



**ADDENDUM TO IP MOBILENET TEST REPORT FC04-066A**

**FOR THE**

**700/800 MOBILE RADIO, M64700G25**

**FCC PART 90**

**COMPLIANCE**

**DATE OF ISSUE: MAY 9, 2005**

**PREPARED FOR:**

IP MobileNet  
16842 Von Karman  
Irvine, CA 92606

P.O. No.: 003611-00  
W.O. No.: 82563

**PREPARED BY:**

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Date of test: September 24, 2004 –  
April 15, 2005

**Report No.: FC04-066B**

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## ADMINISTRATIVE INFORMATION

**DATE OF TEST:** September 24, 2004 – April 15, 2005

**DATE OF RECEIPT:** September 24, 2004

**PURPOSE OF TEST:** To demonstrate the compliance of the 700/800 Mobile Radio, M64700G25 with the requirements for FCC Part 90 devices.  
**Addendum A** is to add 90.543(e) data.  
**Addendum B** is to add 90.543 data with new testing on April 15, 2005.

**TEST METHOD:** FCC Part 90

**FREQUENCY RANGE TESTED:** 4 MHz-9 GHz

**MANUFACTURER:** IP MobileNet  
16842 Von Karman  
Irvine, CA 92606

**REPRESENTATIVE:** Eric Tanner

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

## SUMMARY OF RESULTS

As received, the IP MobileNet 700/800 Mobile Radio, M64700G25 was found to be fully compliant with the following standards and specifications:

### United States

➤ FCC Part 90

## CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

## APPROVALS

Steve Behm, Director of Engineering Services

### QUALITY ASSURANCE:



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Joyce Walker, Quality Assurance Administrative Manager

### TEST PERSONNEL:



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Eddie Wong, EMC Engineer



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Stuart Yamamoto, EMC Engineer

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

The EUT tested by CKC Laboratories was a production unit. It is a 30 Watt mobile radio to be used in a wireless data network.

The following model was tested by CKC Laboratories: **M32700G25**

Since the time of testing the manufacturer has chosen to use the following model name in its place. Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets: **M64700G25**.

## **EQUIPMENT UNDER TEST**

### **Mobile Data Radio**

Manuf: IPMobileNet  
Model: M64700G25  
Serial: 04363311  
FCC ID: MI7-M64700G-25

## **PERIPHERAL DEVICES**

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

### **Laptop Computer**

Manuf: Dell Corporation  
Model: PP02L Inspiron I2500  
Serial: 5TZ6611  
FCC ID: DoC

### **DC Power Supply**

Manuf: Samlex America  
Model: SEC 1223  
Serial: 03061-0D01-0632  
FCC ID: NA

### **High Power Termination**

Manuf: Weinschel Corporation  
Model: 45-40-43  
Serial: MN216  
FCC ID: DoC

### **GPS Antenna**

Manuf: San Jose Navigation, Inc.  
Model: SM-25  
Serial: 2569790  
FCC ID: DoC

**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**

15K7F1D

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

794 to 806 MHz

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

25 Watts

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

30 Watts

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

13.8 V

**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**

FSK

## **FCC 2.1033(c)(14)/2.1046/90.541(b) - RF POWER OUTPUT**

**Test Conditions:** The EUT was connected to a laptop computer via the serial interface. The laptop computer was used to command the EUT to begin transmitting or stop transmitting as well as to change the EUT from channel to channel. Also connected to the EUT was a GPS antenna. This GPS antenna was placed outside the room so that there were no obstructions to the sky. A separate DC power supply was used to provide 13.8 VDC 9A to the EUT. On the output of the EUT was placed a high power termination/attenuator which went to either a power meter or spectrum analyzer to measure the RF power, bandwidth, or frequency. The EUT was set to output the rated power of 25 watts. Bandwidth settings: >1 MHz.

FCC 90.541(b) Transmitter output power.

**Limit is 30 Watts**

### **Measured Values from the EUT:**

Low Channel (794 MHz). Measured value was 25.0 Watts.

Middle Channel (800 MHz). Measured value was 25.0 Watts.

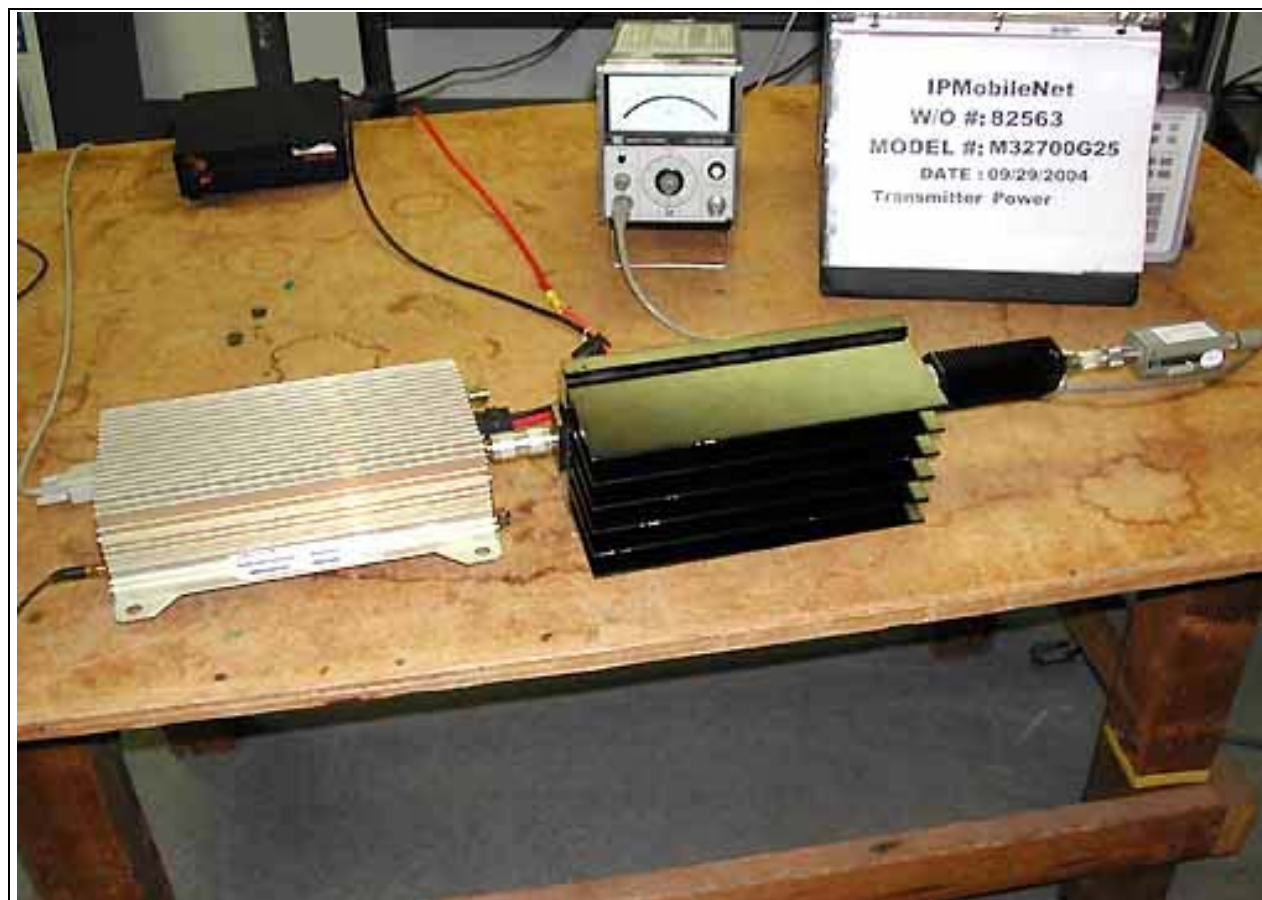
High Channel (806 MHz). Measured value was 25.0 Watts.

### **Test Equipment**

<b>Equipment</b>	<b>Asset #</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>Serial #</b>	<b>Cal Date</b>	<b>Cal Due</b>
RF Power meter	02082	HP	435B	2445A11881	061704	061706
Power Sensor	02036	HP	8482A	1551A01004	061804	061806
High Power 30 dB Attenuator	01578	Bird	25-A-MFN-30	(none)	*	*
High Power 30dB Attenuator	(none)	Weinschel	53-30-34	MG378	*	*

Note: \*-Checks of both attenuators insertion loss was performed just prior to this test at the discrete frequencies used (794 MHz, 800 MHz, and 806 MHz).

## RF POWER

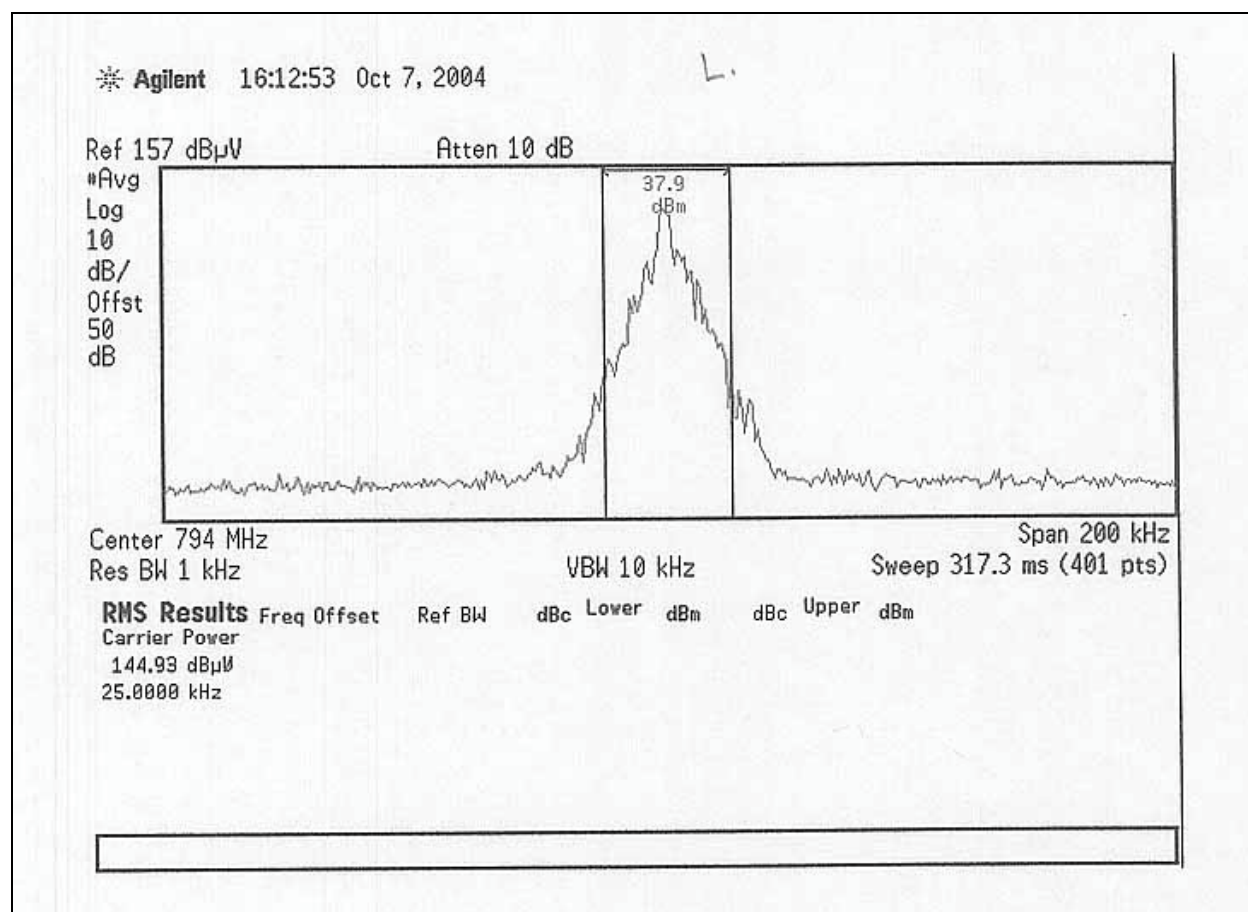




## FCC 90.543 - ADJACENT CHANNEL POWER

**Test Conditions:** The antenna port of the EUT is connected to the spectrum analyzer. The EUT is transmitting during the measurement.

Due to the 100 dBc requirement the test method is altered to avoid damaging the test instrument. The fundamental channel power integrated over 25 kHz was first measured, then a 20 dB notch filter was placed in line and the power integrated over 30 kHz is measured in the center of the receiving band. The internal amplifier of the spectrum analyzer was activated and compensated for.



\* Agilent 16:24:40 Oct 7, 2004

Ref 96.99 dBμV

#Atten 0 dB

#Avg  
Log  
10  
dB/  
Offst  
20  
dB

Ref Level  
96.99 dBμV

-85.6  
dBm

Center 770 MHz

#Res BW 1 kHz

VBW 10 kHz

Span 200 kHz

Sweep 317.3 ms (401 pts)

**RMS Results**

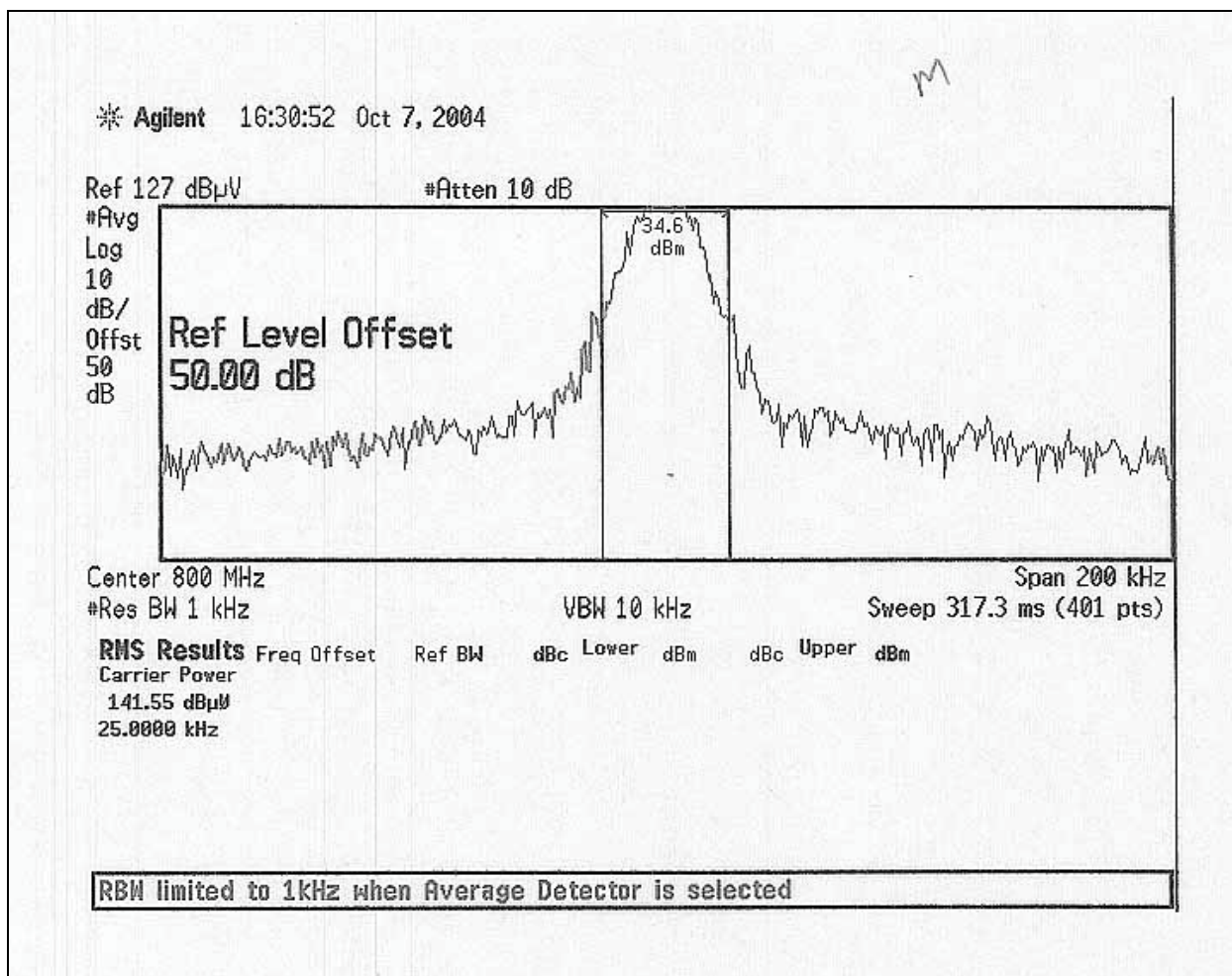
Carrier Power

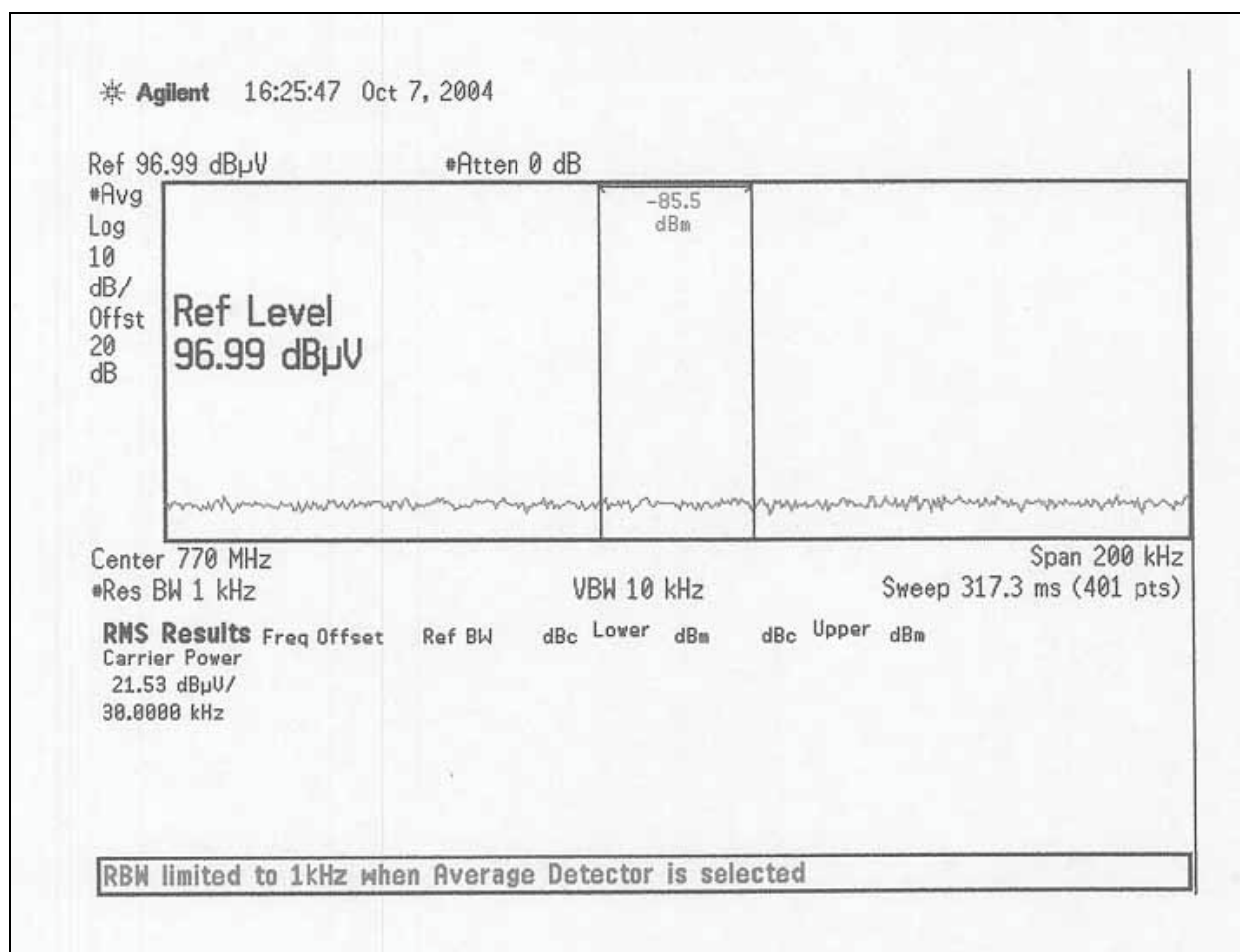
21.39 dBμV/

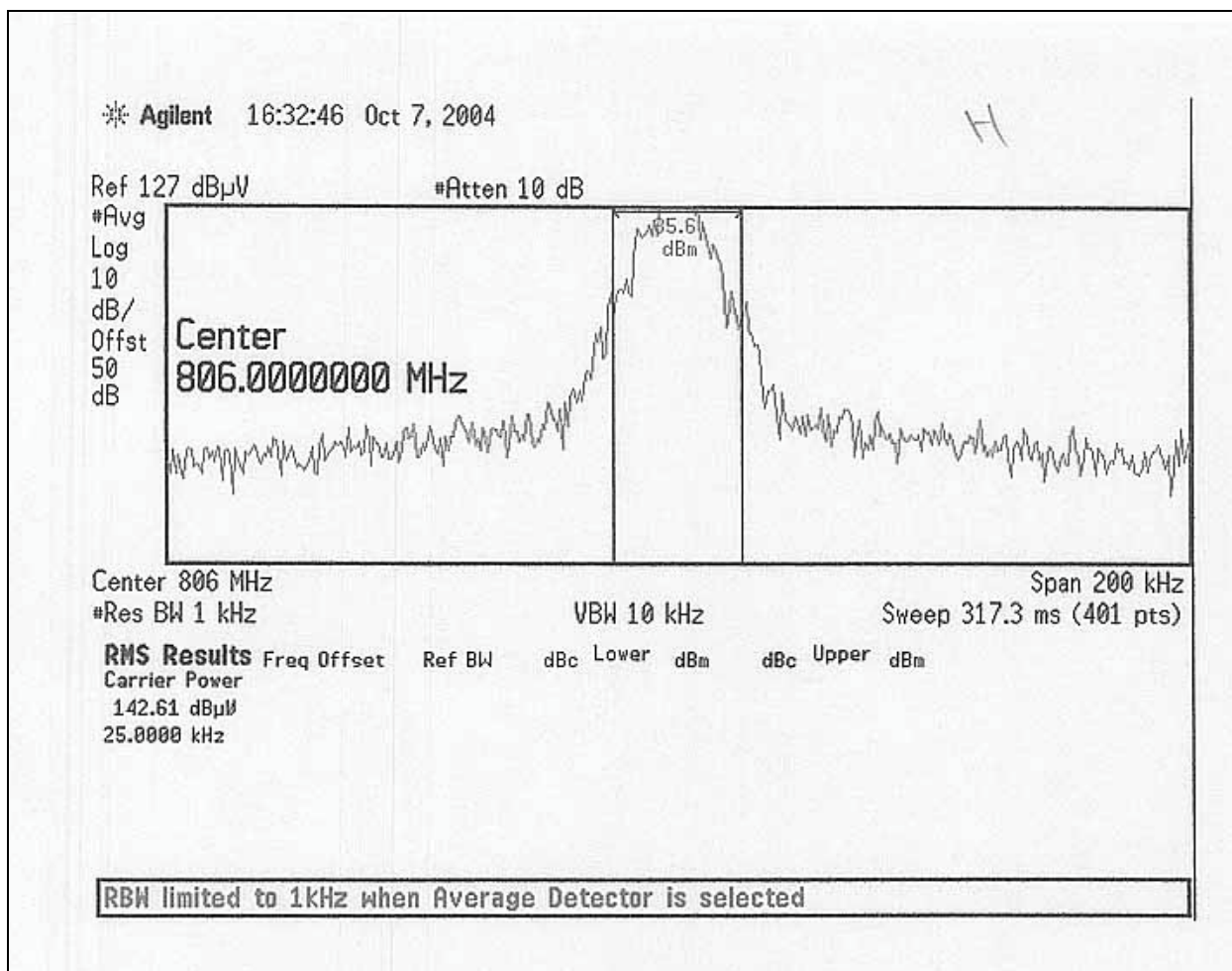
30.0000 kHz

Freq Offset Ref BW dBc Lower dBm dBc Upper dBm

RBW limited to 1kHz when Average Detector is selected

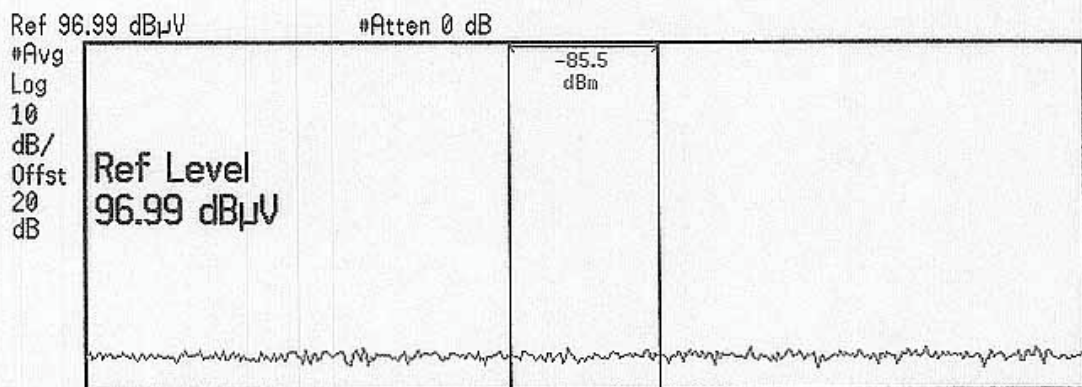








\* Agilent 16:26:49 Oct 7, 2004

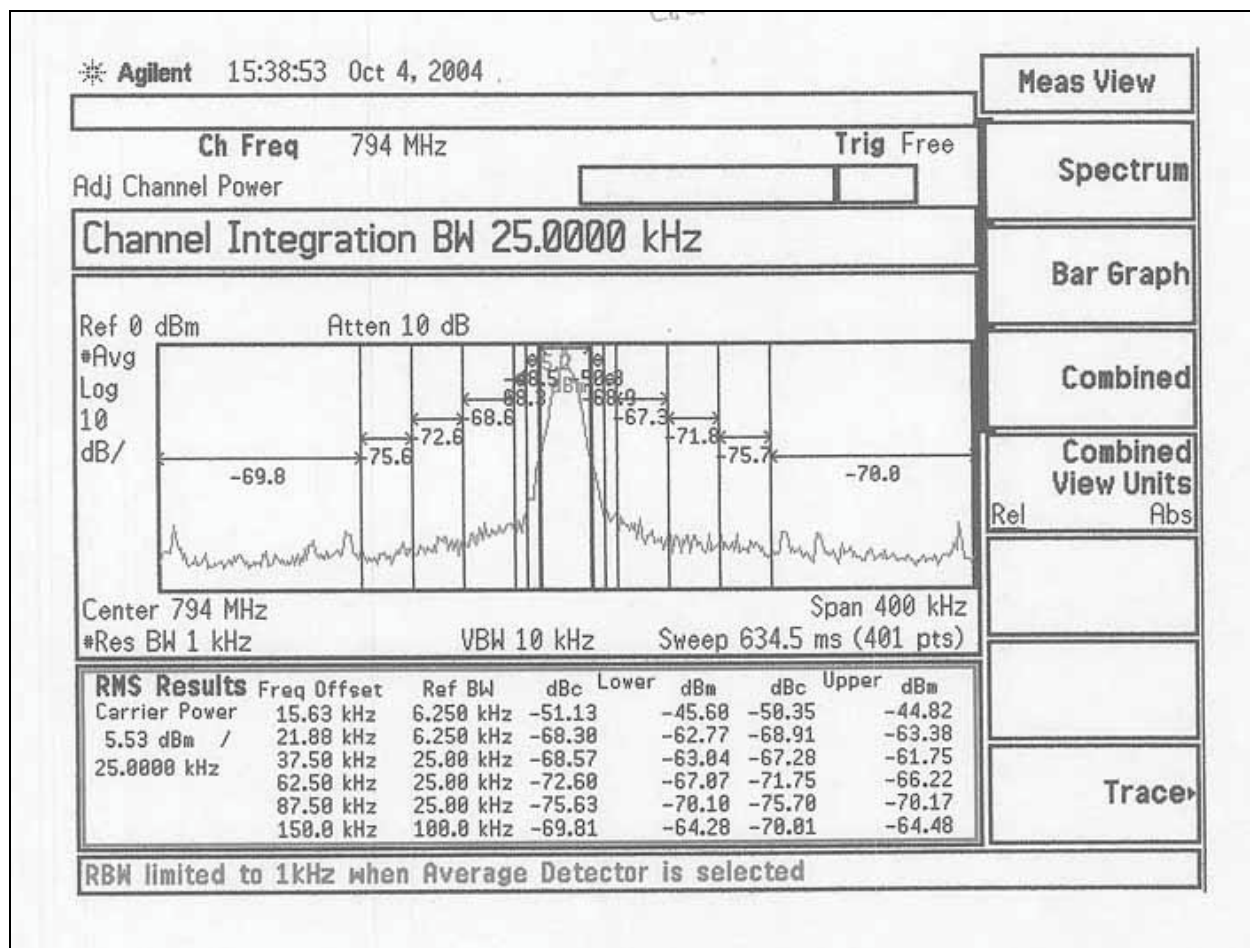


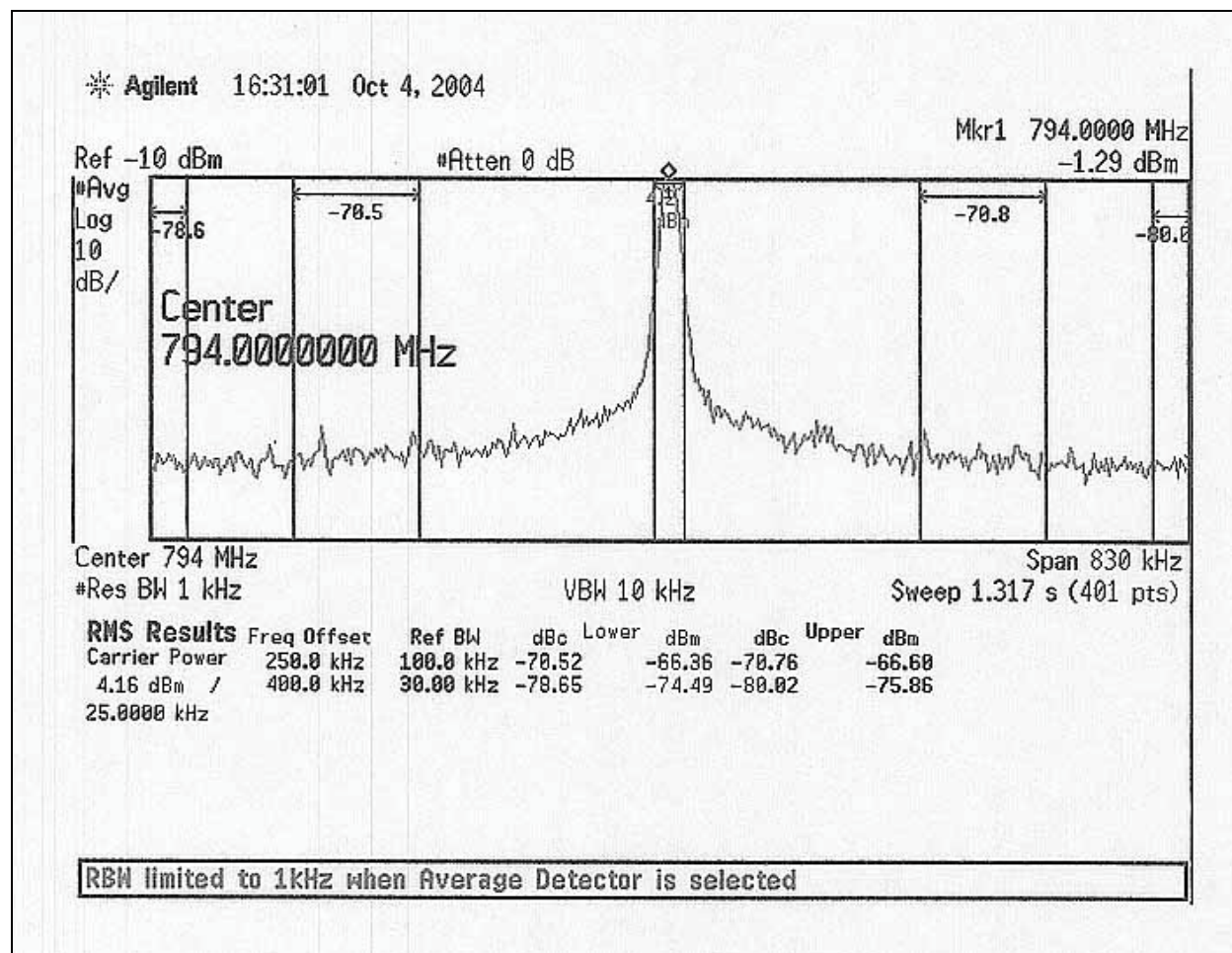
Center 770 MHz Span 200 kHz  
#Res BW 1 kHz VBW 10 kHz Sweep 317.3 ms (401 pts)

**RMS Results**

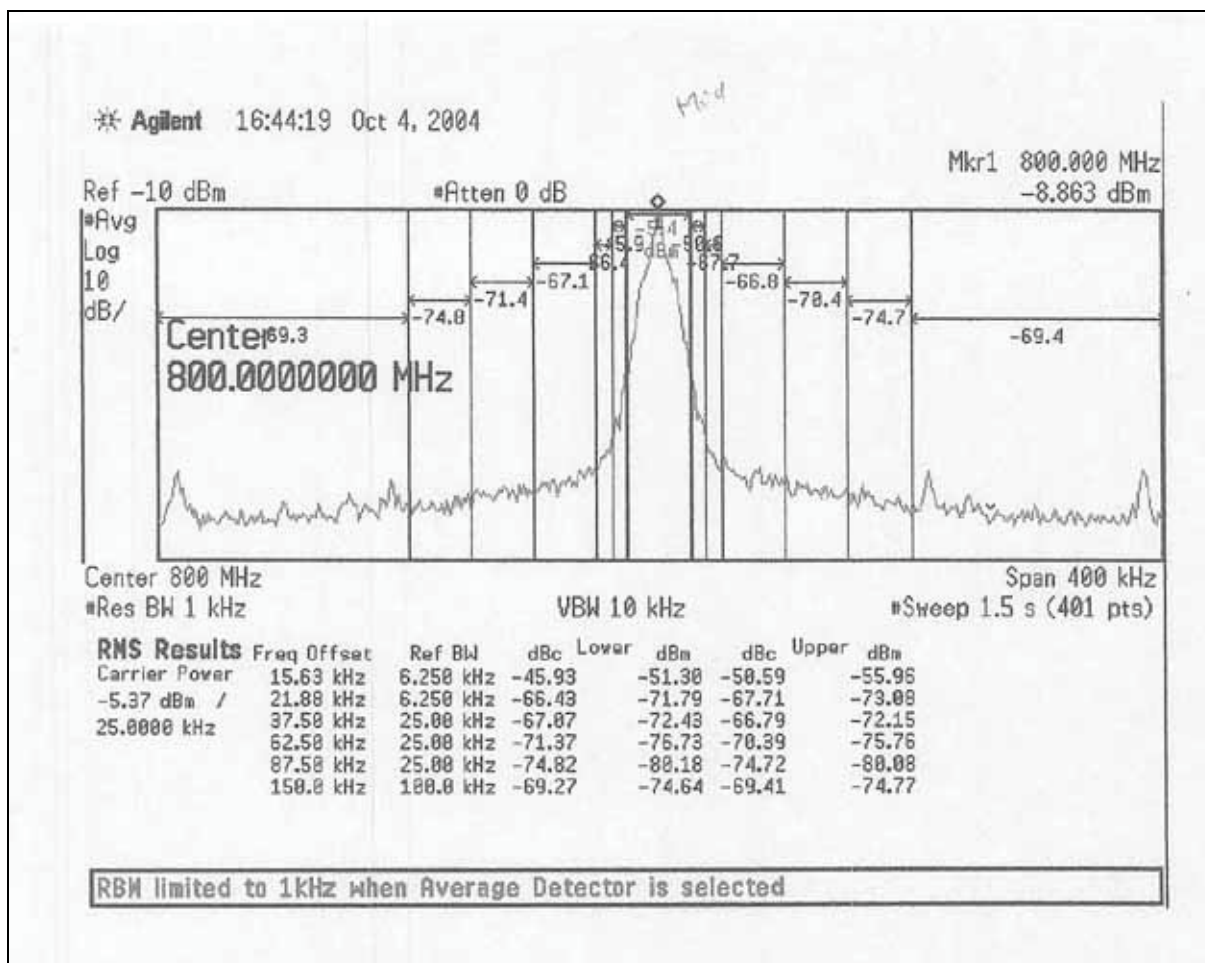
Carrier Power	Freq Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
21.52 dB $\mu$ V/								
30.0000 kHz								

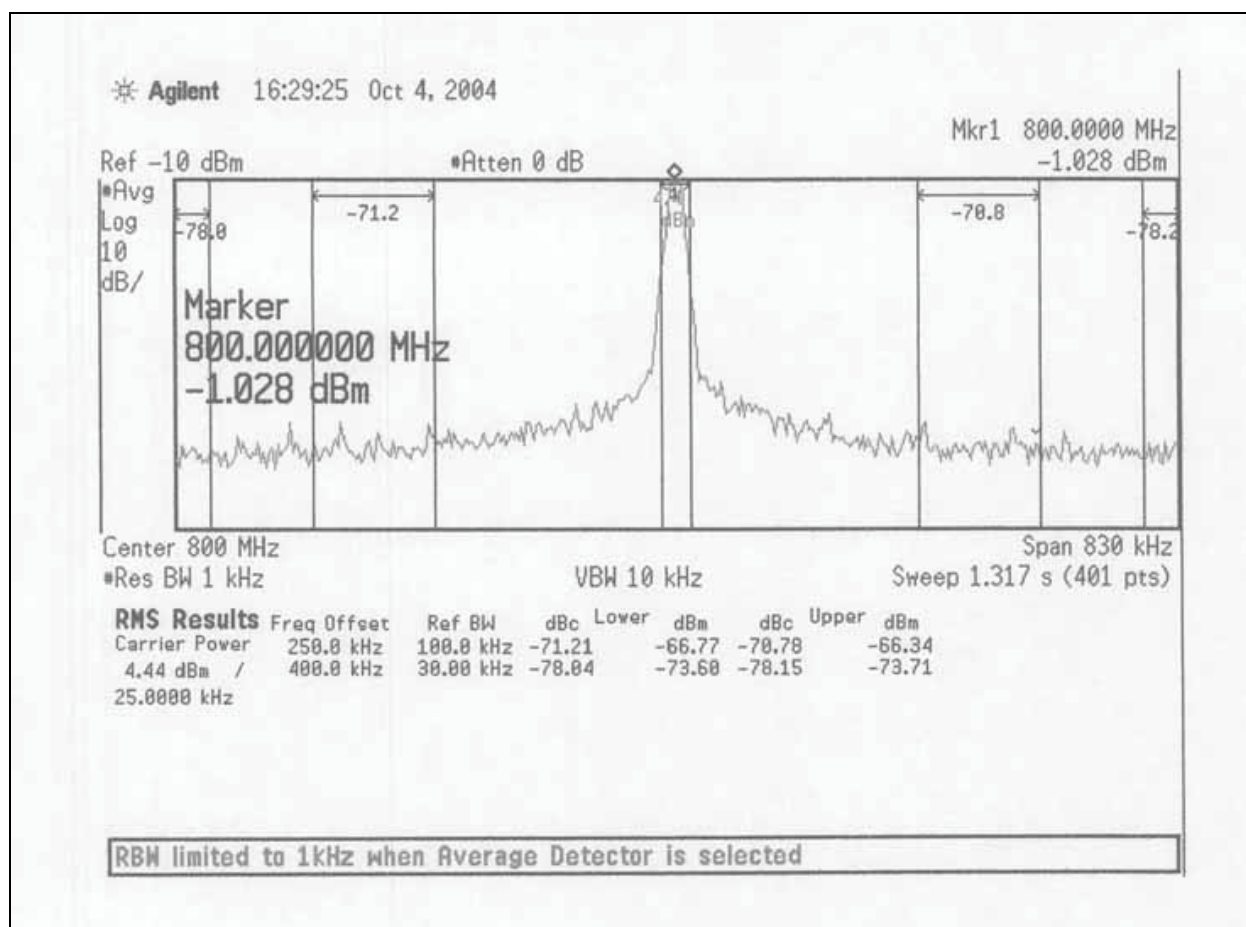
RBW limited to 1kHz when Average Detector is selected

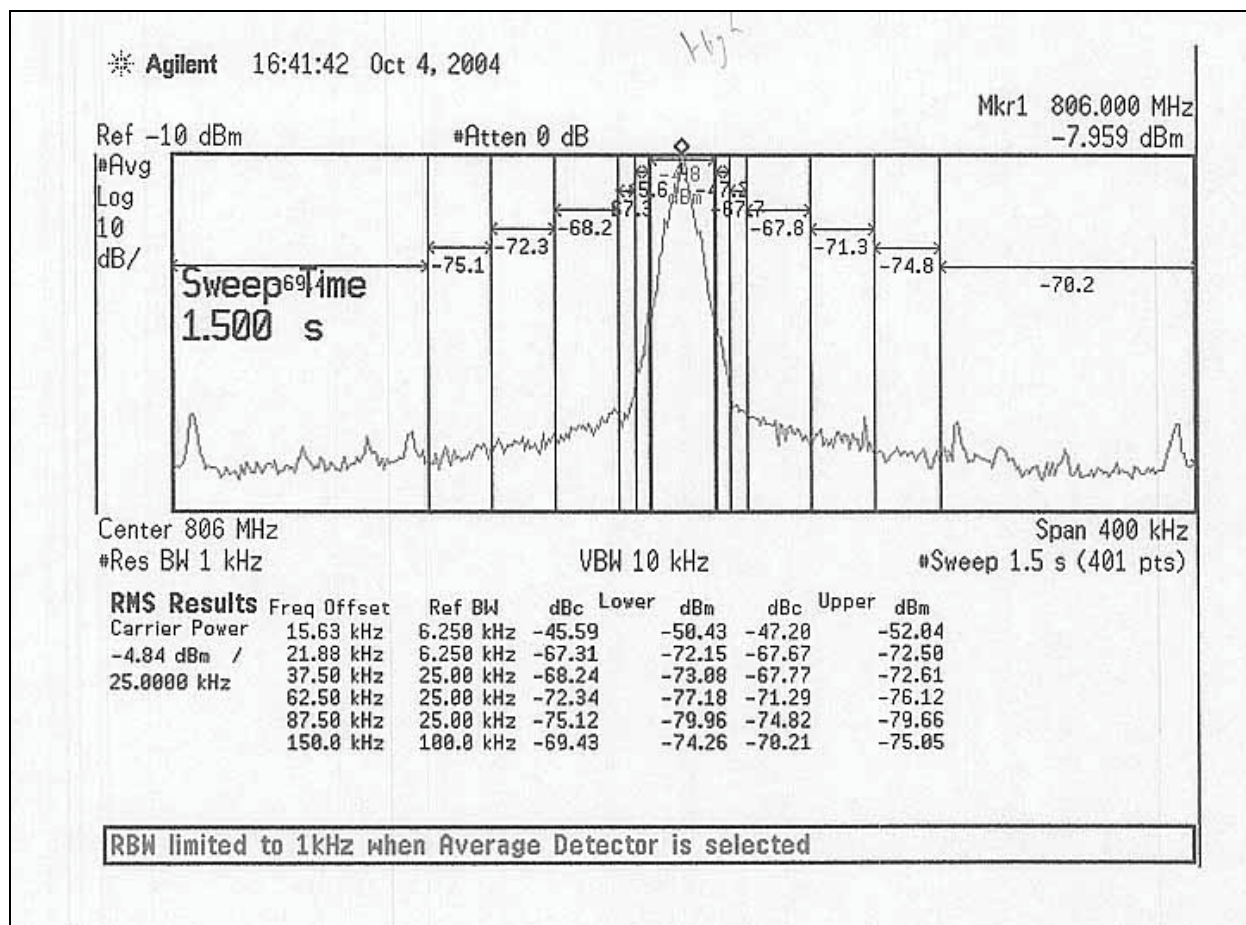




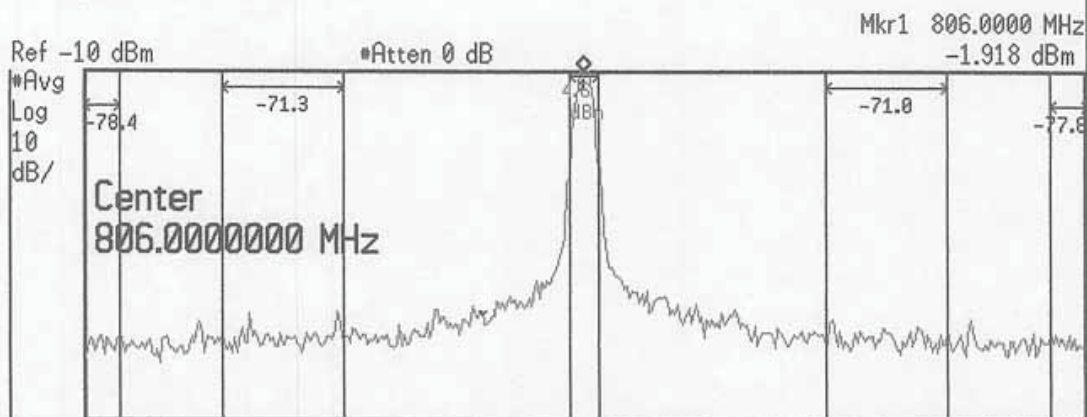








\* Agilent 16:32:42 Oct 4, 2004



Center 806 MHz      Span 830 kHz  
 \*Res BW 1 kHz      VBW 10 kHz      Sweep 1.317 s (401 pts)

RMS Results		Freq Offset	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	250.0 kHz	100.0 kHz	-71.34	-66.74	-71.02	-66.41			
4.61 dBm /	400.0 kHz	30.00 kHz	-78.35	-73.75	-77.77	-73.16			
25.0000 kHz									

RBW limited to 1kHz when Average Detector is selected

**Test Equipment**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer		HP	E4402B	US 39010181	8/25/04	8/2505

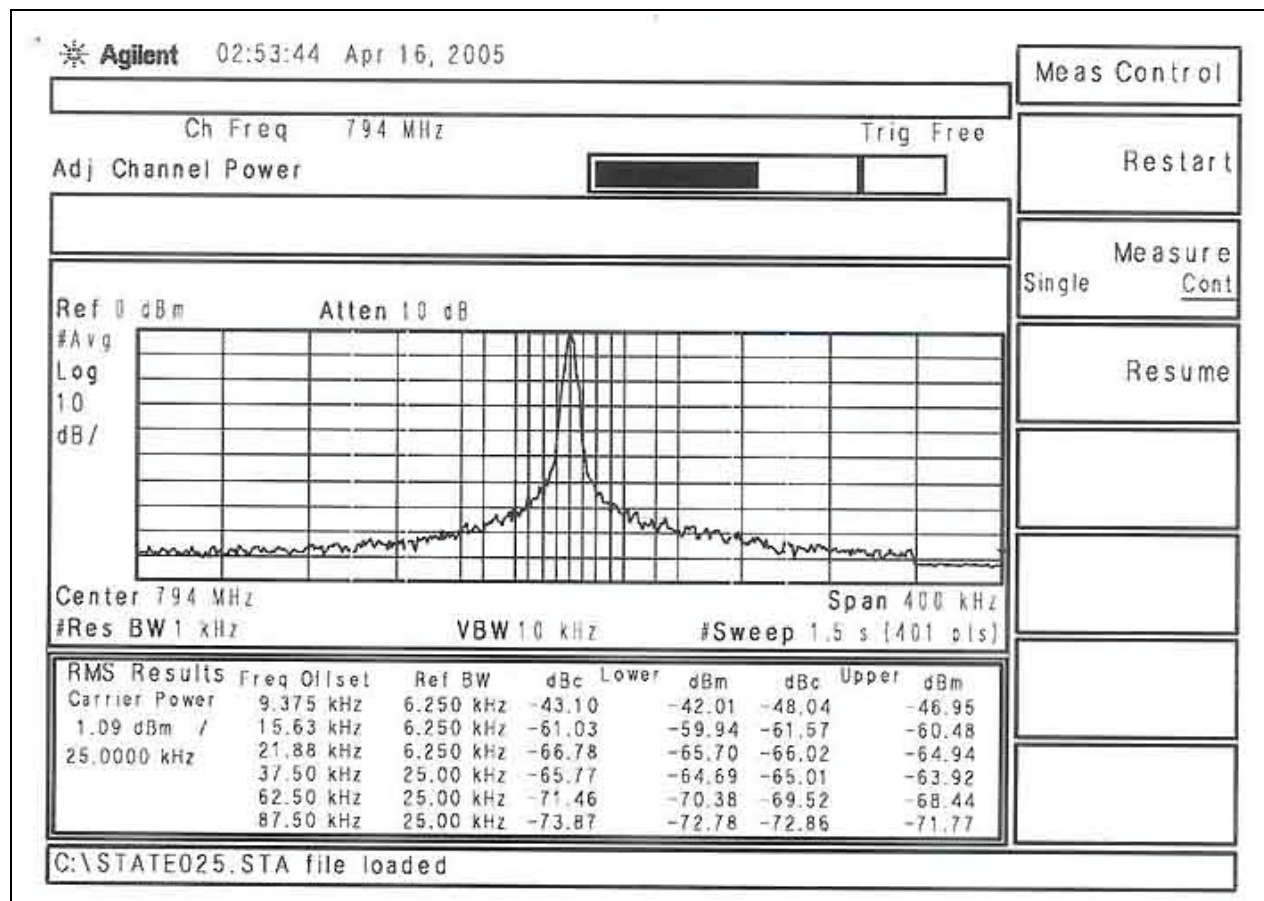
**ADJACENT CHANNEL POWER**



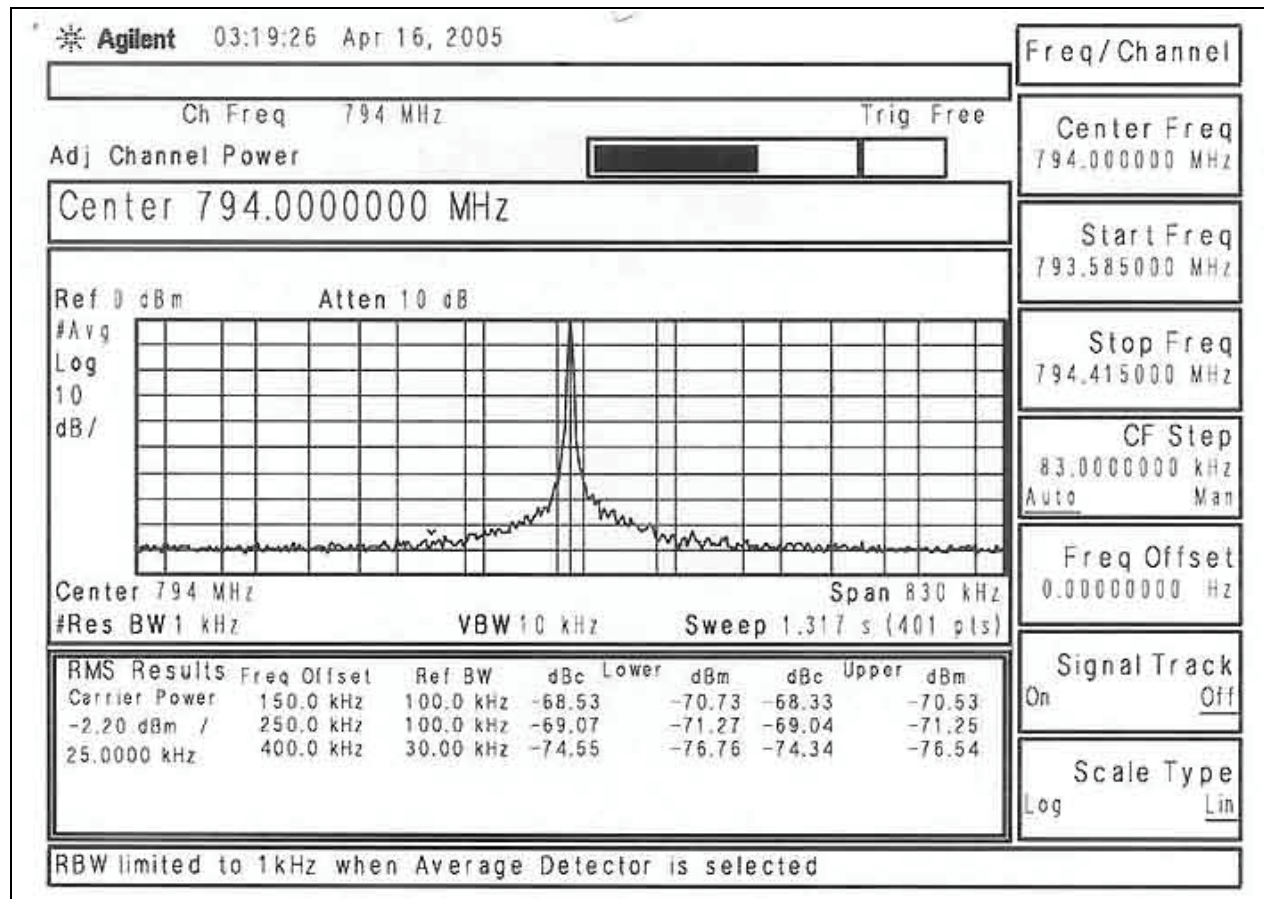


## FCC 90.543 - ADJACENT CHANNEL POWER

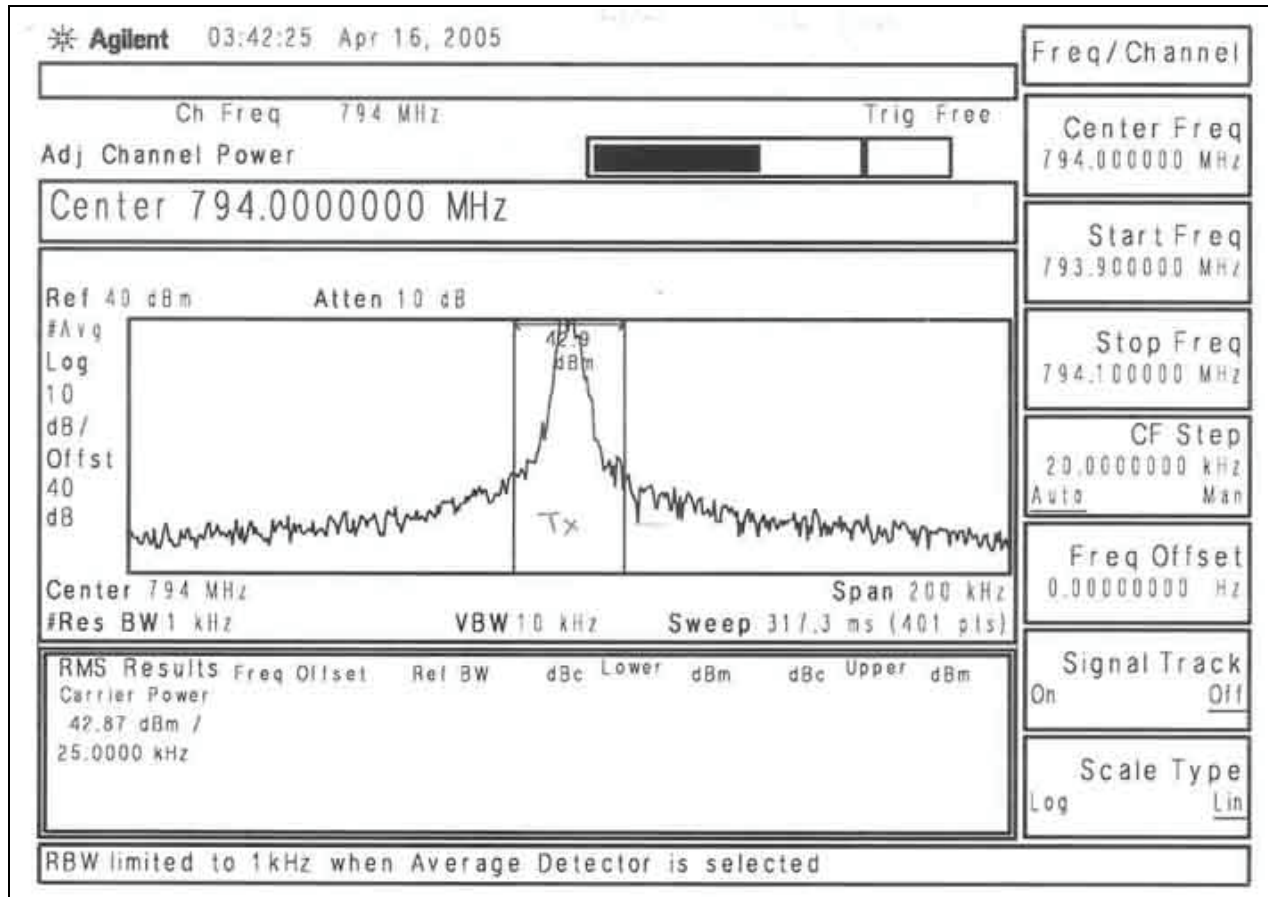
Testing: April 15, 2005



## ADJACENT CHANNEL POWER LOW 2

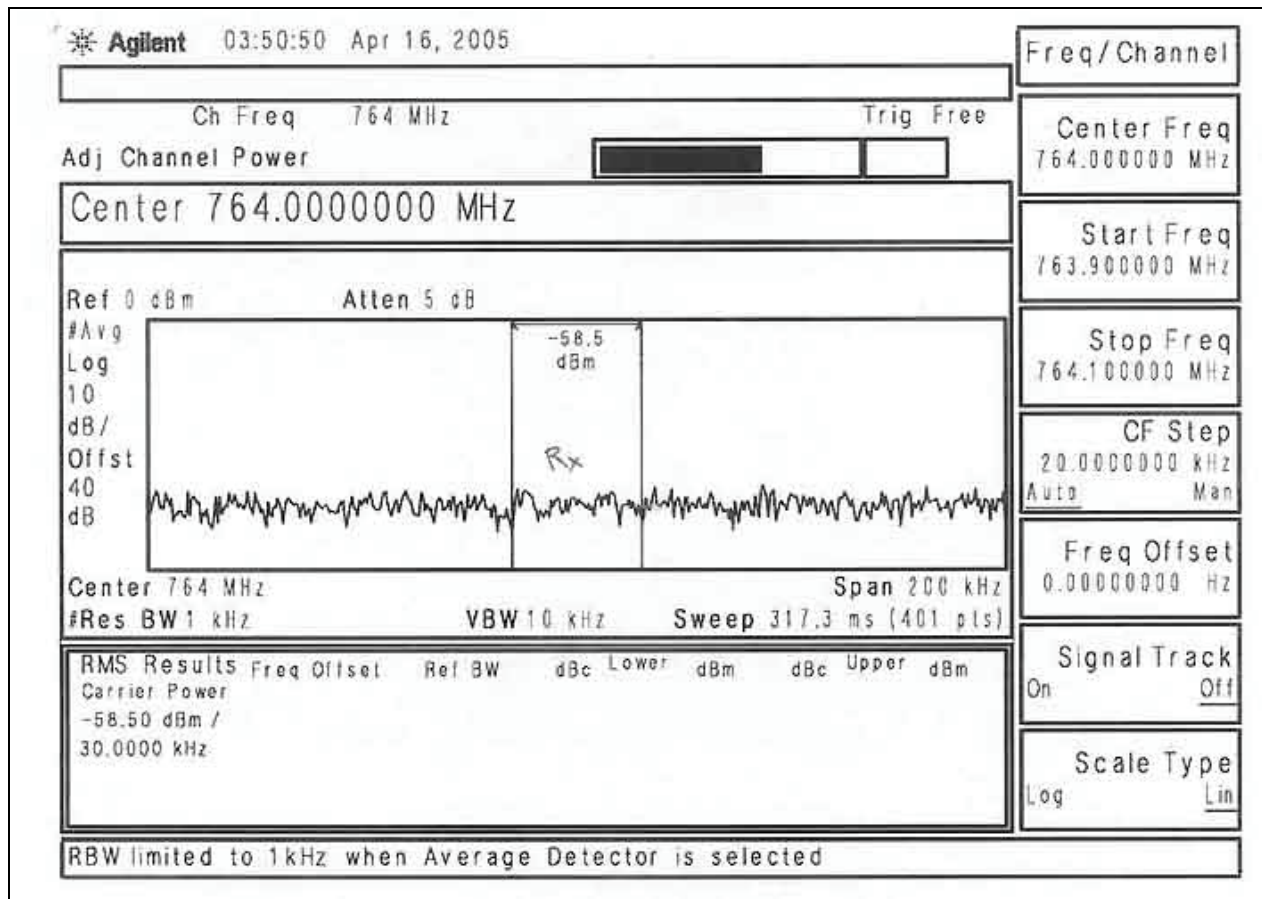


## ADJACENT CHANNEL POWER LOW TX

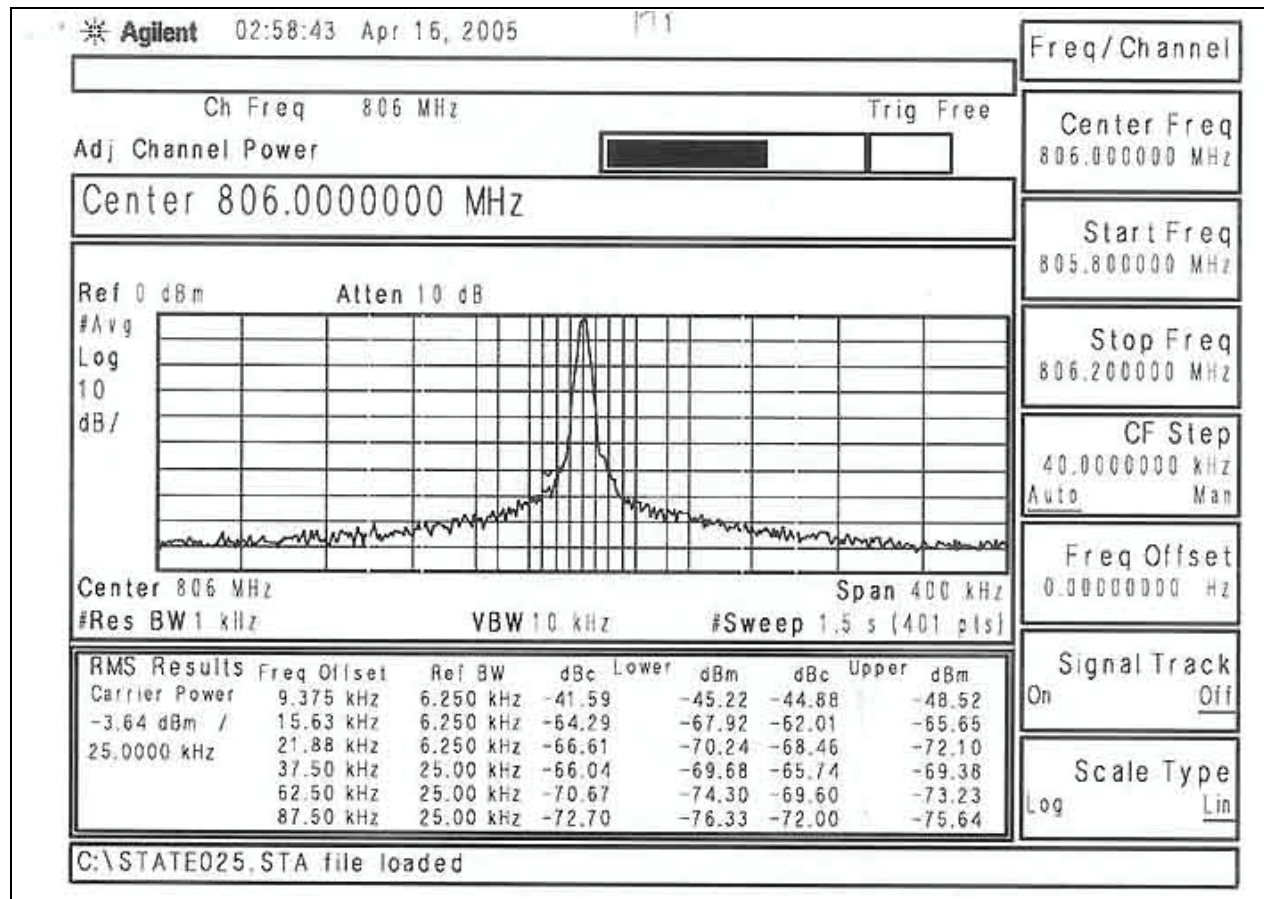




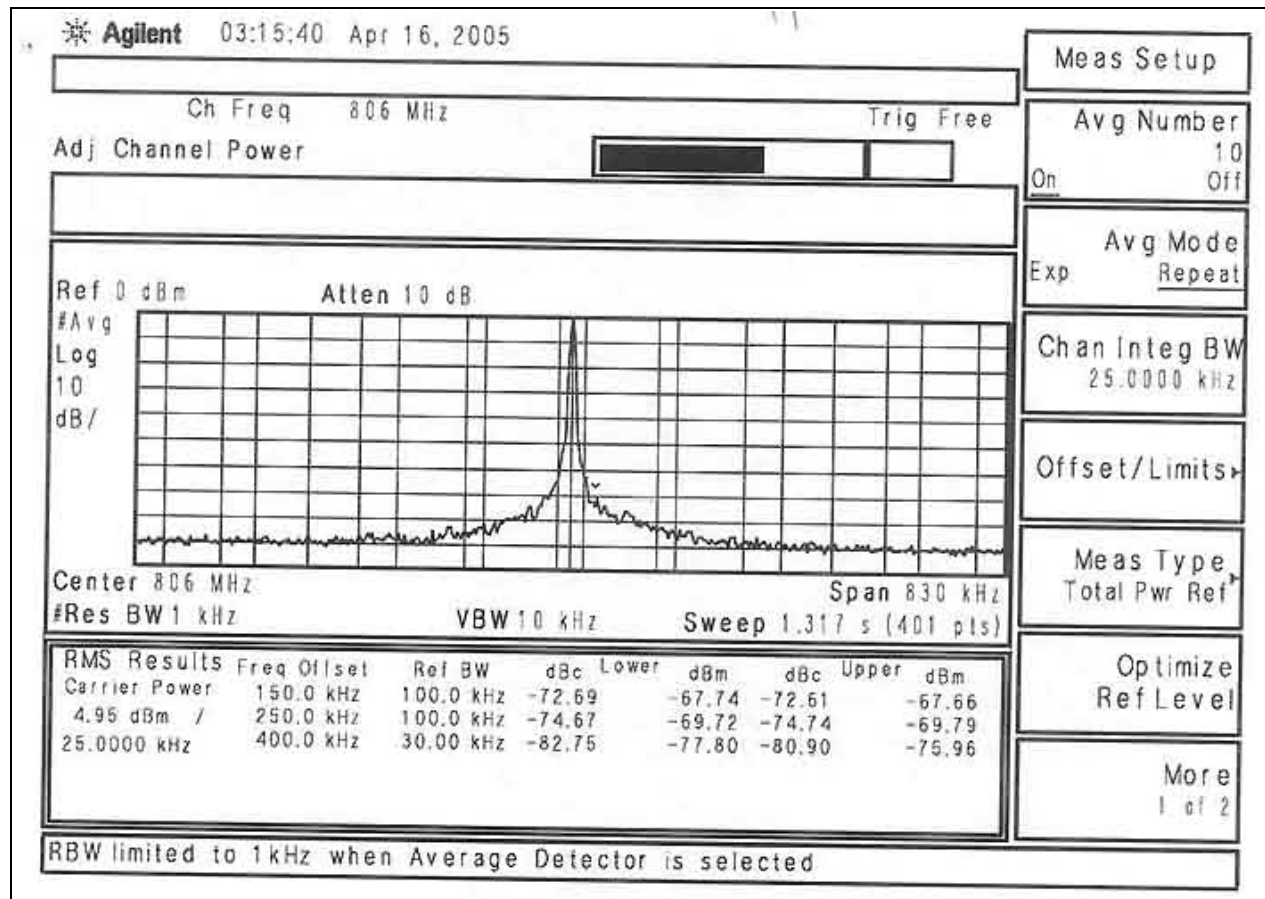
## ADJACENT CHANNEL POWER LOW RX



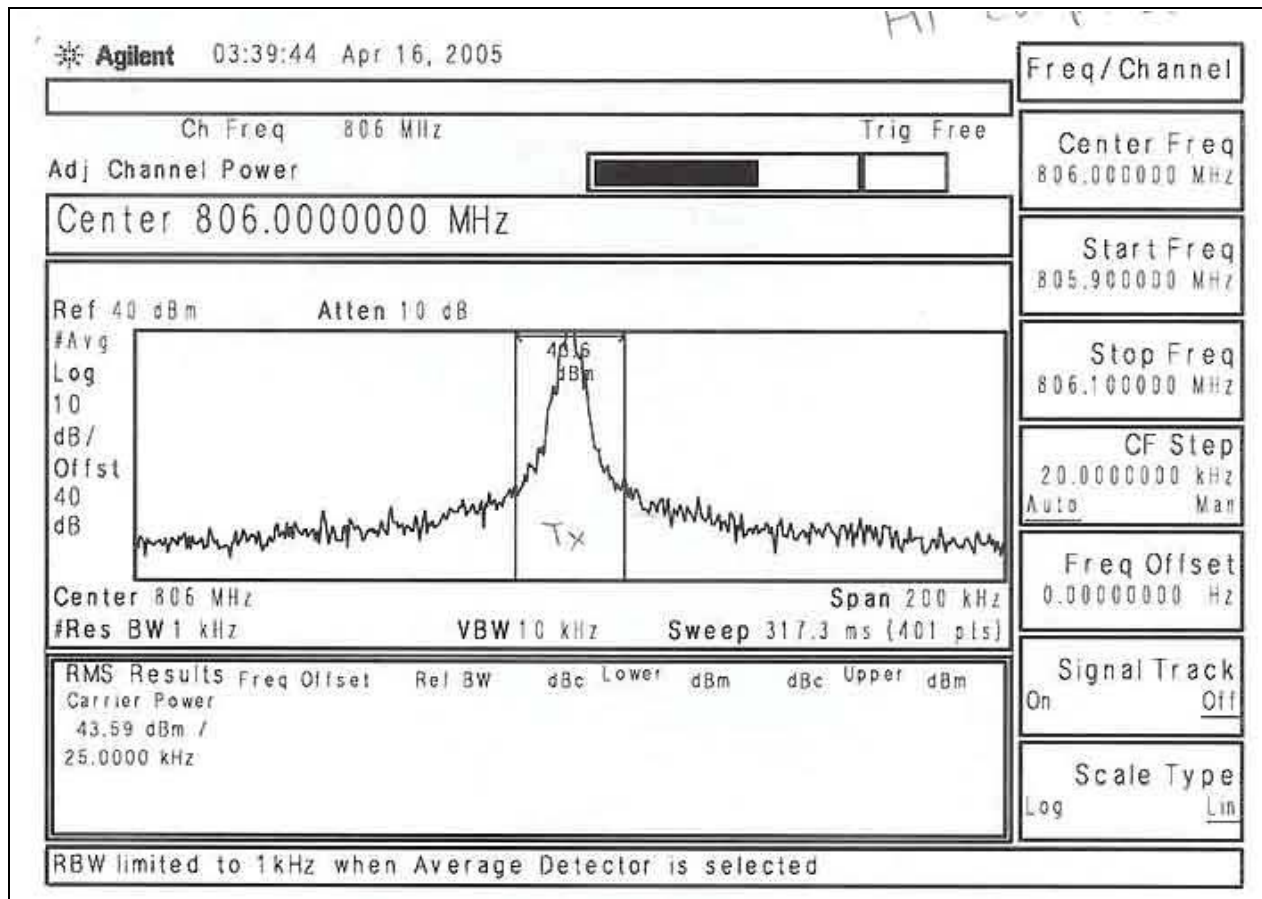
## ADJACENT CHANNEL POWER HIGH 1



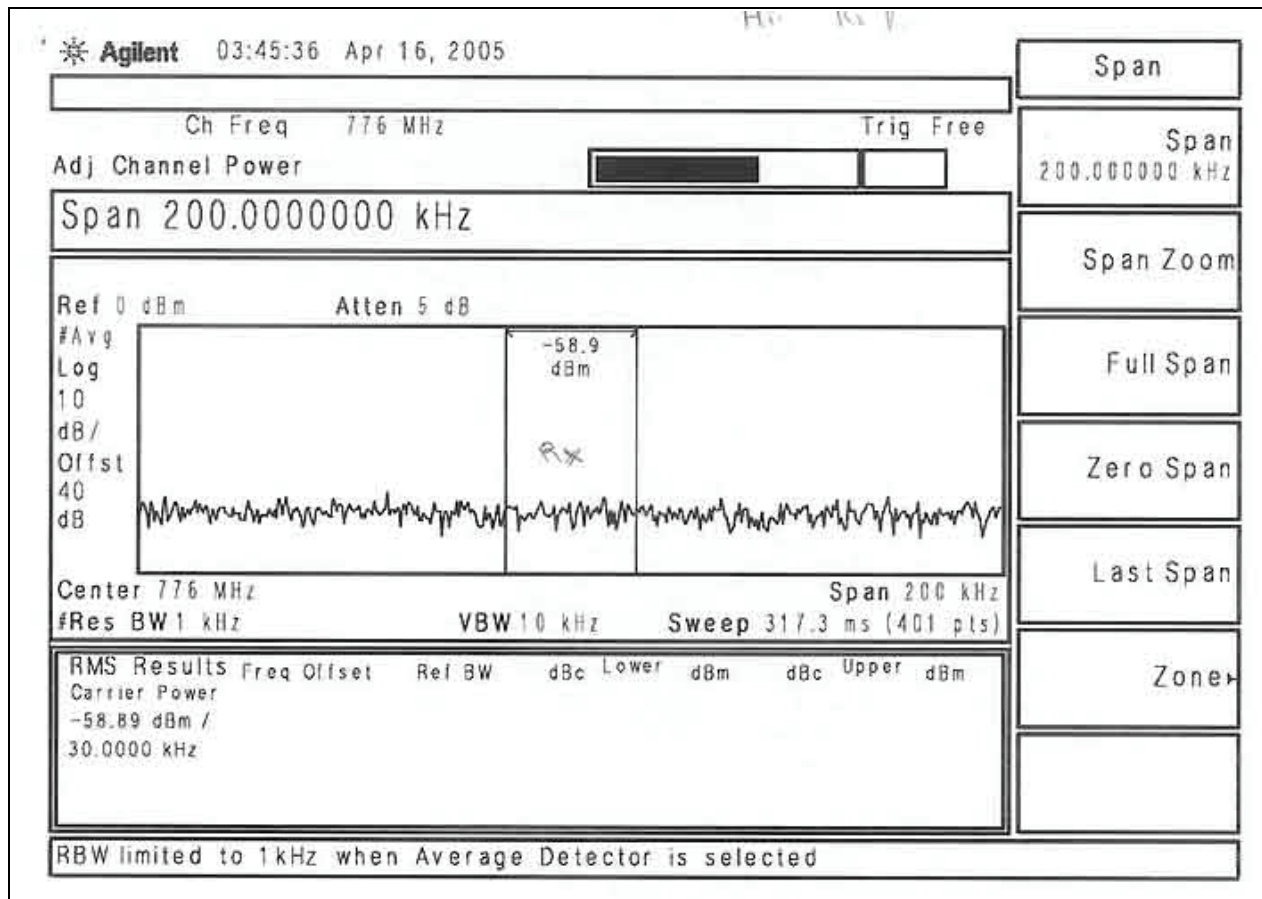
## ADJACENT CHANNEL POWER HIGH 2



## ADJACENT CHANNEL POWER HIGH TX

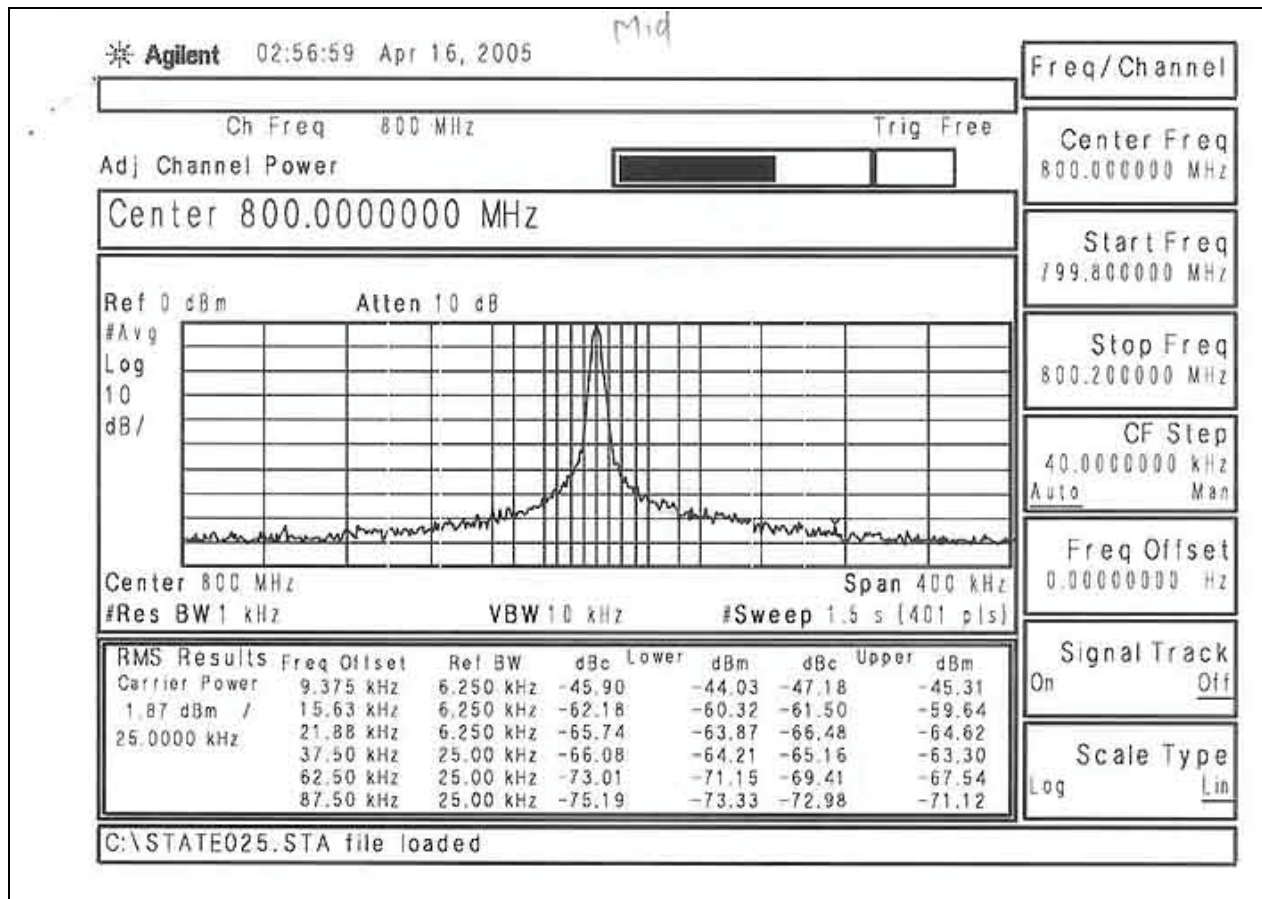


## ADJACENT CHANNEL POWER HIGH RX

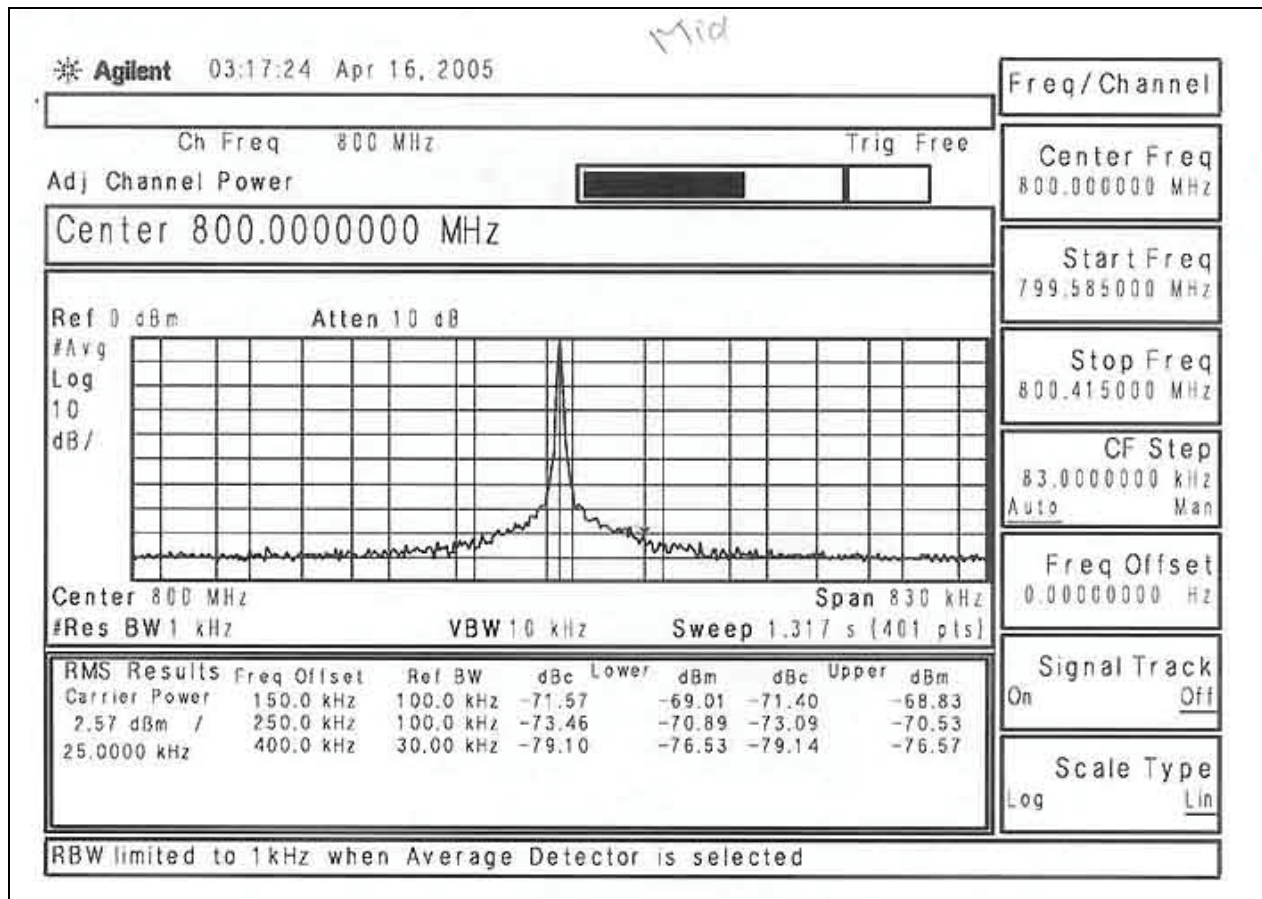




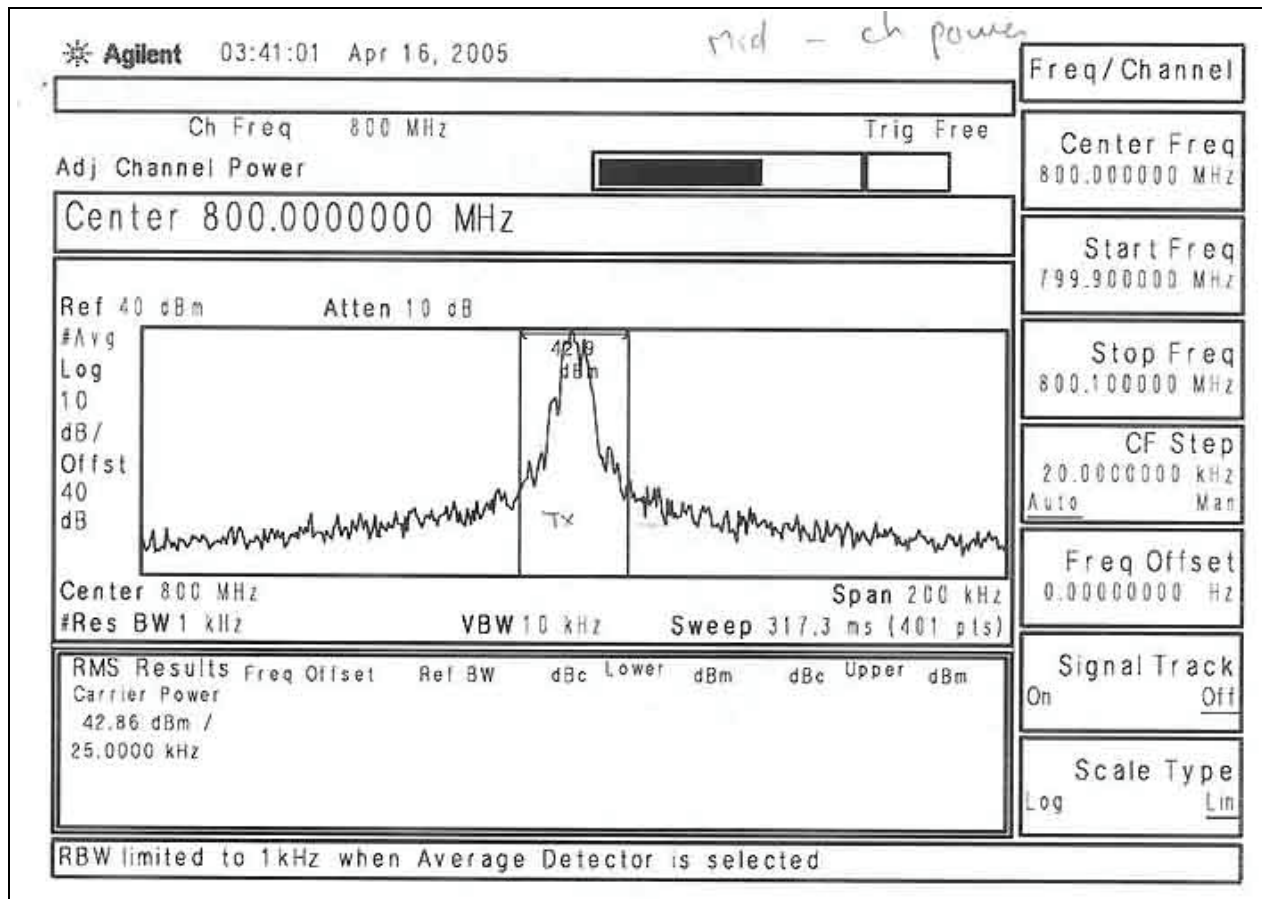
## ADJACENT CHANNEL POWER MID 1



## ADJACENT CHANNEL POWER MID 2

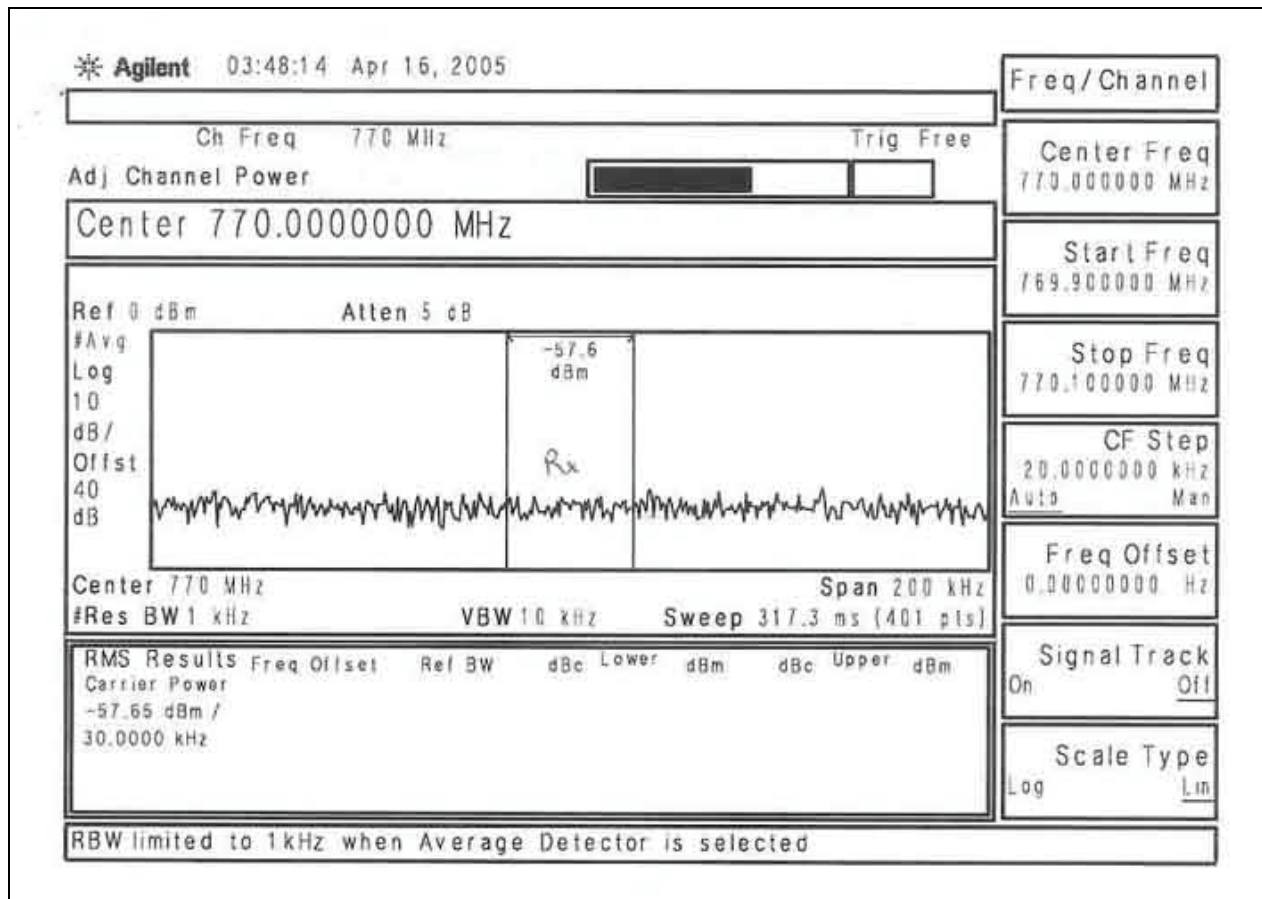


## ADJACENT CHANNEL POWER MID TX





## ADJACENT CHANNEL POWER MID RX



Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	653121	Agilent	E4402B	US41062551	121704	121705

**PHOTOGRAPH SHOWING ADJACENT CHANNEL POWER**



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

Not applicable to this unit.

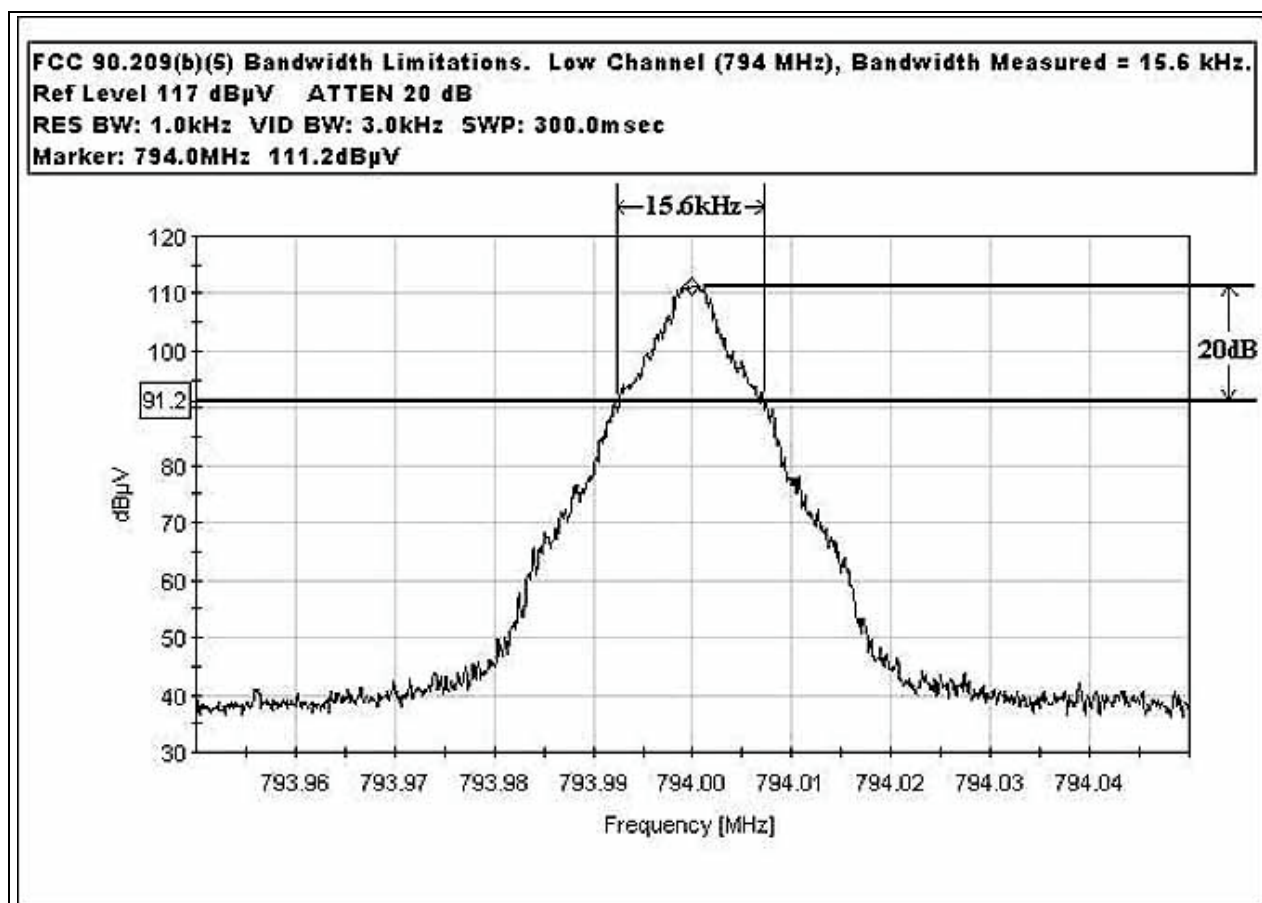
**FCC 2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS- Modulation  
Limiting Response**

Not applicable to this unit.

## FCC 2.1033(c)(14)/2.1049(i)/ 90.209(b)(5) - OCCUPIED BANDWIDTH

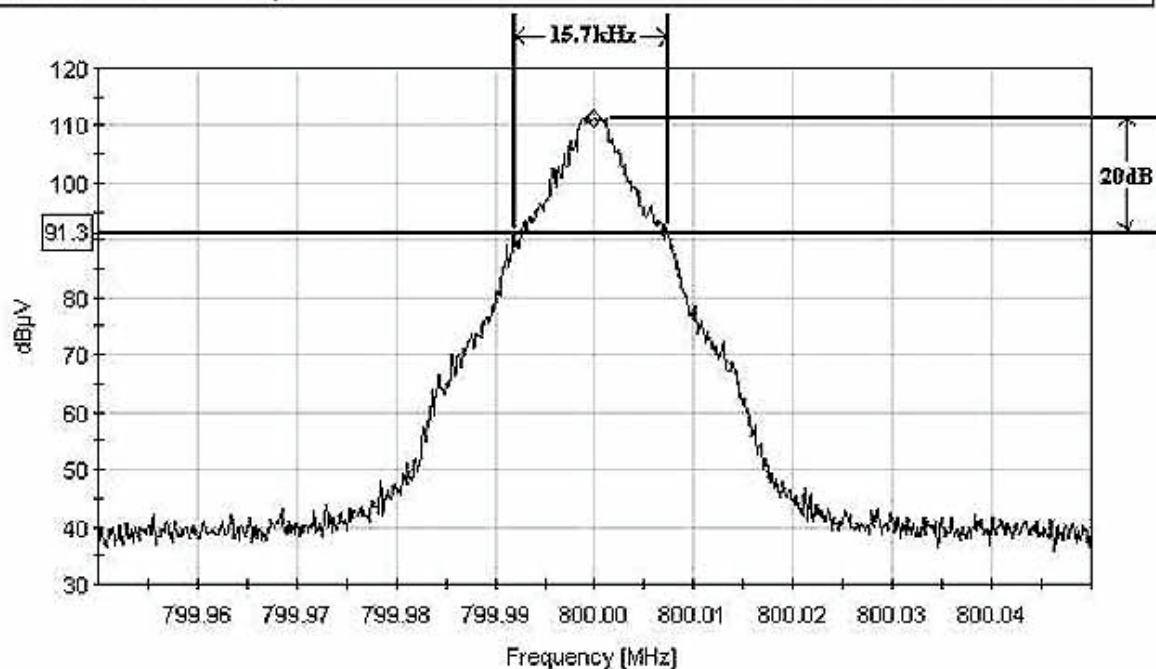
**Test Conditions:** The EUT was connected to a laptop computer via the serial interface. The laptop computer was used to command the EUT to begin transmitting or stop transmitting as well as to change the EUT from channel to channel. Also connected to the EUT was a GPS antenna. This GPS antenna was placed outside the room so that there were no obstructions to the sky. A separate DC power supply was used to provide 13.8 VDC 9A to the EUT. On the output of the EUT was placed a high power termination/attenuator which went to either a power meter or spectrum analyzer to measure the RF power, bandwidth, or frequency. The EUT was set to output the rated power of 25 watts. Bandwidth settings: 1 kHz.

### **FCC 90.209(b)(5) BANDWIDTH LIMITATIONS LOW CHANNEL**

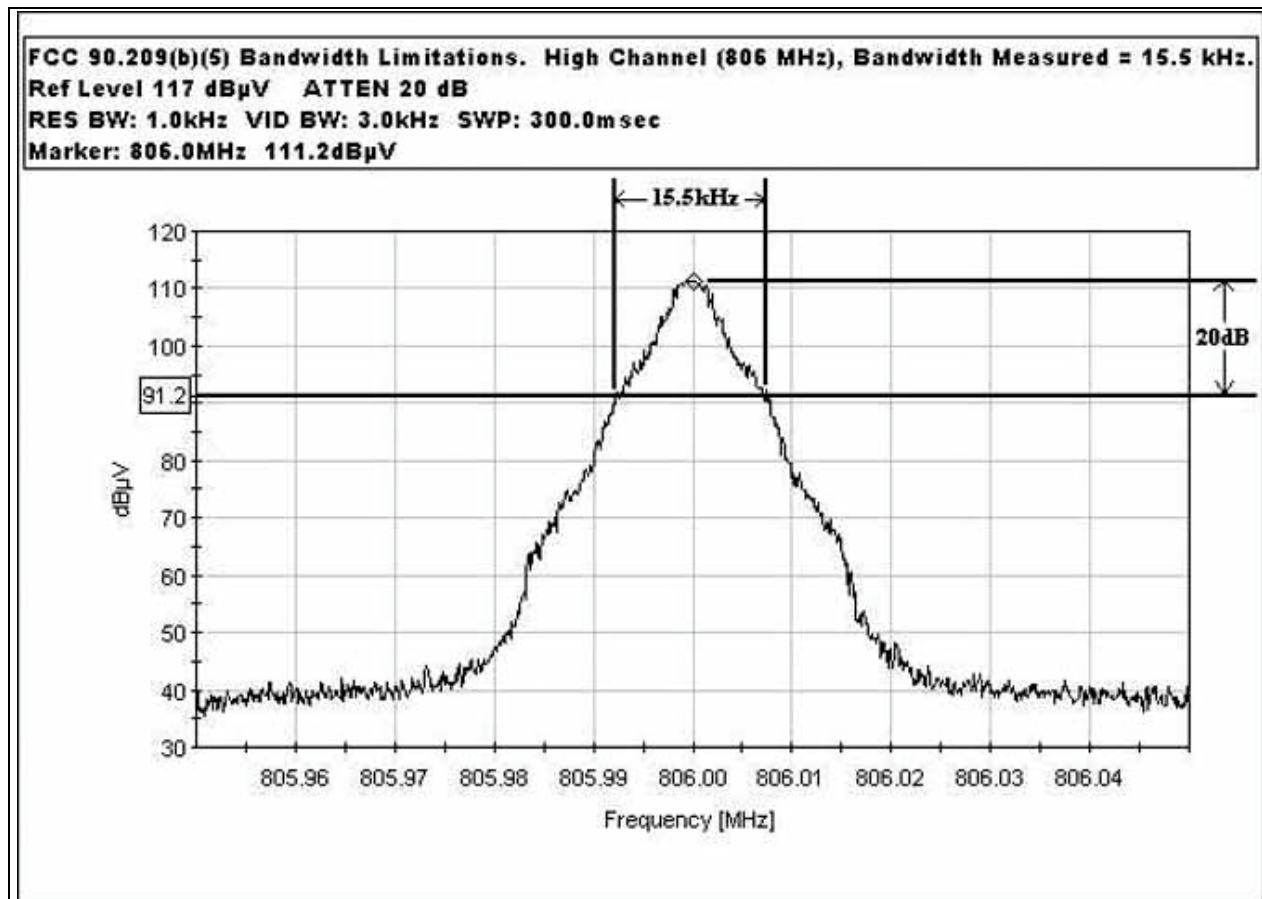


## FCC 90.209(b)(5) BANDWIDTH LIMITATIONS MID CHANNEL

**FCC 90.209(b)(5) Bandwidth Limitations. Mid Channel (800 MHz), Bandwidth Measured = 15.7 kHz.**  
**Ref Level 117 dBμV ATEN 20 dB**  
**RES BW: 1.0kHz VID BW: 3.0kHz SWP: 300.0msec**  
**Marker: 800.0MHz 111.3dBμV**



## FCC 90.209(b)(5) BANDWIDTH LIMITATIONS HIGH CHANNEL



### Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	00989A	HP	8568A	2049A01287	070204	070206
Spectrum Analyzer Display Section	00034	HP	85662A	2349A06091	070204	070206
Quasi Peak Adapter	00200	HP	85650A	2043A00221	070204	070206
High Power 30 dB Attenuator	01578	Bird	25-A-MFN-30	(none)	*	*
High Power 30dB Attenuator	(none)	Weinschel	53-30-34	MG378	*	*

Note: \*-Checks of both attenuators insertion loss was performed just prior to this test at the discrete frequencies used (794 MHz, 800 MHz, and 806 MHz).

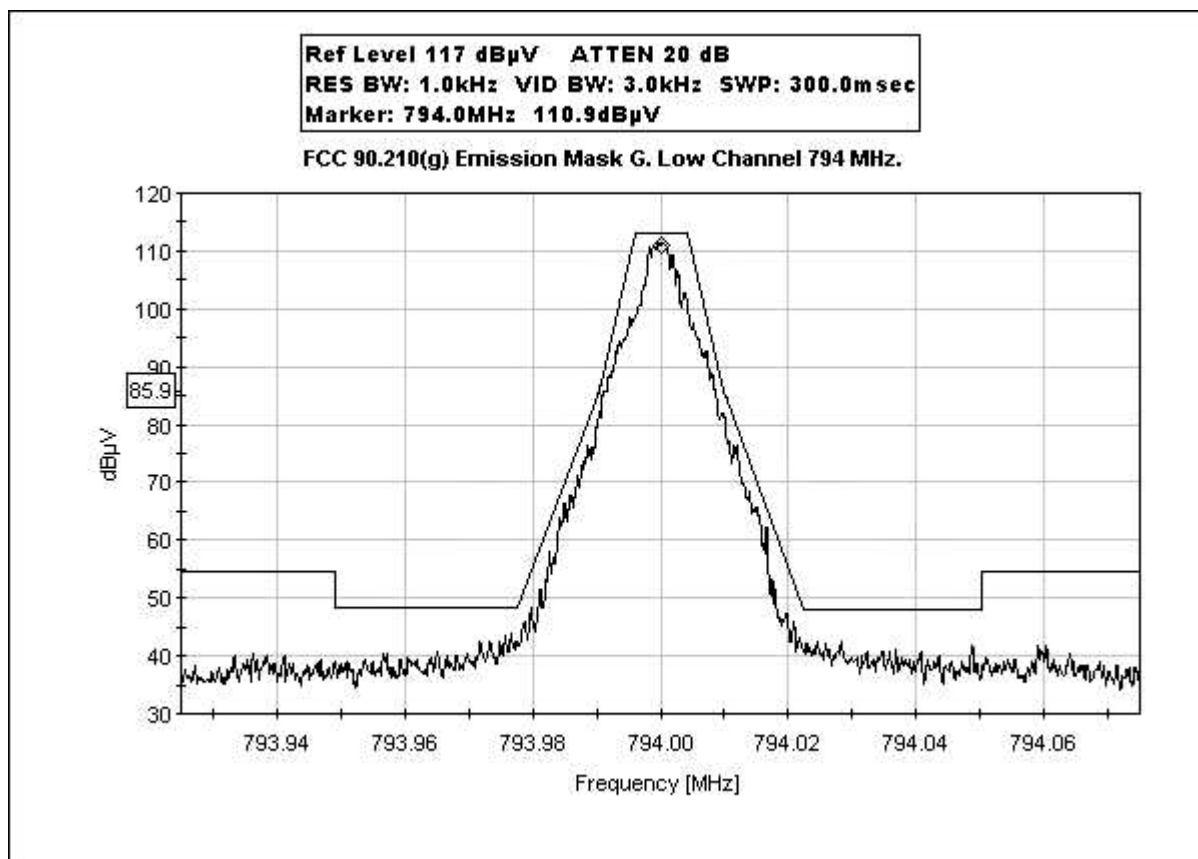


**PHOTOGRAPH SHOWING OCCUPIED BANDWIDTH**

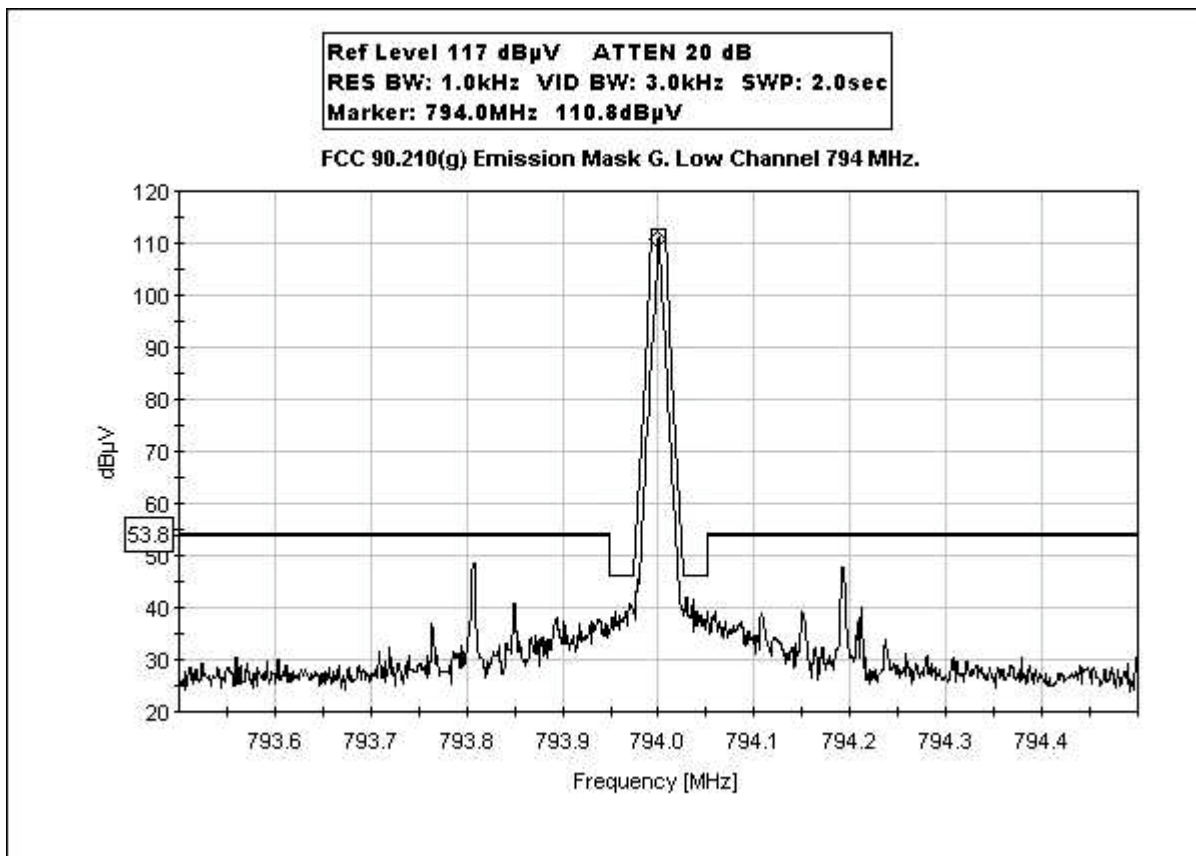


## FCC 90.210(g) - EMISSIONS MASK LOW CHANNEL SMALL SPAN

**Test Conditions:** The EUT was connected to a laptop computer via the serial interface. The laptop computer was used to command the EUT to begin transmitting or stop transmitting as well as to change the EUT from channel to channel. Also connected to the EUT was a GPS antenna. This GPS antenna was placed outside the room so that there were no obstructions to the sky. A separate DC power supply was used to provide 13.8 VDC 9A to the EUT. On the output of the EUT was placed a high power termination/attenuator which went to either a power meter or spectrum analyzer to measure the RF power, bandwidth, or frequency. The EUT was set to output the rated power of 25 watts. Bandwidth settings: 1 kHz

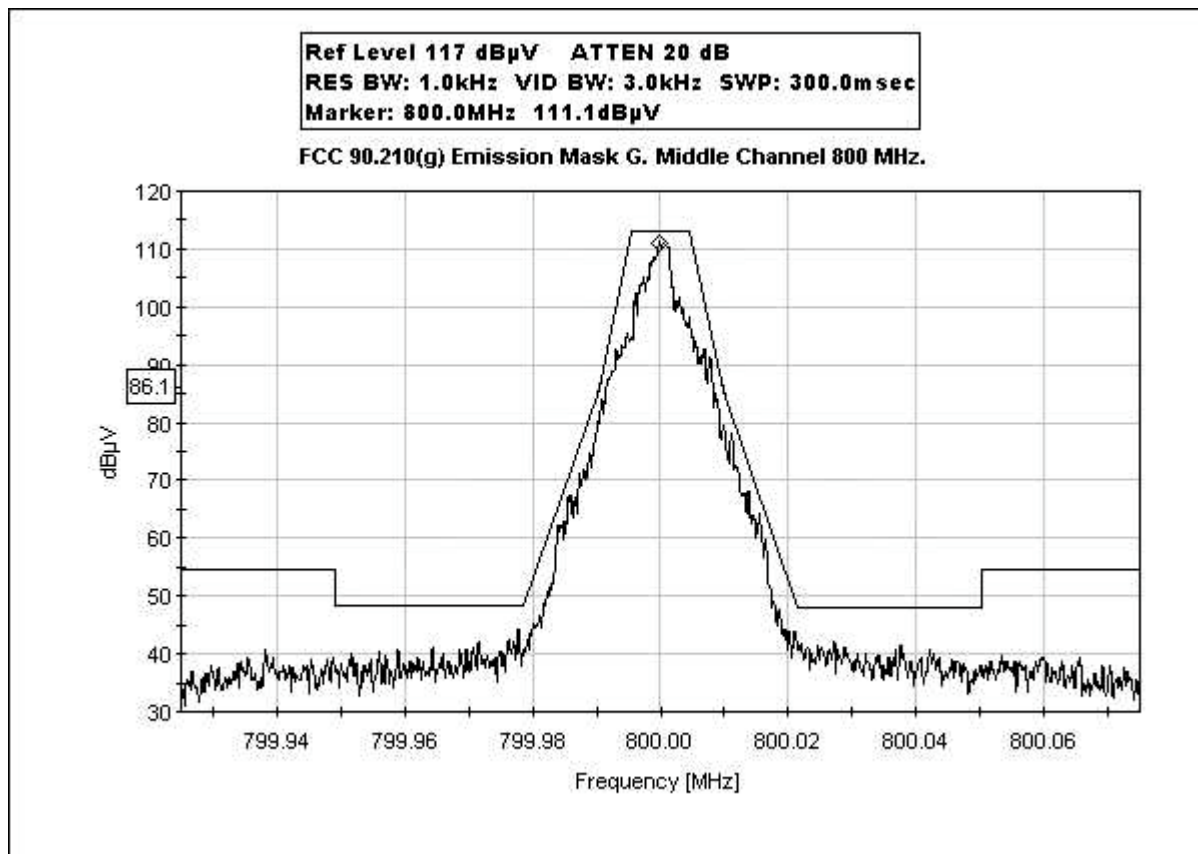


## FCC 90.210(g) EMISSIONS MASK LOW CHANNEL LARGE SPAN

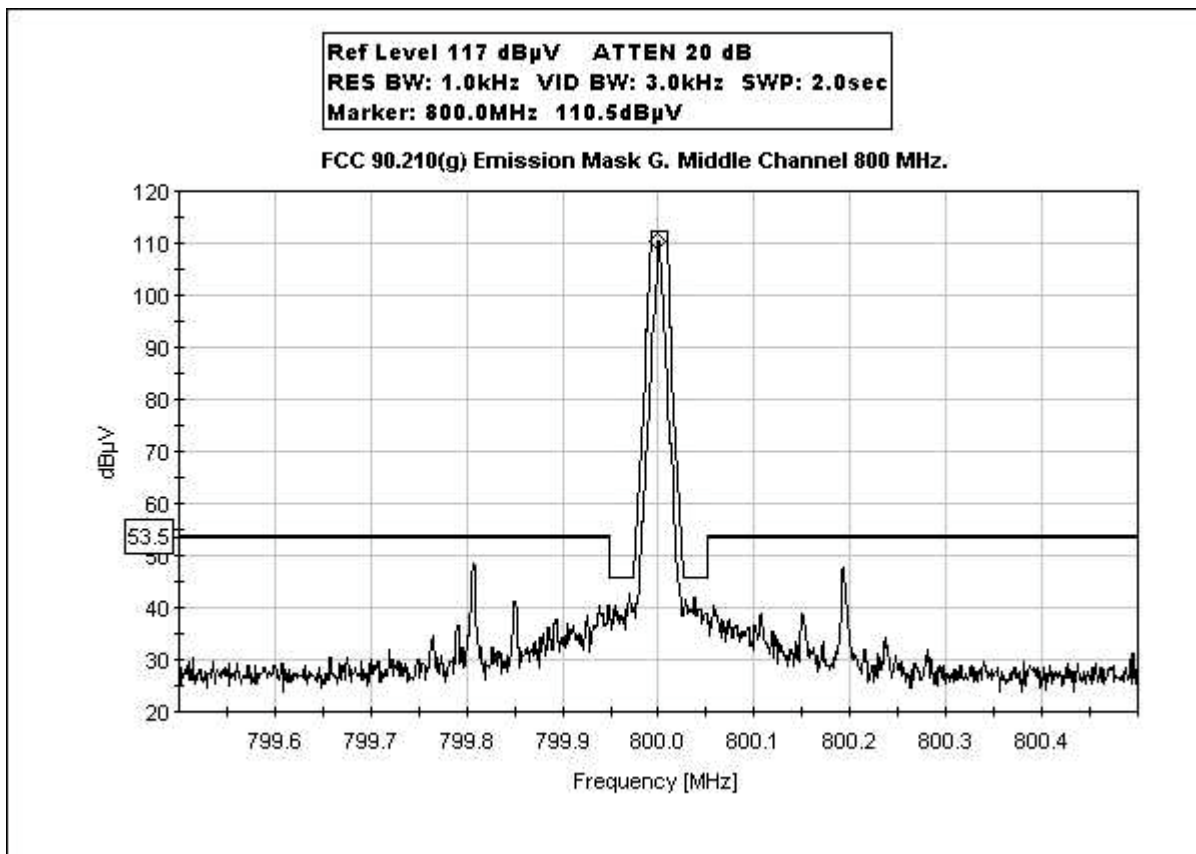




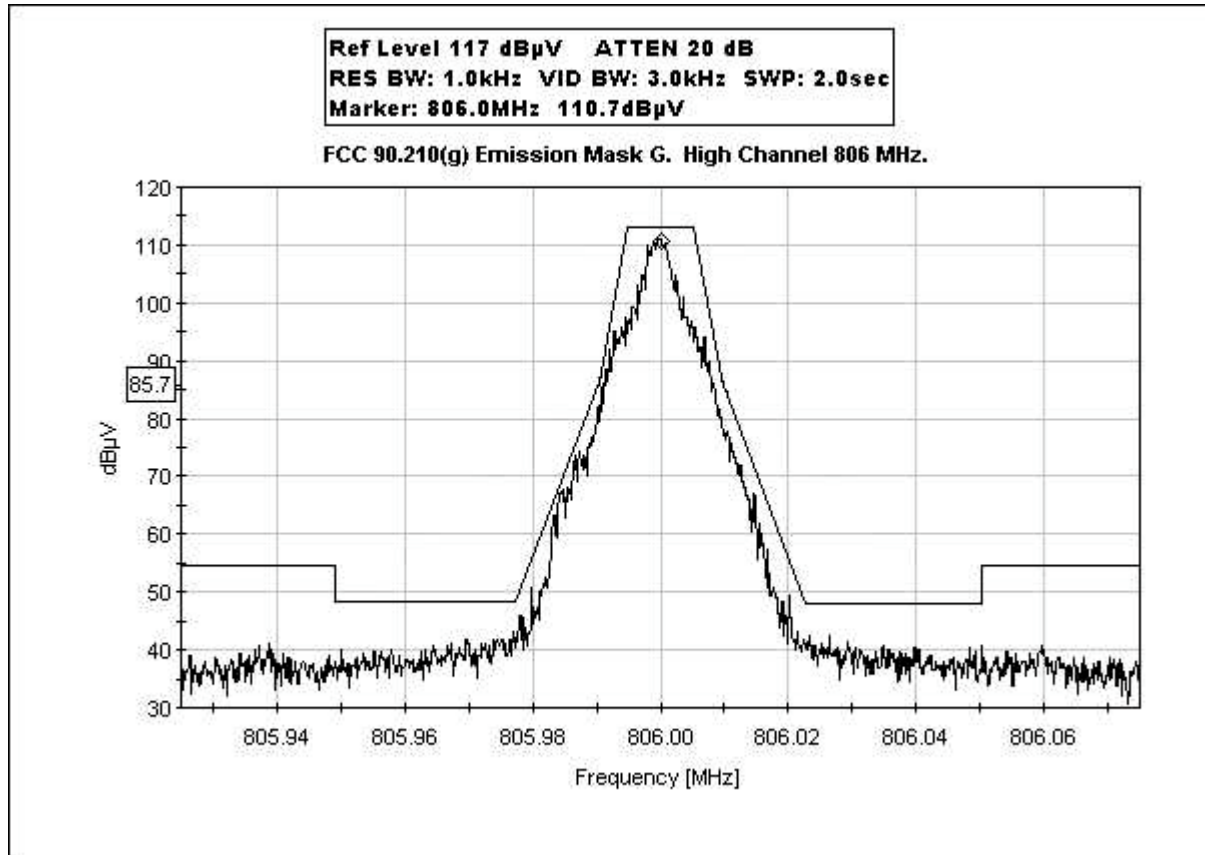
## FCC 90.210(g) EMISSIONS MASK MID CHANNEL SMALL SPAN



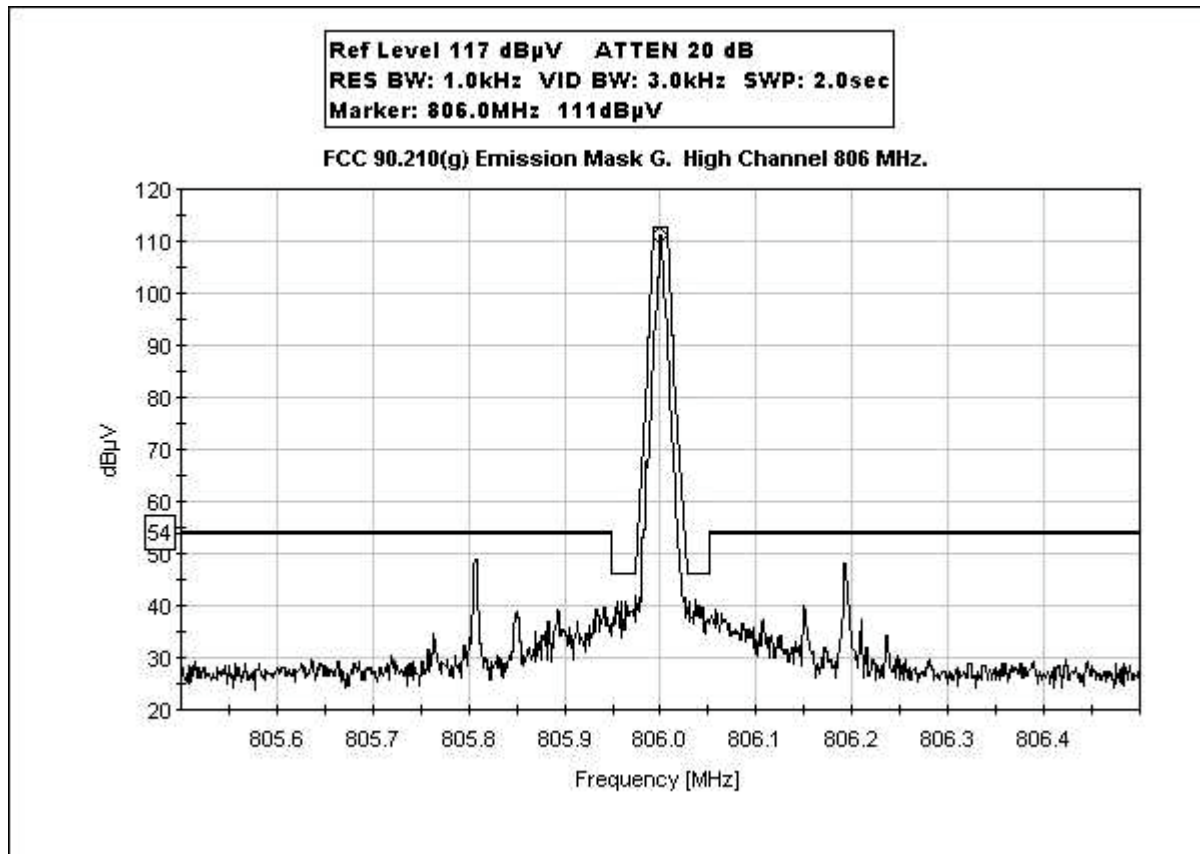
## FCC 90.210(g) EMISSIONS MASK MID CHANNEL LARGE SPAN



## FCC 90.210(g) EMISSIONS MASK HIGH CHANNEL SMALL SPAN



## FCC 90.210(g) EMISSIONS MASK HIGH CHANNEL LARGE SPAN



### Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	00989A	HP	8568A	2049A01287	070204	070206
Spectrum Analyzer Display Section	00034	HP	85662A	2349A06091	070204	070206
Quasi Peak Adapter	00200	HP	85650A	2043A00221	070204	070206
High Power 30 dB Attenuator	01578	Bird	25-A-MFN-30	(none)	*	*
High Power 30dB Attenuator	(none)	Weinschel	53-30-34	MG378	*	*

Note: \*-Checks of both attenuators insertion loss was performed just prior to this test at the discrete frequencies used (794 MHz, 800 MHz, and 806 MHz).

**PHOTOGRAPH SHOWING EMISSIONS MASK**





# **FCC 2.1033(c)(14)/2.1051/90.210(g) - SPURIOUS EMISSIONS AT ANTENNA TERMINAL**

<b>ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE</b>			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	9 GHz	1 MHz

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **IP MobileNet**  
Specification: **FCC 90.210G Spurious ANTENNA**  
Work Order #: **82563** Date: 09/28/2004  
Test Type: **Maximized Emissions** Time: 09:40:58  
Equipment: **Mobile Data Radio** Sequence#: 3  
Manufacturer: IPMobileNet Tested By: Stuart Yamamoto  
Model: M32700G25  
S/N: 04363311

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

Function	Manufacturer	Model #	S/N
Mobile Data Radio*	IPMobileNet	M32700G25	04363311

## ***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell Corporation	PP02L Inspiron I2500	5TZ6611
DC Power Supply	Samlex America	SEC 1223	03061-0D01-0632
High Power Termination	Weinschel Corporation	45-40-43	MN216
GPS Antenna	San Jose Navigation, Inc.	SM-25	2569790

## ***Test Conditions / Notes:***

The EUT, support equipment, and the test equipment are located on the tabletop. Connected to the EUT Tx/Rx port are two high powered attenuators and then coaxial cable to the spectrum analyzer. Connected to the EUT serial port is a laptop computer. Connect to the EUT GPS port is a standard GPS antenna with 5 meter long coaxial cable. Power to the EUT is supplied by an external DC Power supply. The laptop computer is used to check the status of the EUT as well as send commands to have it transmit continuously. Voltage to the EUT is 13.8 VDC. Temperature: 22°C, Humidity: 50%, Pressure: 100kPa. Frequency range scanned and maximized, 4 MHz to 9000 MHz. This data sheet is for the EUT operating on Low (794 MHz), Mid (800MHz), and High (806 MHz) channels.

## ***Transducer Legend:***

T1=SMA Cable 1-40GHz AN2604_012305	T2=30dB Attenuator Bird
T3=30dB Attenuator Weinschel	

## ***Measurement Data:***

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	Dist dB	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	2400.046M	27.8	+0.5	+30.0	+29.7	+0.0	88.0	94.0	-6.0	Vert
Ave										
^	2400.022M	29.4	+0.5	+30.0	+29.7	+0.0	89.6	94.0	-4.4	Vert

3	2382.002M Ave	27.5	+0.5	+30.0	+29.7	+0.0	87.7	94.0	-6.3	Vert
^	2382.002M	29.8	+0.5	+30.0	+29.7	+0.0	90.0	94.0	-4.0	Vert
5	2418.004M Ave	26.5	+0.5	+30.0	+29.7	+0.0	86.7	94.0	-7.3	Vert
^	2418.004M	28.5	+0.5	+30.0	+29.7	+0.0	88.7	94.0	-5.3	Vert
7	4030.003M	24.6	+0.7	+30.0	+29.8	+0.0	85.1	94.0	-8.9	Vert
8	3970.002M	24.0	+0.7	+30.0	+29.8	+0.0	84.5	94.0	-9.5	Vert
9	4000.009M	23.3	+0.7	+30.0	+29.8	+0.0	83.8	94.0	-10.2	Vert
10	302.400M	23.2	+0.0	+30.0	+29.8	+0.0	83.0	94.0	-11.0	Vert
11	1588.007M Ave	18.8	+0.4	+30.0	+29.6	+0.0	78.8	94.0	-15.2	Vert
^	1588.000M	27.6	+0.4	+30.0	+29.6	+0.0	87.6	94.0	-6.4	Vert
13	1599.922M Ave	18.6	+0.4	+30.0	+29.6	+0.0	78.6	94.0	-15.4	Vert
^	1600.004M	29.4	+0.4	+30.0	+29.6	+0.0	89.4	94.0	-4.6	Vert
15	1612.016M Ave	18.4	+0.4	+30.0	+29.6	+0.0	78.4	94.0	-15.6	Vert
^	1612.005M	29.8	+0.4	+30.0	+29.6	+0.0	89.8	94.0	-4.2	Vert

#### Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	00784	HP	8596E	3346A00209	011903	011905
24" SMA Cable	2604	Argosy	UFA147A	0-0360-200200	012304	012305

**PHOTOGRAPH SHOWING DIRECT CONNECT TEST SETUP**



**FCC 2.1033(c)(14)/2.1053/90.210(g) - FIELD STRENGTH OF SPURIOUS RADIATION**

ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	9 GHz	1 MHz

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **IP MobileNet**  
 Specification: **FCC 90.210G Spurious OATS**  
 Work Order #: **82563** Date: 09/27/2004  
 Test Type: **Maximized Emissions** Time: 14:41:37  
 Equipment: **Mobile Data Radio** Sequence#: 2  
 Manufacturer: IPMobileNet Tested By: Stuart Yamamoto  
 Model: M32700G25  
 S/N: 04363311

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

Function	Manufacturer	Model #	S/N
Mobile Data Radio*	IPMobileNet	M32700G25	04363311

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell Corporation	PP02L Inspiron I2500	5TZ6611
DC Power Supply	Samlex America	SEC 1223	03061-0D01-0632
High Power Termination	Weinschel Corporation	45-40-43	MN216
GPS Antenna	San Jose Navigation, Inc.	SM-25	2569790

***Test Conditions / Notes:***

The EUT is stand alone on the table top. Connected to the EUT Tx/Rx port is a high power load at the end of a two meter long coaxial cable. Connected to the EUT Rx power is an unterminated two meter long coaxial cable. Connected to the EUT serial port is a remotely located laptop computer ten meters away in the control room. Connect to the EUT GPS port is a standard GPS antenna with 5 meter long coaxial cable. Connected to the EUT ethernet port is an unterminated cat. 5 UTP cable. Power to the EUT is supplied by a DC Power supply located beneath the wooden table. The remote computer is used to check the status of the EUT as well as send commands to have it transmit continuously. Voltage to the EUT is 13.8 VDC. Temperature: 27°C, Humidity: 35%, Pressure: 100kPa. Frequency range scanned and maximized, 4 MHz to 1000 MHz. This data sheet is for the EUT operating on Low (794 MHz), Mid (800MHz), and High (806 MHz) channels. **No emissions found within 25 dB of the limit.**

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **IP MobileNet**  
 Specification: **FCC 90.210G Spurious OATS**  
 Work Order #: **82563**  
 Test Type: **Maximized Emissions**  
 Equipment: **Mobile Data Radio**  
 Manufacturer: **IPMobileNet**  
 Model: **M32700G25**  
 S/N: **04363311**

Date: 09/27/2004  
 Time: 14:06:07  
 Sequence#: 1  
 Tested By: Stuart Yamamoto

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

Function	Manufacturer	Model #	S/N
Mobile Data Radio*	IPMobileNet	M32700G25	04363311

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop Computer	Dell Corporation	PP02L Inspiron I2500	5TZ6611
DC Power Supply	Samlex America	SEC 1223	03061-0D01-0632
High Power Termination	Weinschel Corporation	45-40-43	MN216
GPS Antenna	San Jose Navigation, Inc.	SM-25	2569790

***Test Conditions / Notes:***

The EUT is stand alone on the table top. Connected to the EUT Tx/Rx port is a high power load at the end of a two meter long coaxial cable. Connected to the EUT Rx power is an unterminated two meter long coaxial cable. Connected to the EUT serial port is a remotely located laptop computer ten meters away in the control room. Connect to the EUT GPS port is a standard GPS antenna with 5 meter long coaxial cable. Connected to the EUT ethernet port is an unterminated cat. 5 UTP cable. Power to the EUT is supplied by a DC Power supply located beneath the wooden table. The remote computer is used to check the status of the EUT as well as send commands to have it transmit continuously. Voltage to the EUT is 13.8 VDC. Temperature: 27°C, Humidity: 35%, Pressure: 100kPa. Frequency range scanned and maximized, 1 GHz to 9 GHz. This data sheet is for the EUT operating on Low (794 MHz), Mid (800MHz), and High (806 MHz) channels.



Operating Frequency: 794 MHz - 806 MHz  
Channels: Low, Mid and High  
Highest Measured Output Power: 43.98 ERP(dBm)= 25 ERP(Watts)  
Distance: 3 meters  
Limit:  $43+10\log(P)$  56.98 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
4,029.98	-17.1	Vert	61.08
4,030.04	-17	Vert	60.98
2,400.02	-17.3	Horiz	61.28
2,400.03	-17.1	Horiz	61.08
2,382.02	-17.4	Horiz	61.38
2,400.00	-17.5	Vert	61.48
2,400.02	-17.2	Vert	61.18
4,029.97	-17.6	Horiz	61.58
4,030.06	-17.1	Horiz	61.08
2,418.02	-17.7	Vert	61.68
2,418.09	-17	Vert	60.98
4,000.01	-17.7	Vert	61.68
4,000.01	-17.2	Vert	61.18
2,418.01	-17.8	Horiz	61.78
2,418.02	-17.1	Horiz	61.08
2,381.74	-18.9	Horiz	62.88
3,969.96	-19	Horiz	62.98
3,970.01	-19.1	Vert	63.08
3,970.01	-17.8	Vert	61.78
4,000.01	-19.3	Horiz	63.28
3,999.96	-17.3	Horiz	61.28
2,381.99	-19.3	Vert	63.28
5,642.00	-19.6	Vert	63.58
5,641.93	-18.4	Vert	62.38
5,600.00	-19.7	Vert	63.68
5,557.99	-20.2	Horiz	64.18
3,969.74	-20.3	Horiz	64.28
5,558.03	-20.6	Vert	64.58
1,600.02	-20.7	Horiz	64.68
1,600.00	-19	Horiz	62.98
1,588.01	-21.4	Horiz	65.38
1,588.09	-19.9	Horiz	63.88
5,599.94	-21.7	Horiz	65.68
1,588.05	-21.8	Vert	65.78
4,800.05	-22	Vert	65.98
1,600.01	-22.1	Vert	66.08
4,799.99	-22.1	Horiz	66.08
5,641.97	-22.3	Horiz	66.28
4,835.94	-22.5	Horiz	66.48

### Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	00989A	HP	8568A	2049A01287	070204	070206
Spectrum Analyzer Display Section	00034	HP	85662A	2349A06091	070204	070206
Quasi Peak Adapter	00200	HP	85650A	2043A00221	070204	070206
Bilog Antenna	00851	Schaffner- Chase EMC	CBL6111C	2629	031604	031606
Antenna cable (10 meter site D)	NA	Andrew	LDF1-50	Cable#17	100203	100204
Antenna cable from bulkhead to antenna	N/A	Pasternack	RG-214/U	Cable #33	032904	032905
Preamp to SA Cable (3 feet)	NA	Pasternack	E100316-I	Cable #22	080904	080905
Pre-amp	00010	HP	8447D	2727A05392	070204	070206
Loop Antenna	00314	EMCO	6502	2014	062804	062806
Antenna cable (Heliac)	NA	Andrew	LDF1-50	Cable#19	101303	101304
Horn Antenna	01646	EMCO	3115	9603-4683	042503	042505
Microwave Pre-amp	00787	HP	83017A	3123A00282	042303	042305
Magnetic Loop Antenna	00314	Emco	6502	2014	072804	072806
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105
Spectrum Analyzer	00784	HP	8596E	3346A00209	011903	011905
24" SMA Cable	2604	Argosy	UFA147A	0-0360-200200	012304	012305
1.5 GHz HPF	02116	HP	84300- 80037	3643A00027	060603	060605

**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



### **FCC 90.543(e) - SPURIOUS EMISSIONS**

**Test Setup:** The EUT, support equipment, and the test equipment are located on the tabletop. Connected to the EUT Tx/Rx port are two high-powered attenuators and then coaxial cable to the spectrum analyzer. Connected to the EUT serial port is a laptop computer. Connect to the EUT GPS port is a standard GPS antenna with 5 meter long coaxial cable. The GPS antenna is placed in clear site of the sky. Power to the EUT is supplied by an external DC Power supply. The laptop computer is used to check the status of the EUT, change channels of the EUT, and send command to the EUT and have it transmit continuously.

**Test Conditions:** The EUT was configured to transmit at the nominal rated power of 25W for the low, middle, and high channels. For each of these three channels, the frequency range of 1559 MHz to 1610 MHz was scanned for emissions coming from the EUT.

**Results:** Within the frequency band of 1559 MHz to 1610 MHz, there were two frequencies found which came from the EUT. The following are the two frequencies as well as their respective amplitude that includes the 0 dBi antenna factor.

- 1) 1588 MHz with a level of -109.4 dBW/MHz
- 2) 1600 MHz with a level of -107.6 dBW/MHz

The limit is the amplitude shall be less than or equal to -70dBW/MHz, therefore the EUT passes this section.

#### **Test Equipment List**

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	00784	HP	8596E	3346A00209	011903	011905
24" SMA Cable	2604	Argosy	UFA147A	0-0360-200200	012304	012305

## FCC 2.1033(c)(14)/2.1055/90.539- FREQUENCY STABILITY

**Test Conditions:** The EUT was connected to a laptop computer via the serial interface. The laptop computer was used to command the EUT to begin transmitting or stop transmitting as well as to change the EUT from channel to channel. Also connected to the EUT was a GPS antenna. This GPS antenna was placed outside the room so that there were no obstructions to the sky. A separate DC power supply was used to provide 13.8 VDC 9A to the EUT. On the output of the EUT was placed a high power termination/attenuator which went to either a power meter or spectrum analyzer to measure the RF power, bandwidth, or frequency. The EUT was set to output the rated power of 25 watts. Bandwidth setting: 300 Hz.

**Customer:** IP MobileNet  
**WO#:** 82563  
**Date:** 29-Sep-04  
**Test Engineer:** Stuart Yamamoto

**Device Model #:** M32700G25  
**Operating Voltage:** 13.8 VDC  
**Frequency Limit:** 1.5 PPM

### Temperature Variations

Channel Frequency:		Channel 1 (MHz)	Dev. (MHz)	Channel 2 (MHz)	Dev. (MHz)	Channel 3 (MHz)	Dev. (MHz)
		794		800		806	
Temp (C)	Voltage						
-30	13.8	794.000037	0.000037	800.000075	0.000075	805.999988	0.000012
-20	13.8	793.999925	0.000075	800.000112	0.000112	806.000087	0.000087
-10	13.8	794.000000	0.000000	799.999975	0.000025	805.999950	0.000050
0	13.8	793.999888	0.000112	799.999900	0.000100	805.999900	0.000100
10	13.8	793.999913	0.000087	799.999950	0.000050	805.999913	0.000087
20	13.8	794.000050	0.000050	800.000087	0.000087	806.000037	0.000037
30	13.8	794.000025	0.000025	799.999938	0.000062	805.999938	0.000062
40	13.8	793.999988	0.000012	800.000012	0.000012	805.999963	0.000037
50	13.8	794.000000	0.000000	799.999888	0.000112	805.999900	0.000100

### Voltage Variations (±15%)

20	11.7	794.000125	0.000125	800.000037	0.000037	805.999913	0.000087
20	13.8	794.000050	0.000050	800.000087	0.000087	806.000037	0.000037
20	15.9	794.000037	0.000037	800.000000	0.000000	806.000037	0.000037
Max Deviation (MHz)		0.000125		0.000112		0.000100	
Max Deviation (PPM)		0.157431		0.140000		0.124069	
		PASS		PASS		PASS	



### Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	00784	HP	8596E	3346A00209	011903	011905
24" SMA Cable	2604	Argosy	UFA147A	0-0360-200200	012304	012305
Temperature Chamber	01878	Thermotron	S1.2 Mini Max	(none)	071904	071906
High Power 30 dB Attenuator	01578	Bird	25-A-MFN-30	(none)	*	*
High Power 30dB Attenuator	(none)	Weinschel	53-30-34	MG378	*	*

Note: \*-Checks of both attenuators insertion loss was performed just prior to this test at the discrete frequencies used (794 MHz, 800 MHz, and 806 MHz).

### PHOTOGRAPH SHOWING TEMPERATURE TESTING

