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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 133 issue 2, FCC Part 24 Subpart E on the PalmOne, Inc. Model: ACE GSM

FCC ID:	O8FCAGEMS
UPN:	3959A-CAGEMS
GRANTEE:	PalmOne, Inc. 400 N. McCarthy Blvd. Milpitas, CA 95035-5112
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	August 24, 2004
FINAL TEST DATE:	August 5, August 6 and August 11, 2004
AUTHORIZED SIGNATORY:	Juan Martinez Senior EMC Engineer

ACCREDITED

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FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

2.1033(c)(1) Grantee:
PalmOne, Inc.
400 N. McCarthy Blvd.
Milpitas, CA 95035-5112

2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions

FCC 24E & RSS-133**: 243KGXW**

2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Range

FCC 24E & RSS-133**:** 1850.2 - 1909.8 MHz

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

FCC 24E & RSS-133**:** 1 Watt EIRP

2.1033(c)(7) & RSP-100 (7.2(a)) Maximum FCC & IC Allowed Power Level

24.235(b) & RSS-133 (6.2): Mobile/portable stations are limited to 2 watts E.I.R.P. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements

Refer to Exhibit 6. The schematic diagram

2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure

Please refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure

2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation

For more information please refer to Exhibit 7: Theory of Operation

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power

Refer to Exhibit 6. The schematic diagram

2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label

Refer to Exhibit 4

2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment

Refer to Exhibit 5

2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation

For more information please refer to Exhibit 7: Theory of Operation

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.

Refer to Exhibit 2

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:

ACE GSM

Manufacturer:

PalmOne, Inc.
400 N. McCarthy Blvd.
Milpitas, CA 95035-5112

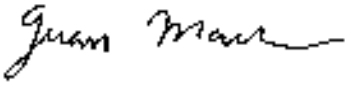
Tested to applicable standards:

RSS-133 Issue 2, Rev. 1 November 6, 1999 (2GHz Personal Communications Services)
FCC Part 24 Subpart E

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC4549_**3** Dated March 5, 2003
Departmental Acknowledgement Number: IC4549_**5** Dated March 5, 2003

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of TIA/EIA-603 and the specific RSS standards applicable to this device); and that the equipment performed in accordance with the data submitted in this report.

Signature	
Name	Juan Martinez
Title	Senior EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	August 24, 2004

Maintenance of compliance with the above standards is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

SCOPE

FCC Part 24 Subpart E & IC RSS-133 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & IC RSS-133. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC & RSS performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC 24 Subpart E & IC RSS-133. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC & Industry Canada. FCC & Industry Canada issues a grant of equipment authorization and a certification number upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

SUMMARY OF TEST RESULTS

Part 24E and RSS-133 Test Summary

Part 2 Measurements Required Section	FCC Part 24 Subpart E Section	RSS-133 Section	Test Performed	Measured Value	Test Procedure Used	Result
Modulation Tested	GSM	GSM	-	-	-	-
2.1047: Modulation characteristics	24.238 (b)	5.6	99% Bandwidth	243 kHz	D	Complies
2.1046: RF power output	24.232 (b)	6.2	Output Power Test	30.1 dBm (1 Watt EIRP)	A	Complies
2.1046: RF power output	24.232 (b)	6.2	Conducted Output Power Test (**Antenna Conducted**)	30.1 dBm (1 Watt)	B	Complies
2.1051: Spurious emissions at antenna Port	24.238 (a) & (b)	6.3	Emission Limits and/or Unwanted Emission 30MHz – 25GHz (**Radiated Method**)	All spurious emissions < -13dBm	N	Complies
2.1049: Occupied Bandwidth	24.238 (a) & (b)	6.3	Out of Block Emissions (**Radiated Method**)	All spurious emissions < -13dBm	I	Complies
2.1053 Field strength of spurious radiation	24.238 (a) & (b)	6.3	Radiated Spurious Emissions 30MHz – 25GHz	- 13.7 dBm @ 3820.833 MHz (-0.7 dB)	N	Complies
2.1055: Frequency stability	24.235	7(a)	Frequency Stability (Frequency Vs. Temperature)			
2.1055: Frequency stability	24.235	7(b)	Frequency Stability (Frequency Vs. Voltage)			
2.1093: Exposure to portable devices	24.52	8	Exposure of Humans to RF Fields	SAR Report provided	N/A	-
-	-	9 (ii)	Receiver Spurious Emissions (**Antenna Conducted**)	All spurious emission below 1 GHz < 2 nanowatts and above 1 GHz < 5 nanowatts	P	Complies

Note 1:

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The PalmOne, Inc. model ACE GSM is a Phone PDA, which is designed to provide cellular phone, wireless Internet or network, and personal organizer features. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, .2 Amps.

The sample was received on August 5, 2004 and tested on August 5, August 6 and August 11, 2004. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	Proposed FCC ID
PalmOne	ACE GSM	PDA phone	N/A	TBD
PalmOne	DSC-51F-52P US	Power Supply	14-0028-02	N/A

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 6 cm wide by 2.3 cm deep by 13 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the emission specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Wavetex	4400M	Communication Test	1011020511134	N/A
Cushcraft	S18512RPP	Patch Antenna	N/A	N/A
PalmOne	N/A	Dipole	N/A	N/A

No equipment was used as remote support equipment for emissions testing.

EUT INTERFACE PORTS

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
DC in	AC/DC adaptor	multiwire	Unshielded	1.7

EUT OPERATION DURING TESTING

EUT was transmitting at full power on the low, middle, and high channel.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on August 5, August 6 and August 11, 2004 at Elliott Laboratories Chamber # 3 and 5 located Fremont, 41039 Boyce Road, Fremont CA 94538. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

RADIATED EMISSIONS CONSIDERATIONS

Radiated measurements are performed in an open field environment or Anechoic Chamber. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the particular detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into filed strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

PEAK POWER METER

A peak power meter and thermister mount may be used for output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or EUT and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transmitters and transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

The requirements of ANSI C63.4 were used for configuration of the equipment turntable. It specifies that the test height above ground for table-mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

General: For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. The attenuators and/or filters are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

Procedure A – Power Measurement (Radiated Method): The following procedure was used for transmitters that do not use external antennas or with devices with test port were the output power can be measured directly, but Power must still be made with antenna attached.

1) Set the EUT to maximum power and to the lowest channel.
2) A spectrum analyzer was use to measure the power output. The search antenna was located 3 meter from the EUT.
3) The spectrum analyzer resolution and video bandwidth was set to 2 MHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarization's were performed. All correction factors are applied to the fundamental.
5) Substitution is then performed. Substitution method is performed by replacing the EUT with a transmit antenna and signal generator. The substitution antenna can be reference to a half-wave dipole in dBi. The signal generator is then set to a fix output level of either –10 or –20dBm. This is then injected into the substitution antenna. The field strength produced by the substitution antenna is then measured. This measured value is then used to determine the conversion factor to convert the EUTs field strength levels to a dBm value.
6) Steps 1 to 5 are repeated for the middle and the highest channel.

Procedure B – Power Measurement (Conducted Method): The following procedure was used for transmitters that do use external antennas.

1) Set the EUT to maximum power and to the lowest channel.
2) Either a power meter or a spectrum analyzer was used to measure the power output.
3) If a spectrum analyzer was used a resolution and video bandwidth 1MHz was used to measure the power output. Corrected for any external attenuation used for the protection of the input of analyzer. In addition, For CDMA or TDMA modulations set spectrum analyzer resolution to 1MHz and video to 30 kHz. Use video averaging with a 100-sample rate.
4) If a power meter was used, corrected for any external attenuation used for the protection of the input of the sensor head. Also set the power sensor correction by setting up the frequency range that will be measured.
5) Repeat this for the high channel and all modulations that will be used and all output ports used for transmission

Procedure D - Occupied Bandwidth (Conducted Method): Either for analog, digital, or data modulations, occupied bandwidth was performed. The EUT was set to transmit the appropriate modulation at maximum power. The bandwidth was measured using following methods:

1) The built-in 99% function of the spectrum analyzer was used.
2) If the built-in 99% is not available then the following method is used:

   26-dB was subtracted to the maximum peak of the emission. Then the display line function was used, in conjunction with the marker delta function, to measure the emissions bandwidth.

3) For the above two methods a resolution and video bandwidth of 10 or 30 kHz was used to measure the emission's bandwidth.

Procedure H - Other Types of Equipment: Either digital or data modulated signals were simulated, by software or external sources, to performed the required tests. The EUT was set to transmit the appropriate digital modulation.

Procedure I – Bandedge: Where Bandedge measurements are specified the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –13 dBm.
3) Set the spectrum analyzer bandwidth to the minimum 1% of the emission bandwidth. The emission bandwidth is determined by using **procedure D**.
4) Set the marker function to the FCC or IC specified frequency band/block.
5) Set the spectrum analyzer span to show any emission within 2 MHz above or below the frequency band/block. All spurious or intermodulation emission must not exceed the –13 dBm limit.
6) Steps 1 to 5 were repeated for all modulations and output ports that will be used for transmission. Also, bandedge is determined for blocks A (high edge), D, B, E, F, C (low edge).

Procedure J – Antenna Conducted Emissions: For spurious emission measurements at the antenna terminal the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –13-dBm.
3) Set the spectrum analyzer bandwidth to 1 MHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 10th harmonic of the fundamental. All spurious or intermodulation emission must not exceed the –13dBm limit.
5) Steps 1 to 4 were repeated for all modulations and output ports that will be used for

transmission.

Procedure K - Frequency Stability: The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The spectrum analyzer is configured to give a 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. The Temperature chamber was varied from –30 to +50° C (or +60° C for some IC RSS standards) in 10 degrees increment. The EUT was allowed enough time to stabilize for each temperature variation.

Procedure L - Frequency Stability: For AC or DC operated devices the nominal voltage is varied to 85% and to 115% at either room temperature or at a controlled +20°C temperature.

Procedure M - Frequency Stability: For battery-powered devices the voltage battery end-point is determined by reducing the dc voltage until the unit ceases to function. This is performed at either room temperature or at a controlled +20°C temperature.

Procedure N - Field Strength Measurement: The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the middle of the frequency band and set at maximum output power.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a transmit antenna and signal generator. The substitution antenna can be reference to a half-wave dipole in dBi. The signal generator is then set to a fix output level of either –10 or –20dBm. This is then injected into the substitution antenna. The field strength produced by the substitution antenna is then measured. This measured value is then used to determine the conversion factor to convert the EUTs field strength levels to a dBm value.

Procedure O – Antenna Conducted Emissions (22.917(f)): For Mobile spurious emission in base frequency the following procedure was performed:

1) Set the transmitting signal as close as possible to the edge of the frequency band/block as specified in the standard. Power is set to maximum
2) Set the spectrum analyzer display line function to –80-dBm.
3) Set the spectrum analyzer bandwidth to 1 kHz. The reason for using 1 kHz BW was to bring the analyzer noise floor down below the limit and provide more dynamic range, since no notch filter was available to attenuate the fundamental.
4) For the spectrum analyzer, the start frequency was set to 869 MHz and the stop frequency set to 894 MHz. All spurious or intermodulation emission must not exceed the –80-dBm limit.
5) Steps 1 to 4 were repeated for low, middle, and high channels.

Procedure P – Receiver Antenna Conducted Emissions: Receiver spurious emission was measured at the antenna terminal, as a port was available.

1) Set the receiver was set to the midpoint of the operating band as specified in the standard.
2) Set the spectrum analyzer display line function to 2 nanowatts for measurements below 1 GHz and 5 nanowatts for measurements above 1 GHz.
3) Set the spectrum analyzer bandwidth to 1 MHz.
4) For the spectrum analyzer, the start frequency was set to 30 MHz and the stop frequency set to the 5^{th} harmonic of the receiver LO. All spurious or intermodulation emission must not exceed the specified limit.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m,). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is $43+10\text{Log}_{10}$ (mean output power in watts) dB below the measured amplitude at the operating power.

CALCULATIONS – EFFECTIVE RADIATED POWER

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m
P= Power in Watts (for this example we use 3 watts)
G= Gain of antenna in numeric gain (Assume 1.64 for ERP)
d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

20 * log (4.049 V/m * 1,000,000) = 132.14 dBuV/m @ 3 meters

FCC Rules request an attenuation of 43 + 10 log (3) or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

132.1 dBuV/m – 47.8 dB = 84.3 dBuV/m @ 3 meter.

Note: Substitution Method is performed for spurious emissions with less than 20dB of margin relative to the calculated field strength limit.

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 3500 - 26,500 MHz, 05-Aug-04
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	08-Jan-05
Hewlett Packard	EMC Spectrum Analyzer 9KHz-26.5GHz, non programmable	8563E	284	15-Mar-05
ETS-Lindgren	Horn Antenna, D. Ridge 1-18GHz	3117	1662	30-Mar-05

Radiated and Antenna Conducted emissions, 12-Aug-04
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	08-Jan-05
Hewlett Packard	EMC Spectrum Analyzer 9KHz-26.5GHz, non programmable	8563E	284	15-Mar-05
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	868	20-Apr-06
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1538	26-May-05
Sunol Sciences	Biconilog, 30-3000MHz	JB3	1549	13-Apr-05
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1630	05-Jan-05

Subsitution Method, 12-Aug-04
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Horn antenna, D. Ridge 1-18GHz (SA40 system antenna)30Hz sunnyvale	3115	1142	11-Jun-05
Elliott Laboratories	Tunable Dipole Antenna	(White) (410-1000 MHz)	323	16-Mar-05
Hewlett Packard	Signal Generator (sweep) 0.01 - 26.5 GHz	8340A	1244	N/A
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	22-Apr-05
Rohde & Schwarz	Peak Power Sensor 100uW - 2 Watts	NRV-Z32	1423	18-Mar-05

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T56055 18 Pages

Elliott

EMC Test Data

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Project Manager:	
Contact:	David Waitt		
Emissions Spec:	FCC 22 & 24, RSS 132 & 133	Class:	-
Immunity Spec:		Environment:	-

EMC Test Data

For The

Palm One

Model

ACE GSM

Date of Last Test: 8/6/2004

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	
Contact:	David Waitt		
Emissions Spec:	FCC 22 & 24, RSS 132 & 133	Class:	-
Immunity Spec:	Enter immunity spec on cover	Environment:	-

EUT INFORMATION

General Description

The EUT is a Phone PDA, which is designed to provide cellular phone, wireless Internet or network, and personal organizer features. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120/240 V, 50/60 Hz, .2 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
PalmOne	ACE GSM	PDA phone	N/A	TBD
PalmOne	DSC-51F-52P US	Power Supply	14-0028-02	N/A

Other EUT Details

EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 6 cm wide by 2.3 cm deep by 13 cm high.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	
Contact:	David Waitt		
Emissions Spec:	FCC 22 & 24, RSS 132 & 133	Class:	-
Immunity Spec:	Enter immunity spec on cover	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Wavetex	4400M	Communication Test	1011020511134	N/A
Cushcraft	S18512RPP	Patch Antenna	N/A	N/A
PalmOne	N/A	Dipole	N/A	N/A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
DC in	AC/DC adaptor	multiwire	Unshielded	1.7

EUT Operation During Emissions

EUT was transmitting at full power on the low, middle, and high channel.

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Radio Performance Test - FCC24E & RSS-133
RF Port Measurements

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/6/2004
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT's rf port was connected to the measurement instrument's rf port, via an attenuator or dc-block if necessary.

Ambient Conditions:

Temperature: 19 °C
Rel. Humidity: 51 %

Summary of Results

Run #	Test Performed	Limit	Result	Value / Margin
1	Power Output	FCC 24E & RSS-133	Pass	Refer to run
2a	Bandwitdh	FCC 24E & RSS-133	Pass	Refer to run
2b	Bandedge	FCC 24E & RSS-133	Pass	Refer to run
3a-3b	Antenna Spurious Emissions	FCC 24E & RSS-133	Pass	< -13dBm
4	RE, 30 - 25,000 MHz, Antenna Conducted Emissions Receiver	RSS-133 (9)	Pass	794.3 pW @ 13,4800 MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

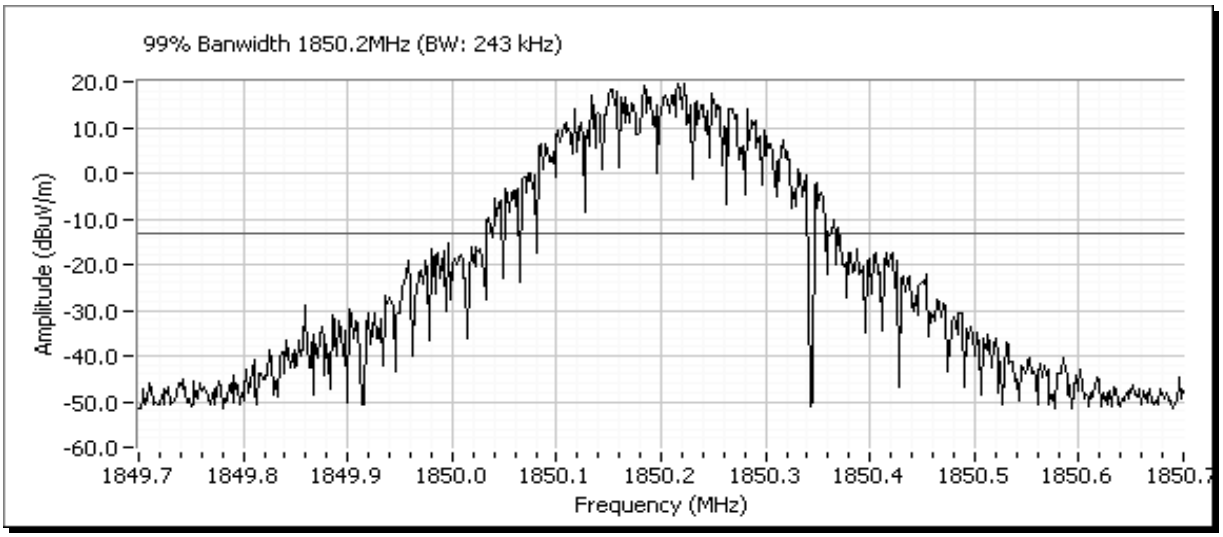
Run #1: Antenna Conducted Power Measurements - GSM Modulation

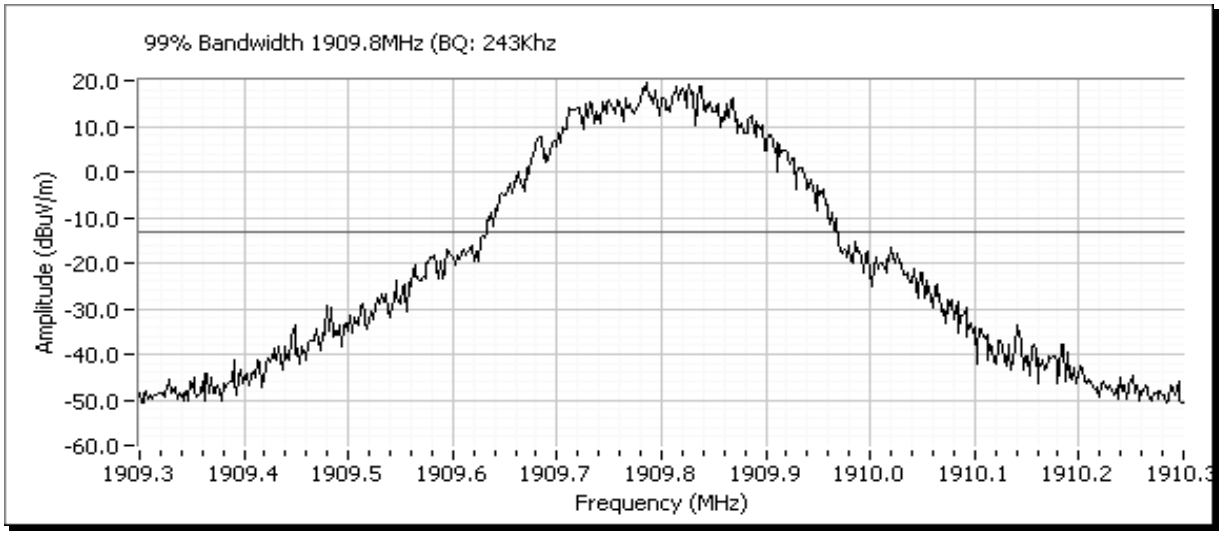
Freq (MHz)	Pmeas	Duty Cycle	Pout
1850	30.10	1	30.1
1880	30.07	1	30.07
1910	29.70	1	29.7

Setting: software power setting of EUT
Pmeas: Measured output power (average)
Duty Cycle: Duty cycleof transmissions (1 = 100%)

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

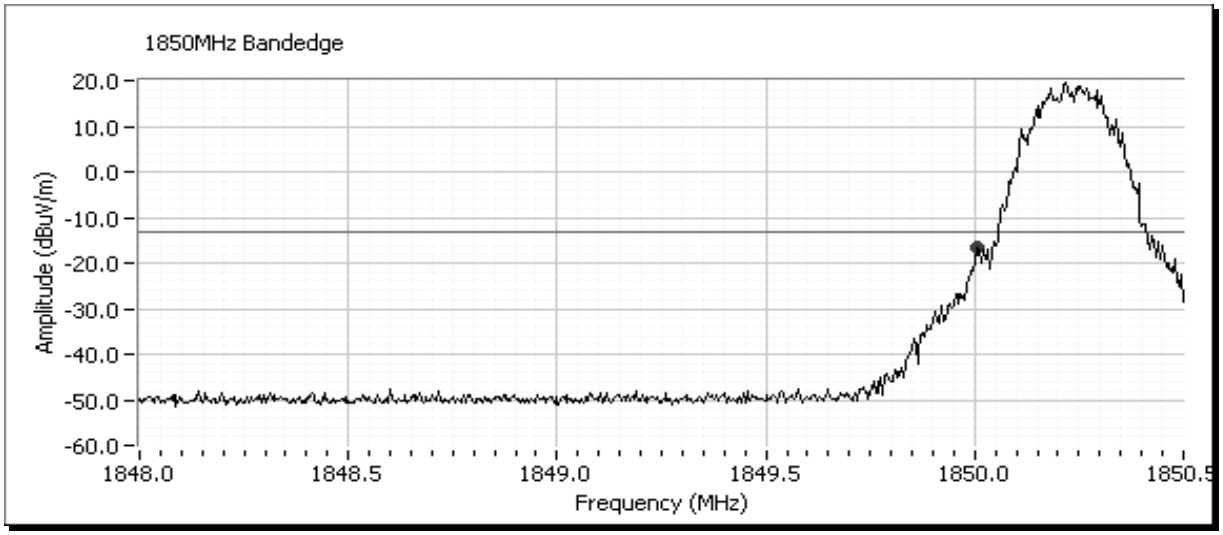
Run #2a: Bandwidth





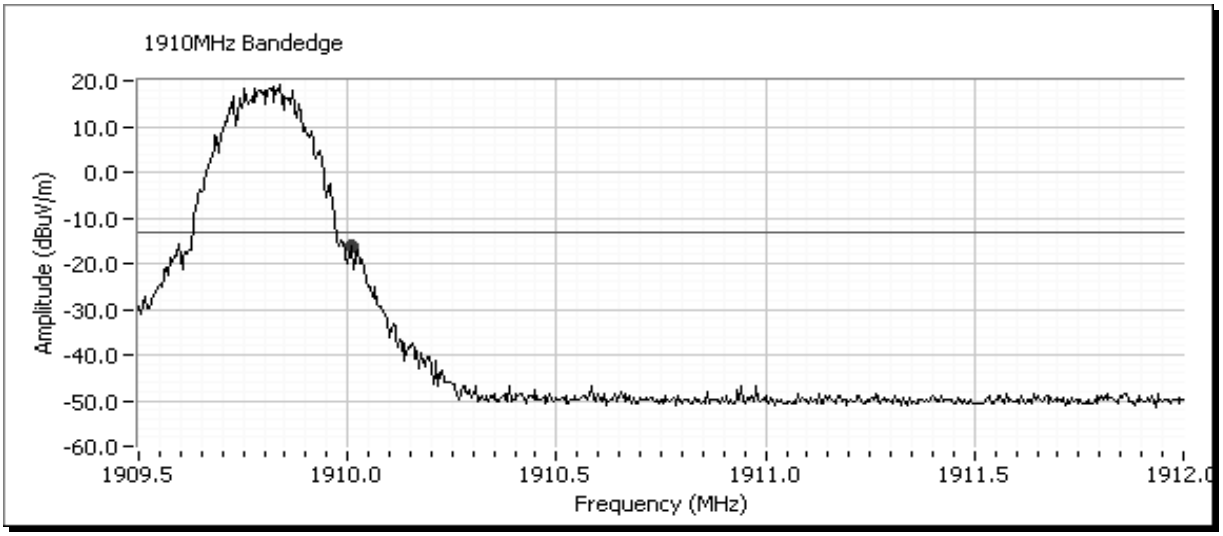
Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #2b: Bandedge



Frequency	Level	Port	FCC 24E		Detector	Comments
MHz	dBm		Limit	Margin		
1850.004	-16.5	RF Port	-13.0	-3.5	Peak	RBW=VBW=3kHz

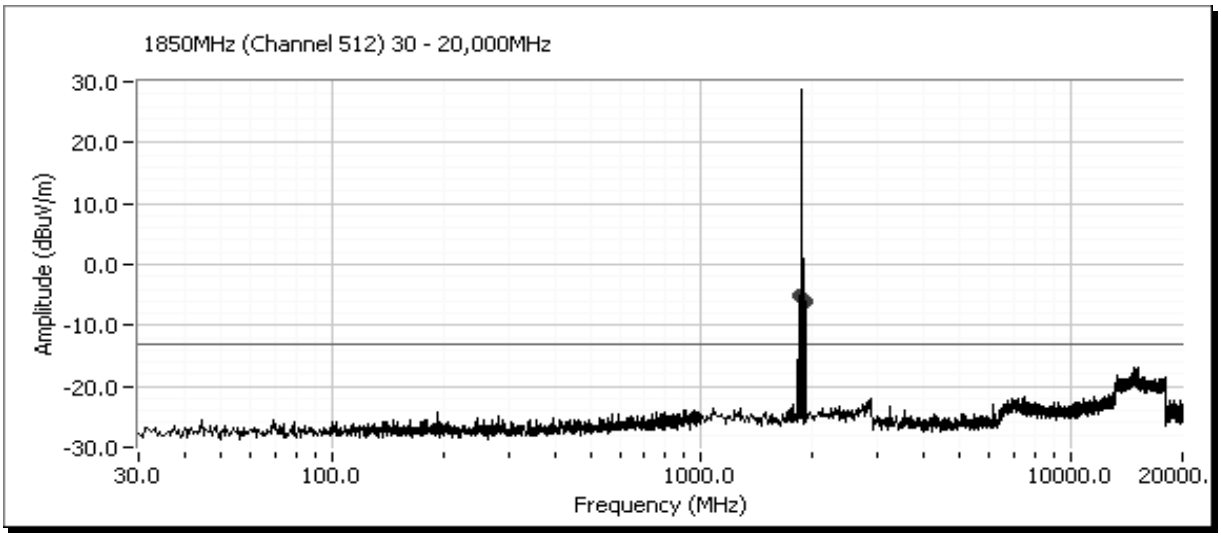
Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A



Frequency	Level	Port	FCC 24E		Detector	Comments
MHz	dBm		Limit	Margin		
1910.008	-16.2	RF Port	-13.0	-3.2	Peak	RBW=VBW=3kHz

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

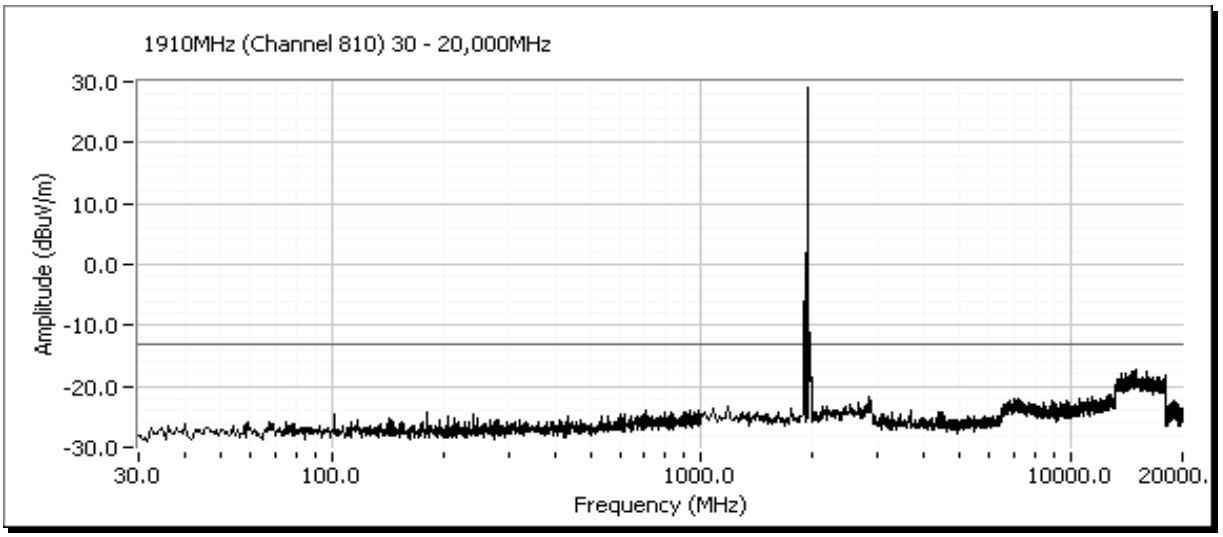
Run #3a: Antenna Port Conducted Spurious Emissions, Transmit Mode, 30 - 20,000 MHz. EUT on 1850.2 MHz



Frequency MHz	Level dBm	Port	FCC 24E Limit	FCC 24E Margin	Detector	Comments
No spurious emission detected.						RBW=VBW=1MHz (Peak Mode)

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #3b: Antenna Port Conducted Spurious Emissions, Transmit Mode, 30 - 20,000 MHz. EUT on 1909.8 MHz

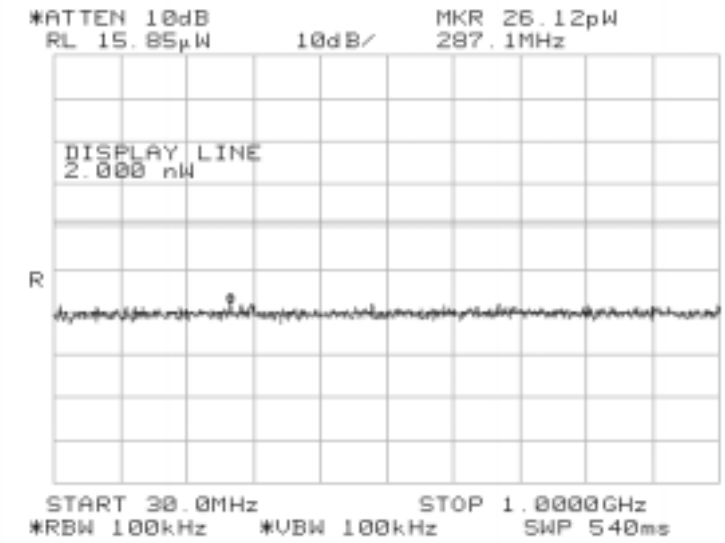


Frequency MHz	Level dBm	Port	FCC 24E Limit	FCC 24E Margin	Detector	Comments
No spurious emission detected.						RBW=VBW=1MHz (Peak Mode)

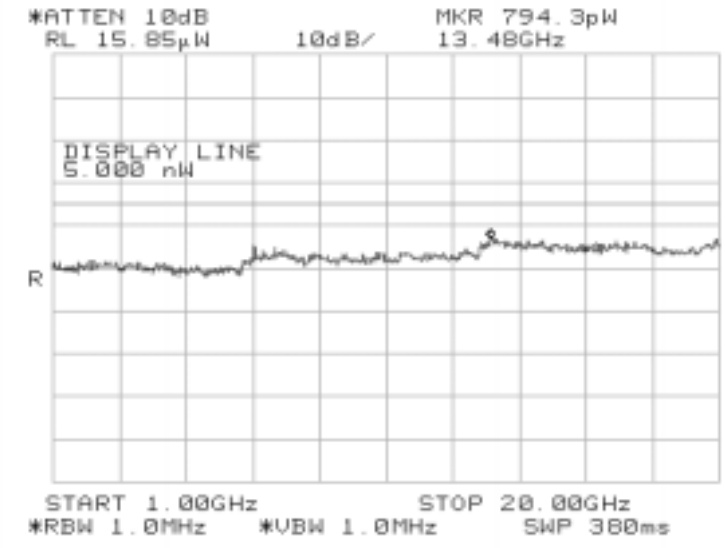
Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	-
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #4: Antenna Conducted Emissions, 30-25,000 MHz

RSS-133 (9)(ii) Rx



RSS-133 (9)(ii) Rx



Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Radiated Spurious Emissions, FCC 24E & RSS-131

Test Specifics

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: 8/5/2004
Test Engineer: Jmartinez
Test Location: FT Chamber# 3
Config. Used: 1
Config Change: None
EUT Voltage: 120Vac, 60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

The measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a-1c	RE, 3500 - 18,000 MHz - Spurious Emissions Transmit Mode	FCC 24E & RSS-133	Pass	-0.7dB @ 3820.8MHz
1a-1c	RE, Fundamental Power	FCC 24E & RSS-133	Pass	30.1 dBm EIRP

Modifications Made During Testing:

No modifications were made to the EUT during testing

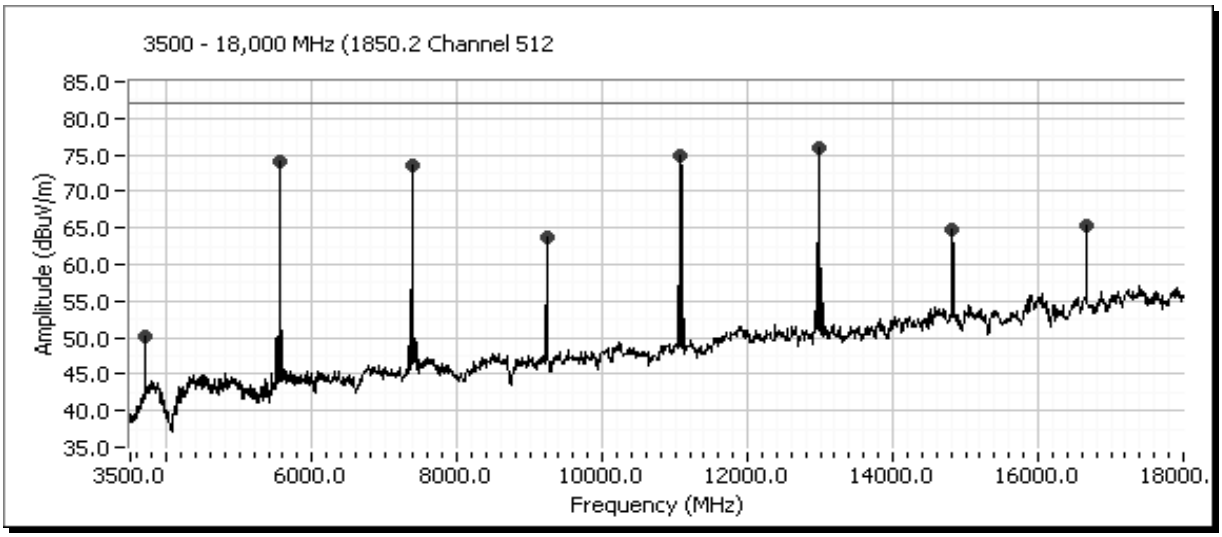
Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #1a: Radiated Spurious Emissions, Transmit Mode, 3500 - 18,000 MHz
Channel 512, 1850.2 MHz



Frequency	Level	Pol	FCC 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1850.250	123.7	V	-	-	PK	27	1.4	Fundamental
1850.330	127.7	H	-	-	PK	159	1.0	Fundamental
3700.000	50.3	V	82.2	-31.9	Peak	92	1.0	
5550.000	74.1	H	82.2	-8.2	Peak	243	1.0	
7390.000	73.7	H	82.2	-8.6	Peak	143	1.4	
9240.000	63.7	H	82.2	-18.5	Peak	205	1.6	
11080.000	74.9	H	82.2	-7.3	Peak	279	1.2	
12980.000	76.0	H	82.2	-6.2	Peak	265	1.4	
14820.000	64.9	H	82.2	-17.3	Peak	205	1.2	
16670.000	65.3	H	82.2	-16.9	Peak	198	1.2	

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 20dB of margin relative to the calculated field strength limit.

Elliott

EMC Test Data

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

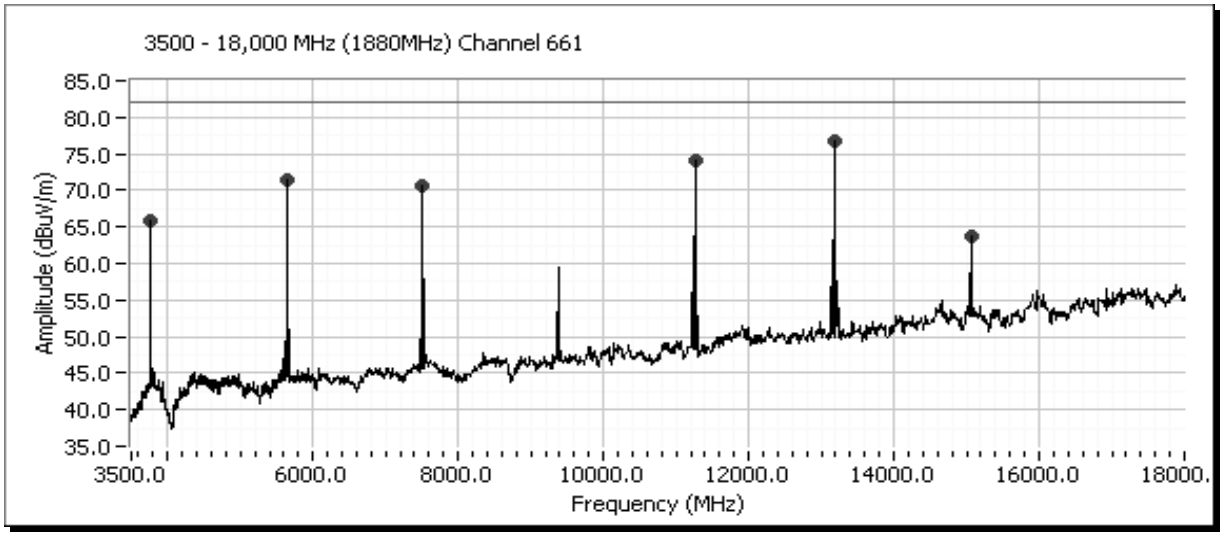
Transmit Mode: Final Field Strength and Substitution Measurements

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1850.000	4	7.7	109.3	97.6	127.7	30.10				
1850.000	4	7.7	120.0	108.3	123.7	15.4				
5550.000	-8.6	10.4	95.6	93.8	74.1	-19.8		-13.0		-6.8
7390.000	-9.2	10.7	95.4	93.9	73.7	-20.2		-13.0		-7.2
9240.000	-9.9	10.6	101.7	101.0	63.7	-37.4		-13.0		-24.4
11080.000	-10.4	12.0	105.0	103.4	74.9	-28.6		-13.0		-15.6
12980.000	-9.9	10.7	103.2	102.5	76.0	-26.5		-13.0		-13.5
14820.000	-10.0	12.0	106.7	104.7	64.9	-39.8		-13.0		-26.8
16670.000	-10.3	14.0	104.2	100.5	65.3	-35.2		-13.0		-22.2

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #1b: Radiated Spurious Emissions, Transmit Mode, 3500 - 18,000 MHz
Channel 661, 1880 MHz



Frequency	Level	Pol	FCC 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1879.850	125.0	V	-	-	PK	26	1.3	Fundamental
1880.140	127.5	H	-	-	PK	171	1.0	Fundamental
3758.333	65.9	H	82.2	-16.3	Peak	44	1.2	
5637.500	71.6	V	82.2	-10.6	Peak	143	1.0	
7510.000	70.6	H	82.2	-11.6	Peak	121	1.4	
11260.000	74.1	H	82.2	-8.2	Peak	280	1.2	
13190.000	76.7	V	82.2	-5.5	Peak	175	1.6	
15060.000	63.7	H	82.2	-18.5	Peak	191	1.2	

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 20dB of margin relative to the calculated field strength limit.

EMC Test Data

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

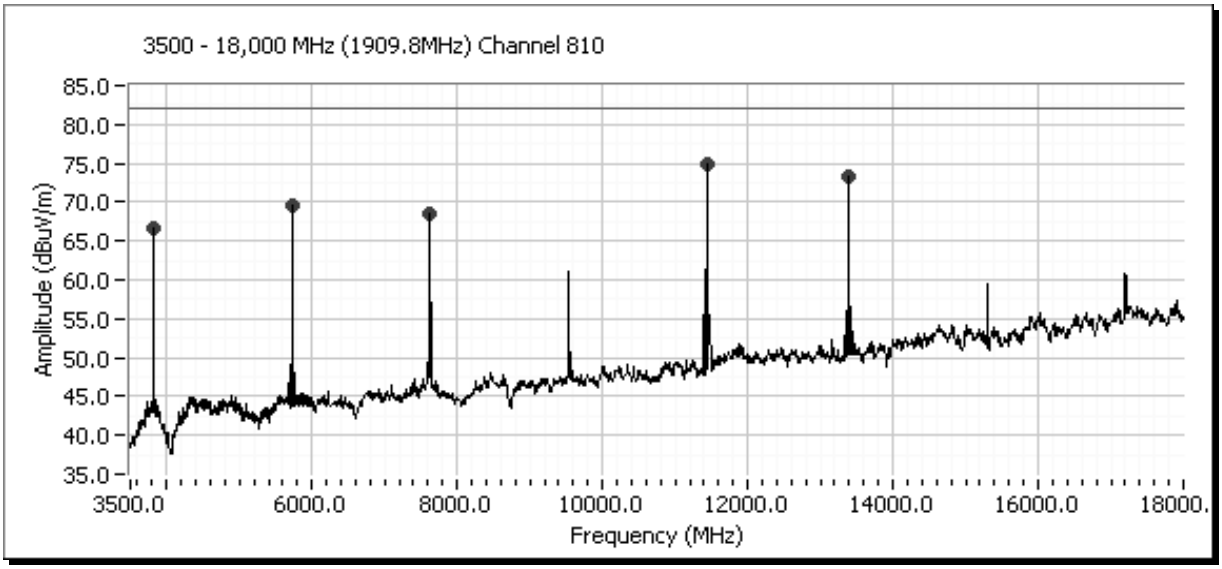
Transmit Mode: Final Field Strength and Substitution Measurements

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1880.000	4.0	7.7	109.1	97.4	127.5	30.07				
1880.000	4.0	7.7	119.8	108.1	125.0	16.90				
3758.333	-8.9	9.7	81.1	80.3	65.9	-14.4		-13.0		-1.4
5637.500	-9.0	10.5	94.7	93.2	71.6	-21.6		-13.0		-8.6
7510.000	-9.2	10.7	95.4	93.9	70.6	-23.3		-13.0		-10.3
11260.000	-10.0	11.9	103.0	101.1	74.1	-27.0		-13.0		-14.0
13190.000	-9.9	10.4	105.8	105.3	76.7	-28.6		-13.0		-15.6
15060.000	-10.0	12.0	106.7	104.7	63.7	-41.0		-13.0		-28.0

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Run #1c: Radiated Spurious Emissions, Transmit Mode, 3500 - 18,000 MHz
Channel 810, 1909.8 MHz



Frequency	Level	Pol	FCC 24E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1909.865	123.3	V	82.2	41.1	PK	47	1.0	Fundamental
1909.660	127.1	H	82.2	44.9	PK	172	1.0	Fundamental
3820.833	66.6	H	82.2	-15.6	Peak	304	1.2	
5729.167	69.7	H	82.2	-12.5	Peak	224	1.0	
7620.000	68.5	H	82.2	-13.7	Peak	289	1.4	
11440.000	74.8	H	82.2	-7.4	Peak	291	1.2	
13390.000	73.2	H	82.2	-9.0	Peak	254	1.0	

Note 1:	The limit in the table above is an approximate field strength limit. It has been calculated form the erp or eirp limit detailed in the EN standard using Friis' equation for free space propagation: E = 30PG/d . This limit is a conservative limit because it does not consider the presence of the ground plane. The actual signal level, in terms of erp or eirp, is determined from a substitution measurement for all signals with less than 20dB of margin relative to the calculated field strength limit.

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EMC Test Data

Client:	Palm One	Job Number:	J55850
Model:	ACE GSM	T-Log Number:	T56055
		Account Manager:	Enter on cover sheet
Contact:	David Waitt		
Spec:	FCC 22 & 24, RSS 132 & 133	Class:	N/A

Transmit Mode: Final Field Strength and Substitution Measurements

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1910.000	3.98	7.7	109.1	97.4	127.1	29.7				
1910.000	3.98	7.7	119.0	107.3	123.3	16.0				
3820.833	-8.9	9.7	81.1	80.3	66.6	-13.7		-13.0		-0.7
5729.167	-8.6	10.4	95.6	93.8	69.7	-24.1		-13.0		-11.1
7620.000	-9.2	10.7	95.4	93.9	68.5	-25.3		-13.0		-12.3
11440.000	-10.0	11.9	103.0	101.1	74.8	-26.3		-13.0		-13.3
13390.000	-9.0	10.4	105.7	104.3	73.2	-31.1		-13.0		-18.1

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna. A dipole has a gain of 2.2dBi.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.