TEST REPORT FOR

FCC PART 15 COMPLIANCE

FOR PACIFICA INTERNATIONAL

Pacifica International
Booster Amplifier
Model Numbers GP850A,
G850A and P1900A

Prepared by
Daniel C. Swann
December 11, 2004

FCC Part 22 Subpart H
FCC Part 24 Subpart E

FCC ID SNY-GP850A

GEL Report File PI_01-2004

GLEN ELLEN LABORATORIES
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MEASUREMENT/TECHNICAL REPORT

Pacifica International
Booster Amplifier

Model Numbers GP850A,
G850A, and P1900A

FCC ID SNY-GP850A

This report concerns:	An Original Equipment Grant
Equipment type:	amplifier
Product Description:	Cellular Telephone Booster Amplifier
FCC Rule Part	47CFR Parts 2, 22H, 24E

Frequency Range	Rated RF power output	Emissions Designator
824-849 MHz	3 Watts	F1D, GXW, DXW, F9W
1850-1940 MHz	2 Watts	GXW, DXW, F9W

Deferred grant requested:	no
Request for confidentiality:	yes
Transition rules per 15.37:	no

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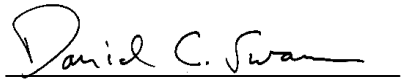
Measurements Certified by: Daniel C. Swann 

Date 12/11/04

GEL Report File: GEL Report File PI_01-2004

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This report contains 39 pages, and may be reproduced in full only.

1 GENERAL INFORMATION

1.1 Product Description

The purpose of the GP850A Booster Amplifier is to boost the output power of a 0.5 watts handheld cellular phone to the maximum FCC allowed output power of 3 watts for the 800 MHz cellular band and 2 watts of the 1900 MHz PCS band.

The GP850A mechanical design consists of a PCB board mounted to a finned heat sink aluminum extrusion, with the voltage regulators directly mounted to the extrusion. The bottom of the unit and the two ends, are covered with aluminum plates. The aluminum parts are painted, except for the areas of the extrusion, bottom cover and end plates that contact each other.

Signal input and outputs are made with TNC connectors located on the end plates.

The DC jack power connector is located on the input end of the housing, with the center at +V.

The controls available to the user are the On / Off switch, and a High Band / Low Band Channel switch, located on the input end of the housing.

Please see the product photographs attachment for pictures of the assembled, and disassembled, unit.

The product will be marketed under three Model Numbers, utilizing the same PC board, but not loading part of the circuitry for two of the models. The operation of the units is the same, with the unused part of the circuit terminated in 50 Ohms.

GP850A	the unit tested for this report, both high and low band circuits
G850A	the 800 MHz cellular band only, without the 1900 MHz PCS band circuitry
P1900A	the 1900 MHz PCS band, without the 800 MHz cellular band circuitry

The amplifier is bi-directional, but only the uplink output was tested. The downlink output was not tested because it is directly connected to the phone with an RF coax cable. The receive signal of this amplifier is a very low signal level and it operates in the -50 dBm or less region with a gain of the LNA (low noise amplifier) approx. 10 dB.

1.2 Tested System Details

Equipment under Test: Pacifica International Model Numbers GP850A, G850A, and P1900A.

FCC ID: SNY-GP850A

Manufacturer and applicant: Pacifica International
1479 Georgia Court
Rohnert Park, CA 94928

GP850A Specifications

Uplink		**Downlink**	
Frequency:	824-849 MHz (800 cellular) 1850-1910 MHz (1900 PCS)	Frequency:	869-894 MHz (800 cellular) 1930-1990 MHz (1900 PCS)
Output power:	3W max.(800 cellular) 2W max (1900 PCS)		
Input max power:	0.5W (800 cellular) .....0.2W(CDMA 800) 0.2W (1900 PCS)	Input max power:	0 dBm
NF:	NA	NF:	6 dB typical
Gain:	6-10 dB (800 cellular) 8-12 dB (1900 PCS)	Gain:	7-12 dB (800 cellular) 6-12 dB (1900 PCS)
Tx-Rx isolation:	35 dB min	Tx-Rx isolation:	35 dB min
Type of emissions:	GXW (GSM) F1D (AMPS) DXW (TDMA/NADC) F9W (CDMA)		
Power supply:	11-20V DC		
Current consumption:	2 A max		
Standby current:	< 600 mA		
Storage temperatures:	-10 to +80C		
Operating temperatures:	-10 to +50C		
In line fuse	3A		
Connector type:	TNC female		
Weight:	1 lb		
Dimension:	1.25”x 4.5”x 3.75”		

Tested by: Daniel Swann
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1.3 Test Methodology

The radiated tests were performed in accordance with 47CFR Parts 2, 22, 24, ANSI C63.4-2001, CISPR 22, EN55022, CISPR 16. See Figure 3.1 and the photographs for details of the test setup. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.4 Test Facility

The facility is located near the town of Glen Ellen, California, at the street address of 1876 London Ranch Road. The open field test site consists of a 10 by 20 meter area of galvanized hardware cloth placed on top of a flat asphalt surface located in an open meadow. The Glen Ellen Laboratories open field test site complies with the requirements specified by VDE 0876/9.78, VDE 0877 Part 1/11.81, VDE 0877 Part 2/2.85, CISPR 16, CISPR 22, and ANSI C63.4-2001. The test site closely follows the theoretical normalized site attenuation specifications for both horizontal and vertical polarizations. The site has been fully described in a report dated October 28, 2004, submitted to the FCC, and accepted in a letter dated November 3, 2004 (Registration Number 90613.)

Test equipment used included:

1. Hewlett Packard 8591EM spectrum analyzer, cal due 04-10-05.
2. Hewlett Packard 8593EM spectrum analyzer, cal due 09-29-05.
3. Agilent E4433B signal generator, cal due 08-25-05.
4. Sonoma Instruments 317 preamplifier, 10 kHz to 2.5 GHz, cal due 04-14-05.
5. RFMD 3802 preamplifier, 800-1000 MHz.
5. RFMD 3805 preamplifier, 1700-2000 MHz.
6. GEL BIC9414 biconical antenna, 30 MHz to 300 MHz, cal due 05-24-05.
7. GEL LPA-3 log periodic antenna, 275 MHz to 2 GHz, cal due 05-24-05.
8. ETS 3115 horn antenna, 1 GHz to 18 GHz, cal due 09-09-05.
9. Hewlett Packard 436A power meter.
10. Hewlett Packard 8481A power meter head, 10 MHz to 18 GHz, cal due 04-02-05.
11. JFW 50 FH-4-100-3N attenuator, cal due 10-23-05.

2 PRODUCT LABELING

2.1 Product Label

The product label shall be placed on the product and shall bear the following statement:

This product is designed to be used with an external antenna with a maximum gain of 3 dBi or less. The use of an antenna of a higher gain is strictly prohibited and violates FCC regulations.

Please see the label attachment for the layout of the label

2.2 FCC User Manual Statement

The instructions furnished to the user shall include the following statement, placed in a prominent location in the text of the manual:

WARNING!

This product is designed to be used with an external antenna with a maximum gain of 3 dBi or less. The use of an antenna of a higher gain is strictly prohibited and violates FCC regulations.

Changes or modifications not expressly approved by the manufacturer may void the user's authority to operate the equipment.

NOTICE: During transmitter operation, a minimum distance of 50cm (20 in.) shall be maintained between the antenna and personnel, in order to meet the maximum permissible exposure (MPE) limits in section 1.1310 of FCC Rules.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was tested in accordance with the standard ANSI C63.4-2001.

3.2 EUT Operating Conditions

The equipment was tested with appropriate signals on all connections, as detailed in the Figures and the data sections, with the equipment listed in the System Equipment List.

3.3 Special Accessories

No special accessories were used.

3.4 Equipment Modifications

No equipment modifications were made.

3.5 Configurations of Tested System

The following figures follow this page:

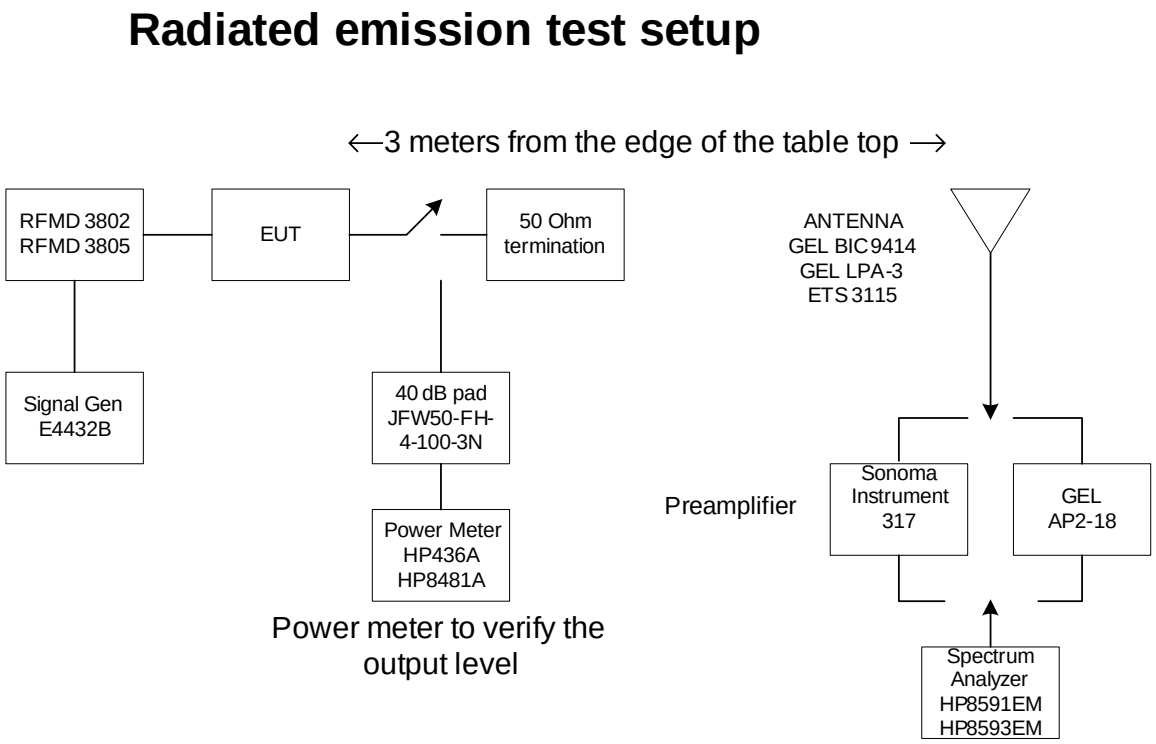
3.5.1 Unintentional Radiated Emissions Test Setup
3.5.2 Conducted Emissions Test Setup
3.5.3 99% Occupied Power BW Test Setup
3.5.4 RF Output Power and Intermodulation Test Setup

In addition, please see the photograph attachments for the configurations of the tested system.

3.5 Configurations of Tested System (continued)

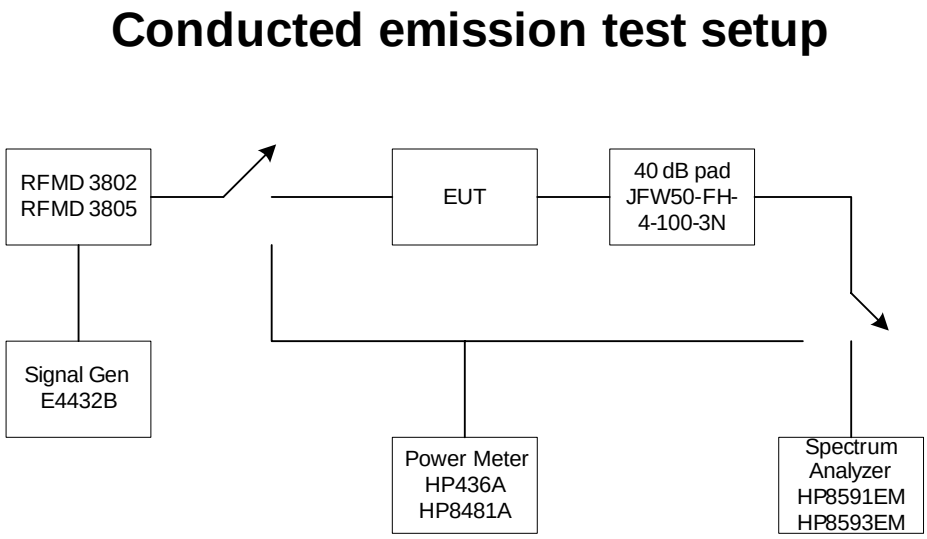
Figure 3.5.1 Unintentional Radiated Emissions Test Setup

3 meters measurement distance from EUT to the receive antenna



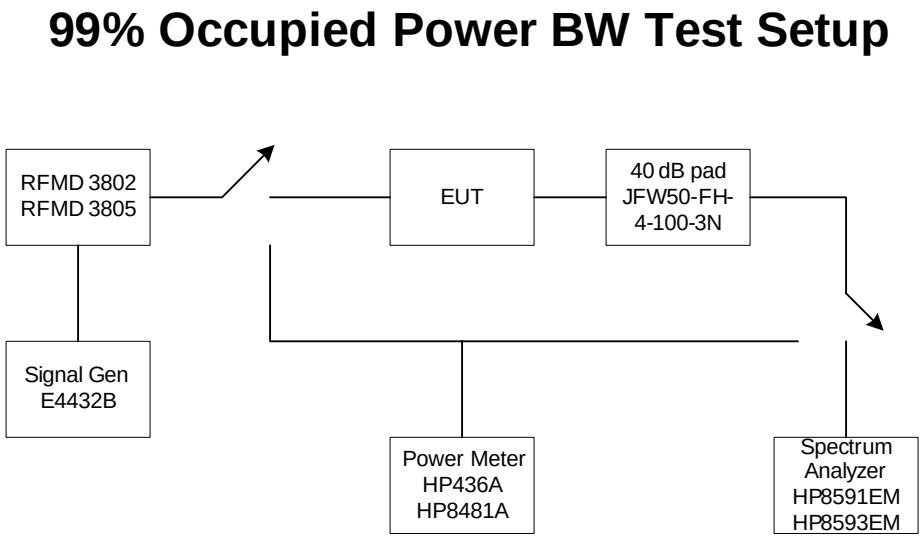
3.5 Configurations of Tested System (continued)

Figure 3.5.2 Conducted Emissions Test Setup



3.5 Configurations of Tested System (continued)

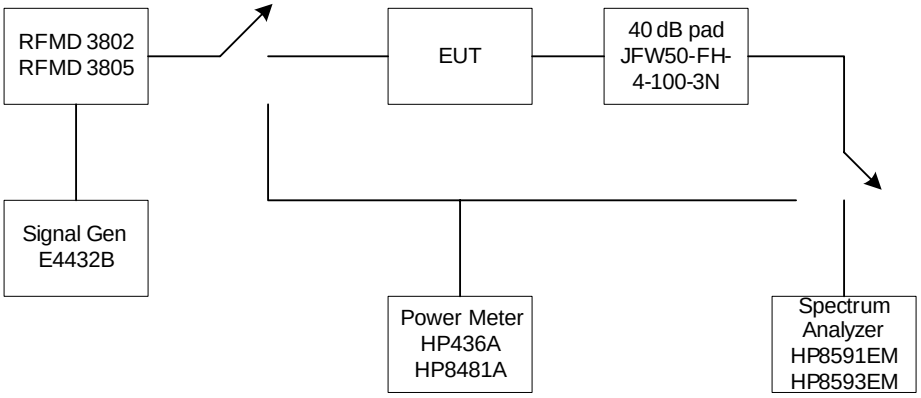
Figure 3.5.3 99% Occupied Power BW Test Setup



3.5 Configurations of Tested System (continued)

Figure 3.5.4 RF Output Power and Intermodulation Test Setup

RF Output Power and Intermodulation Test Setup



4 RADIATED AND CONDUCTED EMISSIONS DATA

4.1 Unintentional Radiated Emissions Data

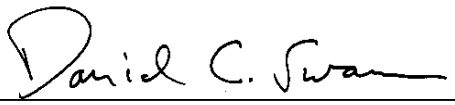
The following data lists the significant emissions frequencies, measured quasi-peak levels, below 1 GHz, and average levels above 1 GHz, and FCC Part 2.1051, 2.1053, 22.917, 24.238 Limits. All tests were done in CW mode. The spectrum analyzer RBW was 120 KHz at 6 dB. These measurements were made on October 15, 2004, by Daniel Swann and Udom Vanich. Please refer to Figure 3.5.1 for a diagram of the test setup.

CW mode

Carrier Frequency (MHz)	824.0	
Power (dBm)	33.4	
Limit (dBc)	46.4	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Vertical Polarization								
1648.0	77.2	25.6	0.9	18.2	85.6	94.0	-8.4	Pass
2472.0	40.4	27.7	1.2	18.9	50.4	94.0	-43.6	Pass
3296.0	37.0	30.8	1.4	18.9	50.3	94.0	-43.7	Pass
4120.0	32.9	33.2	1.6	19.0	48.7	94.0	-45.3	Pass
4944.0	37.1	32.8	1.8	18.3	53.5	94.0	-40.5	Pass
5768.0	28.0	34.7	2.1	18.0	46.8	94.0	-47.2	Pass
4120.0	44.5	33.2	1.6	19.0	60.3	94.0	-33.7	Pass
4944.0	35.4	32.8	1.8	18.3	51.8	94.0	-42.2	Pass
5768.0	29.9	34.7	2.1	18.0	48.7	94.0	-45.3	Pass
6592.0	34.4	35.3	2.4	17.5	54.6	94.0	-39.4	Pass
7416.0	35.3	36.3	2.7	17.4	56.9	94.0	-37.1	Pass
8240.0	37.3	37.8	3.1	17.1	61.1	94.0	-32.9	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

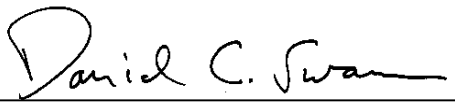
4.1 Unintentional Radiated Emissions Data (continued)

CW mode

Carrier Frequency (MHz)	824.0	
Power (dBm)	33.4	
Limit (dBc)	46.4	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Horizontal Polarization								
1648.0	72.0	25.6	0.9	18.2	80.4	94.0	-13.6	Pass
2472.0	42.6	27.7	1.2	18.9	52.6	94.0	-41.4	Pass
3296.0	39.8	30.8	1.4	18.9	53.1	94.0	-40.9	Pass
4120.0	44.5	33.2	1.6	19.0	60.3	94.0	-33.7	Pass
4944.0	35.4	32.8	1.8	18.3	51.8	94.0	-42.2	Pass
5768.0	29.9	34.7	2.1	18.0	48.7	94.0	-45.3	Pass
6592.0	34.4	35.3	2.4	17.5	54.6	94.0	-39.4	Pass
7416.0	35.3	36.3	2.7	17.4	56.9	94.0	-37.1	Pass
8240.0	37.3	37.8	3.1	17.1	61.1	94.0	-32.9	Pass
9064.0	36.1	38.7	3.3	17.0	61.1	94.0	-32.9	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

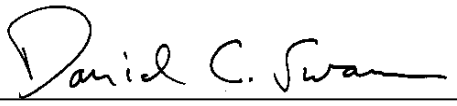
4.1 Unintentional Radiated Emissions Data (continued)

CW mode

Carrier Frequency (MHz)	836.0	
Power (dBm)	34.2	
Limit (dBc)	47.2	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Vertical Polarization								
1672.0	78.1	25.6	0.9	18.3	86.3	94.0	-7.7	Pass
2508.0	46.1	28.9	1.2	18.9	57.3	94.0	-36.7	Pass
3344.0	48.7	30.8	1.4	18.9	62.0	94.0	-32.0	Pass
4180.0	32.1	33.2	1.6	19.0	47.9	94.0	-46.1	Pass
5016.0	35.9	34.2	1.9	18.3	53.6	94.0	-40.4	Pass
5852.0	28.9	34.7	2.2	18.0	47.8	94.0	-46.2	Pass
6688.0	35.1	35.3	2.5	17.5	55.4	94.0	-38.6	Pass
7524.0	34.9	37.6	2.8	17.5	57.8	94.0	-36.2	Pass
8360.0	37.5	37.8	3.1	17.0	61.4	94.0	-32.6	Pass
9196.0	36.1	38.7	3.4	17.0	61.2	94.0	-32.8	Pass
Horizontal Polarization								
1672.0	74.2	25.6	0.9	18.3	82.4	94.0	-11.6	Pass
2508.0	38.7	28.9	1.2	18.9	49.9	94.0	-44.1	Pass
3344.0	45.0	30.8	1.4	18.9	58.3	94.0	-35.7	Pass
4180.0	40.7	33.2	1.6	19.0	56.5	94.0	-37.5	Pass
5016.0	35.7	34.2	1.9	18.3	53.4	94.0	-40.6	Pass
5852.0	28.6	34.7	2.2	18.0	47.5	94.0	-46.5	Pass
6688.0	36.5	35.3	2.5	17.5	56.8	94.0	-37.2	Pass
7524.0	35.9	37.6	2.8	17.5	58.8	94.0	-35.2	Pass
8360.0	37.5	37.8	3.1	17.0	61.4	94.0	-32.6	Pass
9196.0	35.2	38.7	3.4	17.0	60.3	94.0	-33.7	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

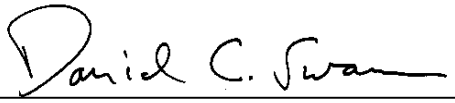
4.1 Unintentional Radiated Emissions Data (continued)

CW mode

Carrier Frequency (MHz)	849.0	
Power (dBm)	35.5	
Limit (dBc)	48.5	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Vertical Polarization	849.0 MHz							
1698.0	77.2	25.6	1.0	18.4	85.3	94.0	-8.7	Pass
2547.0	48.9	28.9	1.2	18.9	60.1	94.0	-33.9	Pass
3396.0	54.9	30.8	1.4	18.9	68.2	94.0	-25.8	Pass
4245.0	33.0	33.2	1.7	19.0	48.9	94.0	-45.1	Pass
5094.0	38.3	34.2	1.9	18.3	56.1	94.0	-37.9	Pass
5943.0	28.6	34.7	2.2	17.9	47.6	94.0	-46.4	Pass
6792.0	36.9	35.3	2.5	17.5	57.2	94.0	-36.8	Pass
7641.0	34.3	37.6	2.8	17.5	57.2	94.0	-36.8	Pass
8490.0	37.1	37.8	3.2	17.0	61.0	94.0	-33.0	Pass
9339.0	35.8	38.7	3.5	17.0	60.9	94.0	-33.1	Pass
Horizontal Polarization								
1698.0	71.6	25.6	1.0	18.4	79.7	94.0	-14.3	Pass
2547.0	42.1	28.9	1.2	18.9	53.3	94.0	-40.7	Pass
3396.0	48.5	30.8	1.4	18.9	61.8	94.0	-32.2	Pass
4245.0	40.7	33.2	1.7	19.0	56.6	94.0	-37.4	Pass
5094.0	35.3	34.2	1.9	18.3	53.1	94.0	-40.9	Pass
5943.0	28.4	34.7	2.2	17.9	47.4	94.0	-46.6	Pass
6792.0	35.8	35.3	2.5	17.5	56.1	94.0	-37.9	Pass
7641.0	34.5	37.6	2.8	17.5	57.4	94.0	-36.6	Pass
8490.0	37.3	37.8	3.2	17.0	61.2	94.0	-32.8	Pass
9339.0	35.1	38.7	3.5	17.0	60.2	94.0	-33.8	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

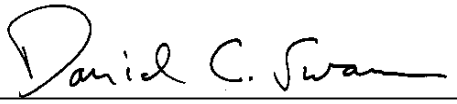
4.1 Unintentional Radiated Emissions Data (continued)

CW mode

Carrier Frequency (MHz)	1850.0	
Power (dBm)	33.1	
Limit (dBc)	46.1	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Vertical Polarization								
3700.0	55.6	31.8	1.5	19.0	69.9	94.0	-24.1	Pass
5550.0	70.2	34.7	2.0	18.2	88.8	94.0	-5.2	Pass
7400.0	45.7	36.3	2.7	17.4	67.3	94.0	-26.7	Pass
9250.0	43.0	38.7	3.4	17.0	68.1	94.0	-25.9	Pass
11100.0	42.2	38.9	4.1	17.0	68.2	94.0	-25.8	Pass
12950.0	41.2	39.4	4.8	17.0	68.4	94.0	-25.6	Pass
14800.0	39.4	40.9	5.5	17.0	68.8	94.0	-25.2	Pass
16650.0	40.5	40.2	6.2	17.0	69.9	94.0	-24.1	Pass
18500.0	39.9	45.8	6.7	17.0	75.4	94.0	-18.6	Pass
20350.0	44.1	45.8	6.7	17.0	79.6	94.0	-14.4	Pass
Horizontal Polarization								
3700.0	60.6	31.8	1.5	19.0	74.9	94.0	-19.1	Pass
5550.0	56.1	34.7	2.0	18.2	74.7	94.0	-19.3	Pass
7400.0	43.7	36.3	2.7	17.4	65.3	94.0	-28.7	Pass
9250.0	37.4	38.7	3.4	17.0	62.5	94.0	-31.5	Pass
11100.0	37.0	38.9	4.1	17.0	63.0	94.0	-31.0	Pass
12950.0	39.9	39.4	4.8	17.0	67.1	94.0	-26.9	Pass
14800.0	39.0	40.9	5.5	17.0	68.4	94.0	-25.6	Pass
16650.0	40.4	40.2	6.2	17.0	69.8	94.0	-24.2	Pass
18500.0	40.0	45.8	6.7	17.0	75.5	94.0	-18.5	Pass
20350.0	45.4	45.8	6.7	17.0	80.9	94.0	-13.1	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

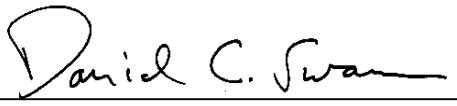
4.1 Unintentional Radiated Emissions Data (continued)

CW mode

Carrier Frequency (MHz)	1910.0	
Power (dBm)	31.4	
Limit (dBc)	44.4	43+10*LOG(0.001*(10^(output power dBm /10)))
Limit (dBuV/m)	94.0	Power (dBm) + 107 (conversion dBm to dBuV) - Limit (dBc)

Frequency MHz	Spectrum Analyzer Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	Limit dBuV/m	Margin dB	Pass/Fail
Vertical Polarization								
3820.0	56.2	31.8	1.5	18.9	70.6	94.0	-23.4	Pass
5730.0	50.7	34.7	2.1	18.0	69.5	94.0	-24.5	Pass
7640.0	59.7	37.6	2.8	17.5	82.6	94.0	-11.4	Pass
9550.0	47.0	38.5	3.5	17.0	72.0	94.0	-22.0	Pass
11460.0	42.2	38.9	4.3	17.0	68.4	94.0	-25.6	Pass
13370.0	39.5	40.5	5.0	17.0	68.0	94.0	-26.0	Pass
15280.0	39.8	39.7	5.7	17.0	68.2	94.0	-25.8	Pass
17190.0	40.2	42.2	6.4	17.0	71.8	94.0	-22.2	Pass
19100.0	41.6	45.8	6.7	17.0	77.1	94.0	-16.9	Pass
21010.0	45.2	45.8	6.7	17.0	80.7	94.0	-13.3	Pass
Horizontal Polarization								
3820.0	59.2	31.8	1.5	18.9	73.6	94.0	-20.4	Pass
5730.0	53.9	34.7	2.1	18.0	72.7	94.0	-21.3	Pass
7640.0	43.7	37.6	2.8	17.5	66.6	94.0	-27.4	Pass
9550.0	44.6	38.5	3.5	17.0	69.6	94.0	-24.4	Pass
11460.0	43.7	38.9	4.3	17.0	69.9	94.0	-24.1	Pass
13370.0	39.0	40.5	5.0	17.0	67.5	94.0	-26.5	Pass
15280.0	40.0	39.7	5.7	17.0	68.4	94.0	-25.6	Pass
17190.0	41.5	42.2	6.4	17.0	73.1	94.0	-20.9	Pass
19100.0	39.8	45.8	6.7	17.0	75.3	94.0	-18.7	Pass
21010.0	44.5	45.8	6.7	17.0	80.0	94.0	-14.0	Pass

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4 RADIATED AND CONDUCTED EMISSIONS DATA (continued)

4.2 Conducted Emissions Data

The following data lists the significant emissions data measured in accordance with 47 CFR Part 2.1051, 2.1053, 22.917, 24.238 Limits. These measurements were made on October 16, 2004, by Daniel Swann and Udom Vanich. Please refer to Figure 3.5.2 for a diagram of the test setup.

Transmitter Conducted Emissions Data

GSM

carrier frequency (MHz)	824.0	
Power (dBm)	33.4	
Limit (dBc)	46.4	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
824.0					
1648.0	-33.9	67.3	46.4	-20.9	Pass
2472.0	-44.6	78.0	46.4	-31.6	Pass
3296.0	-44.2	77.6	46.4	-31.2	Pass
4120.0	-45.1	78.5	46.4	-32.1	Pass
4944.0	-45.1	78.5	46.4	-32.1	Pass
5768.0	-45.3	78.7	46.4	-32.3	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature Daniel C. Swann Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: GSM
carrier frequency (MHz) 836
Power (dBm) 34.56
Limit (dBc) 47.56 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1672	-32.9	67.46	47.56	-19.9	Pass
2508	-43.8	78.36	47.56	-30.8	Pass
3344	-44.3	78.86	47.56	-31.3	Pass
4180	-44.7	79.26	47.56	-31.7	Pass
5016	-45.2	79.76	47.56	-32.2	Pass
5852	-44.9	79.46	47.56	-31.9	Pass

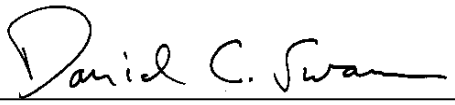
no signal at higher harmonics

Transmitter Conducted Emissions Data
Modulation: GSM
carrier frequency (MHz) 849
Power (dBm) 33.5
Limit (dBc) 46.5 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1698	-34.4	67.9	46.5	-21.4	Pass
2547	-43.9	77.4	46.5	-30.9	Pass
3396	-44.6	78.1	46.5	-31.6	Pass
4245	-45.1	78.6	46.5	-32.1	Pass
5094	-45.6	79.1	46.5	-32.6	Pass
5943	-45.0	78.5	46.5	-32.0	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: TDMA
carrier frequency (MHz) 824
Power (dBm) 33.4
Limit (dBc) 46.4 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1648	-25.6	59.0	46.4	-12.6	Pass
2472	-41.0	74.4	46.4	-28.0	Pass
3296	-44.0	77.4	46.4	-31.0	Pass
4120	-42.7	76.1	46.4	-29.7	Pass
4944	-42.3	75.7	46.4	-29.3	Pass
5768	-44.9	78.3	46.4	-31.9	Pass

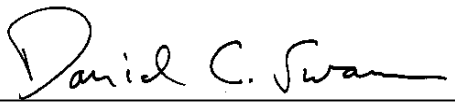
no signal at higher harmonics

Transmitter Conducted Emissions Data
Modulation: TDMA
carrier frequency (MHz) 836
Power (dBm) 34.2
Limit (dBc) 47.2 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1672	-23.5	57.7	47.2	-10.5	Pass
2508	-39.2	73.4	47.2	-26.2	Pass
3344	-41.6	75.8	47.2	-28.6	Pass
4180	-42	76.2	47.2	-29.0	Pass
5016	-41.8	76.0	47.2	-28.8	Pass
5852	-43	77.2	47.2	-30.0	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: TDMA
carrier frequency (MHz) 849
Power (dBm) 33.5
Limit (dBc) 46.5 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1698	-28.9	62.4	46.5	-15.9	Pass
2547	-41.6	75.1	46.5	-28.6	Pass
3396	-44	77.5	46.5	-31.0	Pass
4245	-45.1	78.6	46.5	-32.1	Pass
5094	-44	77.5	46.5	-31.0	Pass
5943	-43.8	77.3	46.5	-30.8	Pass

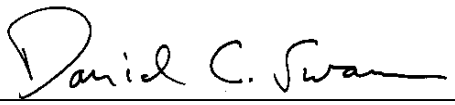
no signal at higher harmonics

Transmitter Conducted Emissions Data
Modulation: FM with 2.5K sine wave, +/-8KHz peak frequency deviation
carrier frequency (MHz) 824
Power (dBm) 29.9
Limit (dBc) 42.9 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1648	-27.0	56.9	42.9	-14.0	Pass
2472	-42.9	72.8	42.9	-29.9	Pass
3296	-43.9	73.8	42.9	-30.9	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: FM with 2.5K sine wave, +/-8KHz peak frequency deviation
carrier frequency (MHz) 836
Power (dBm) 30.32
Limit (dBc) 43.32 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1672	-28.0	58.32	43.32	-15.0	Pass
2508	-39.6	69.92	43.32	-26.6	Pass
3344	-41.3	71.62	43.32	-28.3	Pass

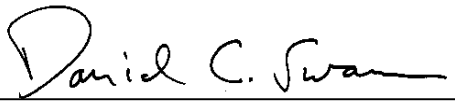
no signal at higher harmonics

Transmitter Conducted Emissions Data
Modulation: FM with 2.5K sine wave, +/-8KHz peak frequency deviation
carrier frequency (MHz) 849
Power (dBm) 30.05
Limit (dBc) 43.05 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1698	-25.3	55.35	43.05	-12.3	Pass
2547	-41.7	71.75	43.05	-28.7	Pass
3396	-44.0	74.05	43.05	-31.0	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: TDMA

carrier frequency (MHz)	1850	
Power (dBm)	31.1	
Limit (dBc)	44.1	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3700	-42.0	73.1	44.1	-29.0	Pass
5550	-35.2	66.3	44.1	-22.2	Pass
7400	-37.0	68.1	44.1	-24.0	Pass
9250	-37.5	68.6	44.1	-24.5	Pass

no signal at higher harmonics

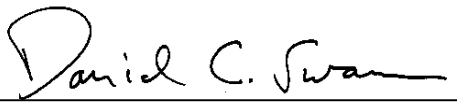
Transmitter Conducted Emissions Data
Modulation: TDMA

carrier frequency (MHz)	1880	
Power (dBm)	32.9	
Limit (dBc)	45.9	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3760	-44.4	77.3	45.9	-31.4	Pass
5640	-31.6	64.5	45.9	-18.6	Pass
7520	-30.1	63.0	45.9	-17.1	Pass
9400	-37.4	70.3	45.9	-24.4	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: TDMA

carrier frequency (MHz)	1910	
Power (dBm)	32.9	
Limit (dBc)	45.9	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3820	-43.2	76.1	45.9	-30.2	Pass
5730	-37.9	70.8	45.9	-24.9	Pass
7640	-37.7	70.6	45.9	-24.7	Pass
9550	-37.0	69.9	45.9	-24.0	Pass

no signal at higher harmonics

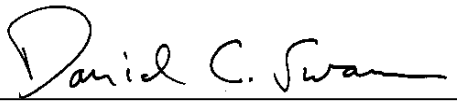
Transmitter Conducted Emissions Data
Modulation: GSM

carrier frequency (MHz)	1850	
Power (dBm)	33.2	
Limit (dBc)	46.2	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3700	-45.2	78.4	46.2	-32.2	Pass
5550	-40.8	74.0	46.2	-27.8	Pass
7400	-30.9	64.1	46.2	-17.9	Pass
9250	-44.9	78.1	46.2	-31.9	Pass
9250	-36.4	69.6	46.2	-23.4	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: GSM

carrier frequency (MHz)	1880	
Power (dBm)	31.7	
Limit (dBc)	44.7	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3760	-43.9	75.6	44.7	-30.9	Pass
5640	-38.1	69.8	44.7	-25.1	Pass
7520	-38.4	70.1	44.7	-25.4	Pass
9400	-30.4	62.1	44.7	-17.4	Pass
11280	-35.7	67.4	44.7	-22.7	Pass

no signal at higher harmonics

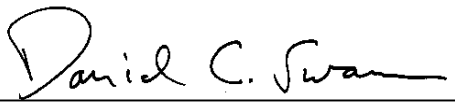
Transmitter Conducted Emissions Data
Modulation: GSM

carrier frequency (MHz)	1910	
Power (dBm)	32.1	
Limit (dBc)	45.1	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3820	-44.4	76.5	45.1	-31.4	Pass
5730	-43.0	75.1	45.1	-30.0	Pass
7640	-38.1	70.2	45.1	-25.1	Pass
9550	-38.0	70.1	45.1	-25.0	Pass
11460	-35.7	67.8	45.1	-22.7	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: CDMA

carrier frequency (MHz)	824	
Power (dBm)	30	
Limit (dBc)	43	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1648	-26.7	56.7	43.0	-13.7	Pass
2472	-30.7	60.7	43.0	-17.7	Pass
3296	-29.7	59.7	43.0	-16.7	Pass
4120	-30.5	60.5	43.0	-17.5	Pass
4944	-30.9	60.9	43.0	-17.9	Pass
5768	-30.6	60.6	43.0	-17.6	Pass
6592	-24.3	54.3	43.0	-11.3	Pass
7416	-24.1	54.1	43.0	-11.1	Pass

no signal at higher harmonics

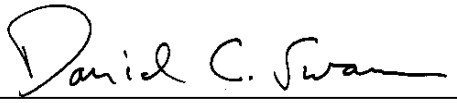
Transmitter Conducted Emissions Data
Modulation: CDMA

carrier frequency (MHz)	836	
Power (dBm)	30.63	
Limit (dBc)	43.63	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1672	-26.5	57.13	43.63	-13.5	Pass
2508	-30.5	61.13	43.63	-17.5	Pass
3344	-29.9	60.53	43.63	-16.9	Pass
4180	-30.9	61.53	43.63	-17.9	Pass
5016	-31.1	61.73	43.63	-18.1	Pass
5852	-30.7	61.33	43.63	-17.7	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

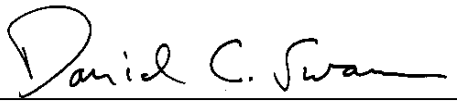
Transmitter Conducted Emissions Data
Modulation: CDMA

carrier frequency (MHz)	849	
Power (dBm)	31.1	
Limit (dBc)	44.1	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
1698	-27.2	58.3	44.1	-14.2	Pass
2547	-30.4	61.5	44.1	-17.4	Pass
3396	-30	61.1	44.1	-17	Pass
4245	-30.6	61.7	44.1	-17.6	Pass
5094	-31.1	62.2	44.1	-18.1	Pass
5943	-30.5	61.6	44.1	-17.5	Pass
6792	-23.9	55	44.1	-10.9	Pass
7641	-23.3	54.4	44.1	-10.3	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

Transmitter Conducted Emissions Data
Modulation: CDMA
carrier frequency (MHz) 1850
Power (dBm) 30.2
Limit (dBc) 43.2 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3700	-43.5	73.7	43.2	-30.5	Pass
5550	-43.1	73.3	43.2	-30.1	Pass
7400	-34.6	64.8	43.2	-21.6	Pass
9250	-37.8	68	43.2	-24.8	Pass

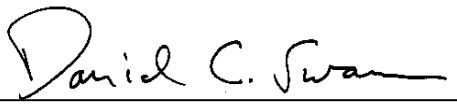
no signal at higher harmonics

Transmitter Conducted Emissions Data
Modulation: CDMA
carrier frequency (MHz) 1880
Power (dBm) 29.6
Limit (dBc) 42.6 43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spec dBc	Margin	Pass / Fail
3760	-41.5	71.1	42.6	-28.5	Pass
5640	-40.8	70.4	42.6	-27.8	Pass
7520	-36.6	66.2	42.6	-23.6	Pass
9400	-35.8	65.4	42.6	-22.8	Pass
11280	-34.1	63.7	42.6	-21.1	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.2 Conducted Emissions Data (continued)

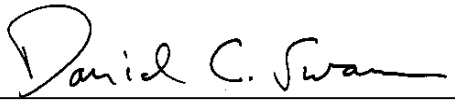
Transmitter Conducted Emissions Data
Modulation: CDMA

carrier frequency (MHz)	1910	
Power (dBm)	27	
Limit (dBc)	40	43+10*LOG(0.001*(10^(output power dBm /10)))

Frequency MHz	Measured Power dBm	Measured Power dBc	Spe dBc	Margin	Pass / Fail
3820	-43.3	70.3	40	-30.3	Pass
5730	-43.1	70.1	40	-30.1	Pass
7640	-36.2	63.2	40	-23.2	Pass
9550	-35.7	62.7	40	-22.7	Pass
11460	-34.2	61.2	40	-21.2	Pass

no signal at higher harmonics

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

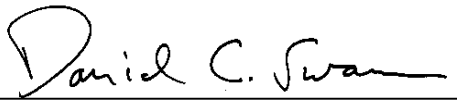
4 RADIATED AND CONDUCTED EMISSIONS DATA (continued)

4.3 99% Occupied Power BW Data

The following data lists the significant emissions data, and the margins, calculated using 47 CFR Parts 2.1051, 2.1053, 22.917, 24.238. All tests were done in CW mode. Plots of these measurements are provided in an attachment. These measurements were made on October 16, 2004, by Daniel Swann and Udom Vanich.. Please refer to Figure 3.5.3 for a diagram of the test setup. Plots of these measurements are included in the attachment "Plots of 99% Occupied Power BW Data."

	99% Occupied BW	
	RF input	RF output
Frequency(MHZ)	BW(KHz)	BW(KHz)
Modulation: TDMA		
824	28.5	28.5
836	28.3	28.4
849	28.4	29
Modulation: GSM		
824	244.5	241.5
836	244.5	243.8
849	243.8	243.8
Modulation: CDMA		
824	1260	1260
836	1260	1260
849	1260	1260
Modulation: FM with 2.5Kz sine wave +/-8KHz peak frequency deviation		
824	21.68	21.68
836	21.6	21.6
849	21.68	21.68

Test Personnel:

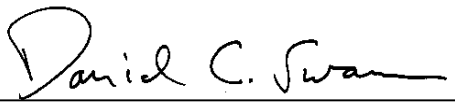
Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.3 99% Occupied Power BW Data (continued)

Modulation: TDMA		
1850	28.3	30
1880	29.2	29.2
1910	28.7	30.8
Modulation: GSM		
1850	243	243
1880	243	240
1910	243	243
Modulation: CDMA		
1850	1250	1260
1880	1253	1257
1910	1253	1257

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

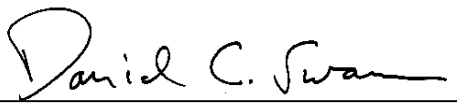
4 RADIATED AND CONDUCTED EMISSIONS DATA (continued)

4.4 RF Output Power and Intermodulation

The following data lists the significant emissions data, and the margins, calculated using 47 CFR Parts 2.1051, 2.1053, 22.917, 24.238. All tests were done in CW mode. Plots of these measurements are provided in an attachment. These measurements were made on October 16, 2004, by Daniel Swann and Udom Vanich. Please refer to Figure 3.5.4 for a diagram of the test setup.

	Maximum output power	
	RF input	RF output
Frequency(MHZ)	Power(dBm)	Power(dBm)
Modulation: TDMA		
824	27.5	33.4
836	27.5	34.2
849	27.5	33.5
Modulation: GSM		
824	27.5	33.1
836	27.5	34.56
849	27.5	33.5
Modulation: CDMA		
824	24.0	30.0
836	24.0	30.63
849	24.0	31.1
Modulation: FM with 2.5Kz sine wave +/-8KHz peak frequency deviation		
824	27.5	29.9
836	27.5	30.32
849	27.5	30.05

Test Personnel:

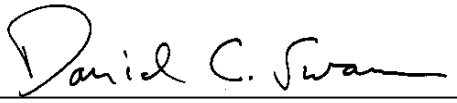
Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4.4 RF Output Power and Intermodulation

Modulation: TDMA		
1850	24.5	33.1
1880	24.5	32.9
1910	24.5	31.4
Modulation: GSM		
1850	24.5	33.29
1880	24.5	31.7
1910	24.5	32.11
Modulation: CDMA		
1850	24.0	30.2
1880	24.0	29.6
1910	24.0	27.5

Test Personnel:

Tester Signature  Date 12/11/04

Tester Name Daniel C. Swann

4 RADIATED AND CONDUCTED EMISSIONS DATA (continued)

4.5 Field Strength Calculation for Radiated Emissions

The field strength was calculated from the following formula:

FS = MEASURED SIGNAL + AF + CF - GAIN

Where FS = field strength, in dBuV/m

MEASURED SIGNAL = Spectrum Analyzer signal amplitude

AF = antenna factor

CF = cable attenuation factor

GAIN = pre-amplifier gain

FS (uV/m) = antilog[10] FS (dBuV/m)

For example, for vertical radiated emissions, fundamental at 824 MHz, at the second harmonic of 1648.0 MHz, an average level of 77.2 dBuV was measured. The antenna factor is 25.6 dB, the cable loss is 0.9 dB, and the pre-amplifier gain is 18.2 dB.

FS (dBuV/m) = 77.2 + 25.6 + 0.9 - 18.2

FS (dBuV/m) = 85.6 dBuV/m

FCC 3 meter limit = 94.0 dBuV/m

FCC 3 meter margin = - 8.4 dB

5 HUMAN EXPOSURE ANALYSIS IN ACCORDANCE WITH 47CFR1.1310

The following is the RF power and Human Exposure Analysis in accordance with 47CFR§1.1310.

5.1. Guidelines

For transmitters operating in the 824-849 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to f/1500 mW/cm^2 for uncontrolled environments and f/300 mW/cm^2 for controlled environments.

Therefore for the 824-894 MHz,

The MPE of the uncontrolled environment = 849/1500 = 0.566 mW/cm^2

The MPE of the controlled environment = 849/300 = 2.83 mW/cm^2.

For transmitters operating in the 1850-1910 MHz range, paragraph 1.1310 Table 1 limits maximum permissible exposure (MPE) to 1 mW/cm^2 for uncontrolled environments and 5 mW/cm^2 for controlled environments.

We will use the uncontrolled environment spec. for the worst case spec.

The far field on-axis power flux density (W/m^2) is calculated using the following formula:

$$S = G P_T / 4\pi R^2$$

Where:

S	=	Power density (mW/cm^2)
G	=	Power gain of the antenna in the direction of interest relative to an isotropic radiator
P_T	=	Power input to the antenna (Watts)
R	=	Distance to the center of radiation of the antenna (cm)

5 HUMAN EXPOSURE ANALYSIS IN ACCORDANCE WITH 47CFR1.1310

5.2 RF power and Human Exposure Calculations of the EUT booster

The following are the calculations of RF power radiated from the 3W booster model GP850A EUT with the 3 dBi antenna. Users may have some concern with the 3 W booster in the 800 MHz cellular band and the 1900 MHz PCS band.

Using the far field power flux density calculation.

$S = G \times P_t / (4\pi R^2)$

Where

S = power density (W/cm^2) at 50 cm

G = Antenna gain = 3 dBi or $10^{3/10}$ = 1.995

P_t = Maximum output power from the booster in Watt

For 800 MHz cellular band, P_t = 34.56 dBm or 2.858 W

For 1900 MHz PCS band, P_t = 33.3 dBm or 2.133 W

R = 50 cm or the distance from the antenna to human. The antenna is externally mounted on the car roof.

5.2 RF power and Human Exposure Calculations of the EUT (continued)

Description	800 MHz Cellular band	1900 MHz PCS band
Maximum output power of the amplifier in dBm (in Watts)	34.56 dBm (2.858W)	33.3 dBm (2.133W)
Antenna Gain in dBi (linear gain)	3 dBi (1.995)	3 dBi (1.995)
Operational Frequency	824-849 MHz	1850-1910MHz
Minimum distance (Controlled): From radiating source for personnel aware of radio frequency equipment and who are able to limit their exposure time. (Installation Technicians)	50 cm	50 cm
Minimum distance (Uncontrolled): From radiating source for personnel unaware of radio frequency equipment and who are not able to limit their exposure time. (General Public)	50 cm	50 cm
Calculated Maximum RF Power Density from EUT:	0.18 mW/cm^3	0.14 mW/cm^3
Maximum Permissible Exposure (MPE) in the uncontrolled environment 6 min average exposure:	0.556 mW/cm^3	1 mW/cm^3
Maximum Permissible Exposure (MPE) in the controlled environment 30 min average exposure:	2.83 mW/cm^3	5 mW/cm^3
Complies with MPE Limits	Yes	Yes

5.2 RF power and Human Exposure Calculations of the EUT (continued)

The following instructions will be placed in the User/Installation Manual (see Section 2.2 of this report, FCC User Manual Statement) instructing installers and users to maintain the minimum MPE distances during operation of the EUT:

"NOTICE: During transmitter operation, a minimum distance of 50cm shall be maintained between the antenna and personnel, in order to meet the maximum permissible exposure (MPE) limits in section 1.1310 of FCC Rules."