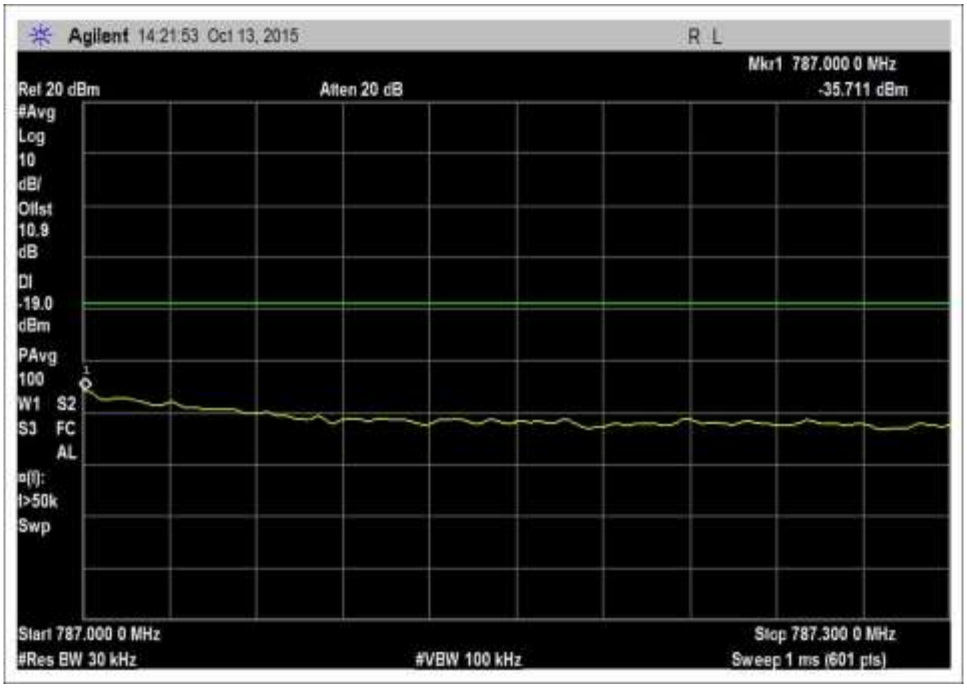
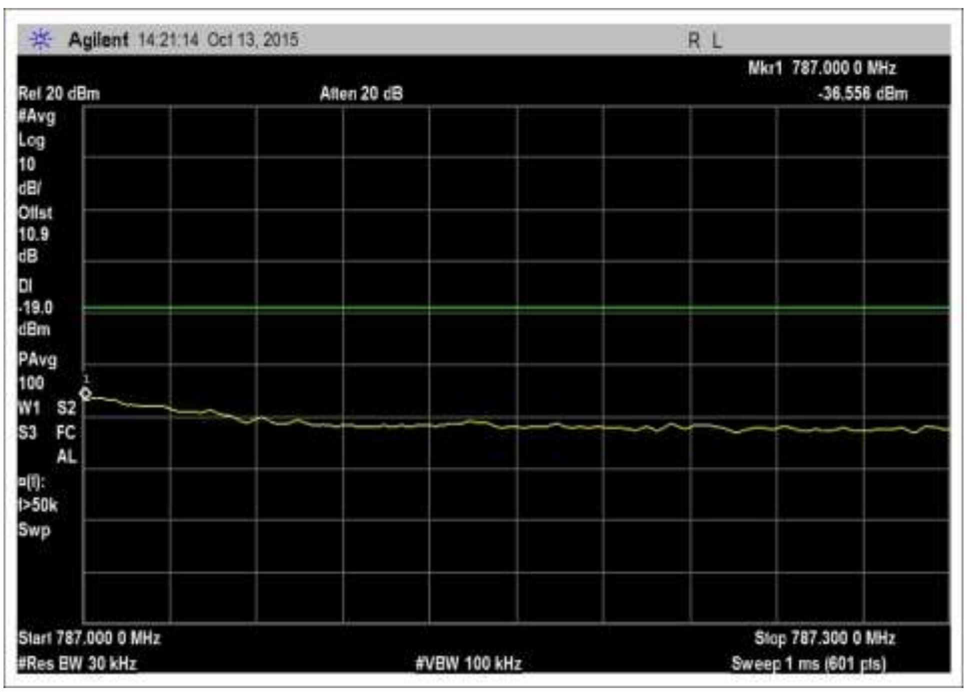
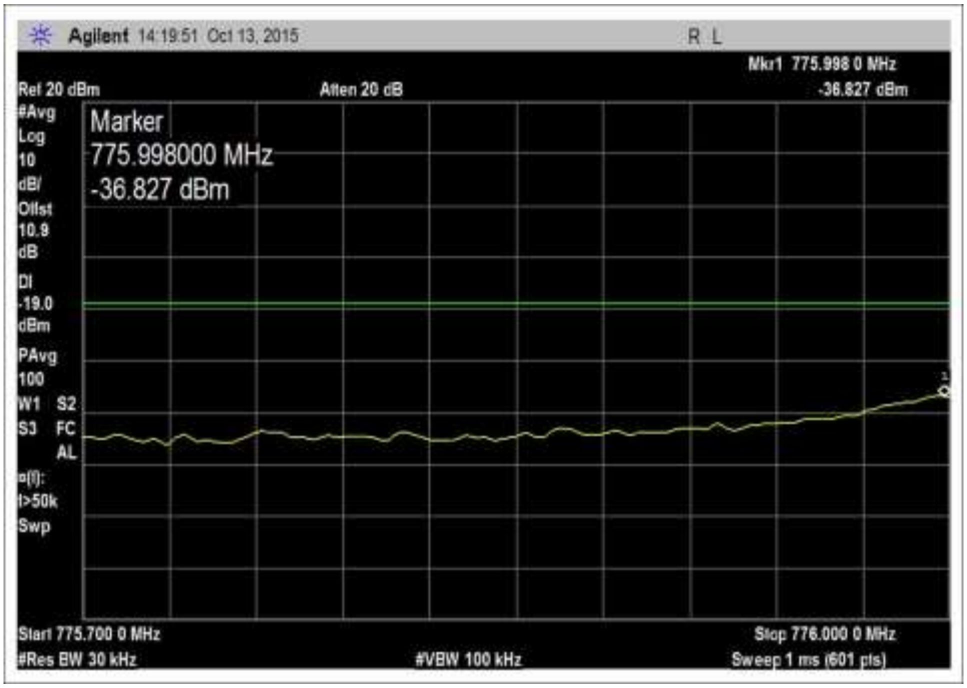


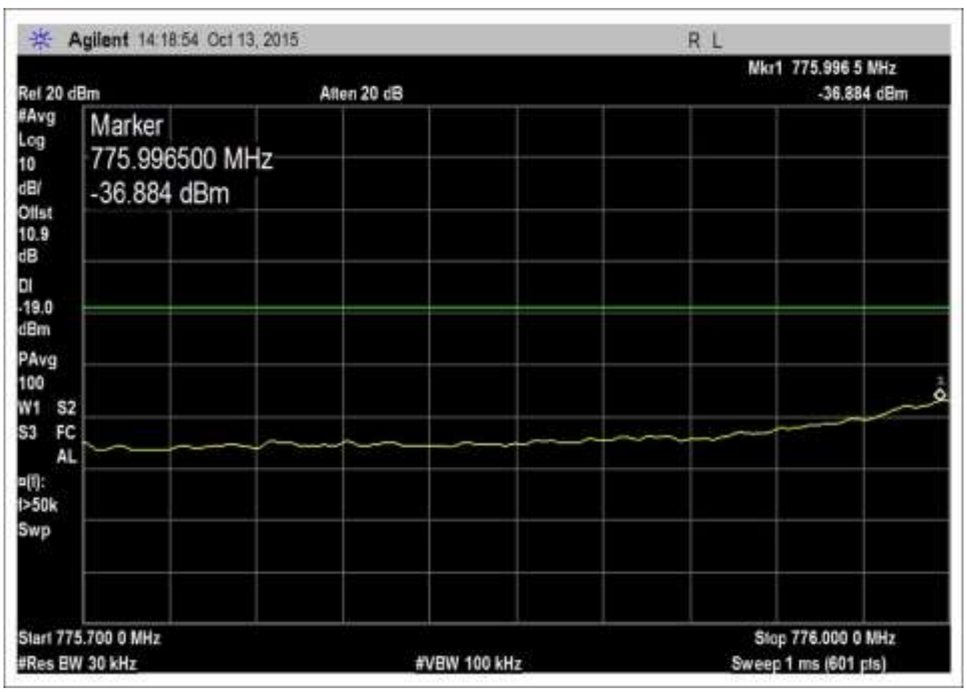
7.5_OBE_UL_776-787MHz_H_Max



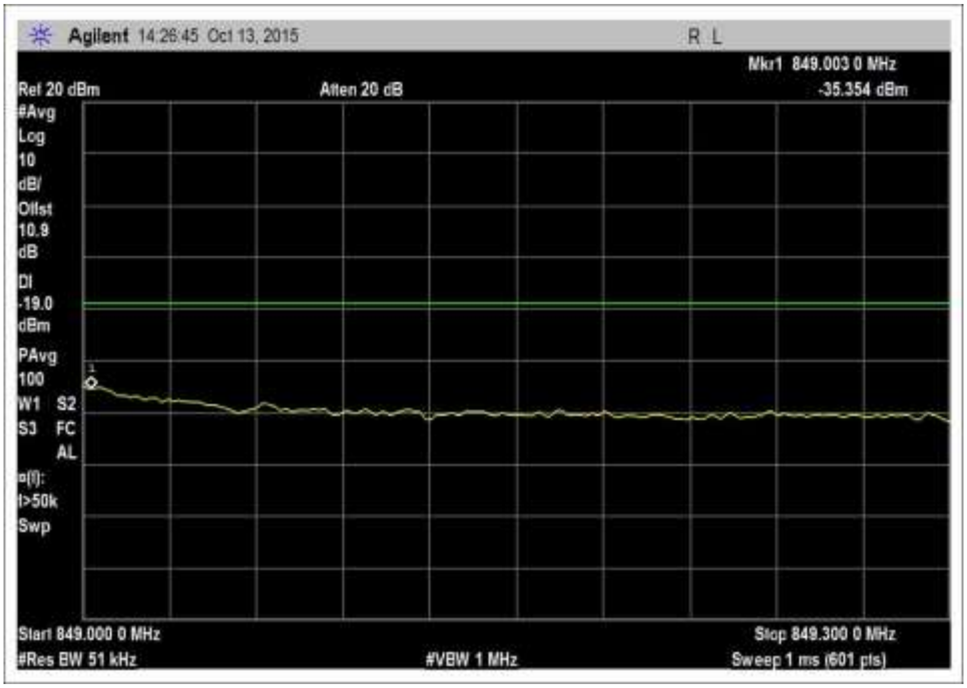
7.5_OBE_UL_776-787MHz_H_PreAGC



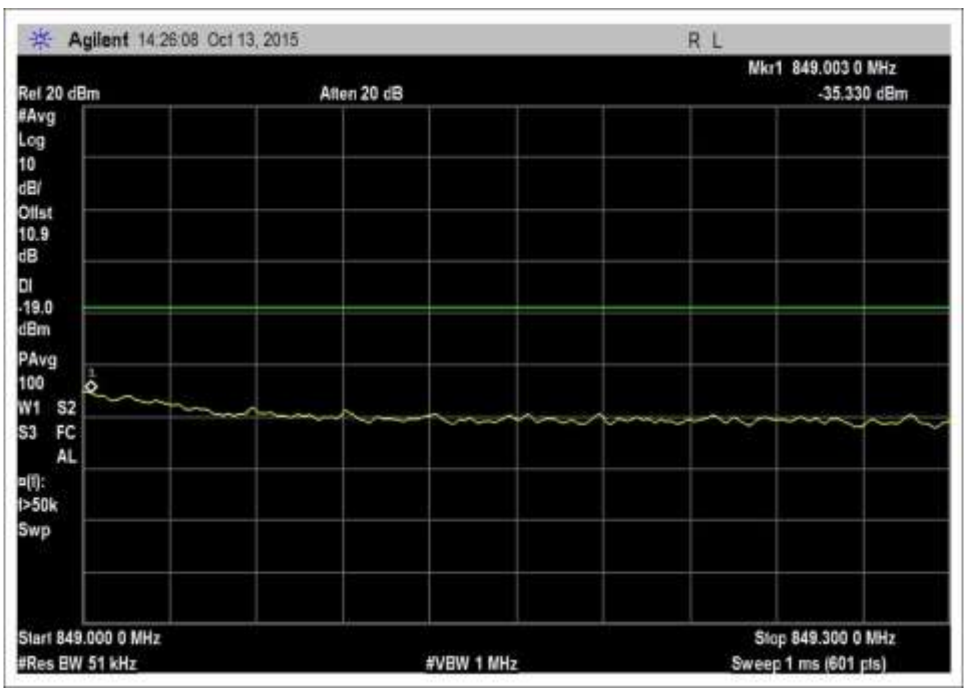
7.5_OBE_UL_776-787MHz_L_Max



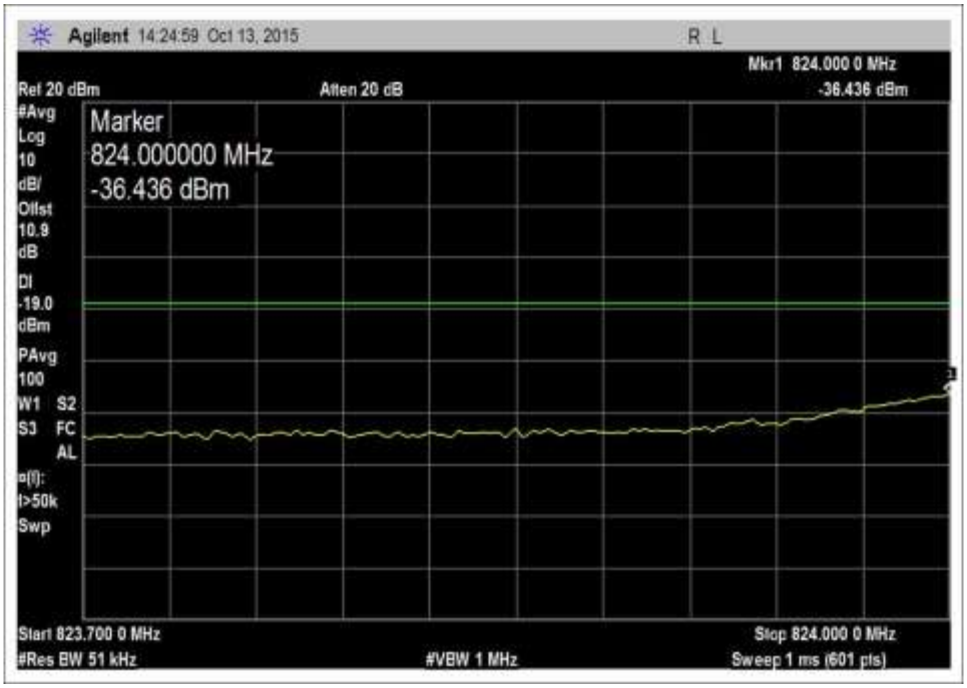
7.5_OBE_UL_776-787MHz_L_PreAGC



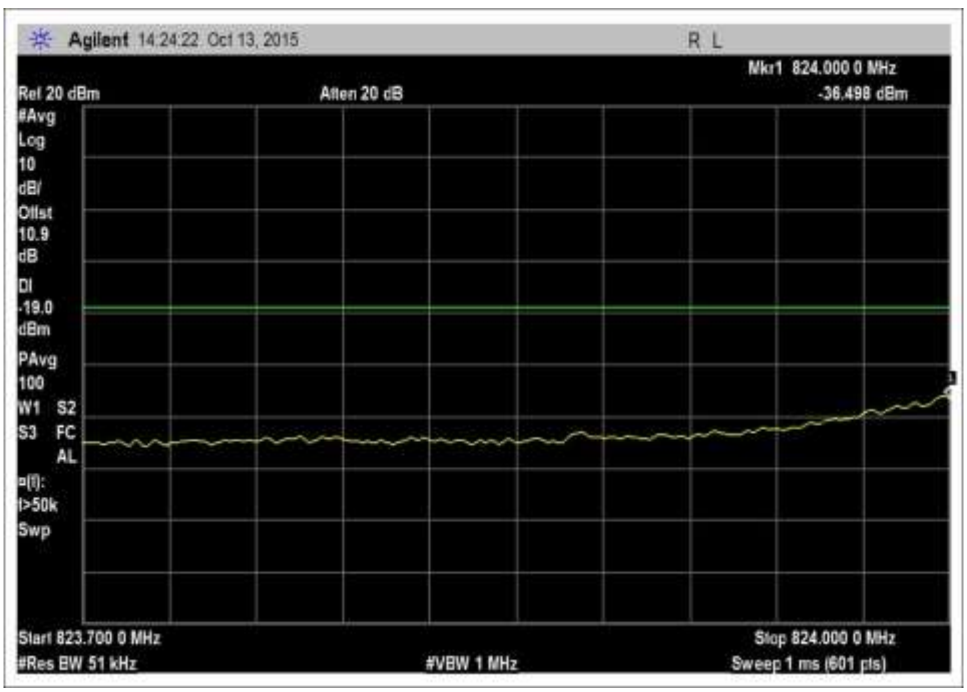
7.5_OBE_UL_824-849MHz_H_Max



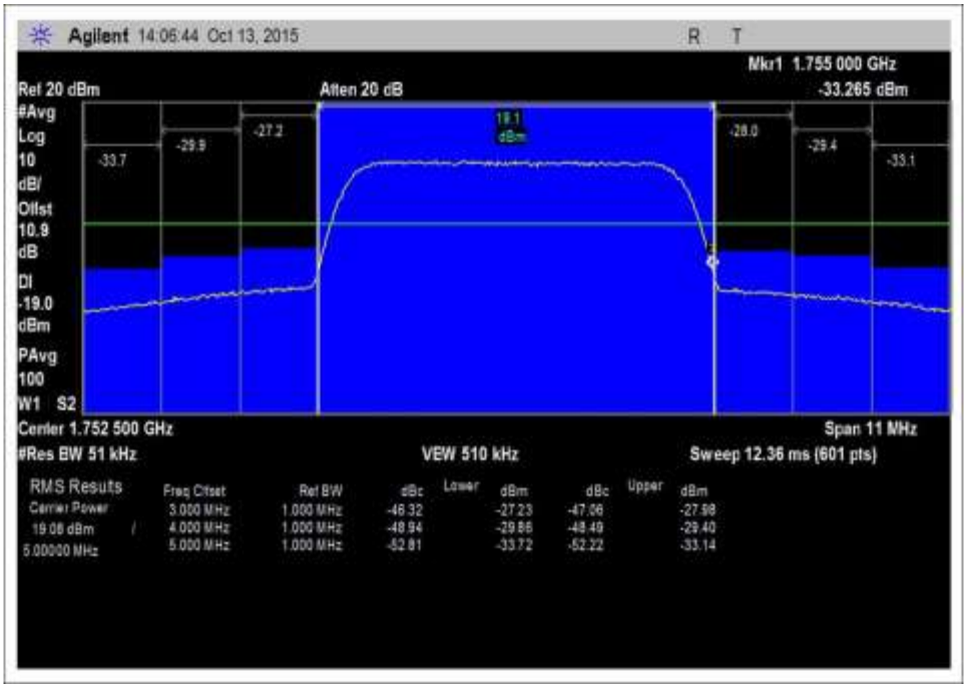
7.5_OBE_UL_824-849MHz_H_PreAGC



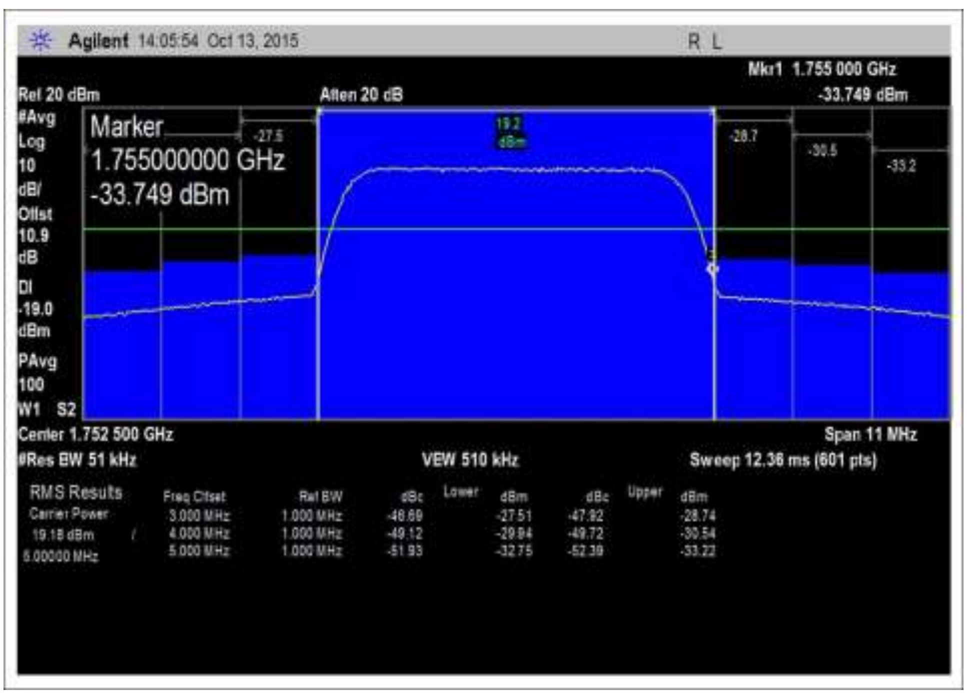
7.5_OBE_UL_824-849MHz_L_Max



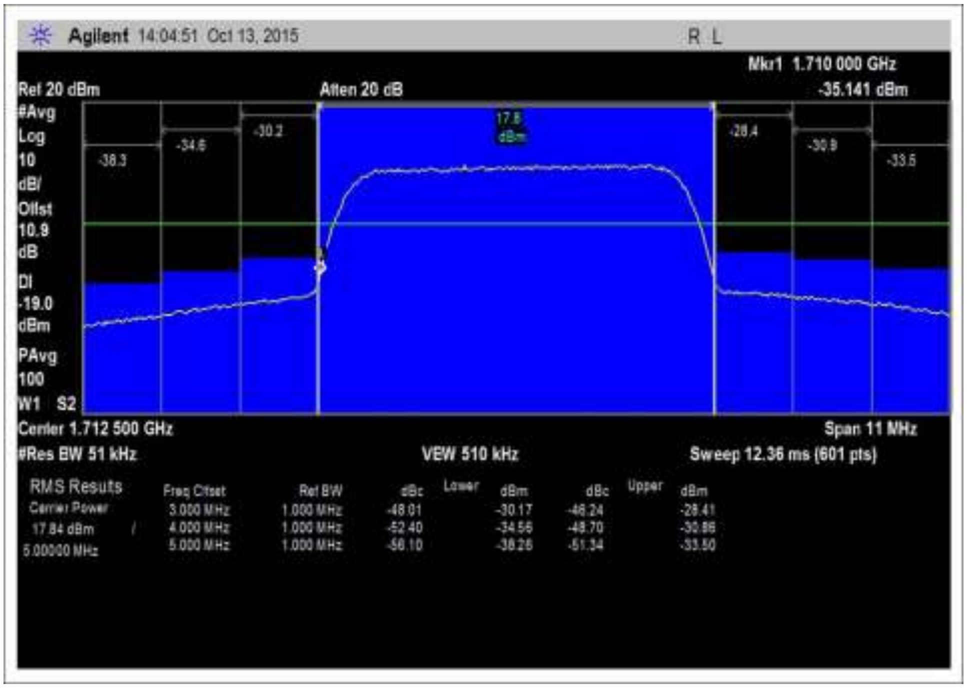
7.5_OBE_UL_824-849MHz_L_PreAGC



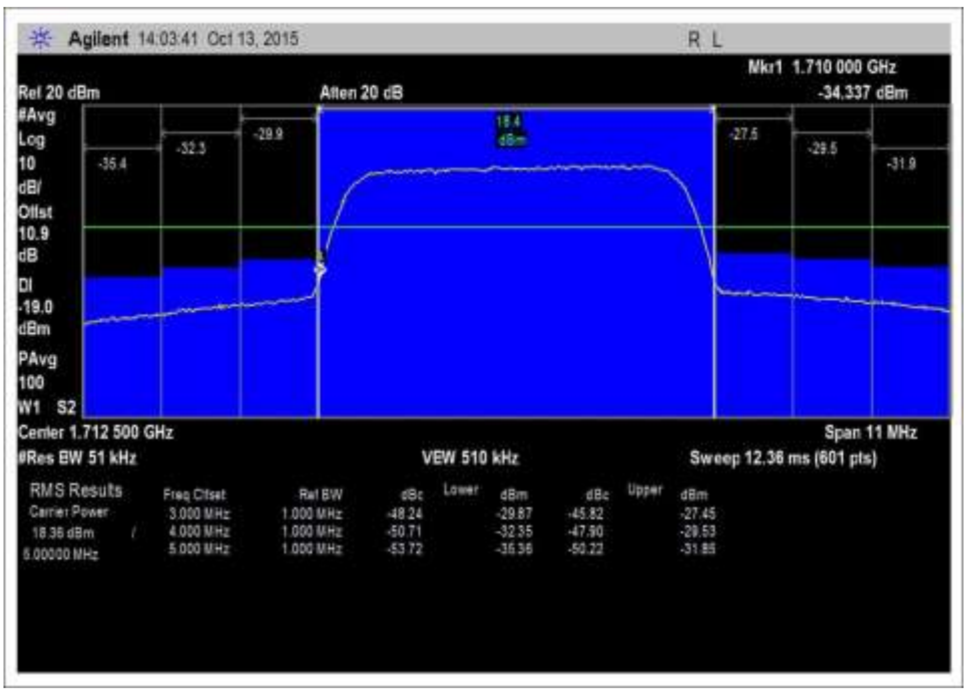
7.5_OBE_UL_1710-1755MHz_H_Max



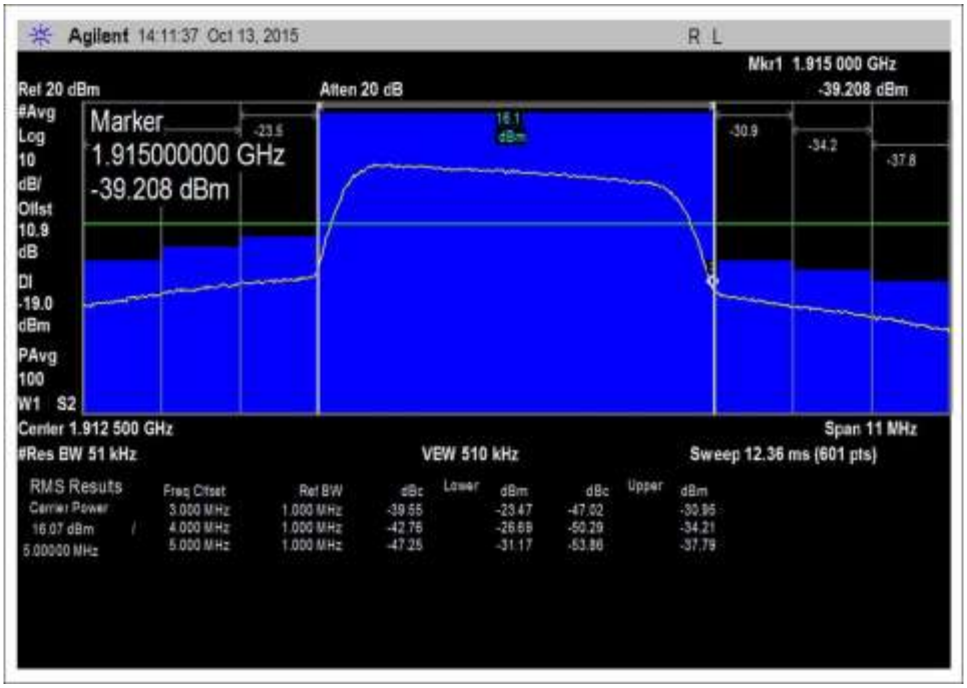
7.5_OBE_UL_1710-1755MHz_H_PreAGC



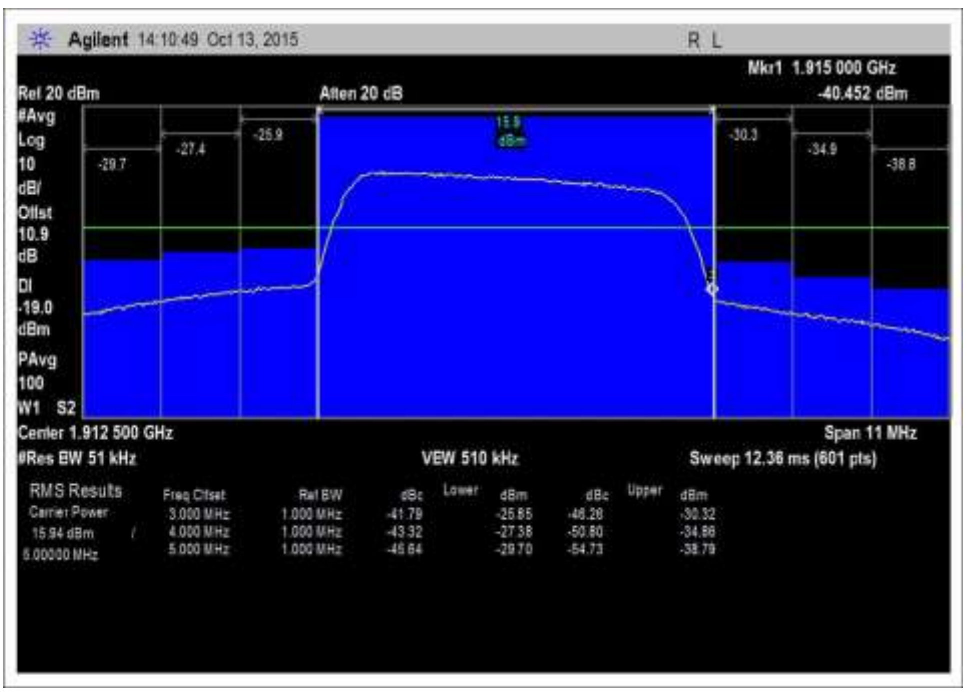
7.5_OBE_UL_1710-1755MHz_L_Max



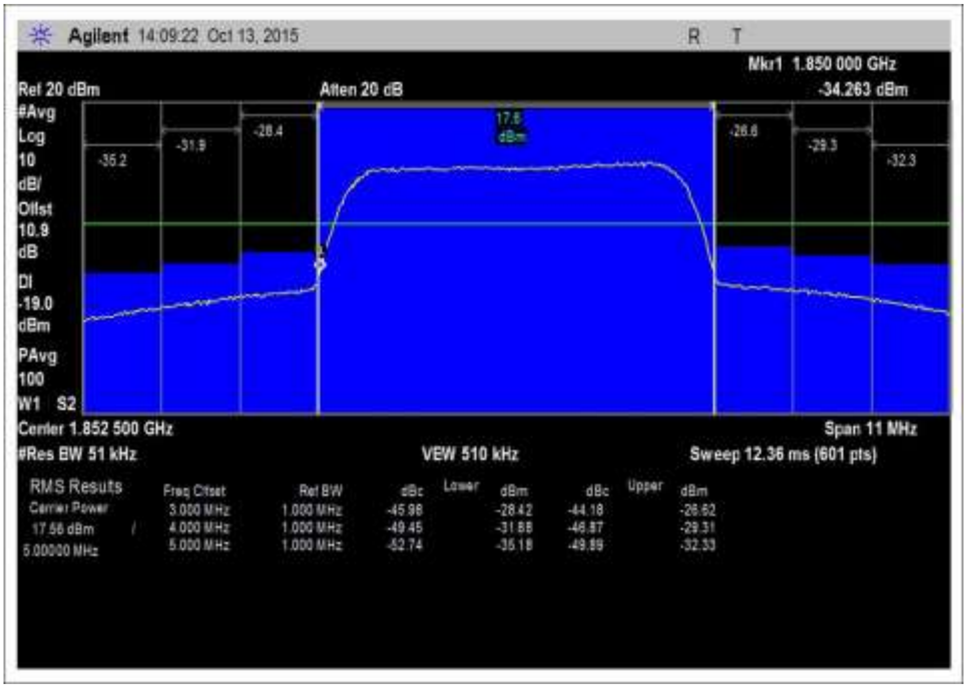
7.5_OBE_UL_1710-1755MHz_L_PreAGC



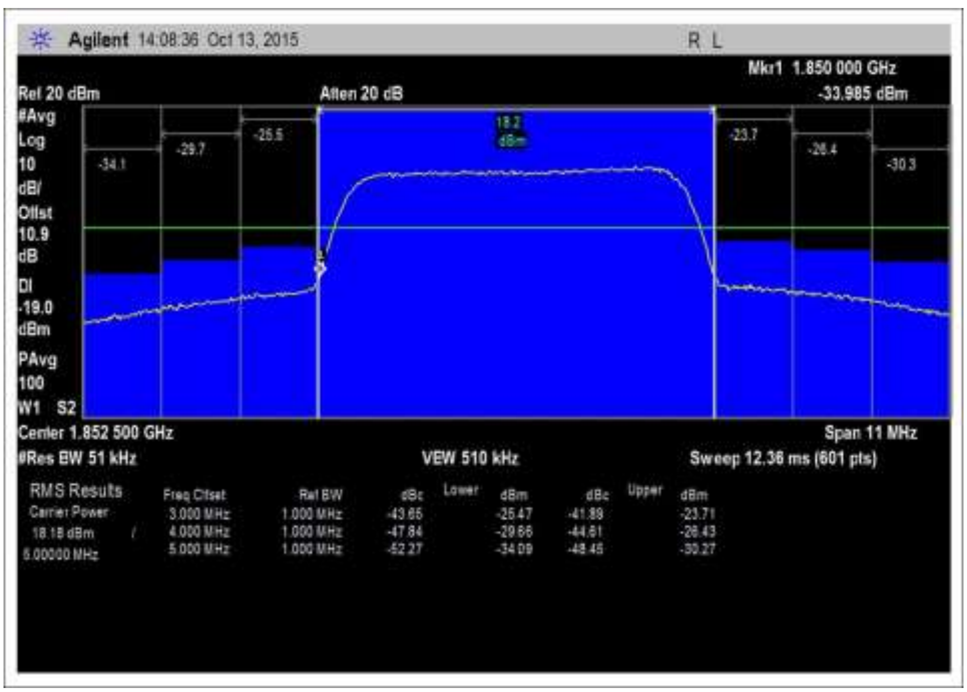
7.5_OBE_UL_1850-1915MHz_H_Max



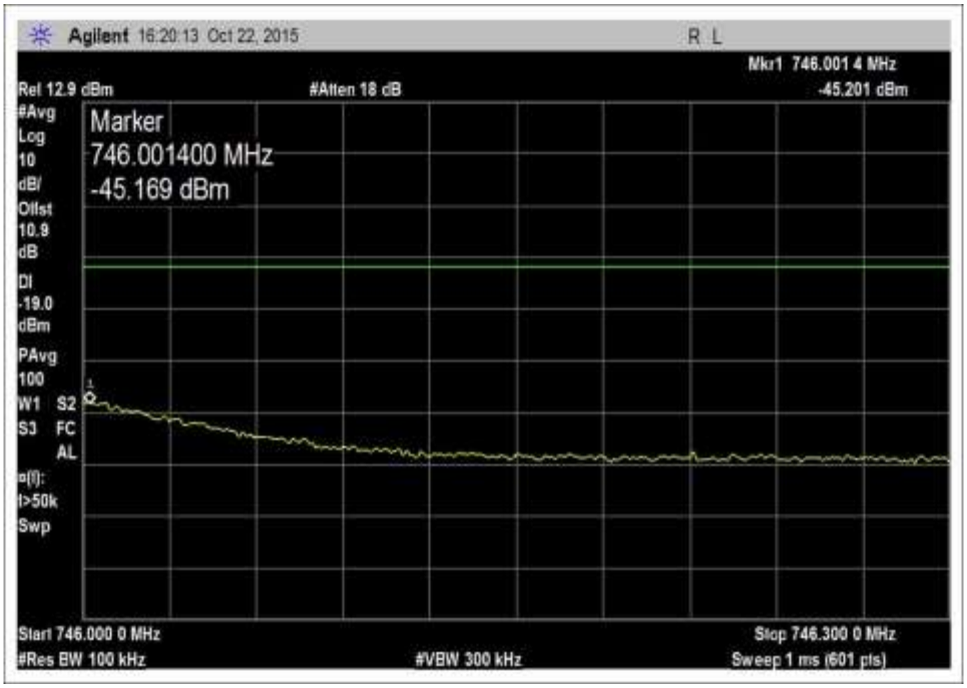
7.5_OBE_UL_1850-1915MHz_H_PreAGC



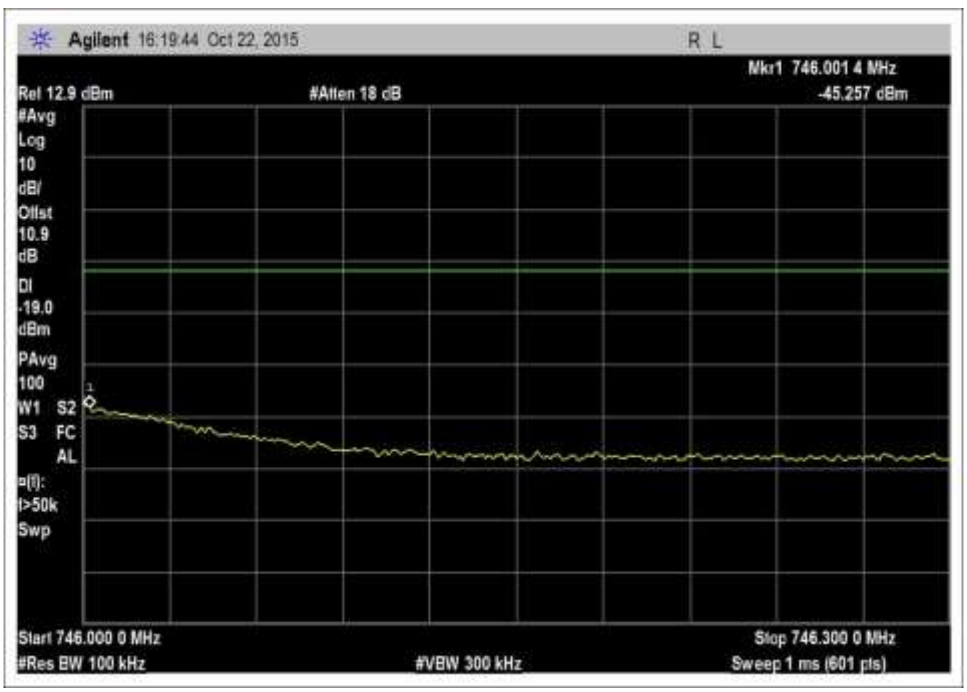
7.5_OBE_UL_1850-1915MHz_L_Max



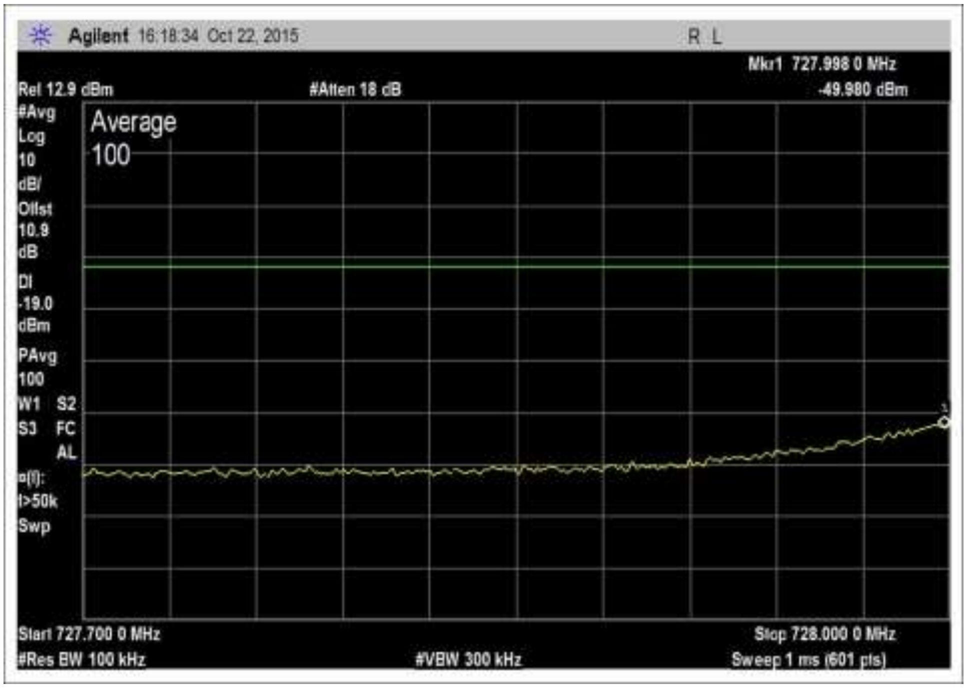
7.5_OBE_UL_1850-1915MHz_L_PreAGC



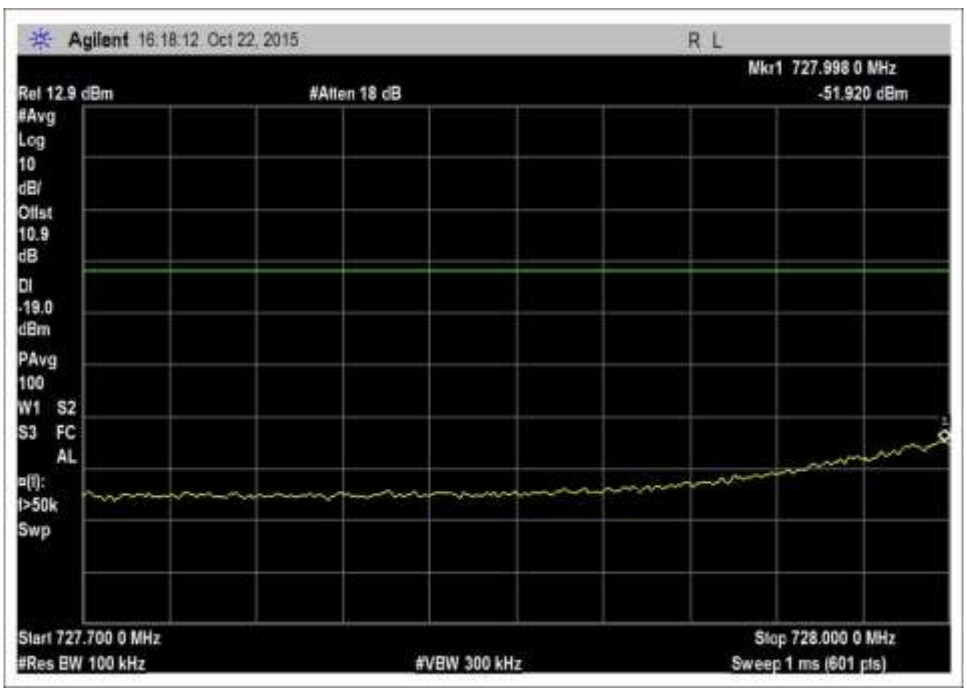
7.5_OBE_DL_728-746MHz_H_Max



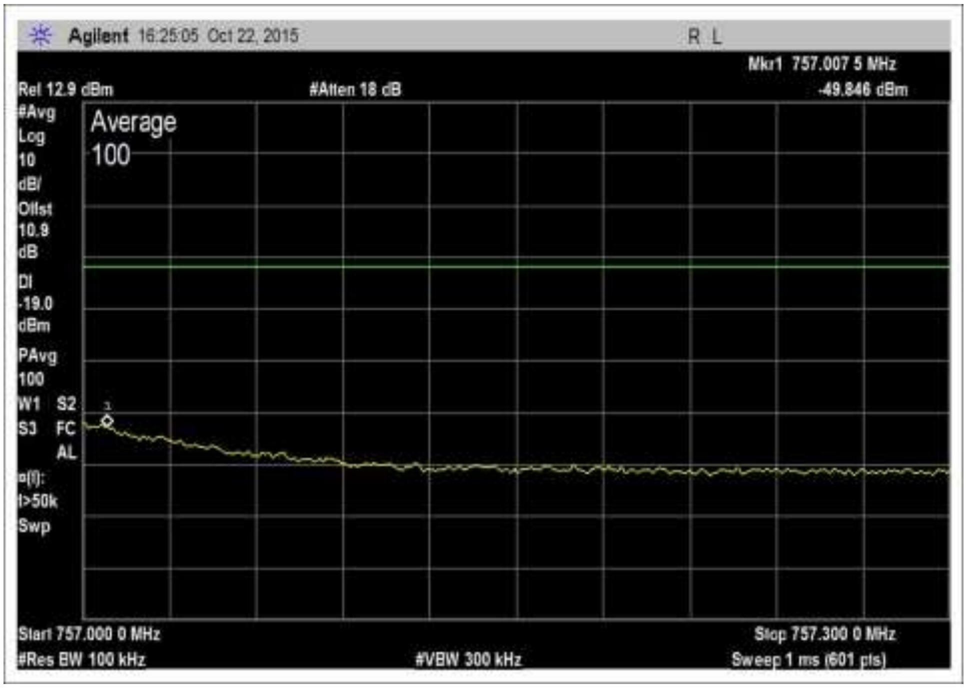
7.5_OBE_DL_728-746MHz_H_PreAGC



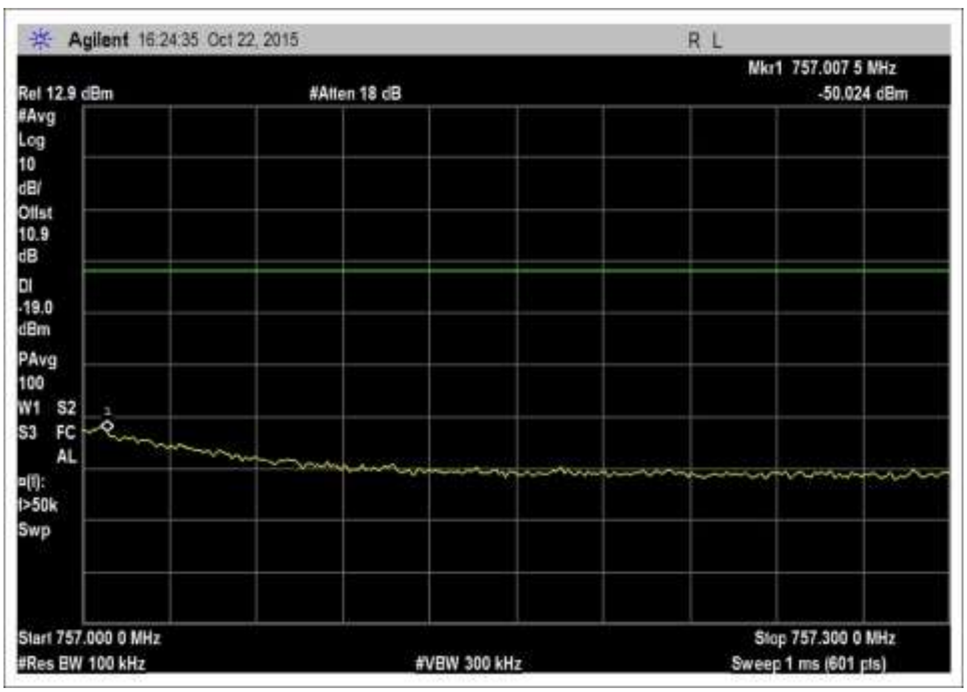
7.5_OBE_DL_728-746MHz_L_Max



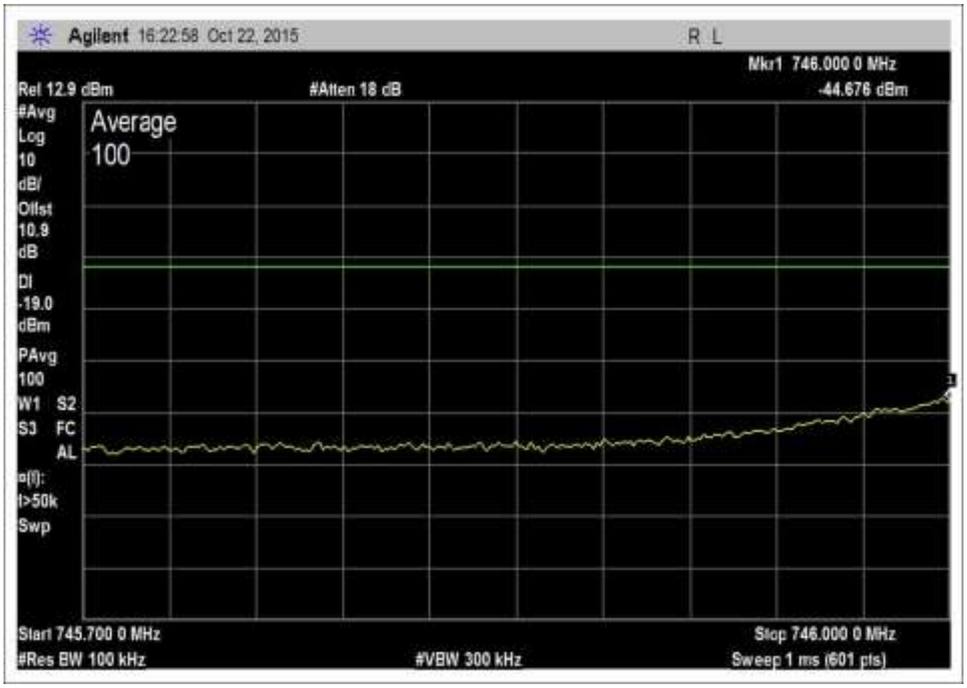
7.5_OBE_DL_728-746MHz_L_PreAGC



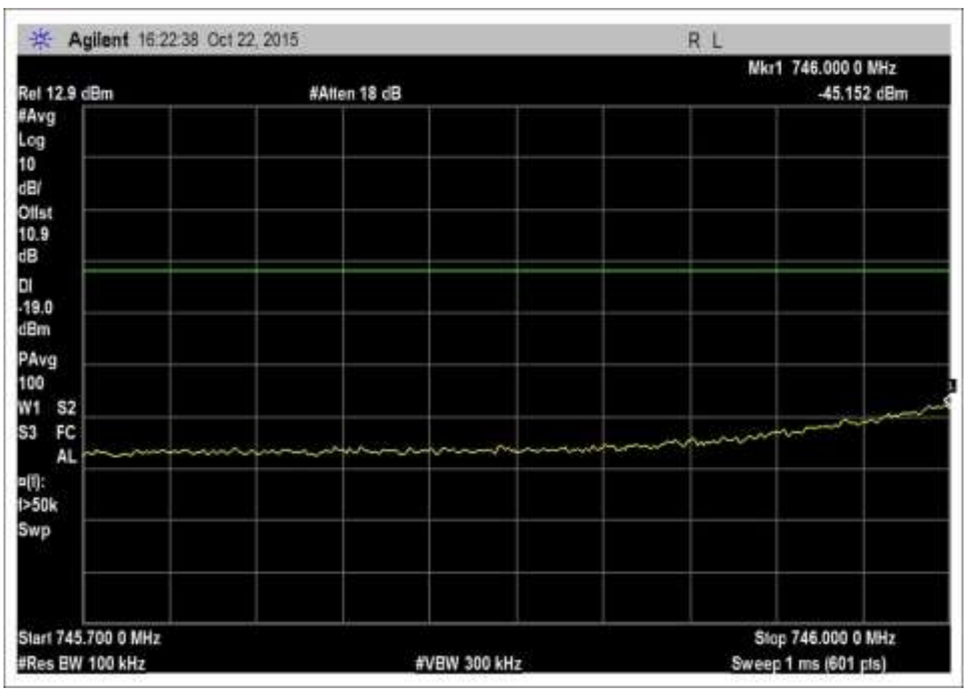
7.5_OBE_DL_746-757MHz_H_Max



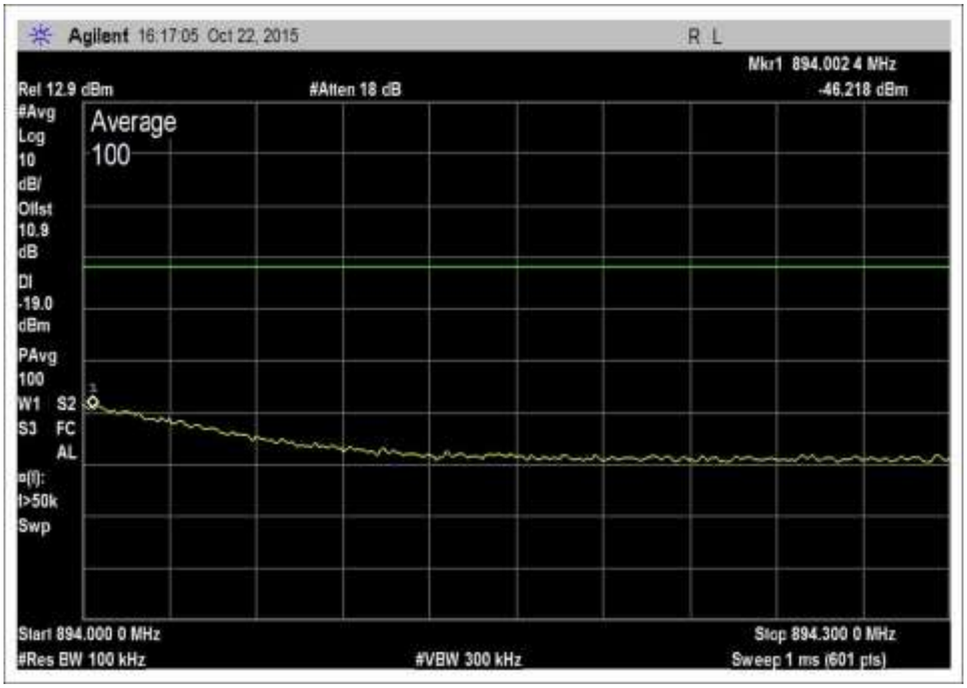
7.5_OBE_DL_746-757MHz_H_PreAGC



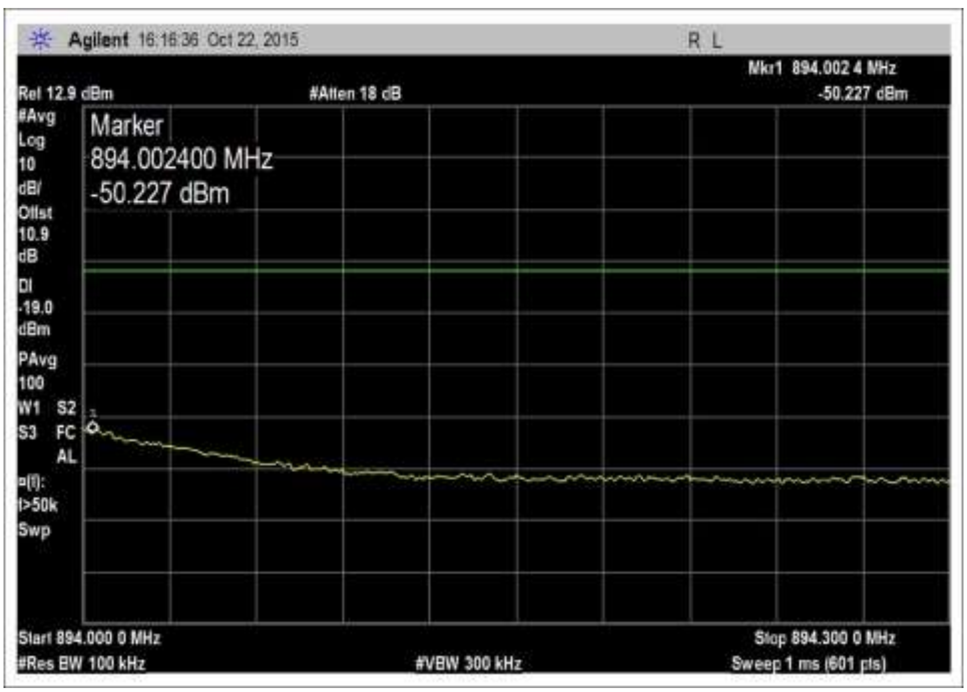
7.5_OBE_DL_746-757MHz_L_Max



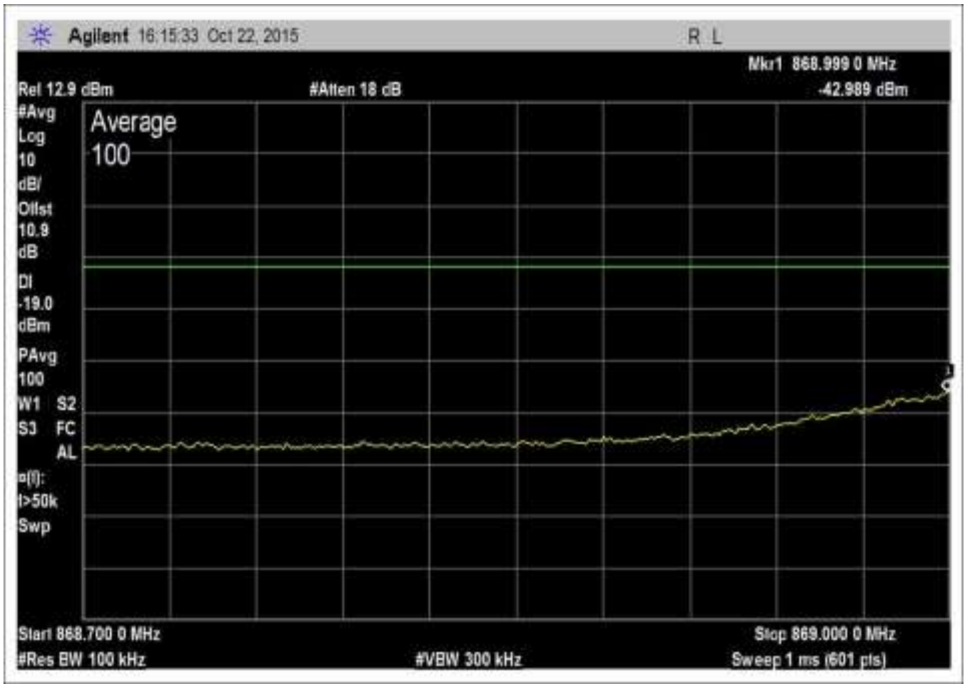
7.5_OBE_DL_746-757MHz_L_PreAGC



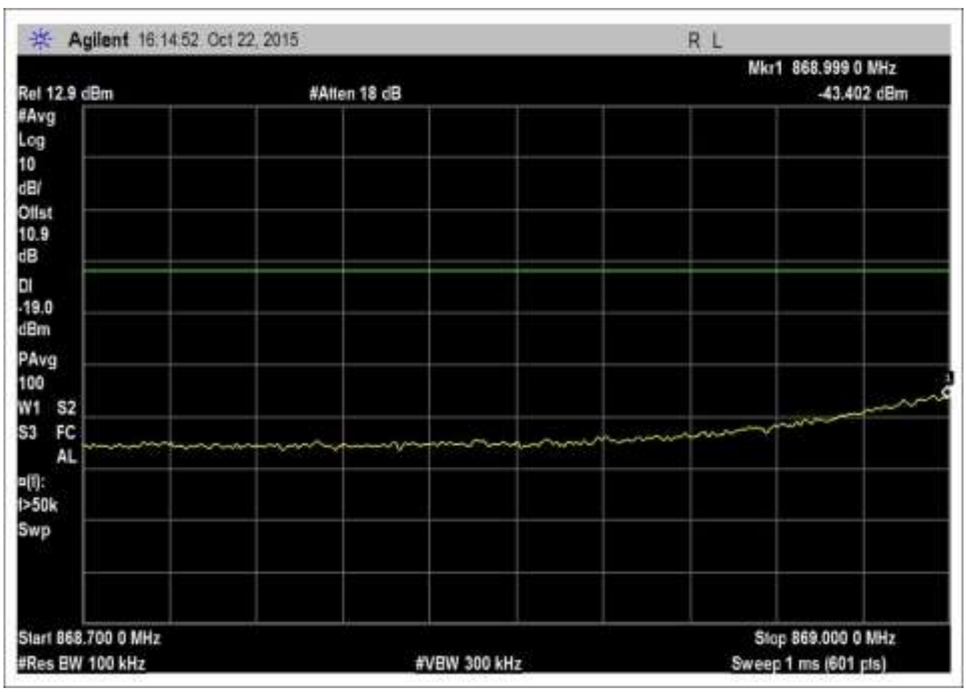
7.5_OBE_DL_869-894MHz_H_Max



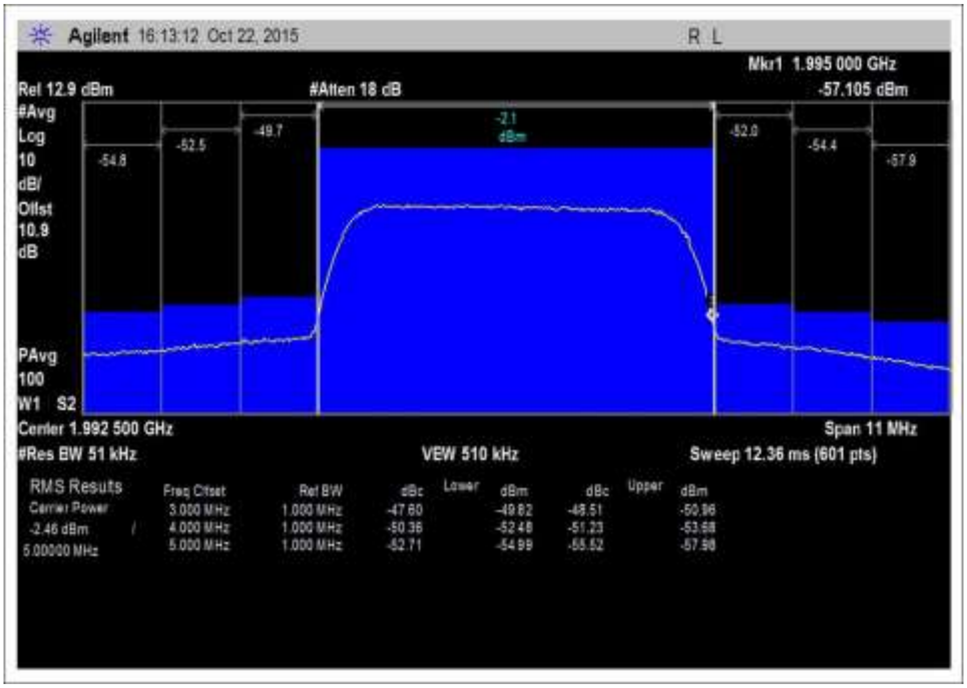
7.5_OBE_DL_869-894MHz_H_PreAGC



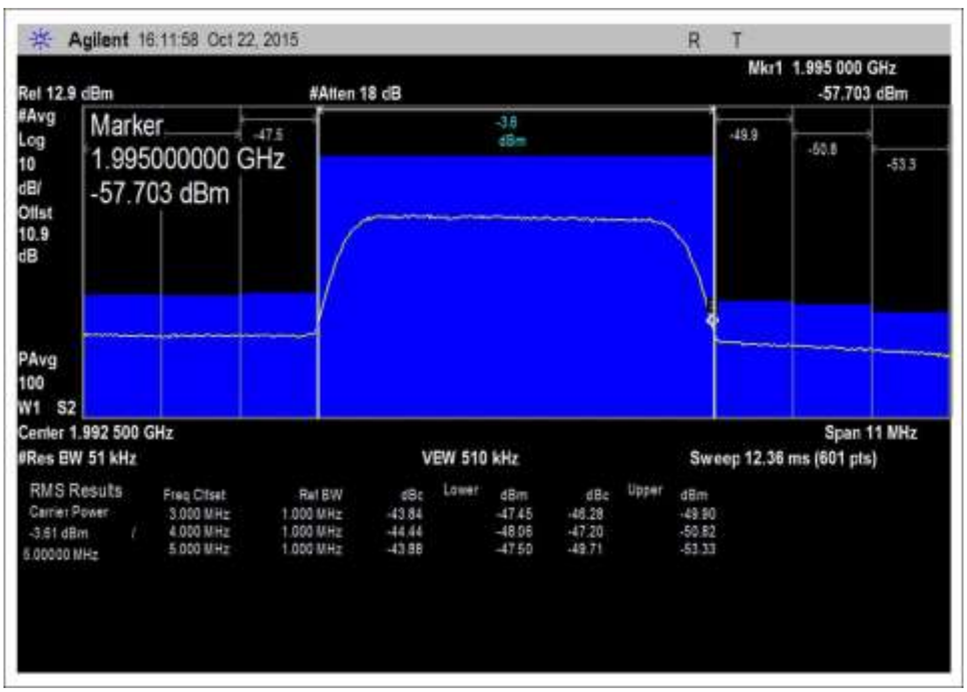
7.5_OBE_DL_869-894MHz_L_Max



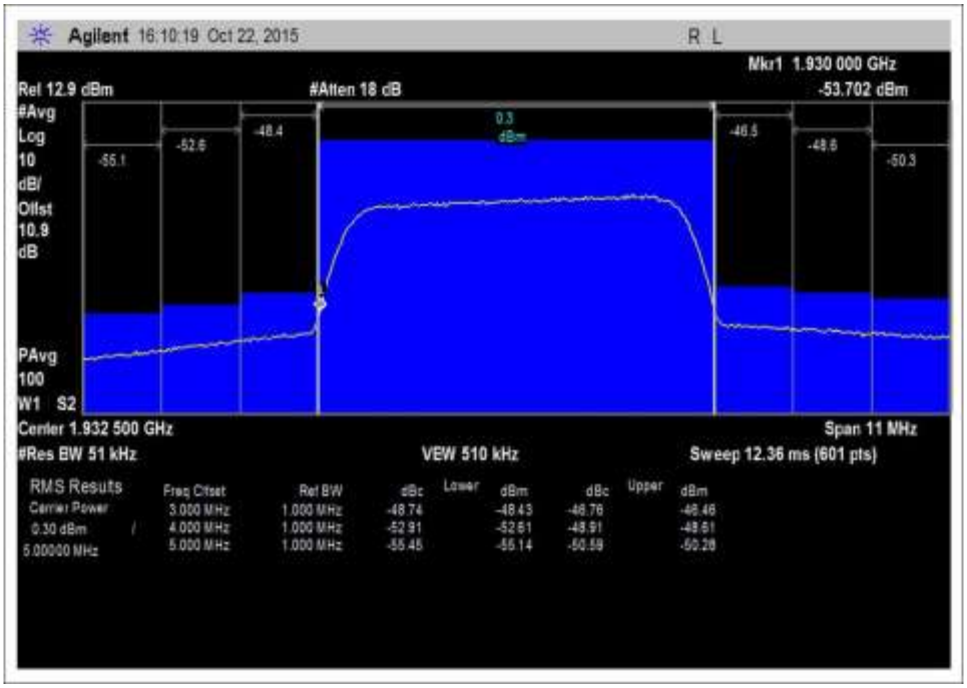
7.5_OBE_DL_869-894MHz_L_PreAGC



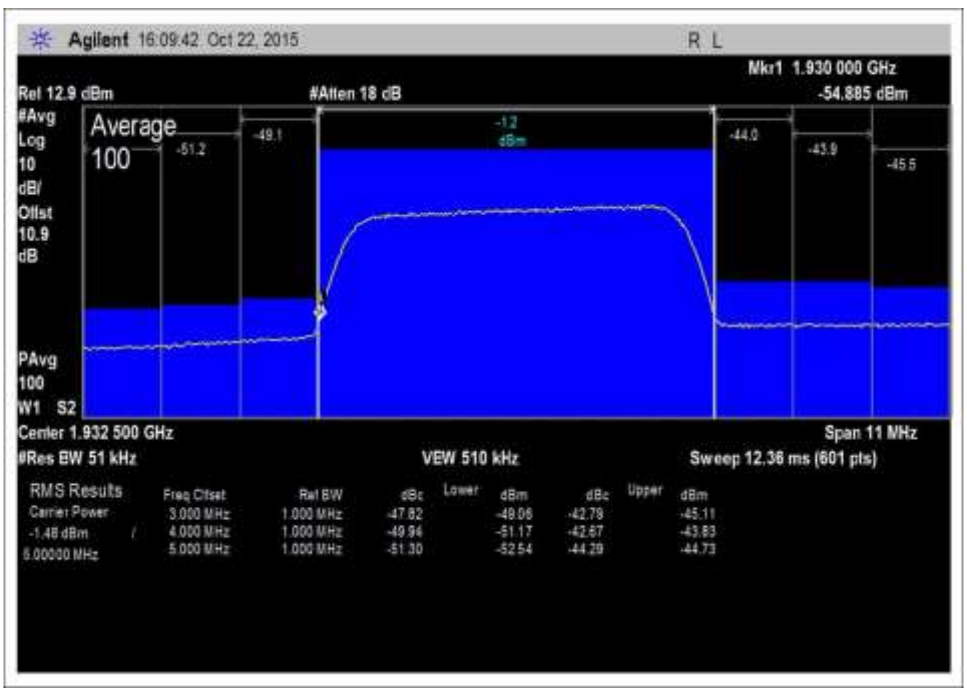
7.5_OBE_DL_1930-1995MHz_H_Max



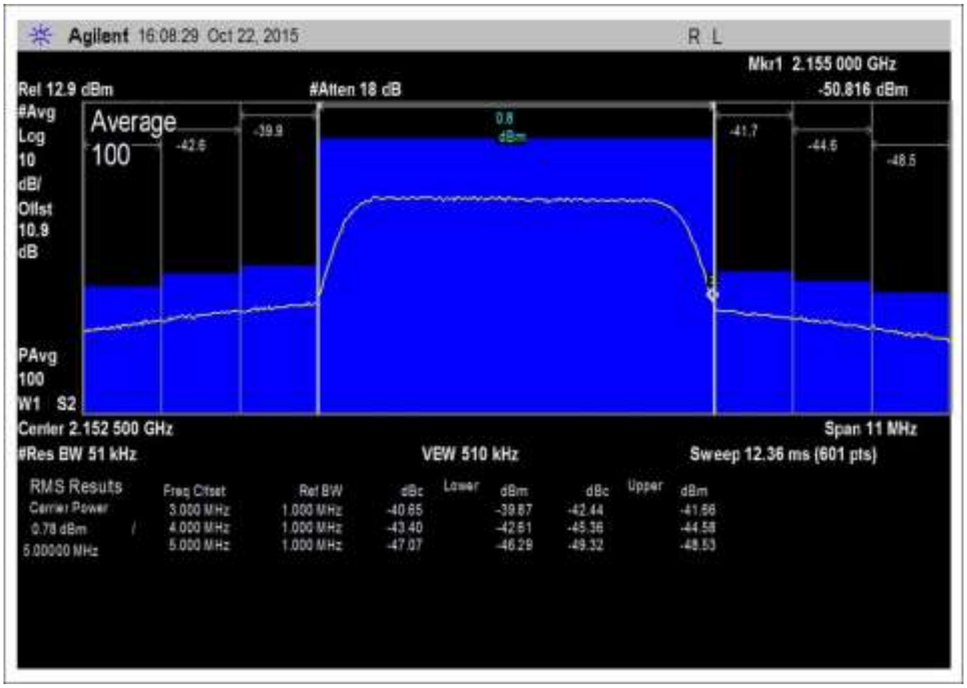
7.5_OBE_DL_1930-1995MHz_H_PreAGC



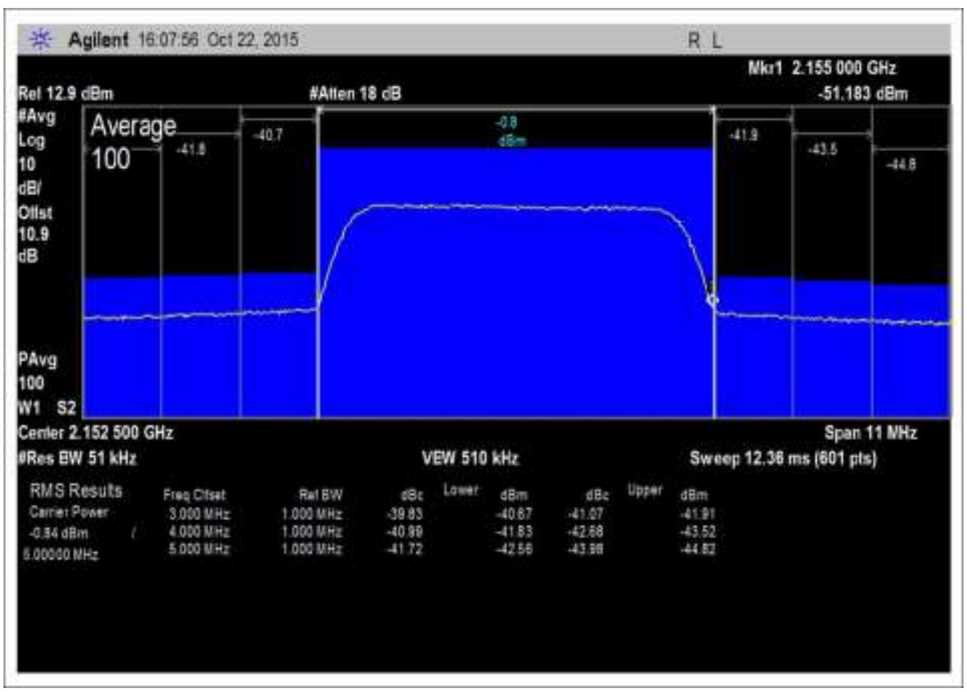
7.5_OBE_DL_1930-1995MHz_L_Max



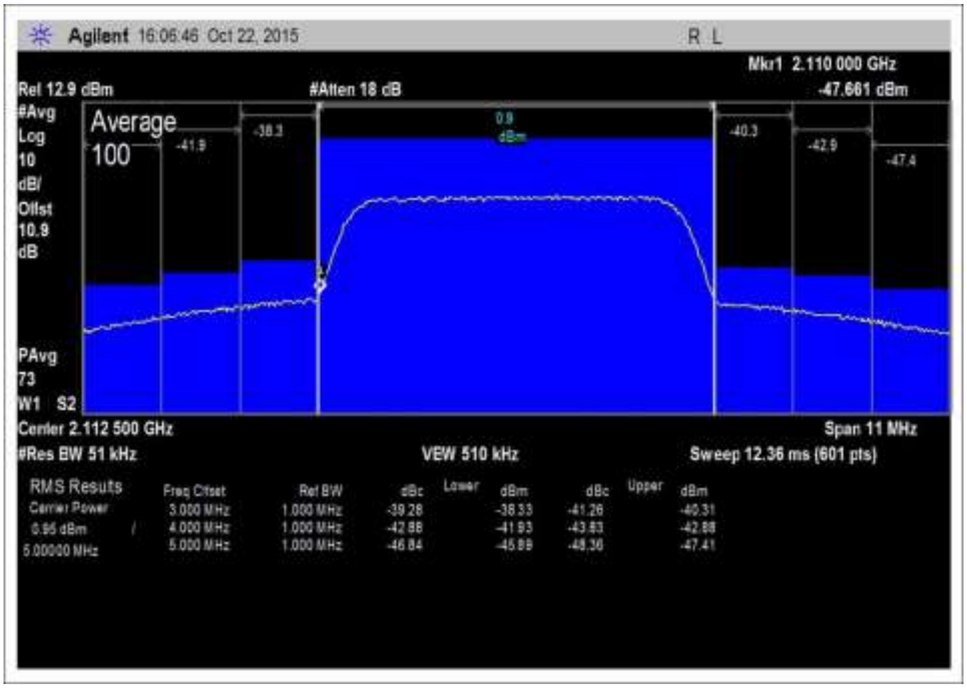
7.5_OBE_DL_1930-1995MHz_L_PreAGC



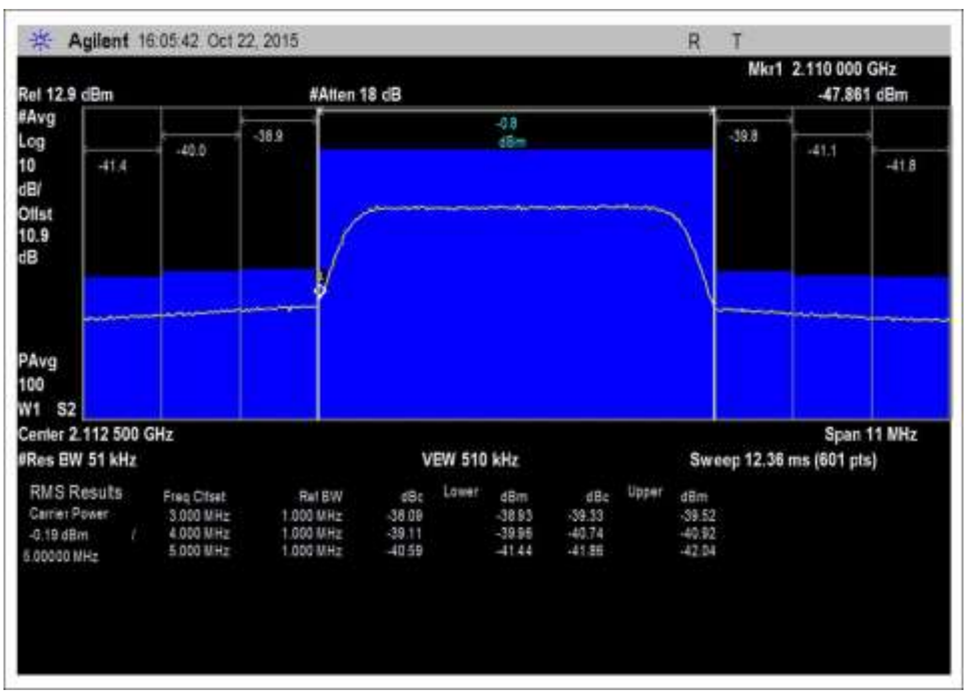
7.5_OBE_DL_2110-2155MHz_H_Max



7.5_OBE_DL_2110-2155MHz_H_PreAGC



7.5_OBE_DL_2110-2155MHz_L_Max



7.5_OBE_DL_2110-2155MHz_L_PreAGC

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 #:	**97491**	Date:	10/13/2015
Test Type:	**Conducted Emissions**	Time:	16:26:07
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed CMRS Wideband Consumer Booster with a Wi-Fi Router and TV amplifier installed. The CMRS DL signal and the Wi-Fi Signal are combined at the diplexer and transmit via the indoor antenna.
The Consumer booster UL and DL power and gain parameters are initially measured with Wi-Fi transmitting at mid channel using sequentially 802.11b, g, n20 and n40 signal. Since no significant change in measured power was observed, all other parameters are obtained with Wi-Fi transmitting at Mid channel, 802.11b.

7.7.1 Maximum Transmitter Noise Power Level
Per figure 3, input port was terminated with 50 Ohm Weinschel load (MN:1424-4 and SN:21874).

7.7.2 Variable UL Noise Timing
Per figure 4, server port was terminated with 50 Ohm Weinschel load (MN:1424-4 and SN:21874).

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

All adjustable settings on the test sample are set at max gain.

Test environment conditions: Temperature: 20.6°C, Relative Humidity: 42%, Pressure: 101.5kPa

The test was performed in accordance with section 7.7 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015. Firmware: V2.0

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015
ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

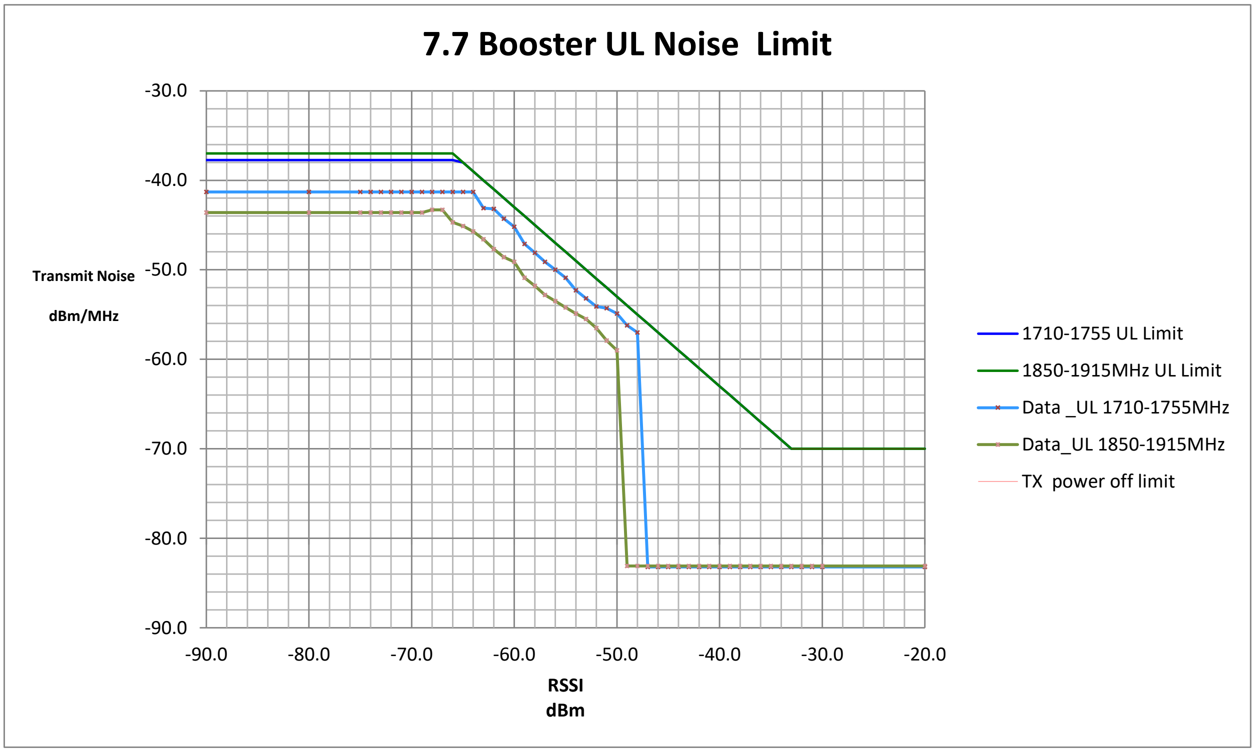
Summary of Results

7.7.1 Maximum transmitter noise power level

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

Maximum Noise Power			
Frequency	Measured	Limit	Margin
MHz	dBm./MHz	dBm/MHz	
UL1710-1755	-42.00	-37.7	-4.3
UL1850-1915	-43.14	-37.0	-6.1
UL824-894	-46.19	-44.1	-2.1
UL 698-716	-47.38	-45.5	-1.9
UL776-787	-45.77	-44.6	-1.2
DL2110-2155	-39.27	-37.7	-1.6
DL1930-1995	-41.74	-37.0	-4.7
DL869-894	-44.94	-44.6	-0.3
DL:728-746	-46.73	-45.5	-1.2
DL 746-757	-47.38	-44.6	-2.8

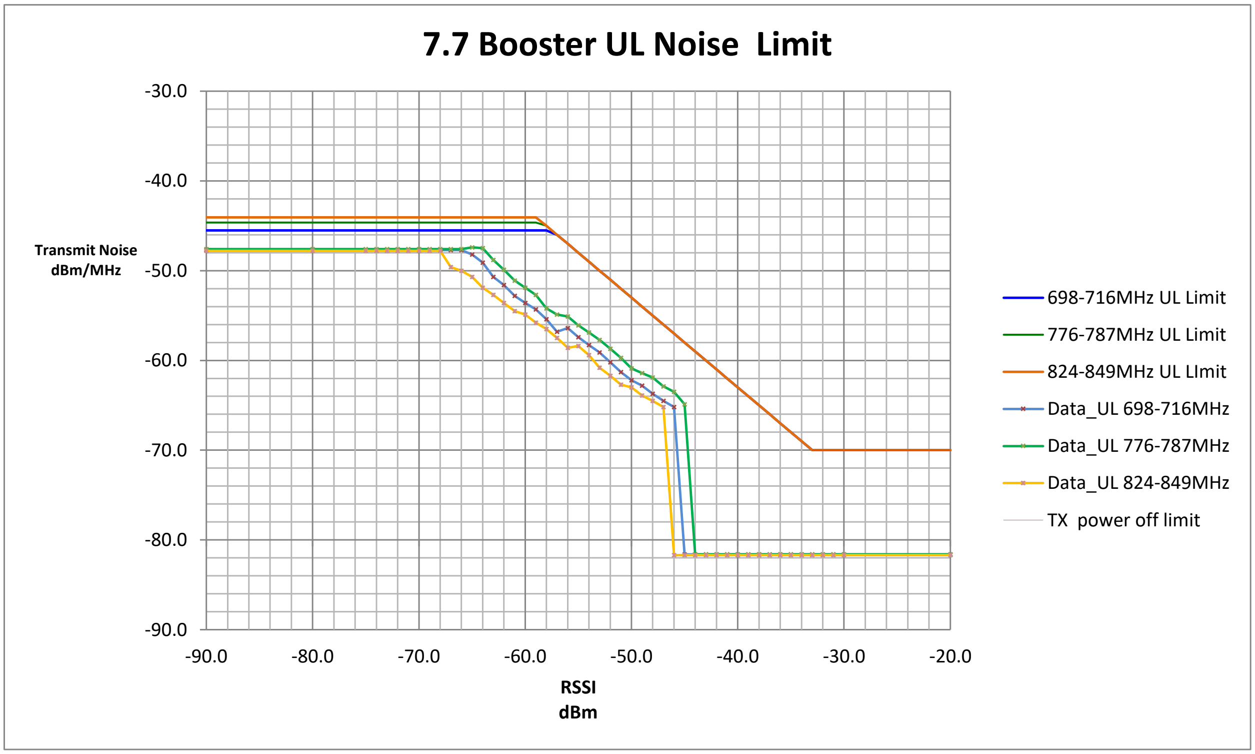
7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal


7.7 Booster UL Noise Limit
Transmit Noise
dBm/MHz
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-90.0
-80.0
-70.0
-60.0
-50.0
-40.0
-30.0
-20.0
RSSI
dBm
1710-1755 UL Limit
1850-1915MHz UL Limit
Data _UL 1710-1755MHz
Data_UL 1850-1915MHz
TX power off limit

1710.0	1755.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-72.0	-41.3		-37.7		-3.6
-66.0	-41.3		-37.7		-3.6
-62.0	-43.2	-41.0			-2.2
-50.0	-54.9	-53.0			-1.9
-49.0	-56.2	-54.0			-2.2
-48.0	-57.0	-55.0			-2.0
-20.0	-83.2			-70	-13.2

1850.0	1915.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-72.0	-43.6		-37.0		-6.6
-67.0	-43.3		-37.0		-6.3
-54.0	-54.9	-49.0			-5.9
-53.0	-55.5	-50.0			-5.5
-52.0	-56.5	-51.0			-5.5
-51.0	-57.9	-52.0			-5.9
-20.0	-83.1			-70	-13.1

698.0	716.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-72.0	-47.7		-45.5		-2.2
-66.0	-47.7		-45.5		-2.2
-49.0	-62.8	-54.0			-8.8
-48.0	-63.7	-55.0			-8.7
-47.0	-64.5	-56.0			-8.5
-46.0	-65.2	-57.0			-8.2
-20.0	-81.6			-70	-11.6


7.7 Booster UL Noise Limit
Transmit Noise
dBm/MHz
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-90.0
-80.0
-70.0
-60.0
-50.0
-40.0
-30.0
-20.0
RSSI
dBm
698-716MHz UL Limit
776-787MHz UL Limit
824-849MHz UL LImit
Data_UL 698-716MHz
Data_UL 776-787MHz
Data_UL 824-849MHz
TX power off limit

776.0	787.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-72.0	-47.6		-44.6		-3.0
-65.0	-47.4		-44.6		-2.8
-48.0	-61.9	-55.0			-6.9
-47.0	-62.9	-56.0			-6.9
-46.0	-63.5	-57.0			-6.5
-45.0	-64.9	-58.0			-6.9
-20.0	-81.6			-70	-11.6

824.0	849.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-72.0	-47.8		-44.1		-3.7
-68.0	-47.8		-44.1		-3.7
-50.0	-63.0	-53.0			-10.0
-49.0	-63.9	-54.0			-9.9
-48.0	-64.5	-55.0			-9.5
-47.0	-65.2	-56.0			-9.2
-20.0	-81.7			-70	-11.7

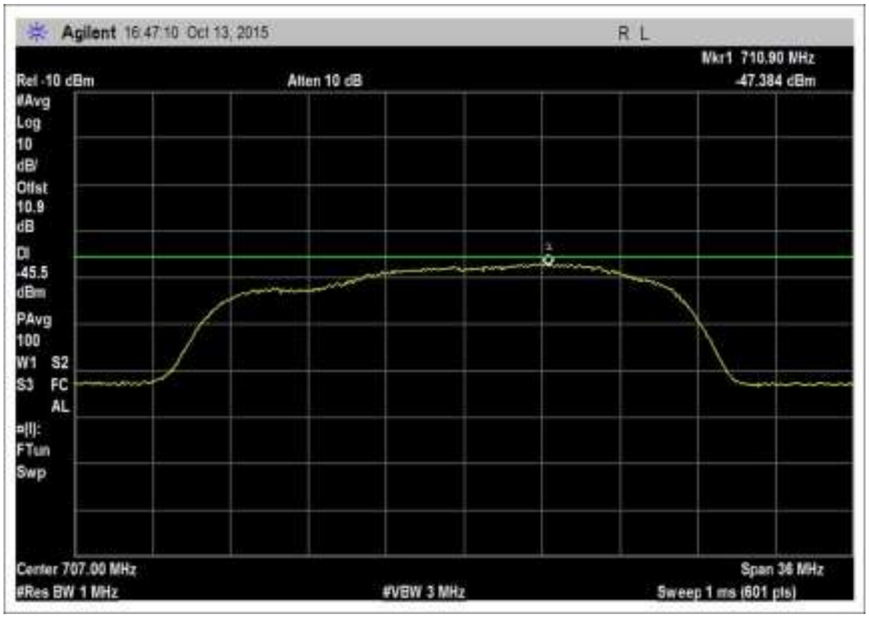
7.7.2 Variable Uplink Noise Timing

Uplink Noise Timing		
Frequency	Measured	Limit
MHz	Sec	sec
UL1710-1755	1.27	3
UL1850-1915	0.97	3
UL824-894	0.87	3
UL 698-716	0.77	3
UL776-787	0.82	3

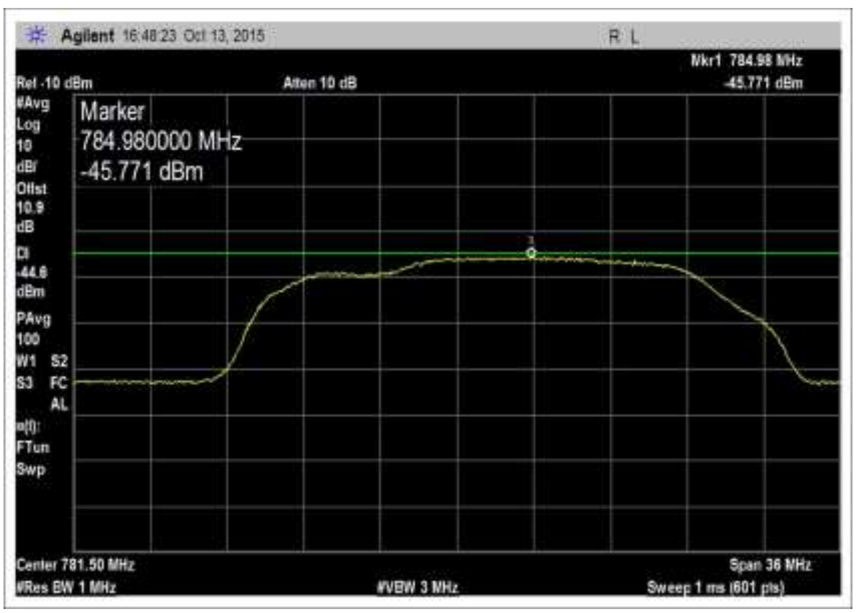
7.7.1 Maximum Transmitter Noise Power Level

Plots

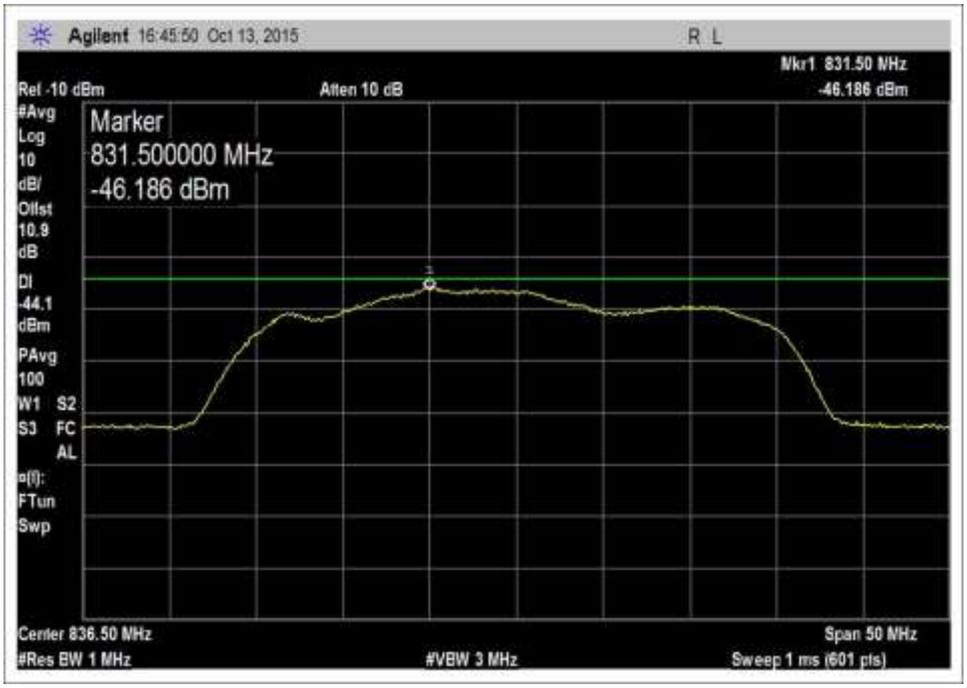
a – g_Noise 50



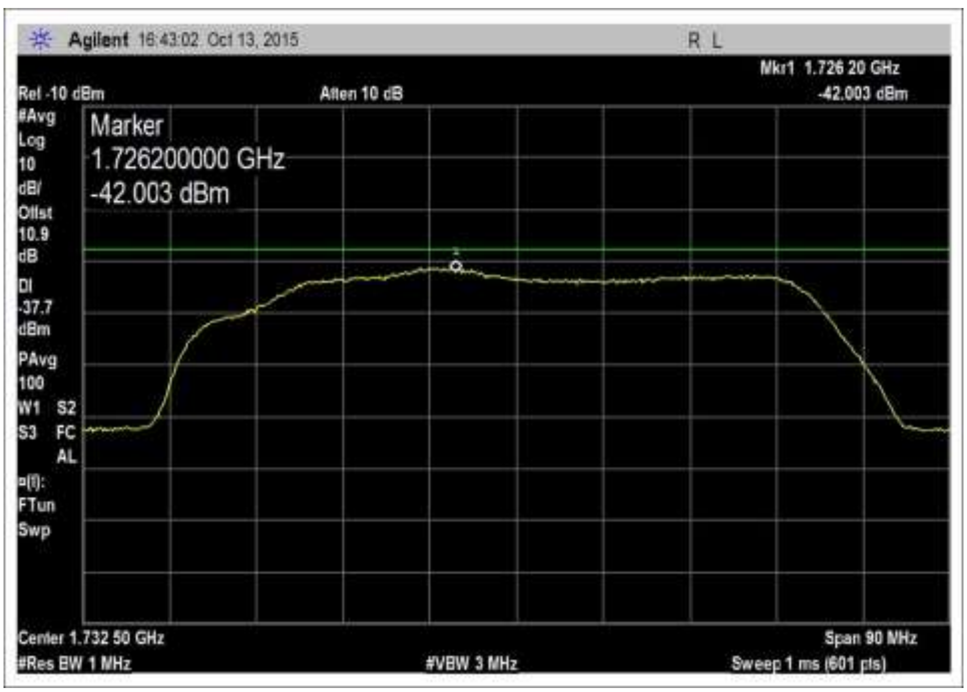
7.7_Noise_UL_698-716MHz



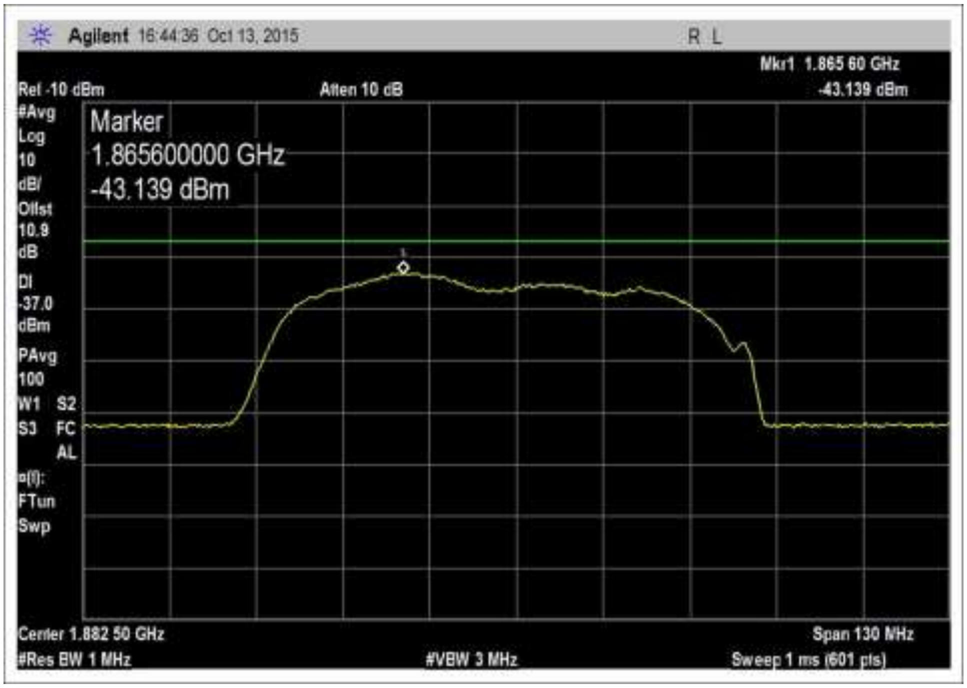
7.7_Noise_UL_776-787MHz



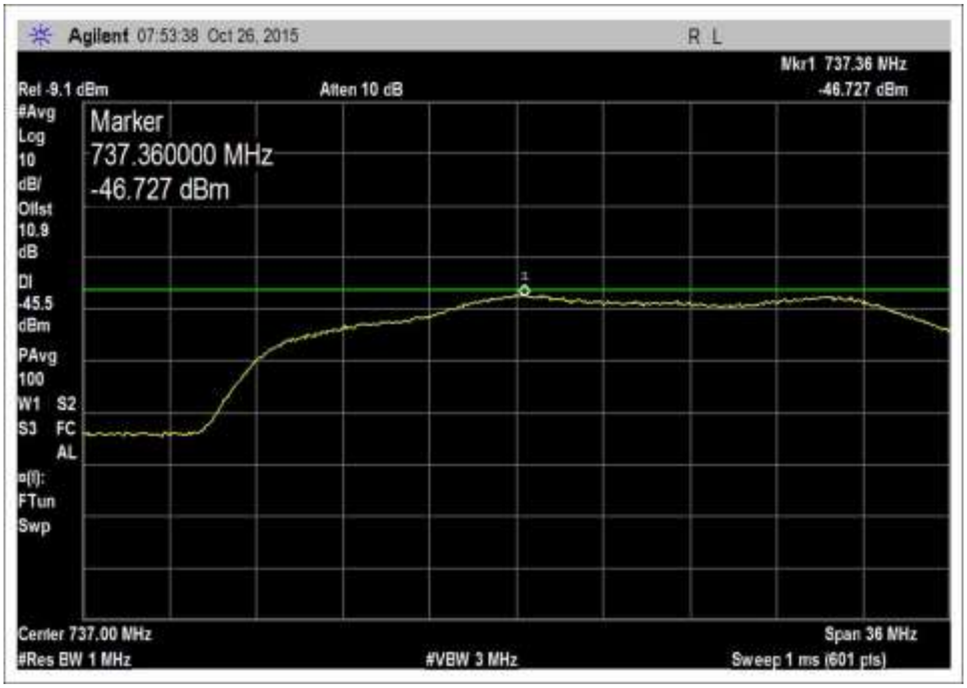
7.7_Noise_UL_824-849MHz



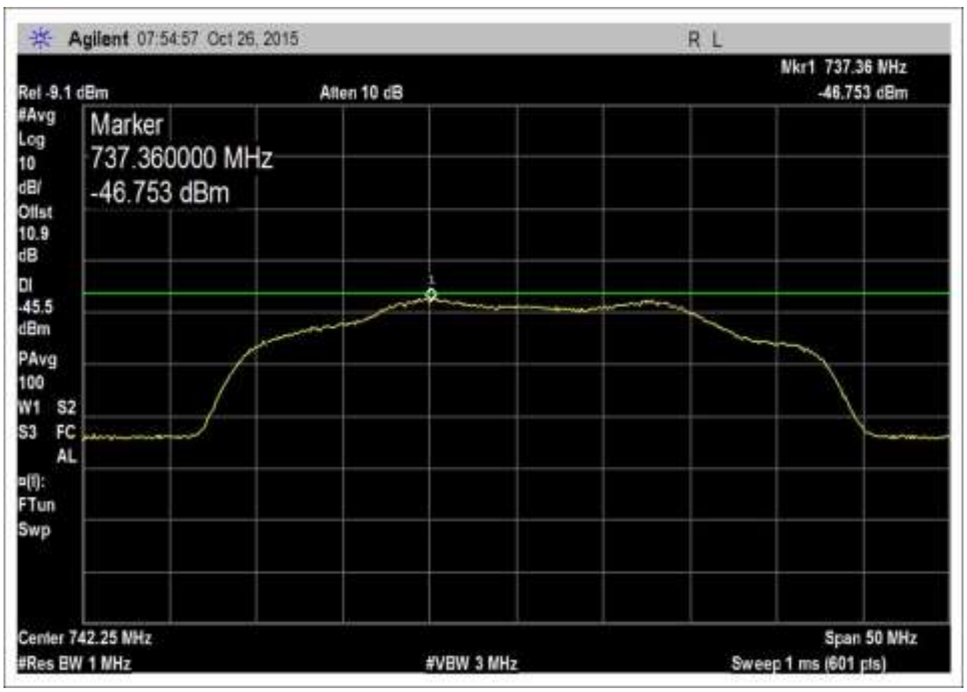
7.7_Noise_UL_1710-1755MHz



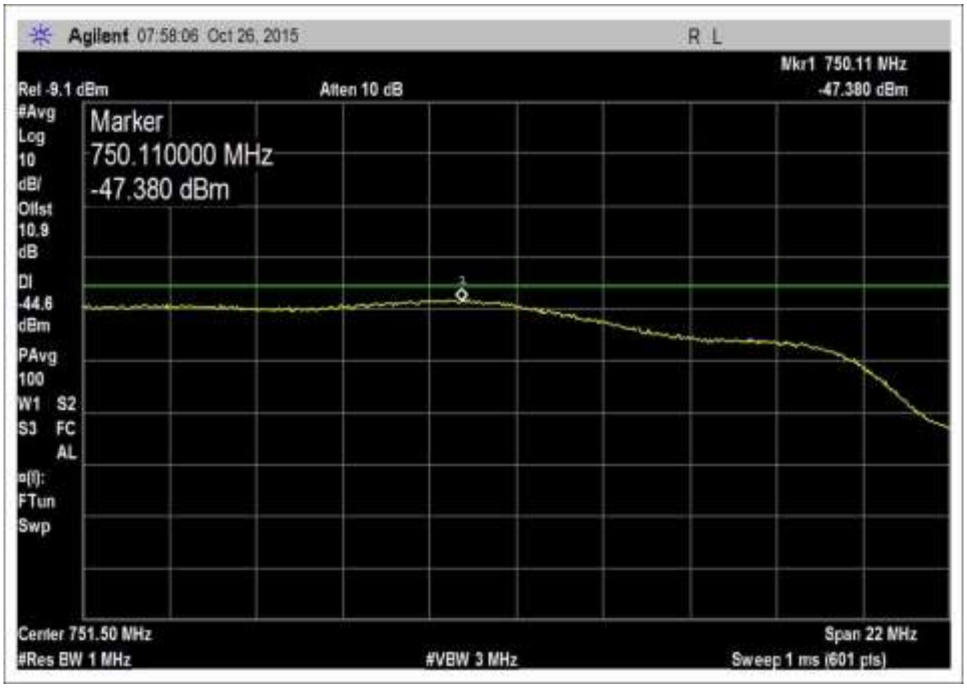
7.7_Noise_UL_1850-1915MHz



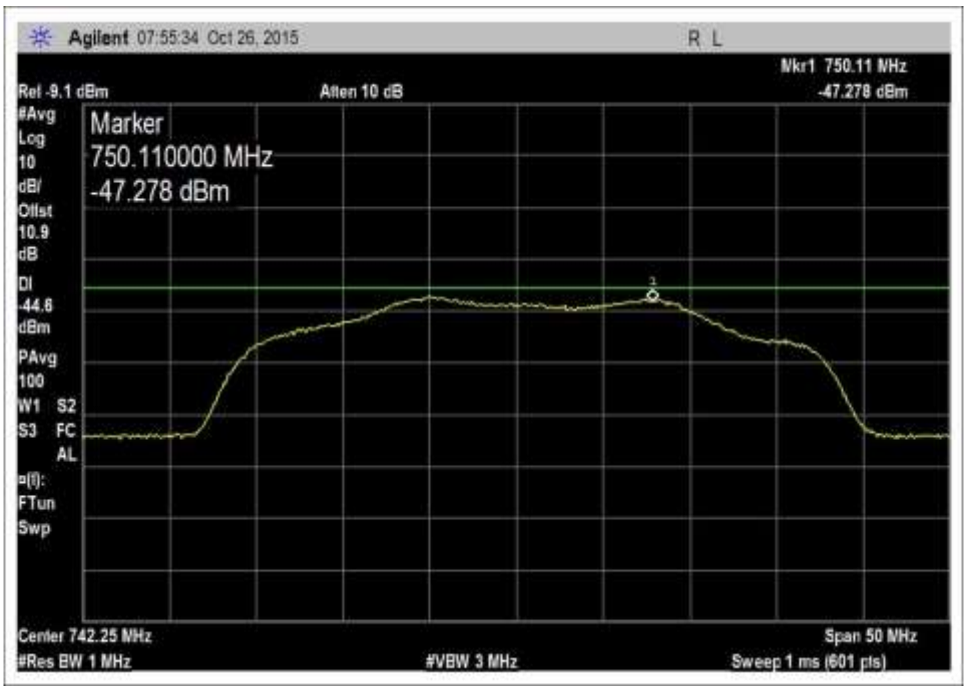
7.7_Noise_DL_728-746MHz



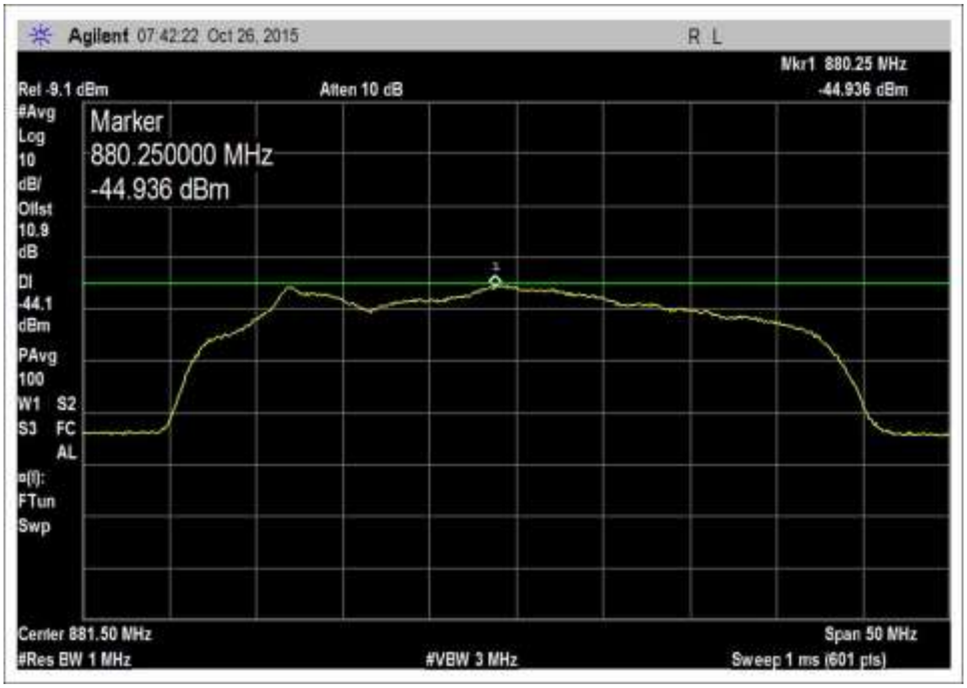
7.7_Noise_DL_728-746MHz-Zoom



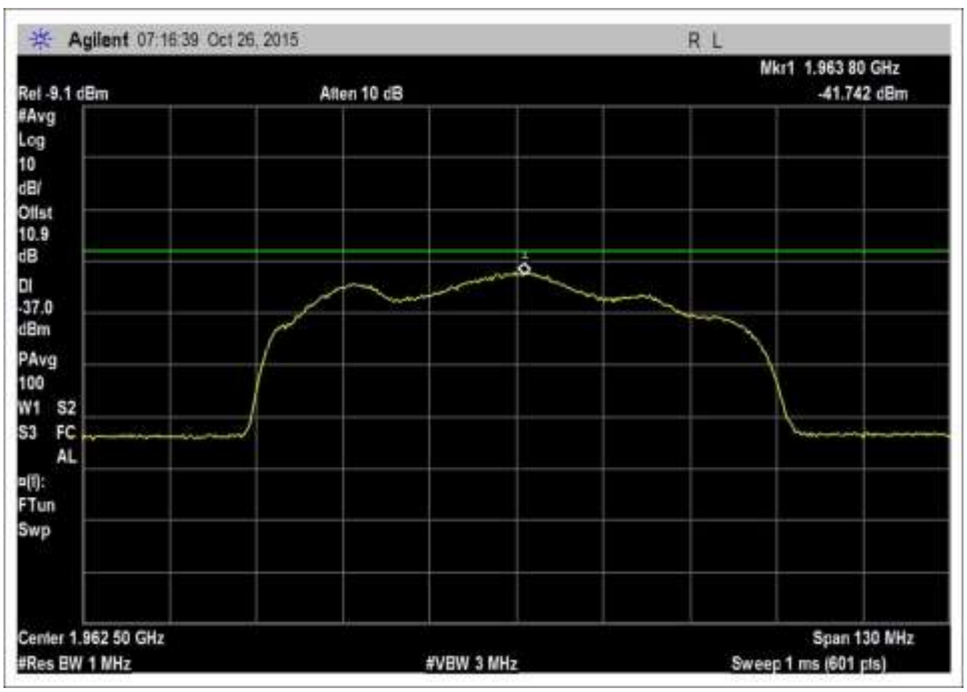
7.7_Noise_DL_746-757MHz



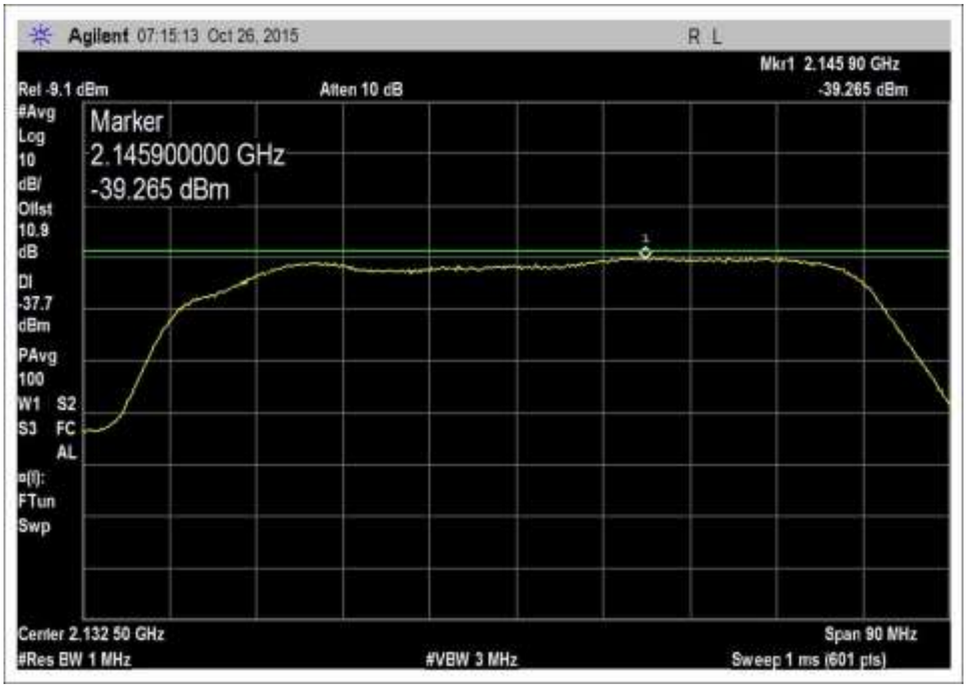
7.7_Noise_DL_746-757MHz-Zoom



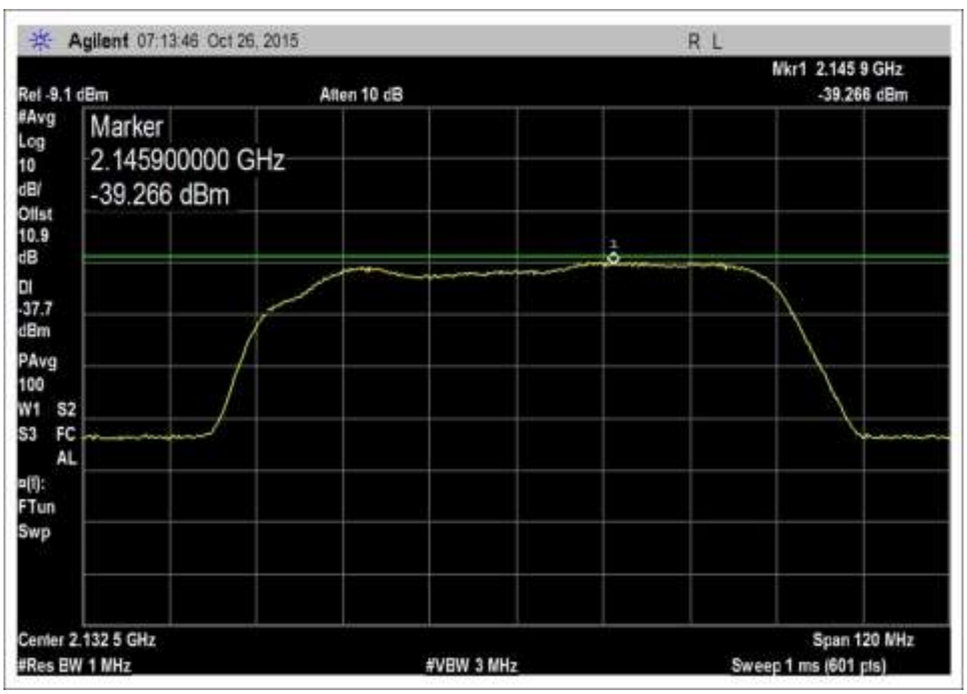
7.7_Noise_DL_869-894MHz



7.7_Noise_DL_1930-1995MHz



7.7_Noise_DL_2110-2155MHz



7.7_Noise_DL_2110-2155MHz-Zoom

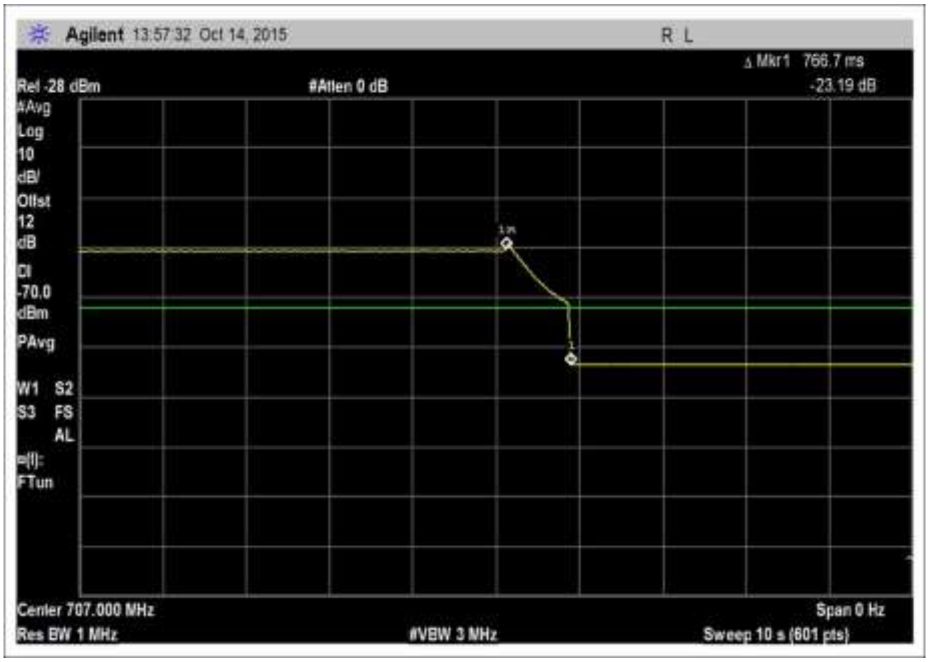
h – n Tx Noise

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

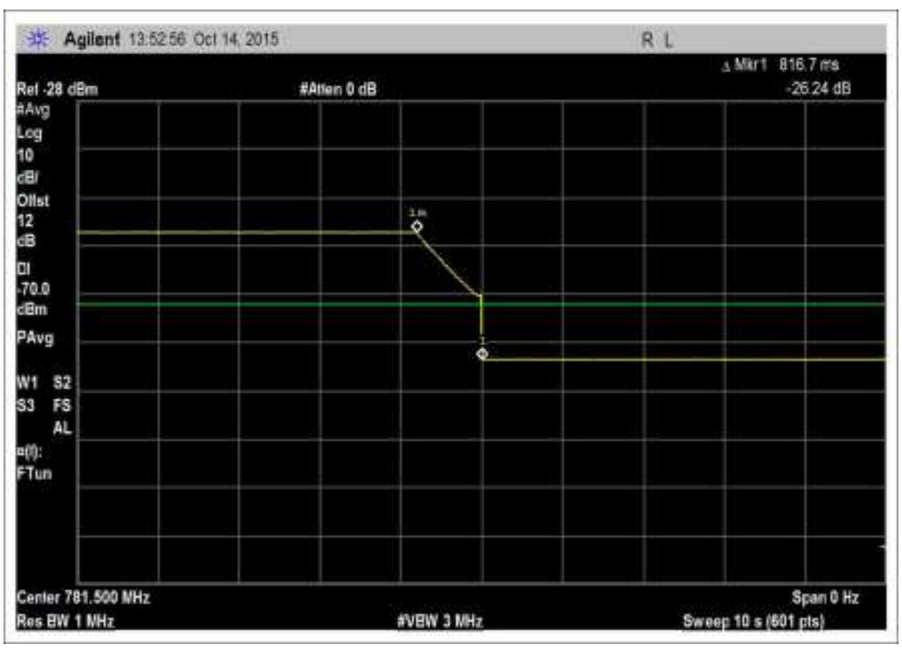
7.7.2 Variable UL Noise Timing

Plots

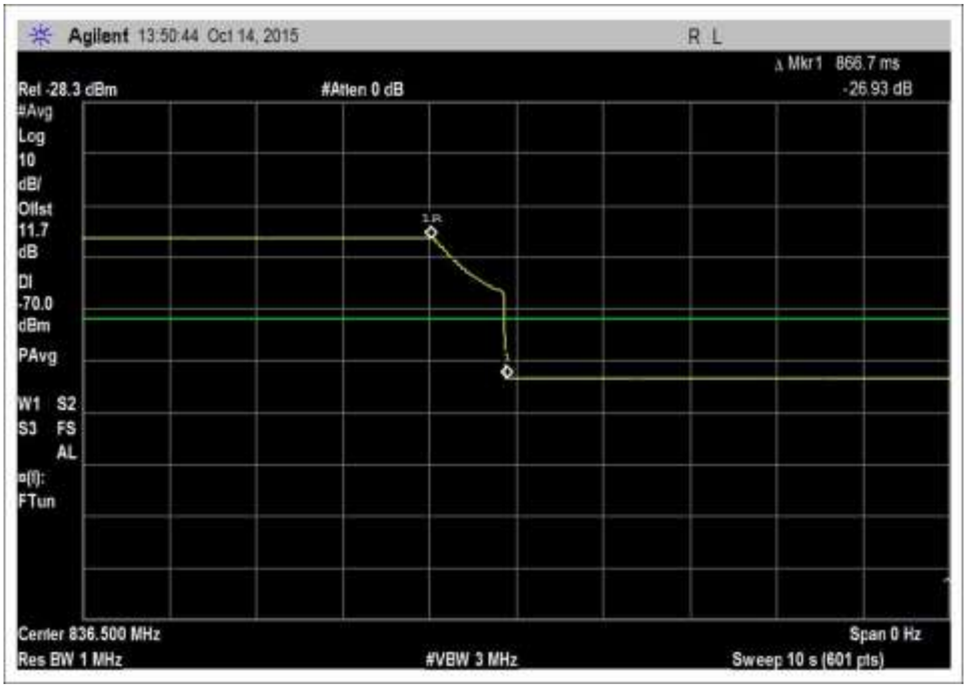
a – g_Timing



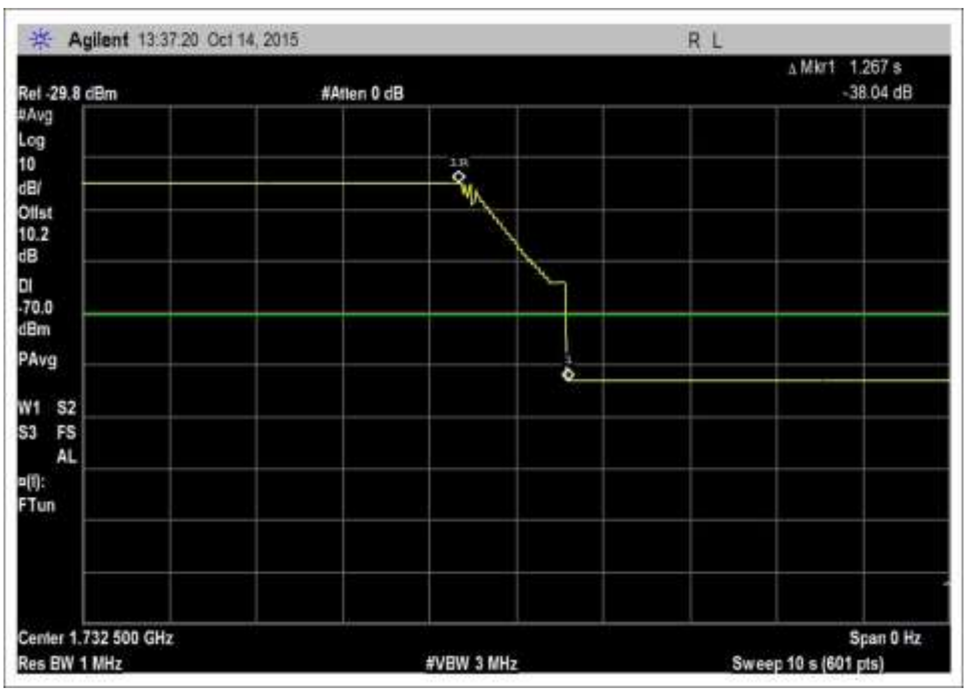
7.7_VarNoise_UL_698-716MHz



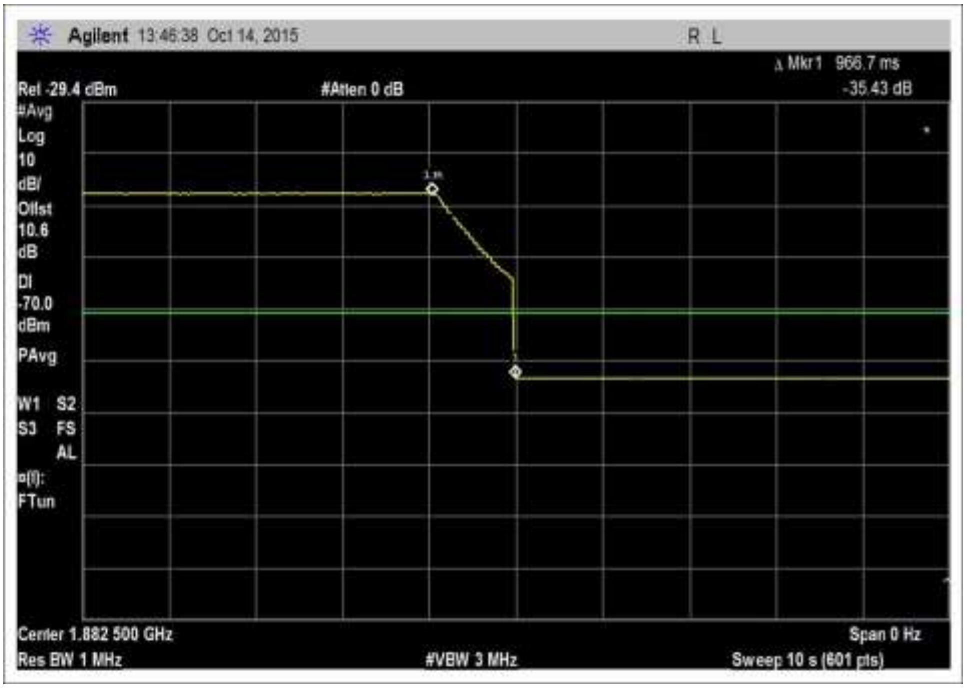
7.7_VarNoise_UL_776-787MHz



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 #:	**97491** — Date: 10/14/2015
Test Type:	**Conducted Emissions** — Time: 14:14:02
Tested By:	Daniel Bertran — Sequence#: 1
Software:	EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed CMRS Wideband Consumer Booster with a Wi-Fi Router and TV amplifier installed. The CMRS DL signal and the Wi-Fi Signal are combined at the diplexer and transmit via the indoor antenna.
The Consumer booster UL and DL power and gain parameters are initially measured with Wi-Fi transmitting at mid channel using sequentially 802.11b, g, n20 and n40 signal. Since no significant change in measured power was observed, all other parameters are obtained with Wi-Fi transmitting at Mid channel, 802.11b.
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

All adjustable settings on the test sample are set at max gain.

Test environment conditions: Temperature: 20.6°C, Relative Humidity: 42%, Pressure: 101.5kPa

Test procedure: The test was performed in accordance with section 7.8 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015. Firmware: V2.0

Test Equipment:

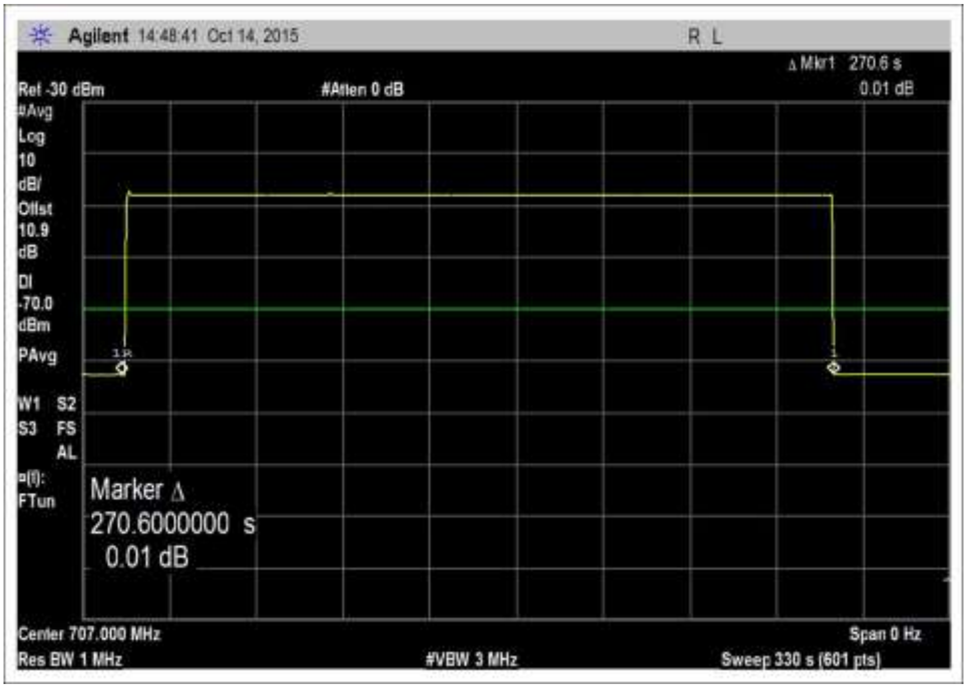
Asset #	Description	Model	Calibration Date	Cal Due Date
ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015
ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Summary of Results

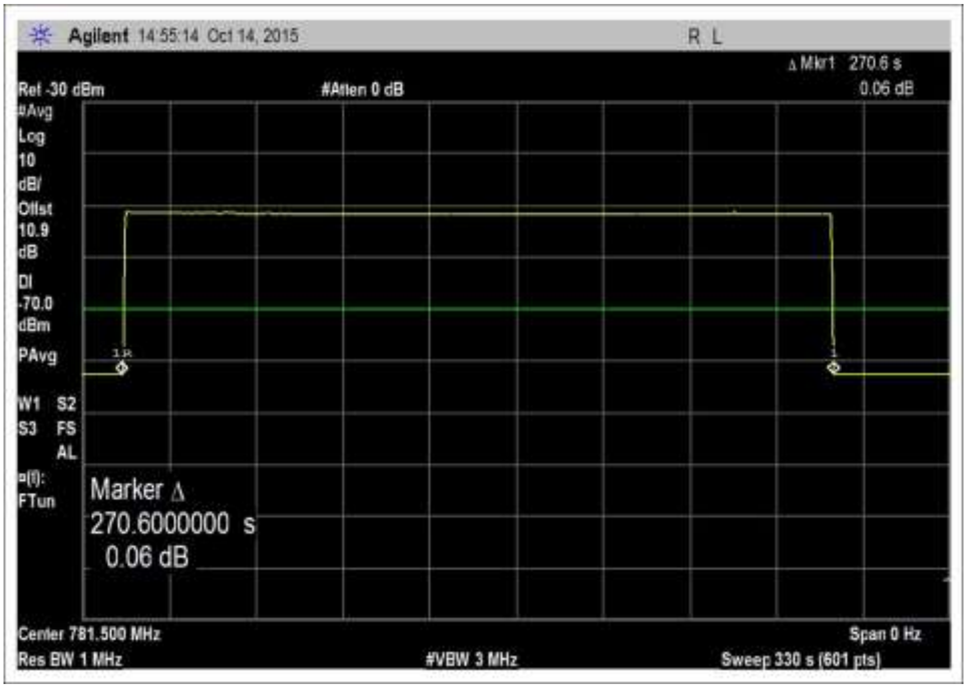
Pass: As demonstrated, when the booster is not serving an active device connection after 5 minutes the uplink noise power does not exceed -70dbm/MHz

Uplink Inactivity		
Frequency	Measured	Limit
MHz	Min	Min
UL1710-1755	4.2	5.0
UL1850-1915	4.2	5.0
UL824-894	4.2	5.0
UL 698-716	4.5	5.0
UL776-787	4.5	5.0

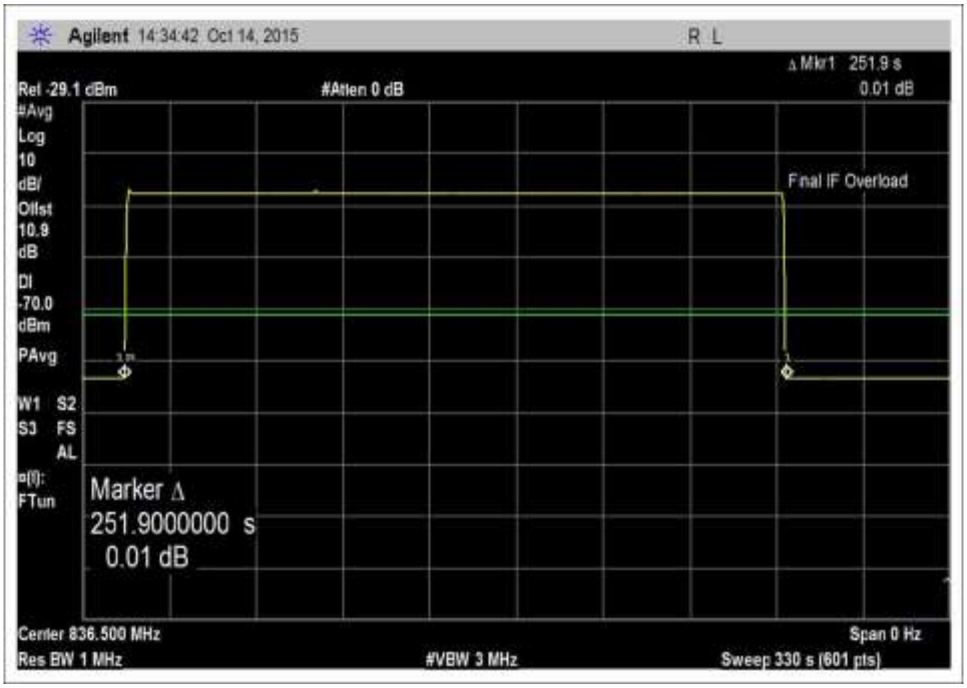
Plots



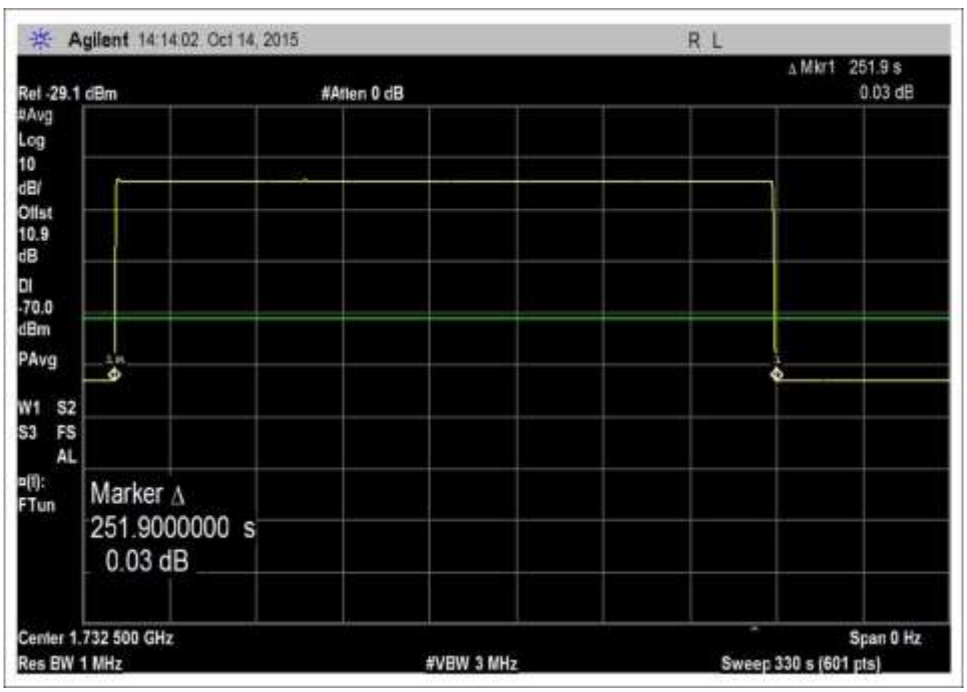
7.8_Inactivity_UL_698-707MHz



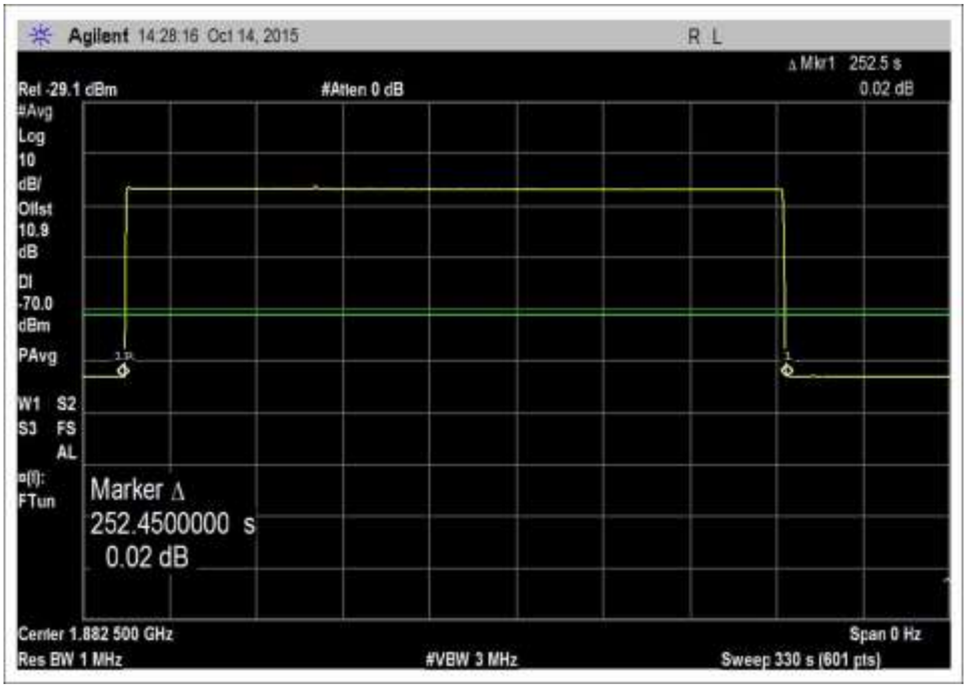
7.8_Inactivity_UL_776-787MHz



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 #:	**97491** Date: 10/15/2015
Test Type:	**Conducted Emissions** Time: 09:31:40
Tested By:	Daniel Bertran Sequence#: 1
Software:	EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed CMRS Wideband Consumer Booster with a Wi-Fi Router and TV amplifier installed. The CMRS DL signal and the Wi-Fi Signal are combined at the diplexer and transmit via the indoor antenna.
The Consumer booster UL and DL power and gain parameters are initially measured with Wi-Fi transmitting at mid channel using sequentially 802.11b, g, n20 and n40 signal. Since no significant change in measured power was observed, all other parameters are obtained with Wi-Fi transmitting at Mid channel, 802.11b.

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

All adjustable settings on the test sample are set at max gain.

Test environment conditions: Temperature: 20.6°C, Relative Humidity: 42%, Pressure: 101.5kPa

The test was performed in accordance with section 7.9 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015. Firmware: V2.0

Note: MSCL provided by the manufacturer's antenna kitting was used.

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.

$$L\,P = 20\log f + 20\log d - 27.5$$

Where:

L P = basic free space path loss,

f = Center frequency,

d = 2 meters.

MSCL

Frequency (MHz)	MSCL (dB)
1850-1915	43.0
824-849	37.2
698-716	35.6
776-787	36.5
1710-1755	41.9

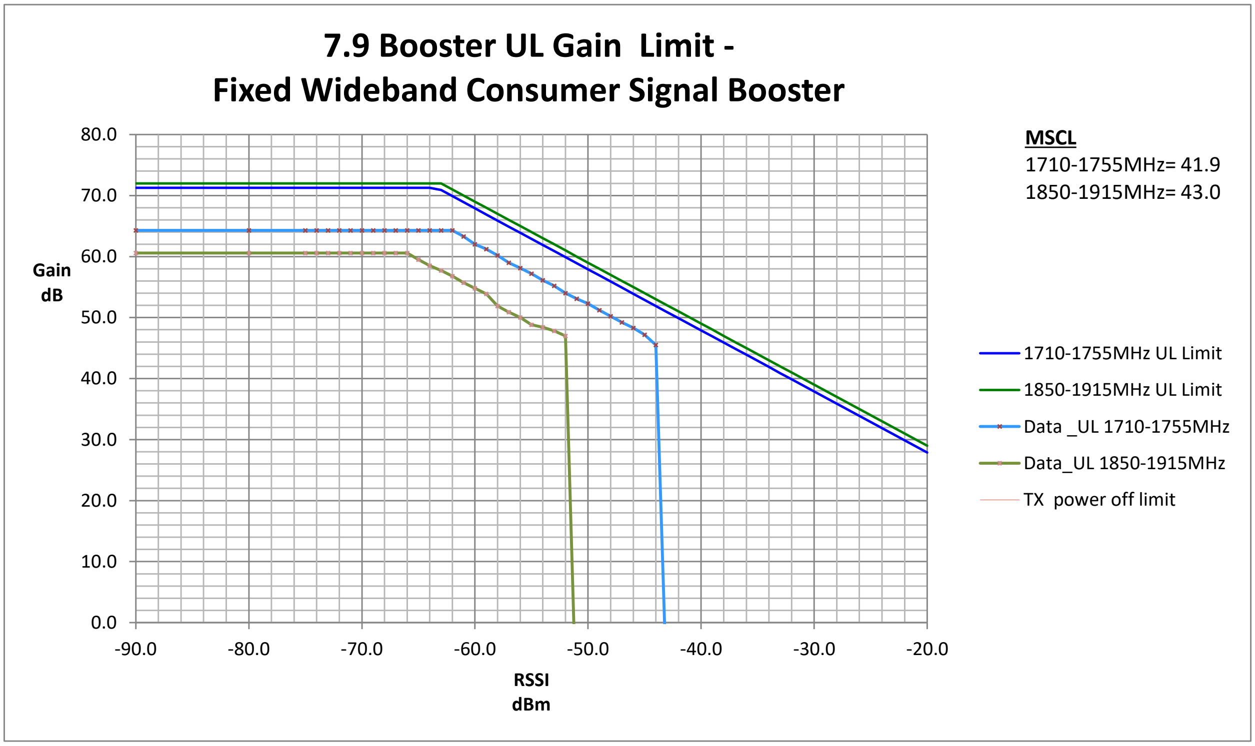
Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
ANP06711	Cable	32022-29094K-29094K-132TC	11/21/2014	11/21/2016
AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015
ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016
ANC00082	RF Coupler	722-10-1.500V	8/26/2015	8/26/2017
ANC00087	Combiner	44000	1/9/2014	1/9/2016

Summary of Results

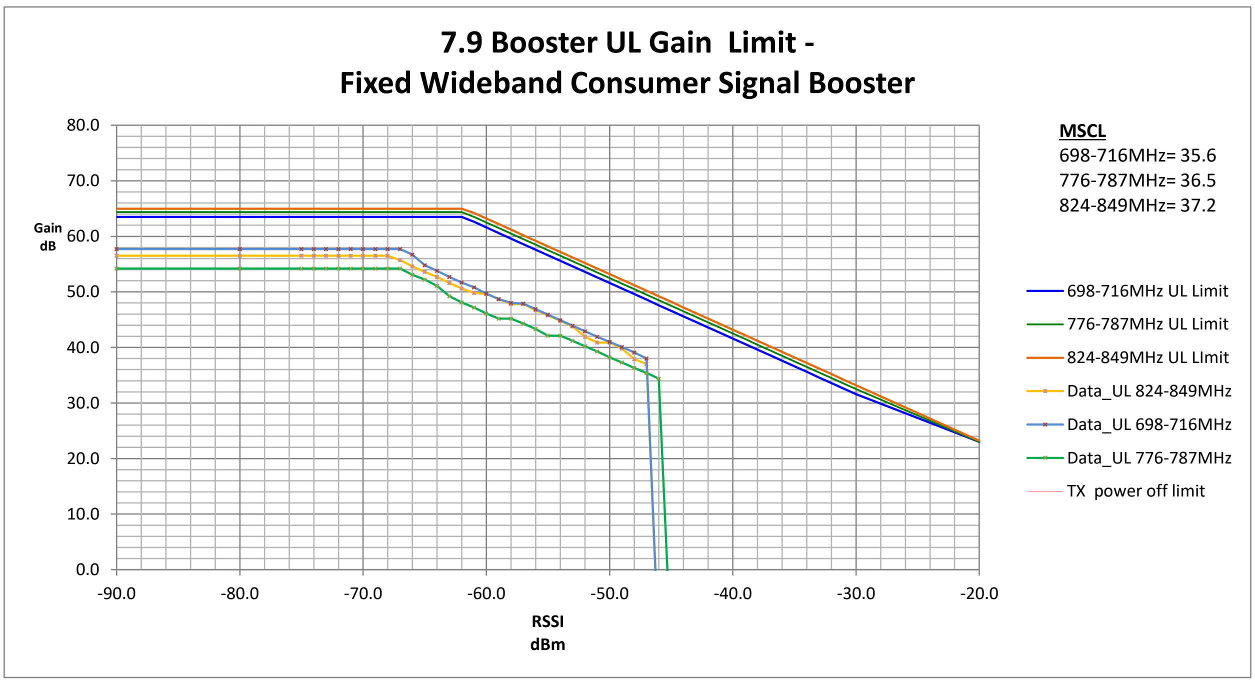
Pass: As demonstrated, computed gains are within the gain limit. All maximum variable uplink gain timings are within 3 second limit.

7.9.1 Maximum Gain



1850.0			1915.0	MHz			
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Mobile Booster Limit	TX off	
-75.0	-50	10.6	60.6		72.0		-11.4
-66.0	-50	10.6	60.6		72.0		-11.4
-60.0	-50	4.8	54.8	69.0			-14.2
-59.0	-50	3.9	53.9	68.0			-14.1
-53.0	-50	-2.2	47.8	62.0			-14.2
-52.0	-50	-3.0	47.0	61.0			-14.0

1710.0			1755.0	MHz			
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Mobile Booster Limit	TX off	
-75.0	-53.1	11.2	64.3		71.3		-7.0
-68.0	-53.1	11.2	64.3		71.3		-7.0
-62.0	-53.1	11.2	64.3	69.9			-5.6
-61.0	-53.1	10.2	63.3	68.9			-5.6
-50.0	-53.1	-0.8	52.3	57.9			-5.6
-46.0	-53.1	-4.8	48.3	53.9			-5.6



824.0			849.0	MHz			
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Mobile Booster Limit	TX off	
-75.0	-45.5	11.0	56.5		64.9		-8.4
-68.0	-45.5	11.0	56.5		64.9		-8.4
-57.0	-45.5	2.3	47.8	60.2			-12.4
-55.0	-45.5	0.3	45.8	58.2			-12.4
-54.0	-45.5	-0.7	44.8	57.2			-12.4
-50.0	-45.5	-4.6	40.9	53.2			-12.3

698.0			716.0	MHz			
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Mobile Booster Limit	TX off	
-75.0	-45.9	11.8	57.7		63.5		-5.8
-68.0	-45.9	11.8	57.7		63.5		-5.8
-50.0	-45.9	-4.9	41.0	51.6			-10.6
-49.0	-45.9	-5.8	40.1	50.6			-10.5
-48.0	-45.9	-6.8	39.1	49.6			-10.5
-47.0	-45.9	-7.9	38.0	48.6			-10.6

776.0			787.0	MHz			
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Mobile Booster Limit	TX off	
-75.0	-45.2	9.0	54.2		64.4		-10.2
-68.0	-45.2	9.0	54.2		64.4		-10.2
-49.0	-45.2	-7.9	37.3	51.5			-14.2
-48.0	-45.2	-8.9	36.3	50.5			-14.2
-47.0	-45.2	-9.8	35.4	49.5			-14.1
-46.0	-45.2	-10.8	34.4	48.5			-14.1

7.9.2 Variable Uplink Gain Timing

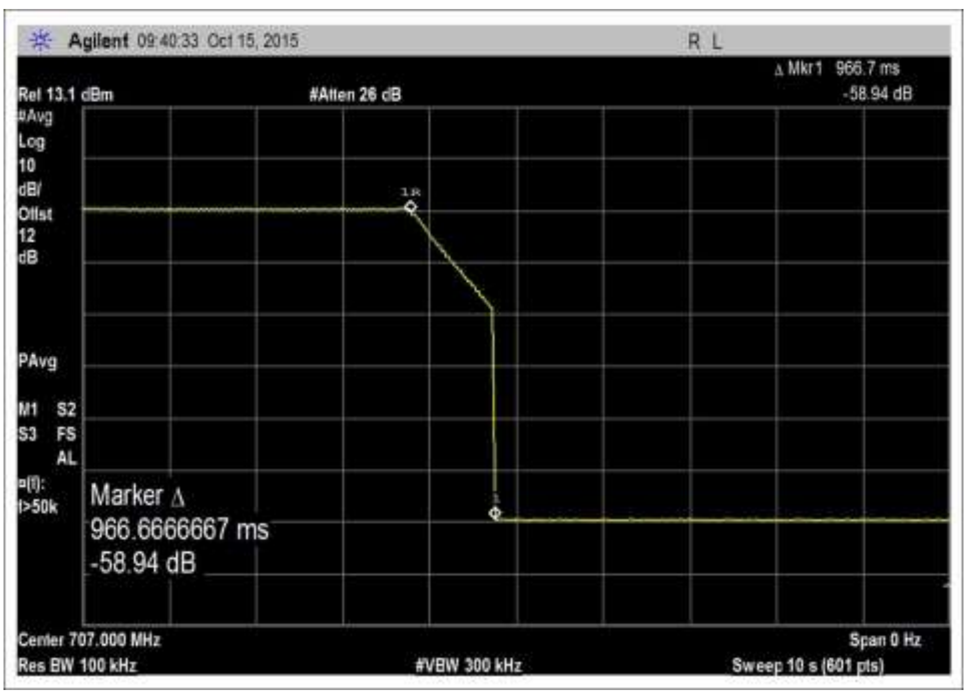
Uplink Gain Timing		
Frequency (MHz)	Measured (Sec)	Limit (Sec)
UL1710-1755	1.30	3
UL1850-1915	0.92	3
UL824-894	0.97	3
UL 698-716	0.97	3
UL776-787	1.00	3

7.9.1 Maximum Gain

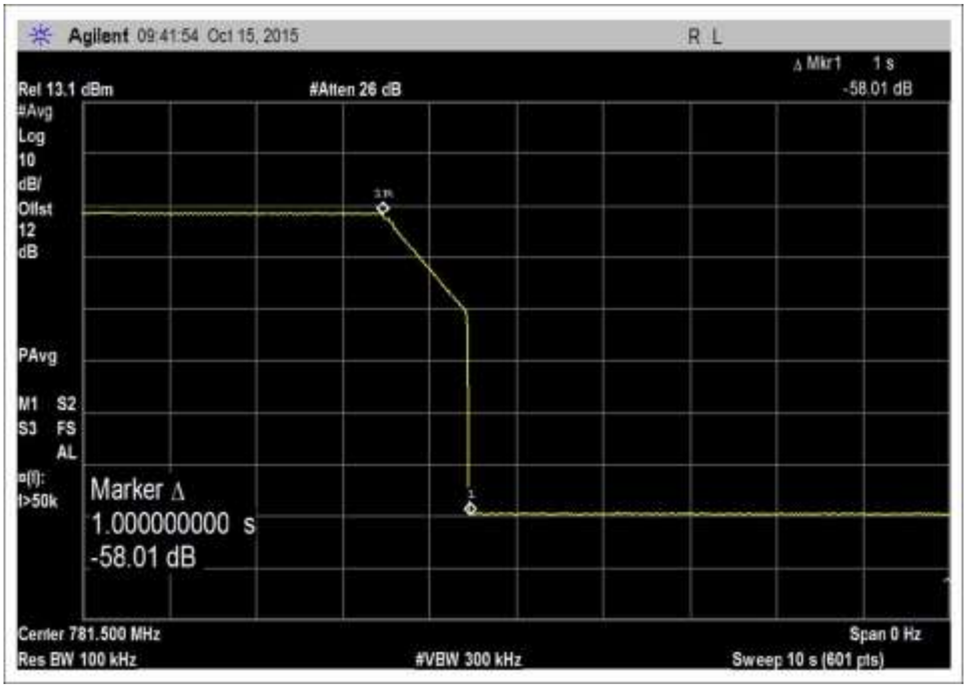
For this subsection, see summary of results of 7.9
7.9.1 Maximum gain

7.9.2 Variable uplink Gain Timing

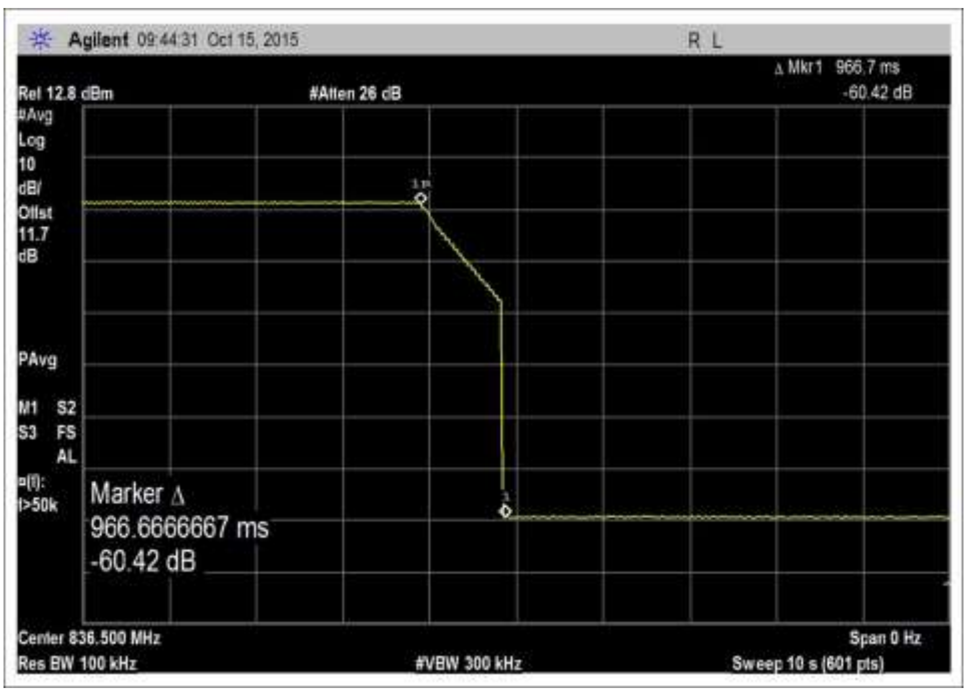
Plots



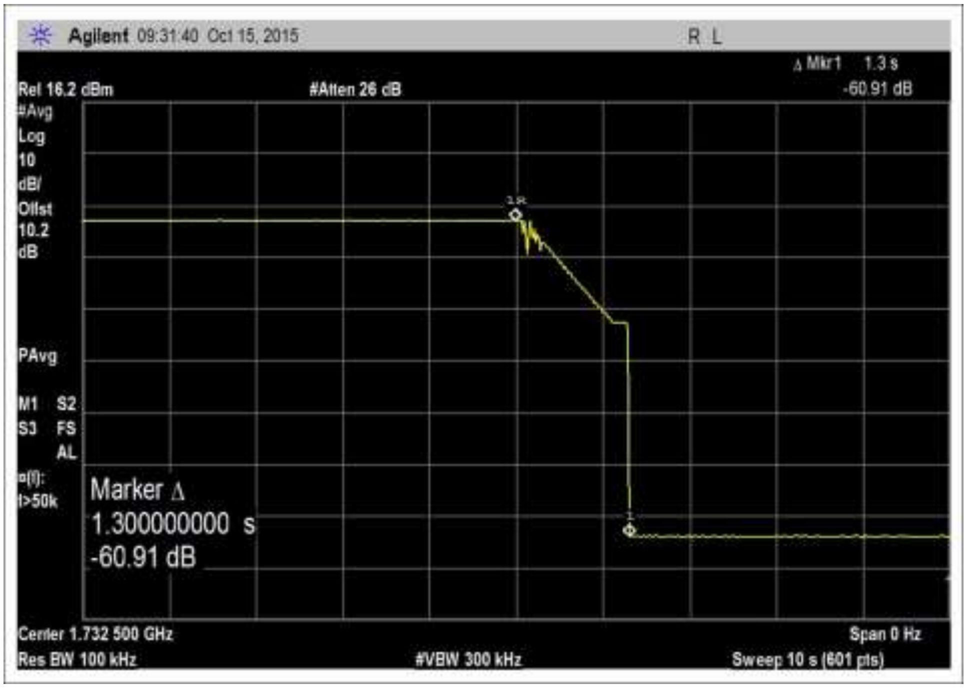
7.9.2_VarULGainTiming_UL_698-716MHz



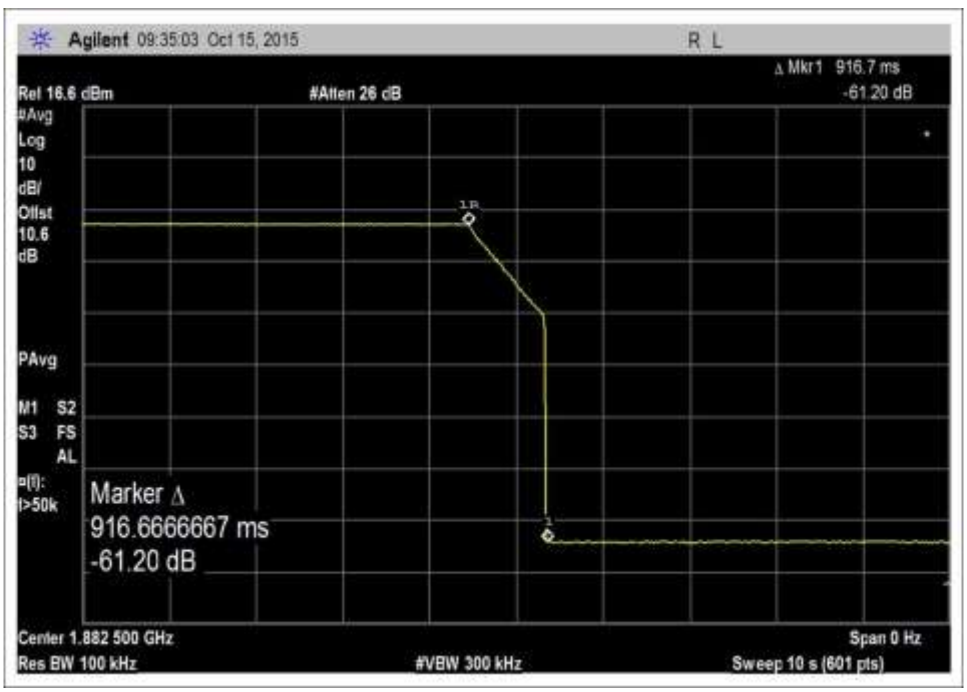
7.9.2_VarULGainTiming_UL_776-787MHz



7.9.2_VarULGainTiming_UL_824-849MHz



7.9.2_VarULGainTiming_UL_1710-1755MHz



7.9.2_VarULGainTiming_UL_1850-1915MHz

7.11 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 #:	**97491** Date: 10/15/2015
Test Type:	**Conducted Emissions** Time: 13:59:10
Tested By:	Daniel Bertran Sequence#: 1
Software:	EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed CMRS Wideband Consumer Booster with a Wi-Fi Router and TV amplifier installed. The CMRS DL signal and the Wi-Fi Signal are combined at the diplexer and transmit via the indoor antenna.
The Consumer booster UL and DL power and gain parameters are initially measured with Wi-Fi transmitting at mid channel using sequentially 802.11b, g, n20 and n40 signal. Since no significant change in measured power was observed, all other parameters are obtained with Wi-Fi transmitting at Mid channel, 802.11b.

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

All adjustable settings on the test sample are set at max gain.

Test environment conditions: Temperature: 20.6°C, Relative Humidity: 42%, Pressure: 101.5kPa

Test procedure: The test was performed in accordance with section 7.11 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015. Firmware: V2.0

Note: UL-1710-1755-**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 1710-1755MHz.
+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:

Asset #	Description	Model	Calibration Date	Cal Due Date
ANP03143	Cable	32022-29094K-144TC	3/18/2015	3/18/2017
ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
ANP06711	Cable	32022-29094K-29094K-132TC	11/21/2014	11/21/2016
ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015
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	01/06/2014	01/06/2016
AN03467	Band Pass Filter	4FV50-731/H30-O/O	01/06/2014	01/06/2016
AN03468	Band Pass Filter	4CS10-781.5/E12.2-O/O	01/06/2014	01/06/2016
AN03469	Band Pass Filter	4CS10-751.5/E12-O/O	01/06/2014	01/06/2016
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
ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016
ANC00082	RF Coupler	722-10-1.500V	8/26/2015	8/26/2017
ANC00087	Combiner	44000	01/09/2014	01/9/2016
AN02748	Low Pass Filter	11SL10-2000/U6000-O/O	1/15/2014	1/15/2016

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	
Frequency	Measured	Limit	Peak Level	Measured	Limit	Measured	Limit
MHz	Sec	Sec	dBm	Sec	At least sec		
UL1710-1755	0.13	0.30	26.4	69	60	2	5
UL1850-1915	0.17	0.30	26.2	69	60	2	5
UL824-894	0.15	0.30	31.1	69	60	2	5
UL 698-716	0.15	0.30	30.0	66	60	2	5
UL776-787	0.14	0.30	29.7	66.5	60	2	5
DL2110-2155	0.13	1.00	22.6	68	60	2	5
DL1930-1995	0.17	1.00	0	69	60	2	5
DL869-894	0.13	1.00	23.6	69	60	2	5
DL:728-746	0.31	1.00	25.6	66	60	2	5
DL 746-757	0.12	1.00	25.4	67.5	60	2	5

The booster continues to mitigate at least 1 minute before restarting. The plots demonstrate after 2 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 dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-51.5	-62.0	10.5	12.0
+4dB	-49.6	-62.4	(12.8)*	12.0
+3dB	-48.1	-62.7	(14.6)*	12.0
+2dB	-45.5	-62.8	(17.3)*	12.0
+1dB	-41.4	-63.4	(22.1)*	12.0
0dB	-32.1	-63.5	(31.4)*	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 2110-2155 MHz				
Max Gain Isolation dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-60.3	-71.4	11.1	12.0
+4dB	-59.1	-71.5	(12.5)*	12.0
+3dB	-57.4	-72.0	(14.6)*	12.0
+2dB	-55.3	-72.1	(16.8)*	12.0
+1dB	-51.9	-72.7	(20.8)*	12.0
0dB	-44.6	-73.3	(28.7)*	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 dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-48.3	-64.4	(16.0)*	12.0
+4dB	-44.9	-64.2	(19.4)*	12.0
+3dB	-38.1	-64.9	(26.8)*	12.0
+2dB	**	**	0.0	12.0
+1dB	**	**	0.0	12.0
0dB	**	**	0.0	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 dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-62.8	-72.7	9.9	12.0
+4dB	-59.9	-72.6	(12.7)*	12.0
+3dB	-58.7	-72.9	(14.2)*	12.0
+2dB	-55.6	-74.1	(18.5)*	12.0
+1dB	-51.8	-74.3	(22.5)*	12.0
0dB	-41.6	-75.2	(33.6)*	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

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 56 second.
** The device shuts down immediately.

UL 824-894 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-55.5	-65.2	9.7	12.0
+4dB	-54.8	-65.7	11.0	12.0
+3dB	-53.0	-66.1	(13.1)*	12.0
+2dB	-51.5	-65.6	(14.1)*	12.0
+1dB	-48.4	-66.6	(18.2)*	12.0
0dB	-42.2	-66.8	(24.6)*	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

UL 698-716 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-57.0	-68.4	(11.4)*	12.0
+4dB	-56.3	-69.0	(12.7)*	12.0
+3dB	-53.9	-69.3	(15.3)*	12.0
+2dB	-50.1	-69.9	(19.8)*	12.0
+1dB	-42.2	-69.3	(27.1)*	12.0
0dB	**	**	0.0	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 869-894 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-65.0	-77.4	(12.4)*	12.0
+4dB	-64.3	-77.5	(13.3)*	12.0
+3dB	-62.6	-77.8	(15.2)*	12.0
+2dB	-60.0	-78.3	(18.3)*	12.0
+1dB	-56.1	-78.8	(22.6)*	12.0
0dB	-47.0	-79.2	(32.2)*	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 728-746 MHz				
Max Gain				
Isolation	Peak	Min	Diff	Limit
dB	dBm	dBm	dB	dB
+5dB	-68.0	-79.8	(11.8)*	12.0
+4dB	-66.2	-80.1	(14.0)*	12.0
+3dB	-64.8	-80.8	(16.0)*	12.0
+2dB	-61.6	-80.7	(19.1)*	12.0
+1dB	-55.7	-81.0	(25.3)*	12.0
0dB	**	**	0.0	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

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 1 minute and 45 second.
** The device shuts down immediately.

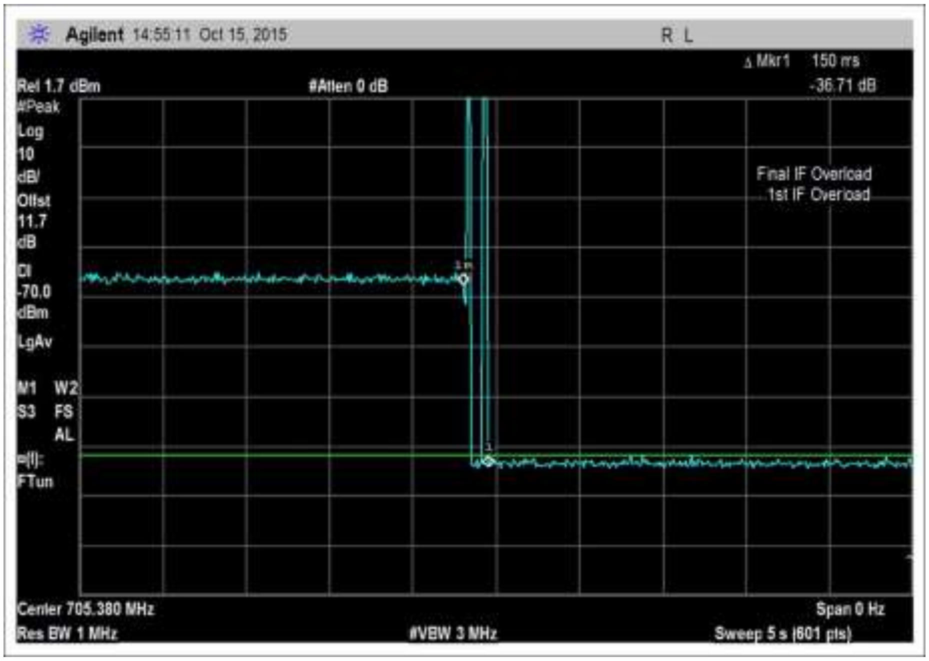
UL 776-787 MHz				
Max Gain Isolation dB	Peak dBm	Min dBm	Diff dB	Limit dB
+5dB	-63.7	-69.7	6.0	12.0
+4dB	-63.5	-69.9	6.5	12.0
+3dB	-62.7	-70.2	7.5	12.0
+2dB	-60.9	-70.9	10.0	12.0
+1dB	-59.5	-70.9	(11.4)*	12.0
0dB	-58.3	-71.6	(13.4)*	12.0
-1dB	-55.7	-72.2	(16.5)*	12.0
-2dB	-51.4	-71.9	(20.5)*	12.0
-3dB	-44.2	-72.5	(28.3)*	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	-56.4	-68.8	(12.4)*	12.0
+4dB	-54.5	-68.4	(13.9)*	12.0
+3dB	-52.7	-69.2	(16.5)*	12.0
+2dB	-49.1	-69.5	(20.3)*	12.0
+1dB	-44.6	-69.9	(25.3)*	12.0
0dB	-25.0	-69.8	(44.8)*	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

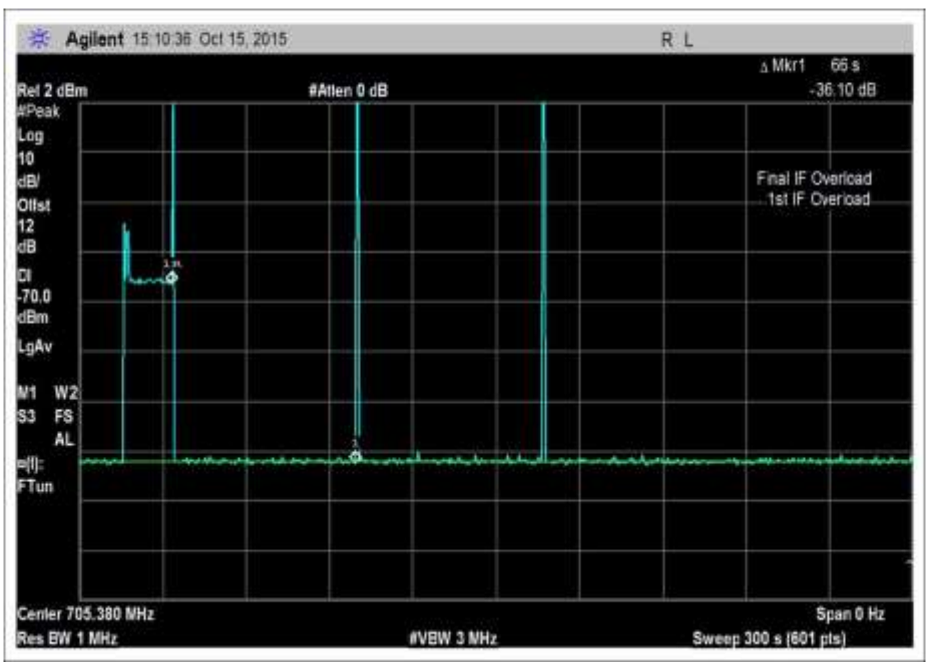
Note:
* The measured difference exceeds the limit for a period of less than 300 second before device mitigates and shuts down. The maximum recorded time prior to shutdown was 1 minute and 45 second.
** The device shuts down immediately.

7.11.2 Oscillation Restart Tests

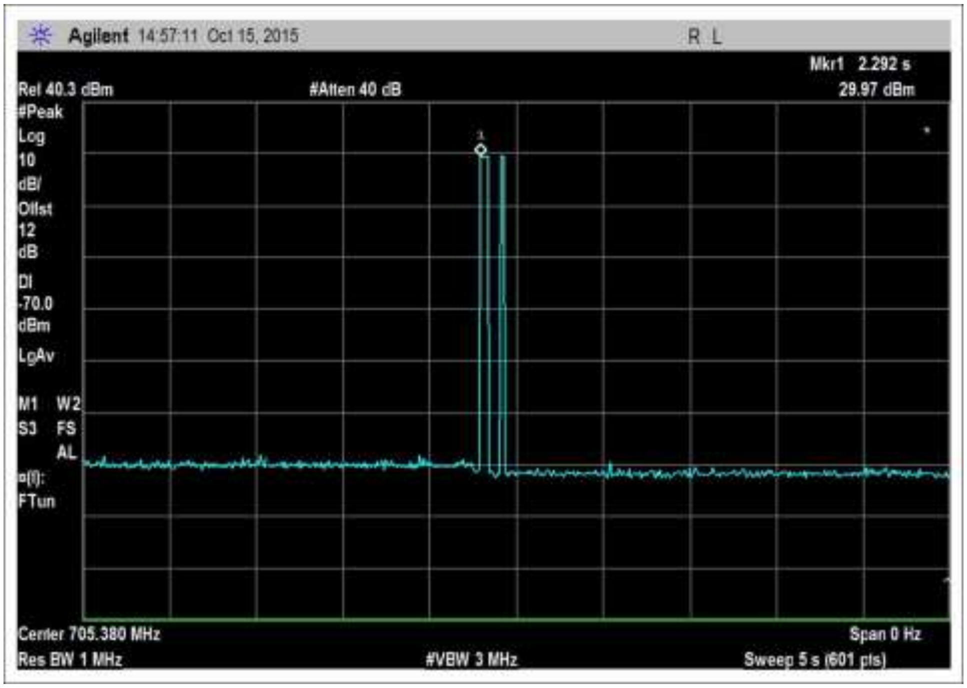
Plots



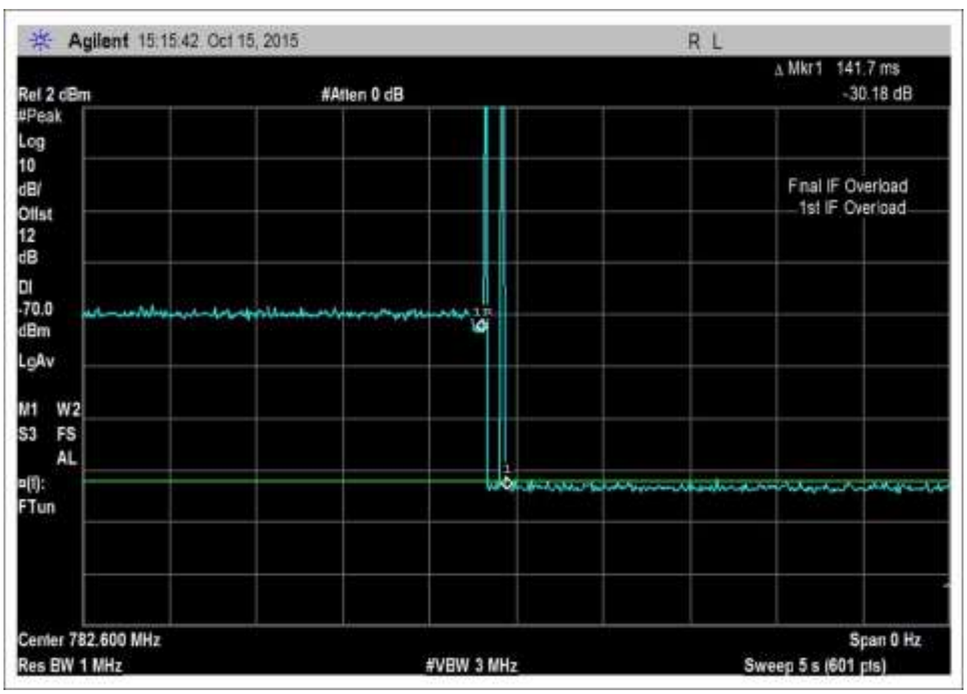
7.11_osc_UL-698-716MHz



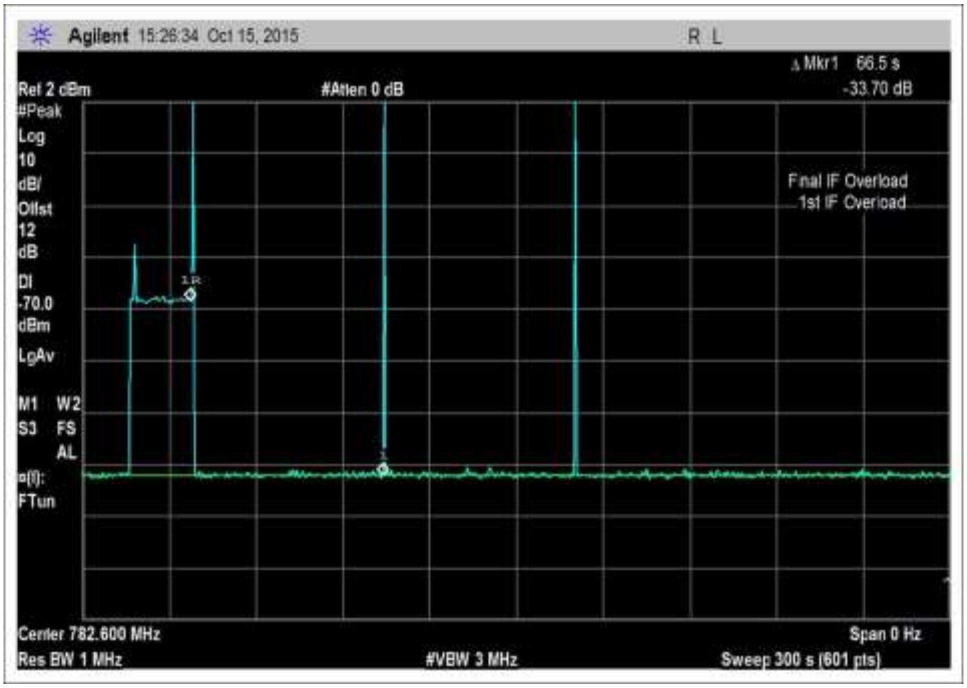
7.11_osc_UL-698-716MHz-300



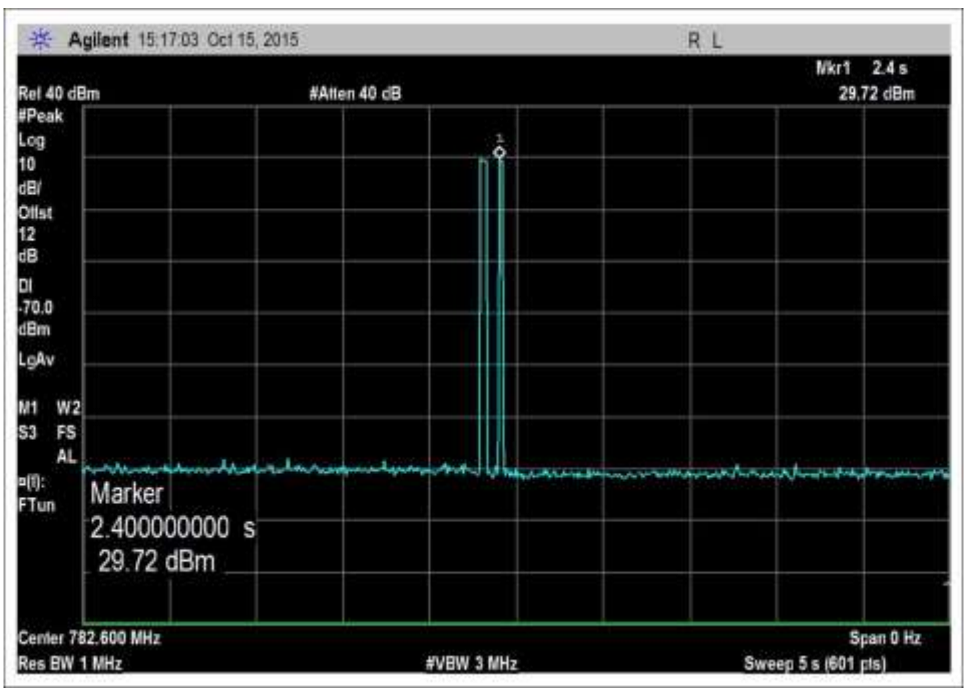
7.11_osc_UL-698-716MHz-Pk



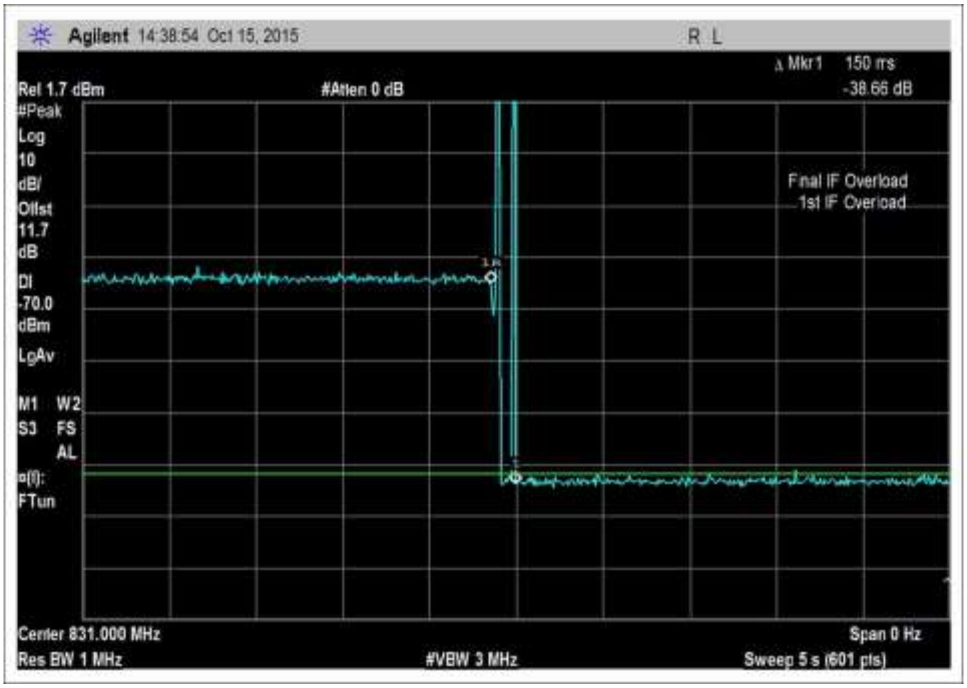
7.11_osc_UL-776-787MHz



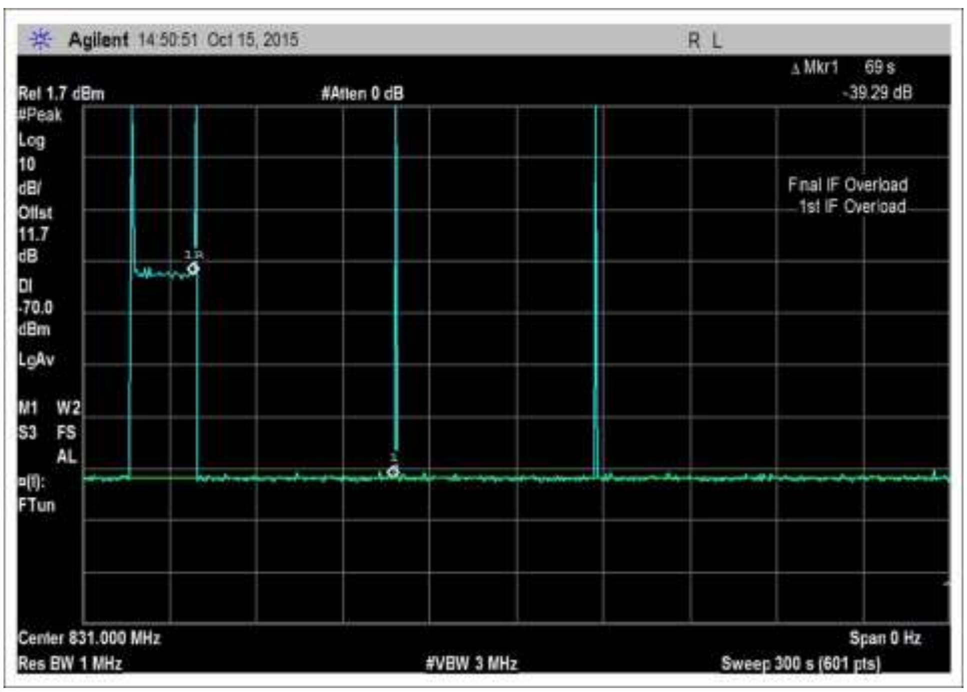
7.11_osc_UL-776-787MHz-300sec



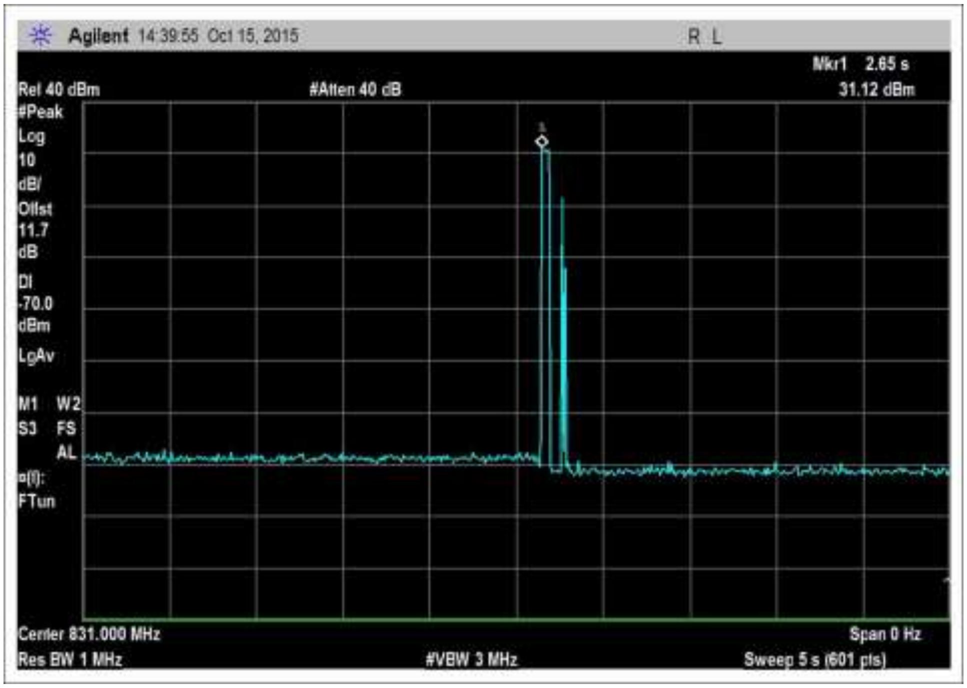
7.11_osc_UL-776-787MHz-Pk



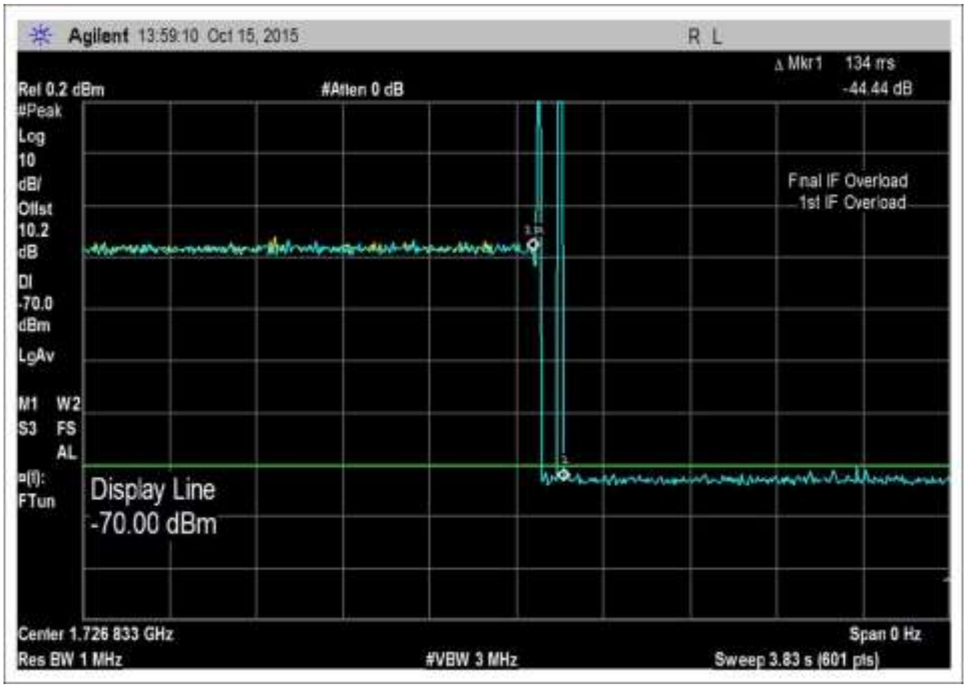
7.11_osc_UL-824-849MHz



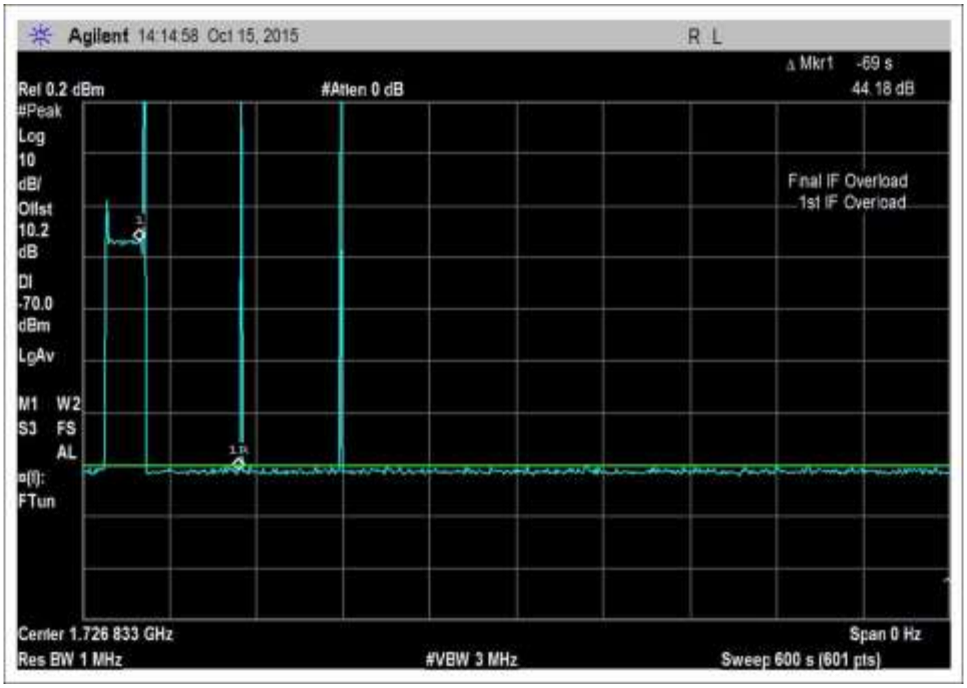
7.11_osc_UL-824-849MHz-300sec



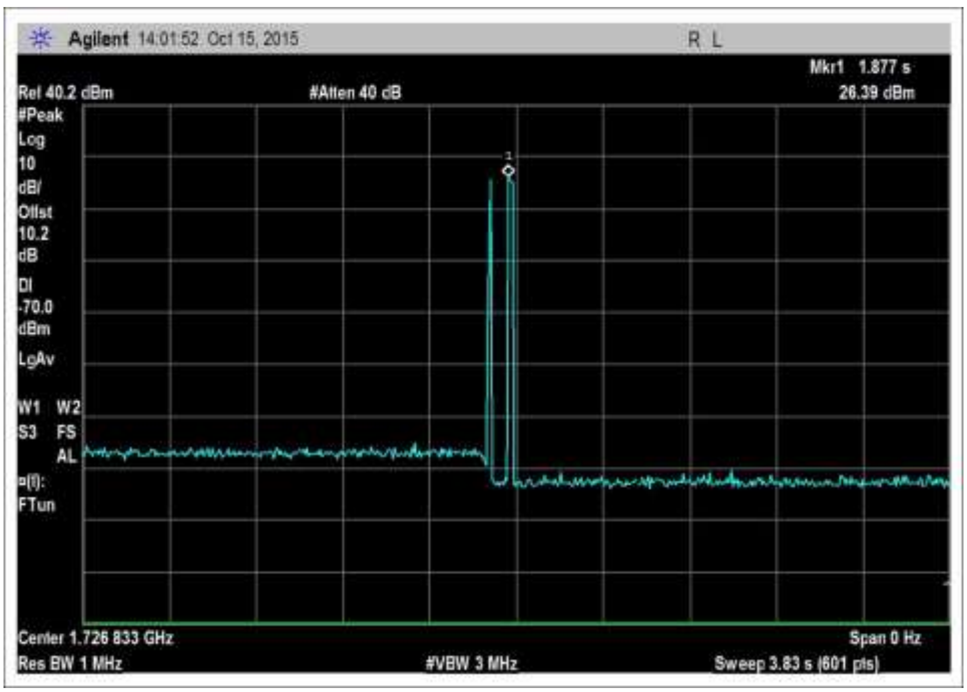
7.11_osc_UL-824-849MHz-Pk



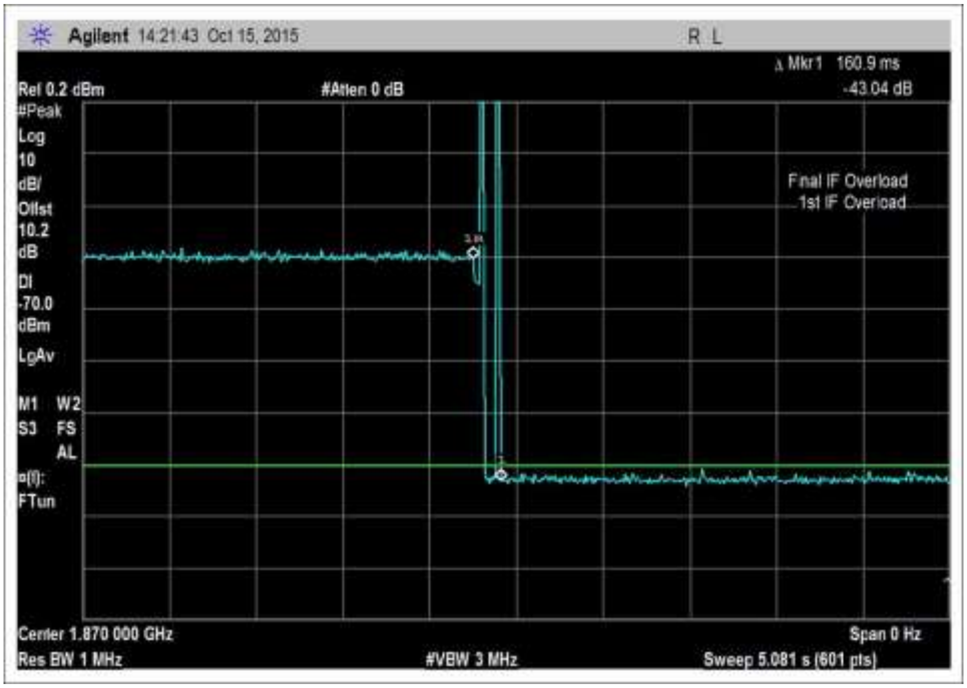
7.11_osc_UL-1710-1755MHz



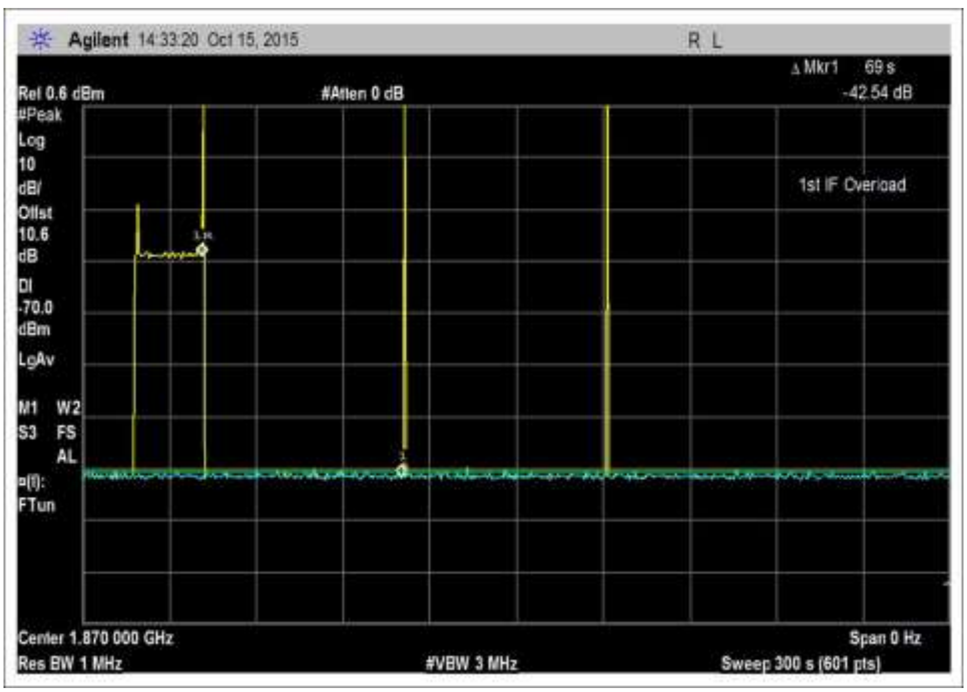
7.11_osc_UL-1710-1755MHz-600sec



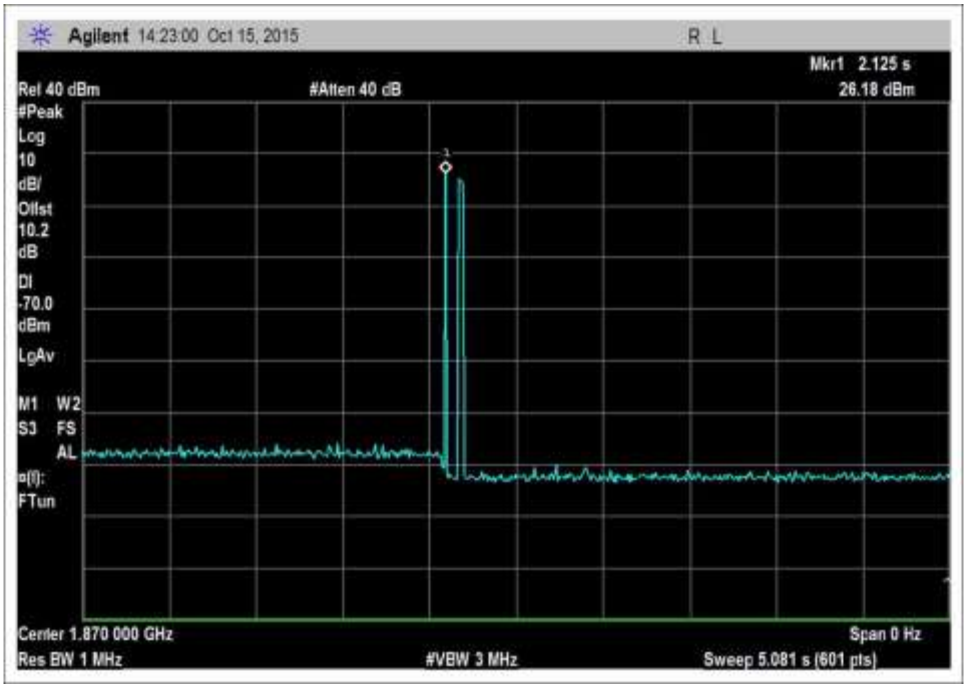
7.11_osc_UL-1710-1755MHz-Pk



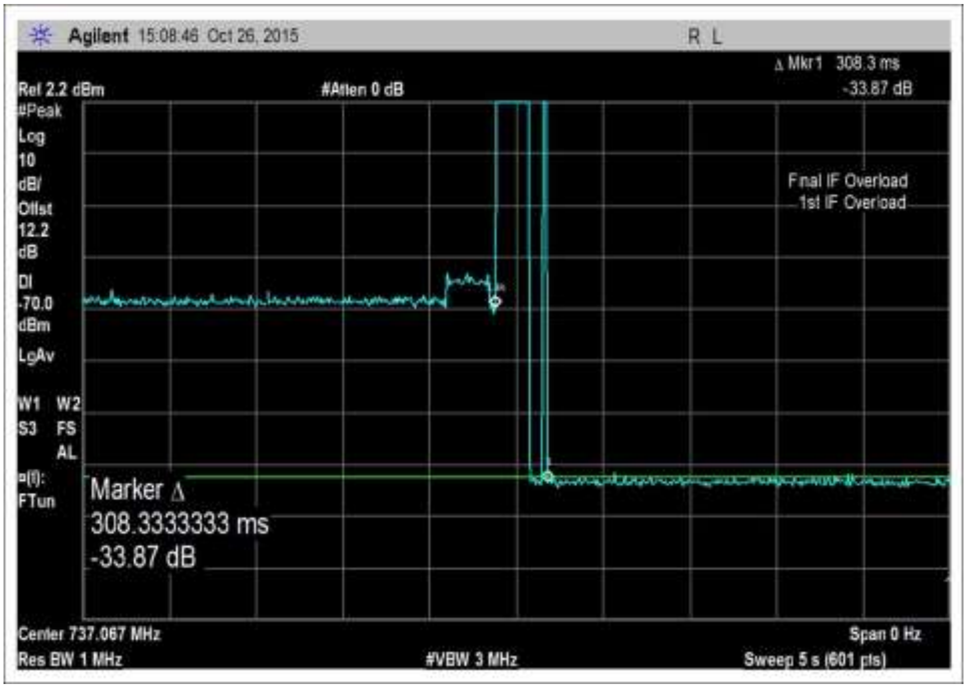
7.11_osc_UL-1850-1915MHz



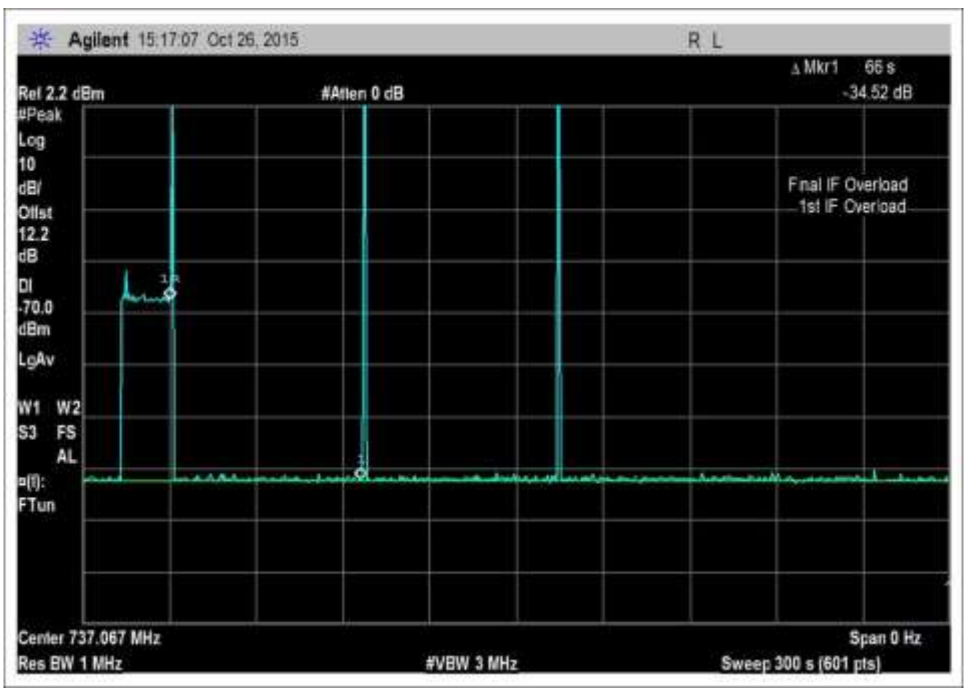
7.11_osc_UL-1850-1915MHz_300sec



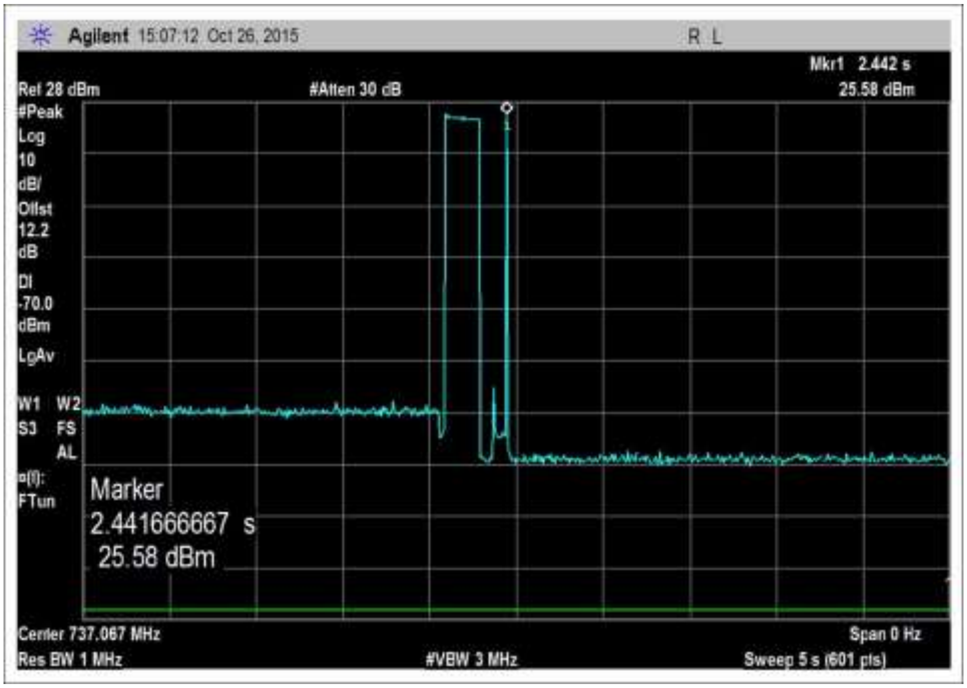
7.11_osc_UL-1850-1915MHz-Pk



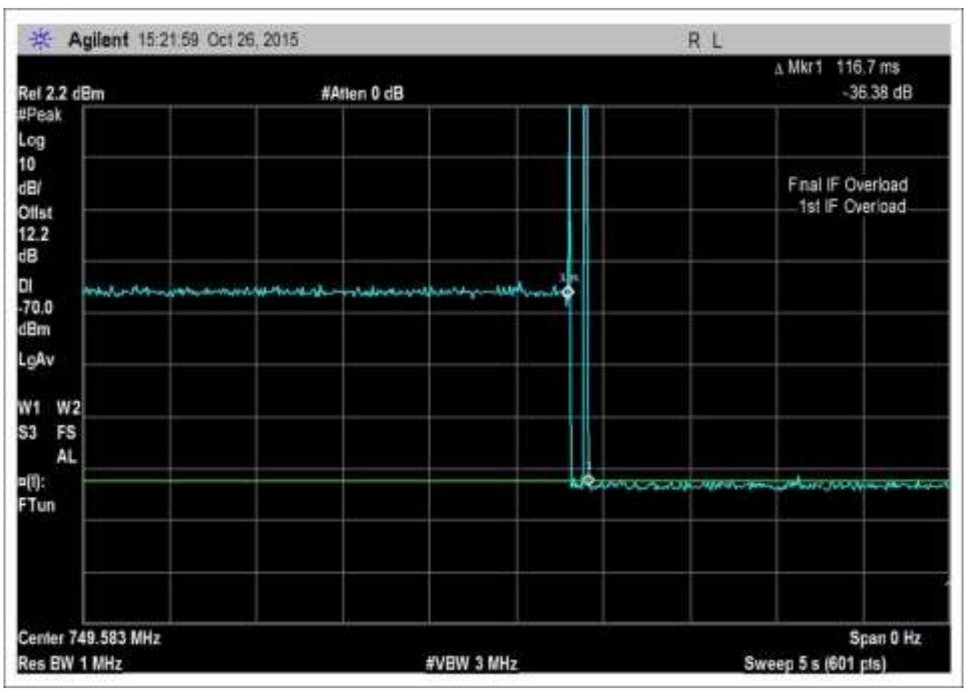
7.11_osc_DL-728-746MHz



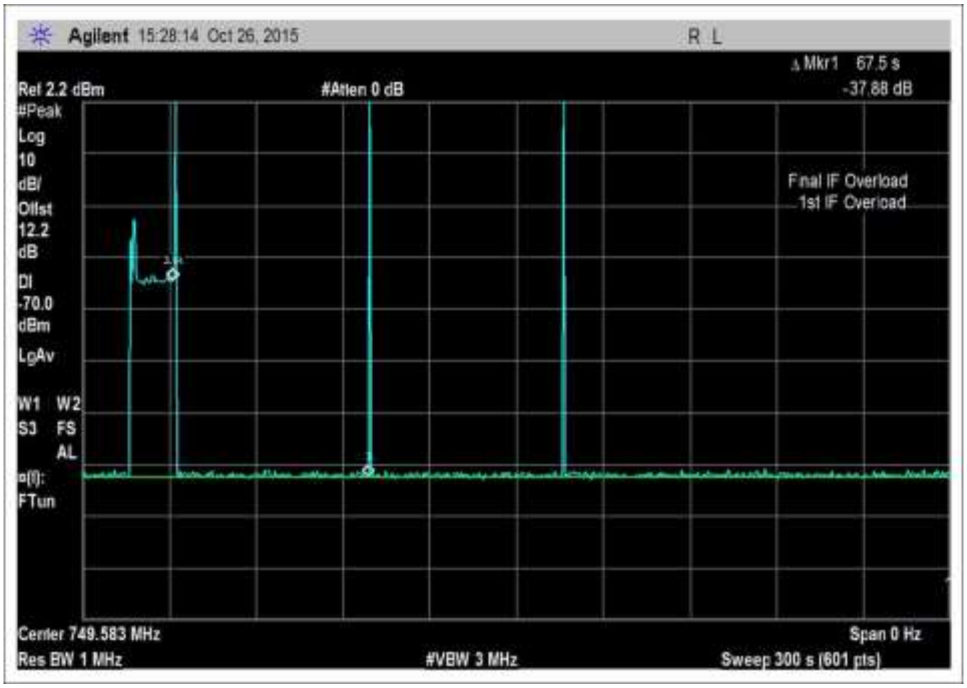
7.11_osc_DL-728-746MHz-300sec



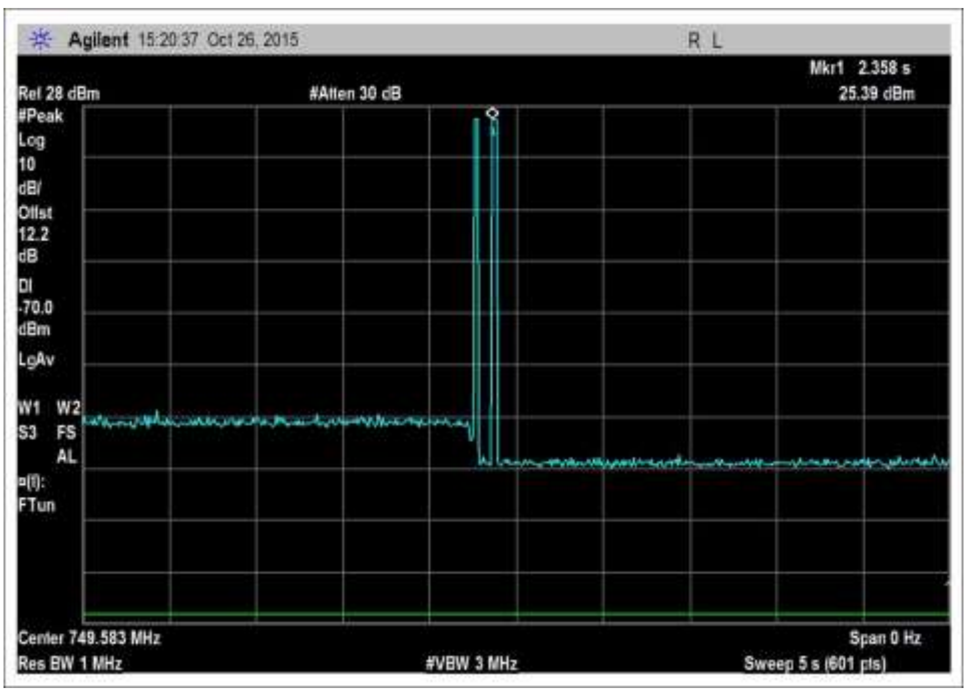
7.11_osc_DL-728-746MHz-Pk



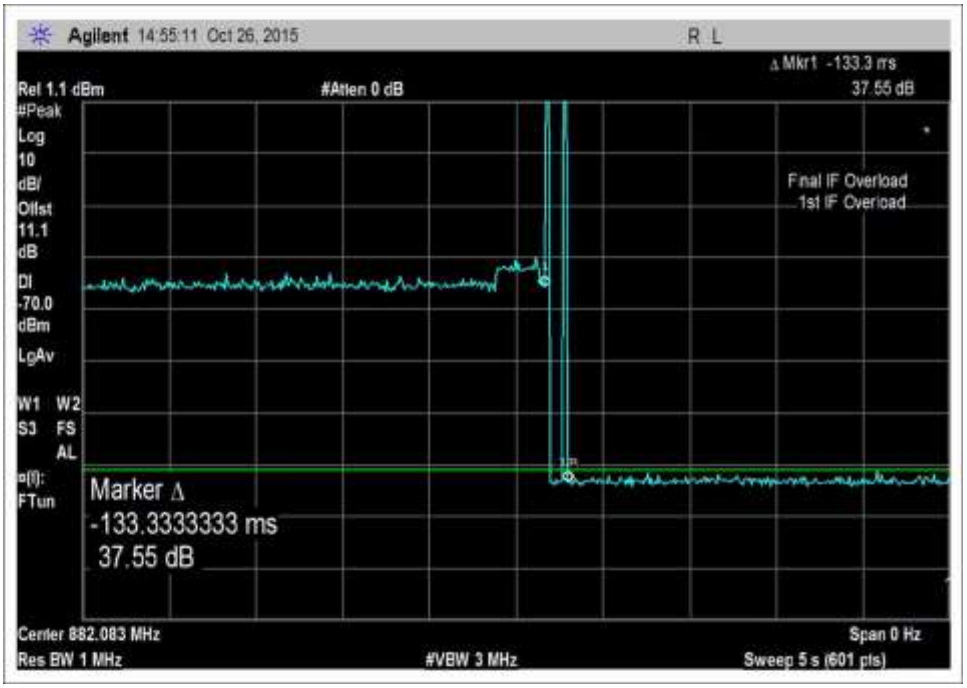
7.11_osc_DL-746-757MHz



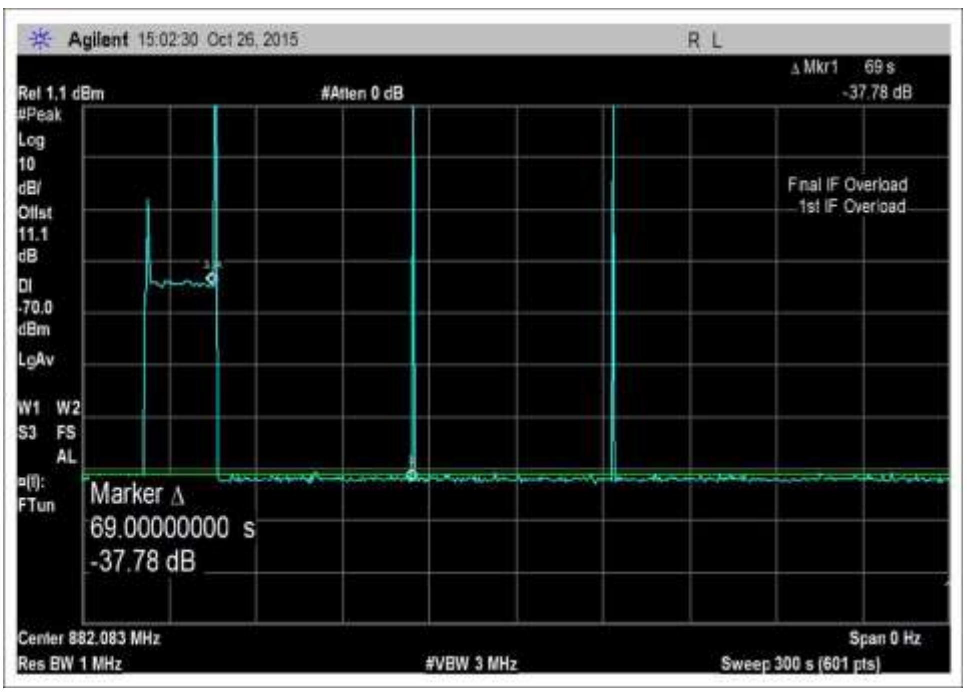
7.11_osc_DL-746-757MHz-300



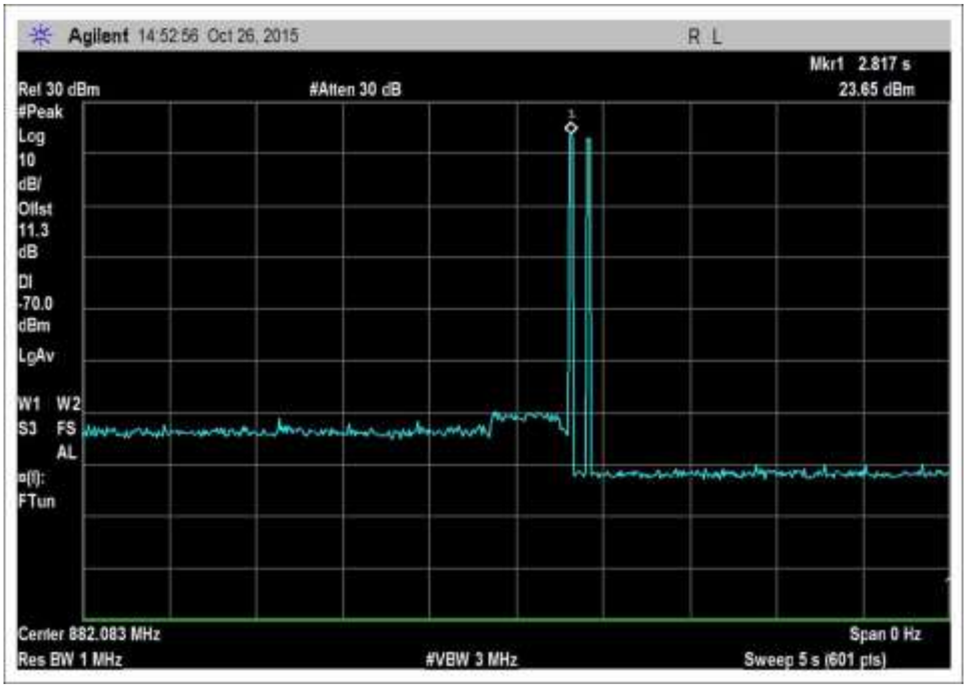
7.11_osc_DL-746-757MHz-Pk



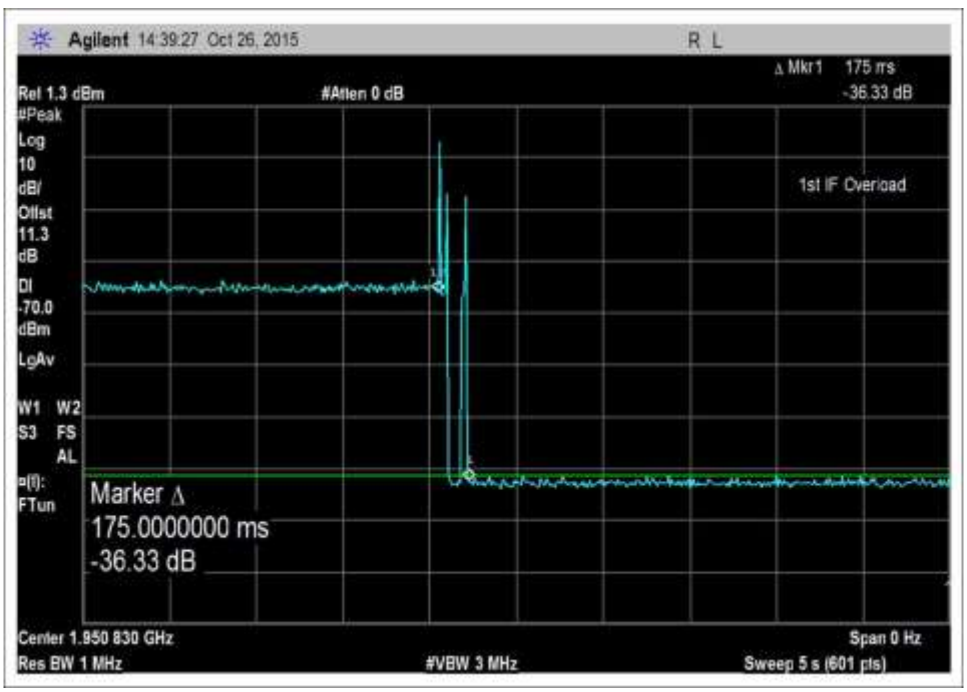
7.11_osc_DL-869-894MHz



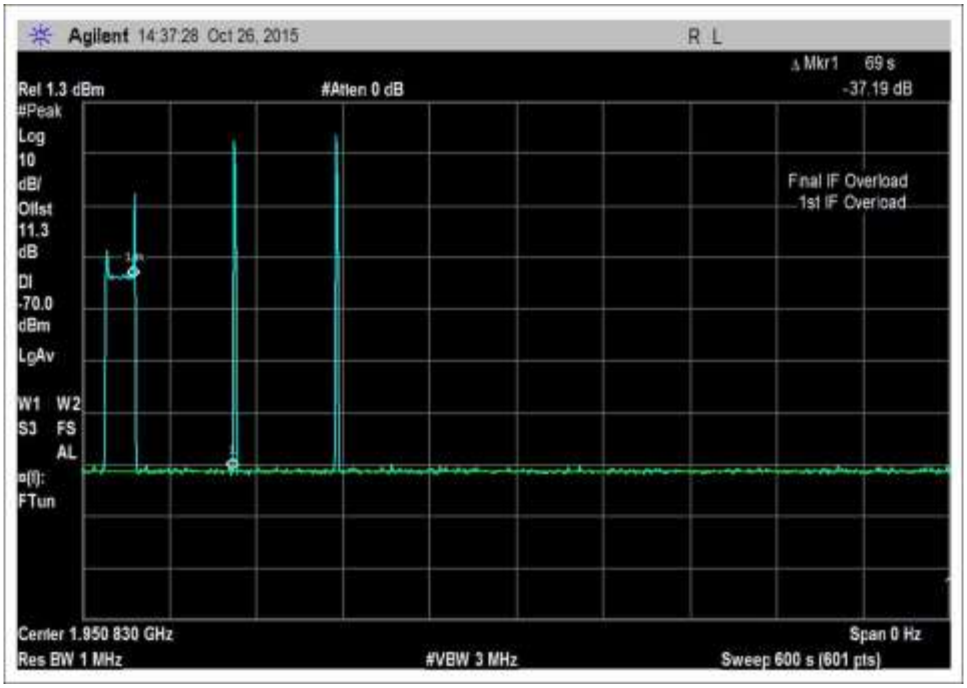
7.11_osc_DL-869-894MHz-300



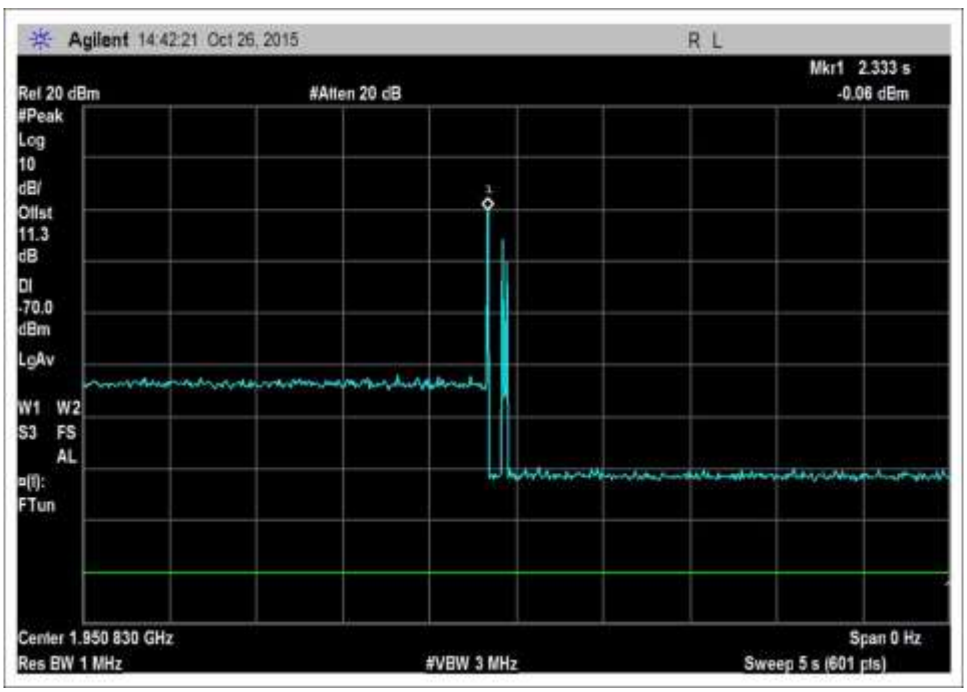
7.11_osc_DL-869-894MHz-Pk



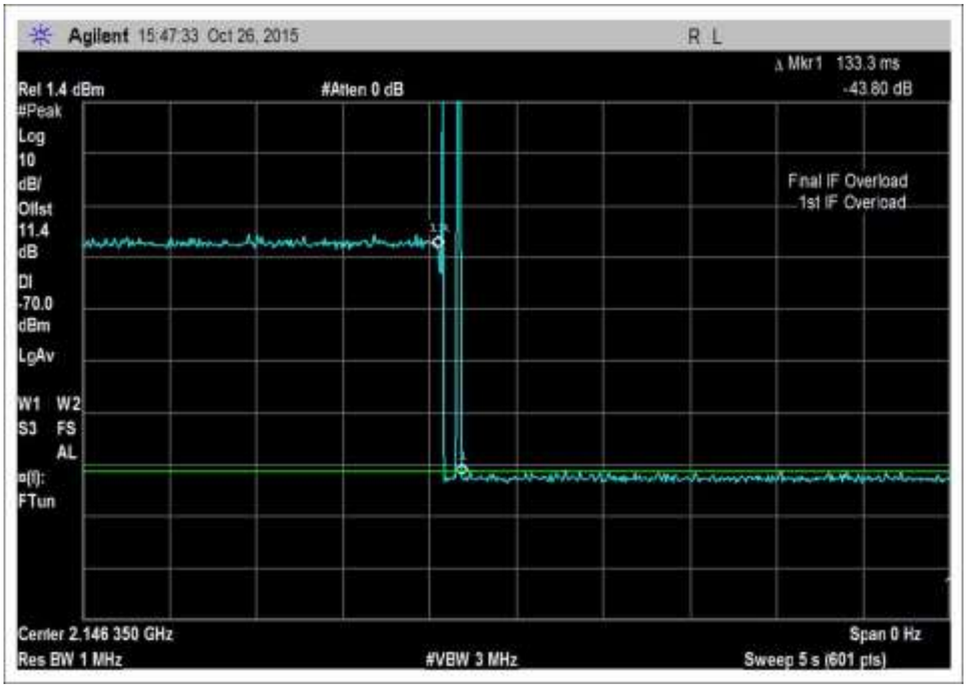
7.11_osc_DL-1930-1995MHz



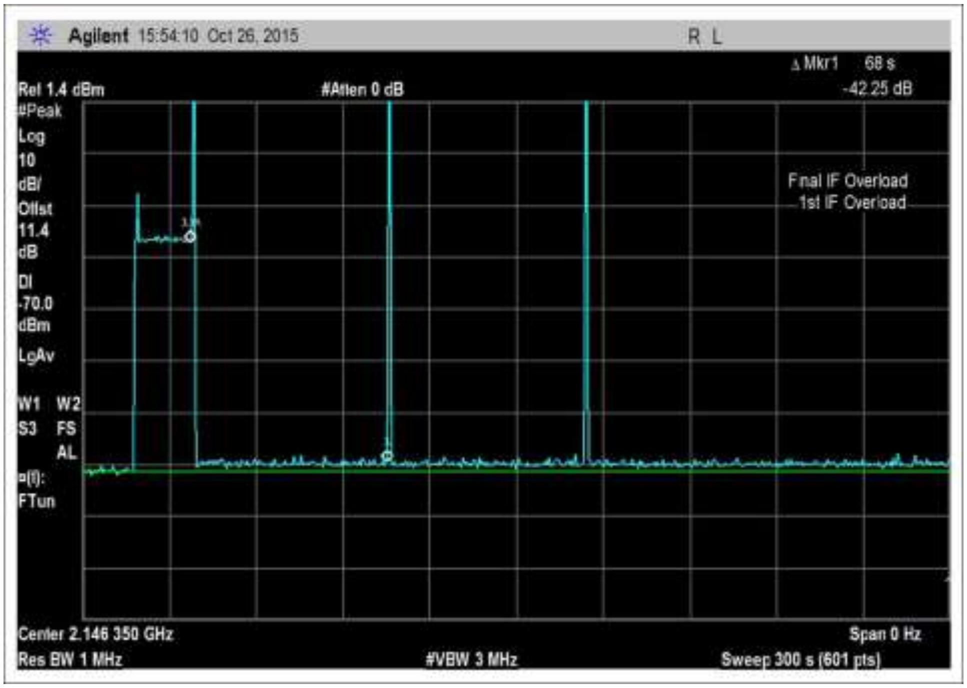
7.11_osc_DL-1930-1995MHz-600sec



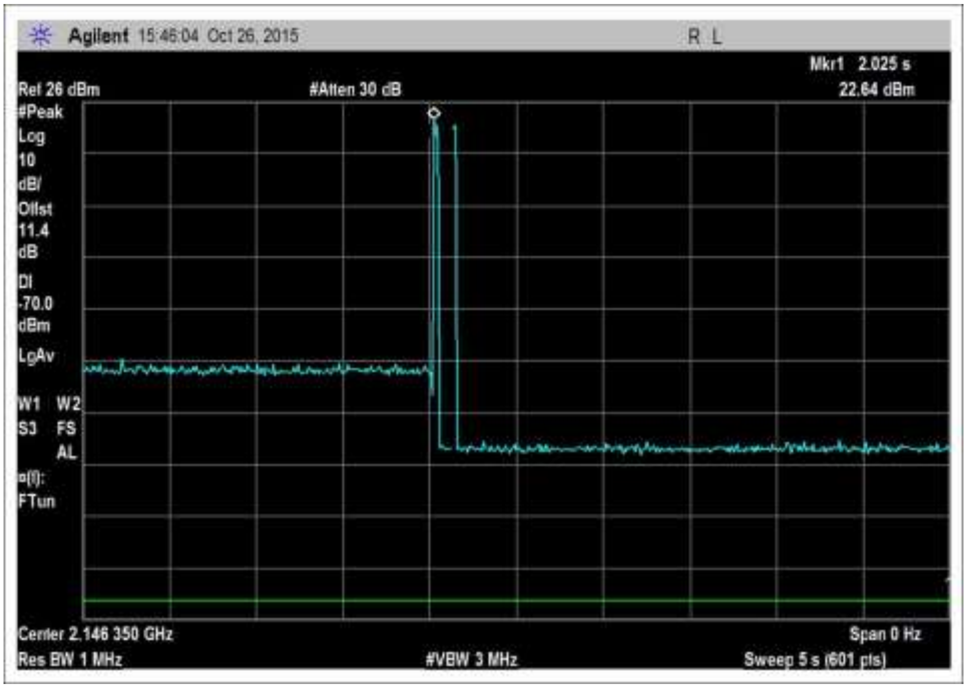
7.11_osc_DL-1930-1995MHz-Pk



7.11_osc_DL-2110-2155MHz



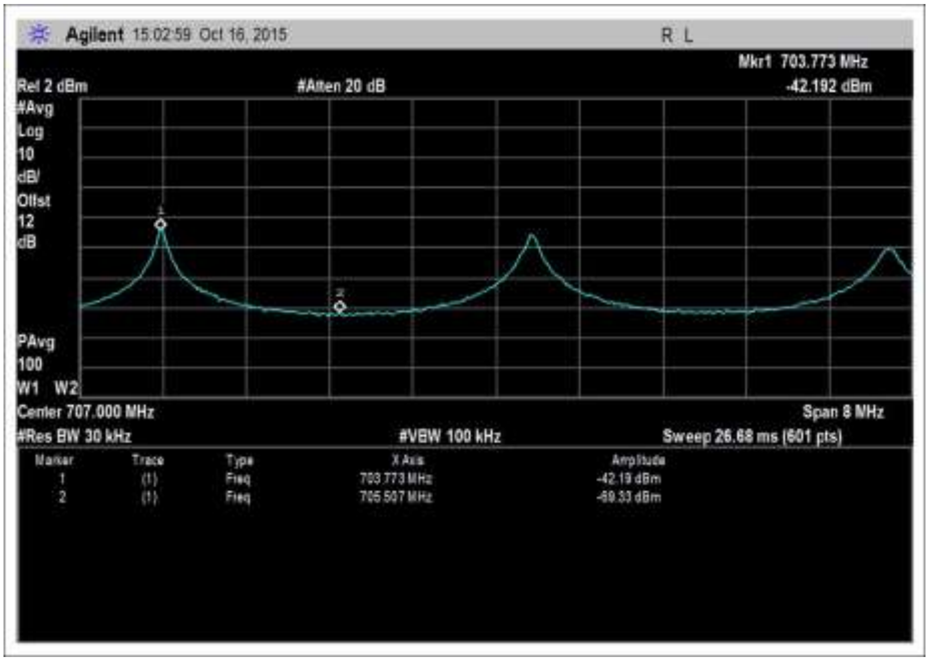
7.11_osc_DL-2110-2155MHz-300sec



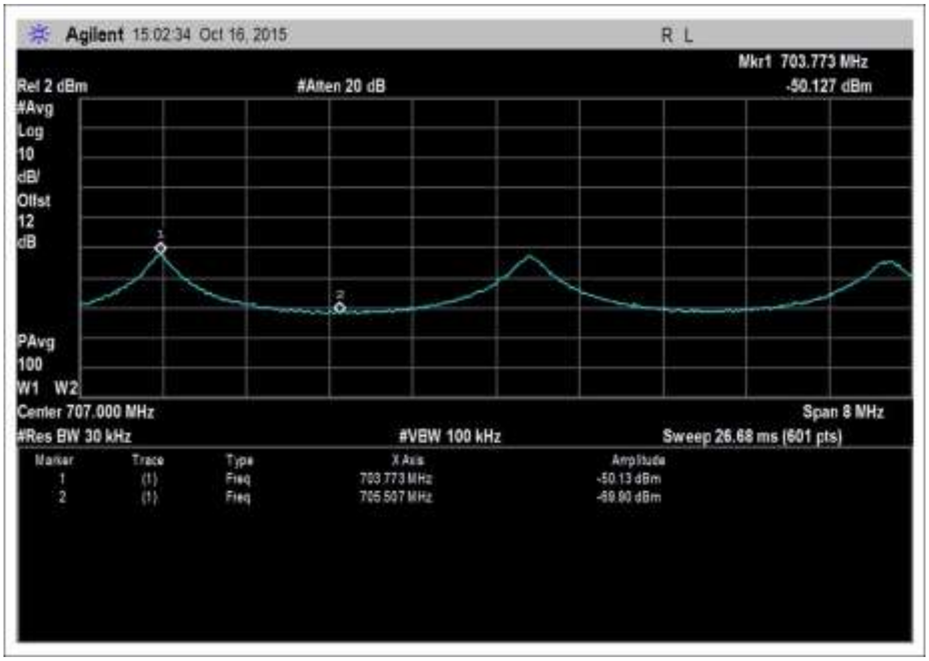
7.11_osc_DL-2110-2155MHz-Pk

7.11.3 Measuring Oscillation Mitigation or Shutdown

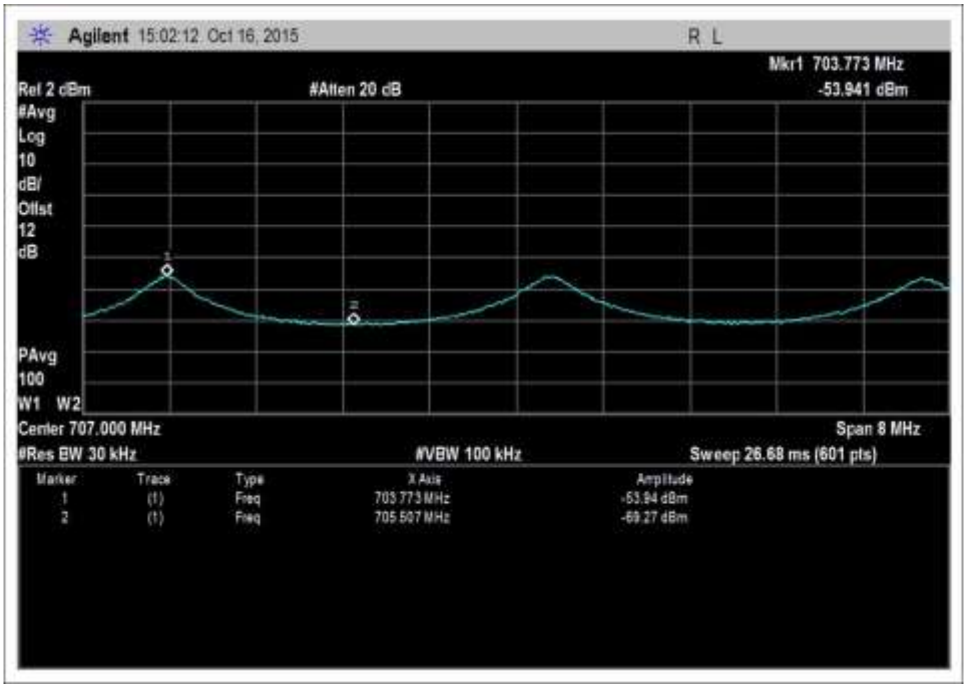
Plots



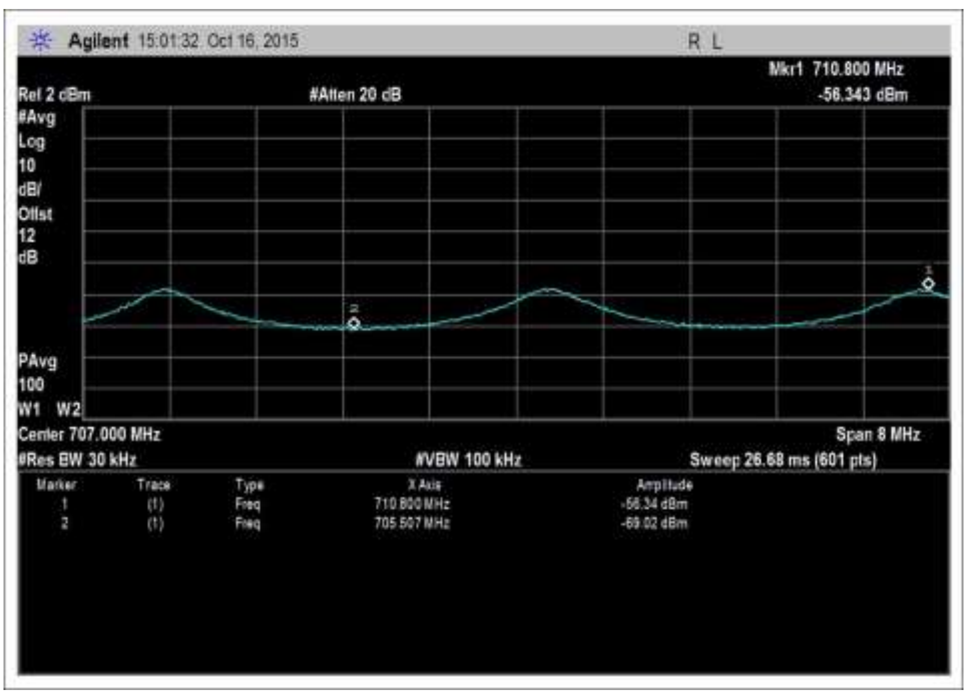
UL-698-716-AWGNL+1



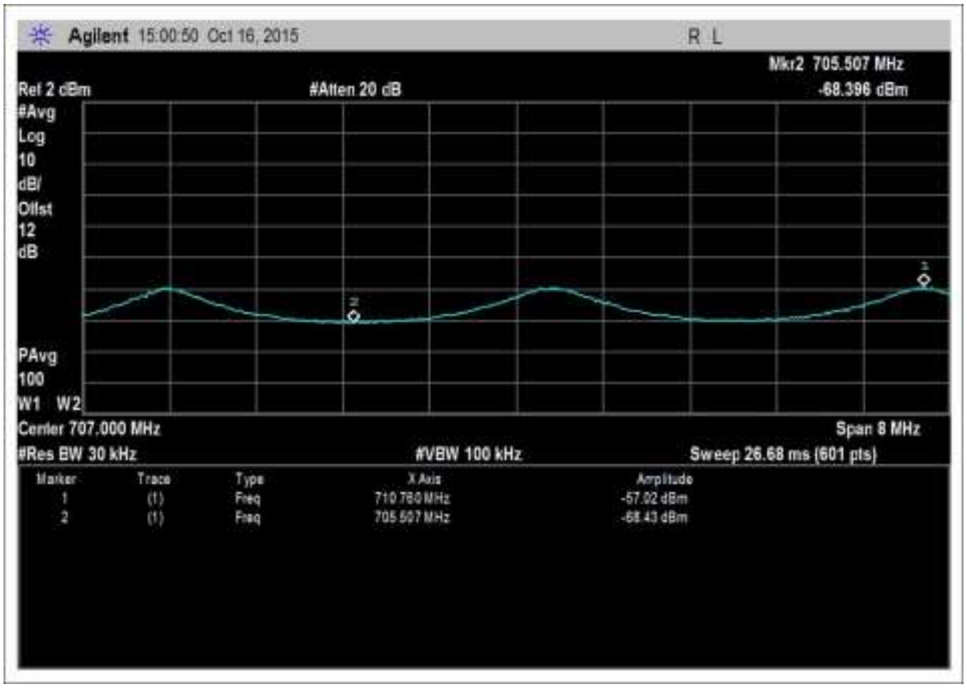
UL-698-716-AWGNL+2



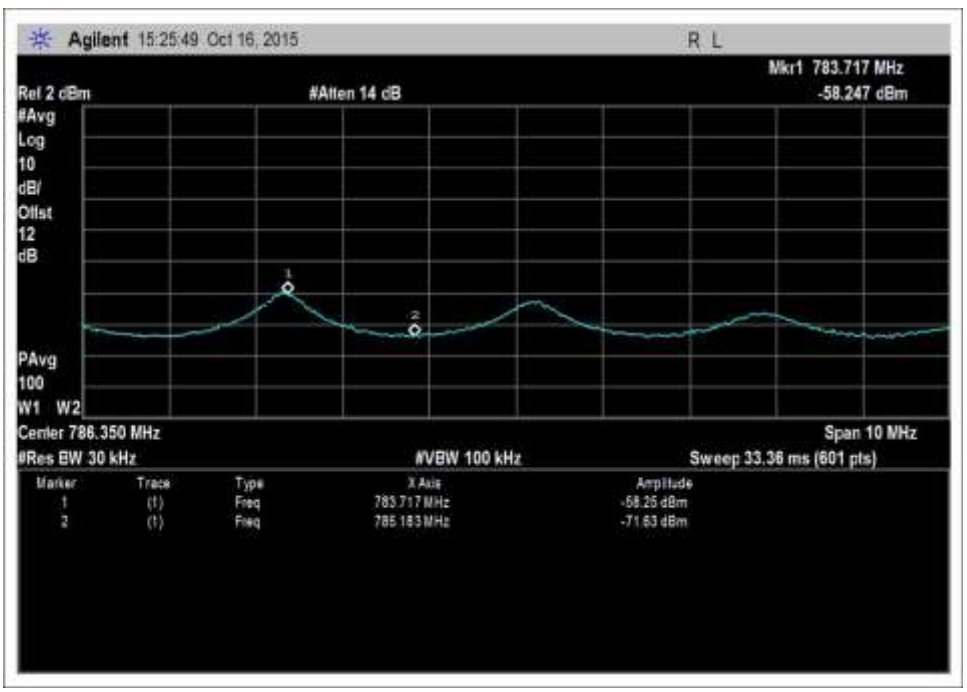
UL-698-716-AWGNL+3



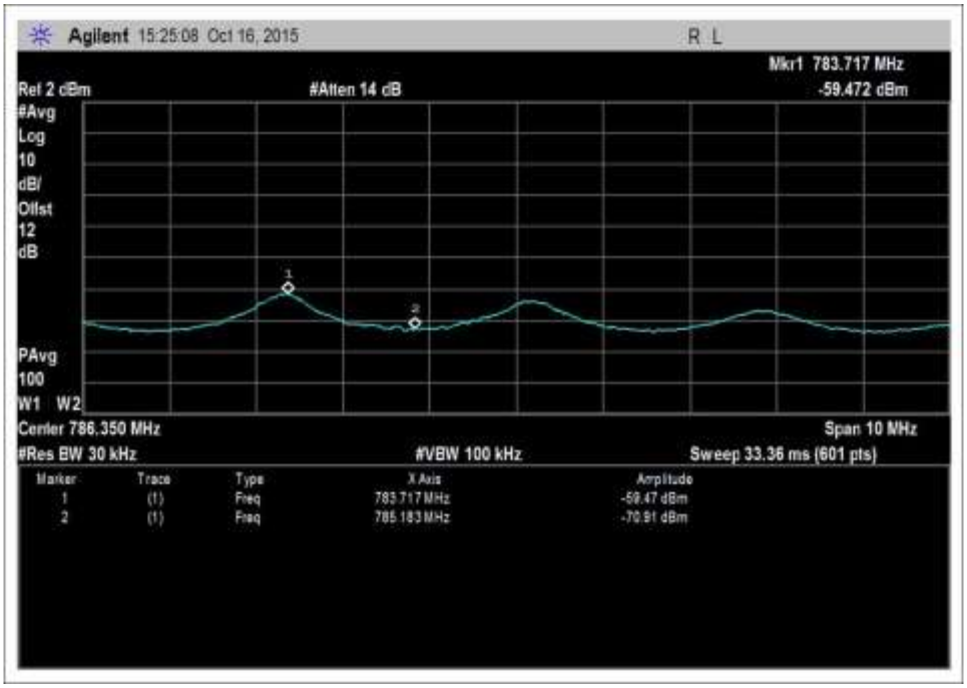
UL-698-716-AWGNL+4



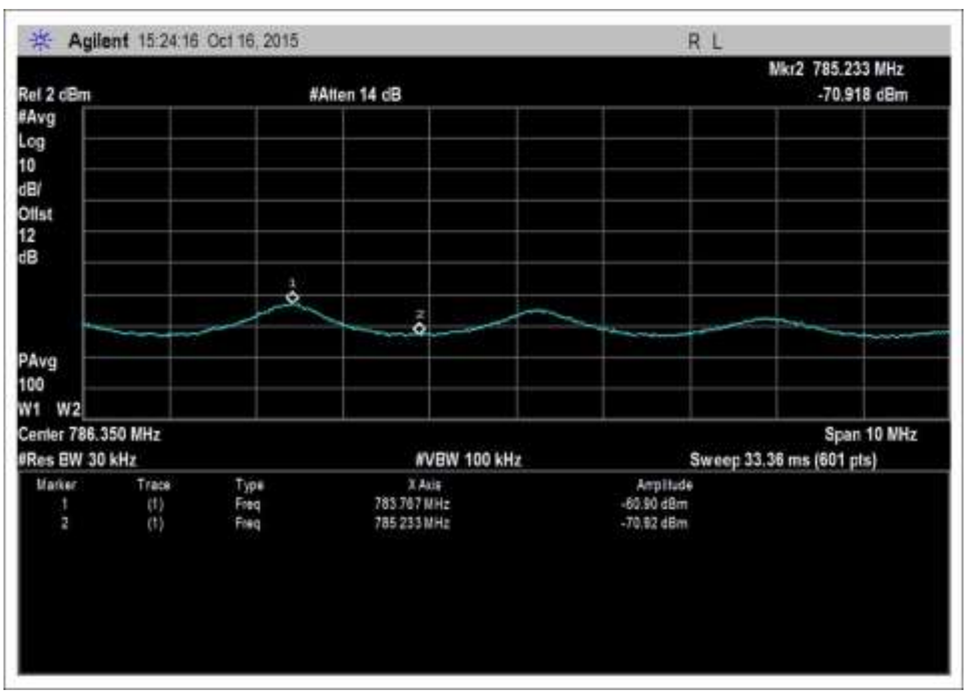
UL-698-716-AWGNL+5



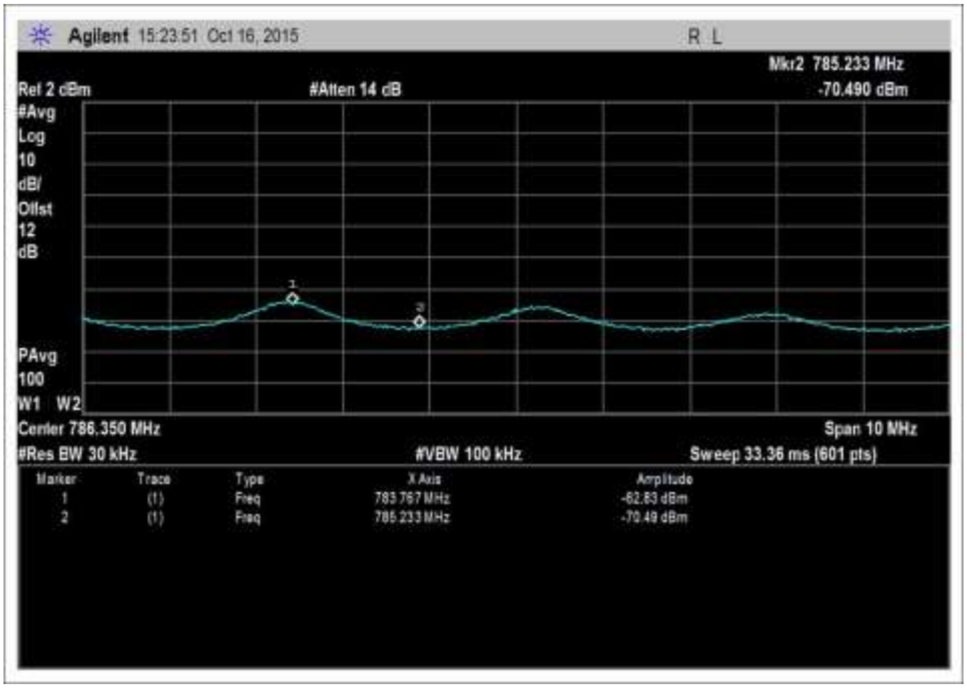
UL-776-787-AWGNL+0



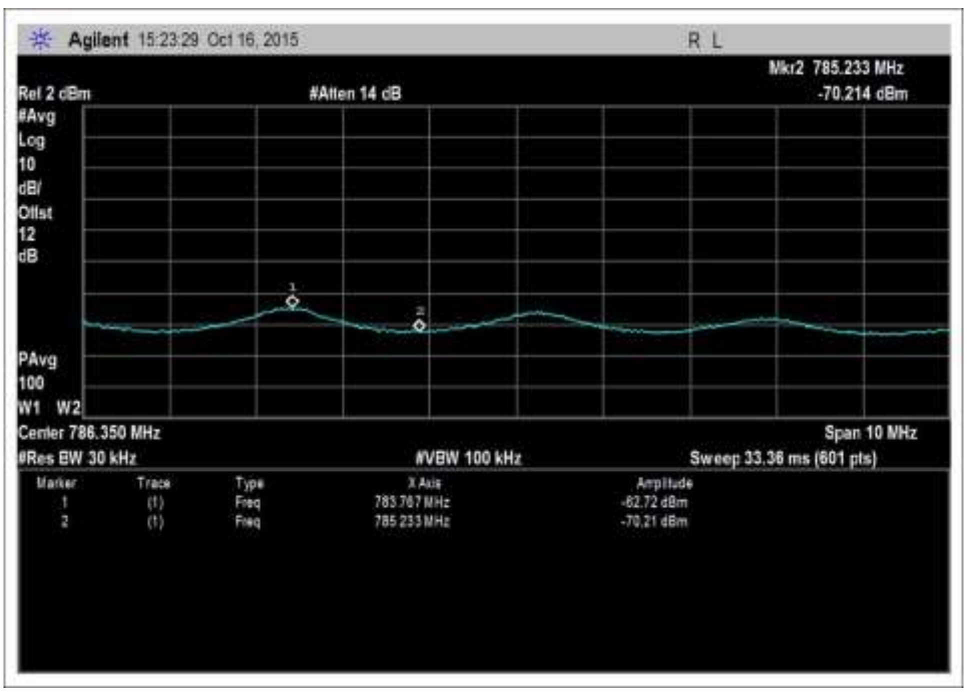
UL-776-787-AWGNL+1



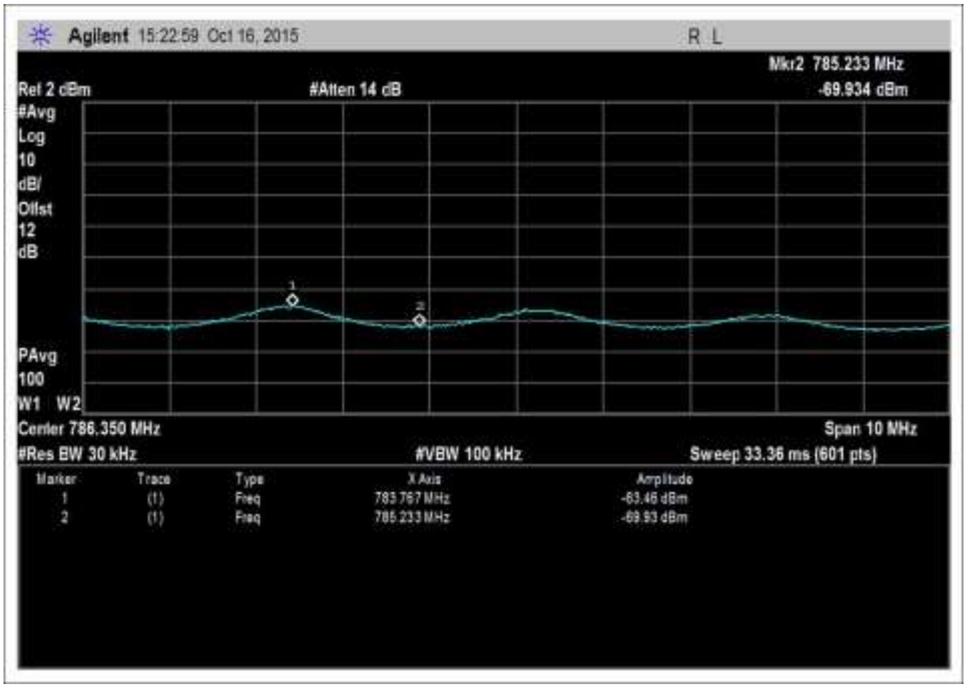
UL-776-787-AWGNL+2



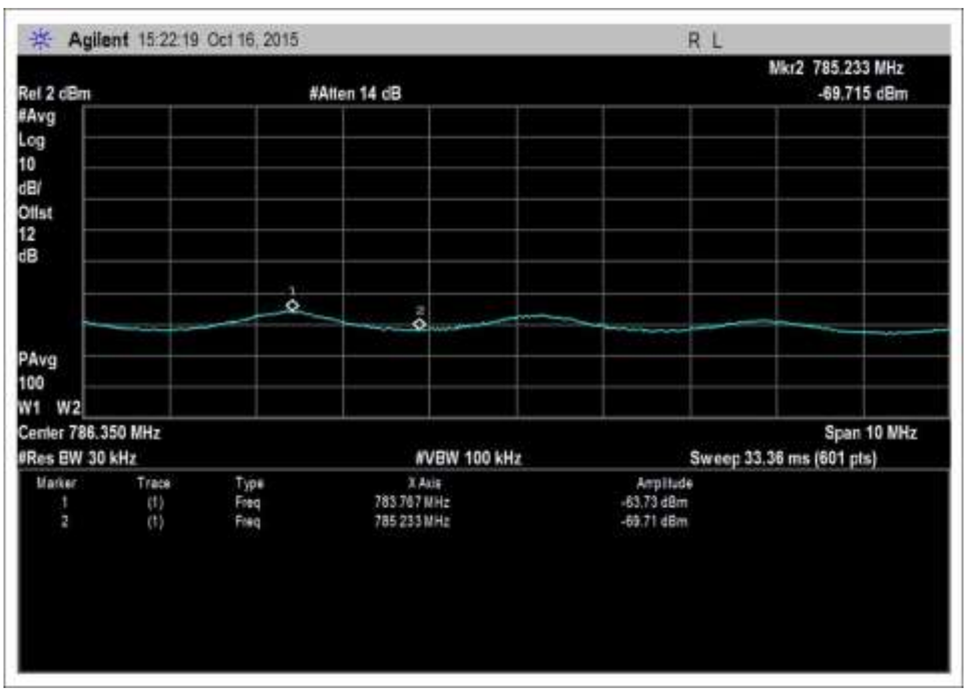
UL-776-787-AWGNL+2-NOK



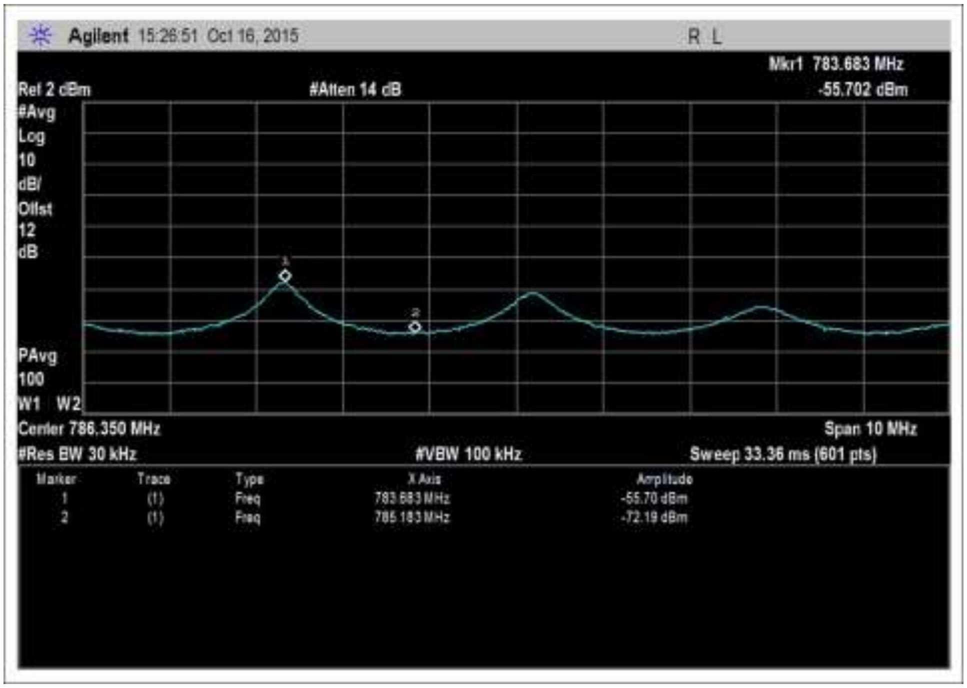
UL-776-787-AWGNL+3



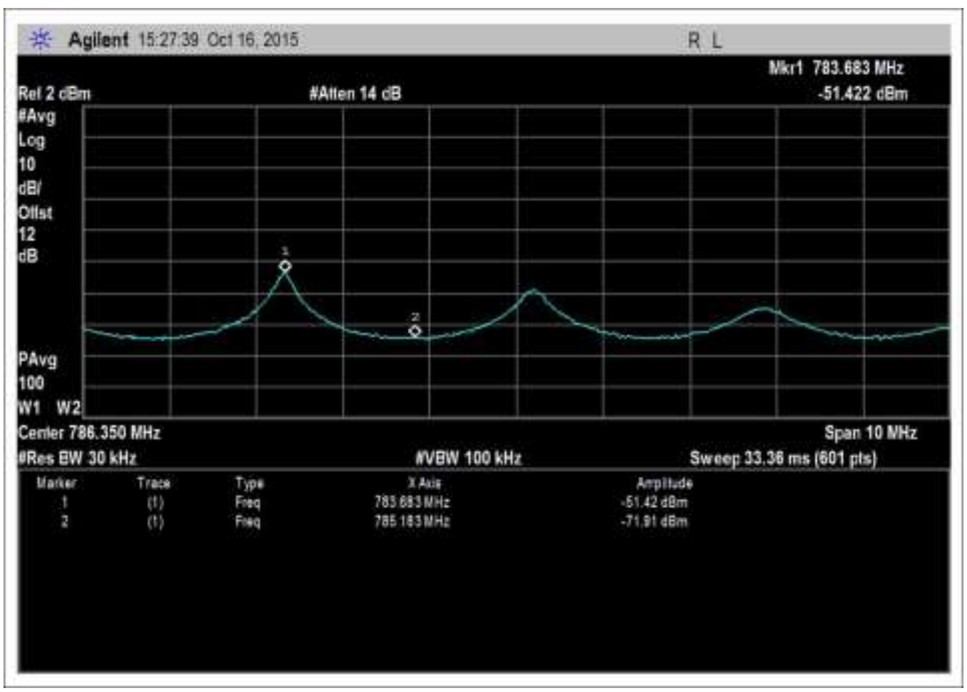
UL-776-787-AWGNL+4



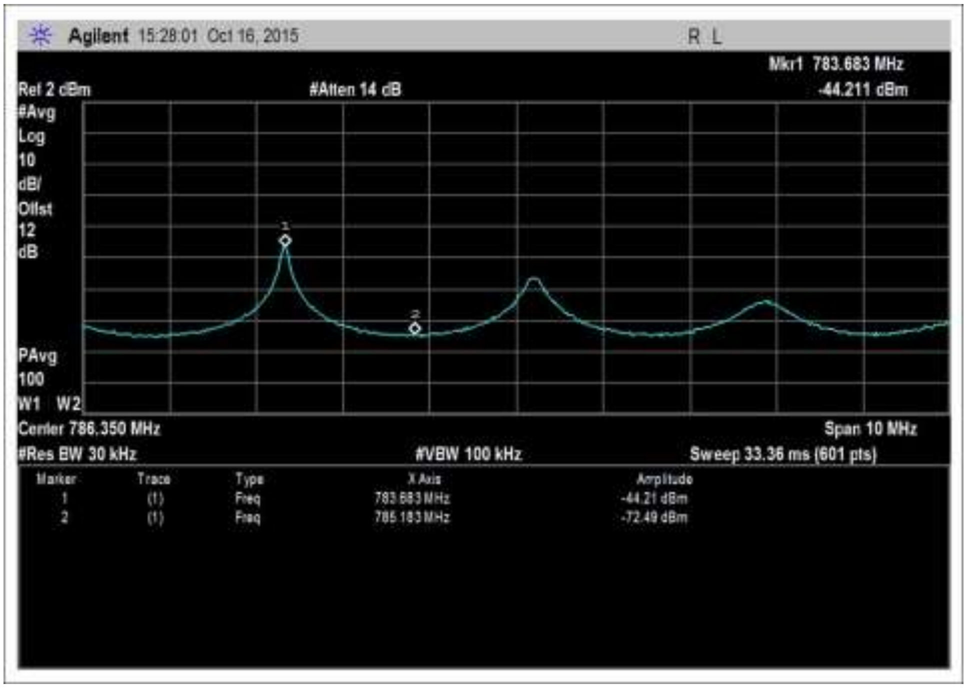
UL-776-787-AWGNL+5



UL-776-787-AWGNL-1



UL-776-787-AWGNL-2



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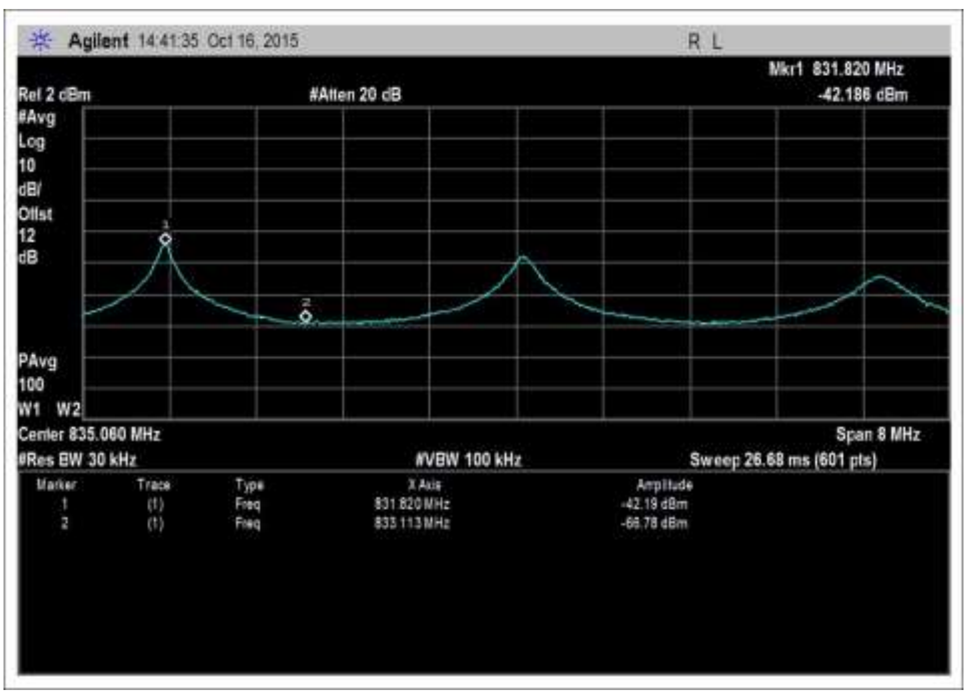

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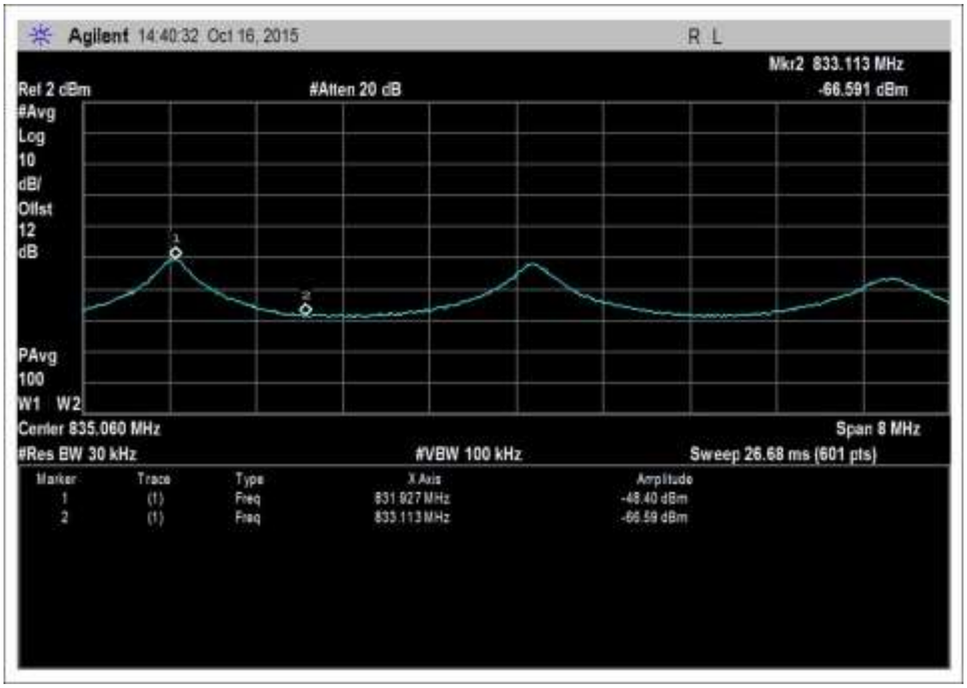

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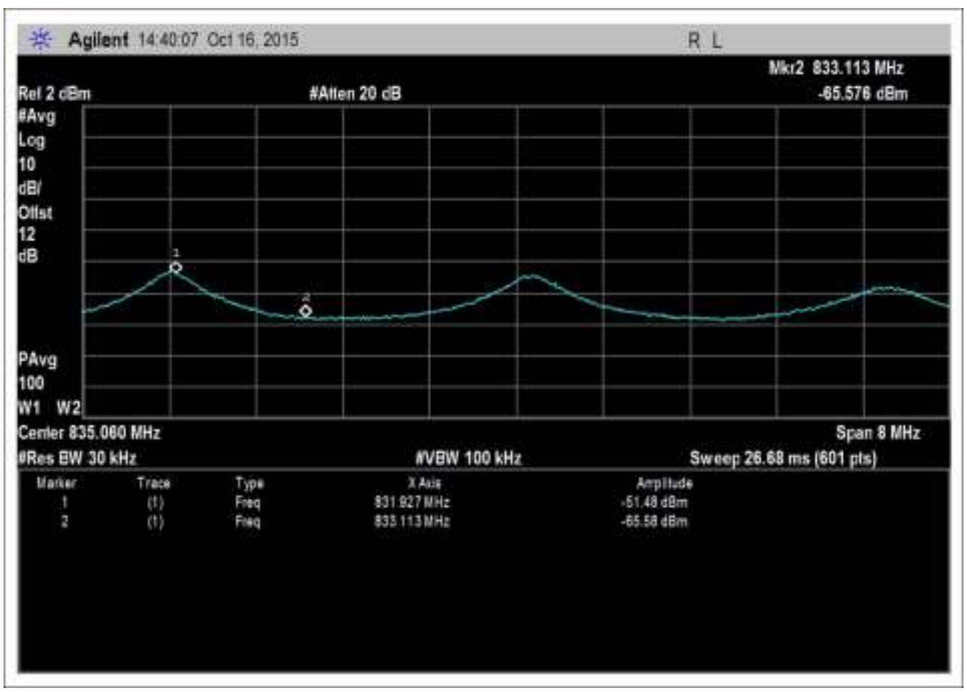

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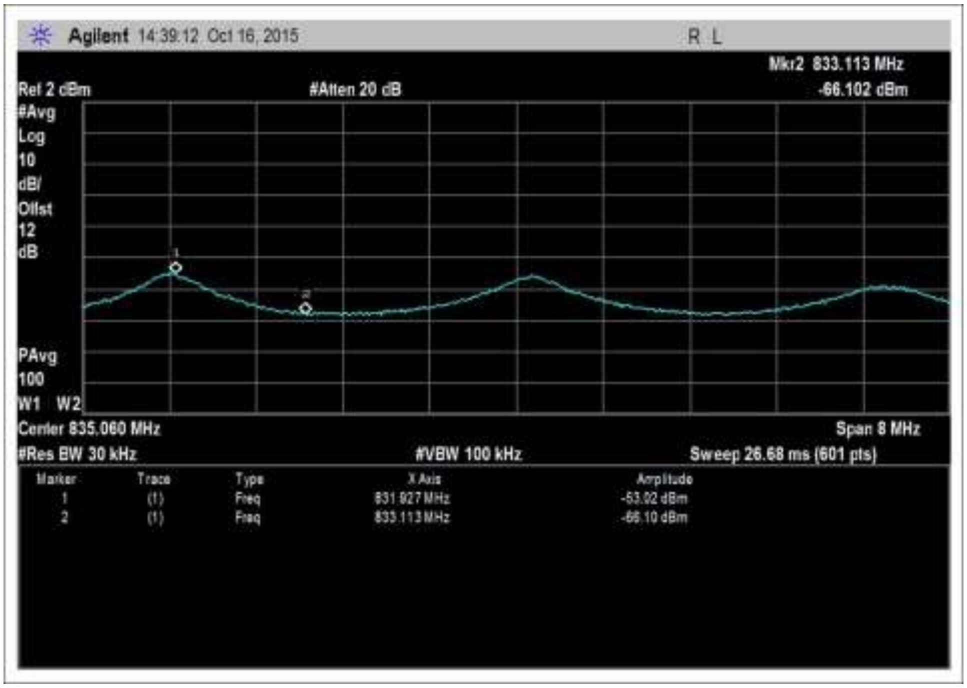

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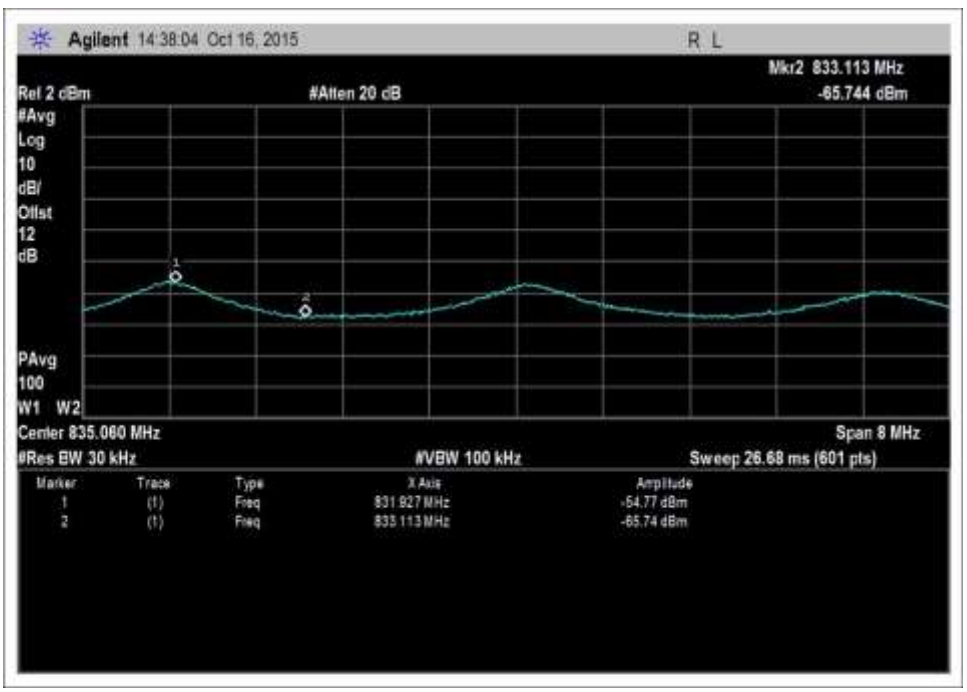

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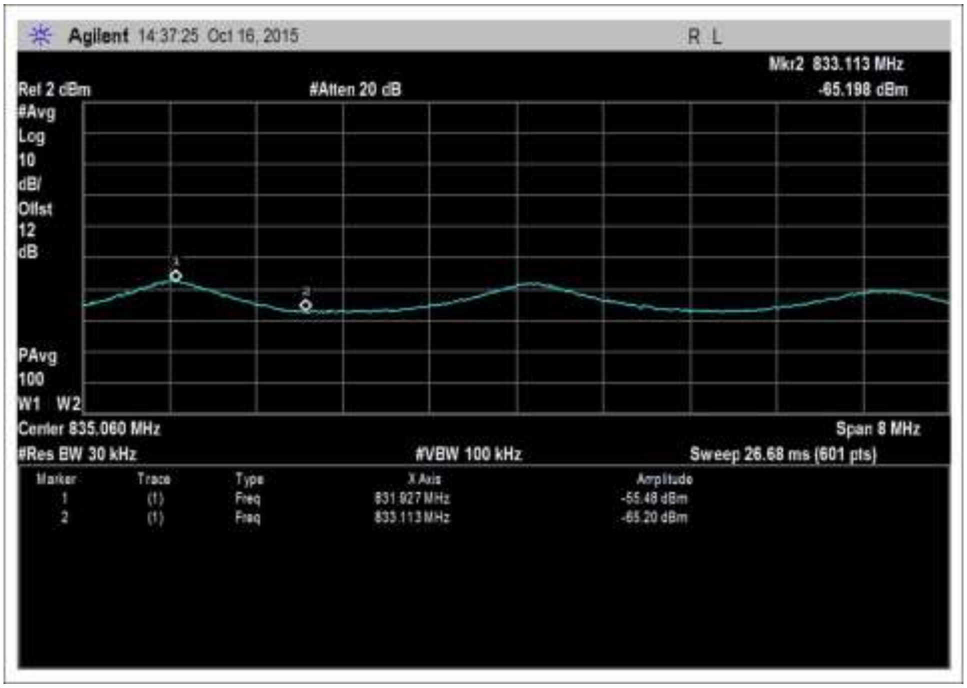

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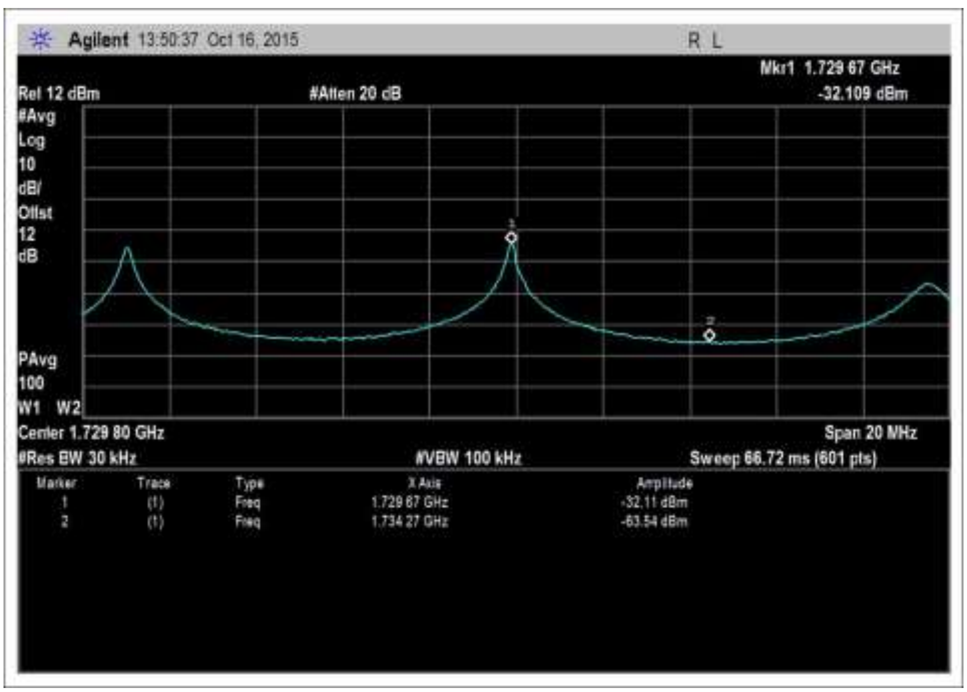

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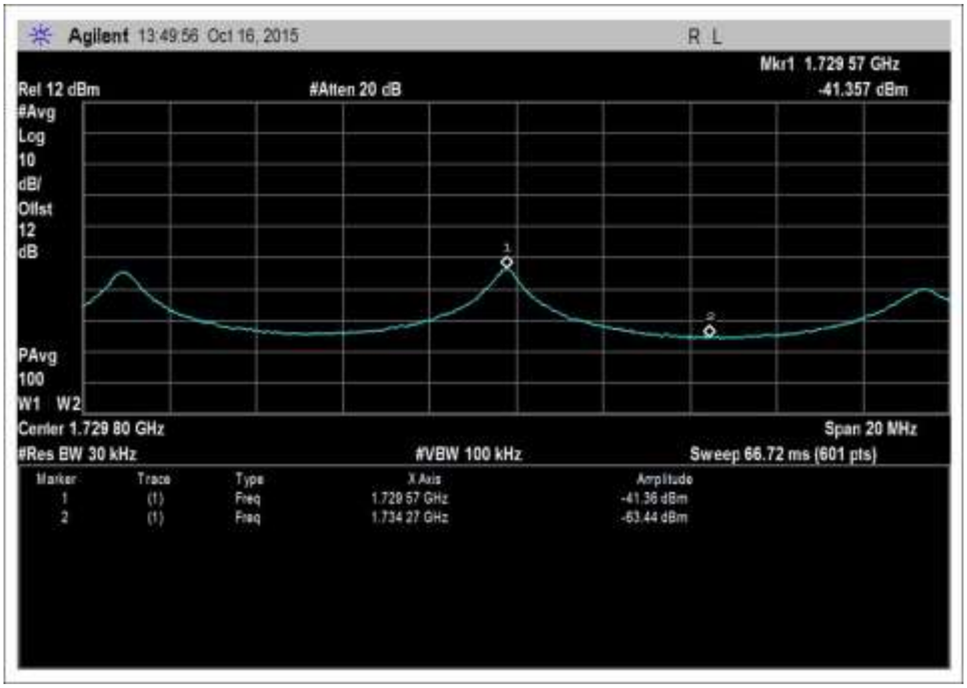

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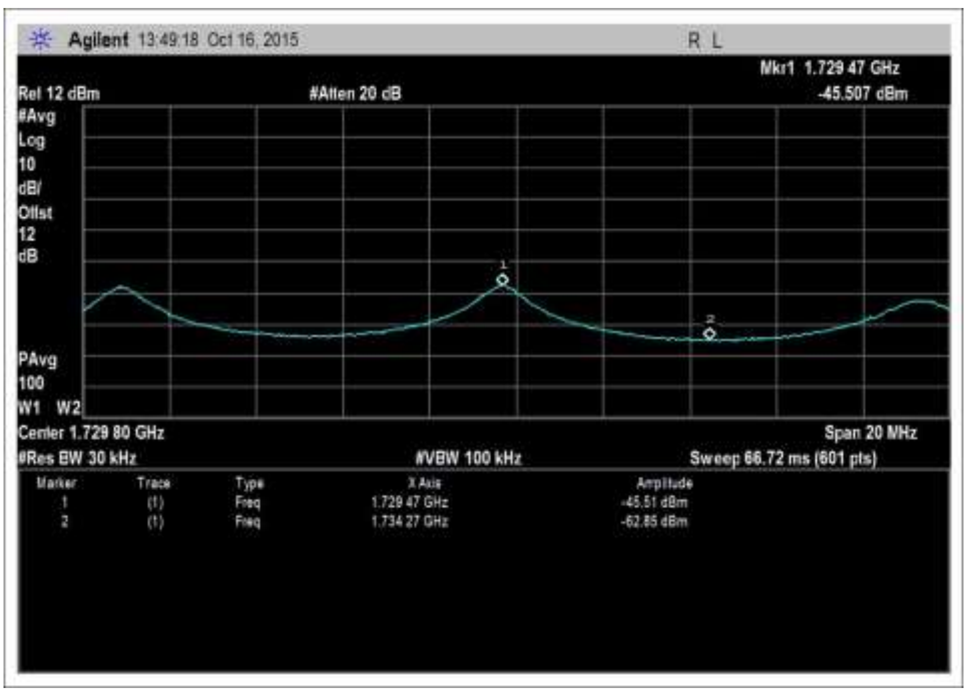

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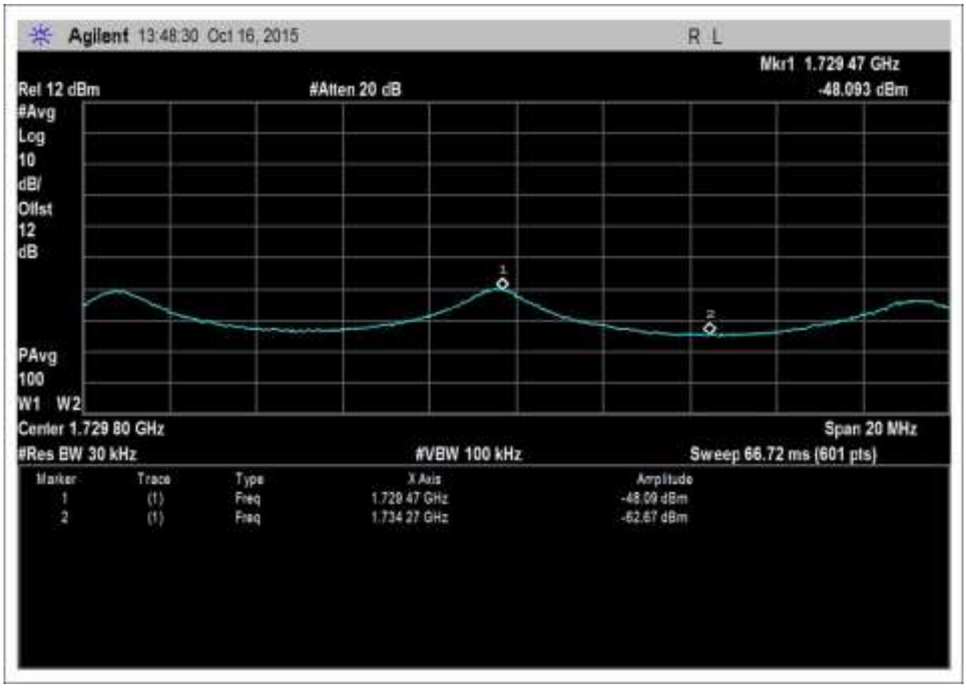

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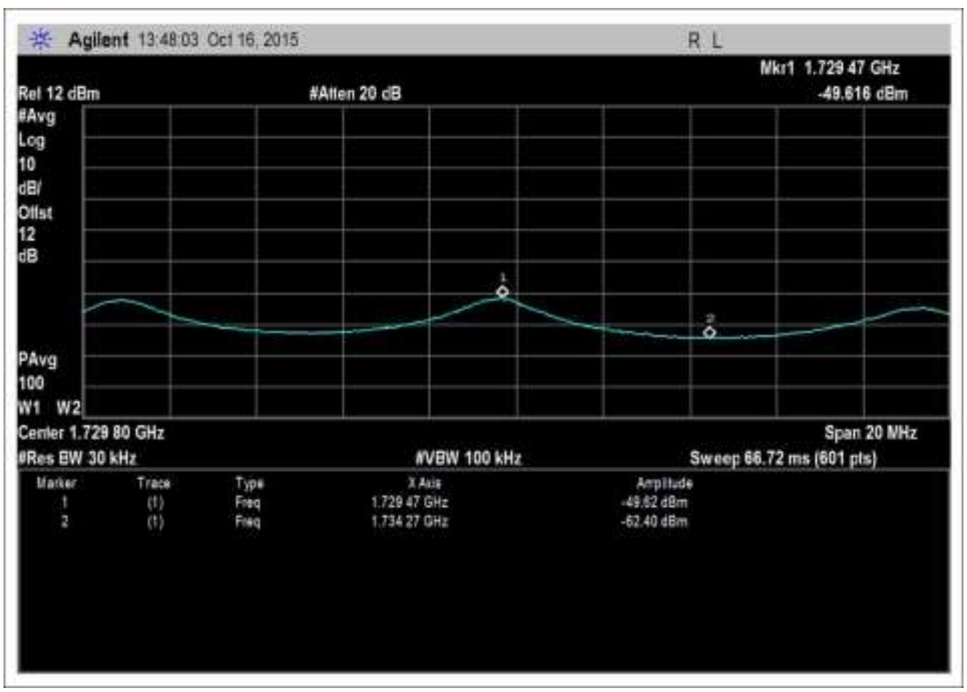

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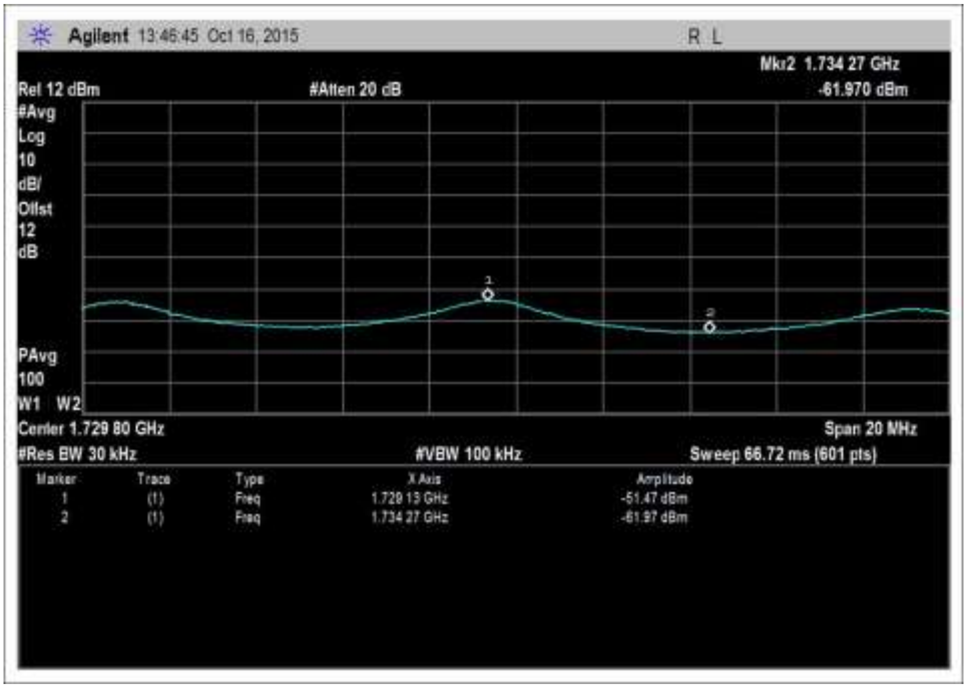

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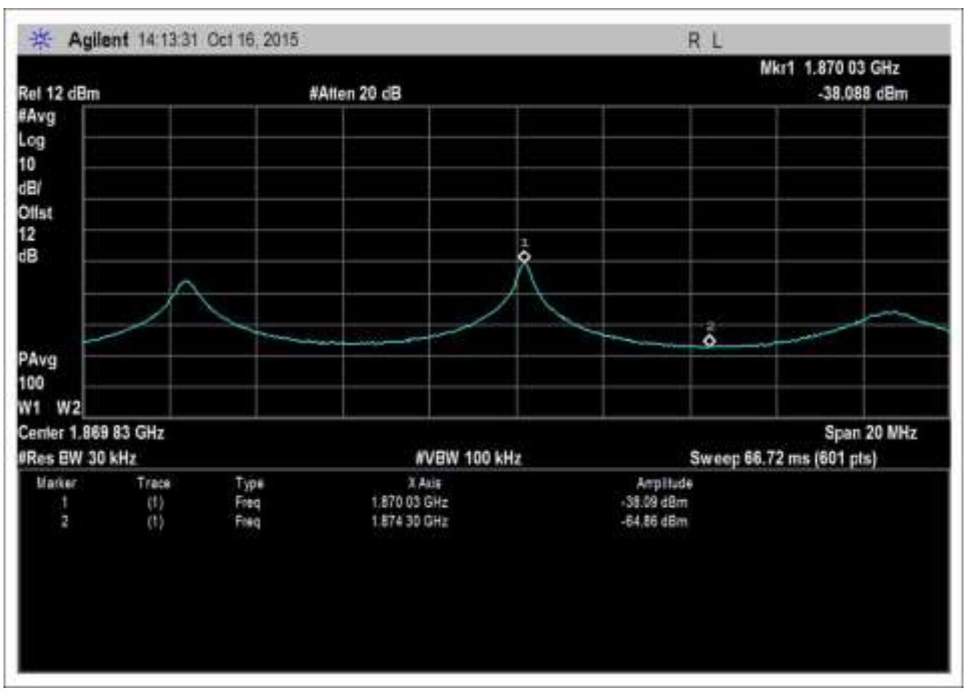

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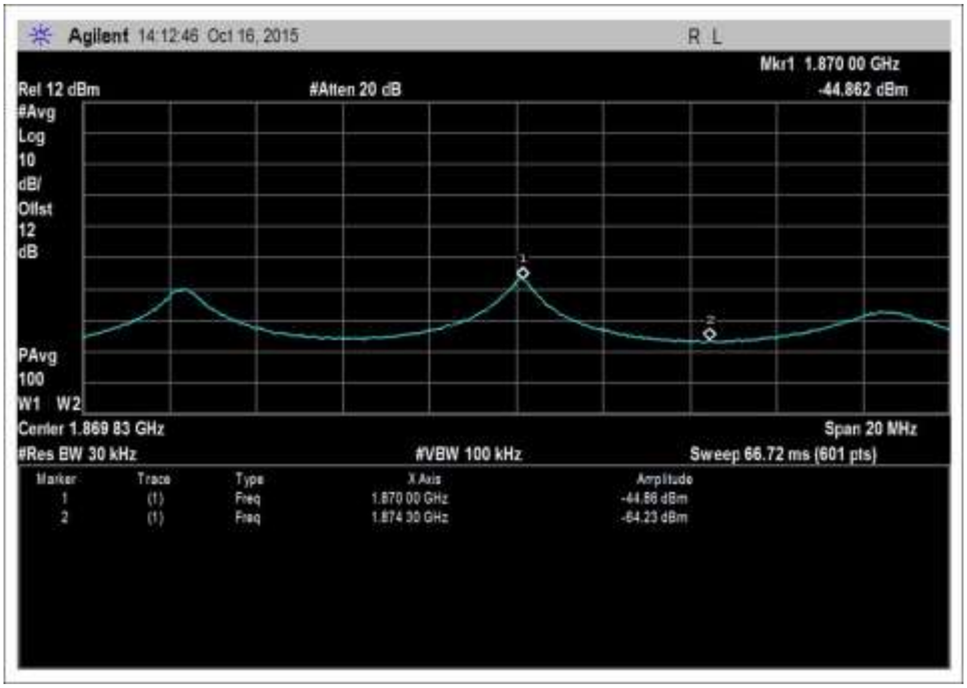

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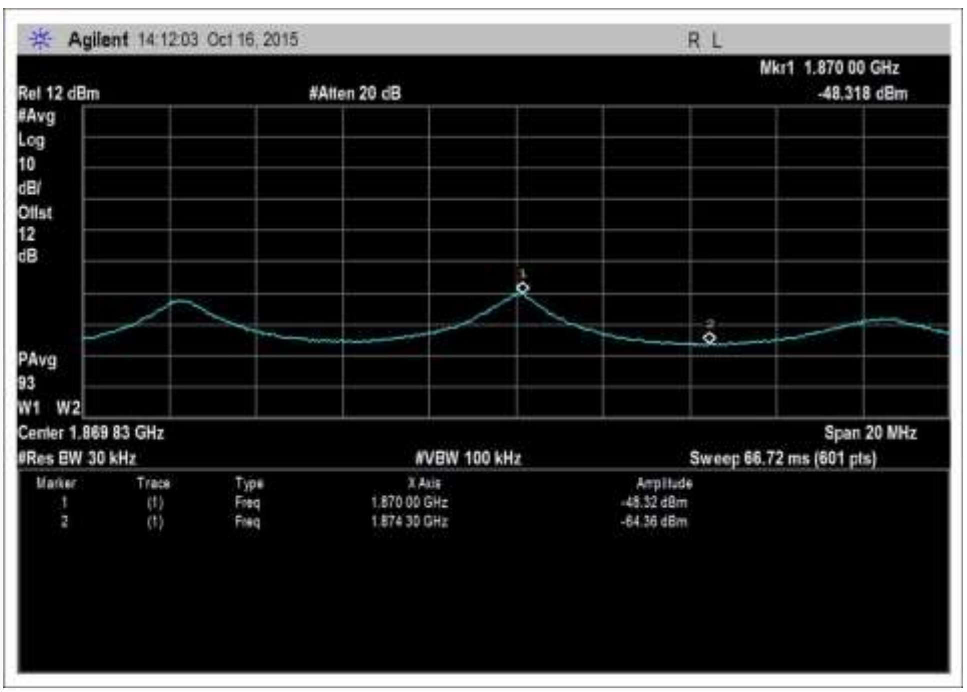

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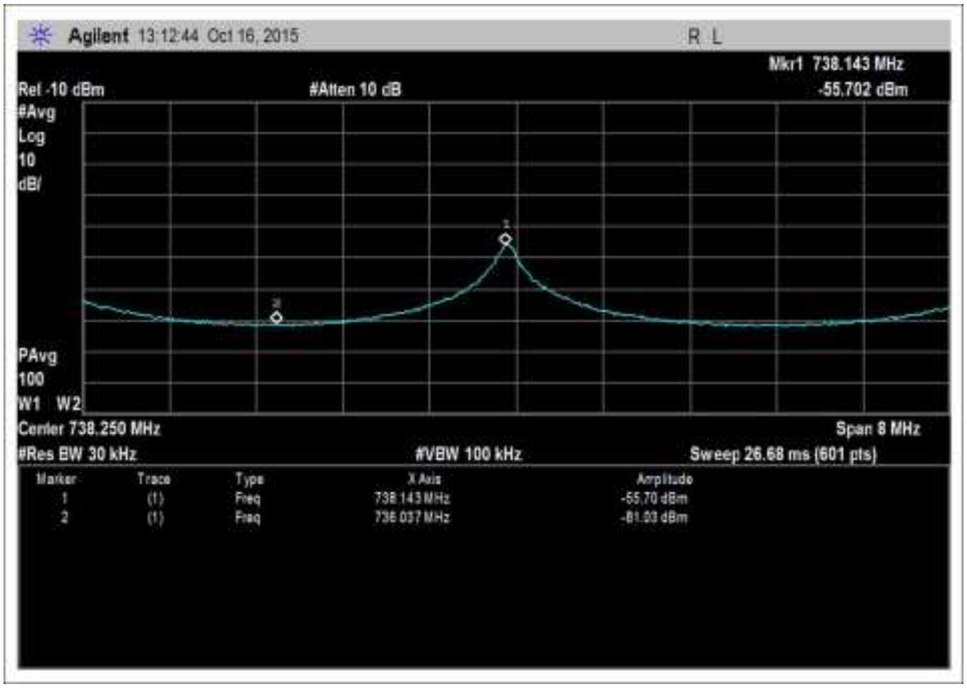

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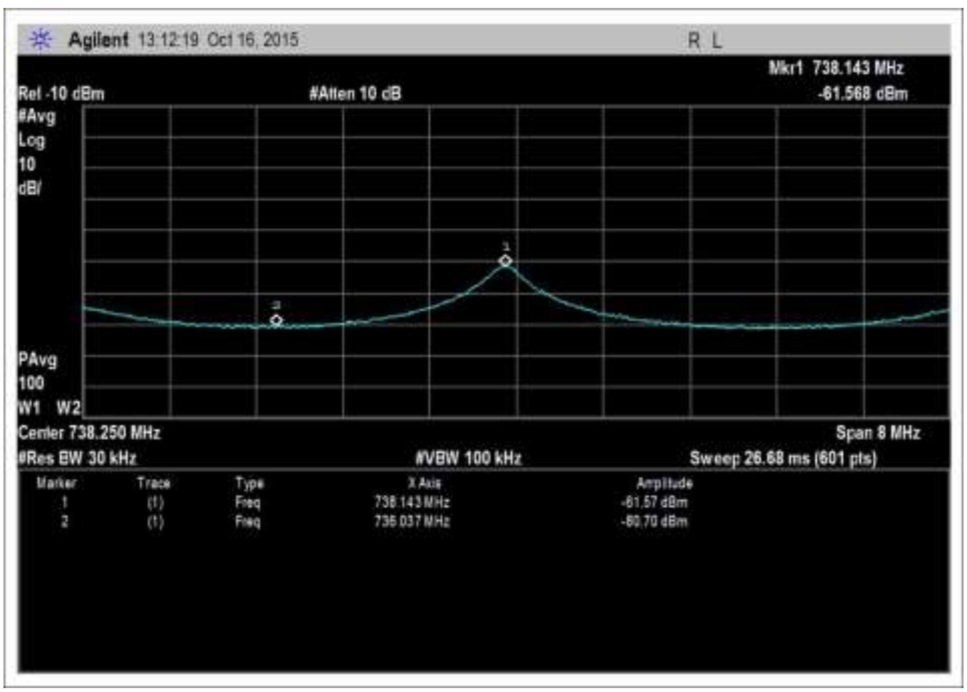

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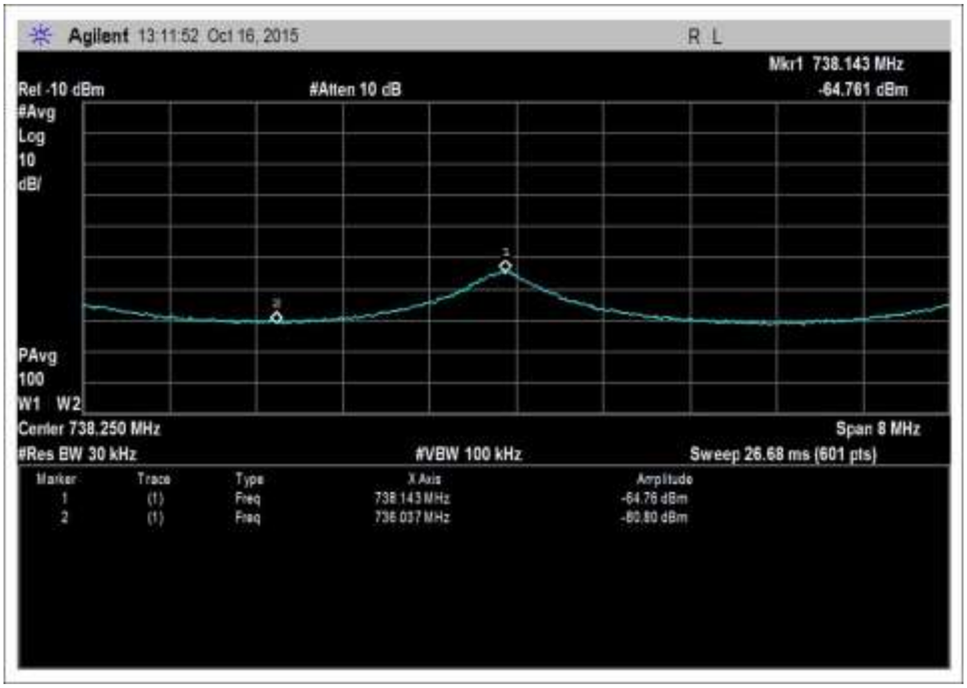

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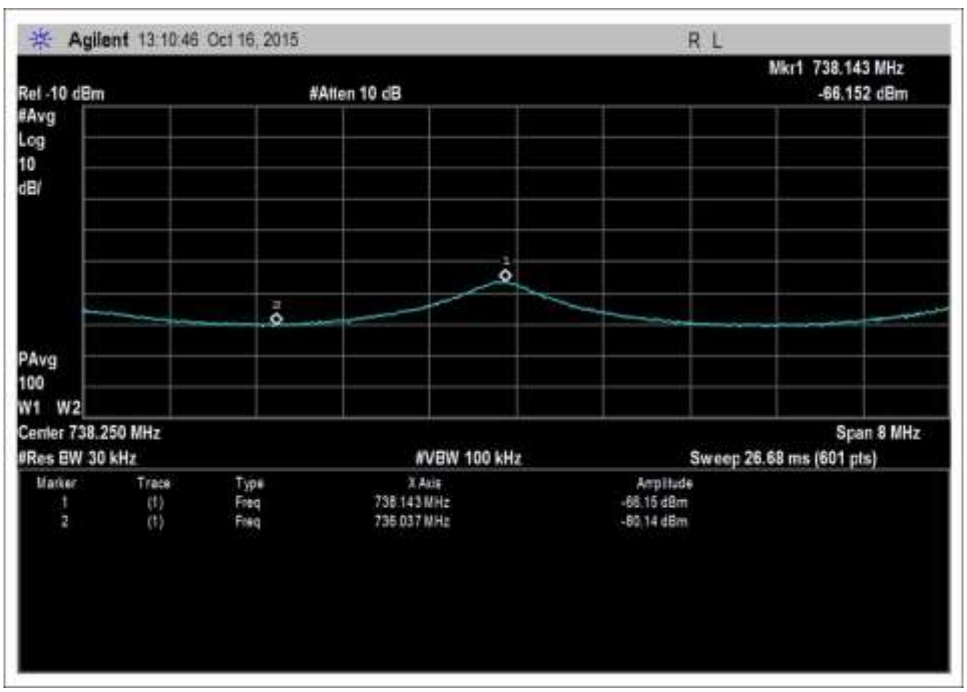

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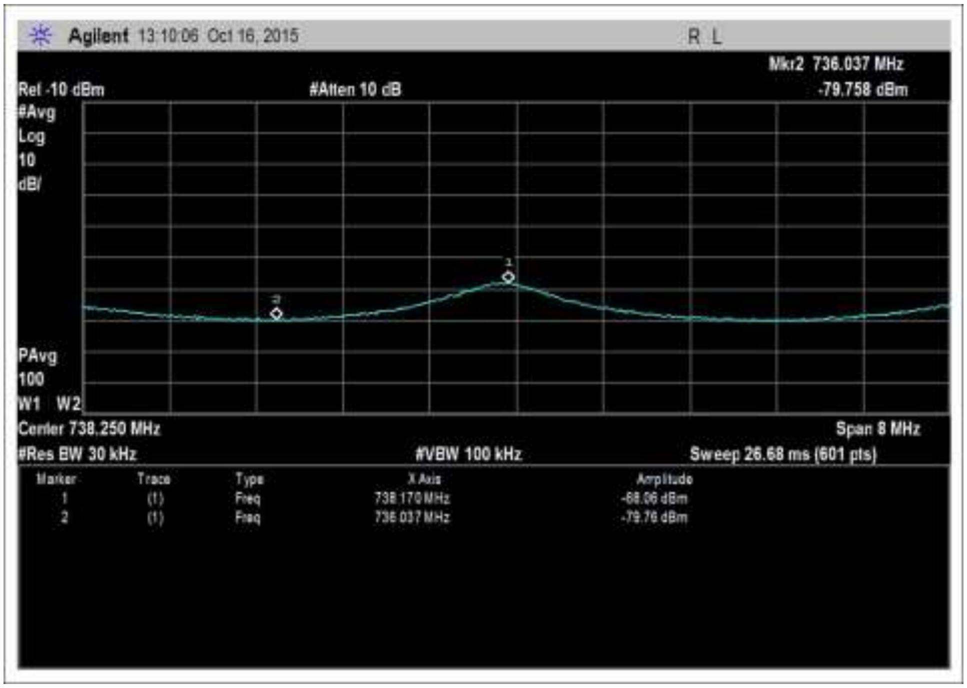

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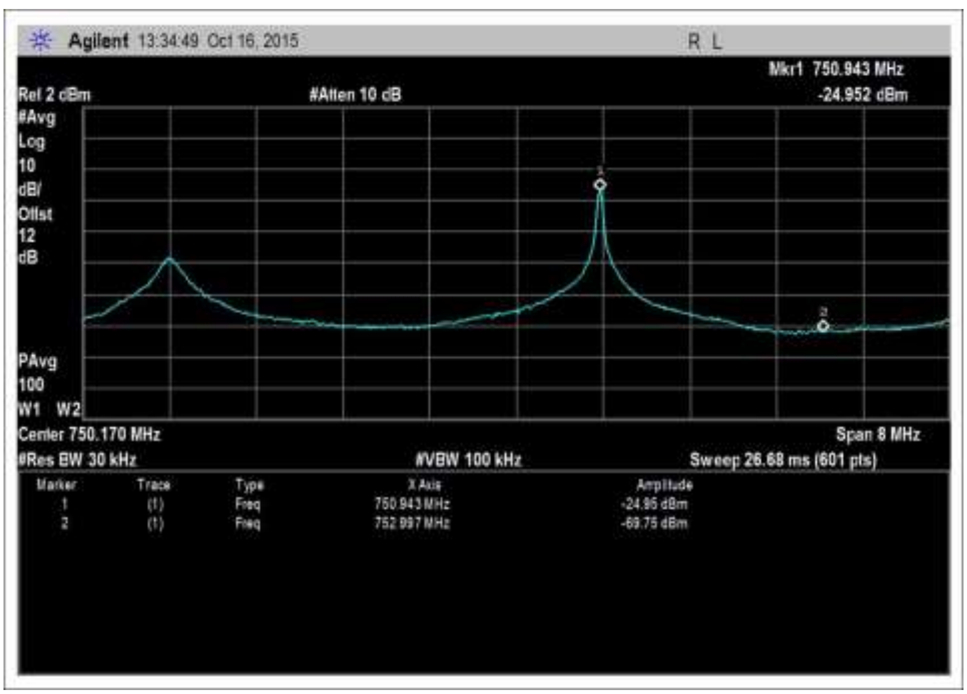

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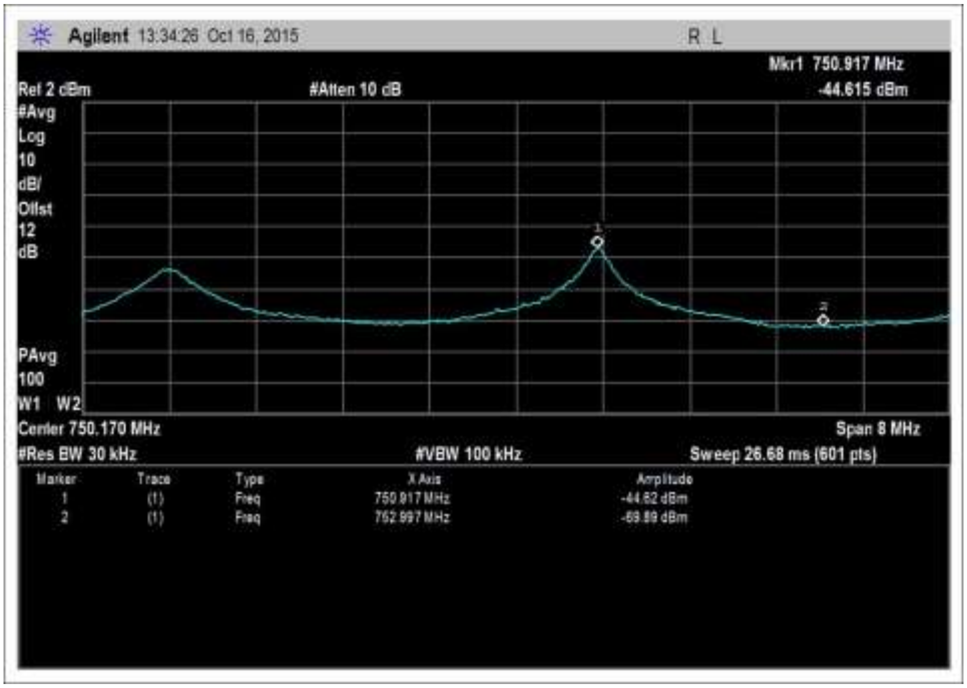

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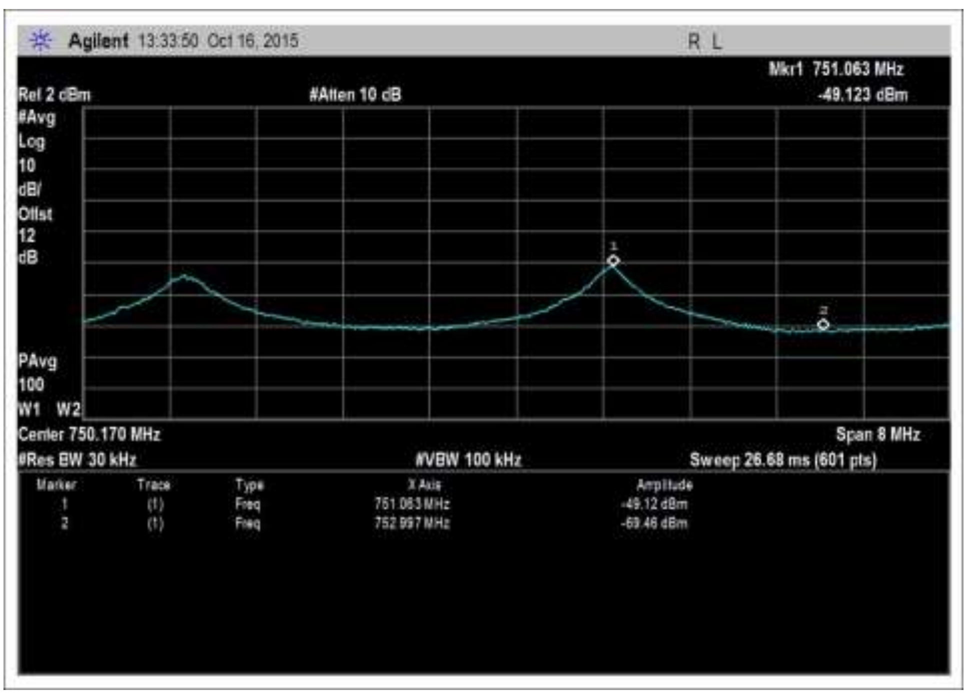

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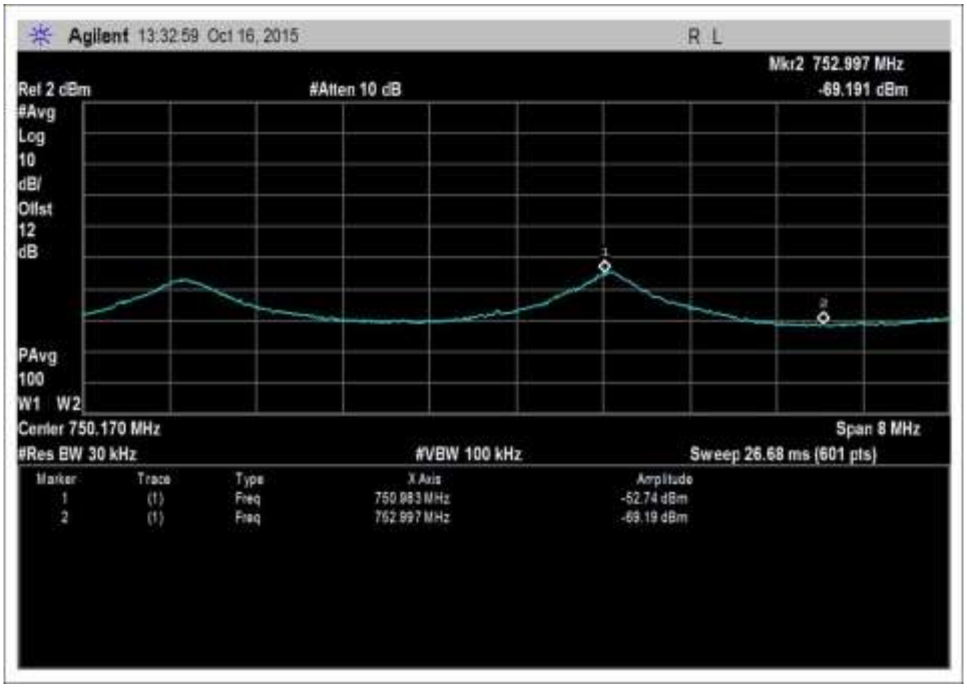

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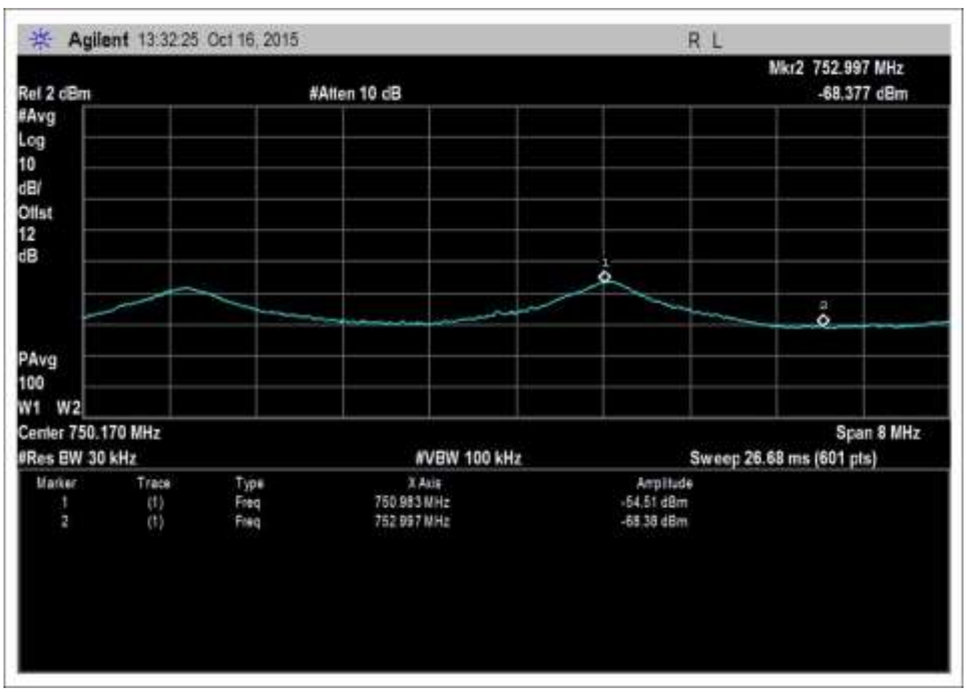

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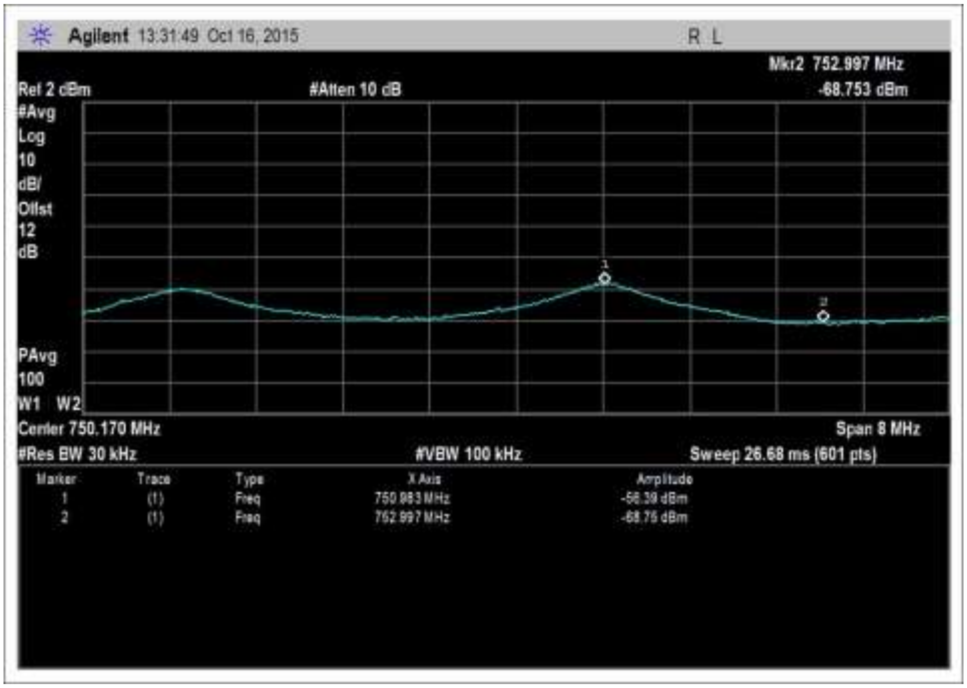

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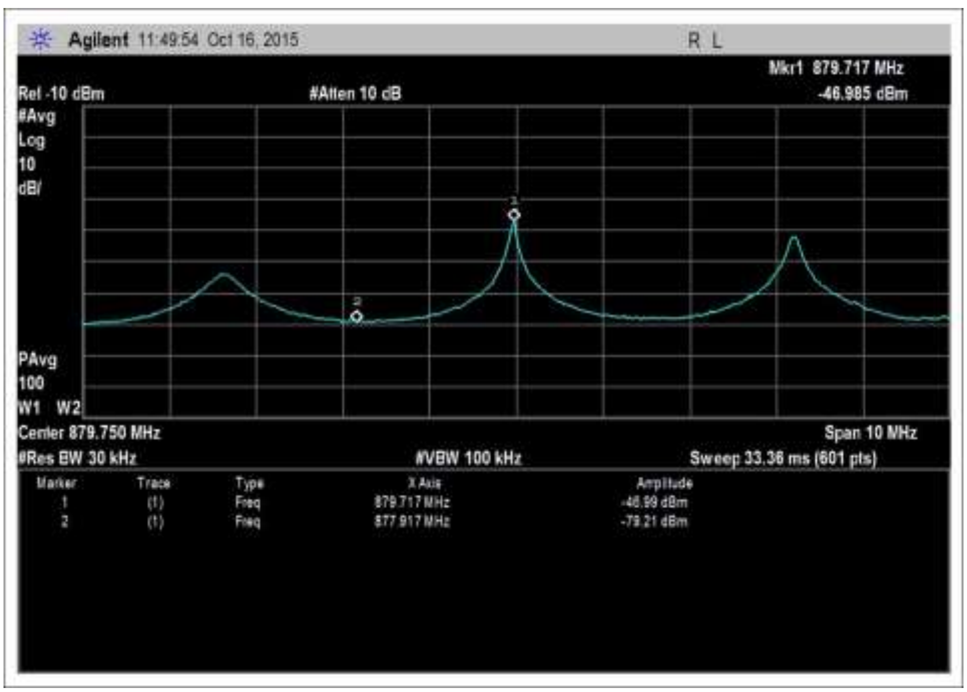

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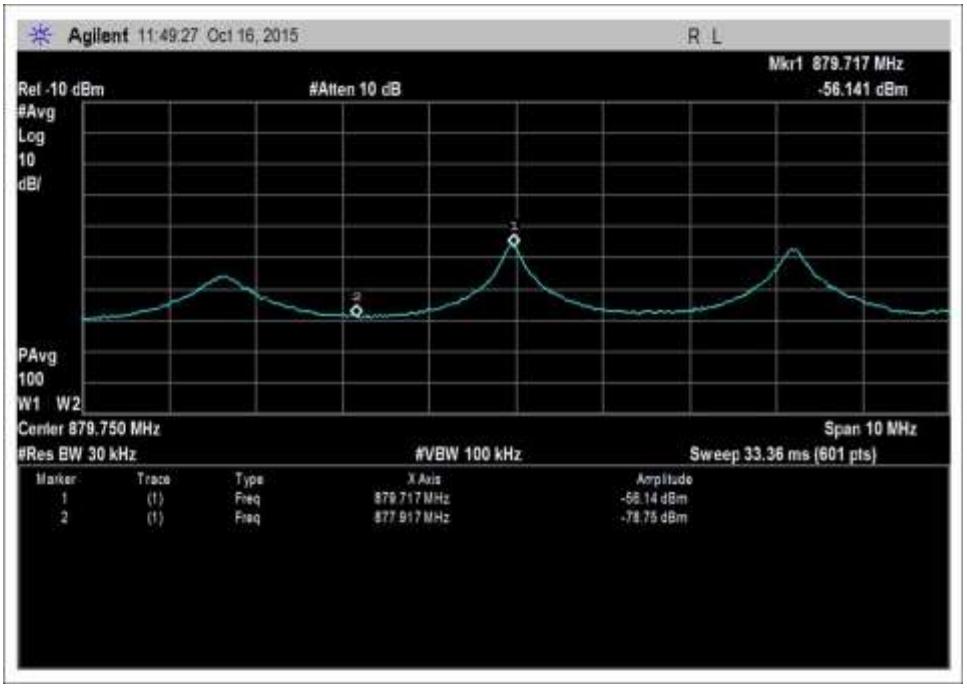

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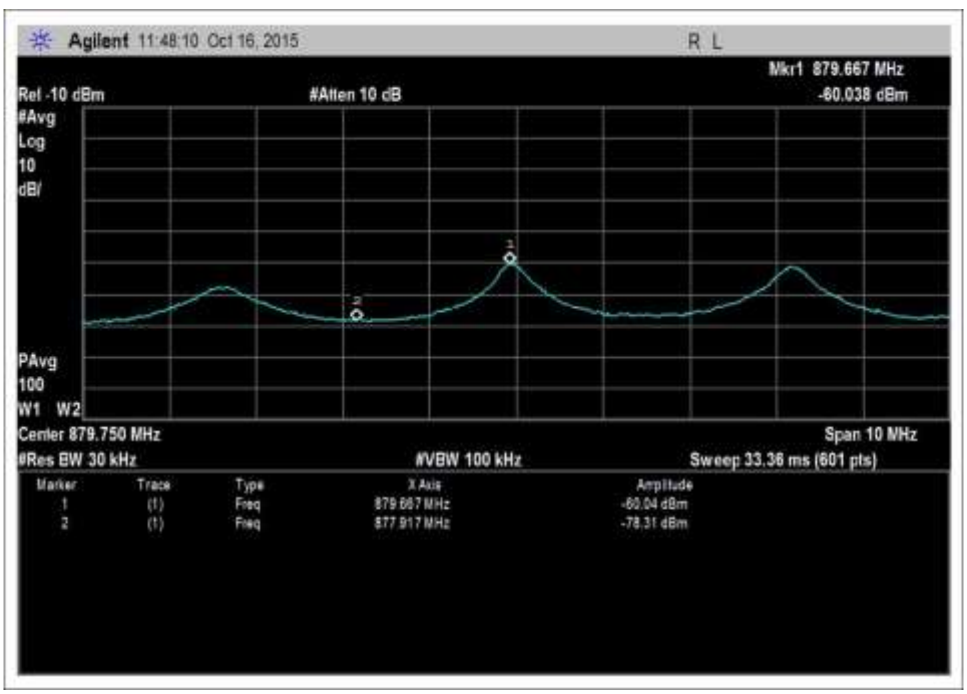

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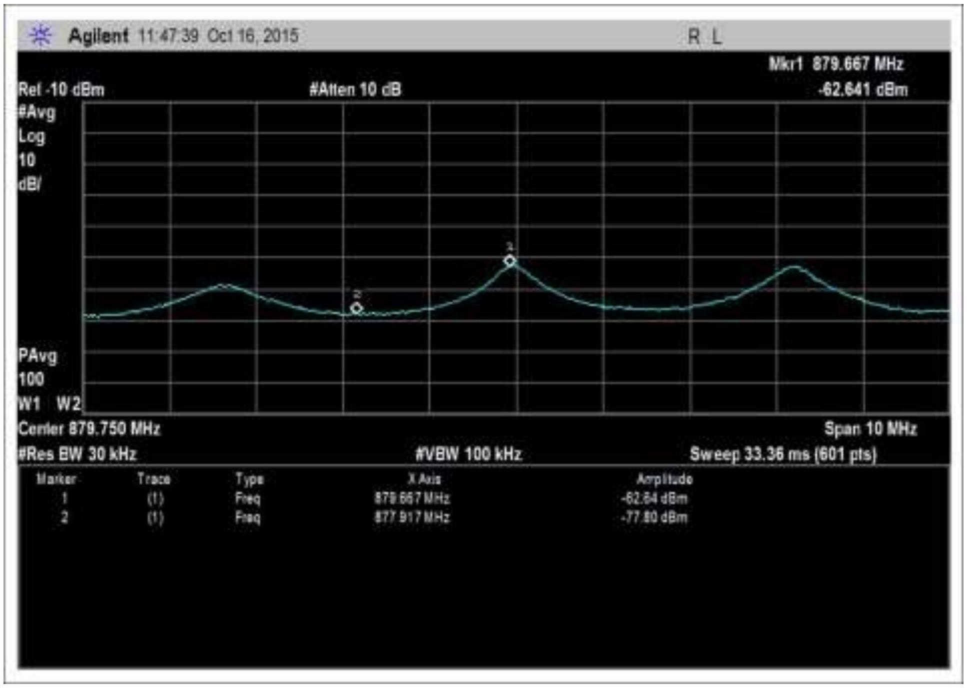

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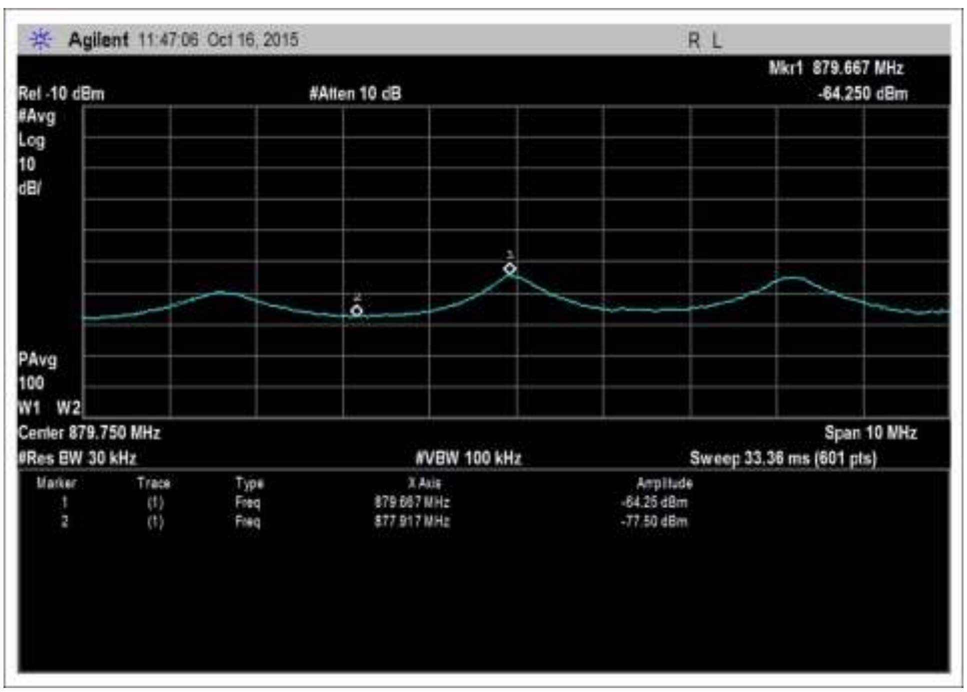

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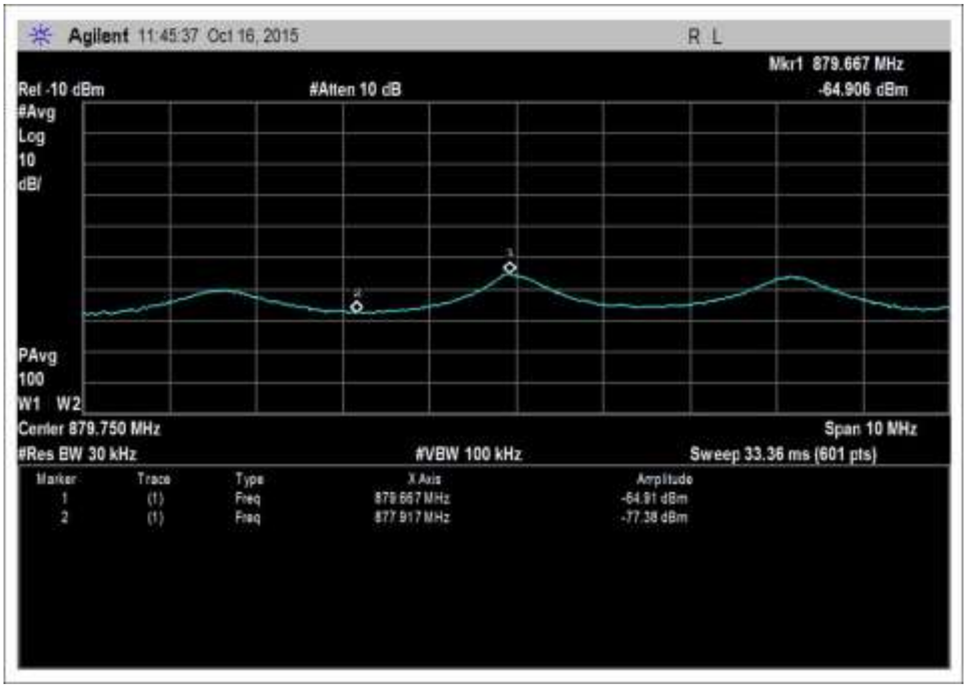

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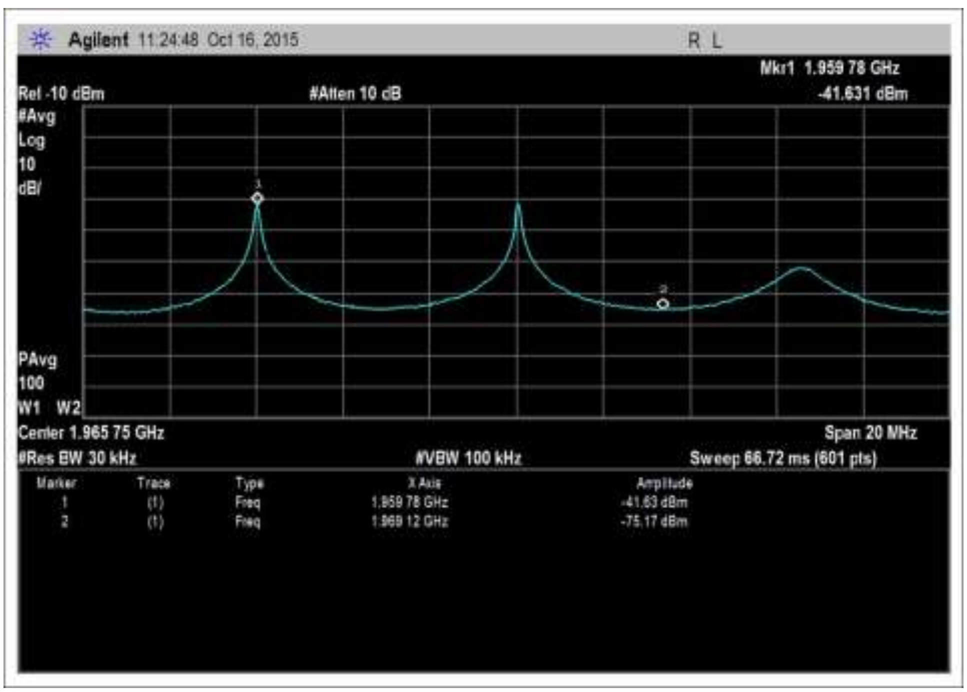

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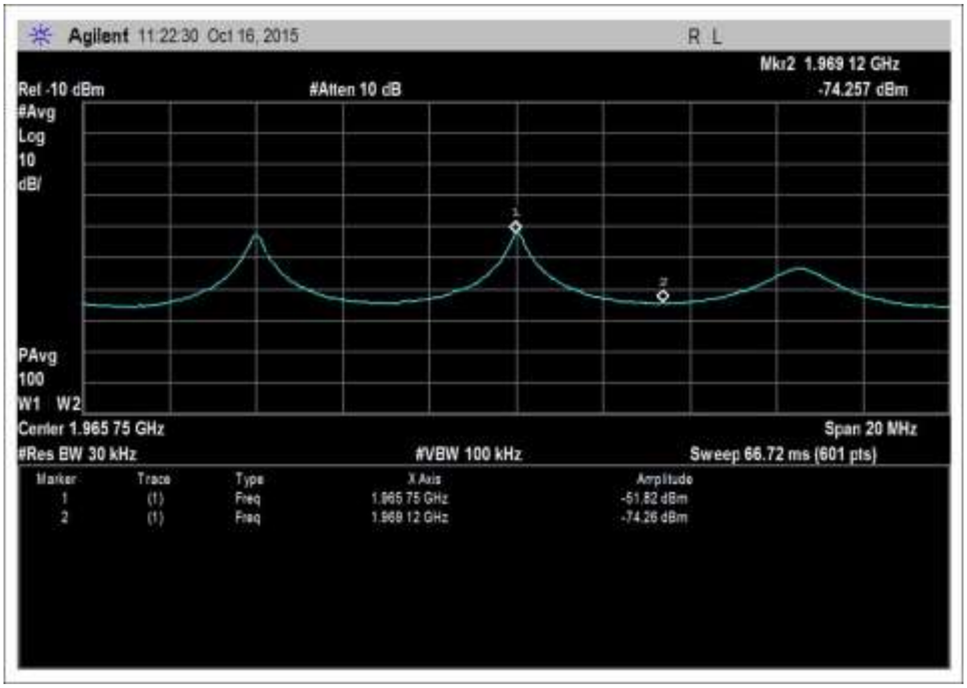

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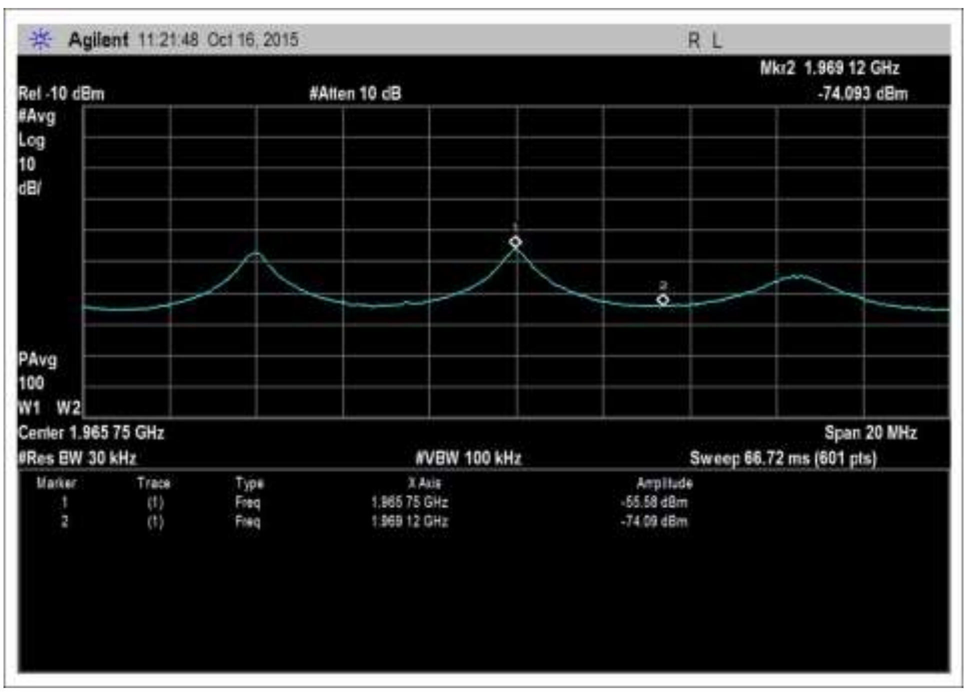

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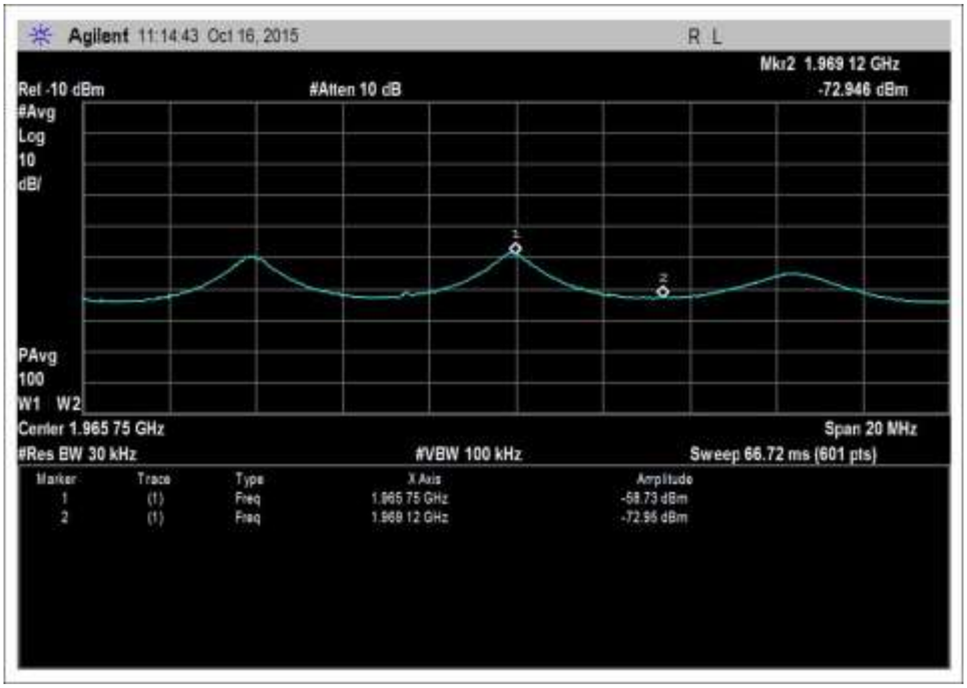

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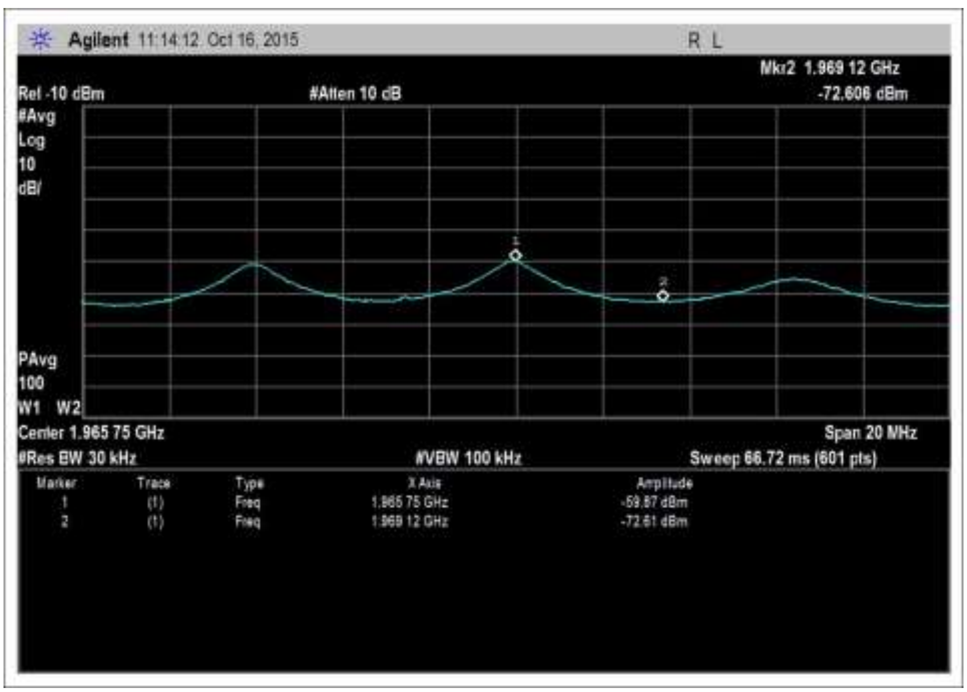

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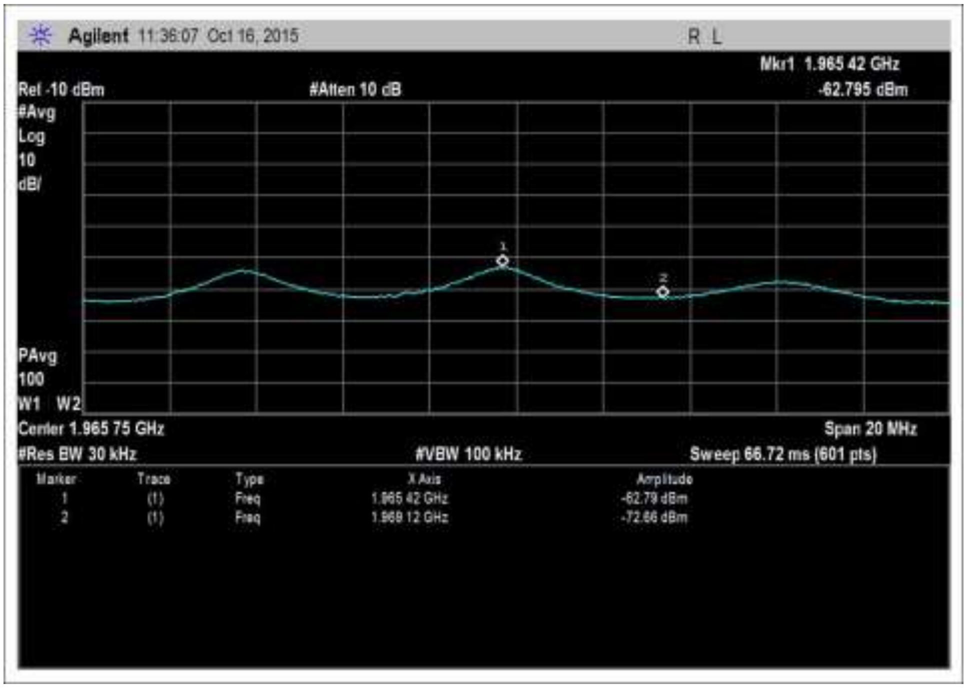

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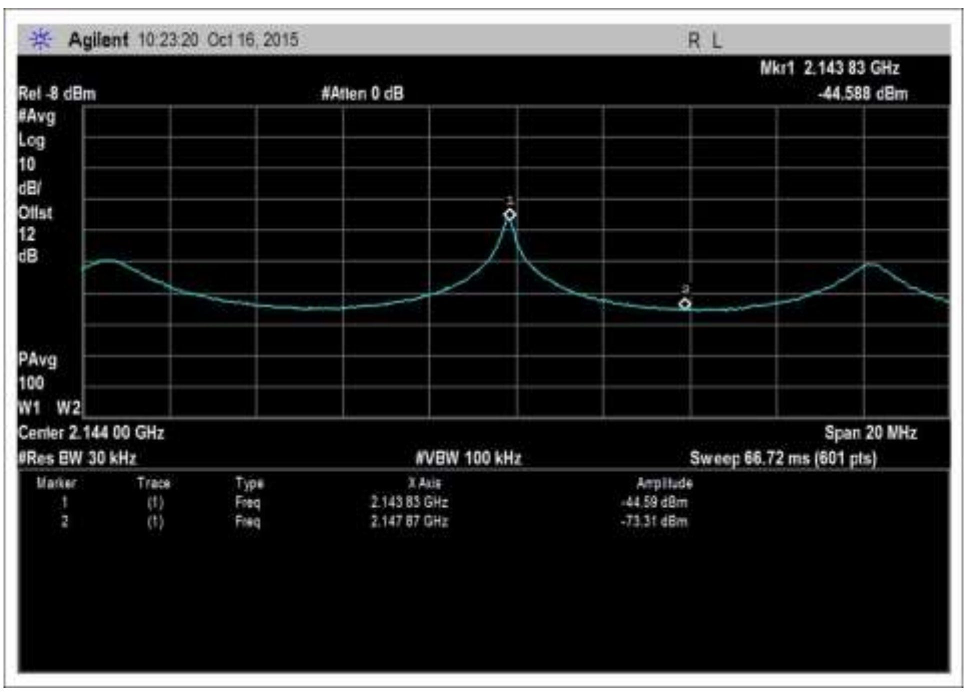

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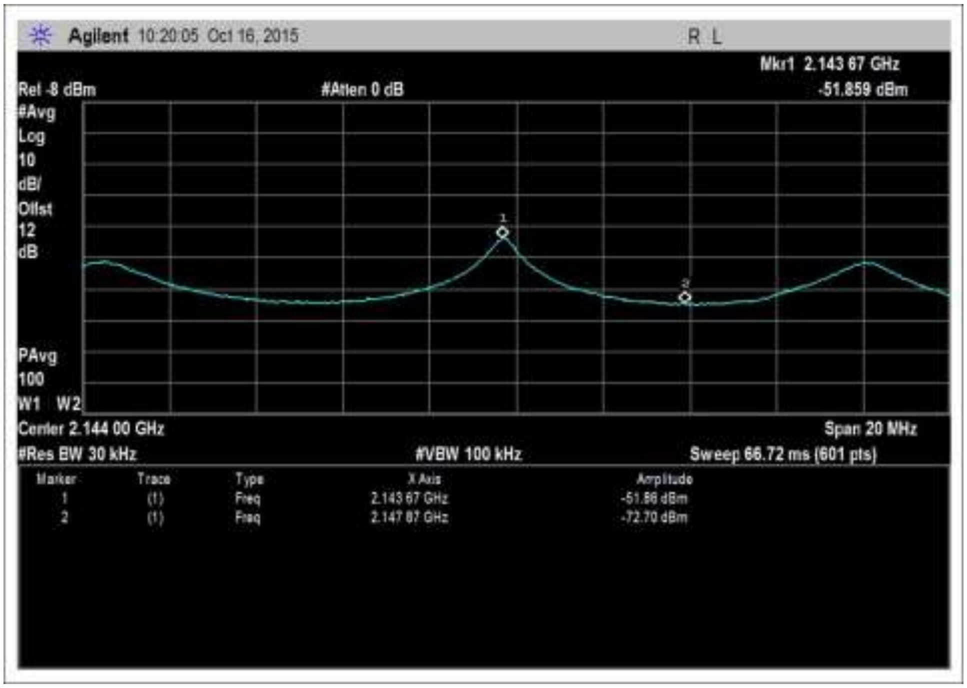

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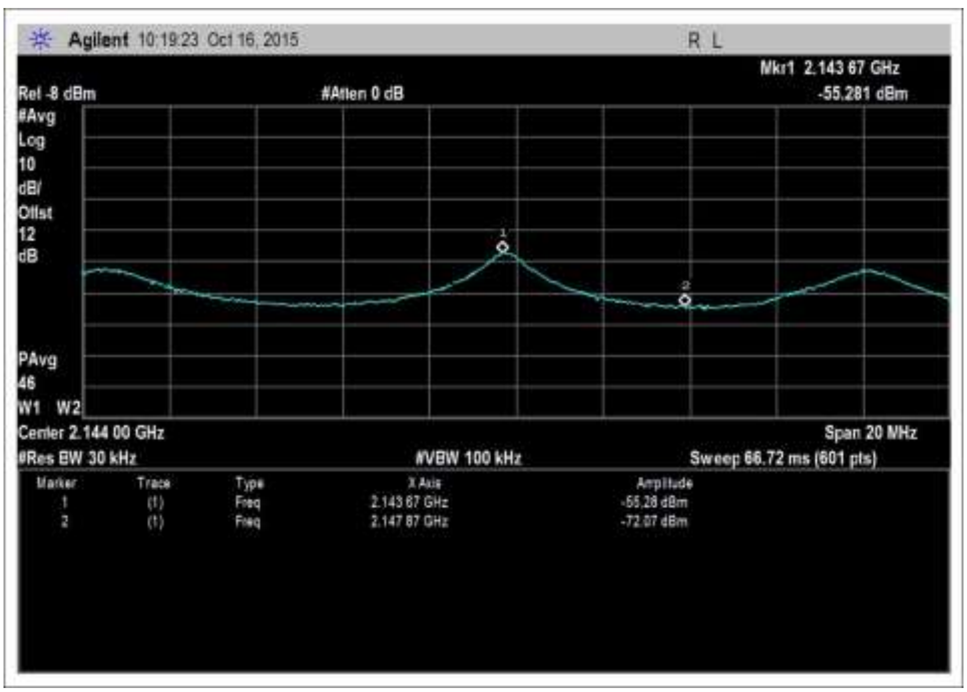

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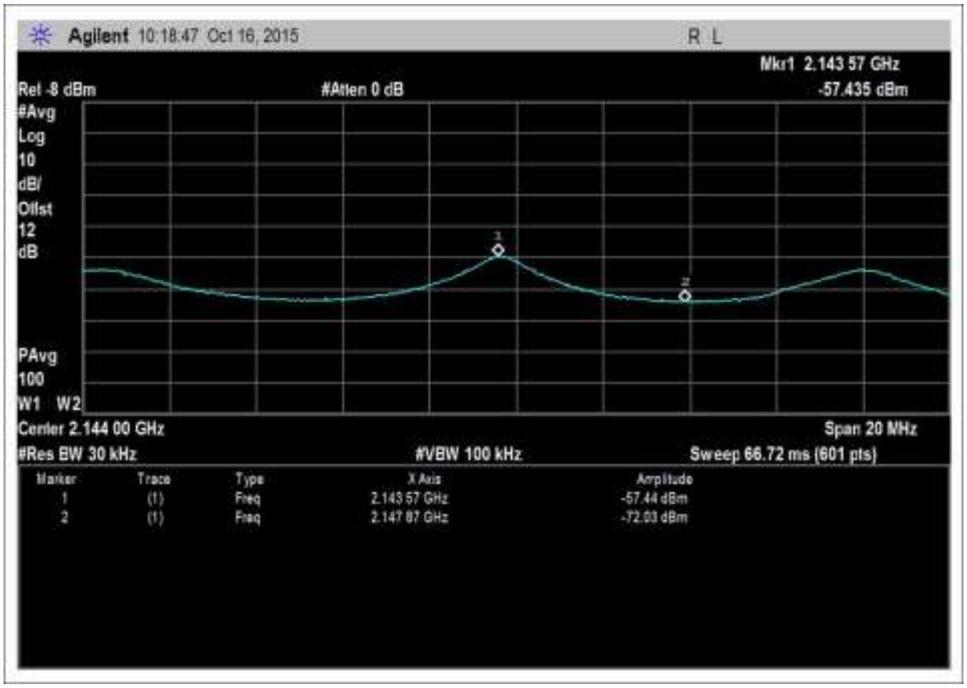

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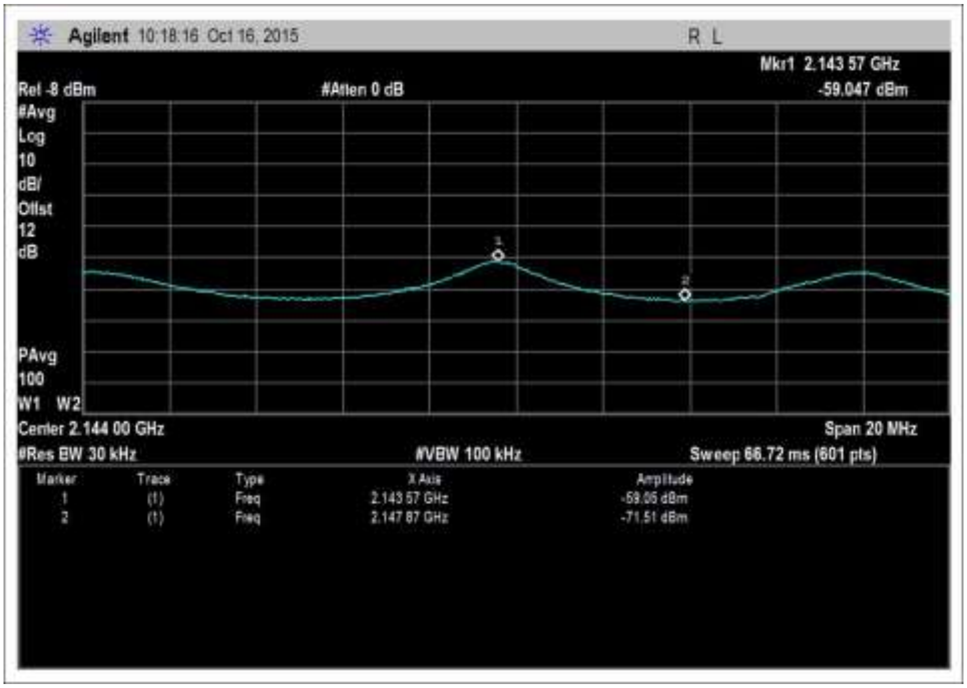

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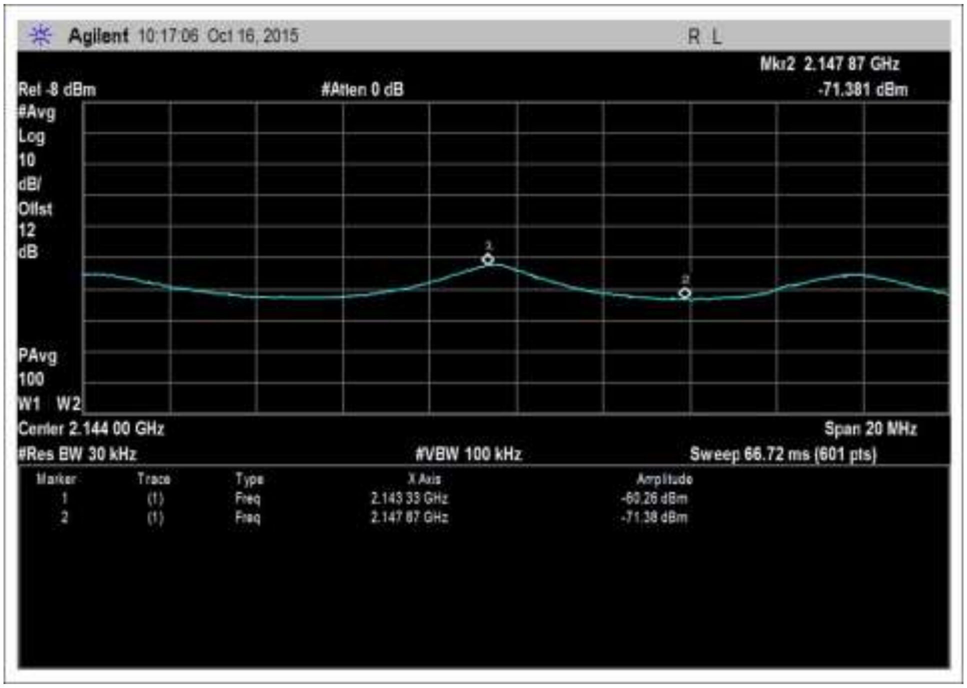


DL-2110-2155-AWGNL+5

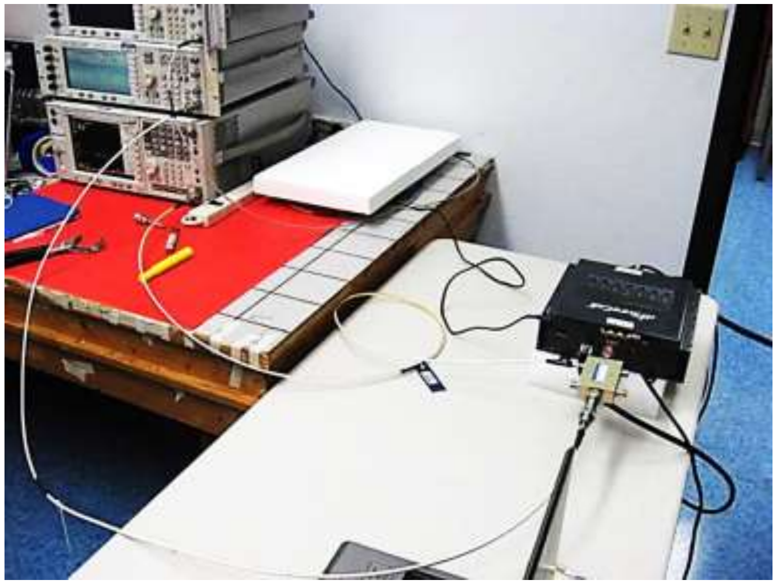
7.13 Spectrum Block Filter

Not applicable because the EUT does not utilize spectrum block filtering.

EXHIBIT A: TEST SETUP PHOTOS

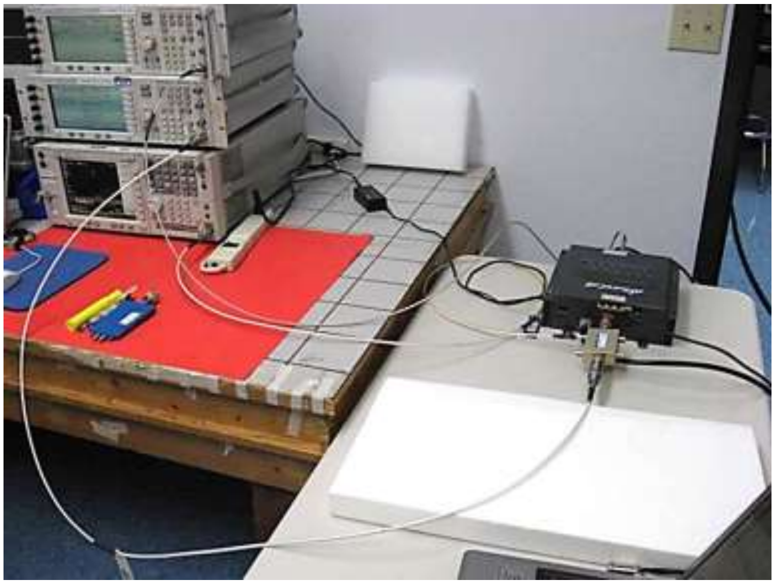
7.1, 7.2, 7.3, 7.5, 7.6, and 7.10 Test Setup

7.4 Test Setup

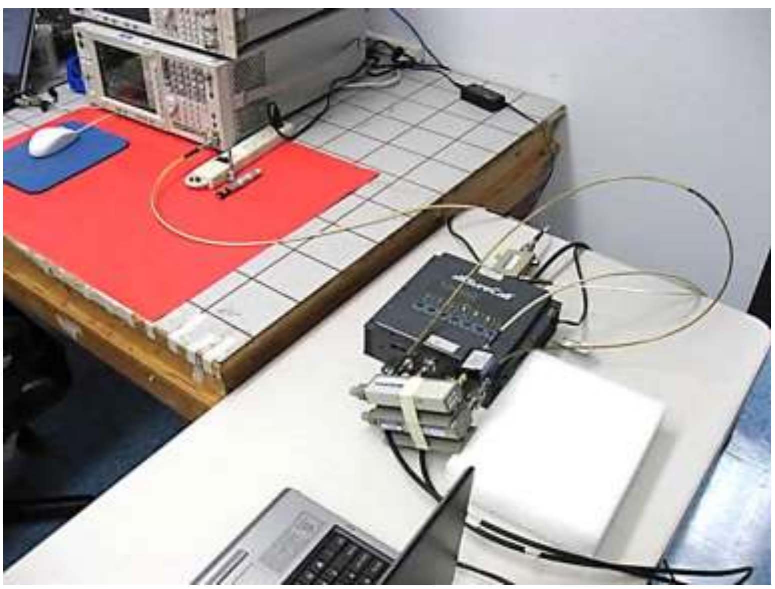


7.7 Test Setup

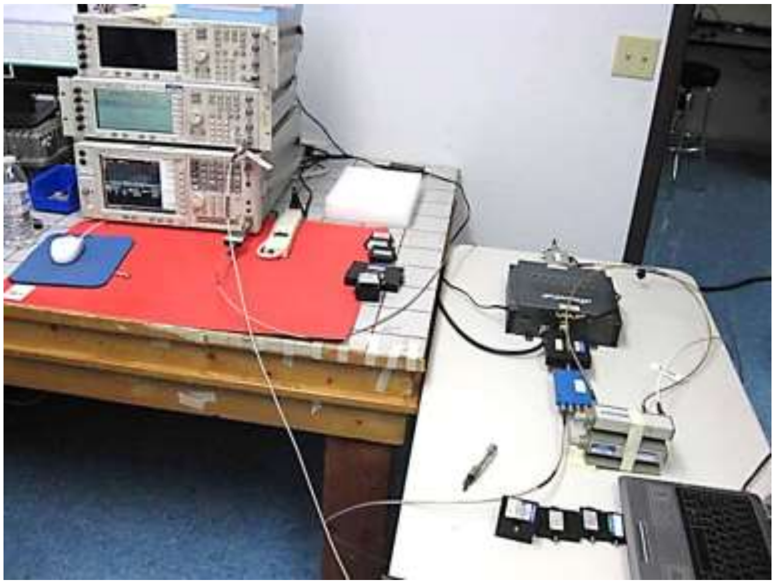
7.8 Test Setup



7.9 Test Setup



7.11.2 Test Setup



7.11.3 Test Setup

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on the limit value subtracting the corrected measured value; a negative margin represents a measurement exceeding the limit while a positive margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.