



ADDENDUM TO WILSON ELECTRONICS TEST REPORT FC08-064

FOR THE

DIRECT CONNECTION CELLULAR/PCS AMPLIFIER W/ GPS BYPASS, 2B1401

FCC PART 15 SUBPART B SECTIONS 15.107 AND 15.109 CLASS B

TESTING

DATE OF ISSUE: JULY 15, 2008

PREPARED FOR:

Wilson Electronics
3301 Esast Deseret Drive
St. George, UT 84790

P.O. No.: PO2B1401-1
W.O. No.: 88034

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Date of test: May 22 - June 23, 2008

Report No.: FC08-064A

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TABLE OF CONTENTS

Administrative Information	3
Approvals	3
Site File Registration Numbers	3
Summary of Results	4
Conditions During Testing.....	4
Equipment Under Test (EUT) Description.....	4
Equipment Under Test	4
Peripheral Devices	4
Report of Emissions Measurements.....	5
Testing Parameters.....	5
Conducted Emissions.....	7
Radiated Emissions.....	14

ADMINISTRATIVE INFORMATION

DATE OF TEST: May 22 - June 23, 2008

DATE OF RECEIPT: May 22, 2008

REPRESENTATIVE: Riki Kline

MANUFACTURER:
Wilson Electronics
3301 Esast Deseret Drive
St. George, UT 84790

TEST LOCATION:
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

TEST METHOD: ANSI C63.4 (2003)

PURPOSE OF TEST:

Original Report: To perform testing of the Direct Connection Cellular/PCS Amplifier w/ GPS Bypass, 2B1401 with the requirements for FCC Part 15 Subpart B Sections 15.107 and 15.109 Class B devices.

Addendum A: To correct the test conditions on pages 8 and 11 with no new testing.


APPROVALS

QUALITY ASSURANCE:



Steve Behm, Director of Engineering Services

TEST PERSONNEL:



Mike Wilkinson, Senior EMC Engineer/Lab Manager

SITE FILE REGISTRATION NUMBERS

Location	Japan	Canada	FCC
Mar D	R-1827 & C-1960	IC 3082A-1	784962

SUMMARY OF RESULTS

Test	Specification	Results
Conducted Emissions	FCC Part 15 Subpart B Section 15.107 Class B	Pass
Radiated Emissions	FCC Part 15 Subpart B Section 15.109 Class B	Pass

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

Direct Connection Cellular/PCS Amplifier w/ GPS Bypass

Manuf: Wilson Electronics
Model: 2B1401
Serial: 811401A1011128467
FCC ID: PWO2B1401SA
IC: 4726A-2B1401SA

DC Power Supply

Manuf: Jentec
Model: AH1812-B
Serial: NA

PERIPHERAL DEVICES

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

Signal Generator

Manuf: Agilent
Model: E4437B
Serial: MY41000126

Signal Generator

Manuf: Gigatronics
Model: 1026
Serial: 281701

REPORT OF EMISSIONS MEASUREMENTS

TESTING PARAMETERS

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 dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/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. 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. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED 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 "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. 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/receiver readings were recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients 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

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. 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.

CONDUCTED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 209 966-5240

Customer: **Wilson Electronics**
 Specification: **FCC 15.107(a) Class B - AVE**
 Work Order #: **88034** Date: 6/23/2008
 Test Type: **Conducted Emissions** Time: 13:03:16
 Equipment: **Direct Connection Cellular/PCS Amplifier w/ GPS Bypass** Sequence#: 11
 Manufacturer: Wilson Electronics Tested By: Mike Wilkinson
 Model: 2B1401 120V 60Hz
 S/N: 811401A1011128467

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/03/2007	01/03/2009	02660
150kHz HP Filter TTE	G7754	01/22/2008	01/22/2010	02608
LISN, 8028-50-TS-24-BNC	8379276, 280	05/07/2007	05/07/2009	1248 & 1249
Site D Conducted Cable	N/A	03/06/2008	03/06/2010	CAB-SITE INT LISN 100k-30M

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Direct Connection Cellular/PCS Amplifier w/ GPS Bypass*	Wilson Electronics	2B1401	811401A1011128467
DC Power Supply	Jentec	AH1812-B	None

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	Agilent	E4437B	MY41000126
Signal Generator	Gigatronics	1026	281701

Test Conditions / Notes:

This is a direct-connect, dual-band bi-directional amplifier for enhancing the range of cell phones, and data communication devices (computers, PDAs, etc.) in both mobile (vehicular) and in-building environments. A "GPS Bypass" is also included that amplifies GPS signals (1.575 GHz), but only in the downlink direction. EUT operating frequency ranges are 824-849 MHz and 1850-1910 MHz for uplink path and 869-894 MHz and 1930-1990 MHz for downlink path. EUT RF ports are terminated in 50 Ohms. Frequency Range Investigated: 150 kHz to 30 MHz Temperature: 22.3°C, Relative Humidity: 35%. RBW=9kHz VBW 27kHz.

Transducer Legend:

T1=CAB-SITED INT LISN 100k-30M	T2=LISN -280 - BK-AN1248
T3=Filter 150kHz HP AN02608	

Measurement Data:

Reading listed by margin.

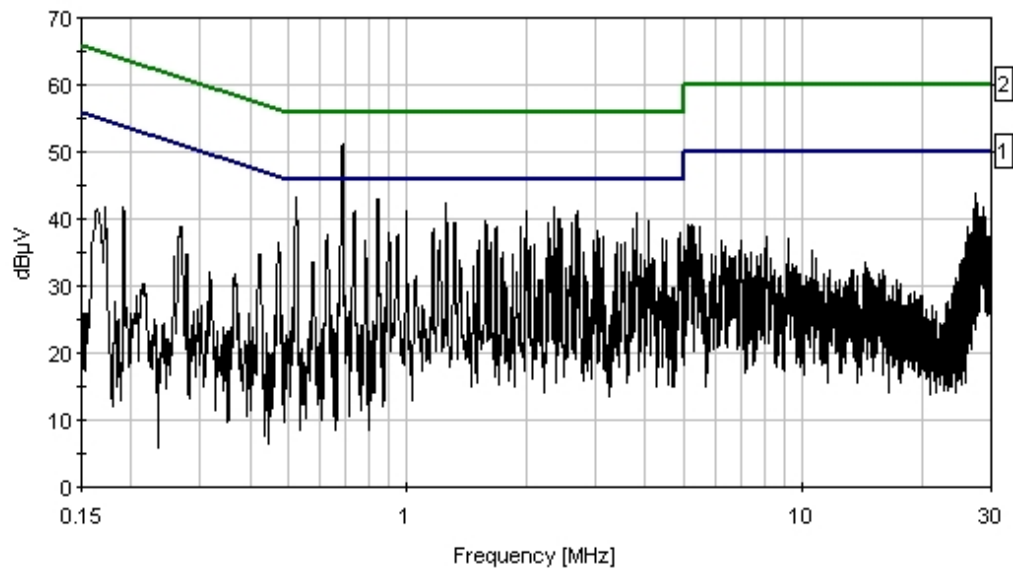
Test Lead: Black

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist dB	Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	685.951k Ave	31.2	+11.8	+0.2	+0.3	+0.0		43.5	46.0	-2.5	Black
^	685.951k	38.8	+11.8	+0.2	+0.3	+0.0		51.1	46.0	+5.1	Black

3	523.784k	30.9	+11.9	+0.2	+0.3	+0.0	43.3	46.0	-2.7	Black
4	842.300k	30.7	+11.8	+0.2	+0.3	+0.0	43.0	46.0	-3.0	Black
5	1.256M	30.2	+11.7	+0.2	+0.2	+0.0	42.3	46.0	-3.7	Black
6	2.361M	30.0	+11.3	+0.2	+0.2	+0.0	41.7	46.0	-4.3	Black
7	734.674k	29.0	+11.8	+0.2	+0.3	+0.0	41.3	46.0	-4.7	Black
8	2.000M	29.5	+11.4	+0.2	+0.2	+0.0	41.3	46.0	-4.7	Black
9	2.685M	29.6	+11.2	+0.3	+0.1	+0.0	41.2	46.0	-4.8	Black
10	996.281k	28.9	+11.8	+0.2	+0.2	+0.0	41.1	46.0	-4.9	Black
11	3.816M	29.3	+11.1	+0.3	+0.1	+0.0	40.8	46.0	-5.2	Black
12	2.417M	28.3	+11.3	+0.2	+0.2	+0.0	40.0	46.0	-6.0	Black
13	1.583M	27.9	+11.5	+0.2	+0.2	+0.0	39.8	46.0	-6.2	Black
14	27.478M	31.2	+11.0	+1.3	+0.2	+0.0	43.7	50.0	-6.3	Black
15	4.062M	28.2	+11.0	+0.3	+0.1	+0.0	39.6	46.0	-6.4	Black
16	1.315M	27.4	+11.6	+0.2	+0.2	+0.0	39.4	46.0	-6.6	Black
17	2.268M	27.7	+11.3	+0.2	+0.2	+0.0	39.4	46.0	-6.6	Black
18	2.621M	27.7	+11.3	+0.3	+0.1	+0.0	39.4	46.0	-6.6	Black
19	2.710M	27.3	+11.2	+0.3	+0.1	+0.0	38.9	46.0	-7.1	Black
20	1.936M	26.9	+11.4	+0.2	+0.2	+0.0	38.7	46.0	-7.3	Black
21	1.681M	26.8	+11.5	+0.2	+0.2	+0.0	38.7	46.0	-7.3	Black
22	4.075M	27.2	+11.0	+0.3	+0.1	+0.0	38.6	46.0	-7.4	Black
23	2.455M	26.8	+11.3	+0.3	+0.1	+0.0	38.5	46.0	-7.5	Black
24	3.727M	26.9	+11.1	+0.3	+0.1	+0.0	38.4	46.0	-7.6	Black
25	27.259M	29.8	+11.0	+1.3	+0.2	+0.0	42.3	50.0	-7.7	Black
26	27.328M	29.8	+11.0	+1.3	+0.2	+0.0	42.3	50.0	-7.7	Black

27	27.814M	29.8	+11.0	+1.3	+0.2	+0.0	42.3	50.0	-7.7	Black
28	28.691M	29.2	+11.0	+1.3	+0.2	+0.0	41.7	50.0	-8.3	Black
29	26.965M	29.0	+11.0	+1.3	+0.2	+0.0	41.5	50.0	-8.5	Black
30	27.437M	28.9	+11.0	+1.3	+0.2	+0.0	41.4	50.0	-8.6	Black
31	28.520M	28.8	+11.0	+1.3	+0.2	+0.0	41.3	50.0	-8.7	Black

CKC Laboratories, Inc. Date: 6/23/2008 Time: 13:03:16 Wilson Electronics WVO#: 88034
 FCC 15.107(a) Class B - AVE Test Lead: Black 120V 60Hz Sequence#: 11 Ext ATTN: (EXTATTN)



— Sweep Data
 — 1 - FCC 15.107(a) Class B - AVE
 — 2 - FCC 15.107(a) Class B - QP

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 209 966-5240

Customer: **Wilson Electronics**
 Specification: **FCC 15.107(a) Class B - AVE**
 Work Order #: **88034** Date: 6/23/2008
 Test Type: **Conducted Emissions** Time: 13:08:24
 Equipment: **Direct Connection Cellular/PCS Amplifier w/ GPS Bypass** Sequence#: 12
 Manufacturer: Wilson Electronics Tested By: Mike Wilkinson
 Model: 2B1401 120V 60Hz
 S/N: 811401A1011128467

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/03/2007	01/03/2009	02660
150kHz HP Filter TTE	G7754	01/22/2008	01/22/2010	02608
LISN, 8028-50-TS-24-BNC	8379276, 280	05/07/2007	05/07/2009	1248 & 1249
Site D Conducted Cable	N/A	03/06/2008	03/06/2010	CAB-SITE INT LISN 100k-30M

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Direct Connection Cellular/PCS Amplifier w/ GPS Bypass*	Wilson Electronics	2B1401	811401A1011128467
DC Power Supply	Jentec	AH1812-B	None

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	Agilent	E4437B	MY41000126
Signal Generator	Gigatronics	1026	281701

Test Conditions / Notes:

This is a direct-connect, dual-band bi-directional amplifier for enhancing the range of cell phones, and data communication devices (computers, PDAs, etc.) in both mobile (vehicular) and in-building environments. A "GPS Bypass" is also included that amplifies GPS signals (1.575 GHz), but only in the downlink direction. EUT operating frequency ranges are 824-849 MHz and 1850-1910 MHz for uplink path and 869-894 MHz and 1930-1990 MHz for downlink path. EUT RF ports are terminated in 50 Ohms. Frequency Range Investigated: 150 kHz to 30 MHz. Temperature: 22.3°C, Relative Humidity: 35%. RBW=9kHz VBW 27kHz.

Transducer Legend:

T1=CAB-SITED INT LISN 100k-30M	T2=LISN -276 - WT-AN01248
T3=Filter 150kHz HP AN02608	

Measurement Data:

Reading listed by margin.

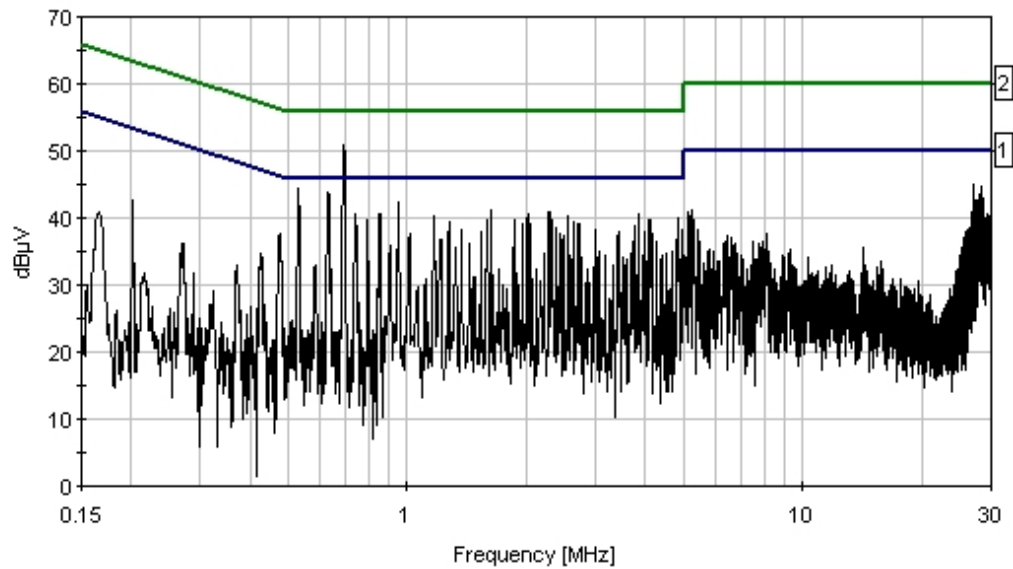
Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist dB	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	531.055k	32.1	+11.9	+0.2	+0.3	+0.0	44.5	46.0	-1.5	White
2	631.409k	31.6	+11.8	+0.1	+0.3	+0.0	43.8	46.0	-2.2	White

3	691.767k Ave	31.4	+11.8	+0.1	+0.3	+0.0	43.6	46.0	-2.4	White
^	691.768k	38.7	+11.8	+0.1	+0.3	+0.0	50.9	46.0	+4.9	White
5	945.249k	30.3	+11.8	+0.2	+0.2	+0.0	42.5	46.0	-3.5	White
6	1.634M	29.3	+11.5	+0.2	+0.2	+0.0	41.2	46.0	-4.8	White
7	2.285M	29.3	+11.3	+0.2	+0.2	+0.0	41.0	46.0	-5.0	White
8	27.211M	32.1	+11.0	+1.6	+0.2	+0.0	44.9	50.0	-5.1	White
9	28.198M	32.0	+11.0	+1.6	+0.2	+0.0	44.8	50.0	-5.2	White
10	2.017M	28.9	+11.4	+0.2	+0.2	+0.0	40.7	46.0	-5.3	White
11	851.753k	28.3	+11.8	+0.2	+0.3	+0.0	40.6	46.0	-5.4	White
12	739.763k	28.3	+11.8	+0.1	+0.3	+0.0	40.5	46.0	-5.5	White
13	3.846M	29.1	+11.0	+0.3	+0.1	+0.0	40.5	46.0	-5.5	White
14	1.171M	28.3	+11.7	+0.2	+0.2	+0.0	40.4	46.0	-5.6	White
15	2.557M	28.5	+11.3	+0.3	+0.1	+0.0	40.2	46.0	-5.8	White
16	4.866M	28.4	+10.9	+0.5	+0.1	+0.0	39.9	46.0	-6.1	White
17	791.395k	27.6	+11.8	+0.1	+0.3	+0.0	39.8	46.0	-6.2	White
18	4.092M	28.4	+11.0	+0.3	+0.1	+0.0	39.8	46.0	-6.2	White
19	1.592M	27.8	+11.5	+0.2	+0.2	+0.0	39.7	46.0	-6.3	White
20	1.864M	27.8	+11.5	+0.2	+0.2	+0.0	39.7	46.0	-6.3	White
21	2.315M	27.9	+11.3	+0.2	+0.2	+0.0	39.6	46.0	-6.4	White
22	4.105M	28.2	+11.0	+0.3	+0.1	+0.0	39.6	46.0	-6.4	White
23	28.020M	30.8	+11.0	+1.6	+0.2	+0.0	43.6	50.0	-6.4	White
24	28.417M	30.8	+11.0	+1.6	+0.2	+0.0	43.6	50.0	-6.4	White
25	28.253M	30.5	+11.0	+1.6	+0.2	+0.0	43.3	50.0	-6.7	White
26	27.054M	30.4	+11.0	+1.6	+0.2	+0.0	43.2	50.0	-6.8	White

27	28.075M	30.2	+11.0	+1.6	+0.2	+0.0	43.0	50.0	-7.0	White
28	28.356M	30.2	+11.0	+1.6	+0.2	+0.0	43.0	50.0	-7.0	White
29	28.582M	30.2	+11.0	+1.6	+0.2	+0.0	43.0	50.0	-7.0	White
30	27.732M	29.8	+11.0	+1.6	+0.2	+0.0	42.6	50.0	-7.4	White
31	28.691M	29.8	+11.0	+1.6	+0.2	+0.0	42.6	50.0	-7.4	White

CKC Laboratories, Inc. Date: 6/23/2008 Time: 13:08:24 Wilson Electronics WVO#: 88034
 FCC 15.107(a) Class B - AVE Test Lead: White 120V 60Hz Sequence#: 12 Ext ATTN: (EXTATTN)



— Sweep Data
 — 1 - FCC 15.107(a) Class B - AVE
 — 2 - FCC 15.107(a) Class B - QP

RADIATED EMISSIONS

Test Setup Photos



Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 209 966-5240

Customer: **Wilson Electronics**
 Specification: **15.109 CLASS B**
 Work Order #: **88034** Date: 6/6/2008
 Test Type: **Maximized Emissions** Time: 12:22:14
 Equipment: **Direct Connection Cellular/PCS Amplifier w/ GPS Bypass** Sequence#: 12
 Manufacturer: Wilson Electronics Tested By: Mike Wilkinson
 Model: 2B1401
 S/N: 811401A1011128467

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4446A SA	US44300407	01/03/2007	01/03/2009	02660
Chase CBL6111C Bilog	2456	12/30/2006	12/30/2008	01991
HP 8447D Preamp	1937A02604	03/14/2007	03/14/2009	00099
3M SITE CABLE 20GHZ	NA	03/06/2008	03/06/2010	SITED3M1
Andrews Hardline (25')	CKC 1012	04/23/2007	04/23/2009	P01012
EMCO 3115 Horn Antenna	9307-4085	03/17/2007	03/17/2009	00656
ARA MWH-1826/B Horn Antenna	1005	11/26/2006	11/26/2008	02046
HP 8449B Preamp	3008A00301	12/13/2006	12/13/2008	2010

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Direct Connection Cellular/PCS Amplifier w/ GPS Bypass*	Wilson Electronics	2B1401	811401A1011128467
DC Power Supply	Jentec	AH1812-B	None

Support Devices:

Function	Manufacturer	Model #	S/N
Signal Generator	Agilent	E4437B	MY41000126
Signal Generator	Gigatronics	1026	281701

Test Conditions / Notes:

This is a direct-connect, dual-band bi-directional amplifier for enhancing the range of cell phones, and data communication devices (computers, PDAs, etc.) in both mobile (vehicular) and in-building environments. A "GPS Bypass" is also included that amplifies GPS signals (1.575 GHz), but only in the downlink direction. EUT operating frequency ranges are 824-849 MHz and 1850-1910 MHz for uplink path and 869-894 MHz and 1930-1990 MHz for downlink path. EUT RF output ports are terminated in 50 Ohms. An input level just below that which will cause the EUT to automatically attenuate the input signal level was applied to the inputs. Frequency Range Investigated: 30 to 20000 MHz. Temperature: 22.3°C, Relative Humidity: 35%. RBW=100 kHz VBW 300 kHz.

Transducer Legend:

T1=Cable P01012	T2=CAB-SITED3M1 9k - 20G
T3=AMP AN00099	T4=ANT AN01991 25-1000MHz

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	36.480M	30.5	+0.3	+0.5	-27.2	+15.7	+0.0	19.8	40.0	-20.2	Vert
2	43.600M	30.8	+0.3	+0.5	-27.2	+12.0	+0.0	16.4	40.0	-23.6	Horiz
3	160.100M	31.1	+0.5	+1.0	-26.9	+10.7	+0.0	16.4	43.5	-27.1	Horiz
4	280.900M	28.1	+0.8	+1.4	-26.4	+13.1	+0.0	17.0	46.0	-29.0	Horiz
5	60.100M	30.0	+0.4	+0.6	-27.2	+6.8	+0.0	10.6	40.0	-29.4	Vert
6	165.270M	28.1	+0.5	+1.1	-26.8	+10.2	+0.0	13.1	43.5	-30.4	Vert
7	123.140M	26.8	+0.5	+0.9	-27.0	+11.7	+0.0	12.9	43.5	-30.6	Vert