Cellphone-Mate, Inc.

TEST REPORT FOR

Fixed Wideband Consumer Signal Boosters
Model: Flex Pro

Tested To The Following Standard:

FCC Part 22H

Report No.: 94297-12

Date of issue: November 15, 2013

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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Fremont, CA 94538

Representative: Dennis Findley

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
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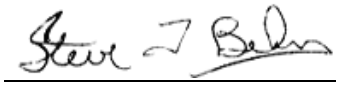
Mariposa, CA 95338

Project Number: 94297

DATE OF EQUIPMENT RECEIPT: October.31, 2013
DATE(S) OF TESTING: October 31 - November 1, 2013

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea A	US0060	SL2-IN-E-1146R	3082D-1	90473	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 22H

Description	Test Procedure/Method	Results
Occupied Bandwidth	FCC Part 22H / 2.1049(I)	Pass
Spurious Emissions at Antenna Terminal	FCC Part 22H § 22.917(a) / 2.1051	Pass
Field Strength of Spurious Radiation	FCC Part 22H § 22.917(a) / 2.1053	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Fixed Wideband Consumer Signal Boosters

Manuf: Cellphone-Mate, Inc.
Model: Flex Pro
Serial: 1

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

AC to 6VDC 2A Power Adapter

Manuf: SureCall
Model: GFP181U-0628B-1
Serial: 1209-0000285

FCC PART 22H

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) Transmitter Characteristics for Intentional radiators 47CFR Part 22 Subpart H (Cellular Radiotelephone Service).

2.1049(I) Occupied Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**2.1049 Occupied Bandwidth**		
Work Order #:	**94297**	Date:	10/31/2013
Test Type:	**Conducted Emissions**	Time:	08:34:21
Equipment:	**Fixed Wideband Consumer Signal Boosters**	Sequence#:	1
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	S. Yamamoto
Model:	Flex Pro		110V 60Hz
S/N:	1		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015
	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Fixed Wideband Consumer Signal Boosters*	Cellphone-Mate, Inc.	Flex Pro	1

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	SureCall	GFP181U-0628B-1	1209-0000285
Signal Generator	Agilent	E4438C	MY42082260

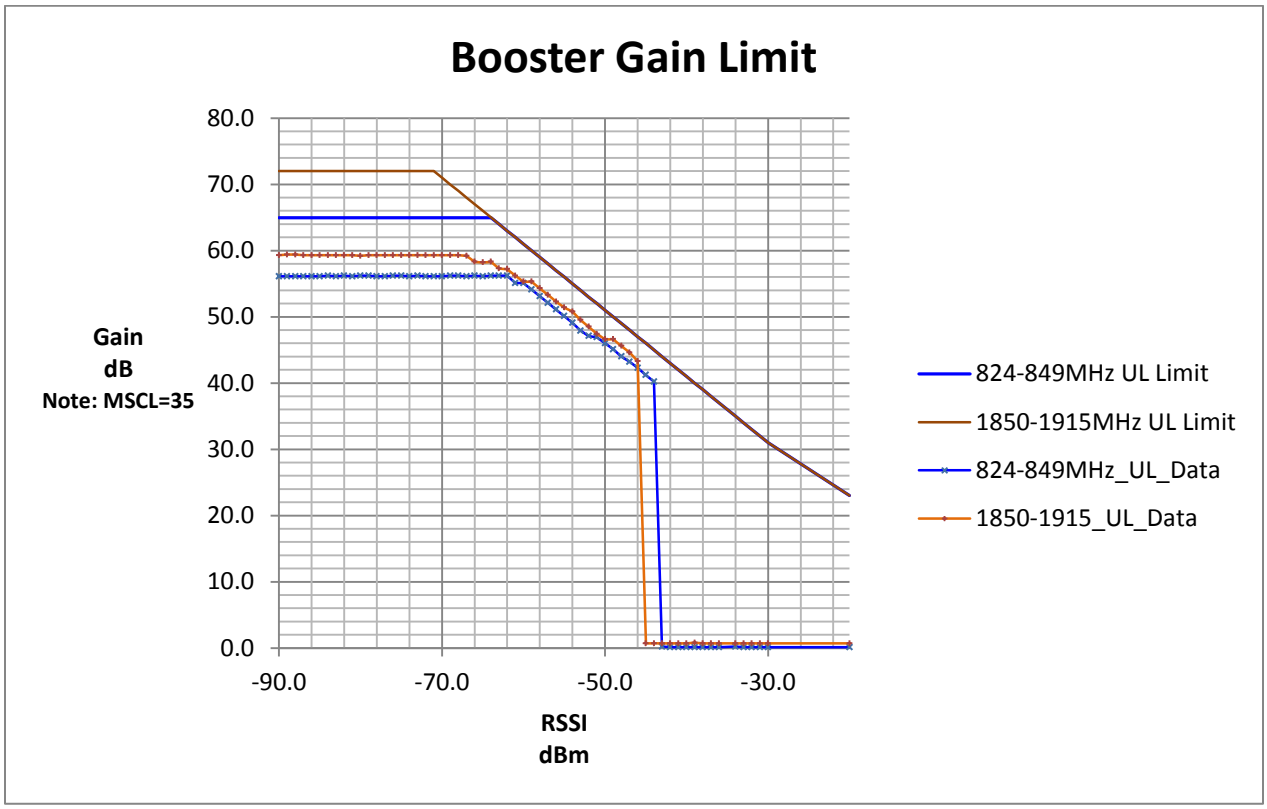
Test Conditions / Notes:

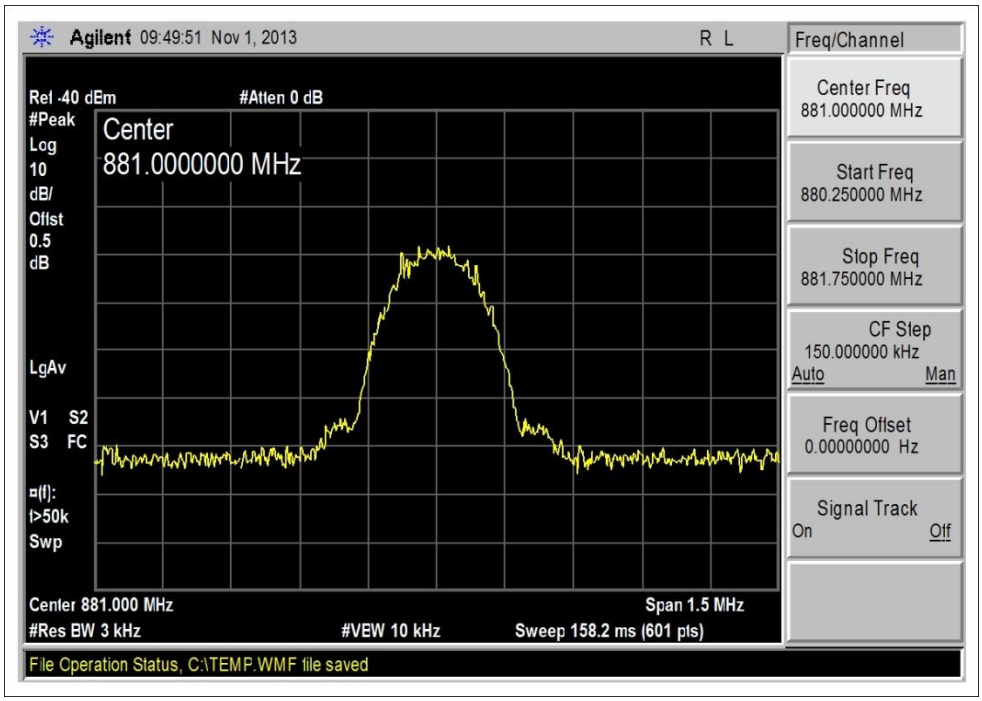
The EUT is placed on the test bench. Cellular -800 gain is set at Max gain of 60dB and PCS-1900 Gain is set at max gain of 65dB.
Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.

UL: 824-849, 1850-1910 MHz
DL: 869-894, 1930-1990 MHz

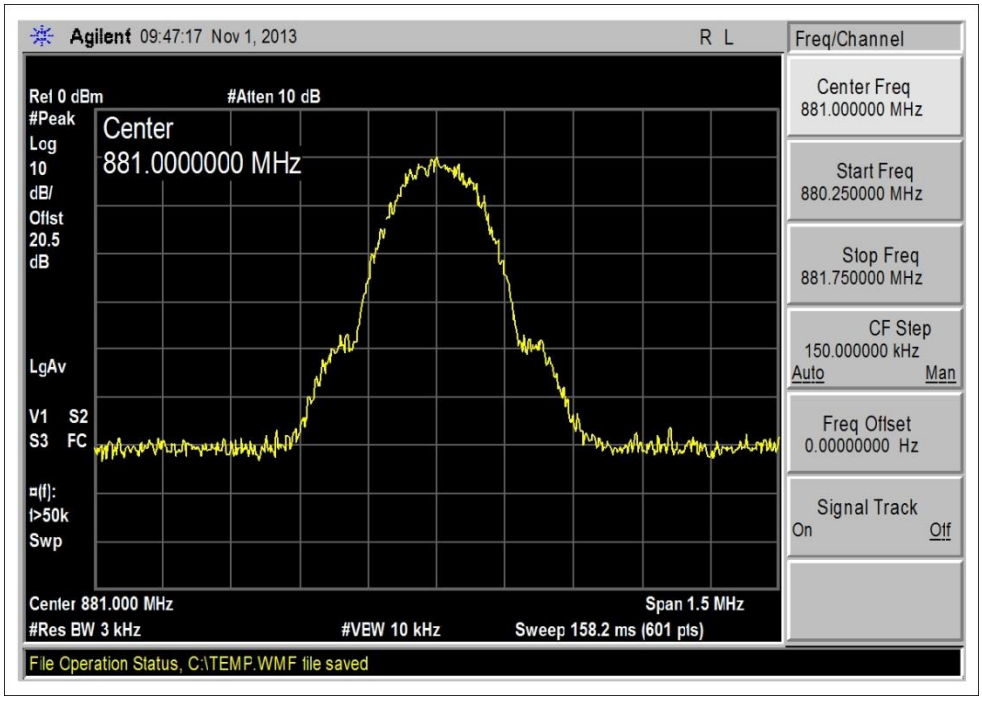
Test environment conditions: 23.9°C, 40% Relative Humidity:100kPa
Test procedure: The test was performed in accordance with section 7.10 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance DR04-41516.

Test Data

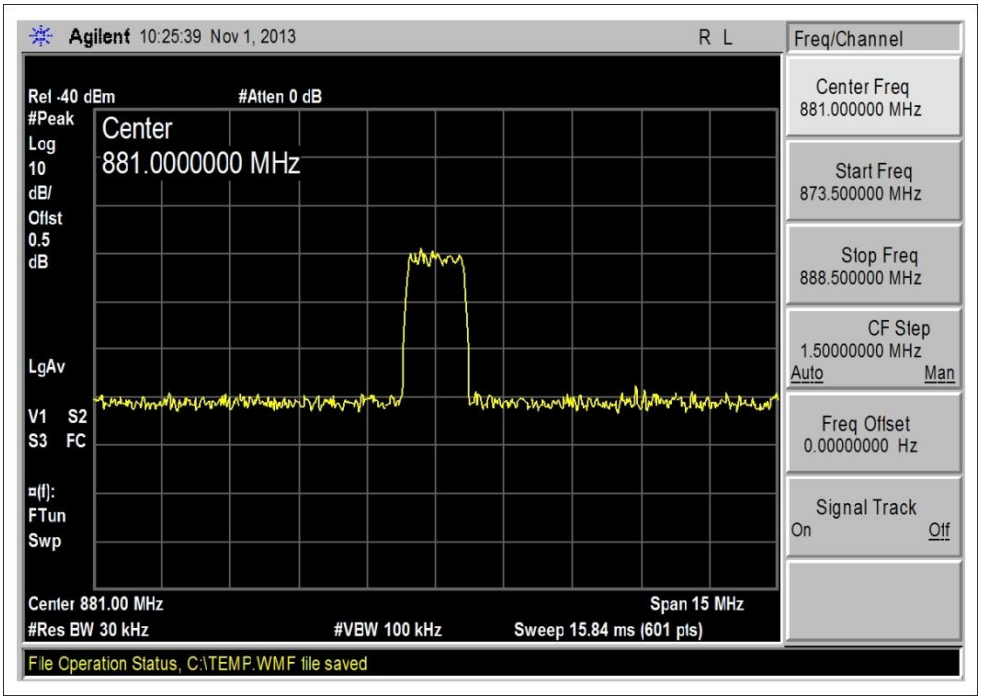

Booster Gain Limit
Gain
dB
Note: MSCL=35
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-90.0
-70.0
-50.0
-30.0
RSSI
dBm
824-849MHz UL Limit
1850-1915MHz UL Limit
824-849MHz_UL_Data
1850-1915_UL_Data



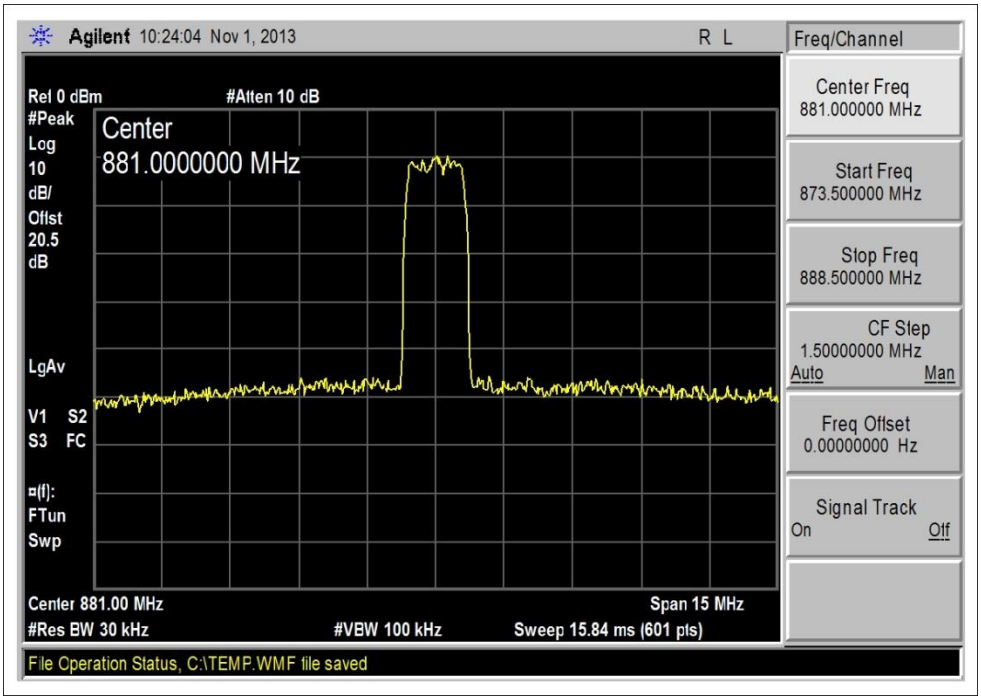
869-894MHz, DL_GSM_Input



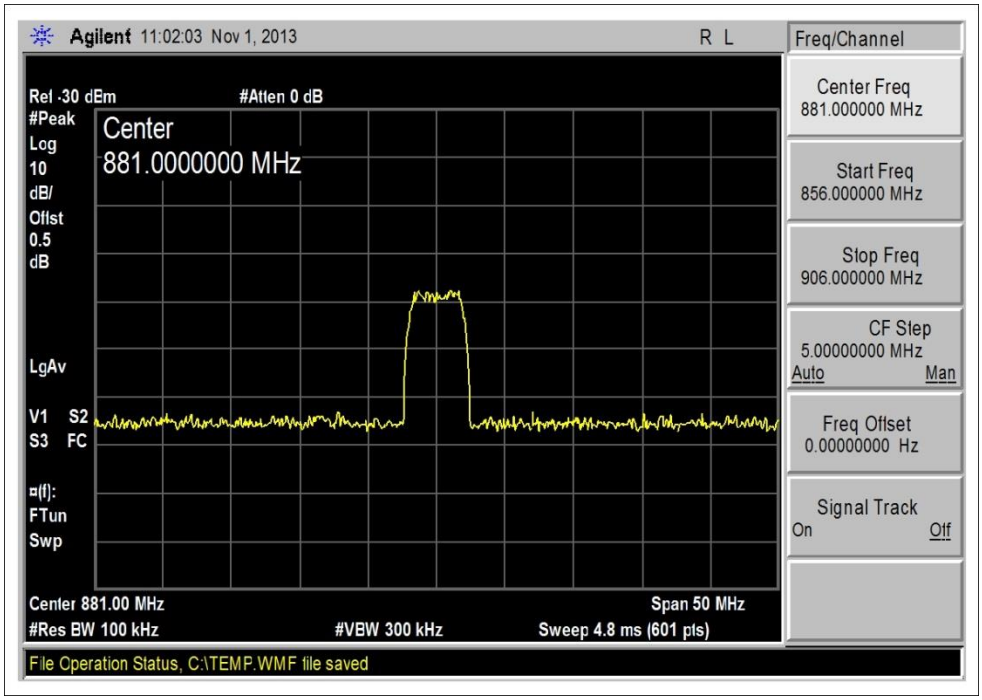
869-894MHz, DL_GSM_Output



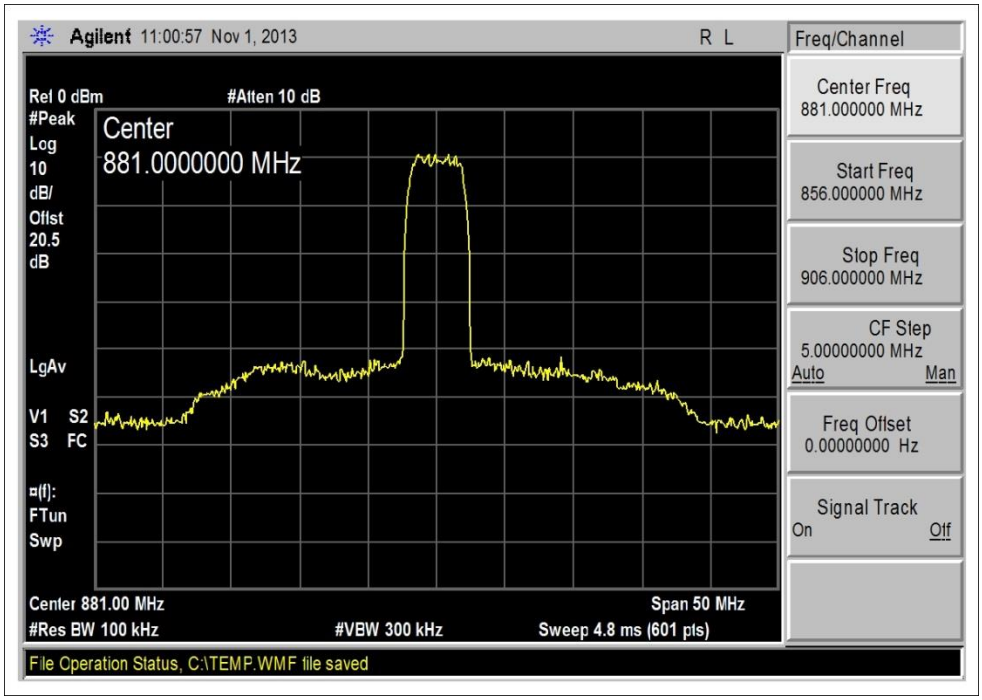
869-894MHz, DL_CDMA_Input



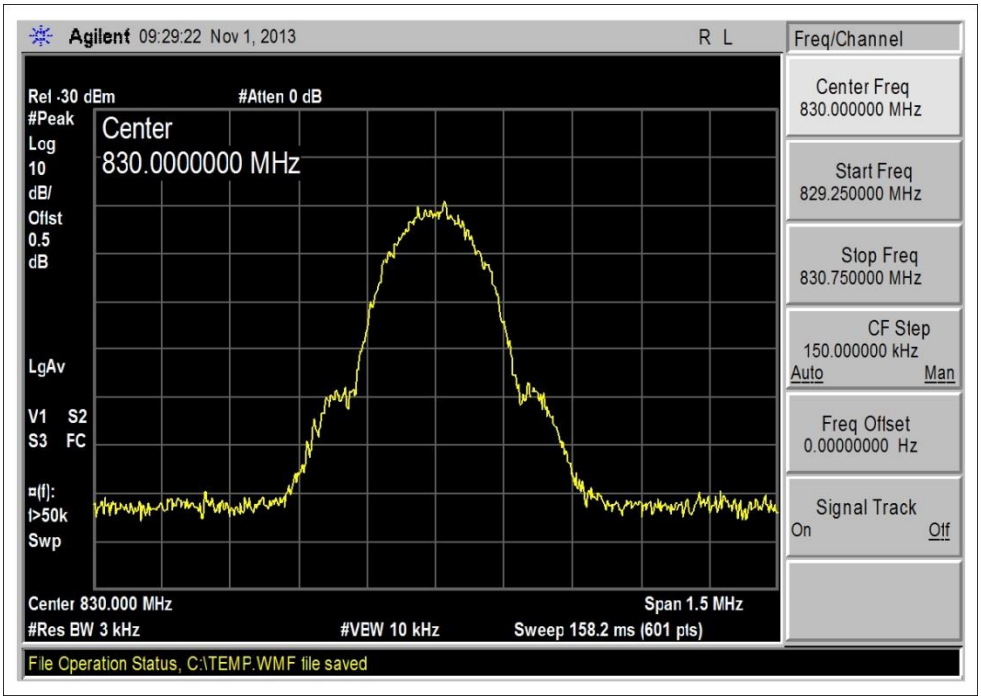
869-894MHz, DL_CDMA_Output



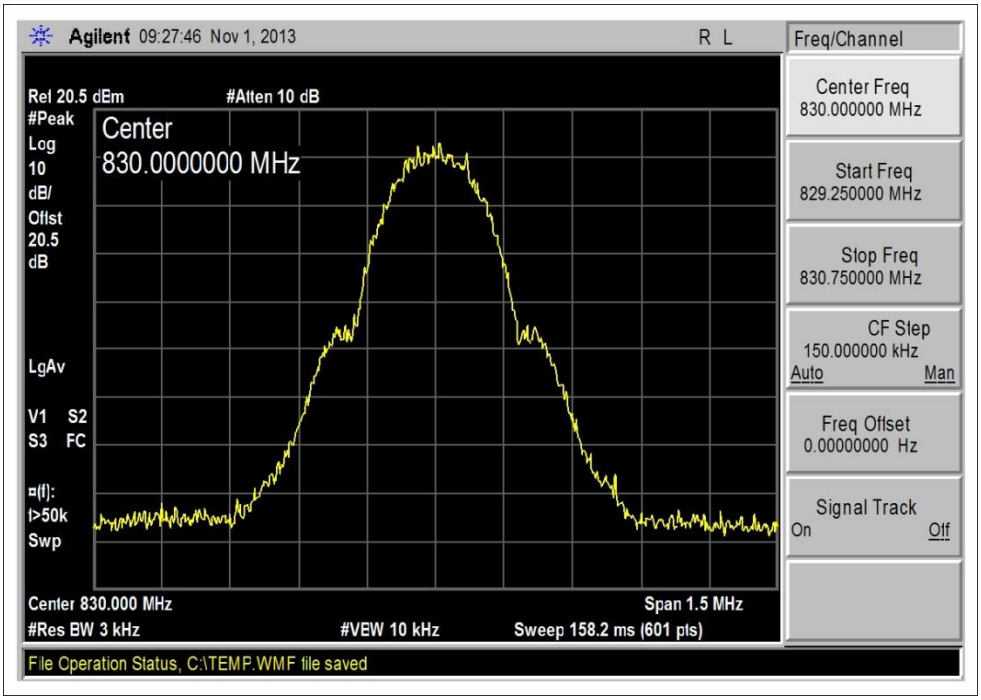
869-894MHz, DL_WCDMA_Input



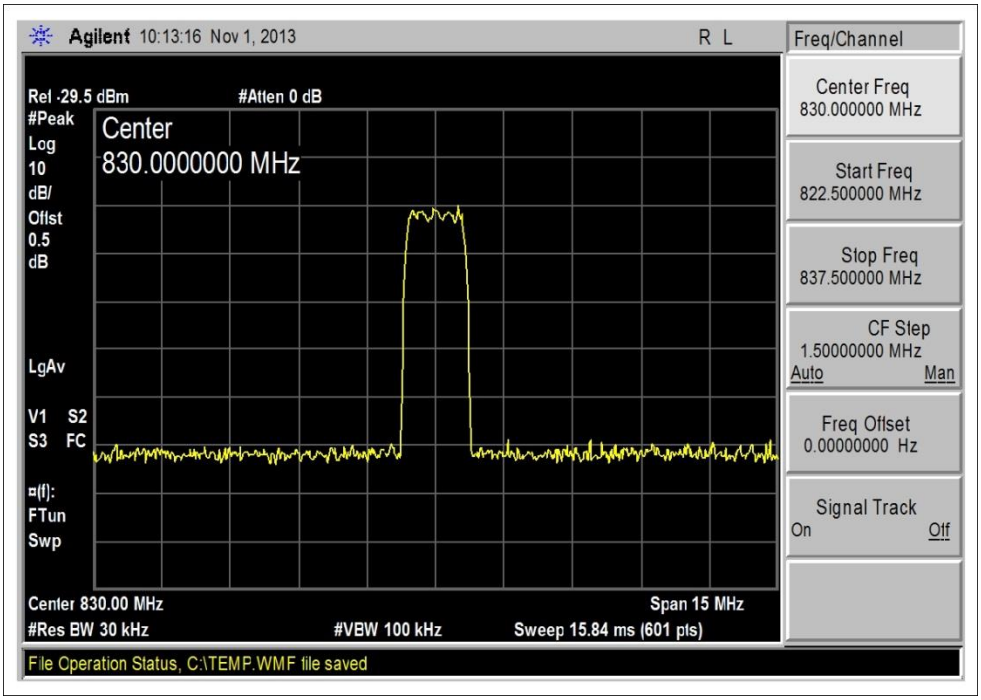
869-894MHz, DL_WCDMA_Output



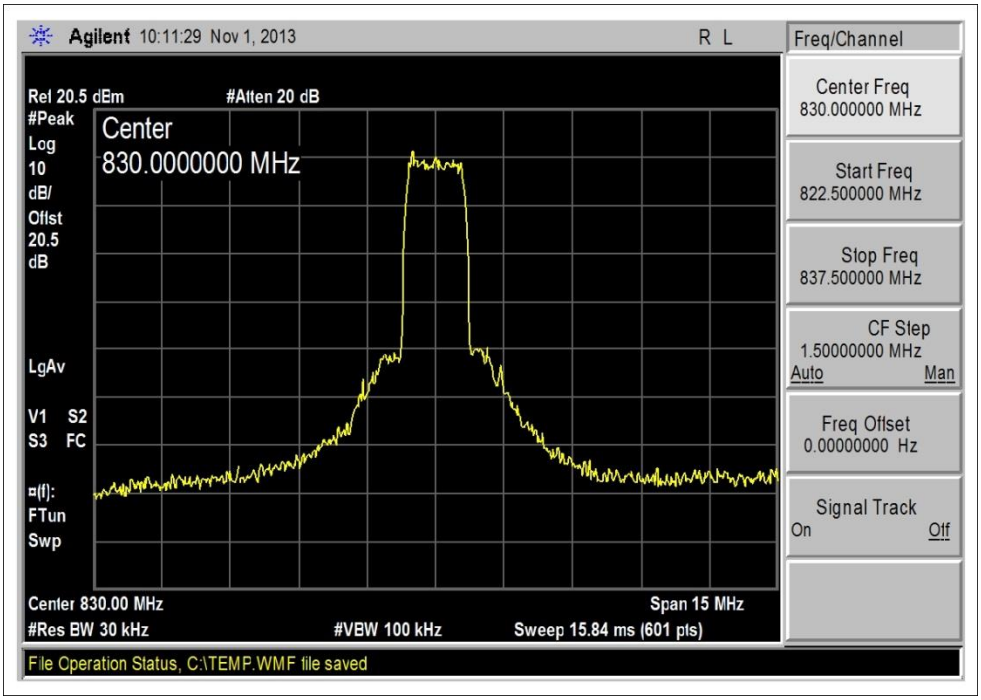
824-849MHz, UL_GSM_Input



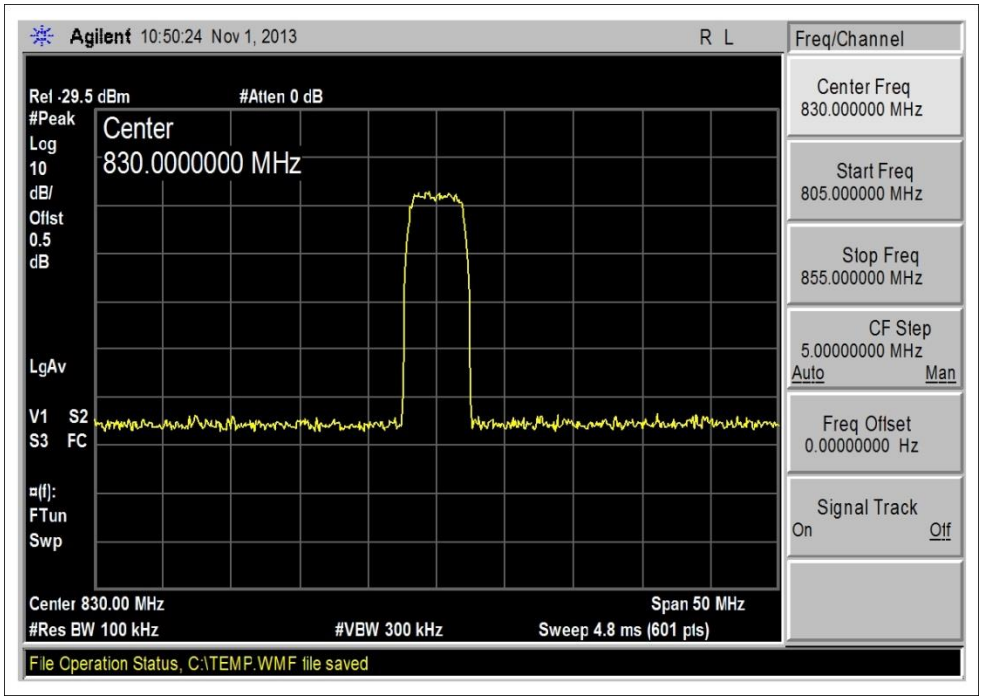
824-849MHz, UL_GSM_Output



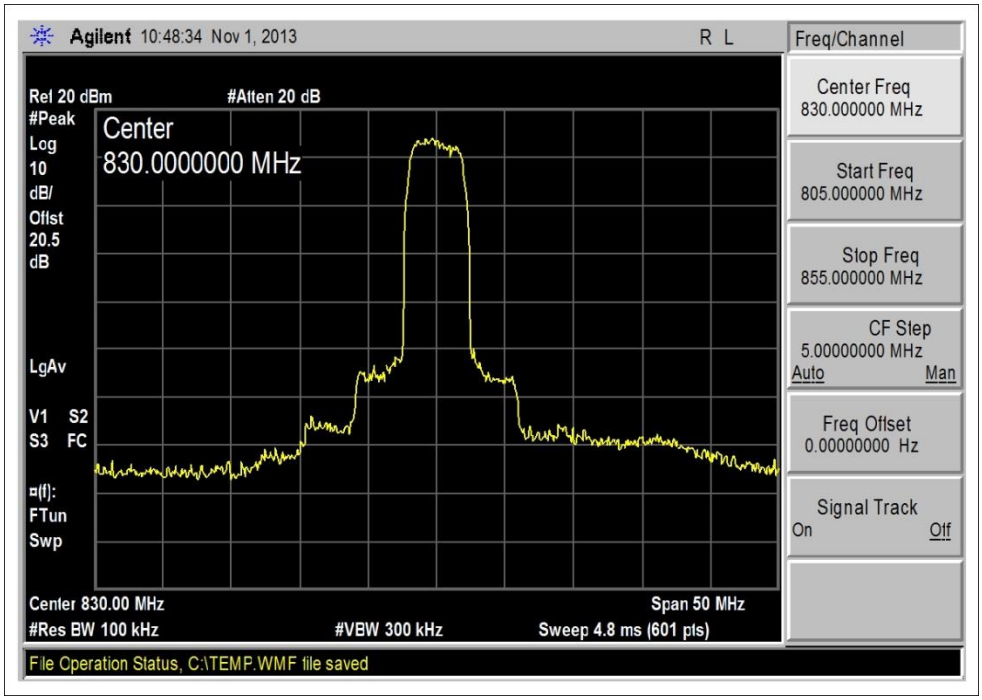
824-894MHz, UL_CDMA_Input



824-894MHz, UL_CDMA_Output



824-894MHz, UL_WCDMA_Input



824-894MHz, UL_WCDMA_Output

Test Setup Photos

22.917(a) / 2.1051 Spurious Emissions at Antenna Terminal

LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

REQUIRED ATTENUATION = 43+10 LOG P DB

Limit line (dBuV) = V_{dBuv} - Attenuation

$$V_{dBuV} = 20 \text{ Log } \frac{V}{1 \text{ x } 10^{-6}}$$

$$= 20\left(\text{Log } V - \text{Log } 1 \text{ x } 10^{-6}\right)$$

$$= 20 \text{ Log } V - 20 \text{ Log} 1 \text{ x } 10^{-6}$$

$$= 20 \text{ Log } V - 20(-6)$$

$$= 20 \text{ Log } V + 120$$

$$\text{Attenuation} = 43 + 10 \text{ Log } P$$

$$= 43 + 10 \text{ Log } \frac{V^2}{R}$$

$$= 43 + 10\left(\text{Log } V^2 - \text{Log } R\right)$$

$$= 43 + 10\left(2 \text{ Log } V - \text{Log } R\right)$$

$$= 43 + 20 \text{ Log } V - 10 \text{ Log } R$$

Limit line = V_{dBuv} - Attenuation

= 20 Log V + 120 – (43 + 20 Log V – 10Log R)

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 120 – 43 + 10 Log 50 Note : R = 50 Ω

= 120 –43 + 16.897

= 94 dBuV at any power level

Test Setup / Data

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**47 CFR §22.917 Spurious Emissions**		
Work Order #:	**94297**	Date:	11/1/2013
Test Type:	**Conducted Emissions**	Time:	12:15:37
Equipment:	**Fixed Wideband Consumer Signal Boosters**	Sequence#:	4
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	S. Yamamoto
Model:	Flex Pro		110V 60Hz
S/N:	1		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN03431	Attenuator	89-20-21	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
T3	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Fixed Wideband Consumer Signal Boosters*	Cellphone-Mate, Inc.	Flex Pro	1

Support Devices:

Function	Manufacturer	Model #	S/N
AC to 6VDC 2A Power Adapter	SureCall	GFP181U-0628B-1	1209-0000285

Test Conditions / Notes:

The equipment under test (EUT) is a cellphone booster/amplifier. The input of the EUT is connected to the signal generator. The signal generator is configured for AWGN with an emission bandwidth of 4.1MHz. The signal generator output level is set so that the EUT is providing maximum gain. The EUT output is connected to the spectrum analyzer through RF attenuators. The frequency range of this data sheet is 9kHz to 20GHz. RBW=1MHz, VBW=3MHz. Site A. Temperature: 20°C, Humidity: 35%, Pressure: 100kPa.
Downlink. 869MHz to 894MHz. AWGN 4.1MHz. Signal generator set at 881MHz

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1959.000M	41.2	+19.4	+0.5	+10.1		+0.0	71.2	94.0	-22.8	None
2	1939.300M	39.5	+19.4	+0.5	+10.1		+0.0	69.5	94.0	-24.5	None
3	1972.000M	39.5	+19.4	+0.5	+10.0		+0.0	69.4	94.0	-24.6	None
4	867.070M	36.9	+19.2	+0.5	+9.9		+0.0	66.5	94.0	-27.5	None
5	1989.000M	36.6	+19.4	+0.5	+9.9		+0.0	66.4	94.0	-27.6	None
6	867.970M	36.6	+19.2	+0.5	+9.9		+0.0	66.2	94.0	-27.8	None
7	865.930M	36.5	+19.2	+0.5	+9.9		+0.0	66.1	94.0	-27.9	None
8	895.270M	35.7	+19.3	+0.5	+10.0		+0.0	65.5	94.0	-28.5	None
9	1932.000M	35.4	+19.4	+0.5	+10.1		+0.0	65.4	94.0	-28.6	None
10	898.130M	34.2	+19.3	+0.5	+10.0		+0.0	64.0	94.0	-30.0	None

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer: **Cellphone-Mate, Inc.**
Specification: **47 CFR §22.917 Spurious Emissions**
Work Order #: **94297** Date: 11/1/2013
Test Type: **Conducted Emissions** Time: 11:57:07
Equipment: **Fixed Wideband Consumer Signal Boosters** Sequence#: 2
Manufacturer: Cellphone-Mate, Inc. Tested By: S. Yamamoto
Model: Flex Pro 110V 60Hz
S/N: 1

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN03431	Attenuator	89-20-21	9/5/2013	9/5/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
T3	AN03430	Attenuator	75A-10-12	9/5/2013	9/5/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Fixed Wideband Consumer Signal Boosters*	Cellphone-Mate, Inc.	Flex Pro	1

Support Devices:

Function	Manufacturer	Model #	S/N
AC to 6VDC 2A Power Adapter	SureCall	GFP181U-0628B-1	1209-0000285

Test Conditions / Notes:

The equipment under test (EUT) is a cellphone booster/amplifier. The input of the EUT is connected to the signal generator. The signal generator is configured for AWGN with an emission bandwidth of 4.1MHz. The signal generator output level is set so that the EUT is providing maximum gain. The EUT output is connected to the spectrum analyzer through RF attenuators. The frequency range of this data sheet is 9kHz to 20GHz. RBW=1MHz, VBW=3MHz. Site A. Temperature: 20°C, Humidity: 35%, Pressure: 100kPa.
Uplink. 824MHz to 849MHz. AWGN 4.1MHz. Signal generator set at 830MHz.

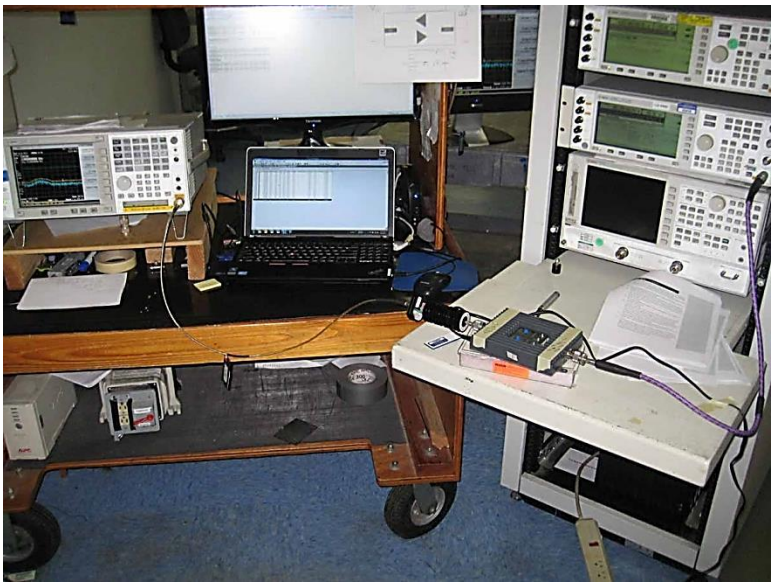
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1870.700M	38.1	+19.3	+0.3	+10.0		+0.0	67.7	94.0	-26.3	None
2	1865.700M	37.5	+19.3	+0.4	+10.0		+0.0	67.2	94.0	-26.8	None
3	1857.400M	35.6	+19.3	+0.4	+10.0		+0.0	65.3	94.0	-28.7	None
4	1899.700M	35.3	+19.4	+0.4	+10.1		+0.0	65.2	94.0	-28.8	None
5	1895.400M	34.9	+19.4	+0.4	+10.1		+0.0	64.8	94.0	-29.2	None
6	1854.400M	34.8	+19.3	+0.4	+10.0		+0.0	64.5	94.0	-29.5	None

7	1910.400M	33.1	+19.4	+0.4	+10.1	+0.0	63.0	94.0	-31.0	None
8	850.200M	32.9	+19.2	+0.5	+9.9	+0.0	62.5	94.0	-31.5	None
9	851.140M	32.4	+19.2	+0.5	+9.9	+0.0	62.0	94.0	-32.0	None
10	246.860M	29.0	+19.1	+0.3	+9.9	+0.0	58.3	94.0	-35.7	None

Test Setup Photos



22.917(a) / 2.1053 Field Strength of Spurious Radiation

LIMIT LINE FOR SPURIOUS RADIATED EMISSION

REQUIRED ATTENUATION = 43+10 LOG P (DB)

For radiated spurious emission measured at 3 meter test distance,

Required attenuation = 43+10 Log $P_{t\ at\ 3\ meter}$ dB
Limit line (dBuV) = E_{dBuv} - Attenuation

E_{dBuv} = Measured field strength at 3 meter in dBuV/m

Power Density (Isotropic)

$$P_D = \frac{P_t}{4\pi r^2}$$

P_D = Power Density in Watts /m^2
Pt = Average Transmit Power
r = Test distance

Field Intensity E (V/m)

$$E = \sqrt{P_D \times 377}$$

$$E = \frac{\sqrt{P_t \times 377}}{4\pi r^2}$$

$$E = \sqrt{\frac{P_t \times 30}{r^2}}$$

$$P_t = \left(\frac{E^2 \times r^2}{30} \right)$$

10 Log P_t = 10 Log E^2 (V/m)+ 10 Log r^2 – 10 Log 30

$10 \text{ Log } P_t = 20 \text{ Log E (V/m)} + 20 \text{ Log r} - 10 \text{ Log } 30$

At 3 meter, r = 3 m

$10 \text{ Log } P_t = 20 \text{ Log E (V/m)} + 20 \text{ Log } 3 - 10 \text{ Log } 30$

$10 \text{ Log } P_t = 20 \text{ Log E (V/m)} + 9.54 - 14.77$

$10 \text{ Log } P_t = 20 \text{ Log E (V/m)} - 5.23$

Since 20 Log E (V/m) = 20 Log E (uV/m) –120

$10 \text{ Log } P_t = 20 \text{ Log E (uV/m)} - 120 - 5.23$

$10 \text{ Log } P_t = 20 \text{ Log E (uV/m)} - 125.23$

Limit line (dBuV) at 3 meter = E_{dBuv} – Attenuation

= $E_{dBuv} - (43 + 10 \text{ Log } P_{t \text{ at 3 meter}})$

= $E_{dBuv} - 43 - 10 \text{ Log } P_{t \text{ at 3 meter}}$

= $E_{dBuv} - 43 - (20 \text{ Log E (uV/m)} - 125.23)$

= $E_{dBuv} - 43 - 20 \text{ Log E (uV/m)} + 125.23$

= $E_{dBuv} - 20 \text{ Log E (uV/m)} + 82.23$

Since 20 Log E (uV/m) = E in dBuV/m

= $\cancel{E_{dBuv}} - \cancel{E_{dBuv}} + 82.23$

Radiated Emission limit 3 meter = 82.23 dBuV at any power level measured in dBuV

Test Setup / Conditions

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**47 CFR §22.917 Spurious Emissions**		
Work Order #:	**94297**	Date:	11/1/2013
Test Type:	**Maximized Emissions**	Time:	12:15:37
Equipment:	**Fixed Wideband Consumer Signal Boosters**	Sequence#:	8
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	S. Yamamoto
Model:	Flex Pro		
S/N:	1		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
	AN00309	Preamp	8447D	3/29/2012	3/29/2014
	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
	AN00786	Preamp	83017A	6/20/2012	6/20/2014
	AN00849	Horn Antenna	3115	4/13/2012	4/13/2014
	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	ANP05421	Cable	Sucoflex 104A	2/8/2012	2/8/2014
	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014
	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Fixed Wideband Consumer Signal Boosters*	Cellphone-Mate, Inc.	Flex Pro	1

Support Devices:

Function	Manufacturer	Model #	S/N
AC to 6VDC 2A Power Adapter	SureCall	GFP181U-0628B-1	1209-0000285

Test Conditions / Notes:

The equipment under test (EUT) is a cellphone booster/amplifier. The input of the EUT is connected to the signal generator. The signal generator is configured for a CW signal. The signal generator output level is set so that the EUT is providing maximum gain. The EUT output is connected to an impedance matched non-radiating load. The frequency range of this data sheet is 9kHz to 20GHz. 9kHz to 150kHz, RBW=VBW=200Hz. 150kHz to 30MHz, RBW=VBW=9kHz. 30MHz to 1000MHz, RBW=VBW=120kHz. 1000MHz to 20000MHz, RBW=VBW=1MHz. Site A. Temperature: 26°C, Humidity: 35%, Pressure: 100kPa.
Downlink. 869MHz to 894MHz. CW. Signal generator set at 881MHz.
No emissions found within 20dB of the limit line.

Test Location: CKC Laboratories, Inc. • 110 North Olinda Place • Brea, CA 92823• 714-993-6112

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**47 CFR §22.917 Spurious Emissions**		
Work Order #:	**94297**	Date:	11/1/2013
Test Type:	**Maximized Emissions**	Time:	12:15:37
Equipment:	**Fixed Wideband Consumer Signal Boosters**	Sequence#:	6
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	S. Yamamoto
Model:	Flex Pro		
S/N:	1		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
	AN00309	Preamp	8447D	3/29/2012	3/29/2014
	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
	AN00786	Preamp	83017A	6/20/2012	6/20/2014
	AN00849	Horn Antenna	3115	4/13/2012	4/13/2014
	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	ANP05421	Cable	Sucoflex 104A	2/8/2012	2/8/2014
	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014
	AN01413	Horn Antenna-ANSI C63.5 (dB/m)	84125-80008	11/9/2012	11/9/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Fixed Wideband Consumer Signal Boosters*	Cellphone-Mate, Inc.	Flex Pro	1

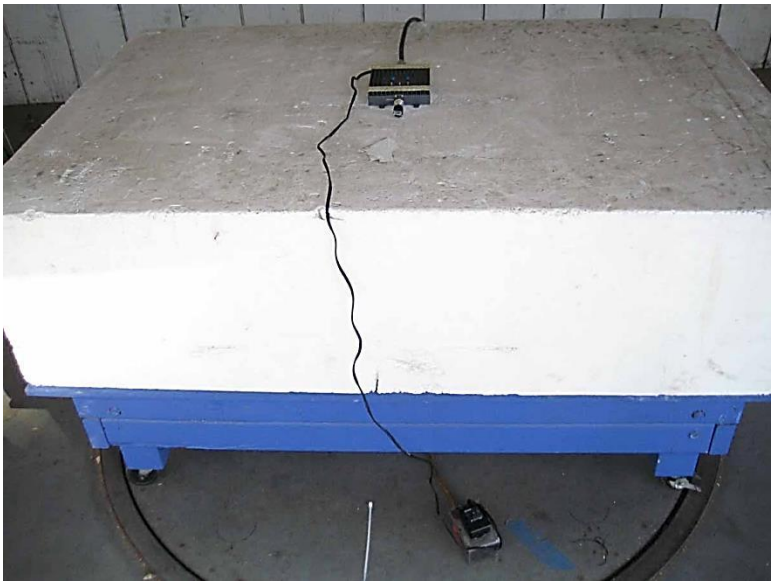
Support Devices:

Function	Manufacturer	Model #	S/N
AC to 6Vdc 2A Power Adapter	SureCall	GFP181U-0628B-1	1209-0000285

Test Conditions / Notes:

The equipment under test (EUT) is a cellphone booster/amplifier. The input of the EUT is connected to the signal generator. The signal generator is configured for a CW signal. The signal generator output level is set so that the EUT is providing maximum gain. The EUT output is connected to an impedance matched non-radiating load. The frequency range of this data sheet is 9kHz to 20GHz. 9kHz to 150kHz, RBW=VBW=200Hz. 150kHz to 30MHz, RBW=VBW=9kHz. 30MHz to 1000MHz, RBW=VBW=120kHz. 1000MHz to 20000MHz, RBW=VBW=1MHz.
Site A. Temperature: 26°C, Humidity: 35%, Pressure: 100kPa.
Uplink. 824MHz to 849MHz. CW. Signal generator set at 830MHz.
No emissions found within 20dB of the limit line.

Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.