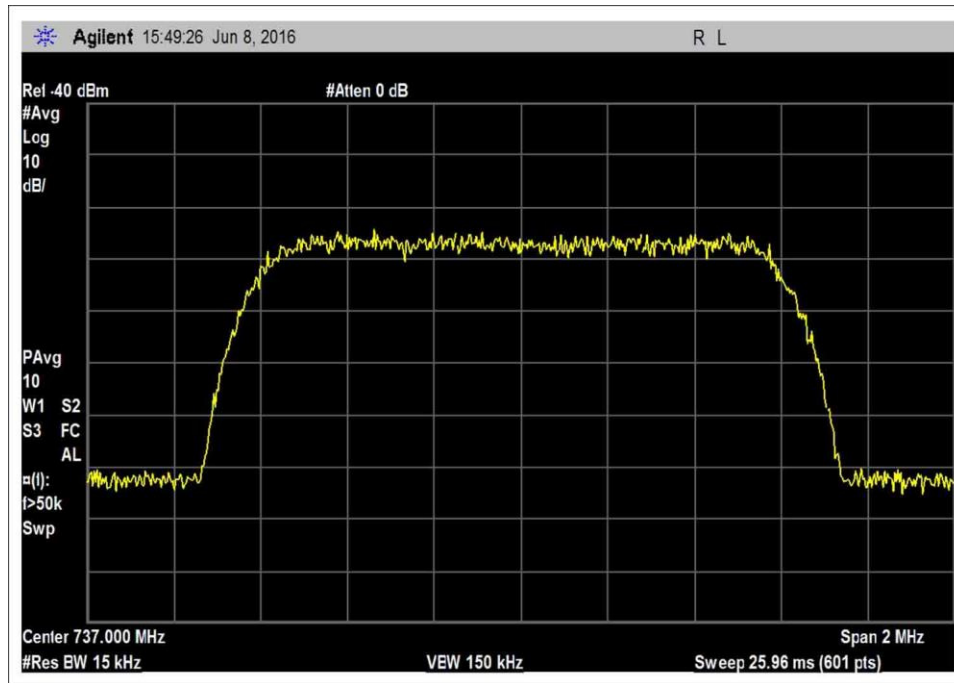
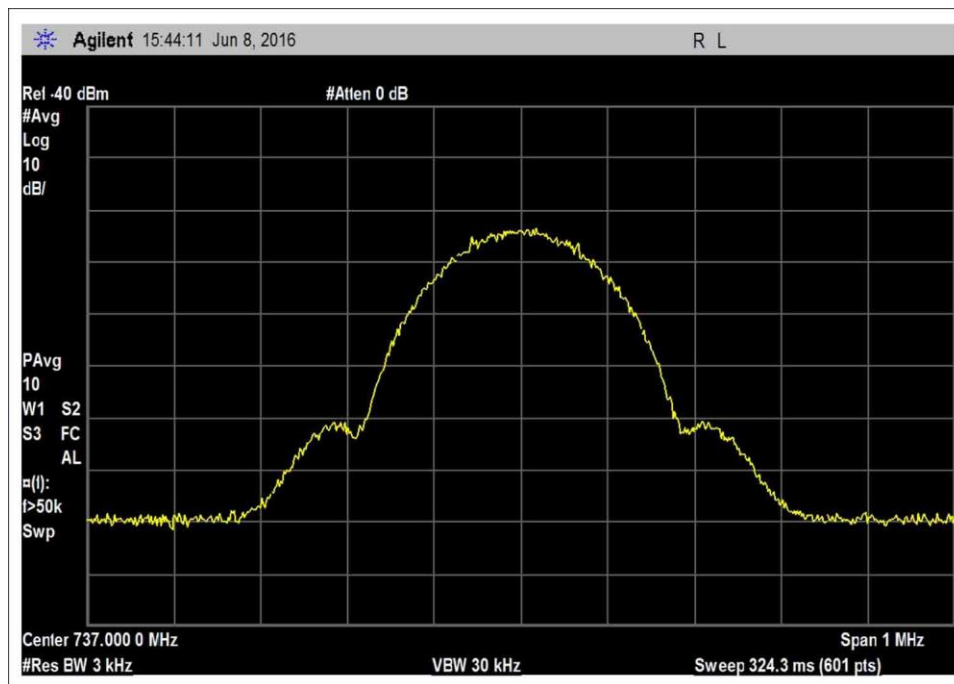


7.10\_OBW\_UL\_1850-1915MHz\_WCDMA

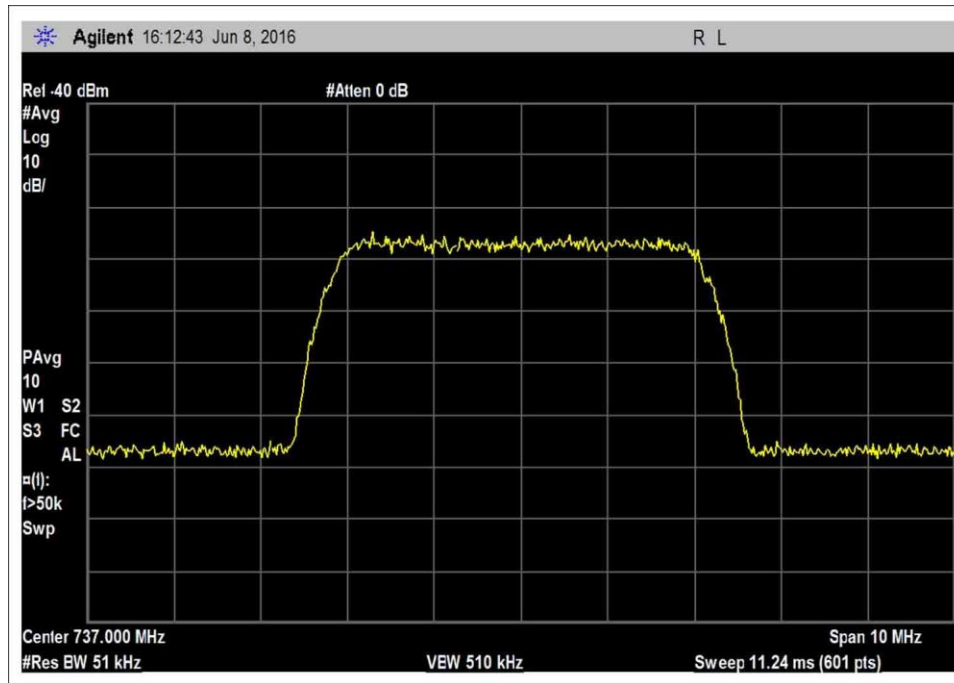
Input - DL



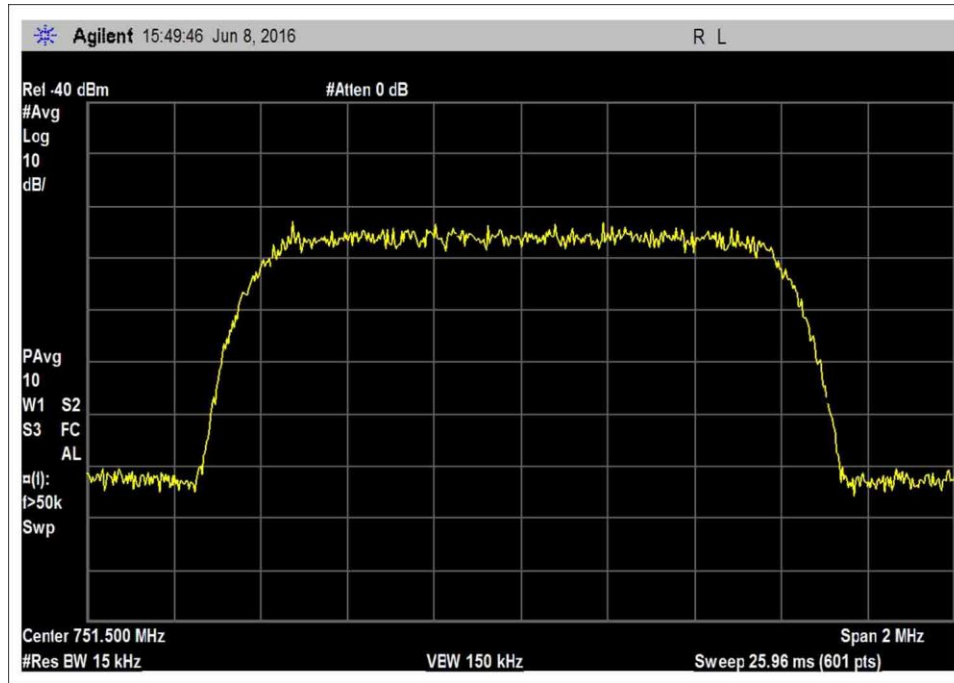
7.10\_OBW\_DL\_728-746MHz\_CDMA



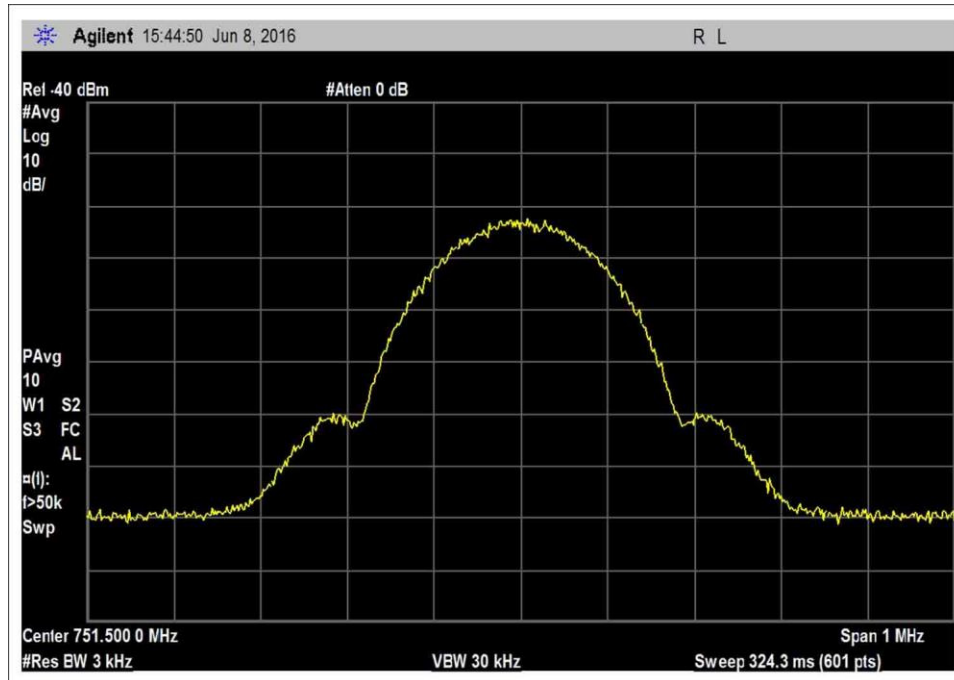
7.10\_OBW\_DL\_728-746MHz\_GSM



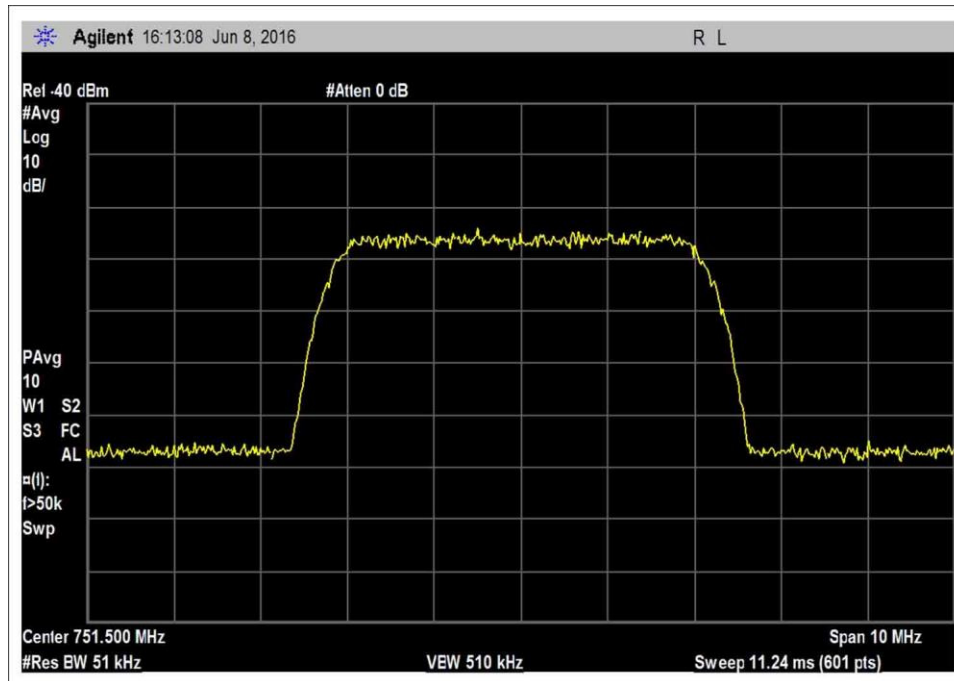
7.10\_OBW\_DL\_728-746MHz\_WCDMA



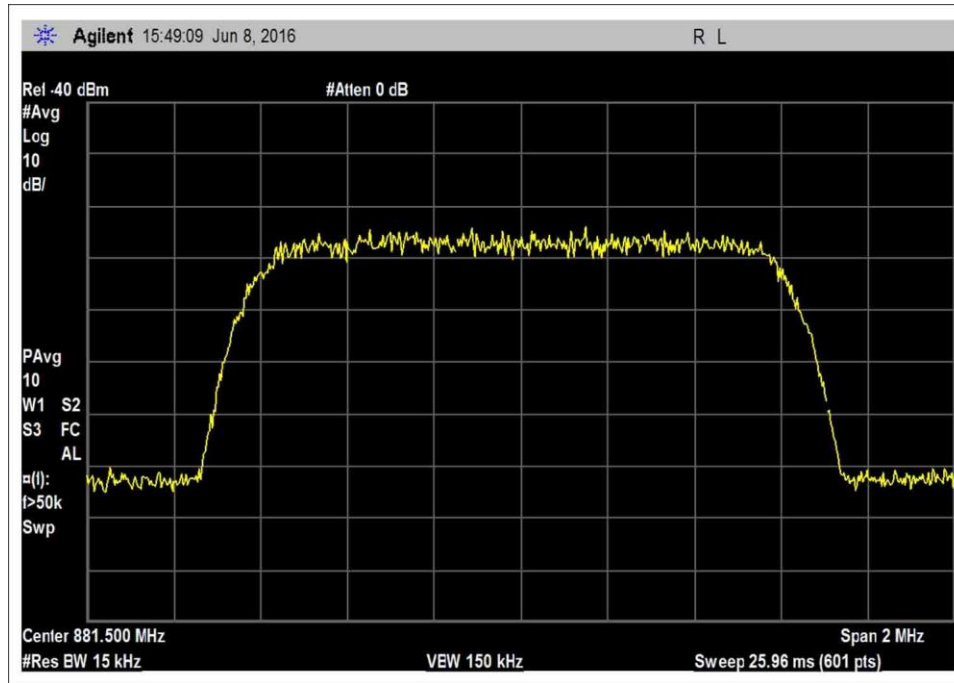
7.10\_OBW\_DL\_746-757MHz\_CDMA



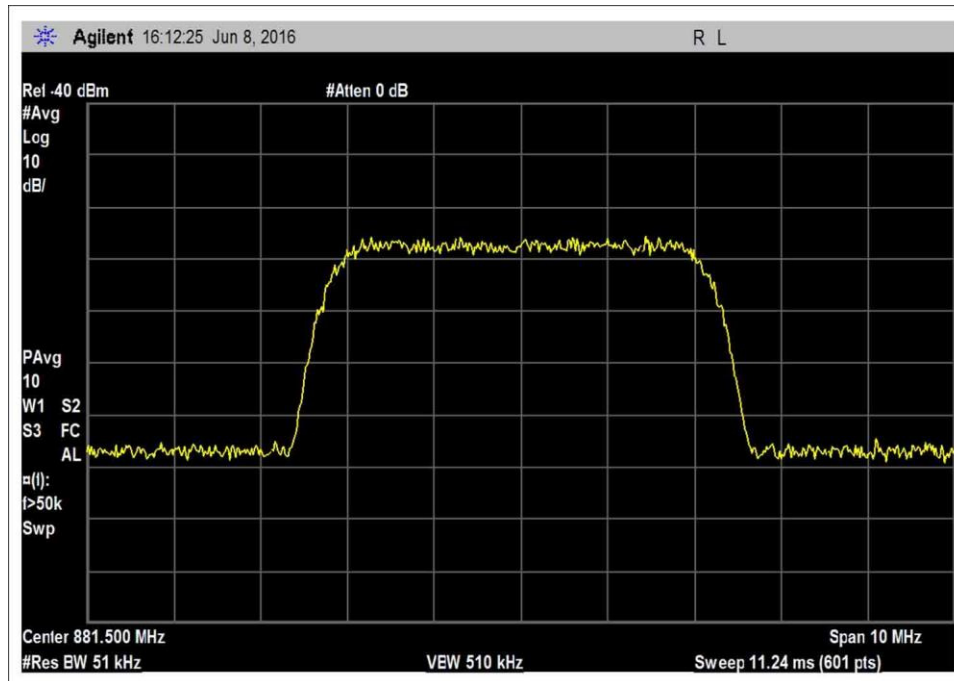
7.10\_OBW\_DL\_746-757MHz\_GSM



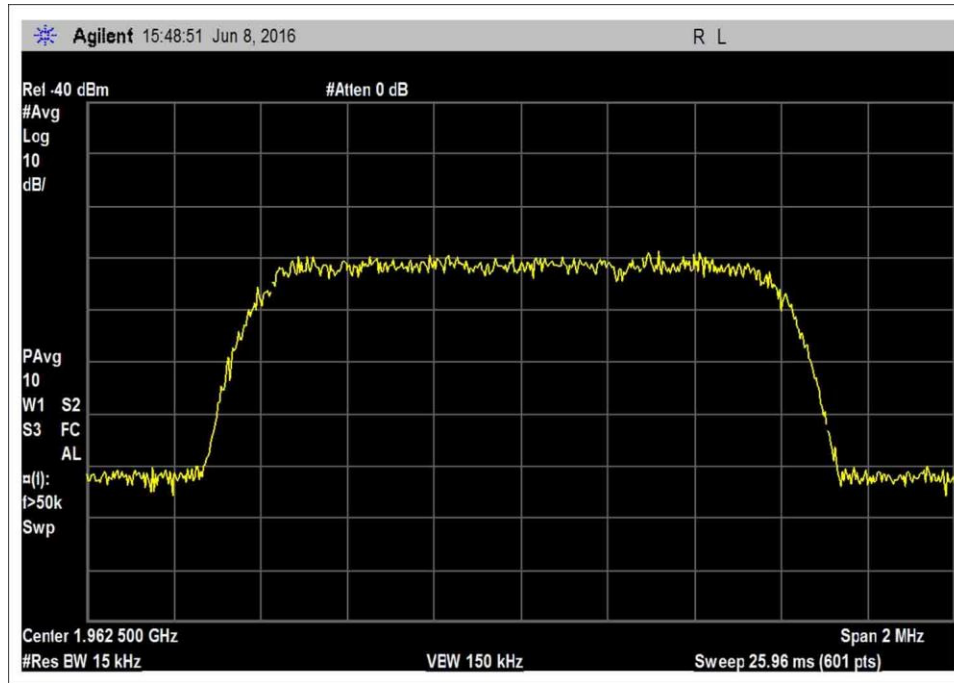
7.10\_OBW\_DL\_746-757MHz\_WCDMA



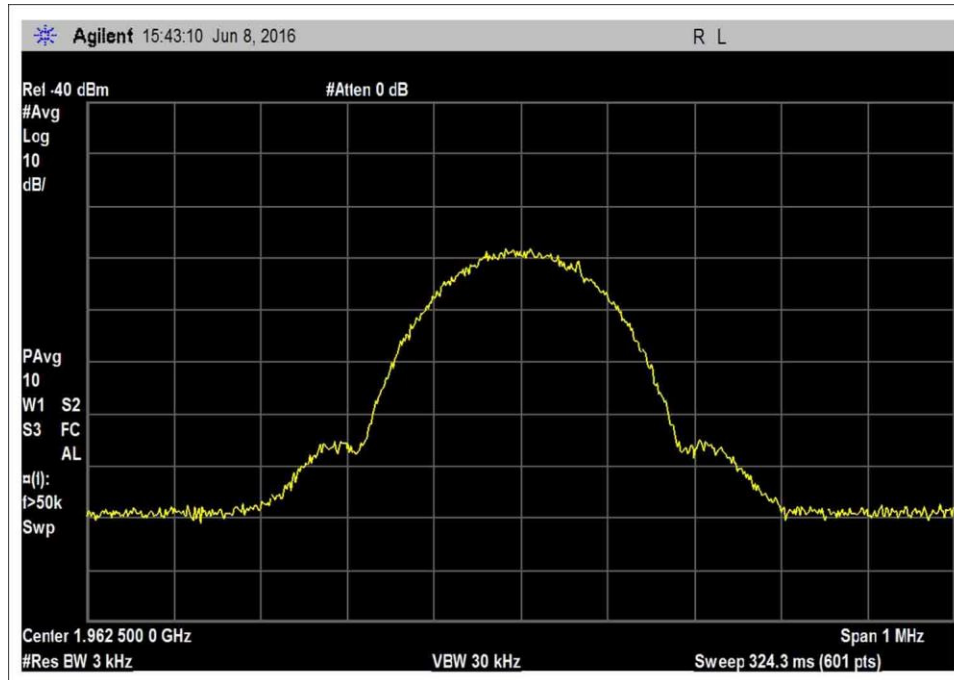
7.10\_OBW\_DL\_869-894MHz\_CDMA



7.10\_OBW\_DL\_869-894MHz\_WCDMA

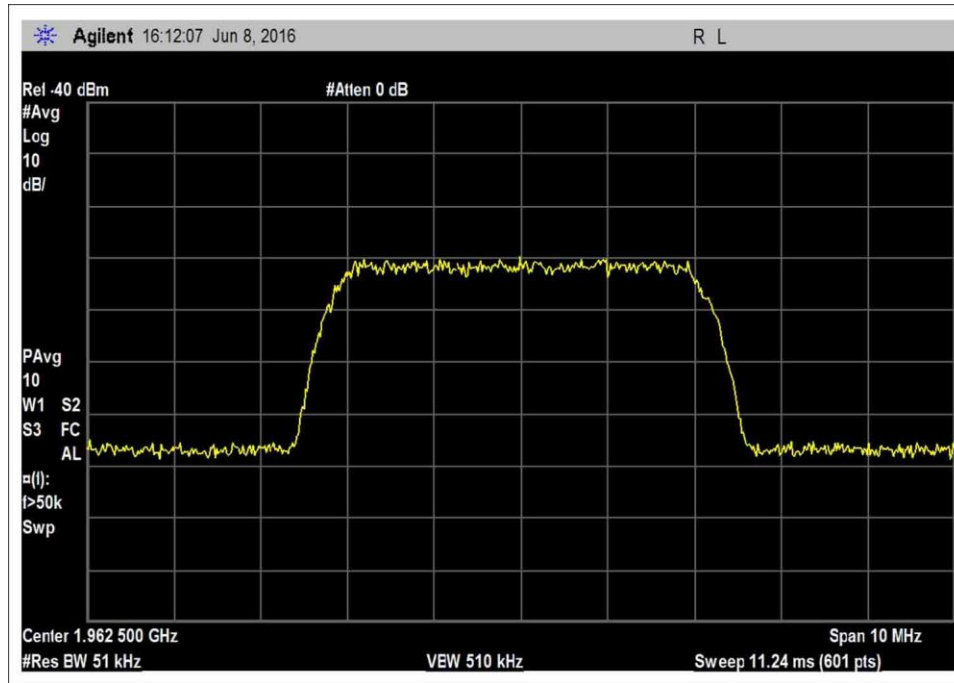


7.10\_OBW\_DL\_1930-1995MHz\_CDMA

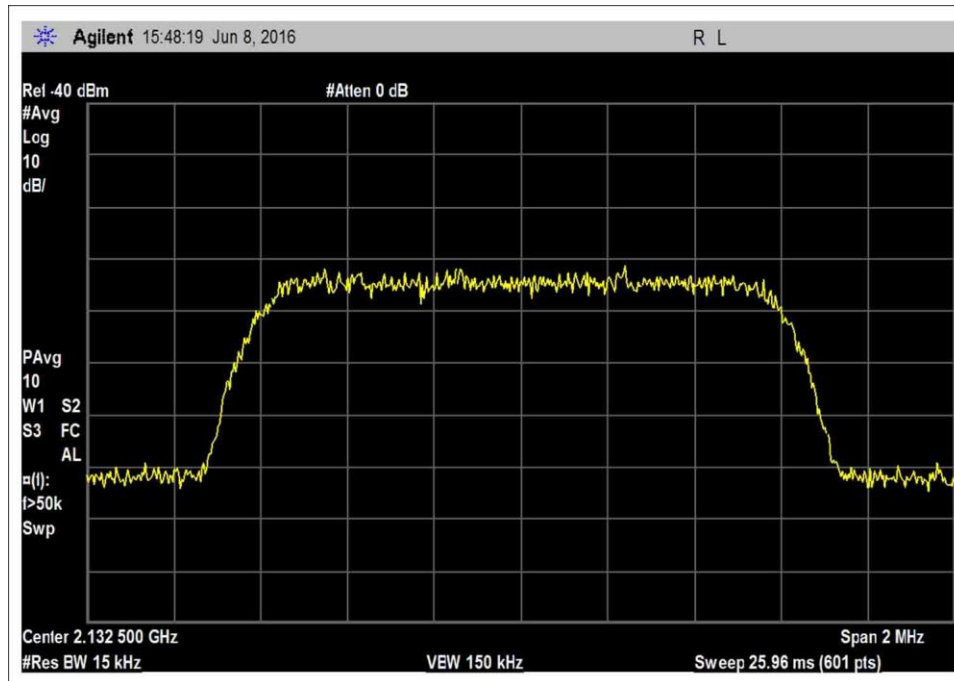


7.10\_OBW\_DL\_1930-1995MHz\_GSM

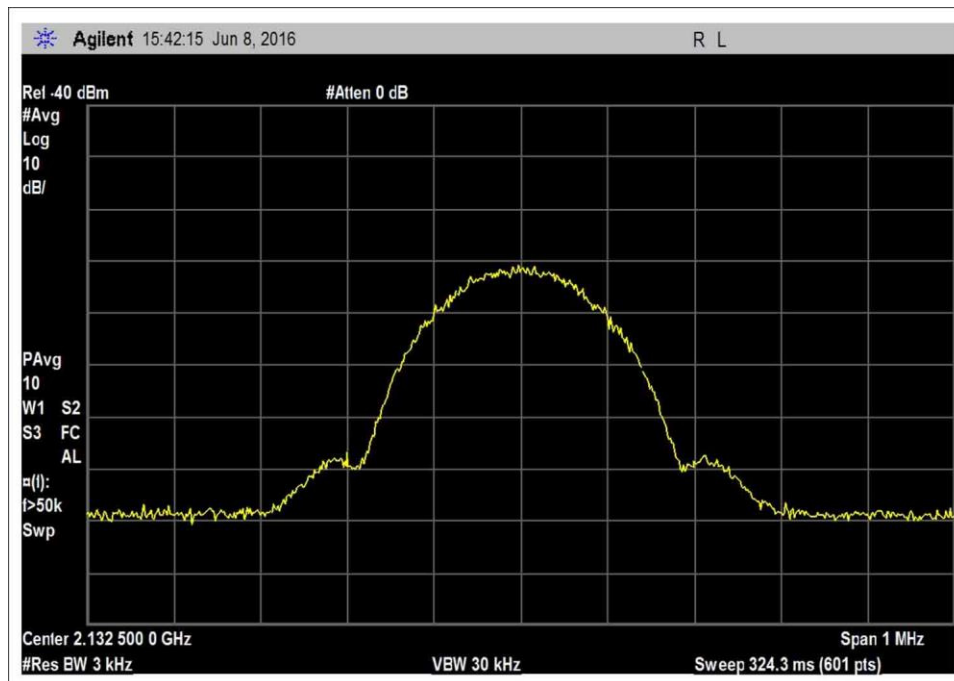




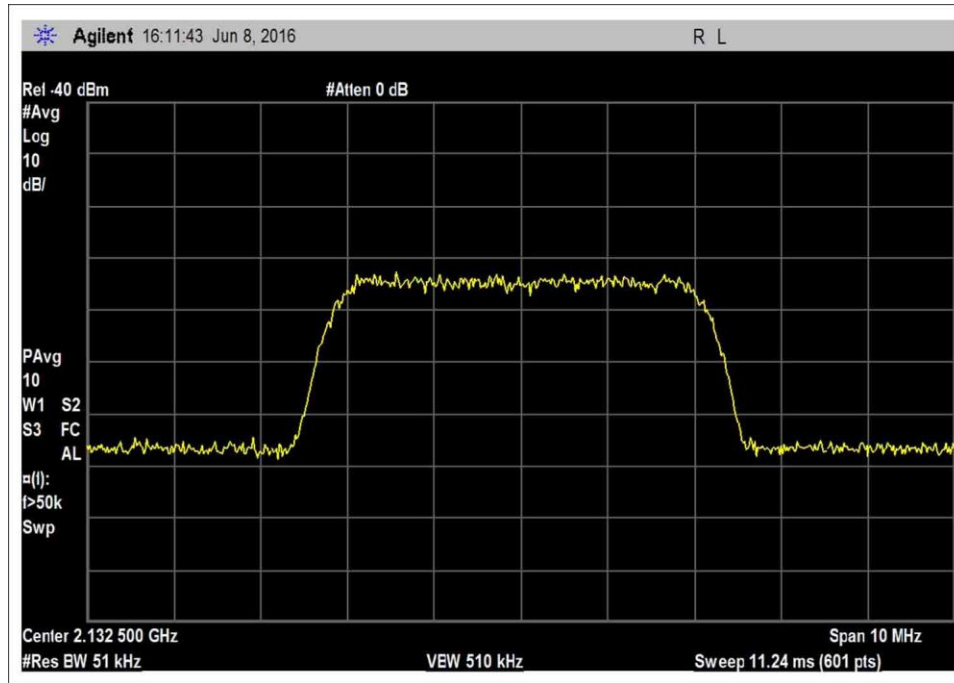
7.10\_OBW\_DL\_1930-1995MHz\_WCDMA



7.10\_OBW\_DL\_2110-2155MHz\_CDMA

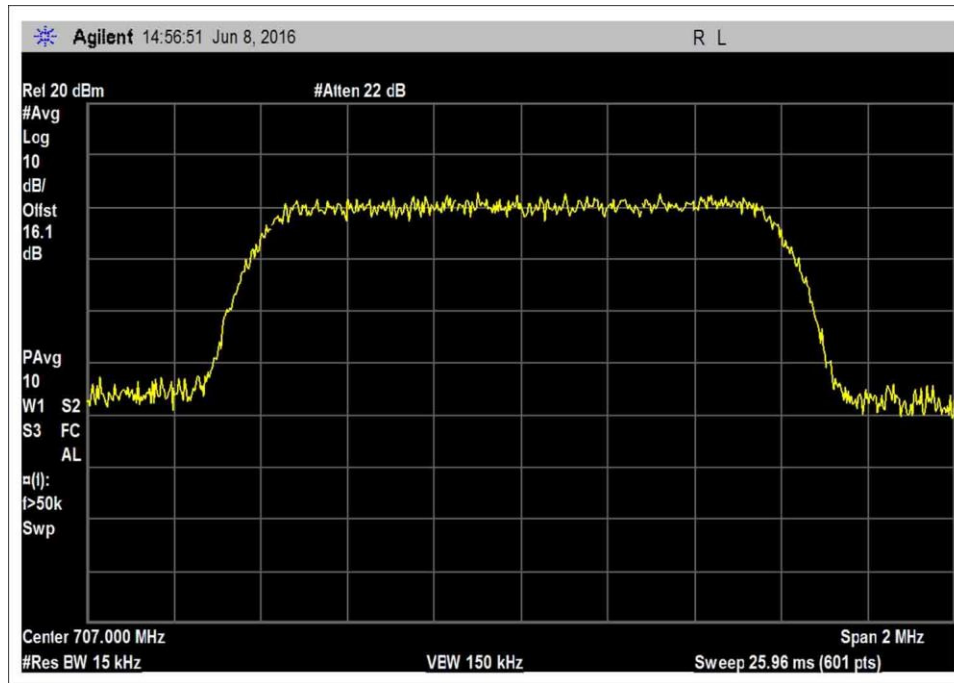


7.10\_OBW\_DL\_2110-2155MHz\_GSM

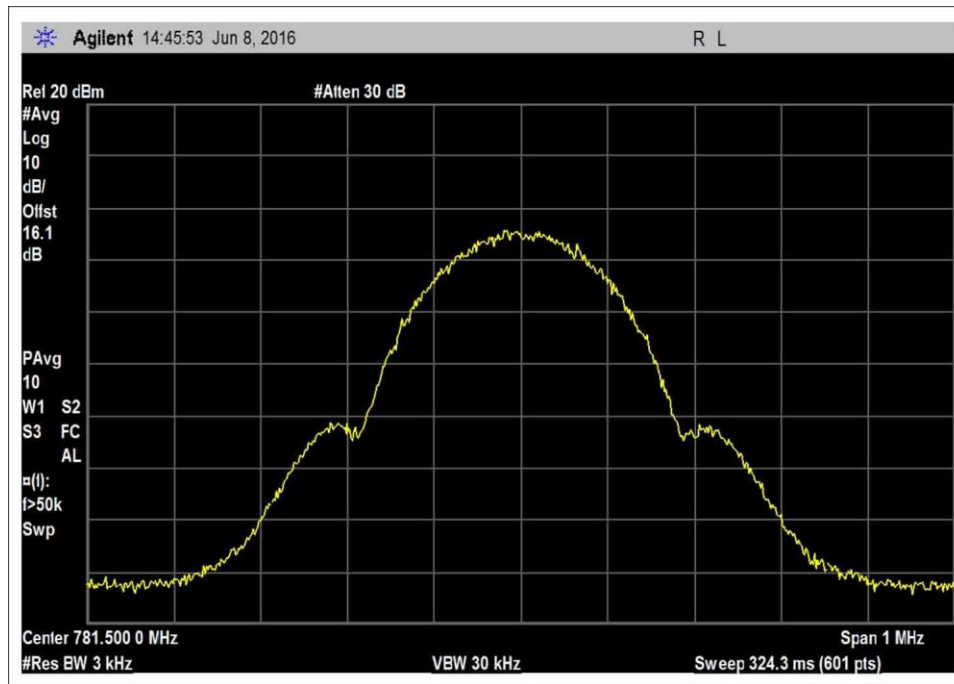


7.10\_OBW\_DL\_2110-2155MHz\_WCDMA

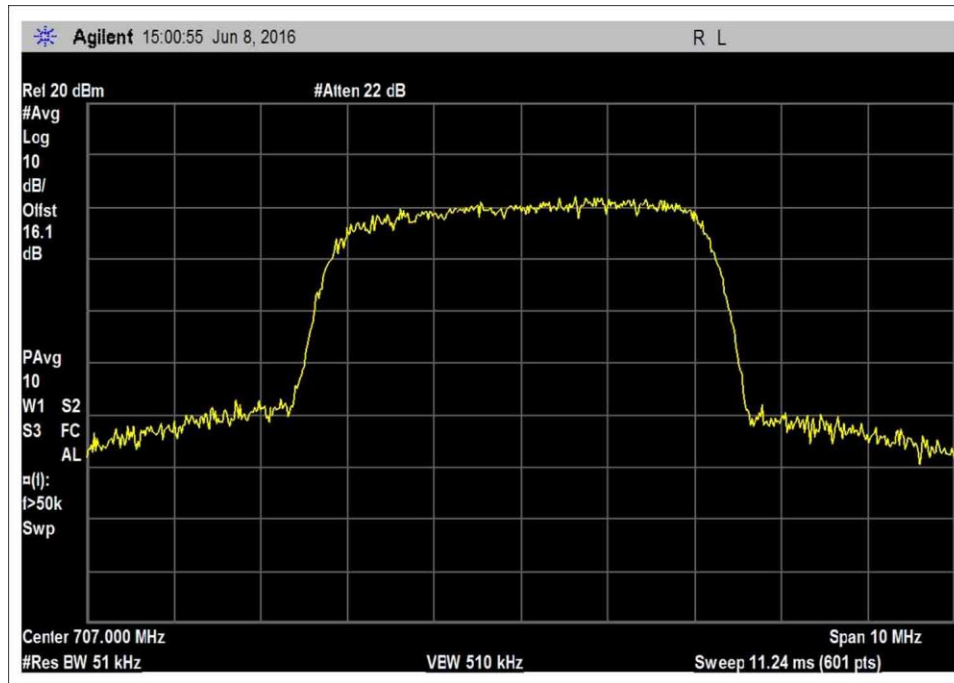
**Output, UL**



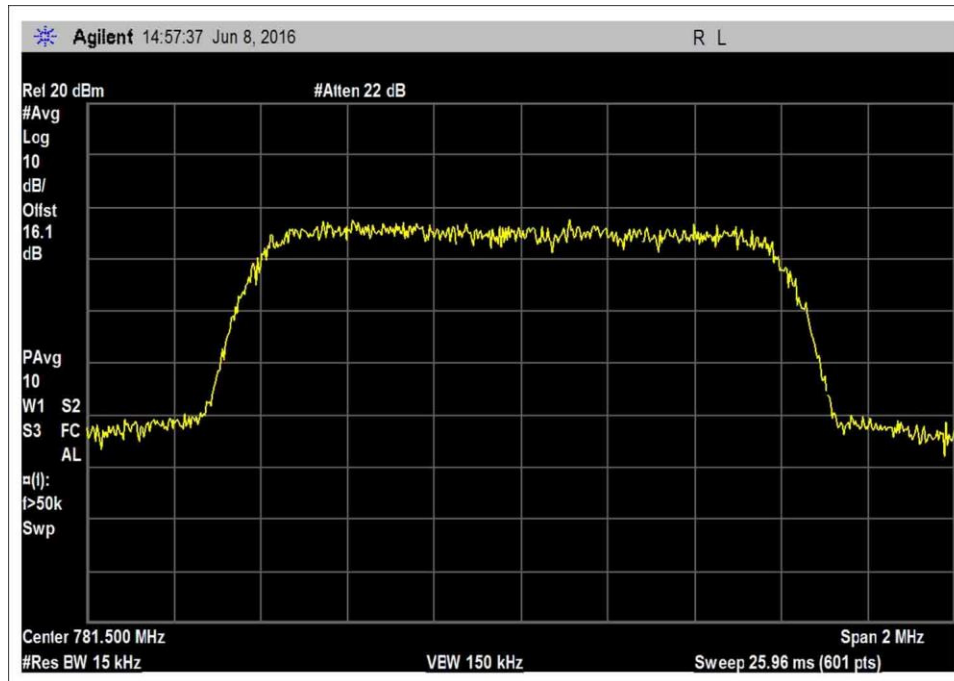
7.10\_OBW\_UL\_698-716MHz\_CDMA



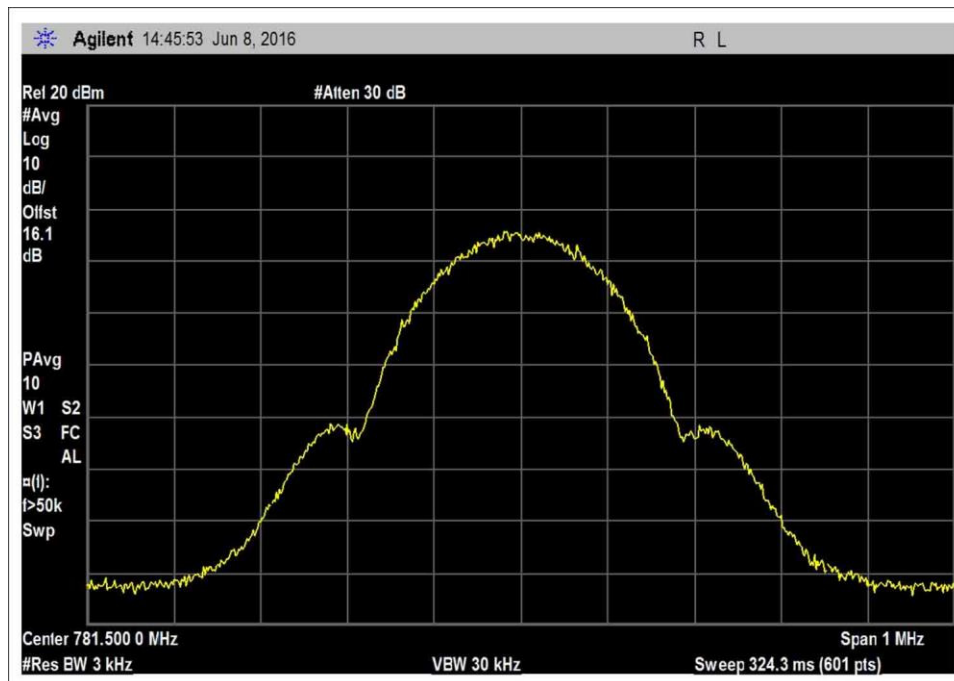
7.10\_OBW\_UL\_698-716MHz\_GSM



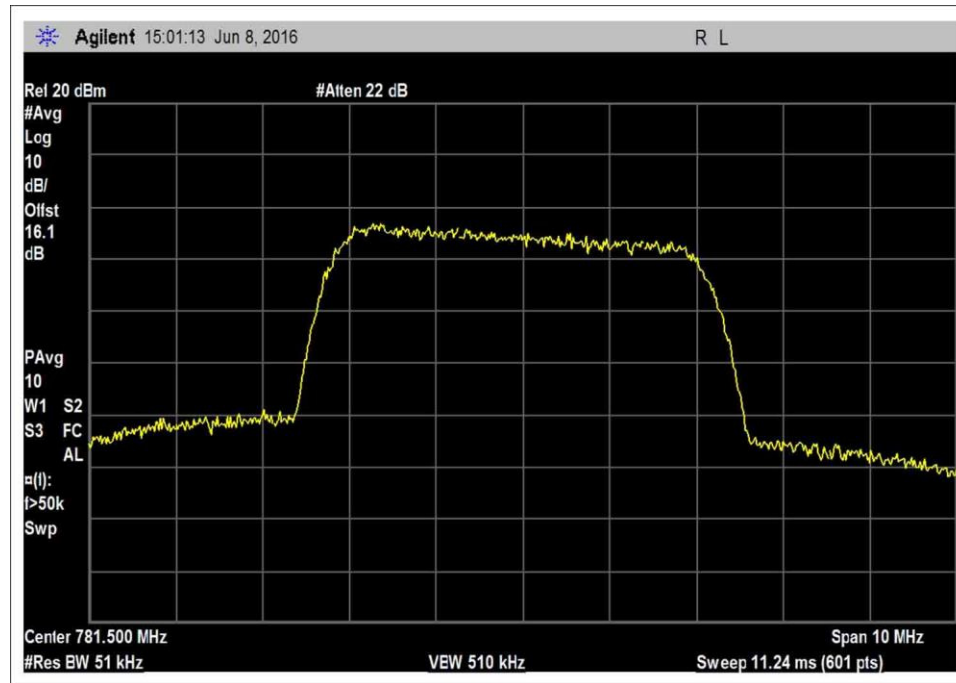
7.10\_OBW\_UL\_698-716MHz\_WCDMA



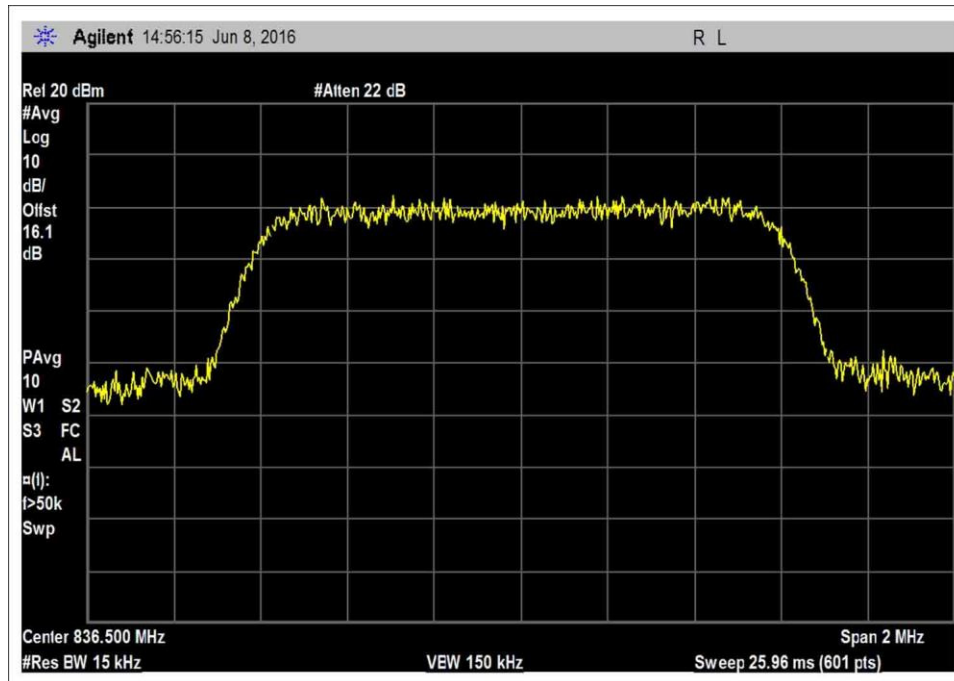
7.10\_OBW\_UL\_776-787MHz\_CDMA



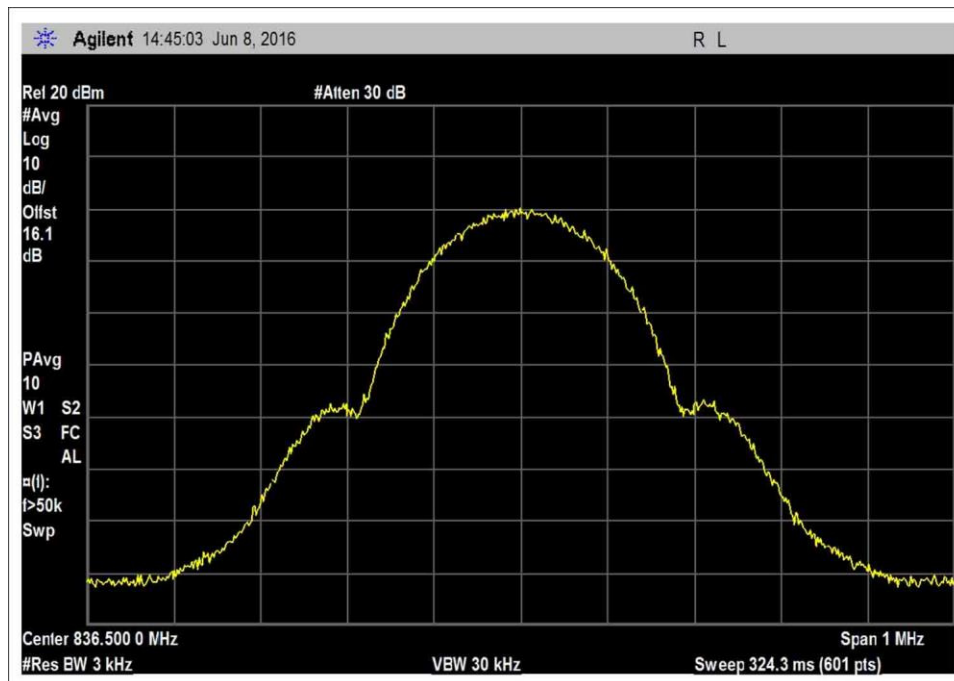
7.10\_OBW\_UL\_776-787MHz\_GSM



7.10\_OBW\_UL\_776-787MHz\_WCDMA

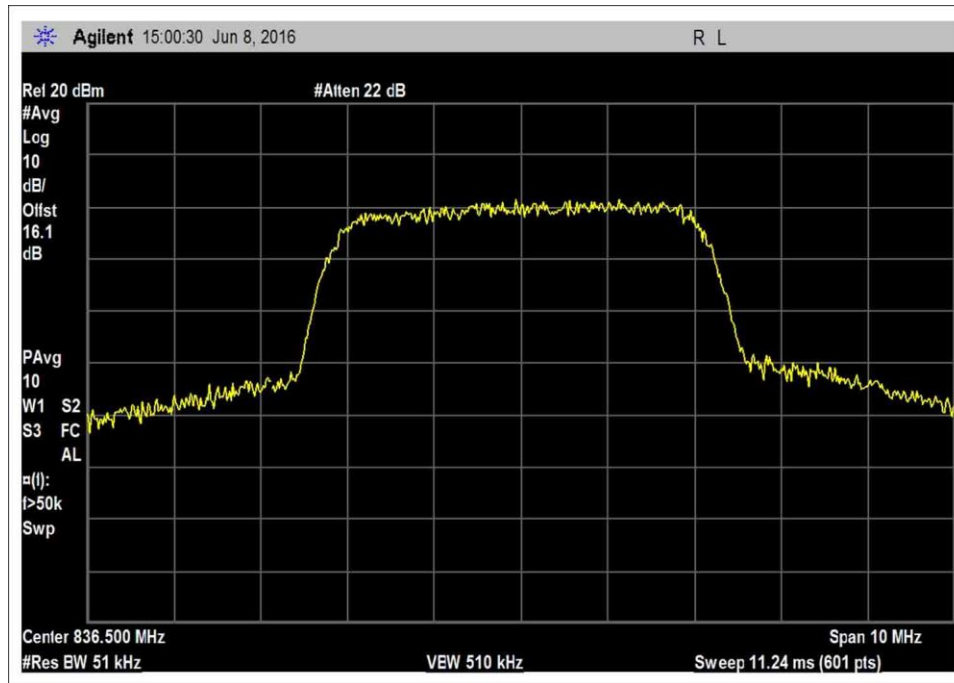


7.10\_OBW\_UL\_824-849MHz\_CDMA

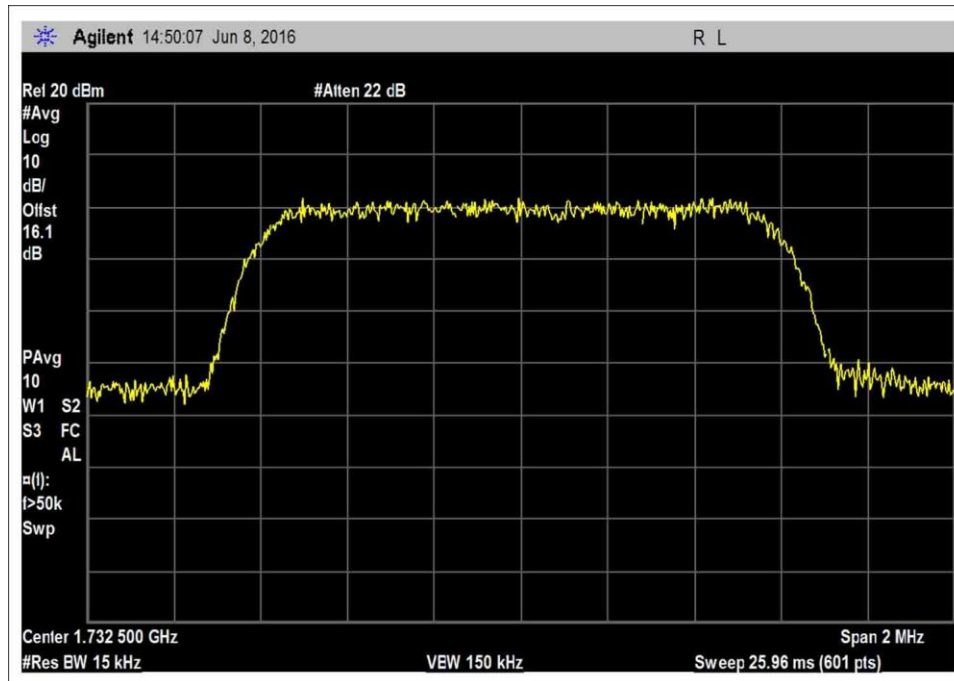


7.10\_OBW\_UL\_824-849MHz\_GSM

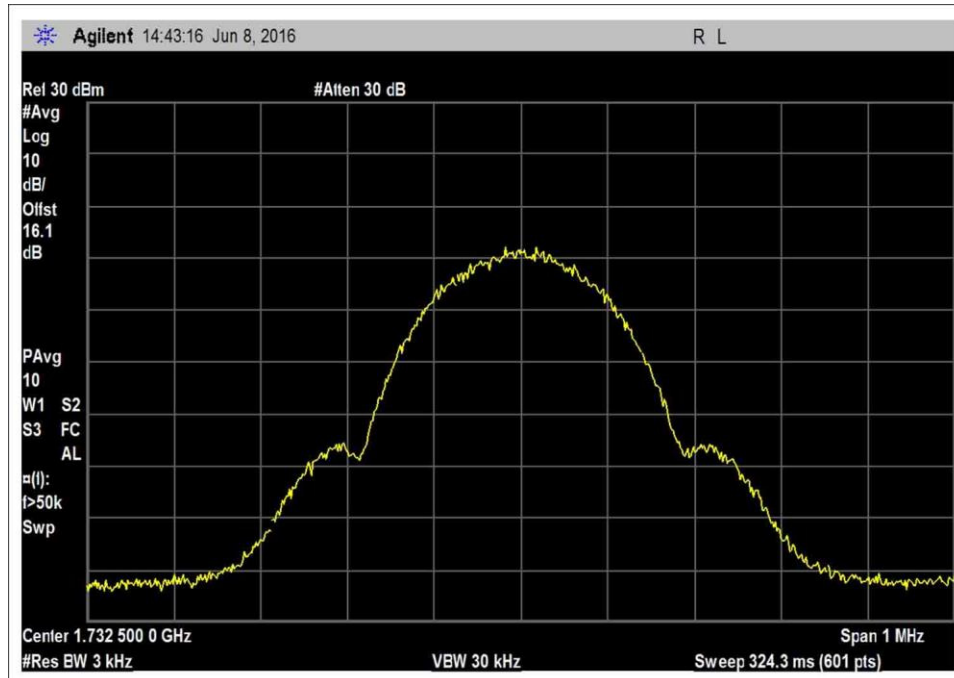




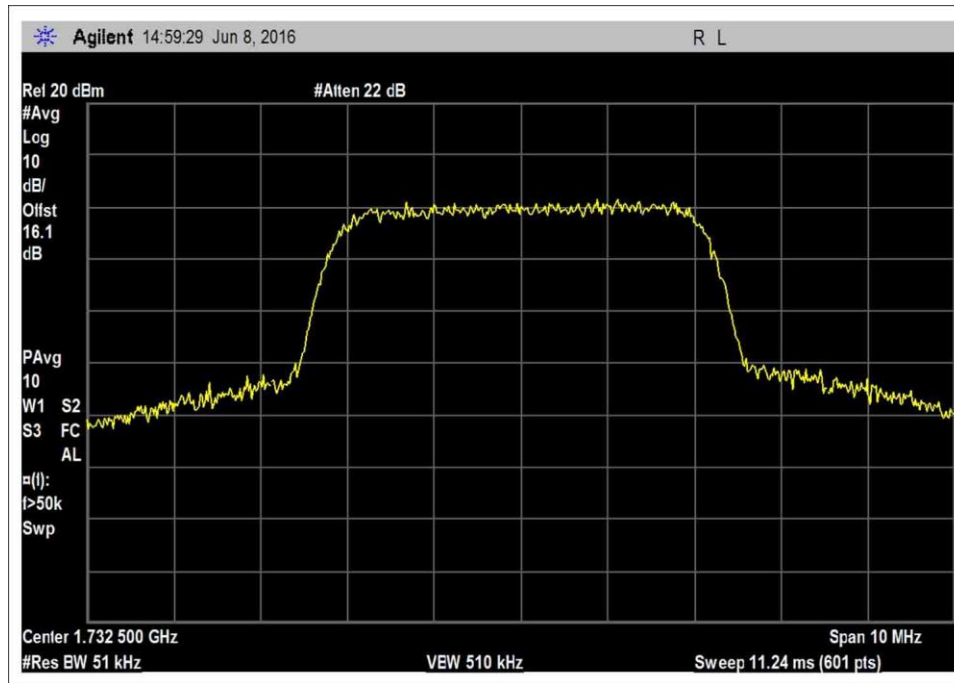
7.10\_OBW\_UL\_824-849MHz\_WCDMA



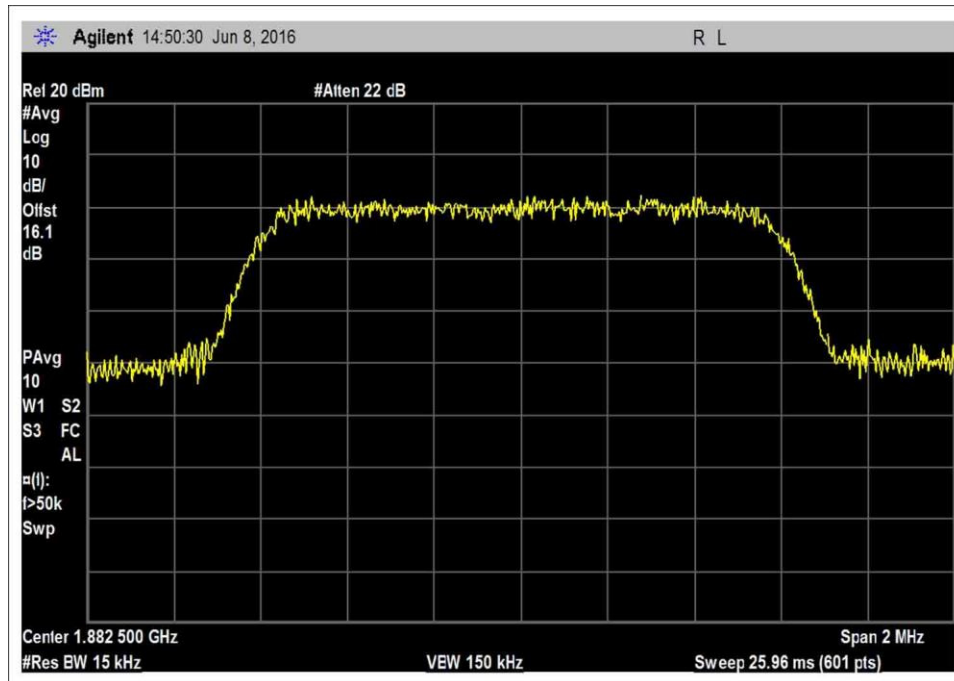
7.10\_OBW\_UL\_1710-1755MHz\_CDMA



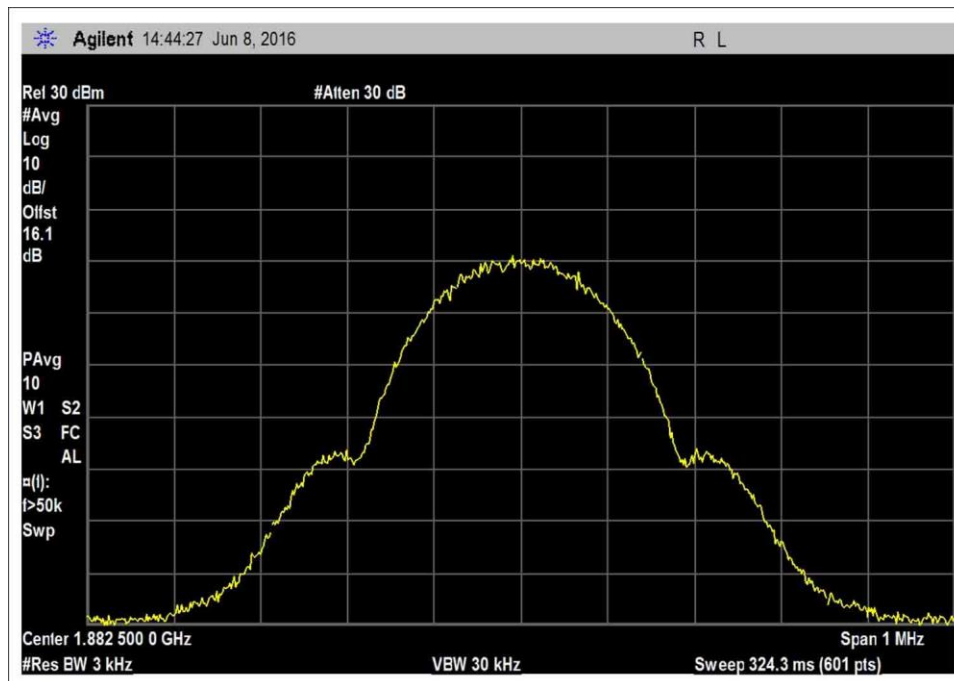
7.10\_OBW\_UL\_1710-1755MHz\_GSM



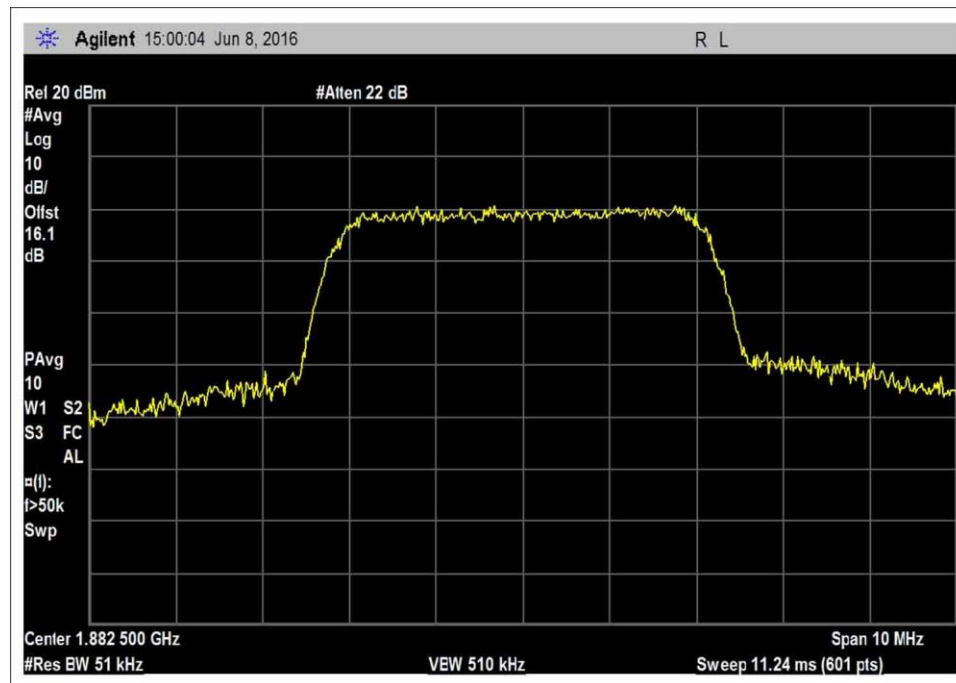
7.10\_OBW\_UL\_1710-1755MHz\_WCDMA



7.10\_OBW\_UL\_1850-1915MHz\_CDMA

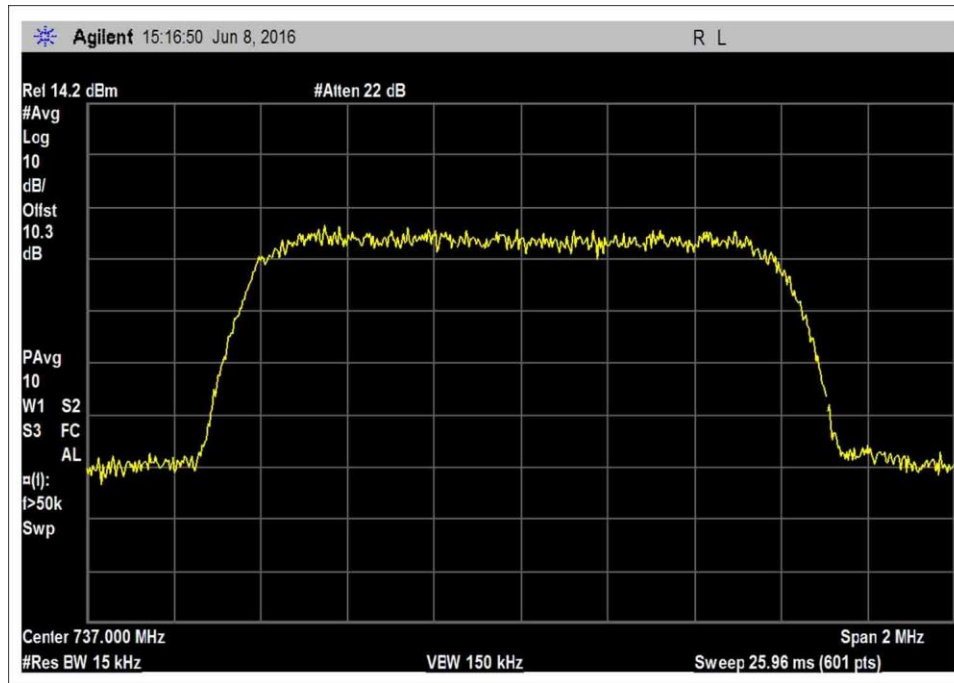


7.10\_OBW\_UL\_1850-1915MHz\_GSM

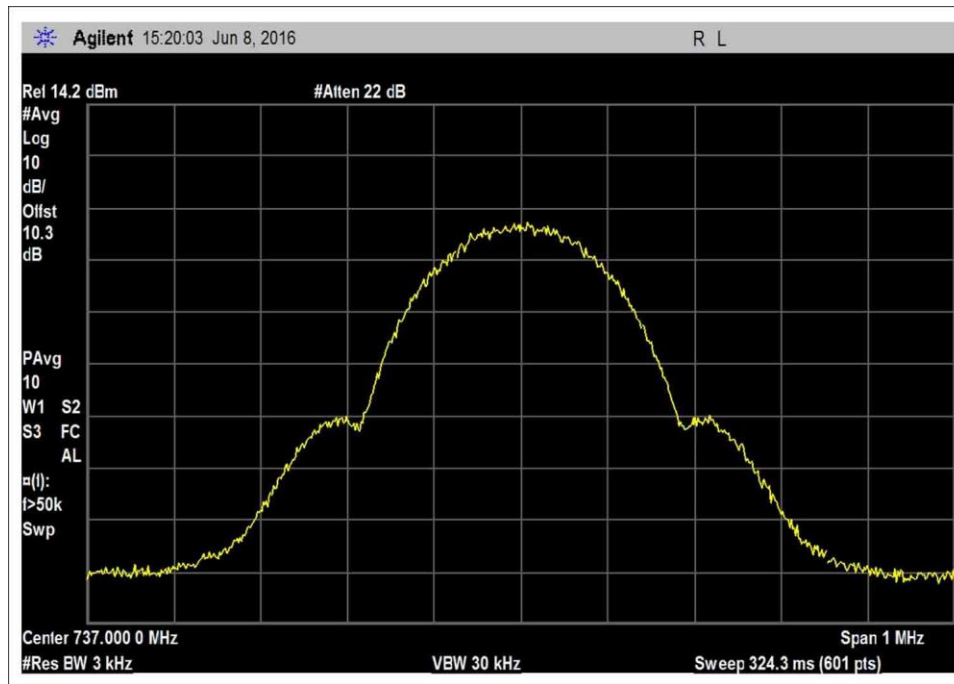


7.10\_OBW\_UL\_1850-1915MHz\_WCDMA

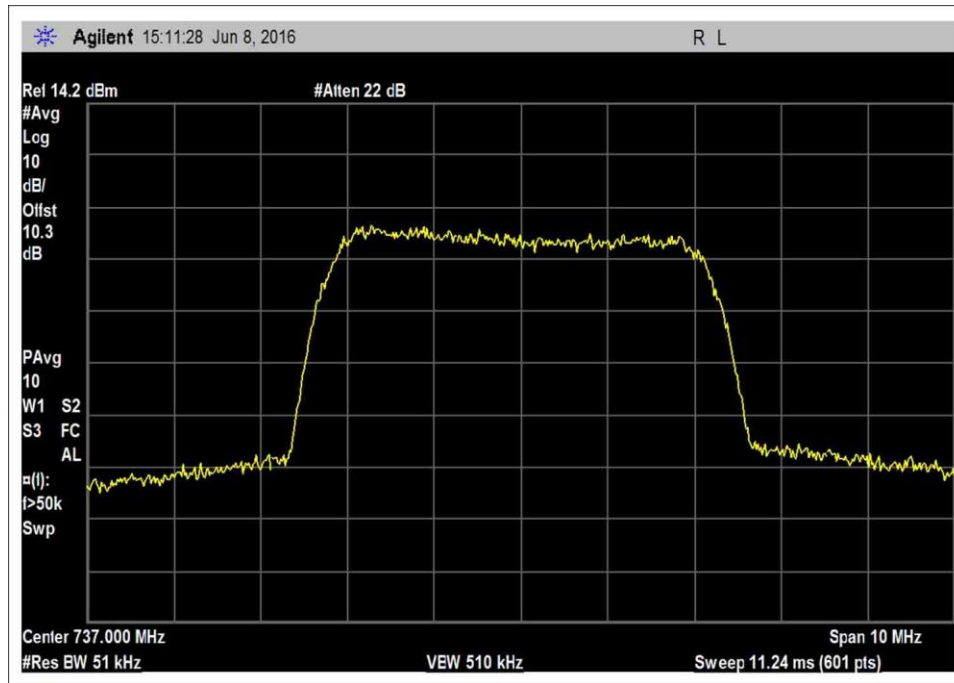
**Output, DL**



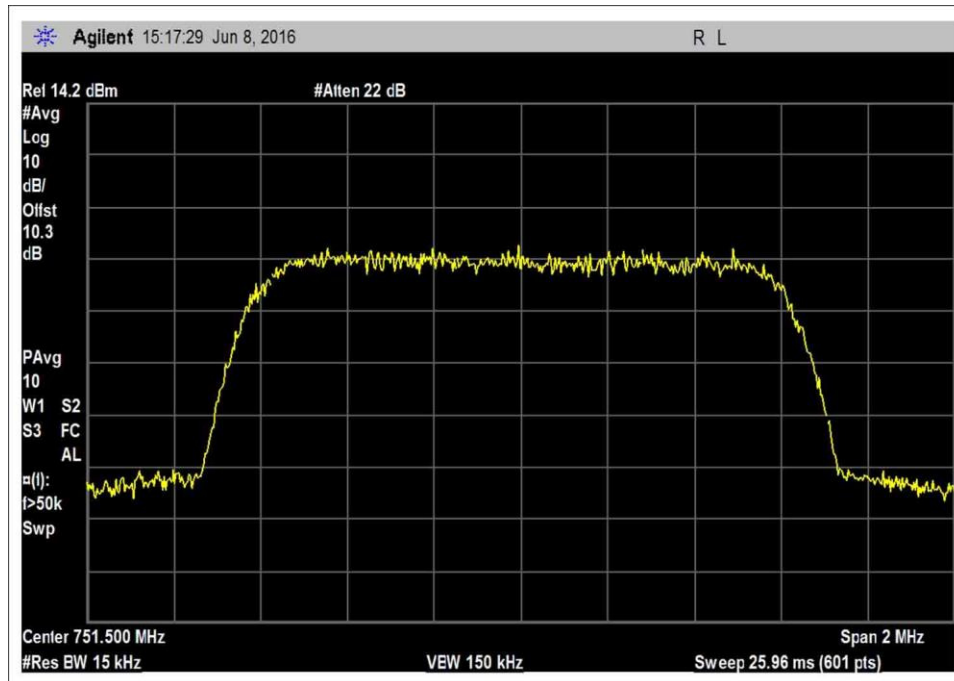
7.10\_OBW\_DL\_728-746MHz\_CDMA



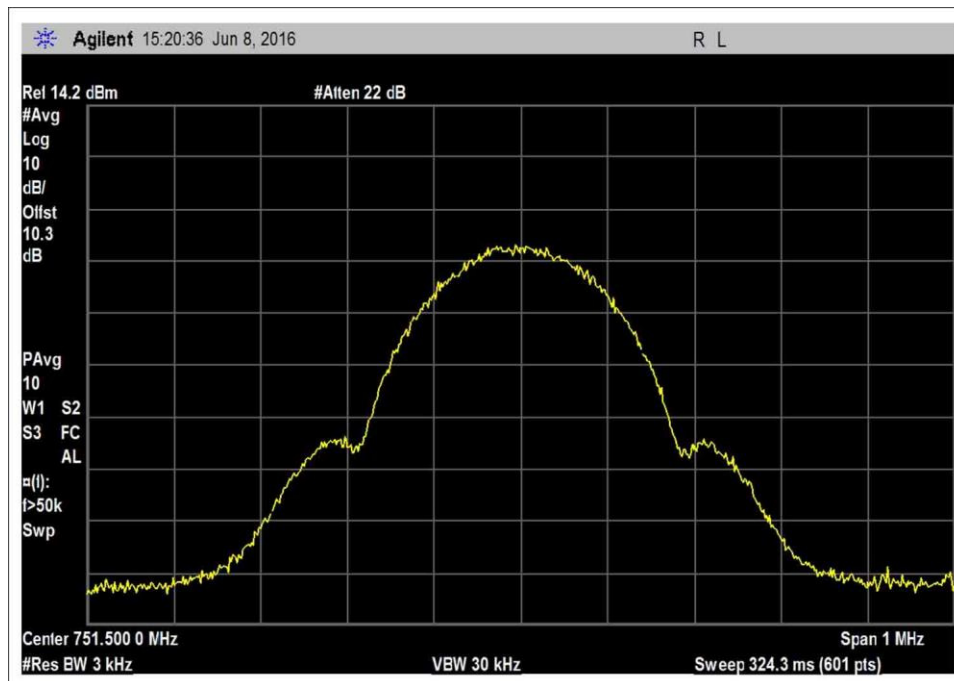
7.10\_OBW\_DL\_728-746MHz\_GSM



7.10\_OBW\_DL\_728-746MHz\_WCDMA

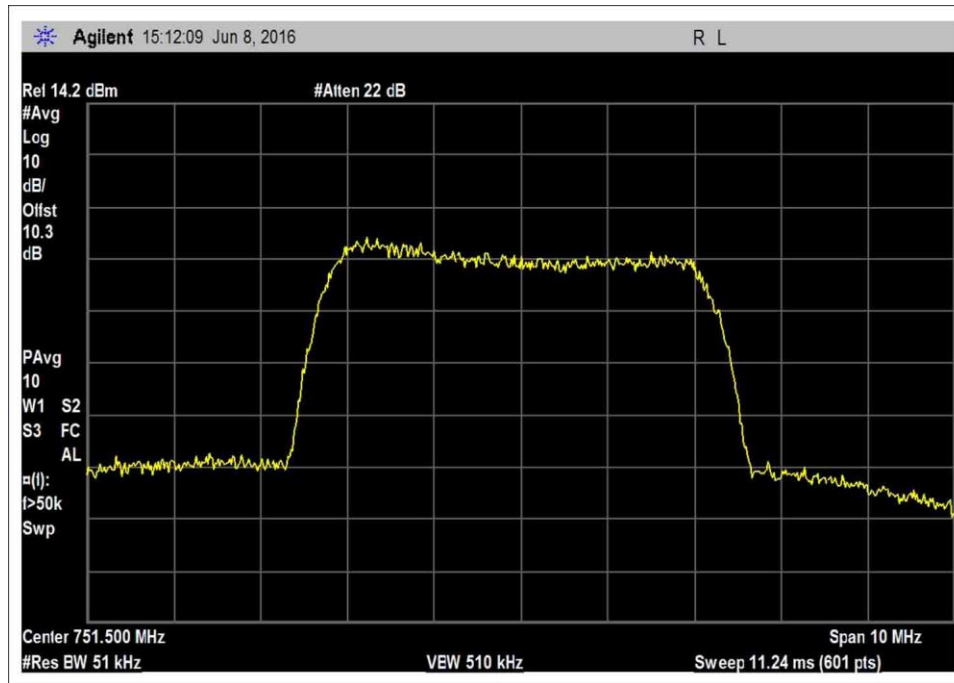


7.10\_OBW\_DL\_746-757MHz\_CDMA

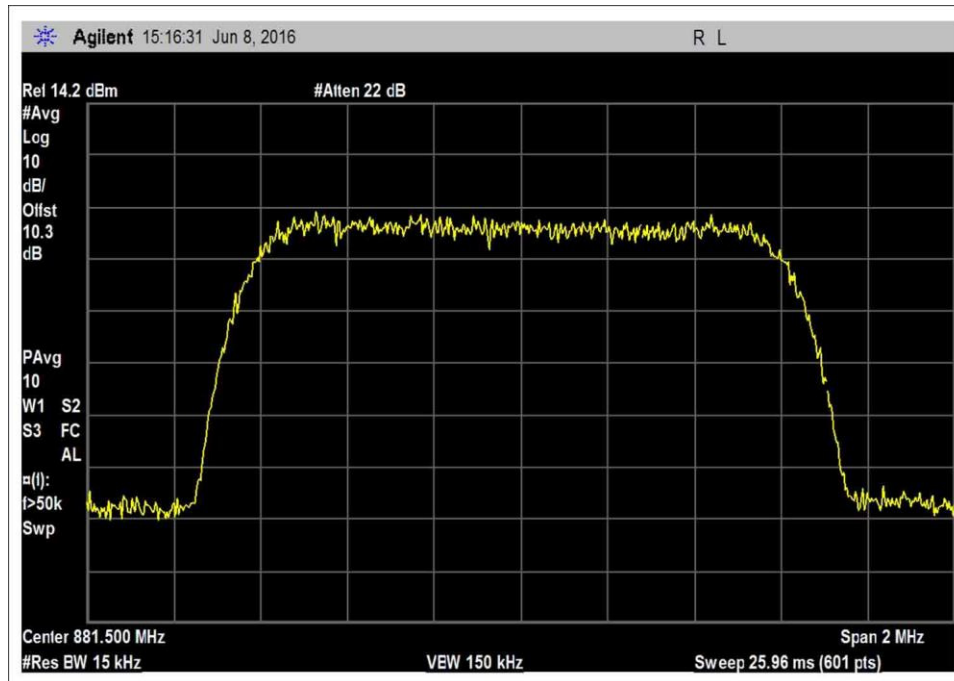


7.10\_OBW\_DL\_746-757MHz\_GSM

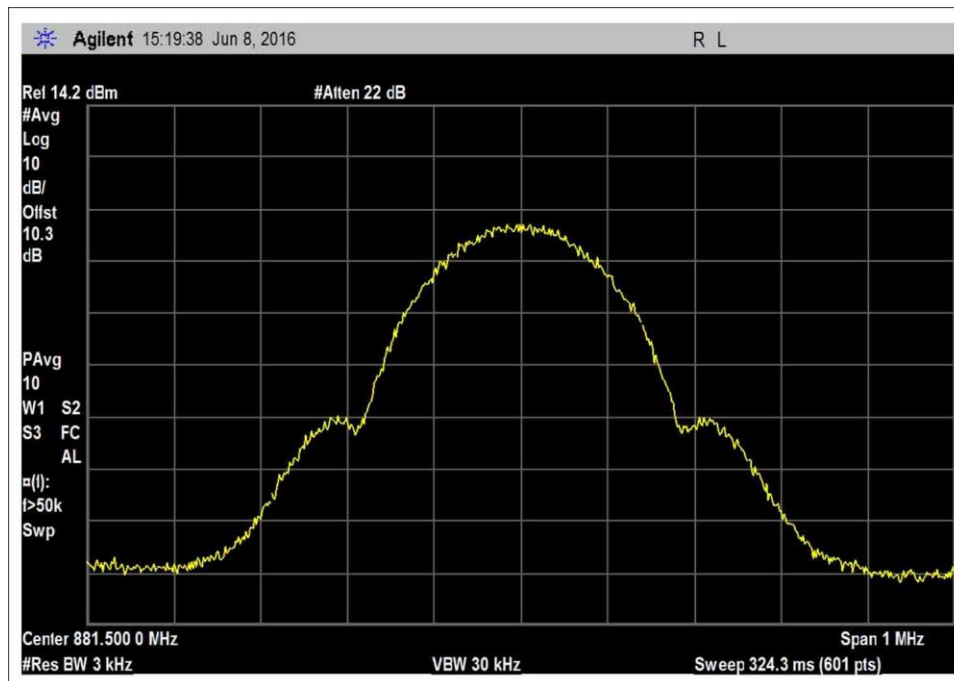




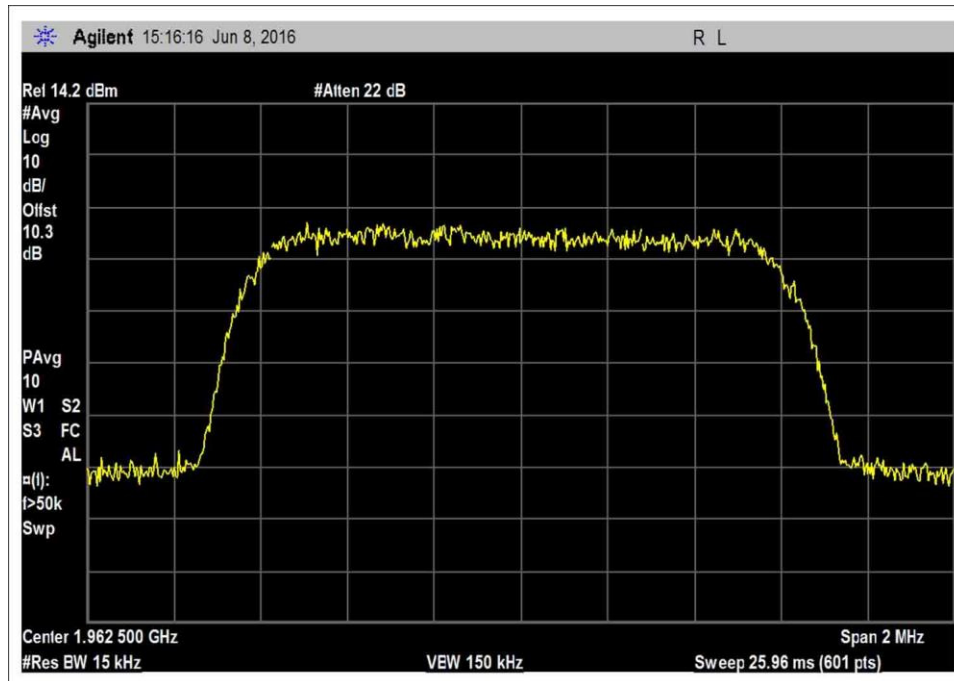
7.10\_OBW\_DL\_746-757MHz\_WCDMA



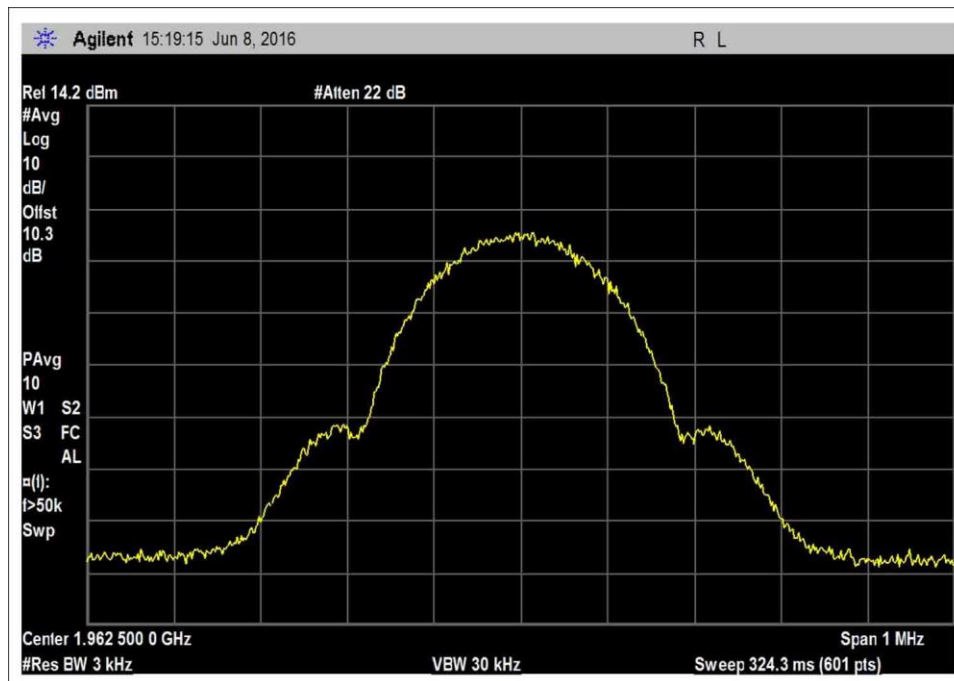
7.10\_OBW\_DL\_869-894MHz\_CDMA



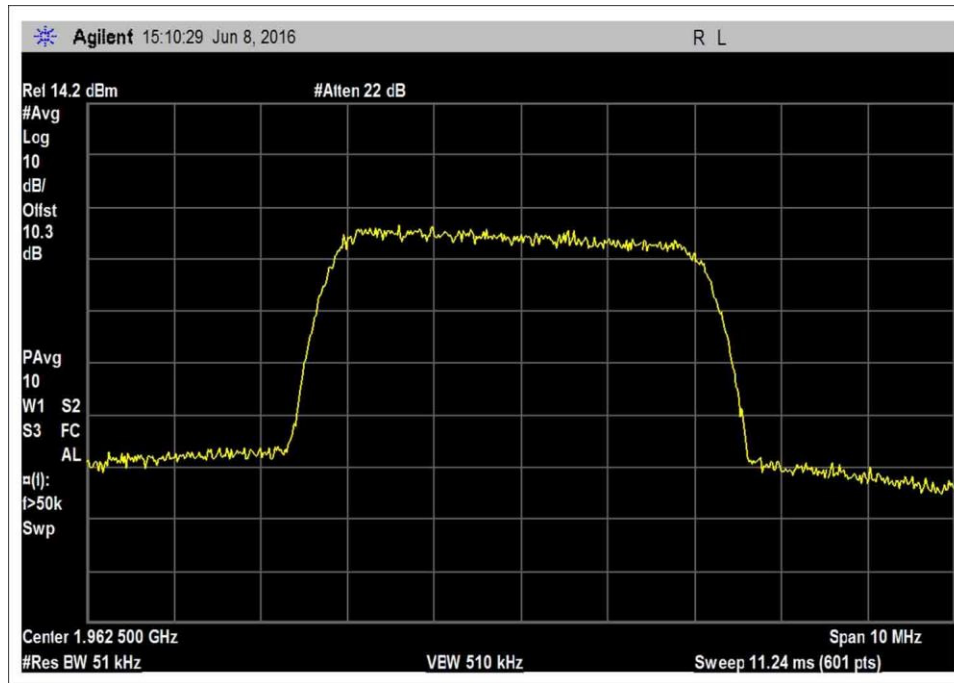
7.10\_OBW\_DL\_869-894MHz\_GSM



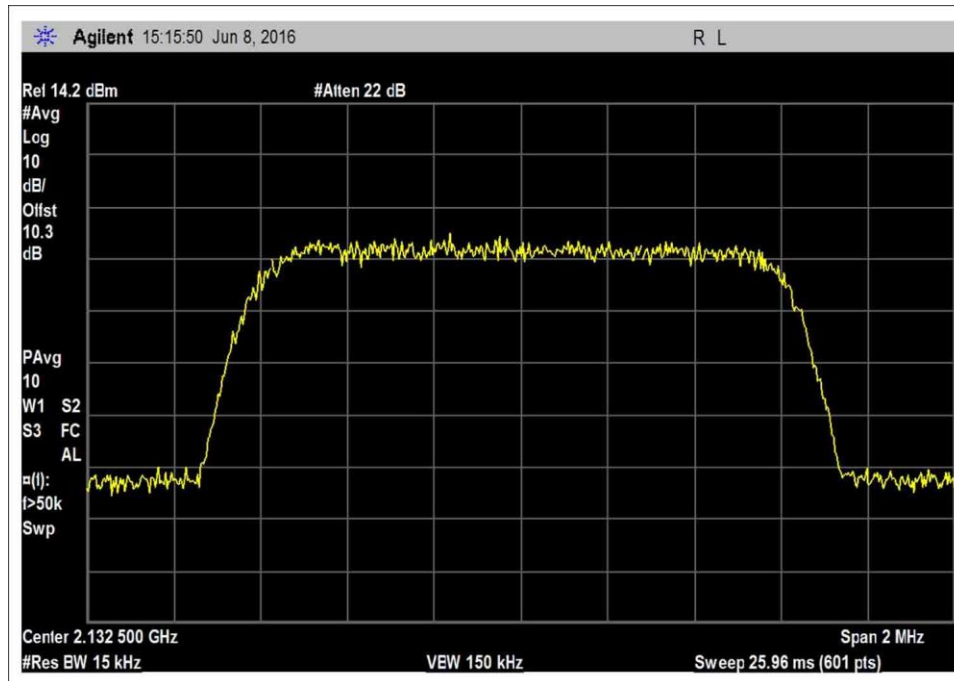
7.10\_OBW\_DL\_1930-1995MHz\_CDMA



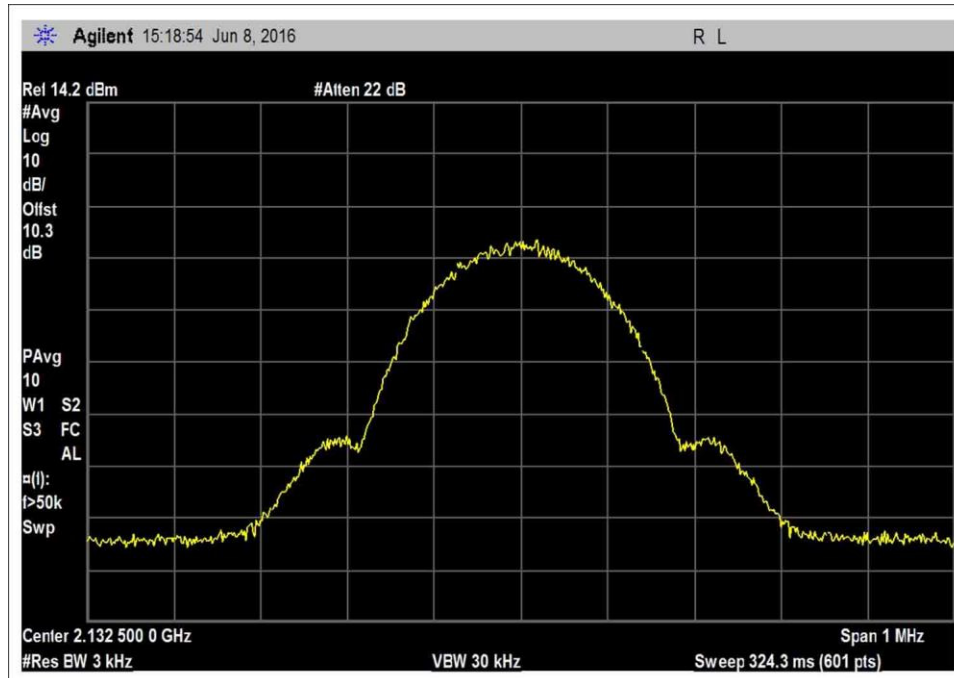
7.10\_OBW\_DL\_1930-1995MHz\_GSM



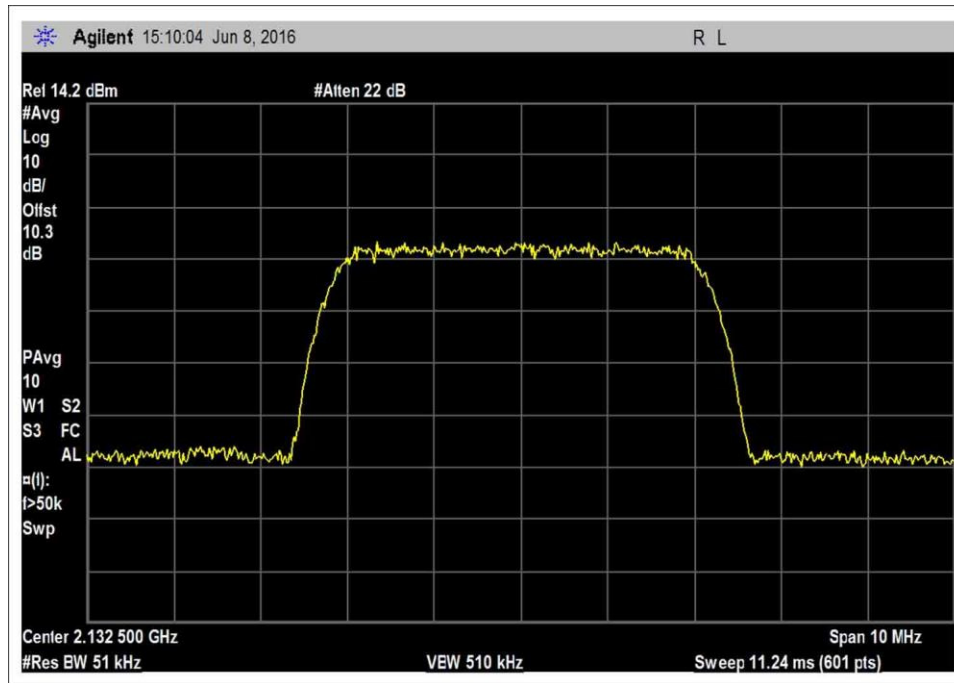
7.10\_OBW\_DL\_1930-1995MHz\_WCDMA



7.10\_OBW\_DL\_2110-2155MHz\_CDMA



7.10\_OBW\_DL\_2110-2155MHz\_GSM



7.10\_OBW\_DL\_2110-2155MHz\_WCDMA

## 7.11 Oscillation Detection

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170  
 Customer: Cellphone-Mate, Inc.  
 Specification: **7.11 Anti-Oscillation (Oscillation Restarts / Oscillation mitigation or shutdown)**  
 Work Order #: **98648** Date: 06/06/2016  
 Test Type: **Conducted Emissions** Time: 16:14:26  
 Tested by: Daniel Bertran Sequence#: 1  
 Software: EMITest 5.03.02

**Equipment Tested:**

Device	Manufacturer	Model #	S/N
Configuration 1			

**Support Equipment:**

Device	Manufacturer	Model #	S/N
Configuration 1			

**Test Conditions / Notes:**

The equipment under test (EUT) is a Fixed Wideband Consumer Booster.  
 The EUT is placed on the test bench. Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.  
 The EUT Server port is a type SMA connector and 50-ohm impedance.  
 The EUT Donor port is type F connector and 75-ohm impedance.  
 During testing there is a 75 ohm to 50 ohm matching pad connected to the EUT type F connector.  
 This matching pad has a 5.8dB correction factor.  
 Firmware: V1.0

Test environment conditions:  
 Temperature: 22.3°C  
 Relative Humidity: 40%  
 101.1 kPa

Part 22  
     UL: 824-849MHz  
     DL: 869-894MHz

Part 24  
     UL: 1850-1915MHz  
     DL: 1930-1995MHz

Part 27  
     UL: 1710-1755MHz, 698-716MHz, 776-787MHz  
     DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure: The test was performed in accordance with section 7.11 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Note: UL1850-1915MHz -AWGNL+5:

- **AWGNL** denotes a 4.1MHz AWGN signal (99% occupied bandwidth) tuned to the frequency of 2.5 MHz above the lower edge of the operating band 1850-1915MHz
- **+5** denotes a variable attenuator adjusted such that the insertion loss for center of band under test (isolation) between the booster's donor and server ports is 5 dB greater than the maximum gain, as recorded in the maximum gain test procedure, for the band under test.

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06902	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	ANP06903	Cable	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
	ANP06899	Cable	32022-29094K-29094K-72TC	12/30/2015	12/30/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	AN03412	Band Pass Filter	PE8705	8/12/2015	8/12/2017
	AN03413	Band Pass Filter	PE8706	8/12/2015	8/12/2017
	AN03414	Band Pass Filter	PE8707	8/12/2015	8/12/2017
	AN03415	Band Pass Filter	PE8708	8/12/2015	8/12/2017
	AN03447	Band Pass Filter	PE8710	8/12/2015	8/12/2017
	AN03448	Band Pass Filter	PE8711	8/12/2015	8/12/2017
	AN03446	Band Pass Filter	4FV50-707/H18-O/O	1/4/2016	1/4/2018
	AN03467	Band Pass Filter	4FV50-731/H30-O/O	1/4/2016	1/4/2018
	AN03468	Band Pass Filter	4CS10-781.5/E12.2-O/O	1/4/2016	1/4/2018
	AN03469	Band Pass Filter	4CS10-751.5/E12-O/O	1/4/2016	1/4/2018
	AN02475	1 dB step Attenuator	8494B	6/29/2015	6/29/2017
	AN03429	10dB step Attenuator	8496B	8/27/2015	8/27/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018
	ANC00082	RF Coupler	722-10-1.500V	8/26/2015	8/26/2017
	ANC00087	Combiner	44000	1/7/2016	1/7/2018



## Summary of Results

Pass: All oscillations detections and mitigations occur within 0.3 seconds in uplink bands, within 1 second in the downlink bands and the noise level is below the -70dBm/MHz limit.

### 7.11.2 Oscillation Restart Tests

Oscillation detection				Time Between restart		Number of Restart	
Freq	Measured	Limit	Peak Level	Measured	Limit	Measured	Limit
MHz	Sec	Sec	dBm	Sec	At least sec		
UL1710-1755	0.10	0.30	23.0	78	60	3	5
UL1850-1915	0.08	0.30	20.1	74	60	3	5
UL824-894	0.24	0.30	26.9	73	60	3	5
UL 698-716	0.18	0.30	26.0	72	60	3	5
UL776-787	0.22	0.30	25.3	72	60	3	5
DL2110-2155	0.14	1.00	23.0	76	60	3	5
DL1930-1995	0.18	1.00	23.6	75	60	3	5
DL869-894	0.10	1.00	23.4	72	60	3	5
DL:728-746	0.20	1.00	20.3	72	60	3	5
DL 746-757	0.24	1.00	20.7	72	60	3	5

The booster continues to mitigate at least 1 minute before restarting. The plots demonstrate after 3 restarts (the limit is 5 restart), the booster does not resume operation until manually reset.

### 7.11.3 Test procedure for measuring oscillation mitigation or shutdown

UL 1710-1755 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-53.6	-63.5	9.9	12.0
+4dB	-50.1	-64.0	(13.9)*	12.0
+3dB	-47.7	-63.9	(16.2)*	12.0
+2dB	-46.2	-64.2	(18.0)*	12.0
+1dB	-45.1	-64.7	(19.6)*	12.0
0dB	-42.4	-64.9	(22.6)*	12.0
-1dB	-38.4	-64.5	(26.2)*	12.0
-2dB	-1.5	-65.5	(64.0)*	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

DL 2110-2155 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-48.3	-58.6	10.4	12.0
+4dB	-47.8	-58.3	10.5	12.0
+3dB	-46.1	-59.3	(13.2)*	12.0
+2dB	-44.0	-59.3	(15.3)*	12.0
+1dB	-42.5	-59.8	(17.3)*	12.0
0dB	-34.7	-60.3	(25.6)*	12.0
-1dB	**	**	0.0	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

UL1850-1915 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-50.6	-60.3	9.7	12.0
+4dB	-49.3	-60.5	11.2	12.0
+3dB	-47.7	-61.2	(13.5)*	12.0
+2dB	-44.9	-60.9	(15.9)*	12.0
+1dB	-42.7	-60.9	(18.2)*	12.0
0dB	-38.2	-61.5	(23.3)*	12.0
-1dB	**	**	0.0	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

DL 1930-1995 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-51.1	-60.8	9.7	12.0
+4dB	-50.7	-60.9	10.2	12.0
+3dB	-48.9	-61.4	(12.5)*	12.0
+2dB	-47.9	-61.3	(13.4)*	12.0
+1dB	-46.1	-61.8	(15.7)*	12.0
0dB	-43.3	-62.1	(18.8)*	12.0
-1dB	-40.1	-62.7	(22.6)*	12.0
-2dB	-30.2	-62.7	(32.5)*	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

Note:

\* The measured difference exceeds the limit for a period of less than 300 second before device mitigates and shuts down. The maximum recorded time prior to shutdown was 46 seconds for the Uplink bands and 26 seconds for the Downlink bands.

\*\* The device shuts down immediately.

UL 824-894 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-56.7	-65.4	8.7	12.0
+4dB	-55.8	-66.1	10.3	12.0
+3dB	-54.0	-65.6	11.6	12.0
+2dB	-53.1	-66.1	(13.0)*	12.0
+1dB	-49.5	-66.2	(16.8)*	12.0
0dB	-44.8	-67.1	(22.3)*	12.0
-1dB	-33.0	-66.7	(33.7)*	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

DL 869-894 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-60.6	-66.9	6.3	12.0
+4dB	-59.9	-67.6	7.7	12.0
+3dB	-59.4	-67.7	8.4	12.0
+2dB	-58.7	-67.7	9.0	12.0
+1dB	-57.9	-67.9	10.0	12.0
0dB	-56.5	-68.2	(11.7)*	12.0
-1dB	-54.7	-68.0	(13.3)*	12.0
-2dB	-52.5	-68.8	(16.3)*	12.0
-3dB	-49.8	-68.6	(18.7)*	12.0
-4dB	-44.3	-68.7	(24.4)*	12.0
-5dB	**	**	0.0	12.0

UL 698-716 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-57.2	-67.3	10.2	12.0
+4dB	-56.8	-67.2	10.4	12.0
+3dB	-55.1	-67.6	(12.5)*	12.0
+2dB	-53.9	-68.3	(14.4)*	12.0
+1dB	-50.2	-67.8	(17.6)*	12.0
0dB	-45.7	-68.0	(22.3)*	12.0
-1dB	-35.1	-67.9	(32.8)*	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

DL 728-746 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-58.3	-64.1	5.8	12.0
+4dB	-58.6	-68.1	9.5	12.0
+3dB	-57.5	-67.9	10.4	12.0
+2dB	-56.0	-68.8	(12.9)*	12.0
+1dB	-53.6	-68.9	(15.3)*	12.0
0dB	-50.6	-68.7	(18.0)*	12.0
-1dB	-46.7	-69.3	(22.6)*	12.0
-2dB	-36.0	-69.5	(33.5)*	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

Note:

\* The measured difference exceeds the limit for a period of less than 300 second before device mitigates and shuts down. The maximum recorded time prior to shutdown was 46 seconds for the Uplink bands and 26 seconds for the Downlink bands.

\*\* The device shuts down immediately.

UL 776-787 MHz				
Max Gain				
Isolation dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-55.4	-64.9	9.5	12.0
+4dB	-53.7	-65.2	(11.5)*	12.0
+3dB	-51.7	-65.4	(13.7)*	12.0
+2dB	-49.0	-65.4	(16.4)*	12.0
+1dB	-44.1	-65.7	(21.6)*	12.0
0dB	-30.6	-66.7	(36.1)*	12.0
-1dB	**	**	0.0	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

DL 746-775 MHz				
Max Gain				
Isolation dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-60.0	-67.0	7.0	12.0
+4dB	-59.9	-67.6	7.7	12.0
+3dB	-59.4	-67.3	7.9	12.0
+2dB	-59.0	-69.0	10.0	12.0
+1dB	-57.0	-68.9	(11.9)*	12.0
0dB	-55.4	-69.1	(13.7)*	12.0
-1dB	-53.6	-69.4	(15.8)*	12.0
-2dB	**	**	0.0	12.0
-3dB	**	**	0.0	12.0
-4dB	**	**	0.0	12.0
-5dB	**	**	0.0	12.0

Note:

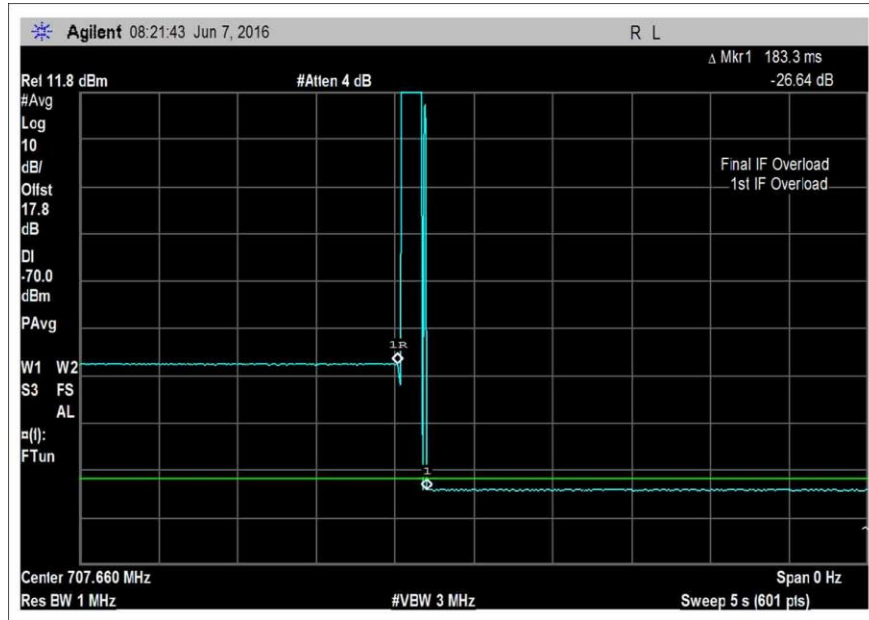
\* The measured difference exceeds the limit for a period of less than 300 second before device mitigates and shuts down. The maximum recorded time prior to shutdown was 46 seconds for the Uplink bands and 26 seconds for the Downlink bands.

\*\* The device shuts down immediately.

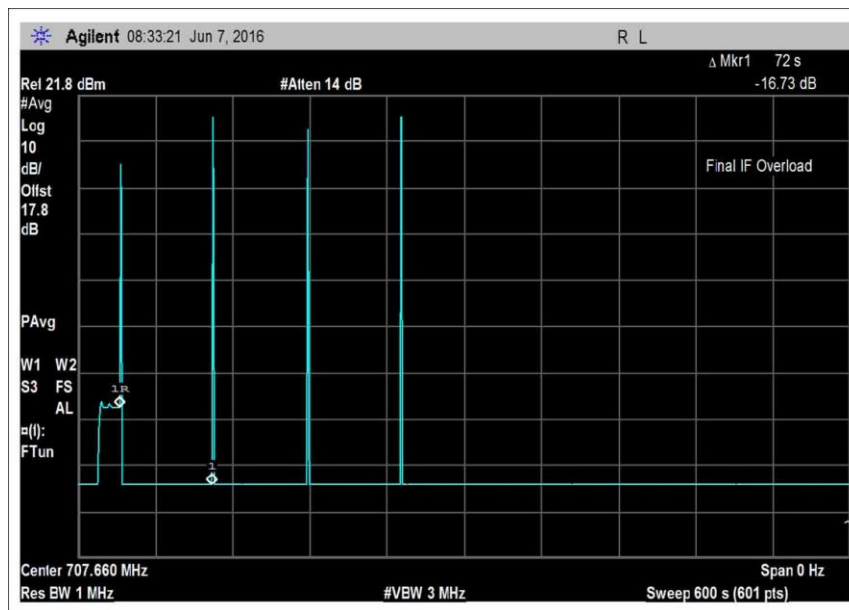
## 7.11.2 Oscillation Restart Tests

### Plots

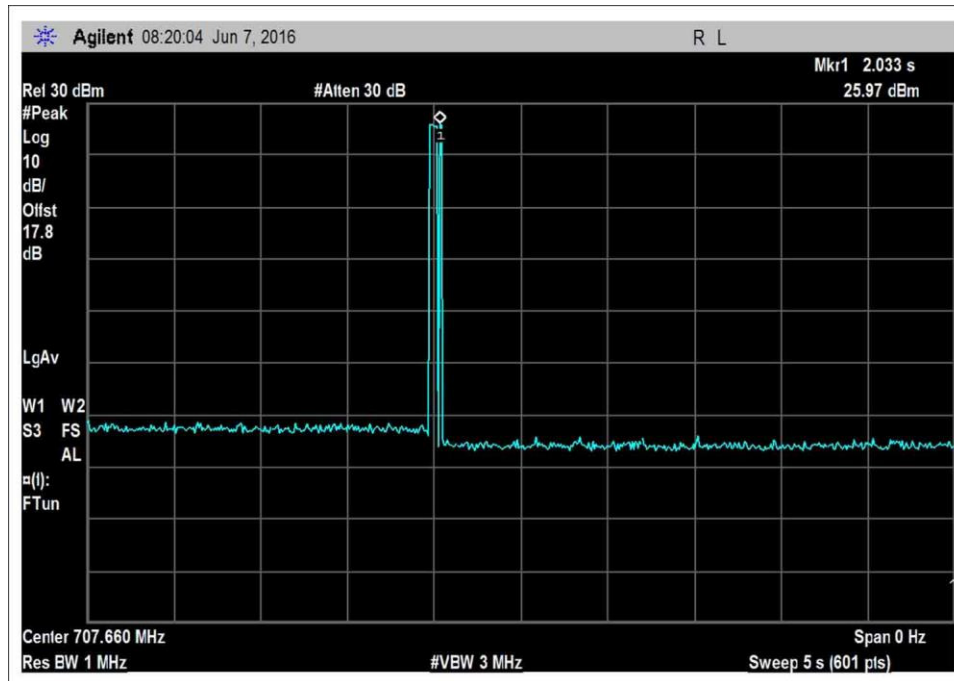
UL



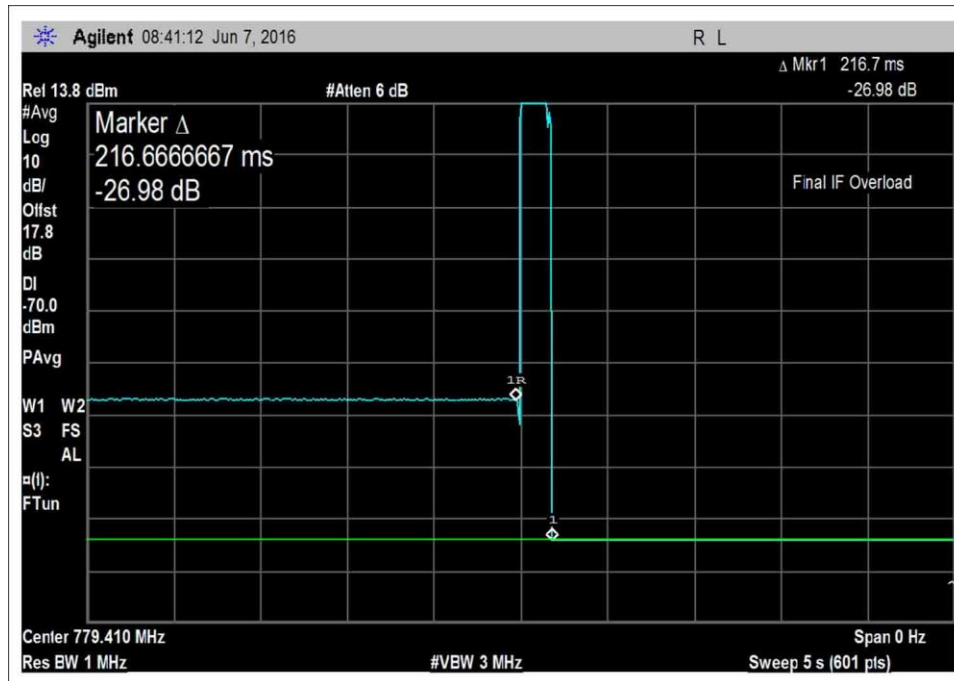
7.11\_osc\_UL-698-716MHz



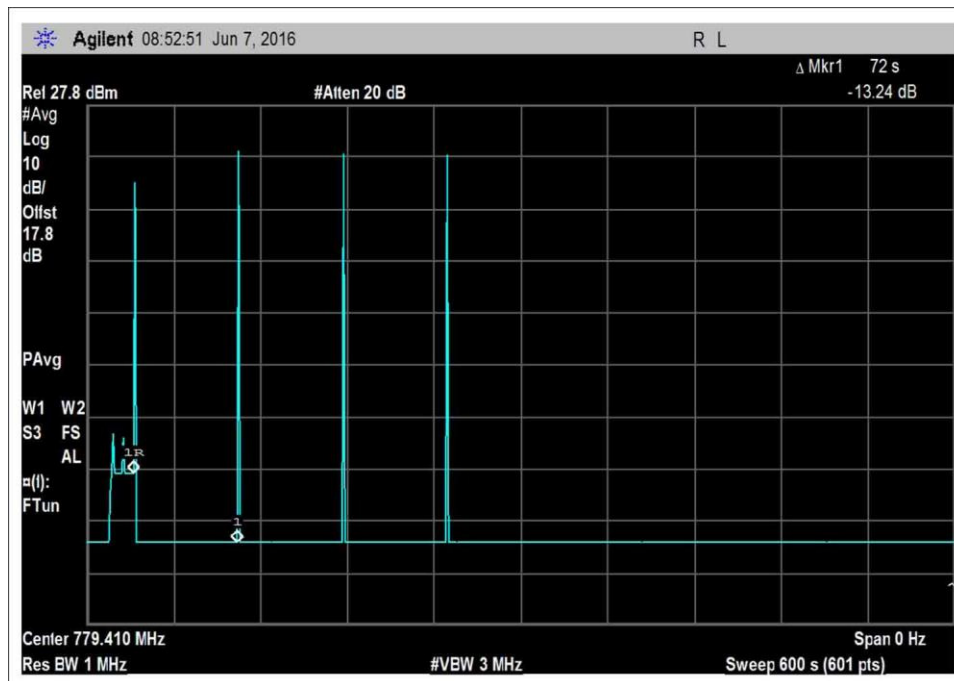
7.11\_osc\_UL-698-716MHz-600sec



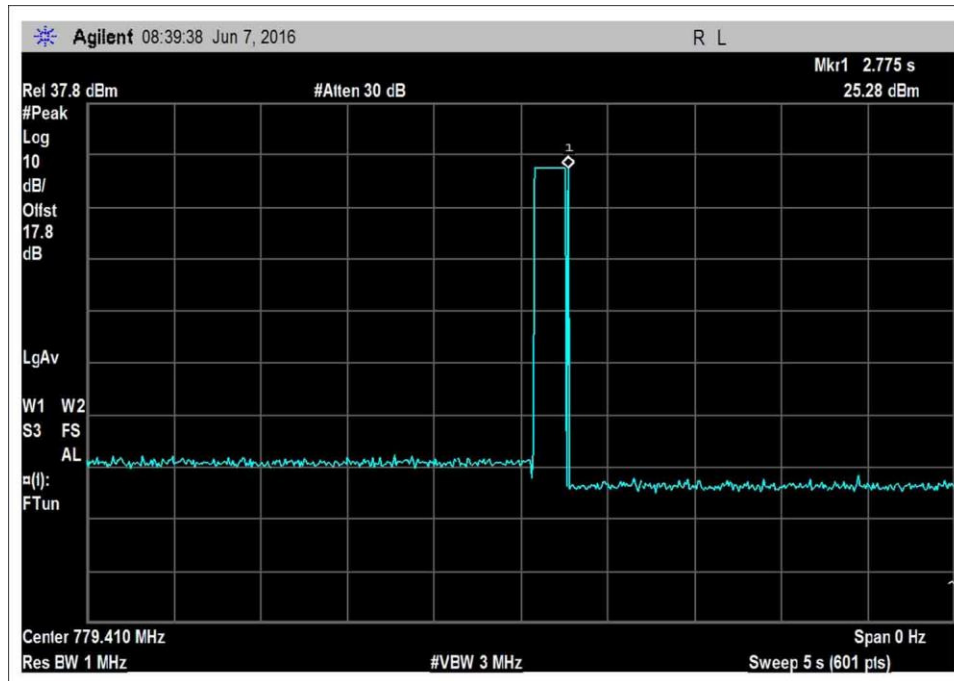
7.11\_osc\_UL-698-716MHz-Pk



7.11\_osc\_UL-776-787MHz

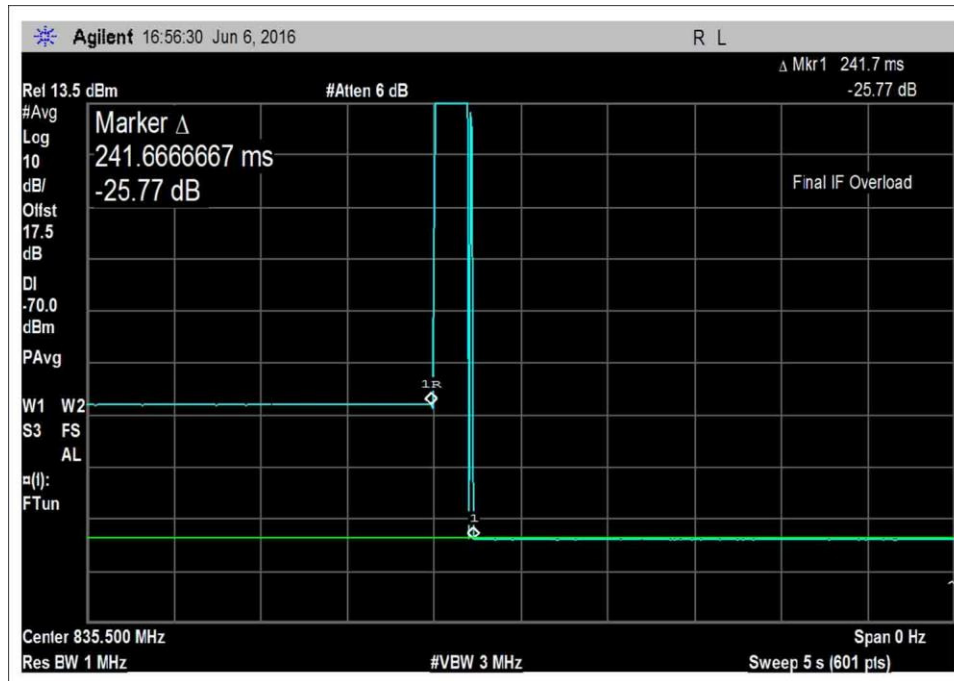


7.11\_osc\_UL-776-787MHz-600sec

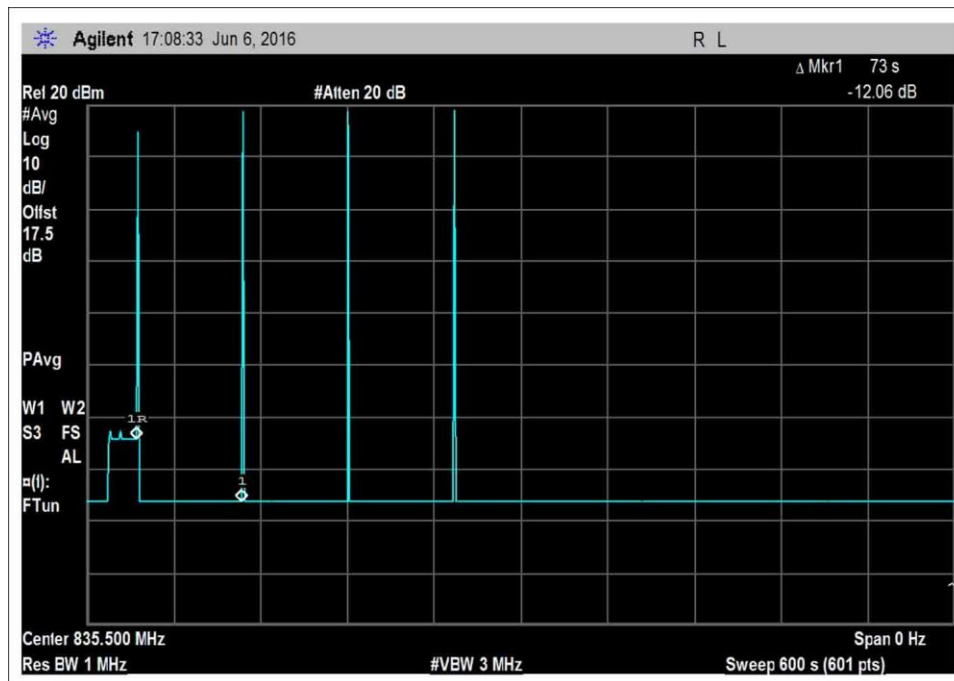


7.11\_osc\_UL-776-787MHz-Pk

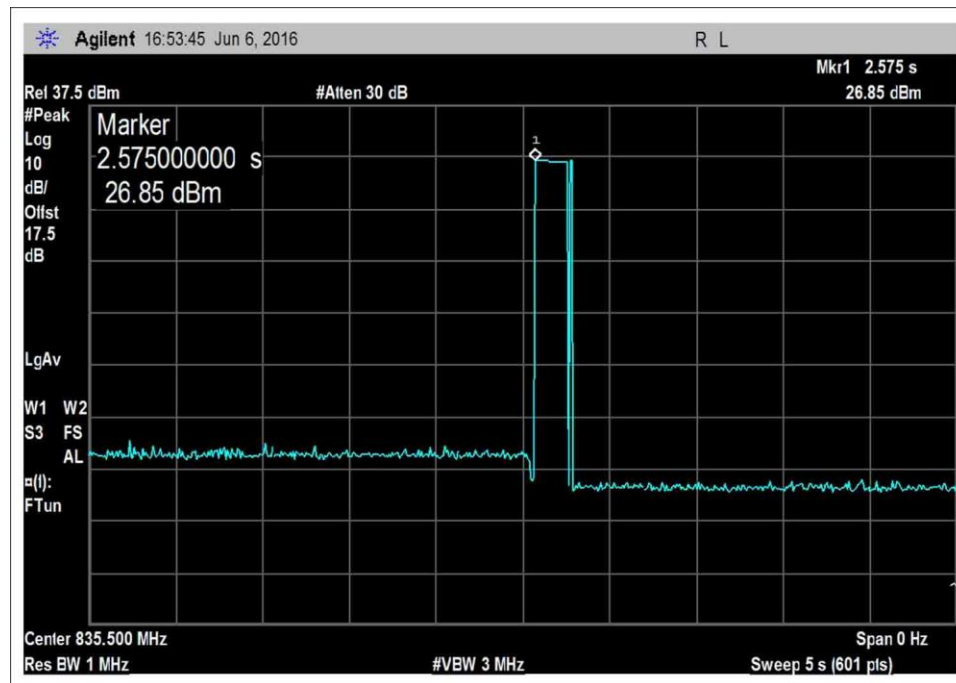




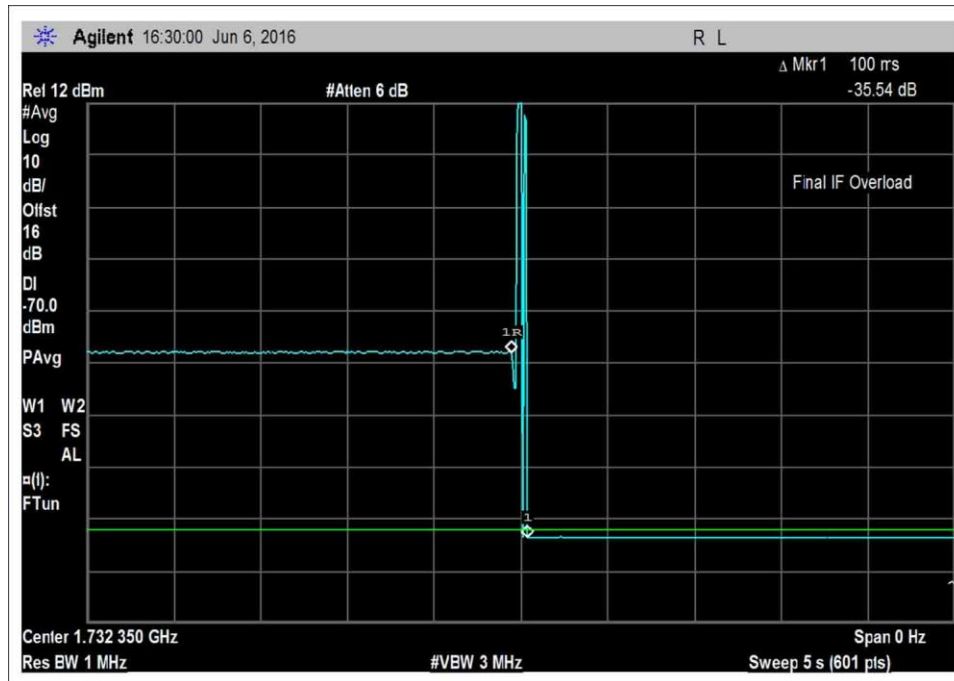
7.11\_osc\_UL-824-849MHz



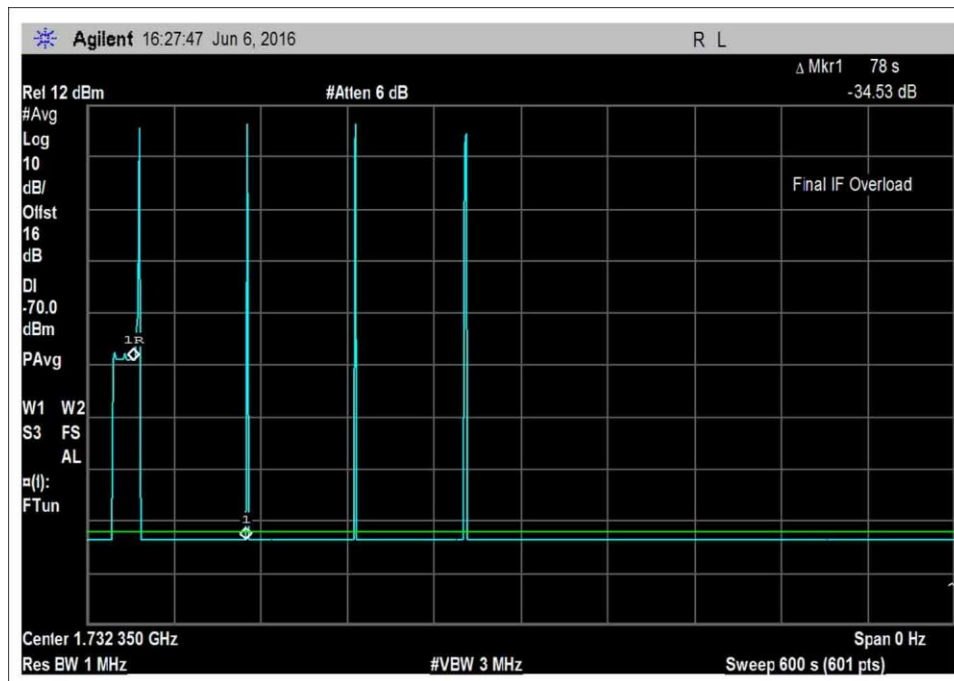
7.11\_osc\_UL-824-849MHz-600sec



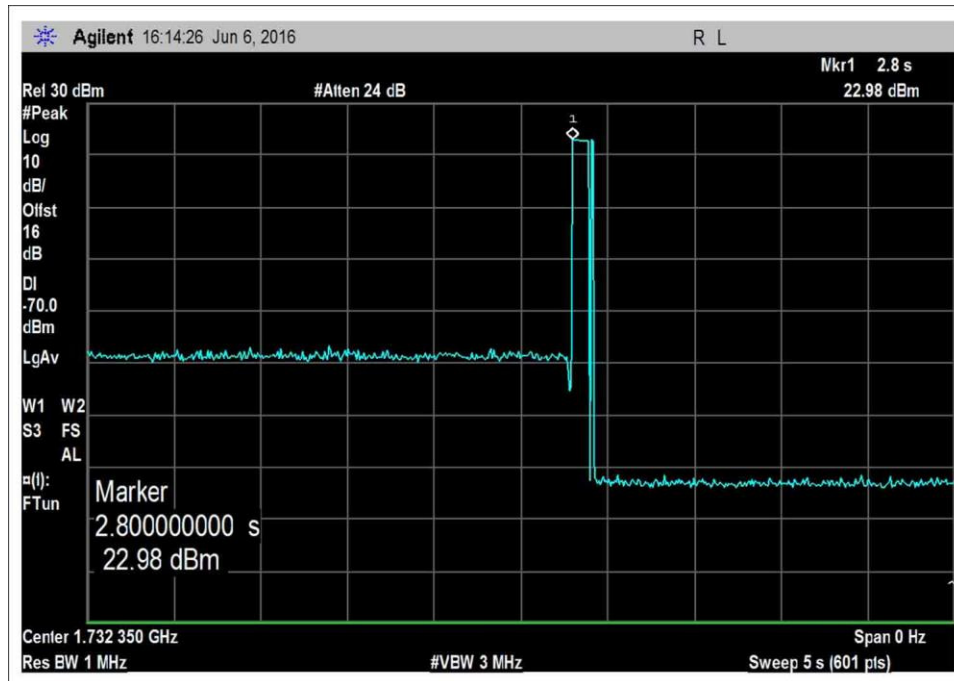
7.11\_osc\_UL-824-849MHz-Pk



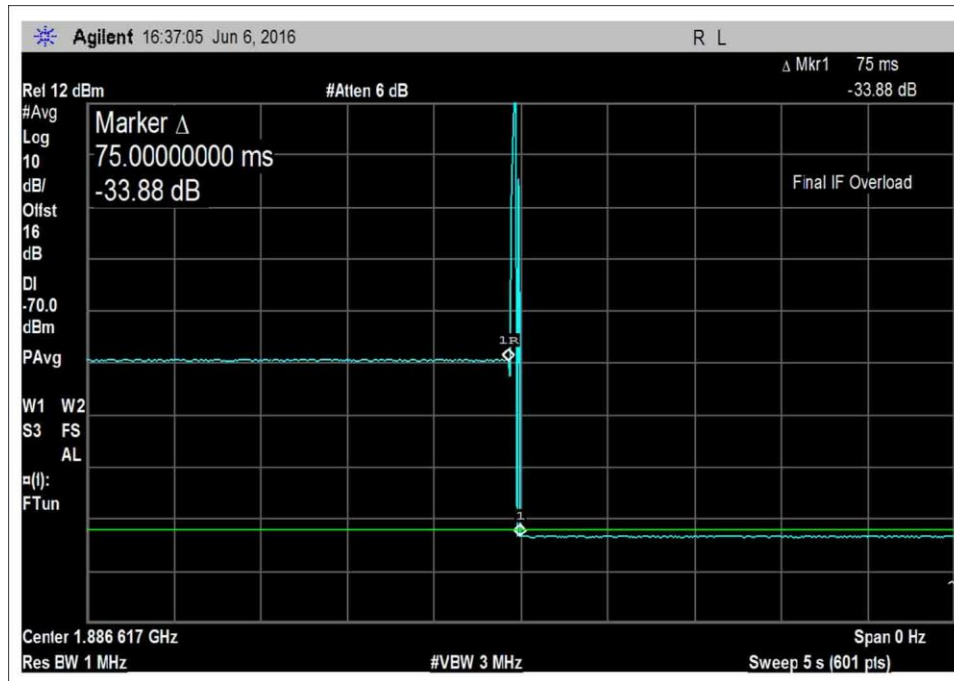
7.11\_osc\_UL-1710-1755MHz



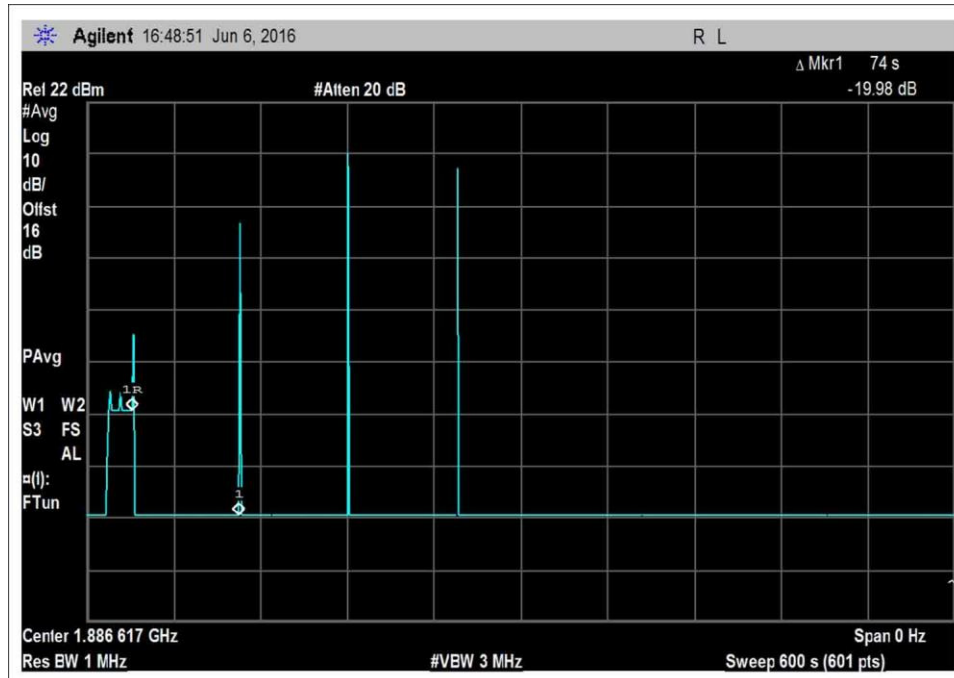
7.11\_osc\_UL-1710-1755MHz-600sec



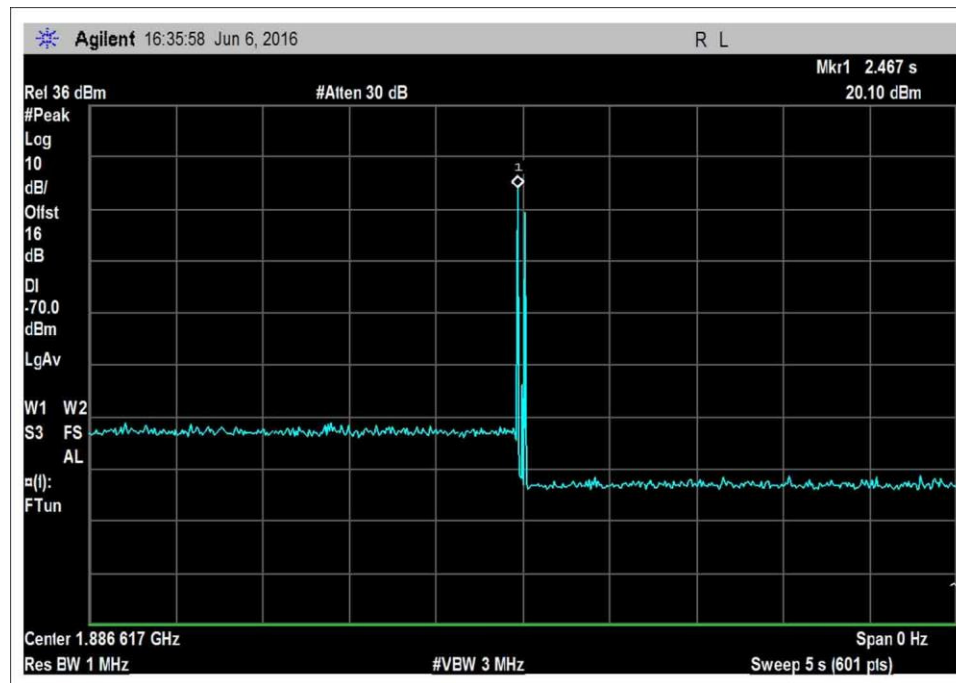
7.11\_osc\_UL-1710-1755MHz-Pk



7.11\_osc\_UL-1850-1915MHz

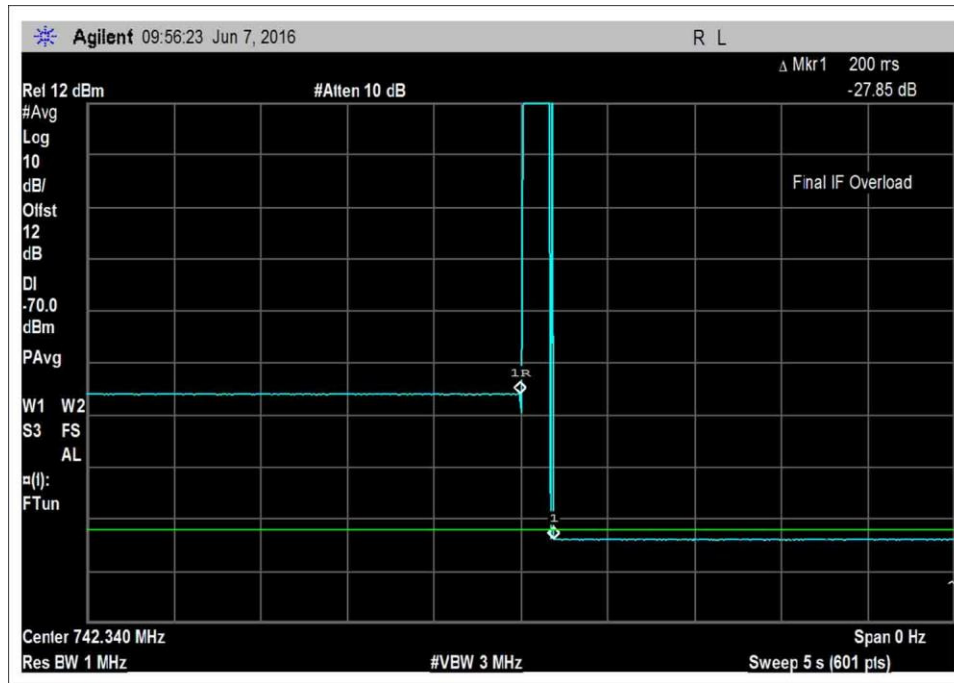


7.11\_osc\_UL-1850-1915MHz\_600sec

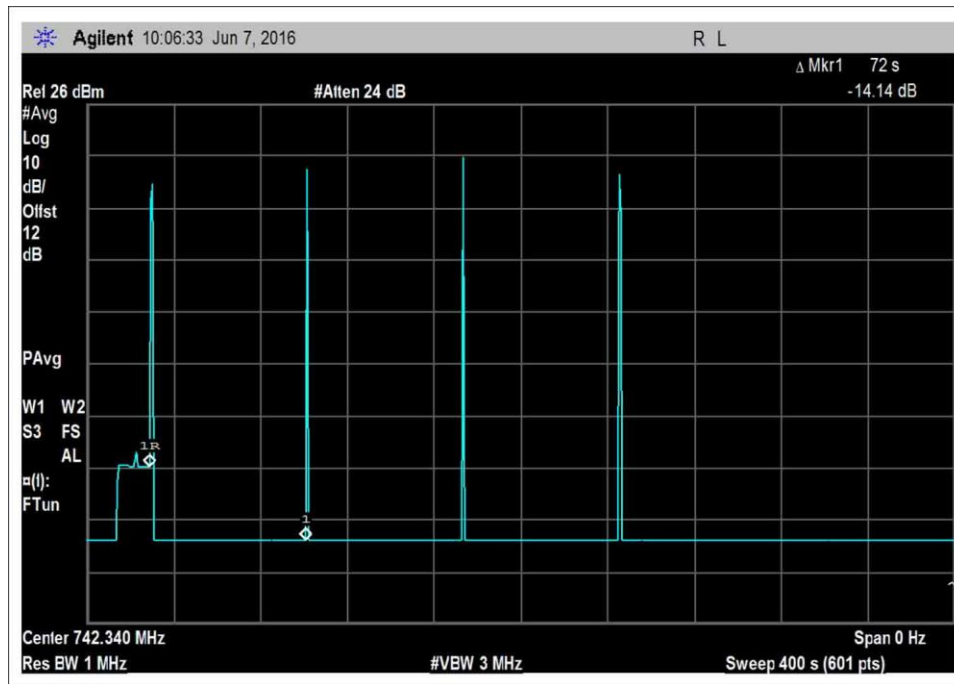


7.11\_osc\_UL-1850-1915MHz-Pk

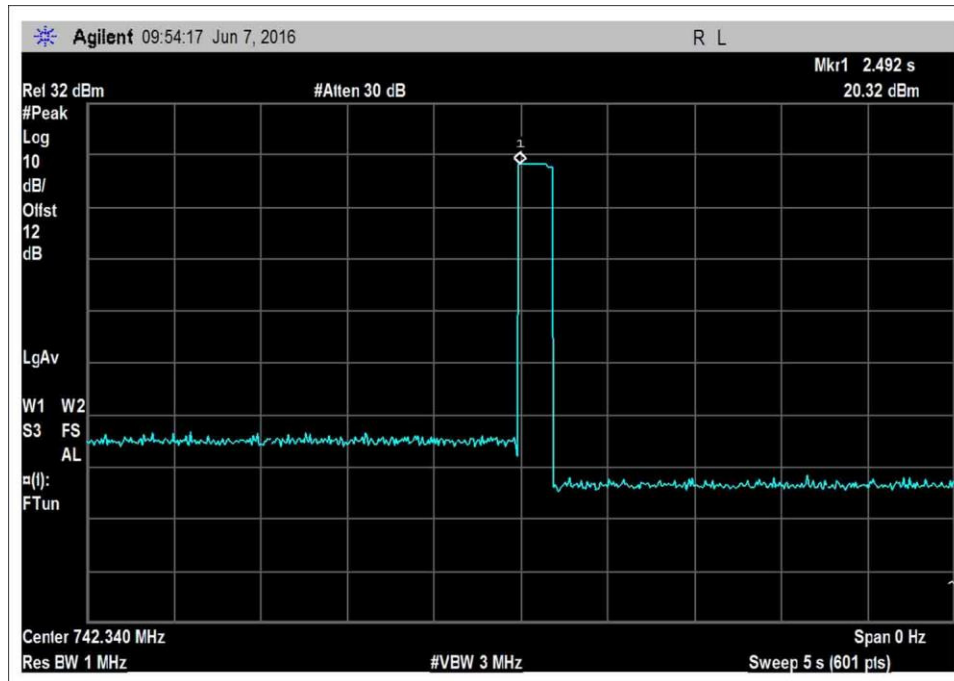
DL



7.11\_osc\_DL-728-746MHz

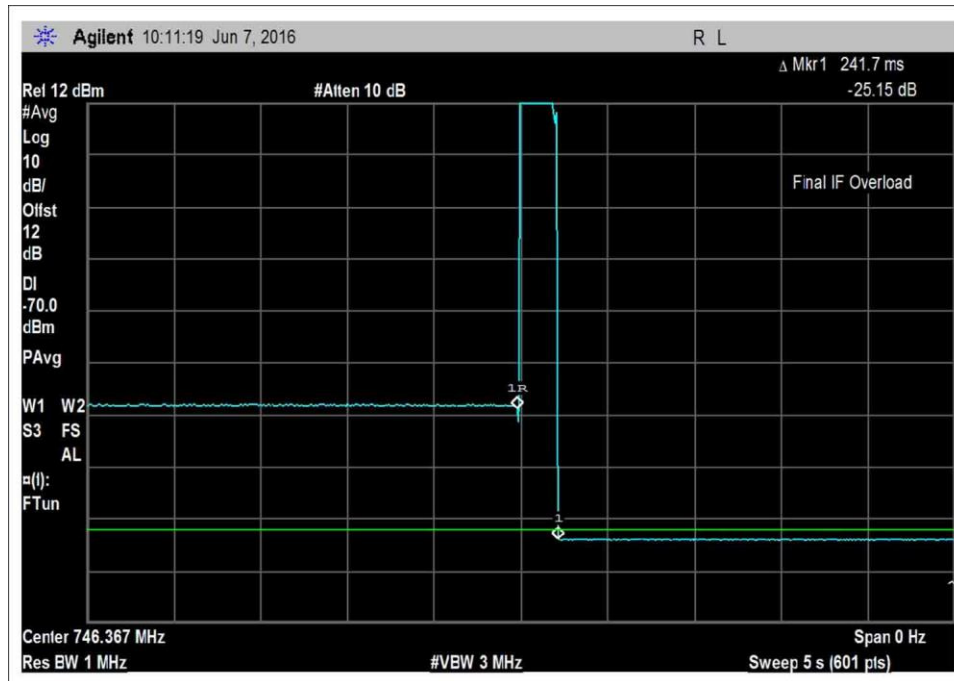


7.11\_osc\_DL-728-746MHz-400sec

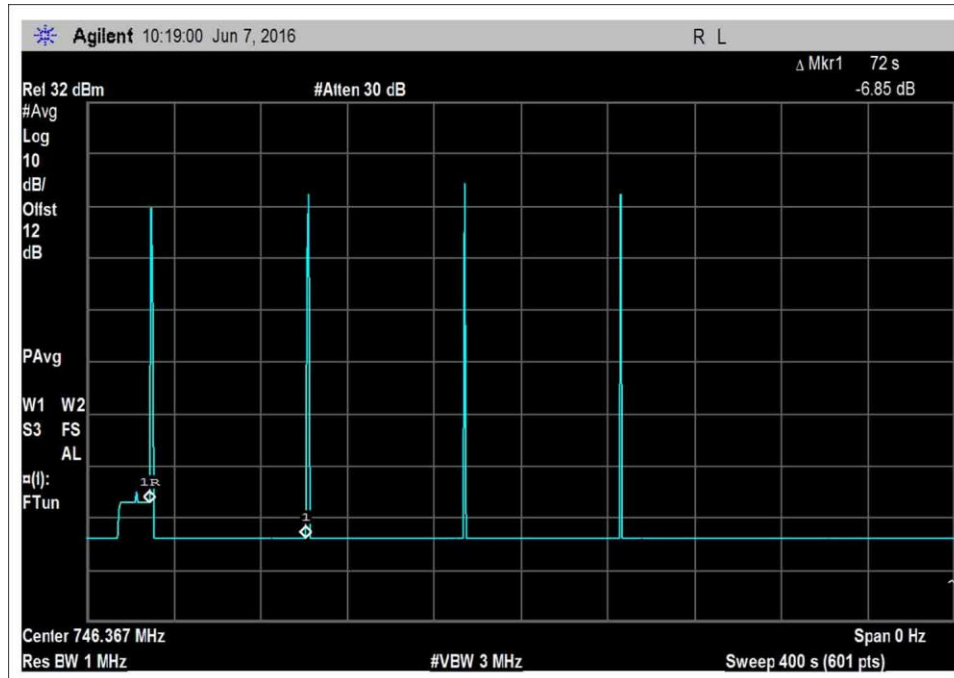


7.11\_osc\_DL-728-746MHz-Pk

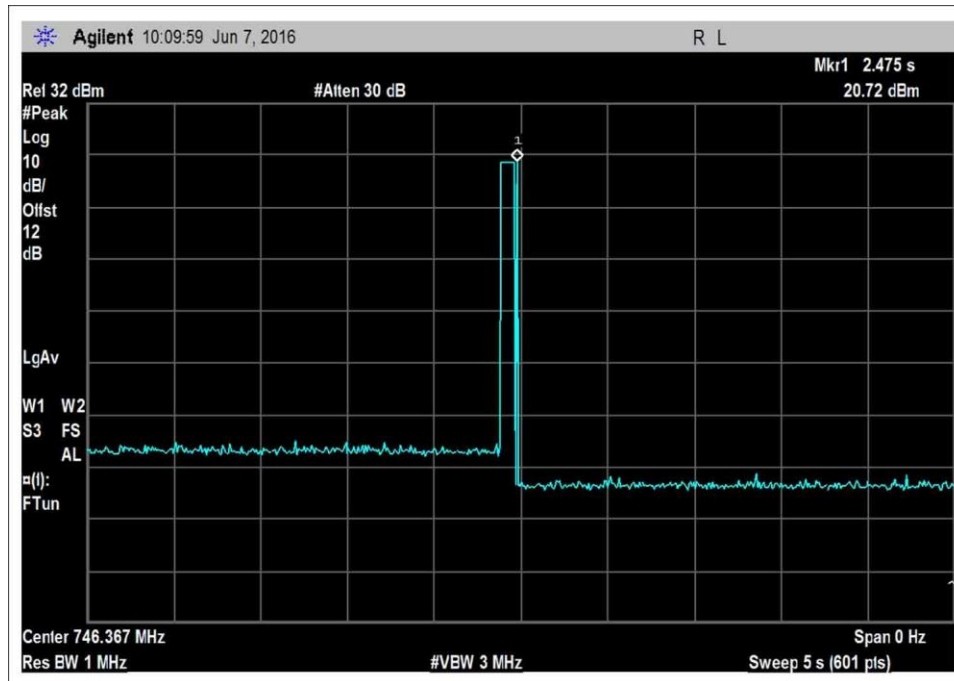




7.11\_osc\_DL-746-757MHz



7.11\_osc\_DL-746-757MHz-400



7.11\_osc\_DL-746-757MHz-Pk