

EMI TEST REPORT

Test Report No. : 22CE0062-YW

Applicant: Matsushita Electric Industrial Co.,Ltd.
AVC Company Personal Computer Division

Type of Equipment: Wireless LAN built in Personal Computer

Model No.: CF-M34

FCC ID: ACJ9TGCF-M34

Test standard: Fcc Part15 Subpart C, Section 15.247

Test Result: Complied

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The results in this report apply only to the sample tested.

Date of test: November 19 and 20, 2001 **Issued date:** December 3, 2001

Tested by: 

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1 GENERAL INFORMATION

APPLICANT : Matsushita Electric Industrial Co.,Ltd.
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REGULATION(S) : FCC Part15 Subpart C, Section 15.247

MODEL NUMBER : CF-M34

SERIAL NUMBER : N/A(Prototype)

KIND OF EQUIPMENT : Wireless LAN built in personal computer

TESTED DATE : November 19 and 20, 2001

RECEIPT DATE OF SAMPLE : November 19, 2001

REPORT FILE NUMBER : 22CE0062-YW

TEST SITE : A-PEX Yokowa No.1 and No.3 Open Test Sites

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1.1 Tested Methodology

The measurement was performed according to the procedures in ANSI C63.4(1992).

1.2 Test Facility

The open area site measurement facilities used to collect the radiated data are located at 108, Yokowa-cho, Ise-shi, Mie-ken, 516-1106 Japan.

These sites have been fully described in reports submitted to the FCC office.

No.1 and No.3 test site has filed to the FCC on September 12, 2000 as number: 90412 and is accepted by Industry Canada on May 01,2001 as number IC2973-1,IC2973-3.

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2 PRODUCT DESCRIPTION

Matsushita Electric Industrial Co.,Ltd, Model CF-M34 (referred to as the EUT in this report) is a Wireless LAN built in Personal Computer.

The specification is as following :

Wireless LAN : Direct sequence spread spectrum.(IEEE 802.11b)
 2412 through 2462MHz (11channels / each 5MHz wide)
 Antenna Type:Dipole Antenna
 Antenna Gain: 2.14dBi
 Antenna Part No:NIBZBJA00001
 I/F:PCMCIA-bus

*Fcc Part 15.31(e)

The host device CF-M34 provide the LAN Module with stable power supply(DC3.3V), and the LAN module complies power supply regulation.

*Fcc Part 15.203 Antenna requirement

The wirelss LAN card is installed in the host device and cannot be removed by the user.
 Connector used between the wireless LAN card and antenna cable is special one (manufacuter's unique specification: TC-1 plug) , and antenna and its cable are solder-mounted so that antenna is unremoved.
 Due to the above reasons, the wireless LAN card meets the anntena requirements of FCC 15. 203.

2.1 Test System Details

Model	FCC ID	Description
(1) Matsushita Electric Industrial Co.,Ltd. M/N: CF-M34 S/N: N/A(Prototype) *FccPart15 Subpart B Class B Digital Device	ACJ9TGCF-M34 DOC	Wireless LAN built in PC
(2)Matsushita Electric Industrial Co.,Ltd. M/N: CF-AA1527C4 S/N: C01091919A	DOC	AC Adapter

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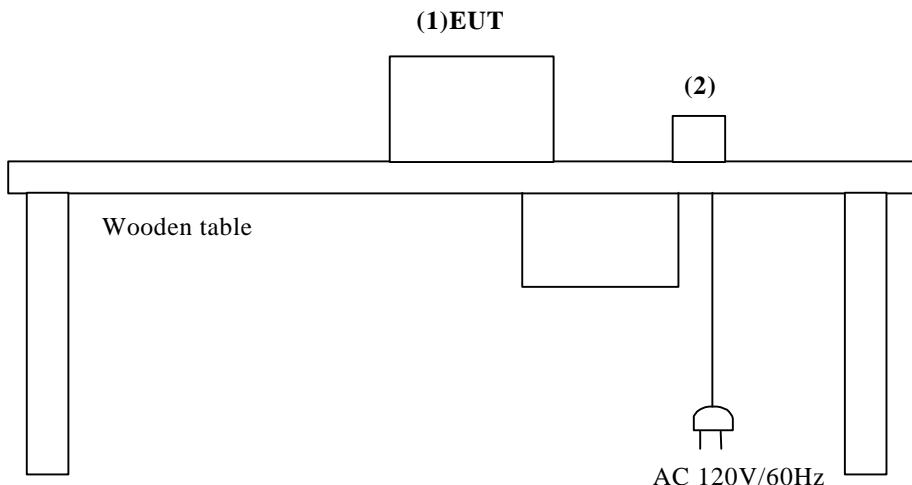
3 SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode : Data Transmitting mode(bit rate : 11Mbps)
 Performed the test about channels 1(low), 6(mid) and 11(high) among 11 channels of all Carrier frequencies.
 Receiving mode

3.2 Configuration of Tested System



* Cabling was taken into consideration and test data was taken under worst case conditions.

List of cables used

No.	Name	Length (m)	Shield	Remark
	AC Power Cable	1.8	N	Polyvinyl chloride
	DC Power Cable	1.9	N	Polyvinyl chloride

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4 Measurement Uncertainty

Conducted Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ± 2.0 dB.

The data listed in this test report may exceed the test limit because it does not have enough margin (more than 2.0dB).

The data listed in this test report has enough margin, more than site margin.

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.4 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 3.2 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ± 5.8 dB.

The data listed in this test report may exceed the test limit because it does not have enough margin.

The data listed in this test report has enough margin, more than site margin.

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5 TEST EQUIPMENT USED

Name	Manufacturer	Model	Control No.	Calibrated Until
Pre Amplifier	Hewlett Packard	MH648A	AF-02	March 30, 2002
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 3, 2002
Biconical Antenna	Schwarzbeck	BBA9106	BA-01	April 30, 2002
Logperiodic Antenna	Schwarzbeck	UKLP9140-A	LA-07	April 30, 2002
LISN	Schwarzbeck	NSLK8126	LS-07	November 6, 2002
Horn Antenna	AH System, Inc	SAS-200/571	HA-01	May 19 , 2002
Horn Antenna	Schwarzbeck	BBHA9170	HA-03	November 22 , 2001
Spectrum Analyzer	Hewlett packard	8567A	SA-01	March 30, 2002
Spectrum Analyzer	Advantest	R3271	SA-05	January 31, 2002
Test Receiver	Rohde & Schwarz	ESHS-20	TR-01	April 11, 2002
Test Receiver	Rohde & Schwarz	ESVS-30	TR-02	April 11, 2002
Power Sensor	Hewlett packard	ECP-E18A	PS-01	May 28, 2002
Power Metor	Hewlett packard	EPM-442A	PM-01	May 28, 2002

All measurement equipment is traceable to national standards.

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6 SUMMARY OF TESTS

6.1 §15.207 Conducted Emissions

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flush with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, were individually connected through a LISN to the input power source. All unused 50 connectors of the LISN were resistively terminated in 50 when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT on a shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements have been performed with a CISPR quasi-peak detector(IF BW 10kHz) .
(Measurement range : 450kHz to 30MHz)

Test data : APPENDIX A1 to A5
Photographs of test setup : Page 14(1)
Test result : Pass
Test instruments : LS-07, SA-01, TR-02

6.2 § 15.247(a)(2) 6dB Bandwidth

Test Procedure

The minimum 6dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

2412MHz(Low) : 8.0286MHz > 500kHz
2437MHz(Mid) : 7.8857MHz > 500kHz
2462MHz(High) : 8.0286MHz > 500kHz

Test data : APPENDIX A6 to A8
Test result : Pass
Test instruments : SA-05

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6.3 § 15.247(b) Maximum Peak Out Put Power

Radiated : Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

EUT emission levels were compared when the EUT antenna position was vertical polarization and horizontal polarization.

For EUT antenna position was vertical polarization, EUT emission level became higher when the measurement antenna was vertical polarization.

Then for EUT antenna position was horizontal polarization, the emission level became higher when measurement antenna was horizontal polarization.

Therefore measurement was performed with following conditions:

EUT antenna position was vertical polarization: measurement antenna was vertical polarization

EUT antenna position was horizontal polarization: measurement antenna was horizontal polarization

Test data : APPENDIX A9 to A15

Photographs of test setup : Page15(2)

Test result : Pass

Test instruments : SA-05, HA-01, AF-04

Conducted :Test Procedure

The Maximum Peak Output power was measured with a power meter connected to the antenna port.

* Antenna Gain dose not exceed 6dBi.

Test data : APPENDIX A16

Test result : Pass

Test instruments : PS-01, PM-01, SA-05

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6.4 § 15.247(c) Out of Band Emissions(Radiated)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

EUT emission levels were compared when the EUT antenna position was vertical polarization and horizontal polarization.

For EUT antenna position was vertical polarization, EUT emission level became higher when the measurement antenna was vertical polarization.

Then for EUT antenna position was horizontal polarization, the emission level became higher when measurement antenna was horizontal polarization.

Therefore measurement was performed with following conditions:

EUT antenna position was vertical polarization: measurement antenna was vertical polarization

EUT antenna position was horizontal polarization: measurement antenna was horizontal polarization

Radiated Spurious emissions

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement. The result was also satisfied the general limits specified in Sec.15.209(a).

Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz

: 1GHz to 26GHz PK and AV Detector

Test data : APPENDIX A17 to A20(30 –1000MHz)
: APPENDIX A21 to A24(1 – 26GHz)

Photographs of test setup : Page14(2)

Test result : Pass

Test instruments : AF-02, AF-04, BA-01, LA-07, HA-01, , SA-01, SA-05, TR-07

6.5 § 15.247(c) Out of Band Emissions(Conducted)

Test Procedure

The Out of Band Emissions(Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX A25 to A36

Test result : Pass

Test instruments : SA-05

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6.6 § 15.247(d) Power Density(Conducted)

Test Procedure

The Power Density was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX A37 to A40

Test result : Pass

Test instruments : SA-05

6.7 §15.247(e) Processing Gain Requirement

Test data : APPENDIX A41 to A64

Test result : Pass

Test instruments : SA-05

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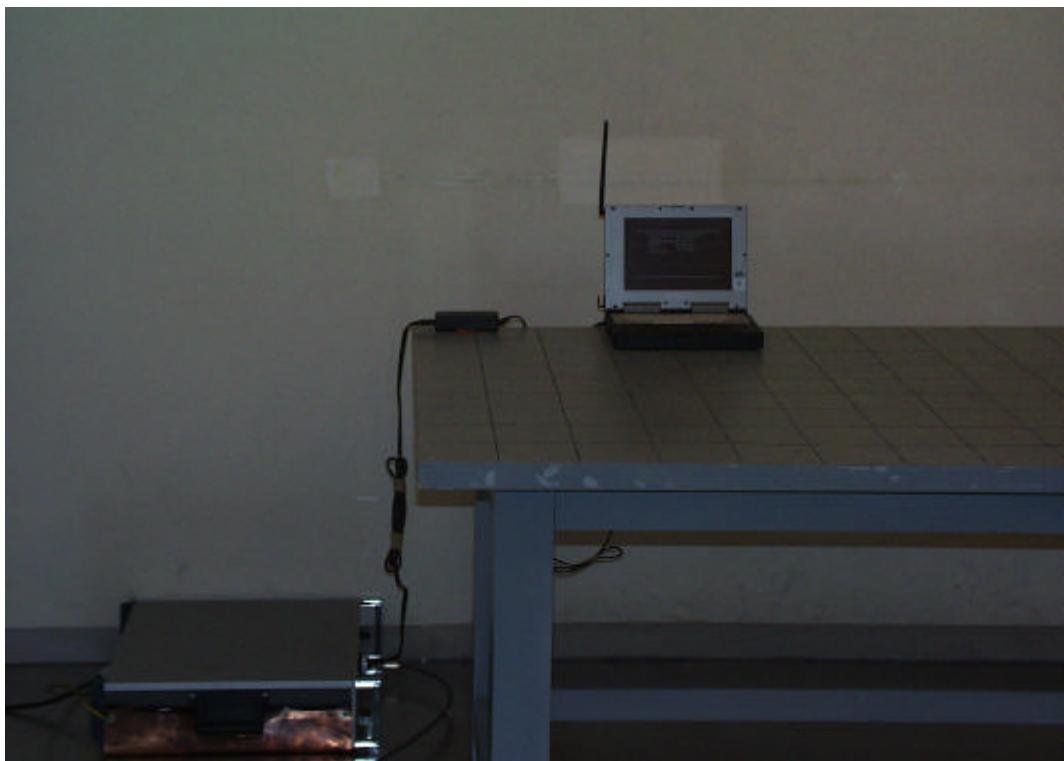
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Photographs of test setup(1)



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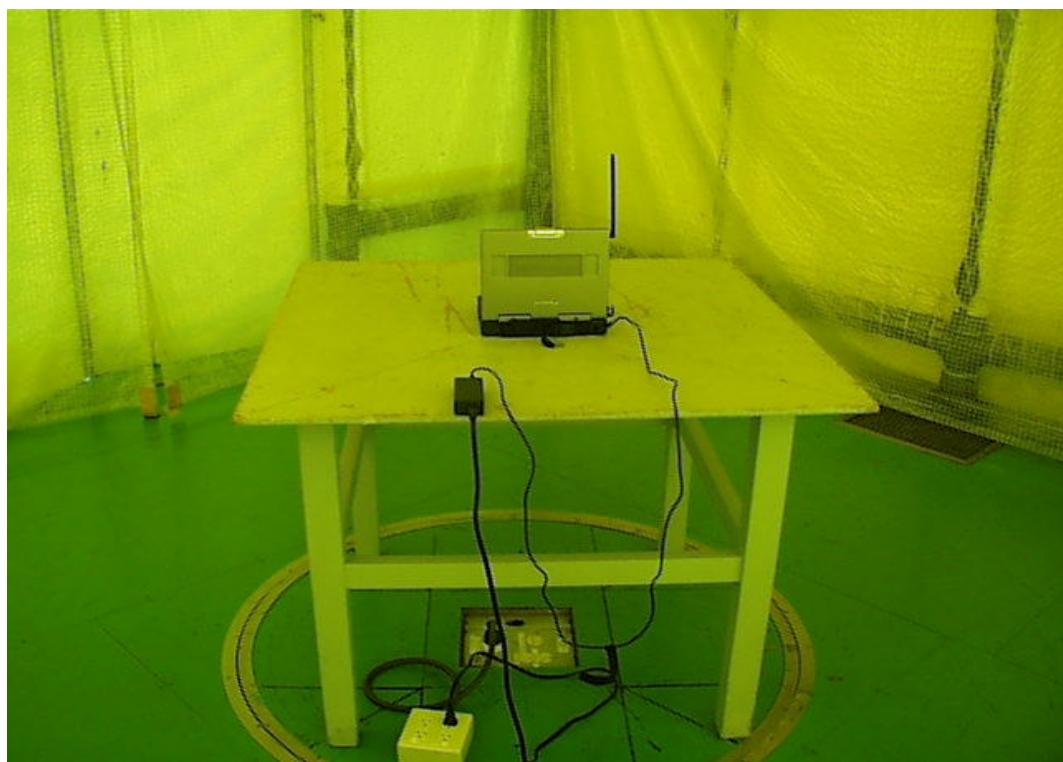
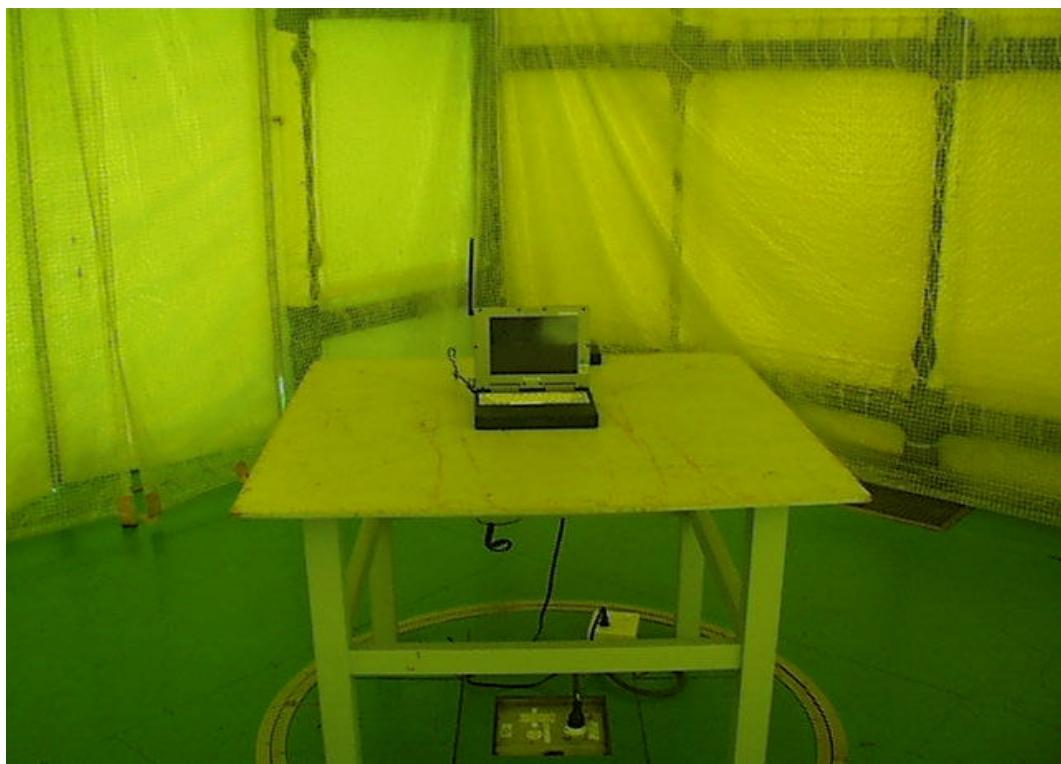
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Photographs of test setup(2)



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APPENDIX

Test Data

Conducted Emission (6.1)	<u>A1 to A5</u>
6dB Bandwidth (6.2)	<u>A6 to A8</u>
Maximum peak output power (6.3)	<u>A9 to A16</u>
Out of band emissions(Radiated) (6.4)	<u>A17 to A24</u>
Out of band emissions(Conducted) (6.5)	<u>A25 to A36</u>
Power density (6.6)	<u>A37 to A40</u>
Processing Gain Requirement (6.7)	<u>A41 to A64</u>

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