



EMI TEST REPORT

Test Report No.: 26LE0301-HO-A-1

Applicant : Sharp Corporation
Type of Equipment : Wireless PDA
Model No. : PV150
Test standard : FCC Part 22 Subpart H: 2006
FCC ID : APYNAR0062
Test Result : Complied

1. This test report shall not be reproduced 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 report are traceable to the national or international standards.

Date of test:

November 14 to 28, 2006

Tested by:

T. Shimada

Takumi Shimada
EMC Services

Approved by :

H. Shimoji

Hironobu Shimoji
Assistant Manager of EMC Services

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SECTION 1: Client information

Company Name : SHARP CORPORATION
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JAPAN
Telephone Number : +81-743-55-4022
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Contact Person : Takahiro Inoue

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless PDA
Model No. : PV150
Serial No. : PVT2-88
Country of Manufacture : Japan
Rating : AC120V/60Hz (AC Adapter)
Receipt Date of Sample : November 14, 2006
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No: PV150 (referred to as the EUT in this report) is the Wireless PDA.

Equipment Type : Transceiver
Frequency Operation : 824.2-848.8MHz (GSM850)
Type of Modulation : GMSK
Bandwidth : 340kHz
Channel Spacing : 200kHz
Channel Number : 124
Antenna fixed method : Integral
Antenna Type : PIFA (Type 3b)
Antenna Connector Type : Pin Contact
Antenna Gain : -2.9dBi max
Mode of Operation : Duplex
Other Clock Frequency : 32kHz, 13MHz, 26MHz, 32MHz
Power Supply : DC3.6V - 4.2V
Temperature of Operation : -10 deg. C. to + 55 deg. C.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 22 Subpart H: 2006
Title : FCC 47CFR Part 22 Subpart H
Cellular Radiotelephones Services

3.2 Procedures and results

Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
Peak Output Power	FCC Part2 Section 2.1046	Section 22.913(a)	Conducted/ Radiated	N/A	6.1dB 848.8MHz (Radiated)	Complied
Emission Bandwidth, 99% Occupied Bandwidth	FCC Part2 Section 2.1049	Section 22.917(b)	Conducted	N/A	-	Complied
Band-Edge	FCC Part2 Section 2.1049	Section 22.917(b)	Conducted/ Radiated	N/A	0.4dB 848.8MHz (Conducted)	Complied
Spurious Emission	FCC Part2 Section 2.1051	Section 22.917(b)	Conducted	N/A	-	Complied
Spurious Radiation	FCC Part2 Section 2.1053	Section 22.917(b)	Radiated	N/A	27.0dB 2546.4MHz Horizontal	Complied
Frequency Stability (Temperature Variation)	FCC Part2 Section 2.1055(a) (1) and (b)	Section 22.355	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	FCC Part2 Section 2.1055(d)(1) and (2)	Section 22.355	Conducted	N/A	-	Complied

Note: UL Apex's EMI Work Procedures No. QPM05

*These tests were also referred to TIA-603-B "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."

3.3 Additions to standards

No addition, deviation or exclusion has been made from standards.

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3.4 Uncertainty

Conducted

The measurement uncertainty (with a 95% confidence level) for this test is ± 2.66 dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Radiated

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.59 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 4.62 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ± 5.27 dB.
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 measurement room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 measurement room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 shielded room	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	N/A	-
No.6 preparation room	-	-	4.75 x 5.4 x 3.0m	N/A	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.7 shielded room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

The EUT was set with the mode in a manner similar to typical use during the tests.

The sequence is used :

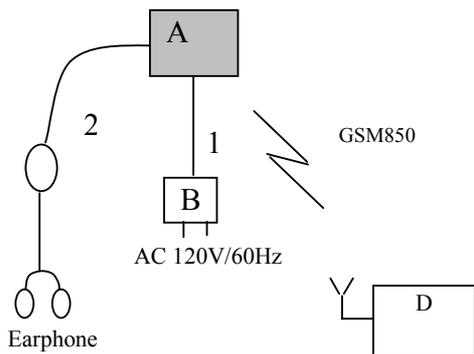
- Transmitting mode (GSM, GSMK)
 - Low Channel : 824.2MHz (Ch 128)
 - Mid Channel : 836.6MHz (Ch 190)
 - High Channel : 848.8MHz (Ch 251)

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 - Low Channel : 824.2MHz (Ch 128)
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 - High Channel : 848.8MHz (Ch 251)

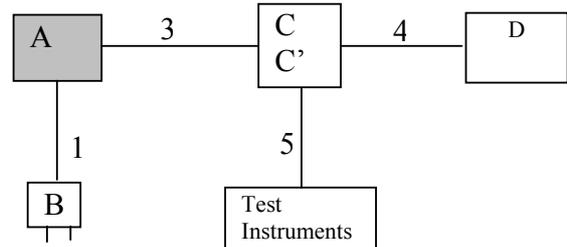
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Radiated



Conducted



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

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Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless PDA	PV150	PVT2-88	Sharp Corporation	EUT
B	AC Adapter	PV-AC11	0GW0645000012	Sharp Corporation	-
C	Power splitters/Combiners *1	ZFSC-2-2500	0124	Mini-Circuit	Below 2GHz
C'	Power splitters/Combiners *1	ZFSC-2-10G	0127	Mini-Circuit	Above 2GHz
D	Universal Radio Communication Tester	CMU200	130900897	ROHDE& SCHWARZ	-

*1 It was used depending on measurement frequency.

List of cables used

No.	Name	Length (m)	Shield	Remarks
1	DC Cable	1.5	N	-
2	Headset Cable	1.2	N	-
3	Coaxial Cable	1.0	Y	-
4	Coaxial Cable	1.2	Y	-
5	Coaxial Cable	0.5	Y	-

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SECTION 5: Peak Output Power (Conducted/Radiated)

[Conducted]

Test Procedure

The peak output power (conducted) was measured with a power meter and an attenuator at the antenna port.

Test data : **APPENDIX 3**
Test result : **Pass**

[Radiated]

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1.0 m by 0.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in No.1 semi anechoic chamber with a ground plane and at a distance of 3m (for the Peak Output Power for the Radiated). The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
- 2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table. The frequency below 1GHz of the Substitution Antenna was used as the Half wave dipole Antenna, which is harmonized with the measured frequency in 1). The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1). The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level. Its Output power of Signal Generator was recorded.
- 3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).

Test data : **APPENDIX 3**
Test result : **Pass**

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SECTION 6: Bandwidth and Band-Edge (Conducted)

Test Procedure

The Emission Bandwidth, 99% Occupied Bandwidth and Band-Edge was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 7: Spurious Emission (Conducted)

Test Procedure

The Spurious Emission was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 8: Spurious Radiation and Band-Edge (Radiated)

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1.0m by 0.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in No.1/No.2 semi anechoic chamber with a ground plane and at a distance of 3m. The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
- 2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table. The frequency below 1GHz of the Substitution antenna was used as the Half wave dipole antenna and Shorted dipole antenna calibrated with the Half wave dipole antenna, which is harmonized with the measured frequency in 1). The frequency above 1GHz of the Substitution antenna was used with Horn antenna calibrated with the Half wave dipole antenna. The Substitution antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution antenna was matched with the one of the measuring antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1). The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level. Its Output power of Signal Generator was recorded.
- 3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2). For the usage of the antenna (Shorted dipole and Horn antenna) except for the Half wave dipole antenna (2.15dBi) for the Substitution antenna, the Effective radiated power was calculated by compensating the finite difference in the antenna gain of the Half wave dipole antenna, and Substitution antenna.

Test data : APPENDIX 3
Test result : Pass

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SECTION 9: Frequency Stability

Test Procedure

The Frequency Stability was measured with a frequency counter and attenuator connected to the antenna port. The Frequency Drift was measured with the 10 deg. C. steps from -30 deg. C. to 50 deg. C., and it is presented as the ppm unit. The Frequency Drift was measured with the normal temperature (20 deg. C.) and Voltage tolerance (DC3.6V to DC4.2V), and it is presented as the ppm unit.

Temperature : -30deg.C to +50deg.C (10 deg. C. step)
Voltage : Vnom:DC3.9V, Vmin:DC3.6V, Vmax:DC4.2V : Operating voltage range of EUT *

*The voltage supply beyond DC 4.2V exceeds the operating voltage range of EUT.

In case of the voltage supply below 3.6V, the EUT stops operation by "low battery detection function. Therefore, Frequency Stability test was conducted under the above condition.

Test data : **APPENDIX 3**
Test result : **Pass**

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