

MEASUREMENT/TECHNICAL REPORT

FCC PART 15, Class B (ANSI C63.4:1992)

Issued: July 2, 1998

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Test Item: USB Pedestal

Identification: TY-LD65A (TY-LD65V, TY-LD65***)

Serial No.: FX8310006

Sample No.: 1

Sample Receipt Date: July 1, 1998

Test Result: PASS

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July 2, 1998
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Date

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Table of Contents	Page
1 GENERAL INFORMATION	3 to 4
1.1 Product Description	3
1.2 Related Submittal(s)/Grant(s)	3
1.3 Tested System Details	3 to 4
1.4 Test Methodology	4
1.5 Test Facility	4
2 SYSTEM TEST CONFIGURATION	5 to 11
2.1 Justification	5
2.2 EUT Exercise Software	5
2.3 Special Accessories	5
2.4 Equipment Modifications	5
2.5 Configuration of Tested System	6 to 11
3 CONDUCTED AND RADIATED MEASUREMENT PHOTOS	12 to 13
4 CONDUCTED EMISSION DATA	14
5 RADIATED EMISSION DATA	15 to 16
6 LIST OF TEST AND MEASUREMENT INSTRUMENT	17
7 THE TREATMENT OF UNCERTAINTY IN EMC MEASUREMENT	18 to 21
7.1 Radiated Emission	19 to 20
7.2 Conducted Emission	21
8 ATTACHMENT	22

1. General Information

1.1 Product Description

The Matsushita Electric Industrial Co., Ltd., Model TY-LD65A (TY-LD65V, TY-LD65***) (referred to as the EUT in this report) is a USB Pedestal. This equipment is intended for commercial use.

Rated input voltage is AC 120V.

EUT is featuring a 12 MHz processor.

1.2 Related Submittal(s)/Grant(s)

Related Submittal Grant is not covered in this report.

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system(including inserted cards, which have grants) are:

Model No.	Serial No.	FCC ID	Description	Cable Description
TY-LD65A, (TY-LD65V, TY-LD65***)	FX8310006	Doc (ACJ93312138)	EUT	AC Power Cord 1.8m Unshielded AC Out Cord 0.8m Unshielded USB Cable 1.8m Shielded
D4594B	SG74350121	Doc	Personal Computer	AC Power Cord 1.8m Unshielded
P815-3*	FX8310006	GSS21012	CRT Display Monitor	Video I/F Cable (D-Sub=D-Sub) 1.8m Shielded
C4565A	SG731140TZ	B94C4555X	Printer	AC Power Cord 1.8m Unshielded Printer Cable 3.0m Shielded
5300AM	2195912A	BFJ5300AM	Modem	Modem Cable 2.4m Shielded
T41-090800-A01	None	N/A	AC Adapter	AC Power Cord 1.9m Unshielded

1. General Information (Continued)

1.3 Tested System Details (Continued)

Model No.	Serial No.	FCC ID	Description	Cable Description
RT6656TWJP	31470982	AQ6-MTN4C15	Keyboard	Keyboard Cable 1.95m Shielded
M-S34	LZ64952349	DZL211029	Mouse	Mouse Cable 1.8m Shielded
ECM-S3906	0000162	EW4ECM-S3906	USB Mouse	USB Mouse Cable 1.6m Shielded
ECM-S3906	0000163	EW4ECM-S3906	USB Mouse	USB Mouse Cable 1.6m Shielded
ECM-S3906	0000164	EW4ECM-S3906	USB Mouse	USB Mouse Cable 1.6m Shielded
ECM-S3906	0000168	EW4ECM-S3906	USB Mouse	USB Mouse Cable 1.6m Shielded
79075010153 (MGA-MILL/2/DIP)	CAJ92909	ID7057600	Video Card	None

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 meters. Final Result was converted in 3m, using $20 \log 10m / 3m$.

1.5 Test Facility

The open area test site, Cosmos EMC Lab., and conducted measurement facility used to the radiated data is located at 543 Shimesasu, Watarai-cho, Watarai-gun, Mie-ken, 516-2119, Japan. This site has been fully described in a report dated May 23, 1996 submitted to FCC, and accepted in a letter dated July 10, 1996 (31040/SIT 1300F2).

2. System Test Configuration

2.1 Justification

EUT was measured by max radiation mode user specified.
The measurement of CRT Display Monitor was conducted for the resolution
 1600×1200 and 640×480 .

Following is the worst condition;

Conducted Emission, Radiated Emission	1600×1200
Dot Clock Frequency	239.35 MHz
Horizontal Frequency	115.0 kHz
Vertical Frequency	92 Hz

2.2 EUT Exercise Software

EUT did not exercise program during radiated and conducted testing.

2.3 Special Accessories

This cable model and part numbers are instructed with their installation manual.

2.4 Equipment Modifications

No equipment modification to achieve compliance to Class B levels was done during test.

2. System Test Configuration (Continued)

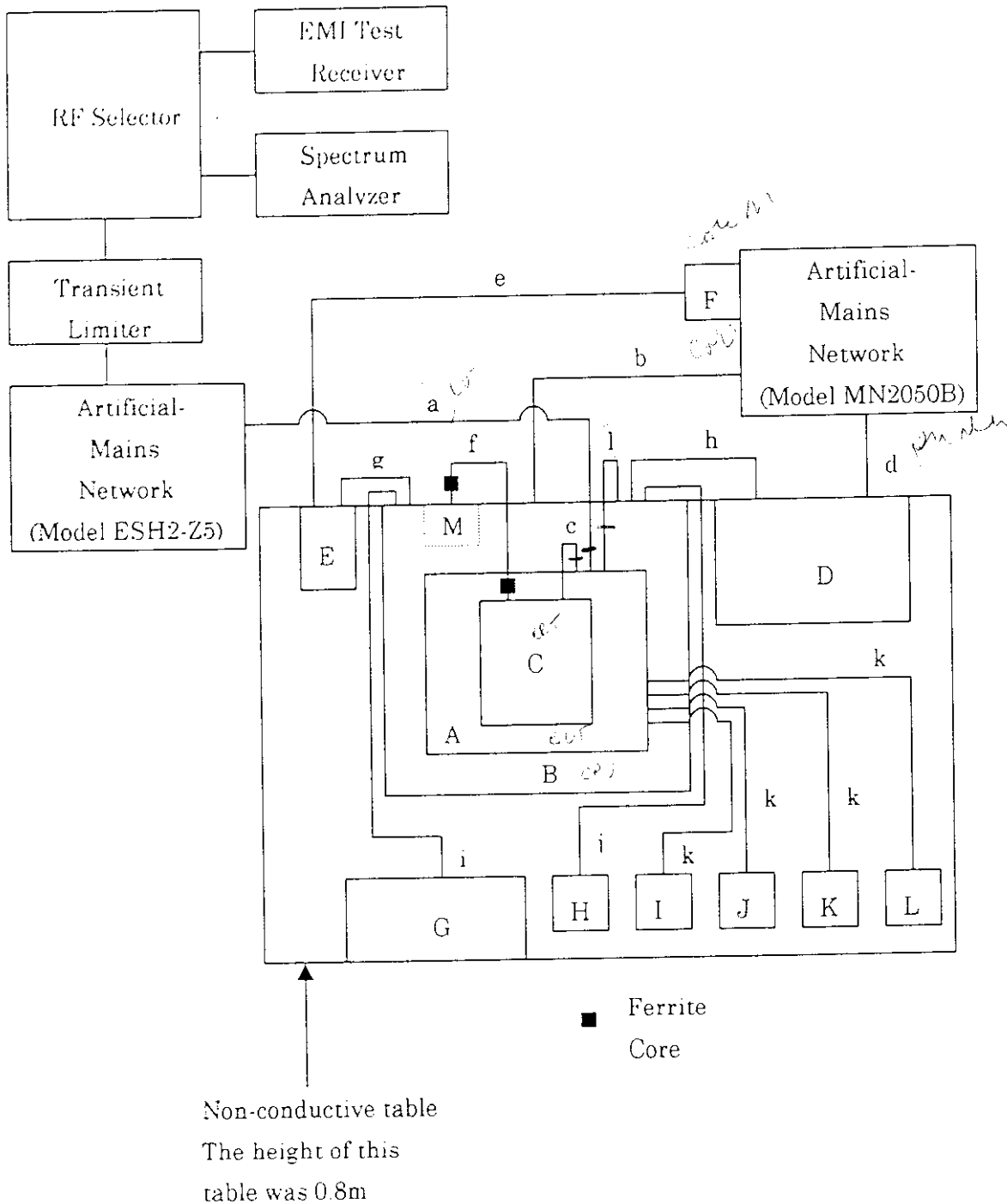
2.5 Configuration of Tested System

Instrument		Cord / Cable
A) EUT	a) ✓	AC Power Cord 1.8m Unshielded
B) Personal Computer	b) ✓	AC Power Cord 1.8m Unshielded
C) CRT Display Monitor	c) ✓	AC Out Cord 0.8m Unshielded
D) Printer	d) ✓	AC Power Cord 1.8m Unshielded
E) Modem	e) ✓	AC Power Cord 1.9m Unshielded
F) AC Adapter	f) ✓	Video I/F Cable 1.8m Shielded (D-Sub=D-Sub)
G) Keyboard	g) ✓	Modem Cable 2.4m Shielded
H) Mouse	h) ✓	Printer Cable 3.0m Shielded
I) USB Mouse	i) ✓	Keyboard Cable 1.95m Shielded
J) USB Mouse	j) ✓	Mouse Cable 1.8m Shielded
K) USB Mouse	k) ✓	USB Mouse Cable 1.6m Shielded
L) USB Mouse	l) ✓	USB Cable 1.8m Shielded
M) Video Card		

2. System Test Configuration (Continued)

2.5 Configuration of Tested System (Continued)

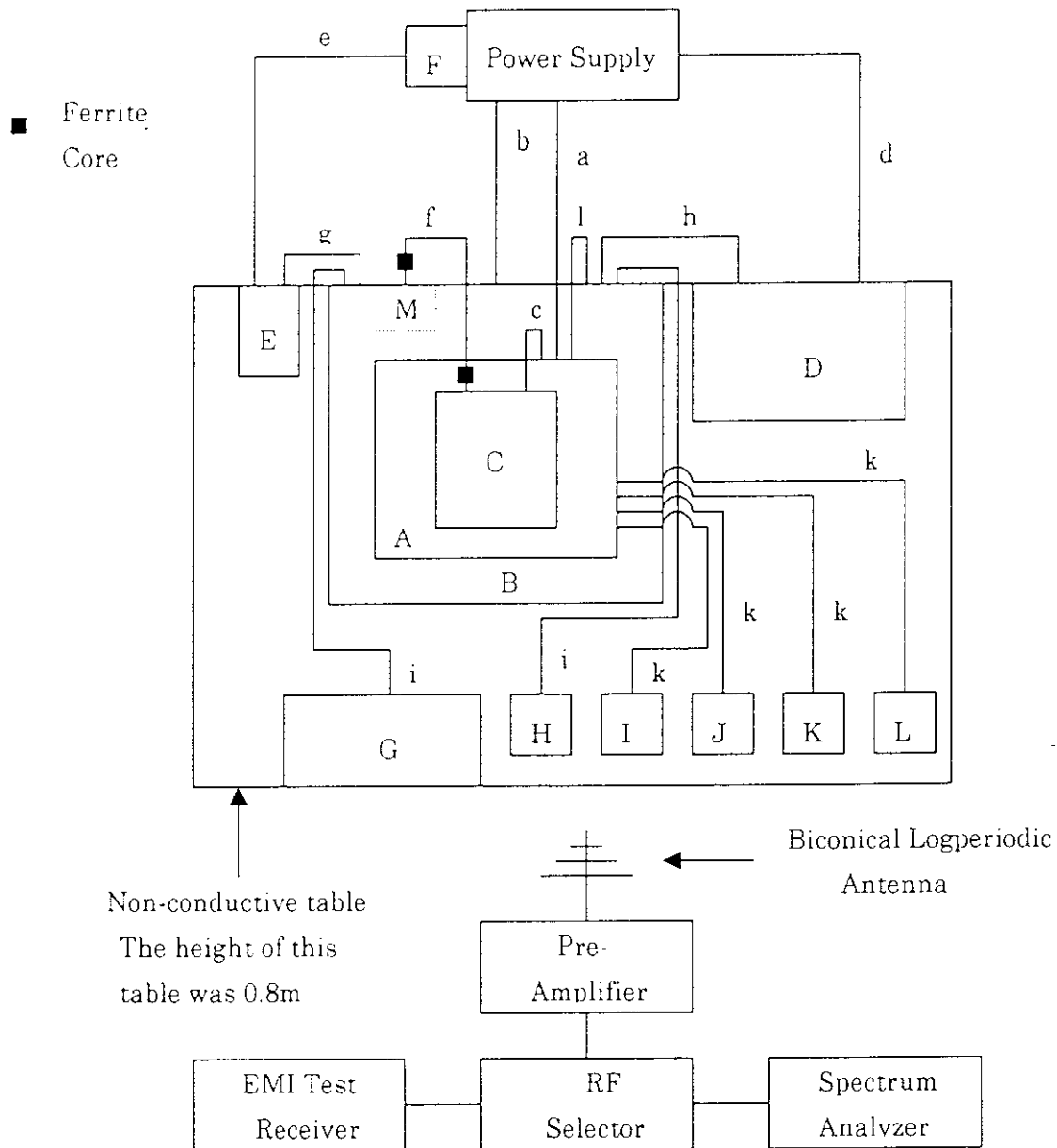
Conducted Emission



2. System Test Configuration (Continued)

2.5 Configuration of Tested System (Continued)

Radiated Emission



2. System Test Configuration (Continued)

2.5 Configuration of Tested System (Continued) Conducted Emission

- 1) Video Card was inserted in Personal Computer.
- 2) CRT Display Monitor was put on the EUT.
- 3) EUT was put on the Personal Computer.
- 4) Personal Computer and Printer located at 0.1m intervals.
- 5) Personal Computer and Modem located at 0.1m intervals.
- 6) Keyboard and Mouse located at 0.1m intervals.
- 7) Mouse and USB Mouse (Serial Number: 0000162) located at 0.1m intervals.
- 8) USB Mouse (S/N: 0000162) and USB Mouse (S/N: 0000163) located at 0.1m intervals.
- 9) USB Mouse (S/N: 0000163) and USB Mouse (S/N: 0000164) located at 0.1m intervals.
- 10) USB Mouse (S/N: 0000164) and USB Mouse (S/N: 0000168) located at 0.1m intervals.
- 11) EUT was connected to Artificial-Mains Network (Model ESH2-Z5) by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.3m length,
and the Cord was hung in the middle between ground and table.
- 12) Personal Computer was connected to Artificial-Mains Network (Model MN2050B) by the AC Power Cord.
- 13) EUT was connected to CRT Display Monitor by the AC Out Cord.
- 14) Printer was connected to Artificial-Mains Network (Model MN2050B) by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.3m length,
and the Cord was hung in the middle between ground and table.
- 15) AC Adapter was connected to Artificial-Mains Network (Model MN2050B).
- 16) Modem was connected to AC Adapter by the AC Power Cord.
- 17) CRT Display Monitor was connected to Video Card by the Video I/F Cable.
Extended Cable was folded at the center of Cable by 0.35m length,
and the Cable was hung in the middle between ground and table.
- 18) Personal Computer was connected to Modem by the Modem Cable.
Extended Cable was folded at the center of Cable by 0.4m length,
and the Cable was hung in the middle between ground and table.
- 19) Personal Computer was connected to Printer by the Printer Cable.
Extended Cable was folded at the center of Cable by 0.4m length,
and the Cable was hung in the middle between ground and table.
- 20) Personal Computer was connected to Keyboard by the Keyboard Cable.
- 21) Personal Computer was connected to Mouse by the Mouse Cable.
- 22) Personal Computer was connected to USB Mouse (S/N: 0000162) by the USB Mouse Cable.
- 23) Personal Computer was connected to USB Mouse (S/N: 0000163) by the USB Mouse Cable.
- 24) Personal Computer was connected to USB Mouse (S/N: 0000164) by the USB Mouse Cable.
- 25) Personal Computer was connected to USB Mouse (S/N: 0000168) by the USB Mouse Cable.
- 26) EUT was connected to Personal Computer by the USB Cable.
Extended Cable was folded at the center of Cable by 0.35m length,
and the Cable was hung in the middle between ground and table.

2. System Test Configuration (Continued)

2.5 Configuration of Tested System (Continued)

Radiated Emission

- 1) Video Card was inserted in Personal Computer.
- 2) CRT Display Monitor was put on the EUT.
- 3) EUT was put on the Personal Computer.
- 4) Personal Computer and Printer located at 0.1m intervals.
- 5) Personal Computer and Modem located at 0.1m intervals.
- 6) Keyboard and Mouse located at 0.1m intervals.
- 7) Mouse and USB Mouse (Serial Number: 0000162) located at 0.1m intervals.
- 8) USB Mouse (S/N: 0000162) and USB Mouse (S/N: 0000163) located at 0.1m intervals.
- 9) USB Mouse (S/N: 0000163) and USB Mouse (S/N: 0000164) located at 0.1m intervals.
- 10) USB Mouse (S/N: 0000164) and USB Mouse (S/N: 0000168) located at 0.1m intervals.
- 11) EUT was connected to Power Supply by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.3m length,
and the Cord was hung in the middle between ground and table.
- 12) Personal Computer was connected to Power Supply by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.4m length,
and the Cord was hung in the middle between ground and table.
- 13) EUT was connected to CRT Display Monitor by the AC Out Cord.
- 14) Printer was connected to Power Supply by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.3m length,
and the Cord was hung in the middle between ground and table.
- 15) AC Adapter was connected to Power Supply.
- 16) Modem was connected to Power Supply by the AC Power Cord.
Extended Cord was folded at the center of Cord by 0.4m length,
and the Cord was hung in the middle between ground and table.
- 17) CRT Display Monitor was connected to Video Card by the Video I/F Cable.
Extended Cable was folded at the center of Cable by 0.35m length,
and the Cable was hung in the middle between ground and table.
- 18) Personal Computer was connected to Modem by the Modem Cable.
Extended Cable was folded at the center of Cable by 0.4m length,
and the Cable was hung in the middle between ground and table.
- 19) Personal Computer was connected to Printer by the Printer Cable.
Extended Cable was folded at the center of Cable by 0.4m length,
and the Cable was hung in the middle between ground and table.
- 20) Personal Computer was connected to Keyboard by the Keyboard Cable.

2. System Test Configuration (Continued)

2.5 Configuration of Tested System (Continued)

Radiated Emission (Continued)

- 21) Personal Computer was connected to Mouse by the Mouse Cable.
- 22) Personal Computer was connected to USB Mouse (S/N: 0000162) by the USB Mouse Cable.
- 23) Personal Computer was connected to USB Mouse (S/N: 0000163) by the USB Mouse Cable.
- 24) Personal Computer was connected to USB Mouse (S/N: 0000164) by the USB Mouse Cable.
- 25) Personal Computer was connected to USB Mouse (S/N: 0000168) by the USB Mouse Cable.
- 26) EUT was connected to Personal Computer by the USB Cable.
Extended Cable was folded at the center of Cable by 0.35m length,
and the Cable was hung in the middle between ground and table.

4. Conducted Emission Data

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

	Frequency (MHz)	Measured * (dB μ V)	Limit (dB μ V)
Neutral Line	0.51557	40.8	48.0
Neutral Line	1.03416	38.0	48.0
Neutral Line	13.82236	41.3	48.0
Neutral Line	21.12260	41.9	48.0
Neutral Line	25.30285	34.5	48.0
Neutral Line	27.06797	35.0	48.0
L Line	0.51656	40.6	48.0
L Line	13.93192	34.8	48.0
L Line	16.87644	39.3	48.0
L Line	21.08702	32.6	48.0
L Line	24.53404	34.7	48.0
L Line	25.31263	34.9	48.0

* All readings are quasi-peak unless stated otherwise.

Environment:

Temperature 29 °C

Humidity 64 %

Tested Personnel:

Tester Signature Hiroshi Wakabayashi

Typed/Printed Name Hiroshi Wakabayashi

5. Radiated Emission Data

The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit. Explanation of the Correction Factor is given in paragraph.

Frequency (MHz)	Polarity (H/V)	Receiver * Reading (dB μ V)	Correction Factor (dB/m)	Corrected Reading (dB μ V/m)	3 Meter Limit (dB μ V/m)
192.008	Horizontal	52.8	-17.8	35.0	43.5
55.389	Vertical	55.5	-21.0	34.5	40.0
75.896	Vertical	57.0	-21.0	36.0	40.0
110.567	Vertical	53.2	-16.5	36.7	43.5
129.024	Vertical	47.6	-15.6	32.0	43.5
240.012	Vertical	55.5	-15.2	40.3	46.0

*All readings are quasi-peak unless stated otherwise, with an IF bandwidth of 120 kHz, along with an 1 S sweep time. A video filter was not used.

Environment:

Temperature 32 °C
Humidity 39 %

Tested Personnel:

Tester Signature Hiroshi Wakabayashi

Typed/Printed Name Hiroshi Wakabayashi

5. Radiated Emission Data (Continued)

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/m}$$

$$\text{Level in uV/m} = \text{Common Antilogarithm} [(32 \text{ dBuV/m})/20] = 39.8 \text{ uV/m}$$

6. List of Test and Measurement Instruments

Conducted Emission

Manufacturer	Instruments	Model / Type	Serial No.	Calibration Date Next Calibration
ROHDE & SCHWARZ	Spectrum Analyzer	FSB / DISPLAY	838497/005 / 838301/009	May, 1998 May, 1999
ROHDE & SCHWARZ	EMI Test Receiver	ESHS10	842121/012	May, 1998 May, 1999
ROHDE & SCHWARZ	Artificial-Mains Network	ESH2-Z5	842210/010	May, 1998 May, 1999
CHASE ELECTRONICS LIMITED	Artificial-Mains Network	MN2050B	1140	May, 1998 May, 1999

Radiated Emission

Manufacturer	Instruments	Model / Type	Serial No.	Calibration Date Next Calibration
ROHDE & SCHWARZ	Spectrum Analyzer	FSB / DISPLAY	838497/005 / 838301/009	May, 1998 May, 1999
ROHDE & SCHWARZ	EMI Test Receiver	ESVS10	842122/014	May, 1998 May, 1999
CHASE ELECTRONICS LIMITED	Pre-Amplifier	CPA9231	3045	February, 1998 February, 1999
CHASE ELECTRONICS LIMITED	Biconical Logperiodic Antenna	CBL6111A	1732	May, 1998 May, 1999

7. The Treatment of Uncertainty In EMC Measurement

Uncertainty Budget

CONTENTS	Page
SECTION	
7.1 RADIATED EMISSION	19 to 20
7.2 CONDUCTED EMISSION	21

7.1 Radiated Emission

Measurement of vertically polarised field strength between $30 \text{ dB } \mu \text{ V/m}$ and $60 \text{ dB } \mu \text{ V/m}$ over the frequency range 30 MHz to 1 GHz on an open area test site at 10m and 30m

Contribution	Probability Distribution	Uncertainty $\pm$ [dB]	
		Biconical Logperiodic Antenna	
		10m	30m
Ambient Signals		—	—
Antenna factor calibration	normal [k = 2]	1.0	1.0
Cable loss calibration	normal [k = 2]	0.5	0.8
Receiver specification	rectangular	1.5	1.5
Antenna directivity	rectangular	0.3	0
Antenna factor variation with height	rectangular	2.2	2.2
Antenna phase centre variation	rectangular	0.2	0.1
Antenna factor frequency interpolation	rectangular	0.2	0.2
Measurement distance variation	rectangular	0.4	0.2
Site imperfections	rectangular	1.5	1.5
Mismatch Receiver VRC: $\Gamma_1 = 0.2$ Antenna VRC: $\Gamma_2 = 0.67$ [Bi] 0.3 [Lp] Uncertainty limits $20\text{Log} [1 \pm \Gamma_1 \Gamma_2]$	U-shaped	1.1	1.1
System repeatability [previous assessment of $s(q_k)$ from 5 repeats, 1 reading on EUT]	Std Deviation	0.5	0.5
Repeatability of EUT*		—	—
Combined standard uncertainty u_c [y]	normal	2.09	2.098
Expanded uncertainty U	normal [k = 2]	4.18	4.197

7.1 Radiated Emission (Continued)

Calculation for 10m biconical Logperiodic antenna, positive value:

$$u_c [y] = \sqrt{\left(\frac{1.0}{2}\right)^2 + \left(\frac{0.5}{2}\right)^2 + \frac{1.5^2 + 0.3^2 + 2.2^2 + 0.2^2 + 0.2^2 + 0.4^2 + 1.5^2}{3} + \frac{1.1^2}{2} + 0.5^2}$$

k=2:

$$U = 2 u_c [y] = 2 \times \pm 2.09 = \pm 4.18 \text{ dB}$$

7.2 Conducted Emission

Measurement of conducted emissions between 30 dB μ V and 60 dB μ V over the frequency range 9 kHz to 30 MHz .

Contribution	Probability Distribution	Uncertainty ($\pm$ dB)	
		9 kHz - 150 MHz	150 - 30 MHz
Receiver specification	rectangular	1.3	1.3
LISN coupling specification	rectangular	1.3	1.3
Cable and input attenuator calibration	normal [k = 2]	0.3	0.5
Mismatch Receiver VRC: $\Gamma_1 = 0.03$ LISN VRC: $\Gamma_2 = 0.8$ (9 kHz) 0.2 (30 MHz) Uncertainty limits $20\text{Log} [1 \pm \Gamma_1 \Gamma_2]$	U-shaped	0.2	0.05
System repeatability (previous assessment of $s(q_k)$ from 10 repeats, 1 reading on EUT)	Standard dev.	0.2	0.35
Repeatability of EUT*		—	—
Combined standard uncertainty u_c [y]	normal	1.12	1.13
Expanded uncertainty U	normal [k = 2]	2.24	2.26

Calculation for 9 kHz to 150 kHz range:

$$u_c [y] = \pm \sqrt{\frac{1.3^2 + 1.3^2}{3} + \left(\frac{0.3}{2}\right)^2 + \frac{0.2^2}{2} + 0.2^2} = \pm 1.12 \text{ dB}$$

k=2:

$$U = 2 \times u_c [y] = 2 \times \pm 1.12 = \pm 2.24 \text{ dB}$$

8. Attachment

- User Manual