



**ADDENDUM TO COLEMAN TECHNOLOGIES TEST REPORT FC04-020**

**FOR THE**

**AVL/GPS DATA LOGGING WITH WIRELESS COMMUNICATION,  
1XRTT AGENT**

**FCC PART 22 & PART 24**

**COMPLIANCE**

**DATE OF ISSUE: APRIL 20, 2004**

**PREPARED FOR:**

Coleman Technologies  
20 N. Orange Avenue, Suite 300  
Orlando, FL

P.O. No.: JET 2677  
W.O. No.: 81879

**PREPARED BY:**

Mary Ellen Clayton  
CKC Laboratories, Inc.  
5473A Clouds Rest  
Mariposa, CA 95338

Date of test: March 4-5, 2004

**Report No.: FC04-020A**

This report contains a total of 32 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc. The results in this report apply only to the items tested, as identified herein.

## TABLE OF CONTENTS

Administrative Information.....	3
Summary of Results.....	4
Conditions for Compliance .....	4
Approvals.....	4
Equipment Under Test (EUT) Description.....	5
Equipment Under Test.....	5
Peripheral Devices.....	5
Temperature and Humidity During Testing.....	6
FCC 2.1033(c)(3) User's Manual.....	6
FCC 2.1033(c)(4) Type of Emissions .....	6
FCC 2.1033(c)(5) Frequency Range .....	6
FCC 2.1033(c)(6) Operating Power.....	6
FCC 2.1033(c)(7) Maximum Power Rating.....	6
FCC 2.1033(c)(8) DC Voltages .....	6
FCC 2.1033(c)(9) Tune-Up Procedure.....	6
FCC 2.1033(c)(10) Schematics and Circuitry Description.....	6
FCC 2.1033(c)(11) Label and Placement.....	6
FCC 2.1033(c)(12) Submittal Photos.....	6
FCC 2.1033(c)(13) Modulation Information.....	6
FCC 2.1033(c)(14)/2.1046/22.913/24.232 - RF Power Output .....	7
FCC 2.1033(c)(14)/2.1047(b)/22.917(a) - Audio Frequency Response .....	10
FCC 2.1033(c)(14)/2.1047(b)/22.915(a) - Modulation Limiting Response .....	10
FCC 2.1033(c)(14)/2.1049(i) - Occupied Bandwidth.....	10
FCC 22.917(c) Emissions Mask.....	13
FCC 2.1033(c)(14)/2.1051/2.1053/22.917(e) - Out of Band Emissions .....	16
FCC 2.1033(c)(14)/2.1051/24.238 - Spurious Emissions at Antenna Terminal.....	17
FCC 2.1033(c)(14)/2.1055/22.355/24.235 - Frequency Stability.....	22
FCC 24.236 - Field Strength Limits.....	22
FCC Part 22 Block Edge .....	22
FCC Part 24 Block Edge .....	29

## ADMINISTRATIVE INFORMATION

**DATE OF TEST:** March 4-5, 2004

**DATE OF RECEIPT:** March 4, 2004

**PURPOSE OF TEST:** To demonstrate the compliance of the AVL/GPS Data Logging with Wireless Communication, 1XRTT Agent with the requirements for FCC Part 22 & Part 24 devices.  
**Addendum A** is to revise the operating power on page 6, add information regarding modulation and dc voltages, add a statement regarding conditions for compliance and revise the occupied bandwidth plots.

**TEST METHOD:** FCC Part 22 & Part 24

**FREQUENCY RANGE TESTED:** 9 kHz-20 GHz

**MANUFACTURER:** Coleman Technologies  
20 N. Orange Avenue, Suite 300  
Orlando, FL

**REPRESENTATIVE:** Peter Stern

**TEST LOCATION:** CKC Laboratories, Inc.  
110 Olinda Place  
Brea, CA 92621

## SUMMARY OF RESULTS

As received, the Coleman Technologies AVL/GPS Data Logging w/ Wireless Communication, 1XRTT Agent was found to be fully compliant with the following standards and specifications:

### **United States**

- FCC Part 22 & Part 24

### **CONDITIONS FOR COMPLIANCE**

Portions of testing contained in this test report represent a demonstration of continued compliance for this product. Emissions characteristics deemed unaffected by installation type are contained in a separate test report.

### **APPROVALS**

Steve Behm, Director of Engineering Services

#### **QUALITY ASSURANCE:**



Joyce Walker, Quality Assurance Administrative Manager

#### **TEST PERSONNEL:**



Matthew Pettersen, EMC Test Engineer

## **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

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

## **EQUIPMENT UNDER TEST**

### **AVL/GPS Data Logging with Wireless Communication**

Manuf: Coleman Technologies  
Model: 1XRTT Agent  
Serial: 20040304  
FCC ID: QQZ (pending)

## **PERIPHERAL DEVICES**

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

### **Laptop**

Manuf: Compaq  
Model: Evo N150  
Serial: D171QK260V3  
FCC ID: DoC

### **Power Supply**

Manuf: CUI Inc.  
Model: DV-1280  
Serial: NA  
FCC ID: NA

**TEMPERATURE AND HUMIDITY DURING TESTING**

The temperature during testing was within +15°C and + 35°C.  
The relative humidity was between 20% and 75%.

**FCC 2.1033(c)(3) USER'S MANUAL**

The necessary information is contained in a separate document.

**FCC 2.1033 (c)(4) TYPE OF EMISSIONS**

1M25F9W

**FCC 2.1033 (c)(5) FREQUENCY RANGE**

824.04MHz – 848.97MHz and 1851.25MHz – 1908.75MHz.

**FCC 2.1033 (c)(6) OPERATING POWER**

0.31 Watts Part 22, 0.28 Watts Part 24

**FCC 2.1033 (c)(7) MAXIMUM POWER RATING**

280mW

**FCC 2.1033 (c)(8) DC VOLTAGES**

6-26 Volts, 40 millamps @ 12 volts

**FCC 2.1033 (c)(9) TUNE-UP PROCEDURE**

The necessary information is contained in a separate document.

**FCC 2.1033(c)(10) SCHEMATICS AND CIRCUITRY DESCRIPTION**

The necessary information is contained in a separate document.

**FCC 2.1033(c)(11) LABEL AND PLACEMENT**

The necessary information is contained in a separate document.

**FCC 2.1033(c)(12) SUBMITTAL PHOTOS**

The necessary information is contained in a separate document.

**FCC 2.1033 (c)(13) MODULATION INFORMATION**

Phase

## FCC 2.1033(c)(14)/2.1046/22.913/24.232 - RF POWER OUTPUT

**Test Conditions :** EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation if the signal. EUT is in operational. 12VDC (110VAC, 60Hz), 23°C, 55% relative humidity.

Comparison of Conducted power.

### **Data taken for AnyData EMIII Dual, W/O 78691**

Frequency	Av Power (Watt)	SA reading (dBuV)
824.04 MHz	0.34	135.1 (0.6472 W)
836.52MHz	0.48	136.1 (0.8148 W)
848.97MHz	0.25	134.6 (0.5768 W)

Frequency	Av Power (Watt)	SA reading (dBuV)
1851.25 MHz	0.42	136.4 (0.8730 W)
1880.00 MHz	0.55	137.3 (1.0741 W)
1908.75 MHz	0.40	136.5 (0.8934 W)

### **Data taken for Coleman Technologies, 1XRTT Agent, W/O 81879**

	Frequency	Av Power meter	SA (peak power)
L	824.04 MHz	0.31watt	135dBuV ( 0.62W)
M	836.52 MHz	0.30 watt	135dBuV (0.62W)
H	848.97 MHz	0.24watt	134dBuV (0.48W)

	Frequency	Av Power meter	SA (peak power)
L	1851.25 MHz	0.28 watt	134.1dBuV (0.51W)
M	1880.00 MHz	0.28 watt	133 dBuV (0.396W)
H	1908.75 MHz	0.28 watt	134dBuV (0.48W)

**The data taken for 1XRTT Agent shows that the power level does not exceed the RF power of EMII Dual. Hence using the test report of AnyData is acceptable.**

#### **Test Equipment**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	2111	HP	8593EM	3624A00159	05/12/2003	05/12/2005
2.4 GHz HPF	1440	K & L	91H31-3000	1	02/20/2003	02/20/2005
Power Meter	2082	HP	435B	2445A11881	09/30/2002	09/30/2004
Power Sensor	2036	HP	8482A	1551A01004	05/29/2003	05/29/2004

## TEST SETUP



FCC 24.232 & 22.913

## TEST SETUP



FCC 24.232 & 22.913

**FCC 2.1033(c)(14)/2.1047(a)/22.915(a) - MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE**

The necessary information is contained in a separate document.

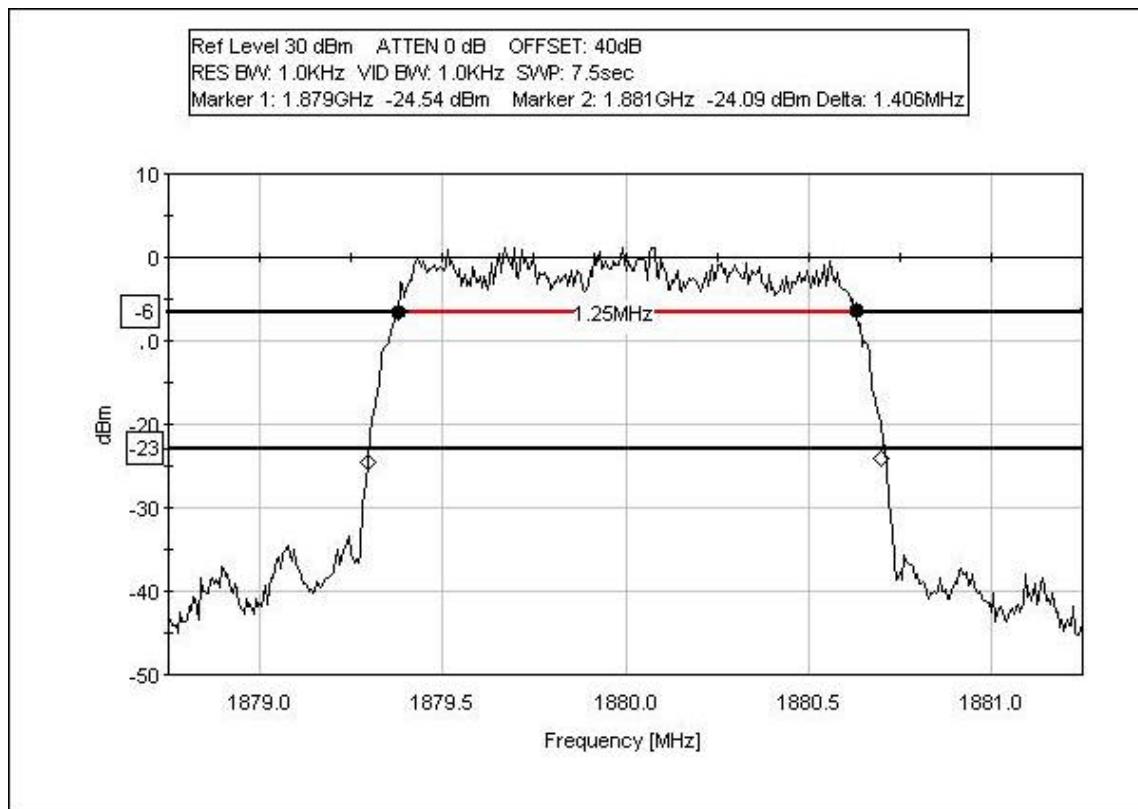
**FCC 2.1033(c)(14)/2.1047(b)/22.915(a) MODULATION CHARACTERISTICS- Modulation Limiting Response**

The necessary information is contained in a separate document.

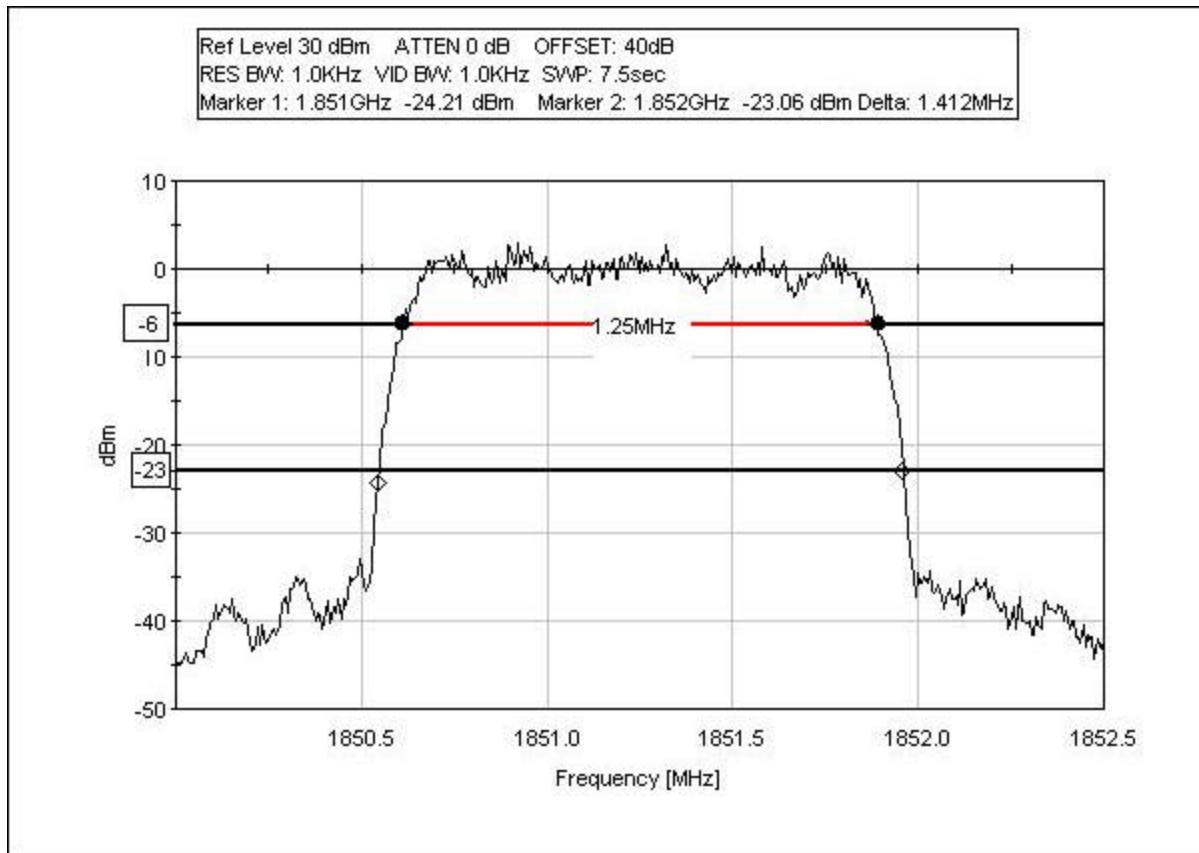
**FCC 2.1033(c)(14)/2.1049(i)- OCCUPIED BANDWIDTH**

Test Conditions: EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation if the signal. EUT is in operational. 12VDC (110VAC, 60Hz), 23°Celsius, 55% relative humidity.

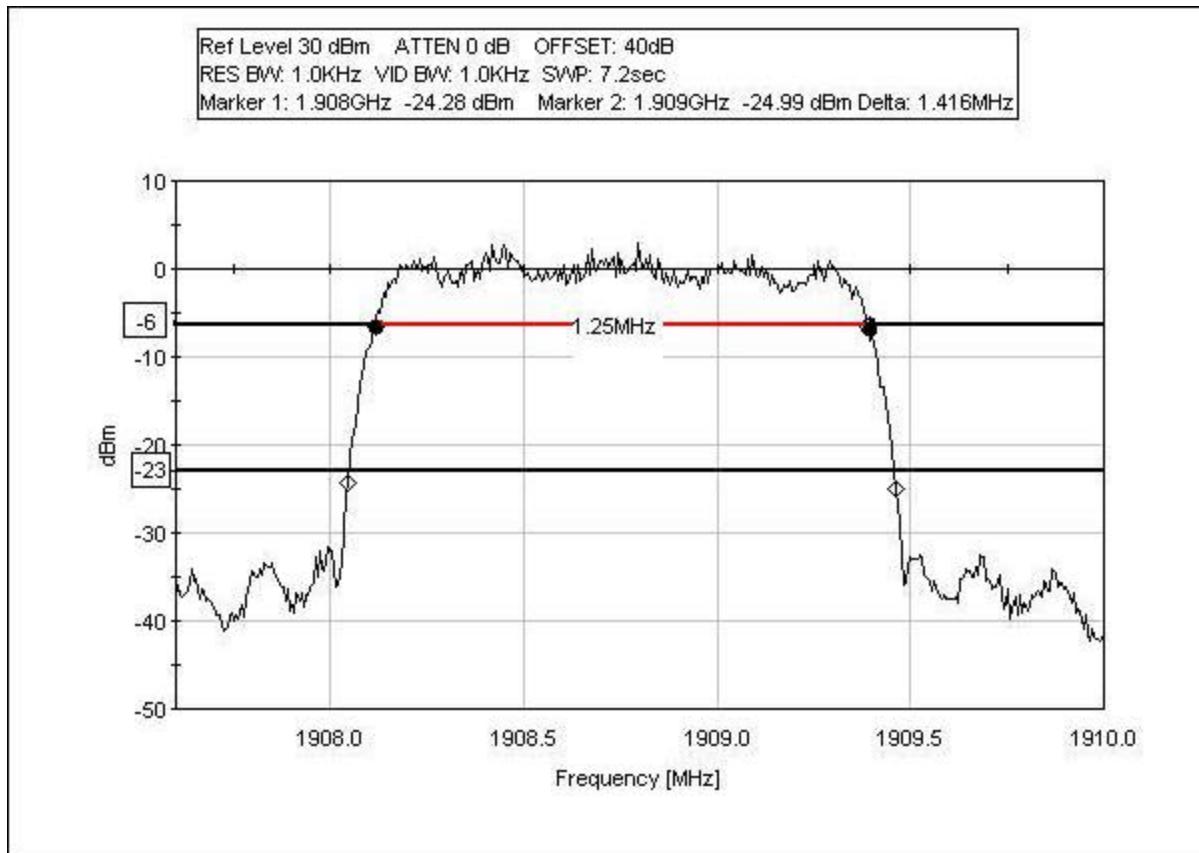
**FCC 2.1049 Occupied Bandwidth 1880MHz**



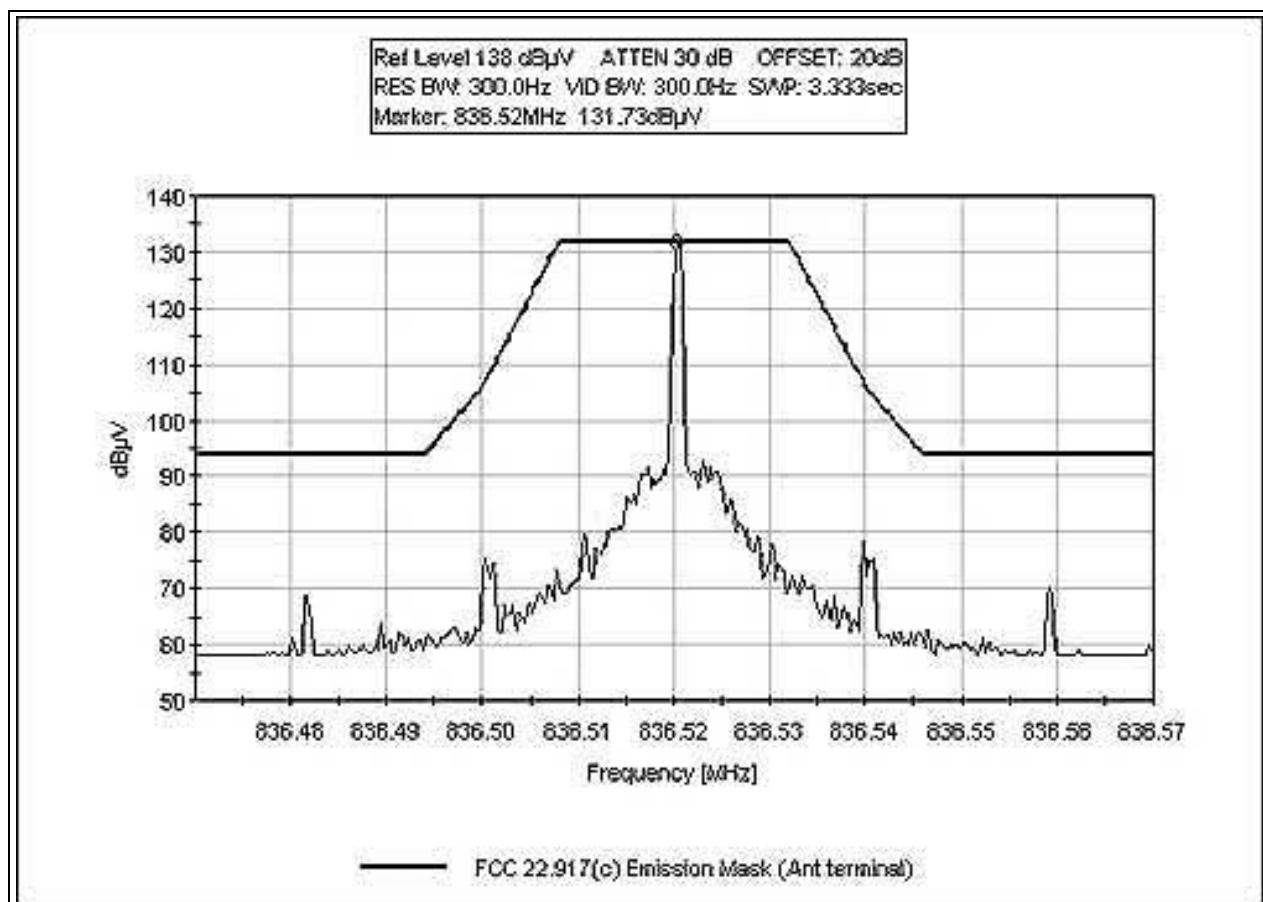
**FCC 2.1049 Occupied Bandwidth 1851.25MHz**



**FCC 2.1049 Occupied Bandwidth 1908.75MHz**



**FCC 22.917(c) Emissions Mask Mid Channel**



**Test Equipment**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	2111	HP	8593EM	3624A00159	05/12/2003	05/12/2005
2.4 GHz HPF	1440	K & L	91H31-3000	1	02/20/2003	02/20/2005
Power Meter	2082	HP	435B	2445A11881	09/30/2002	09/30/2004
Power Sensor	2036	HP	8482A	1551A01004	05/29/2003	05/29/2004

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



Front View

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



Side View

**FCC 2.1033(c)(14)/2.1051/2.1053/22.917(e) - OUT OF BAND EMISSIONS**

The necessary information is contained in a separate document.

## FCC 2.1033(c)(14)/2.1051/24.238 - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112  
 Customer: **Coleman Technologies**  
 Specification: **FCC 24.238 RF Spur**  
 Work Order #: **81879** Date: 03/04/2004  
 Test Type: **Conducted Emissions** Time: 14:26:49  
 Equipment: **AVL/GPS Data Logging w/ Wireless Communication** Sequence#: 1  
 Manufacturer: Coleman Technologies Tested By: Matthew Pettersen  
 Model: 1XRTT Agent 12VDC  
 S/N: 20040304

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

Function	Manufacturer	Model #	S/N
AVL/GPS Data Logging w/ Wireless Communication*	Coleman Technologies	1XRTT Agent	20040304

**Support Devices:**

Function	Manufacturer	Model #	S/N
Laptop	Compaq	Evo N150	D171QK260V3
Power Supply	CUI Inc.	DV-1280	none

**Test Conditions / Notes:**

EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation of the signal. EUT is in operation. Tx Freq = 1851.25MHz. 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz; 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz; 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz, 1000 MHz-20000 MHz; RBW=1 MHz, VBW=1 MHz. 12VDC (110VAC, 60Hz), 23°C, 55% relative humidity. Frequency range tested: 9kHz – 20GHz.

**Transducer Legend:**

T1=HPF 2.4GHz High Pass 022004

Measurement Data:				Reading listed by margin.							Test Lead: Antenna Terminal			
#	Freq MHz	Rdng dB $\mu$ V	T1 dB				Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant			
1	5552.750M	84.3	+2.4				+0.0	86.7	94.0	-7.3	Anten			
2	3702.500M	76.9	+0.7				+0.0	77.6	94.0	-16.4	Anten			
3	7404.000M	71.7	+5.1				+0.0	76.8	94.0	-17.2	Anten			
4	9254.750M	70.9	+5.3				+0.0	76.2	94.0	-17.8	Anten			
5	11106.250M	56.6	+4.7				+0.0	61.3	94.0	-32.7	Anten			
6	14808.250M	44.1	+3.8				+0.0	47.9	94.0	-46.1	Anten			
7	12959.750M	41.3	+5.0				+0.0	46.3	94.0	-47.7	Anten			
8	5021.000M	36.4	+1.2				+0.0	37.6	94.0	-56.4	Anten			

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

Customer: **Coleman Technologies**  
 Specification: **FCC 24.238 RF Spur**  
 Work Order #: **81879** Date: 03/04/2004  
 Test Type: **Conducted Emissions** Time: 14:19:57  
 Equipment: **AVL/GPS Data Logging w/ Wireless Communication** Sequence#: 2  
 Manufacturer: Coleman Technologies  
 Model: 1XRTT Agent  
 S/N: 20040304  
 Tested By: Matthew Pettersen  
 12VDC

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

Function	Manufacturer	Model #	S/N
AVL/GPS Data Logging w/ Wireless Communication*	Coleman Technologies	1XRTT Agent	20040304

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop	Compaq	Evo N150	D171QK260V3
Power Supply	CUI Inc.	DV-1280	none

***Test Conditions / Notes:***

EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation of the signal. EUT is in operation. Tx Freq = 1880MHz. 9 kHz-150 kHz; RBW=200 Hz, VBW=200 Hz; 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz; 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz, 1000 MHz-20000 MHz; RBW=1 MHz, VBW=1 MHz. 12VDC (110VAC, 60Hz), 23°C, 55% relative humidity. Frequency range tested: 9kHz – 20GHz.

***Transducer Legend:***

T1=HPF 2.4GHz High Pass 022004
--------------------------------

Measurement Data: Reading listed by margin.				Test Lead: Antenna Terminal						
#	Freq MHz	Rdng dB $\mu$ V	T1 dB	dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	5639.080M	76.0	+2.0			+0.0	78.0	94.0	-16.0	Anten
2	9398.700M	65.7	+6.7			+0.0	72.4	94.0	-21.6	Anten
3	7518.950M	64.6	+5.5			+0.0	70.1	94.0	-23.9	Anten
4	3760.450M	67.7	+0.8			+0.0	68.5	94.0	-25.5	Anten
5	11278.330M	50.3	+4.4			+0.0	54.7	94.0	-39.3	Anten
6	13160.080M	37.8	+4.5			+0.0	42.3	94.0	-51.7	Anten
7	15040.200M	37.8	+4.3			+0.0	42.1	94.0	-51.9	Anten
8	5113.000M	35.3	+1.5			+0.0	36.8	94.0	-57.2	Anten

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112  
 Customer: **Coleman Technologies**  
 Specification: **FCC 24.238 RF Spur**  
 Work Order #: **81879** Date: 03/04/2004  
 Test Type: **Conducted Emissions** Time: 14:03:29  
 Equipment: **AVL/GPS Data Logging w/ Wireless** Sequence#: 3  
**Communication**  
 Manufacturer: Coleman Technologies Tested By: Matthew Pettersen  
 Model: 1XRTT Agent 12VDC  
 S/N: 20040304

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

Function	Manufacturer	Model #	S/N
AVL/GPS Data Logging w/ Wireless Communication*	Coleman Technologies	1XRTT Agent	20040304

**Support Devices:**

Function	Manufacturer	Model #	S/N
Laptop	Compaq	Evo N150	D171QK260V3
Power Supply	CUI Inc.	DV-1280	none

**Test Conditions / Notes:**

EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation of the signal. EUT is in operation. Tx Freq = 1908.75MHz. 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz; 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz; 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz, 1000 MHz-20000 MHz; RBW=1 MHz, VBW=1 MHz. 12VDC (110VAC, 60Hz), 23°C, 55% relative humidity. Frequency range tested: 9kHz – 20GHz.

**Transducer Legend:**

T1=HPF 2.4GHz High Pass 022004
--------------------------------

#	Freq MHz	Rdng dB $\mu$ V	Reading listed by margin.			Dist Table	Test Lead: Antenna Terminal			
			T1 dB	dB	dB		Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	5725.250M	80.8	+1.6			+0.0	82.4	94.0	-11.6	Anten
2	3816.900M	80.4	+0.8			+0.0	81.2	94.0	-12.8	Anten
3	9542.200M	70.9	+7.4			+0.0	78.3	94.0	-15.7	Anten
4	7633.700M	64.7	+5.7			+0.0	70.4	94.0	-23.6	Anten
5	11452.450M	53.3	+4.0			+0.0	57.3	94.0	-36.7	Anten
6	13362.550M	45.1	+3.7			+0.0	48.8	94.0	-45.2	Anten
7	15269.500M	42.8	+3.6			+0.0	46.4	94.0	-47.6	Anten

**Test Equipment**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	2111	HP	8593EM	3624A00159	05/12/2003	05/12/2005
2.4 GHz HPF	1440	K & L	91H31-3000	1	02/20/2003	02/20/2005
Power Meter	2082	HP	435B	2445A11881	09/30/2002	09/30/2004
Power Sensor	2036	HP	8482A	1551A01004	05/29/2003	05/29/2004

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



Side View

## FCC 2.1033(c)(14)/2.1055/22.355/24.235 - FREQUENCY STABILITY

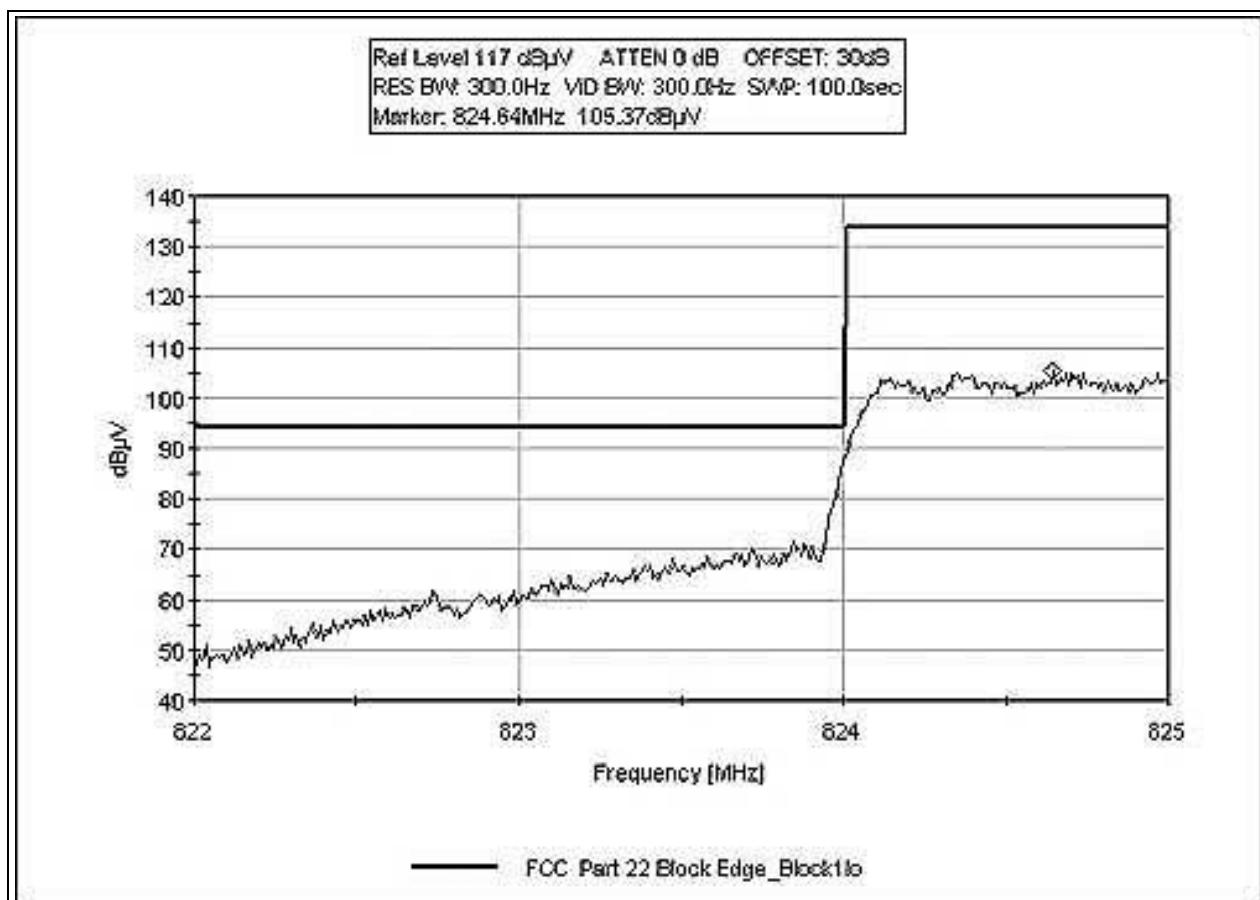
The necessary information is contained in a separate document.

## FCC 24.236 - FIELD STRENGTH LIMITS

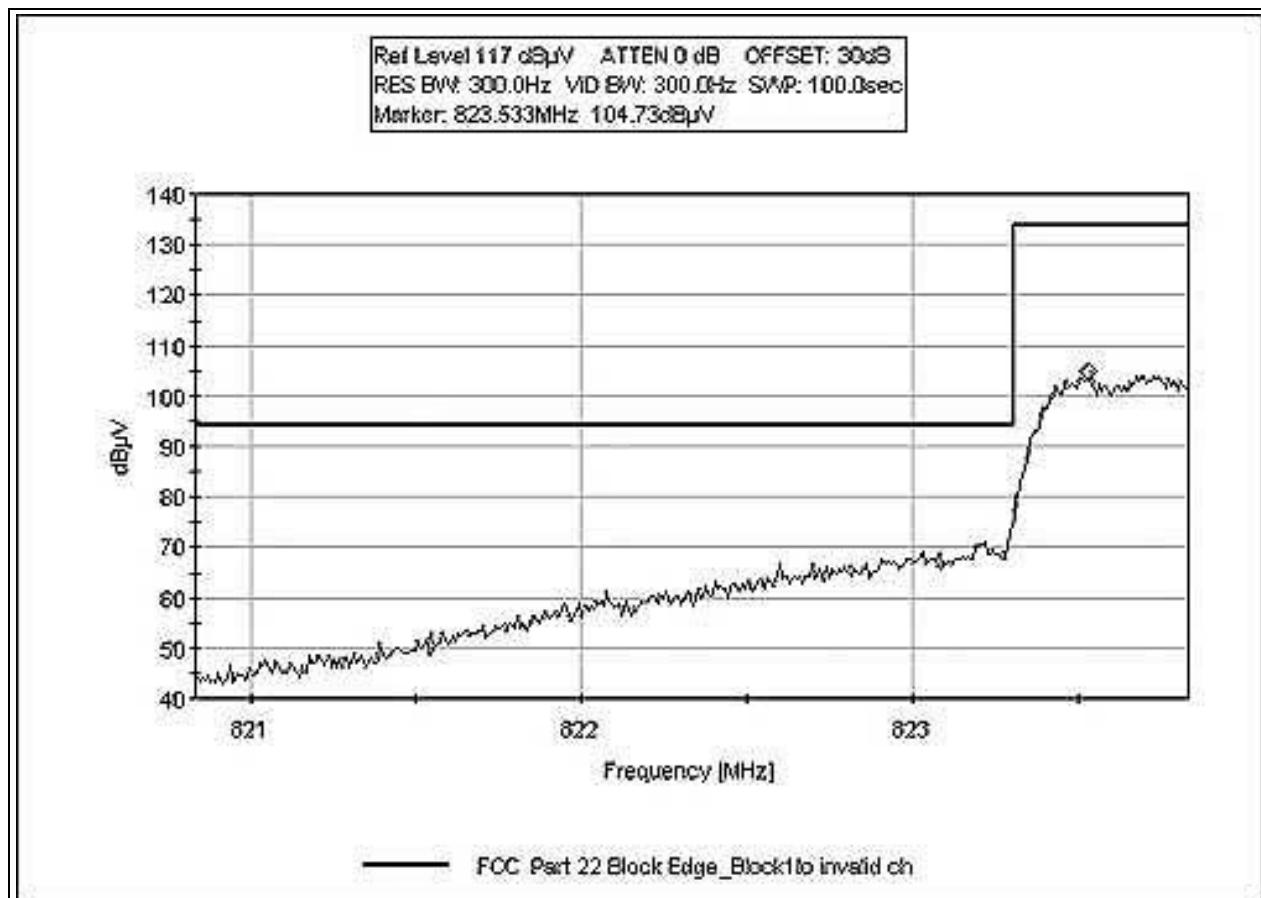
The necessary information is contained in a separate document.

## FCC Part 22 Block Edge Block 1 Low

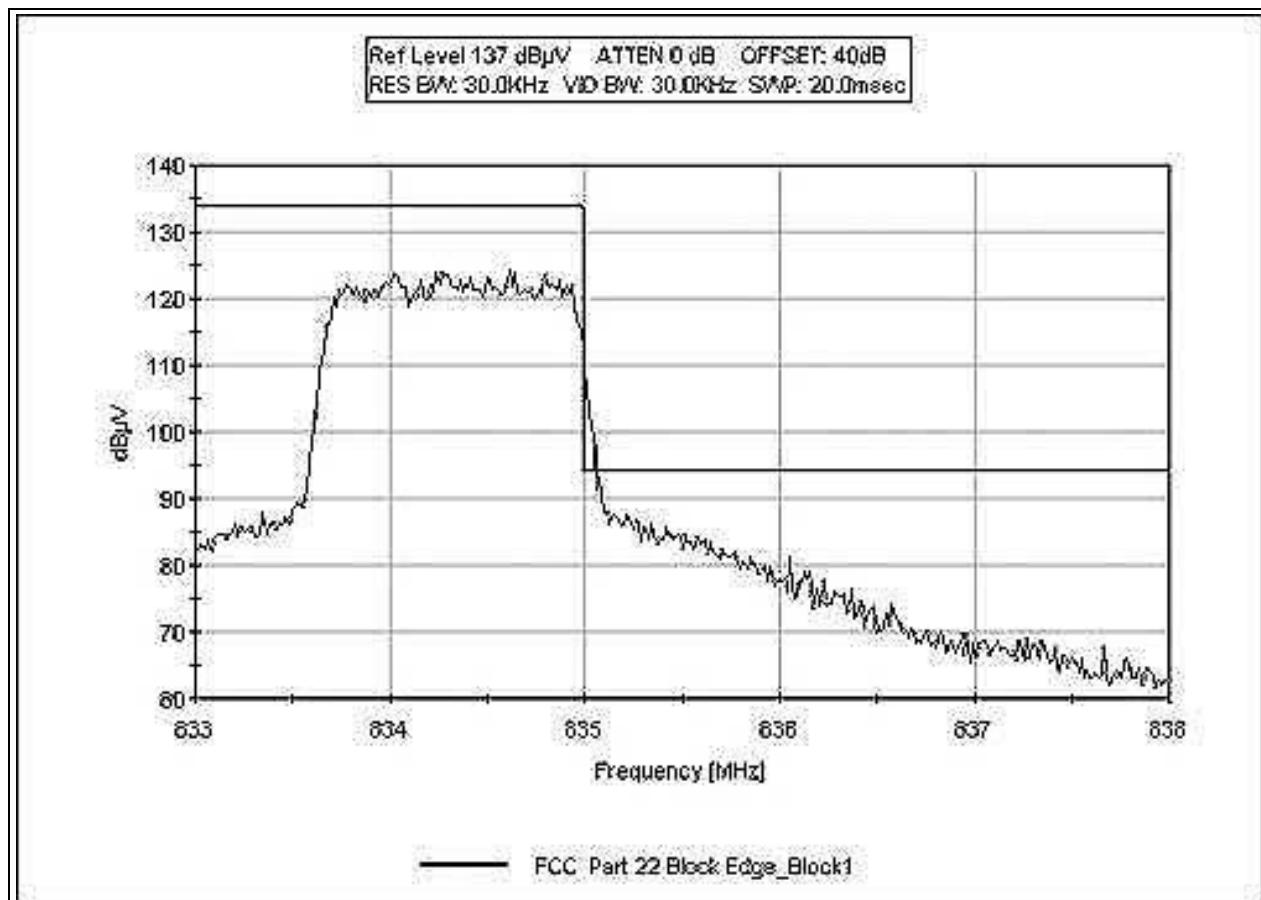
**Test Conditions :** EUT is placed on the test bench. Discrete I/O port is connected to the support laptop. Power is obtained from a support DC power supply. RF port is connected to the spectrum analyzer for evaluation if the signal. EUT is in operational. 12VDC (110VAC, 60Hz), 23°C, 55% relative humidity.



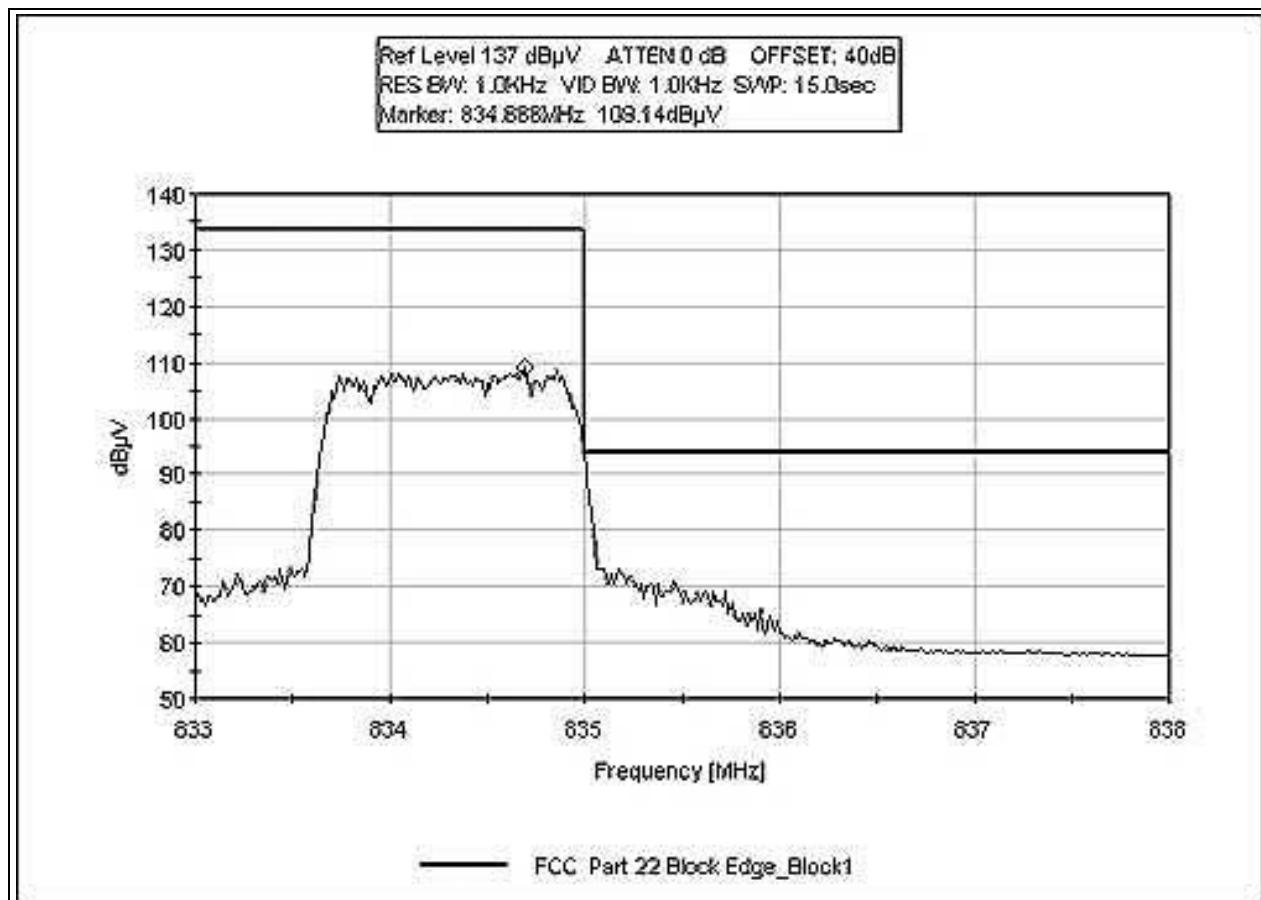
**FCC Part 22 Block Edge Block 1 Low Invalid Channel**



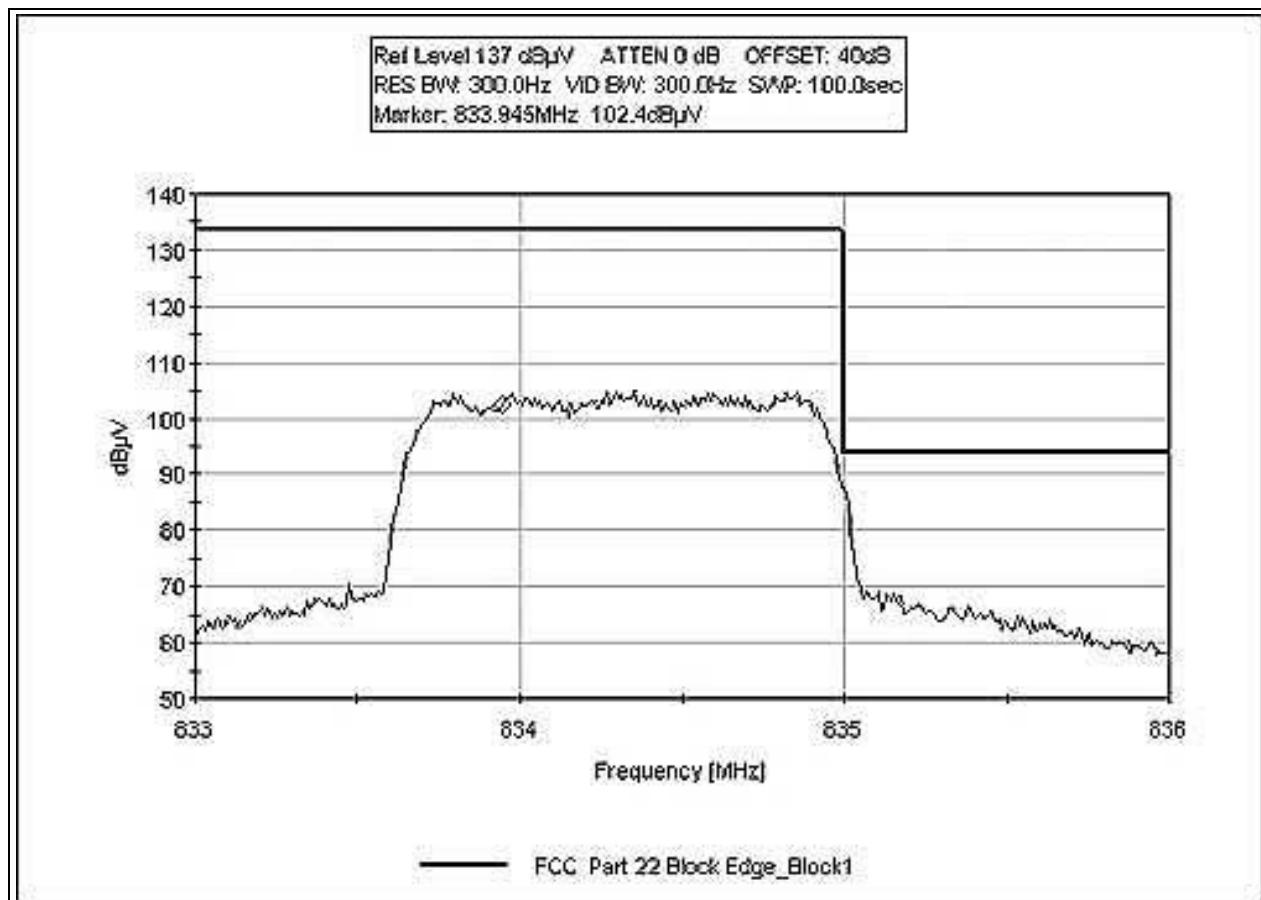
**FCC Part 22 Block Edge Block 1 High**



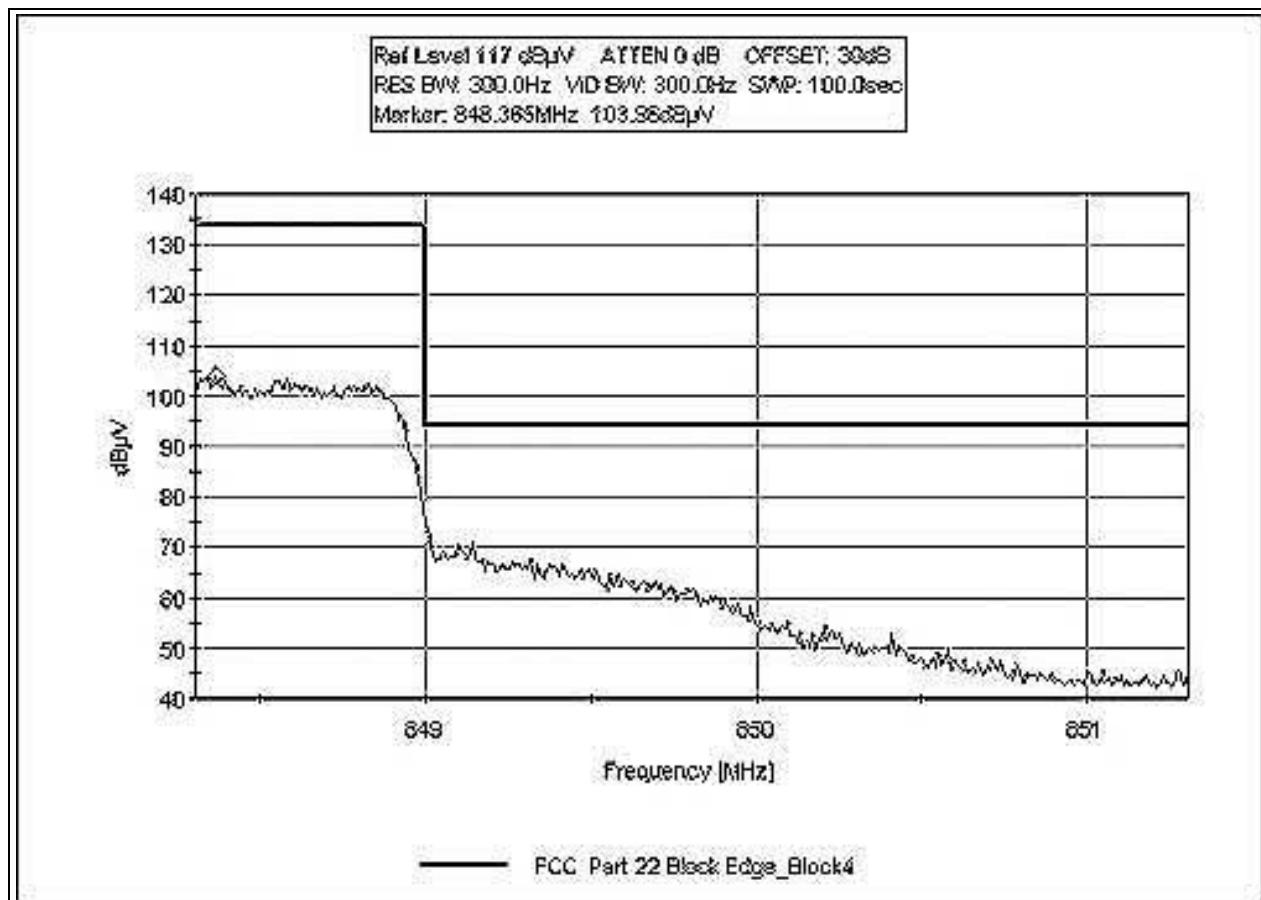
**FCC Part 22 Block Edge Block 1 High 1kHz**



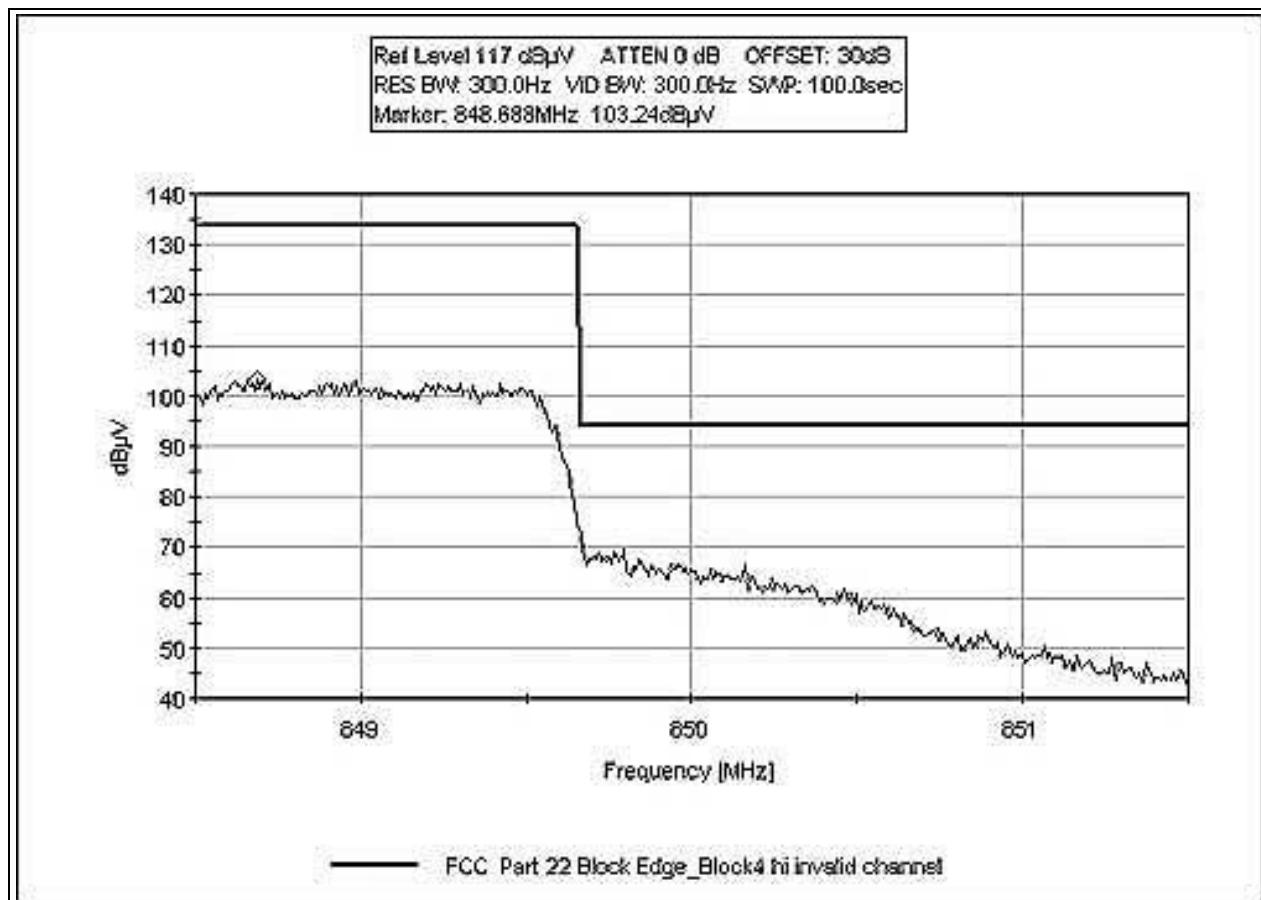
**FCC Part 22 Block Edge Block 1 High 300Hz**



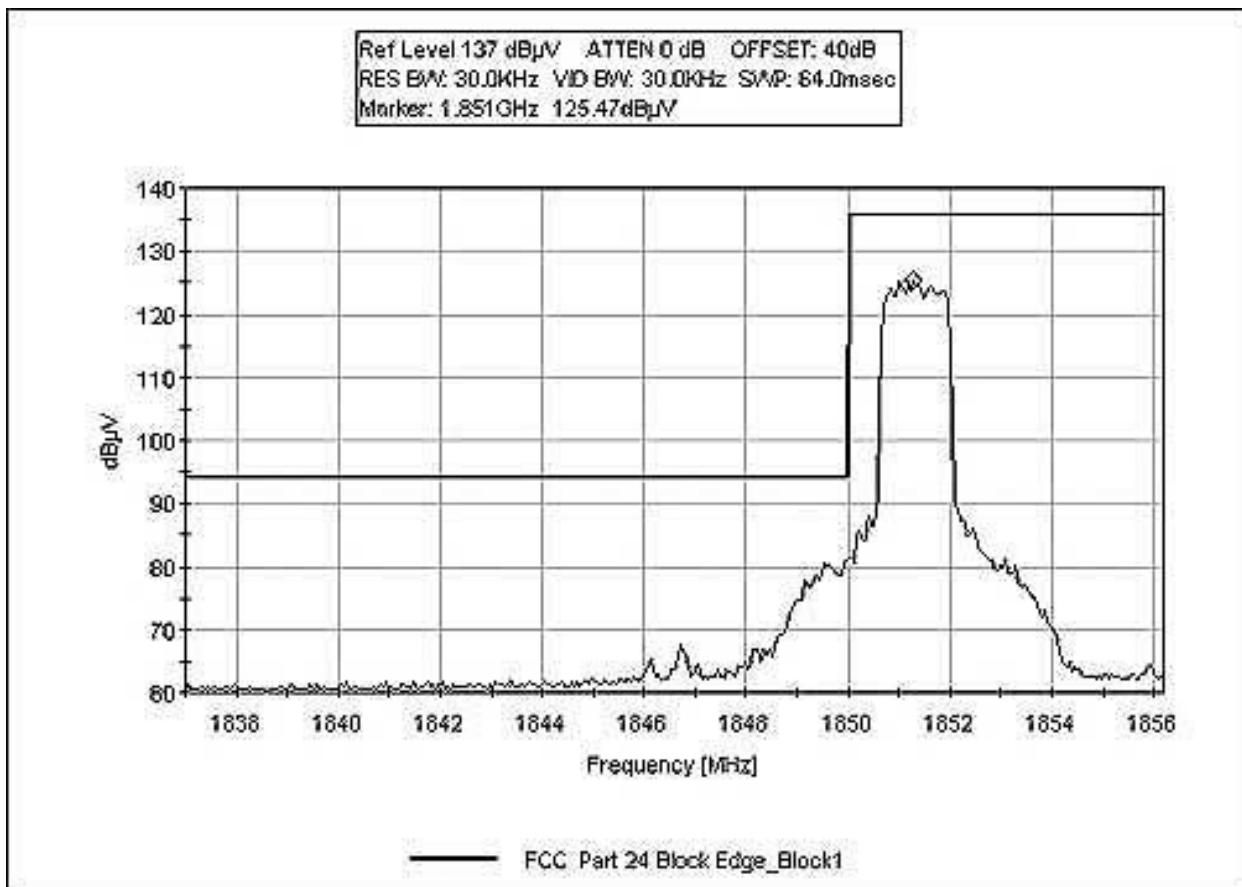
**FCC Part 22 Block Edge Block 4 High**



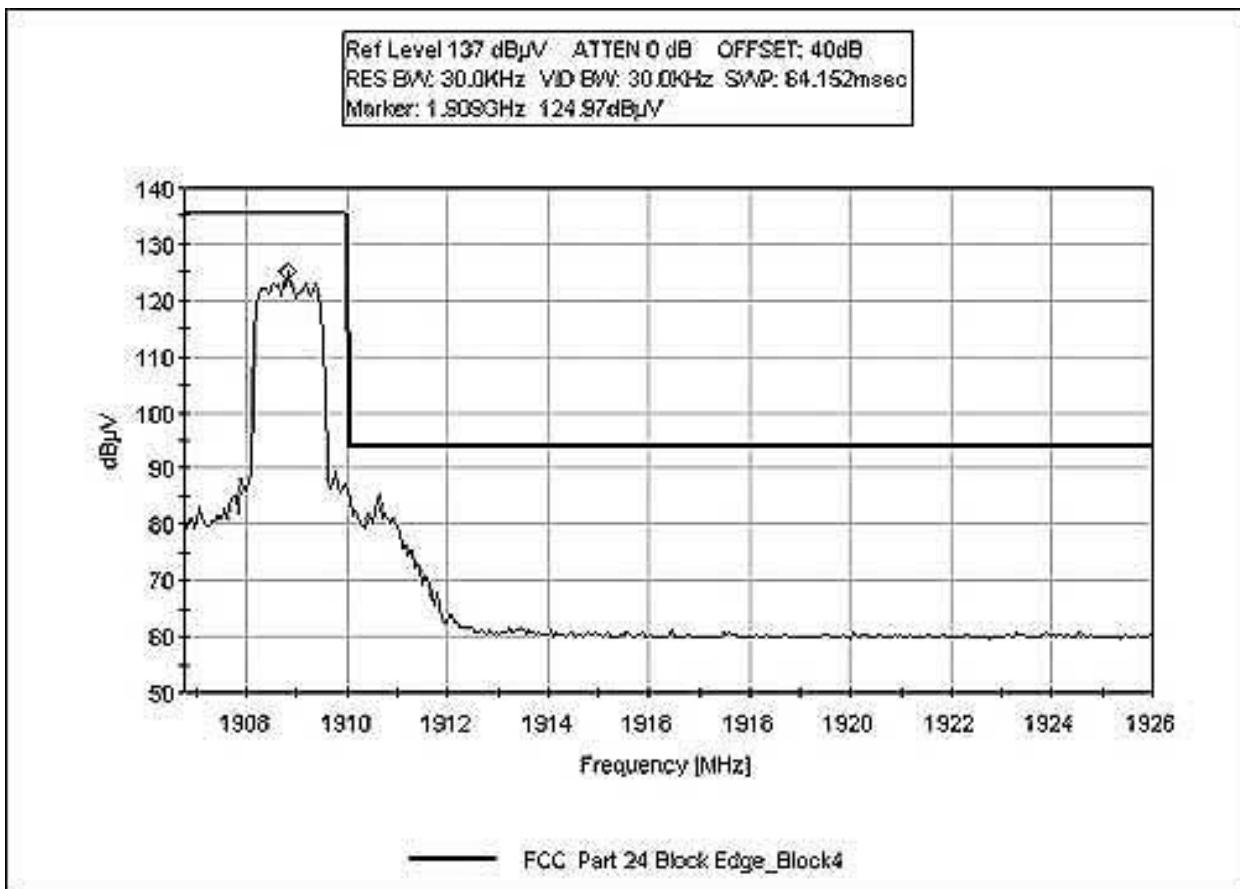
**FCC Part 22 Block Edge Block 4 High Invalid Channel**



**FCC Part 24 Block Edge Block 1 Low 1851.25MHz**



**FCC Part 24 Block Edge Block 1 High 1908.75MHz**



**Test Equipment**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	2111	HP	8593EM	3624A00159	05/12/2003	05/12/2005
2.4 GHz HPF	1440	K & L	91H31-3000	1	02/20/2003	02/20/2005
Power Meter	2082	HP	435B	2445A11881	09/30/2002	09/30/2004
Power Sensor	2036	HP	8482A	1551A01004	05/29/2003	05/29/2004

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



Front View

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



Side View