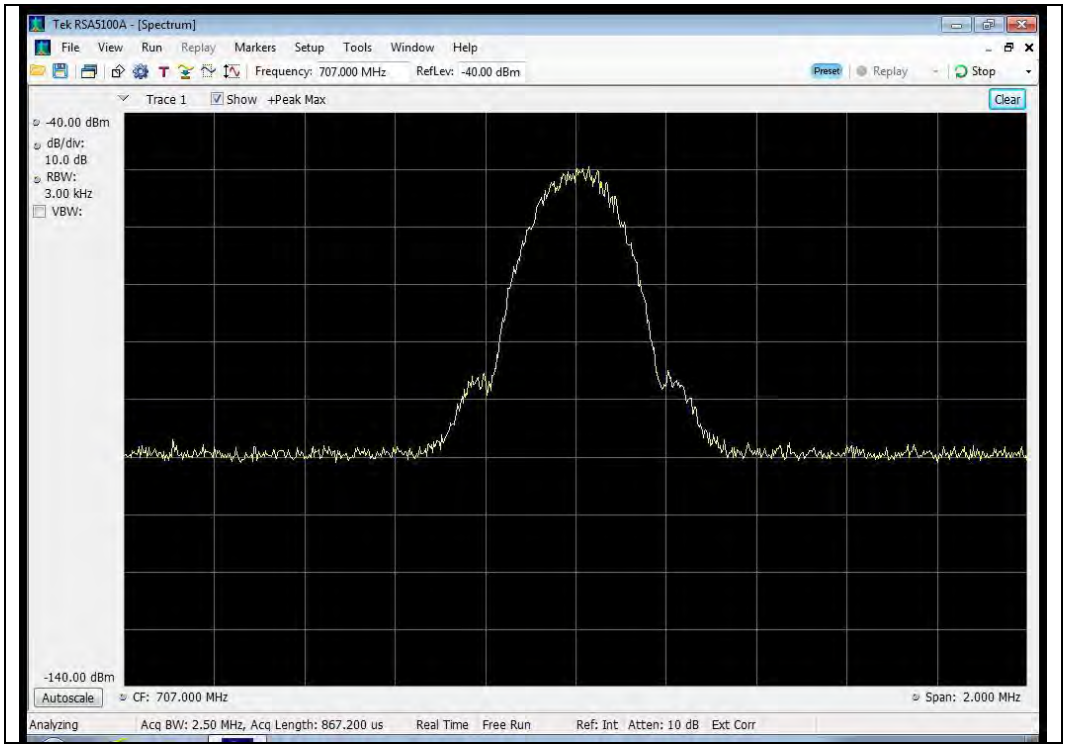
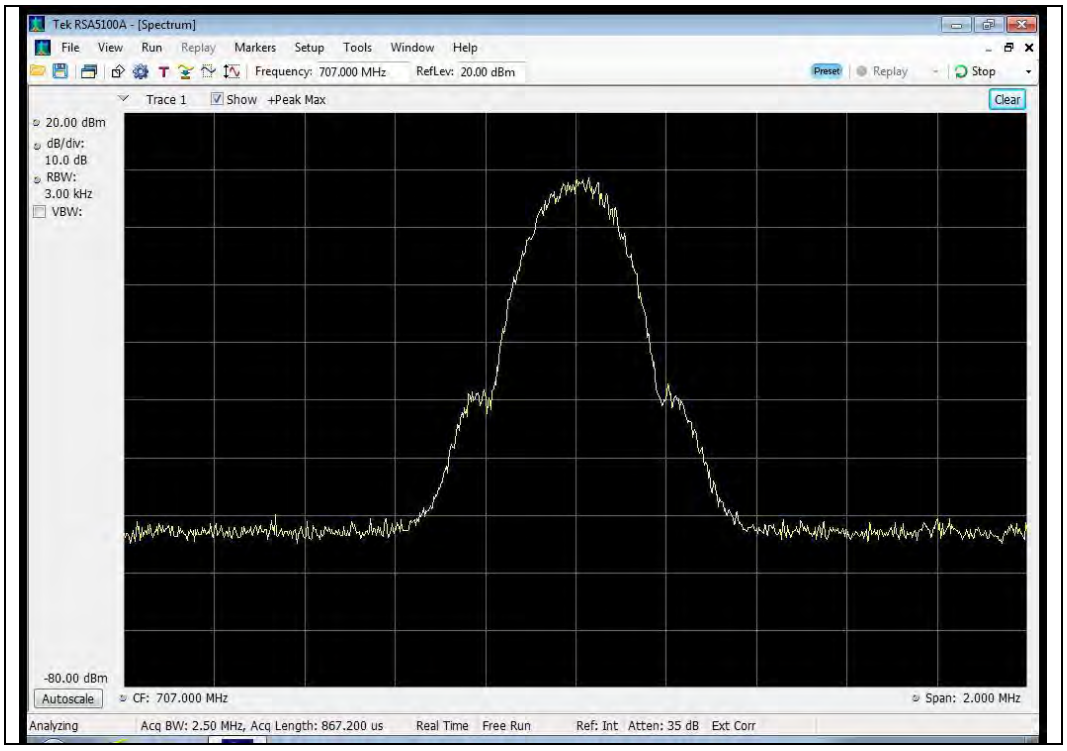
GSM Uplink Test Plots

698 - 716 MHz Band

Input

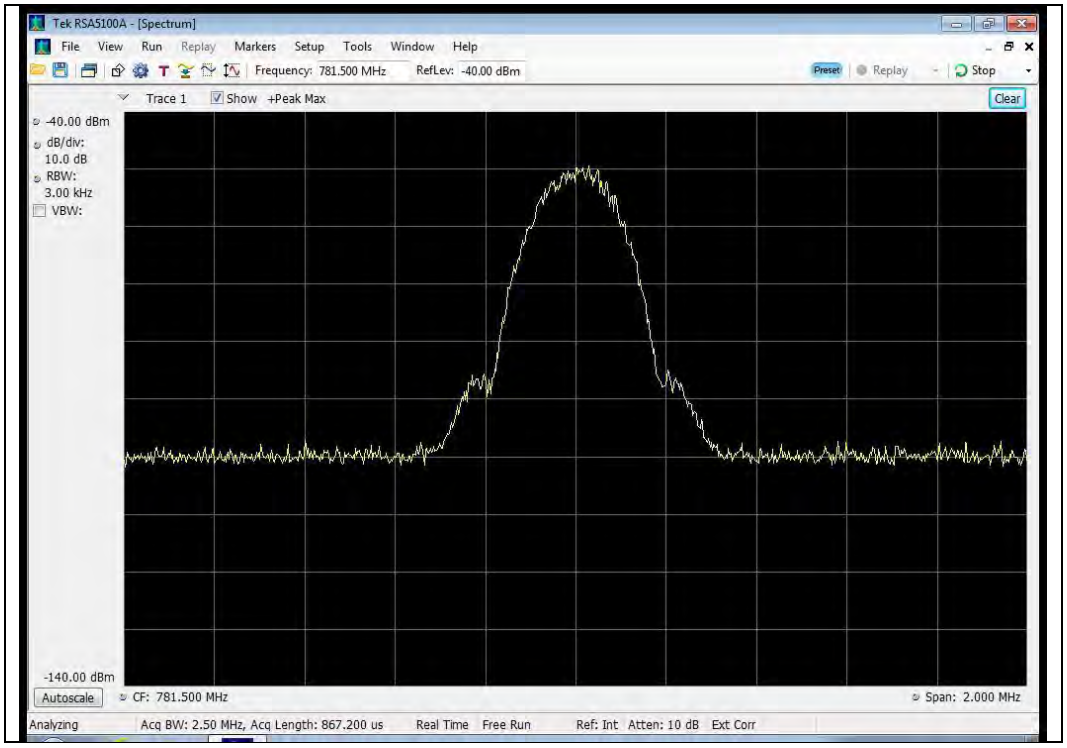


Output

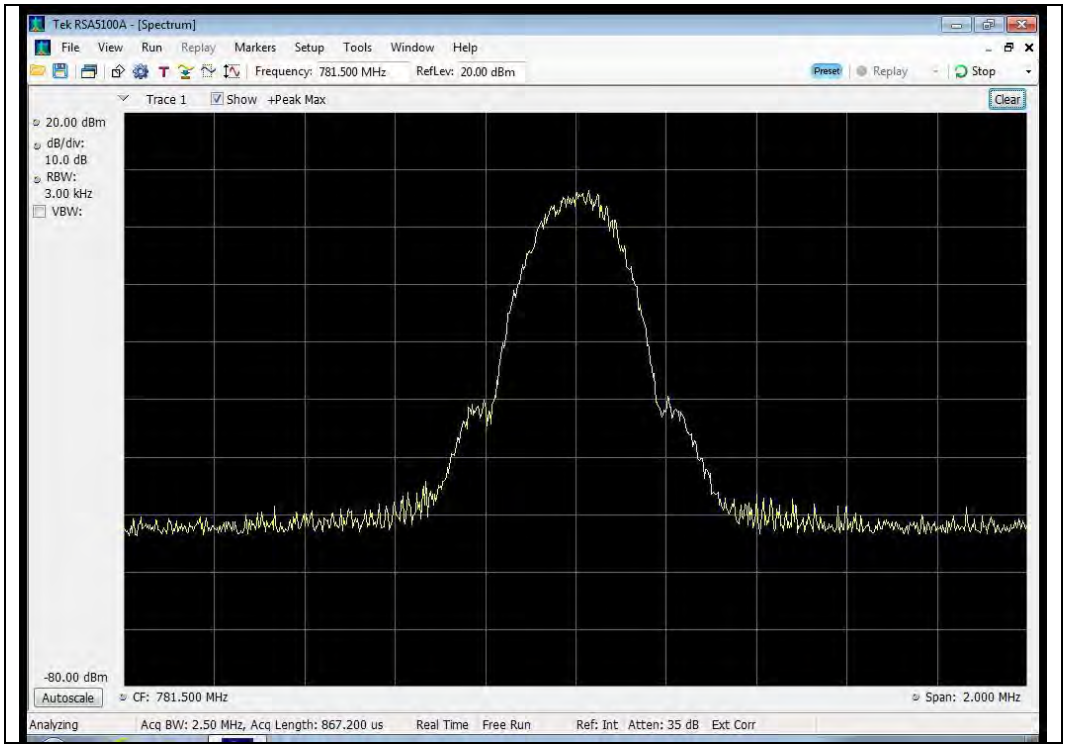


776 - 787 MHz Band

Input

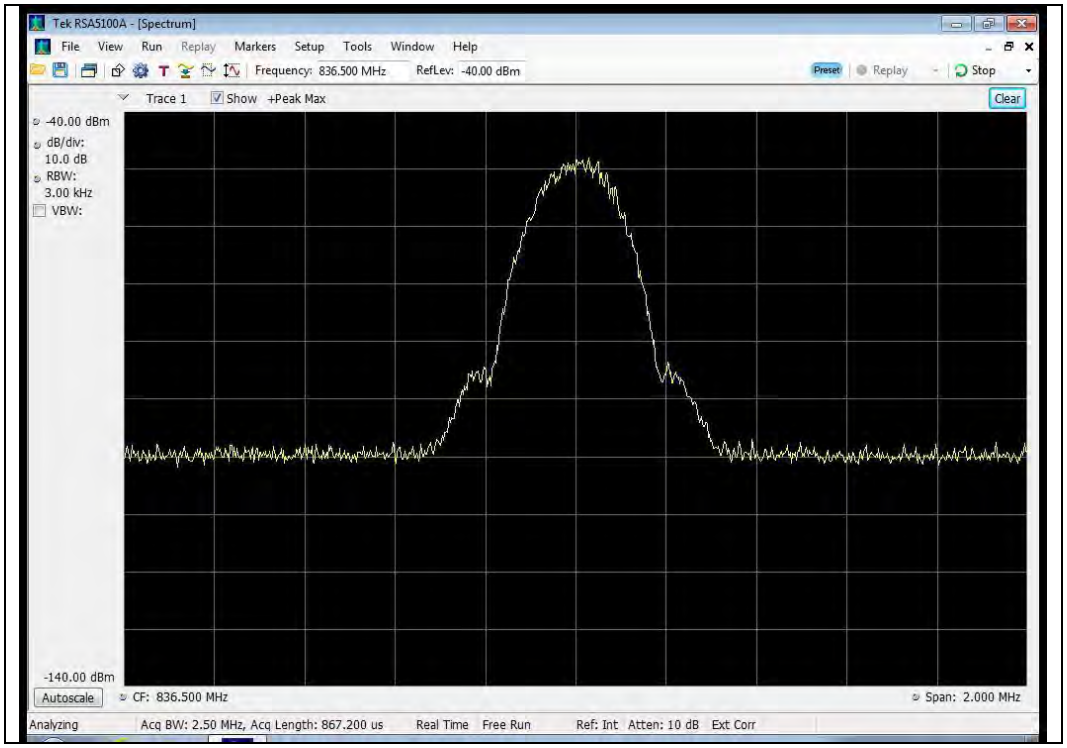


Output

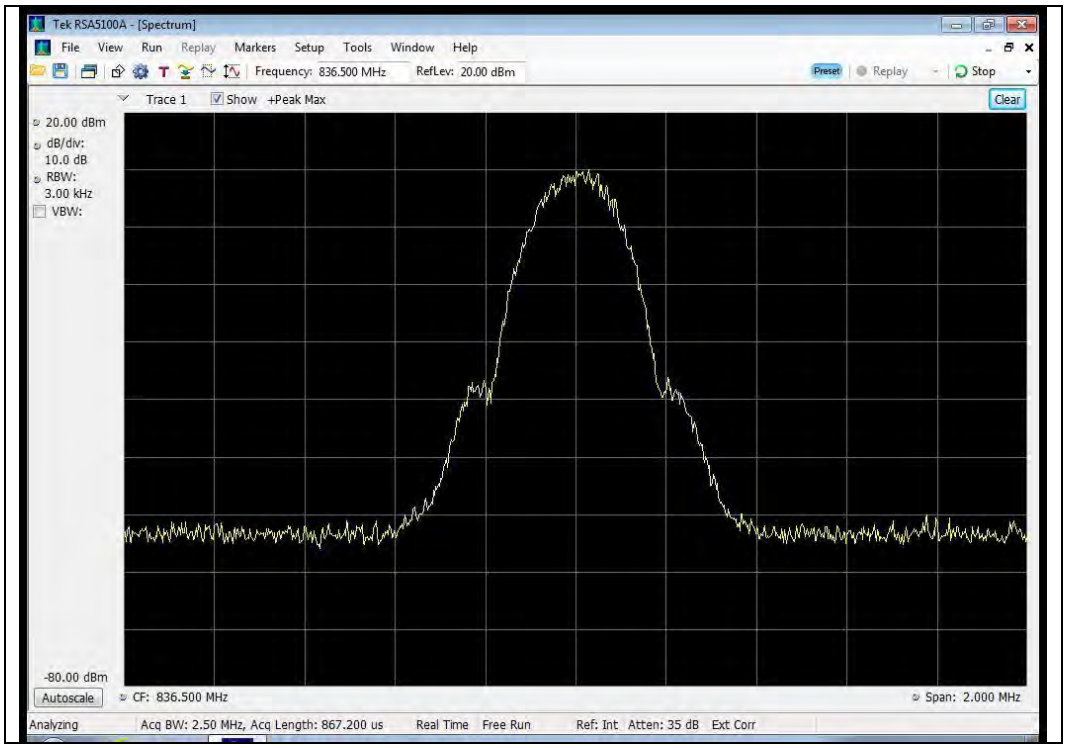


824 - 849 MHz Band

Input

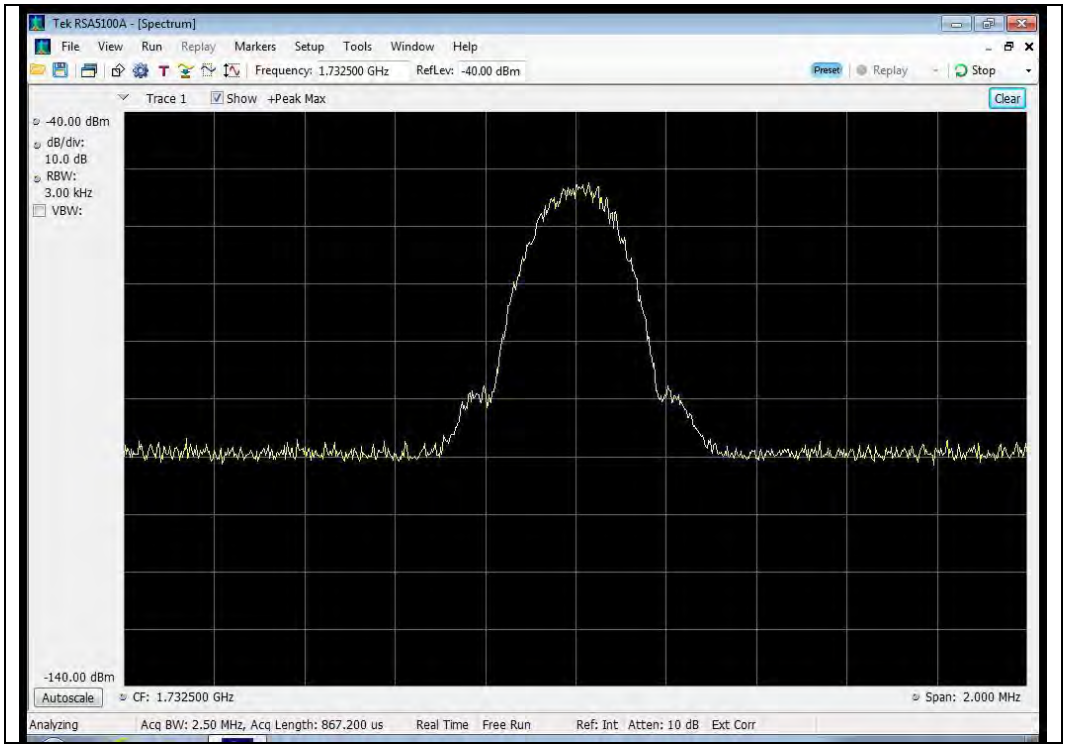


Output

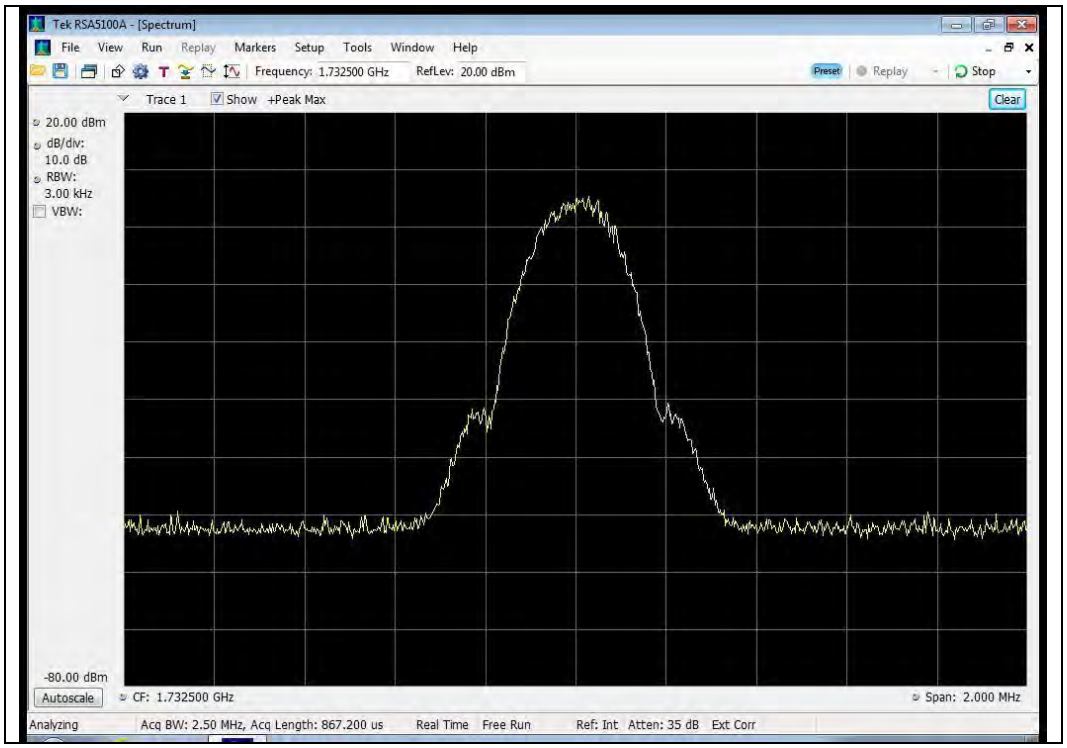


1710 - 1755 MHz Band

Input

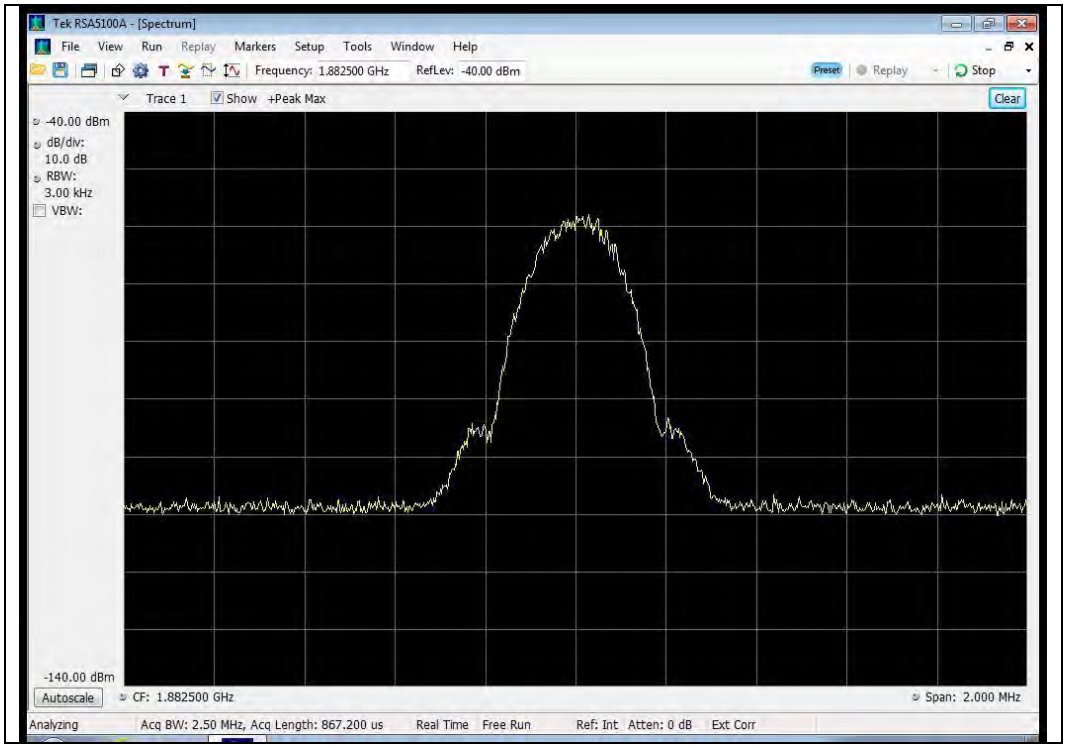


Output

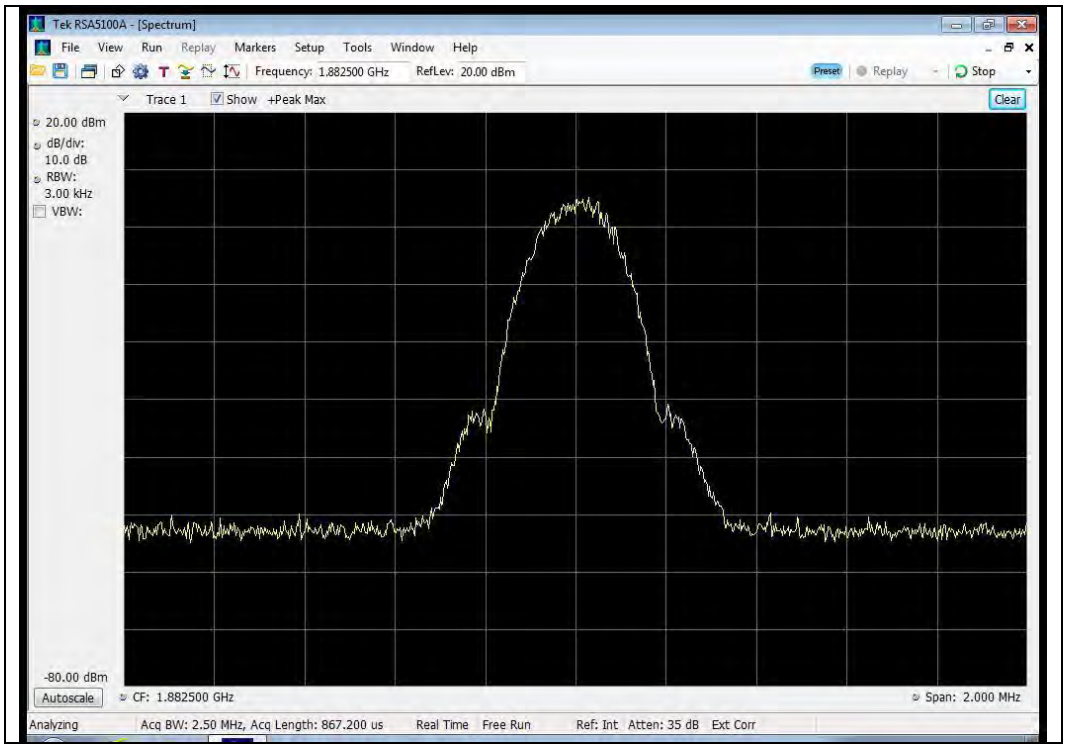


1850 - 1915 MHz Band

Input



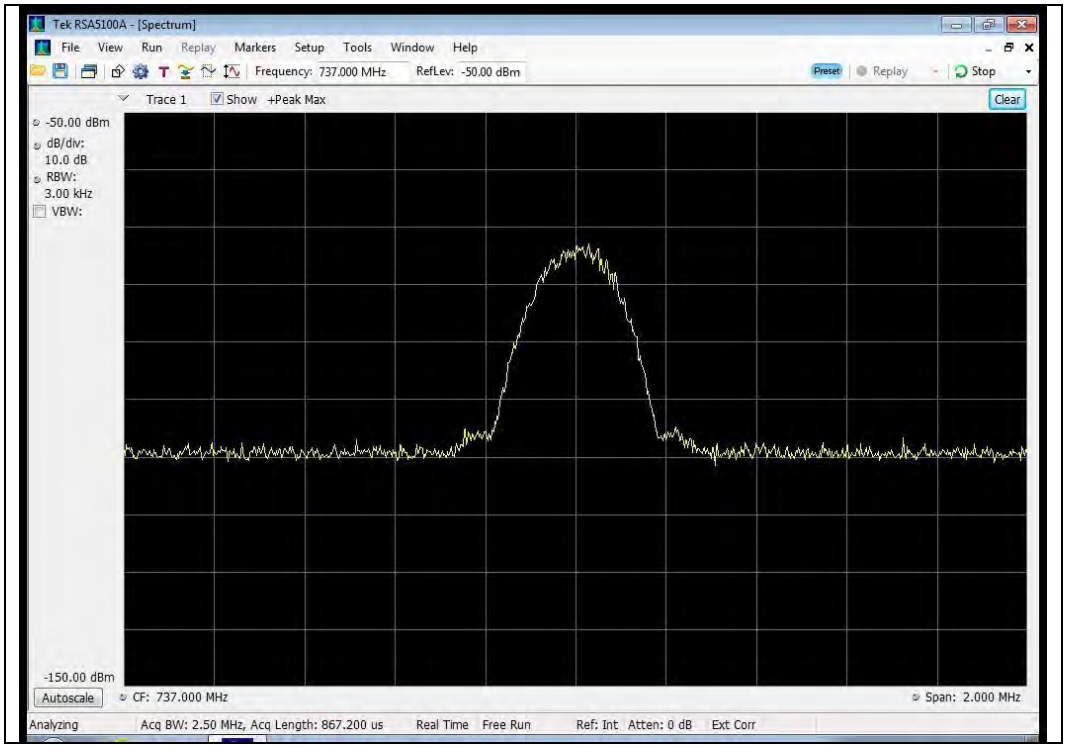
Output



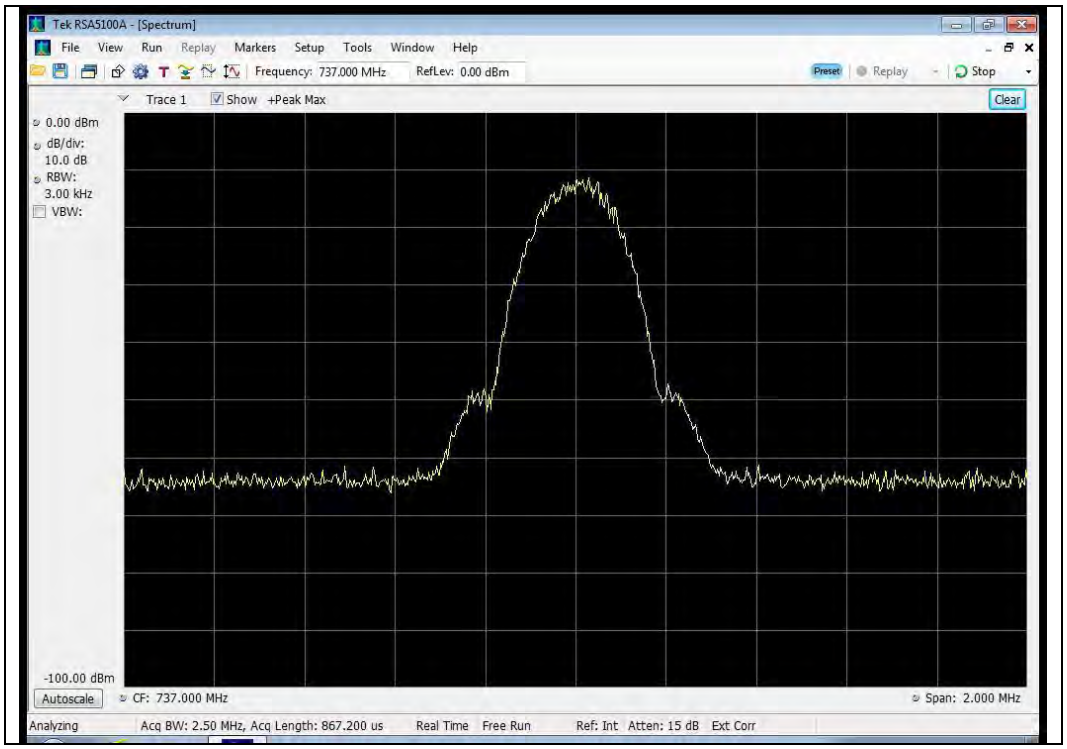
GSM Downlink Test Plots

728 - 746 MHz Band

Input

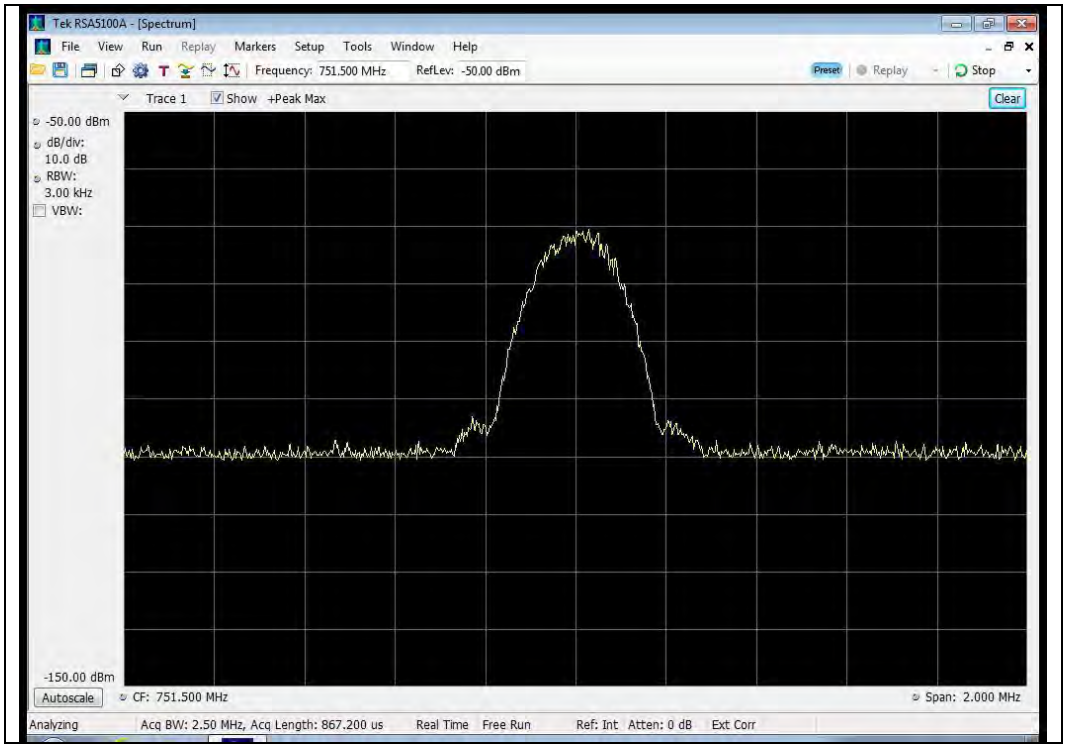


Output

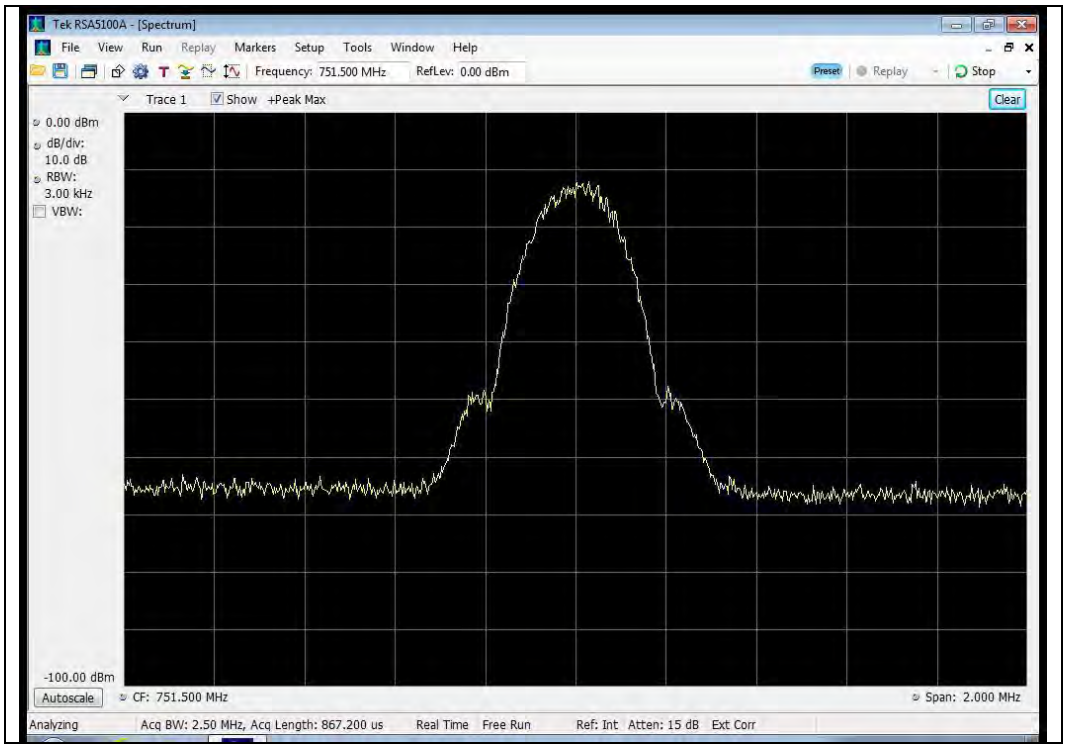


746 - 757 MHz Band

Input

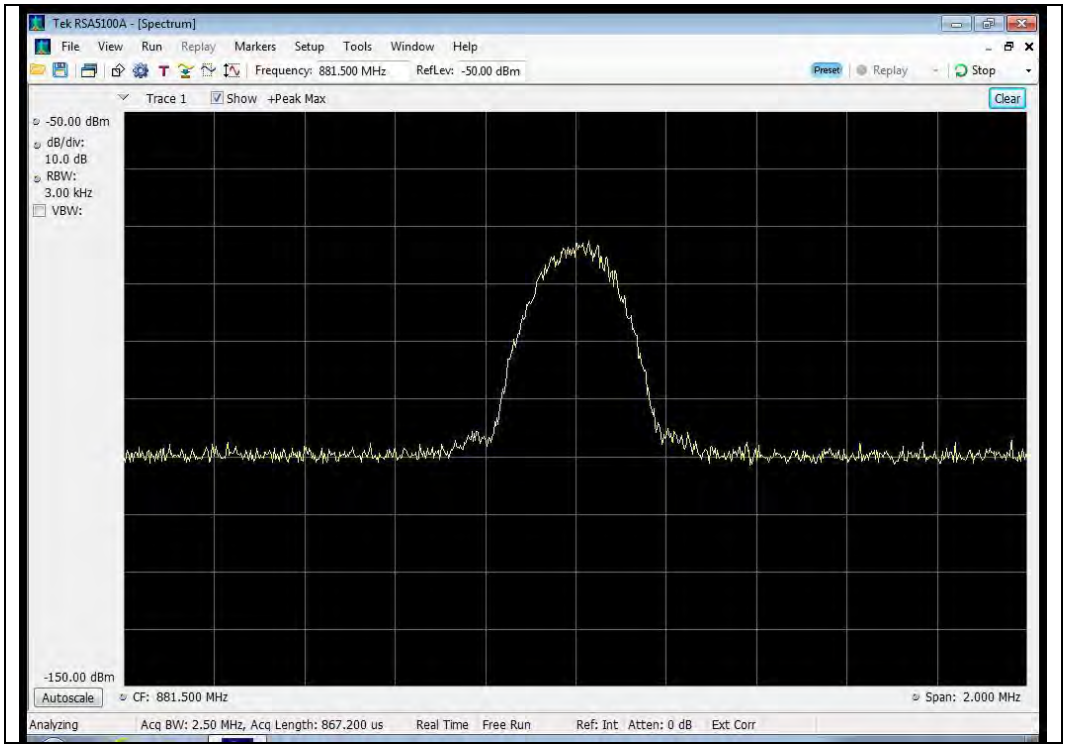


Output

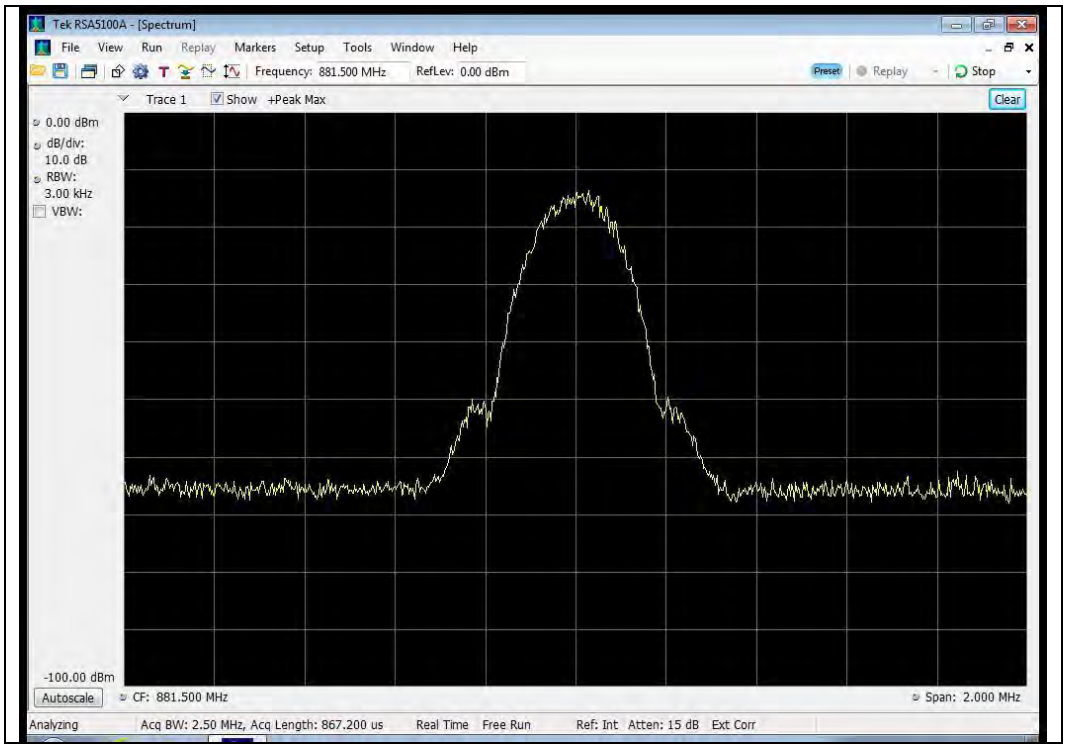


869 - 894 MHz Band

Input

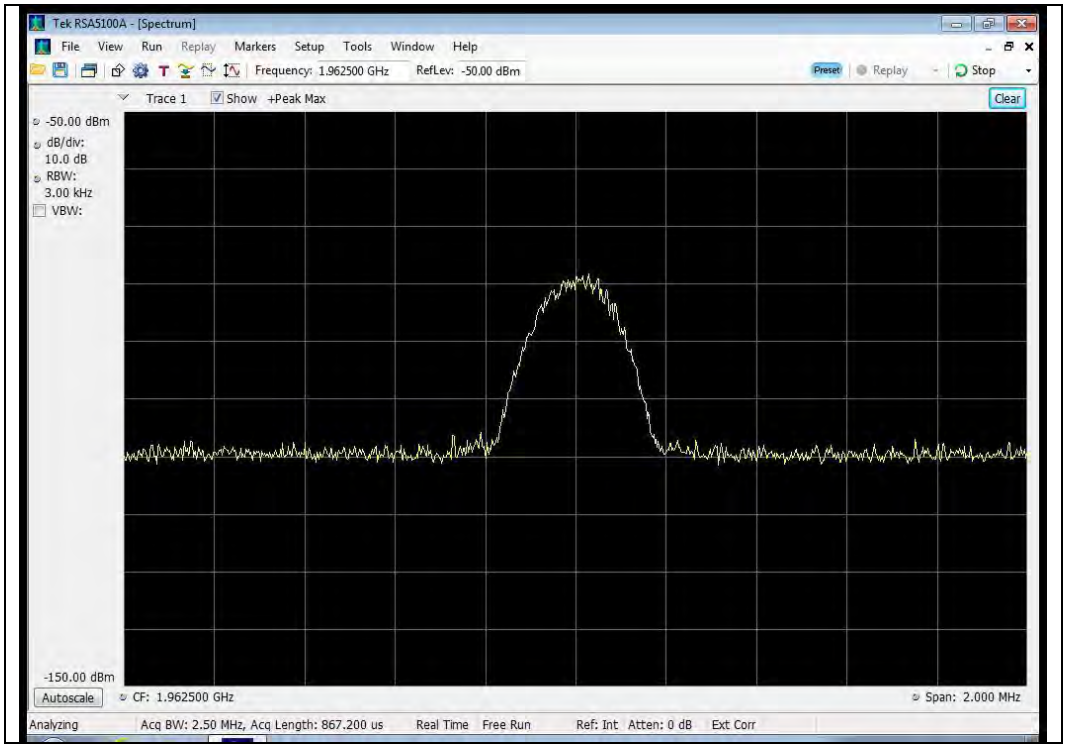


Output

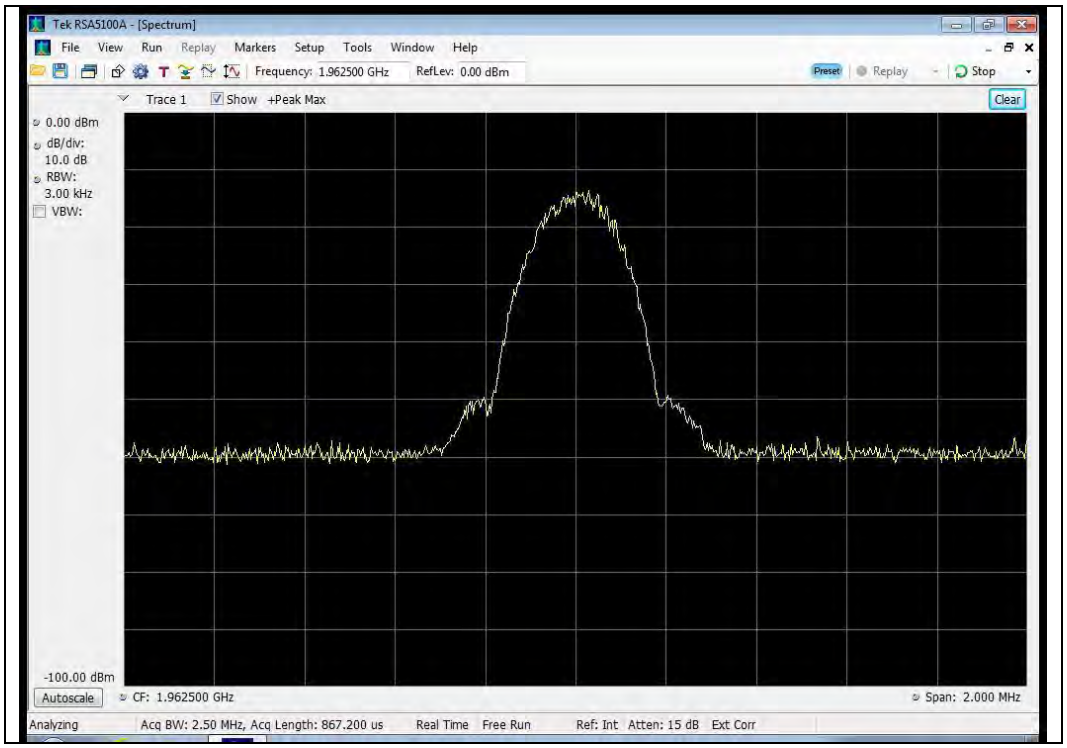


1930 - 1995 MHz Band

Input

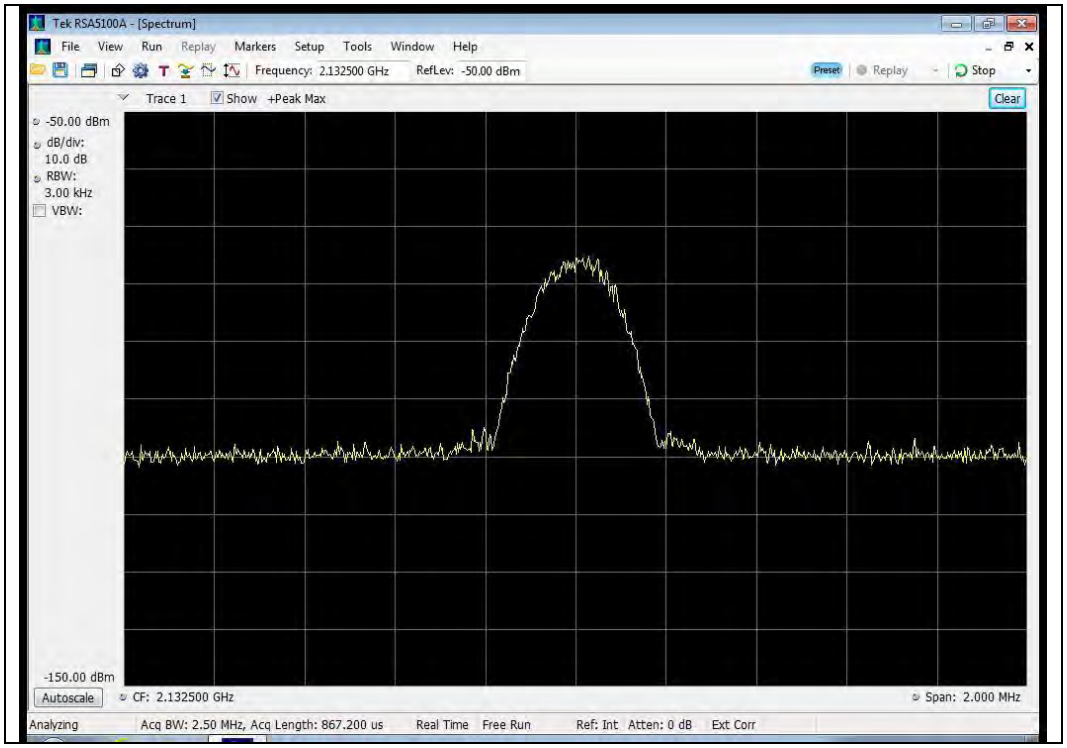


Output

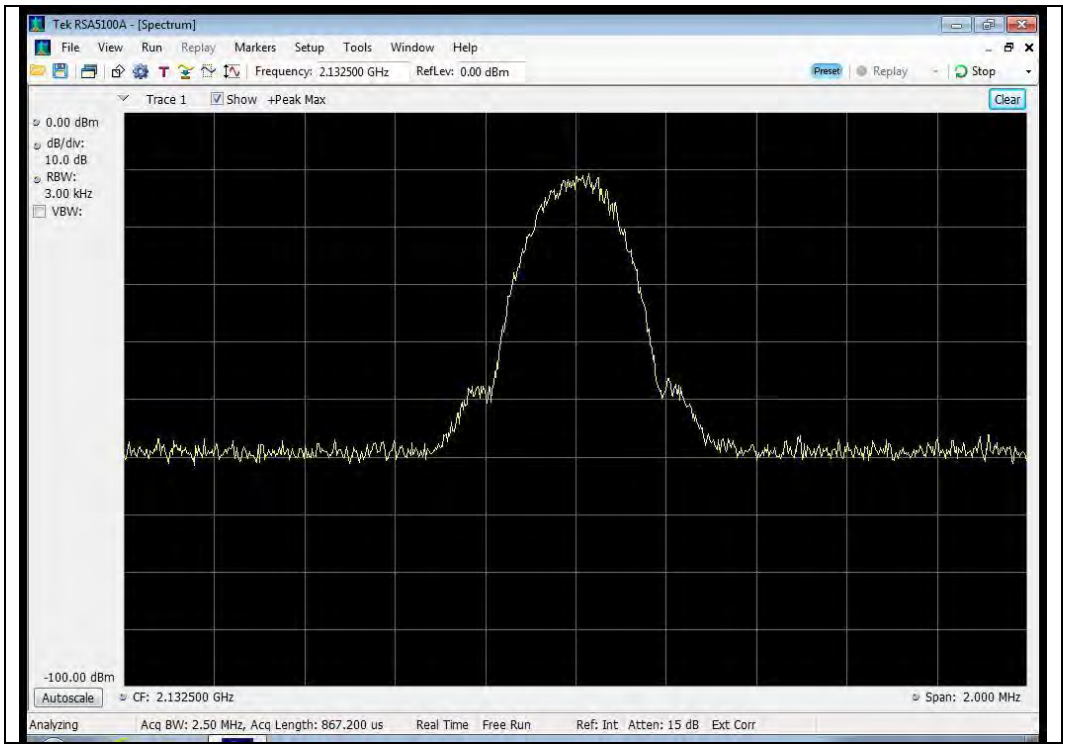


2110 - 2155 MHz Band

Input



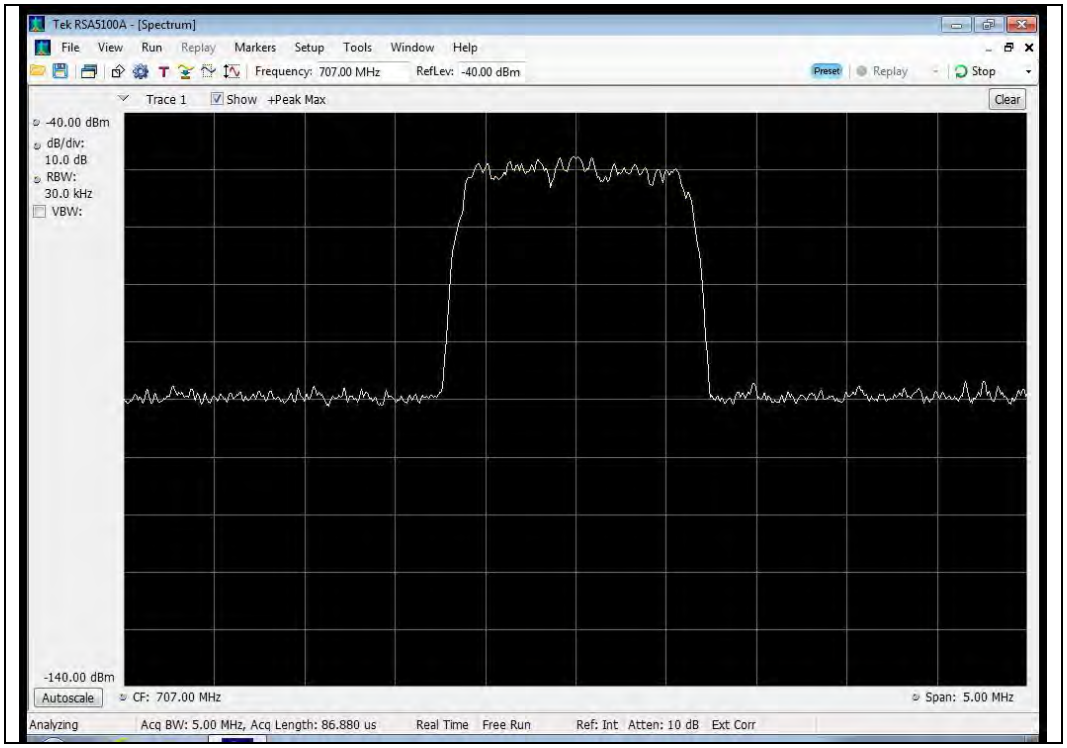
Output



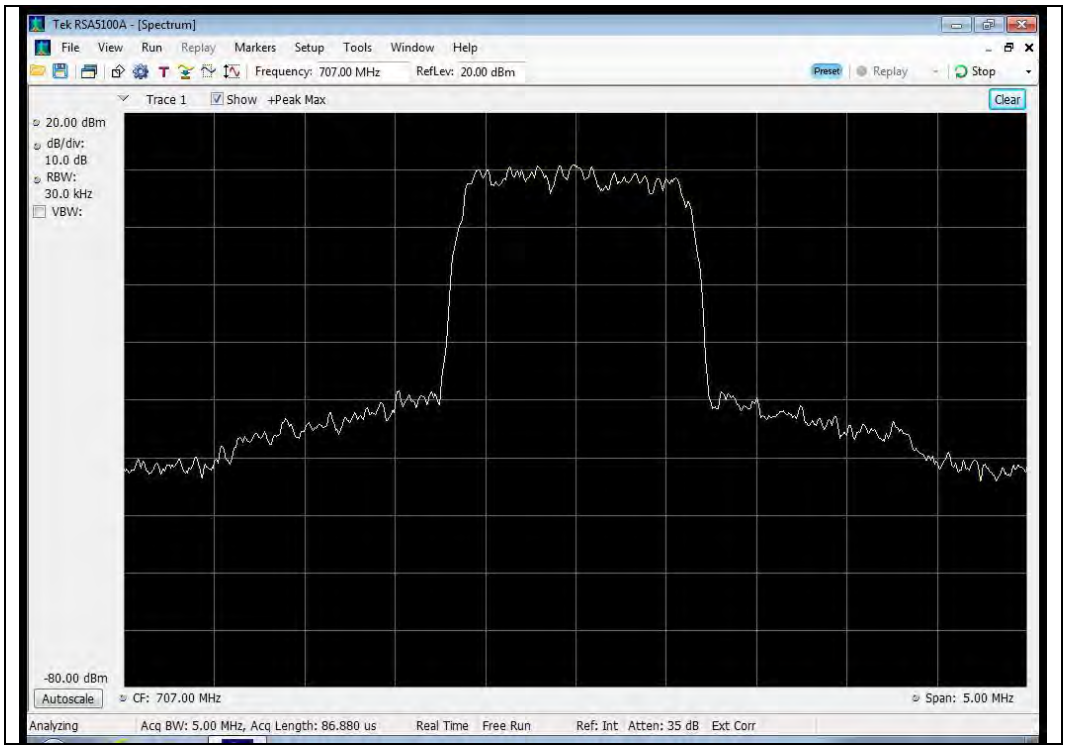
CDMA Uplink Test Plots

698 - 716 MHz Band

Input

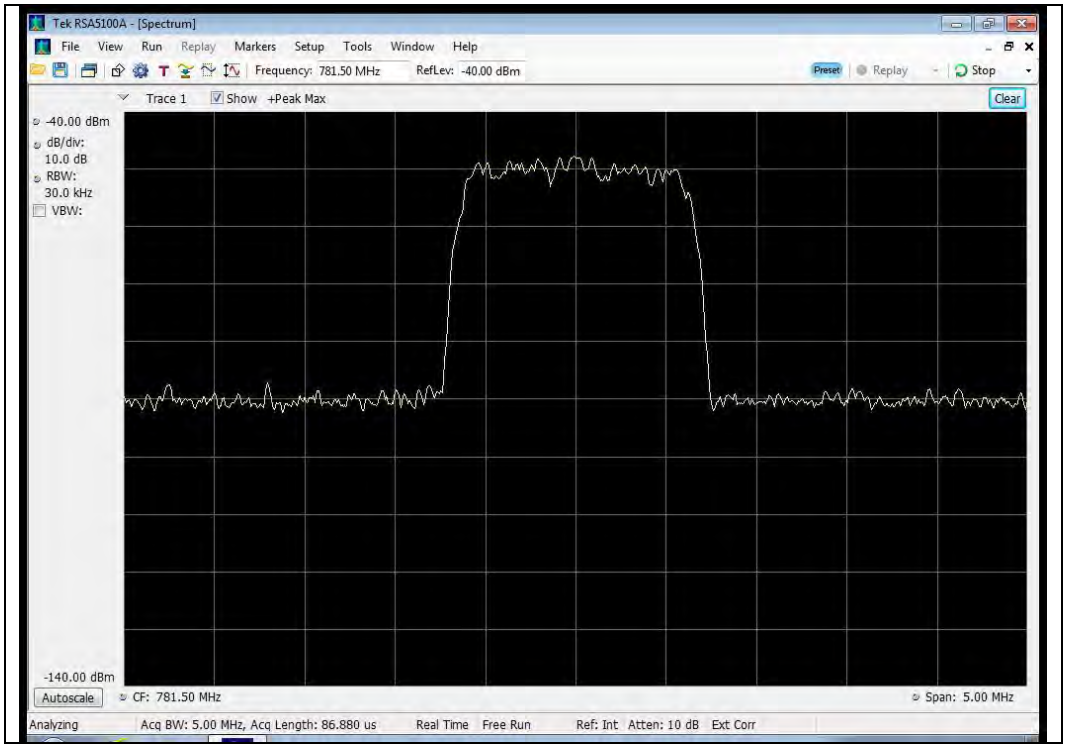


Output

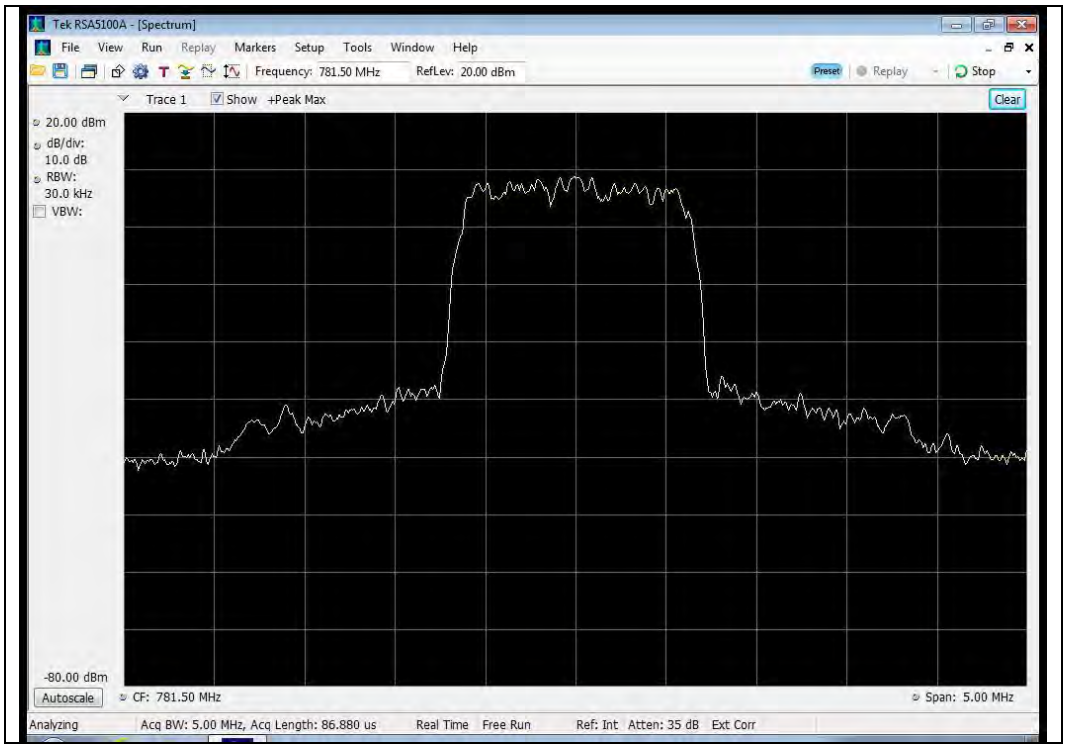


776 - 787 MHz Band

Input

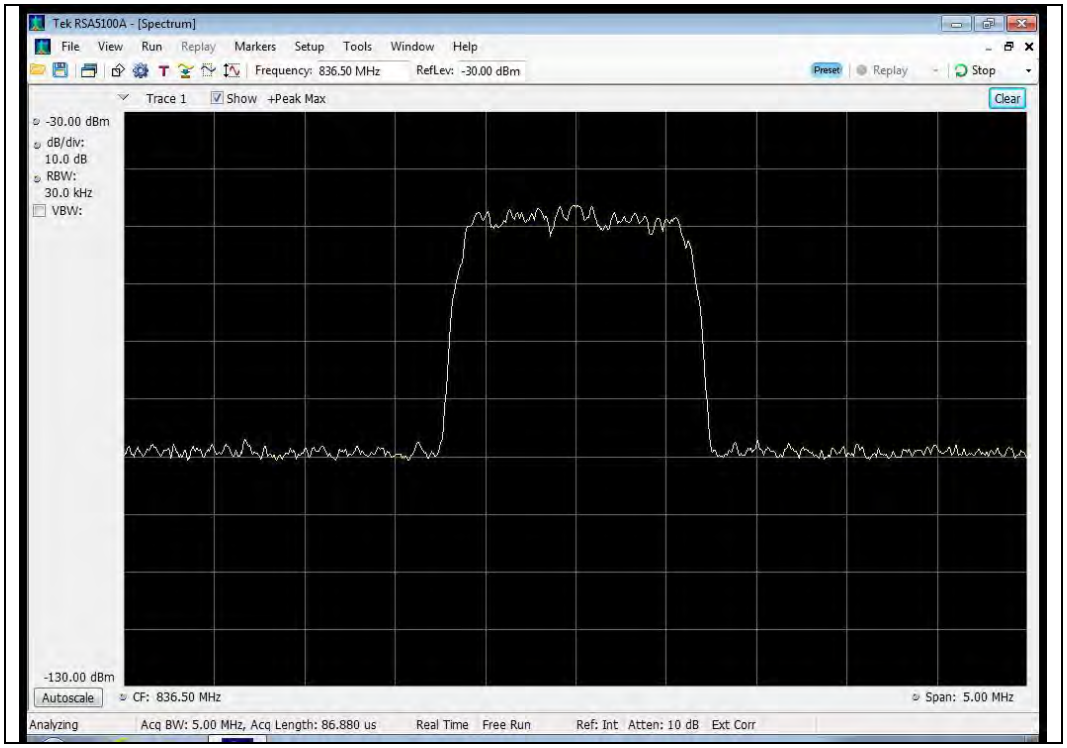


Output

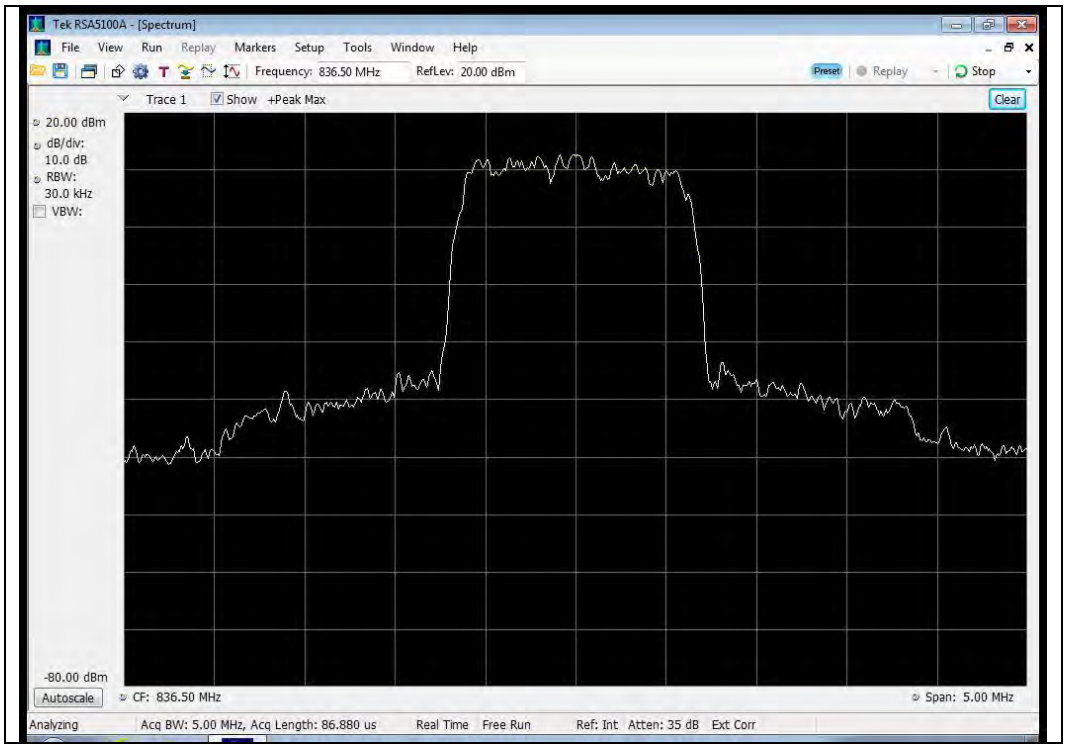


824 - 849 MHz Band

Input

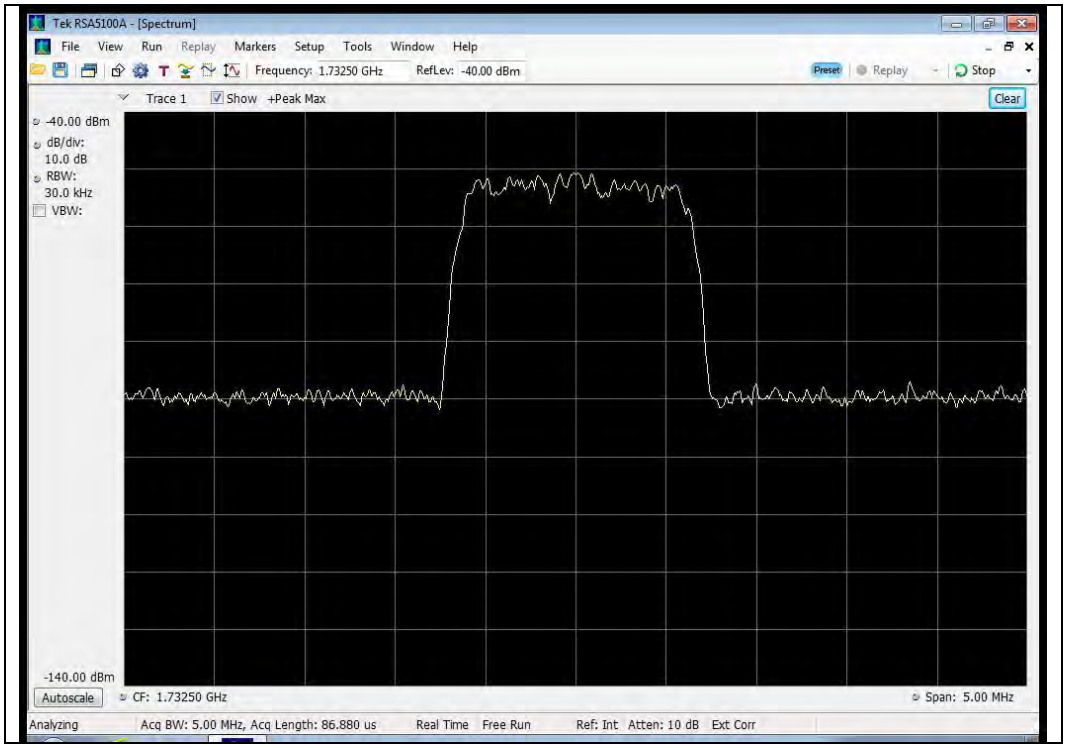


Output

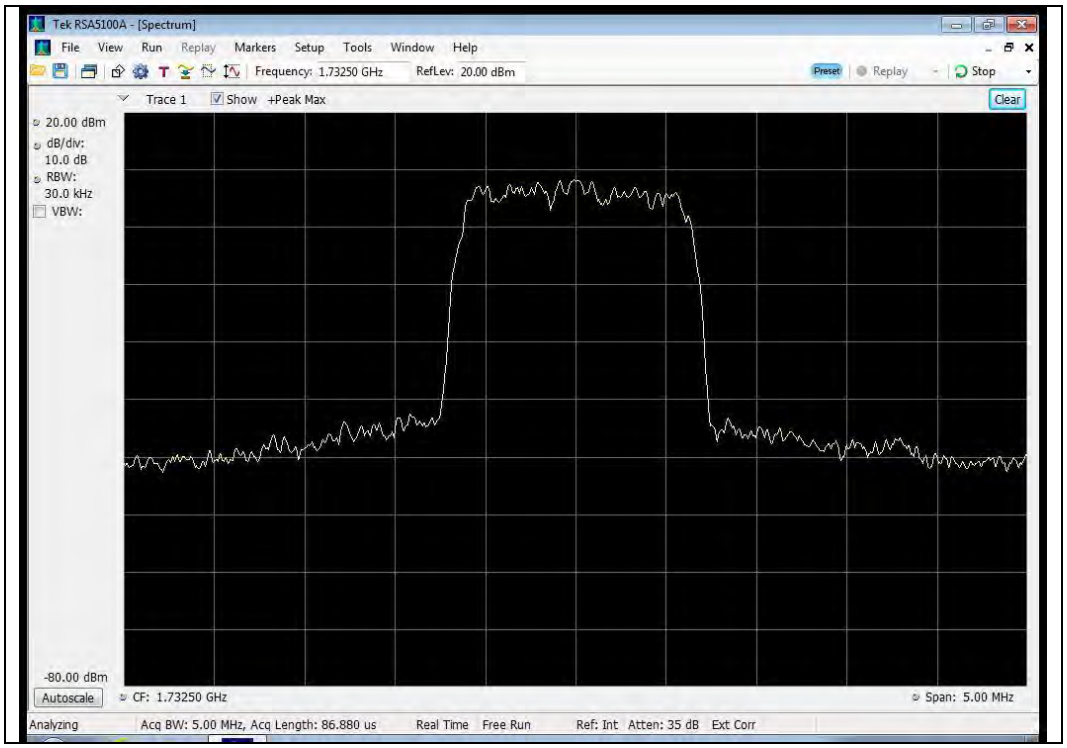


1710 - 1755 MHz Band

Input

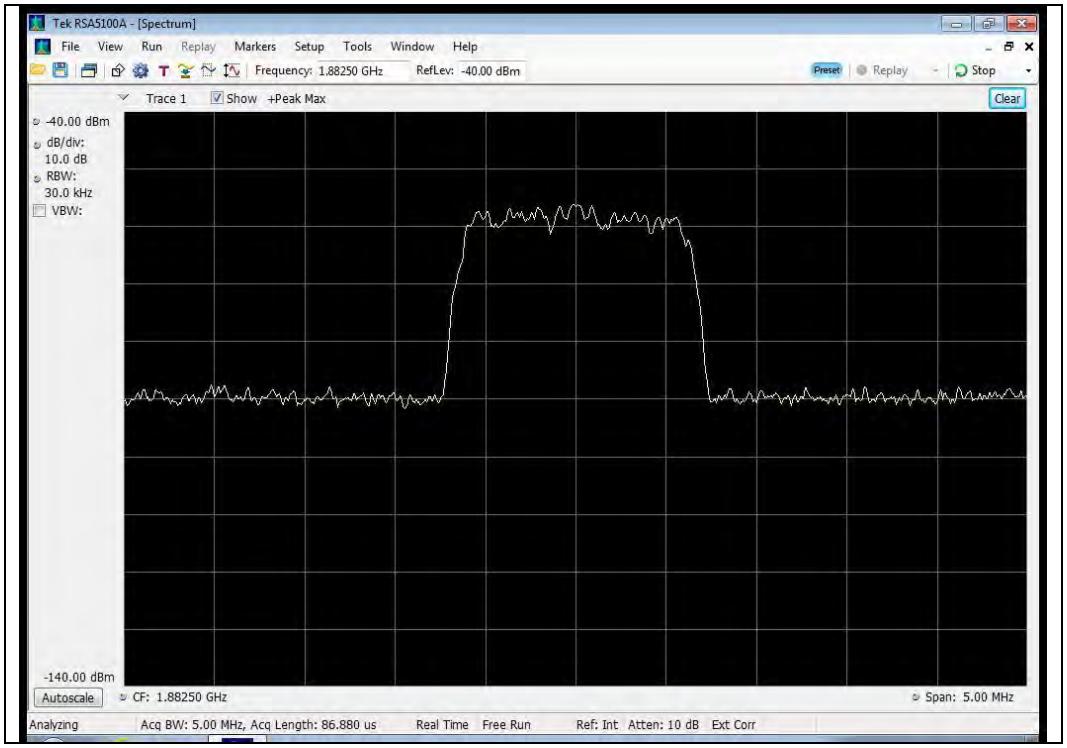


Output

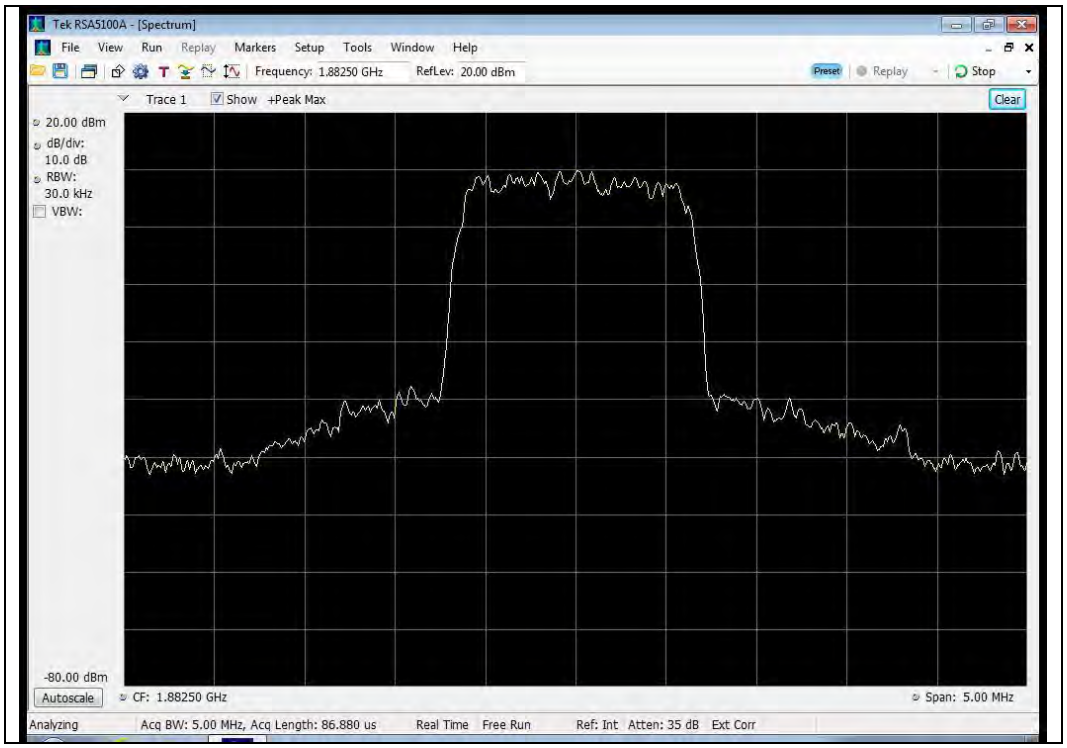


1850 - 1915 MHz Band

Input



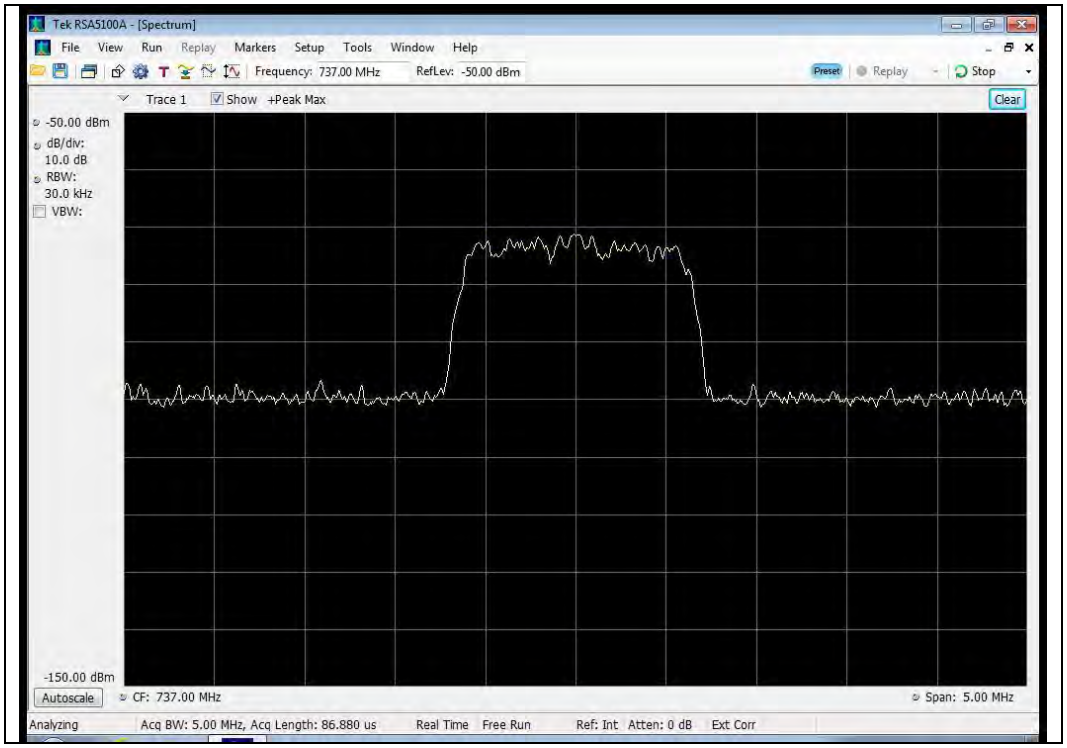
Output



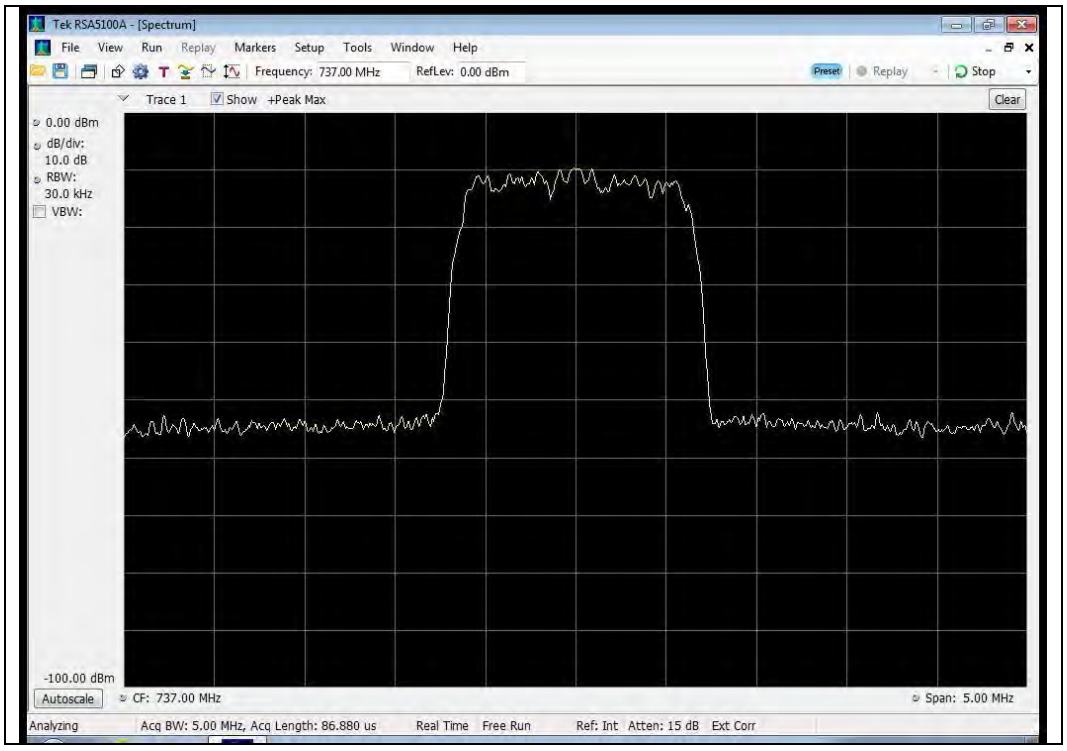
CDMA Downlink Test Plots

728 - 746 MHz Band

Input

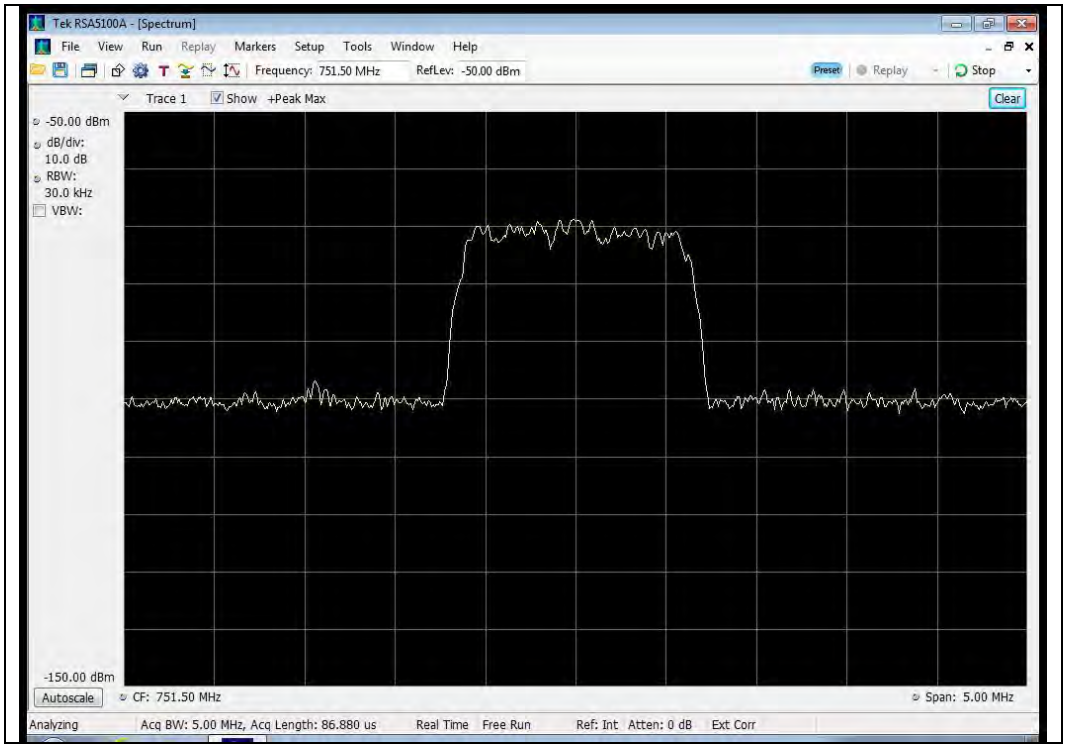


Output

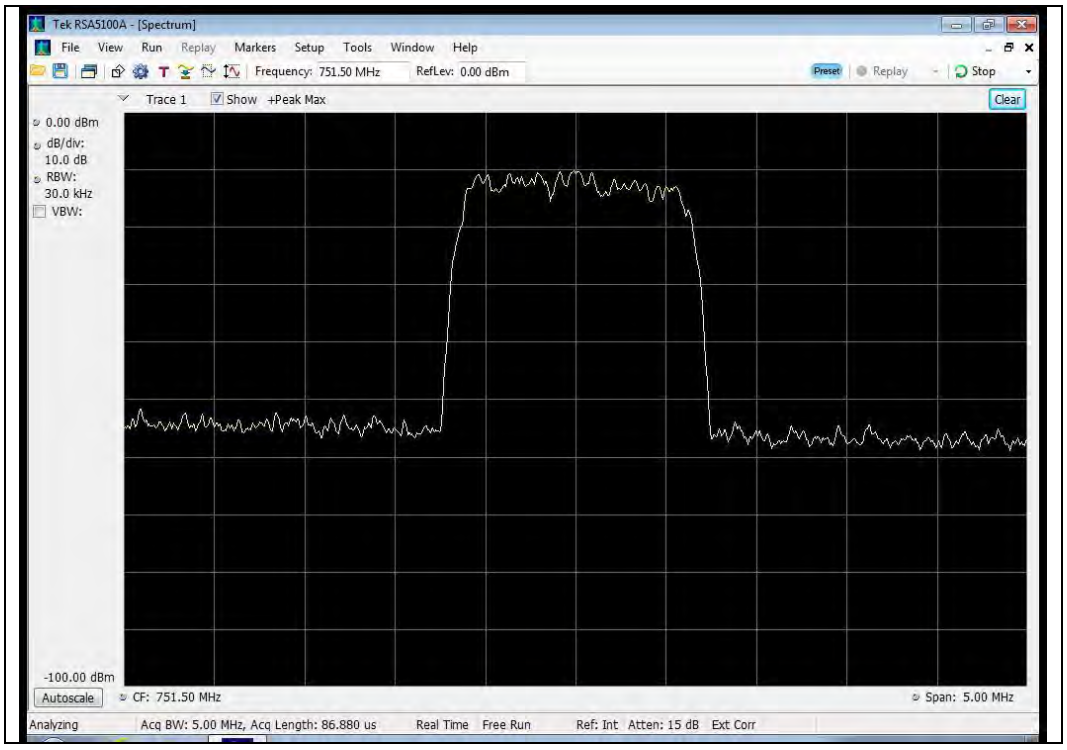


746 - 757 MHz Band

Input

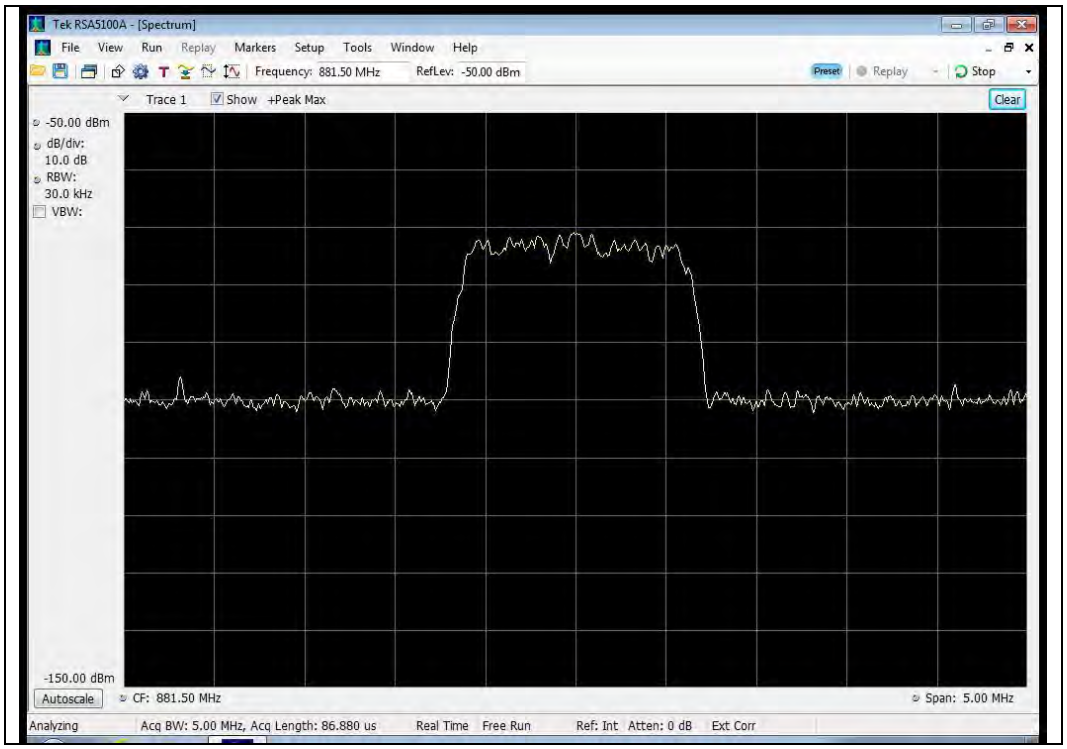


Output

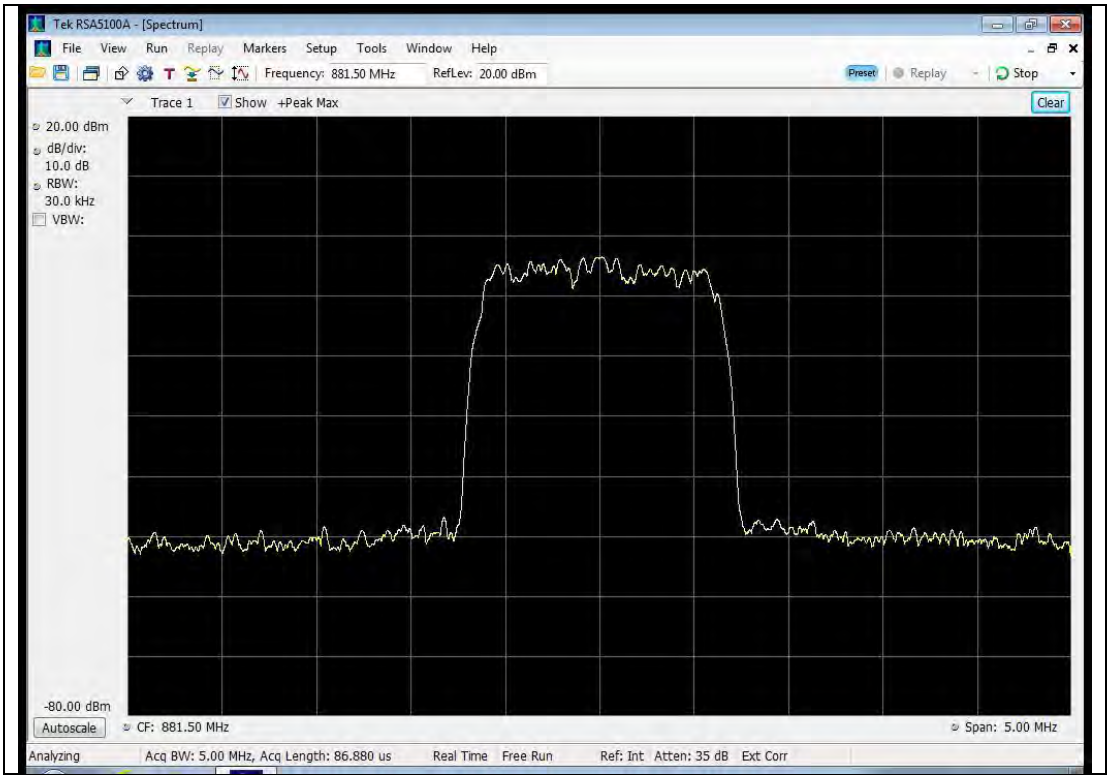


869 - 894 MHz Band

Input

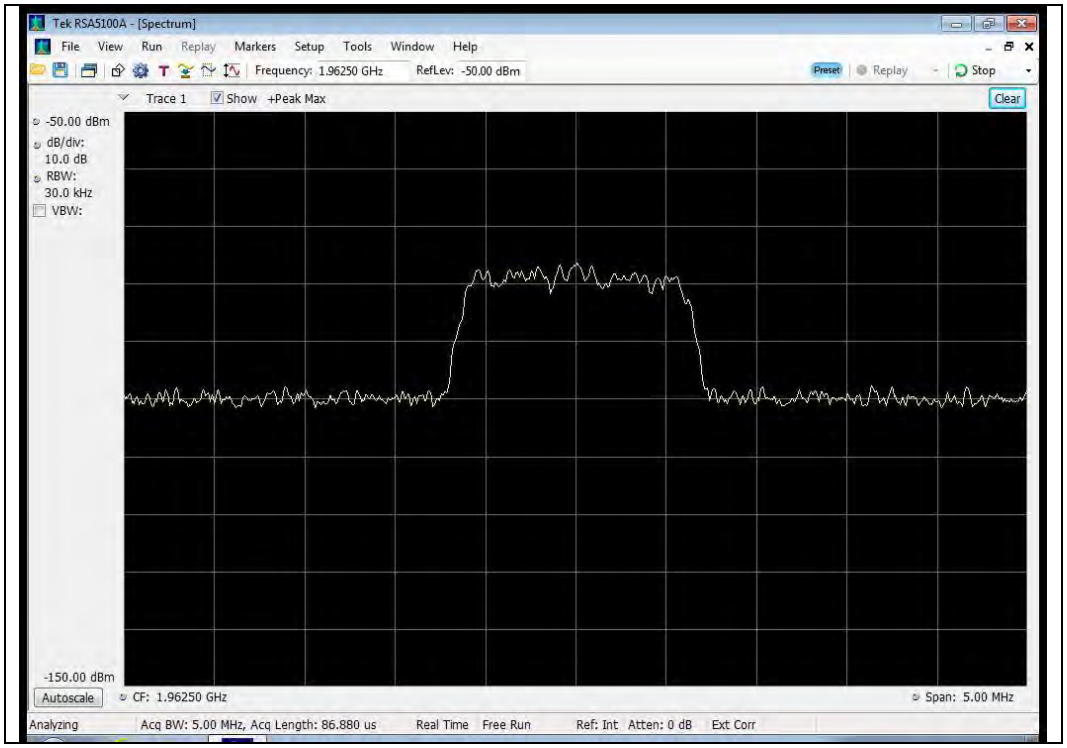


Output

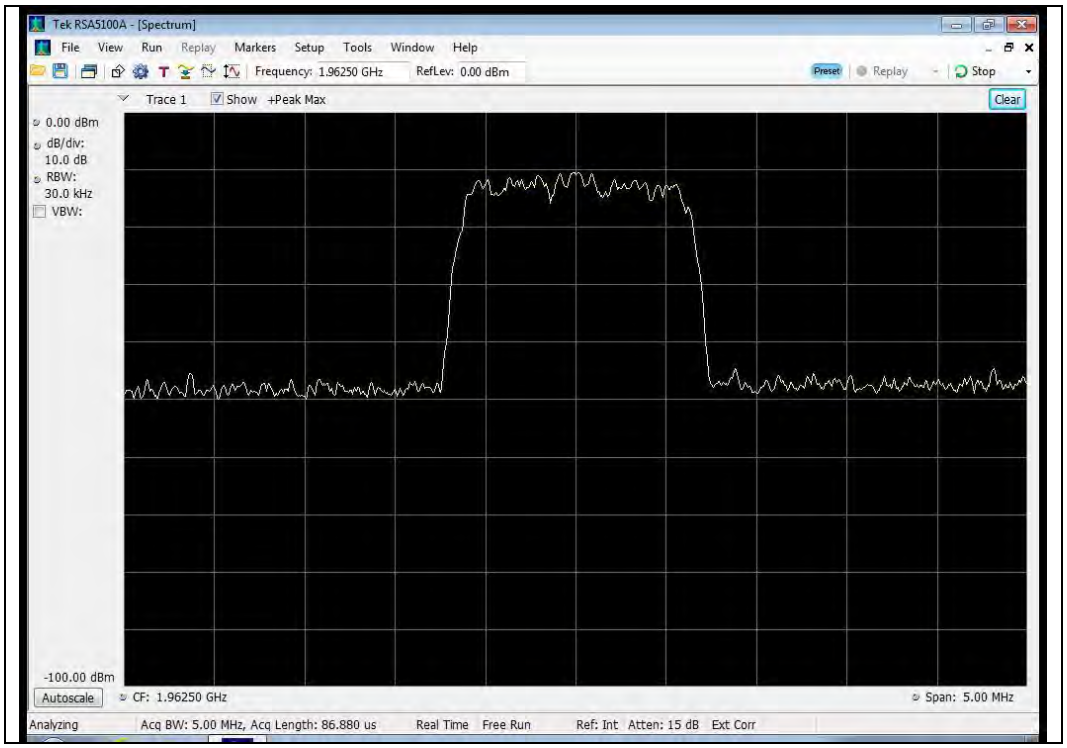


1930 - 1995 MHz Band

Input

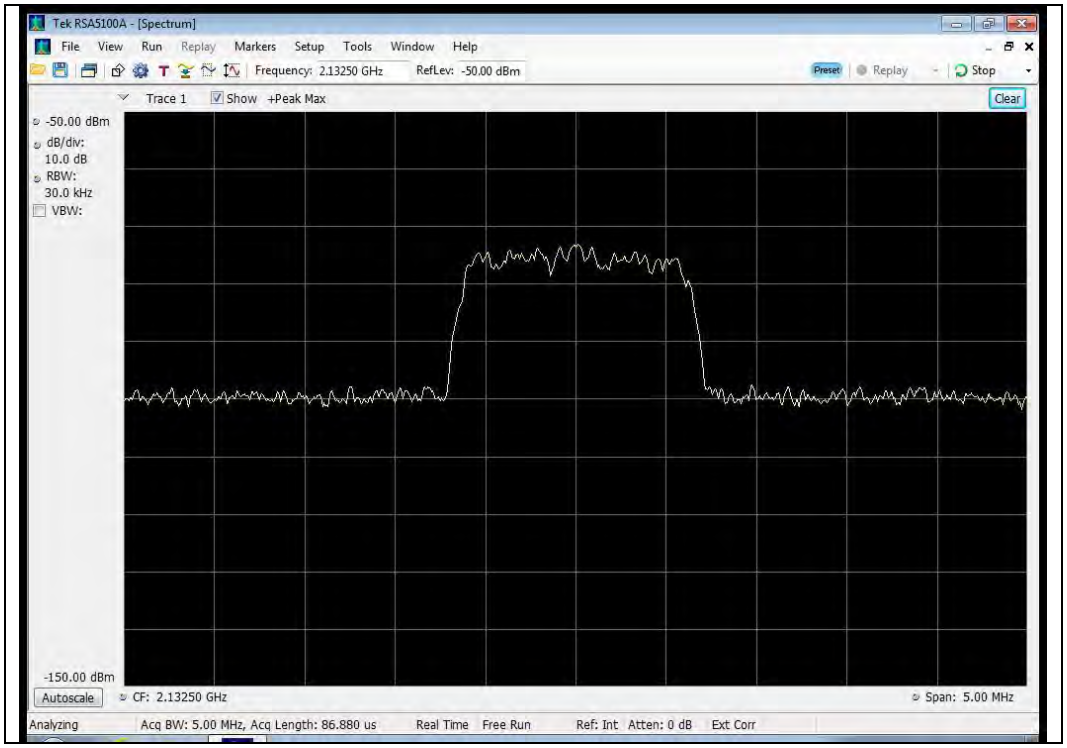


Output

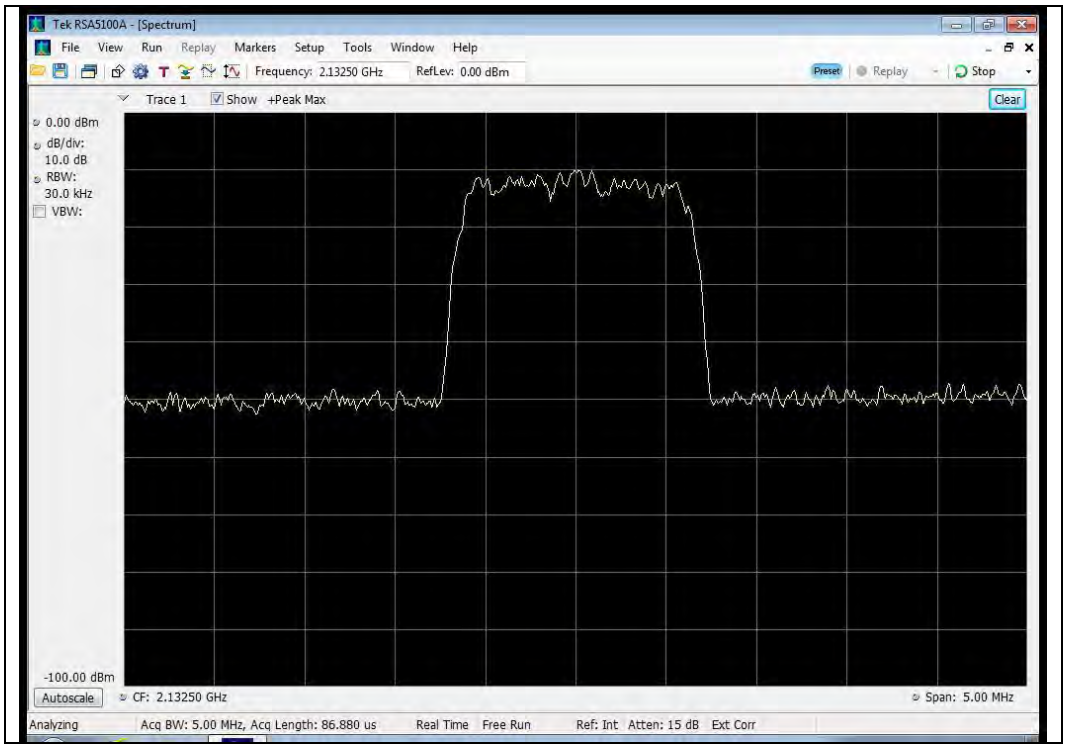


2110 - 2155 MHz Band

Input



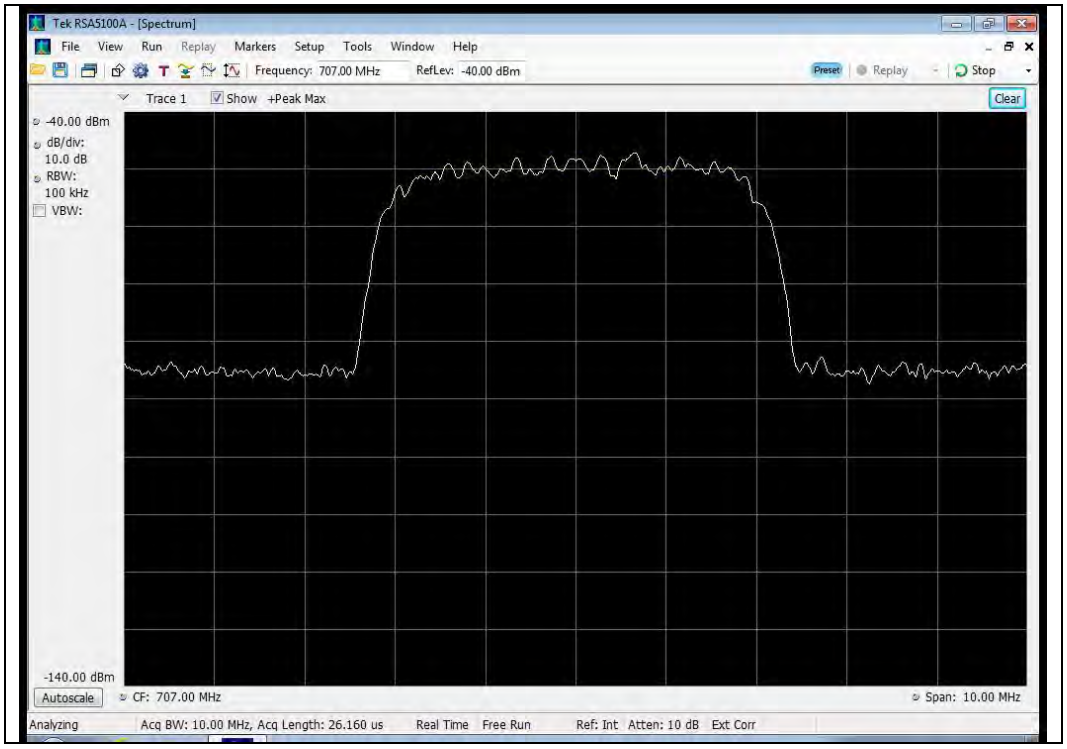
Output



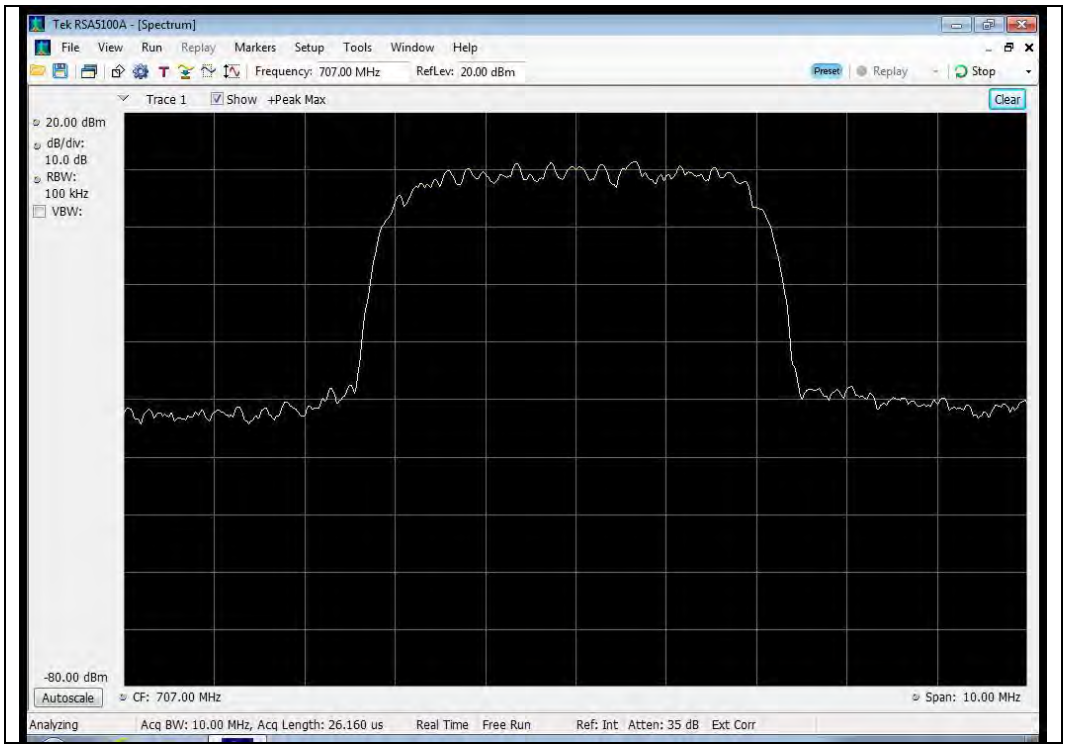
WCDMA Uplink Test Plots

698 - 716 MHz Band

Input

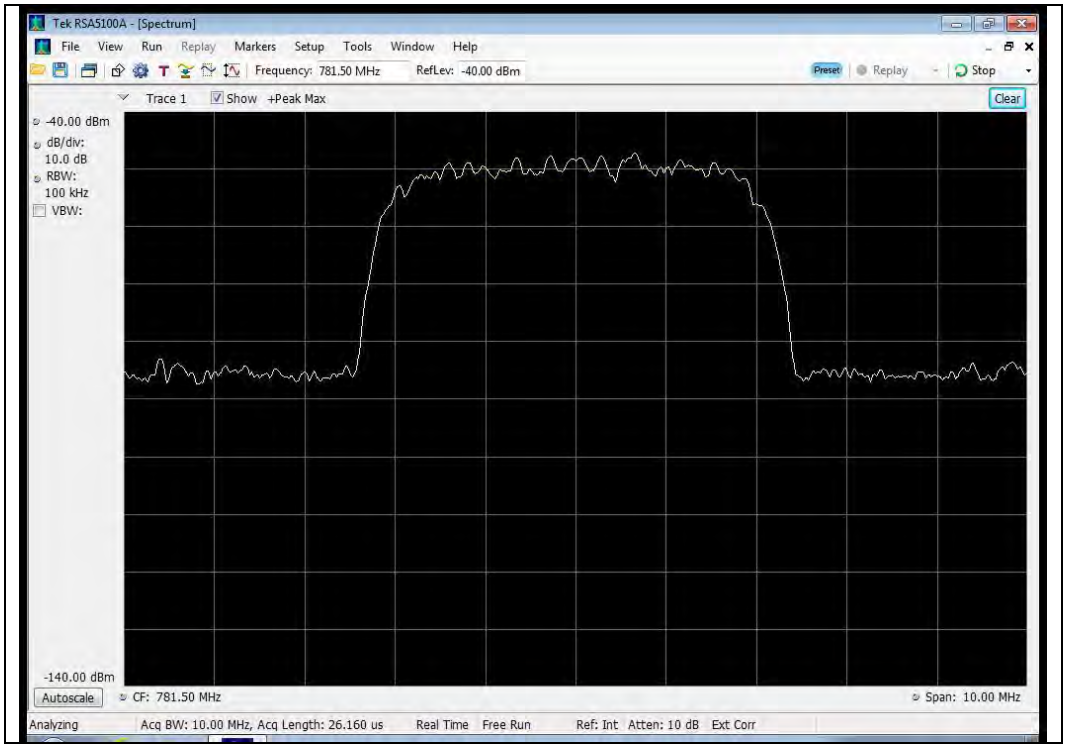


Output

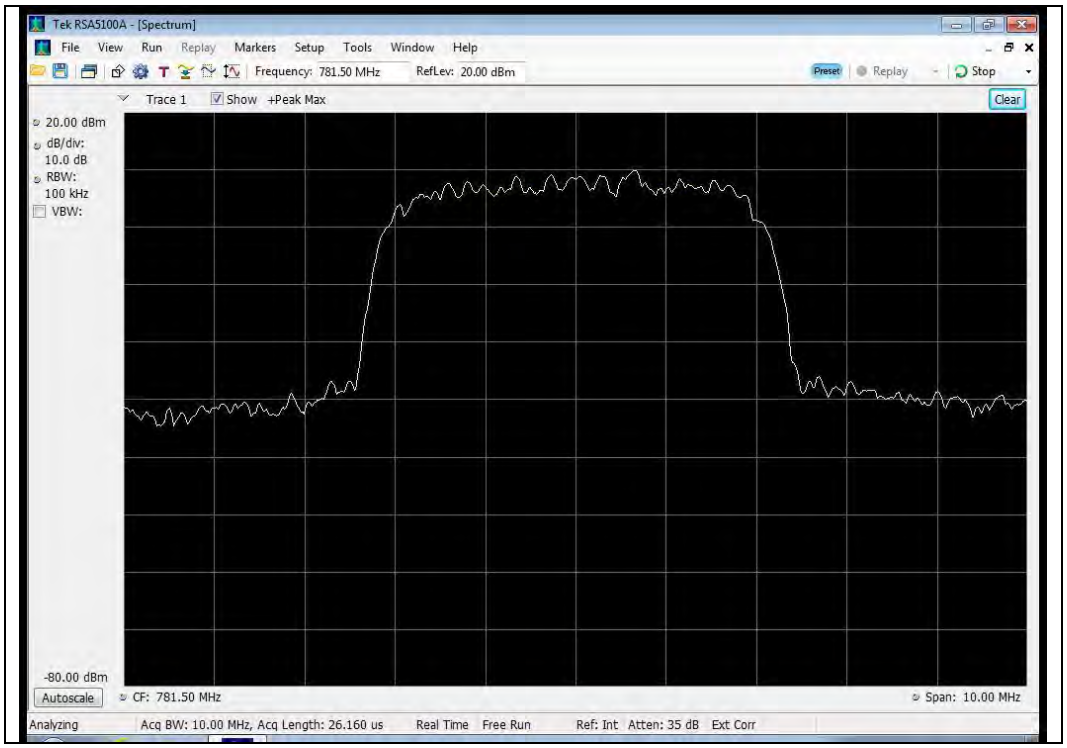


776 - 787 MHz Band

Input

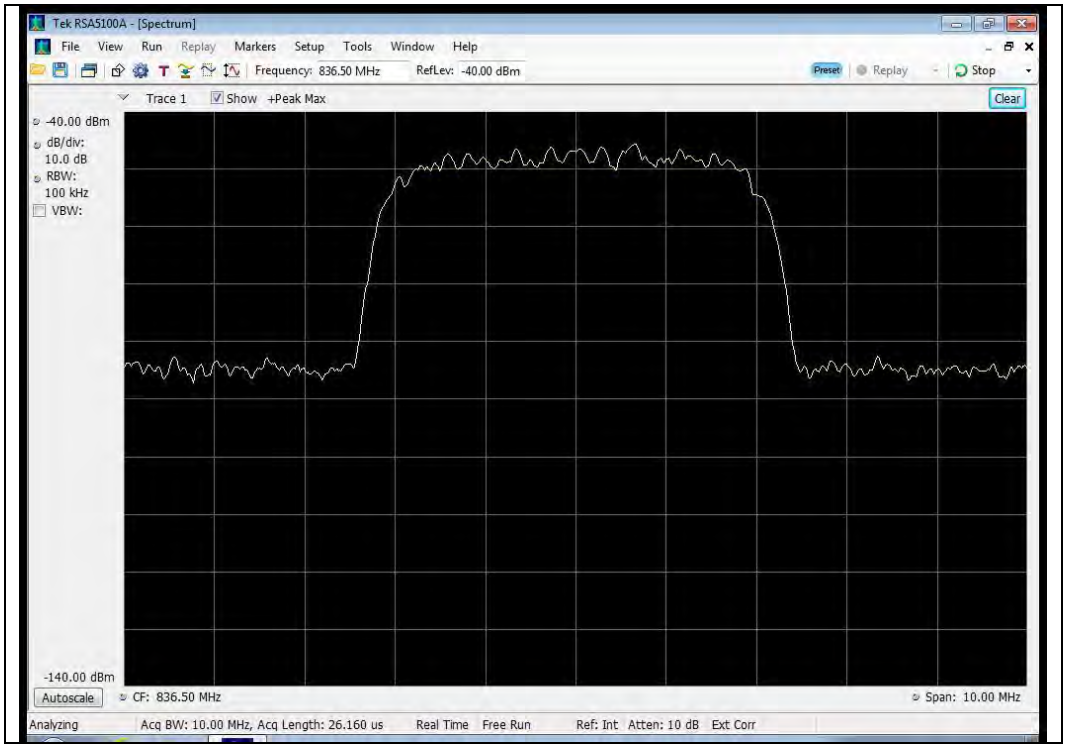


Output

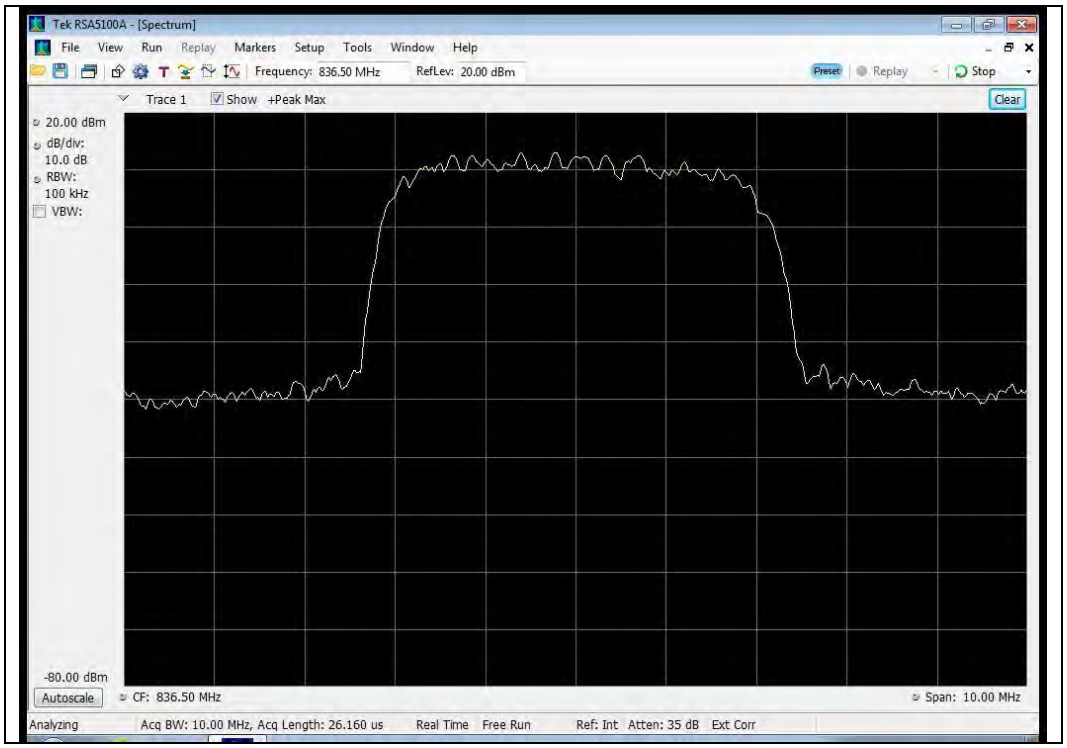


824 - 849 MHz Band

Input

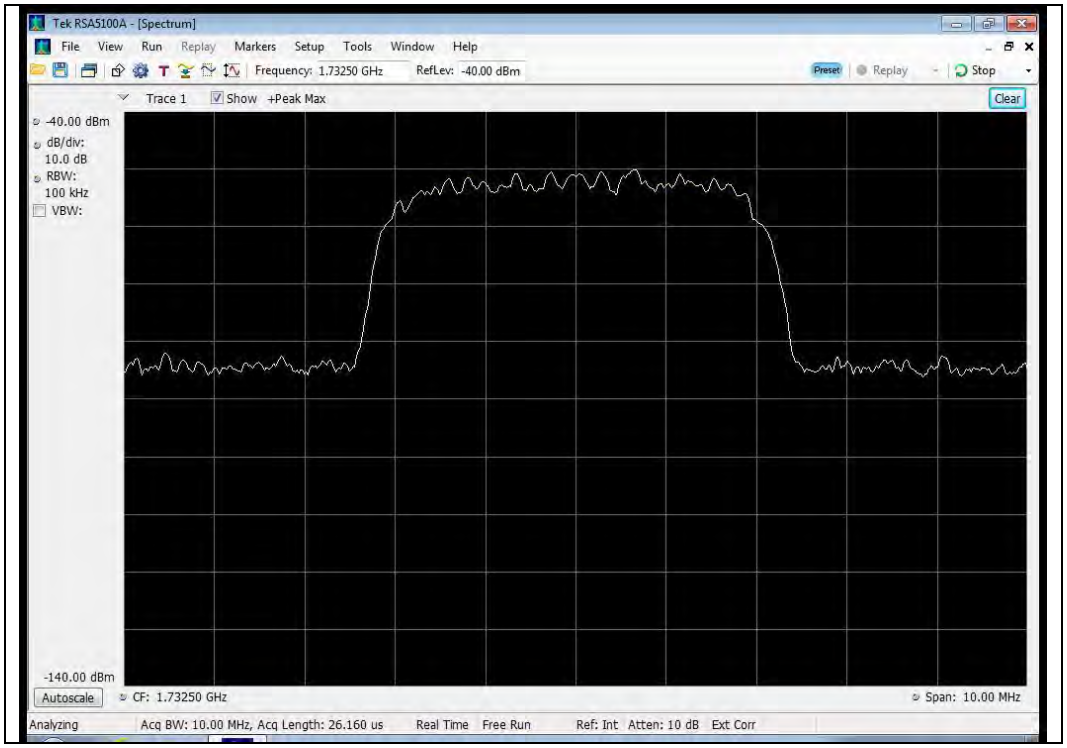


Output

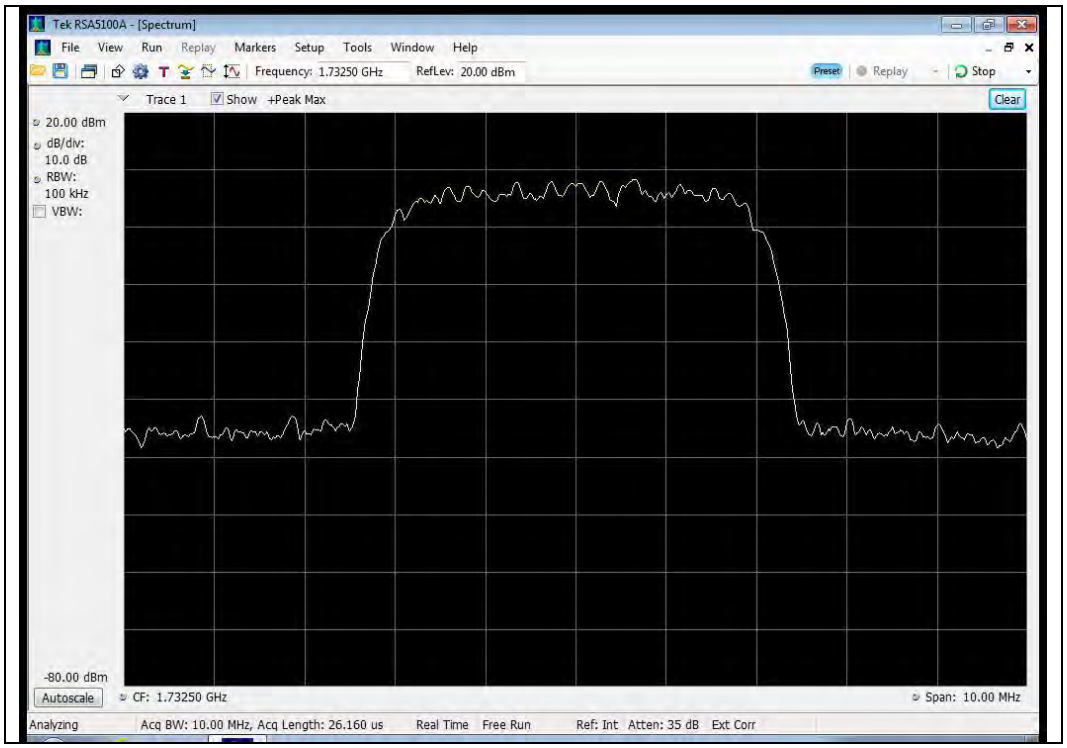


1710 - 1755 MHz Band

Input

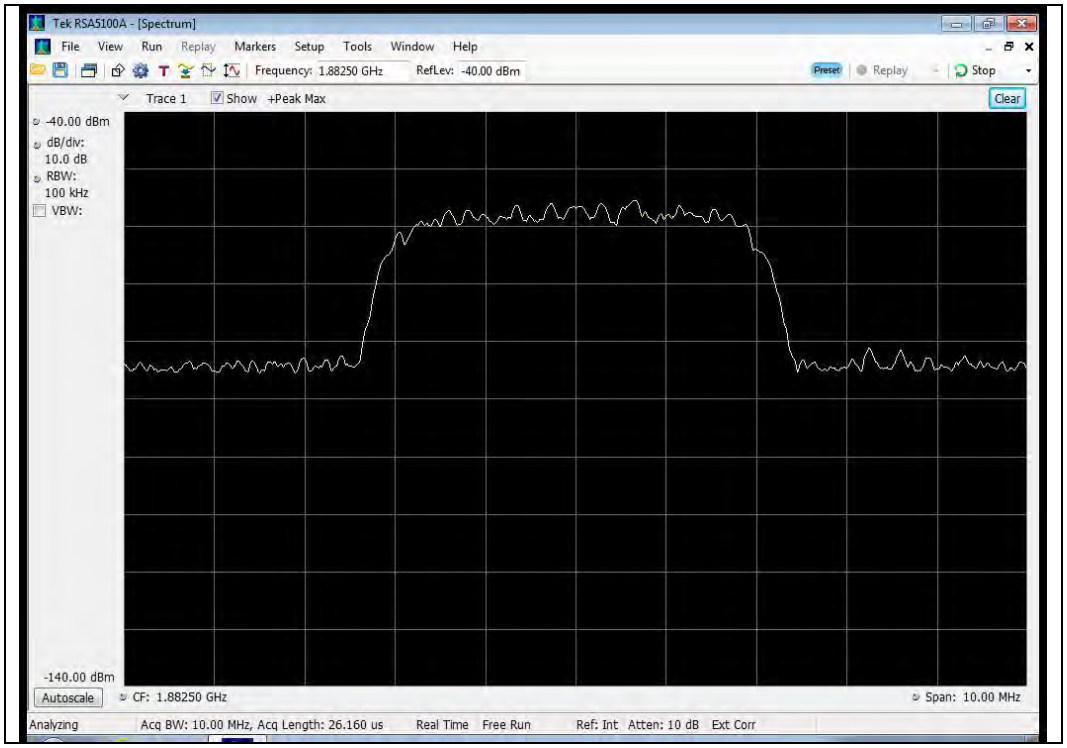


Output

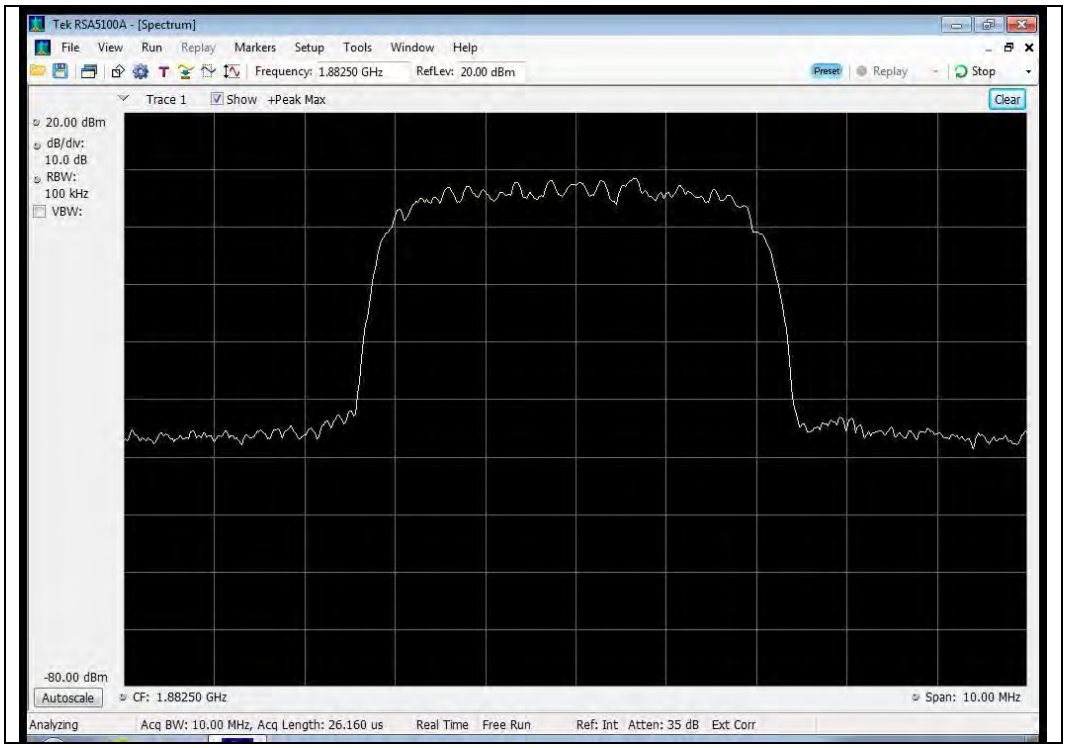


1850 - 1915 MHz Band

Input



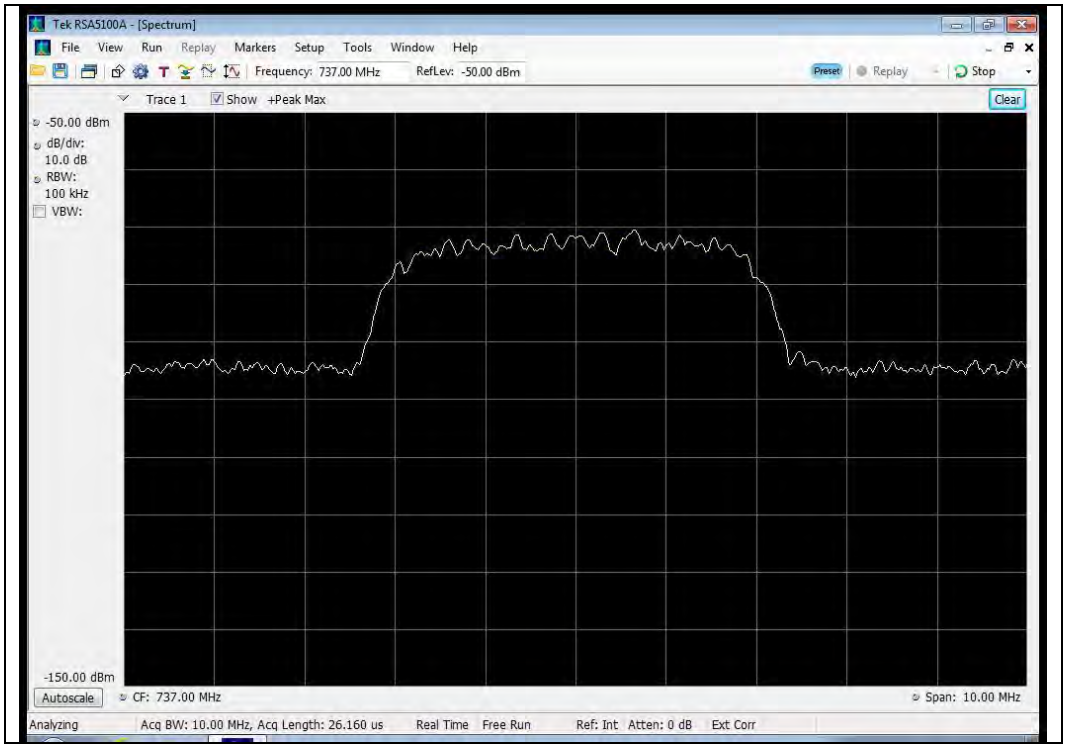
Output



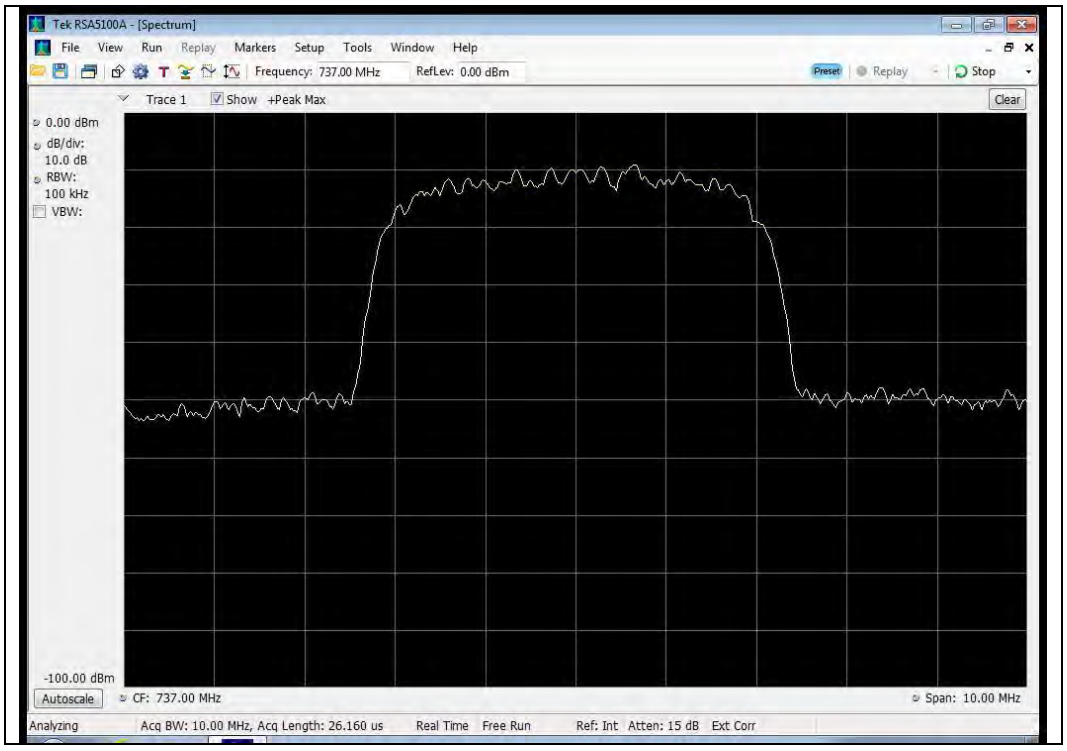
WCDMA Downlink Test Plots

728 - 746 MHz Band

Input

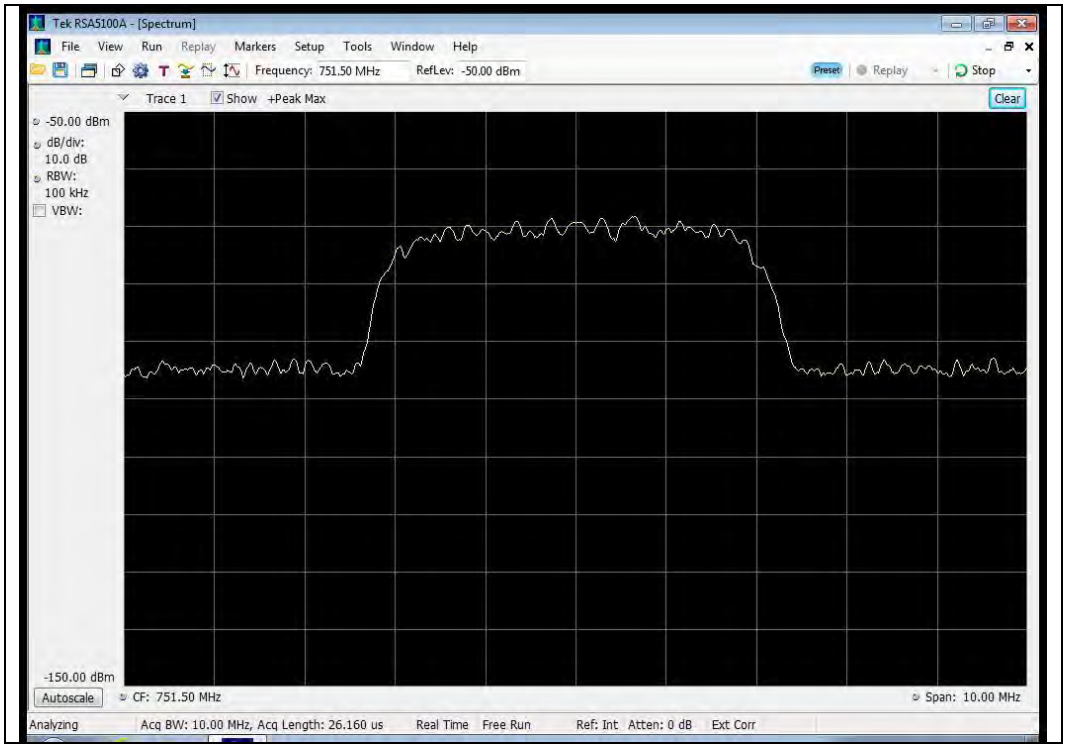


Output

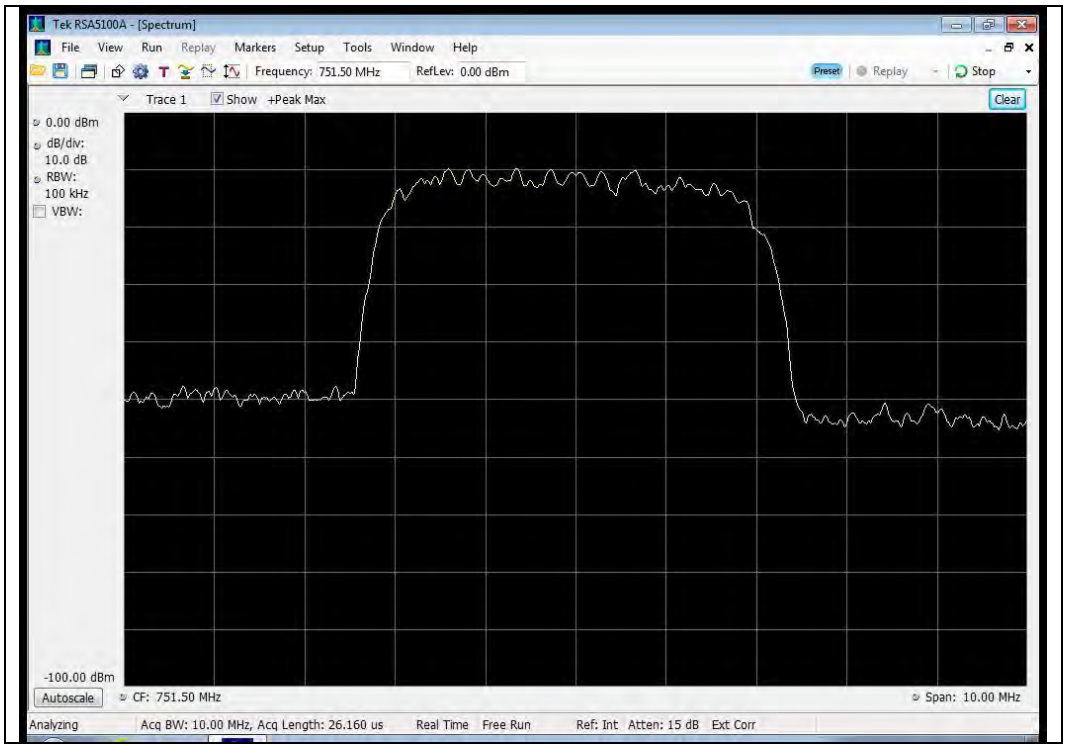


746 - 757 MHz Band

Input

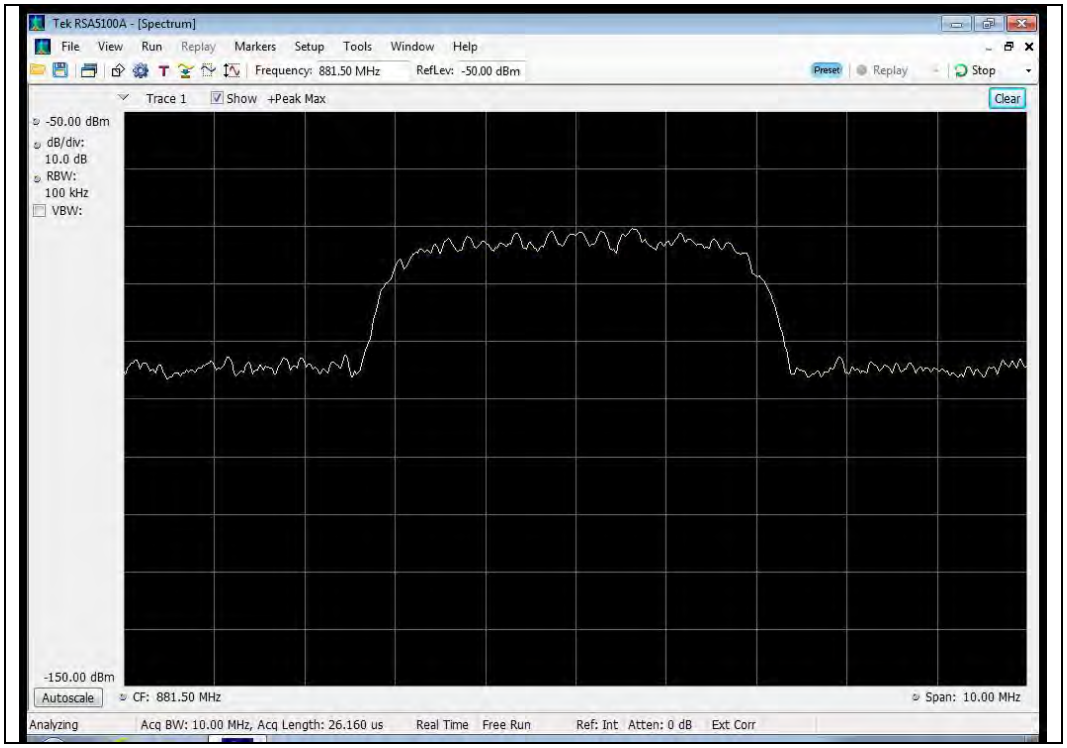


Output

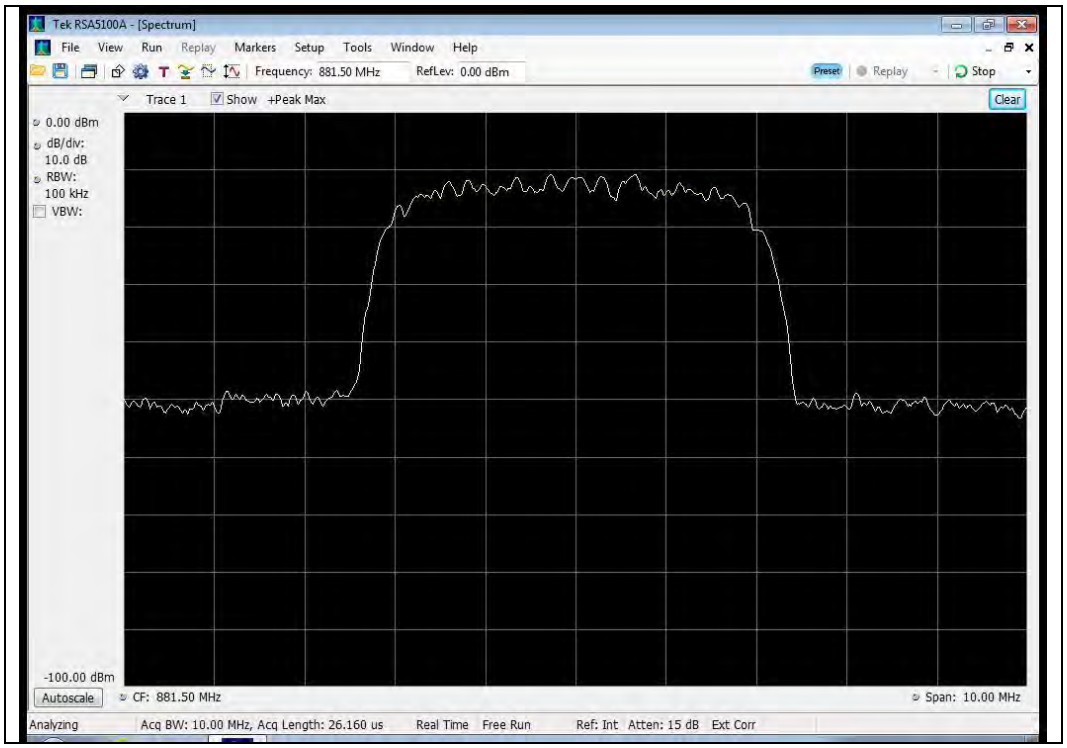


869 - 894 MHz Band

Input

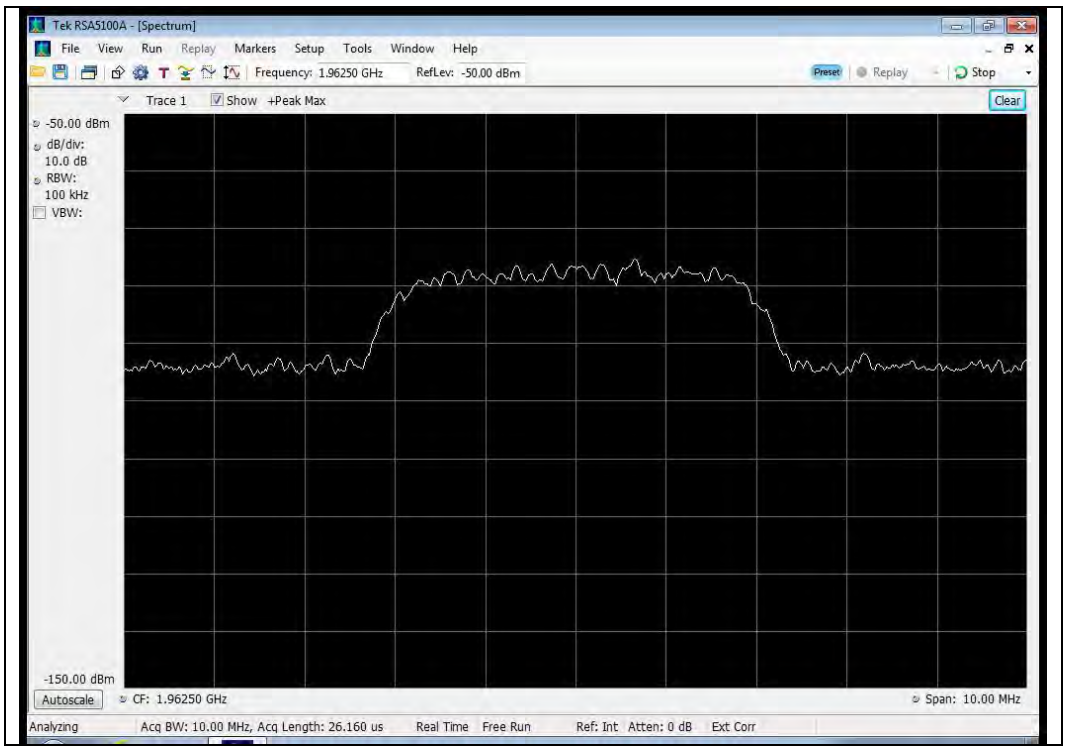


Output

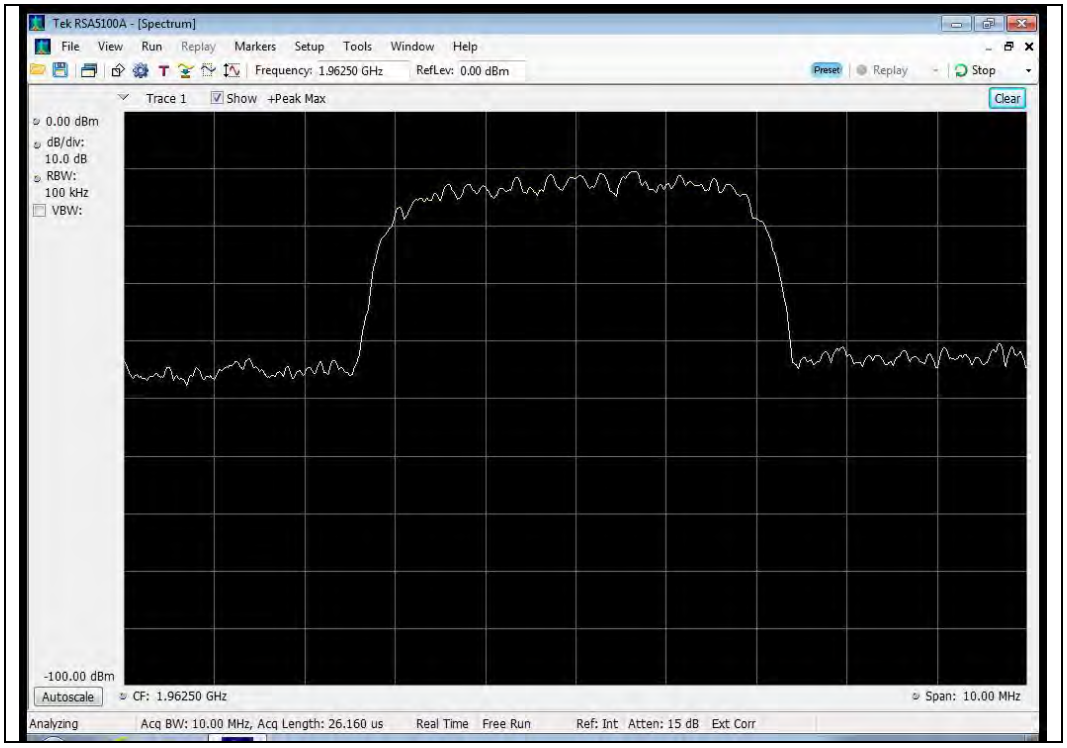


1930 - 1995 MHz Band

Input

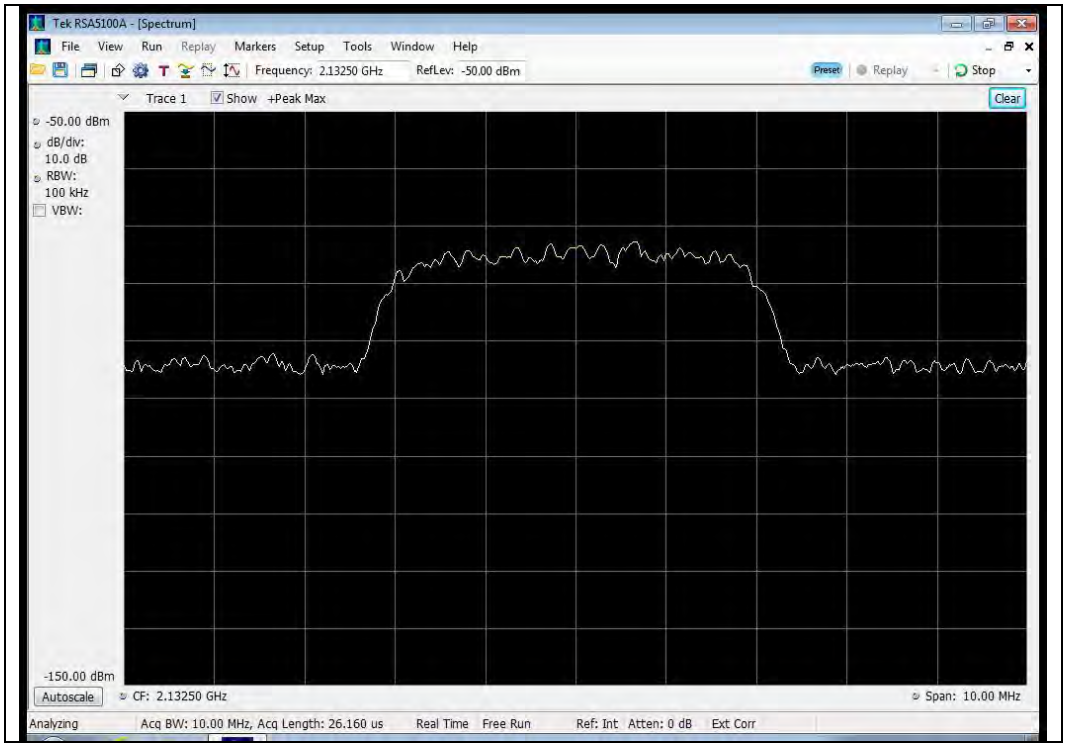


Output

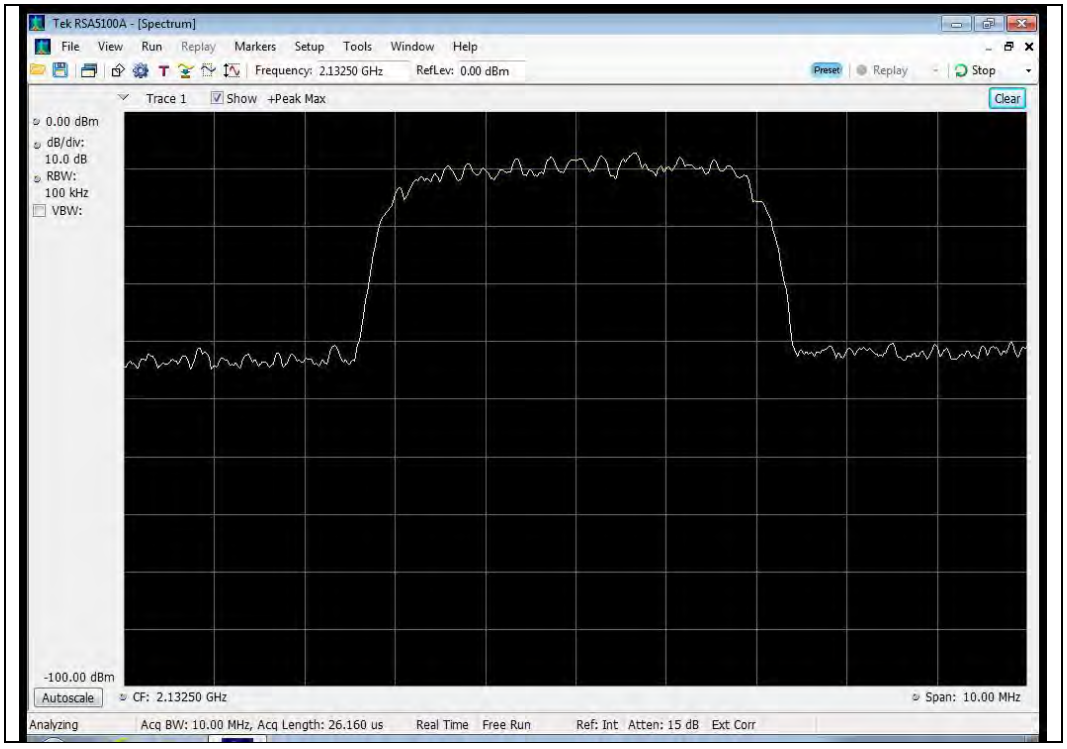


2110 - 2155 MHz Band

Input



Output

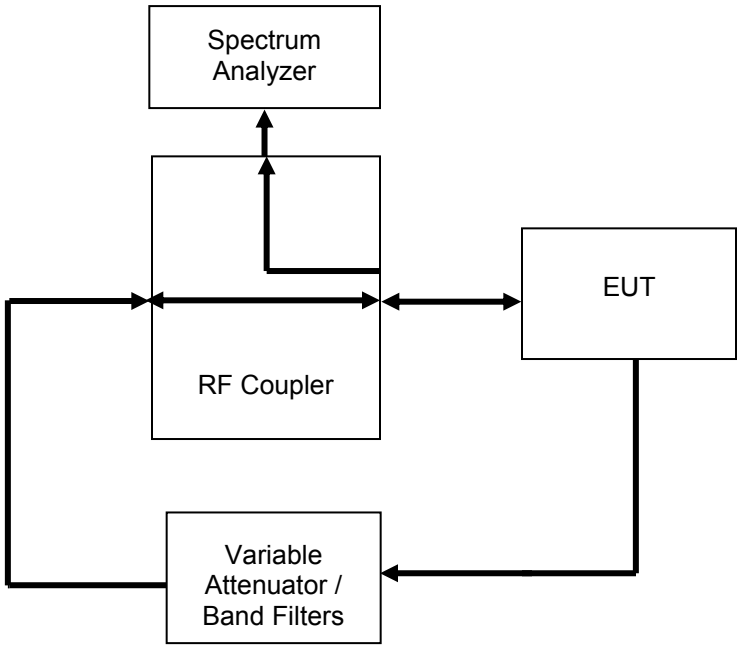


Oscillation Detection
Engineer: Mike Graffeo
Test Date: 10/28/14

Test Procedure

The EUT was connected to a spectrum analyzer set for 0 Hz operation. The EUT uplink and downlink were fed back upon each other through a selectable band pass filter and variable attenuator. The EUT uplink and downlink were tested to ensure that the presence of oscillation was detected and that the EUT output turned off within 300 mS for the Uplink and 1 second for the Downlink and remained off for 1 minute. A EUT with test software was utilized to ensure that the EUT only had a maximum of 5 attempts at restart from oscillation before permanently shutting off.

Test Setup



Uplink Detection Time Test Results

Frequency Band (MHz)	Measured Time (mS)	Limit (mS)	Result
698 - 716	118.30	300	Pass
776 - 787	52.25	300	Pass
824 - 849	55.00	300	Pass
1710 - 1755	22.00	300	Pass
1850 - 1915	156.80	300	Pass

Downlink Detection Time Test Results

Frequency Band (MHz)	Measured Time (mS)	Limit (mS)	Result
728 - 746	74.25	1000	Pass
746 - 757	22.00	1000	Pass
869 - 894	195.30	1000	Pass
1930 - 1995	22.00	1000	Pass
2110 - 2155	93.50	1000	Pass

Uplink Restart Time Test Results

Frequency Band (MHz)	Measured Time (S)	Limit (S)	Result
698 - 716	device shut down	≥60	Pass
776 - 787	device shut down	≥60	Pass
824 - 849	device shut down	≥60	Pass
1710 - 1755	device shut down	≥60	Pass
1850 - 1915	69.97	≥60	Pass

Downlink Restart Time Test Results

Frequency Band (MHz)	Measured Time (S)	Limit (S)	Result
728 - 746	device shut down	≥60	Pass
746 - 757	device shut down	≥60	Pass
869 - 894	device shut down	≥60	Pass
1930 - 1995	69.52	≥60	Pass
2110 - 2155	70.2	≥60	Pass

Uplink Restart Count Test Results

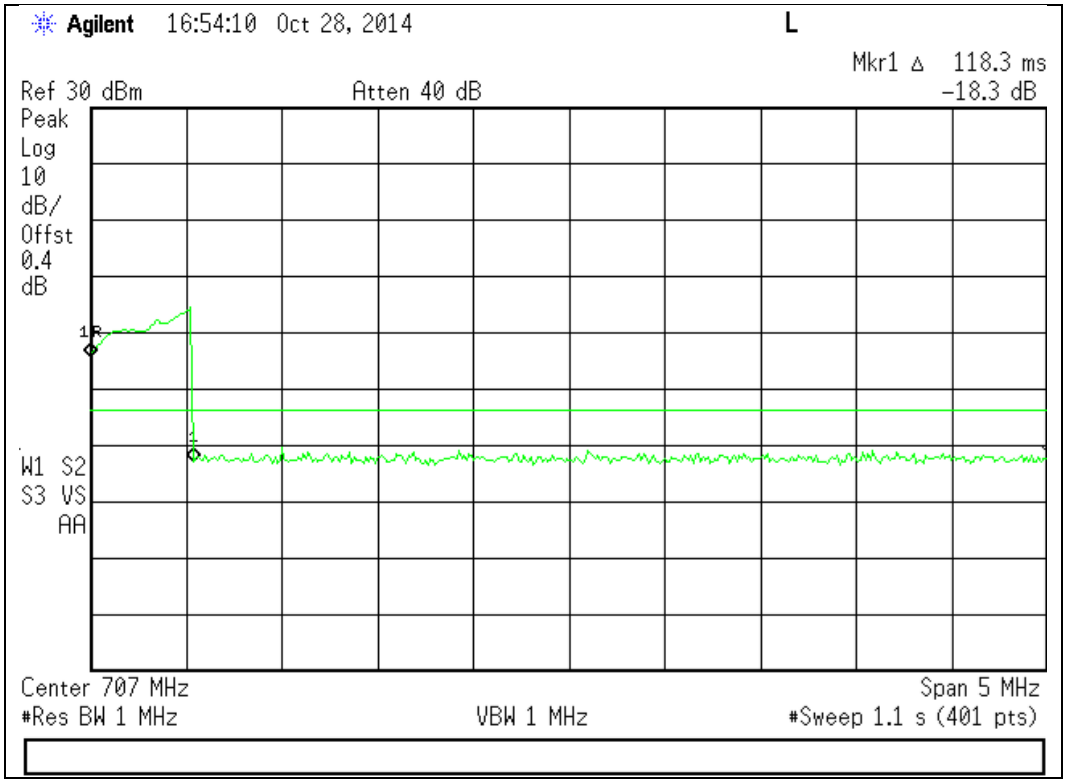
Frequency Band (MHz)	Restarts	Limit	Result
698 - 716	0	≤5	Pass
776 - 787	0	≤5	Pass
824 - 849	0	≤5	Pass
1710 - 1755	0	≤5	Pass
1850 - 1915	3	≤5	Pass

Downlink Restart Count Test Results

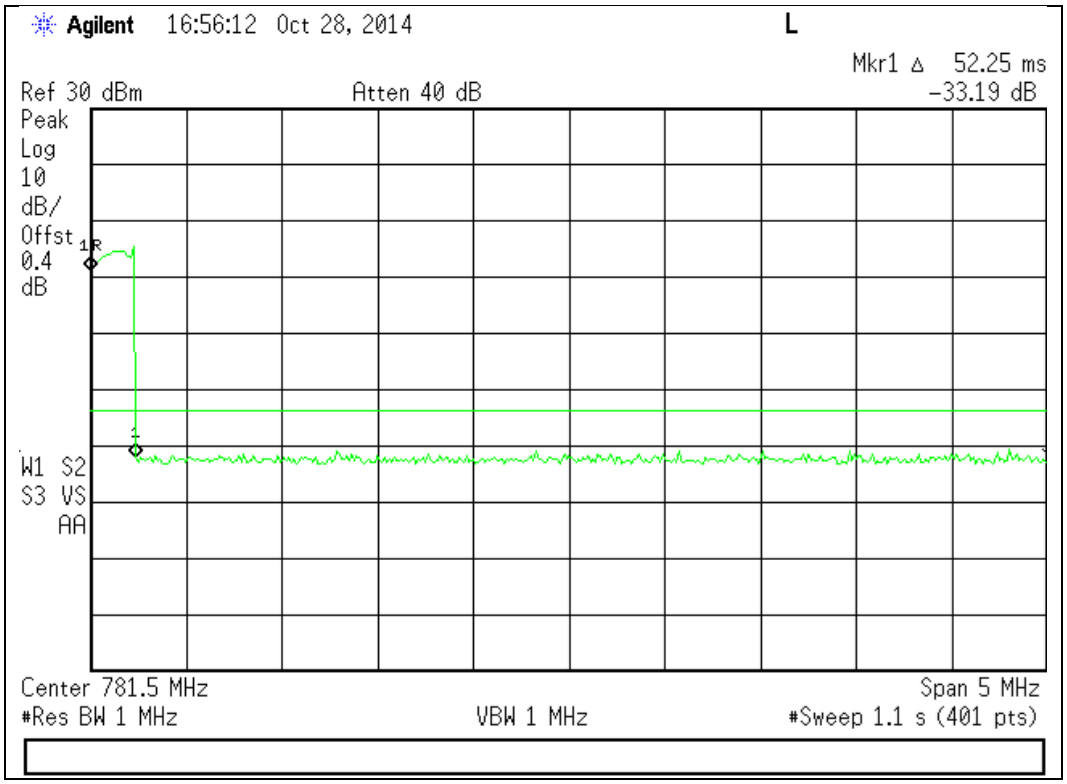
Frequency Band (MHz)	Restarts	Limit	Result
728 - 746	0	≤5	Pass
746 - 757	0	≤5	Pass
869 - 894	0	≤5	Pass
1930 - 1995	4	≤5	Pass
2110 - 2155	4	≤5	Pass

Uplink Detection Time Test Results

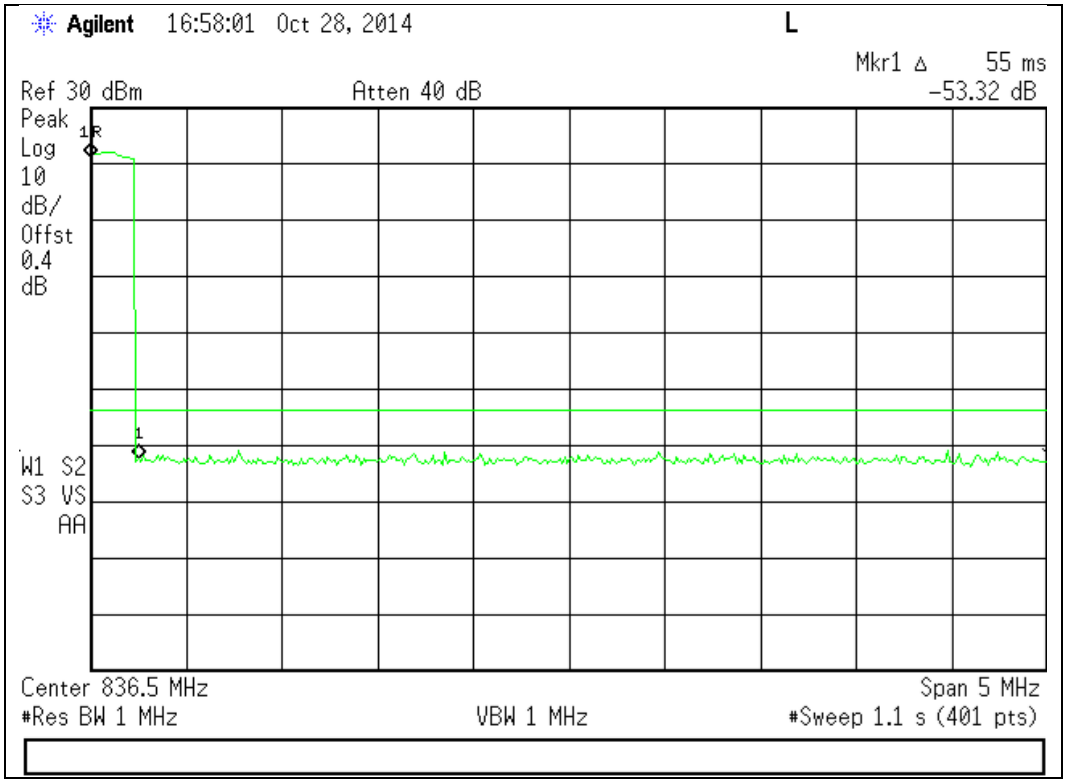
698 - 716 MHz Band



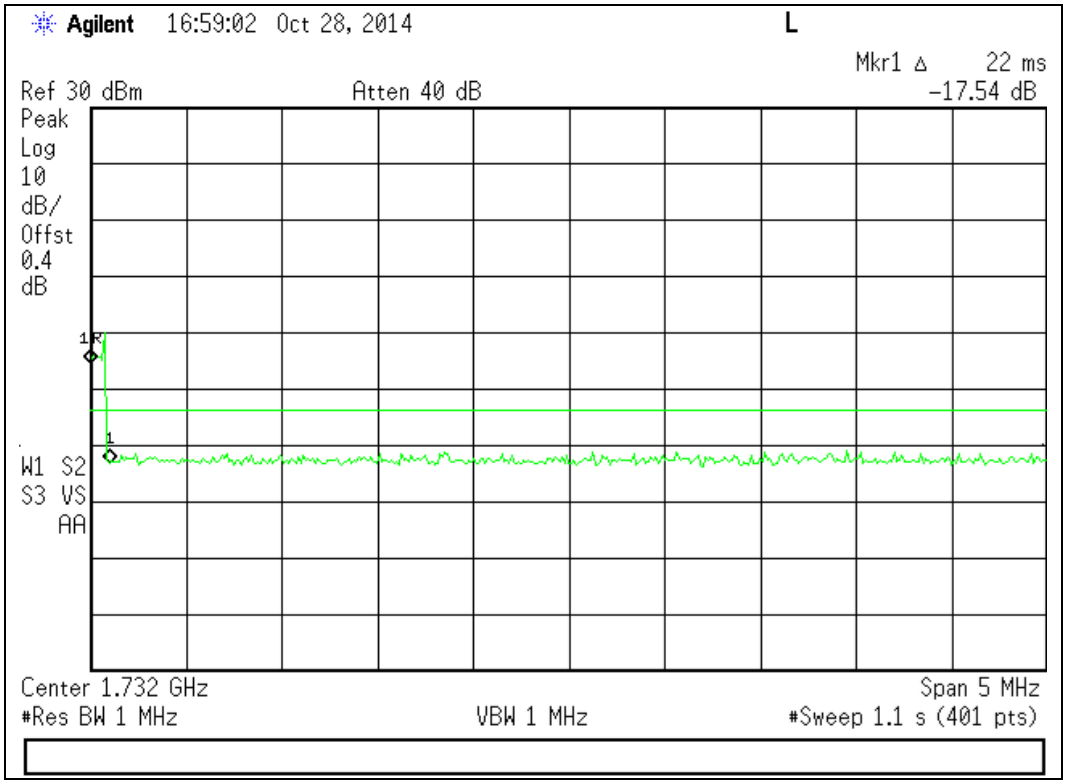
776 - 787 MHz Band



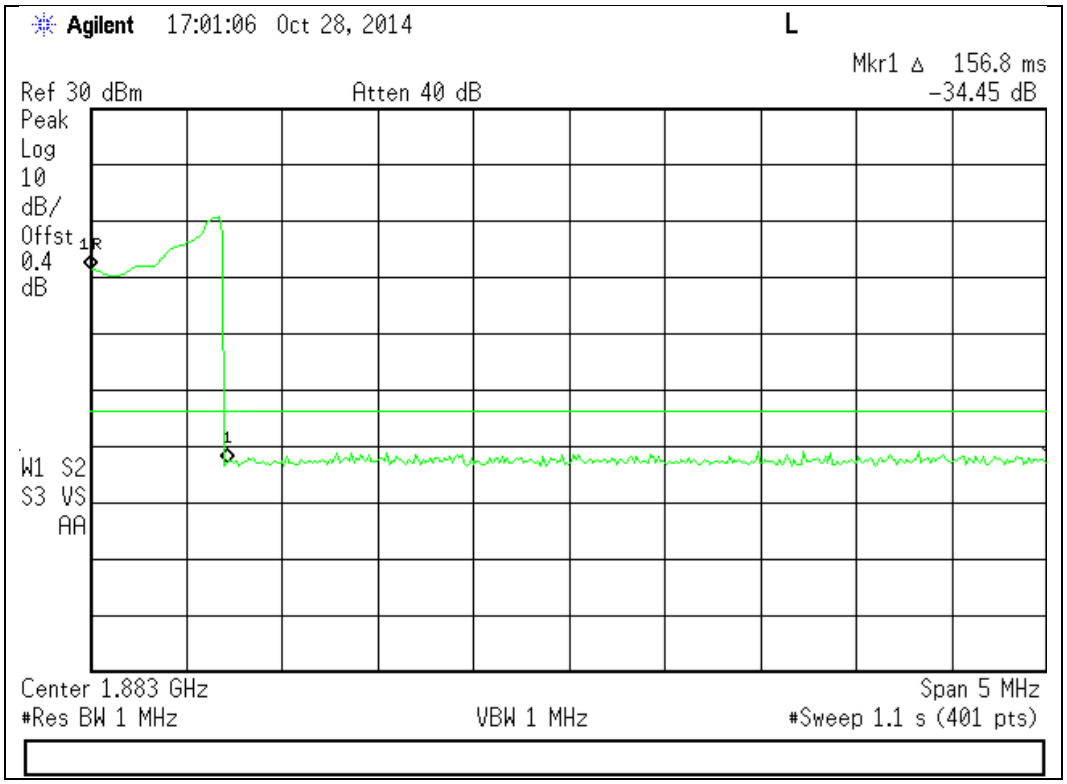
824 - 849 MHz Band



1710 - 1755 MHz Band

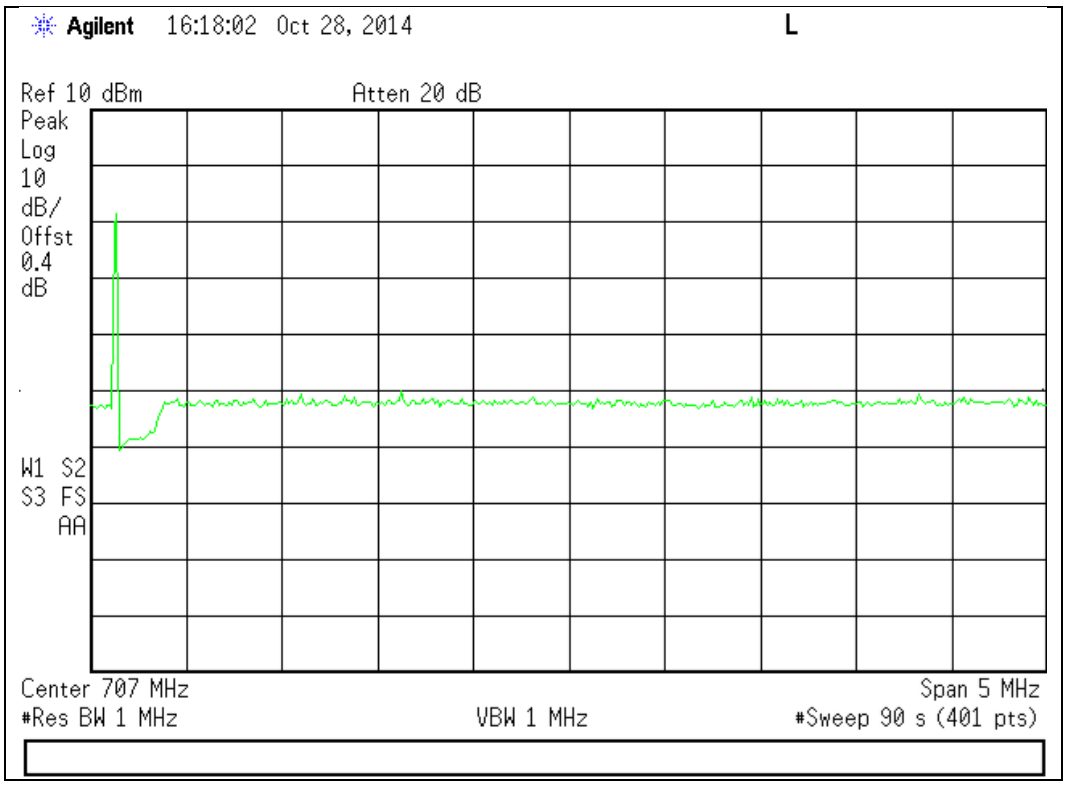


1850 - 1915 MHz Band

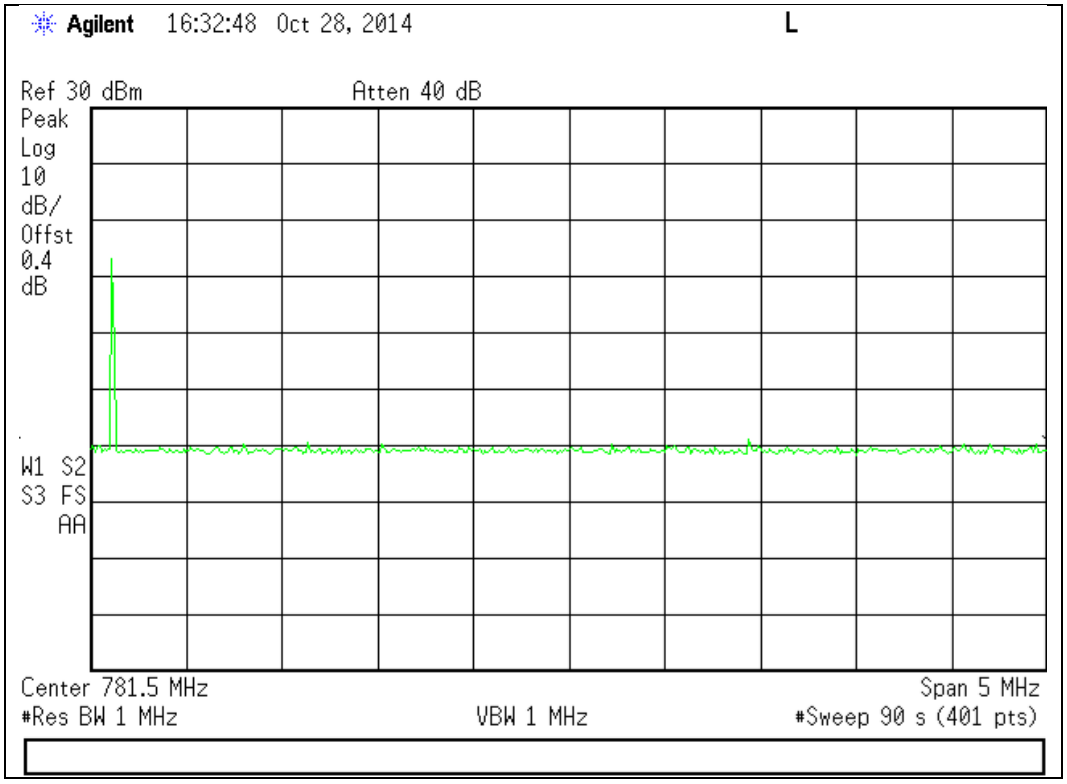


Uplink Restart Time Test Results

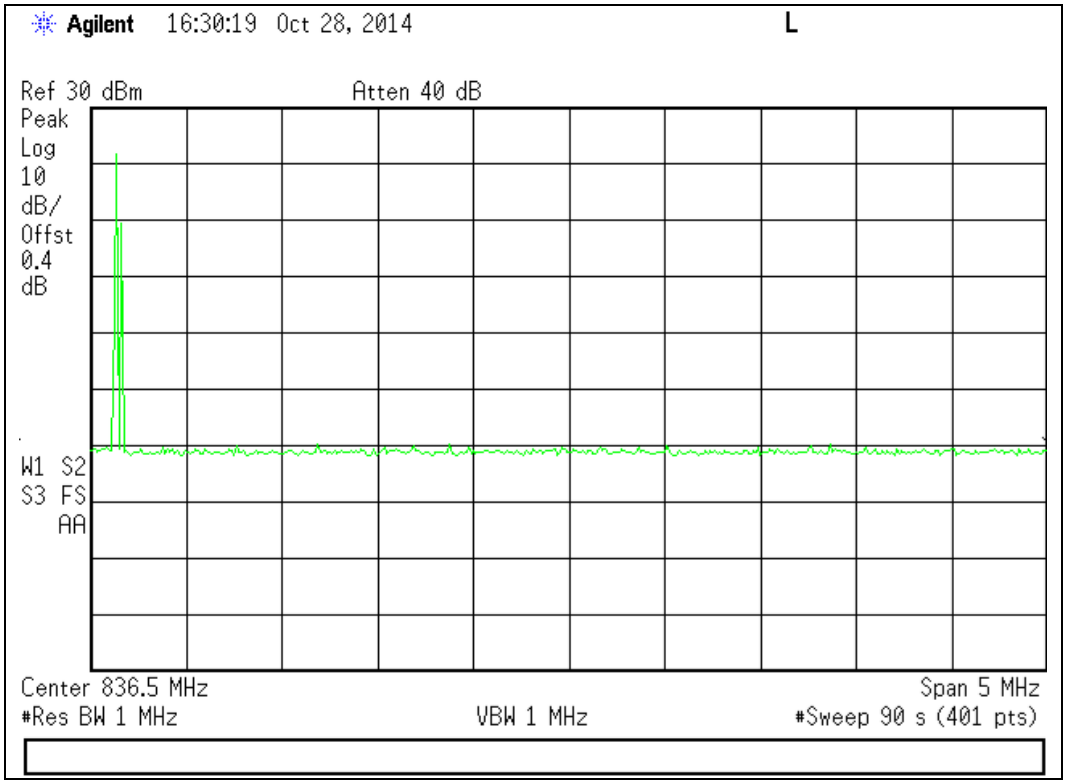
698 - 716 MHz Band



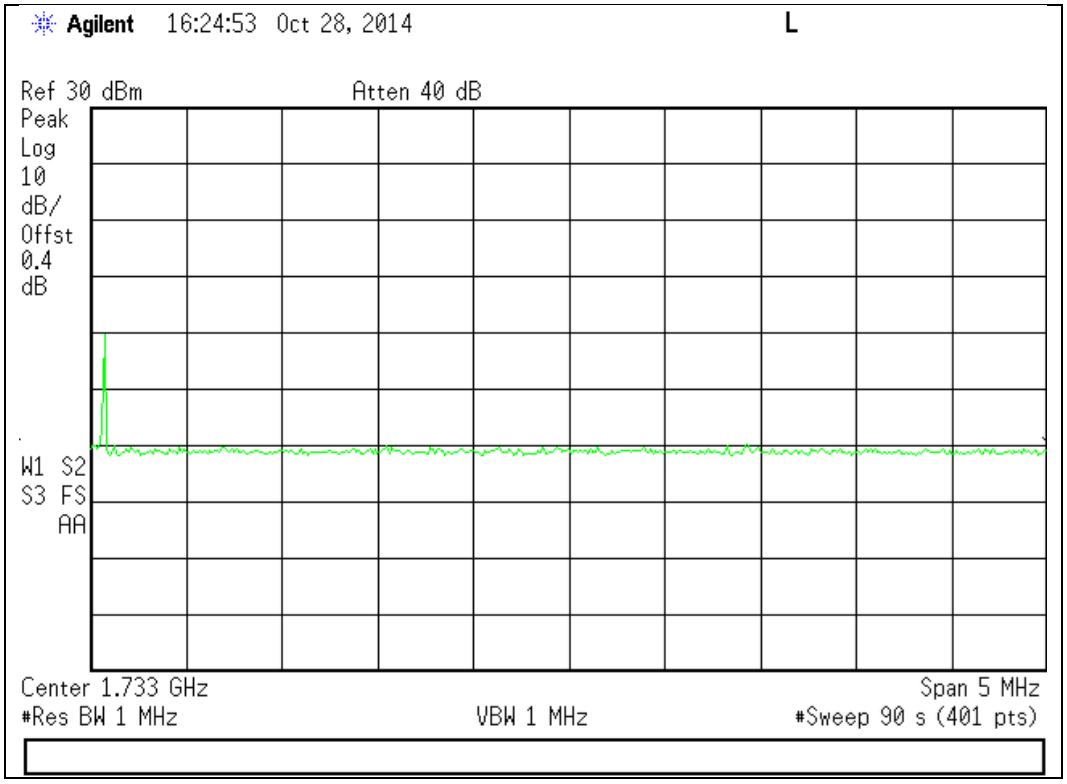
776 - 787 MHz Band



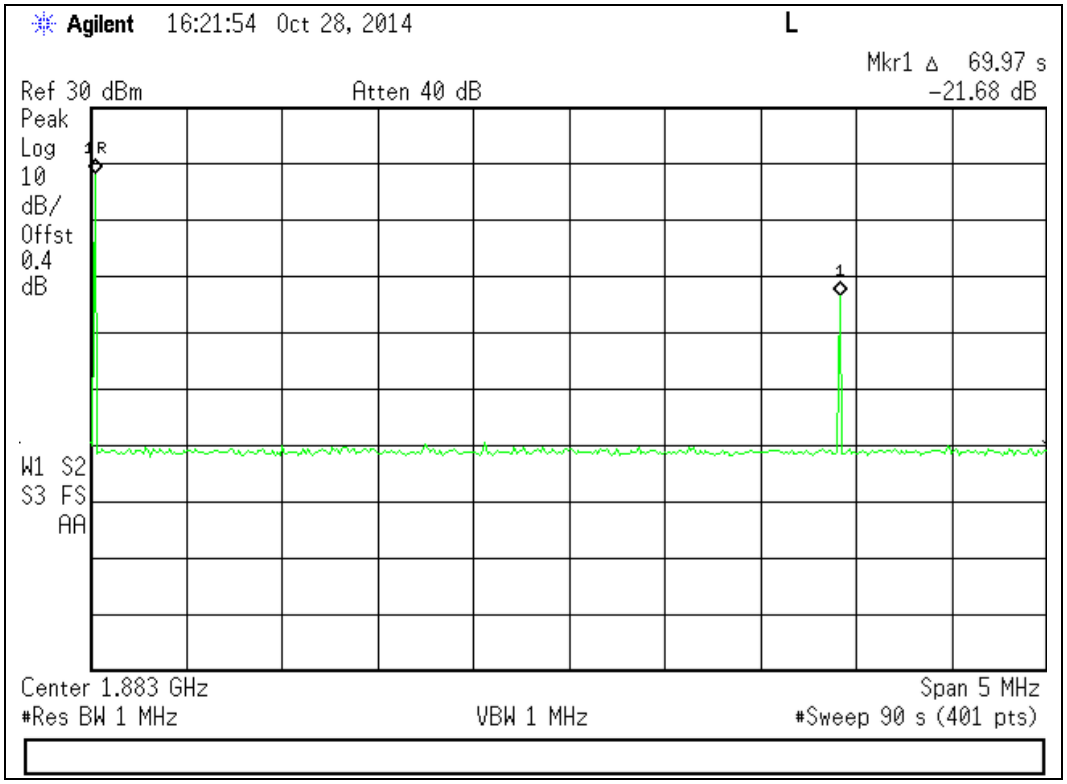
824 - 849 MHz Band



1710 - 1755 MHz Band

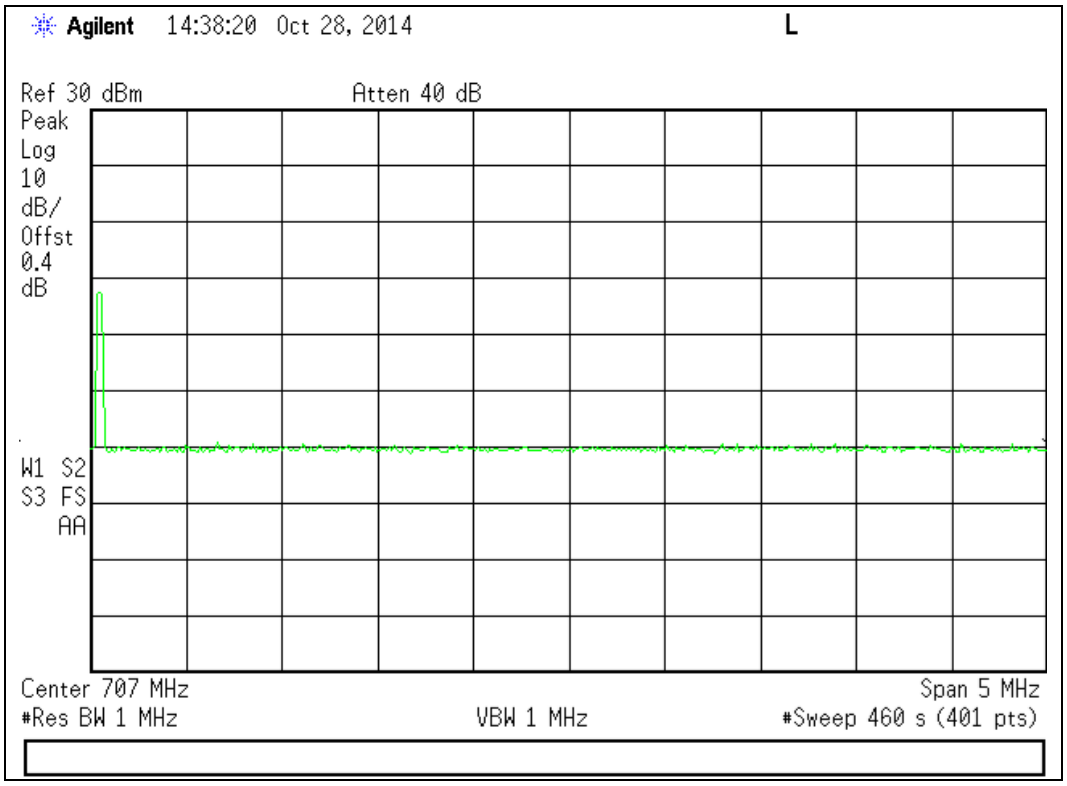


1850 - 1915 MHz Band

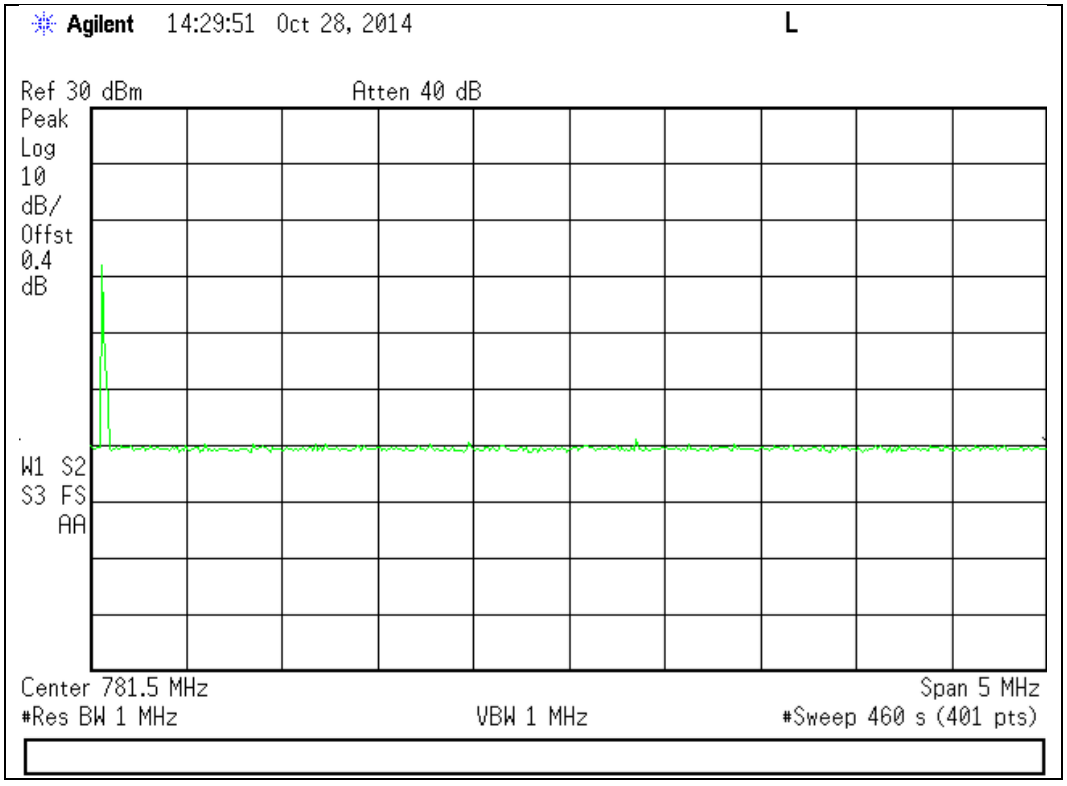


Uplink Restart Count Test Results

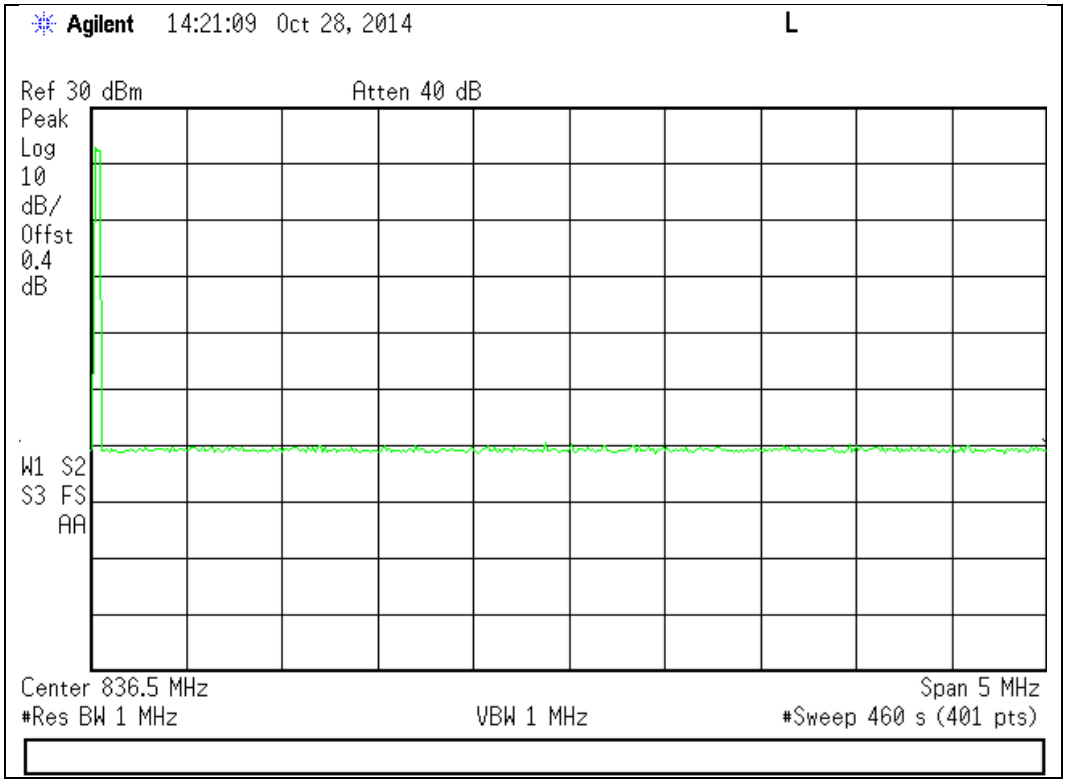
698 - 716 MHz Band



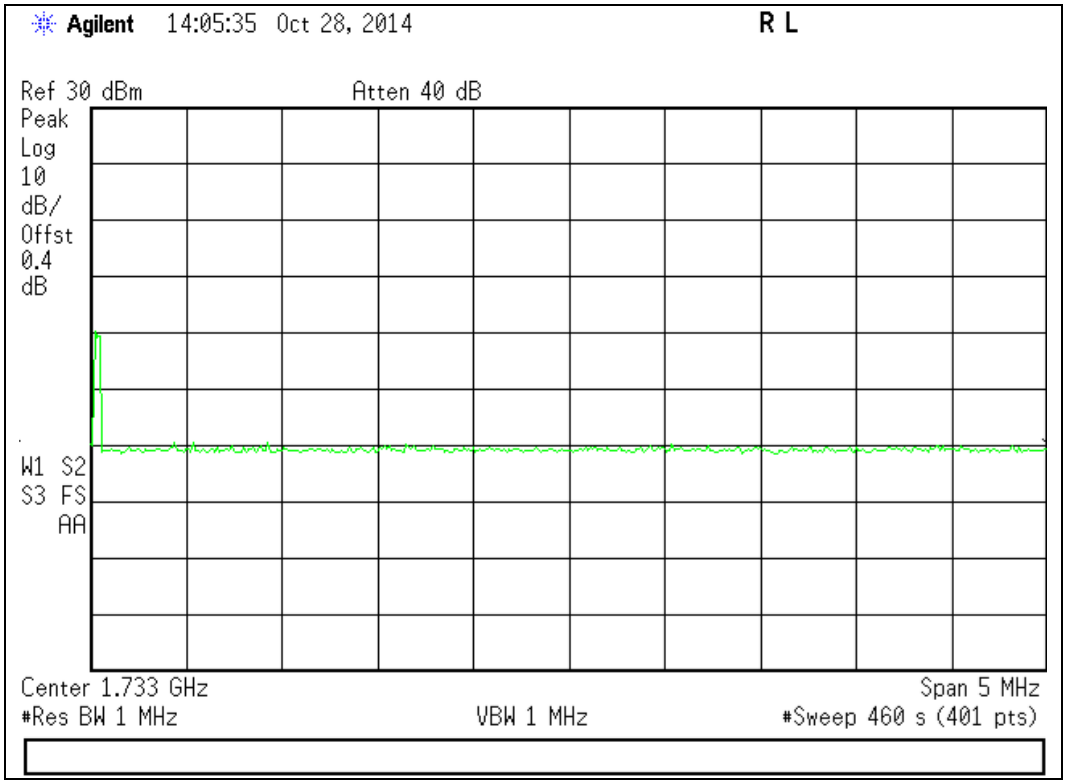
776 - 787 MHz Band



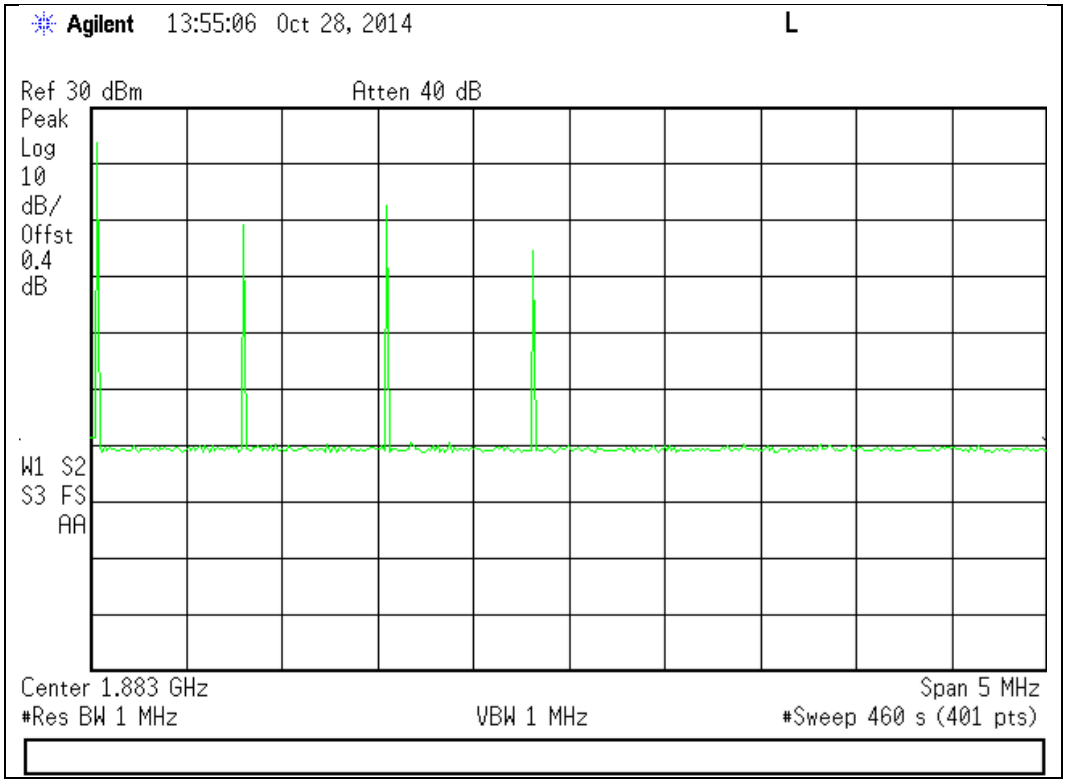
824 - 849 MHz Band



1710 - 1755 MHz Band

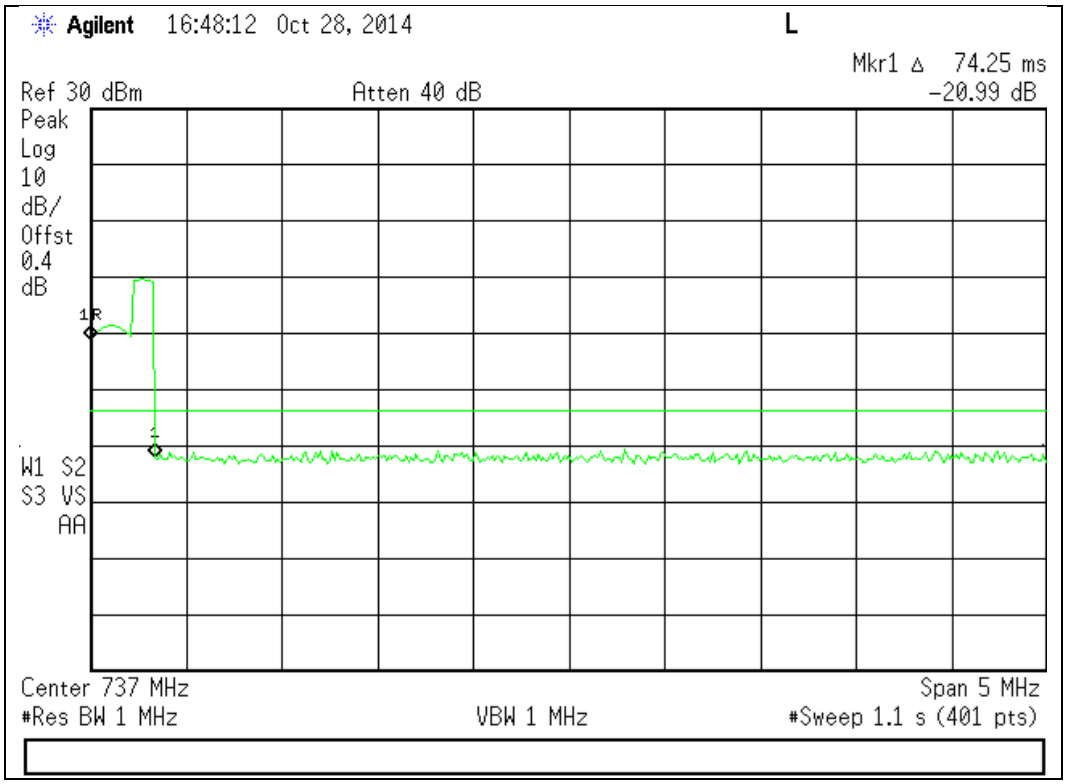


1850 - 1915 MHz Band

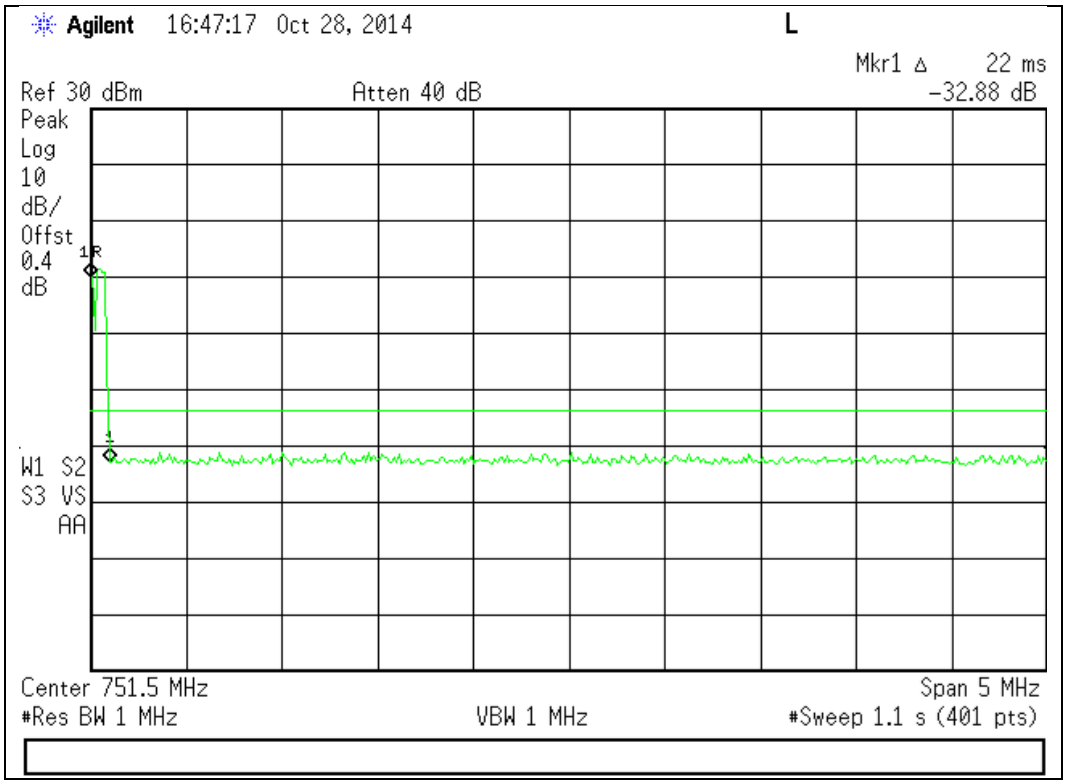


Downlink Detection Time Test Results

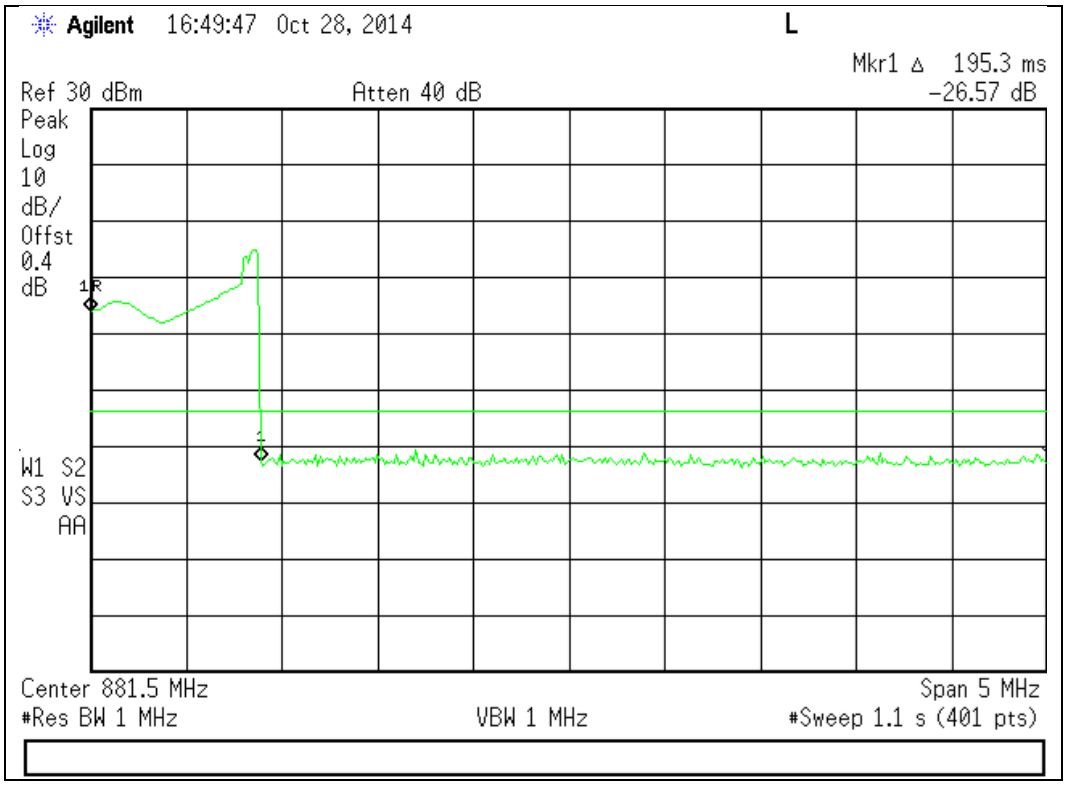
728 - 746 MHz Band



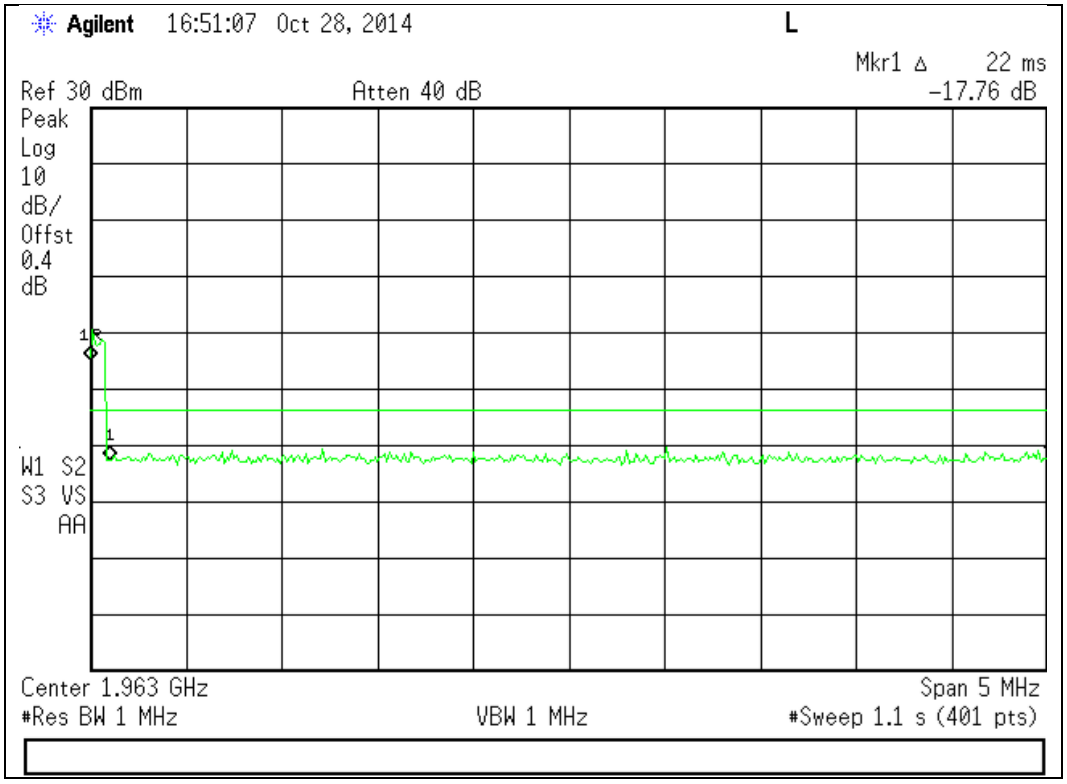
746 - 757 MHz Band



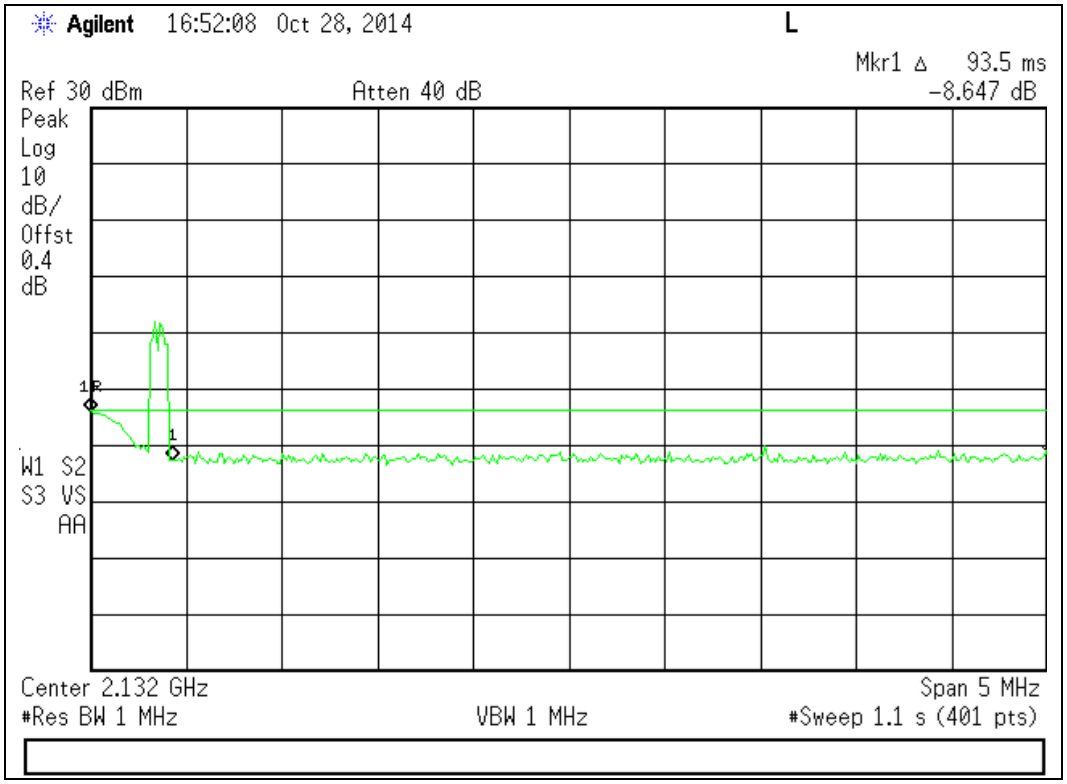
869 - 894 MHz Band



1930 - 1995 MHz Band

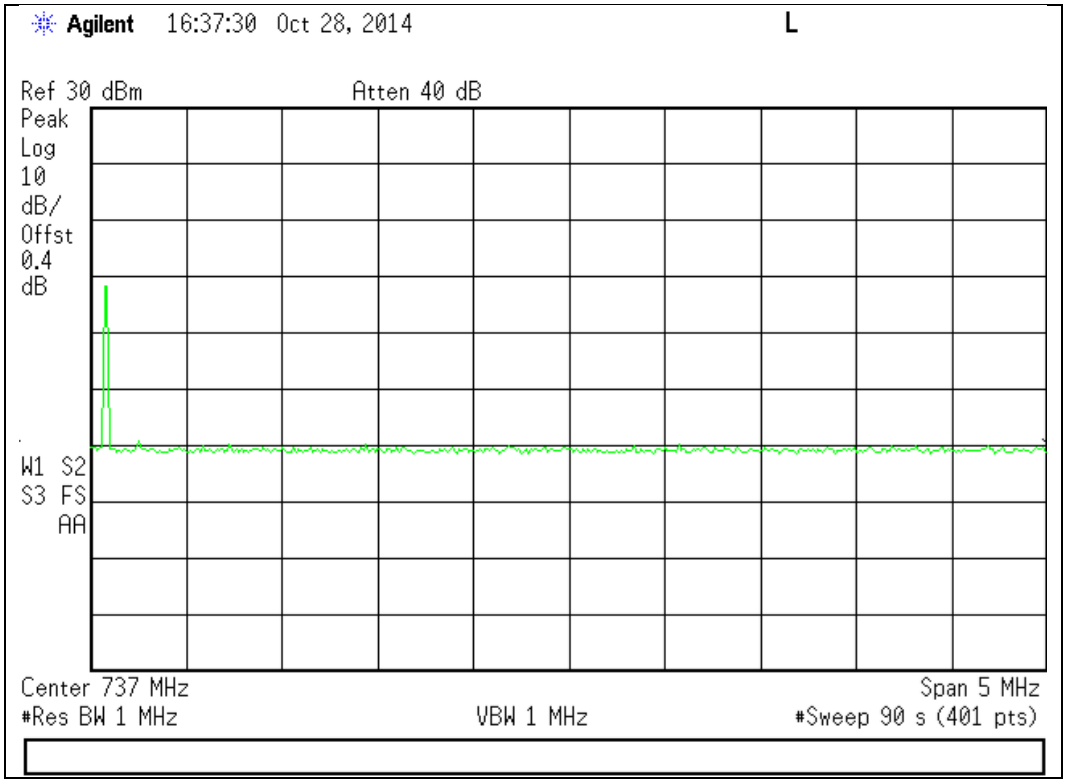


2110 - 2155 MHz Band

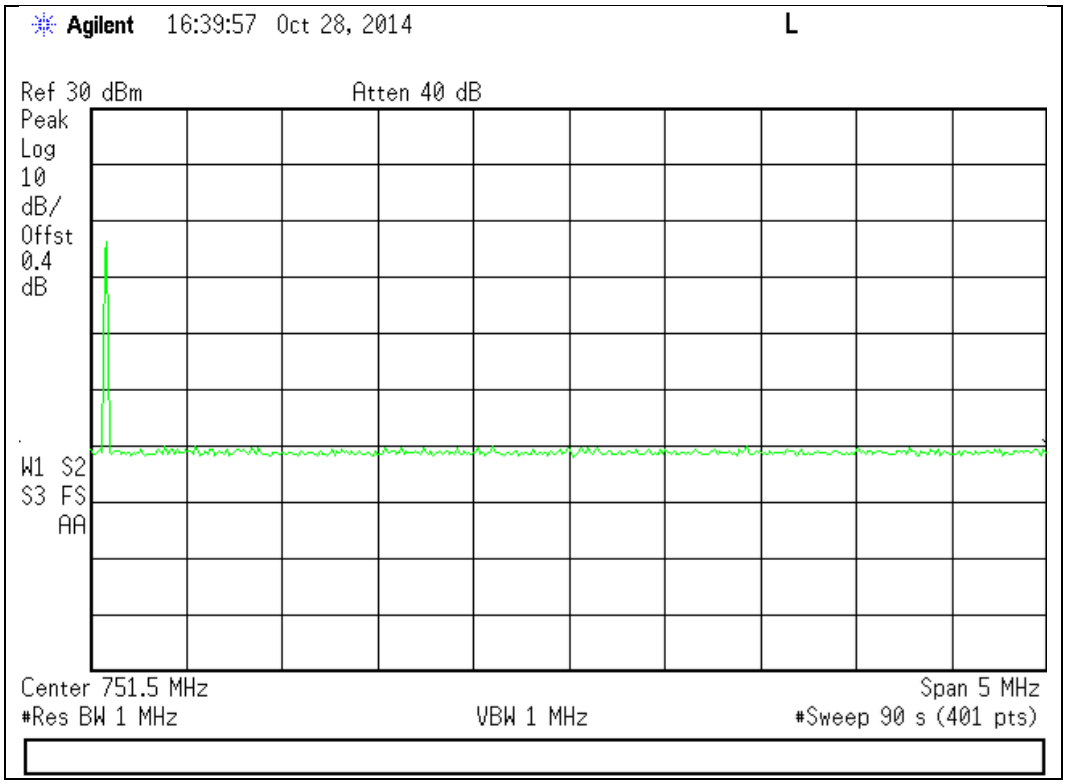


Downlink Restart Time Test Results

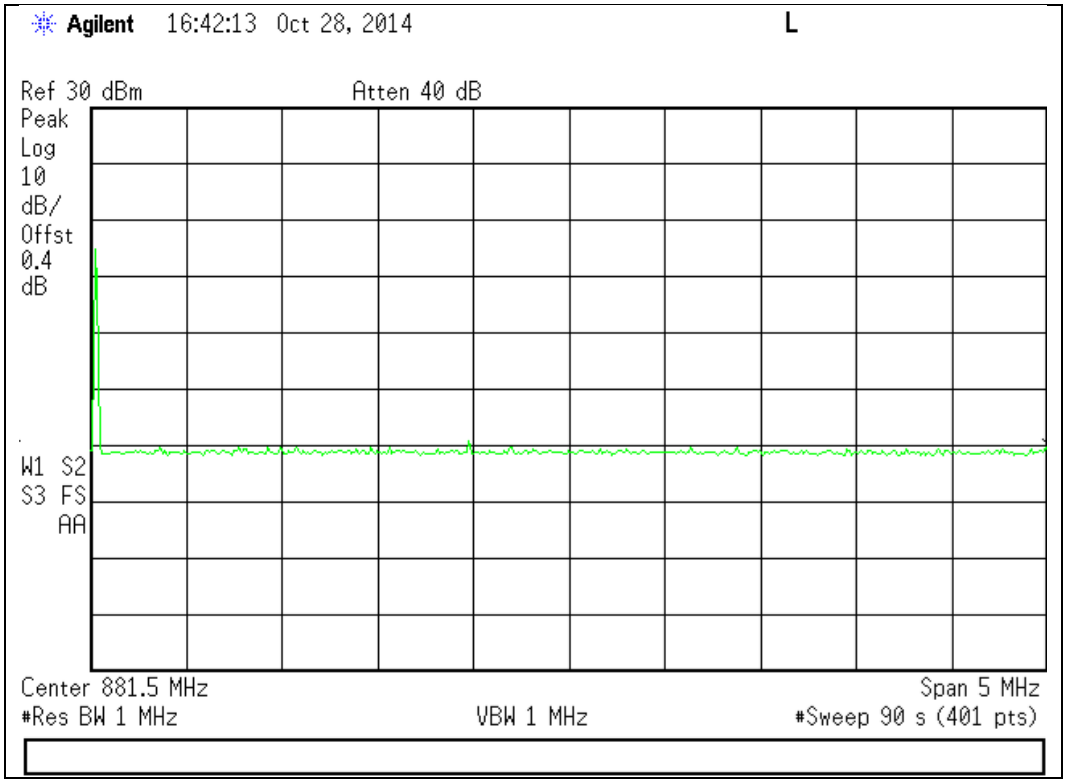
728 - 746 MHz Band



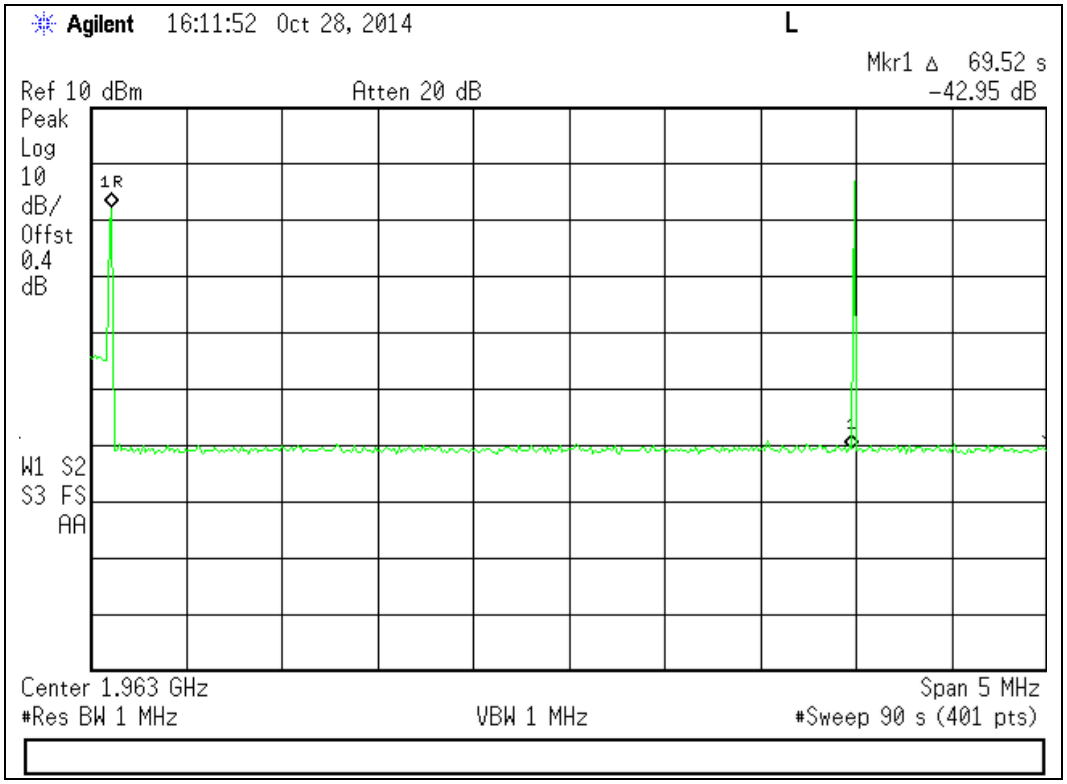
746 - 757 MHz Band



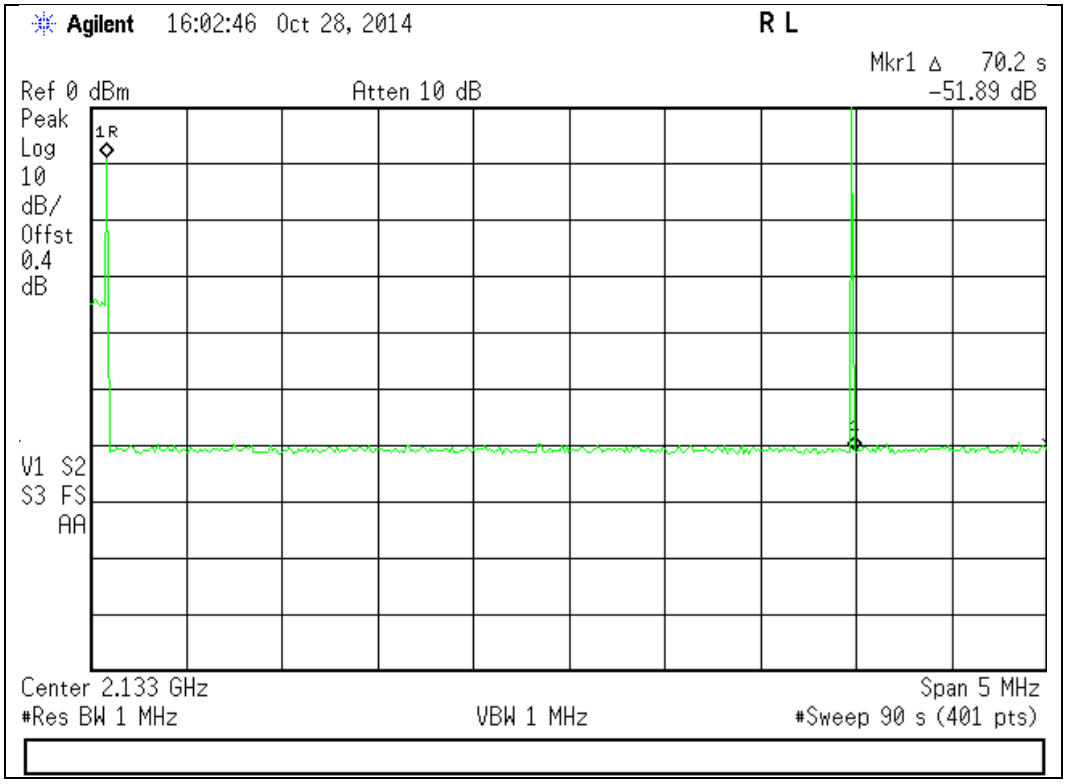
869 - 894 MHz Band



1930 - 1995 MHz Band

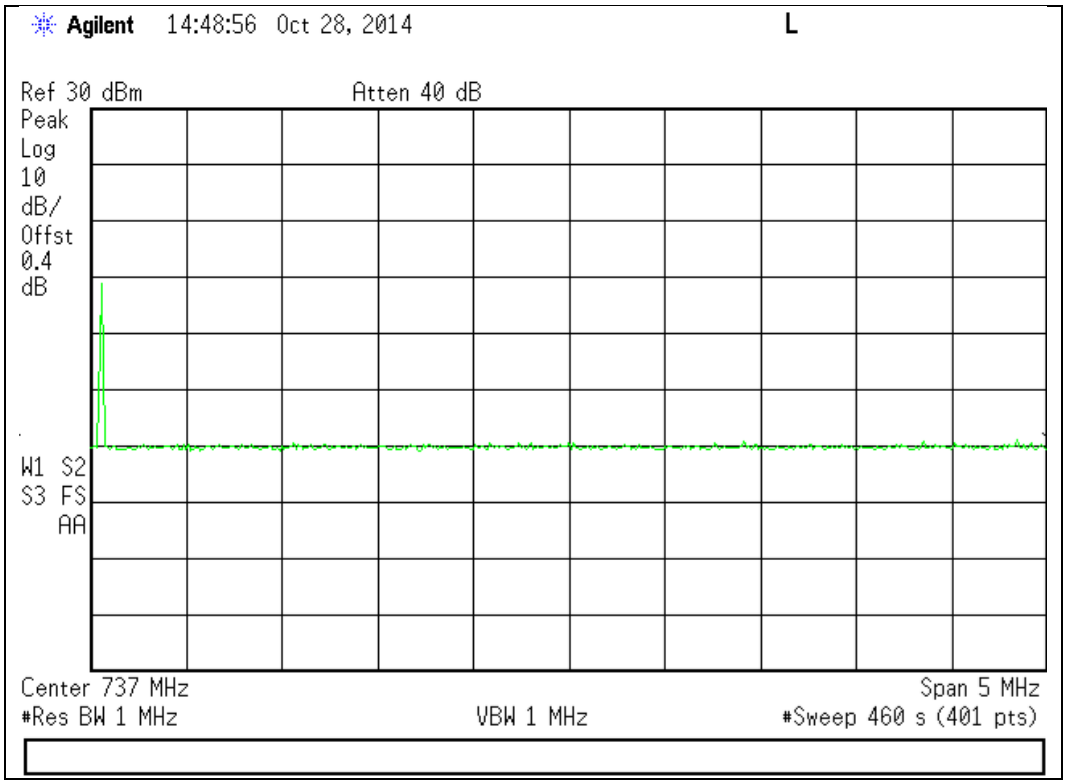


2110 - 2155 MHz Band

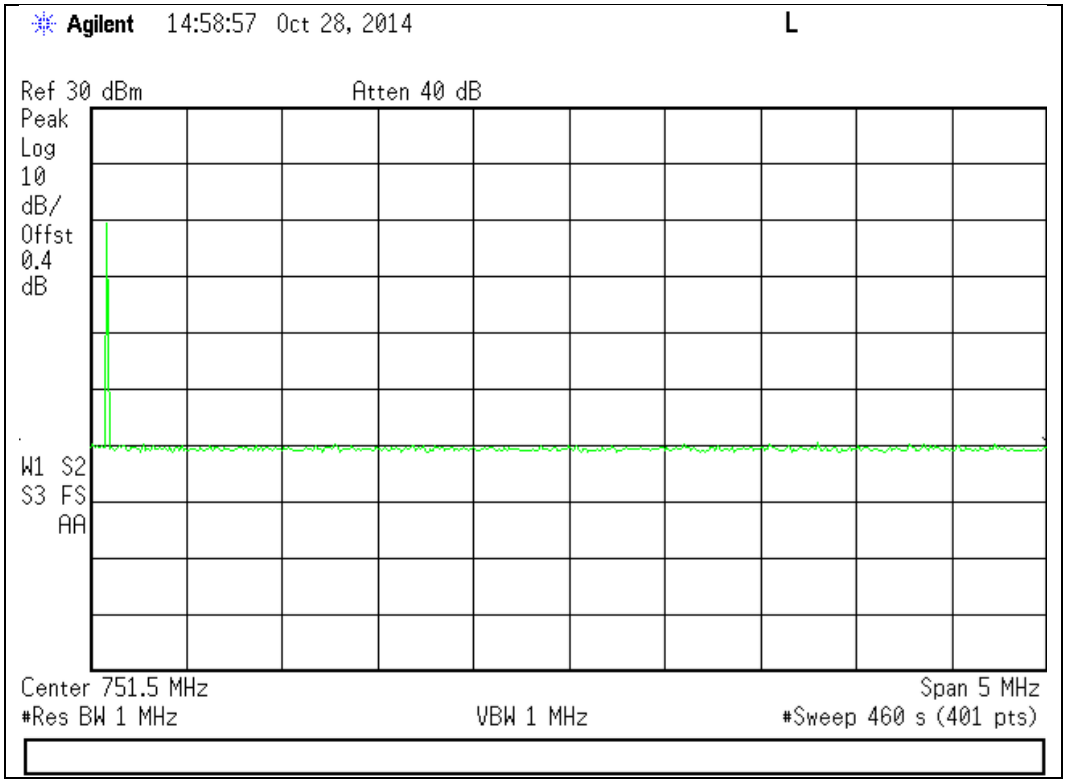


Downlink Restart Count Test Results

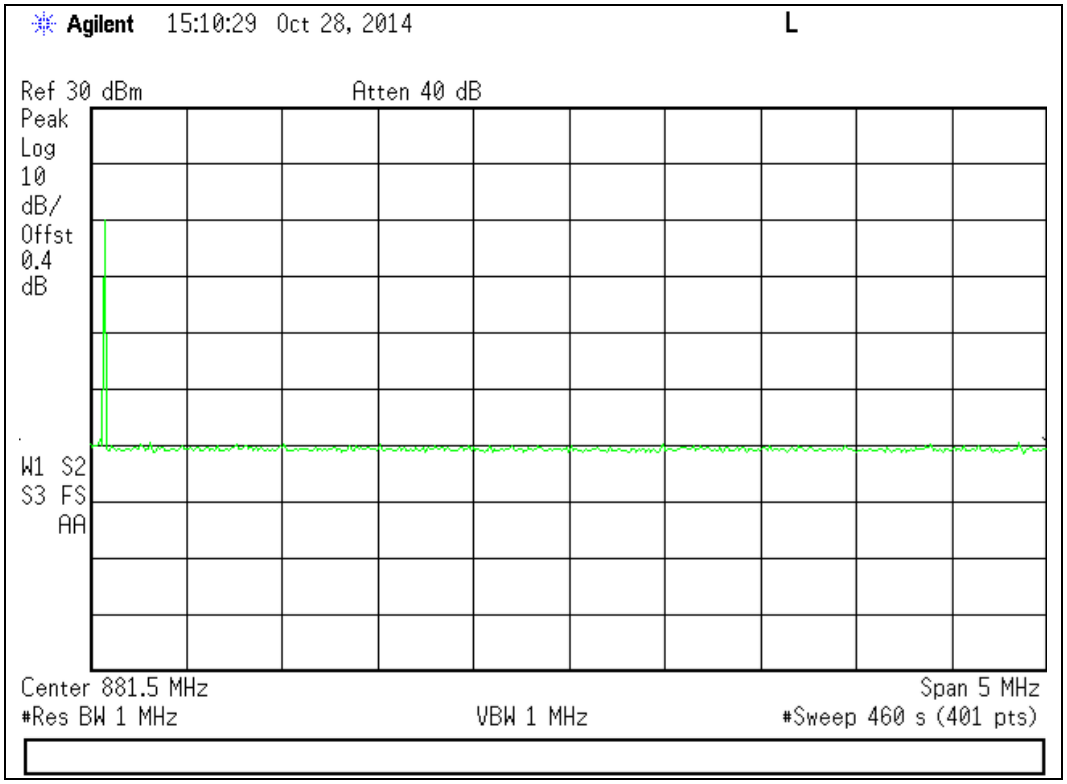
728 - 746 MHz Band



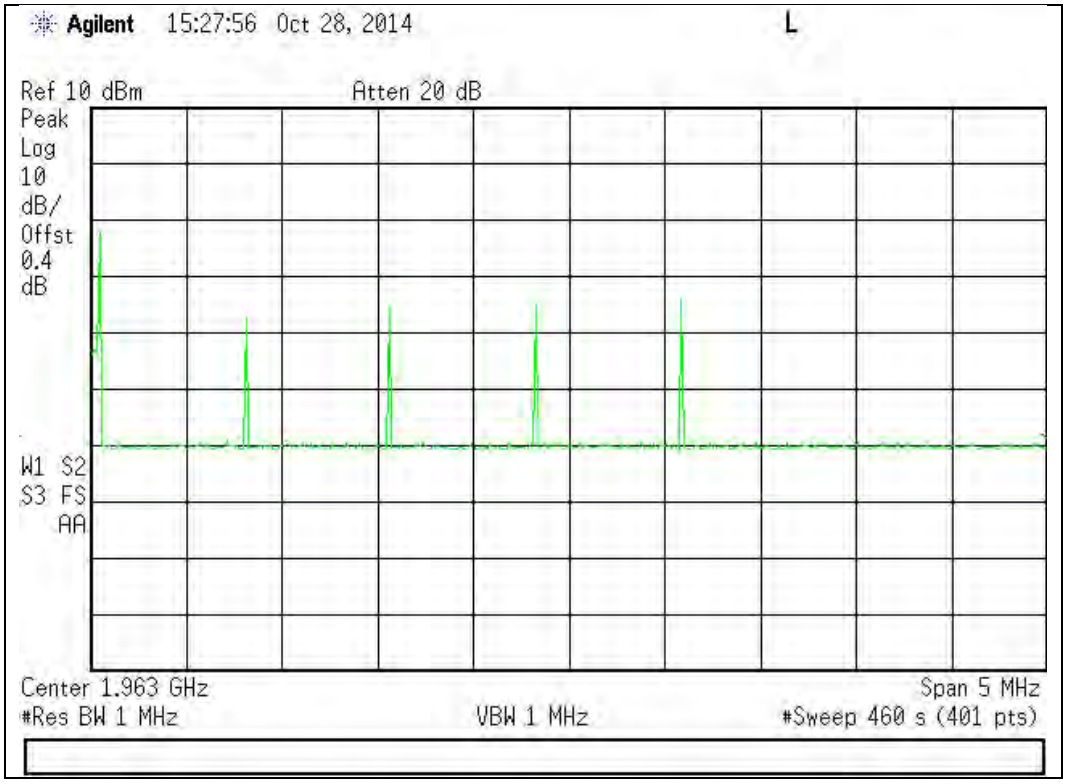
746 - 757 MHz Band



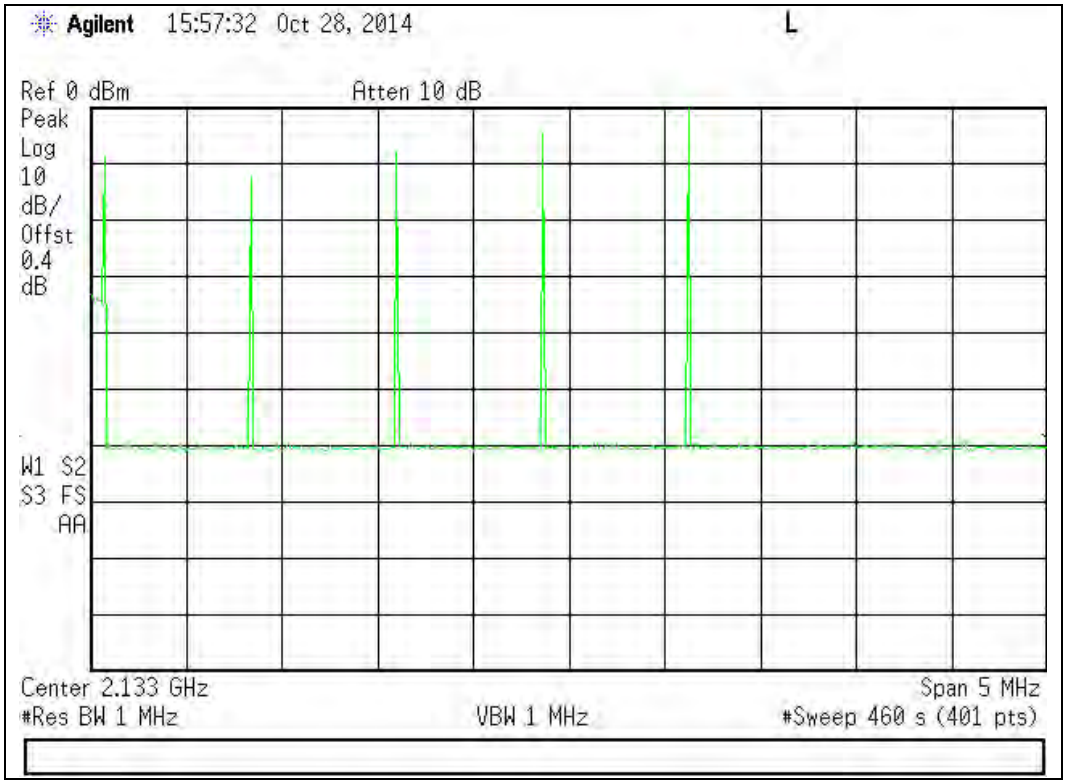
869 - 894 MHz Band



1930 - 1995 MHz Band



2110 - 2155 MHz Band



Radiated Spurious
Engineer: Mike Graffeo
Test Date: 10/29/14

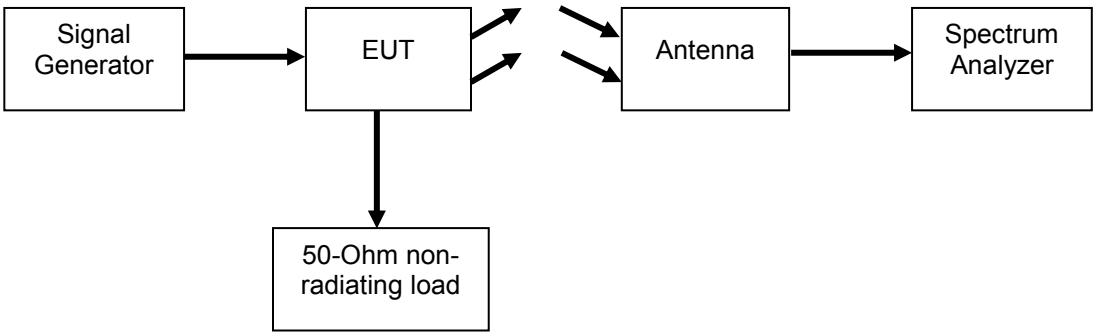
Test Procedure

The EUT was tested in a semi-anechoic chamber with the turntable set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360 degrees with the antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure that the signal levels were maximized. All cable and antenna correction factors were input into the spectrum analyzer ensuring an accurate measurement in ERP/EIRP with the resultant power in dBm. A signal generator was used to provide a CW signal centered in each operational uplink and downlink band. The EUT output was terminated into a 50 Ohm non-radiating load.

The following formula was used for calculating the limits:

Radiated Spurious Emissions Limit = P1 – (43+ 10Log(P2)) = -13dBm
P1 = power in dBm
P2 = power in Watts

Test Setup



Uplink Test Results

698 - 716 MHz Band 707 MHz Tuned Frequency

Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
1414	-59.06	-13	Pass
2121	-58.28	-13	Pass
2828	-53.58	-13	Pass

776 - 787 MHz Band 781.5 MHz Tuned Frequency

Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
1563	-60.90	-13	Pass
2344.5	-55.85	-13	Pass
3126	-51.81	-13	Pass

824 - 849 MHz Band 836.5 MHz Tuned Frequency

Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
1673	-59.42	-13	Pass
2509.5	-55.33	-13	Pass
3344	-50.14	-13	Pass

1710 - 1755 MHz Band 1732.5 MHz Tuned Frequency

Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
3465	-48.95	-13	Pass
5197.5	-47.82	-13	Pass
6930	-42.55	-13	Pass

1850 - 1915 MHz Band 1882.5 MHz Tuned Frequency

Measured Frequency (MHz)	Measured Level (dBm)	Limit (dBm)	Result
3765	-49.35	-13	Pass
5647.5	-44.89	-13	Pass
7530	-38.28	-13	Pass