EMI TEST REPORT

Test Report No. : 23KE0038-HO-4

Applicant	:	**Matsushita Electric Industrial Co.,Ltd. Panasonic System Solutions Company**
Type of Equipment	:	**Order Taker Unit**
Model No.	:	**WX-CT2020**
Test standard	:	**FCC Part 15 Subpart B Class B**
Test Result	:	**Complied**

1. This test report shall not be reproduced except in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this test report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : July 11, 2003

Tested by :
Hiroka Umeyama
EMC Service

Approved by :
Hironobu Shimoji
Group Leader of EMC Service

NVLAP®
Lab code: 200572-0

This laboratory is accredited by the NIST/NVLAP, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.

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Head Office EMC Lab.
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CONTENTS

SECTION 1: Client information

Company name	:	Matsushita Electric Industrial Co.,Ltd. Panasonic System Solutions Company
Brand name	:	Panasonic
Address	:	4-3-1,TSUNASHIMA-HIGASHI,YOKOHAMA-CITY, KANAGAWA, 223-8639 JAPAN
Telephone Number	:	+81 45 540 5525
Facsimile Number	:	+81 45 540 5511
Contact Person	:	Shinichi ohgo

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Order Taker Unit
Model No.	:	WX-CT2020
Serial No.	:	CF0001
Rating	:	DC3.6V
Country of Manufacture	:	Japan
Receipt Date of Sample	:	June 23, 2003
Condition of EUT	:	Engineering prototype

2.2 Product description

Matsushita Electric Industrial Co.,Ltd. Panasonic System Solutions Company.
Model: WX-CT2020 (referred to as the EUT in this report) is the Order Taker Unit.

The clock frequency of this EUT is as follows;

Equipment identification	:	Order Taker Unit
Intended use/Purpose of the equipment	:	Drive Through System for the fast food store
Equipment Type	:	Transceiver
Frequency of Operation	:	from 463.6125MHz to 464.3875MHz
Other Clock Frequency	:	PLL clock 21.85MHz Receive VCO 442.2125~442.9875MHz RF CPU clock 4.19MHz Baseband clock 3.58MHz
Modulation	:	Frequency modulation
Bandwidth / Channel spacing	:	12.5kHz / 25MHz
Transmit power or power range	:	15mW (not including the antenna gain)
Channel access protocol	:	Rotaly SW
Mode of operation	:	Duplex
Antenna Gain	:	-3dB
Method of Frequency Generation	:	Synthesizer
Operating temperature range	:	-10 deg. C. to 50 deg. C.

SECTION 3: Test specification, procedures and results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4: 2001	Class B	N/A	N/A*1)	N/A
Radiated emission	ANSI C63.4: 2001	Class B	N/A	6.3dB 447.60MHz, Vertical	Complied
*Note: UL Apex's EMI Work Procedure QPM05. *1) The test is not applicable since the EUT does not have AC mains.					

3.3 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T., in the configuration tested, complies with the specifications, FCC Part15 Subpart B.

3.4 Uncertainty

Radiated emission test
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.
□ The result is within Head Office EMC Lab's uncertainty.
■ The data listed in this test report has enough margin, more than the site margin.

3.5 Test location

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 semi Anechoic chamber.
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Telephone : +81 596 24 8116
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This semi anechoic chamber has been fully described in a report submitted to FCC office, and listed on June 05, 2002.
(Registration number: No.2 :846015 Industry Canada: No.2 : IC4247-2)
*NVLAP Lab. code: 200572-0

3.6 Photographs of test setup, Test instruments and Data of EMI Test

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes

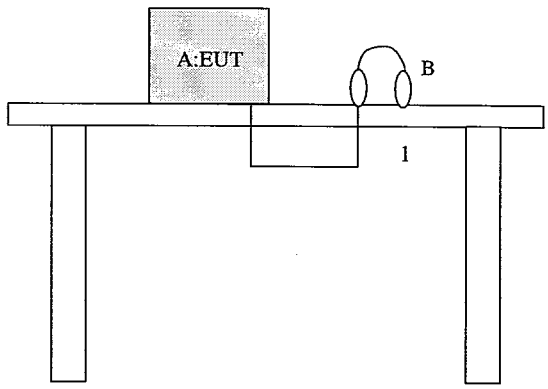
The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used : Receiving mode

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

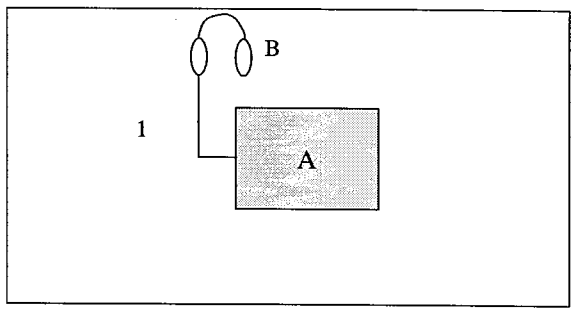
4.2 Configuration and peripherals

Front View



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

Top View



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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID	Remark
A	Order Taker Unit	WX-CT2020	CF0001	Panasonic	ACJ9TAWX-CT2020	EUT
B	All-in-One Headset	WX-C1027	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	Headphone cable	1.0	N	Polyvinyl chloride

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2 m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The EUT was set on the center of the tabletop.
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.
A drawing of the set up is shown in the photos of APPENDIX 1.

5.3 Test conditions

Frequency range : 30MHz – 300MHz (Biconical antenna) / 300MHz – 1000MHz (Logperiodic antenna)
Test distance : 3m
EUT position : Table top
EUT operation mode : Receiving mode

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi anechoic chamber with a ground plane and at a distance of 3m.
Measurements were performed with a quasi-peak detector.
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.
The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	Below 1GHz
Detector Type	Quasi-peak
IF Bandwidth	120 kHz

5.5 Results

Summary of the test results: Pass

Date: July 11, 2003 Test engineer: Hiroka Umeyama

CONTENTS OF APPENDIXES

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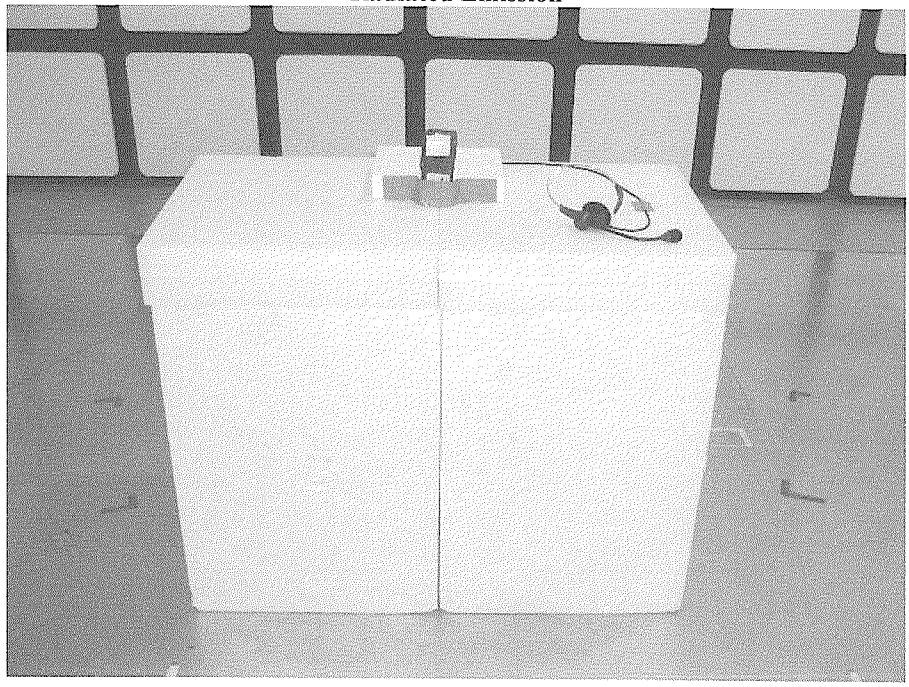
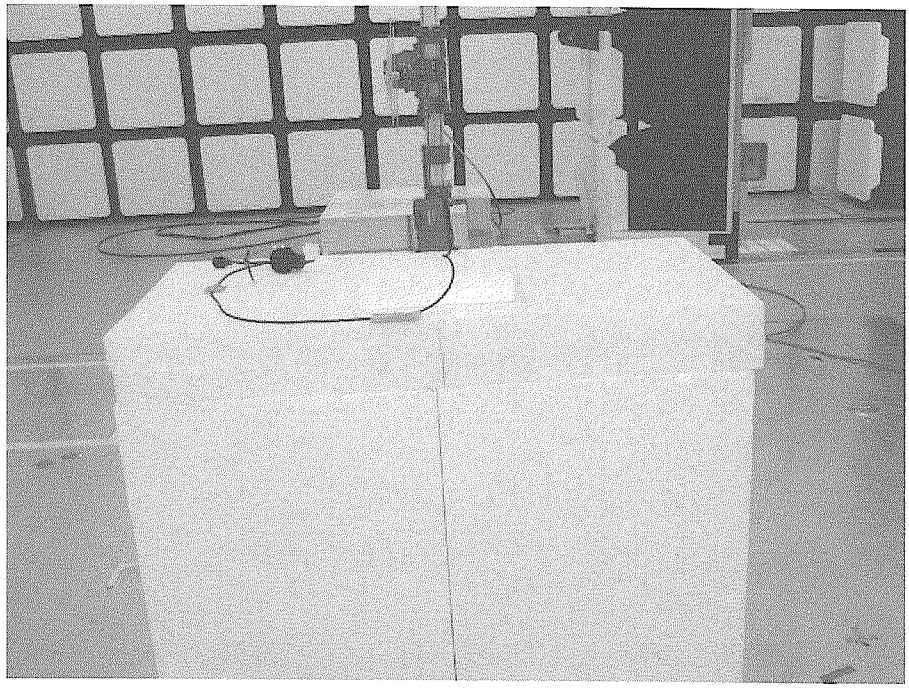
APPENDIX 1: Photographs of test setup

Radiated Emission





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APPENDIX 2:Test Instruments

Test Report No :23KE0038-HO-4

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No.	Test Item	Calibration Date * Interval(month)
MPA-02	Pre Amplifier	Agilent	87405A	RE	2003/04/17 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2003/04/11 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	MCC-12-01(8D-2W15m),MCC-12-02(5D-2W-0.7),MCC-12-03(5D-2W-0.8),MCC-12-04(5D-2W-1m),MCC-12-05(RF SW),MCC-12-06(RF SW),※MCC-12-07(5D-2W-0.4m)5/8追加	RE	2003/05/08 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/04/28 * 12
SA-07	Spectrum Analyzer	Advantest	R3273	RE	2002/12/10 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/04/28 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE/CE	2003/01/31 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
Test Item:

RE: Radiated emission,

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APPENDIX 3: Data of EMI

DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No.: 23KE0038-HO-4

Applicant : Matsushita Electric Industrial Co., Ltd.
Kind of Equipment : Oder Taker Unit
Model No. : WX-CT2020
Serial No. : CF0001
Power : DC3.6V
Mode : Receiving
Remarks :
Date : 7/11/2003
Test Distance : 3 m
Temperature : 25 ℃
Humidity : 60 %
Regulation : FCC Part15B CLASS B

Engineer : Hiroka Umeyama

No.	FREQ. [MHz]	ANT TYPE	READING HOR [dBμV]	READING VER [dBμV]	ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR [dBμV/m]	RESULT VER [dBμV/m]	LIMITS [dBμV/m]	MARGIN HOR [dB]	MARGIN VER [dB]
1.	90.01	BB	22.2	22.2	6.6	23.3	1.1	6.1	12.7	12.7	43.5	30.8	30.8
2.	132.09	BB	24.9	25.2	13.8	23.3	1.5	6.0	22.9	23.2	43.5	20.6	20.3
3.	174.98	BB	21.9	22.0	15.8	23.2	1.8	6.0	22.3	22.4	43.5	21.2	21.1
4.	221.51	BB	22.0	21.9	16.5	23.1	2.1	6.0	23.5	23.4	46.0	22.5	22.6
5.	223.80	BB	22.0	22.0	16.6	22.9	2.1	6.0	23.8	23.8	46.0	22.2	22.2
6.	447.60	BB	32.0	36.0	17.7	23.0	2.8	6.2	35.7	39.7	46.0	10.3	6.3
7.	895.20	BB	21.2	21.2	21.2	23.0	4.4	6.1	29.9	29.9	46.0	16.1	16.1

CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

Except for the above table:adequate margin data below the limits.
ANT.TYPE:30-300MHz Biconical, 300-1000MHz Logperiodic

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