

# EMI TEST REPORT

**Test Report No.: 26LE0301-HO-C**

**Applicant** : **Sharp Corporation**  
**Type of Equipment** : **Wireless PDA**  
**Model No.** : **PV150**  
**Test Standard** : **FCC Part 24: 2005**  
**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 the 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:**



Takumi Shimada  
EMC Services

**Approved by :**



Hironobu Shimoji  
Group Leader of  
EMC Services

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## **SECTION 1: Client information**

Company Name : SHARP CORPORATION  
Address : 492 Minosho-cho, Yamatokoriyama-city, NARA 639-1186,  
JAPAN  
Telephone Number : +81-743-55-4022  
Facsimile Number : +81-743-55-2553  
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 : 1850.2 - 1909.8MHz (PCS1900)  
Type of Modulation : GMSK/8PSK  
Bandwidth : 337kHz  
Channel Spacing : 200kHz  
Channel Number : 299  
Antenna fixed method : Integral  
Antenna Type : PIFA (Type 3b)  
Antenna Connector Type : Pin Contact  
Antenna Gain : -1.7dBi 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 24: 2005  
Title : FCC 47CFR Part 24  
Personal Communications Services

### **3.2 Procedures and results**

<b>Item</b>	<b>Test Procedure</b>	<b>Specification</b>	<b>Remarks</b>	<b>Deviation</b>	<b>Worst margin</b>	<b>Results</b>
Peak Output Power	FCC Part2 Section 2.1046	Section 24.232(b)	Conducted/ Radiated	N/A	1.9dB 1909.8MHz (Radiated)	Complied
Emission Bandwidth, 99% Occupied Bandwidth	FCC Part2 Section 2.1049	Section 24.238(b)	Conducted	N/A	-	Complied
Band-Edge	FCC Part2 Section 2.1049	Section 24.238(b)	Conducted/ Radiated	N/A	0.6dB 1850.0MHz (Radiated)	Complied
Spurious Emission	FCC Part2 Section 2.1051	Section 24.238(a)	Conducted	N/A	-	Complied
Spurious Radiation	FCC Part2 Section 2.1053	Section 24.238(a)	Radiated	N/A	17.6dB 7520.0MHz Horizontal	Complied
Frequency Stability (Temperature Variation)	FCC Part2 Section 2.1055(a) (1) and (b)	Section 24.235	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	FCC Part2 Section 2.1055(d)(1) and (2)	Section 24.235	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."

\*These tests were performed without any deviations from test procedure except for additions or exclusions.

### **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  $\pm 2.66$ dB.  
The data listed in this test report has enough margin, more than the site margin.

#### Radiated

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.59$ dB.  
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 4.62$ dB.  
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 5.27$ 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 operated in a manner similar to typical use during the tests.

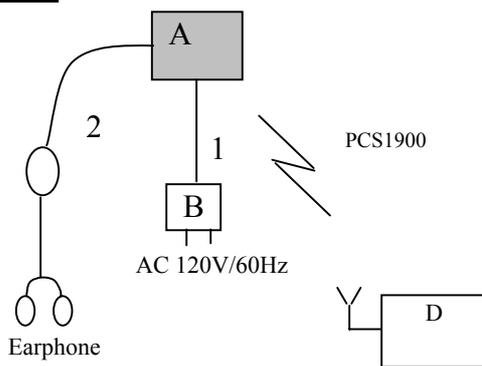
The mode is used :

- Transmitting mode (GSM, GMSK)
  - Low Channel : 1850.2MHz (Ch 512)
  - Mid Channel : 1880.0MHz (Ch 661)
  - High Channel : 1909.8MHz (Ch 810)
- Transmitting mode (GPRS, 8PSK)
  - Low Channel : 1850.2MHz (Ch 512)
  - Mid Channel : 1880.0MHz (Ch 661)
  - High Channel : 1909.8MHz (Ch 810)

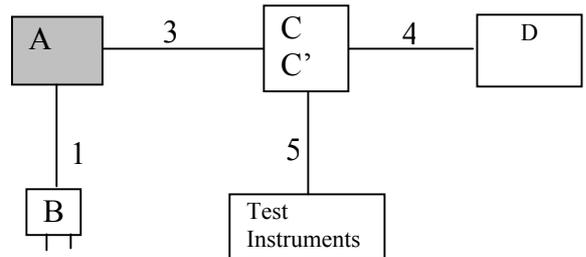
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

### **4.2 Configuration and peripherals**

#### **Radiated**



#### **Conducted**



\* Cabling and setup were taken into consideration and test data was taken under worst 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, 1.0by 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 measurement was set for the same height 1m as the EUT. The frequency above 1GHz of the Substitution antenna was used with Horn antenna calibrated with 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) Equivalent isotropic 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**

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

### **Test Procedure**

- 1) EUT was placed on a platform of nominal size, 1m 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.  
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.
  
- 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) Equivalent isotropic 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).

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

## **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**