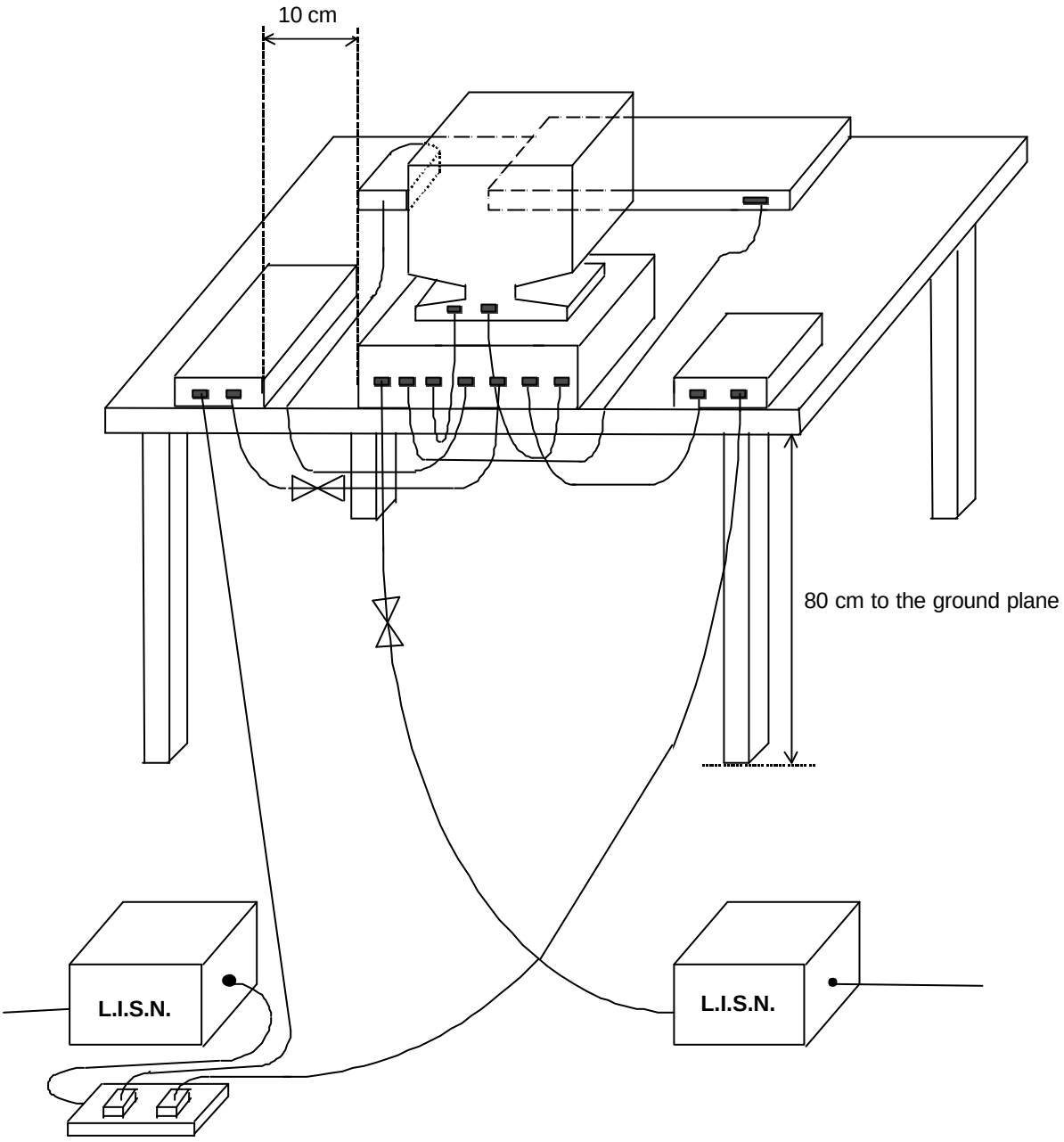
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.

f. Both sides of AC line were checked for maximum conducted interference.

g. The frequency range from 150 kHz to 30 MHz was searched.

h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3 Typical Test Setup Layout of Conducted Powerline



5.4 Test Result of AC Powerline Conducted Emission

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 21°C
- Relative Humidity : 57 %
- Test Date : Aug. 16, 2002
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin NEUTRAL 0.151 MHz / 50.40 dBuV.

Freq.	Line	Meter Reading				Limits				Margin	
	or	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.	Q.P.	A.V.
(MHz)	Neutral	(dBuV)	(dBuV)	(uV)	(uV)	(dBuV)	(dBuV)	(uV)	(uV)	(dB)	(dB)
0.151	L	48.10	48.50	254.10	266.07	65.94	55.94	1982.62	626.96	-17.84	-7.44
0.234	L	40.30	40.60	103.51	107.15	62.31	52.31	1304.14	412.41	-22.01	-11.71
0.468	L	34.60	33.30	53.70	46.24	56.55	46.55	672.15	212.55	-21.95	-13.25
0.826	L	27.90	27.40	24.83	23.44	56.00	46.00	630.96	199.53	-28.10	-18.60
1.051	L	33.00	30.40	44.67	33.11	56.00	46.00	630.96	199.53	-23.00	-15.60
13.736	L	26.50	26.00	21.13	19.95	60.00	50.00	1000.00	316.23	-33.50	-24.00
0.151	N	49.30	50.40	291.74	331.13	65.94	55.94	1982.62	626.96	-16.64	-5.54
0.229	N	36.20	34.00	64.57	50.12	62.49	52.49	1331.36	421.01	-26.29	-18.49
0.469	N	32.40	31.00	41.69	35.48	56.53	46.53	670.78	212.12	-24.13	-15.53
0.823	N	27.20	24.70	22.91	17.18	56.00	46.00	630.96	199.53	-28.80	-21.30
1.053	N	30.80	27.80	34.67	24.55	56.00	46.00	630.96	199.53	-25.20	-18.20
13.732	N	27.80	27.60	24.55	23.99	60.00	50.00	1000.00	316.23	-32.20	-22.40

Test Engineer : Castries

Castries Huang

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1,000 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

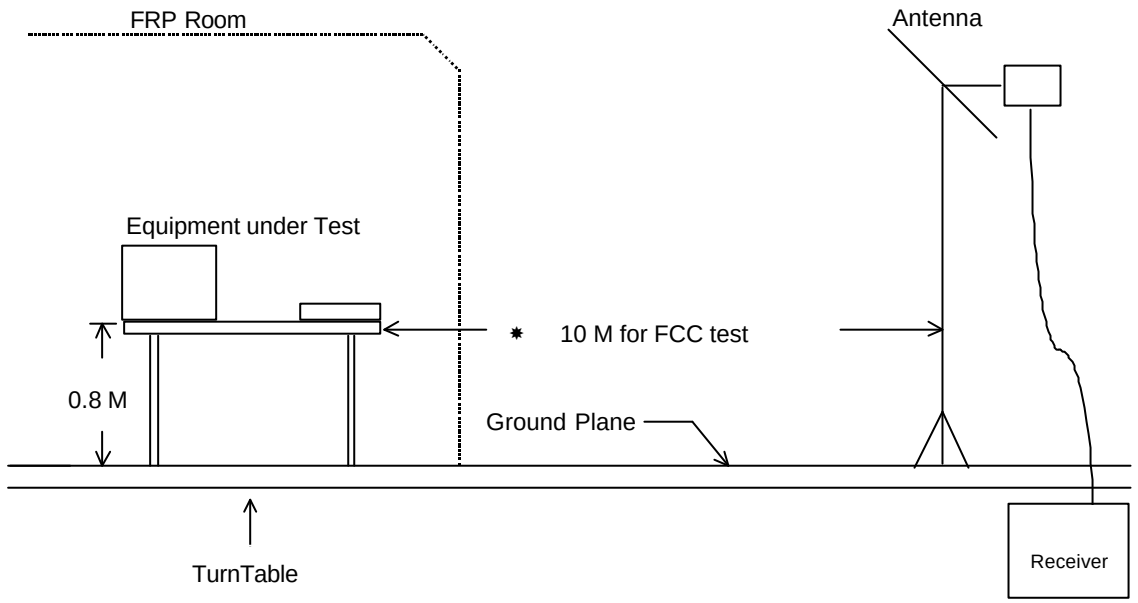
- Amplifier (HP 8447D)
  Attenuation 10 dB
  RF Gain 25 dB
  Signal Input 0.1 MHz -1.3 GHz

- Spectrum Analyzer (ADVANTEST R3261C)
  Attenuation 10 dB
  Start Frequency 30 MHz
  Stop Frequency 1000 MHz
  Resolution Bandwidth 120 KHz
  Signal Input 9 KHz to 2.6 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 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 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

- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 10 M
- Temperature : 29°C
- Relative Humidity : 52 %
- Test Date : Aug. 15, 2002
- 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

468.000 MHz / 28.64 dBuV/m (VERTICAL) Antenna Height 1 Meter, Turntable Degree 360 °.

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)
144.000	H	11.32	1.67	5.62	30.00	32	18.61	8.52	-11.39
468.000	H	17.69	2.99	6.56	37.00	71	27.24	23.01	-9.76
120.100	V	12.52	1.52	4.70	30.00	32	18.74	8.65	-11.26
144.000	V	11.32	1.67	5.62	30.00	32	18.61	8.52	-11.39
308.000	V	13.19	2.35	10.54	37.00	71	26.08	20.14	-10.92
468.000	V	17.69	2.99	7.96	37.00	71	28.64	27.04	-8.36

Test Engineer : Castries

Castries Huang

7. EMI Suppression Component List

No EMI suppression components.

8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	16.1	0.8
35	15.1	0.8
40	13.7	0.9
45	10.7	0.9
50	8.6	0.9
55	7.1	1.0
60	5.5	1.0
65	5.6	1.1
70	5.7	1.1
75	6.3	1.2
80	7.0	1.2
85	8.3	1.3
90	9.5	1.3
95	10.2	1.3
100	10.9	1.3
110	11.7	1.4
120	12.5	1.5
130	11.8	1.5
140	11.9	1.6
150	10.6	1.8
160	10.5	1.8
170	9.9	1.7
180	8.6	1.8
190	8.8	1.8
200	9.0	1.9
220	10.3	1.9
240	11.6	2.1
260	12.4	2.2
280	12.7	2.2
300	12.9	2.3
320	13.6	2.4
340	14.4	2.6
360	15.2	2.7
380	15.9	2.7
400	16.7	2.8
450	17.4	2.9
500	18.1	3.1
550	18.7	3.3
600	19.3	3.3
650	19.9	3.8
700	20.4	3.7
750	20.2	4.0
800	20.0	4.0
850	21.1	4.2
900	22.2	4.3
950	21.3	4.3
1000	20.5	4.4

9. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30 MHz	Jul. 31, 2002	Conduction
Spectrum Monitor	R&S	EZM	894987/011	9KHz – 1.3GHz	Jul. 31, 2002	Conduction
LISN	Rolf Heine	NNB-2/16Z	99041	50uH / 50 ohm	Mar. 26, 2002	Conduction (CN01)
LISN	KYORITSU	KNW-407	8-1010-15	50uH / 50 ohm	Nov. 28, 2001	Conduction (CN01)
Power Filter	CORCOM	MR12030	N/A	30A*2	N/A	Conduction (CN01)
Spectrum Analyzer	Advantest	R3261C	71720471	9KHz - 2.6GHz	Jan. 22, 2002	Radiation (ON02)
Amplifier	HP	8447D	2944A06292	0.1MHz -1.3GHz	Mar. 02, 2002	Radiation (ON02)
Bilog Antenna	CHASE	CBL6122B	2631	30MHz - 2GHz	Jun. 26, 2002	Radiation (ON02)
Half-wave dipole antenna	Schwarzbeck	UHAP VHAP	995+996 1024+1024	30MHz - 1GHz	Sep. 27, 2001	Radiation (ON02)
Turn Table	EMCO	2080	9508-1805	0 ~ 360 degree	N/A	Radiation (ON02)
Antenna Mast	EMCO	2075	9804-2151	1 m - 4 m	N/A	Radiation (ON02)

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

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

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 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**	**±2.8**	**±2.2**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**±5.6**	**±4.4**

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1.6/2)^2+(0.3/2)^2+(3^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.8$ for 3m test distance