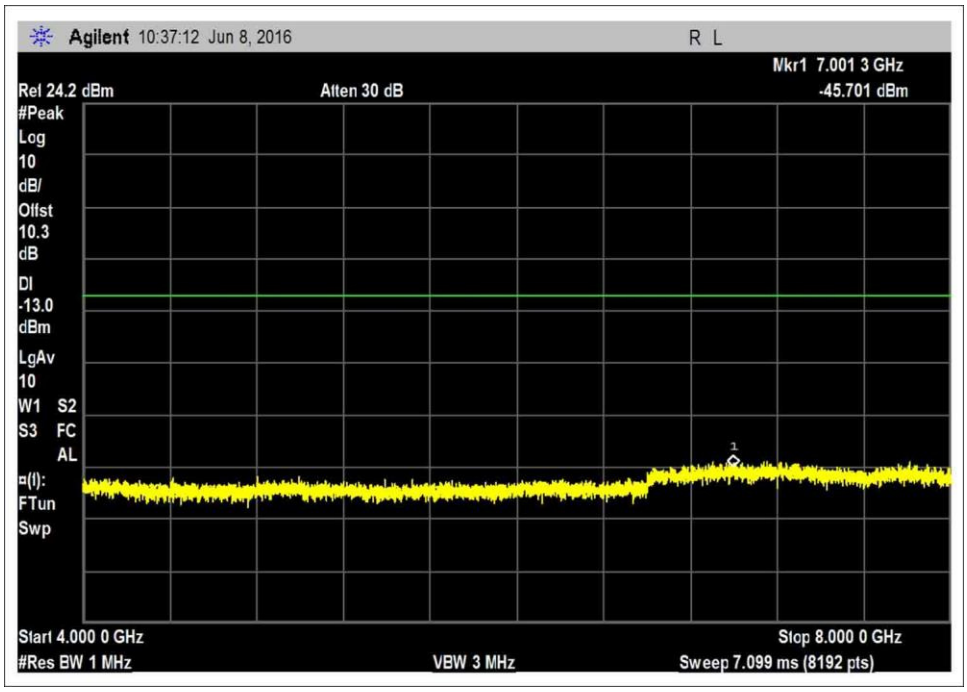
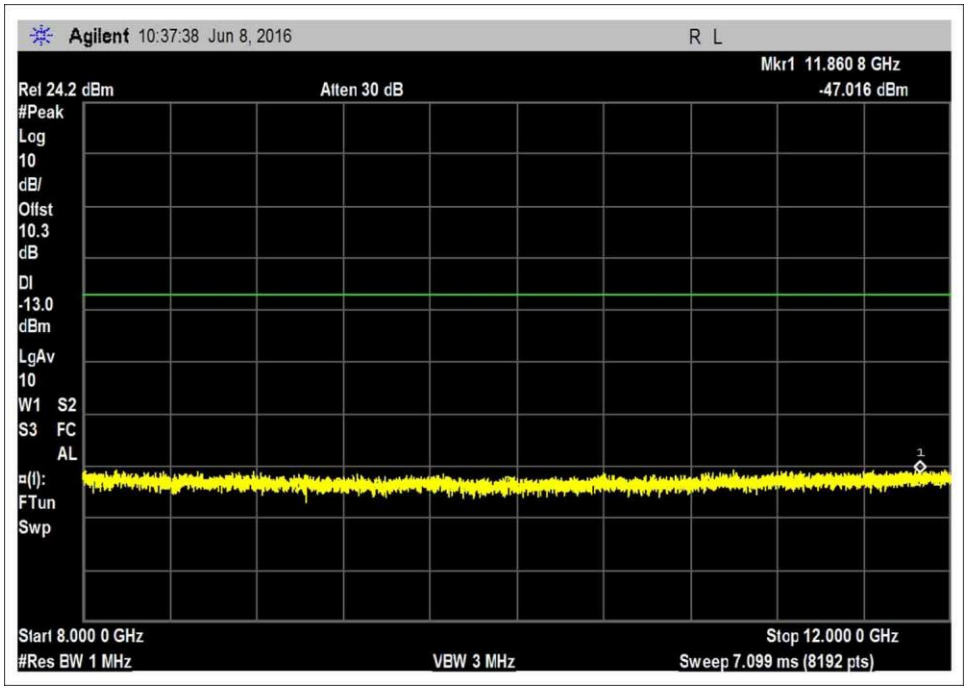
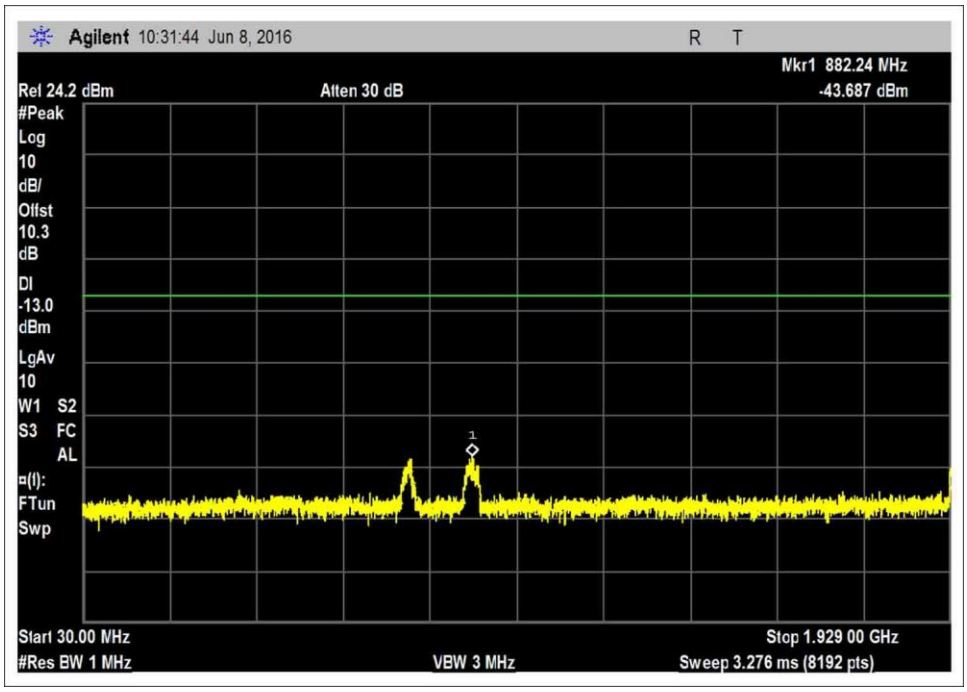


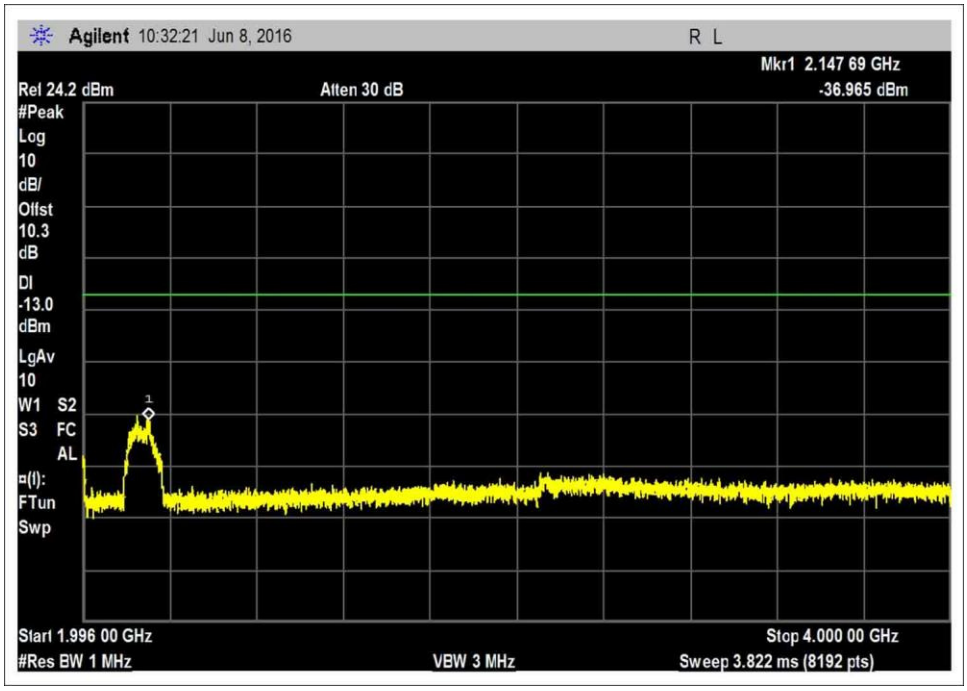
DL_869-894R2



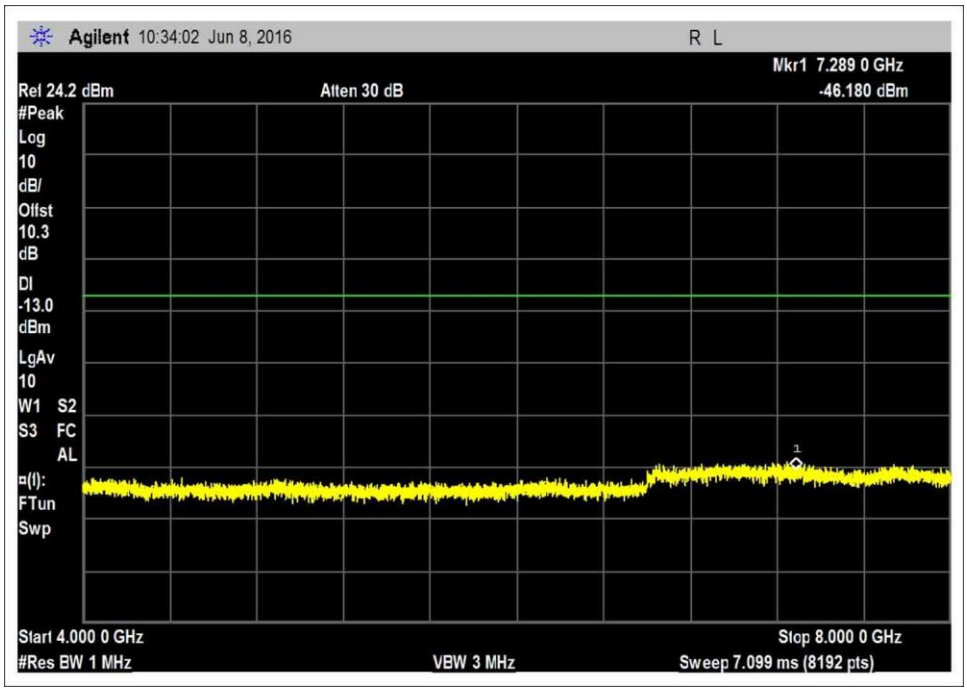
DL_869-894R3



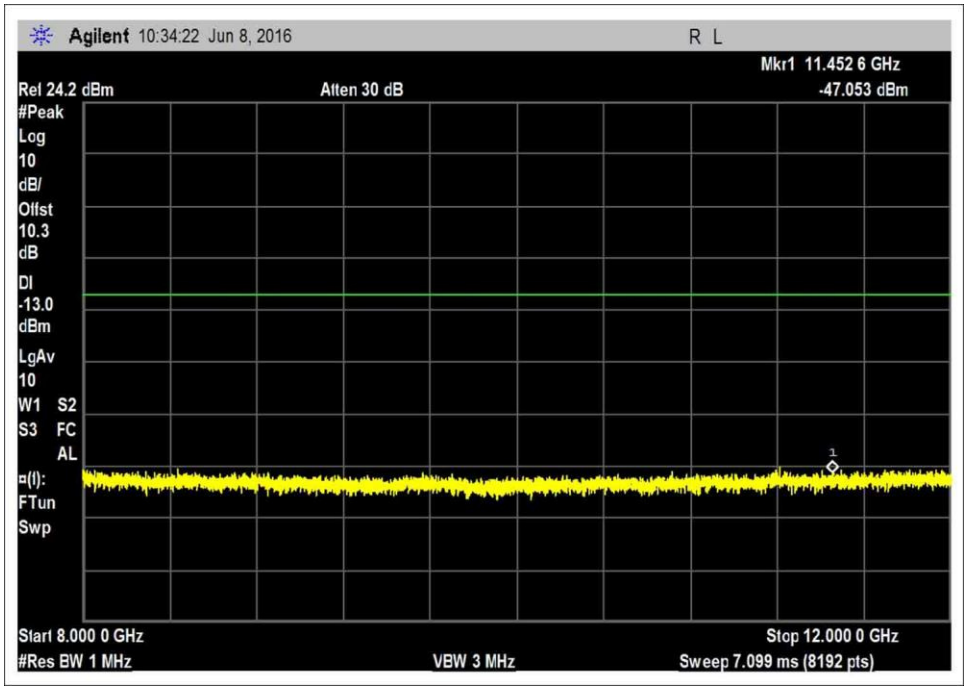
DL_1930-1995L



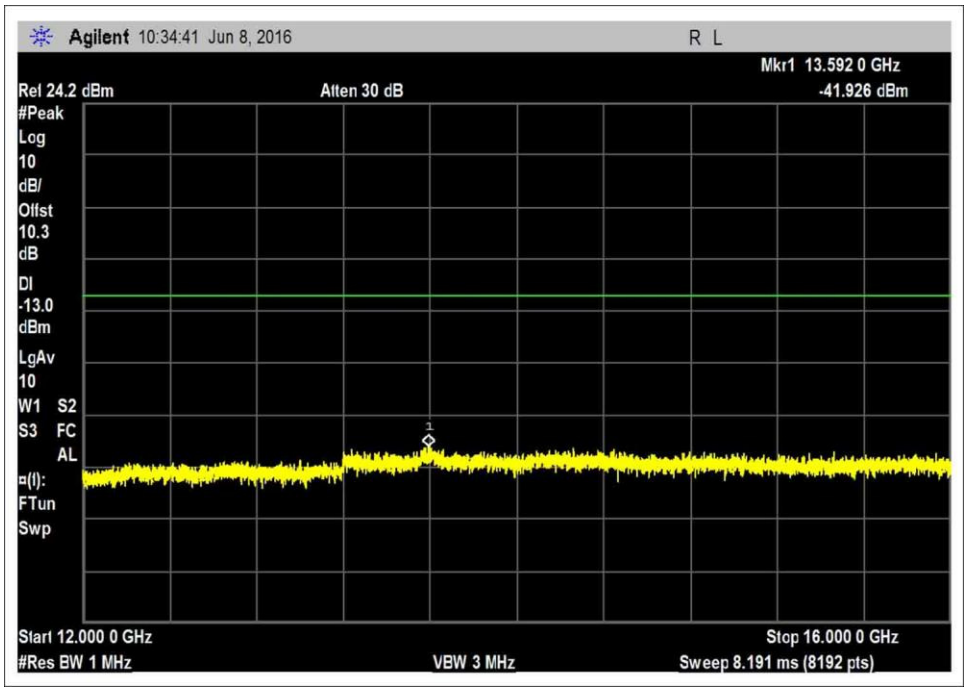
DL_1930-1995R1



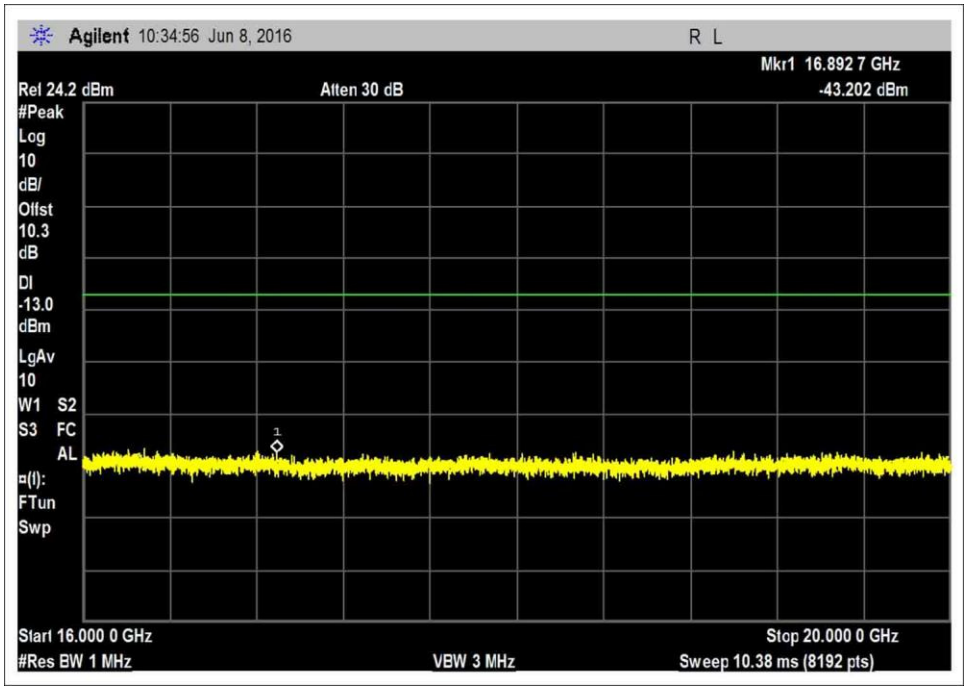
DL_1930-1995R2



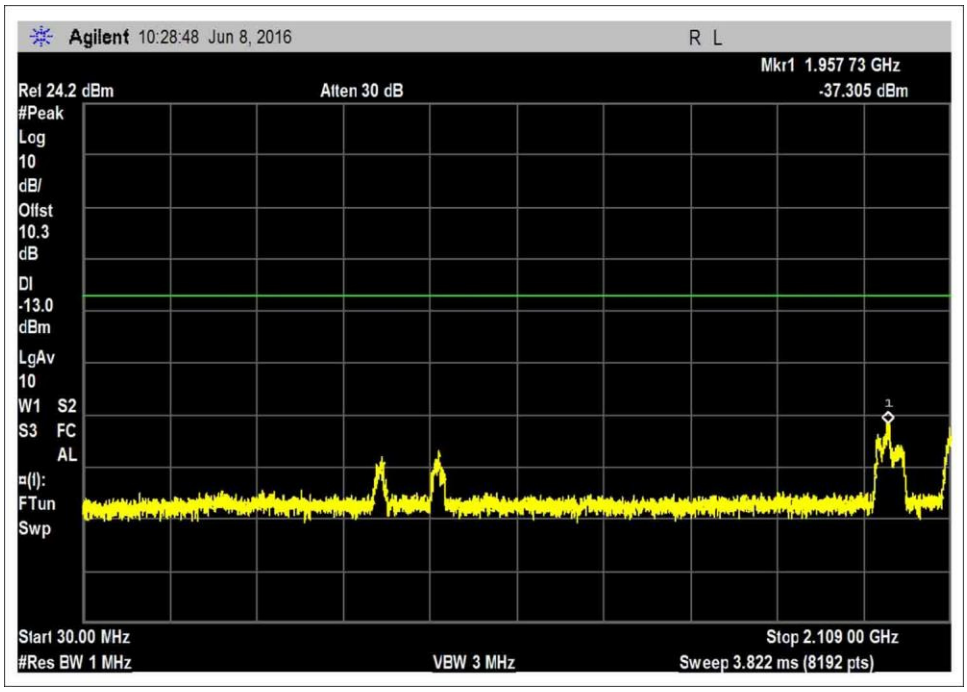
DL_1930-1995R3



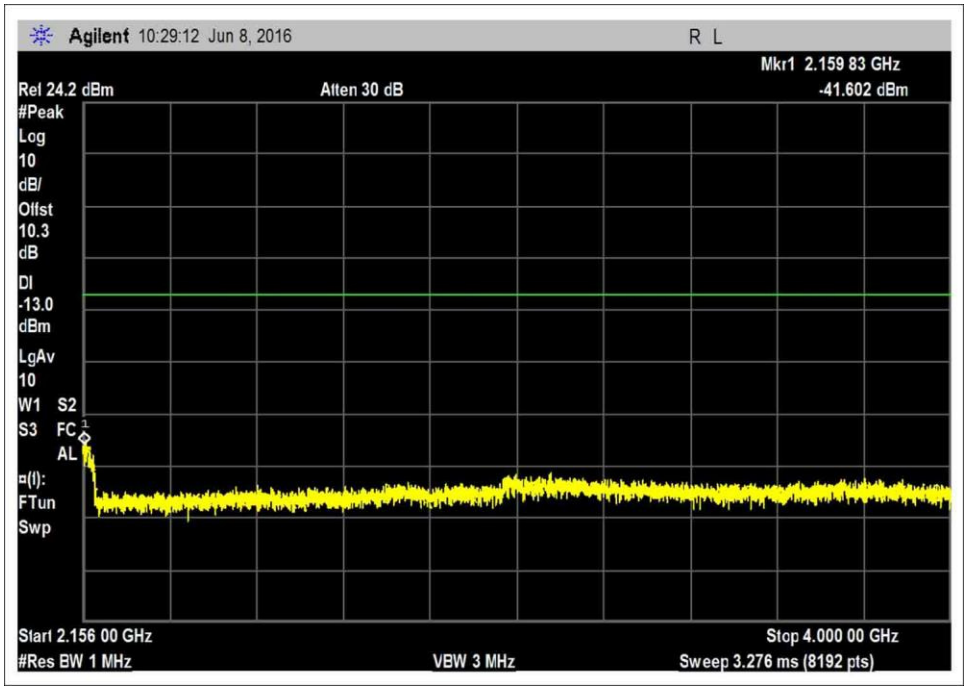
DL_1930-1995R4



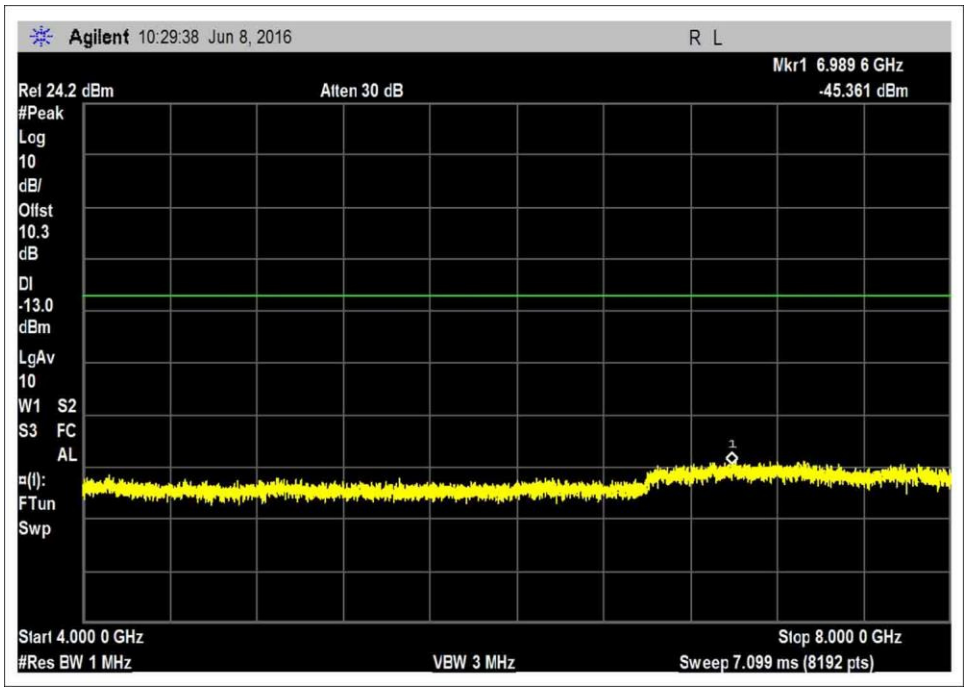
DL_1930-1995R5



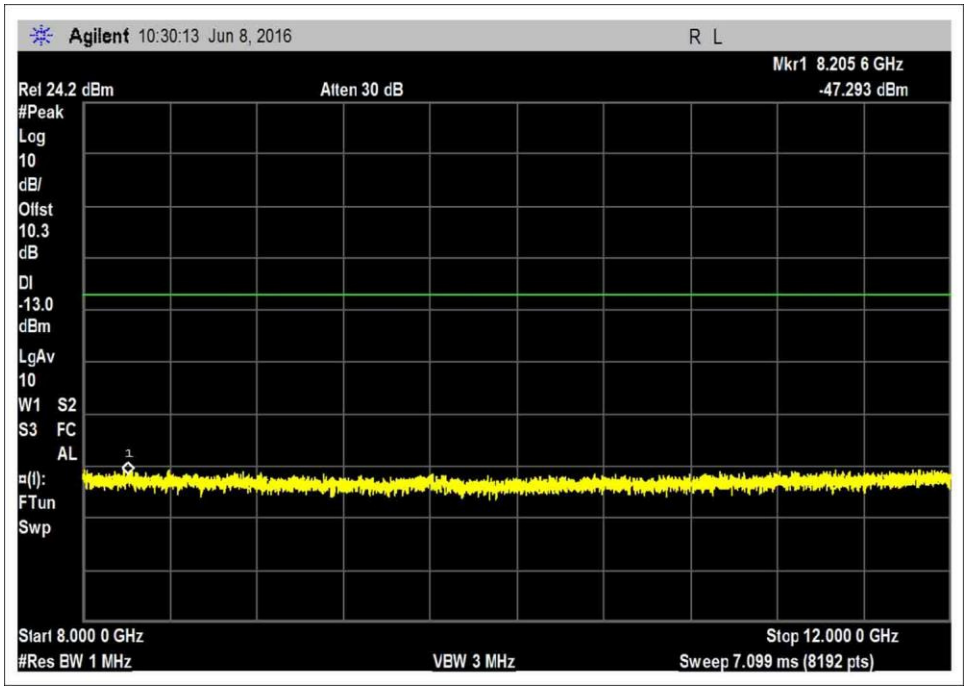
DL_2110-2155L



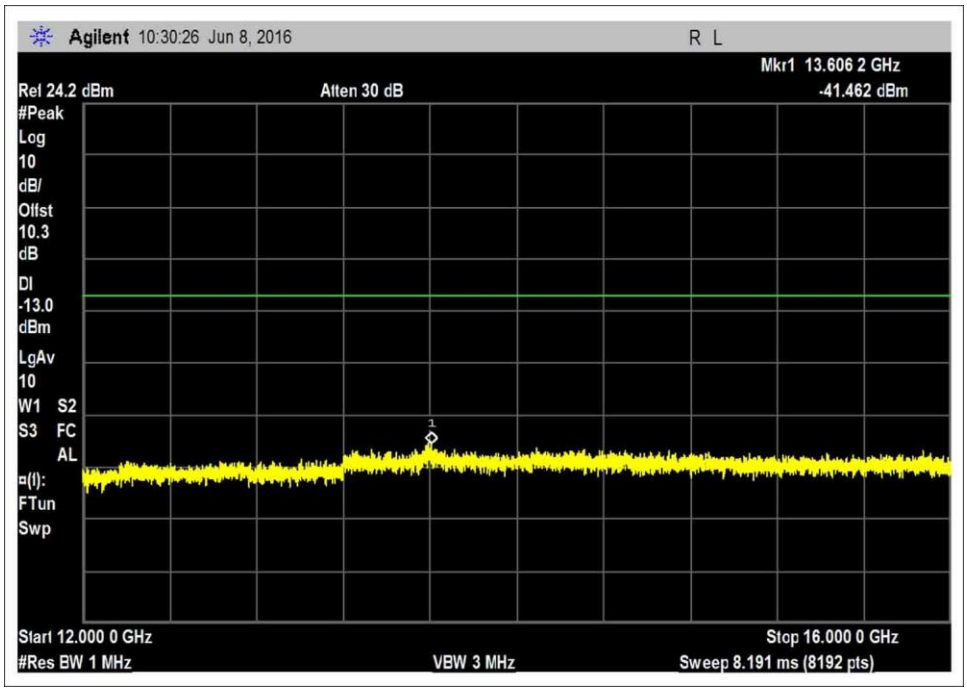
DL_2110-2155R1



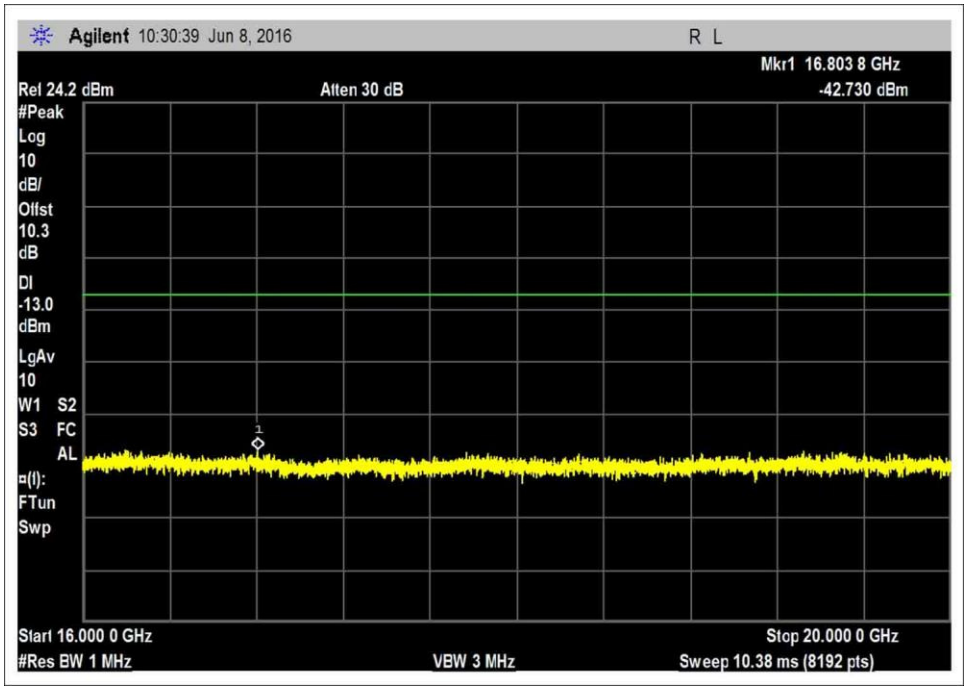
DL_2110-2155R2



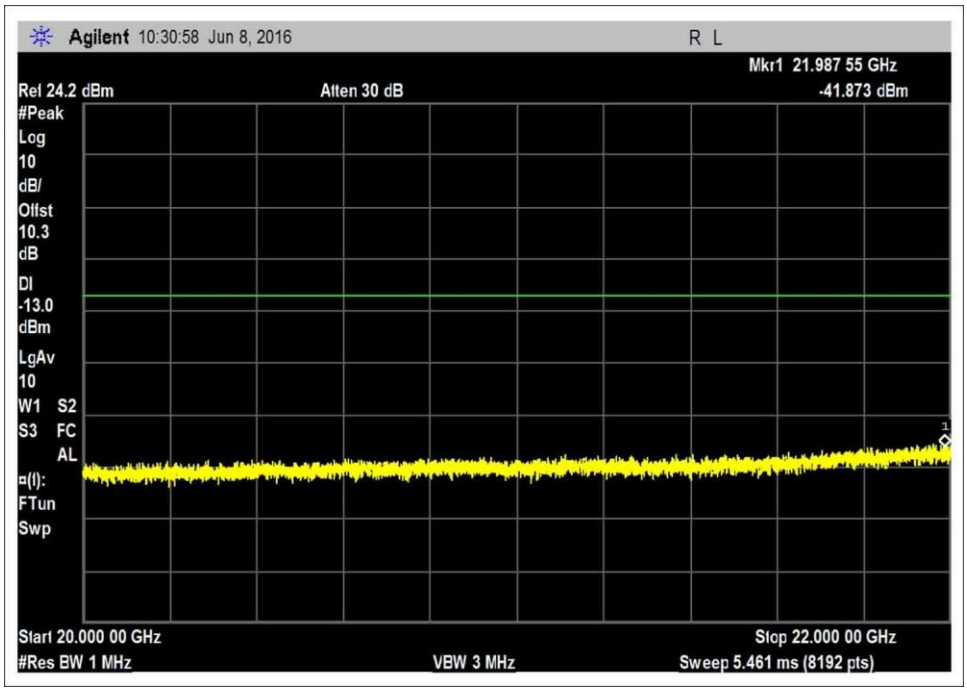
DL_2110-2155R3



DL_2110-2155R4



DL_2110-2155R5



DL_2110-2155R6

7.7 Noise limit

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.7 Noise Limit (Maximum Transmitter Noise Power Level / Variable UL Noise Timing)**		
Work Order #:	**98648**	Date:	06/06/2016
Test Type:	**Conducted Emissions**	Time:	09:03:37
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 7.7 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Note: **7.7.1 Maximum Transmitter Noise Power Level**
Per figure 3, input port was terminated with 50 Ohm Pasternack load (MN: PE6187 and SN: 1443).
Input donor port was terminated with 50 Ohm Pasternack load via a 75/50 Ohm impedance matching pad.

7.7.2 Variable UL Noise Timing
Per figure 4, server port was terminated with 50 Ohm Pasternack load (MN: PE6187 and SN: 1443).

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	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
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

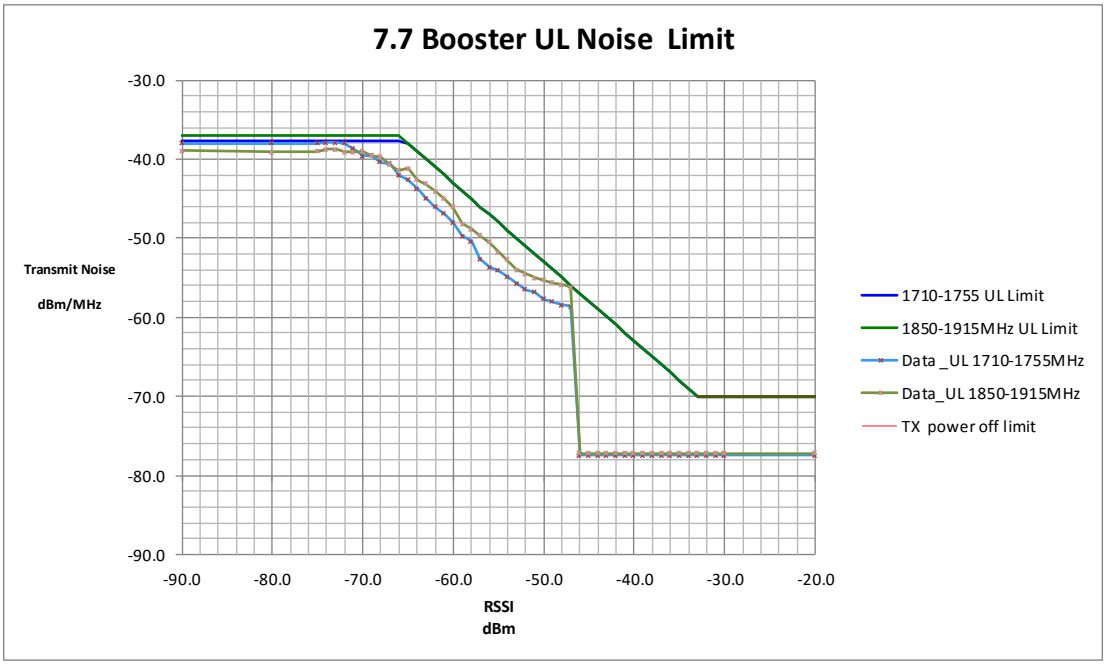
Summary of Results

7.7.1 Maximum transmitter noise power level

- 7.7.1 a-g: Maximum transmitter noise with 50-ohm shielded load

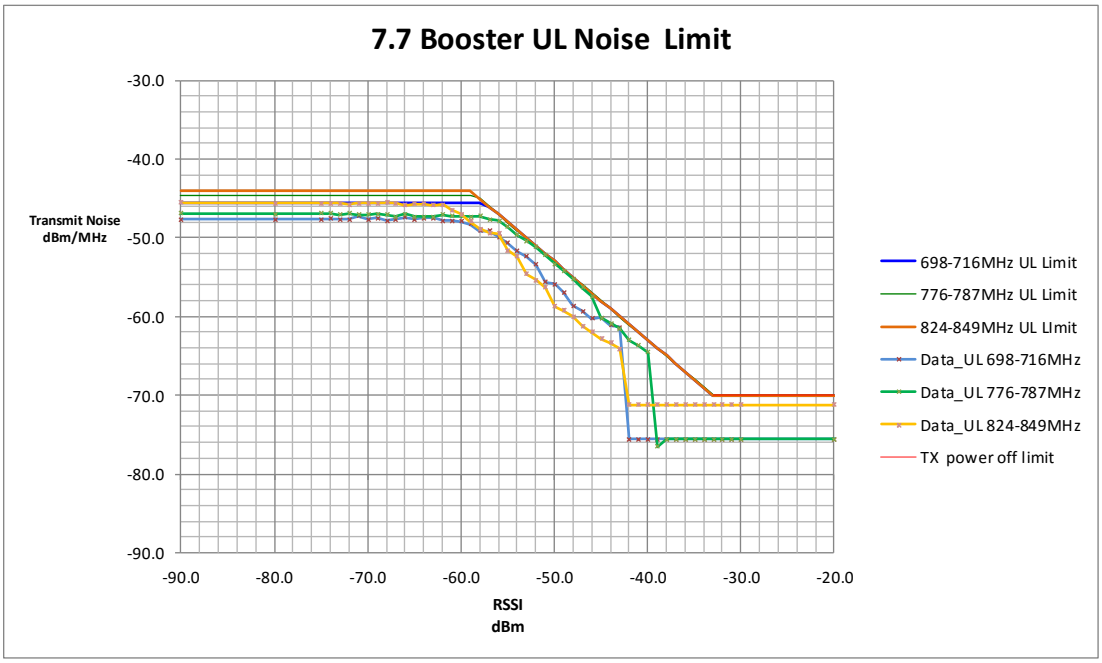
Maximum Noise Power			
Freq	Measured	Limit	Margin
MHz	dBm./MHz	dBm/MHz	
UL 1710-1755	-38.20	-37.7	-0.5
UL 1850-1915	-38.30	-37.0	-1.3
UL 824-849	-45.40	-44.1	-1.3
UL 698-716	-46.50	-45.5	-1.0
UL 776-787	-45.60	-44.6	-1.0
DL 2110-2155	-38.30	-37.7	-0.6
DL 1930-1995	-39.00	-37.0	-2.0
DL 869-894	-45.70	-44.1	-1.6
DL 728-746	-47.10	-45.5	-1.6
DL 746-757	-49.30	-44.6	-4.7

- 7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal



1710.0	1755.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-37.9		-37.7		-0.2
-73.0	-37.9		-37.7		-0.2
-65.0	-42.6	-38.0			-4.6
-49.0	-58.0	-54.0			-4.0
-48.0	-58.5	-55.0			-3.5
-47.0	-58.6	-56.0			-2.6
-32.0	-77.5			-70	-7.5

1850.0	1915.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-38.8		-37.0		-1.8
-73.0	-38.8		-37.0		-1.8
-50.0	-55.3	-53.0			-2.3
-49.0	-55.6	-54.0			-1.6
-48.0	-55.9	-55.0			-0.9
-47.0	-56.2	-56.0			-0.2
-32.0	-77.2			-70	-7.2



824.0	849.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-45.5		-44.1		-1.4
-68.0	-45.5		-44.1		-1.4
-56.0	-49.5	-47.0			-2.5
-35.0	-71.2	-68.0			-3.2
-34.0	-71.2	-69.0			-2.2
-33.0	-71.2	-70.0			-1.2
-32.0	-71.2			-70	-1.2

698.0	716.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-71.0	-47.2		-45.5		-1.7
-66.0	-47.4		-45.5		-1.9
-53.0	-52.4	-50.0			-2.4
-45.0	-60.2	-58.0			-2.2
-44.0	-61.1	-59.0			-2.1
-43.0	-61.4	-60.0			-1.4
-32.0	-75.6			-70	-5.6

776.0	787.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-46.9		-44.6		-2.3
-72.0	-46.9		-44.6		-2.3
-52.0	-51.2	-51.0			-0.2
-51.0	-52.2	-52.0			-0.2
-49.0	-54.2	-54.0			-0.2
-48.0	-55.2	-55.0			-0.2
-32.0	-75.6			-70	-5.6

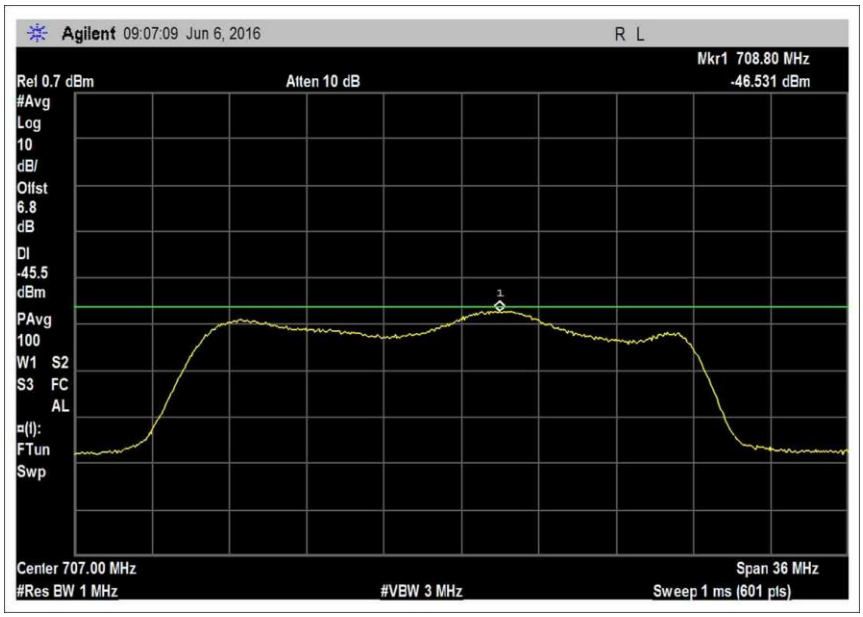
7.7.2 Variable uplink noise timing

Uplink Noise Timing		
Freq	Measured	Limit
MHz	Sec	sec
UL1710-1755	0.35	3
UL1850-1915	0.37	3
UL824-849	0.30	3
UL 698-716	0.27	3
UL776-787	0.27	3

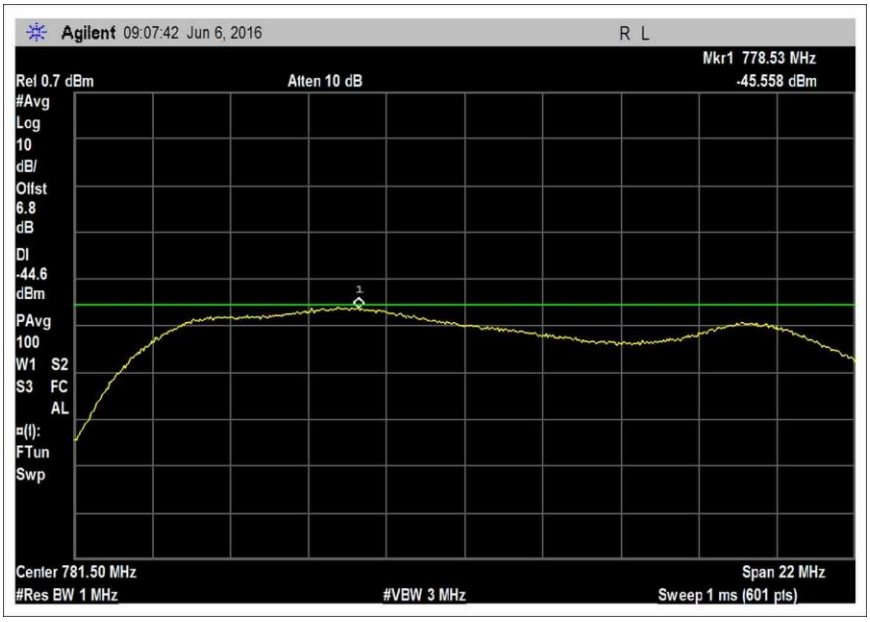
7.7.1 Maximum Transmitter Noise Power Level

Plots

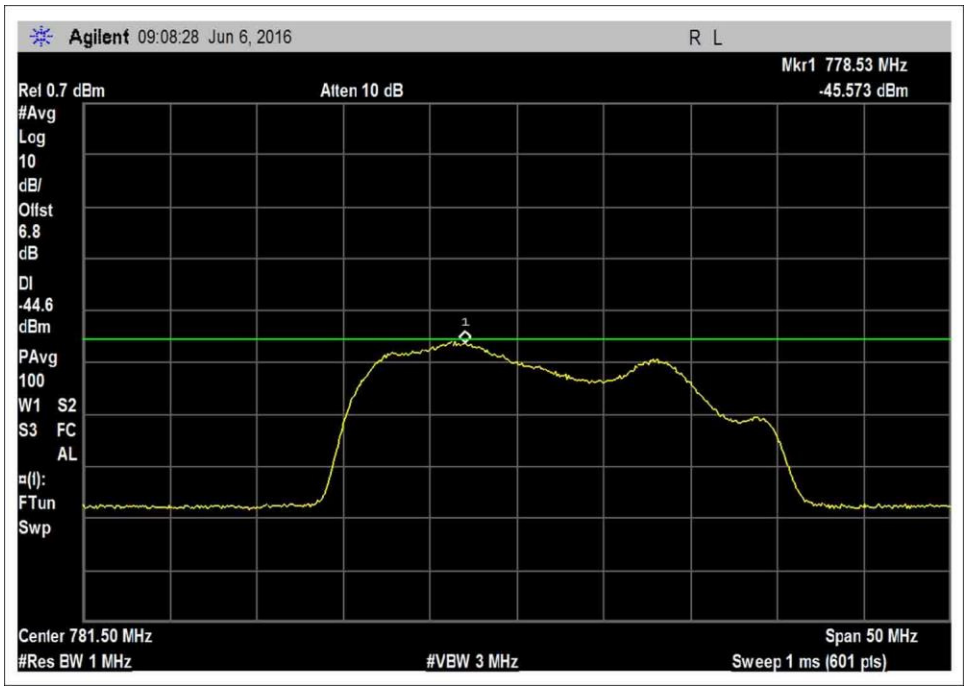
a – g Noise 50, UL



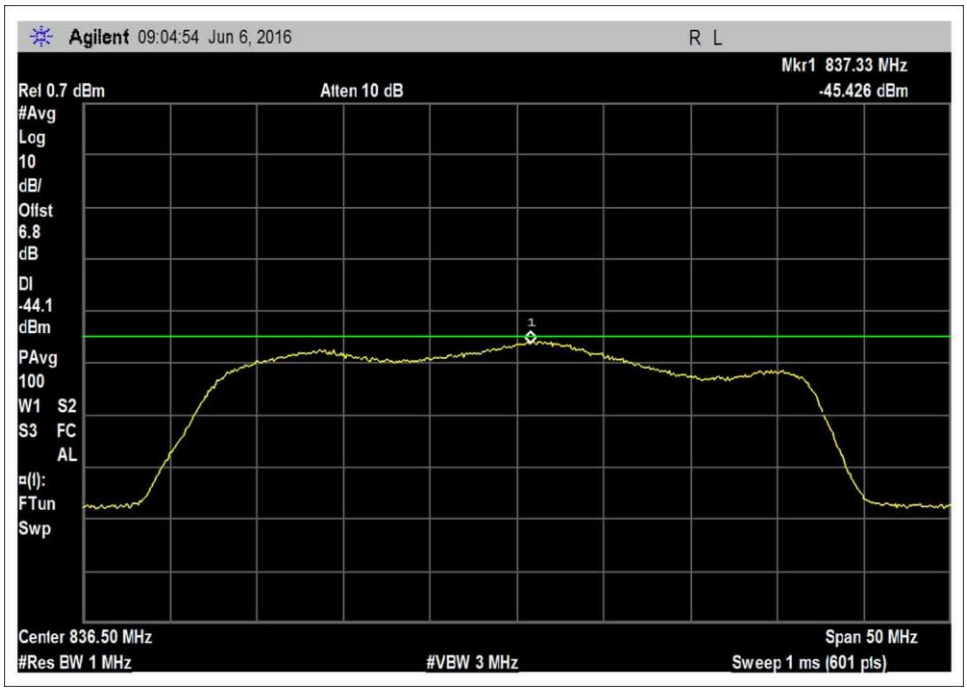
7.7_Noise_UL_698-716MHz



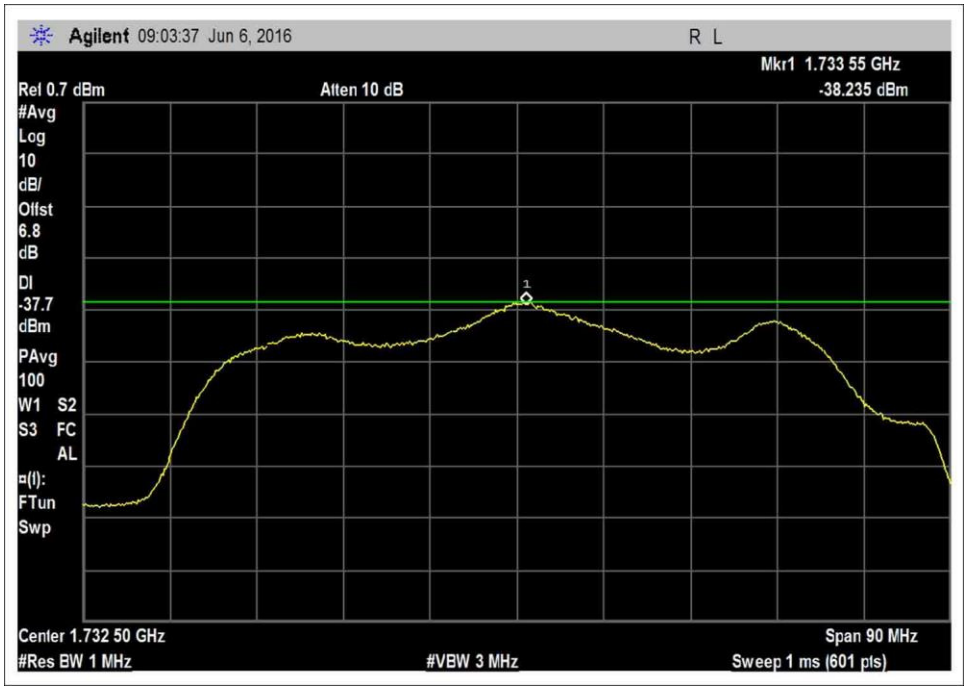
7.7_Noise_UL_776-787MHz



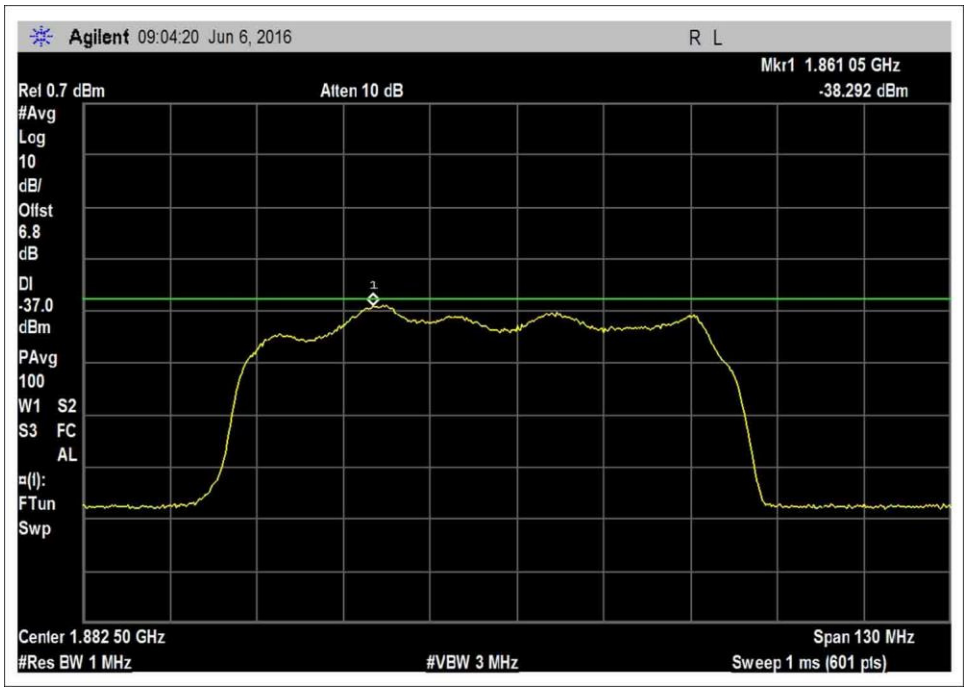
7.7_Noise_UL_776-787MHz-Zoom



7.7_Noise_UL_824-849MHz

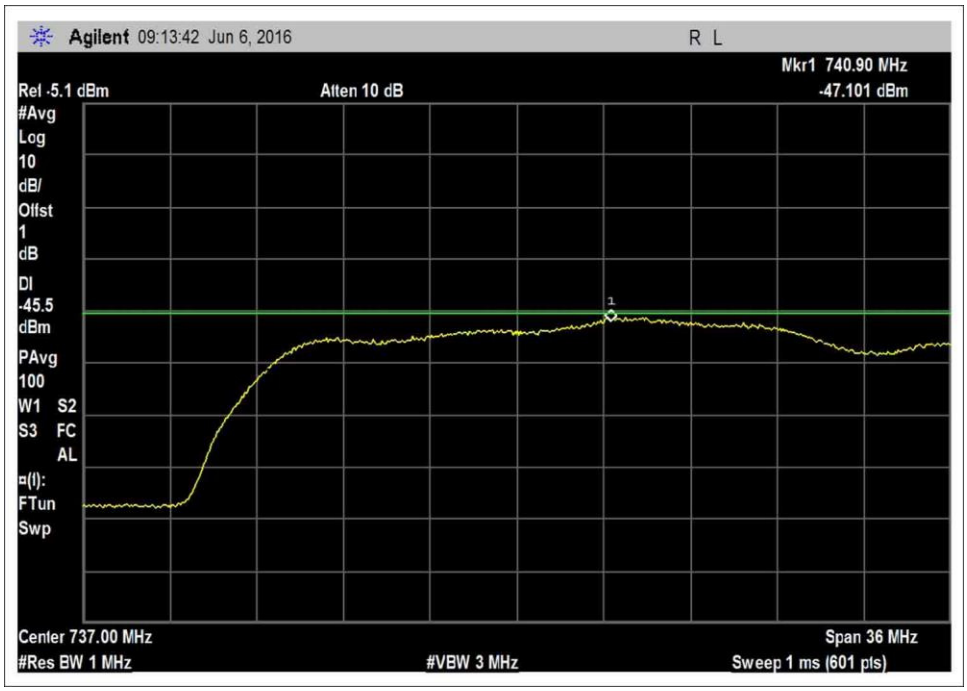


7.7_Noise_UL_1710-1755MHz

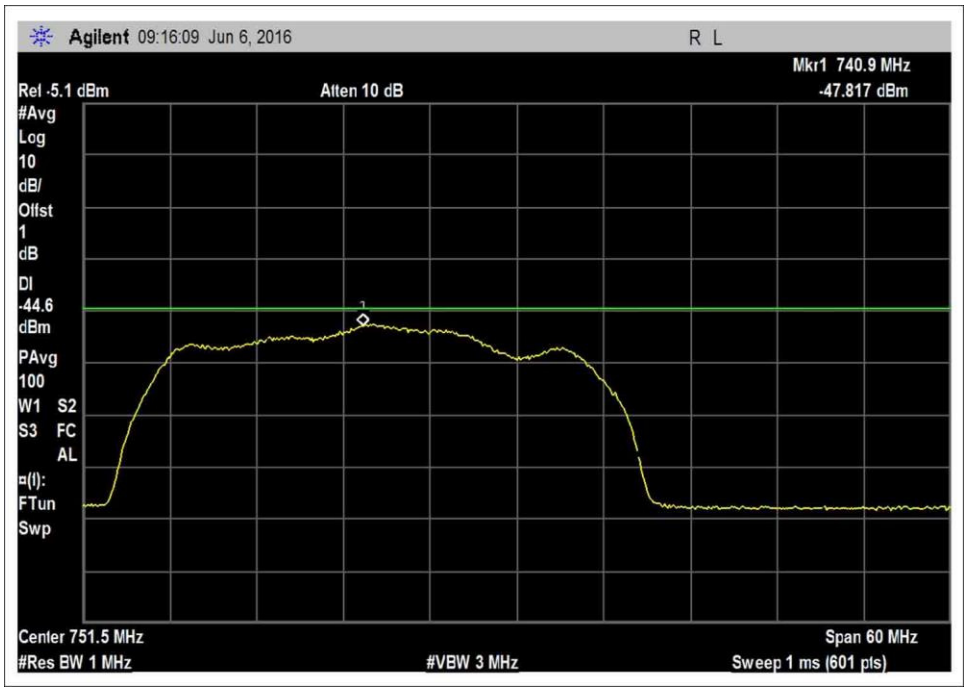


7.7_Noise_UL_1850-1915MHz

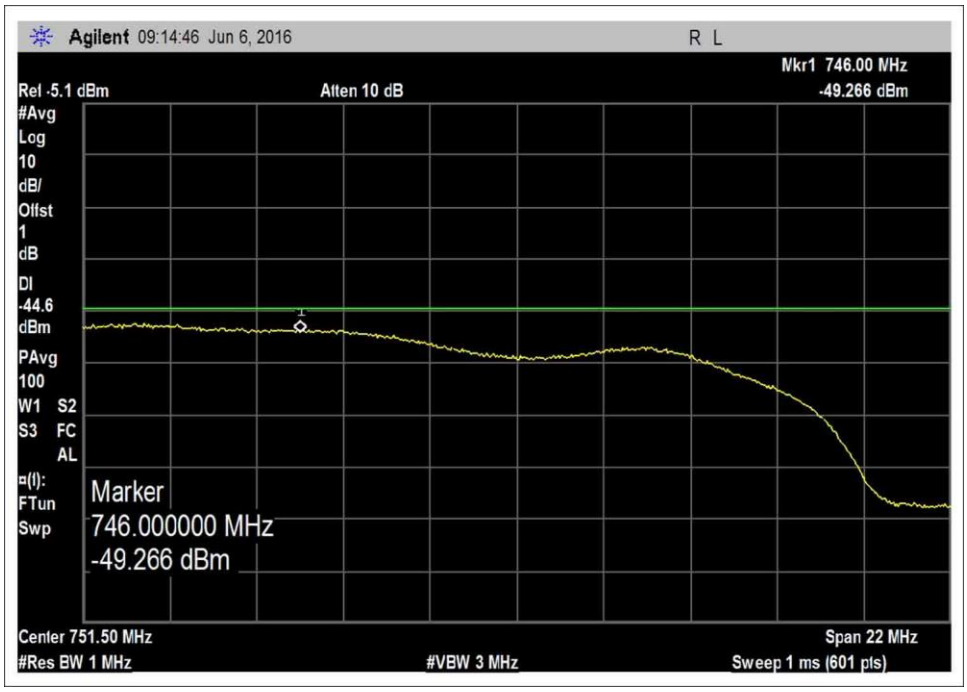
a – g Noise 50, DL



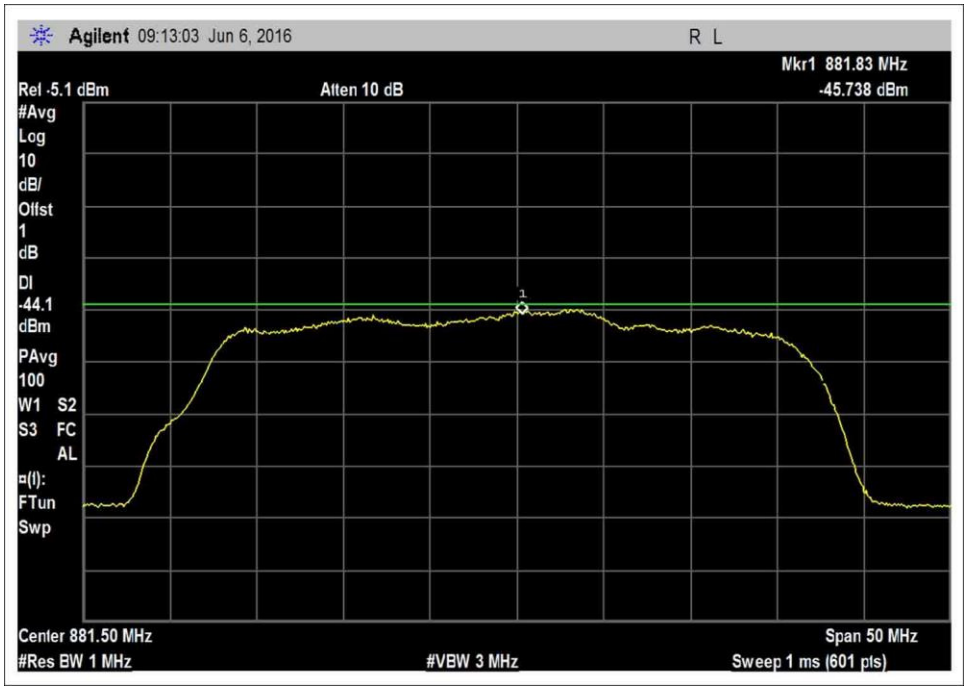
7.7_Noise_DL_728-746MHz



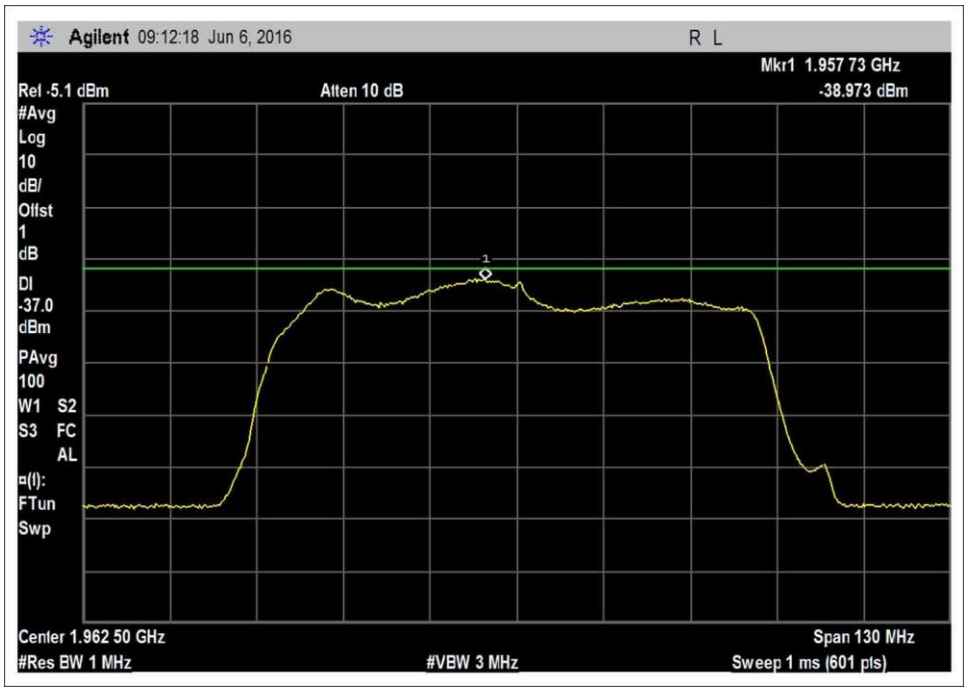
7.7_Noise_DL_728-757MHz-Zoom



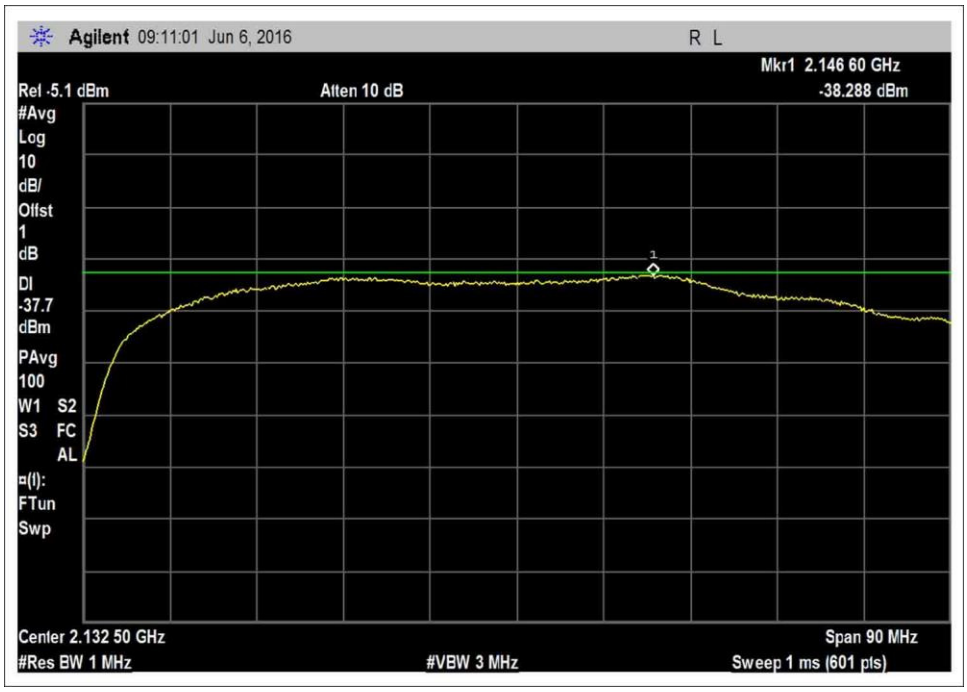
7.7_Noise_DL_746-757MHz



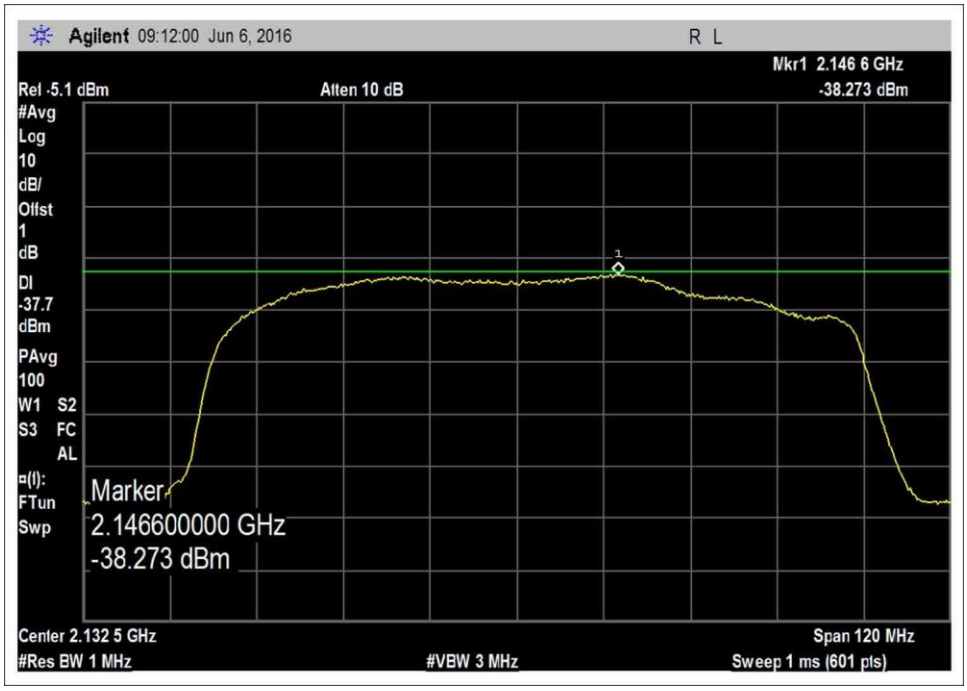
7.7_Noise_DL_869-894MHz



7.7_Noise_DL_1930-1995MHz



7.7_Noise_DL_2110-2155MHz



7.7_Noise_DL_2110-2155MHz-Zoom

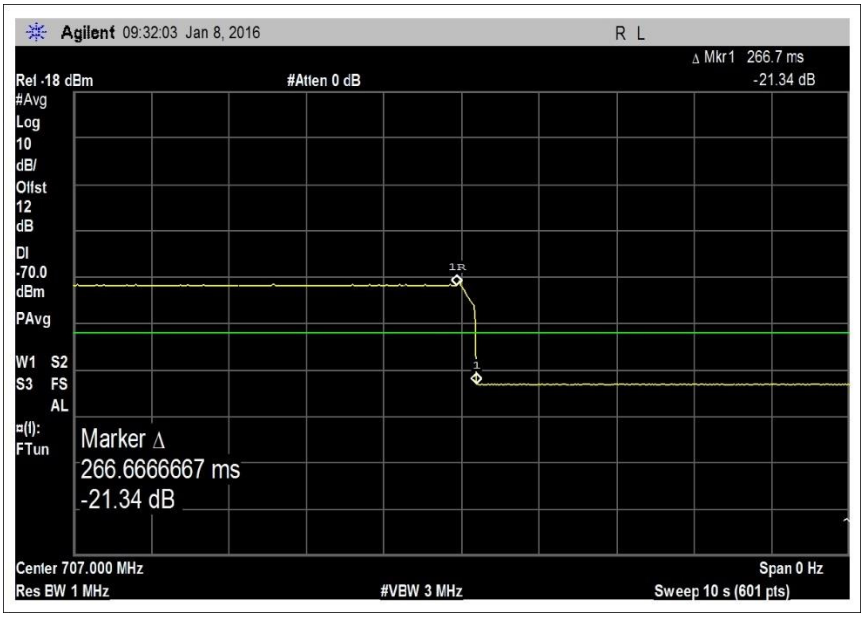
h – n Tx Noise

Note: For this subsection, see summary of results of 7.7.
7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal.

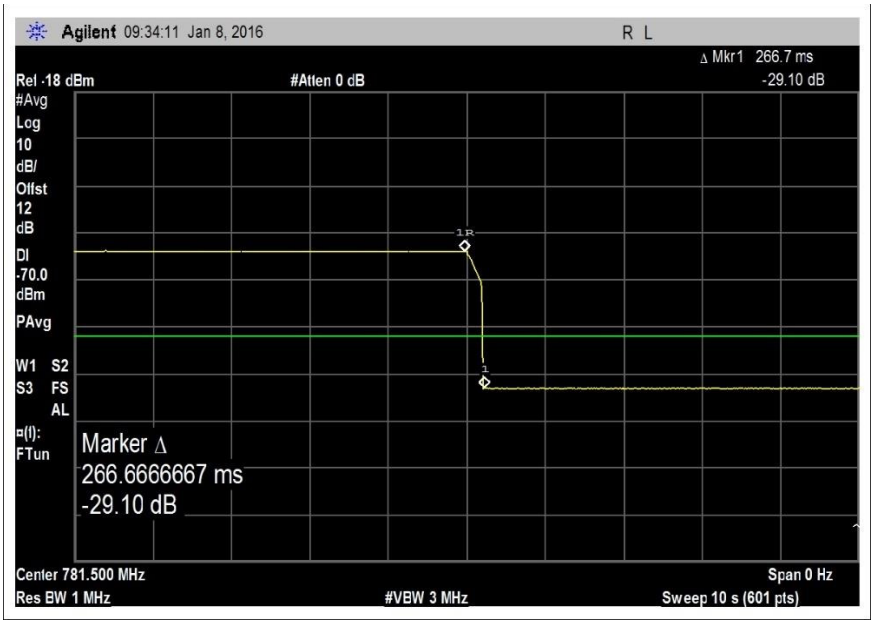
7.7.2 Variable UL Noise Timing

Plots

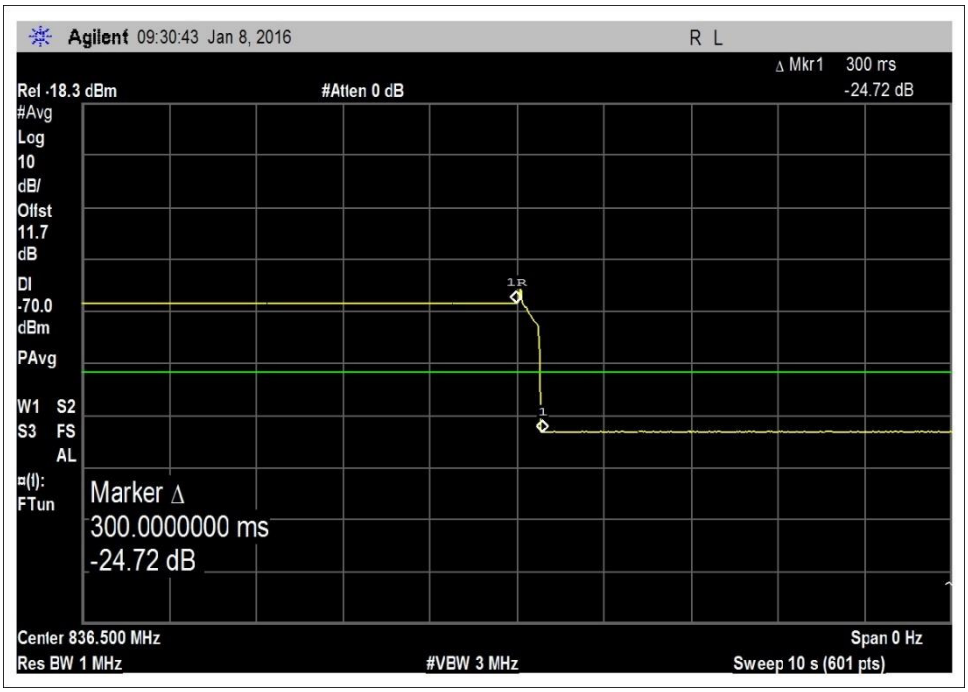
a – g Timing, UL



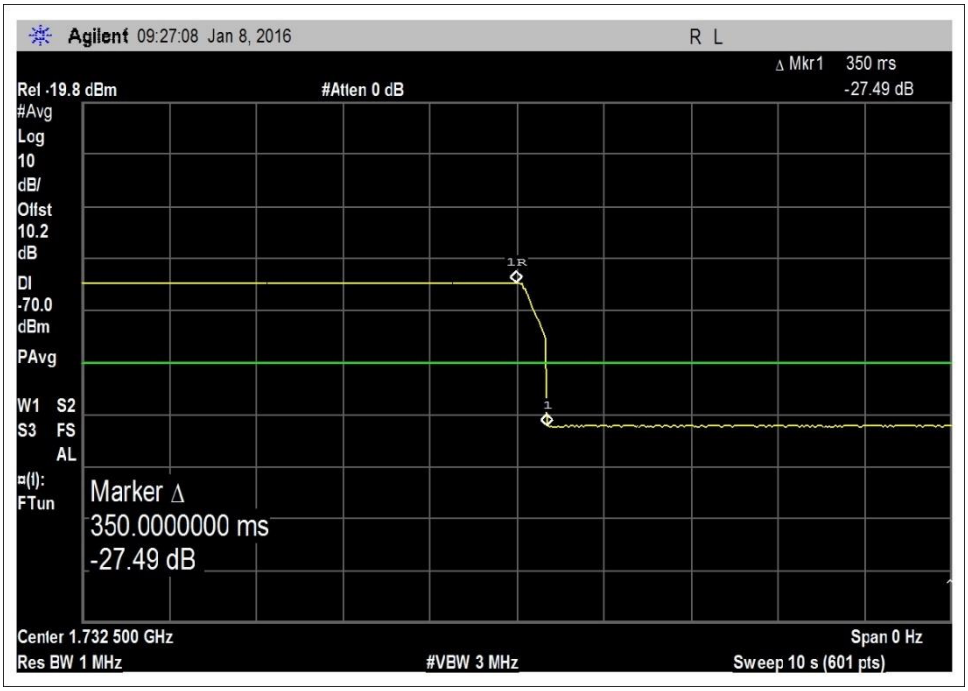
7.7_VarNoise_UL_698-716MHz



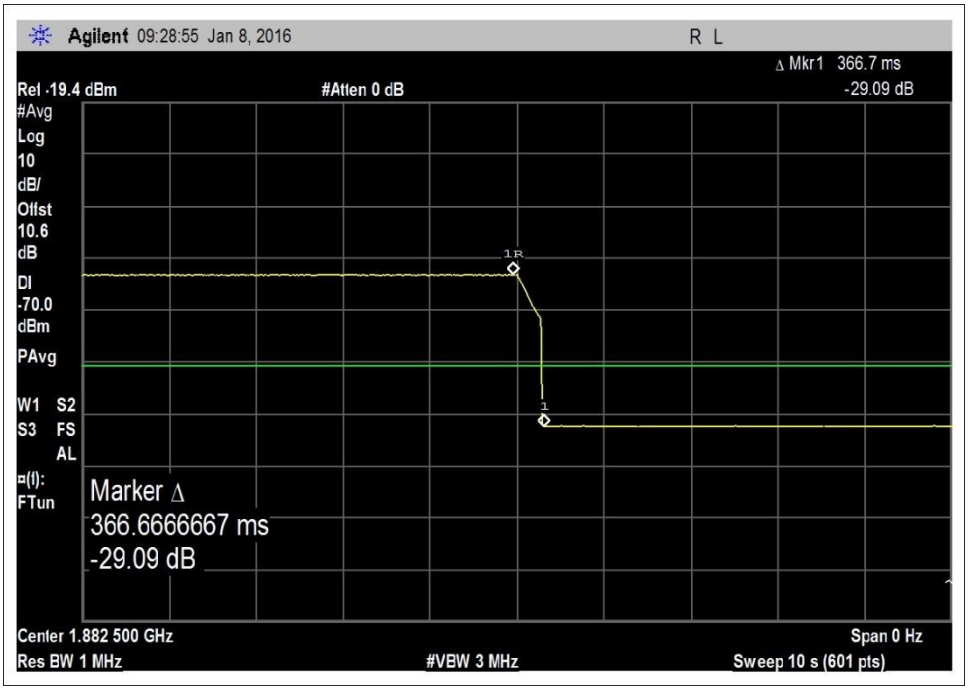
7.7_VarNoise_UL_776-787MHz



7.7_VarNoise_UL_824-849MHz



7.7_VarNoise_UL_1710-1755MHz



7.7_VarNoise_UL_1850-1915MHz

7.8 Uplink Inactivity

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.8 Uplink Inactivity**		
Work Order #:	**98648**	Date:	06/06/2016
Test Type:	**Conducted Emissions**	Time:	11:51:23
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 7.8 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

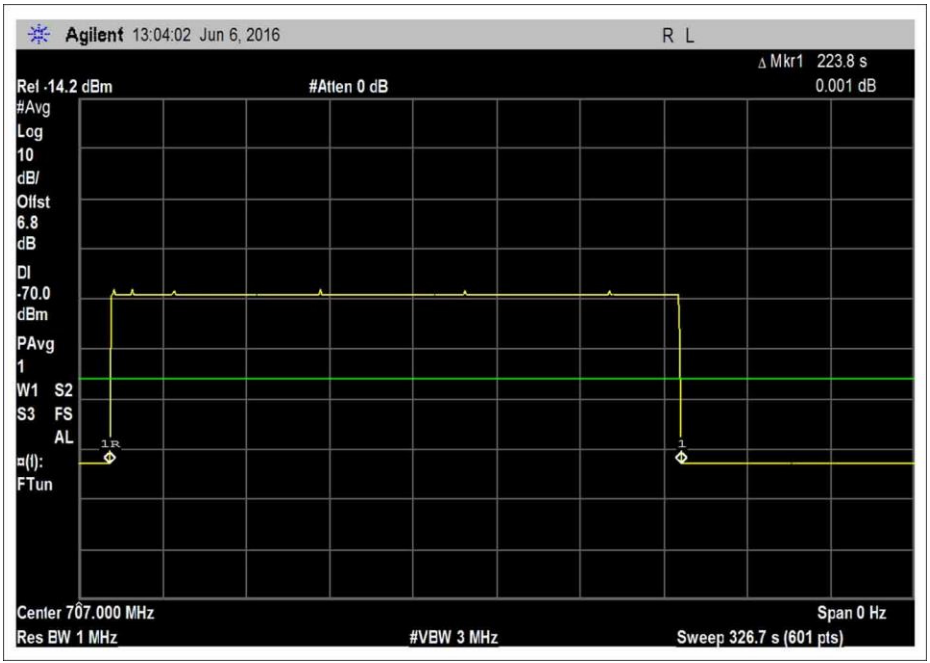
Summary of Results

Pass: As demonstrated, when the booster is not serving an active device connection after 5 minutes the uplink noise power does not exceed -70dBm/MHz

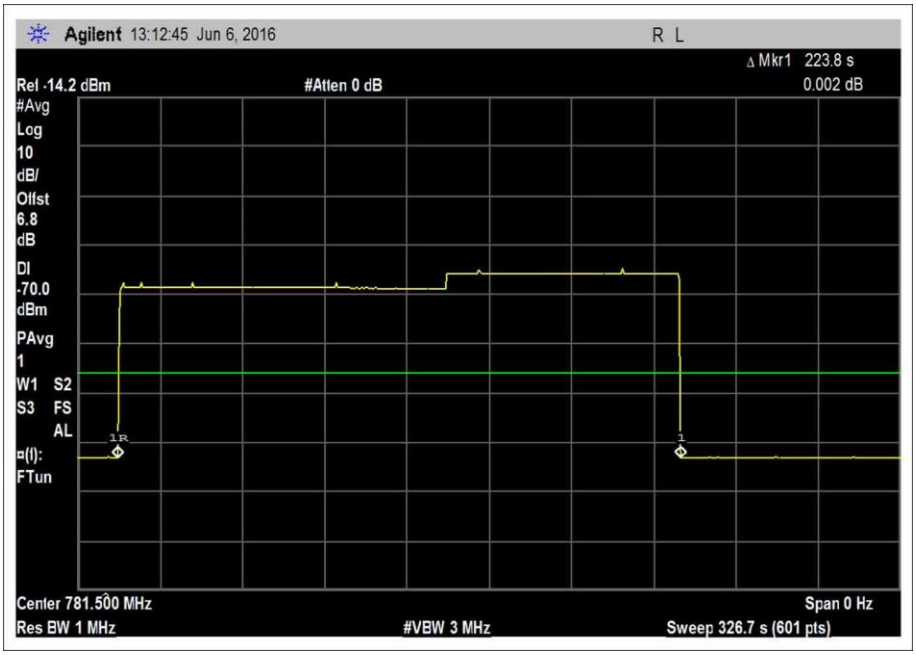
Uplink Inactivity		
Freq	**Measured**	**Limit**
MHz	**Min**	**Min**
UL1710-1755	3.7	5.0
UL1850-1915	3.7	5.0
UL824-849	3.7	5.0
UL 698-716	3.7	5.0
UL776-787	3.7	5.0

Plots

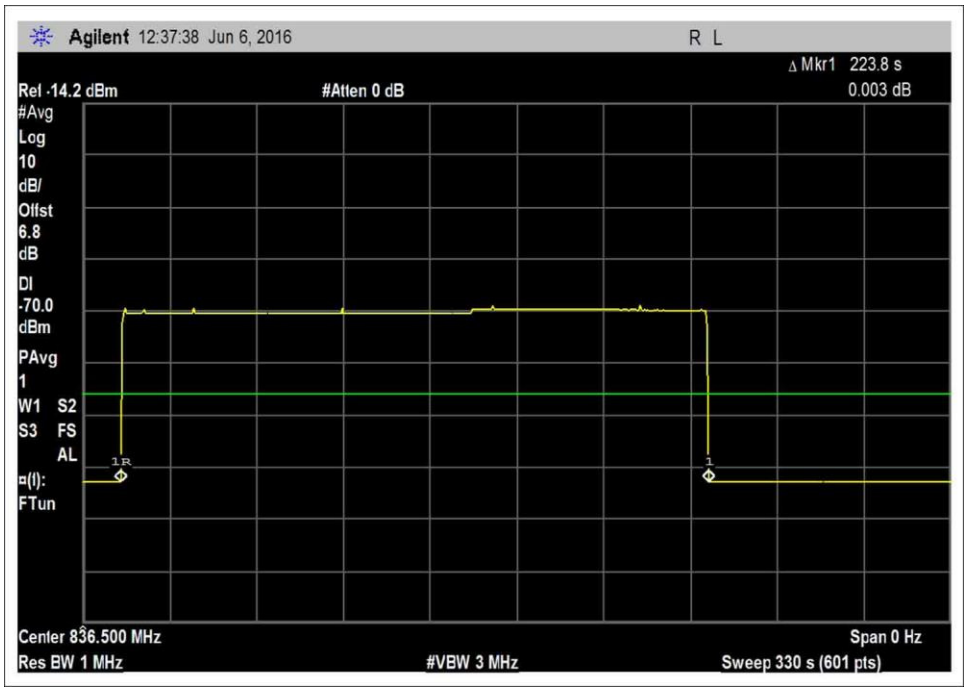
UL



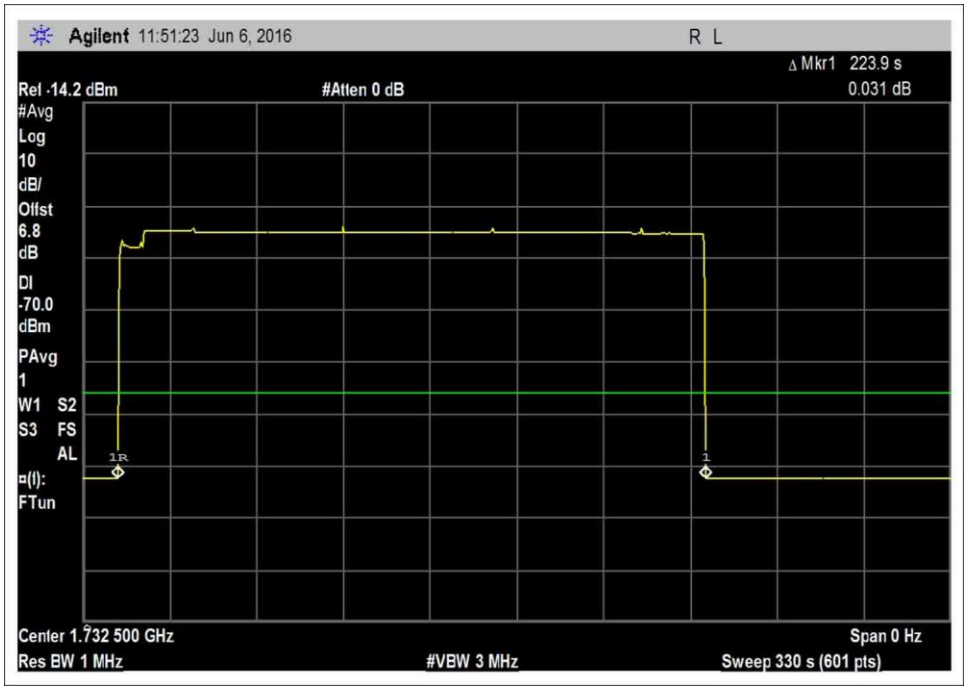
7.8_Inactivity_UL_698-707MHz



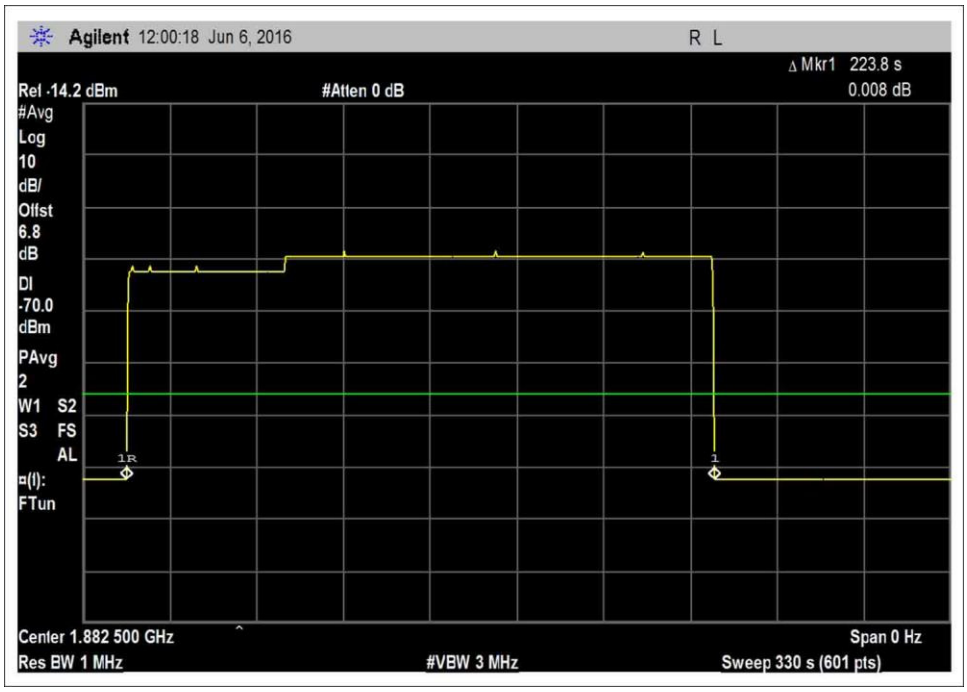
7.8_Inactivity_UL_776-787MHz



7.8_Inactivity_UL_824-849MHz



7.8_Inactivity_UL_1710-1755MHz



7.8_Inactivity_UL_1850-1915MHz

7.9 Booster Gain Limit

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.9 Variable Booster gain(Max Gain / Variable Uplink Gain Timing)**		
Work Order #:	**98648**	Date:	06/06/2016
Test Type:	**Conducted Emissions**	Time:	08:22:06
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 7.9 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.
Note: Used MSCL provided by the manufacture's antenna kitting.

Mobile station coupling loss (MSCL): *the minimum coupling loss (in dB) between the wireless device and the input (server) port of the consumer booster. MSCL must be calculated or measured for each band of operation and provided in compliance test reports. MSCL includes the path loss from the wireless device, and the booster's server antenna gain and cable loss. The wireless device is assumed to be an isotropic (0 dBi) antenna reference. Minimum standoff distances from inside wireless devices to the booster's server antenna must be reasonable and specified by the manufacturer in customer provided installation manuals.*

L P = 20logf + 20logd – 27.5
Where:

L P = basic free space path loss,
f = Center frequency,
d = 2 meters.

MSCL

Frequency (MHz)	MSCL (dB)
1850-1915	41.8
824-849	36.8
698-716	35.8
779-787	36.8
1710-1755	42.1

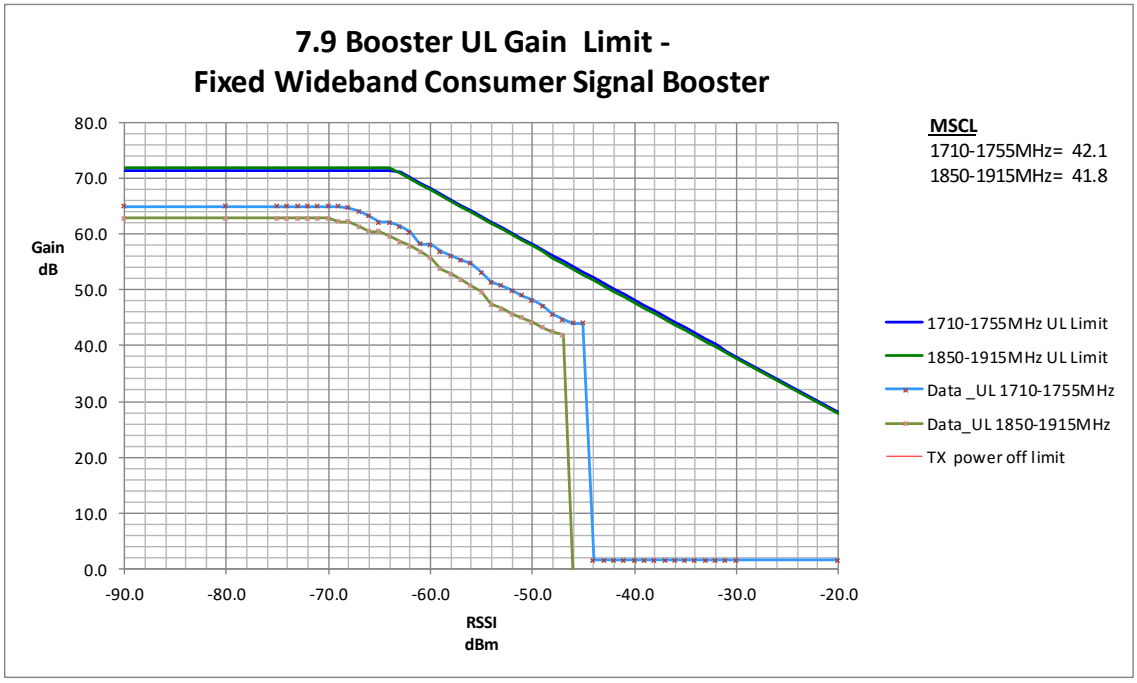
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	ANC00032	Signal Generator	E4433B	2/26/2016	2/26/2018
	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
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018
	ANC00087	Combiner	44000	1/7/2016	1/7/2018
	ANC00082	RF Coupler	722-10-1.500V	8/26/2015	8/26/2017
	ANP06138	Cable	32022-29094K-29094K-72TC	3/18/2015	3/18/2017

Summary of Results

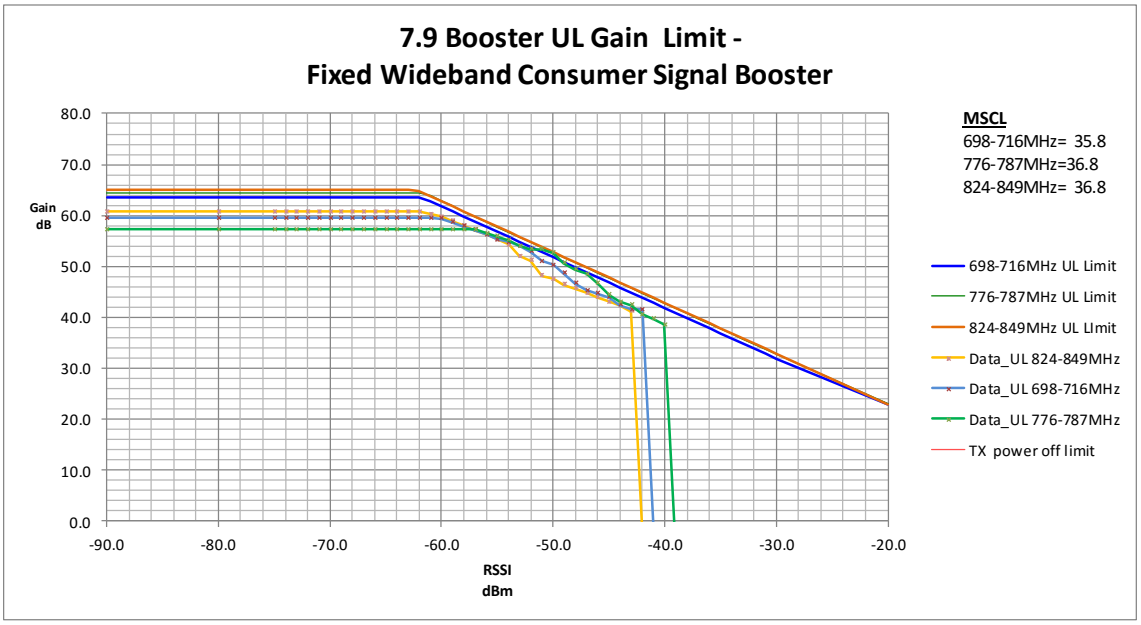
Pass: As demonstrated, computed gains are within the gain limit. All maximum variable uplink gain timings are within 3 second limit.

7.9.1 Maximum gain



1850.0			1915.0 MHz				
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-50.1	12.8	62.9		72.0		-9.1
-71.0	-50.1	12.8	62.9		72.0		-9.1
-63.0	-50.1	8.5	58.6	70.8			-12.2
-62.0	-50.1	7.8	57.9	69.8			-11.9
-61.0	-50.1	6.8	56.9	68.8			-11.9
-60.0	-50.1	5.6	55.7	67.8			-12.1

1710.0			1755.0 MHz				
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-52.5	12.4	64.9		71.3		-6.4
-70.0	-52.5	12.4	64.9		71.3		-6.4
-62.0	-52.5	7.9	60.4	70.1			-9.7
-57.0	-52.5	2.9	55.4	65.1			-9.7
-56.0	-52.5	2.2	54.7	64.1			-9.4
-45.0	-52.5	-8.5	44.0	53.1			-9.1



824.0			849.0 MHz				
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-48.0	12.8	60.8		64.9		-4.1
-69.0	-48.0	12.8	60.8		64.9		-4.1
-57.0	-48.0	9.1	57.1	59.8			-2.7
-56.0	-48.0	8.3	56.3	58.8			-2.5
-55.0	-48.0	7.3	55.3	57.8			-2.5
-54.0	-48.0	6.2	54.2	56.8			-2.6

698.0			716.0 MHz				
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-74.0	-47.5	12.0	59.5		63.5		-4.0
-69.0	-47.5	12.0	59.5		63.5		-4.0
-55.0	-47.5	7.8	55.3	56.8			-1.5
-54.0	-47.5	7.2	54.7	55.8			-1.1
-53.0	-47.5	6.5	54.0	54.8			-0.8
-52.0	-47.5	5.4	52.9	53.8			-0.9

776.0			787.0 MHz				
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-75.0	-45.3	12.0	57.3		64.4		-7.1
-72.0	-45.3	12.0	57.3		64.4		-7.1
-51.0	-45.3	8.1	53.4	53.8			-0.4
-50.0	-45.3	7.3	52.6	52.8			-0.2
-49.0	-45.3	5.3	50.6	51.8			-1.2
-47.0	-45.3	3.2	48.5	49.8			-1.3

7.9.2 Variable Uplink Gain Timing

Uplink Gain Timing		
Frequency (MHz)	Measured (Sec)	Limit (Sec)
UL 1710-1755	2.3	3
UL 1850-1915	2.3	3
UL 824-849	2.3	3
UL 698-716	2.3	3
UL 776-787	2.3	3

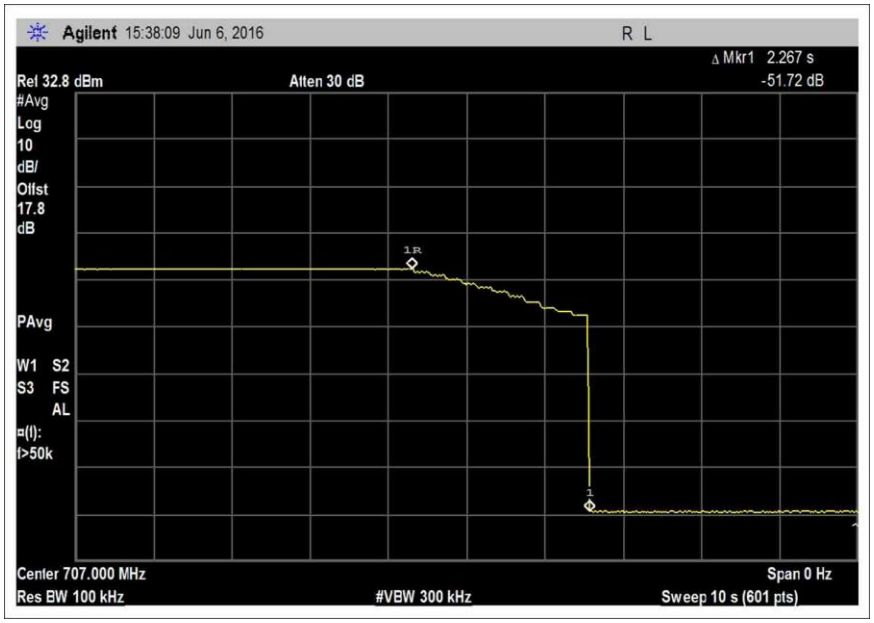
7.9.1 Maximum Gain

Note: For this subsection, see summary of results of 7.9.
7.9.1 Maximum gain

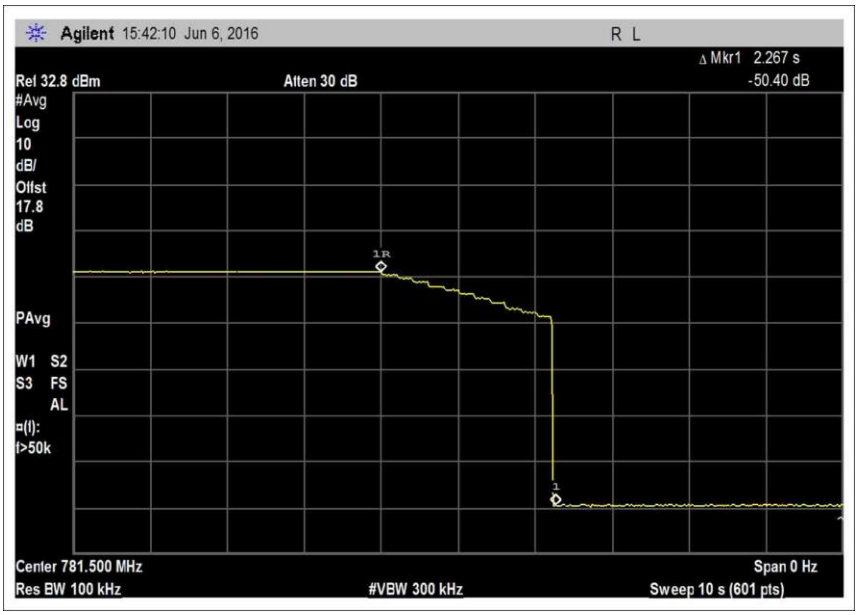
7.9.2 Variable uplink Gain Timing

Plots

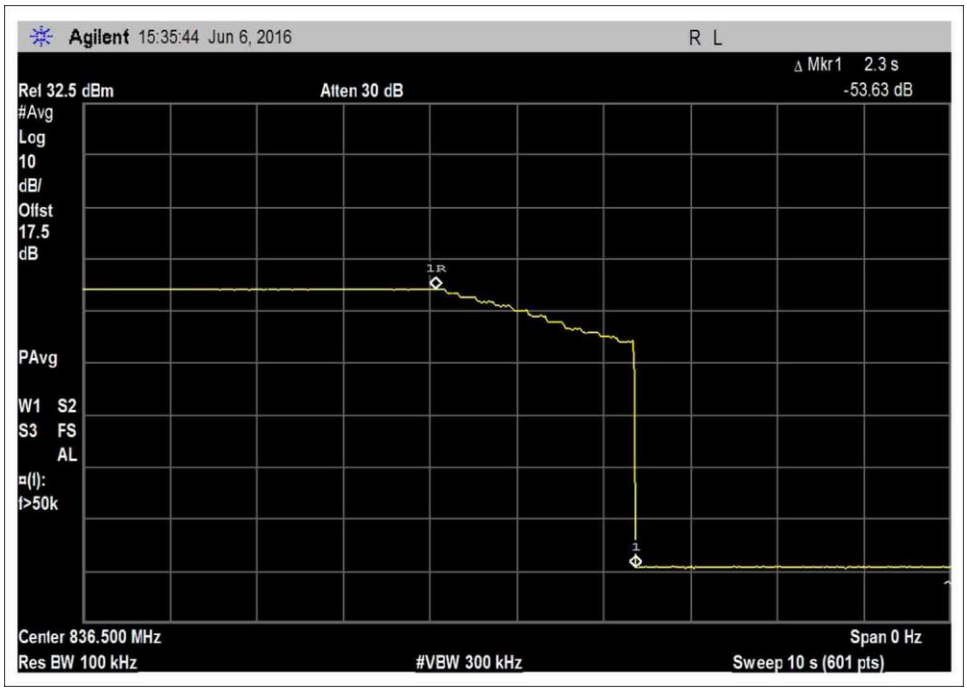
UL



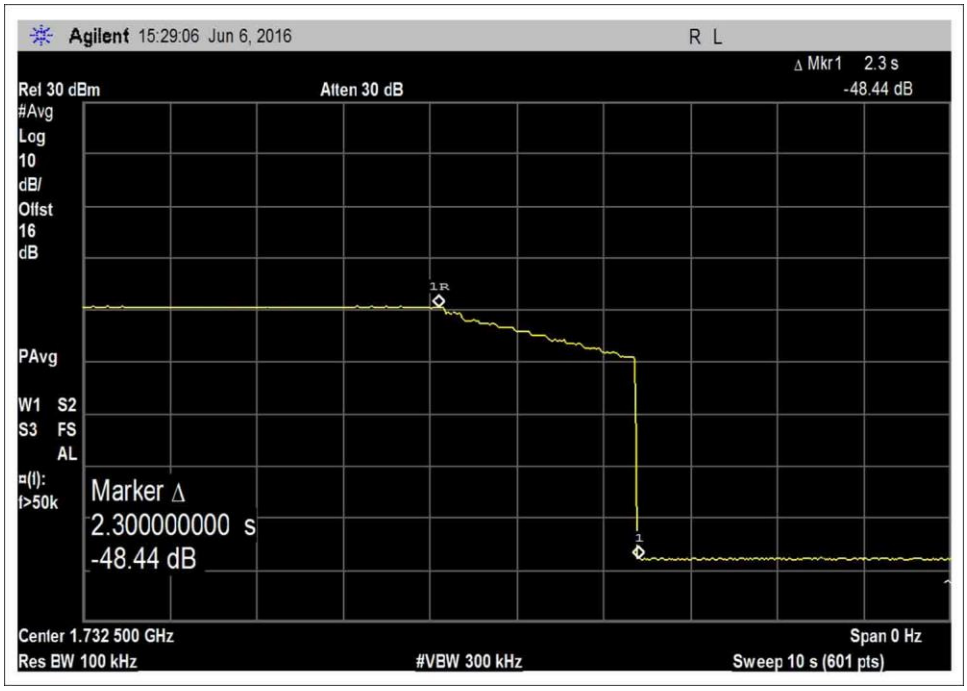
7.9.2_VarULGainTiming_UL_698-716MHz



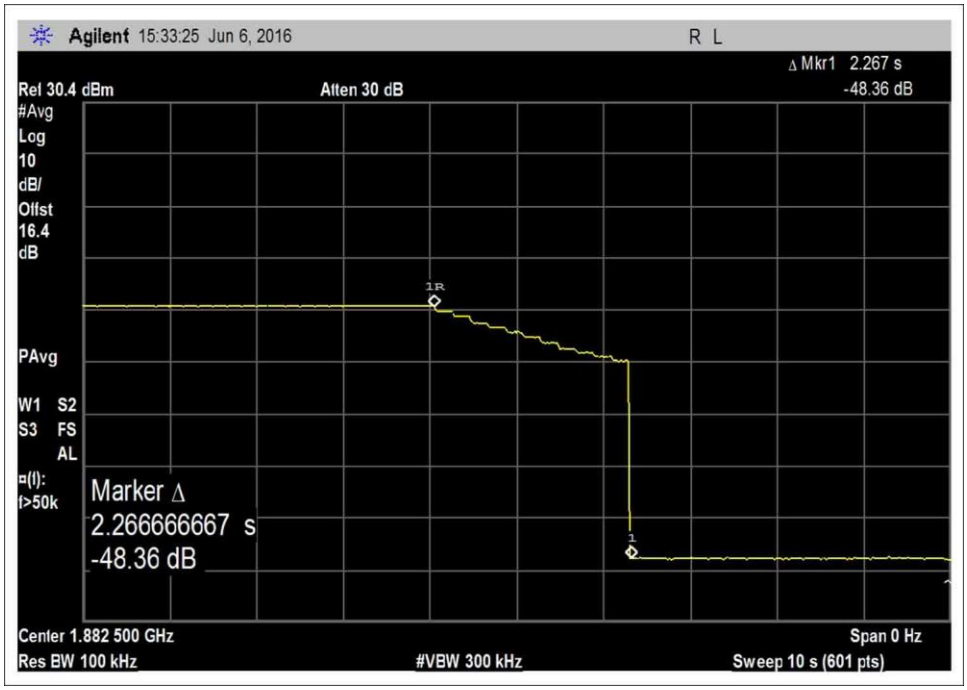
7.9.2_VarULGainTiming_UL_776-787MHz



7.9.2_VarULGainTiming_UL_824-849MHz



7.9.2_VarULGainTiming_UL_1710-1755MHz



7.9.2_VarULGainTiming_UL_1850-1915MHz

7.10 - Occupied Band Width

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.10 Occupied Band Width / 47 CFR §2.1049 Occupied Band Width**		
Work Order #:	**98648**	Date:	06/08/2016
Test Type:	**Conducted Emissions**	Time:	14:43:16
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: 23.1°C
Relative Humidity: 42%
101.2 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 7.10 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Test Equipment:

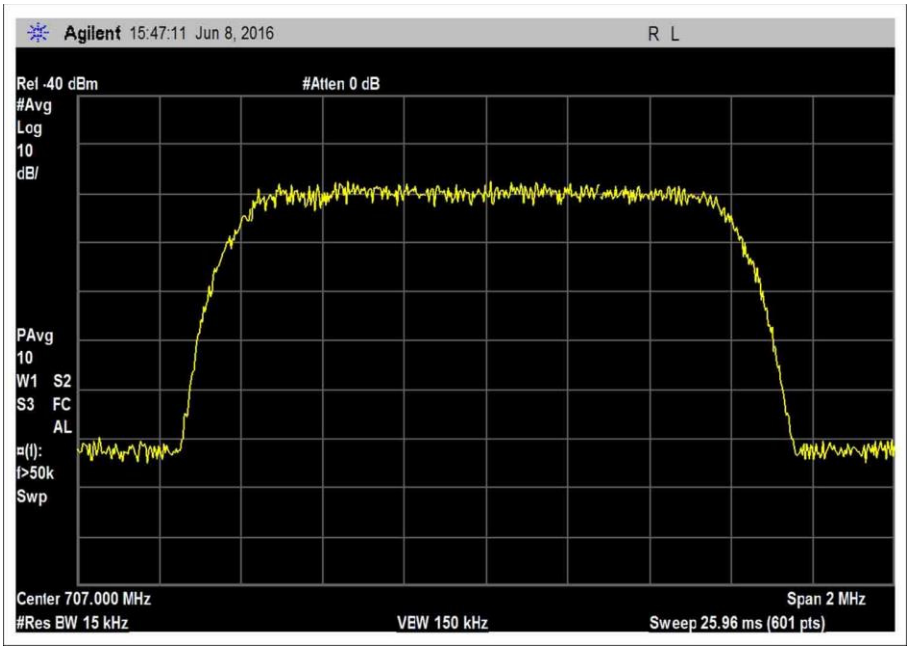
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

Summary of Results

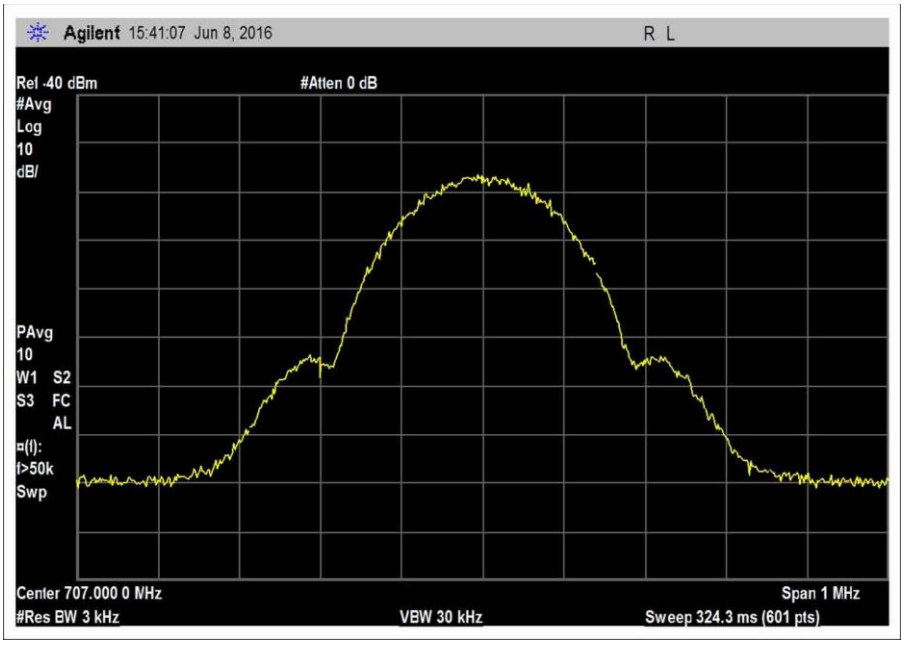
Pass: As summarized in plots below, the uniformity of the output signal relative to the input signal are practically identical. Therefore, the comparison is within limits.

Plots

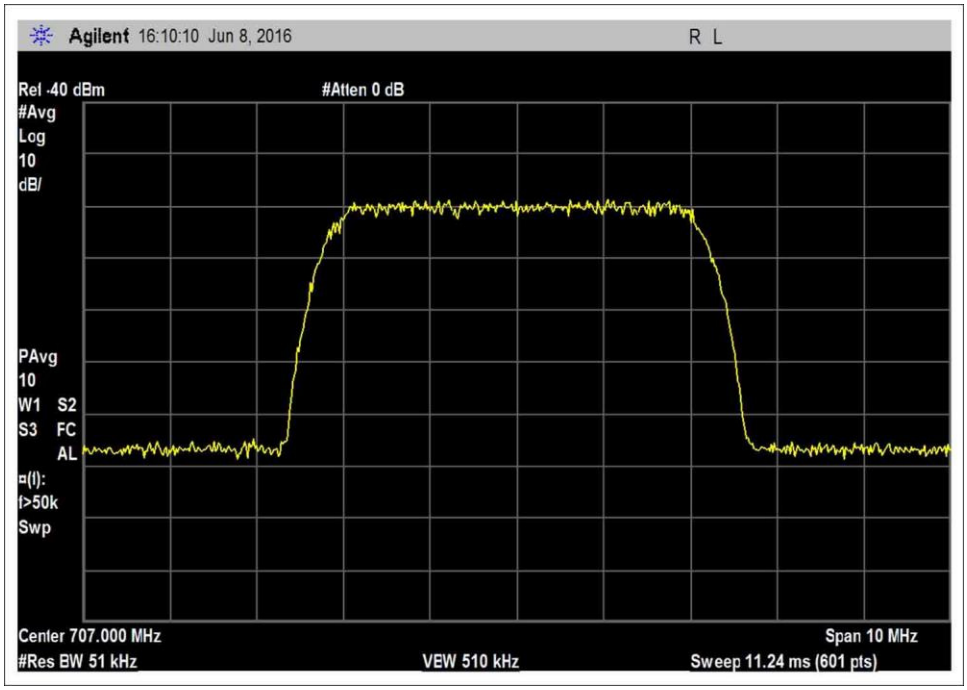
Input - UL



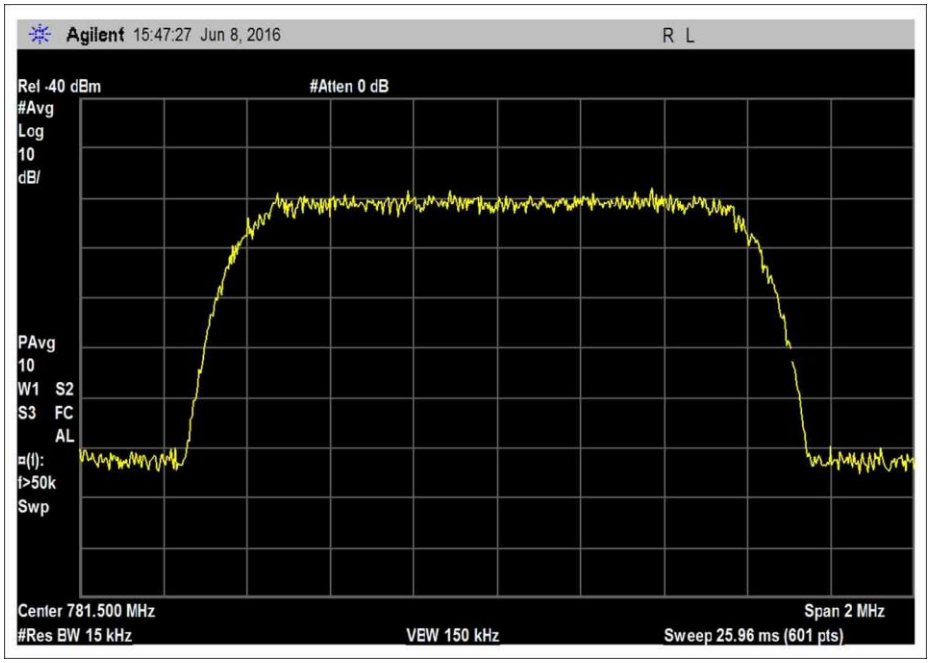
7.10_OBW_UL_698-716MHz_CDMA



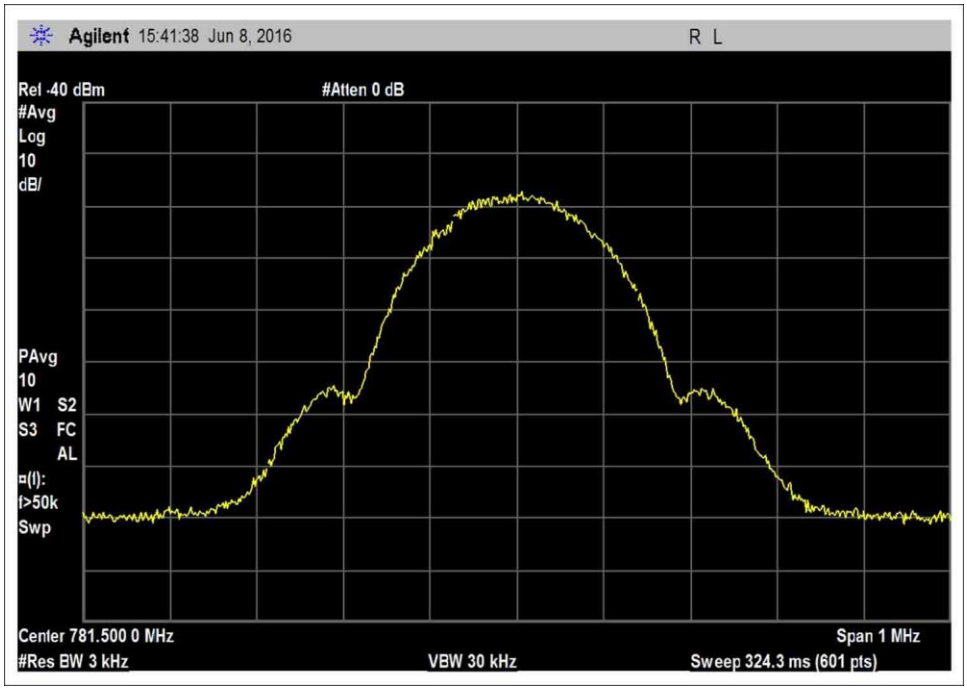
7.10_OBW_UL_698-716MHz_GSM



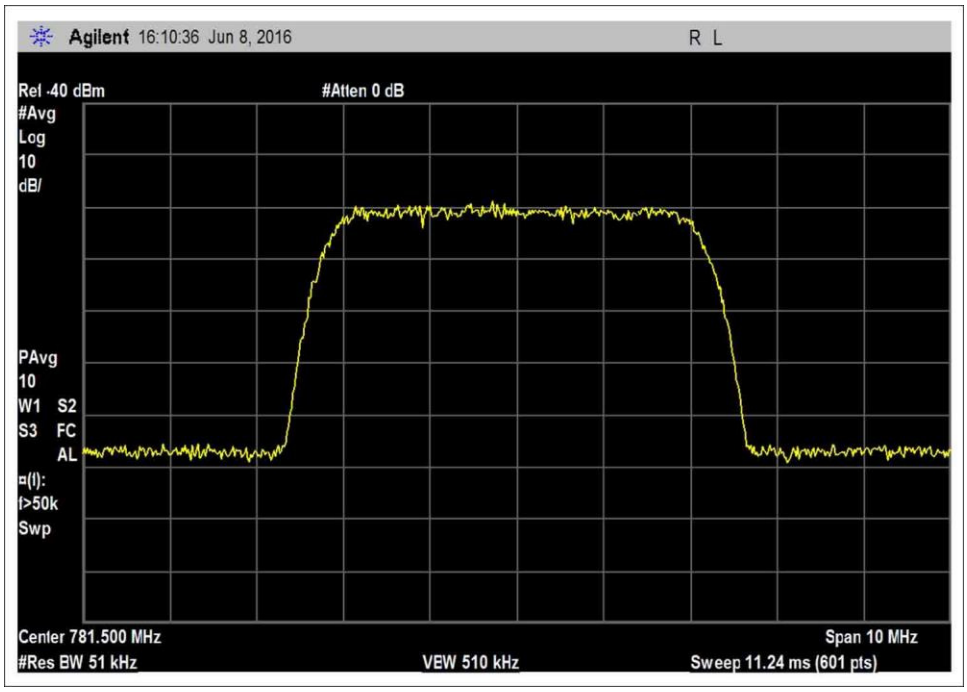
7.10_OBW_UL_698-716MHz_WCDMA



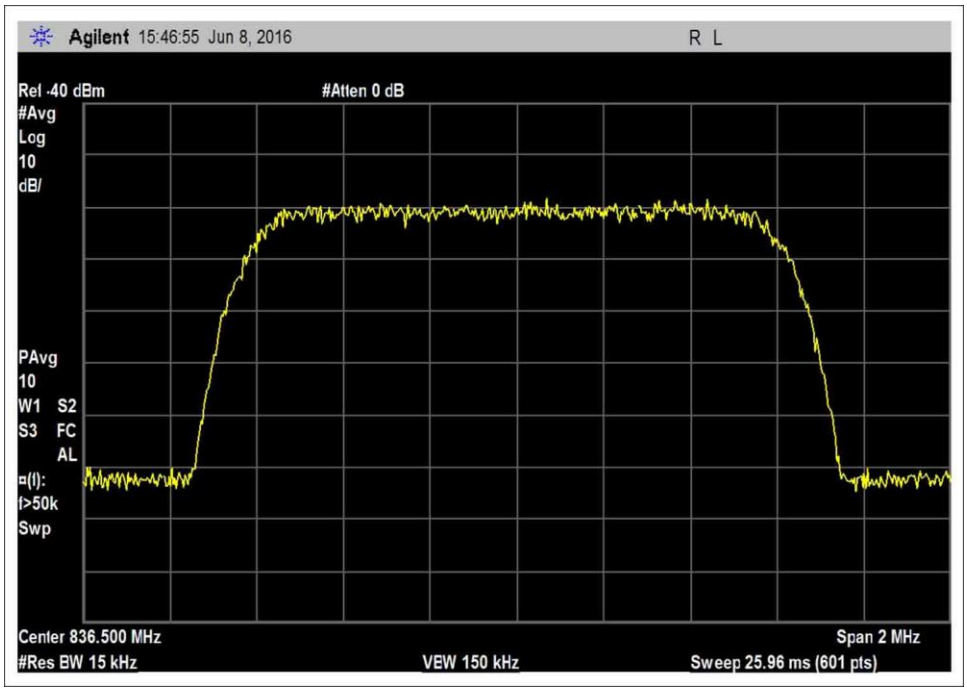
7.10_OBW_UL_776-787MHz_CDMA



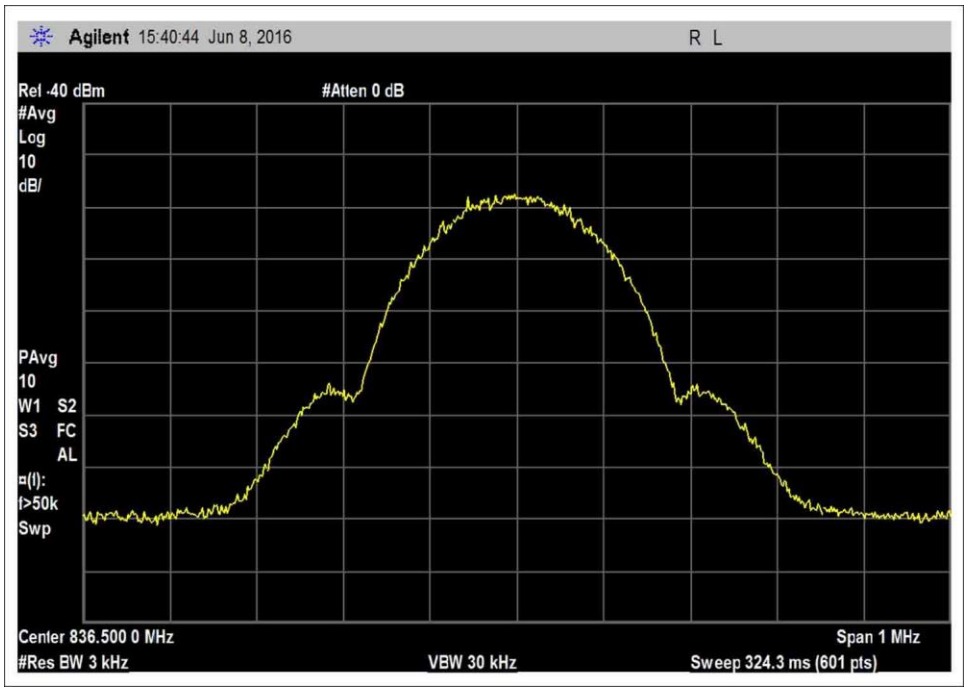
7.10_OBW_UL_776-787MHz_GSM



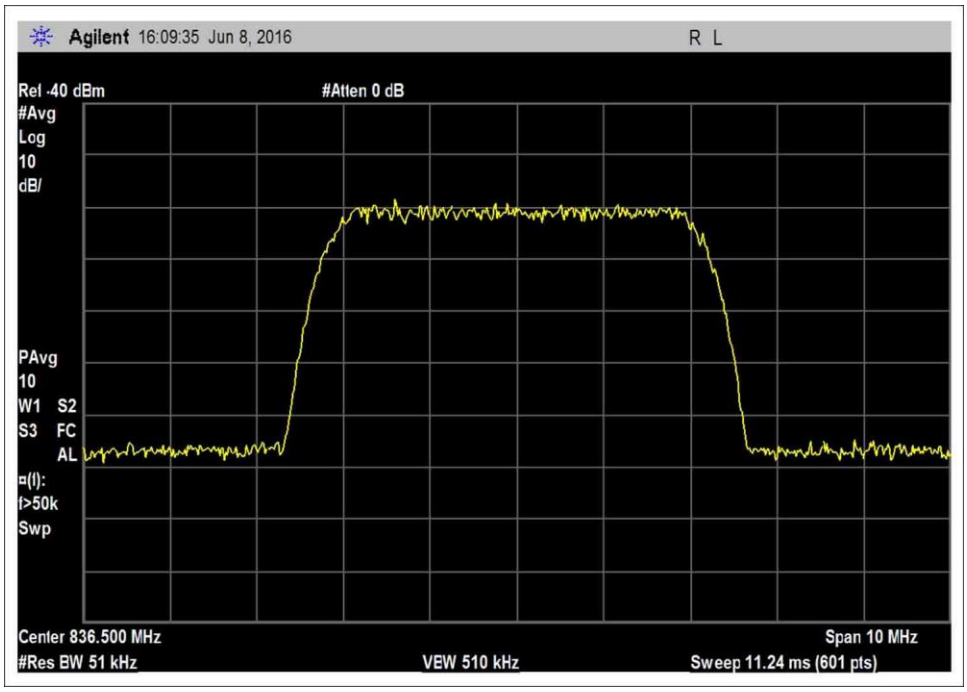
7.10_OBW_UL_776-787MHz_WCDMA



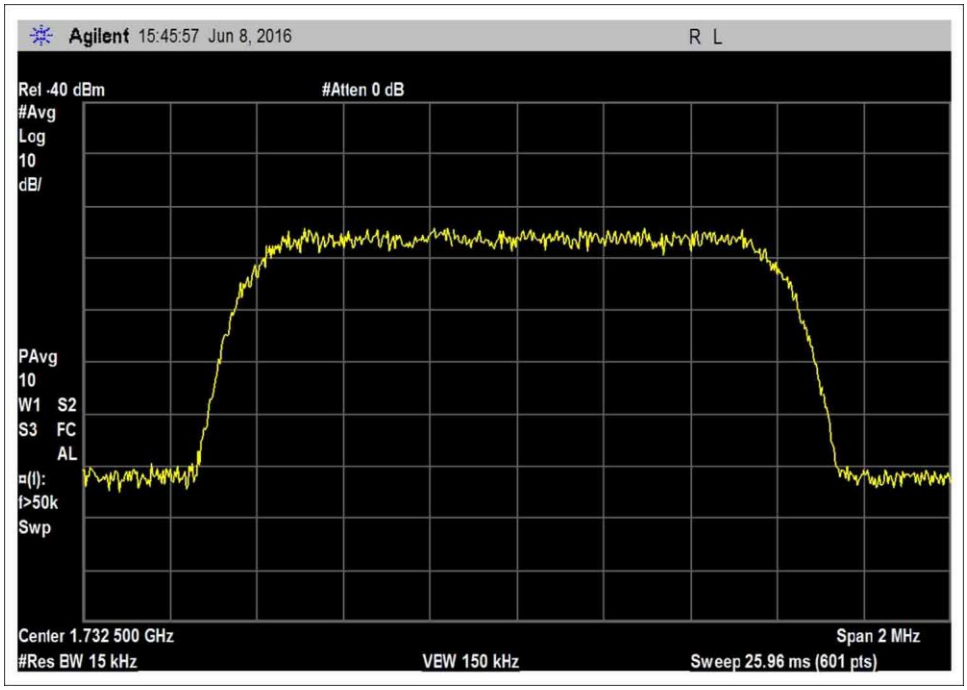
7.10_OBW_UL_824-849MHz_CDMA



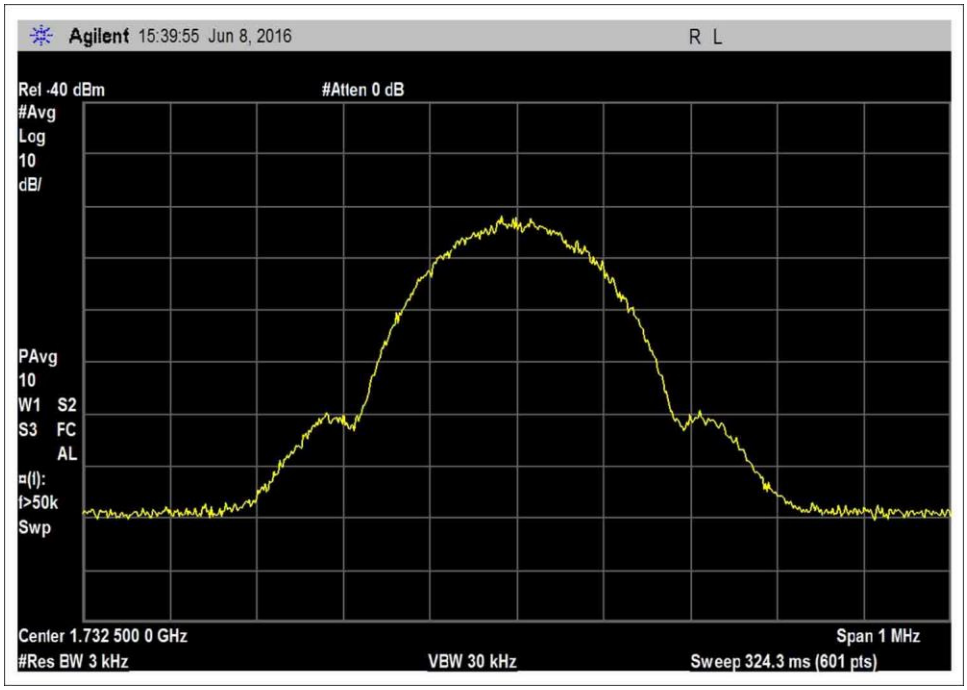
7.10_OBW_UL_824-849MHz_GSM



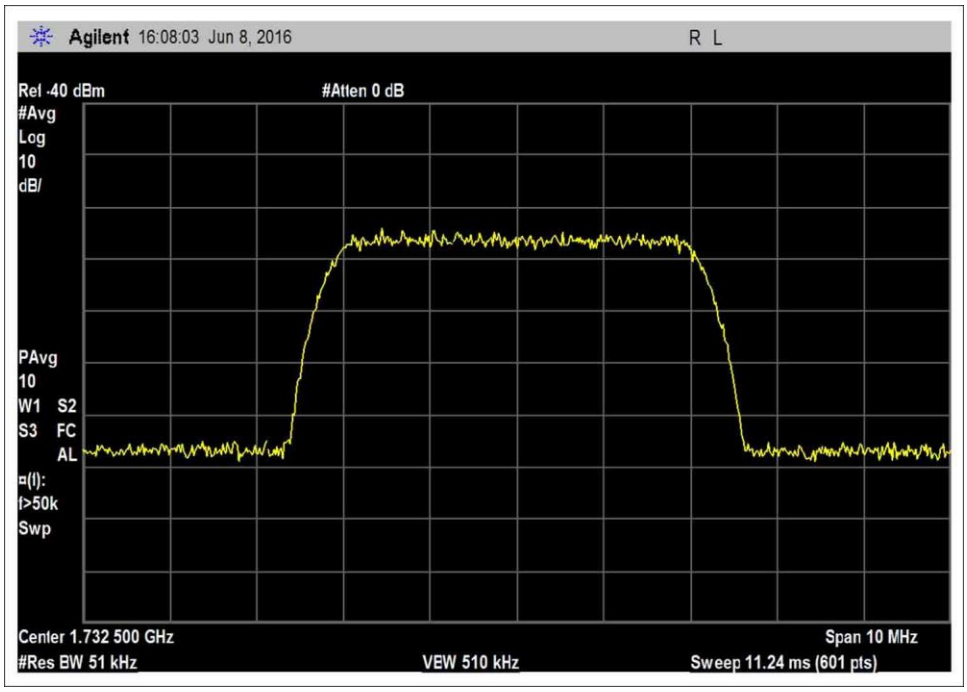
7.10_OBW_UL_824-849MHz_WCDMA



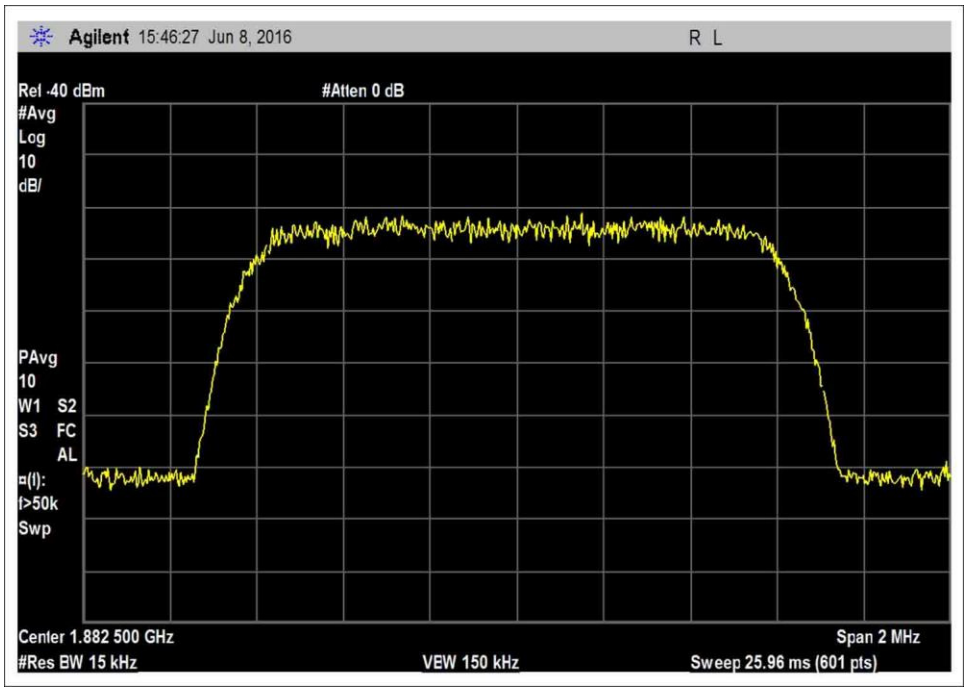
7.10_OBW_UL_1710-1755MHz_CDMA



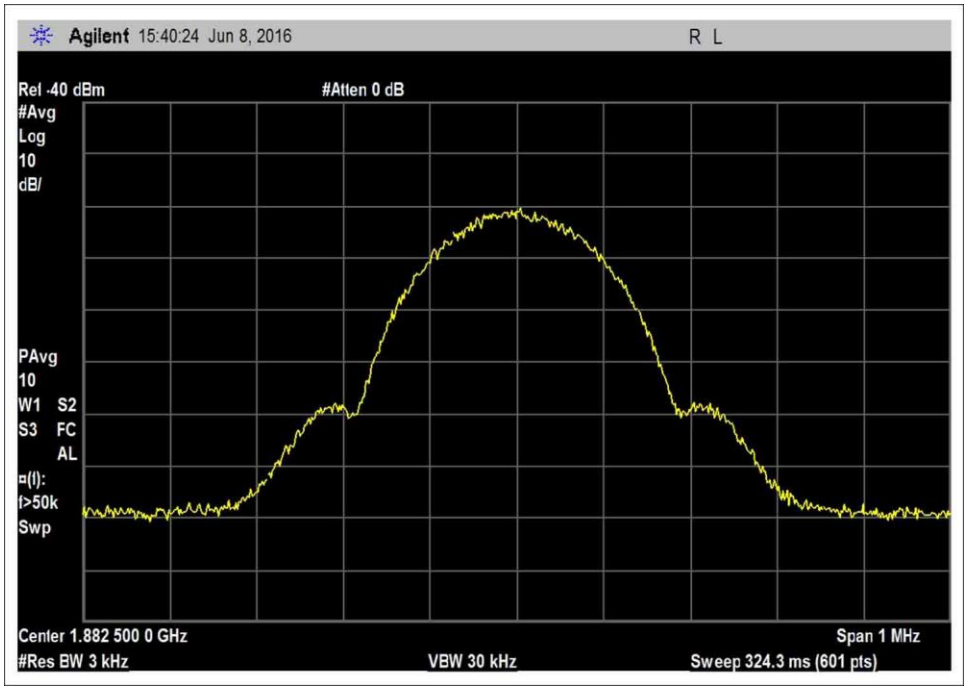
7.10_OBW_UL_1710-1755MHz_GSM



7.10_OBW_UL_1710-1755MHz_WCDMA



7.10_OBW_UL_1850-1915MHz_CDMA



7.10_OBW_UL_1850-1915MHz_GSM