



Global Telecom Solutions Sector

SC4812T-MF 1X/1X-EVDO @ 800 MHz CDMA BTS  
Test Report Exhibit

FCC ID: IHET5EL1

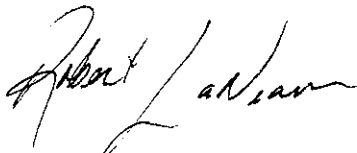
## Equipment Authorization Measurements

FCC Identifier: IHET5EL1  
Name of Grantee: Motorola, Inc  
Equipment Class: Licensed Non-Broadcast Transmitter  
Notes: SC4812-MF 1X/1X-EVDO @ 800 MHz CDMA BTS

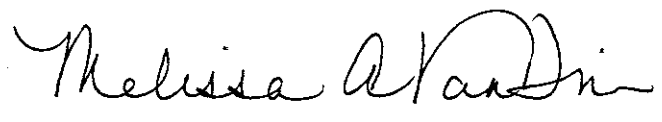
FCC CFR Title 47	Description	Section	Compliant
2.1046	RF Output Power	A	Yes
2.1047	Modulation Characteristics	B	Yes
2.1049	Occupied Bandwidth	C	Yes
2.1051	Spurious Emissions at Antenna Terminals	D	Yes
2.1053	Field Strength of Spurious Radiation	E	Yes
2.1055	Frequency Stability	F	Yes

### Measurements Performed by:

Motorola EMC Facility  
5555 North Beach Street  
Fort Worth, TX 76137  
Authorized Testing Laboratory  
FCC Test Firm Registration No. 90809



**Test Engineer**



**FCC/Package Coordination**





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## SECTION A

### RF Output Power - 47CFR2.1046

Channel	Tune Frequency (MHz)	Modulation	Power Level (mW)	Power Level (dBm)	Power Level Measured (dBm)	IS-97 Limit (dB)	Pass/Fail
1013	869.70	1X-QPSK	0.063	-12	-11.92	+2/-4	Pass
1015	869.76	1X-DO-16QAM	0.063	-12	-11.90	+2/-4	Pass
1015	869.76	1X-DO-8PSK	0.063	-12	-11.97	+2/-4	Pass
777	893.31	1X-QPSK	0.063	-12	-12.14	+2/-4	Pass
775	893.25	1X-DO-16QAM	0.063	-12	-12.03	+2/-4	Pass
775	893.25	1X-DO-8PSK	0.063	-12	-11.96	+2/-4	Pass



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**Summary of Radiated RF Measurements**  
*Worst Case Radiated RF Spur Level*

Transmit Channel	Power Level (mW)	Spur Freq. (MHz)	Spur Level Measured (dB $\mu$ V/meter)	Spur Level Measured (dBm*)	FCC Max Limit (dBm)	Pass/Fail
283	0.063	3513.96	39.59	-55.64	-13.0	Pass

**Summary of Conducted RF Measurements**  
*Worst Case Conducted RF Spur Level*

Transmit Channel	Modulation Type	Power Level (mW)	Freq. (MHz)	Spur Level Measured (dBm)	FCC Max Limit (dBm)	Pass/Fail
775	1X-DO-16QAM	0.063	1.78650	-74.08	-13.0	Pass



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## **SECTION B**

### **Modulation Characteristics - 47CFR2.1047**

#### **Summary of Modulation Characteristics**

<b>Channel</b>	<b>Tune Frequency (MHz)</b>	<b>Modulation</b>	<b>Power Level (mW)</b>	<b>RHO Measured</b>	<b>RHO Spec</b>	<b>Pass/Fail</b>
1013	869.70	1X-QPSK	.063	0.98454	>0.912	Pass
1015	869.76	1X-DO-16QAM	.063	0.99739	>0.912	Pass
1015	869.76	1X-DO-8PSK	.063	0.99722	>0.912	Pass
777	893.31	1X-QPSK	.063	0.98461	>0.912	Pass
775	893.25	1X-DO-16QAM	.063	0.99786	>0.912	Pass
775	893.25	1X-DO-8PSK	.063	0.99725	>0.912	Pass

*Note: The BTS was configured for maximum power out of -12.0 dBm. The output power was set 0.063mW using a power meter.*



# SECTION C

## Occupied Bandwidth - 47CFR2.1049

### Summary of Occupied Bandwidth

Channel	Frequency (MHz)	Modulation	Power Level (dBm)	Measured (MHz)	FCC Limit (MHz)	Pass/Fail
1013	869.70	1X-QPSK	-12.0	1.2229	1.30	Pass
1015	869.76	1X-DO-16QAM	-12.0	1.2729	1.30	Pass
1015	869.76	1X-DO-8PSK	-12.0	1.2743	1.30	Pass
777	893.31	1X-QPSK	-12.0	1.2252	1.30	Pass
775	893.25	1X-DO-16QAM	-12.0	1.2759	1.30	Pass
775	893.25	1X-DO-8PSK	-12.0	1.2723	1.30	Pass

*Note: The BTS was configured for maximum power out of -12.0 dBm. The output power was set 0.063mW using a power meter.*

The following formula is used to obtain the correct power reference point from which the OBW of the CDMA signal is obtained. See example calculation below:

$$\text{Power (measured in 30kHz bandwidth)} + 10 \log (1.2288 \text{ MHz}/30\text{kHz})$$

The occupied bandwidth is measured in a 30 kHz resolution bandwidth. Results are summarized above.

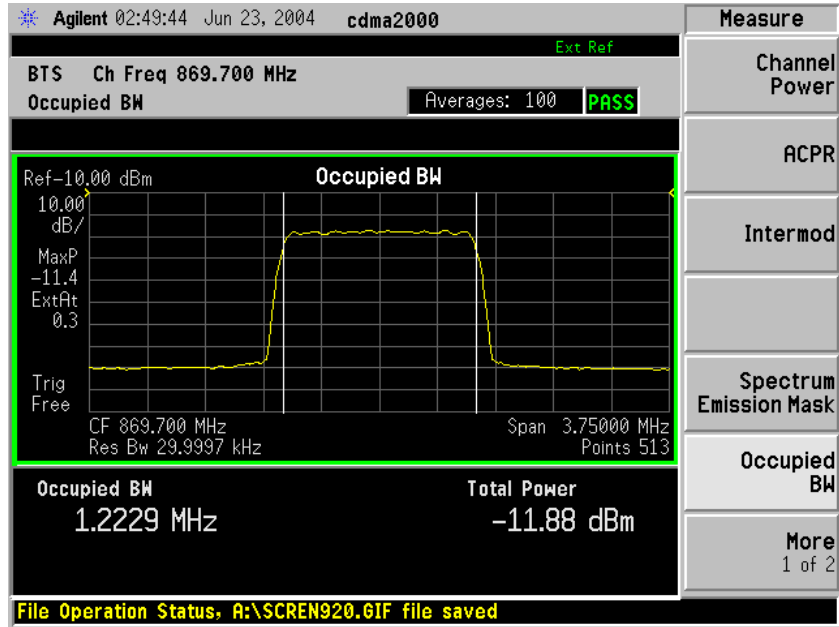


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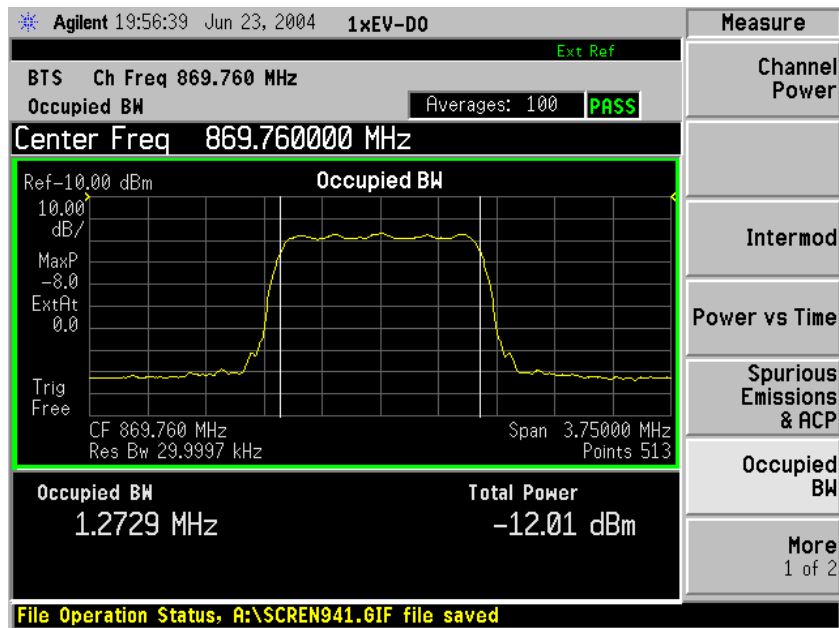
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### Occupied Bandwidth – 0.063mW



### Channel 1013 – 869.70 MHz – QPSK



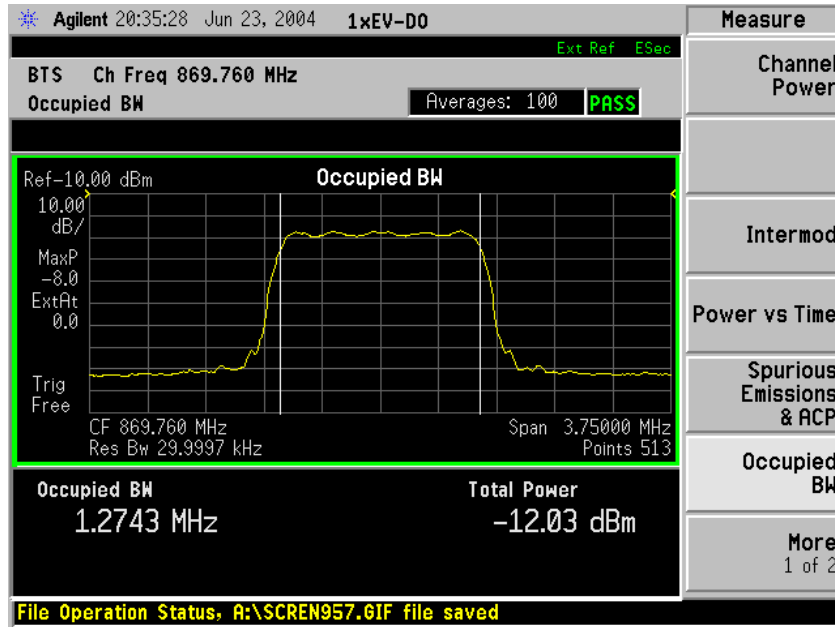


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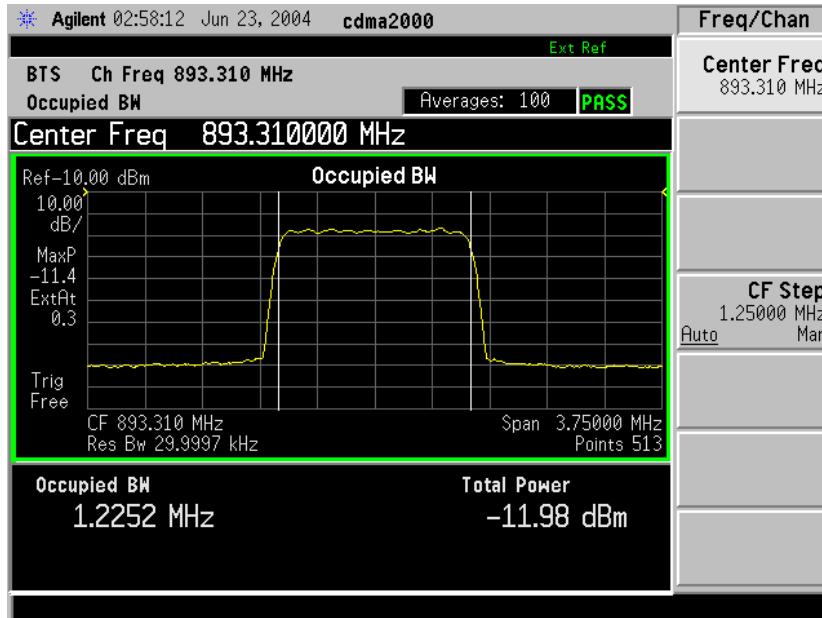
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Channel 1015 – 869.76 MHz – 16QAM



Channel 1015 – 869.76 MHz – 8PSK



Channel 777 – 893.31 MHz – QPSK

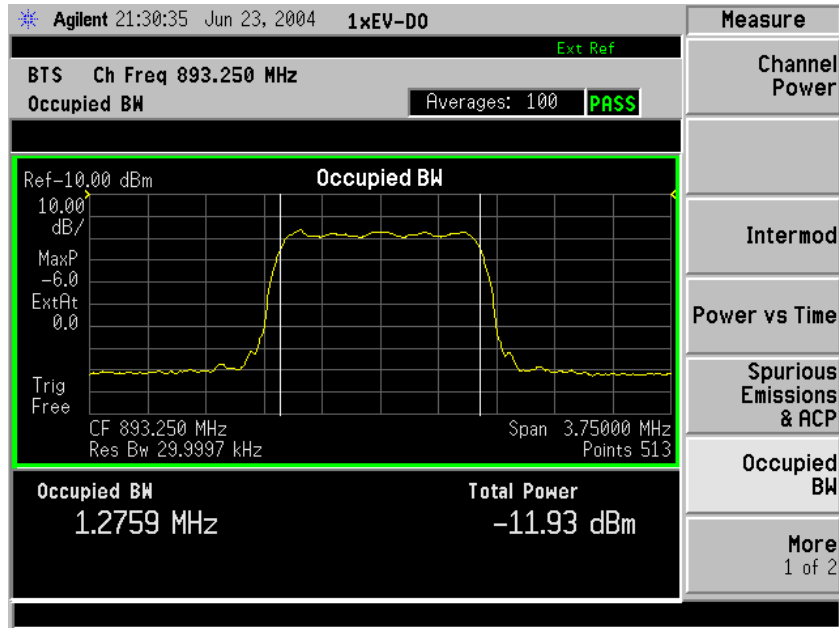


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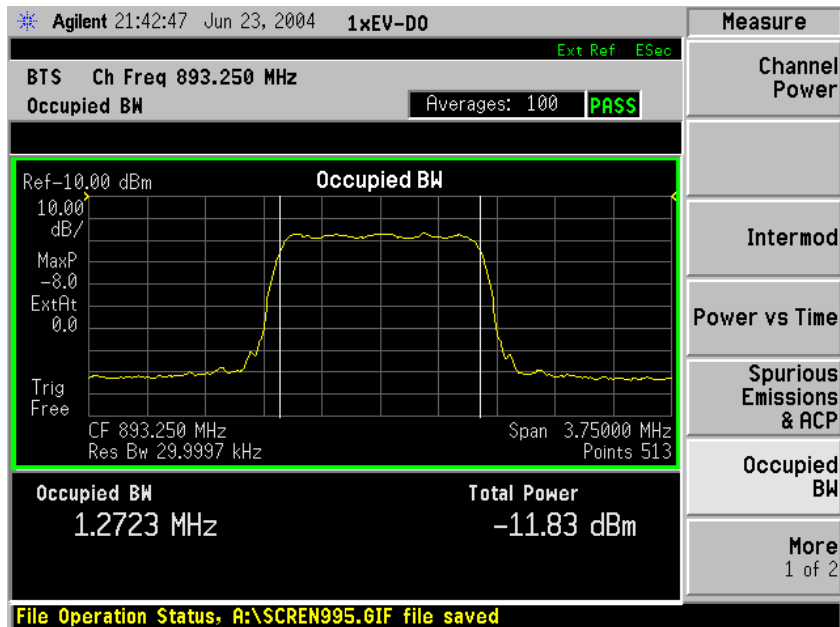
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Channel 775 – 893.25 MHz – 16QAM



Channel 775 – 893.25 MHz – 8PSK





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## SECTION D

### Spurious Emissions at Antenna Terminal - 47 CFR 2.1051

#### Summary of Worst Case Spurious Emissions at Antenna Terminal

Channel	Modulation	Freq. (GHz)	Spur Level Measured (dBm)	FCC Max Limit (dBm)	Pass/Fail
1013	1X-QPSK	1.73940	-75.49	-13	Pass
1015	1X-DO-16QAM	1.73952	-75.34	-13	Pass
1015	1X-DO-8PSK	1.72952	-75.01	-13	Pass
777	1X-QPSK	1.78662	-75.17	-13	Pass
775	1X-DO-16QAM	1.78650	-74.08	-13	Pass
775	1X-DO-8PSK	1.78650	-74.25	-13	Pass

FCC Max. Limit Per 47 CFR:

- = Transmitted Power (10 Log<sub>10</sub> (P<sub>watt</sub>)) - (43 + 10 Log<sub>10</sub> (P<sub>watt</sub>)) dBW
- = 10 Log<sub>10</sub> (P<sub>watt</sub>) - (43 + 10 Log<sub>10</sub> (P<sub>watt</sub>)) dBW
- = -43 dBW
- = -13 dBm



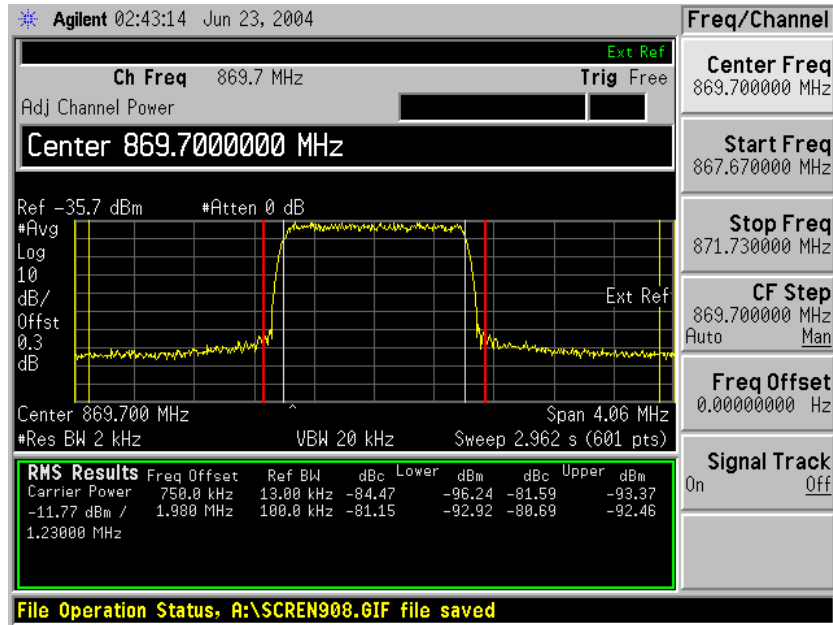
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# Spurious Emissions at Antenna Terminal – 0.063mW Channel 1013 – 869.70 MHz – QPSK



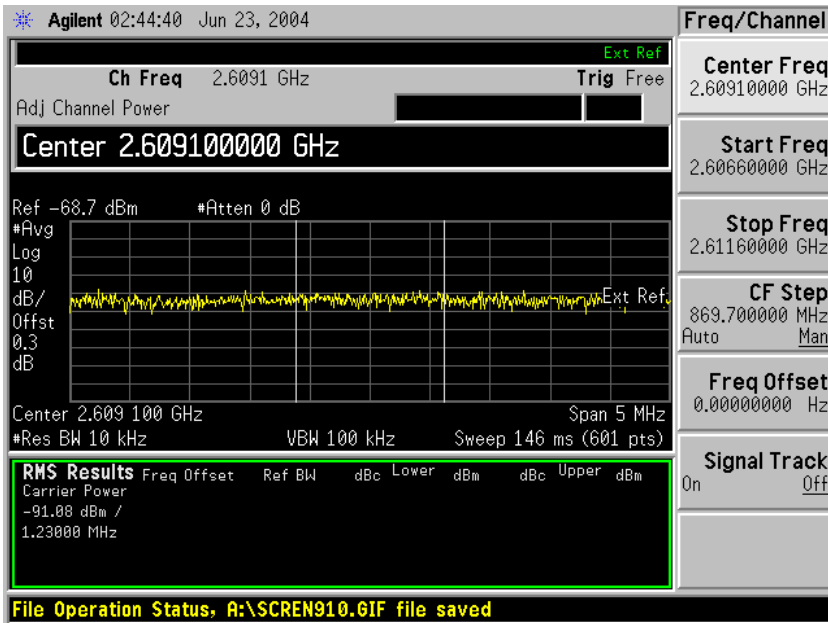
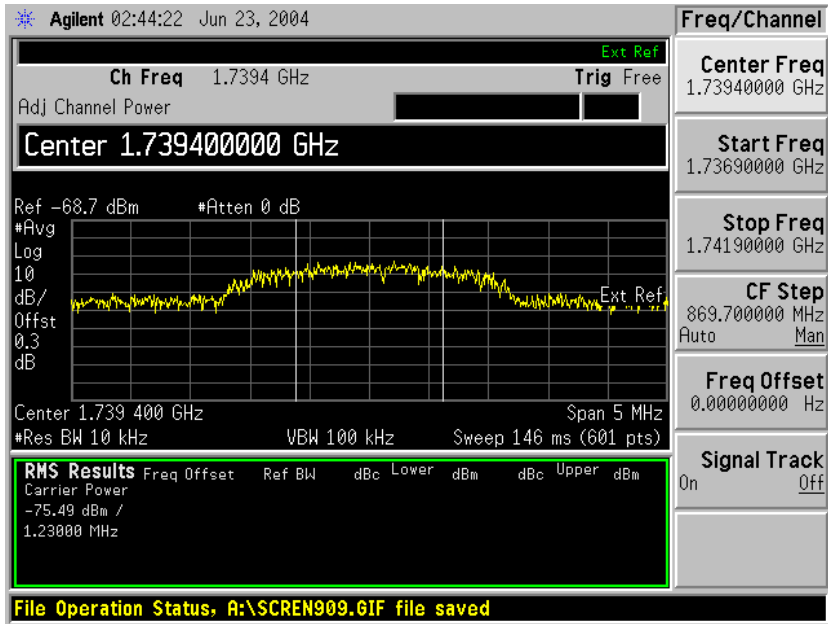


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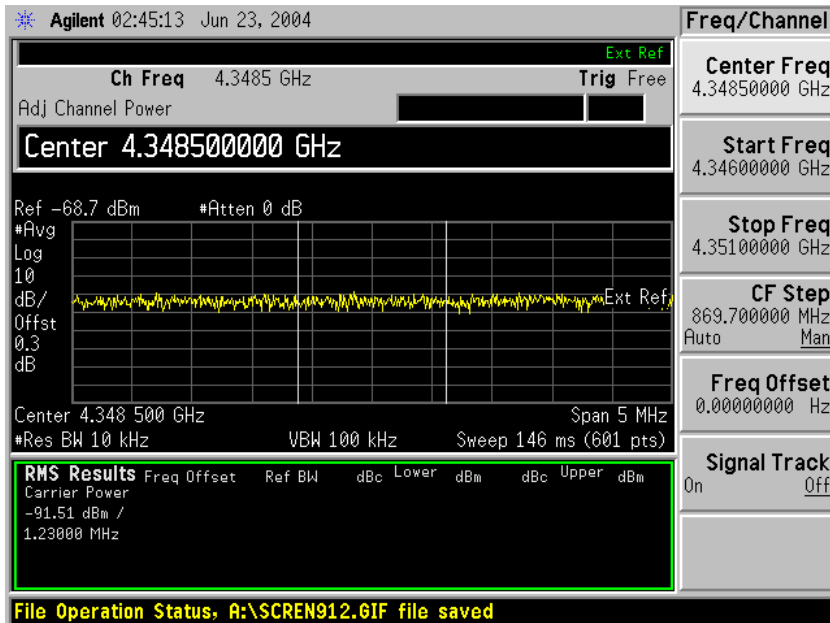
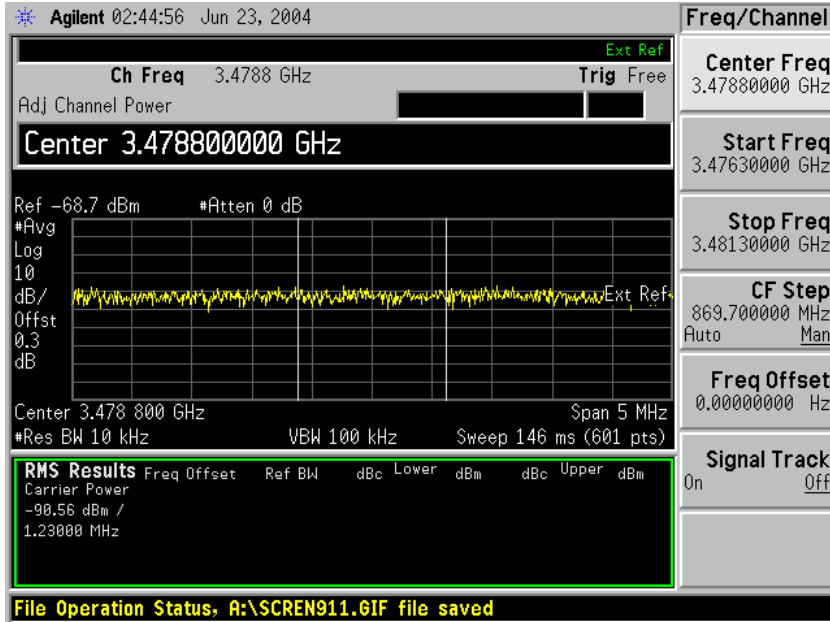


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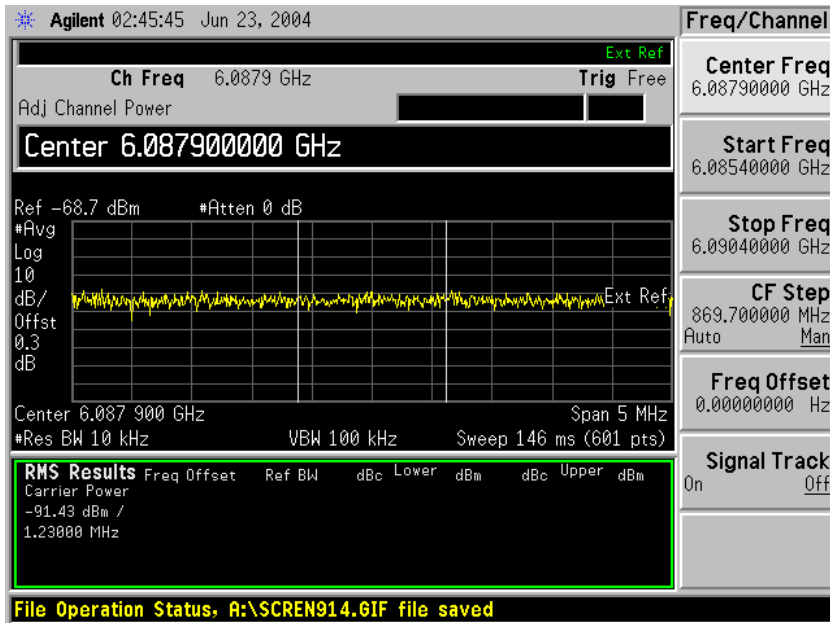
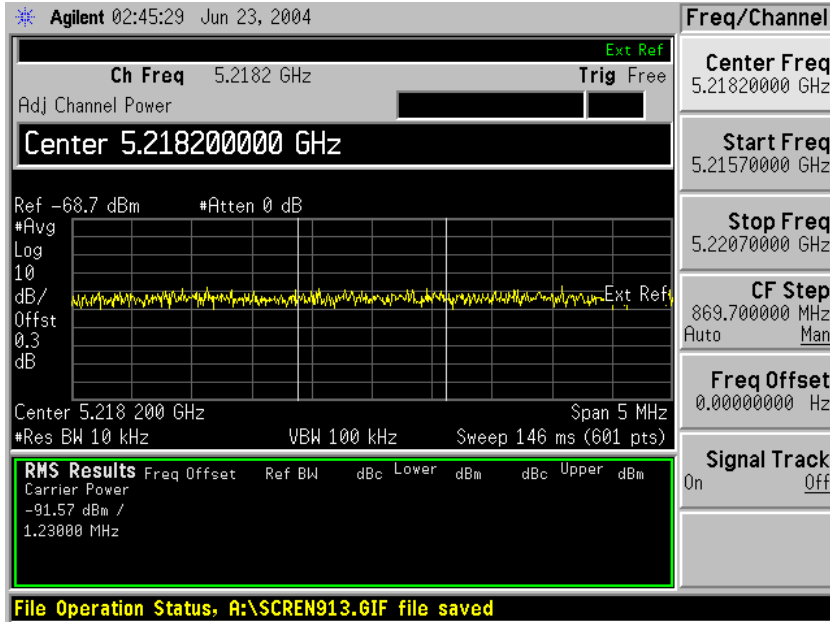


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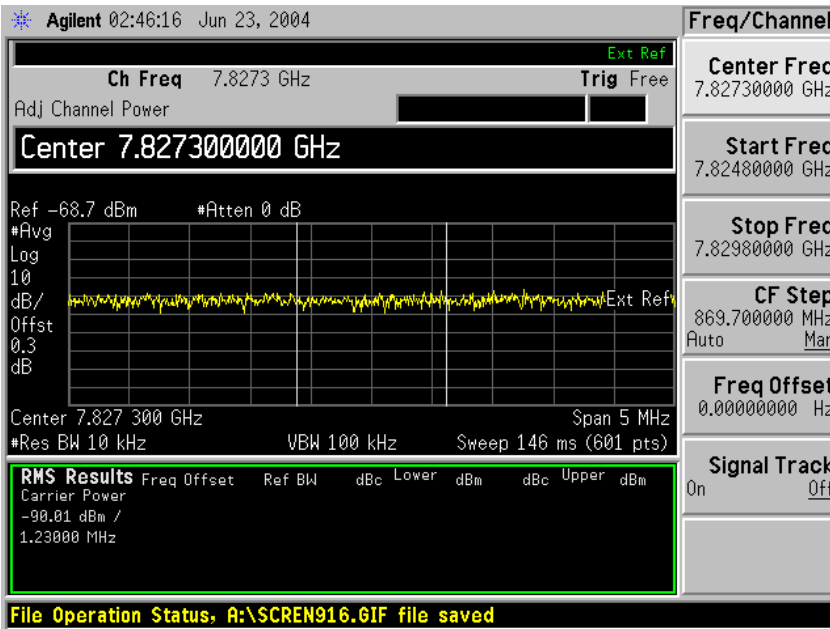
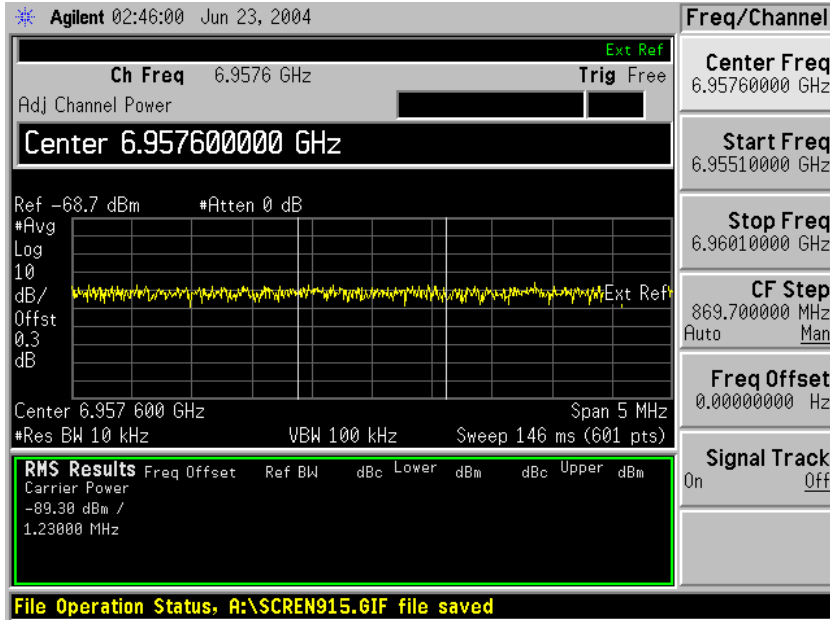


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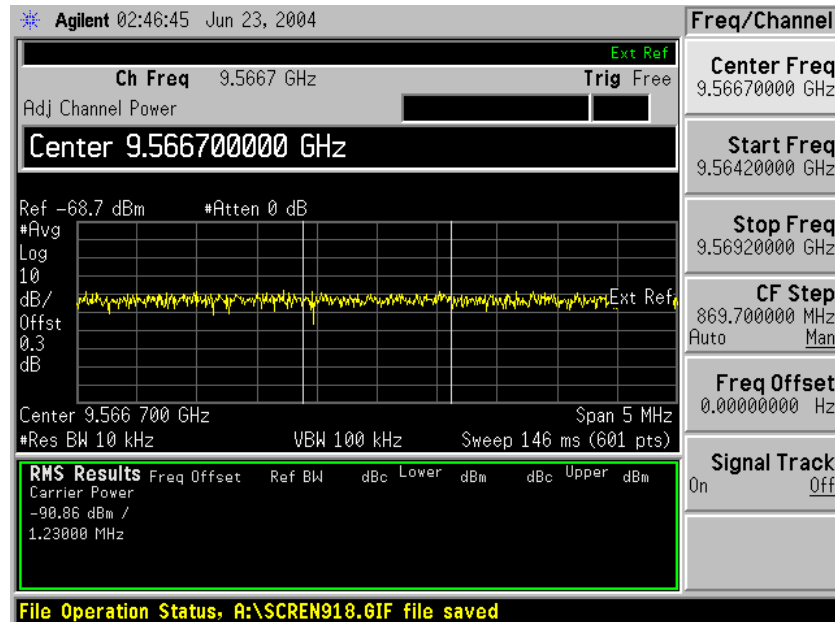
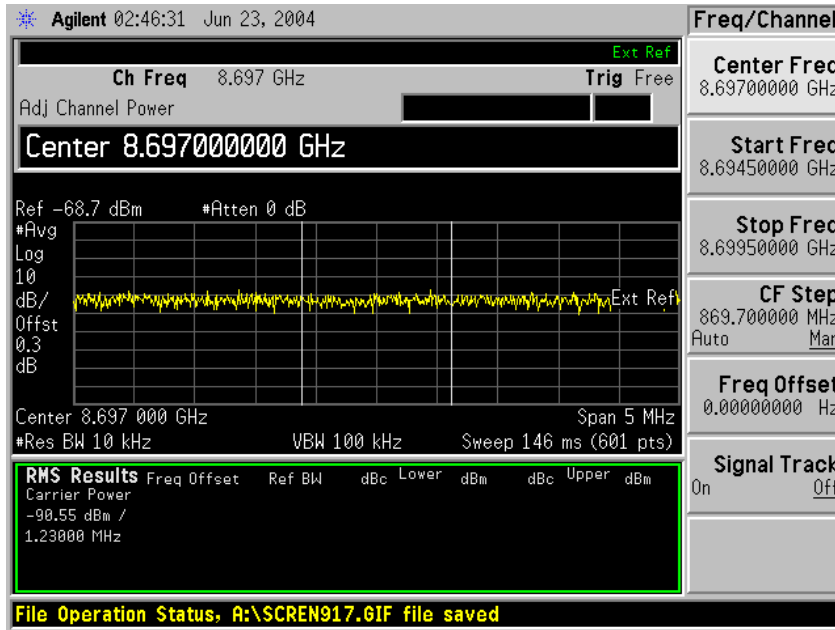


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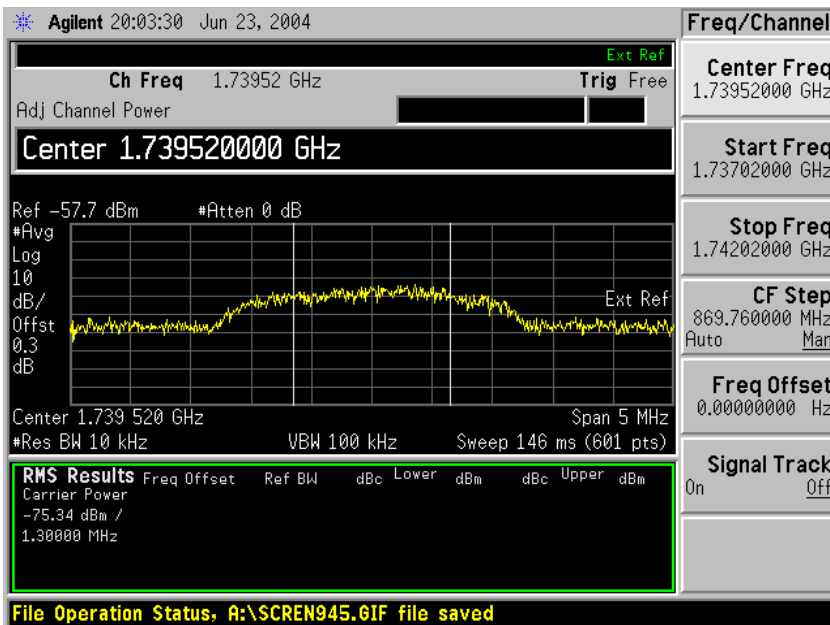
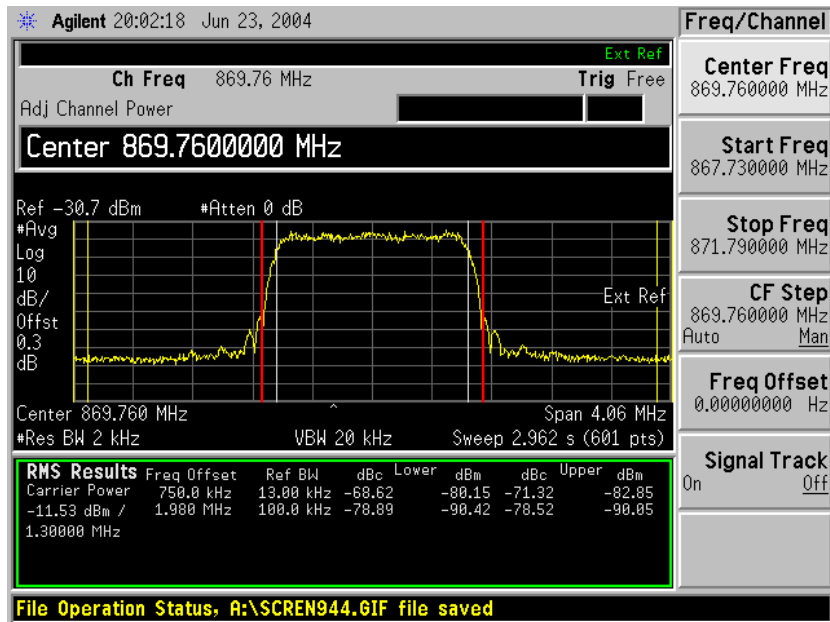
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# Spurious Emissions at Antenna Terminal – 0.063mW Channel 1015 – 869.76 MHz – 16QAM



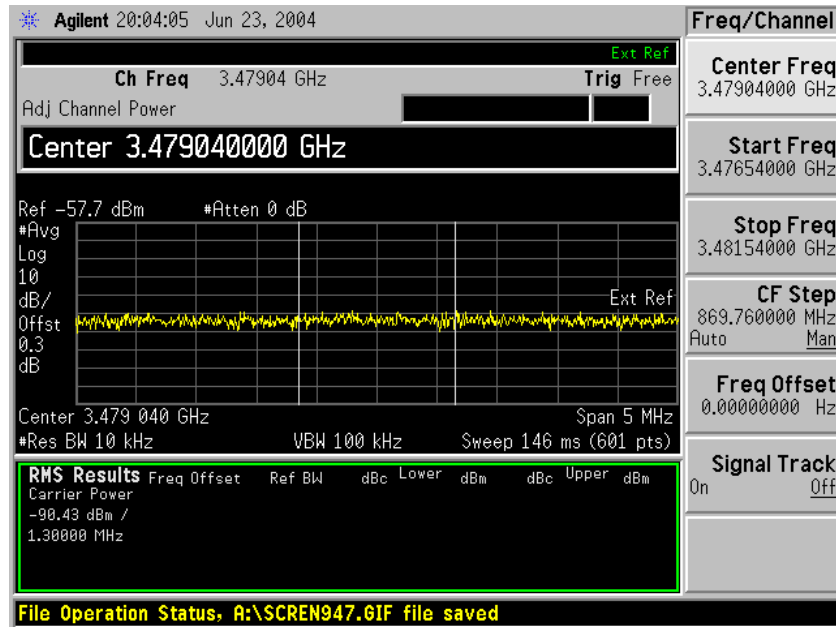
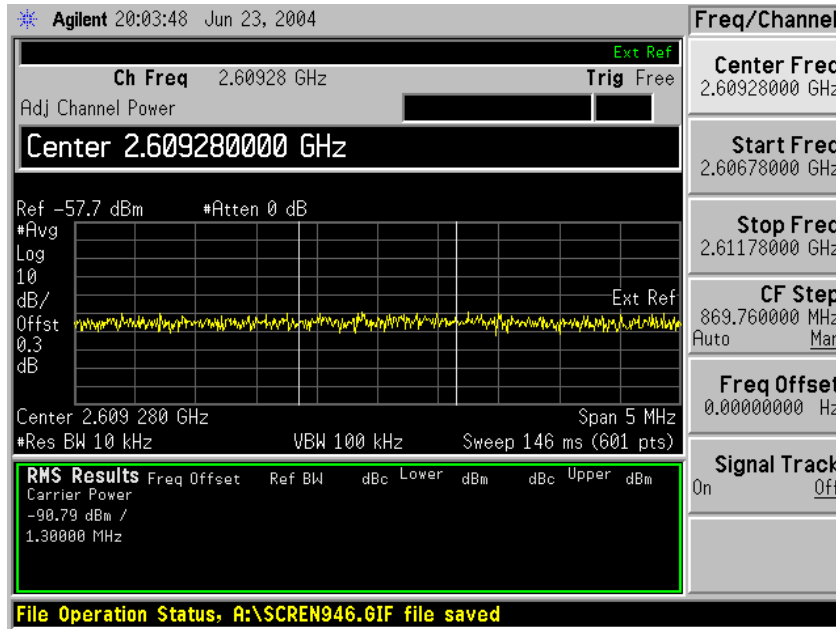




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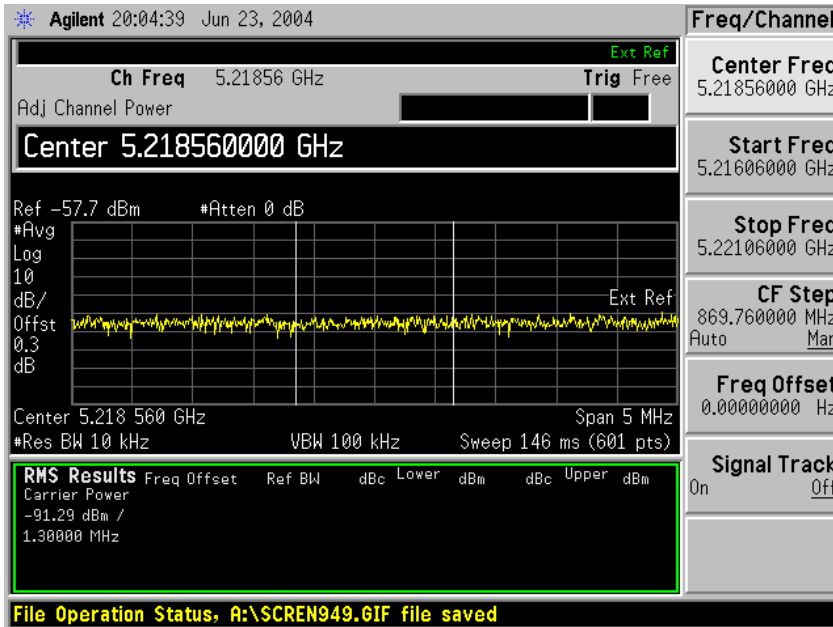
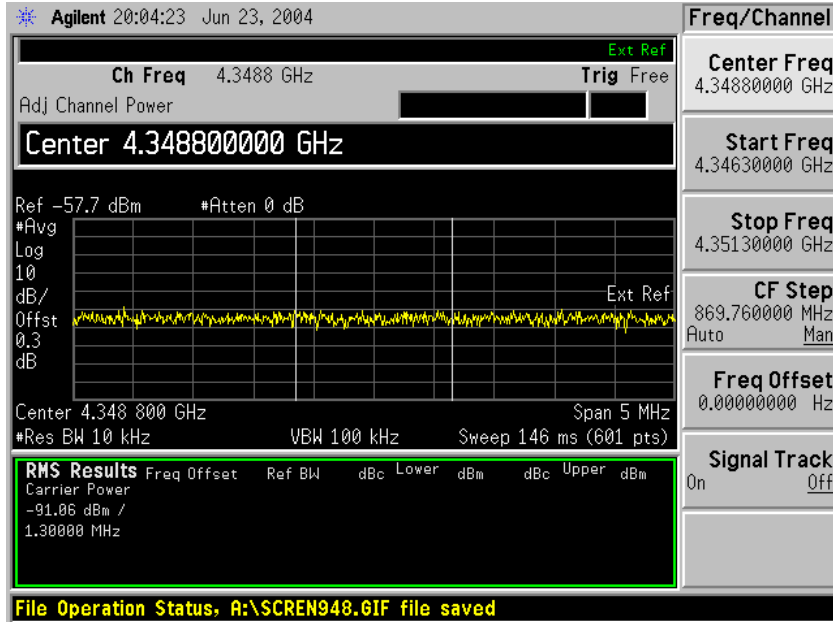


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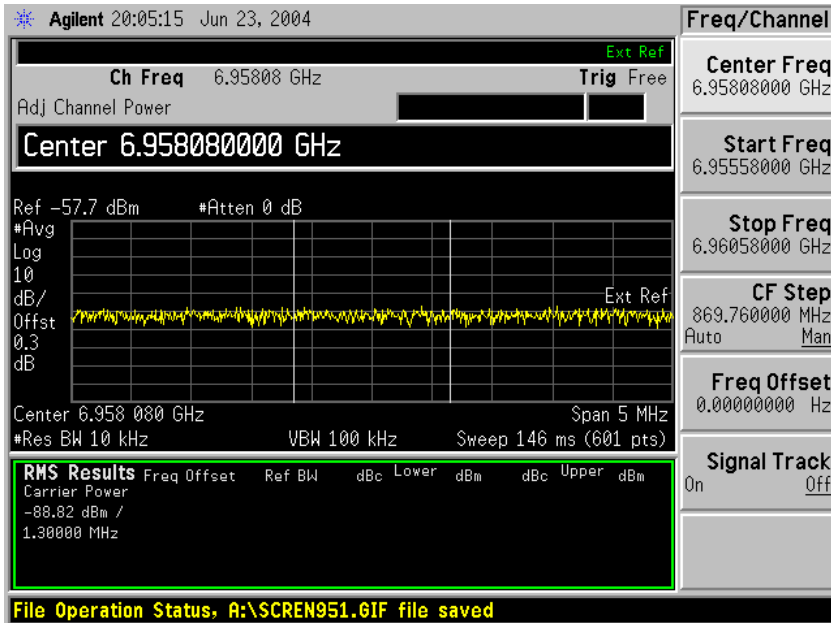
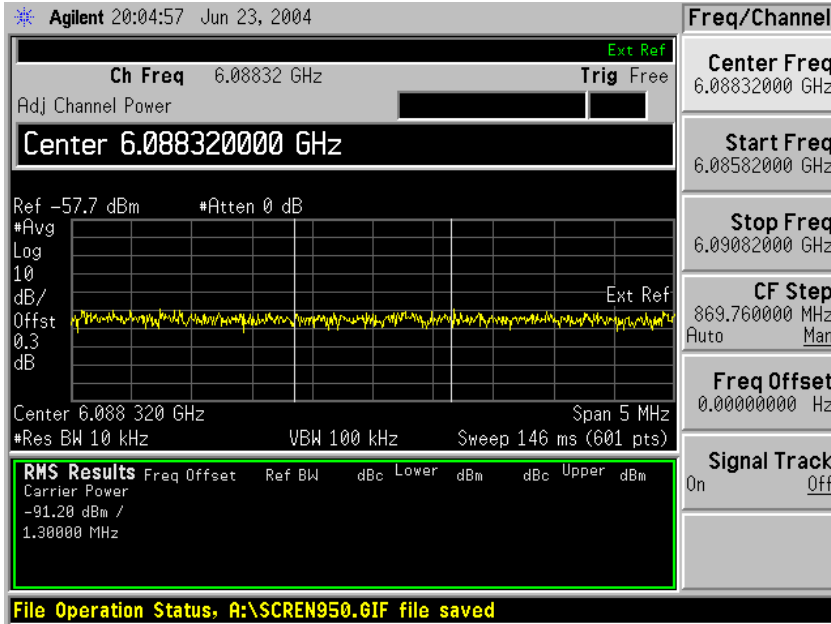


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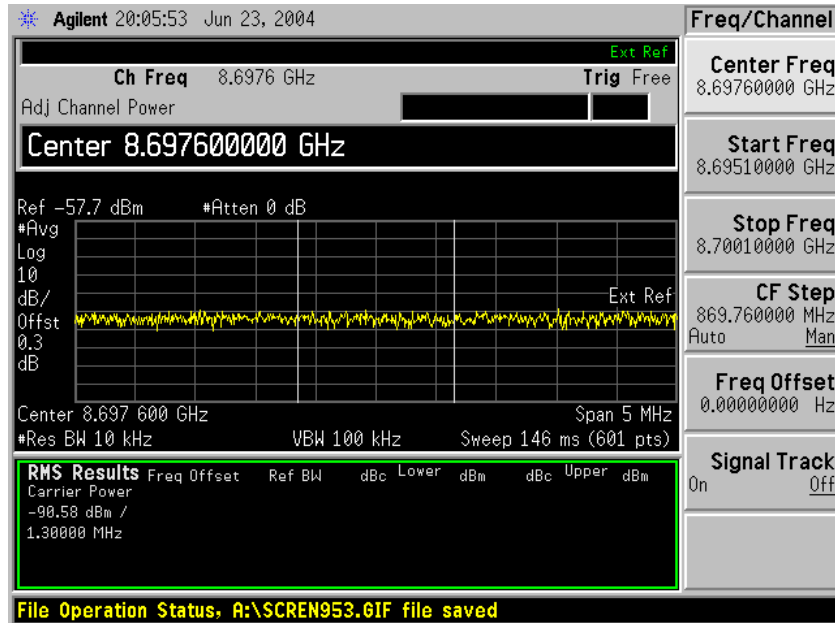
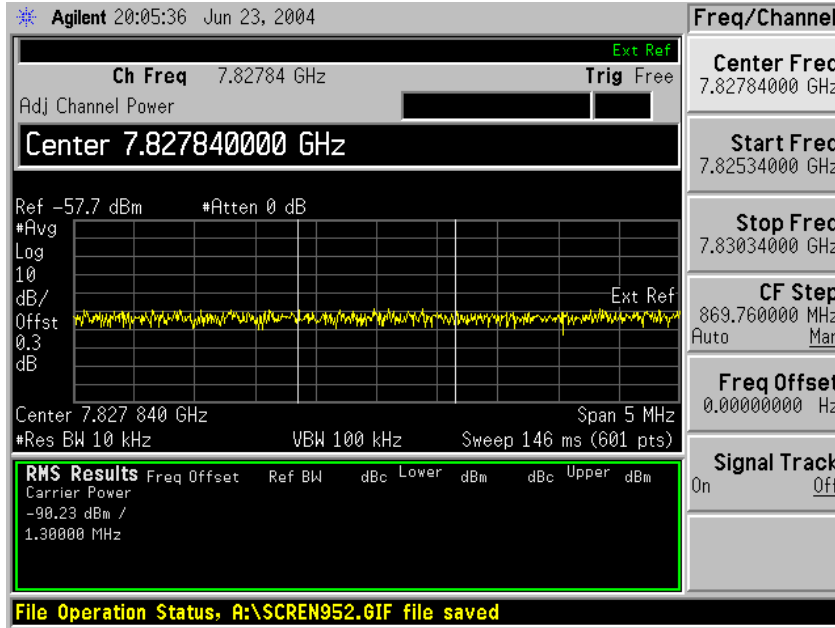


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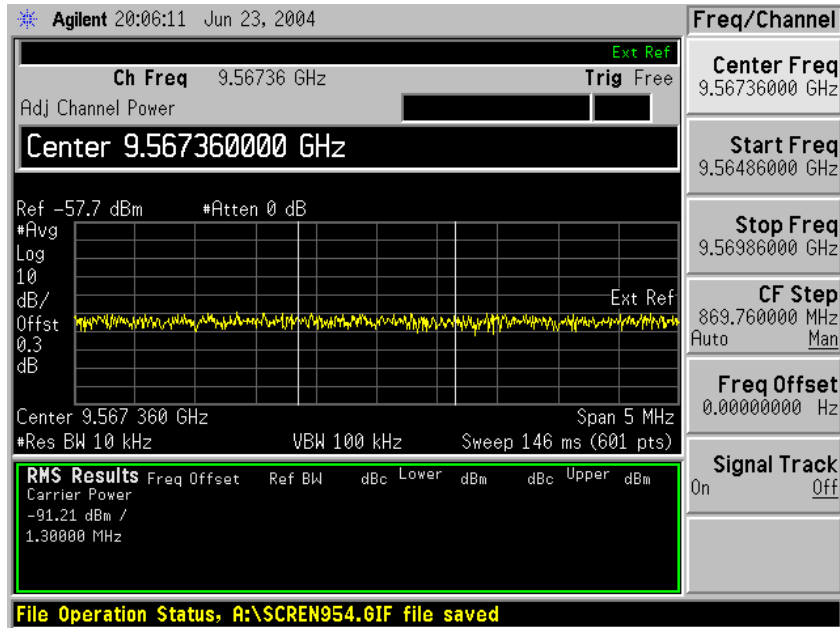


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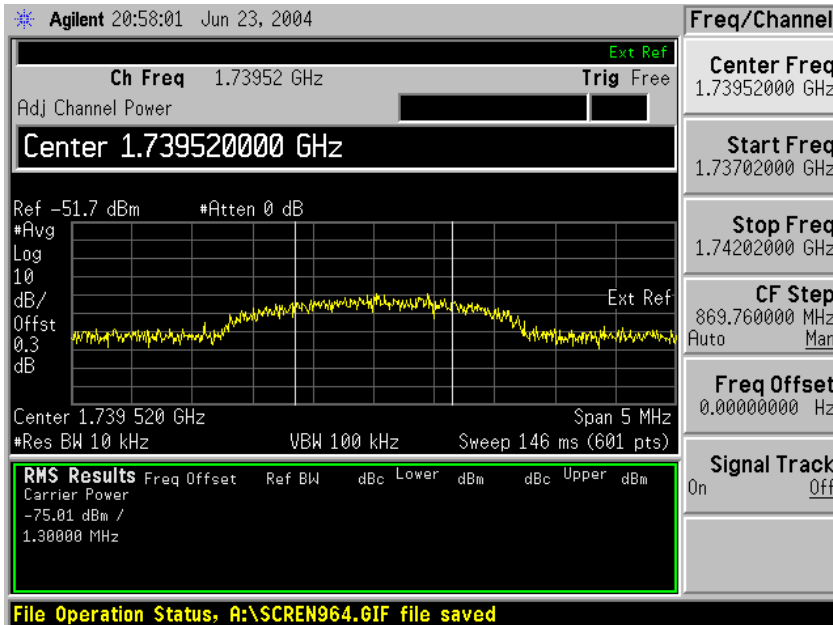
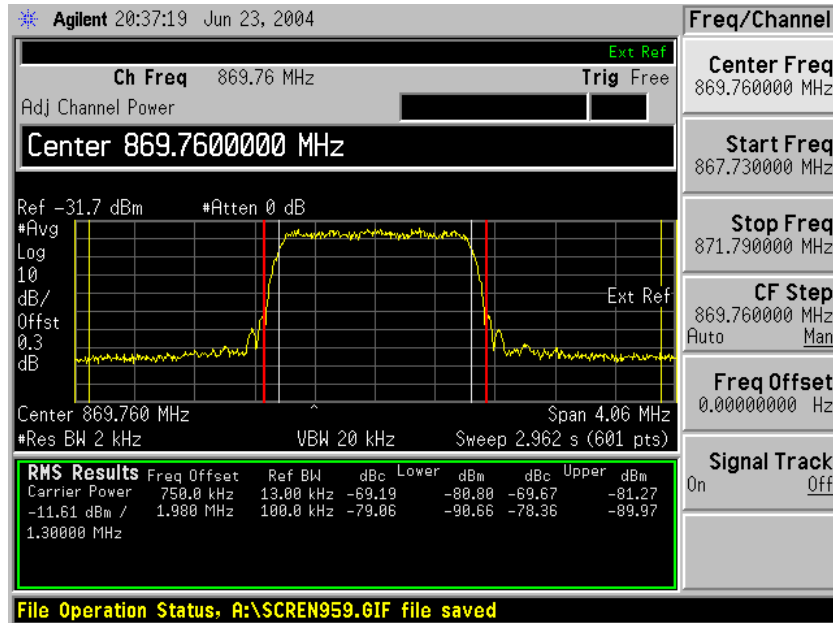
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# Spurious Emissions at Antenna Terminal – 0.063mW Channel 1015 – 869.76 MHz – 8PSK





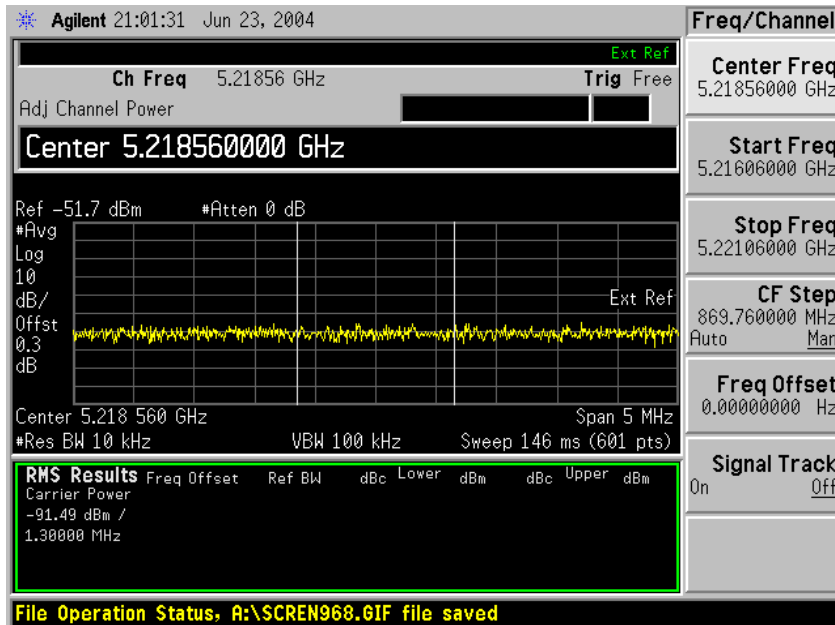
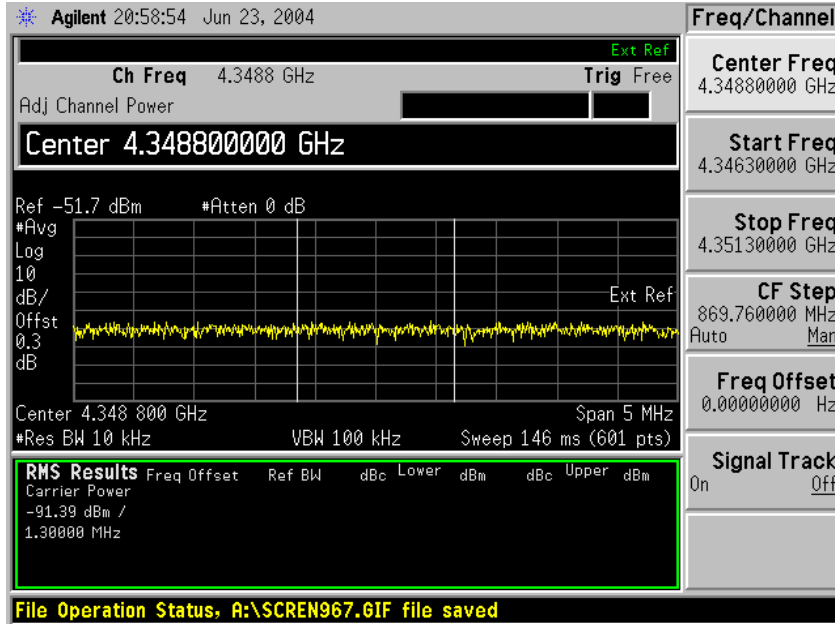


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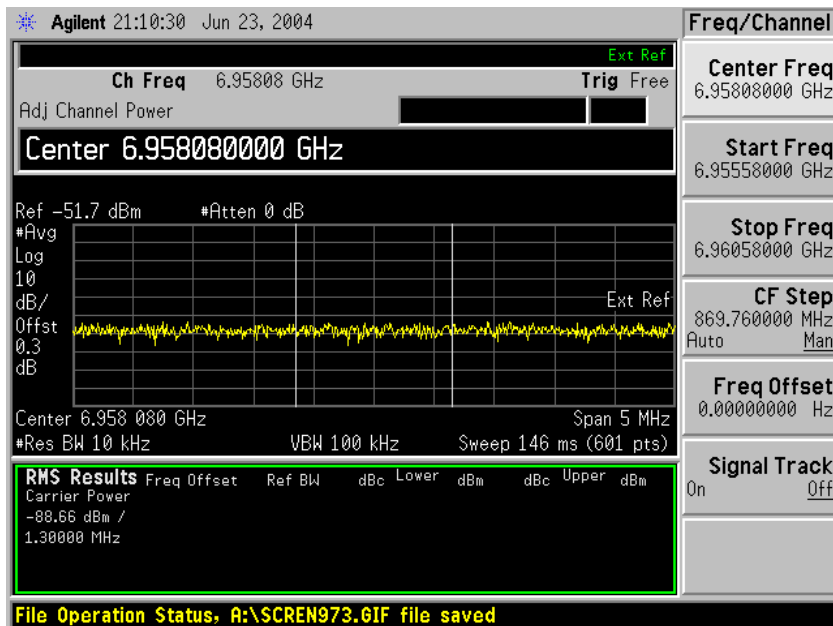
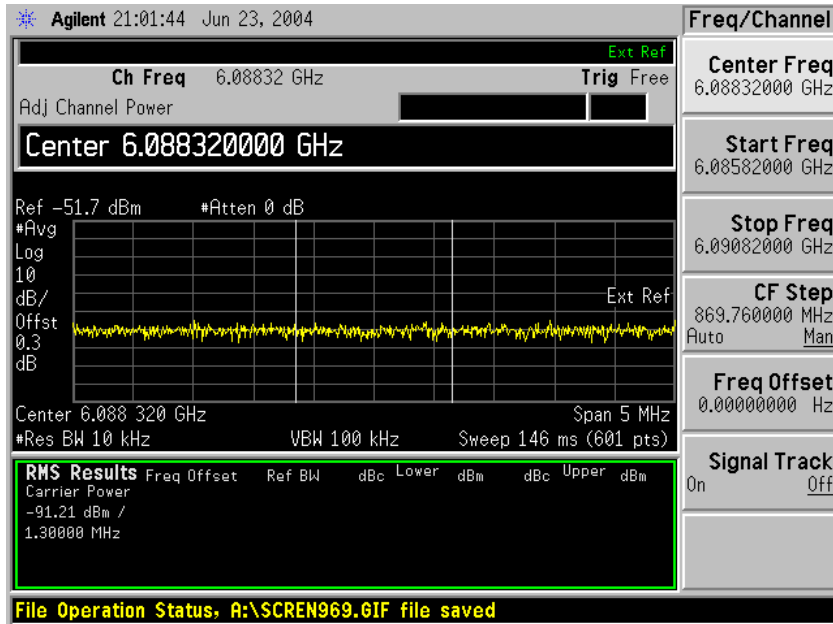


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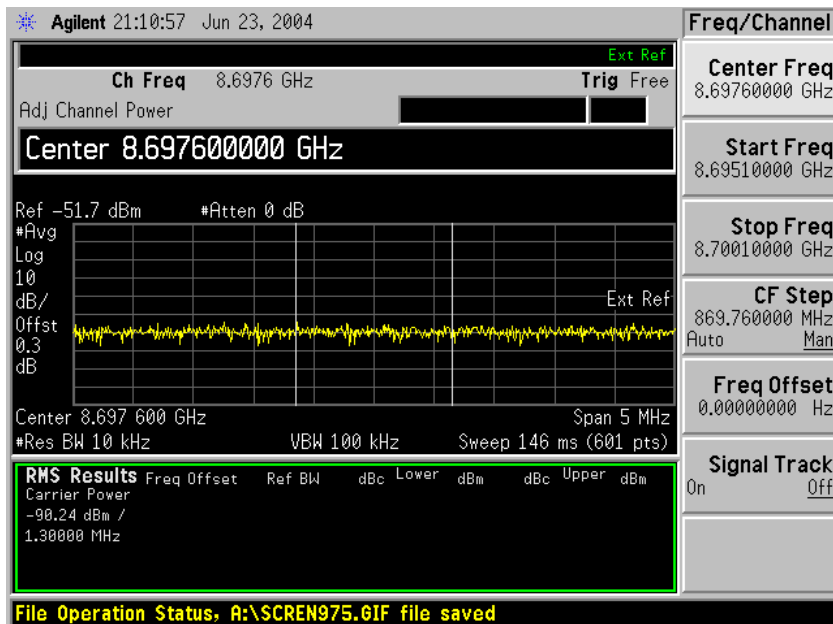
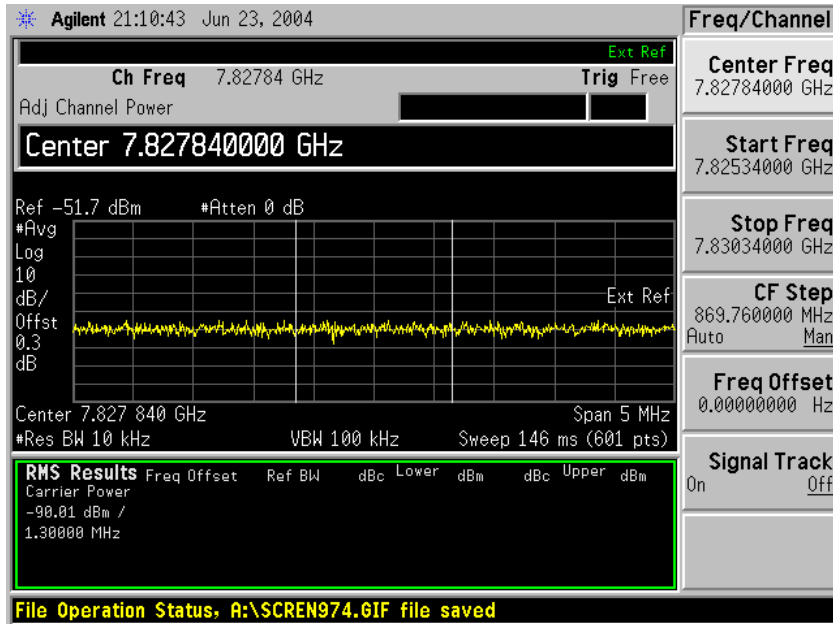


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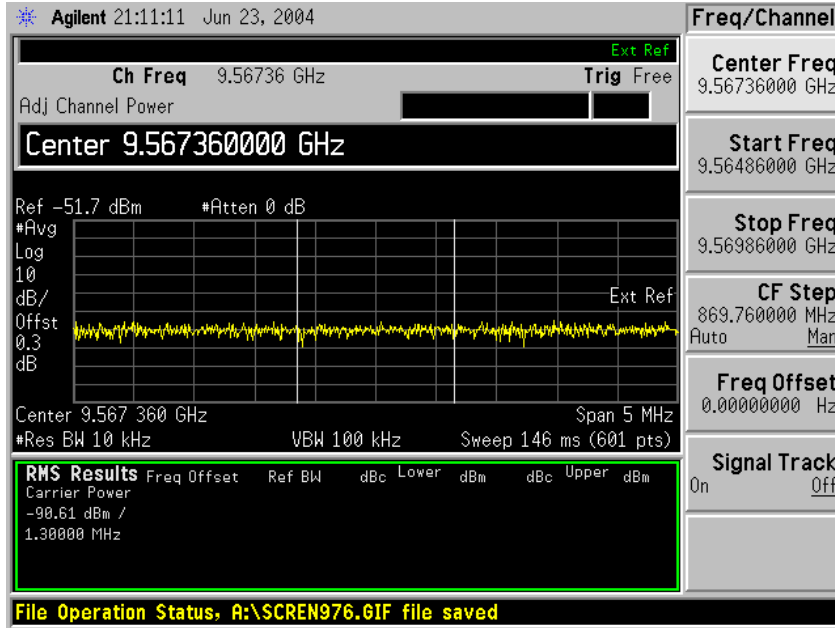


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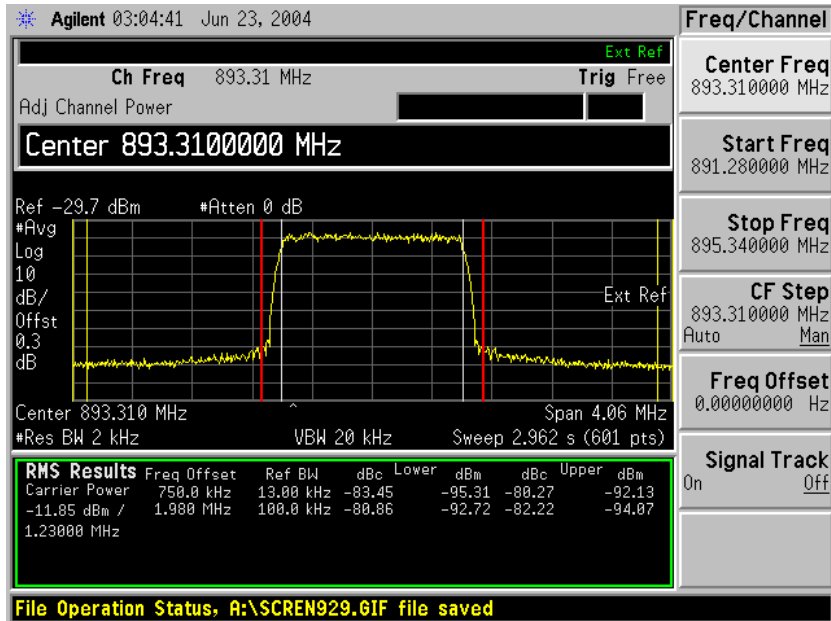


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## Spurious Emissions at Antenna Terminal – 0.063mW Channel 777 – 893.31 MHz – QPSK



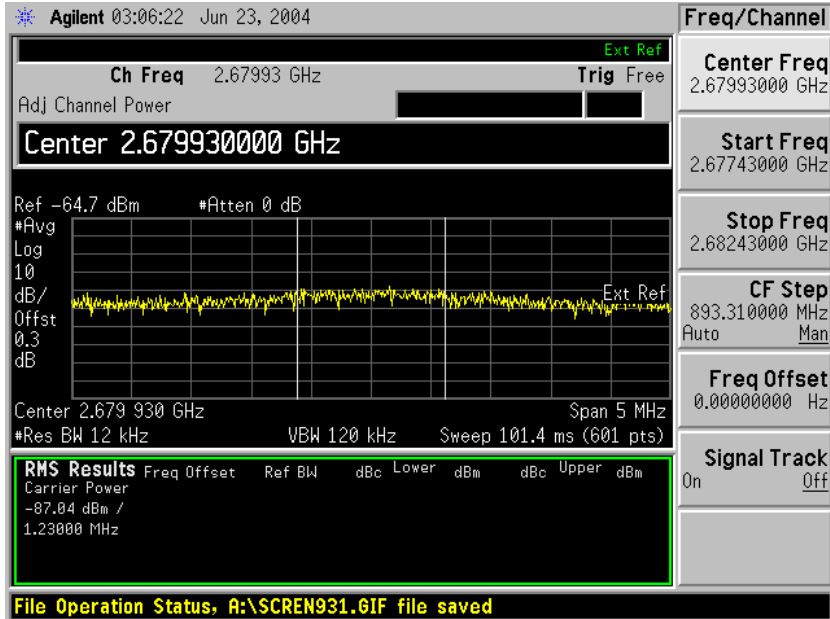
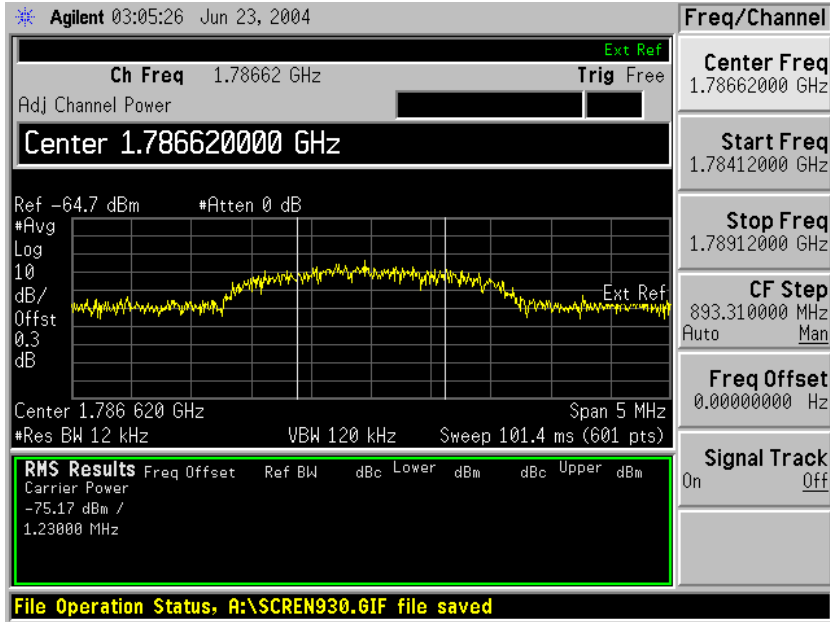


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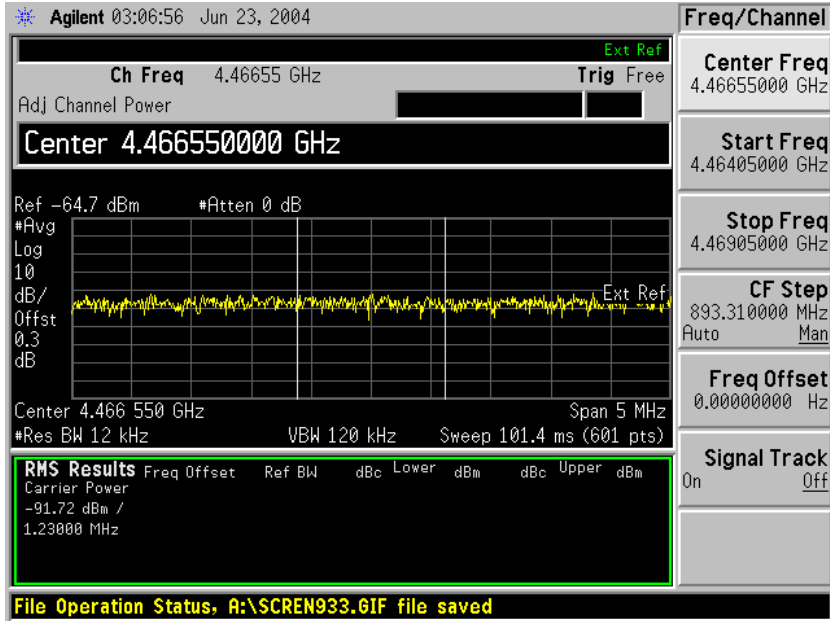
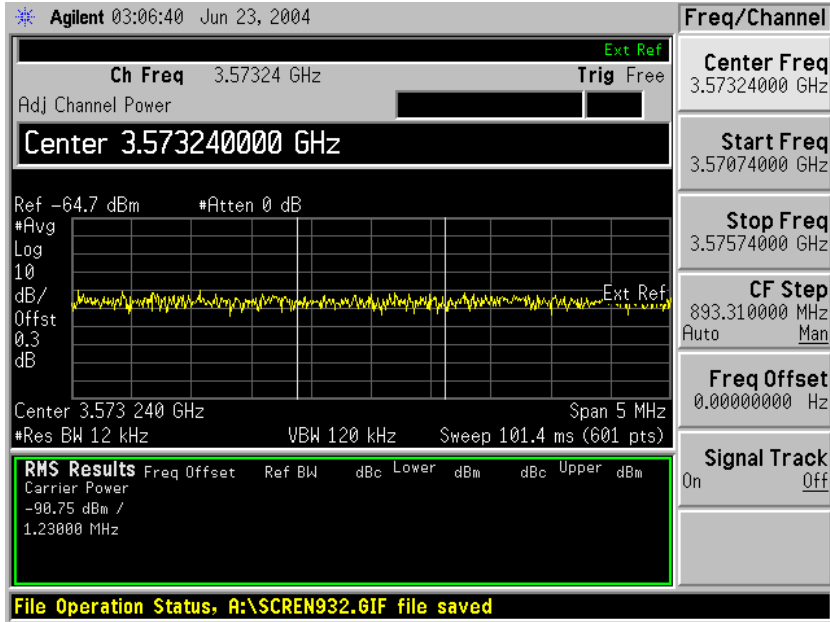


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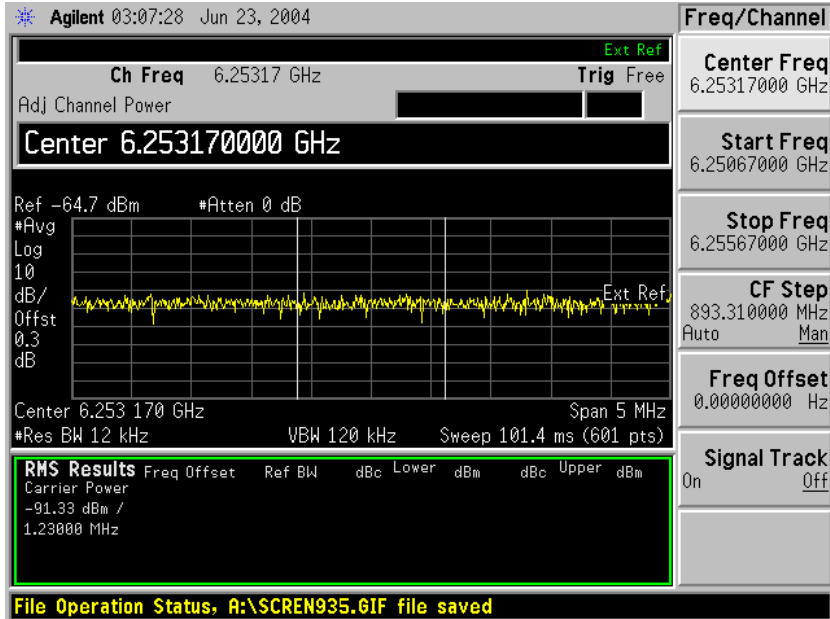
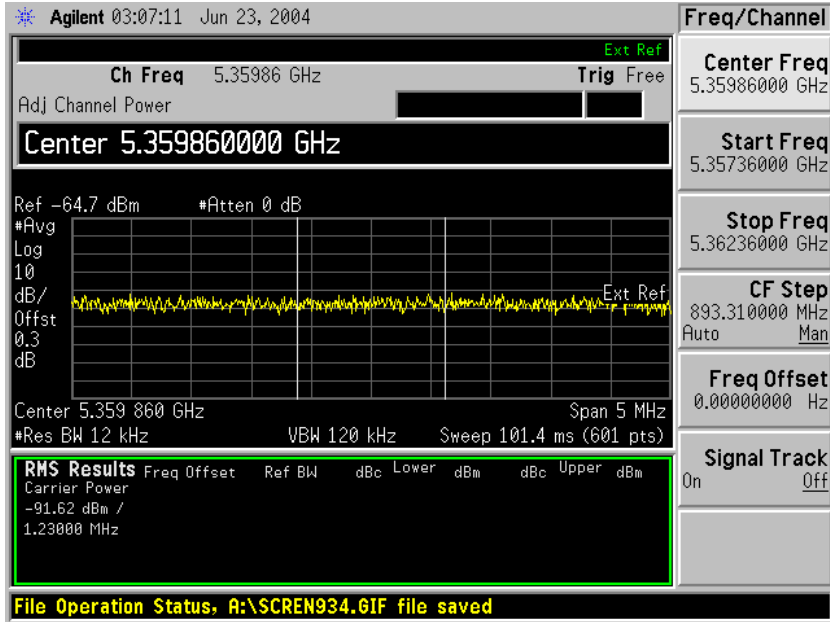


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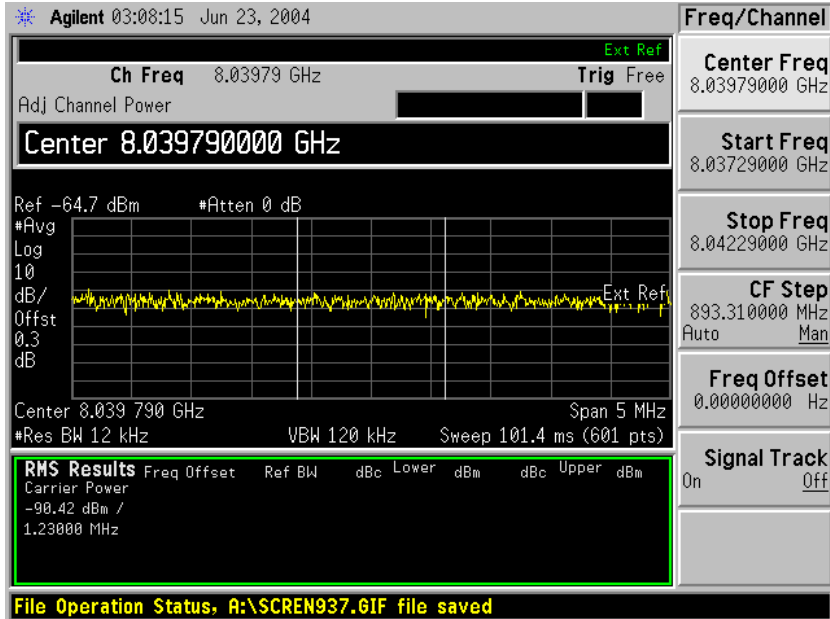
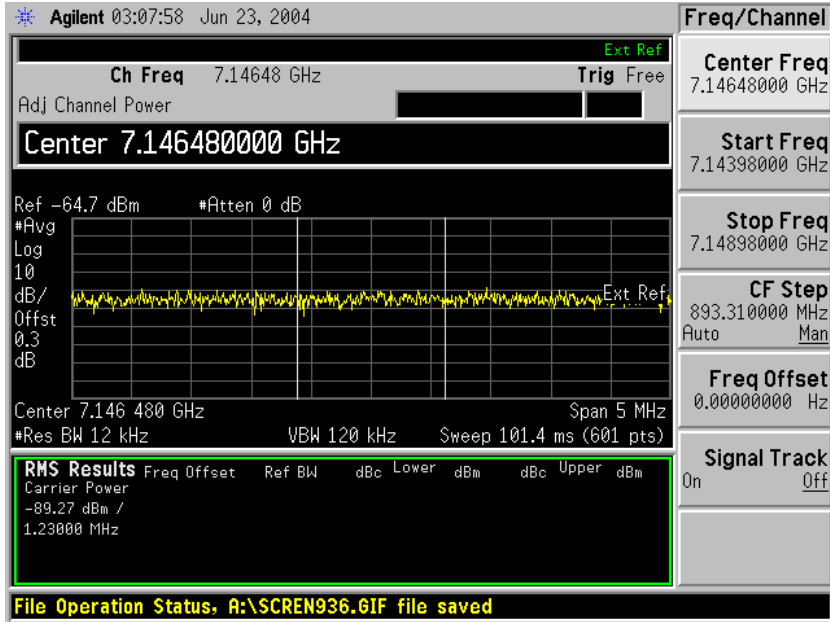


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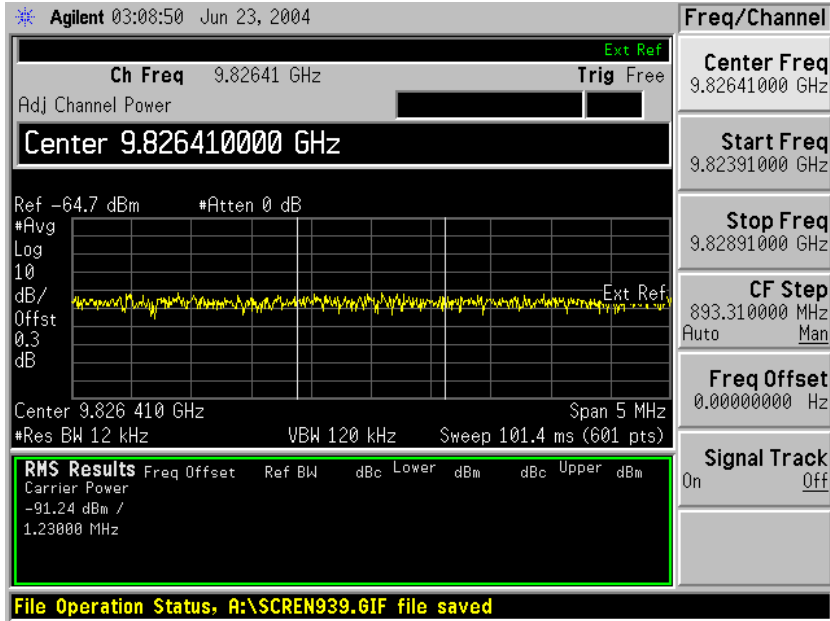
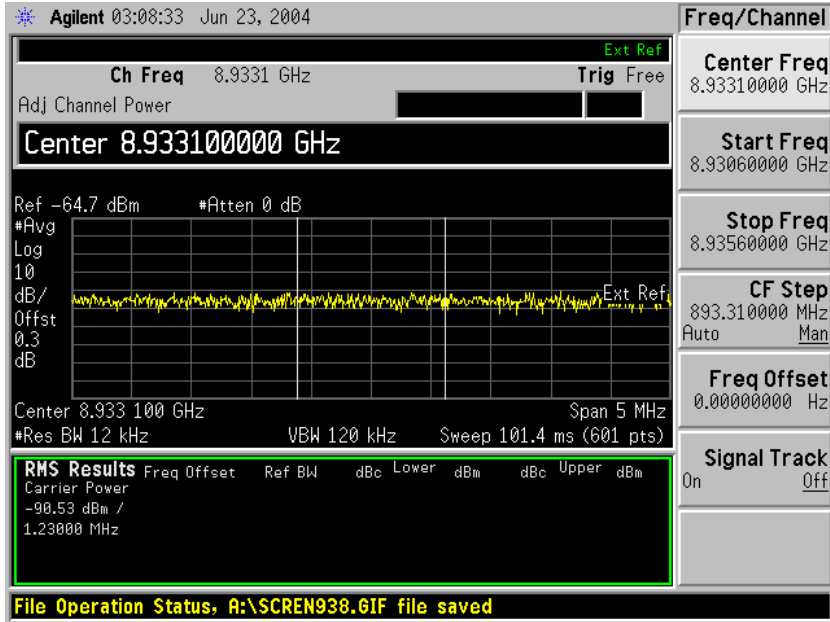


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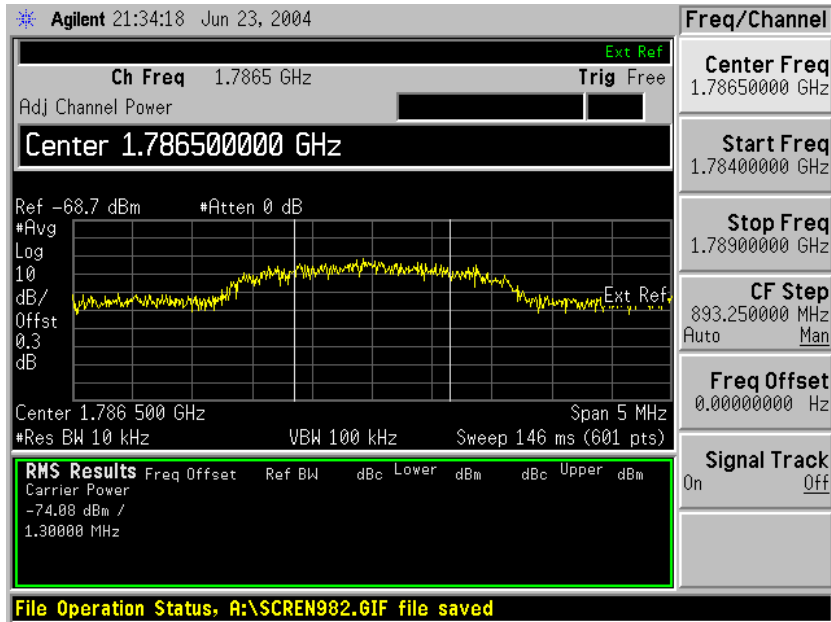
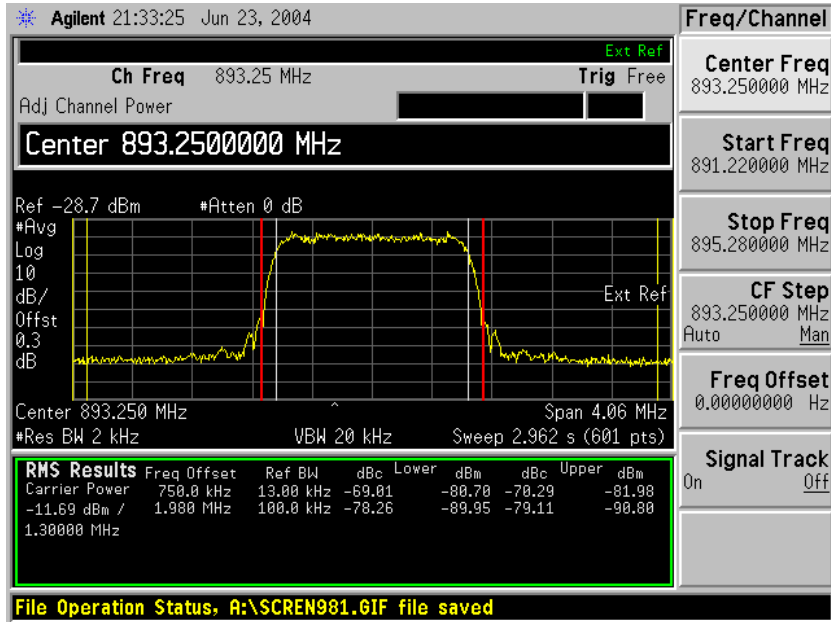
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# Spurious Emissions at Antenna Terminal – 0.063mW Channel 775 – 893.25 MHz – 16QAM



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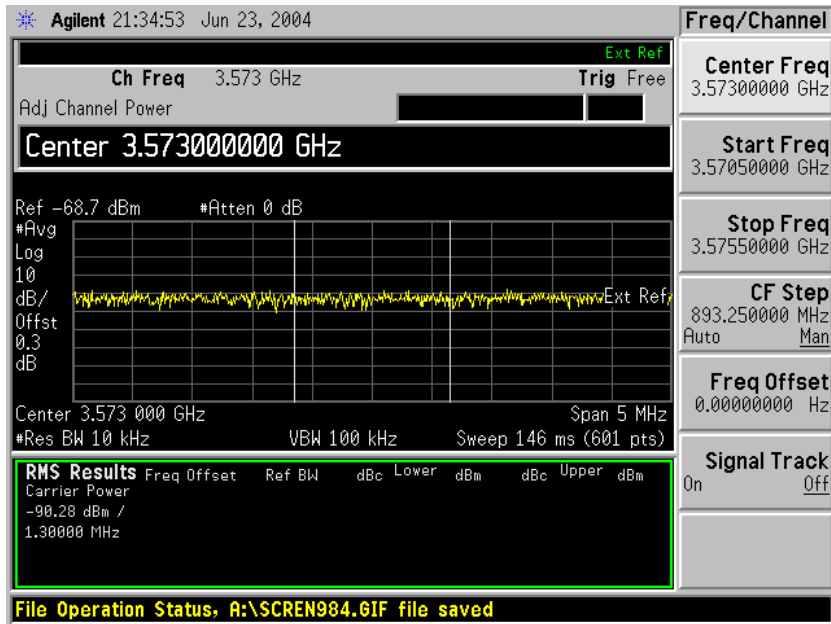
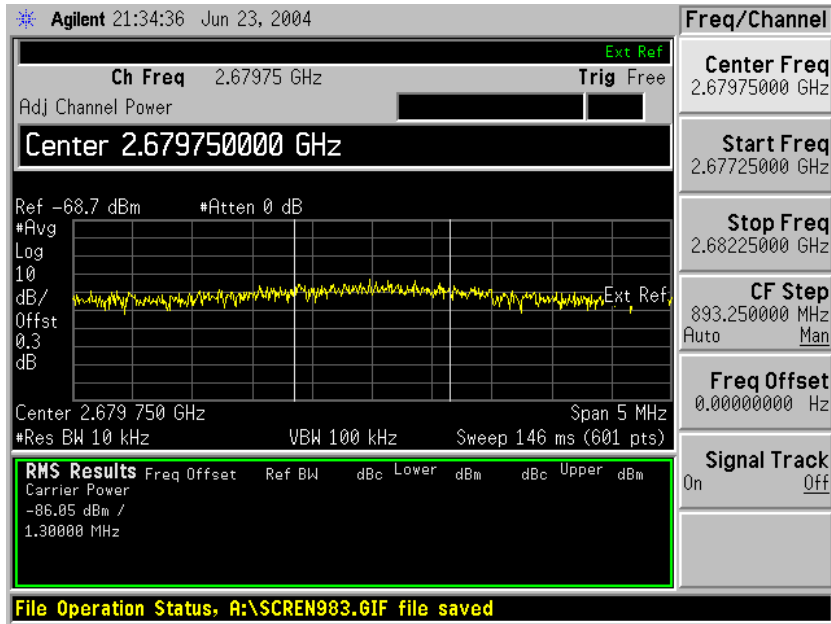
7/28/2004



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FCC ID: IHET5EL1



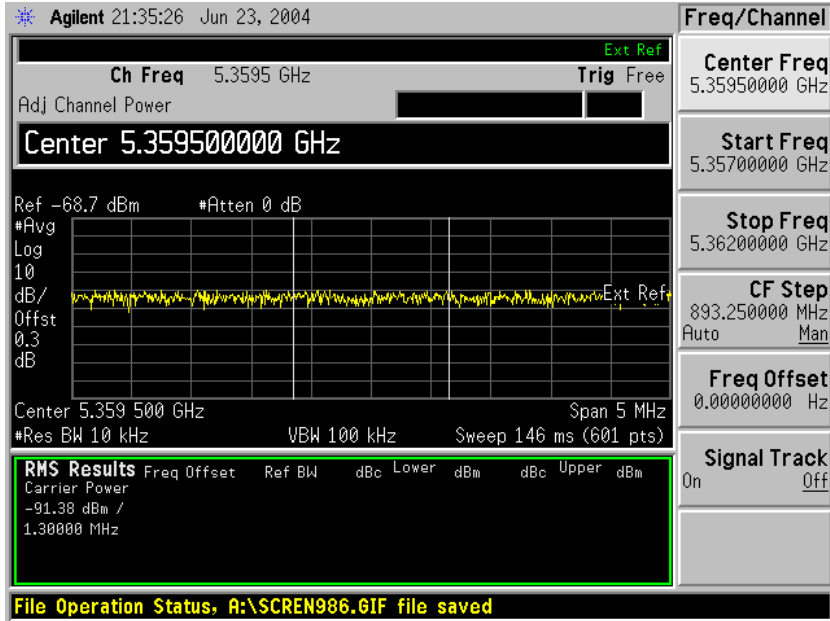
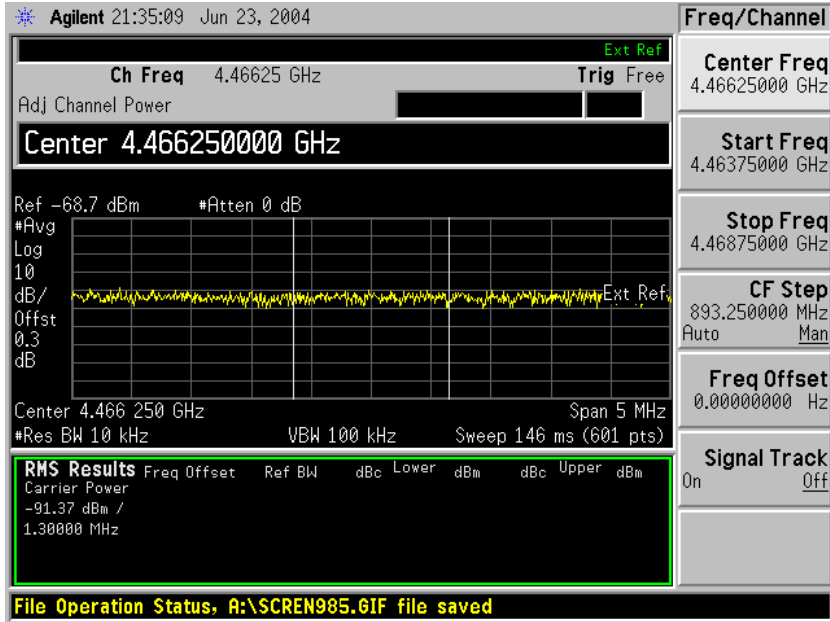


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FCC ID: IHET5EL1

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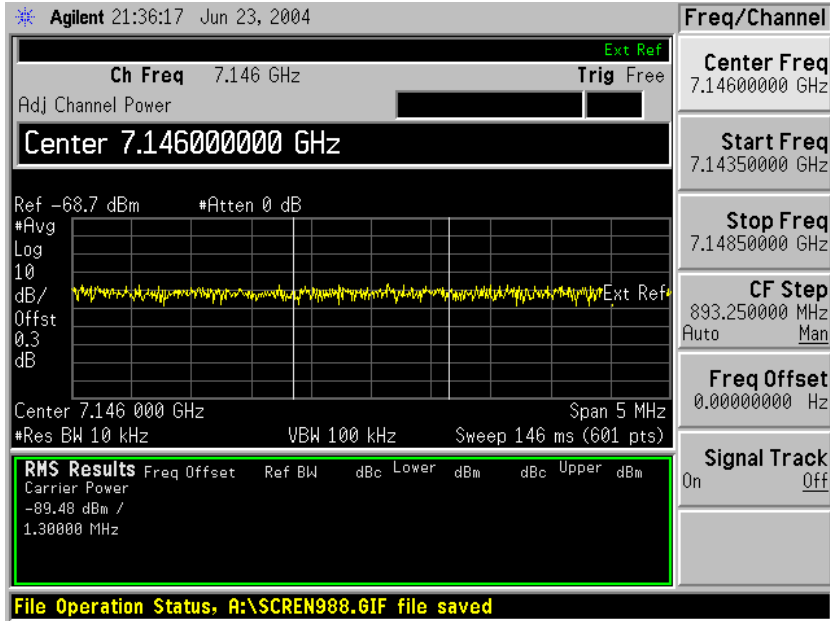
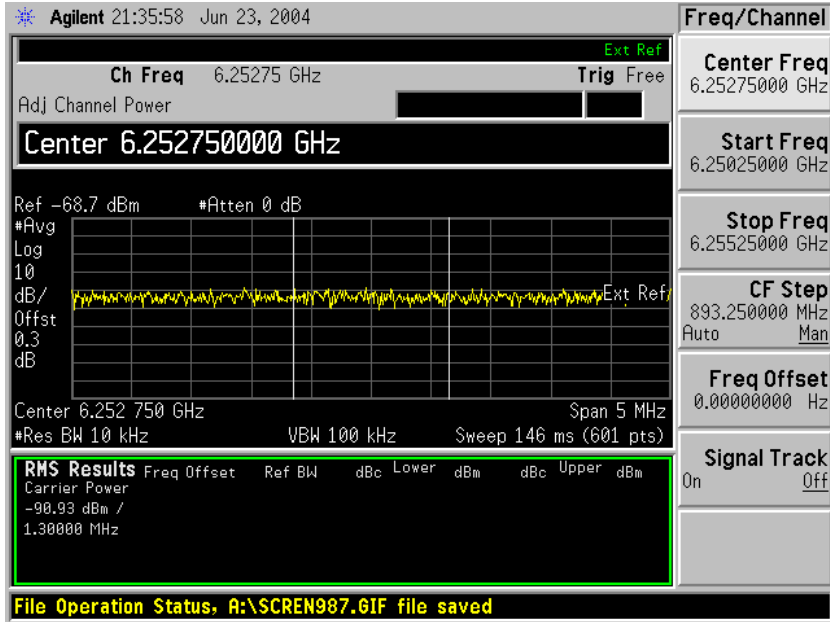


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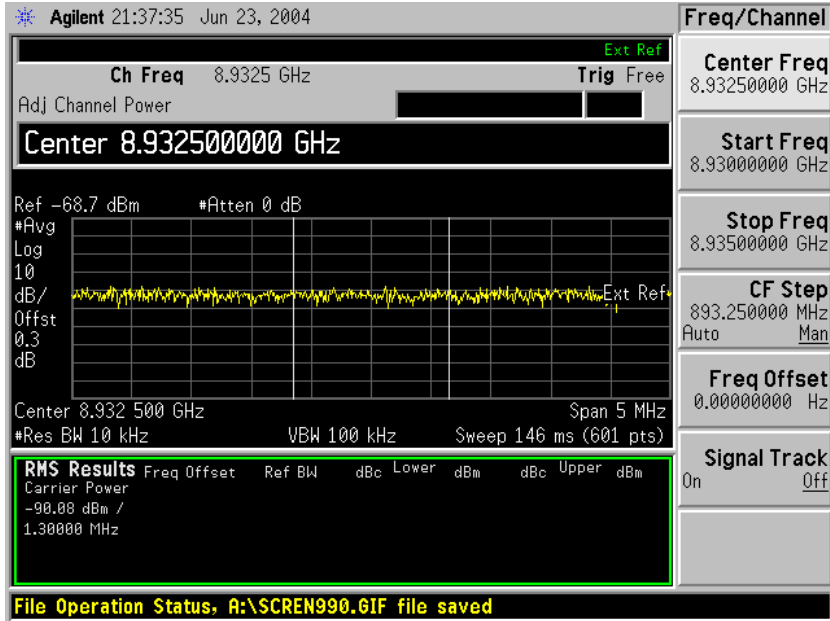
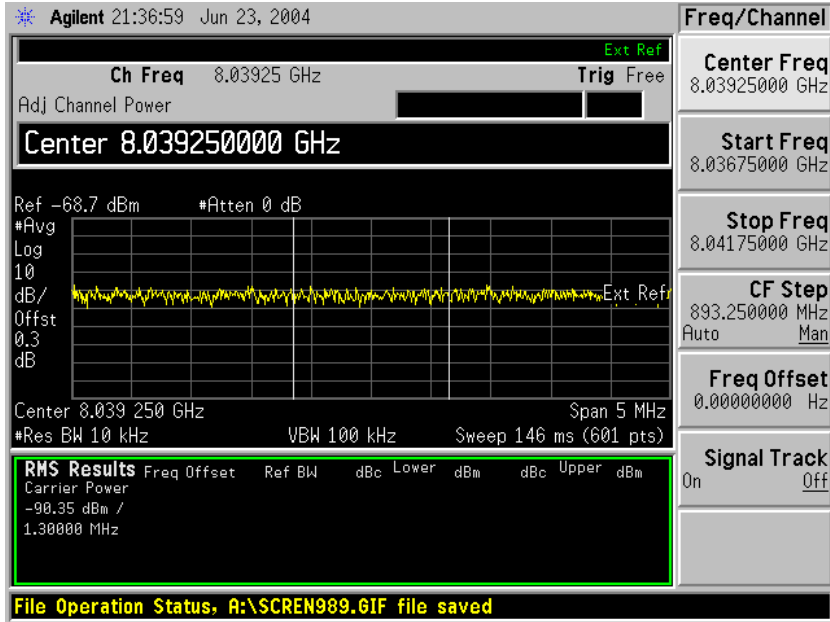


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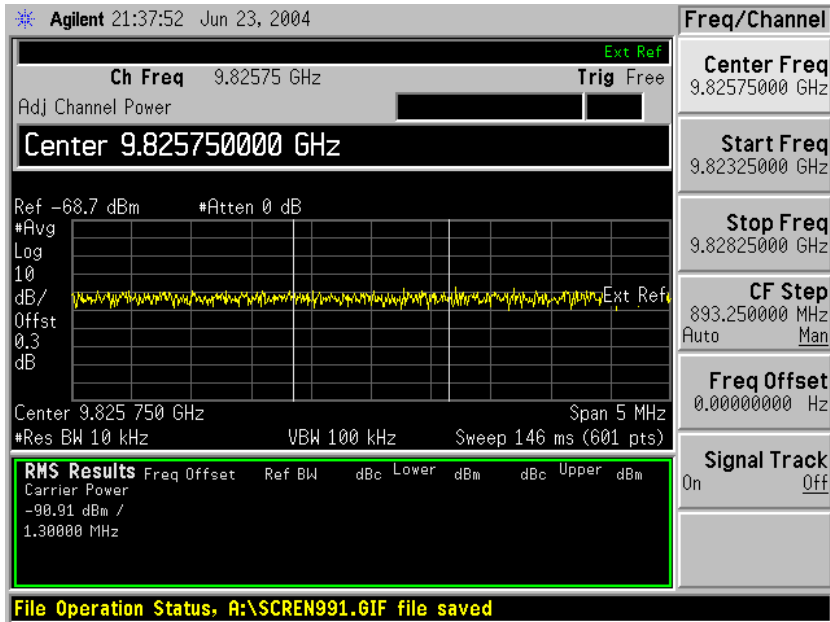


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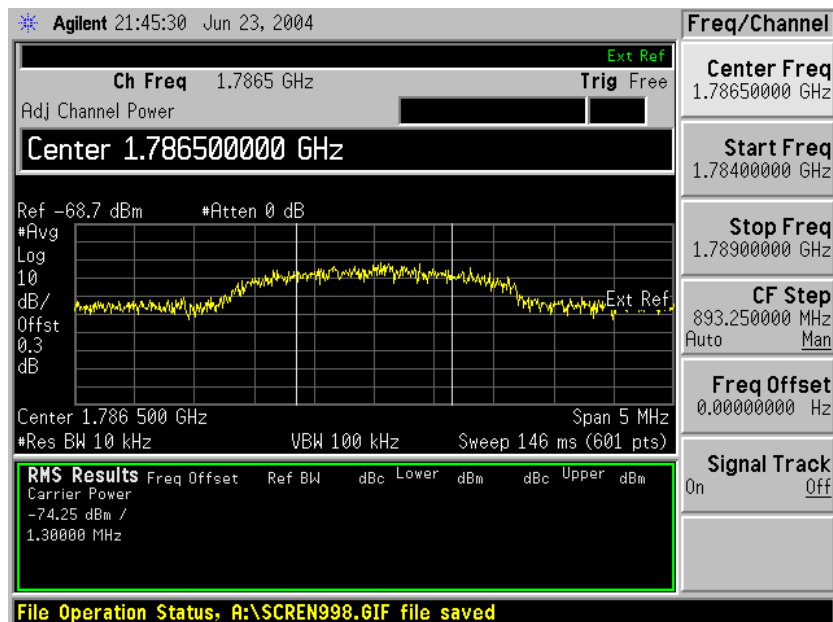
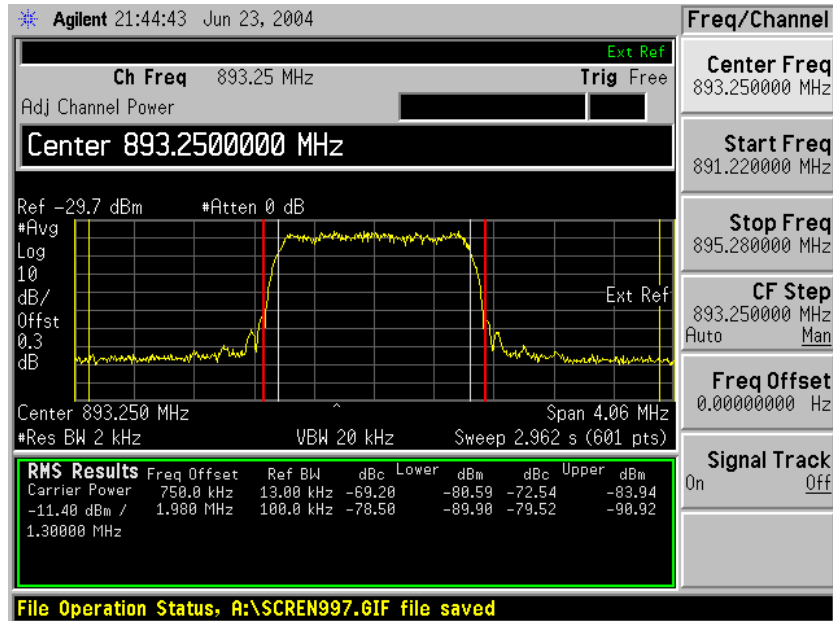
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# Spurious Emissions at Antenna Terminal – 0.063mW Channel 775 – 893.25 MHz – 8PSK





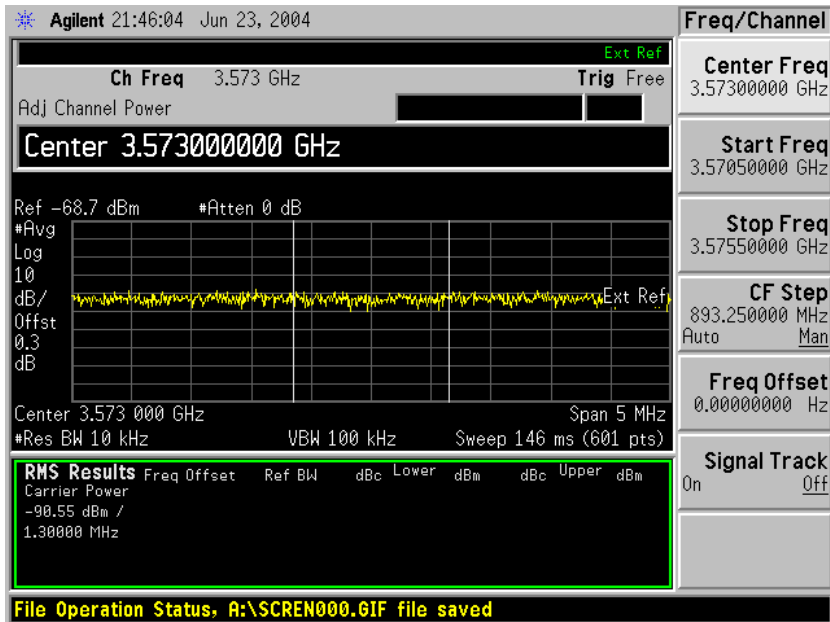
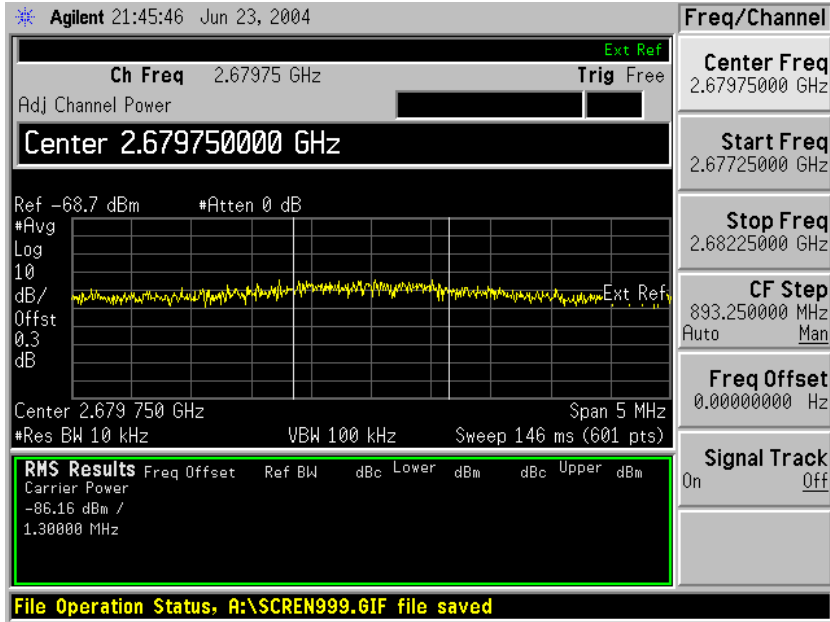


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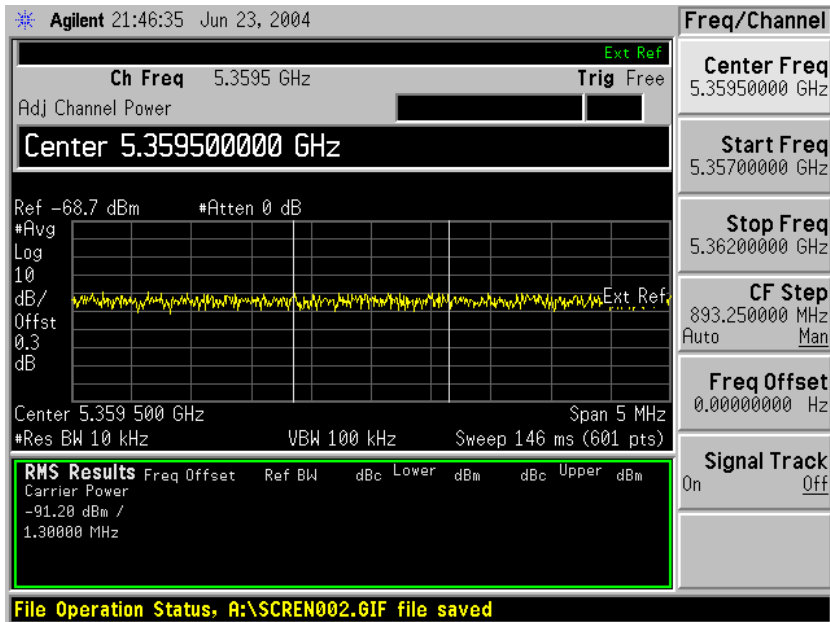
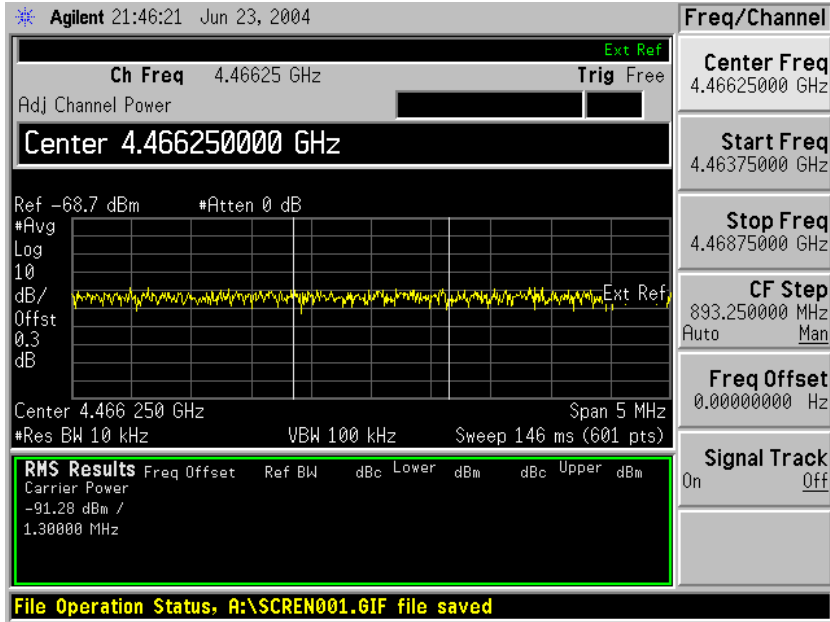


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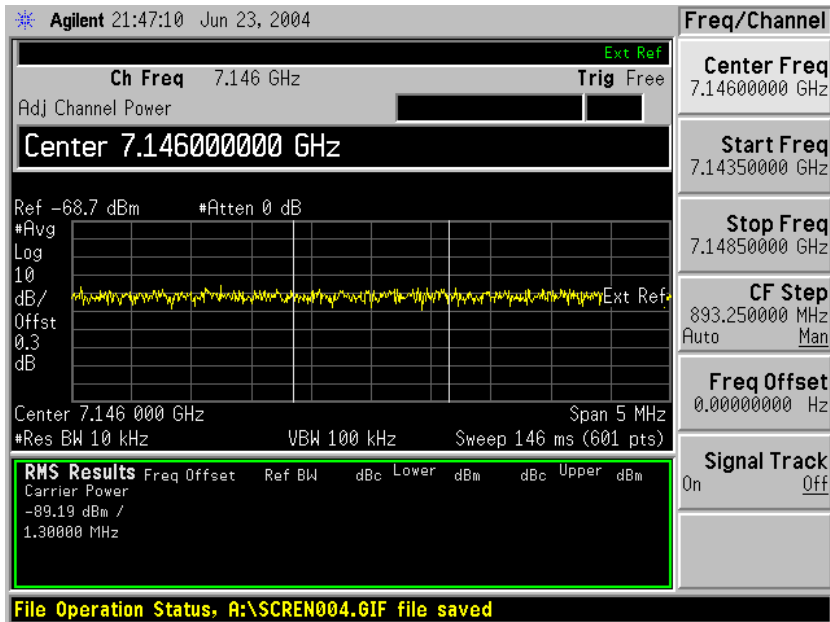
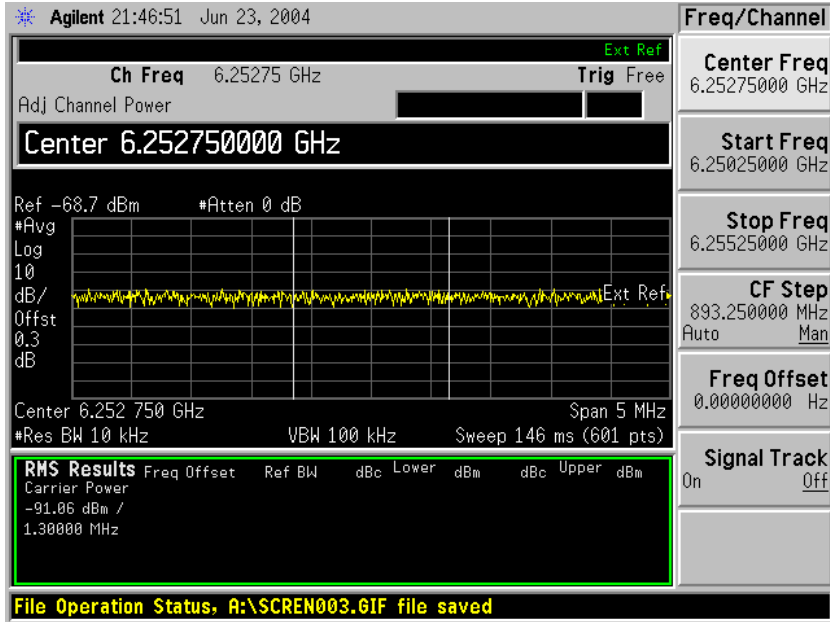


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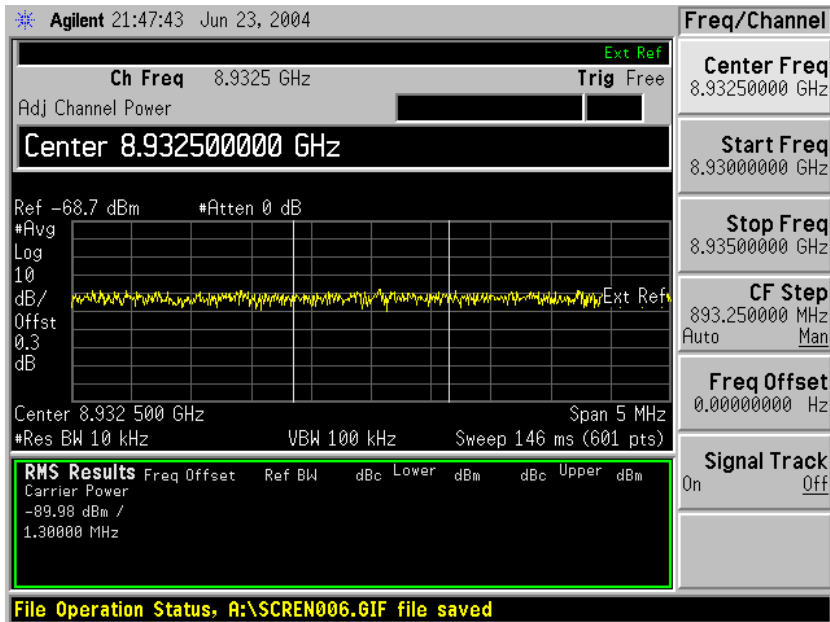
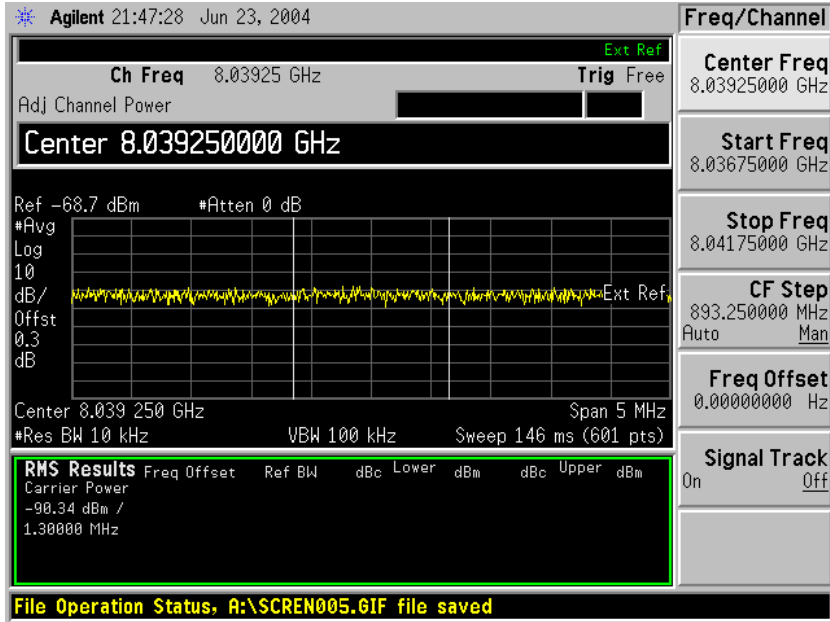


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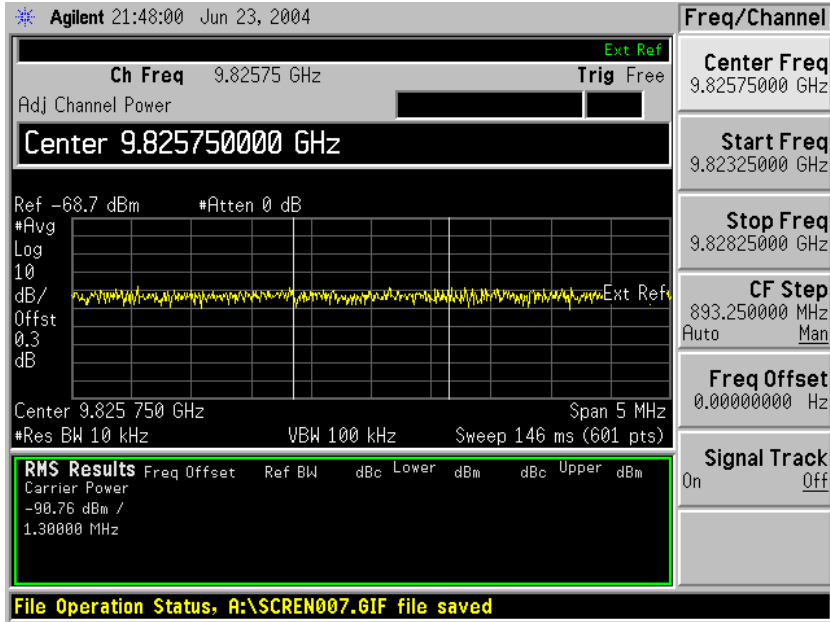


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## SECTION E

### Field Strength of Spurious Radiation - 47CFR2.1053

#### Worst case Radiated RF Spur Levels

TRANSMIT CHANNEL	SPUR FREQUENCY (MHz)	MEASURED SIGNAL LEVEL dBuV/meter	MEASURED Signal Level (dBm)	FCC, Part 22 MAX LIMIT (dBm)
1013H 1013V	8697.000 8697.000	38.047 36.747	-57.18 -58.48	-13 -13
777H 777V	8933.100 8933.100	37.830 36.373	-57.36 -58.86	-13 -13
283H 283V	8784.900 3513.960	38.340 39.590	-56.89 -55.64	-13 -13
384H 384V	8815.200 8815.200	37.340 36.940	-57.89 -58.29	-13 -13

Converting dBuV/meter to dBm when Part 24 is done at 3 meters.

1.  $(\text{dBuV/M} / 20) * (\text{Inverse Log}) = \text{uV/M}$
2.  $\text{Log}(\text{uV/M} / 57735) * 20 = \text{dBm}$

If the test is done at 10 meters, the first formula would remain the same.

The 2nd is as follows  $\text{Log}[(\text{uV/m} * 1 / (3 * 57735)/10)] * 20 \text{ dBm}$



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SC4812T-MF 1X/1X-EVDO @ 800 MHz CDMA BTS

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## **SECTION F**

### **Frequency Stability - 47CFR2.1055**

<b>Mode</b>	<b>27V Power</b>	<b>Worst case DPPM</b>	<b>FCC Requirement</b>	<b>Pass/Fail</b>
CSM1	85-115%	<0.02	+/- 1.5 ppm max	Pass
CSM 2	85-115%	<0.02	+/- 1.5 ppm max	Pass

<b>Mode</b>	<b>Temperature</b>	<b>DPPM</b>	<b>FCC Requirement</b>	<b>Pass/Fail</b>
CSM1	-30 to +50 C	<0.02	+/- 1.5 ppm max	Pass
CSM2	-30 to +50 C	<0.02	+/- 1.5 ppm max	Pass

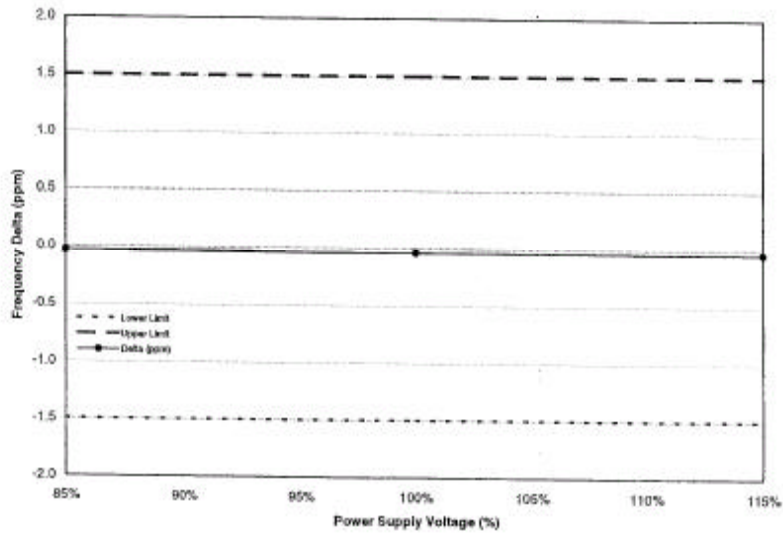


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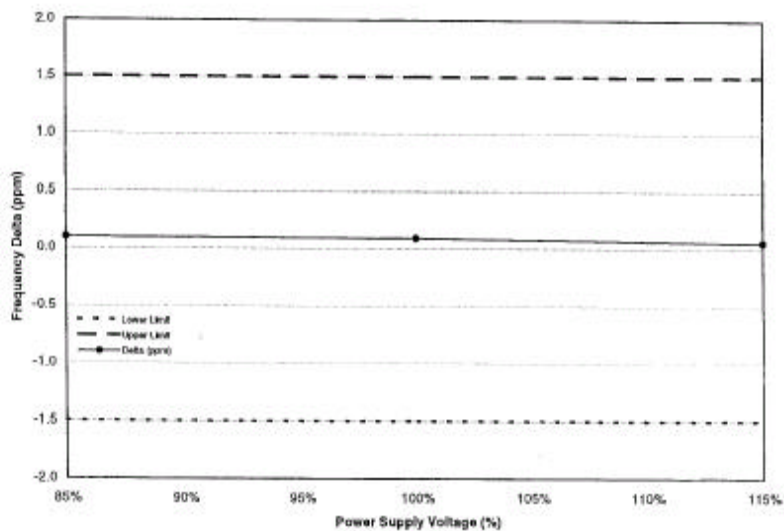
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FCC ID: IHET5EL1

Frequency Stability with Varying Supply Voltage - CSM1



Frequency Stability with Varying Supply Voltage - CSM2





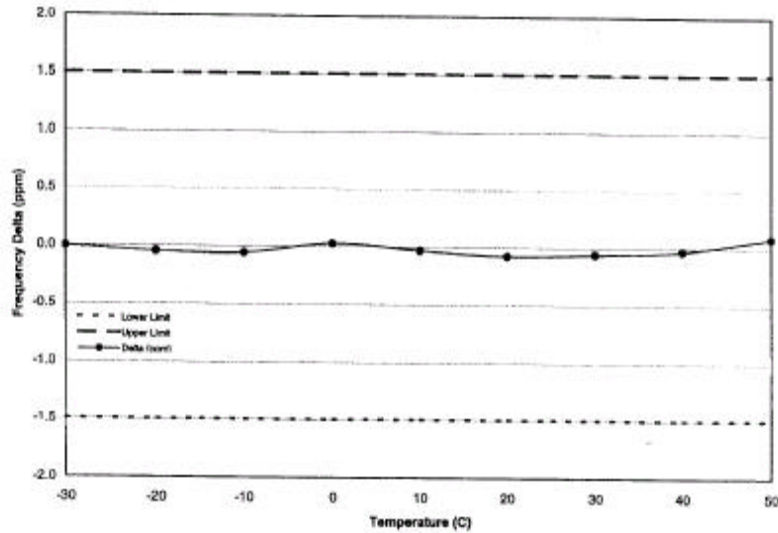


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Frequency Stability Over Temperature - CSM1



Frequency Stability Over Temperature - CSM2

