Cellphone-Mate, Inc.

REVISED TEST REPORT TO 97835-12

Consumer Booster
Model: Fusion4Home

Tested To The Following Standard:

FCC Part 20.21

Report No.: 97835-12A

Date of issue: March 27, 2019

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Cellphone-Mate, Inc.
48346 Milmont Drive
Fremont, CA 94538

REPRESENTATIVE: Dennis Findley
Customer Reference Number: CKC20151106

REPORT PREPARED BY:

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CKC Laboratories, Inc.
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Mariposa, CA 95338

Project Number: 97835

DATE OF EQUIPMENT RECEIPT: November 17, 2015
DATE(S) OF TESTING: November 17 – December 4, 2015
March 5, 2019

Revision History

Original: Testing of the Consumer Booster Model: Fusion4Home to FCC Parts: 20.21, 22, 24 and 27.
Revision A: To replace section 7.4 with corrected test data.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.02.00
EMITest Emissions	5.03.11
EMITest Immunity	5.02.00

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Fremont	US0082	SL2-IN-E-1148R	3082B-1	958979	A-0149

SUMMARY OF RESULTS

Standard / Specification: FCC Part 20.21

KDB 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03, June 5, 2015		FCC Part Section Correlation		Mods	Results
Guidance Sec #	**Guidance Description**	**FCC Sec #**	**FCC Rule Description**		
7.1 a) - k)	Authorized Frequency Band Verification Test	20.21(e)(3)	Frequency Bands	NA	Pass
7.2.2 a) - k)	Maximum Power Measurement Procedure	2.1046/20.21(e)(8)(i)(D)	Power Limit	NA	Pass
7.3 a) - d)	Maximum Booster Gain Computation	20.21(e)(8)(i)(B)	Bidirectional Capabilities	NA	Pass
7.4 a) - n)	Intermodulation Product	20.21(e)(8)(i)(F)	Intermodulation Limit	NA	Pass
7.5 a) - n)	Out of Band Emissions	20.21(e)(8)(i)(E)	Out of Band Emission	NA	Pass
7.6 a) - e)	Conducted Spurious Emission	2.1051/22/24/27	Spurious emission	NA	NA[1]
7.7.1 a) - g) 7.7.1 h) - n) 7.7.2 a) - g)	Noise Limit Procedure Variable Noise Variable Noise Timing	20.21(e)(8)(i)(A)(2)(i) 20.21(e)(8)(i)(A)(1) 20.21(e)(8)(i)(H)	Noise Limits Transmit Power Off Mode	NA	Pass
7.8 a) - l)	Uplink inactivity	20.21(e)(8)(i)(I)	Uplink Inactivity	NA	Pass

NA = Not Applicable
NA[1] = A different standard applies; see applicable test report.
NA[2] = Not applicable. See the section in the report for the reason.

Standard / Specification: FCC Part 20.21 - continued

KDB 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03, June 5, 2015		FCC Part Section Correlation		Mods	Results
Guidance Sec #	**Guidance Description**	**FCC Sec #**	**FCC Rule Description**		
7.9.1 a) - l) 7.9.2 a) - f)	Variable Booster Gain Variable Uplink Gain Timing	20.21(e)(8)(i)(C) (1), (2)(i) 20.21(e)(8)(i)(H)	Booster Gain Transmit Power Off Mode	NA	Pass
7.10.a) - j)	Occupied Band Width	2.1049/22/24/27	Occupied Band Width	NA	NA[1]
7.11.2 a) - r) 7.11.3 a) - h) 7.11.4 a) - h) (alternate to 7.11.3)	Anti-Oscillation	20.21(e)(8)(ii)(A)	Anti-Oscillation	NA	Pass
7.12a) - f)	Radiated Spurious Emission	2.1053/ 22/24/27	Spurious Emission	NA	NA[1]
7.13 a) - c)	Spectrum Block Filter[2]	NA[2]	NA[2]	NA	NA[2]

NA = Not Applicable
NA[1] = A different standard applies; see applicable test report.
NA[2] = Not applicable. See the section in the report for the reason.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
On the Outside (Donor) antenna port, which is a 75 ohm impedance port, an impedance matching pad is used. Readings are compensated by adding the additional loss on the Spectrum Analyzer. On the Inside (Server) antenna port, which is a 50 ohm impedance port, readings are taken using injection signals compensated. The level of these signals is corrected by adding the additional loss due to the usage of the impedance matching pad to create equivalent power/RSSI at the Donor antenna port.

EQUIPMENT UNDER TEST (EUT)

During testing numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Consumer Booster	Cellphone-Mate, Inc.	Fusion4Home	01
AC/DC Power Adapter	SureCall	GFP181U-0628B-1	1409-0000765

Support Equipment:

Device	Manufacturer	Model #	S/N
Signal Generator	Agilent	E4433B	US40052164
Signal Generator	Agilent	E4438C	MY42082260

Configuration 1-for tests performed on March 5, 2019 only

Equipment Tested:

Device	Manufacturer	Model #	S/N
Consumer Booster	Cellphone-Mate, Inc	Fusion4Home	01
AC/DC Power Adapter	SureCall	GFP181U-0628B-1	1409-0000765

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

FCC PART 20.21

7.1 Authorized Frequency Band Verification

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.1 Authorized Frequency Band Verification**		
Work Order #:	**97835**	Date:	11/17/2015
Test Type:	**Conducted Emissions**	Time:	09:59:44
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

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.

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 environment conditions: Temperature: 23.1°C, Relative Humidity: 30%, Pressure: 102.6 kPa

Test procedure:
The test was performed in accordance with section 7.1 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015
Firmware: V2.0

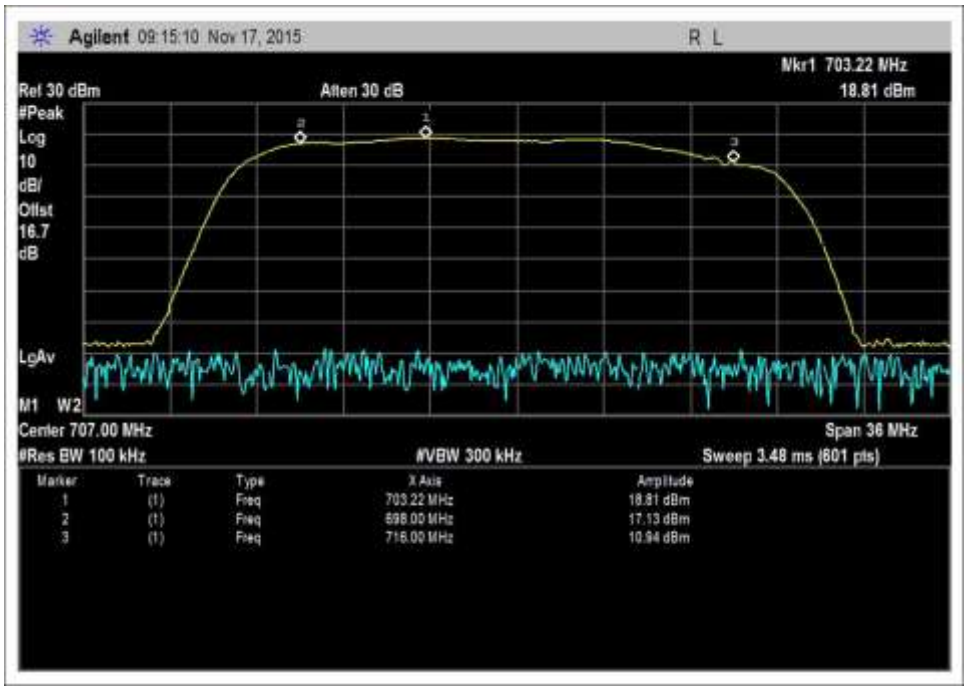
Test Equipment:

ID	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
	AN02660	Spectrum Analyzer	E4446A	7/9/2015	7/9/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

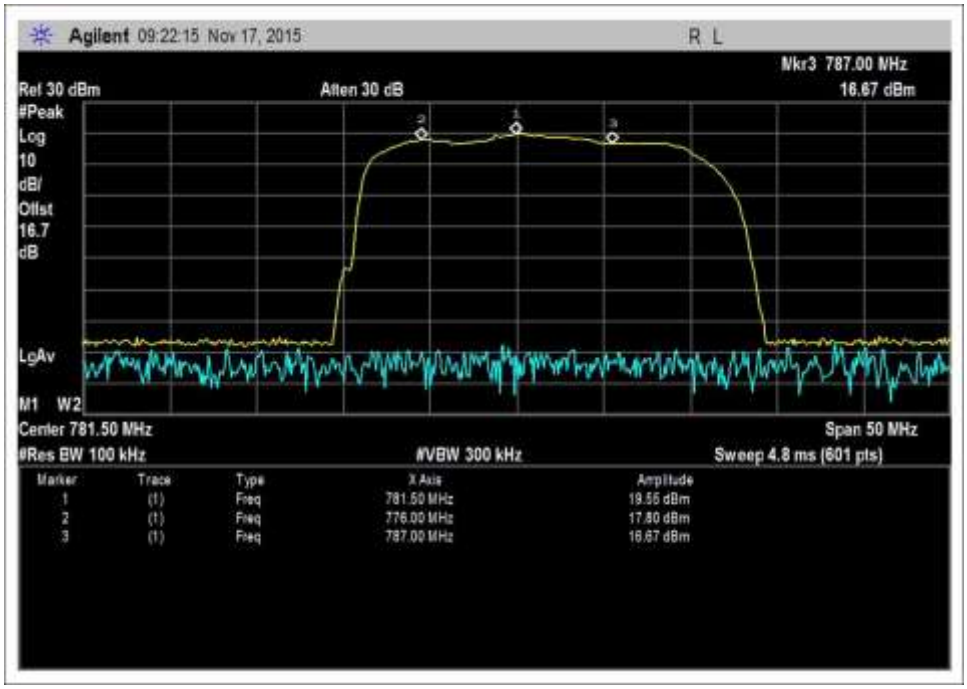
Summary of Results

Pass: The plots below show the device only operates on the CMRS frequency bands authorized for use by the NPS.

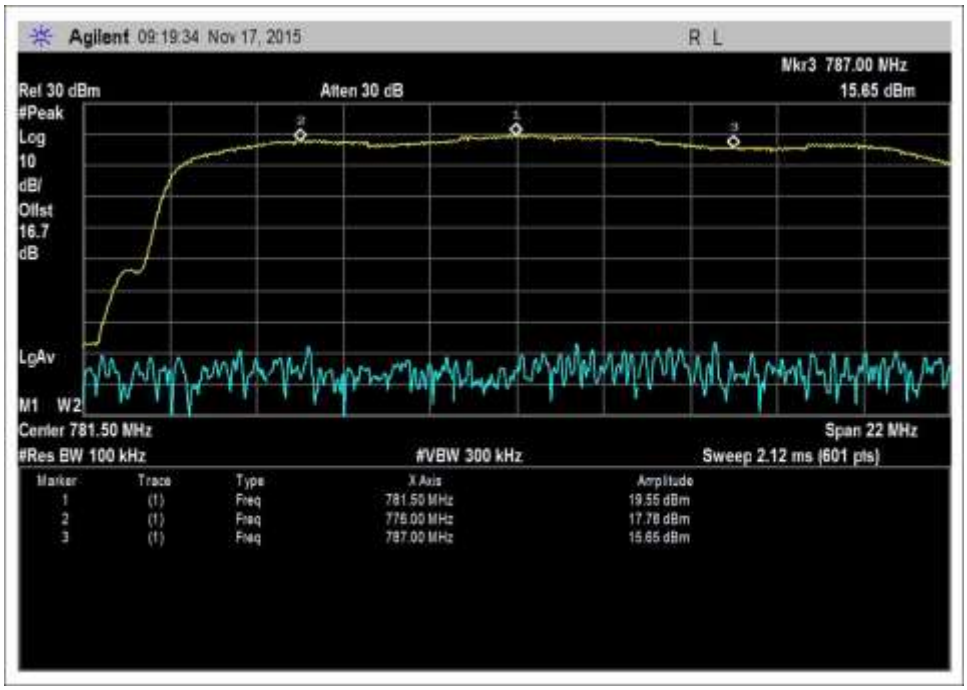
Plots



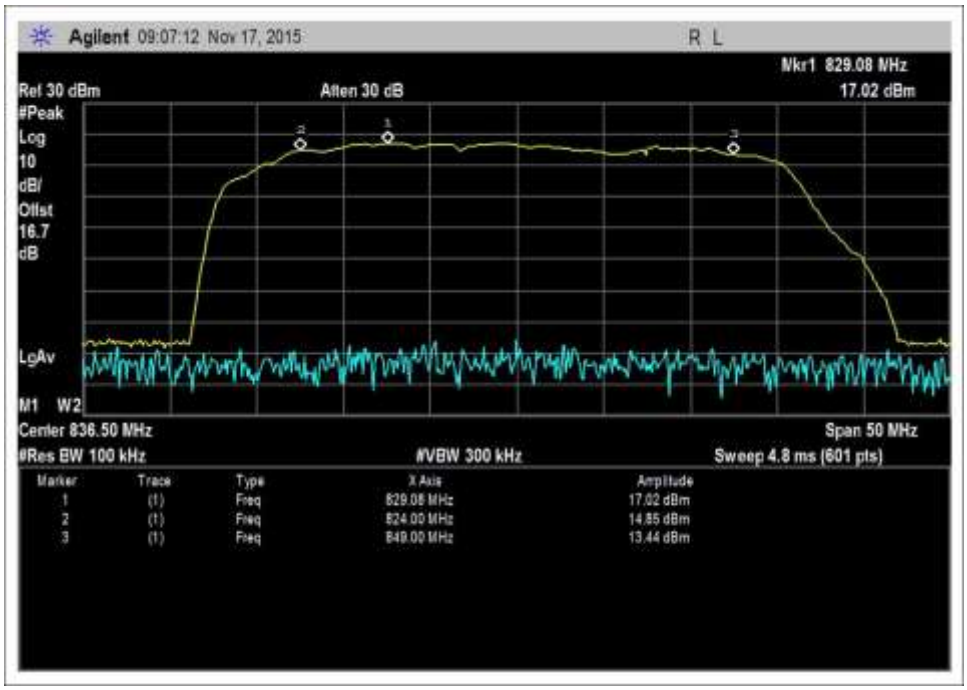
7.1_band verify_UL_698-716MHz



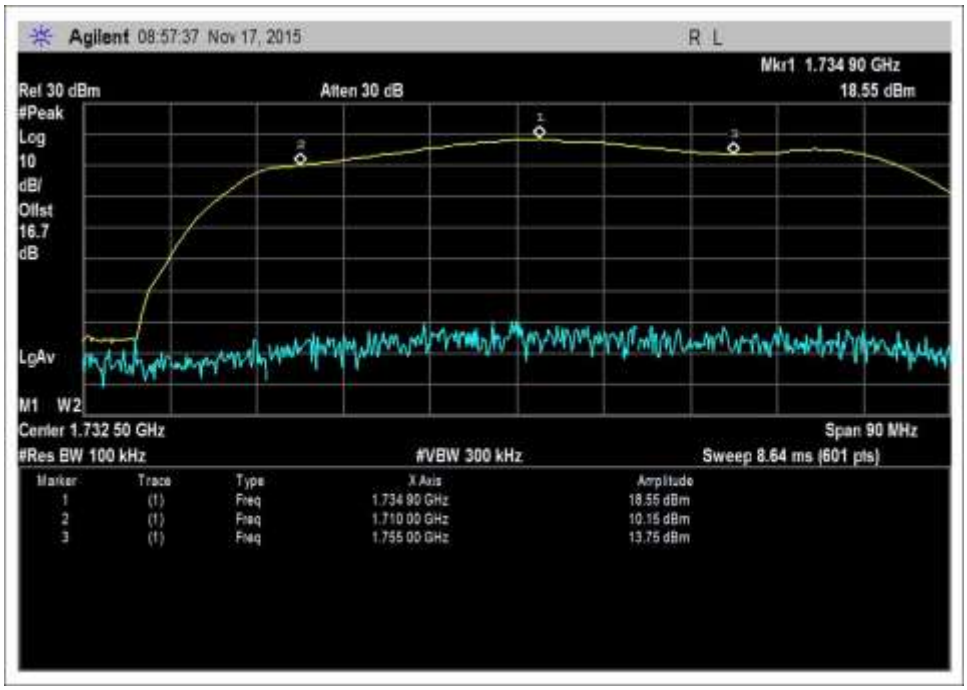
7.1_band verify_UL_776-787MHz



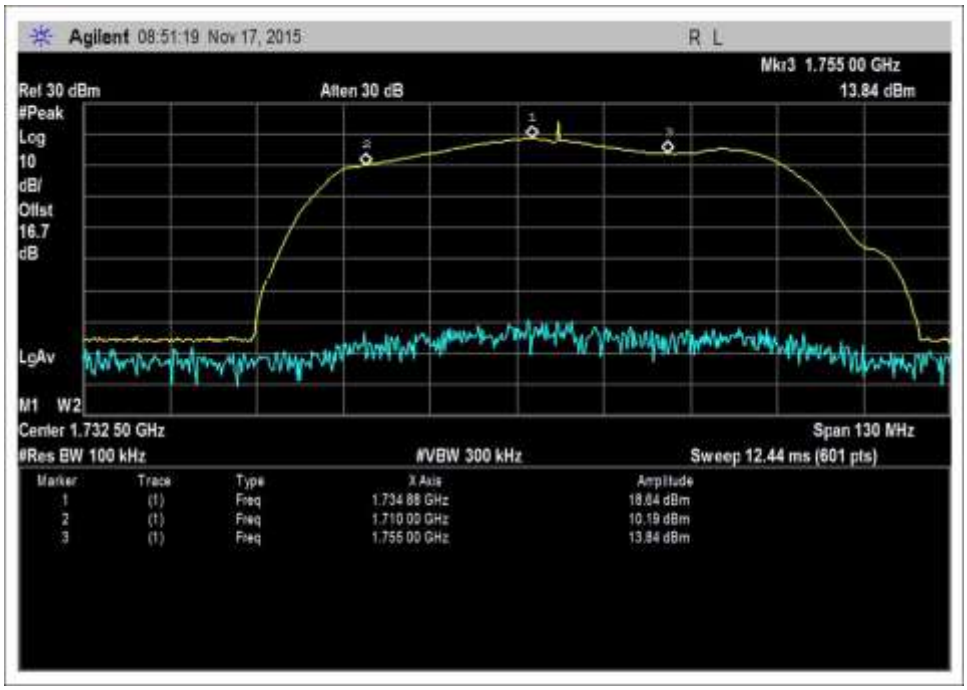
7.1_band verify_UL_776-787MHz-Zoom



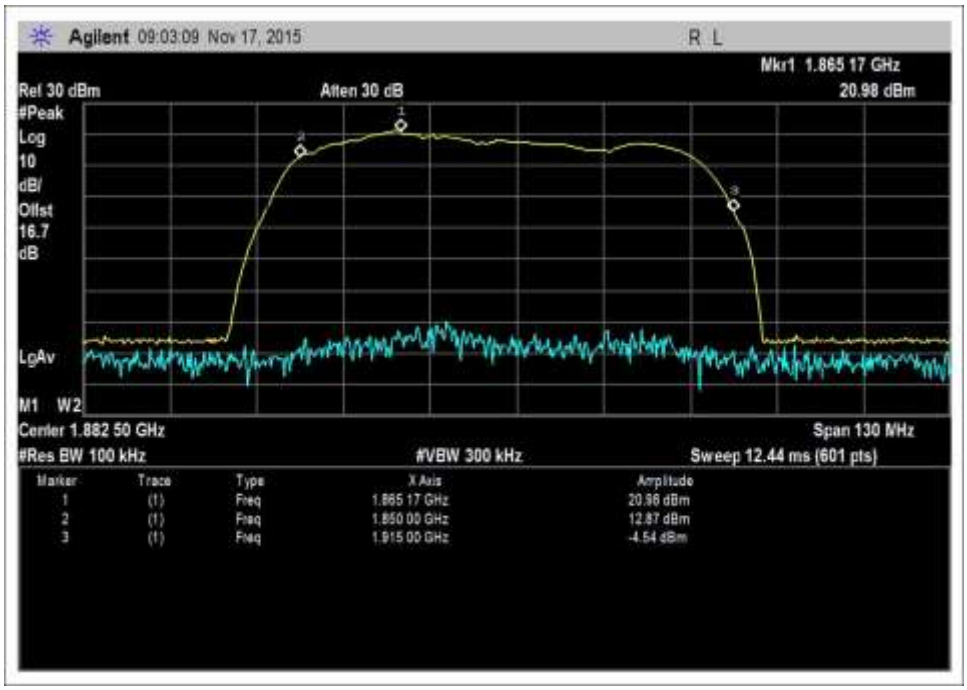
7.1_band verify_UL_824-849MHz



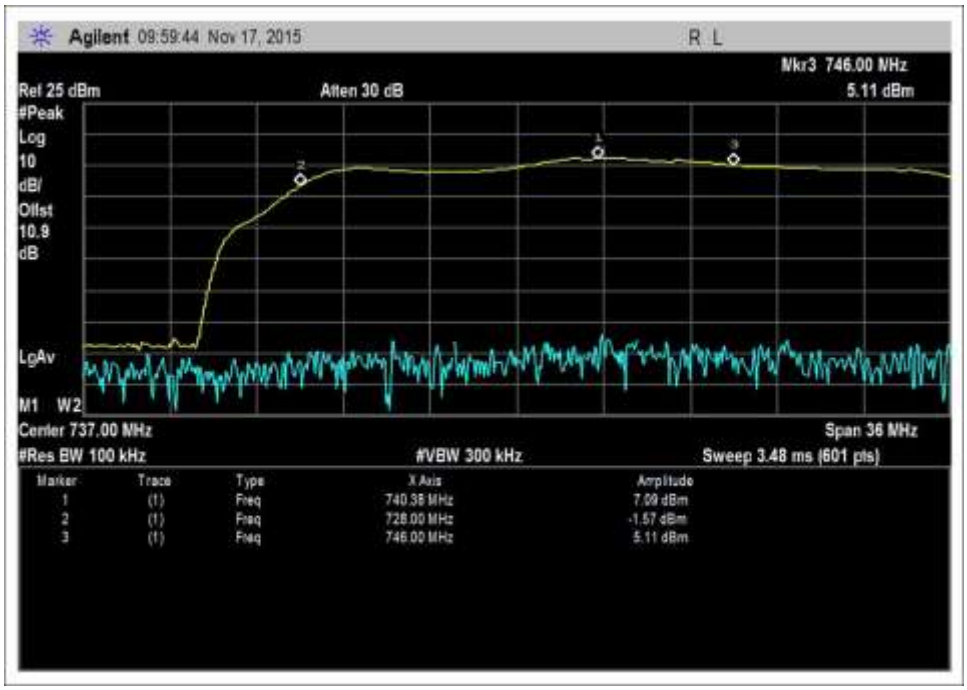
7.1_band verify_UL_1710-1755MHz



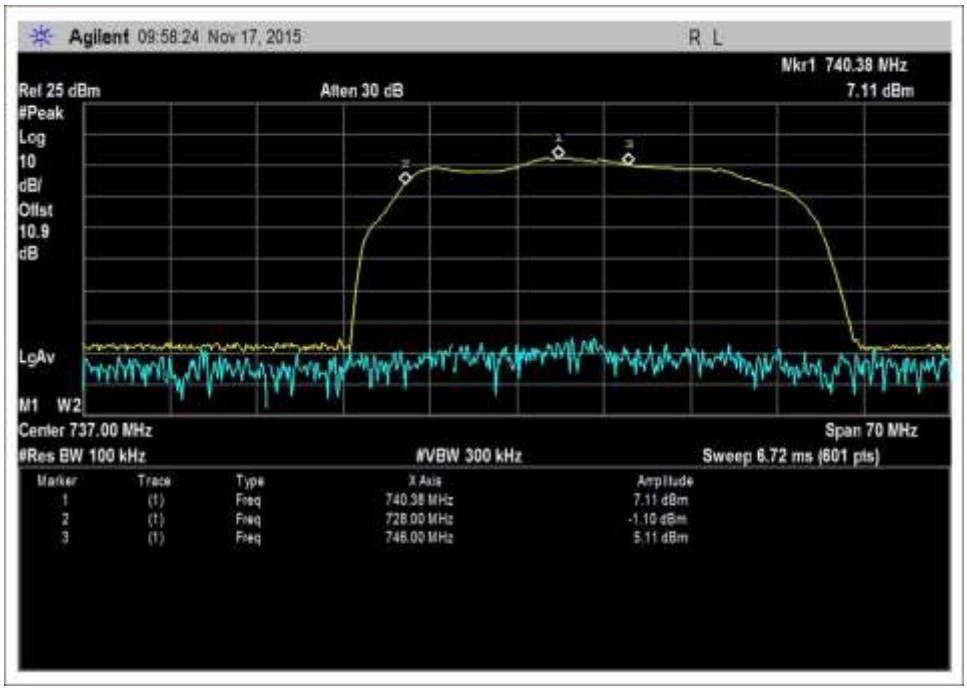
7.1_band verify_UL_1710-1755MHz-Zoom



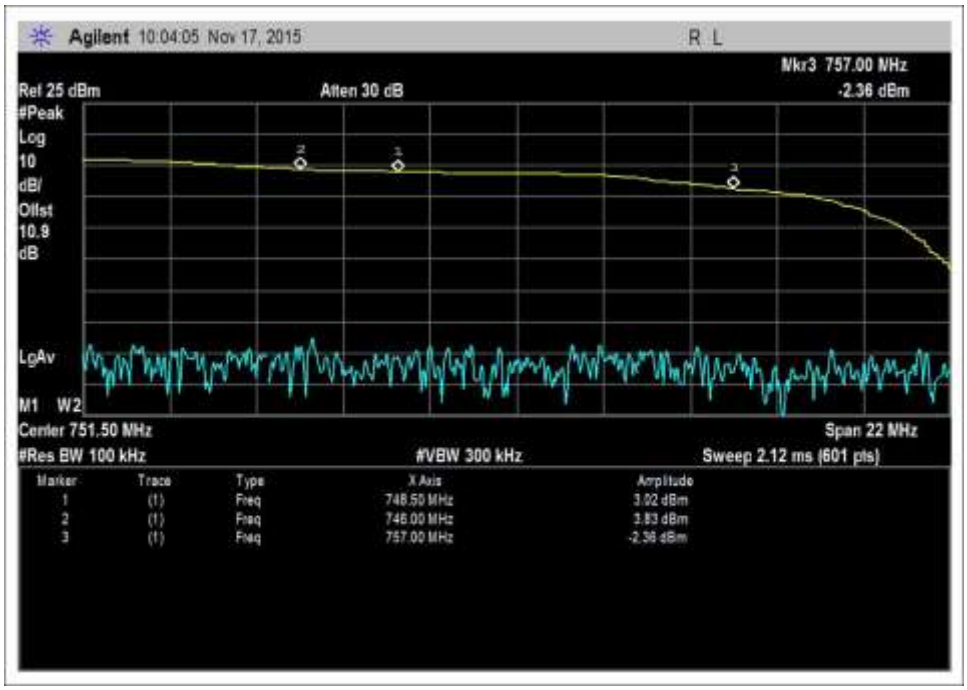
7.1_band verify_UL_1850-1915MHz



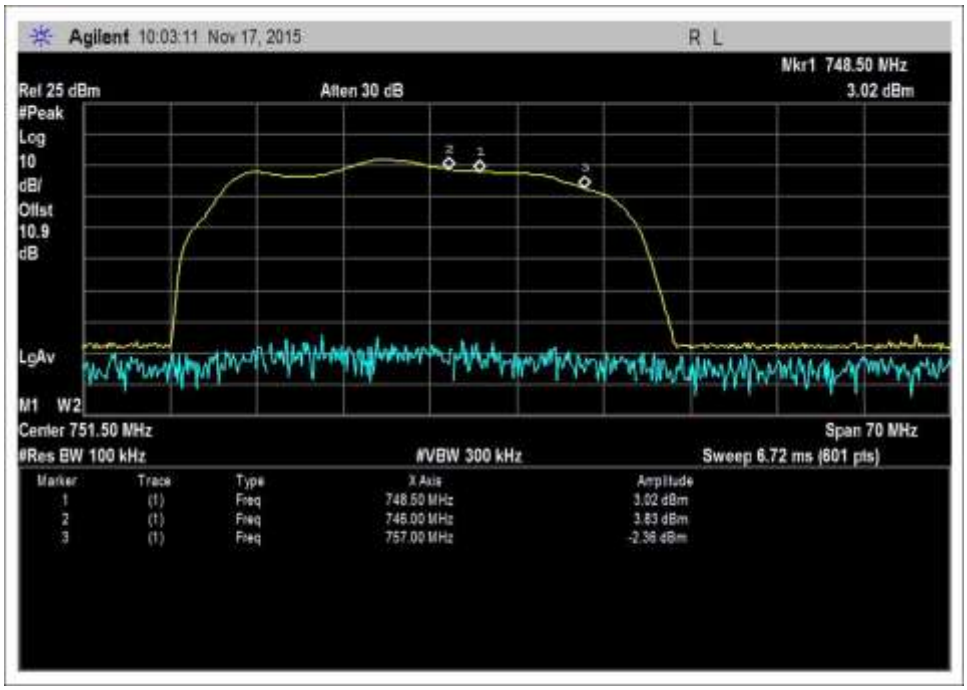
7.1_band verify_DL_728-746MHz



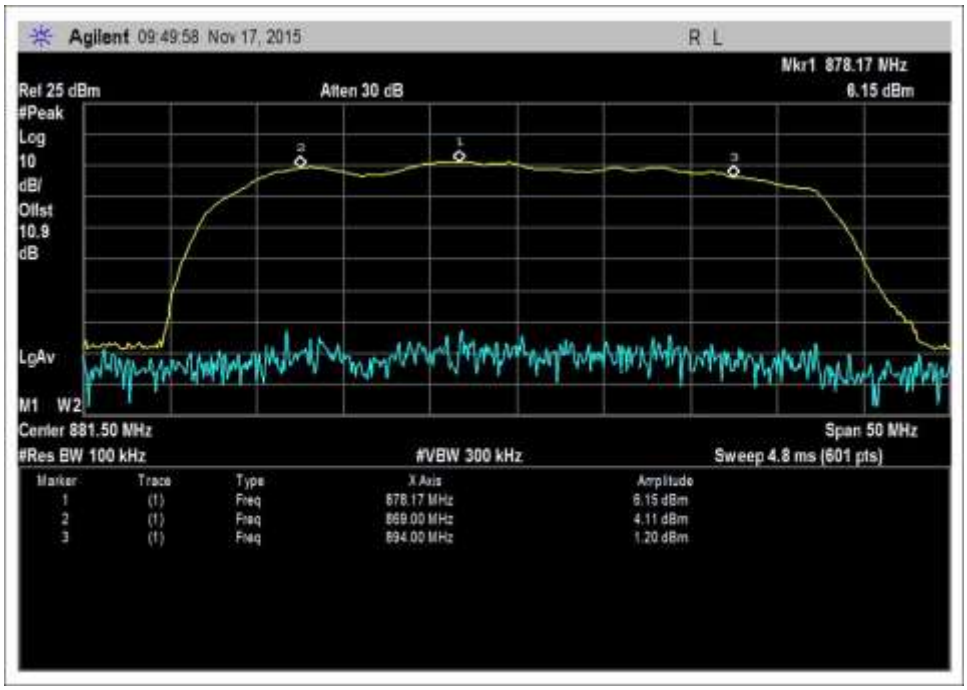
7.1_band verify_DL_728-746MHz-Zoom



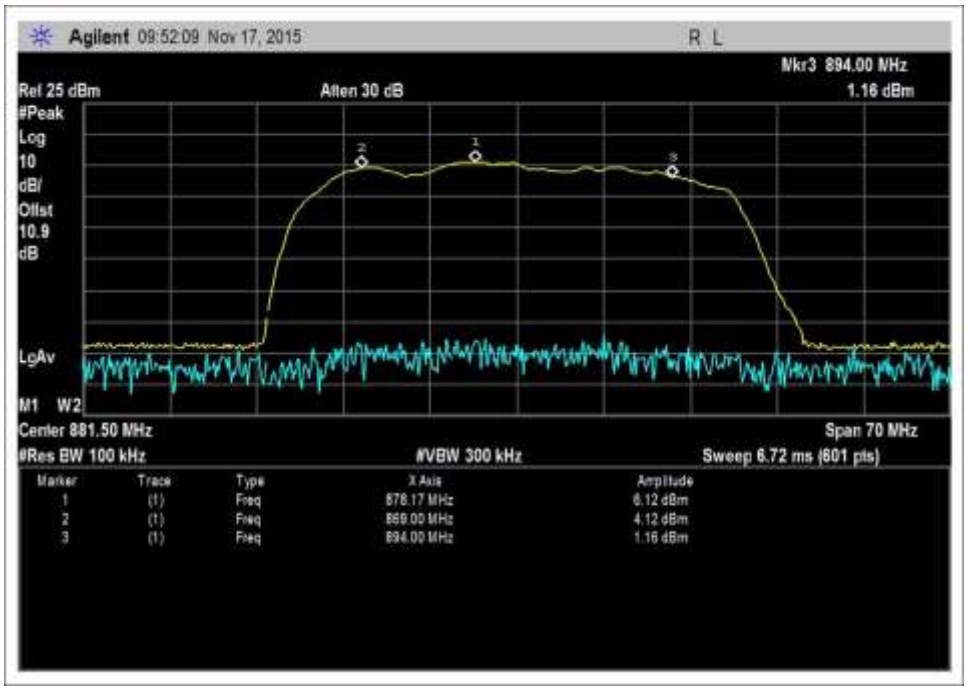
7.1_band verify_DL_746-757MHz



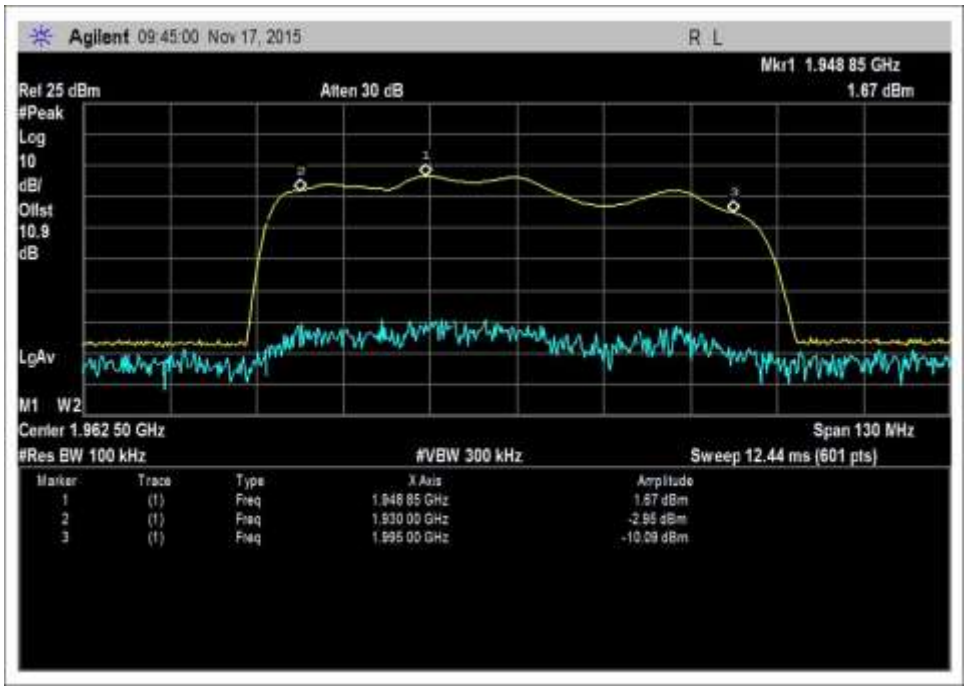
7.1_band verify_DL_746-757MHz-Zoom



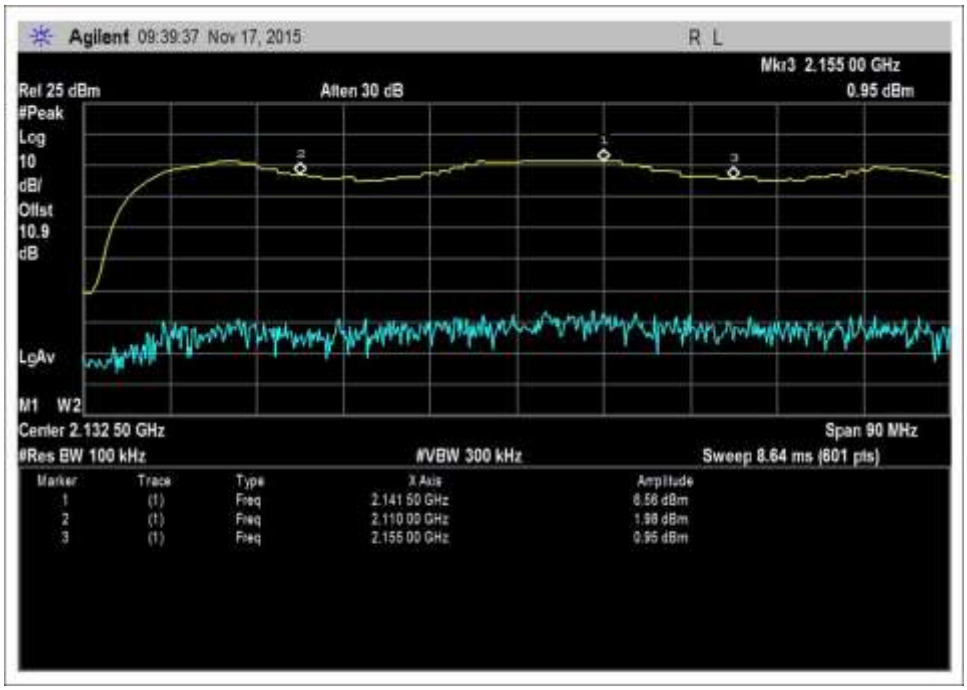
7.1_band verify_DL_869-894MHz



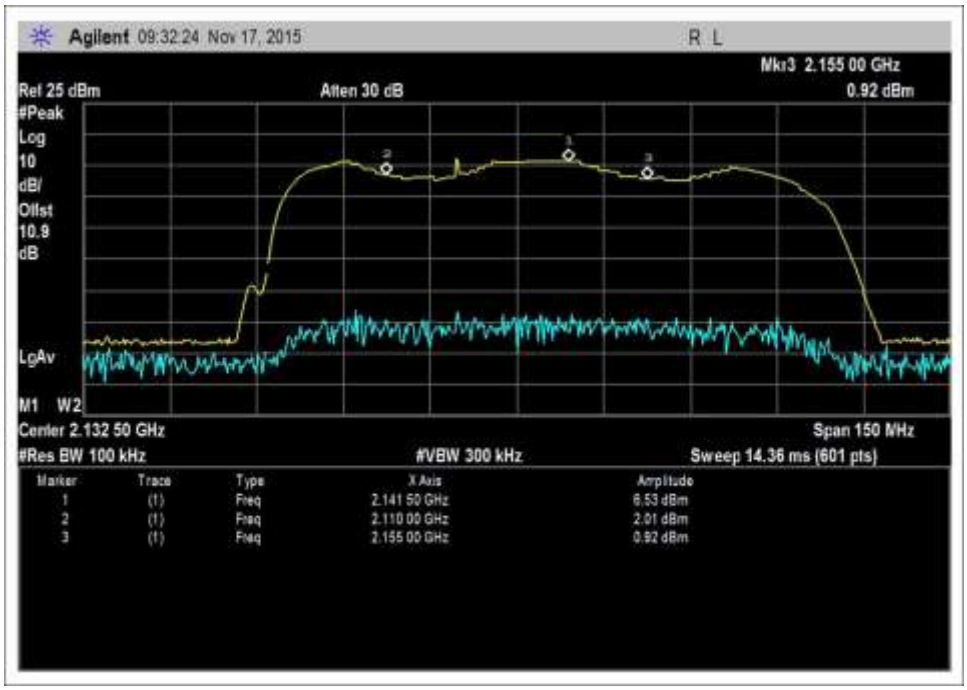
7.1_band verify_DL_869-894MHz-Zoom



7.1_band verify_DL_1930-1995MHz



7.1_band verify_DL_2110-2155MHz



7.1_band verify_DL_2110-2155MHz-Zoom

7.2 Maximum Power

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.2 Maximum Power Measurement**		
Work Order #:	**97835**	Date:	11/17/2015
Test Type:	**Conducted Emissions**	Time:	10:34:28
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

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.

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 environment conditions: Temperature: 23.1°C, Relative Humidity: 30%, Pressure: 102.6 kPa

Test procedure:
The test was performed in accordance with section 7.2 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015
Firmware: V2.0

The booster is to be deployed with antenna kit with the following characteristic:

Antenna Kitting Information

Component	Prod No. Description	Gain/Loss					Notes
		LTE-A	LTE-V	800MHz	1900MHz	1700MHz\2100MHz	
Outdoor Antenna*	SC289W-75Ω	3dBi	3dBi	3dBi	4dBi	4dBi\4dBi	
	SC231W-75Ω	7dBi	7dBi	8dBi	10dBi	10dBi\10dBi	
Outdoor Cable*	SC-RG6 -50 50Feet	3.32dB	3.32dB	3.75dB	6.42dB	6.22dB\6.68dB	50 Feet or longer
Indoor Cable*	SC240-20NN 20Feet	2.06dB	2.06dB	2.29dB	3.56dB	3.36dB\ 3.76dB	20 Feet or longer
Indoor Antenna*	SC248W	7dBi	7dBi	7dBi	10dBi	10dBi\10dBi	
	SC222W	3dBi	3dBi	3dBi	6dBi	6dBi\6dBi	
	SC121W	1.2dBi	1.2dBi	1.2dBi	3dBi	3dBi\3dBi	
	SC302W	2.5dBi	2.5dBi	3dBi	5dBi	4dBi\5dBi	
*All equivalent antennas and cables are suitable for use with the Fusion4Home							

Test Equipment:

ID	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
	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN02660	Spectrum Analyzer	E4446A	7/9/2015	7/9/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Summary of Results

Pass: Summarized in the table below, measured EIRP, Gain and UL/DL gain ratio are within limits.

	Pre AGC			Pre AGC		
	Pulse GSM			4.1 MHz AWGN		
Frequency (MHz)	Input (dBm)	Output (dBm)	Gain (dB)	Input (dBm)	Output (dBm)	Gain (dB)
UL1710-1755	-47.6	20.6	68.2	-49.1	18.6	67.7
UL1850-1915	-44.7	22.3	67.0	-48.6	19.2	67.8
UL824-894	-39.3	20.9	60.2	-41.1	18.0	59.1
UL 698-716	-32.0	25.4	57.4	-36.4	20.2	56.6
UL776-787	-34.6	23.8	58.4	-38.3	19.0	57.3
DL2110-2155	-58.1	9.4	67.5	-60.8	6.0	66.8
DL1930-1995	-57.2	9.9	67.1	-59.5	7.1	66.6
DL869-894	-50.3	10.1	60.4	-52.3	7.7	60.0
DL:728-746	-52.4	7.4	59.8	-53.7	6.4	60.1
DL 746-757	-48.1	8.2	56.3	-50.3	6.3	56.6

Pulse GSM					Conducted	Conducted and EIRP
Frequency (MHz)	Output Power (dBm)	Ant Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit Min (dBm)	Limit Max (dBm)
UL1710-1755	20.6	10	6.22	24.4	17	30
UL1850-1915	22.3	10	6.42	25.9	17	30
UL824-894	20.9	8	3.75	25.2	17	30
UL 698-716	25.4	7	3.32	29.0	17	30
UL776-787	23.8	7	3.32	27.5	17	30
DL2110-2155	9.4	10	3.76	15.7	NA	17
DL1930-1995	9.9	10	3.56	16.3	NA	17
DL869-894	10.1	7	2.29	14.8	NA	17
DL:728-746	7.4	7	2.06	12.4	NA	17
DL 746-757	8.2	7	2.06	13.2	NA	17

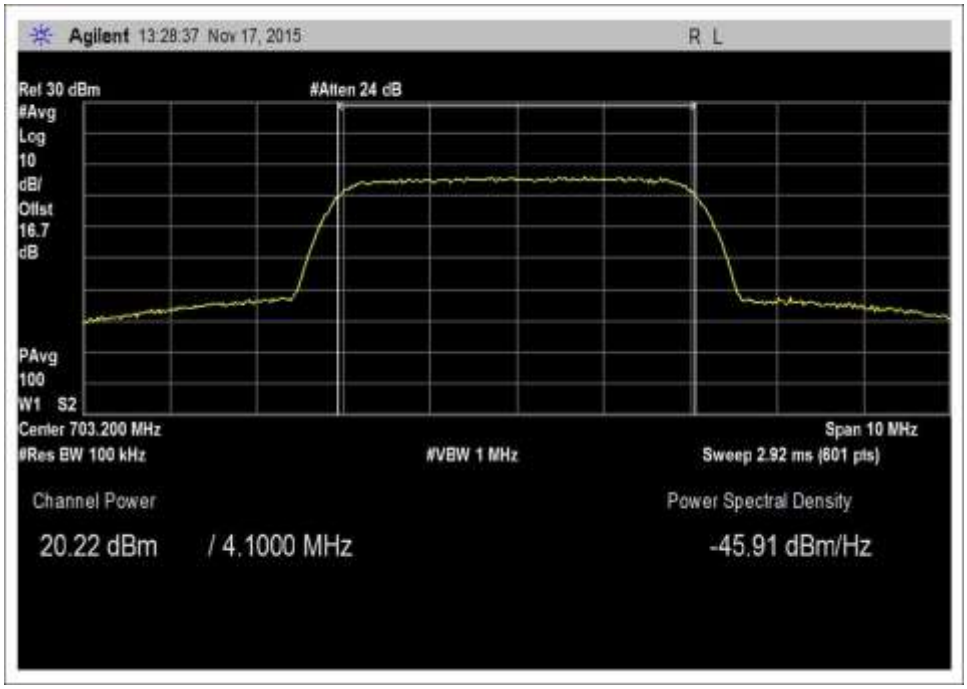
4.1MHz AWGN					Conducted	Conducted and EIRP
Frequency (MHz)	Output Power (dBm)	Ant Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit Min (dBm)	Limit Max (dBm)
UL1710-1755	18.6	10	6.22	22.4	17	30
UL1850-1915	19.2	10	6.42	22.8	17	30
UL824-894	18.0	8	3.75	22.3	17	30
UL 698-716	20.2	7	3.32	23.9	17	30
UL776-787	19.0	7	3.32	22.7	17	30
DL2110-2155	6.0	10	3.76	12.3	NA	17
DL1930-1995	7.1	10	3.56	13.5	NA	17
DL869-894	7.7	7	2.29	12.4	NA	17
DL:728-746	6.4	7	2.06	11.3	NA	17
DL 746-757	6.3	7	2.06	11.2	NA	17

Section 5.5 power						
		Pulse GSM			4.1 MHz AWGN	
Frequency (MHz)	Input (dBm)	Output (dBm)	Gain (dB)	Input (dBm)	Output (dBm)	Gain (dB)
UL1710-1755	-33.7	21.3	55.0	-35.0	19.0	54.0
UL1850-1915	-32.6	22.3	54.9	-34.7	19.1	53.8
UL824-894	-26.3	20.2	46.5	-27.3	18.4	45.7
UL 698-716	-19.0	25.2	44.2	-21.4	22.0	43.4
UL776-787	-20.6	24.1	44.7	-23.3	20.5	43.8
DL2110-2155	-54.5	9.2	63.7	-57.7	6.1	63.8
DL1930-1995	-54.0	9.9	63.9	-56.5	7.0	63.5
DL869-894	-48.0	9.1	57.1	-48.8	8.3	57.1
DL:728-746	-50.0	6.8	56.8	-51.0	5.5	56.5
DL 746-757	-45.9	8.2	54.1	-46.9	6.3	53.2

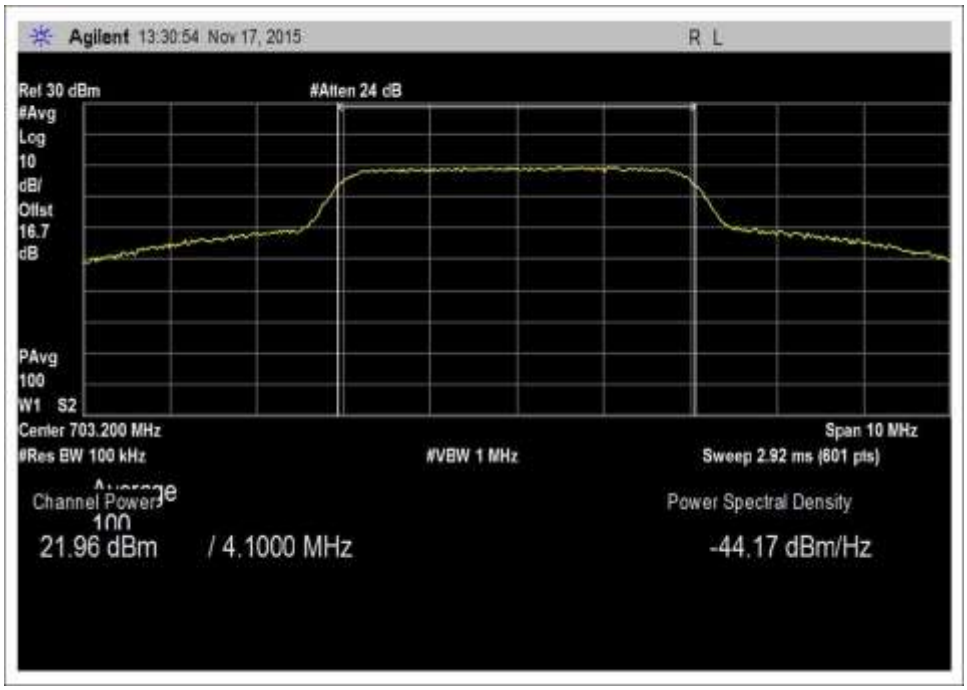
Note: The booster went into Transmitter off mode at Max input power of +0dBm (UL) and -20dBm (DL). Results presented on the above table are at 1 dB below the Transmit off RF input level. This table is for reference only.

Plots

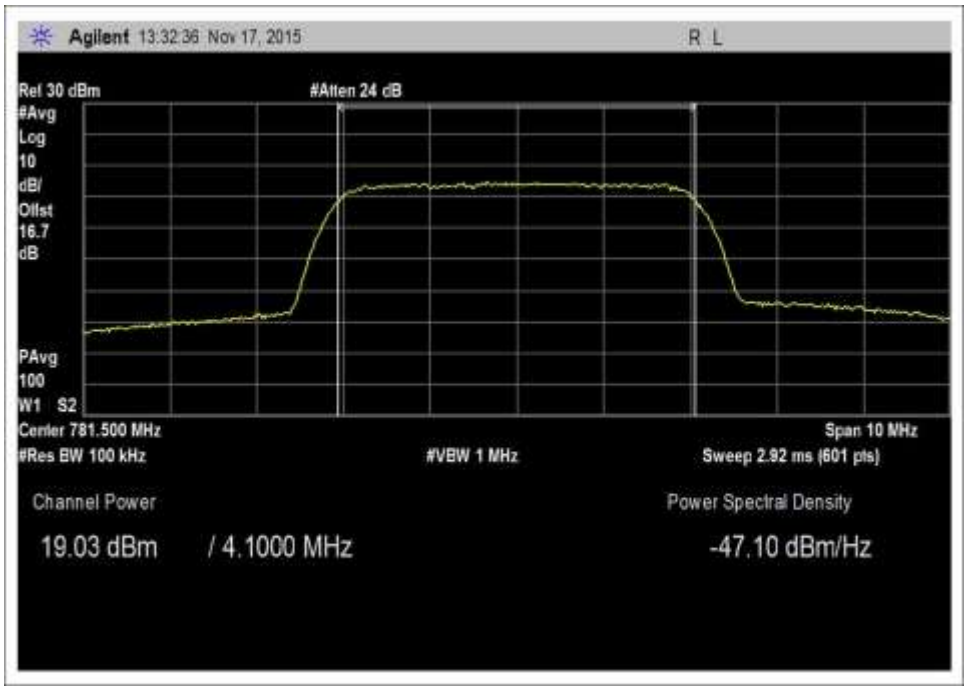
AWGN



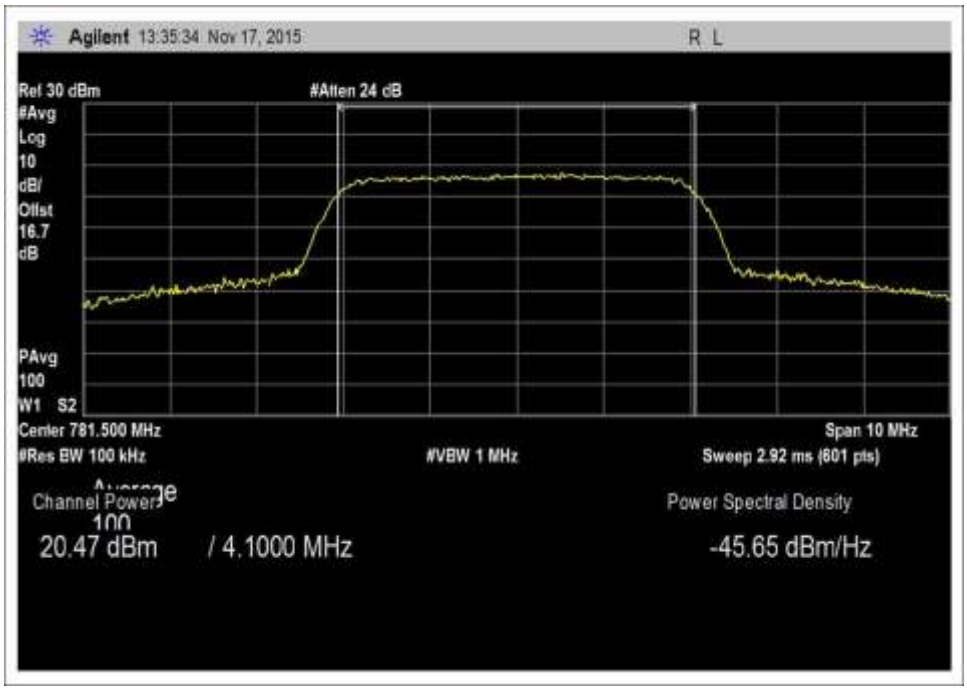
7.2_Power_UL_698-716_AWGN



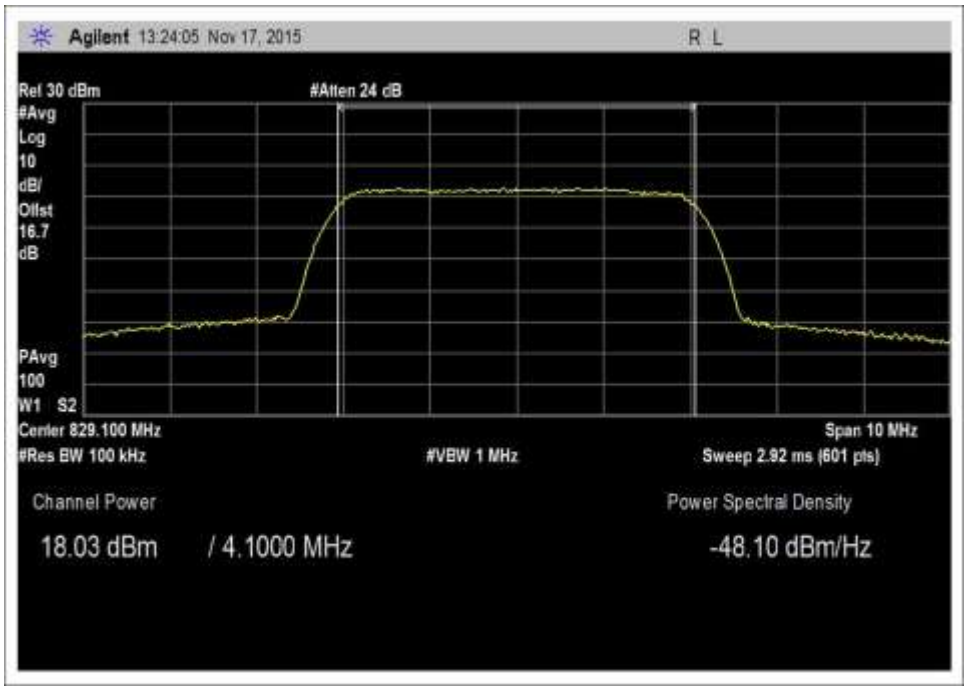
7.2_Power_UL_698-716_AWGN-Max



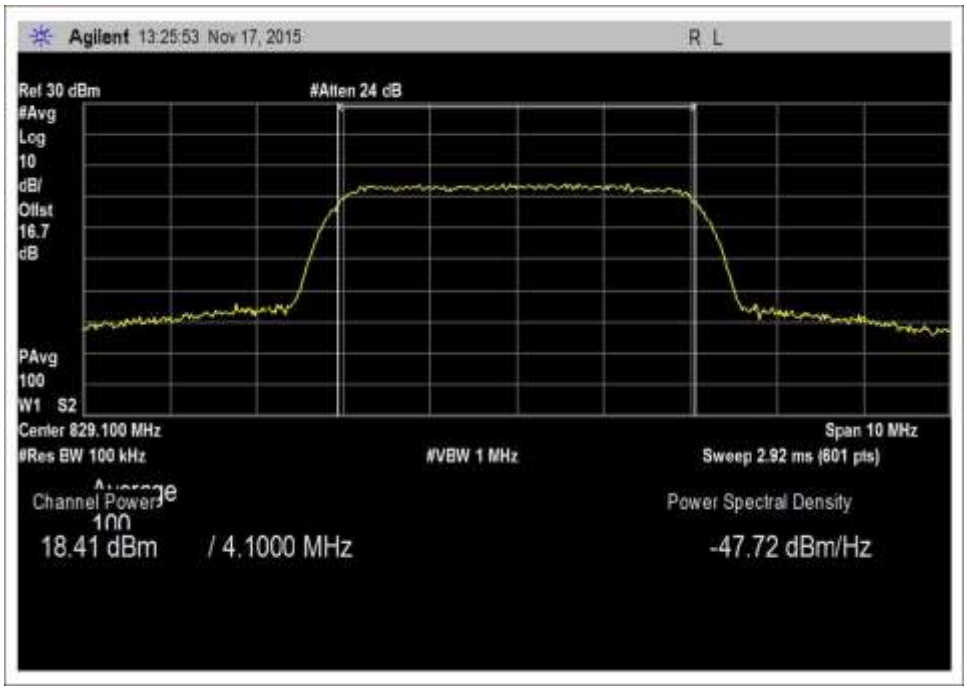
7.2_Power_UL_776-787_AWGN



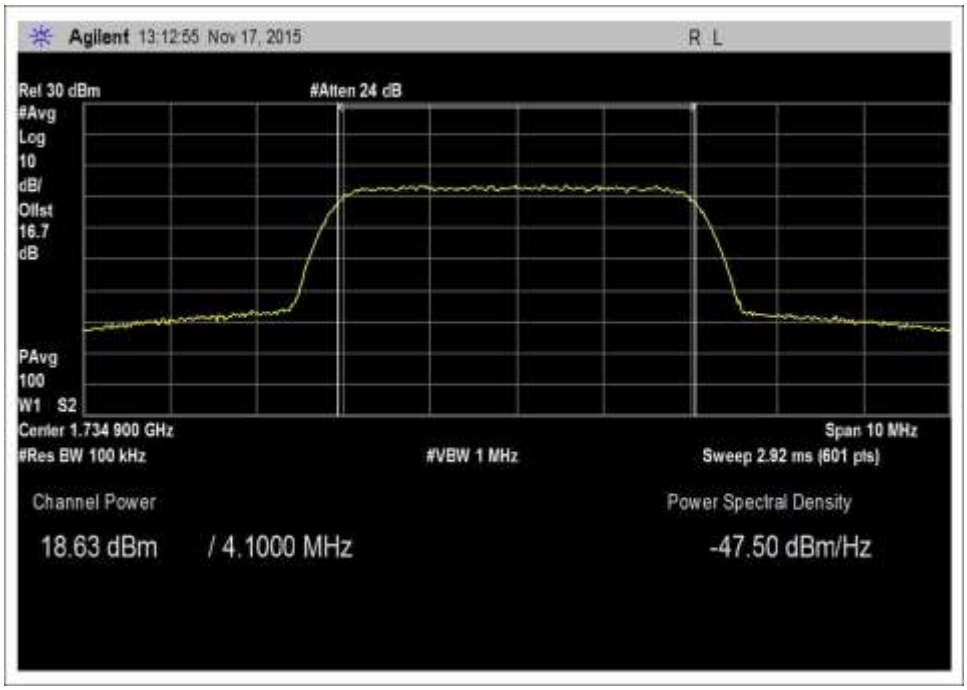
7.2_Power_UL_776-787_AWGN-Max



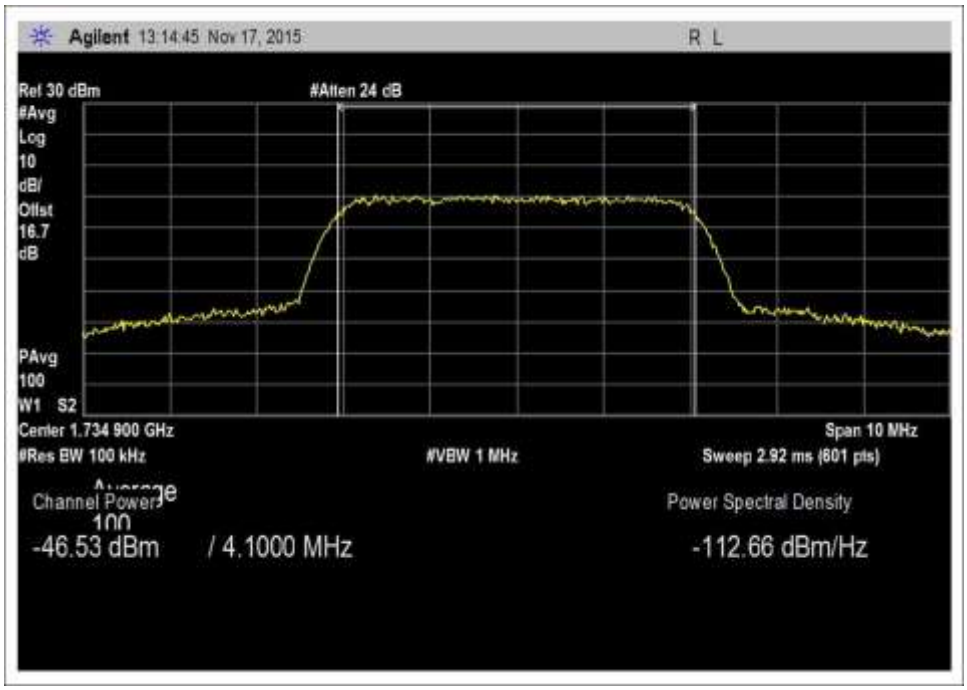
7.2_Power_UL_824-849_AWGN



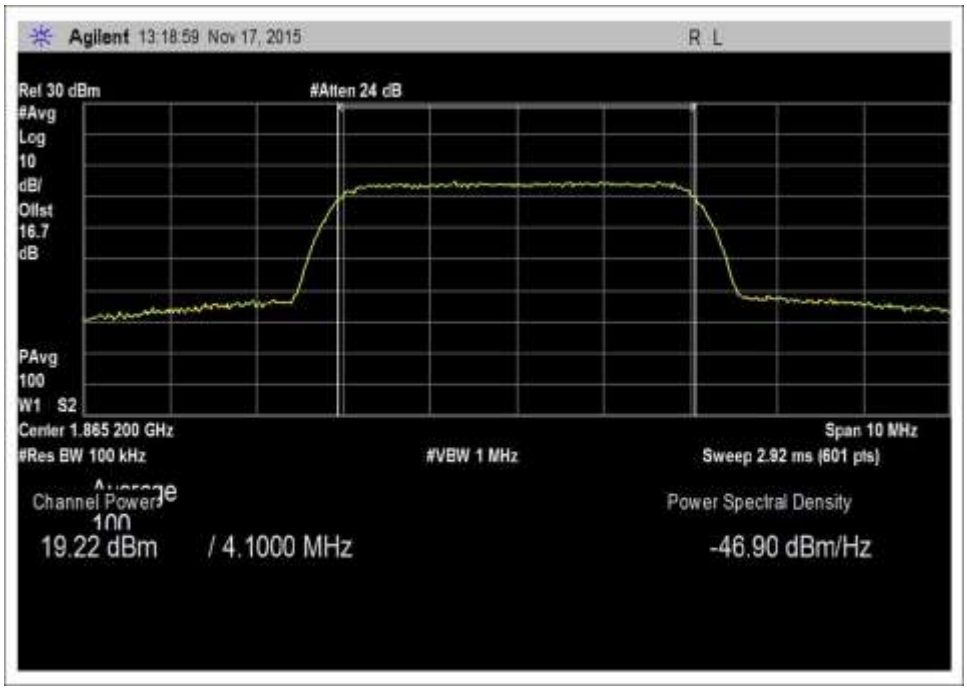
7.2_Power_UL_824-849_AWGN-Max



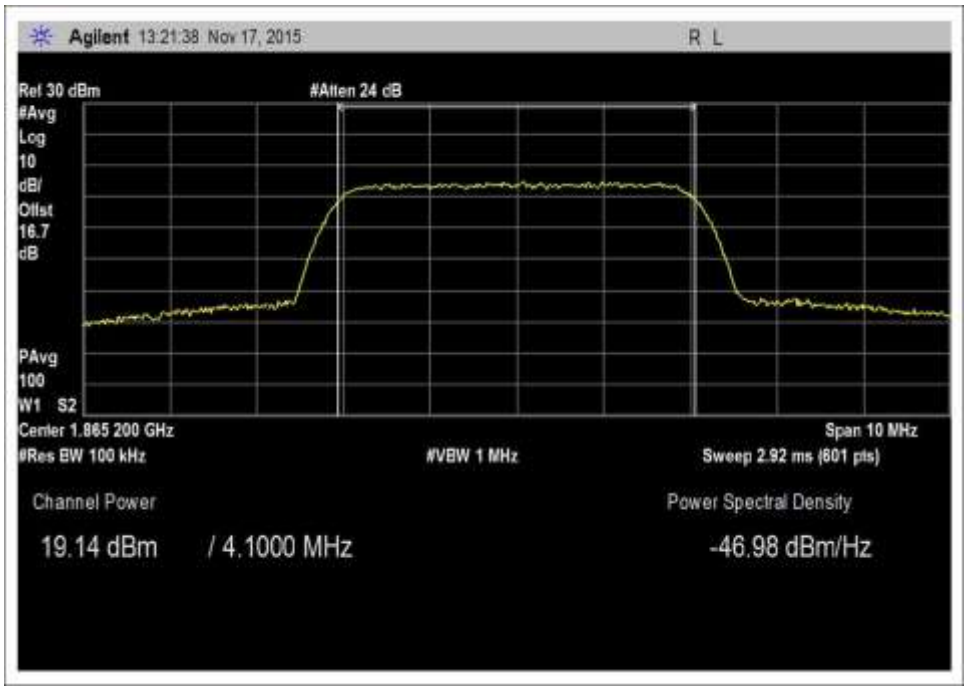
7.2_Power_UL_1710-1755_AWGN



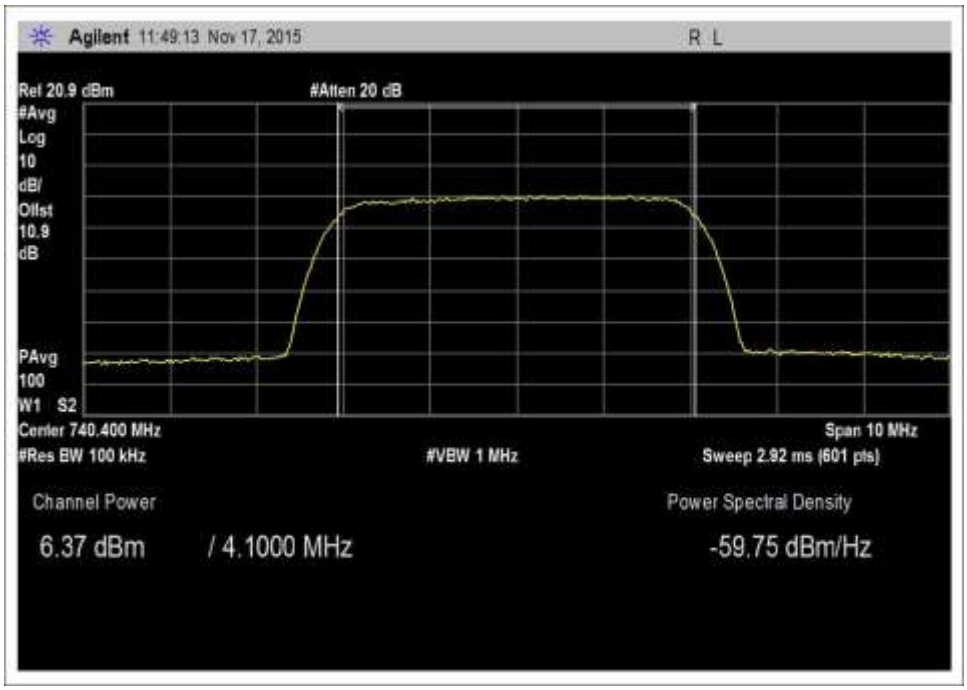
7.2_Power_UL_1710-1755_AWGN-Max



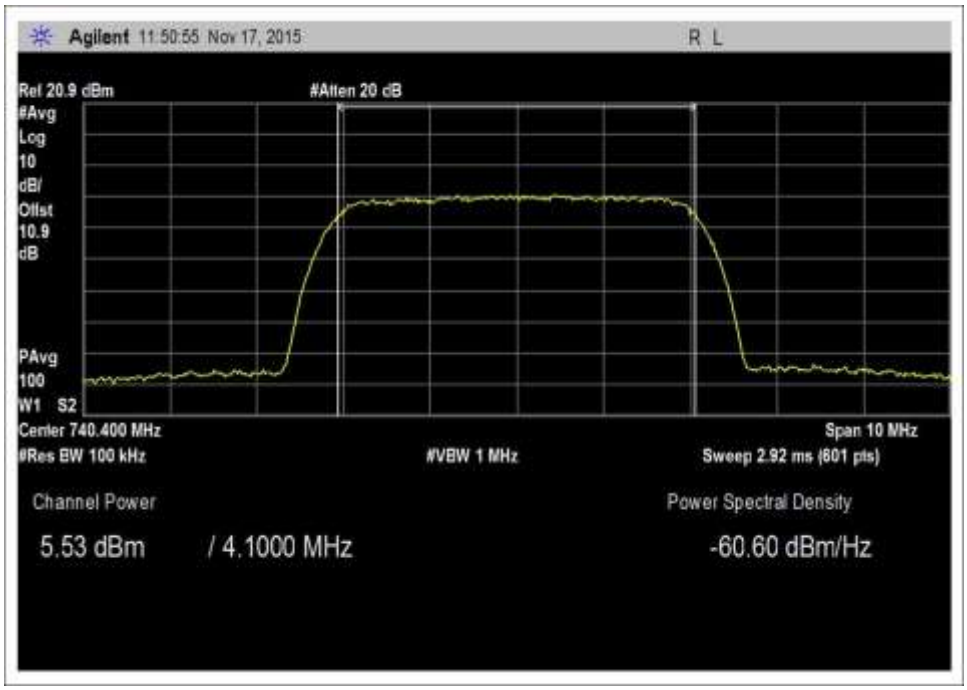
7.2_Power_UL_1850-1915_AWGN



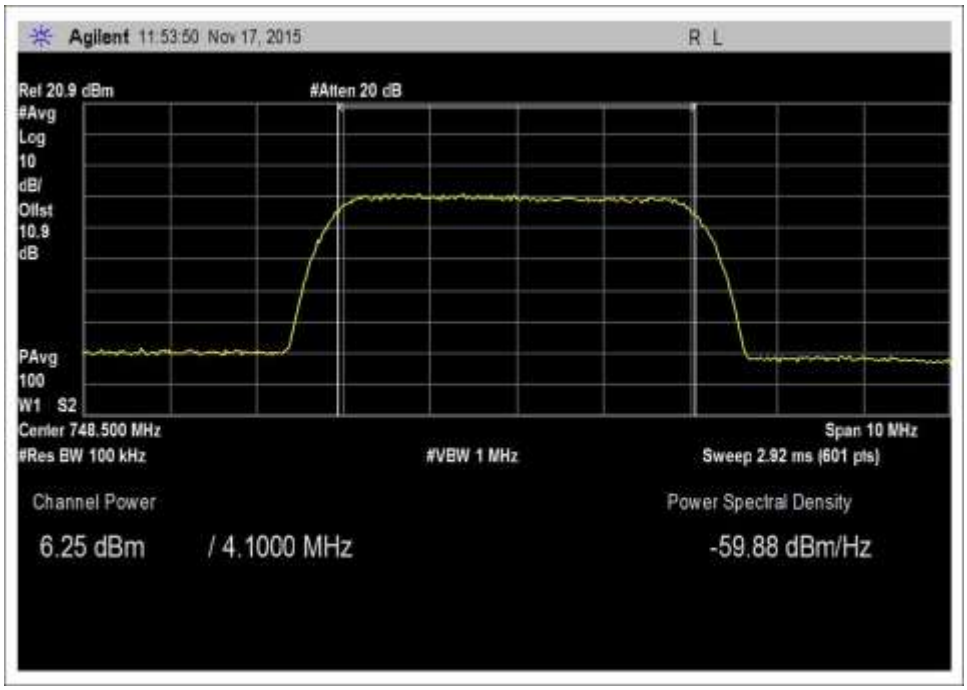
7.2_Power_UL_1850-1915_AWGN-Max



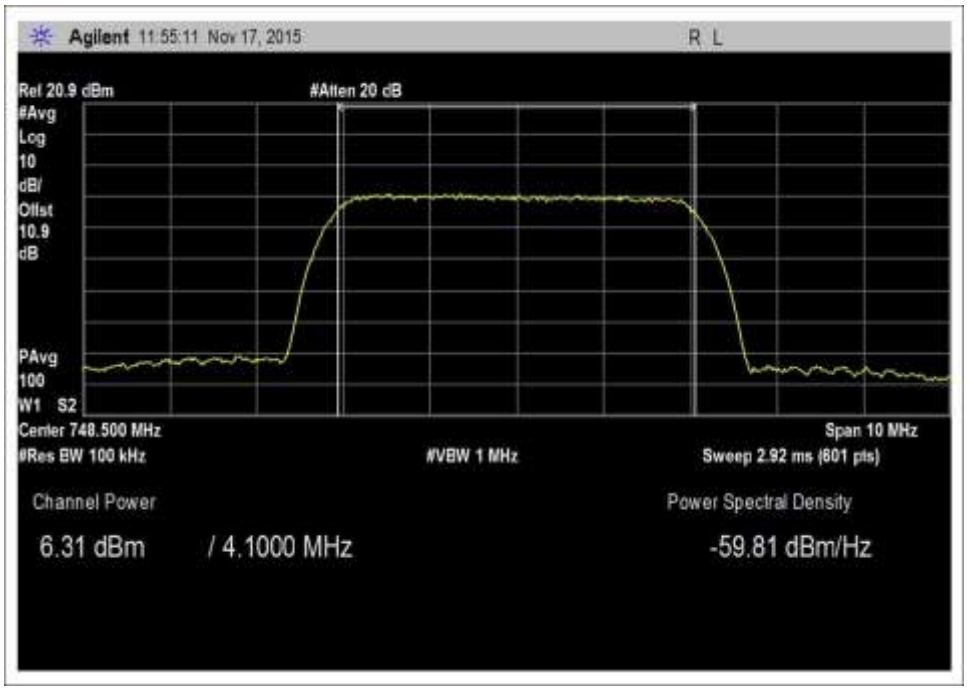
7.2_Power_DL_728-746_AWGN



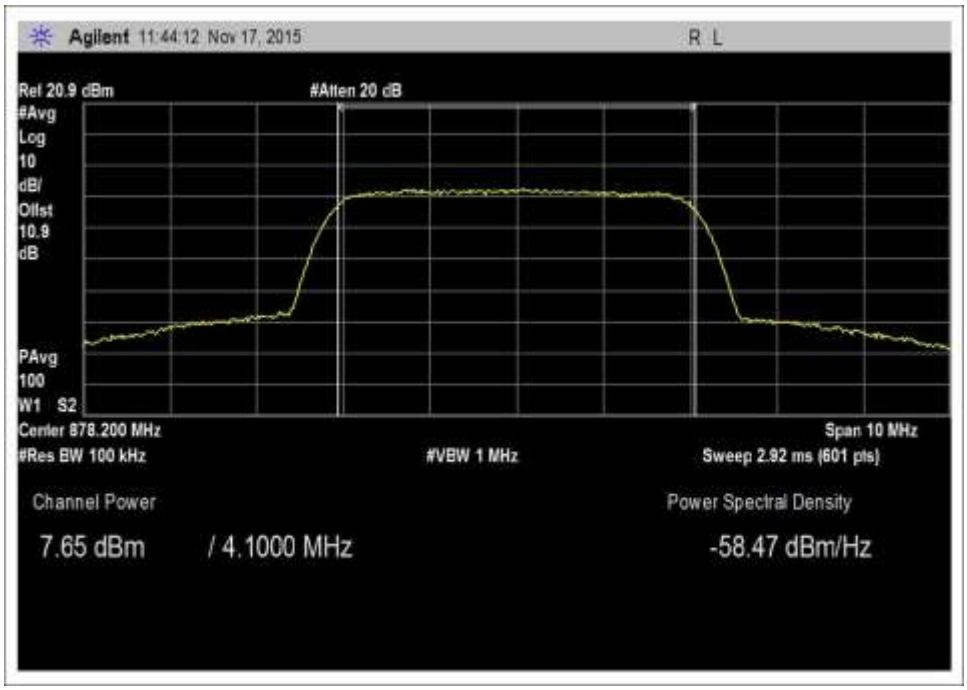
7.2_Power_DL_728-746_AWGN-Max



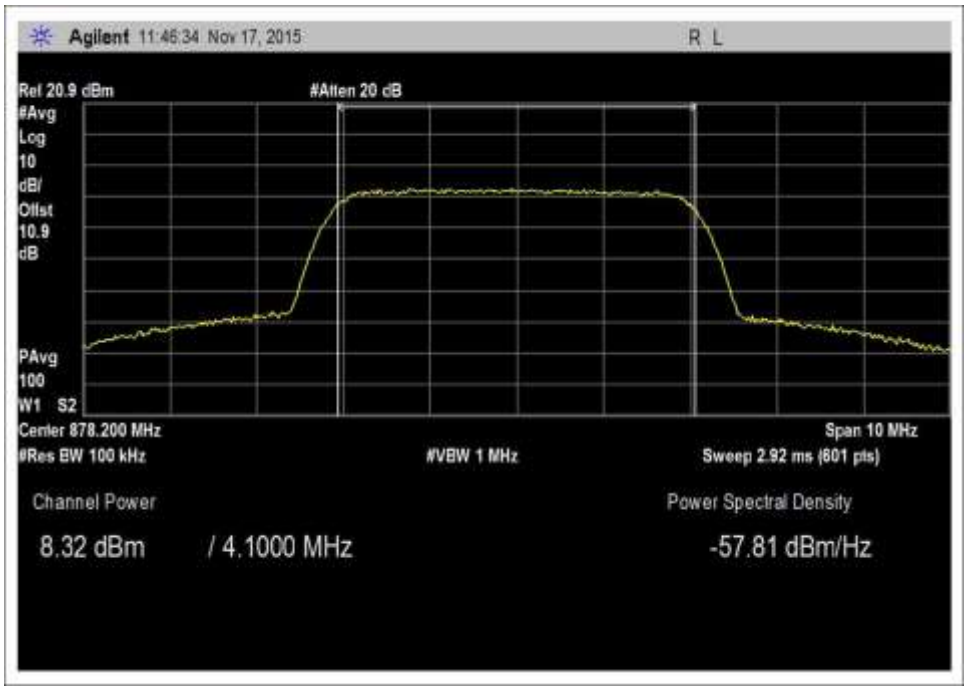
7.2_Power_DL_746-757_AWGN



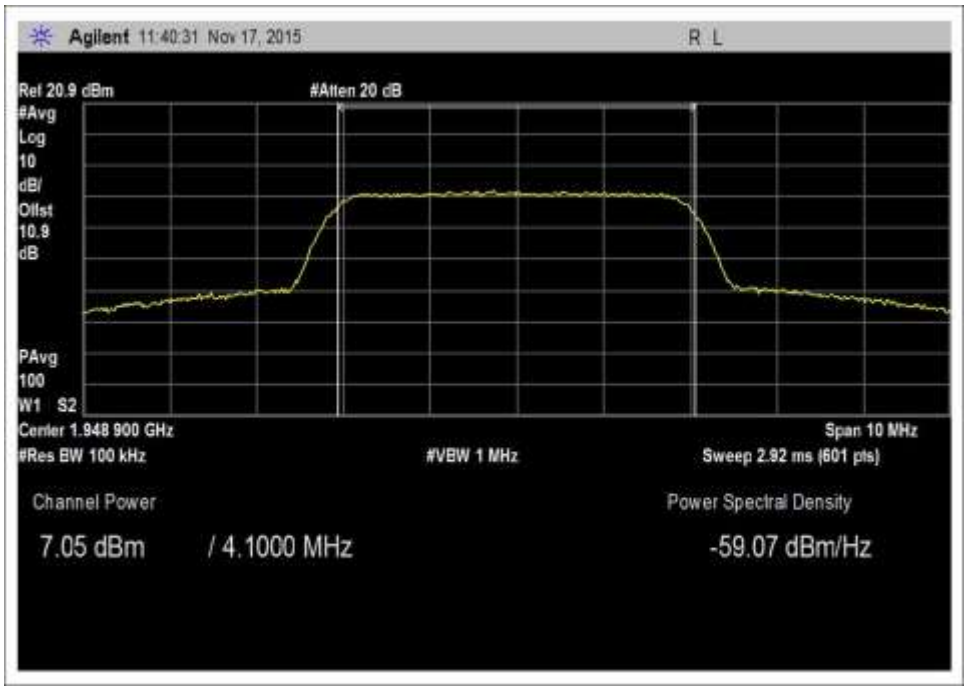
7.2_Power_DL_746-757_AWGN-Max



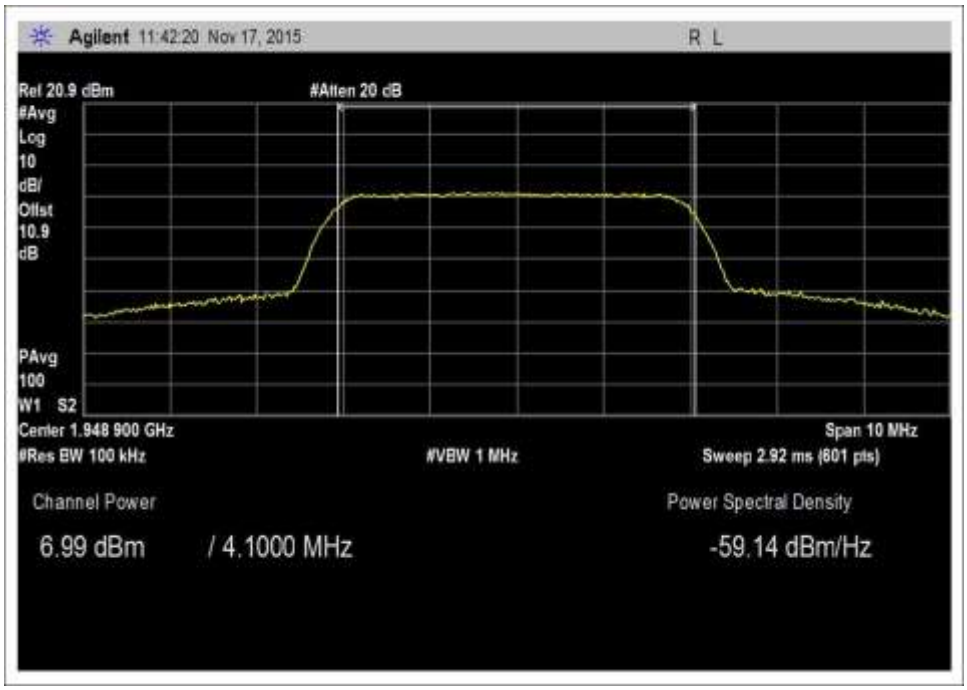
7.2_Power_DL_869-894_AWGN



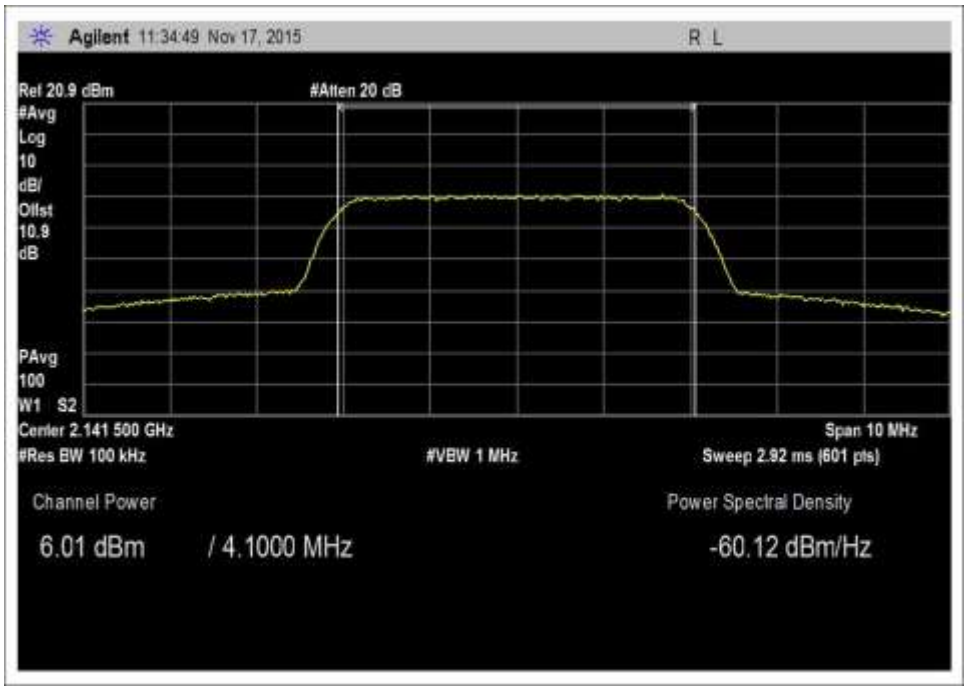
7.2_Power_DL_869-894_AWGN-Max



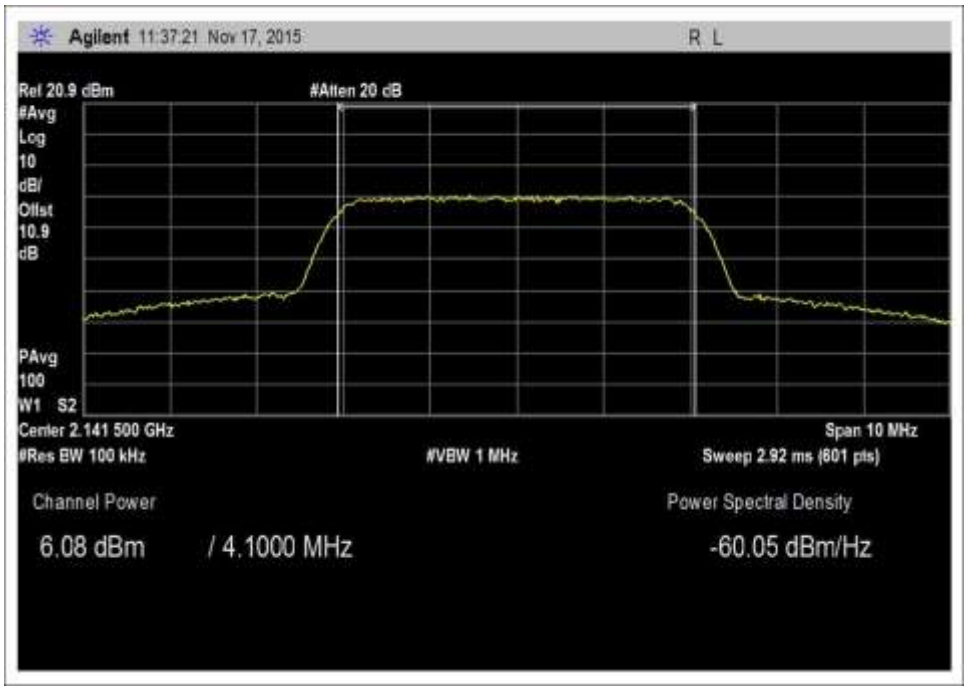
7.2_Power_DL_1930-1995_AWGN



7.2_Power_DL_1930-1995_AWGN-Max

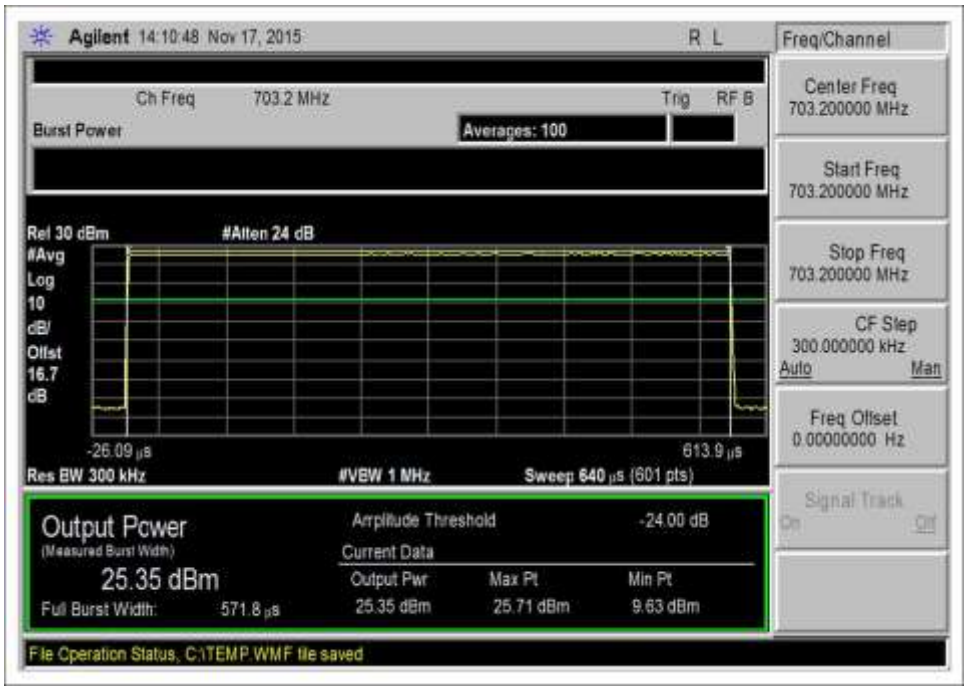


7.2_Power_DL_2110-2155_AWGN

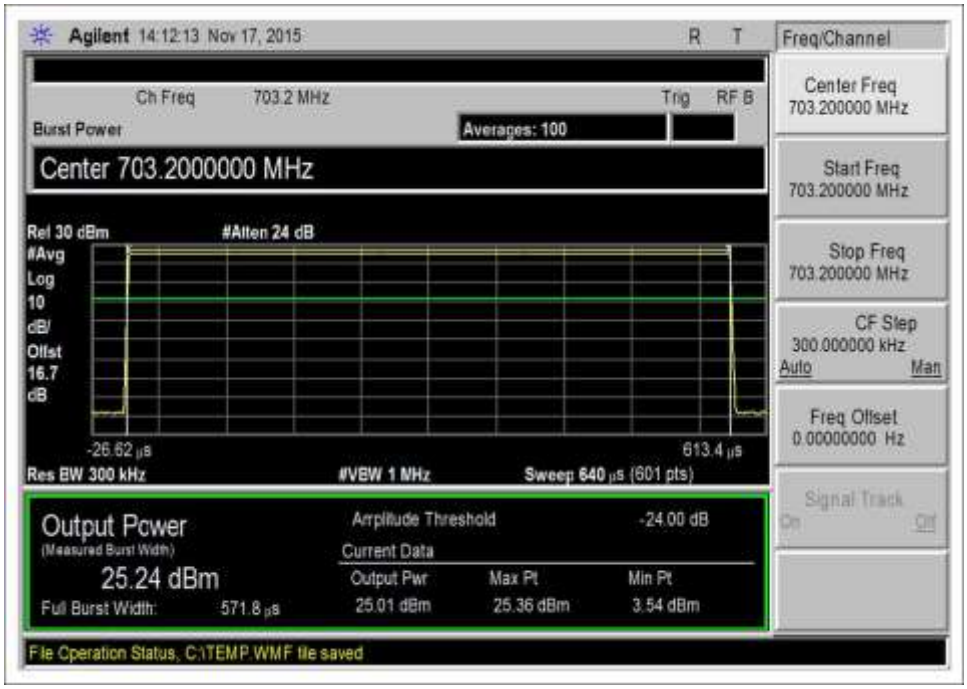


7.2_Power_DL_2110-2155_AWGN-Max

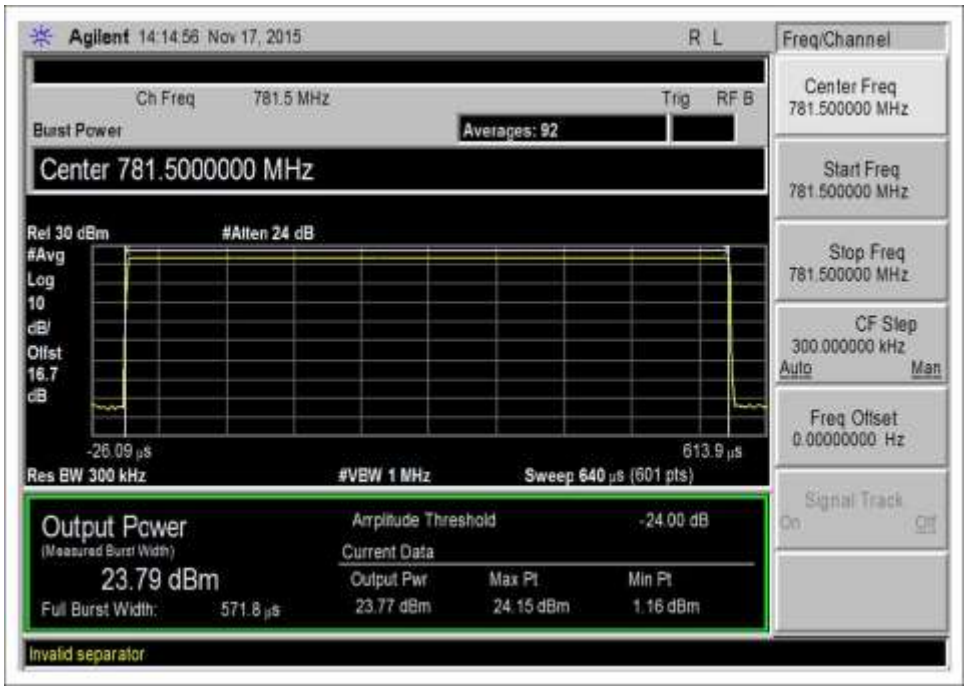
GSM



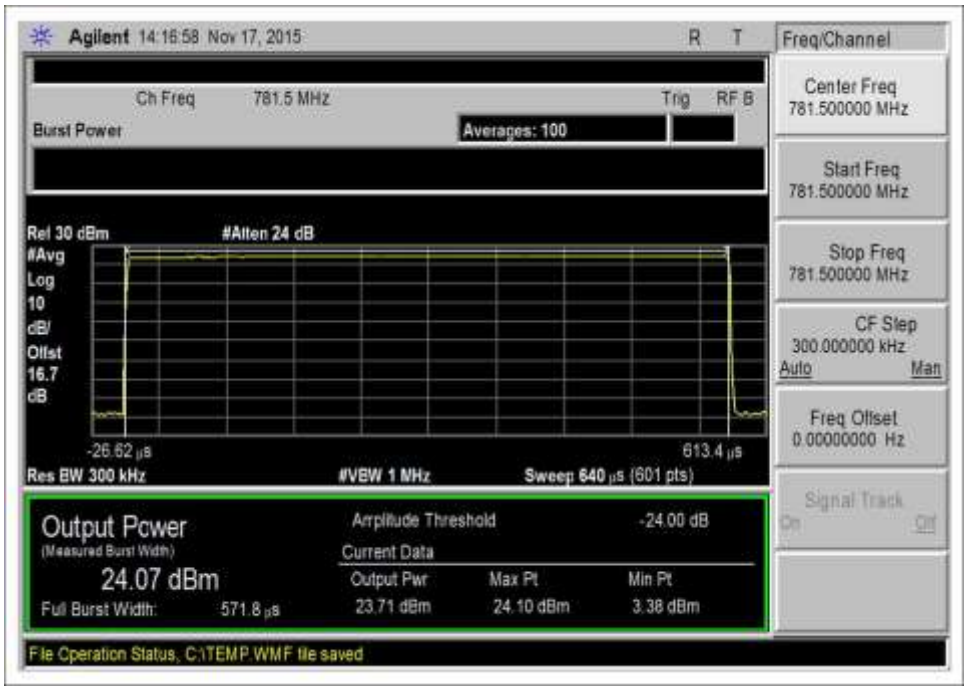
7.2_Power_UL_698-716_GSM



7.2_Power_UL_698-716_GSM-Max

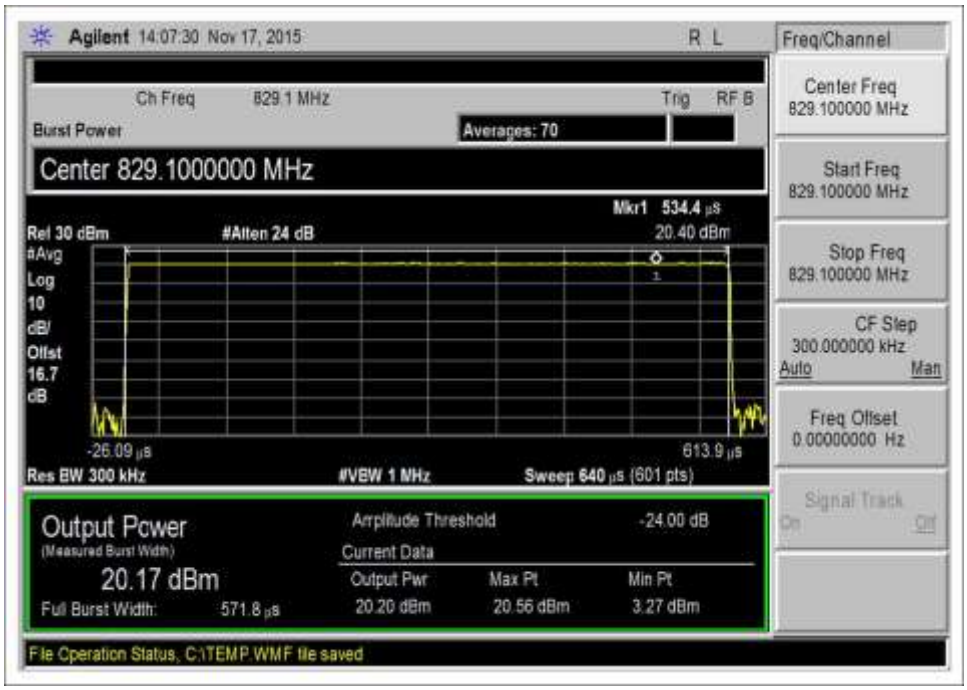


7.2_Power_UL_776-787_GSM

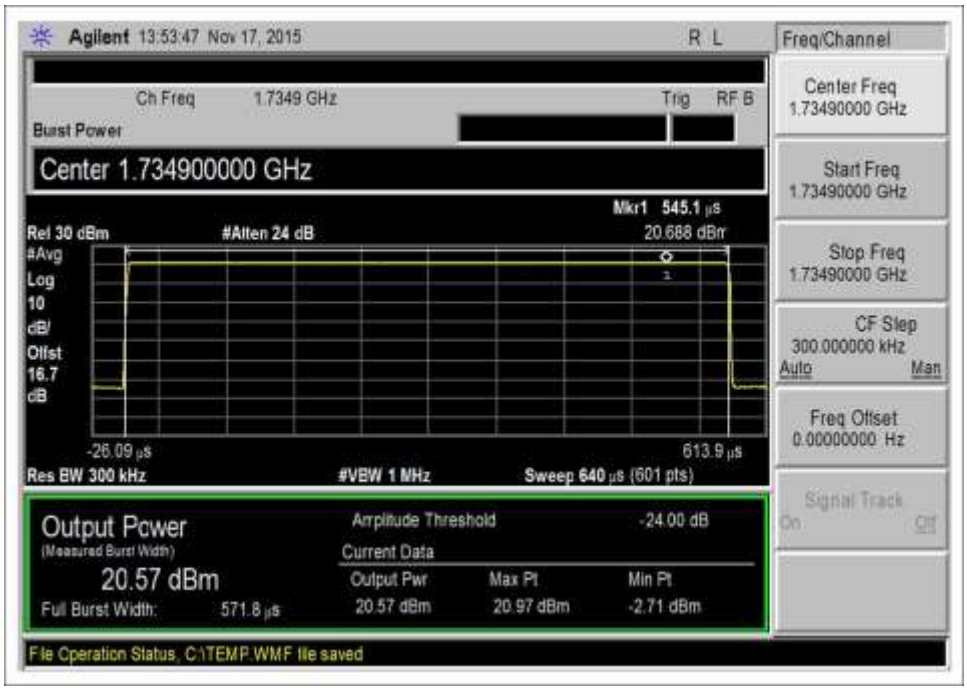


7.2_Power_UL_776-787_GSM-Max

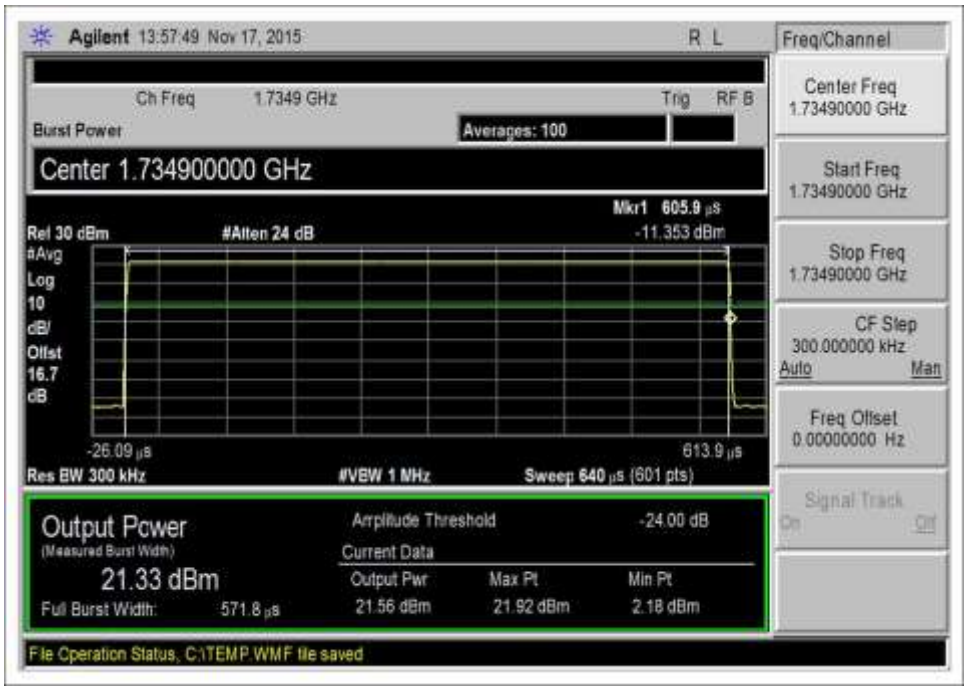
7.2_Power_UL_824-849_GSM



7.2_Power_UL_824-849_GSM-Max

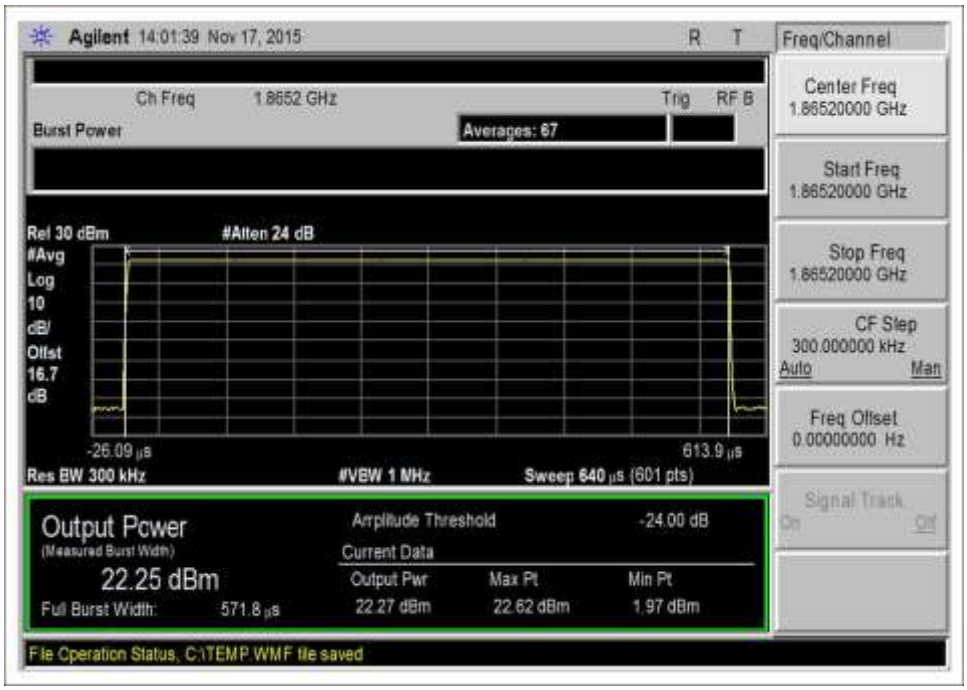


7.2_Power_UL_1710-1755_GSM

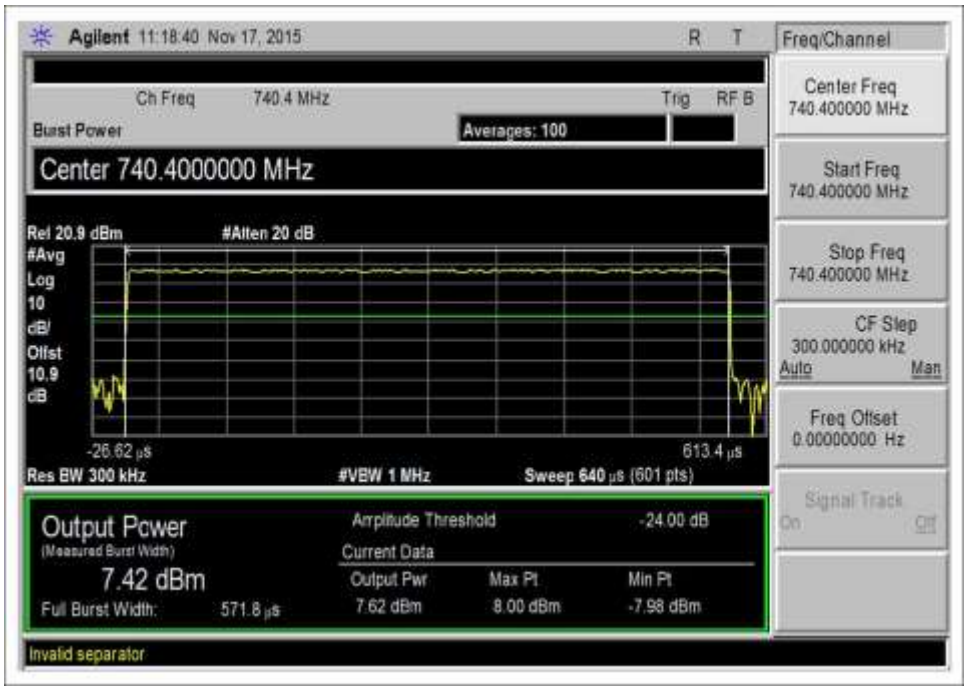


7.2_Power_UL_1710-1755_GSM-Max

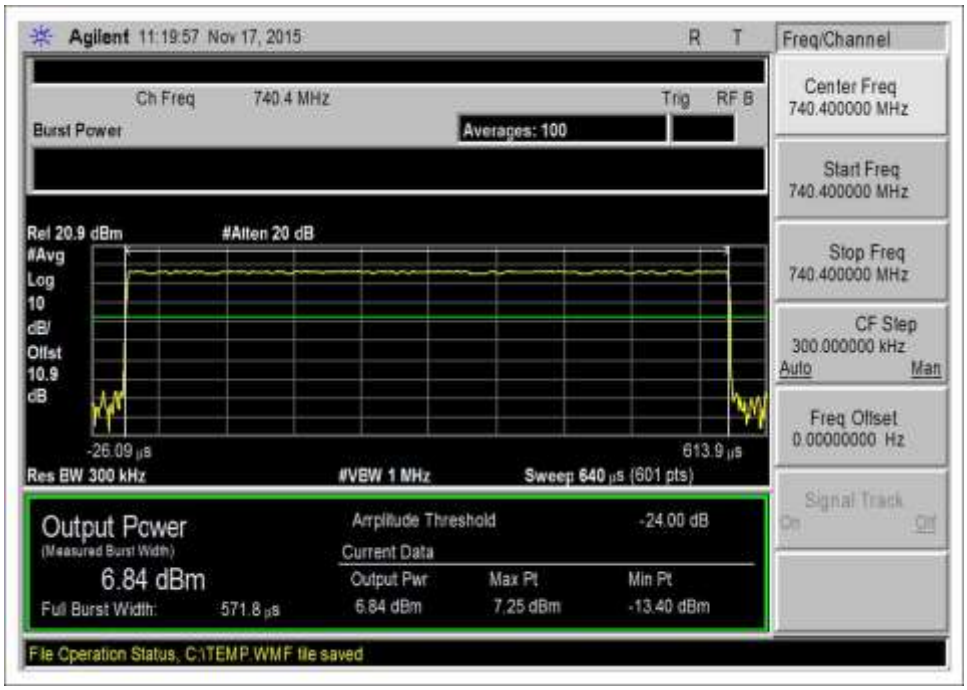
7.2_Power_UL_1850-1915_GSM



7.2_Power_UL_1850-1915_GSM-Max

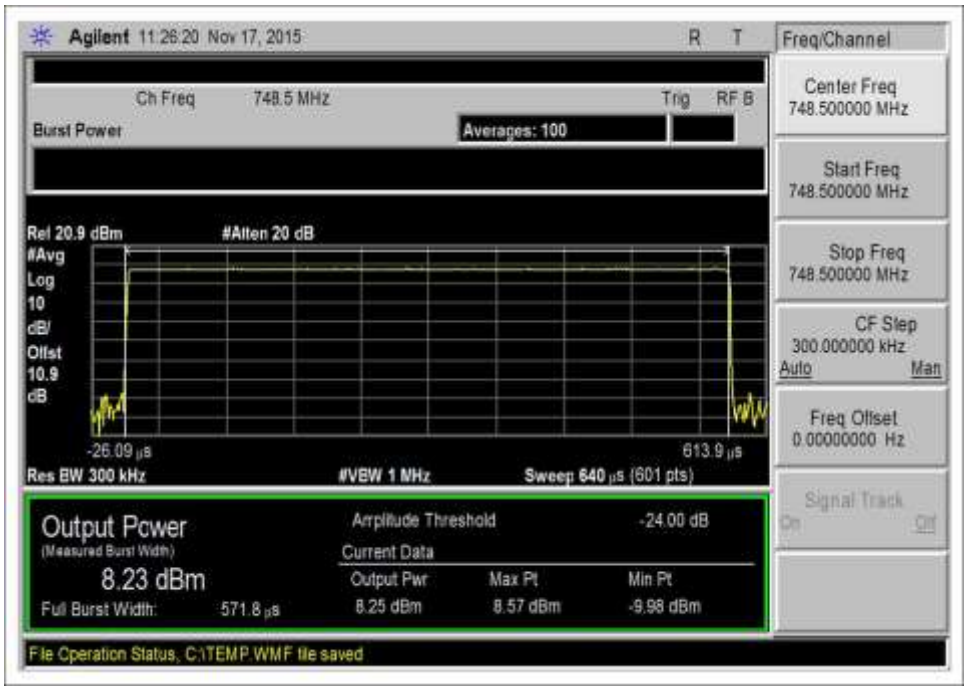


7.2_Power_DL_728-746_GSM

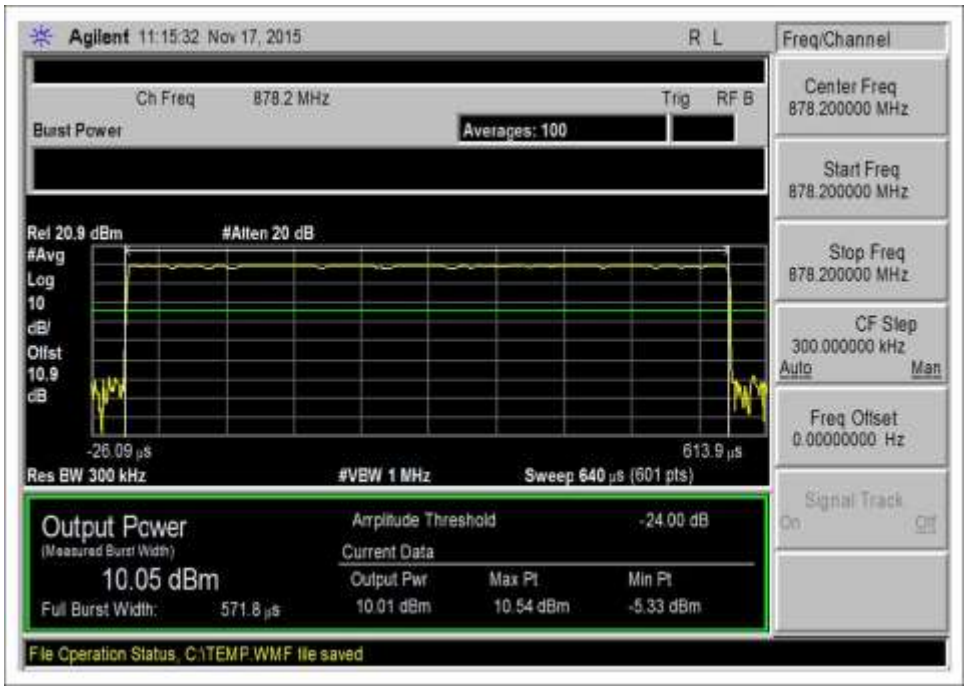


7.2_Power_DL_728-746_GSM-Max

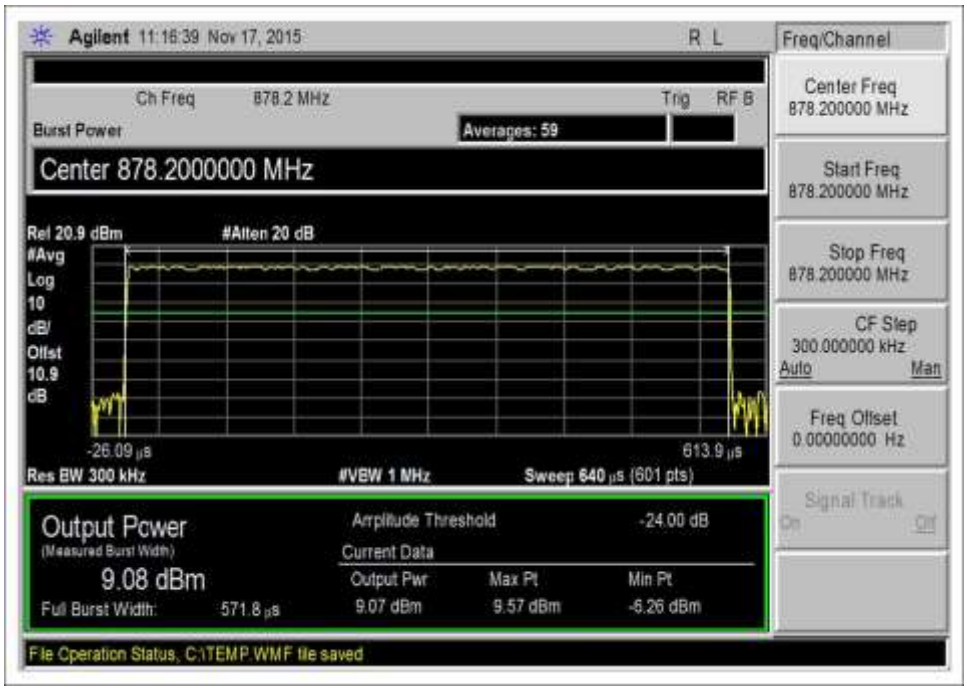
7.2_Power_DL_746-757_GSM



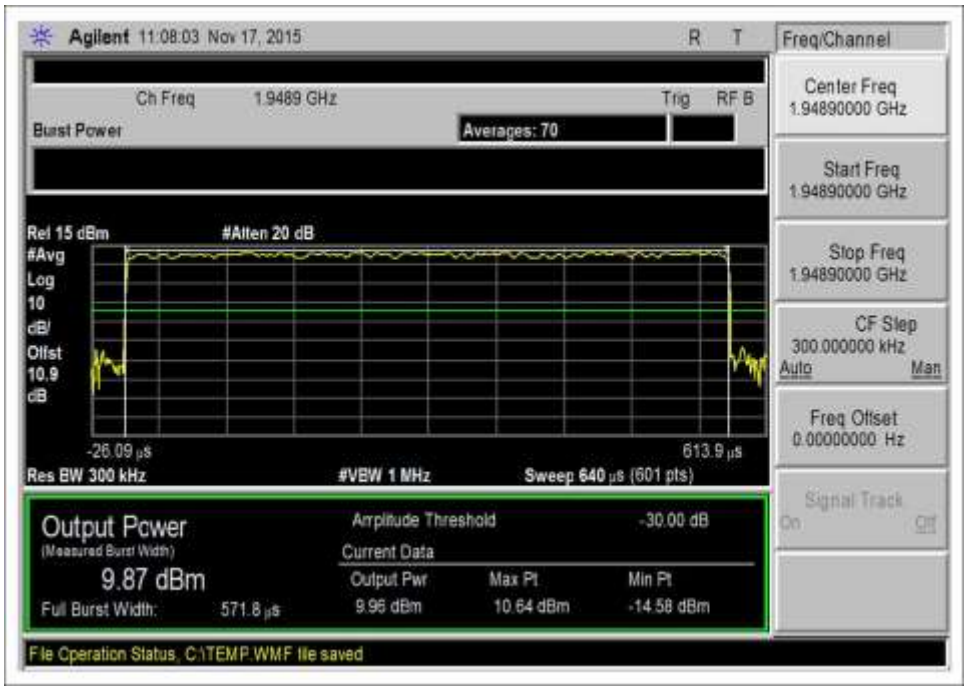
7.2_Power_DL_746-757_GSM-Max



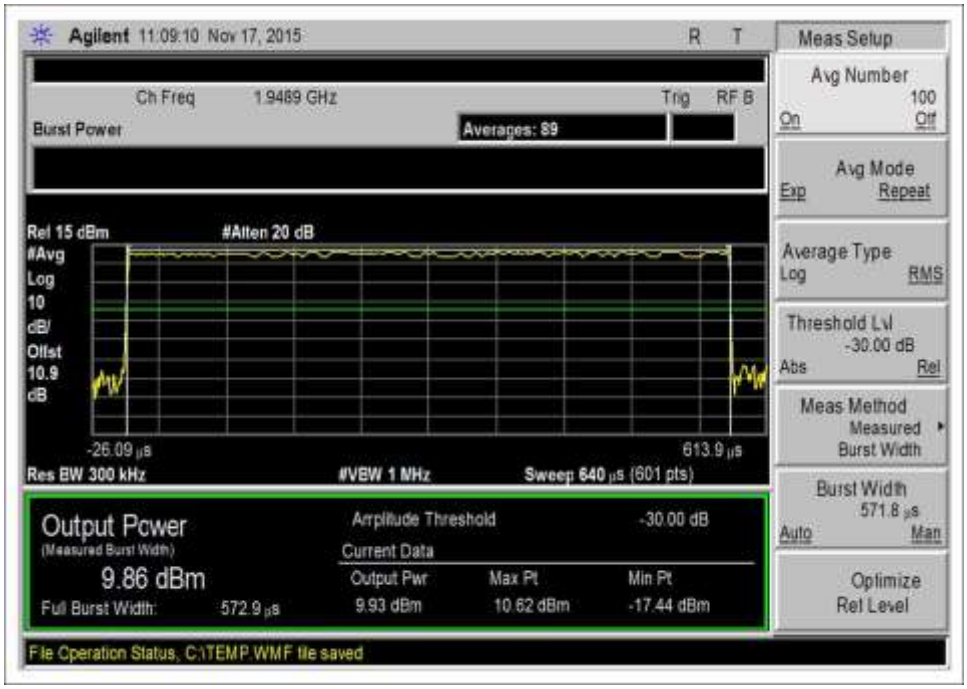
7.2_Power_DL_869-894_GSM



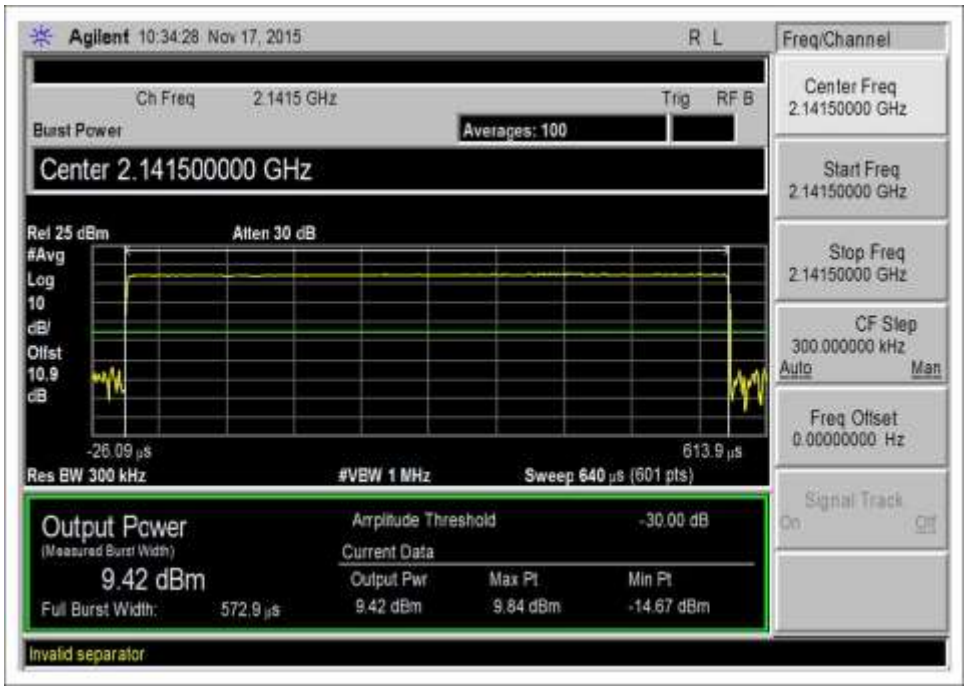
7.2_Power_DL_869-894_GSM-Max



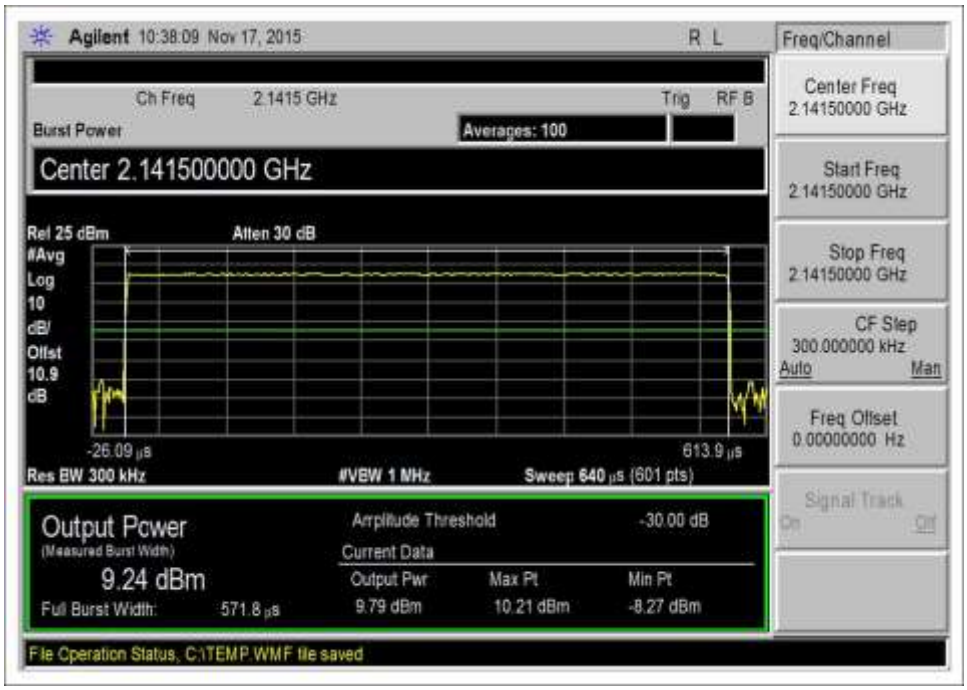
7.2_Power_DL_1930-1995_GSM



7.2_Power_DL_1930-1995_GSM-Max



7.2_Power_DL_2110-2155_GSM



7.2_Power_DL_2110-2155_GSM-Max

7.3 Maximum Gain

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.3 Maximum Booster Gain**		
Work Order #:	**97835**	Date:	11/17/2015
Test Type:	**Conducted Emissions**	Time:	10:34:28
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

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.

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 environment conditions: Temperature: 23.1°C, Relative Humidity: 30%, Pressure: 102.6 kPa

Test procedure:
The test was performed in accordance with section 7.3 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015
Firmware: V2.0

Test Equipment:

ID	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
	AN02660	Spectrum Analyzer	E4446A	7/9/2015	7/9/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Summary of Results

Pass: Summarized in the table below.

	Pre AGC			Pre AGC		
	Pulse GSM			4.1 MHz AWGN		
Frequency (MHz)	Input (dBm)	Output (dBm)	*Gain (dB)	Input (dBm)	Output (dBm)	*Gain (dB)
UL1710-1755	-47.6	20.6	68.2	-49.1	18.6	67.7
UL1850-1915	-44.7	22.3	67.0	-48.6	19.2	67.8
UL824-894	-39.3	20.9	60.2	-41.1	18.0	59.1
UL 698-716	-32.0	25.4	57.4	-36.4	20.2	56.6
UL776-787	-34.6	23.8	58.4	-38.3	19.0	57.3
DL2110-2155	-58.1	9.4	67.5	-60.8	6.0	66.8
DL1930-1995	-57.2	9.9	67.1	-59.5	7.1	66.6
DL869-894	-50.3	10.1	60.4	-52.3	7.7	60.0
DL:728-746	-52.4	7.4	59.8	-53.7	6.4	60.1
DL 746-757	-48.1	8.2	56.3	-50.3	6.3	56.6

*Fixed Booster maximum gain shall not exceed 6.5 dB + 20 Log10 (Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz

	Pulse GSM	**4.1MHz AWGN**	**Limit (dB)**
UL gain vs DL gain 1710/2110	0.7	0.9	9.0
UL gain vs DL gain 1850/1930	-0.1	1.3	9.0
UL gain vs DL gain 824/869	-0.1	-0.8	9.0
UL gain vs DL gain 776/728	-2.5	-3.5	9.0
UL gain vs DL gain 776/746	2.0	0.8	9.0

7.4 Intermodulation Product

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
Customer:	Cellphone-Mate, Inc
Specification:	**7.4 Intermodulation Product**
Work Order #:	**97835** Date 03/05/2019
Test Type:	**Conducted Emissions**
Tested By:	**Hieu S. Nguyenpham**
Software:	EMITest 5.03.11

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Test environment conditions:
Temperature: 20.02° C
Relative Humidity: 45%
Pressure: 101.8 kPa

Test Equipment:

Asset #	Description	Manufacturer	Model	Calibration Date	Cal Due Date
P05411	Attenuator	Weinschel	54A-10	1/19/2018	1/19/2020
P07192	Cable	Astro	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
P07191	Cable	Astro	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
03418	Signal Generator	Agilent	E4438C	6/19/2017	6/19/2019
03471	Spectrum Analyzer	Agilent	E4440A	1/18/2018	1/18/2020
P06910	Attenuator	Pasternack	PE7083	12/20/2017	12/20/2019

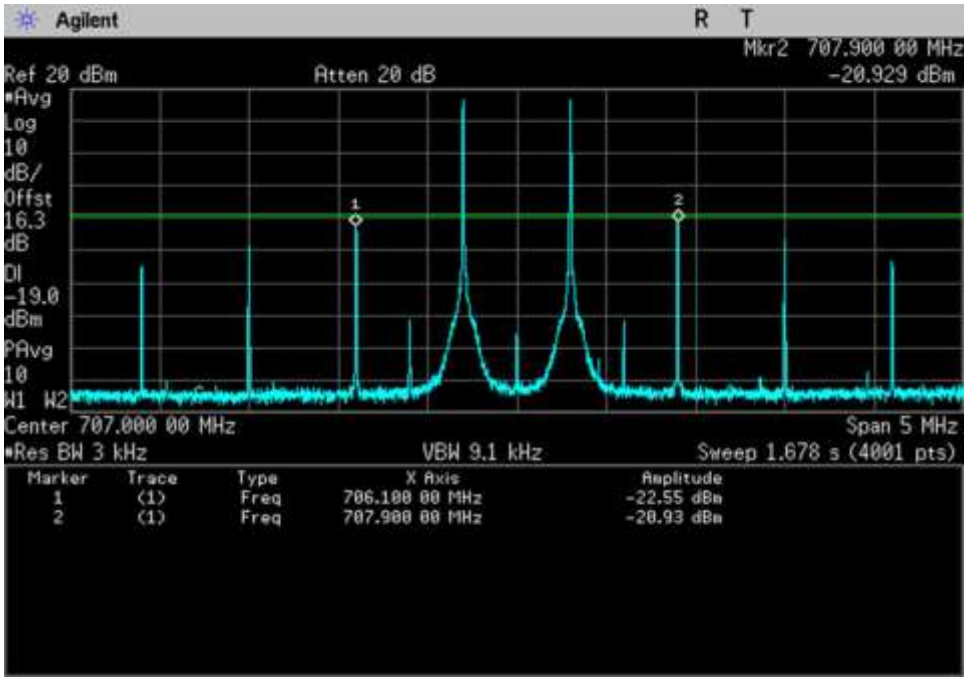
Summary of Results

Pass: As shown on the plots, all intermodulation products are measured below -19dbm limit.

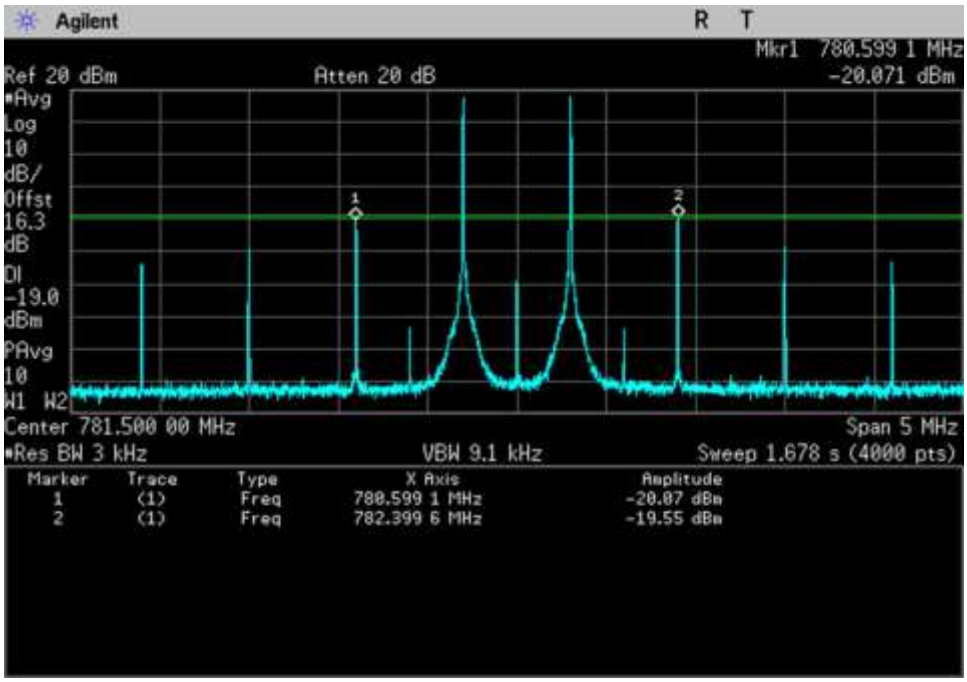
Inter Modulation Product			
Freq (MHz)	Pre AGC (dBm)	Limit (dBm)	Results
UL 1710-1755	-20.0	-19	Pass
UL 1850-1915	-20.6	-19	Pass
UL 824-894	-30.0	-19	Pass
UL 698-716	-20.9	-19	Pass
UL 776-787	-19.5	-19	Pass
DL 2110-2155	-22.0	-19	Pass
DL 1930-1995	-56.0	-19	Pass
DL 869-894	-36.2	-19	Pass
DL 728-746	-47.2	-19	Pass
DL 746-757	-48.8	-19	Pass

Note: The EUT maintains compliance with the intermodulation limit at input power of AGC+10dB

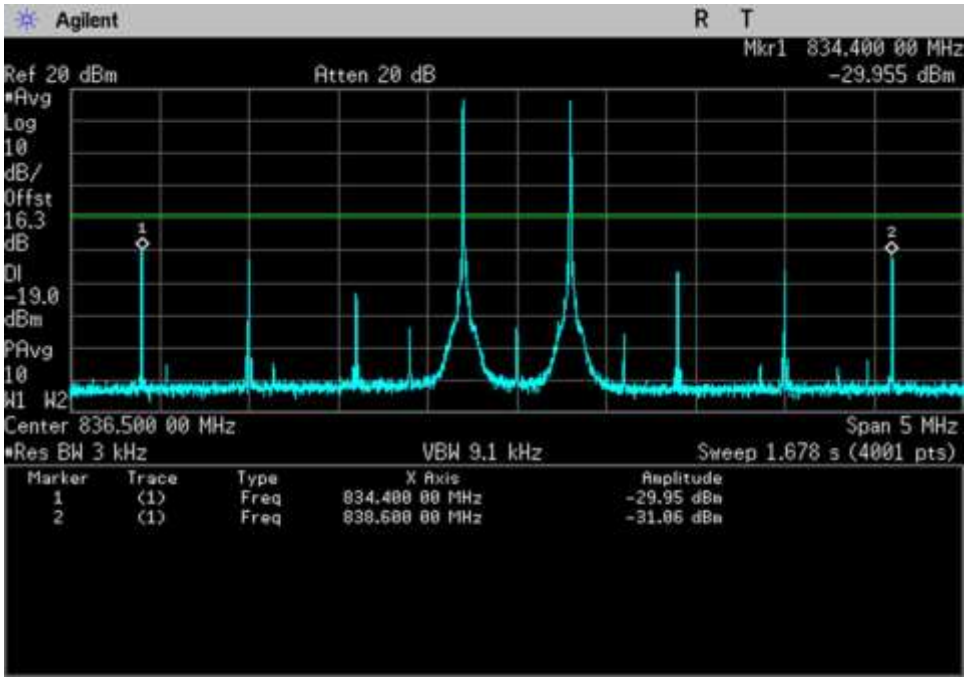
Plots



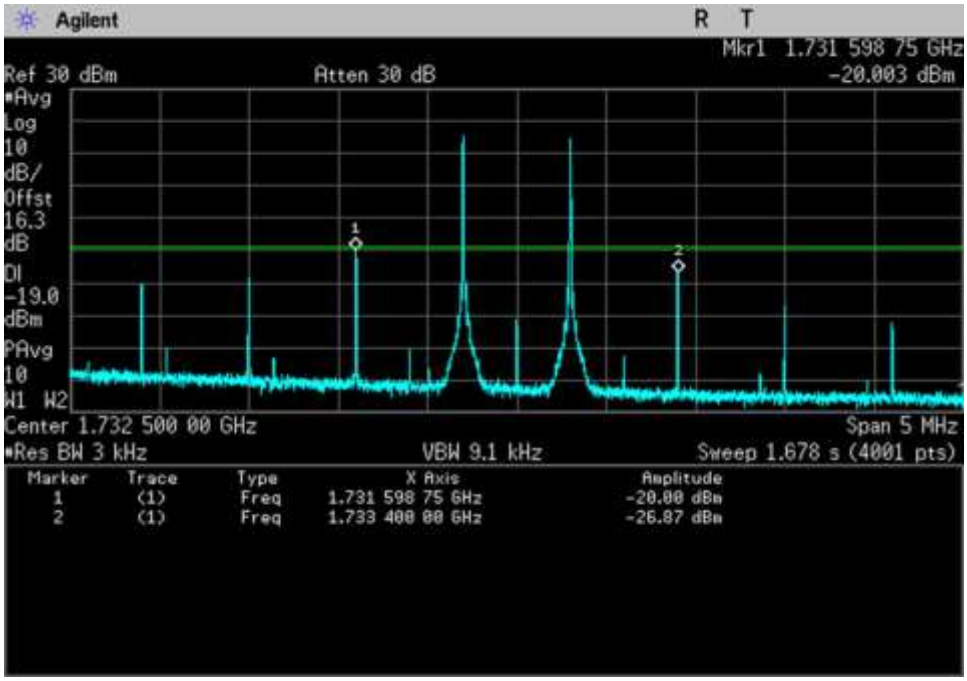
7.4_Intermod_UL_698-716MHz



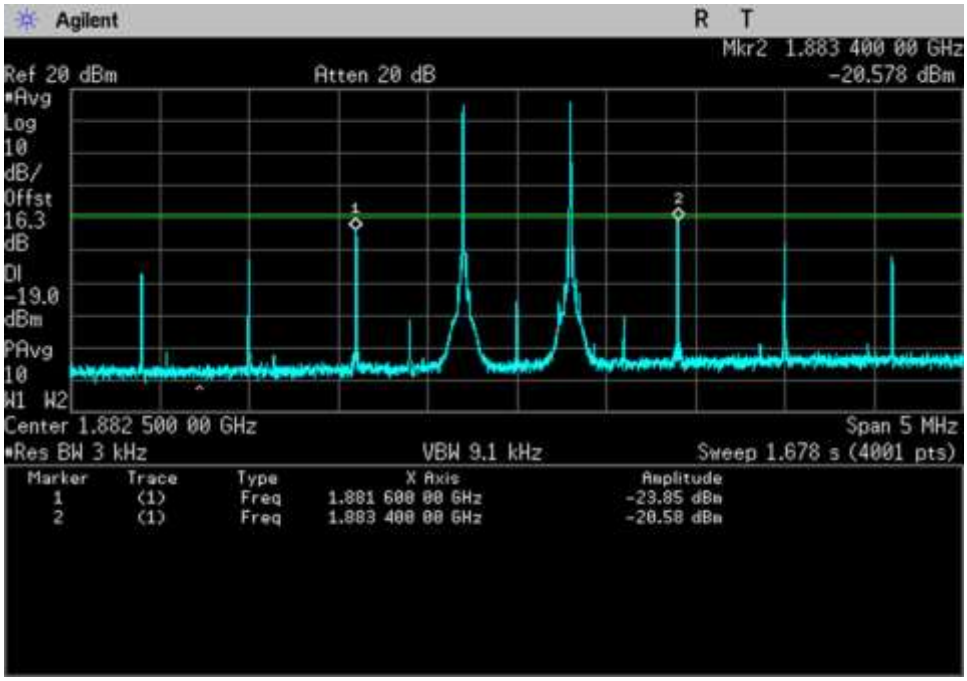
7.4_Intermod_UL_776-787MHz



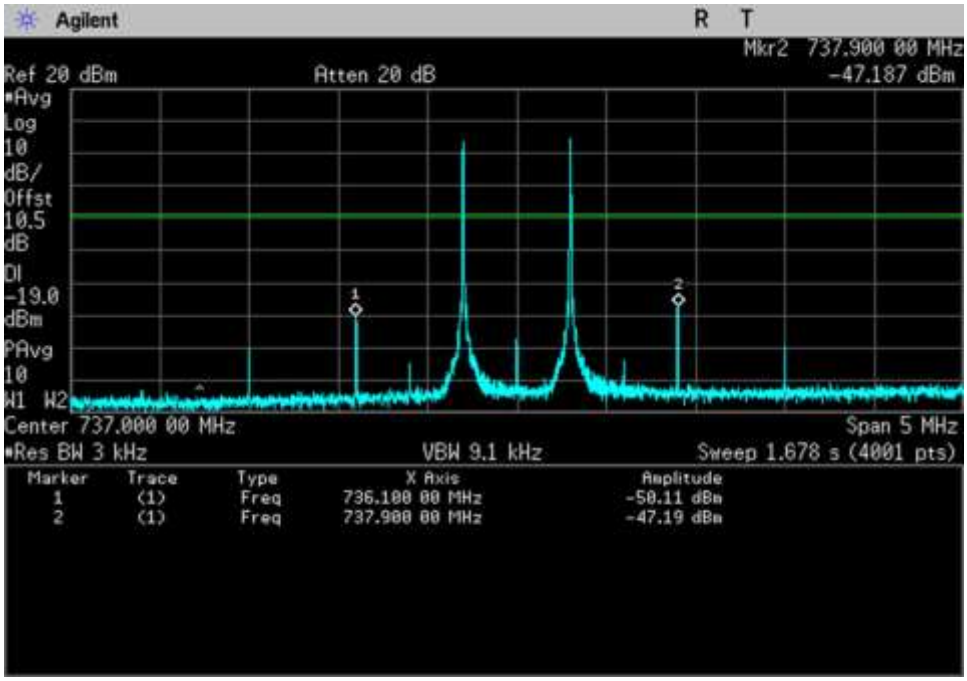
7.4_Intermod_UL_824-849MHz



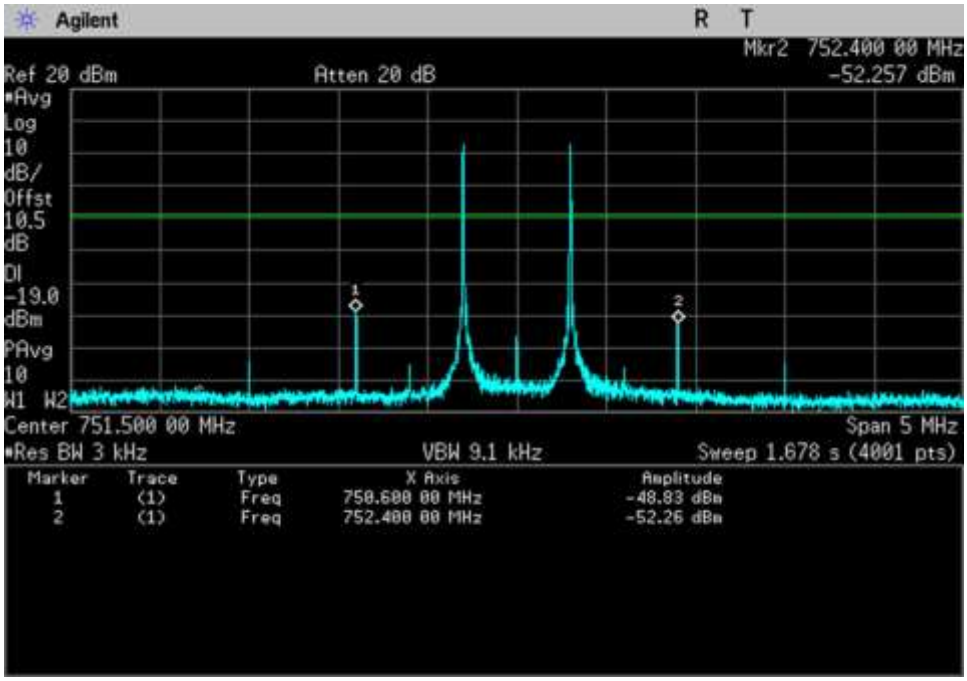
7.4_Intermod_UL_1710-1755MHz



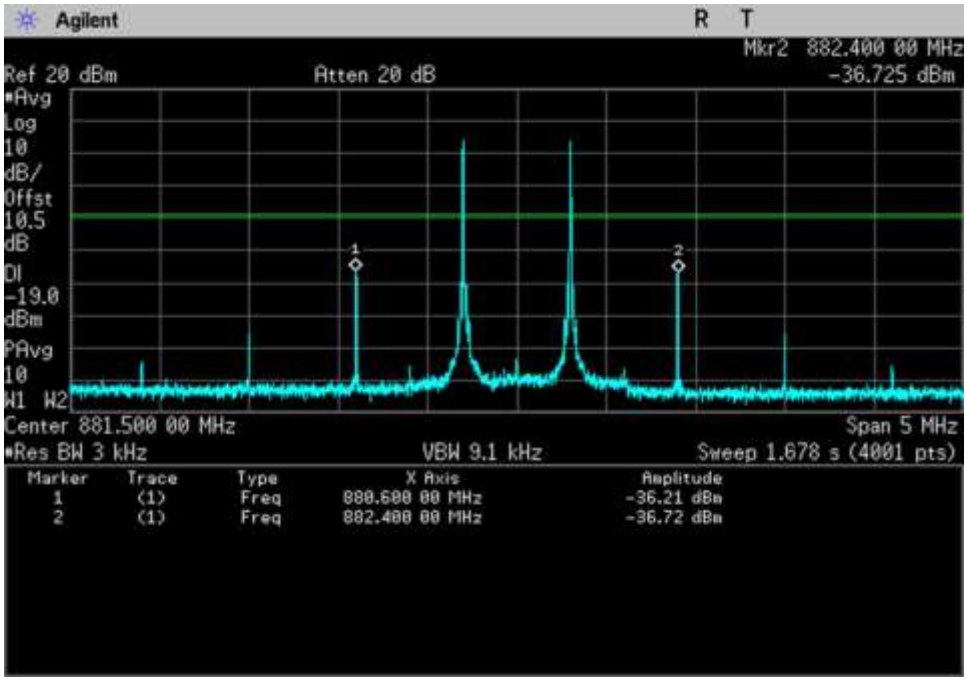
7.4_Intermod_UL_1850-1915MHz



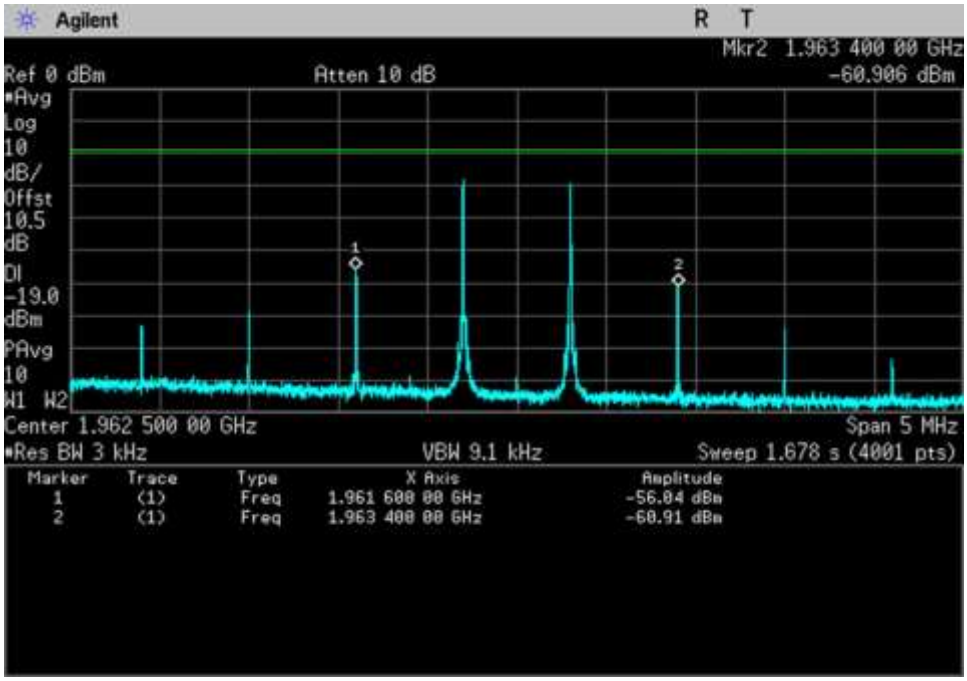
7.4_Intermod_DL_728-746MHz



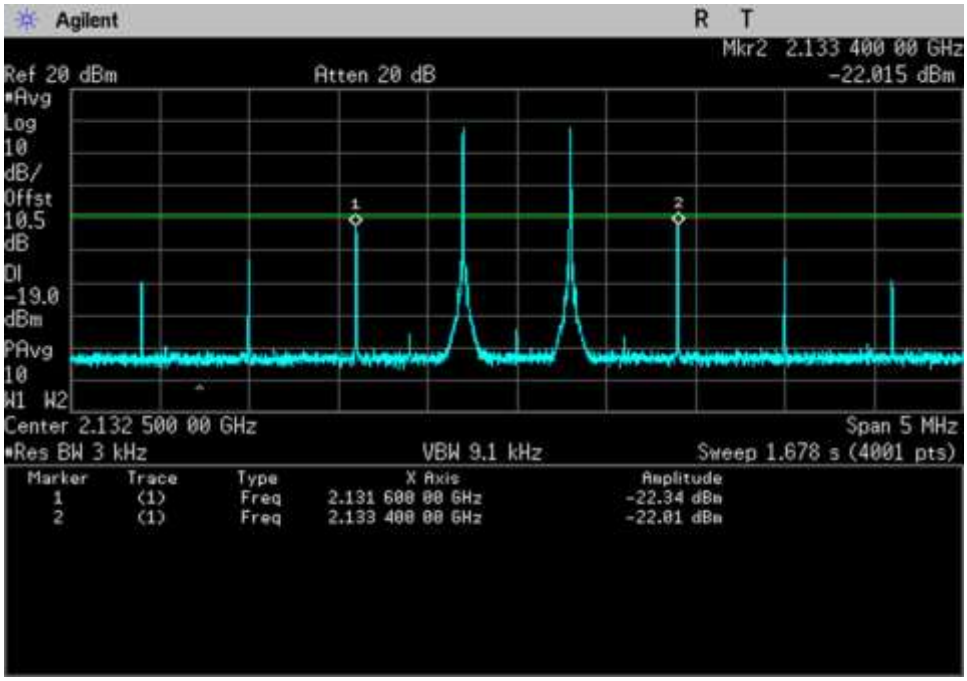
7.4_Intermod_DL_746-757MHz



7.4_Intermod_DL_869-894MHz



7.4_Intermod_DL_1930-1995MHz



7.4_Intermod_DL_2110-2155MHz

7.5 Out of Band Emissions

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.5 Out-of-band Emissions**		
Work Order #:	**97835**	Date:	12/03/2015
Test Type:	**Conducted Emissions**	Time:	10:13:03
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

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.

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 environment conditions: Temperature: 18.5°, Relative Humidity: 39%, Pressure: 101.4 kPa

Test procedure:
The test was performed in accordance with section 7.5 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v03 Dated June 5, 2015
Firmware: V2.0
Additional plots taken at 1dB before EUT shuts down and before reaching the maximum input level indicated in section 5.5 of above document.
- Maximum uplink transmitter test levels for fixed wideband consumer signal booster: +0 dBm
- The maximum downlink input level for all device types is −20 dBm

Lower RBW was used as applicable per rule part, in addition integration power function of the Spectrum Analyzers' Adjacent Channel Power tool was used to show compliance in instances where accuracy can be improved by integrating power measured in smaller RBW and linearly summed into standard bandwidth.
Used for testing the alternative test modulation types:
- CDMA (alternative 1.25 MHz AWGN*)
- LTE 5 MHz (alternative 4.1 MHz AWGN*)

*AWGN test signal, the bandwidth was measured 99% occupied bandwidth.

Test Equipment:

ID	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
	AN02660	Spectrum Analyzer	E4446A	7/9/2015	7/9/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

Summary of Results

Pass: Indicated in the plots below, all OBE are under the limit of -19dBm.

GSM

Low

Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	-28.9	-27.6	-19.0
UL1850-1915	-28.5	-27.9	-19.0
UL824-894	-27.5	-25.7	-19.0
UL 698-716	-26.5	-24.4	-19.0
UL776-787	-25.7	-25.3	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	-37.1	-37.2	-19.0
DL869-894	-35.6	-35.2	-19.0
DL:728-746	-22.1	-21.1	-19.0
DL 746-757	-35.9	-35.7	-19.0

High

Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	-26.8	-26.1	-19.0
UL1850-1915	-32.5	-32.2	-19.0
UL824-894	-25.2	-24.5	-19.0
UL 698-716	-26.0	-21.0	-19.0
UL776-787	-27.7	-26.6	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	< -39.00	< -39.00	-19.0
DL869-894	-41.1	-38.8	-19.0
DL:728-746	-36.2	-36.6	-19.0
DL 746-757	< -39.00	< -39.00	-19.0

CDMA

Low

Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	< -39.00	-28.1	-19.0
UL1850-1915	-35.1	-33.6	-19.0
UL824-894	-40.3	-39.0	-19.0
UL 698-716	-37.6	-32.5	-19.0
UL776-787	< -39.00	< -39.00	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	< -39.00	< -39.00	-19.0
DL869-894	< -39.00	< -39.00	-19.0
DL:728-746	< -39.00	< -39.00	-19.0
DL 746-757	< -39.00	< -39.00	-19.0

High

Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	< -39.00	< -39.00	-19.0
UL1850-1915	< -39.00	< -39.00	-19.0
UL824-894	-39.5	-36.8	-19.0
UL 698-716	-47.4	-32.7	-19.0
UL776-787	< -39.00	< -39.00	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	< -39.00	< -39.00	-19.0
DL869-894	< -39.00	< -39.00	-19.0
DL:728-746	< -39.00	< -39.00	-19.0
DL 746-757	< -39.00	< -39.00	-19.0

LTE

Low

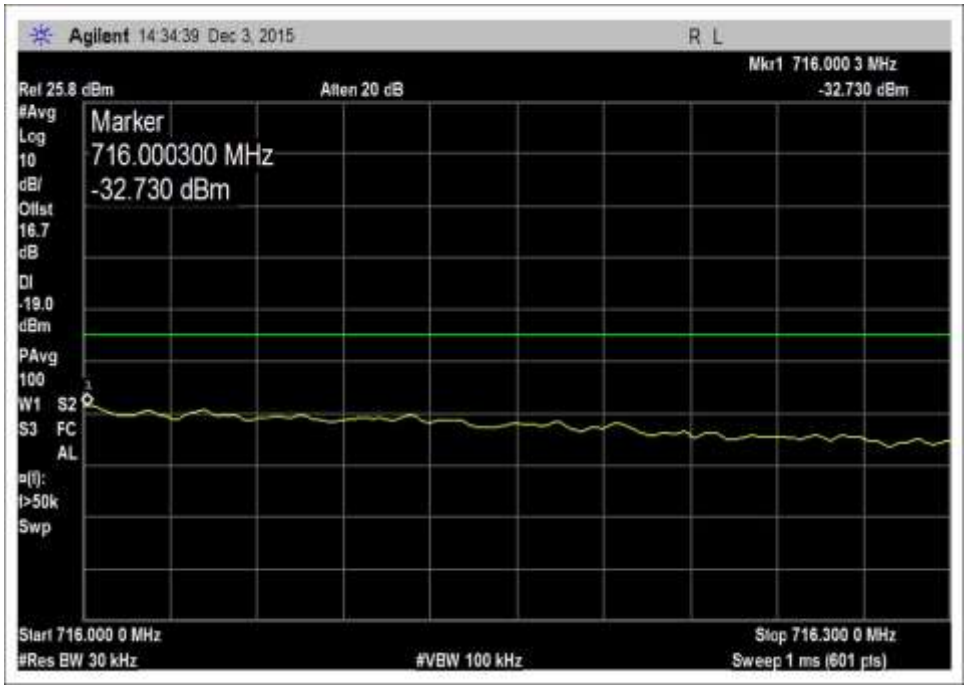
Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	-37.4	-35.1	-19.0
UL1850-1915	-36.4	-34.8	-19.0
UL824-894	-33.8	-31.8	-19.0
UL 698-716	-35.6	-27.3	-19.0
UL776-787	-38.7	-38.5	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	< -39.00	< -39.00	-19.0
DL869-894	< -39.00	< -39.00	-19.0
DL:728-746	< -39.00	< -39.00	-19.0
DL 746-757	< -39.00	< -39.00	-19.0

High

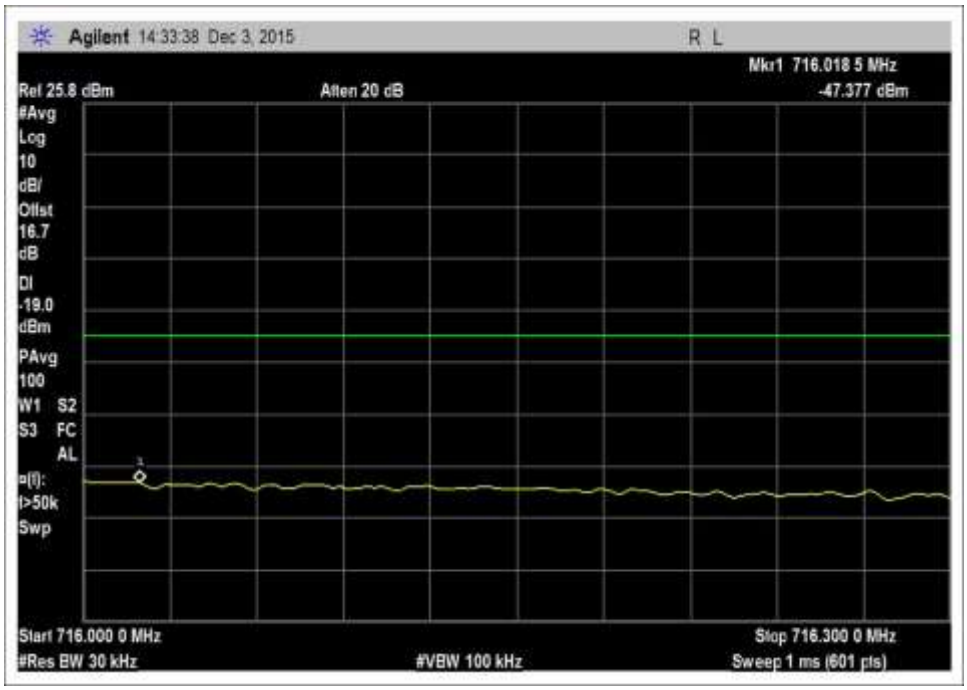
Out of Band Emission			
Frequency	Pre AGC	Max input	Limit
MHz	dBm	+0dBm	dBm
UL1710-1755	-38.0	-35.8	-19.0
UL1850-1915	< -39.00	< -39.00	-19.0
UL824-894	-38.4	-34.1	-19.0
UL 698-716	-41.1	-37.7	-19.0
UL776-787	< -39.00	< -39.00	-19.0
		-20dBm	
DL2110-2155	< -39.00	< -39.00	-19.0
DL1930-1995	< -39.00	< -39.00	-19.0
DL869-894	< -39.00	< -39.00	-19.0
DL:728-746	< -39.00	< -39.00	-19.0
DL 746-757	< -39.00	< -39.00	-19.0

Plots

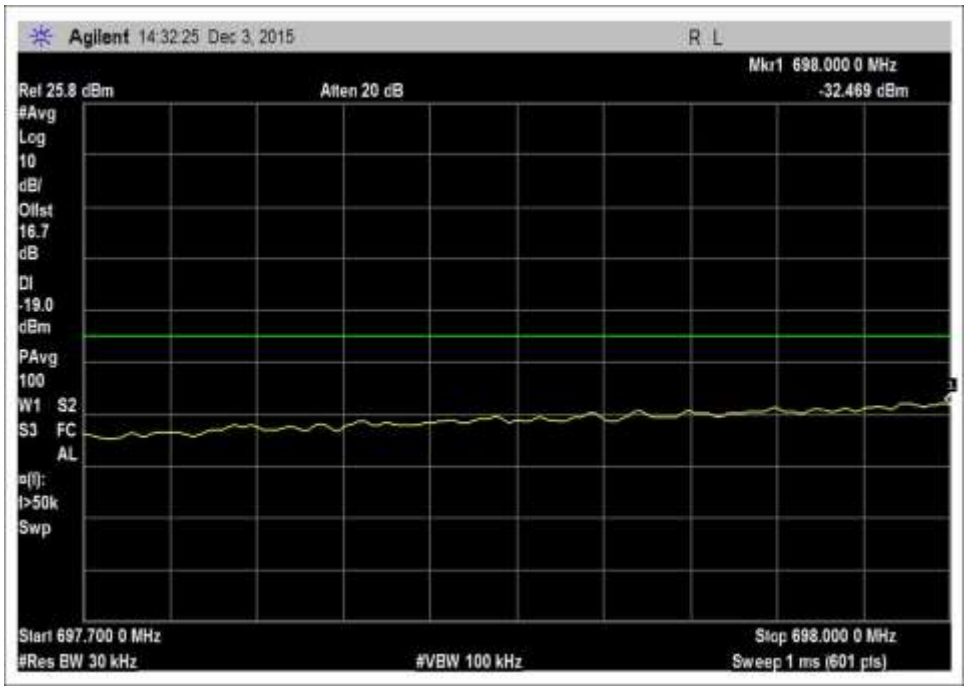
CDMA



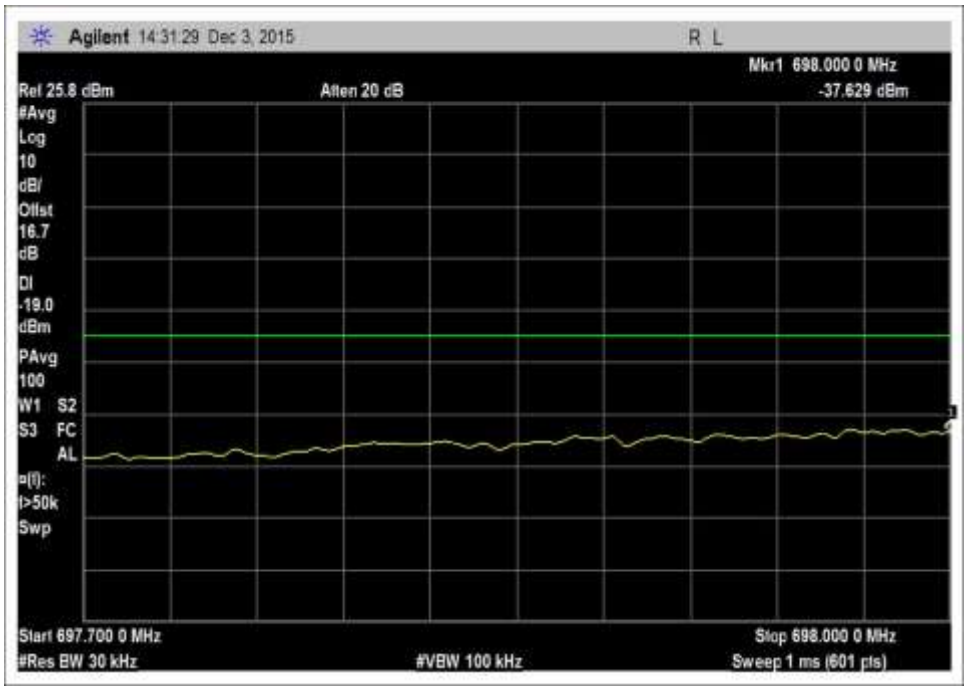
7.5_OBE_UL_698-716MHz_H_Max



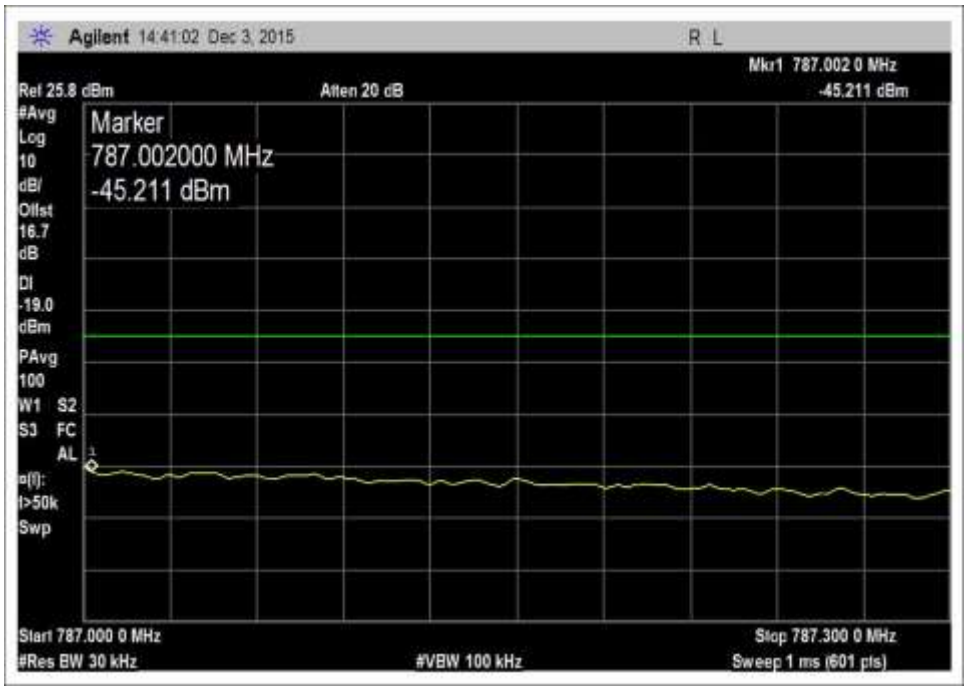
7.5_OBE_UL_698-716MHz_H_PreAGC



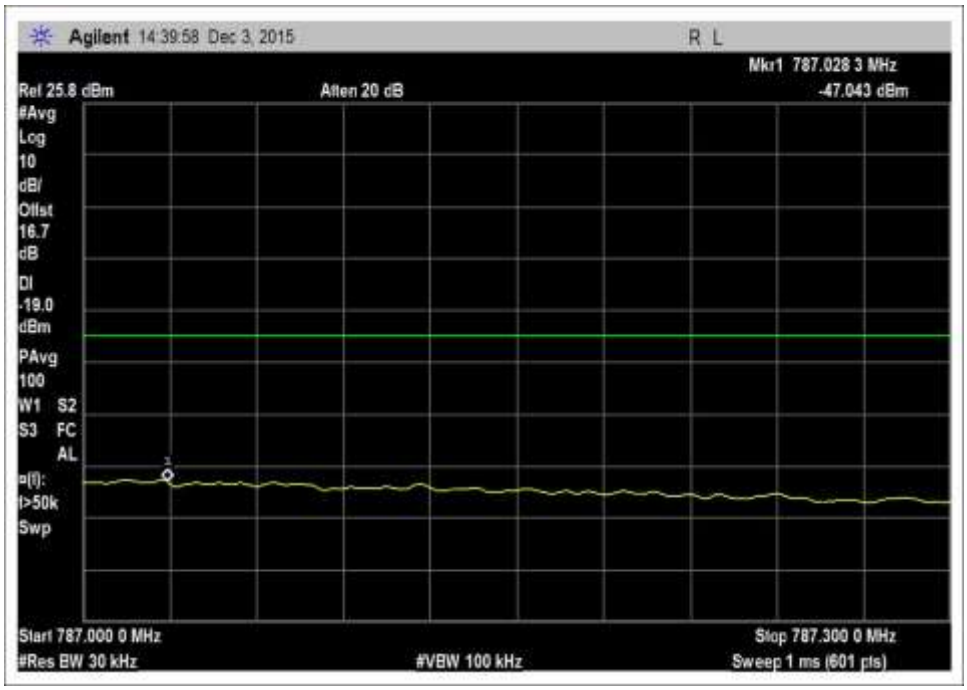
7.5_OBE_UL_698-716MHz_L_Max



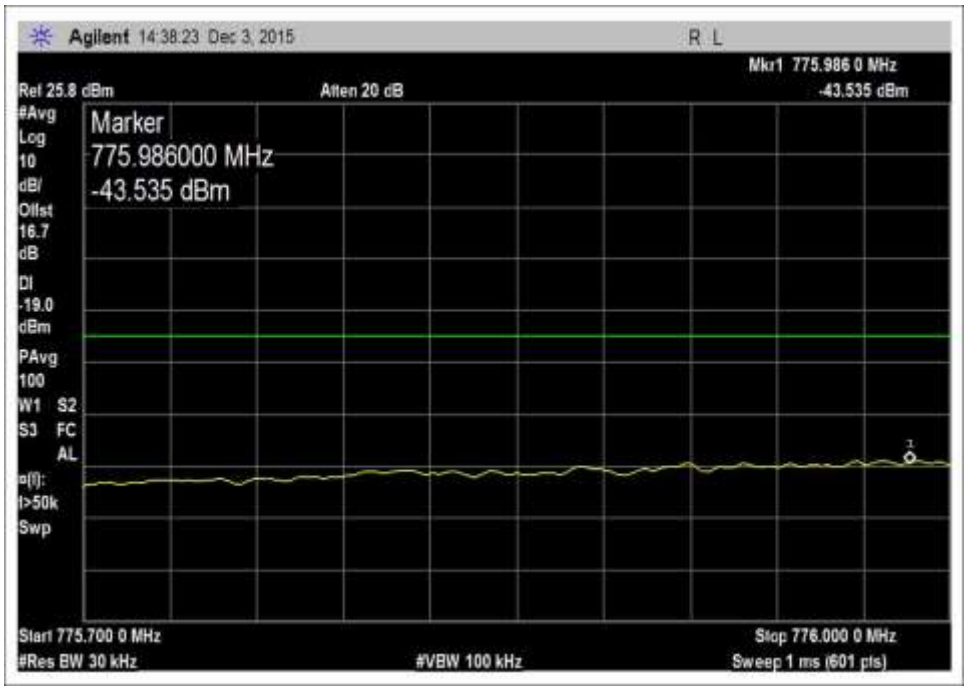
7.5_OBE_UL_698-716MHz_L_PreAGC



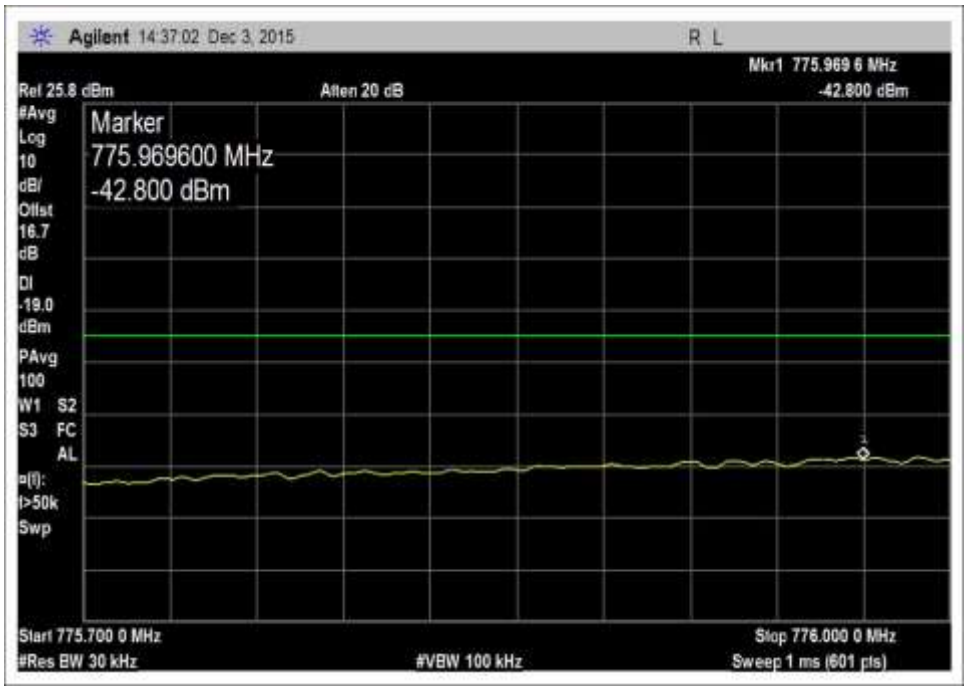
7.5_OBE_UL_776-787MHz_H_Max



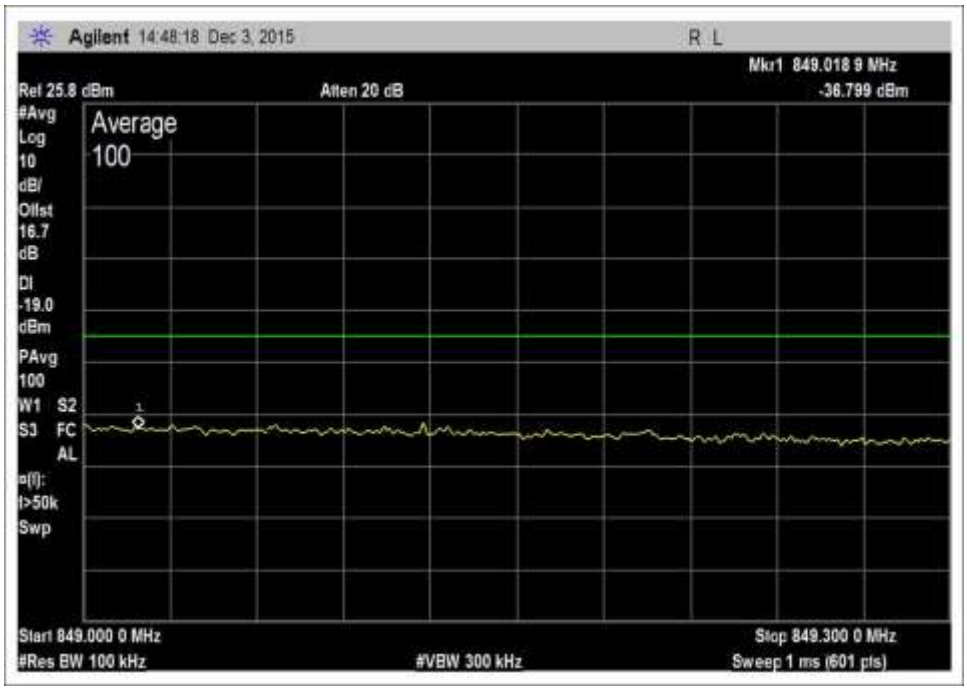
7.5_OBE_UL_776-787MHz_H_PreAGC



7.5_OBE_UL_776-787MHz_L_Max



7.5_OBE_UL_776-787MHz_L_PreAGC



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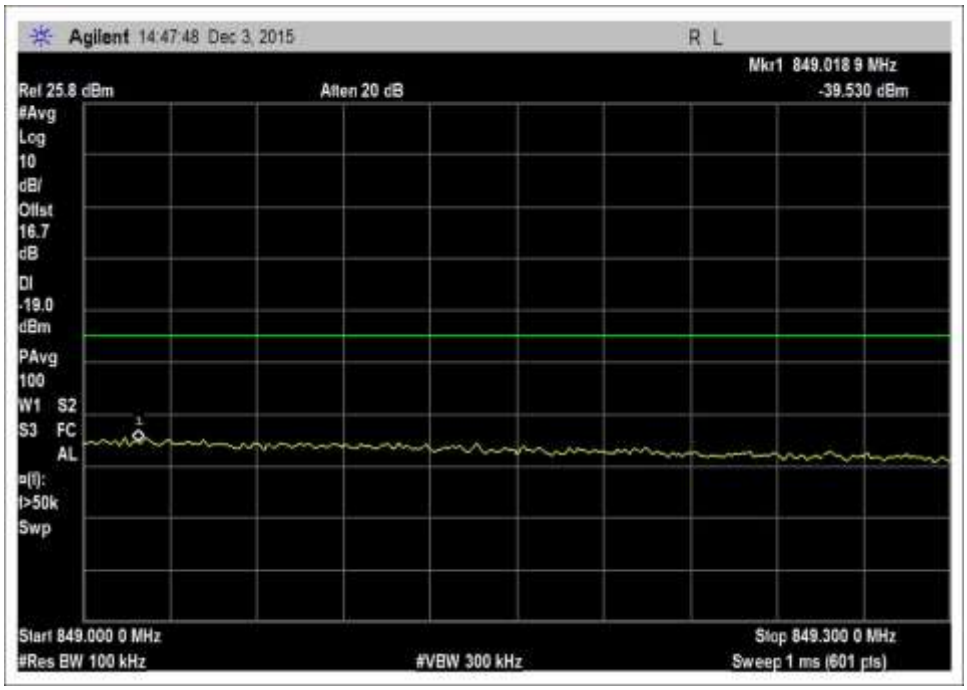

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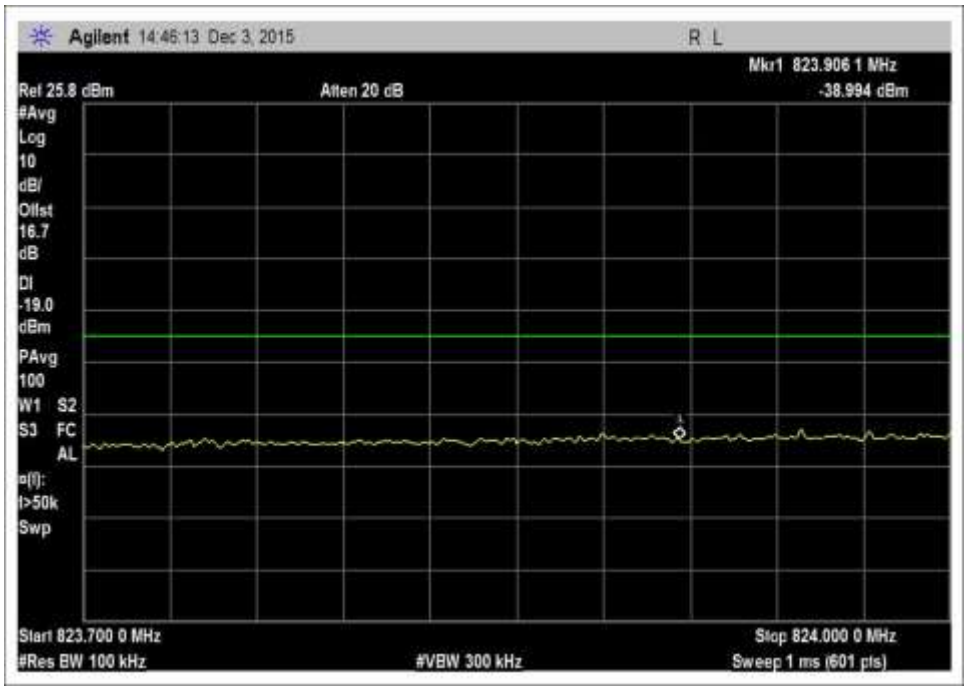
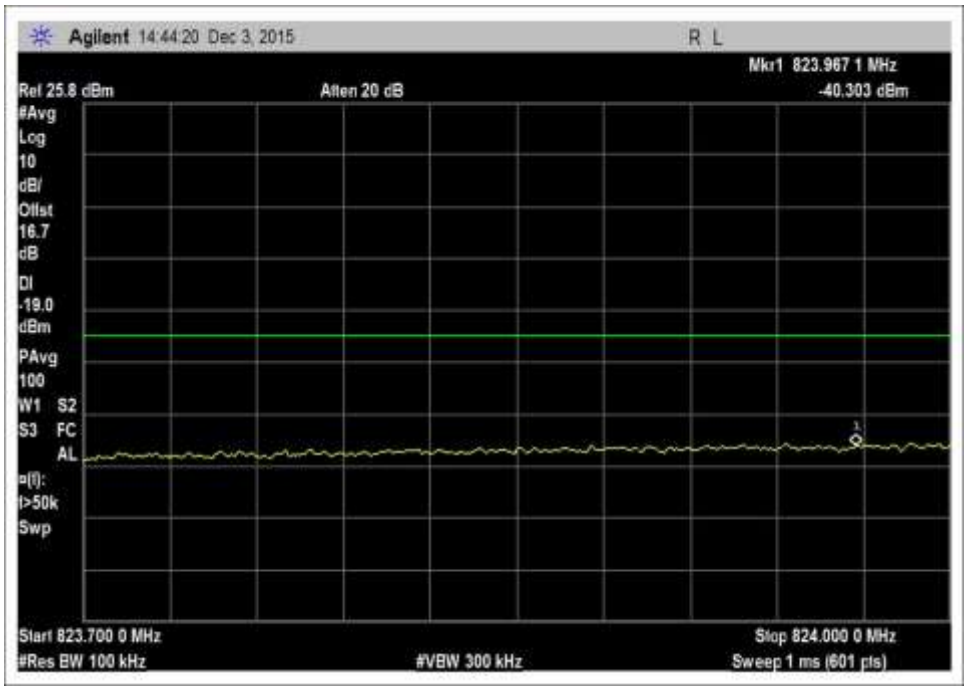
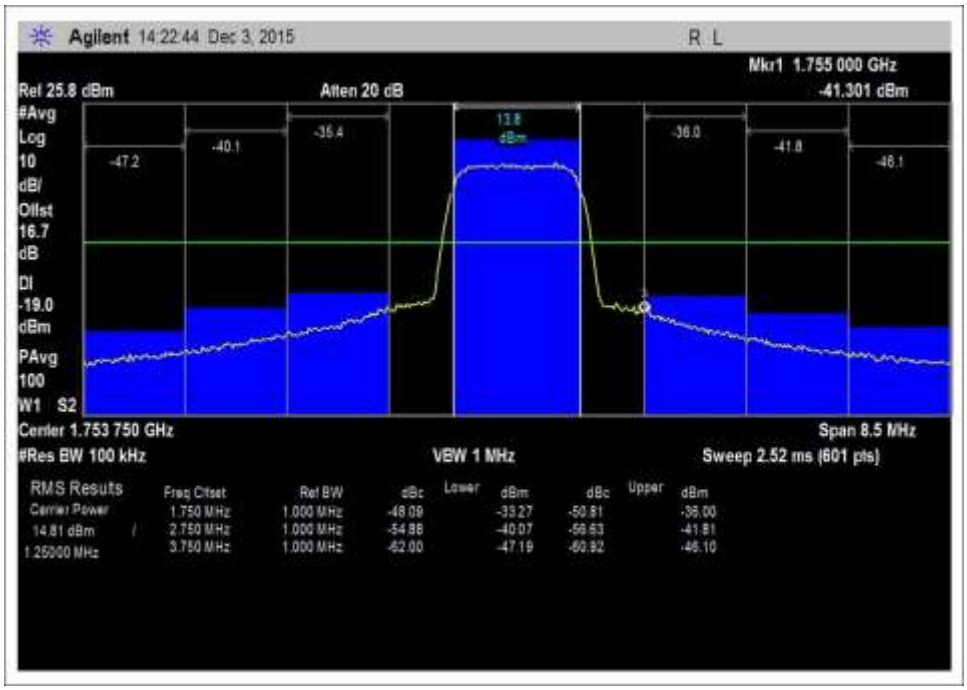


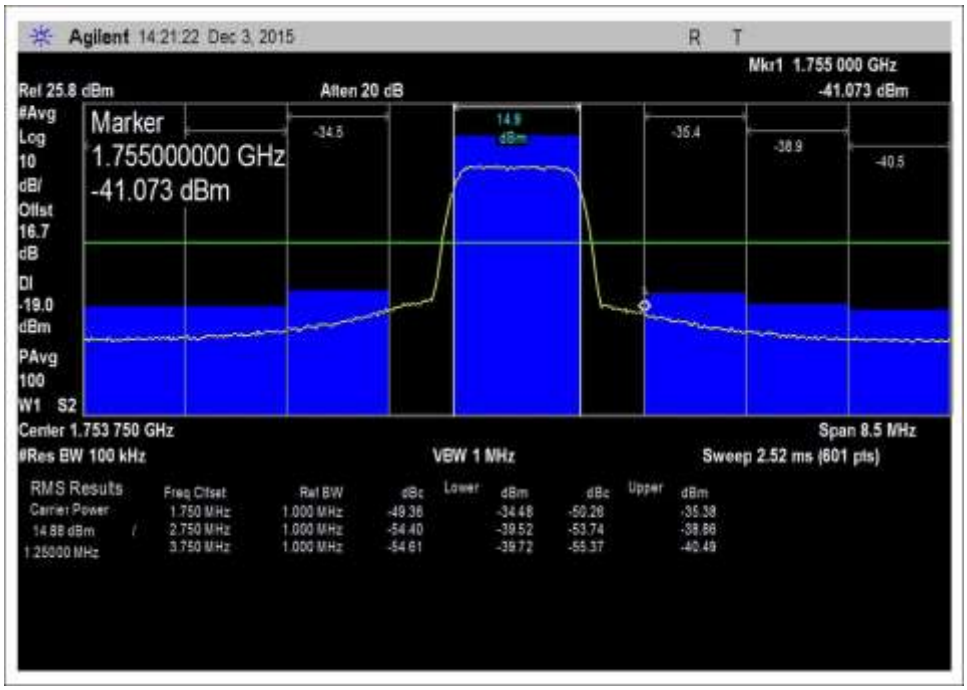
7.5_OBE_UL_824-849MHz_L_Max



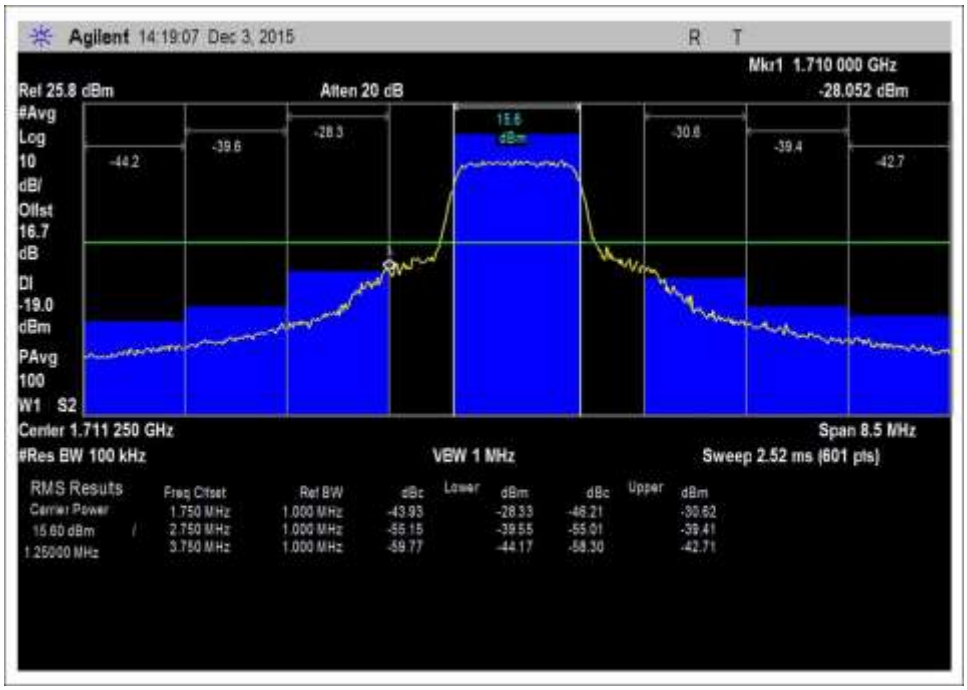
7.5_OBE_UL_824-849MHz_L_PreAGC



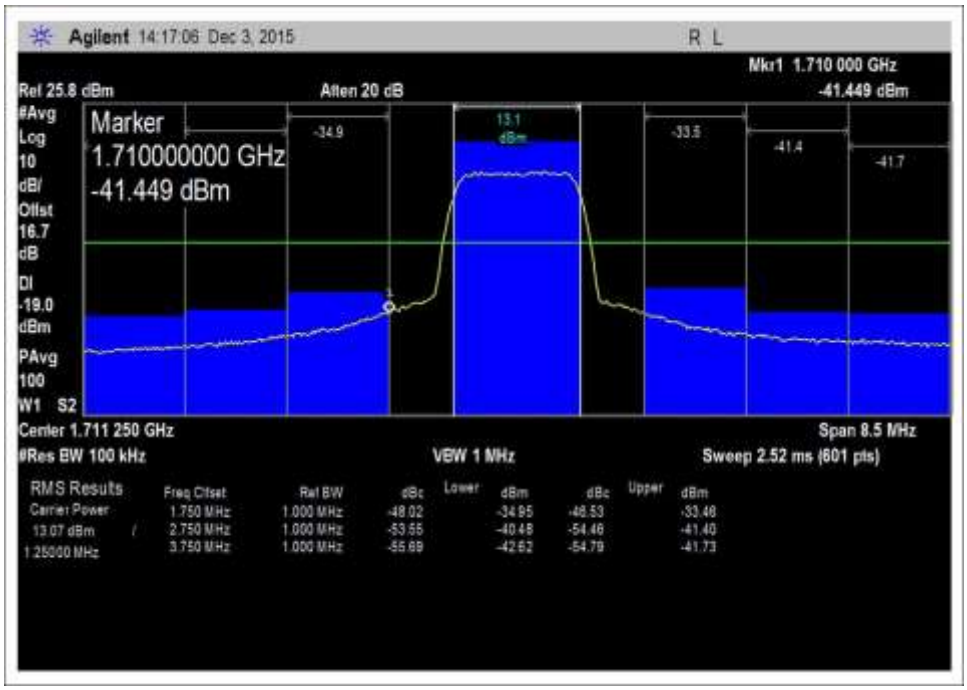
7.5_OBE_UL_1710-1755MHz_H_Max



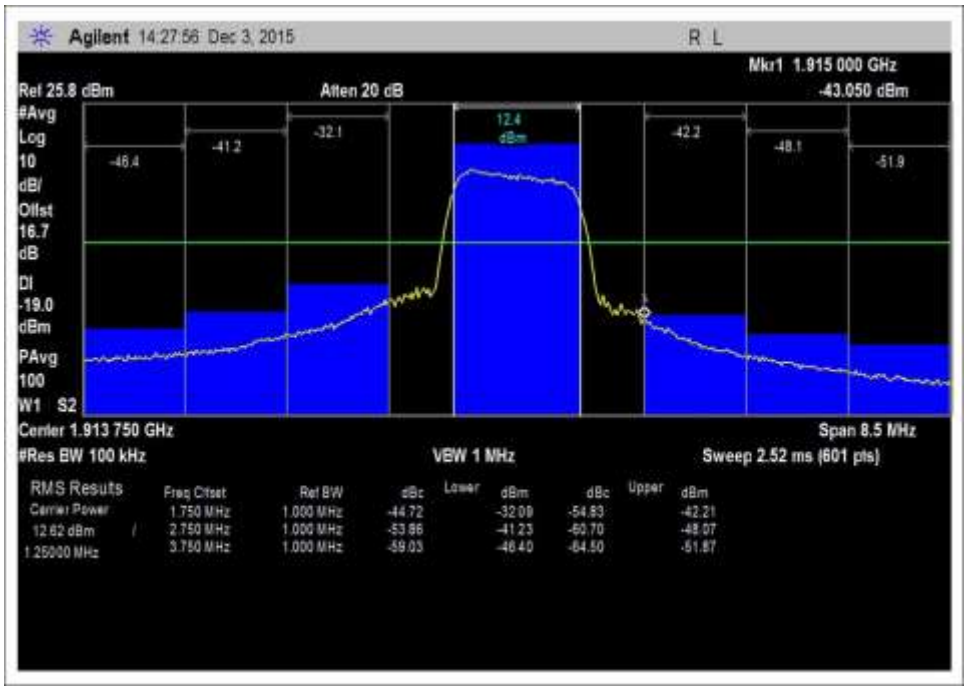
7.5_OBE_UL_1710-1755MHz_H_PreAGC



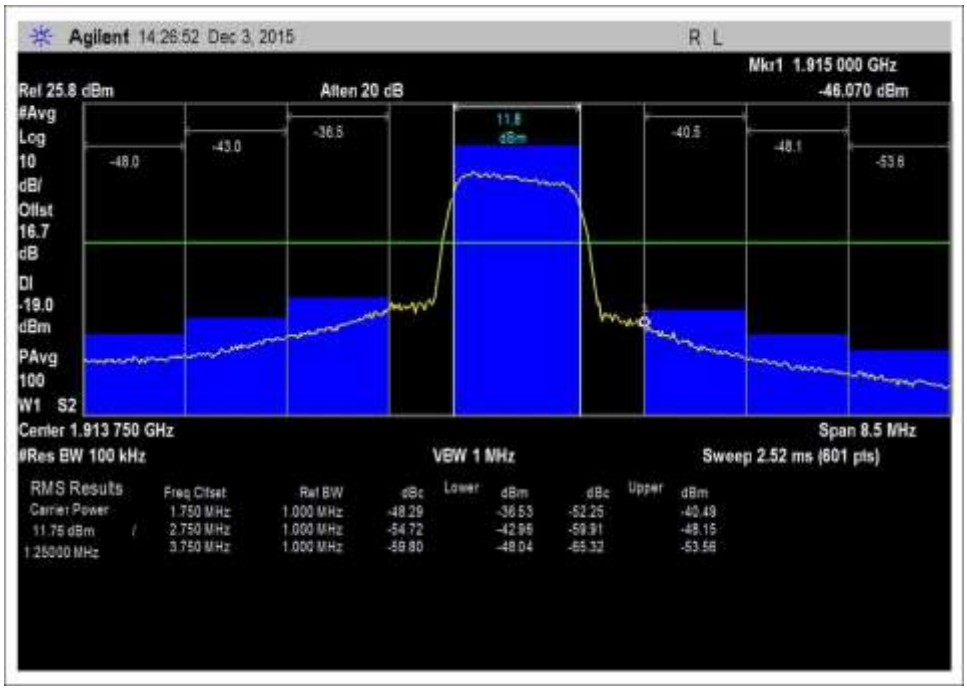
7.5_OBE_UL_1710-1755MHz_L_Max



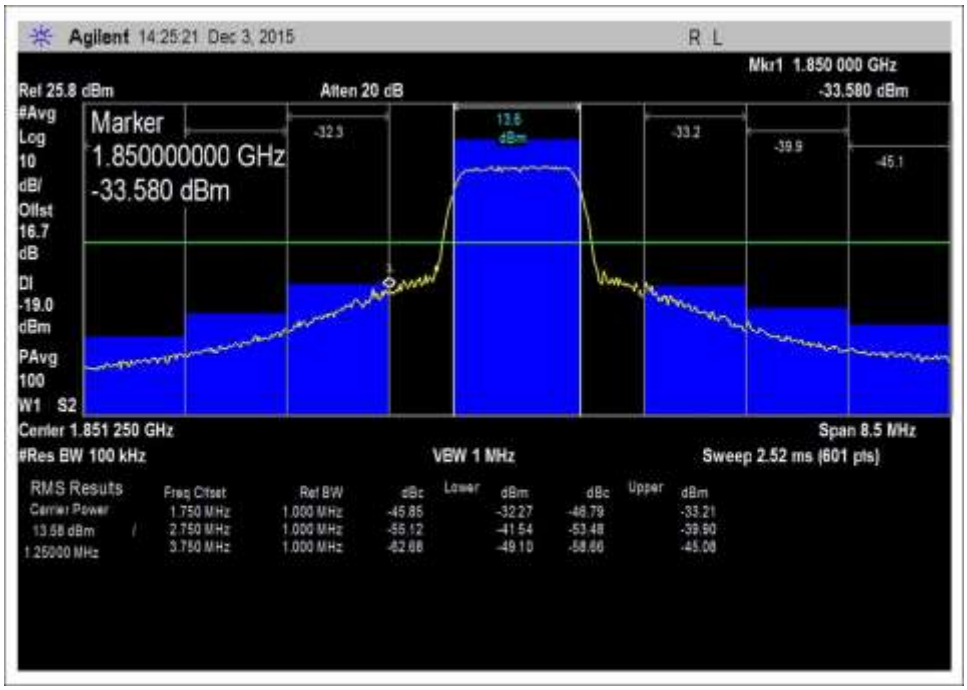
7.5_OBE_UL_1710-1755MHz_L_PreAGC



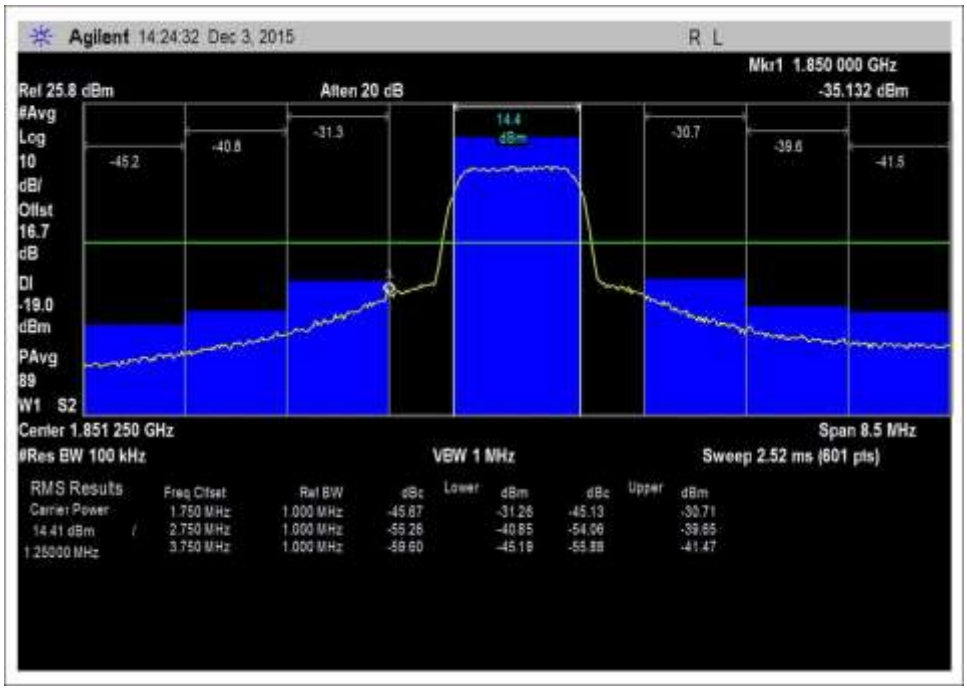
7.5_OBE_UL_1850-1915MHz_H_Max



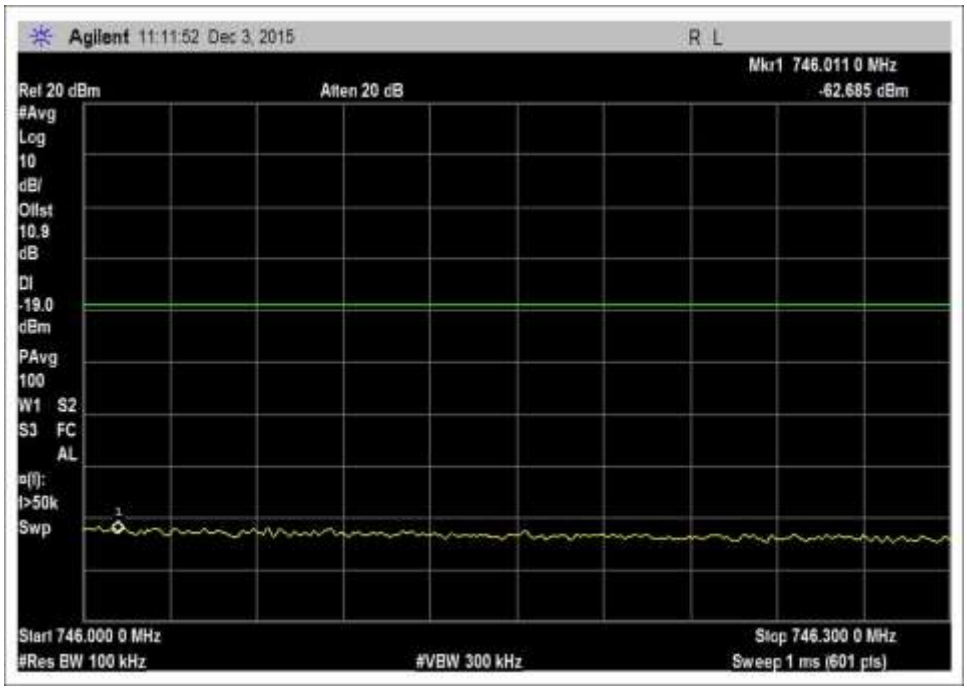
7.5_OBE_UL_1850-1915MHz_H_PreAGC



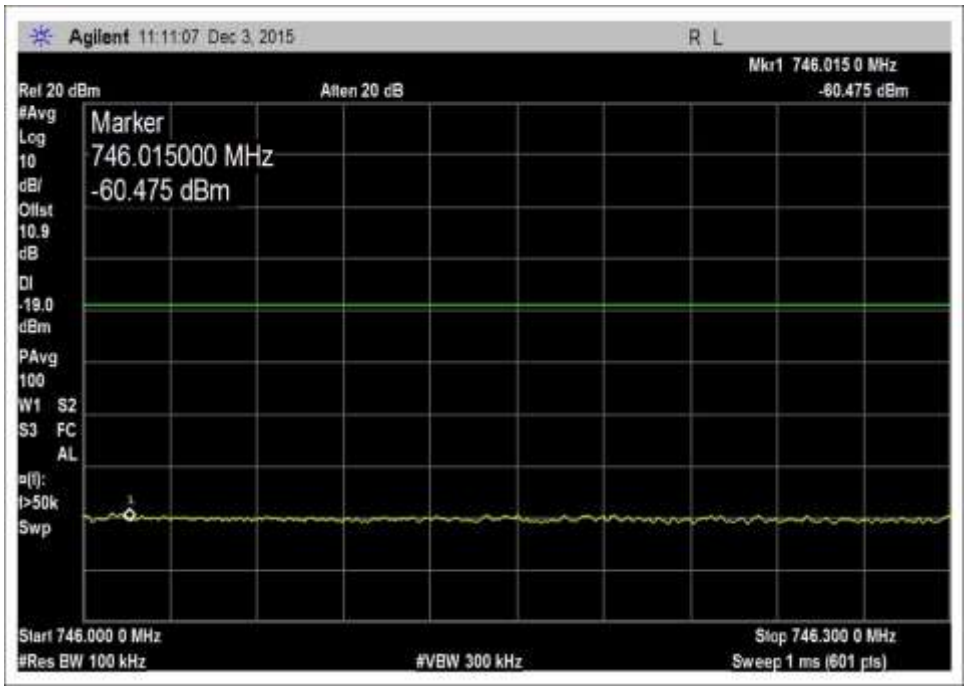
7.5_OBE_UL_1850-1915MHz_L_Max



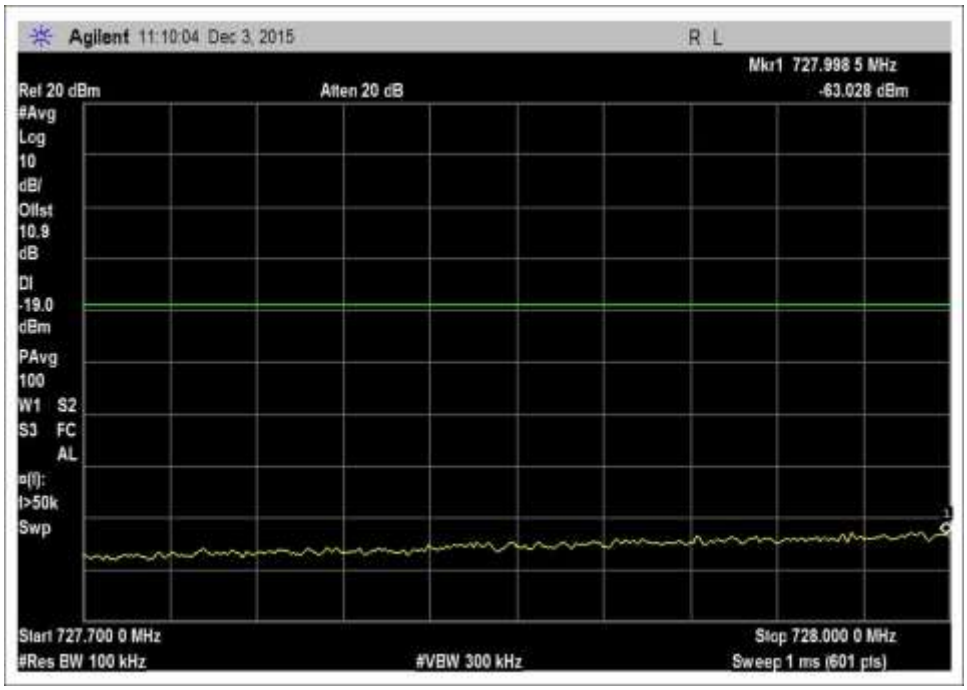
7.5_OBE_UL_1850-1915MHz_L_PreAGC



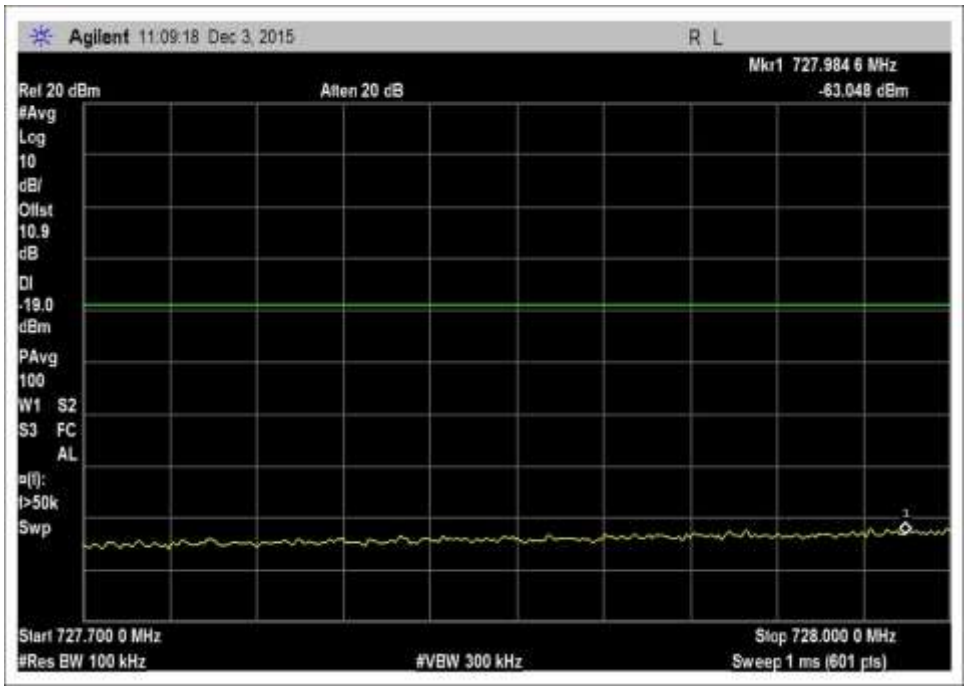
7.5_OBE_DL_728-746MHz_H_Max



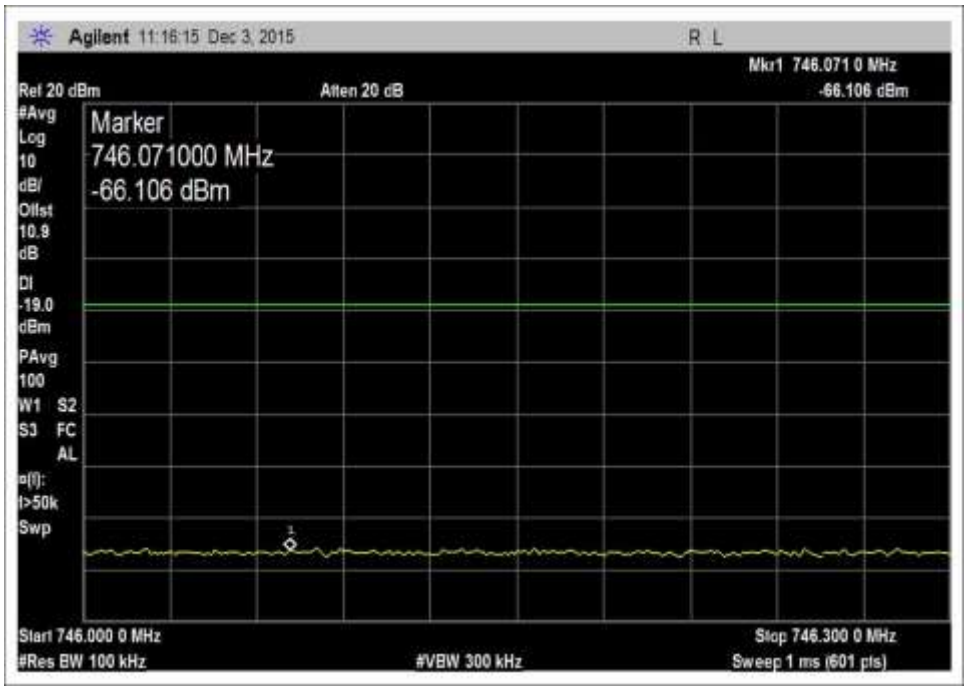
7.5_OBE_DL_728-746MHz_H_PreAGC



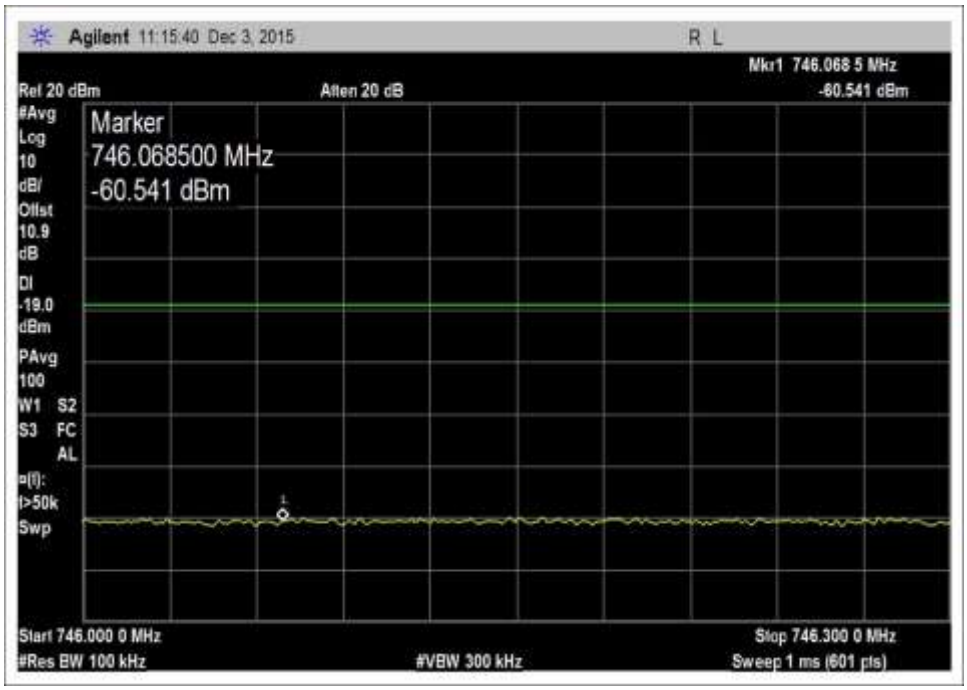
7.5_OBE_DL_728-746MHz_L_Max



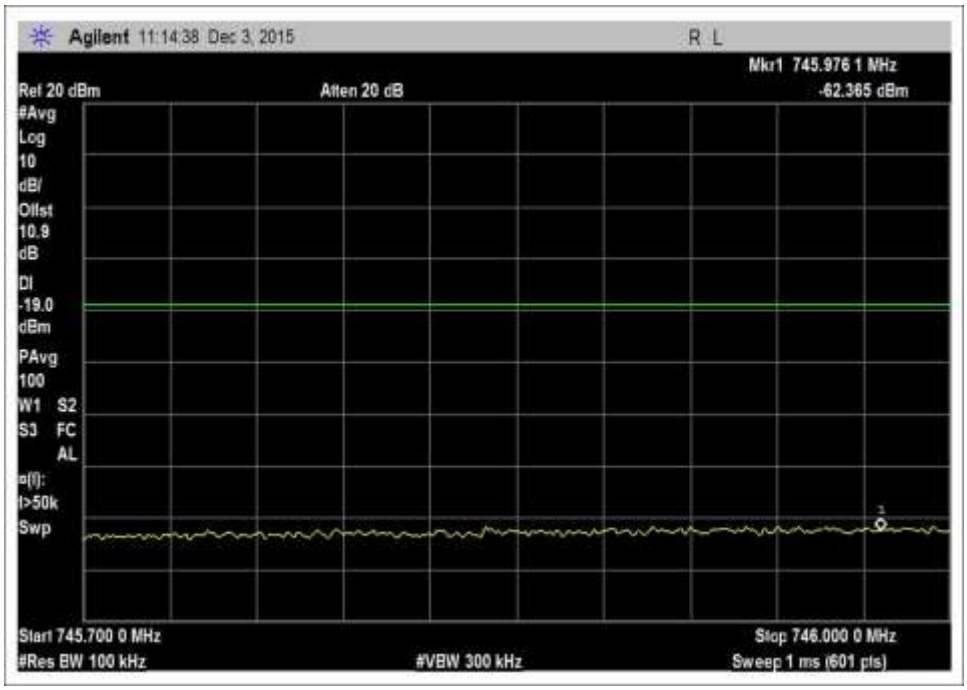
7.5_OBE_DL_728-746MHz_L_PreAGC



7.5_OBE_DL_746-757MHz_H_Max



7.5_OBE_DL_746-757MHz_H_PreAGC



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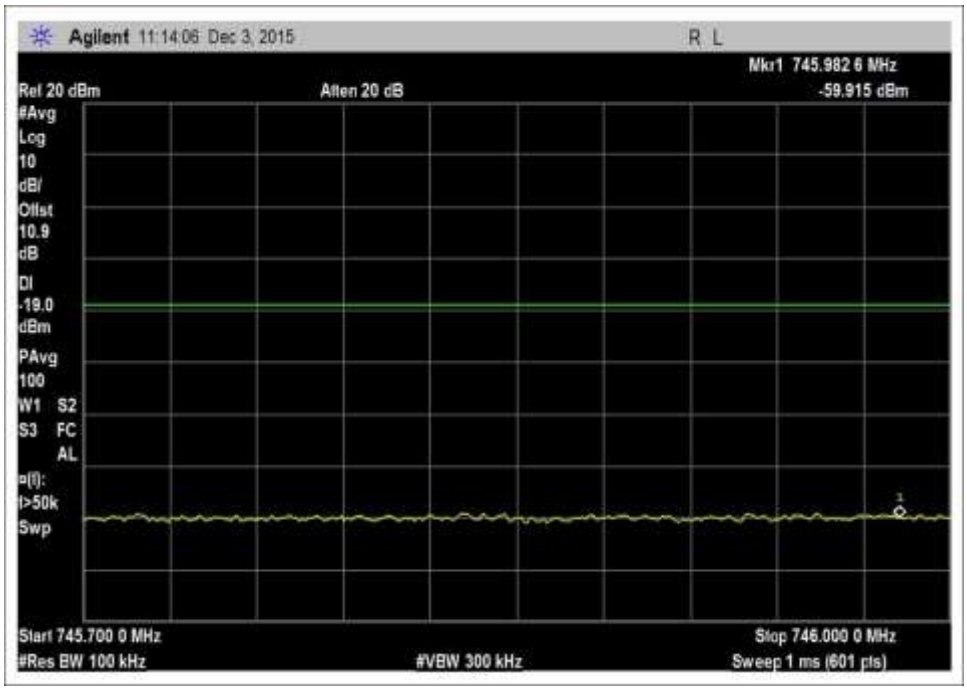
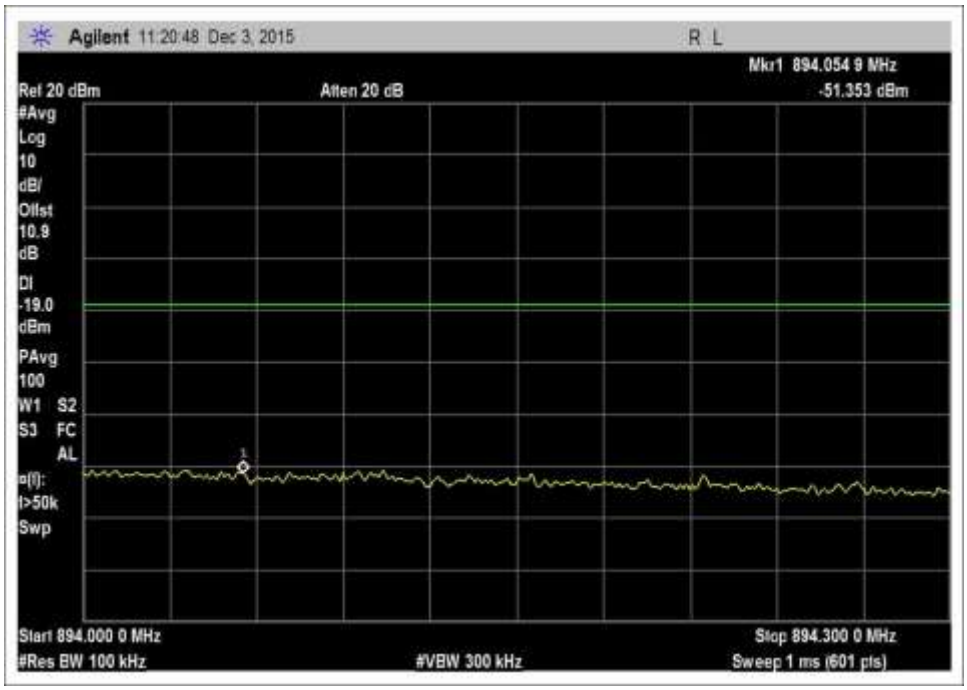
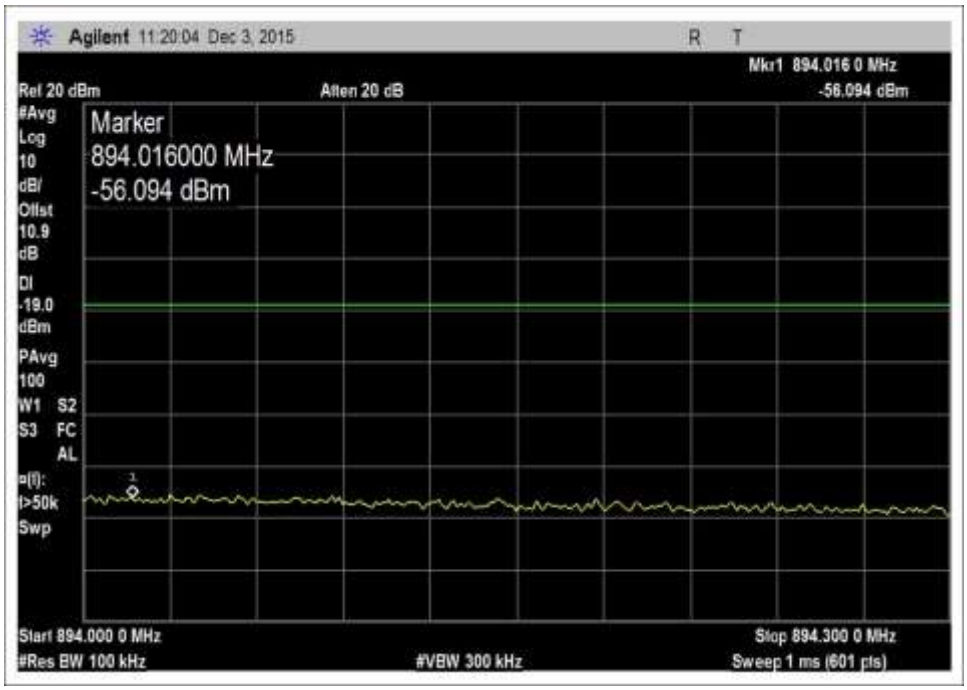


7.5_OBE_DL_746-757MHz_L_PreAGC



7.5_OBE_DL_869-894MHz_H_Max



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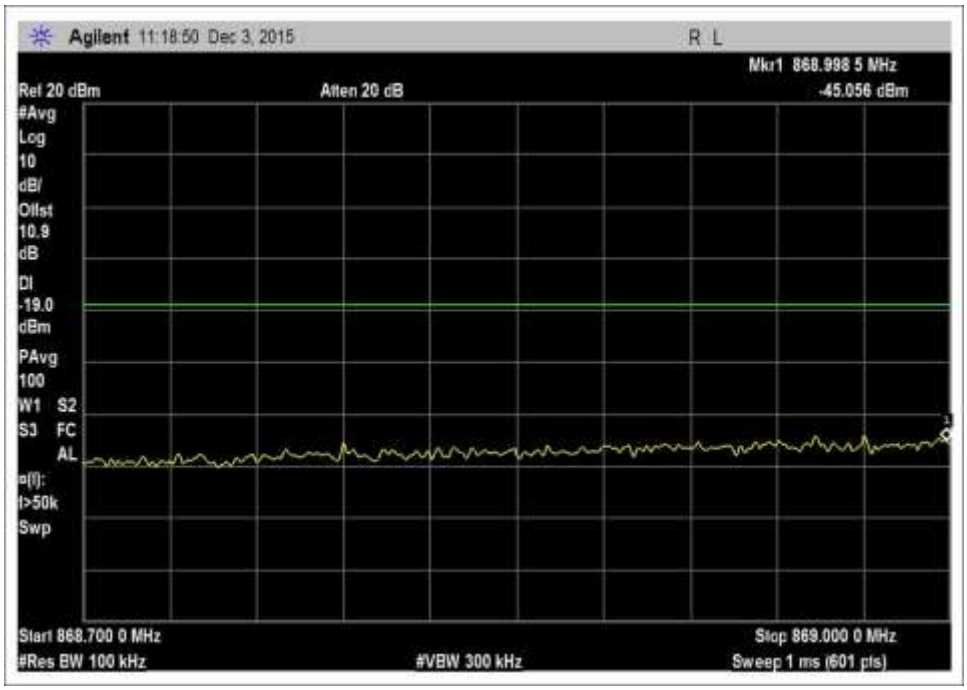

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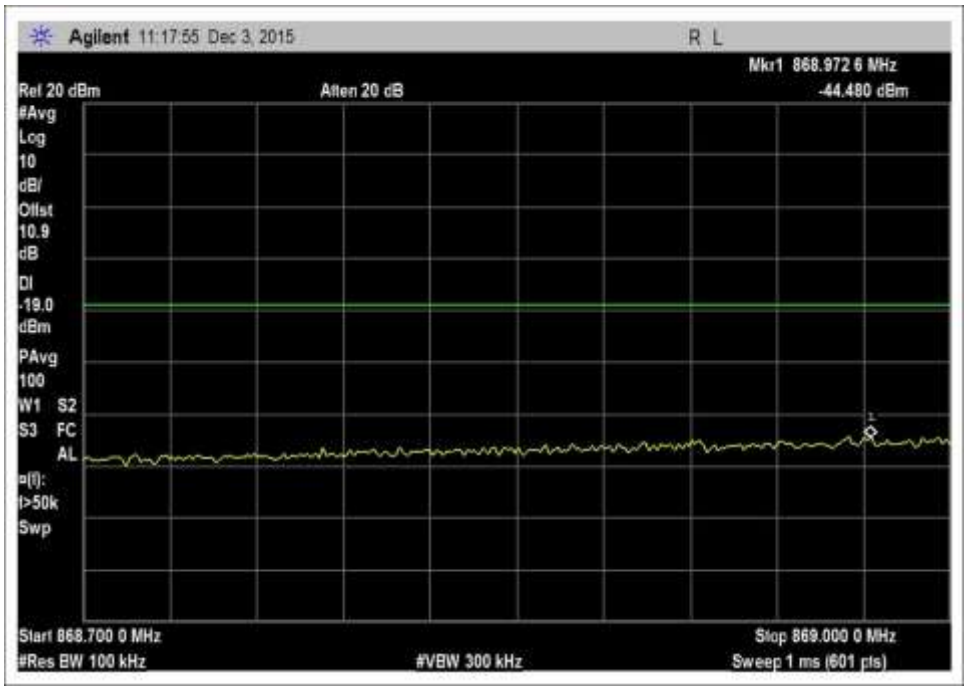
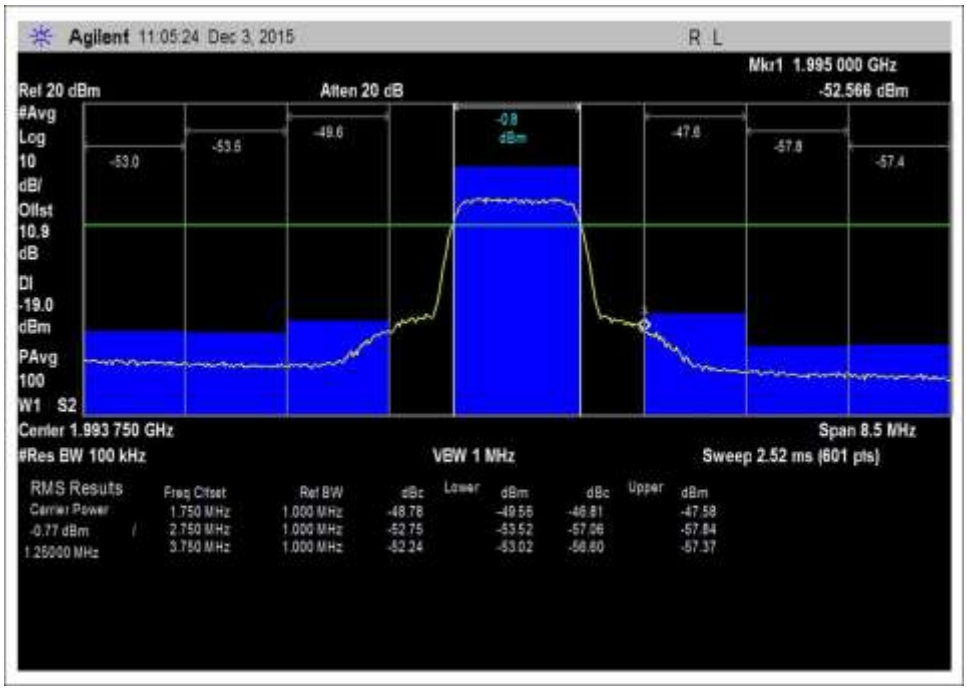
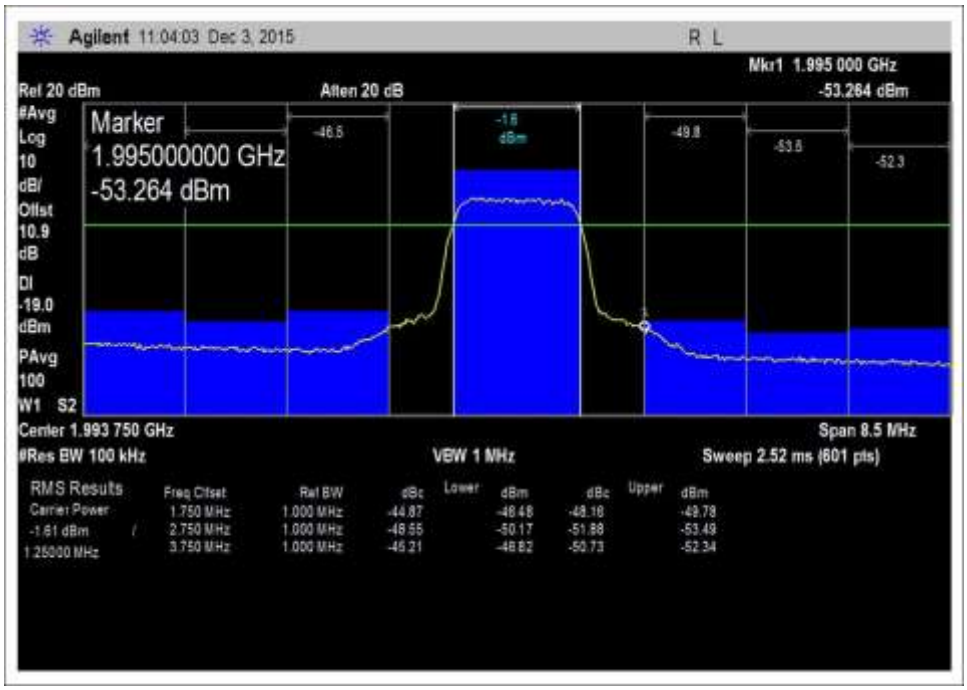


7.5_OBE_DL_869-894MHz_L_PreAGC



7.5_OBE_DL_1930-1995MHz_H_Max



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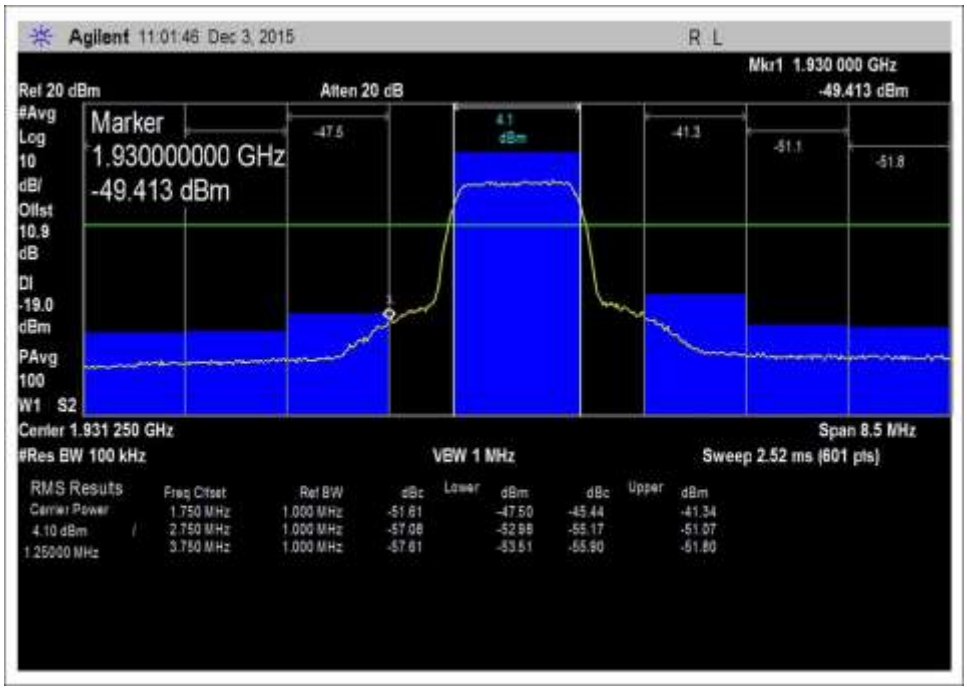

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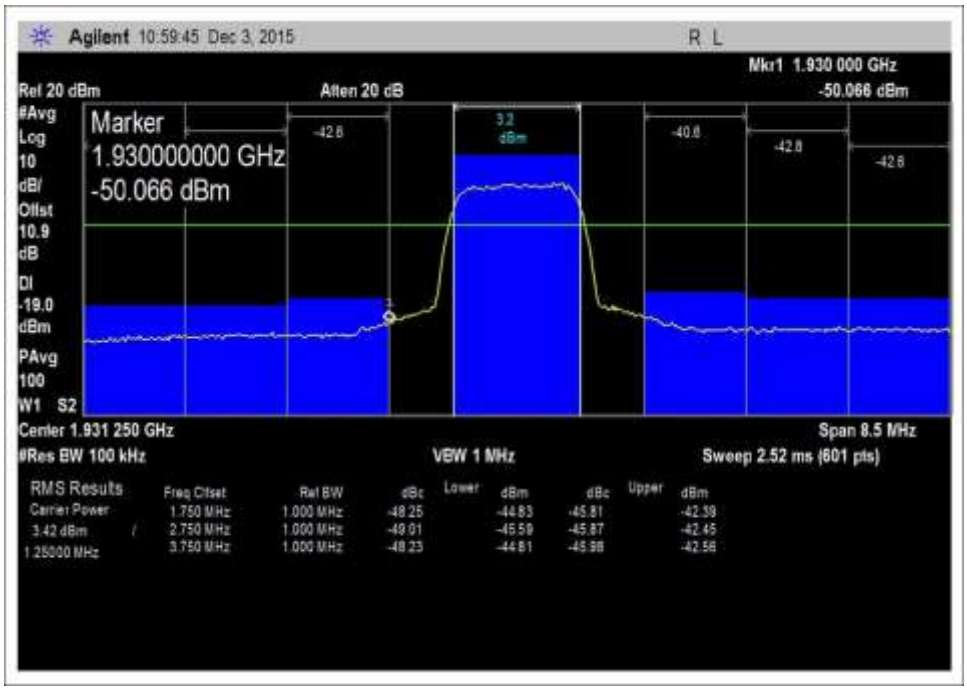

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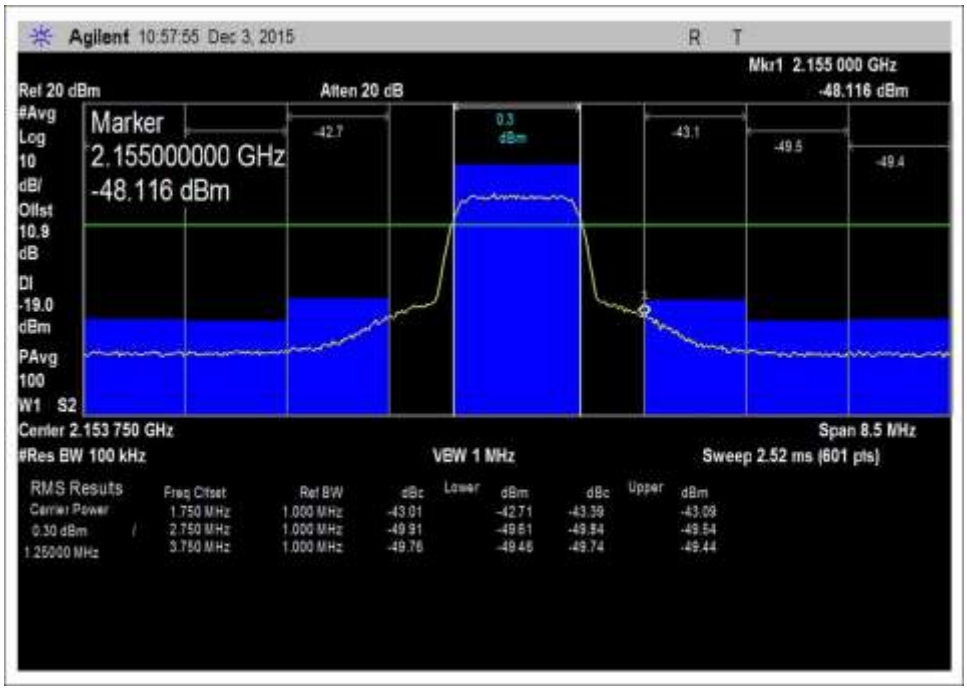
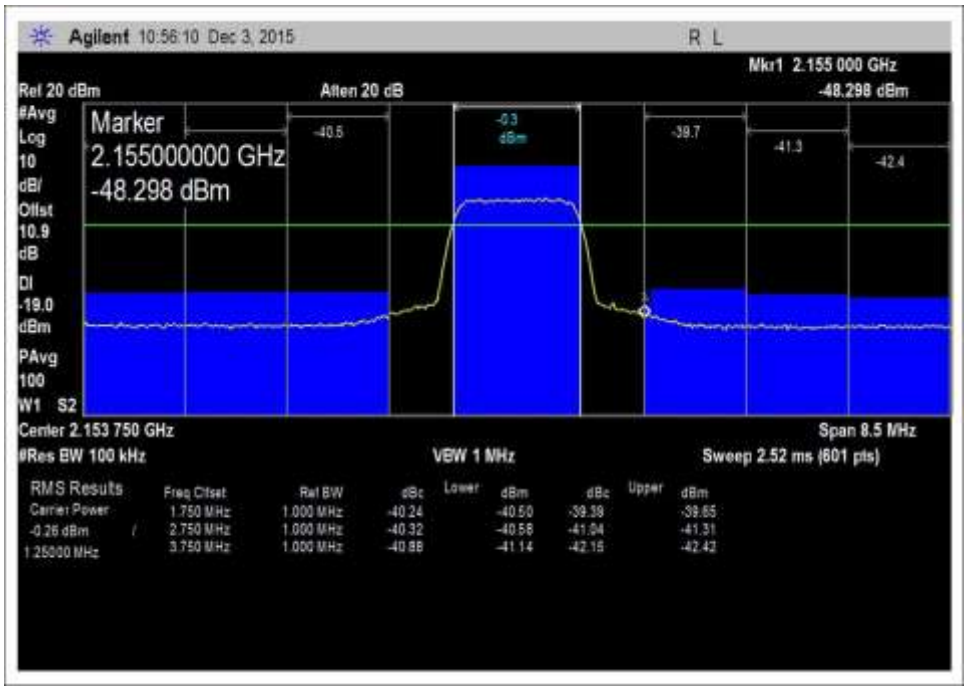


7.5_OBE_DL_2110-2155MHz_H_Max



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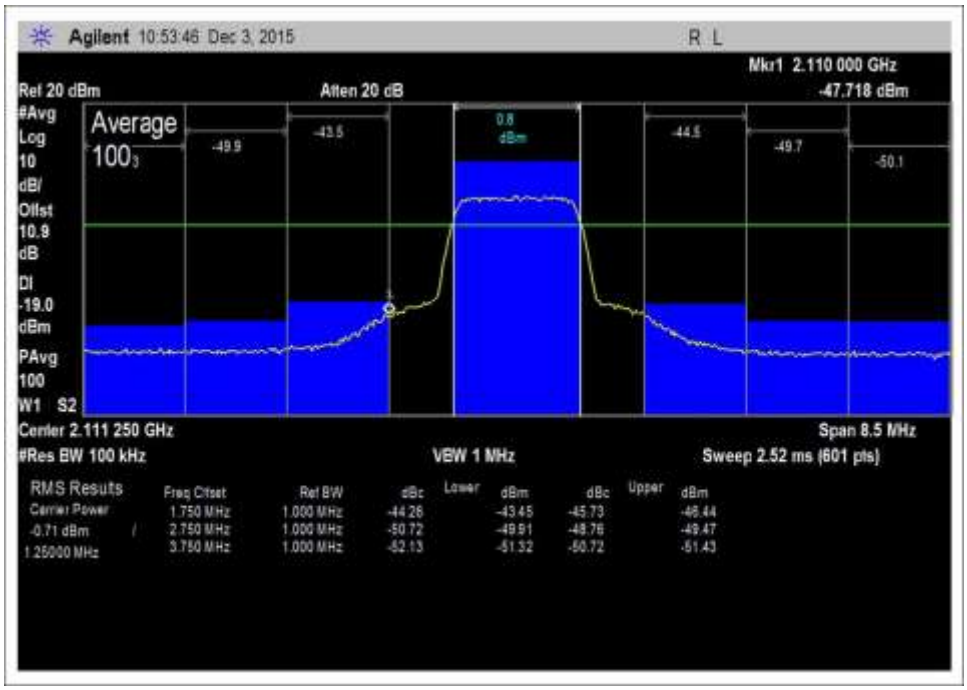

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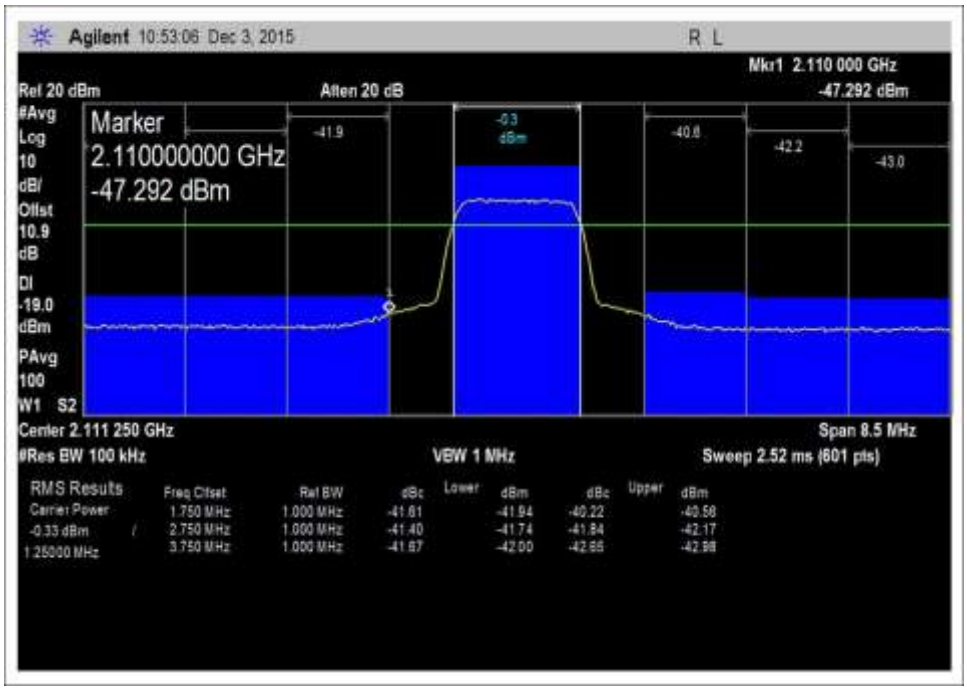
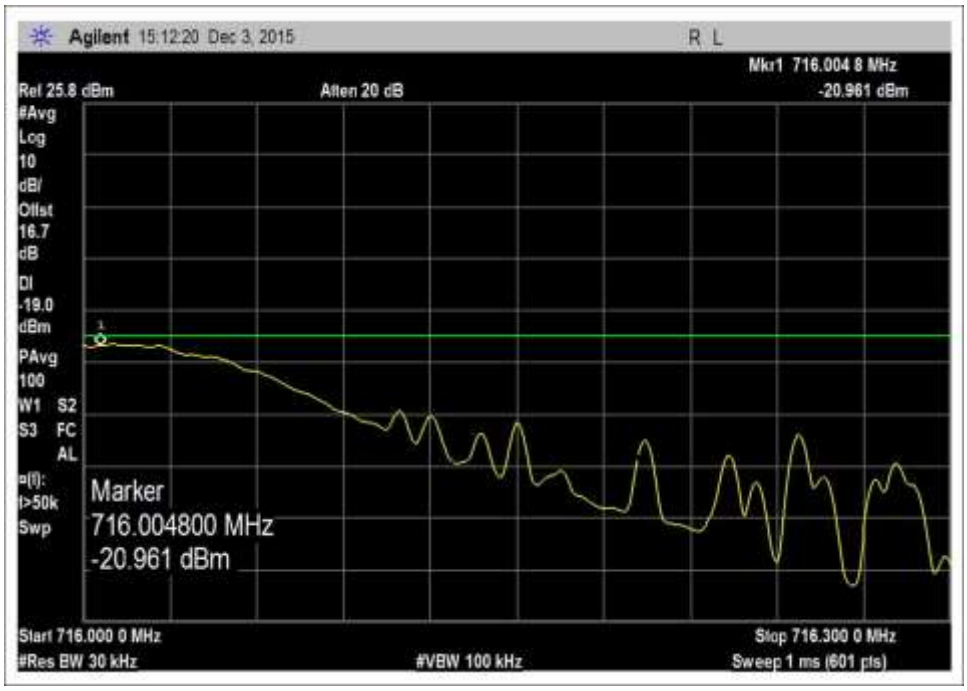
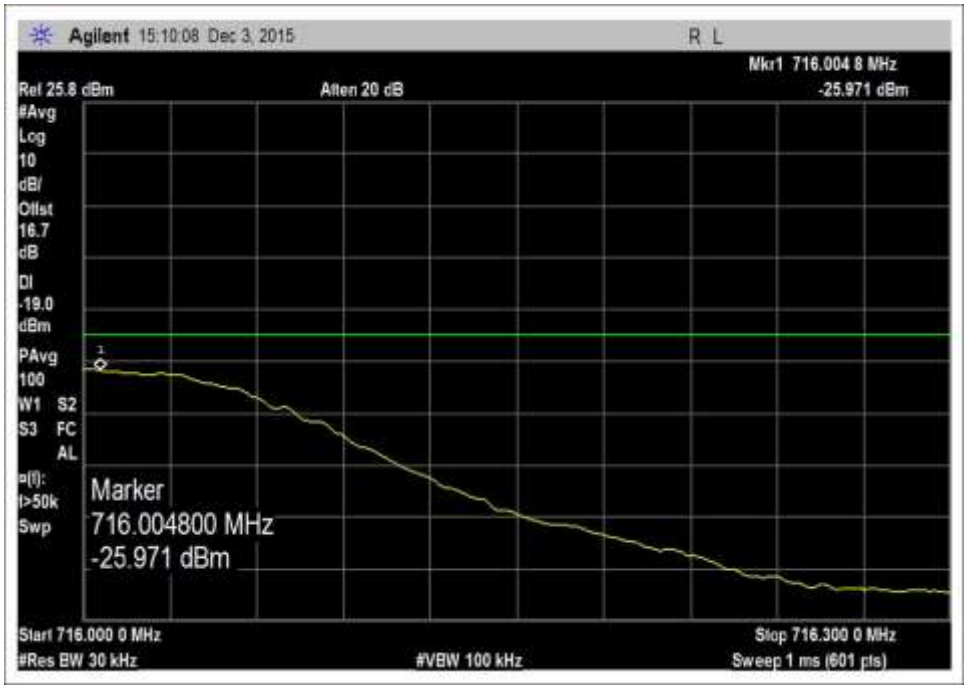


7.5_OBE_DL_2110-2155MHz_L_PreAGC

GSM



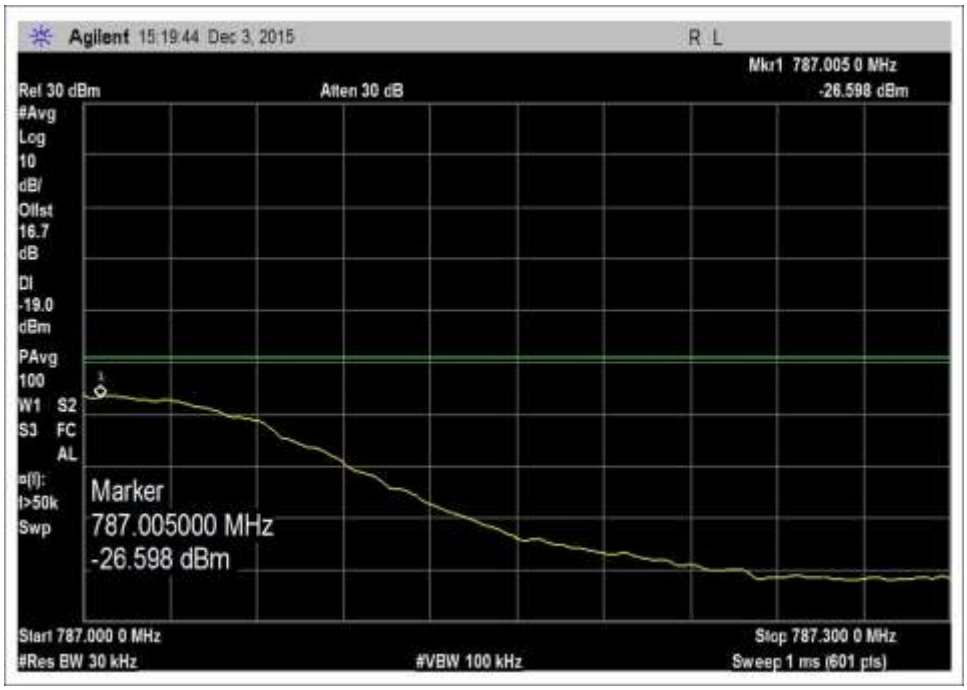
7.5_OBE_UL_698-716MHz_H_0dBm



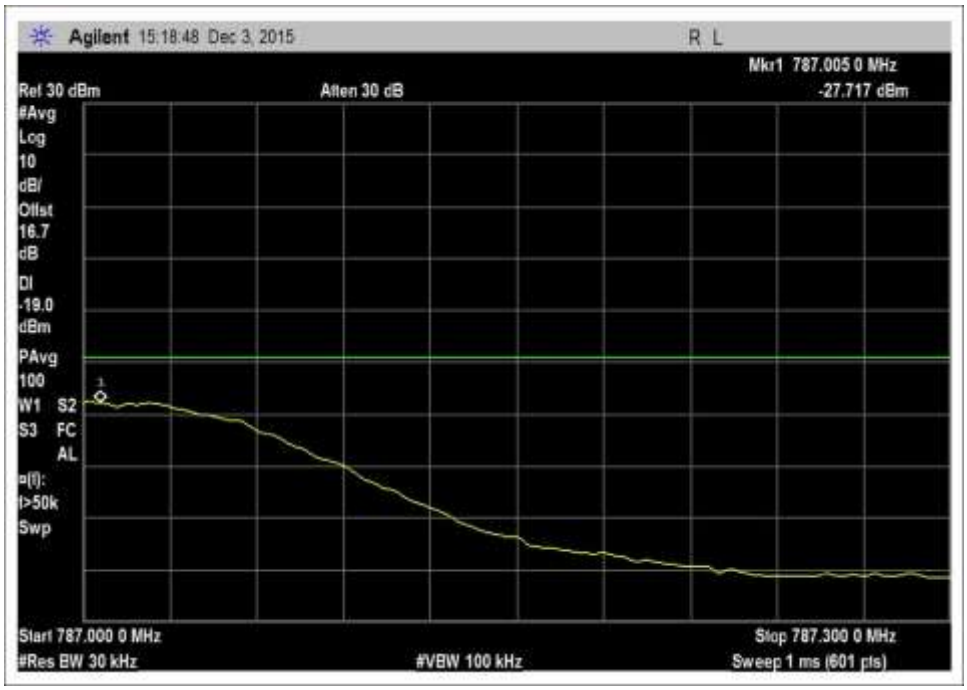
7.5_OBE_UL_698-716MHz_H_PreAGC

7.5_OBE_UL_698-716MHz_L_Max

7.5_OBE_UL_698-716MHz_L_PreAGC



7.5_OBE_UL_776-787MHz_H_Max



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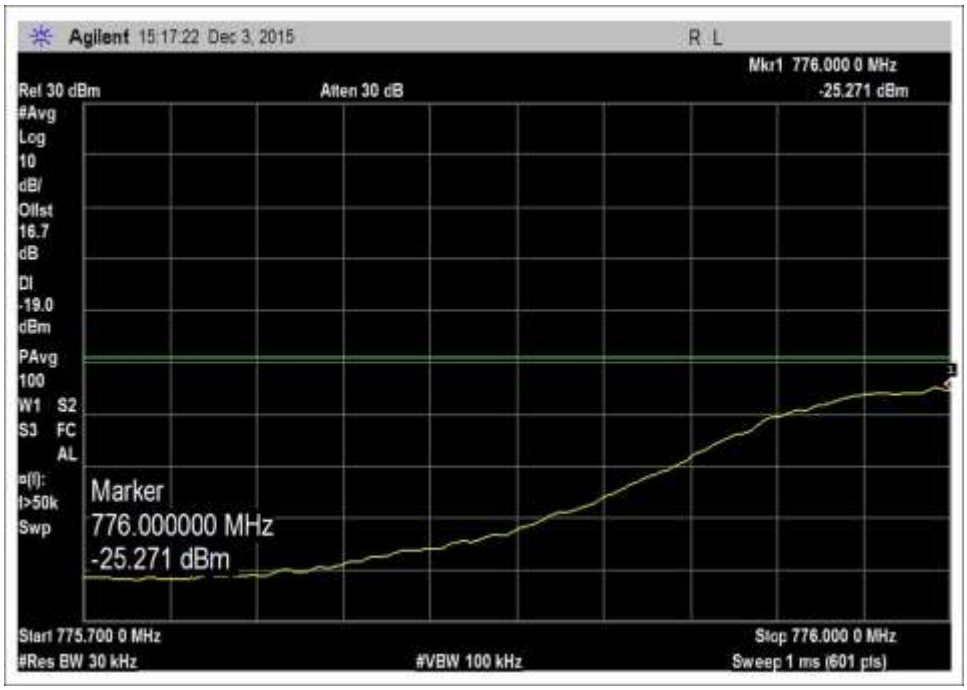

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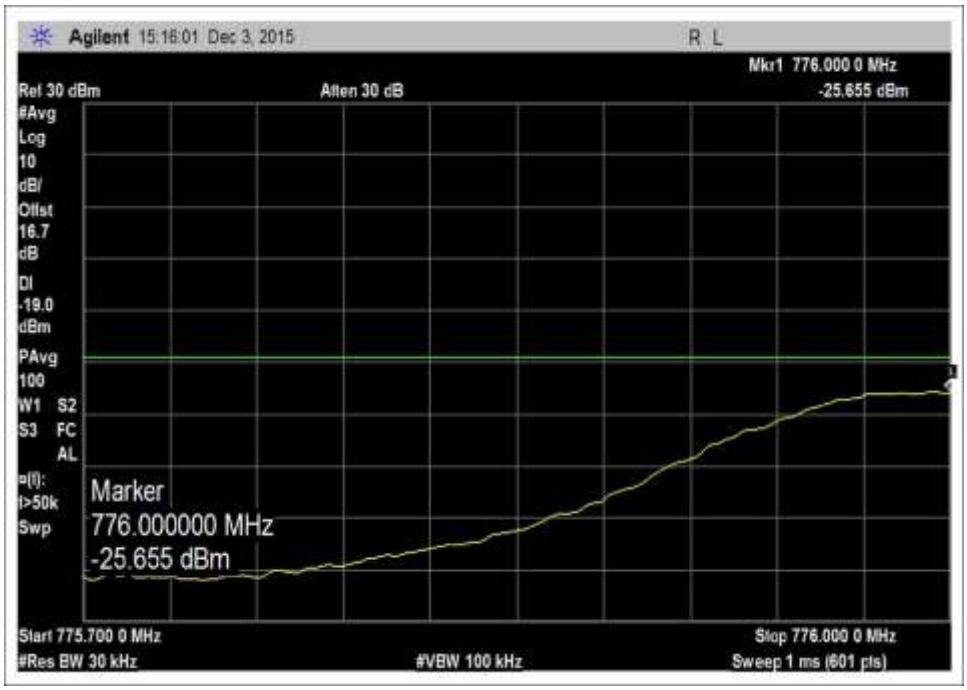

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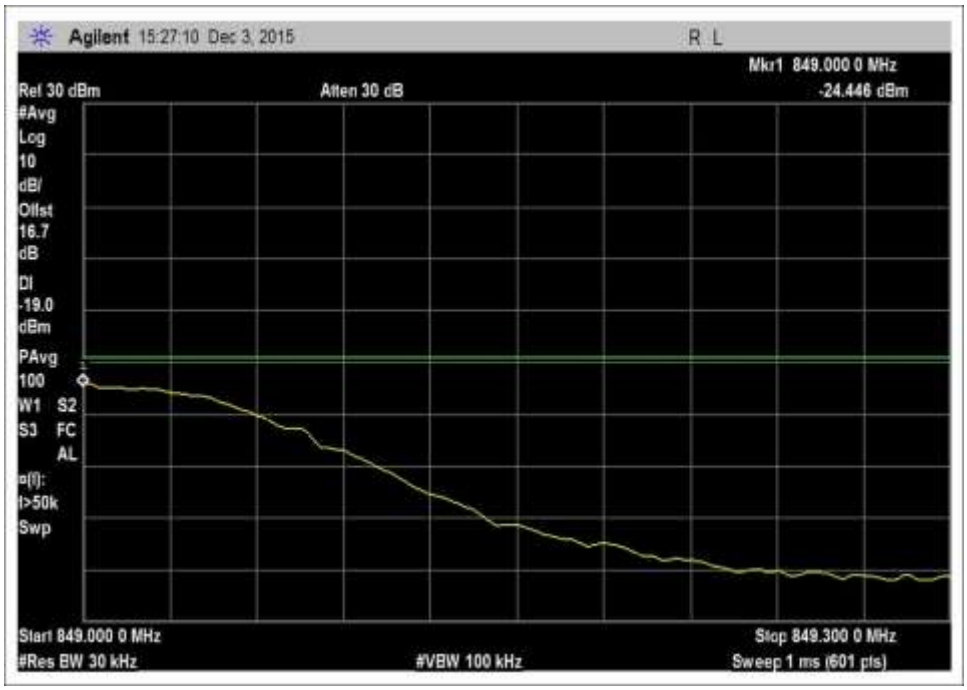
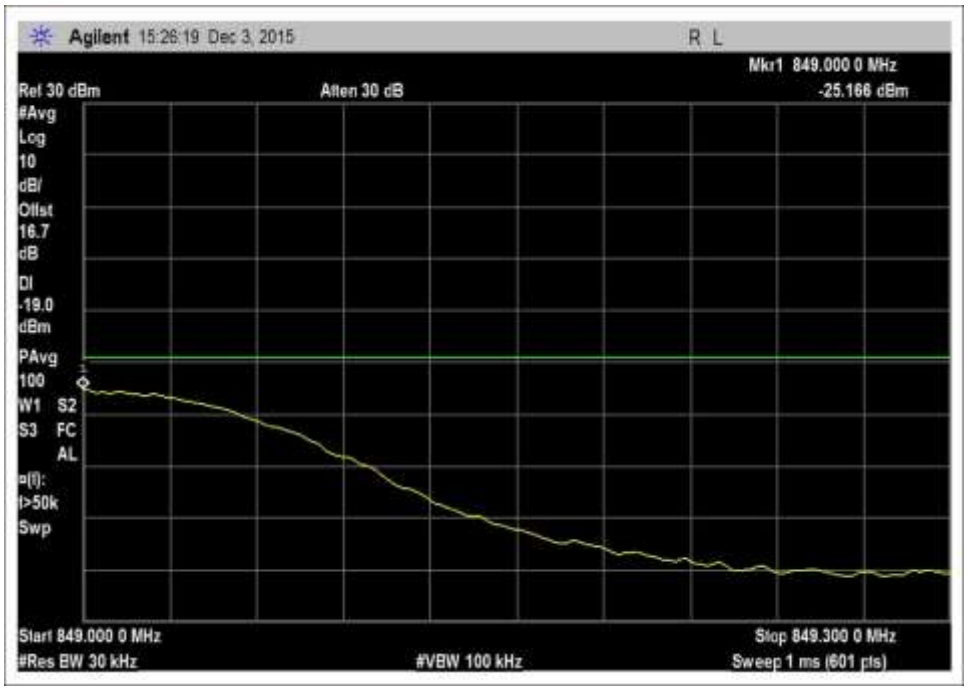
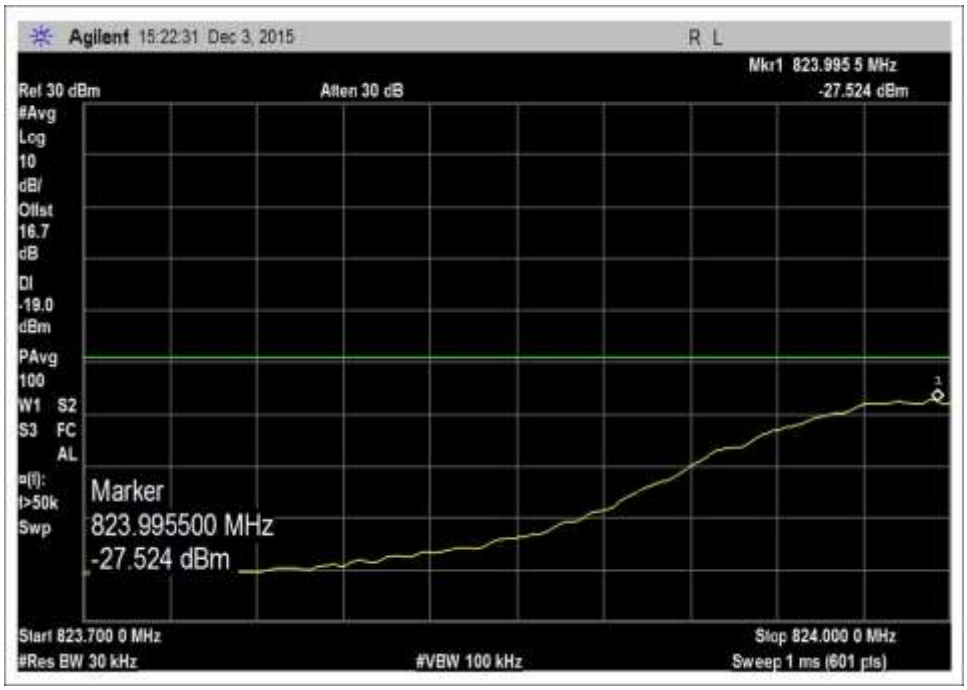


7.5_OBE_UL_824-849MHz_H_Max



7.5_OBE_UL_824-849MHz_H_PreAGC

7.5_OBE_UL_824-849MHz_L_Max



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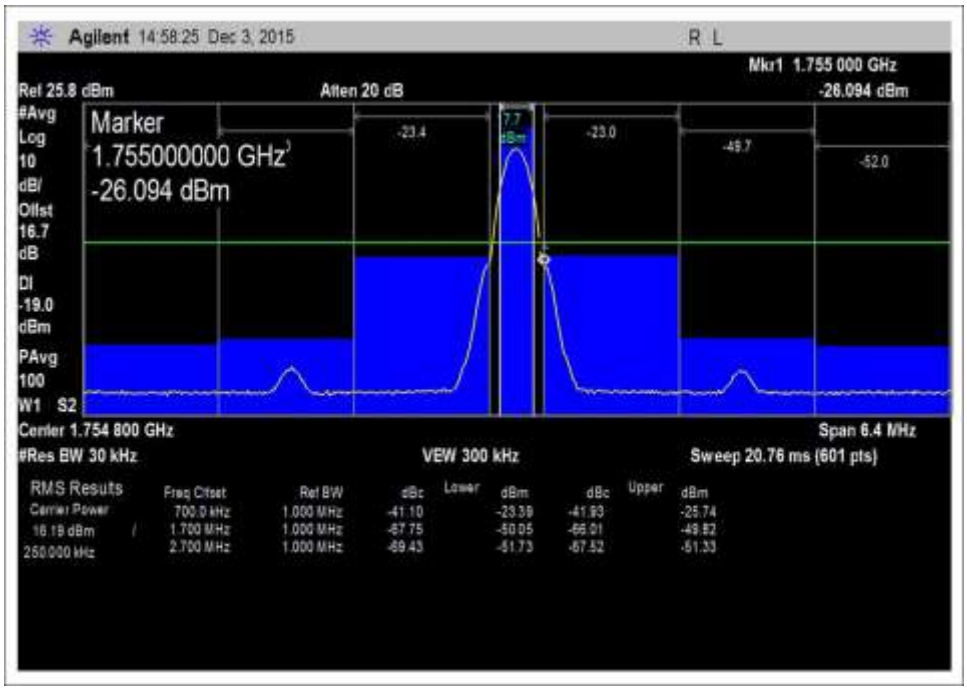
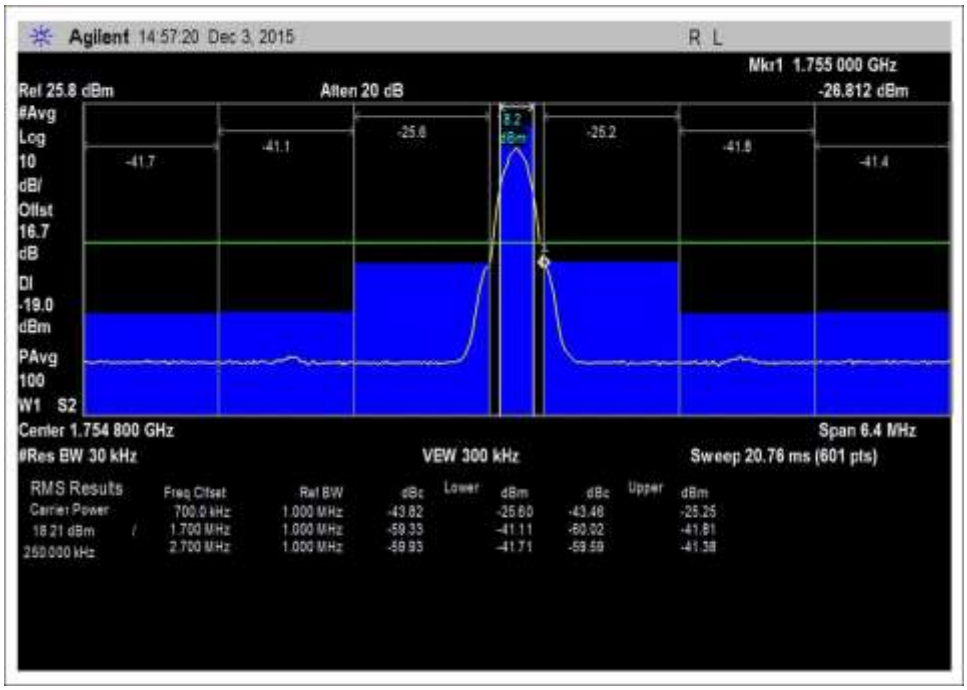


7.5_OBE_UL_1710-1755MHz_H_Max



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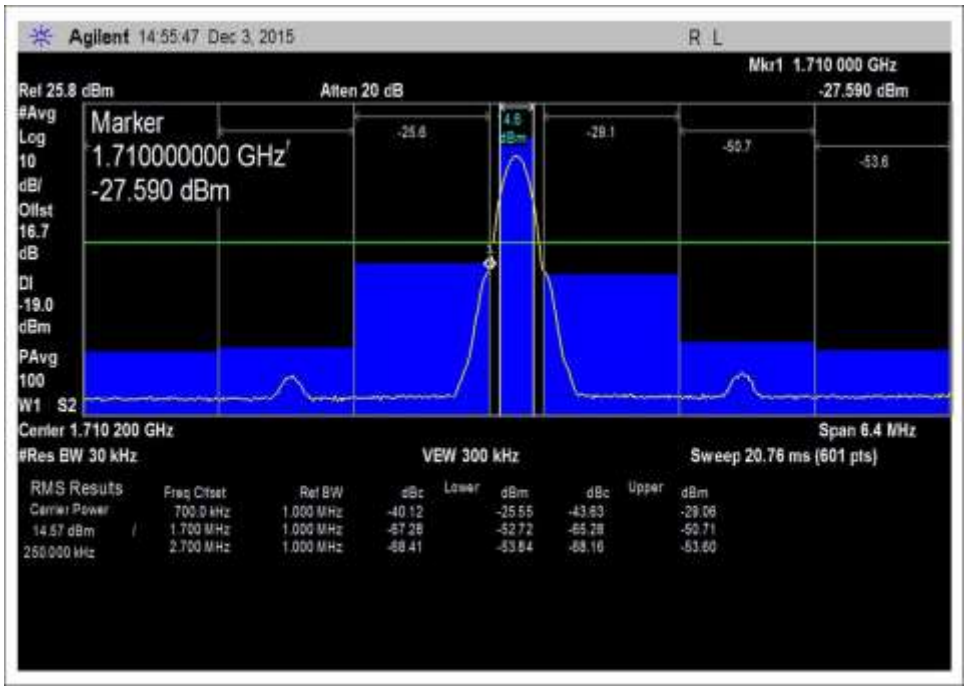

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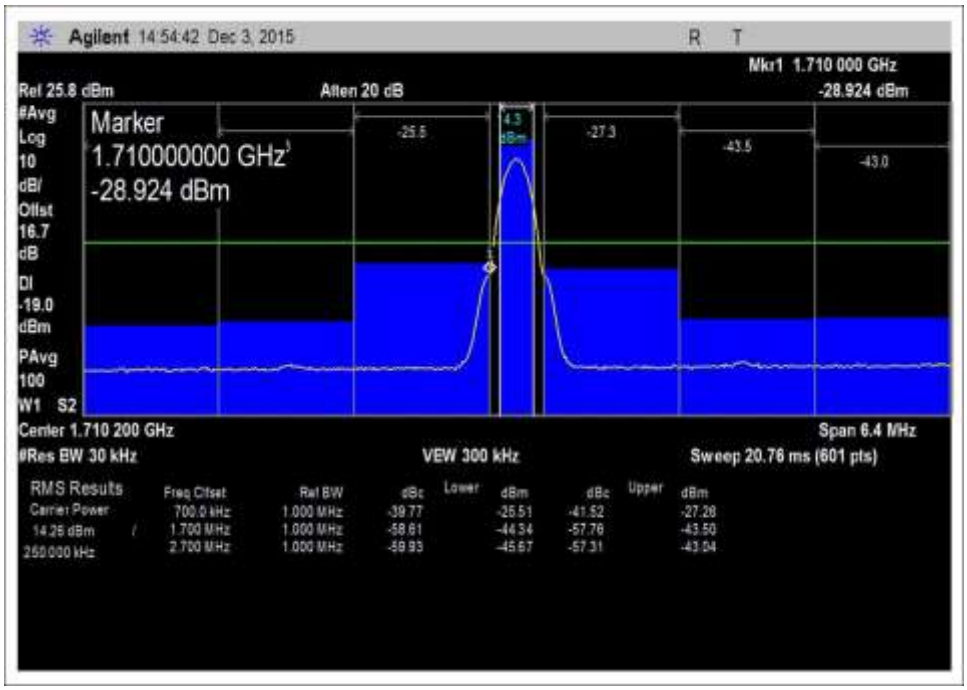

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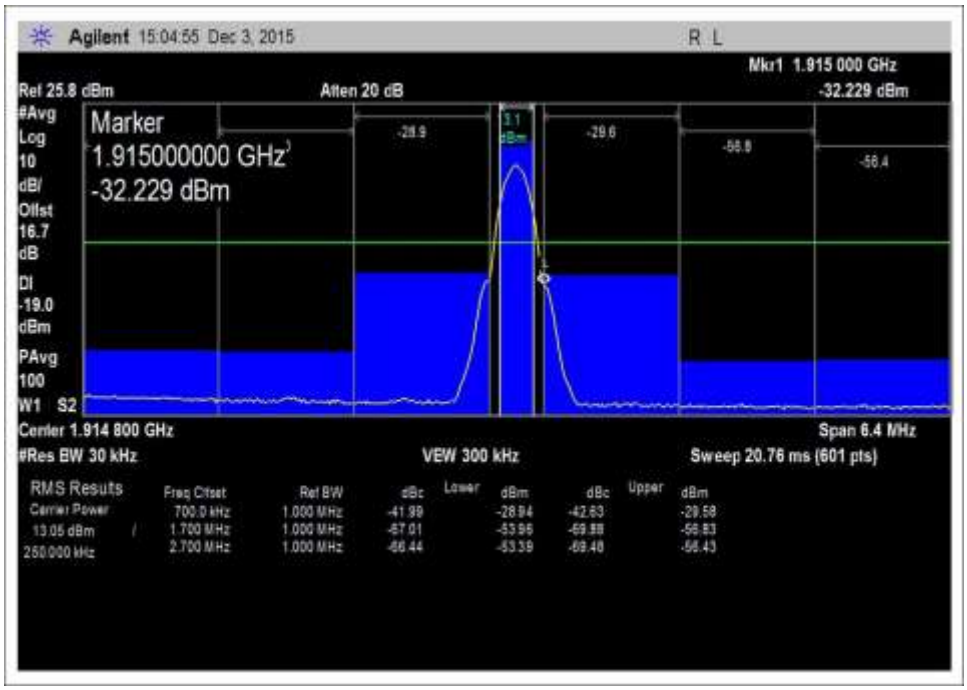
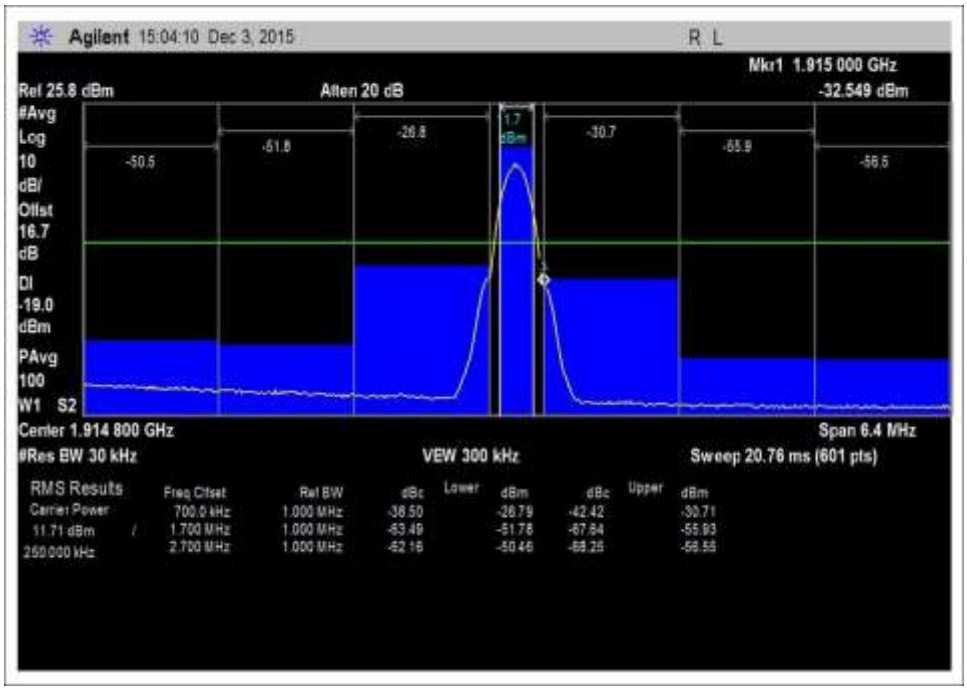


7.5_OBE_UL_1850-1915MHz_H_Max



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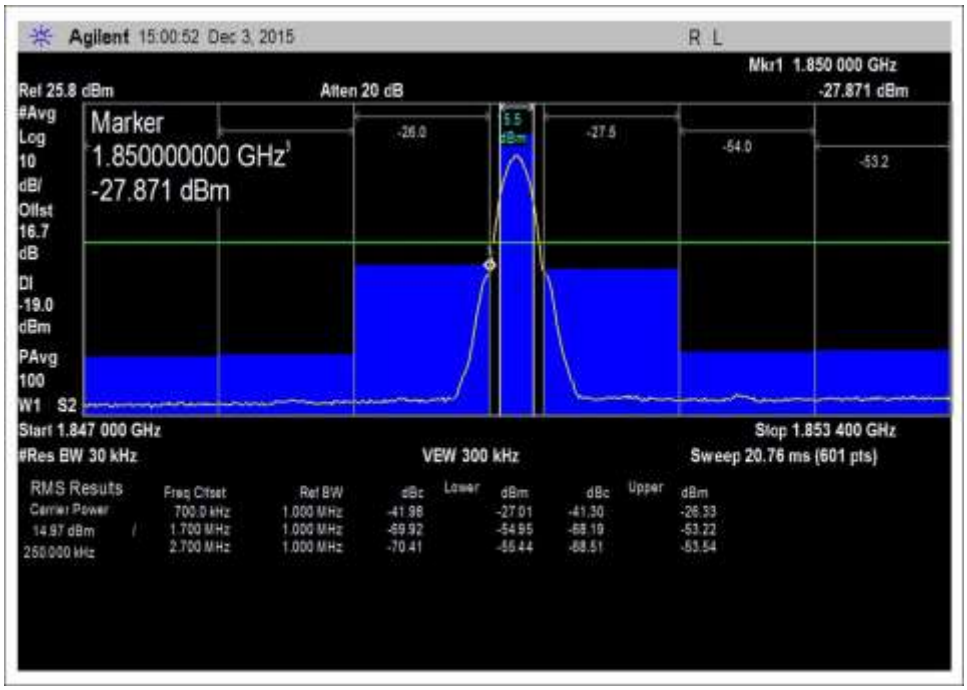

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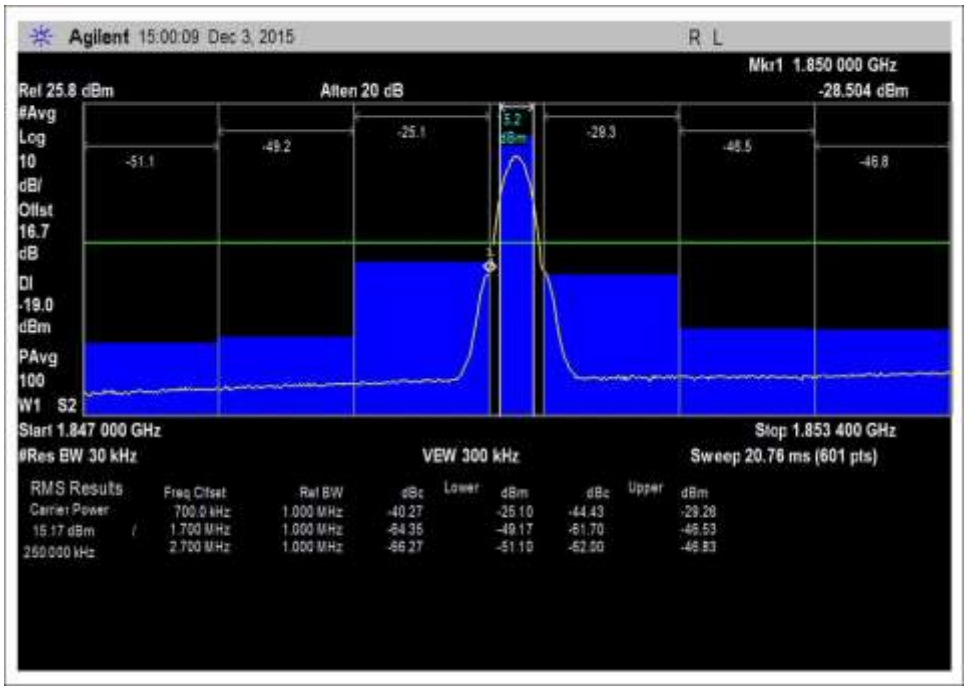

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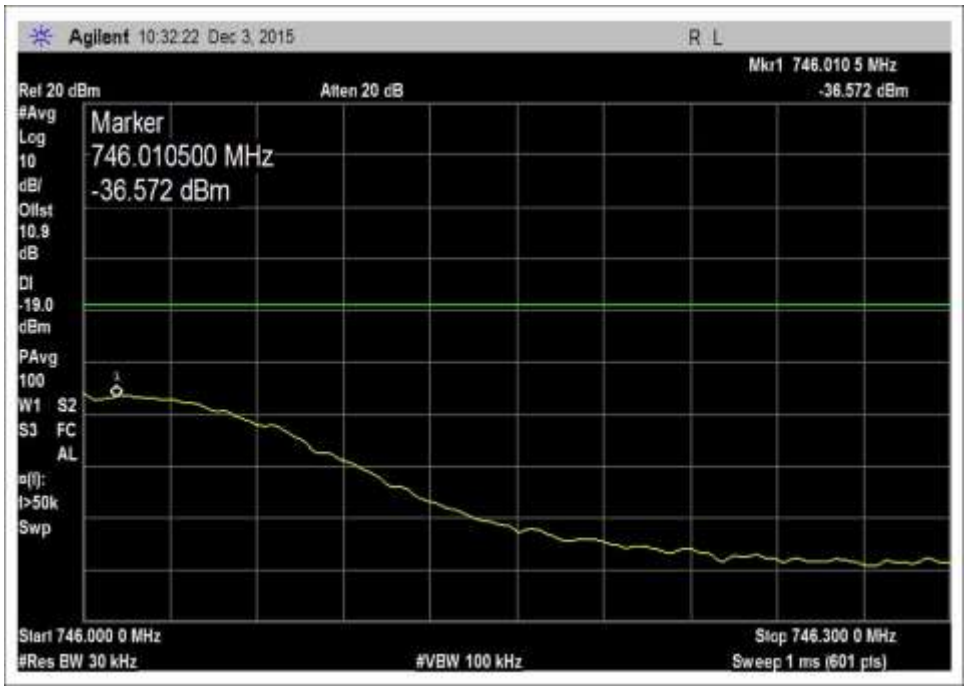
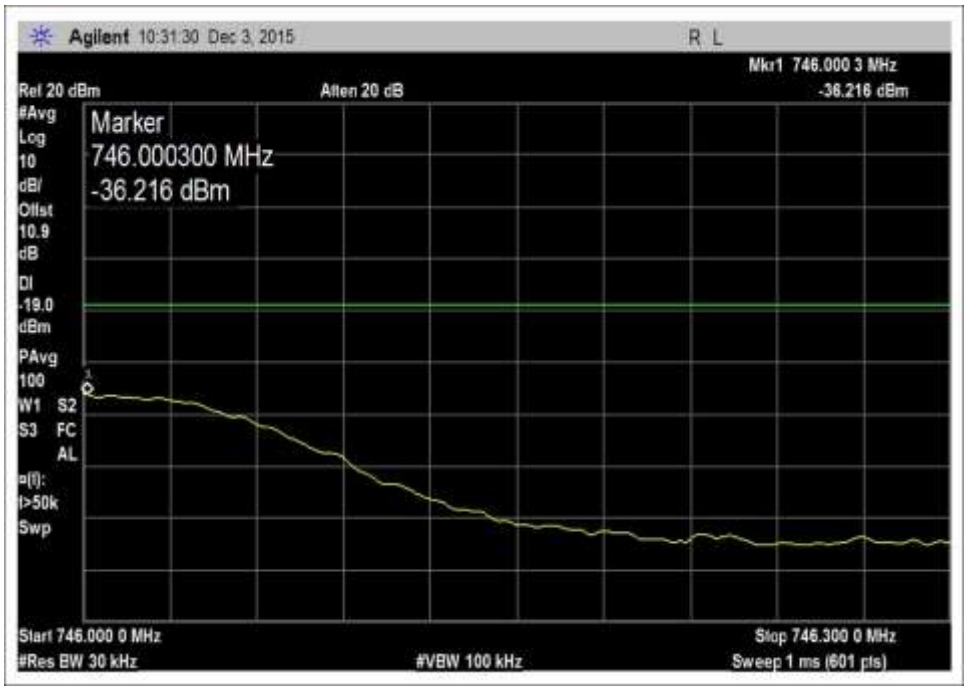


7.5_OBE_DL_728-746MHz_H_Max



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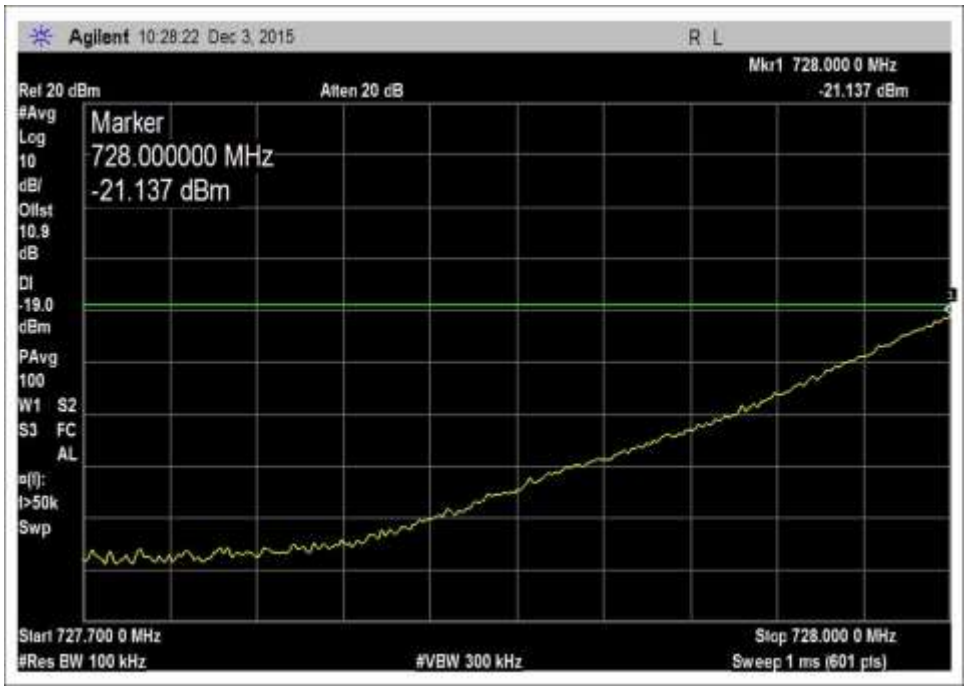
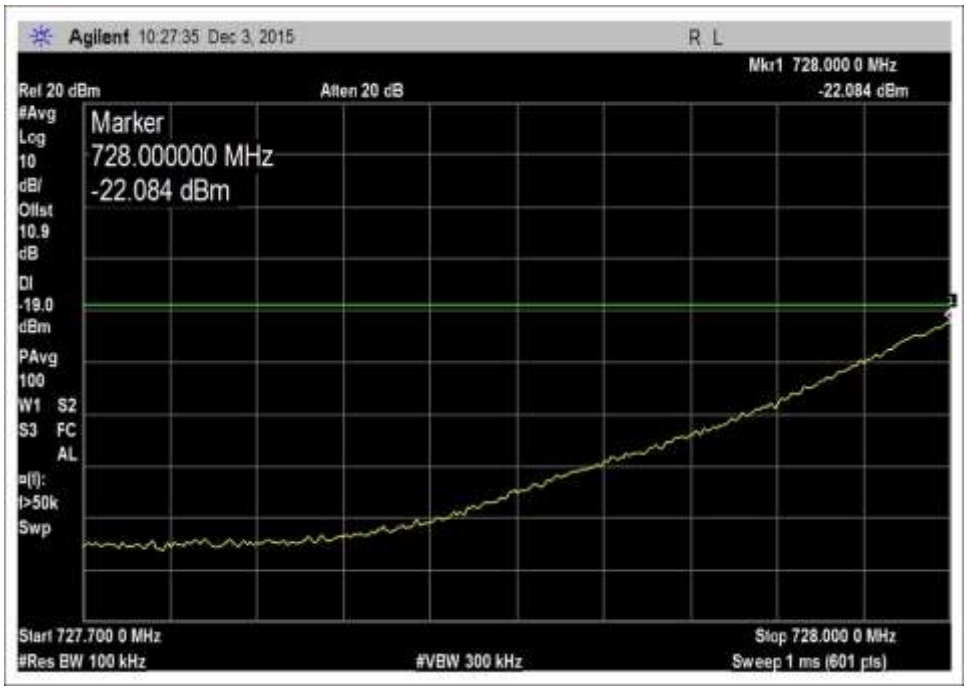


7.5_OBE_DL_728-746MHz_L_Max



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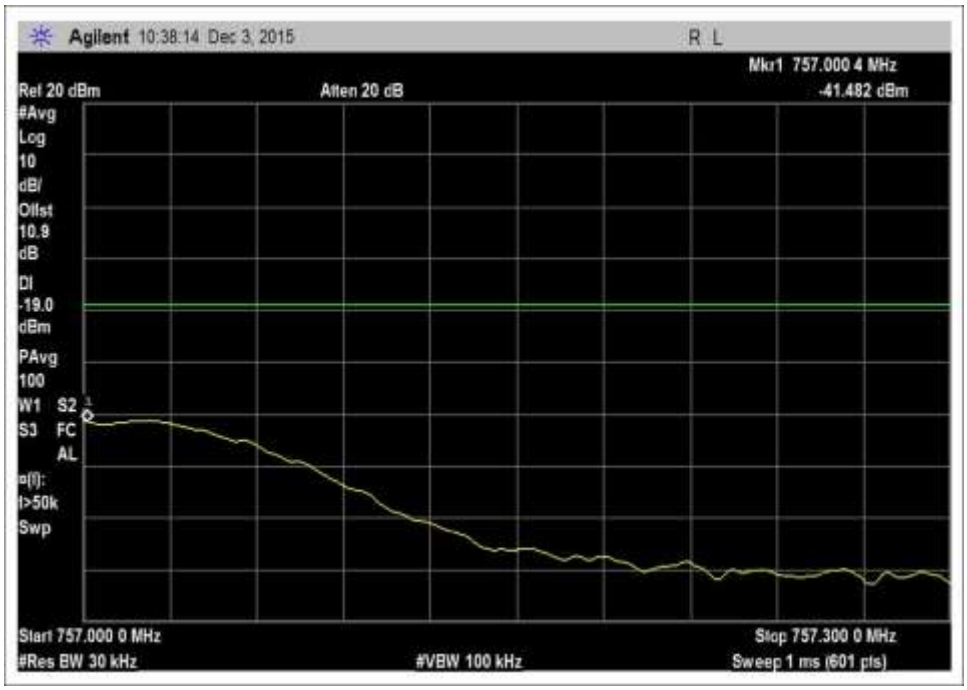
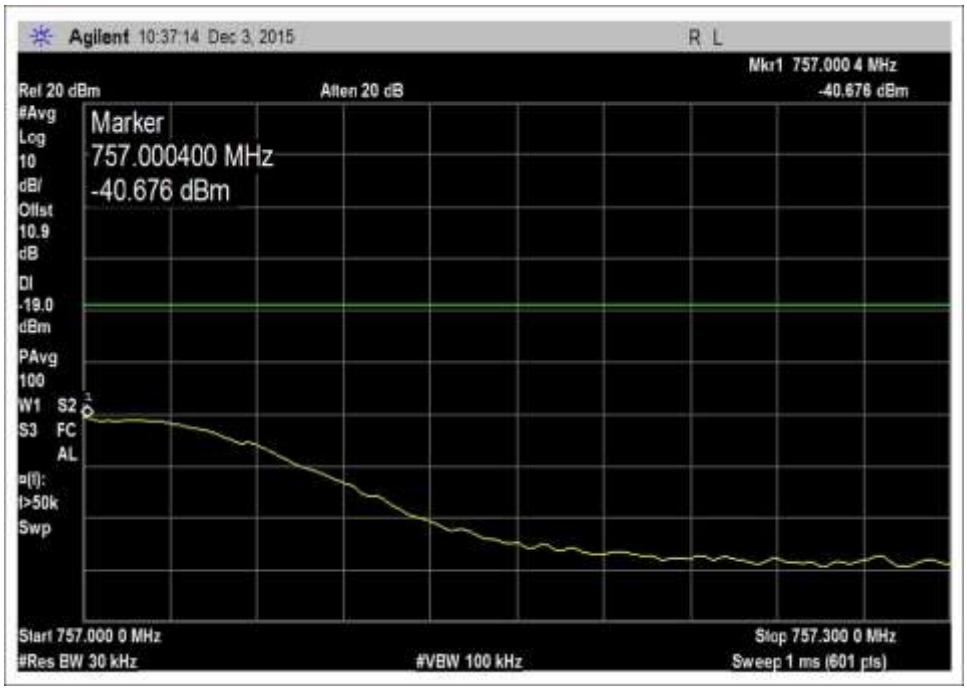
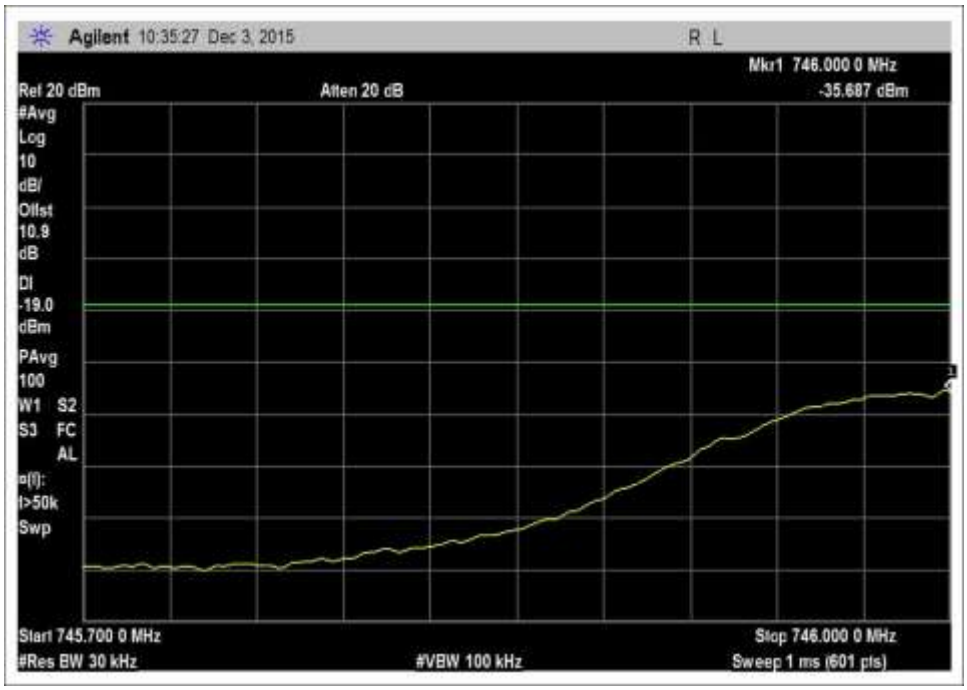


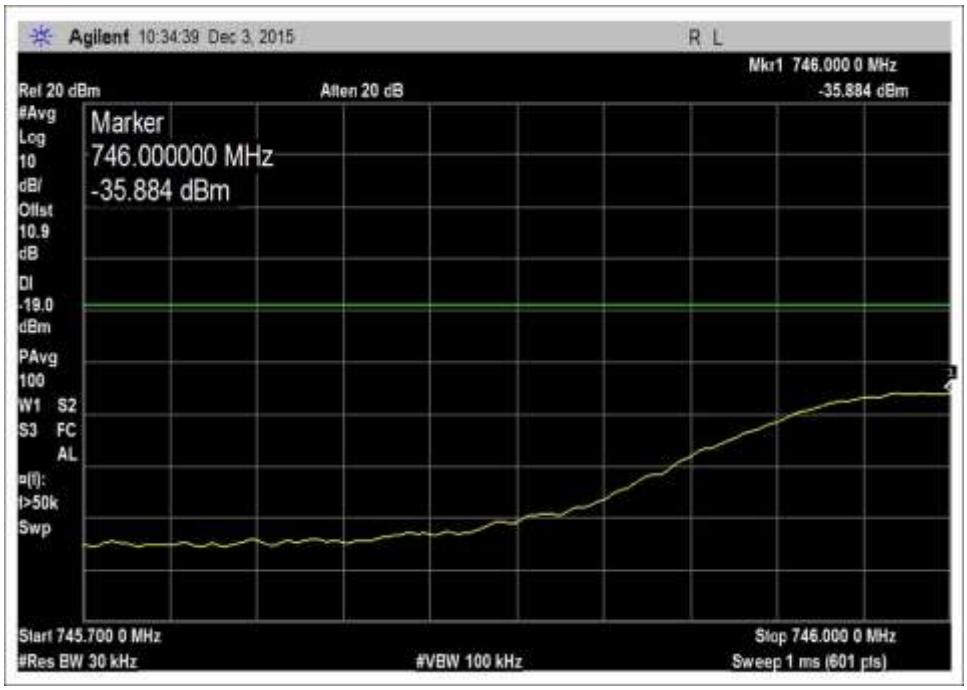
7.5_OBE_DL_746-757MHz_H_Max



7.5_OBE_DL_746-757MHz_H_PreAGC



7.5_OBE_DL_746-757MHz_L_Max



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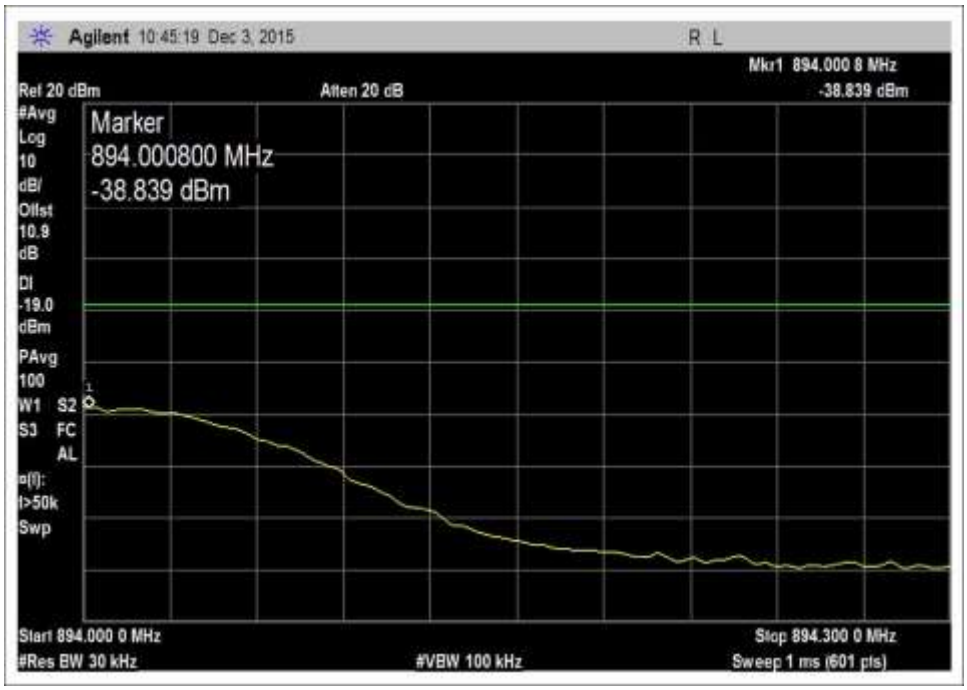
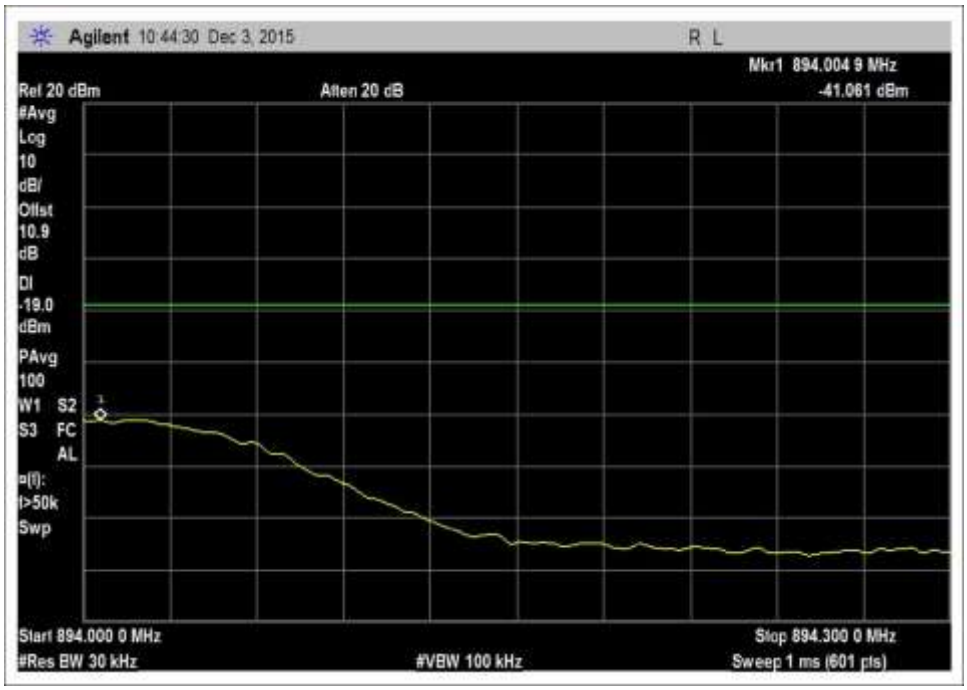
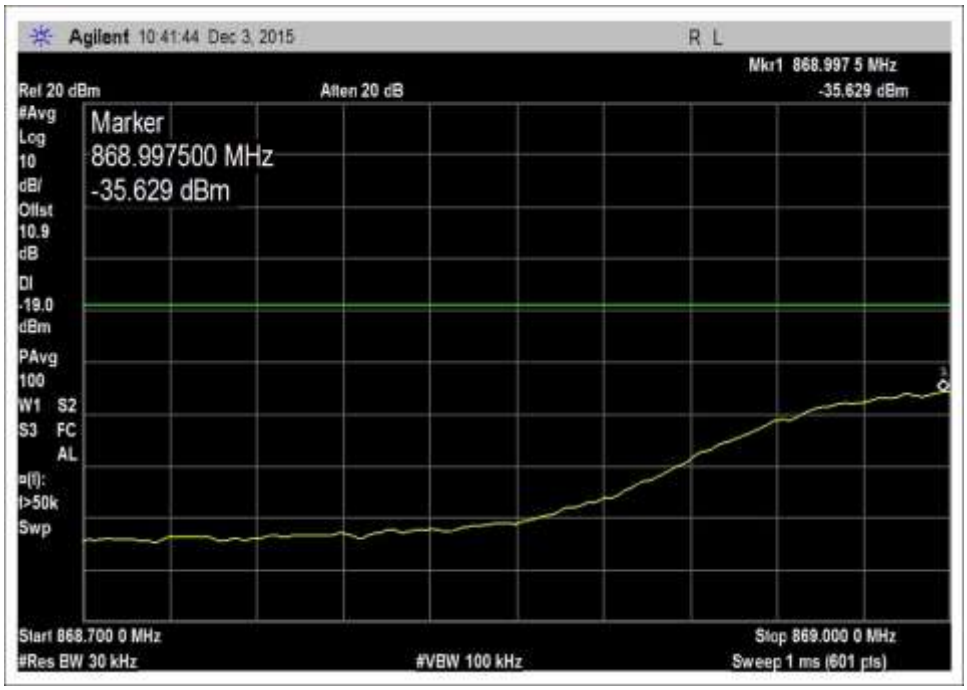


7.5_OBE_DL_869-894MHz_H_Max



7.5_OBE_DL_869-894MHz_H_PreAGC

7.5_OBE_DL_869-894MHz_L_Max



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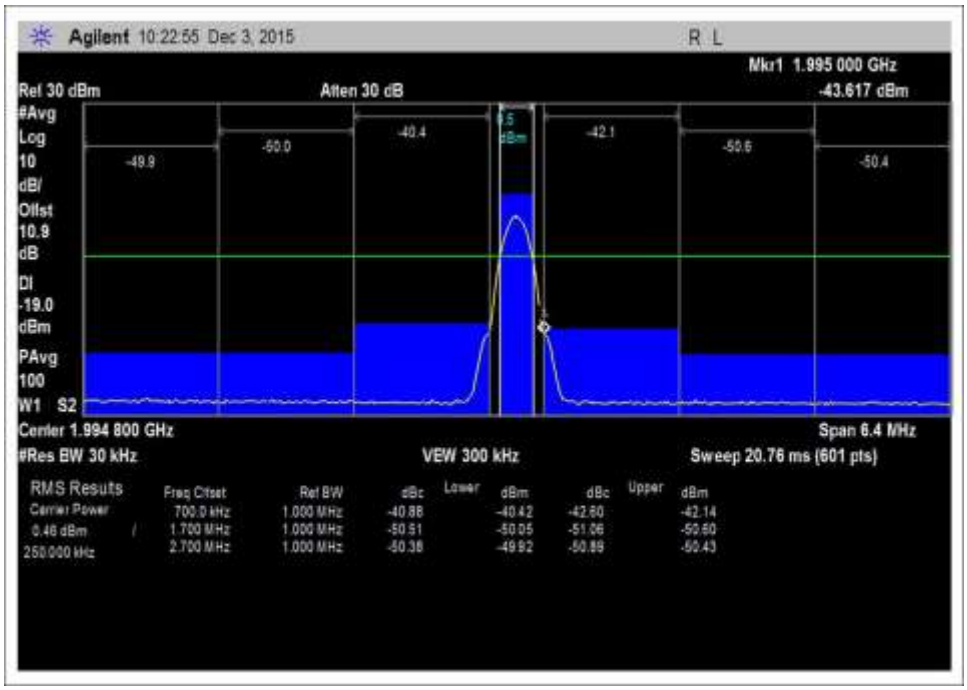
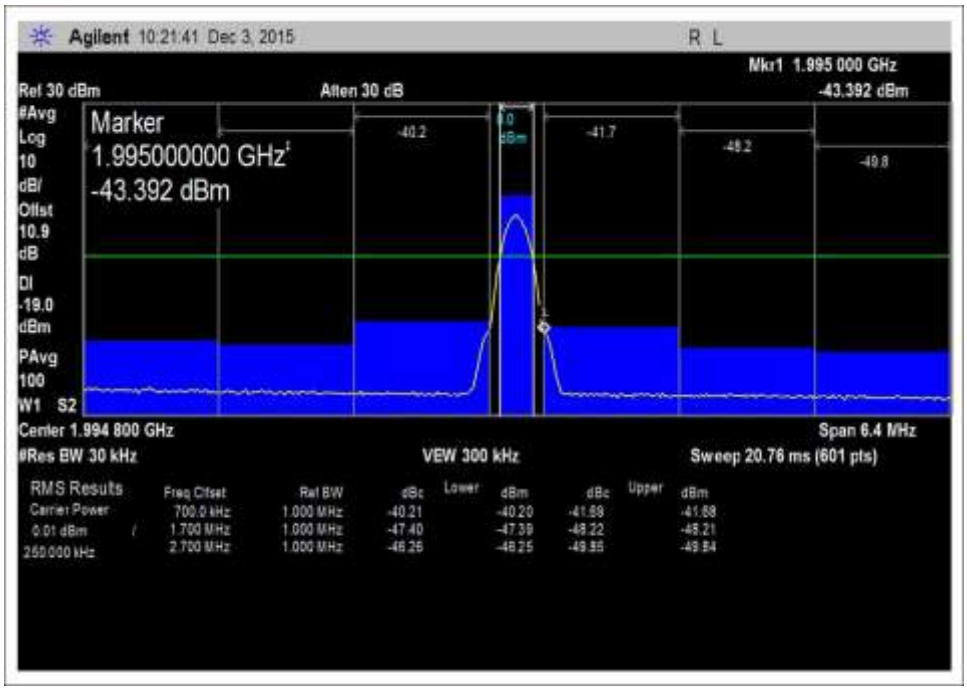


7.5_OBE_DL_1930-1995MHz_H_Max



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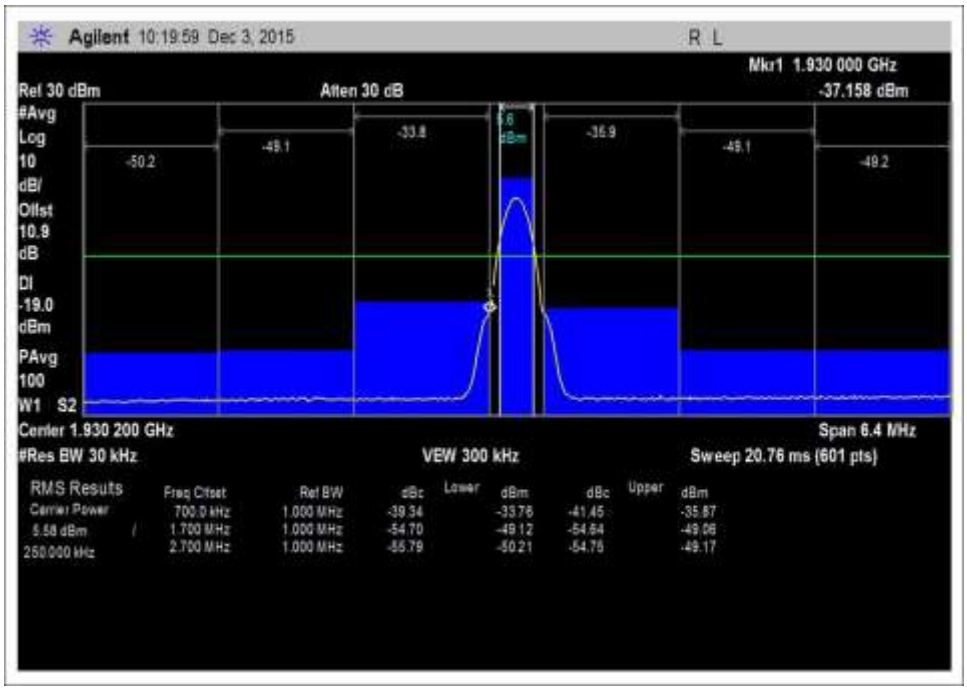
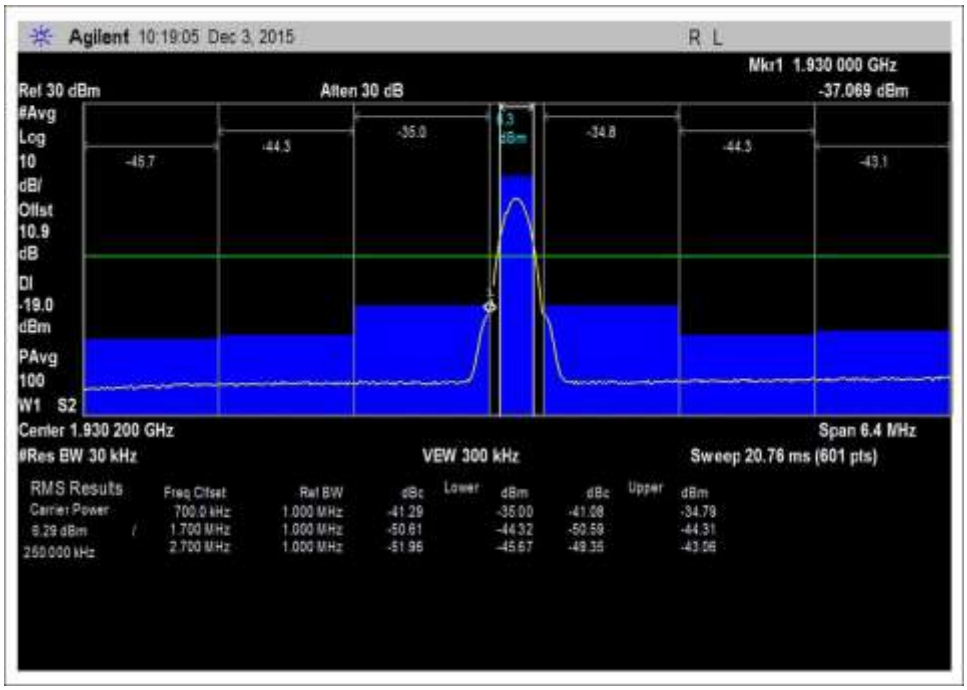
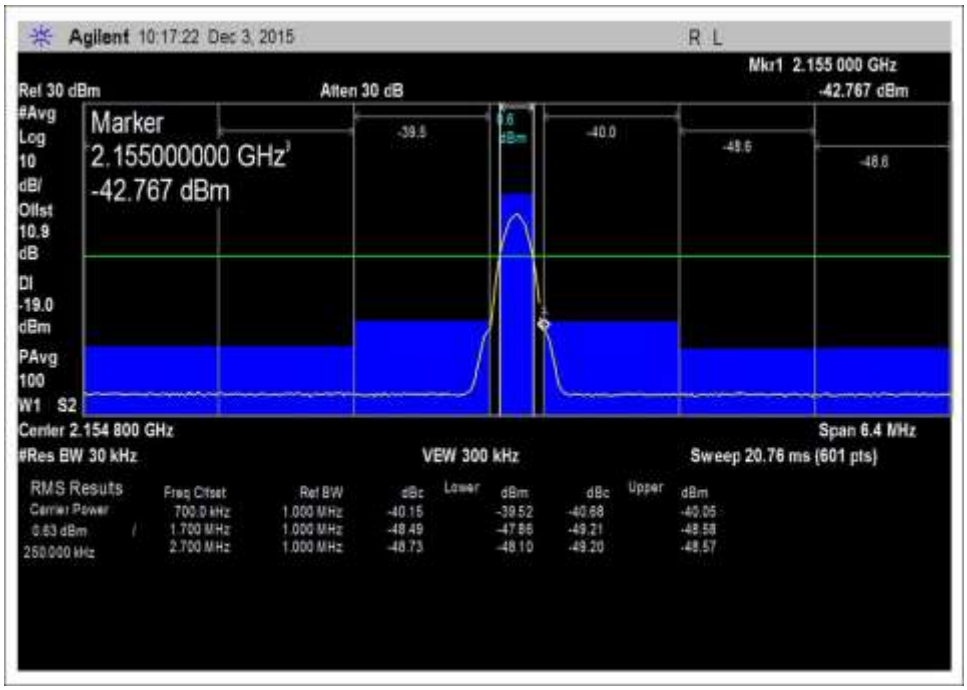


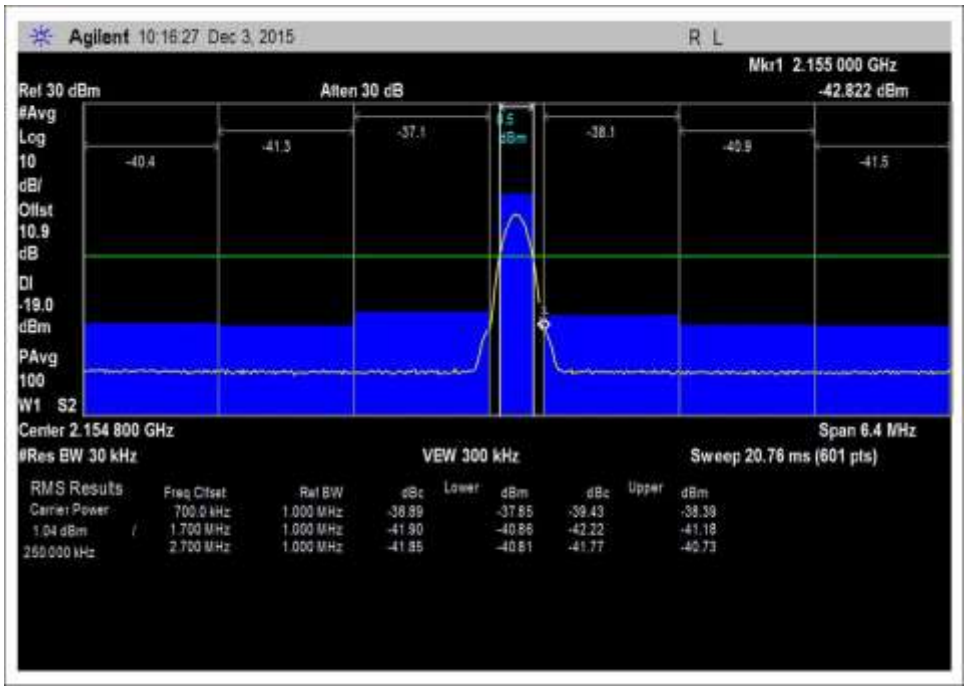
7.5_OBE_DL_1930-1995MHz_L_Max



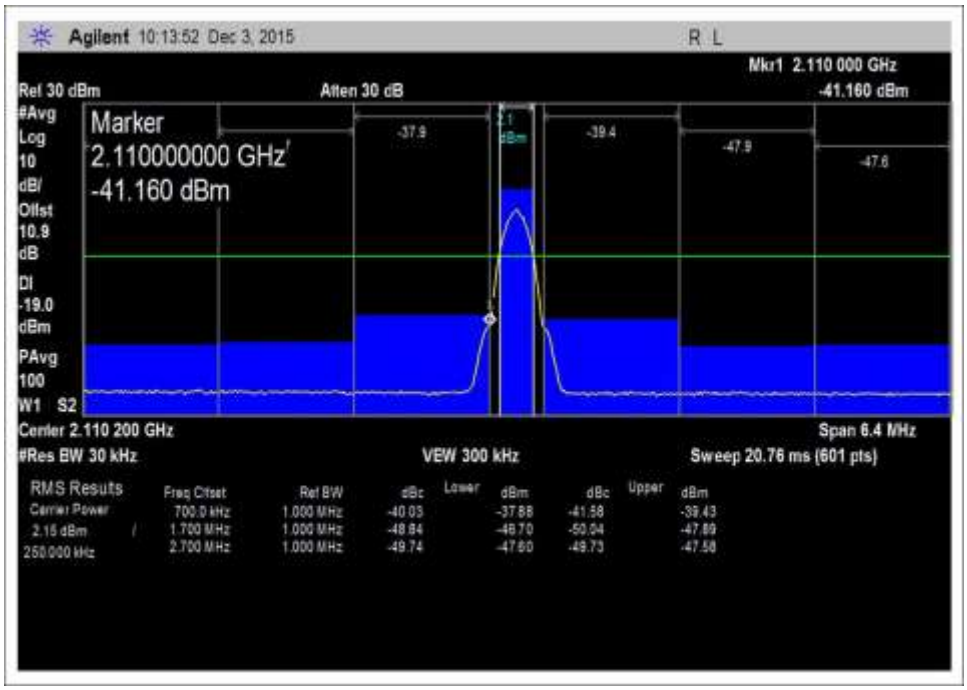
7.5_OBE_DL_1930-1995MHz_L_PreAGC



7.5_OBE_DL_2110-2155MHz_H_Max



7.5_OBE_DL_2110-2155MHz_H_PreAGC



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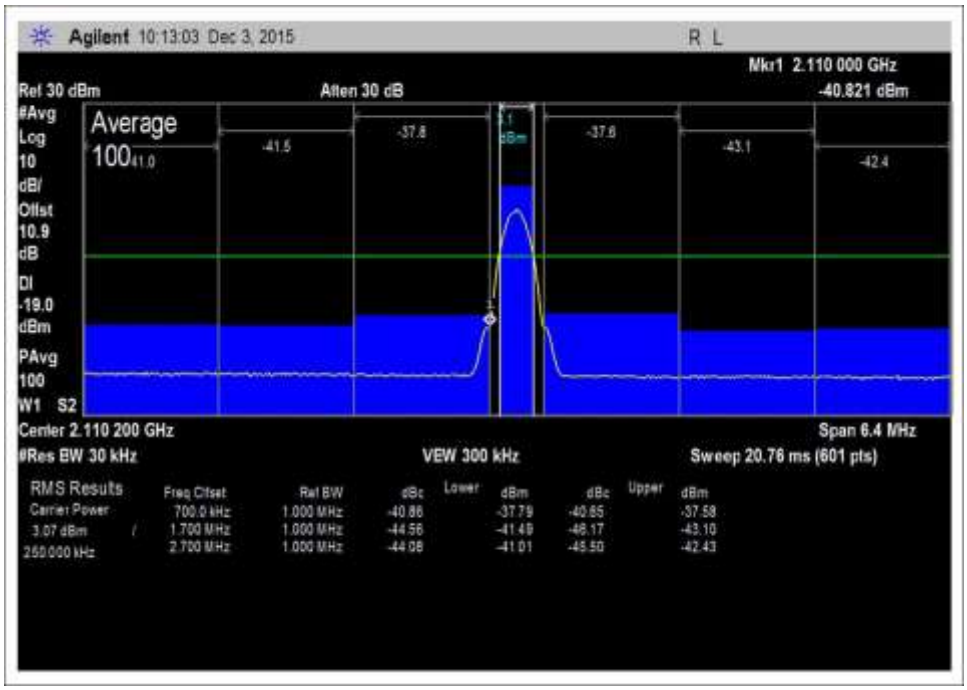
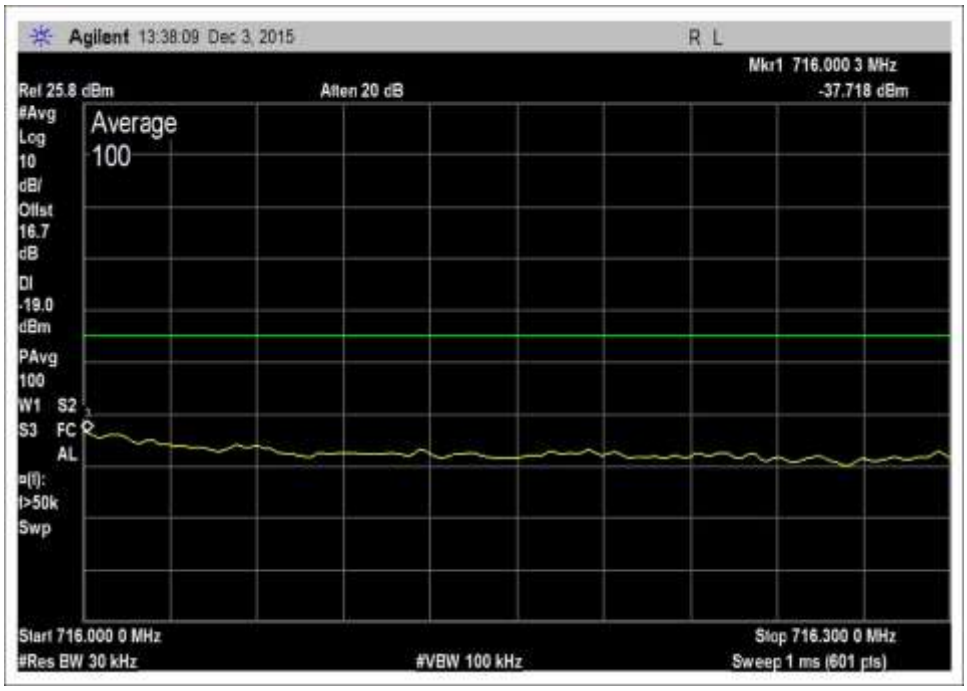
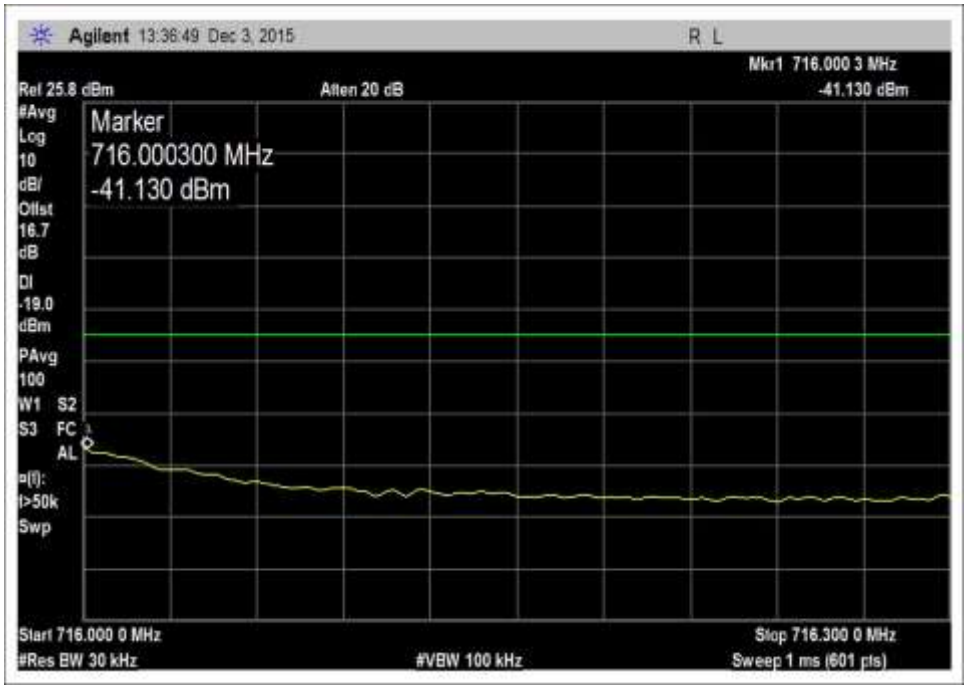


7.5_OBE_DL_2110-2155MHz_L_PreAGC

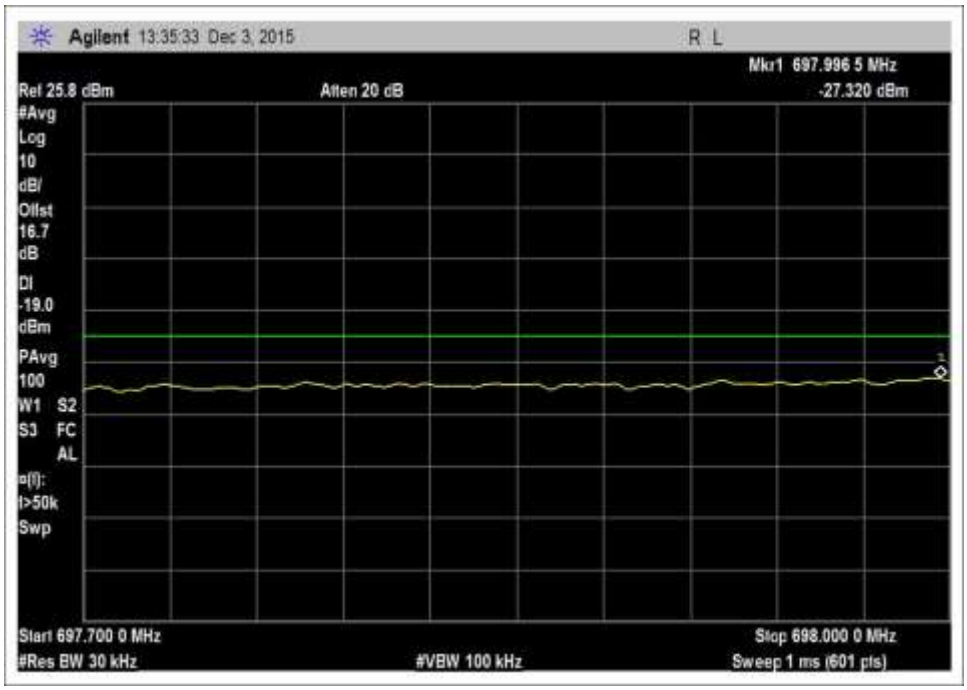
LTE



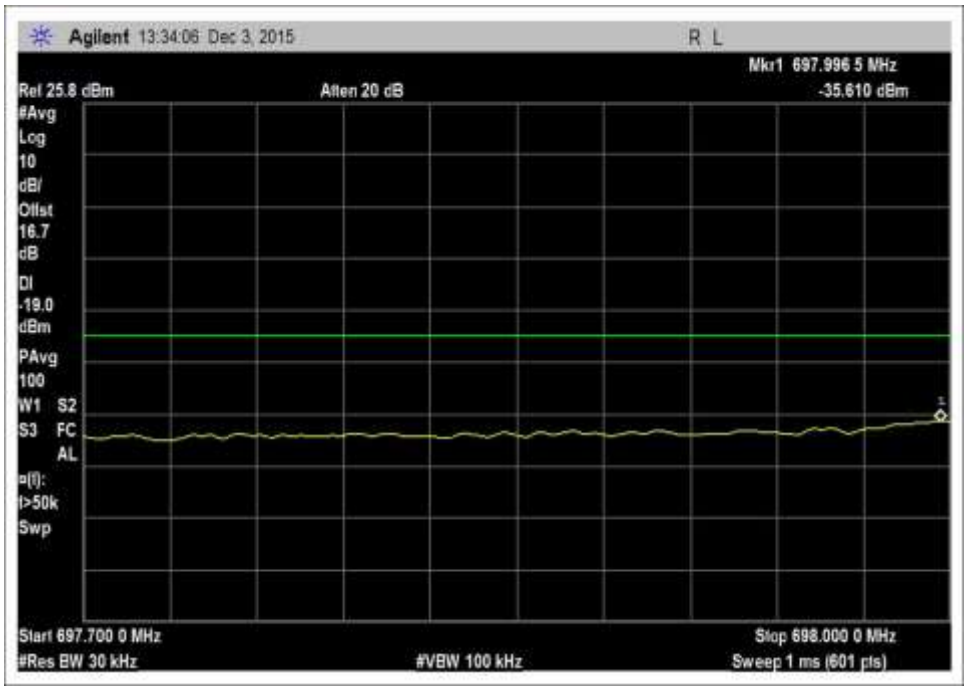
7.5_OBE_UL_698-716MHz_H_Max



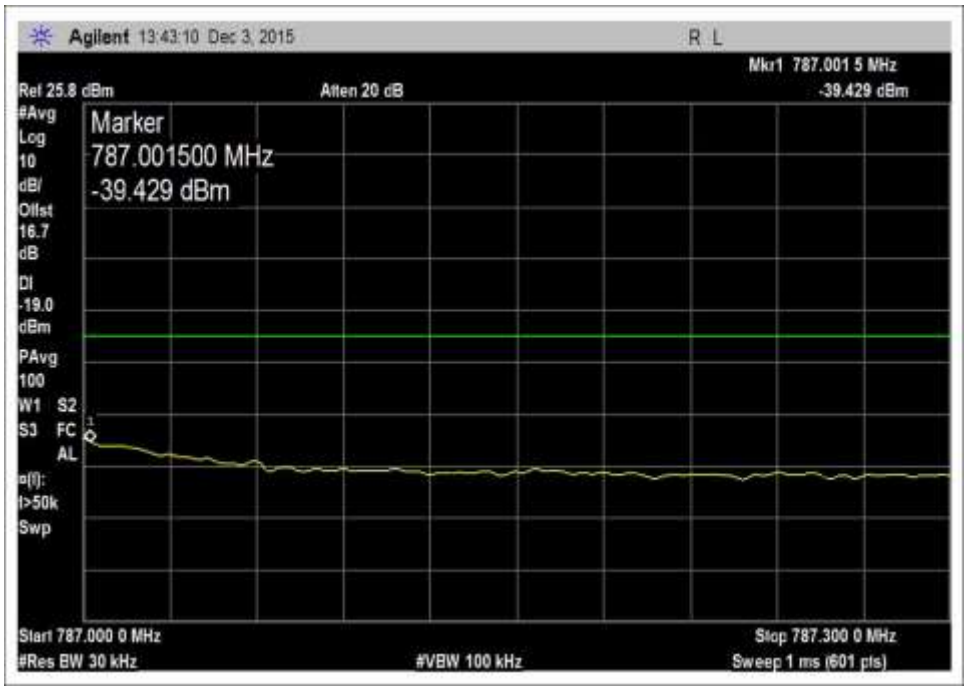
7.5_OBE_UL_698-716MHz_H_PreAGC



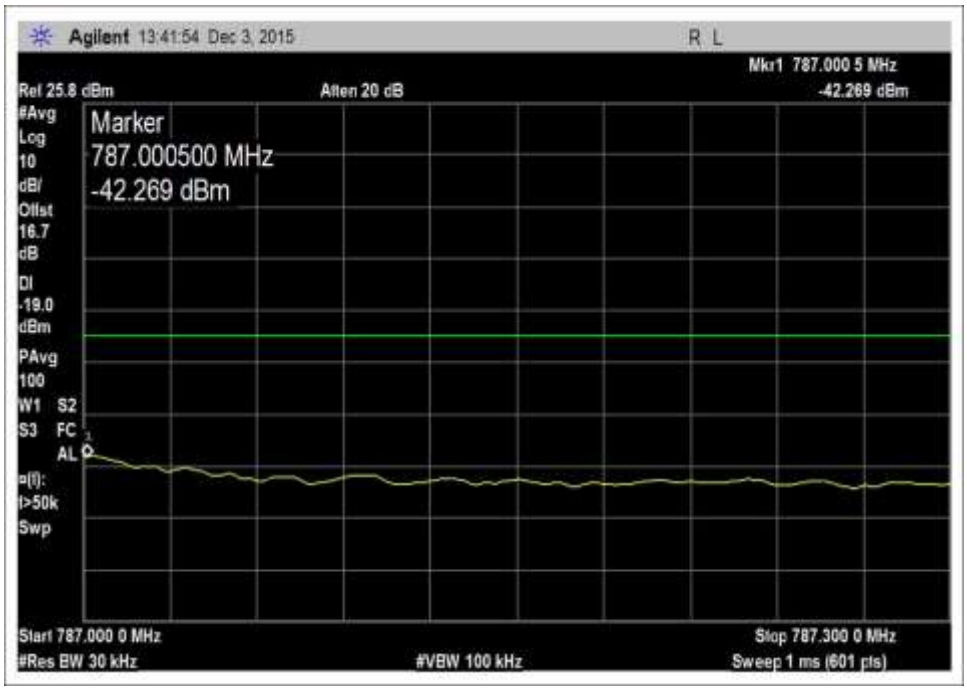
7.5_OBE_UL_698-716MHz_L_Max



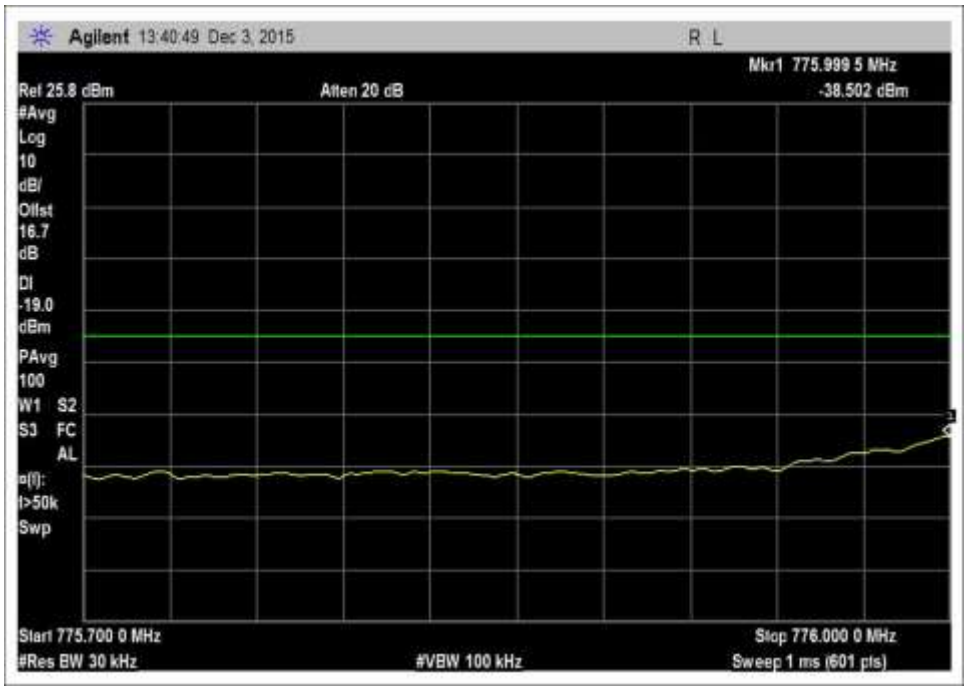
7.5_OBE_UL_698-716MHz_L_PreAGC



7.5_OBE_UL_776-787MHz_H_Max



7.5_OBE_UL_776-787MHz_H_PreAGC



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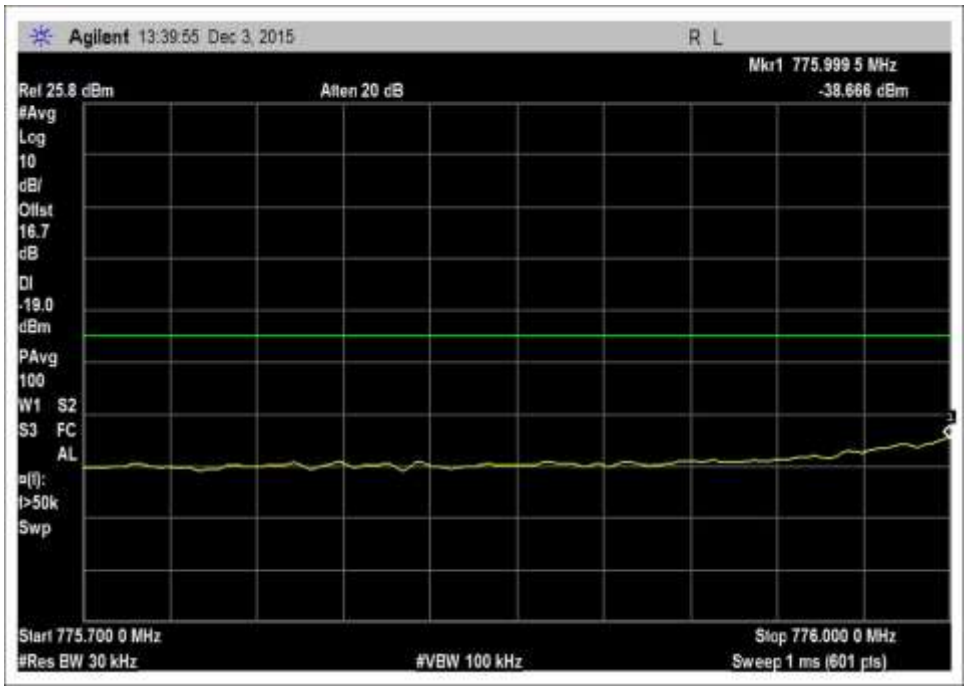
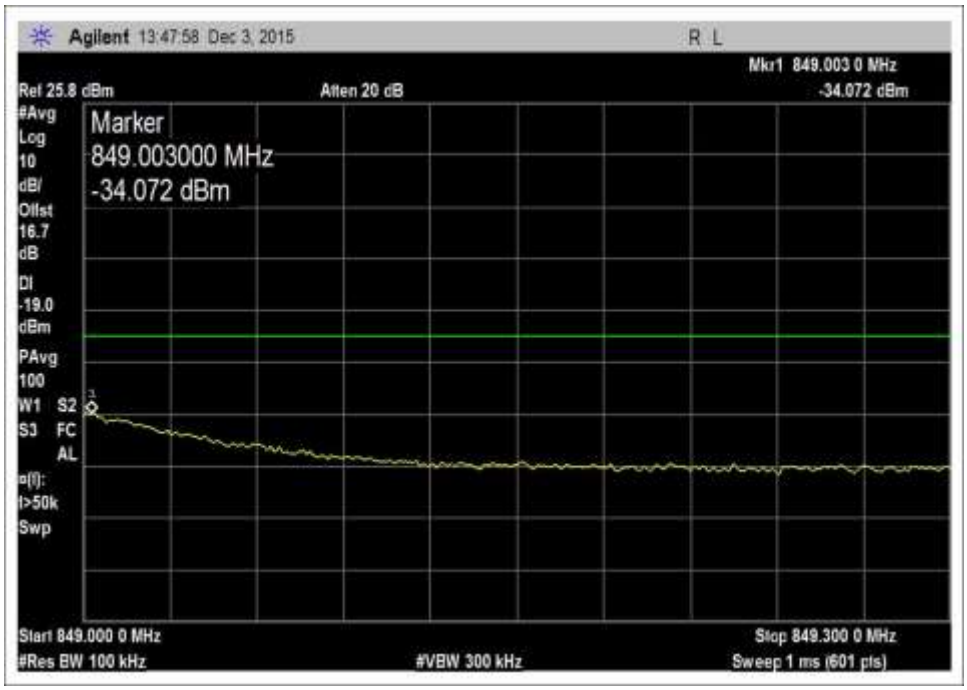
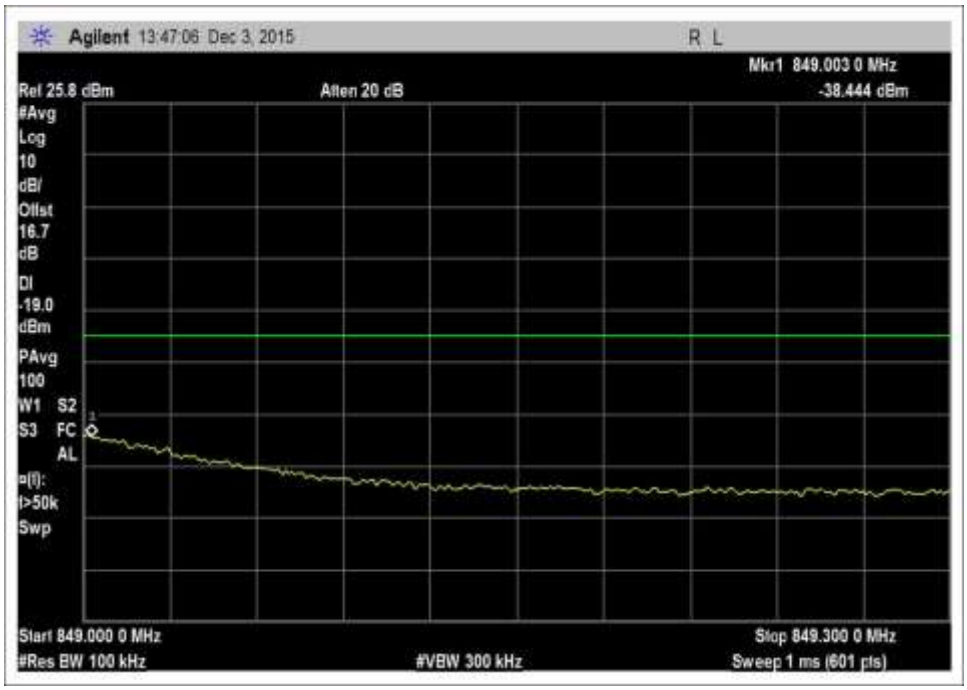


7.5_OBE_UL_776-787MHz_L_PreAGC



7.5_OBE_UL_824-849MHz_H_Max



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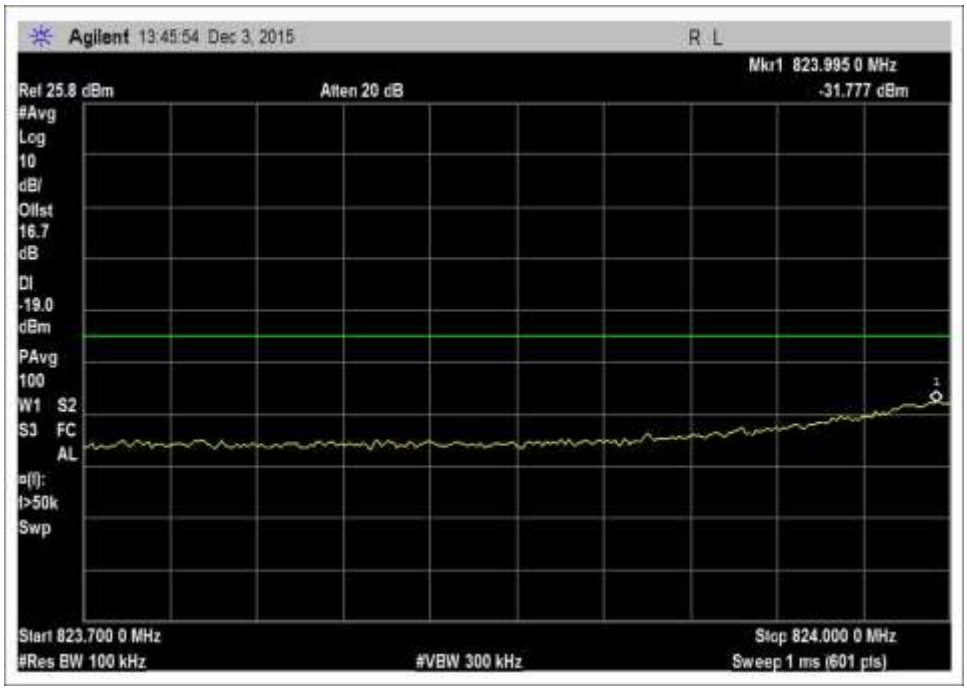
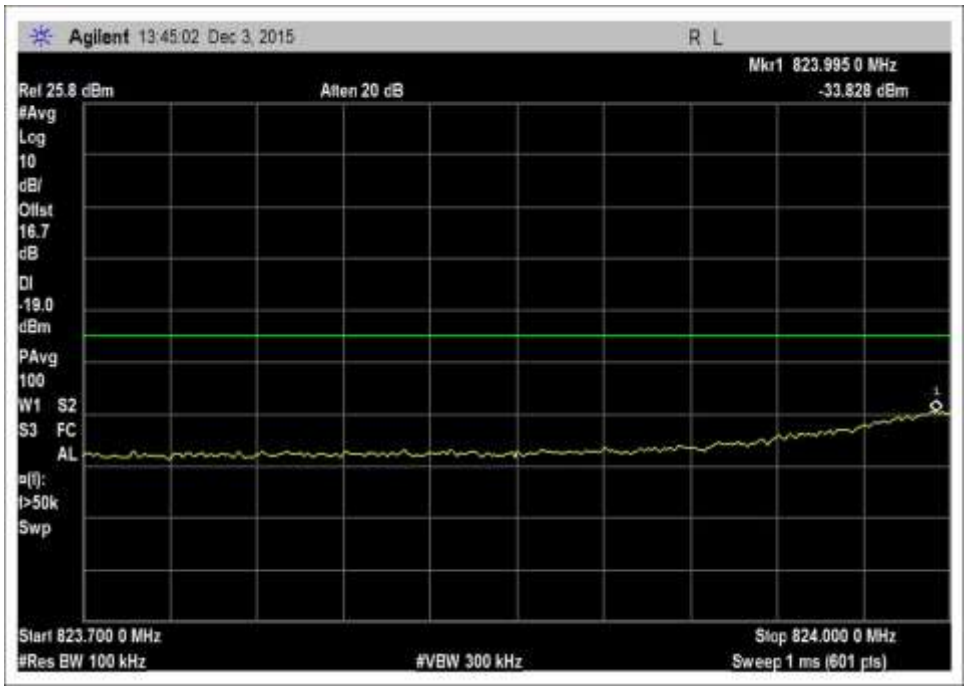
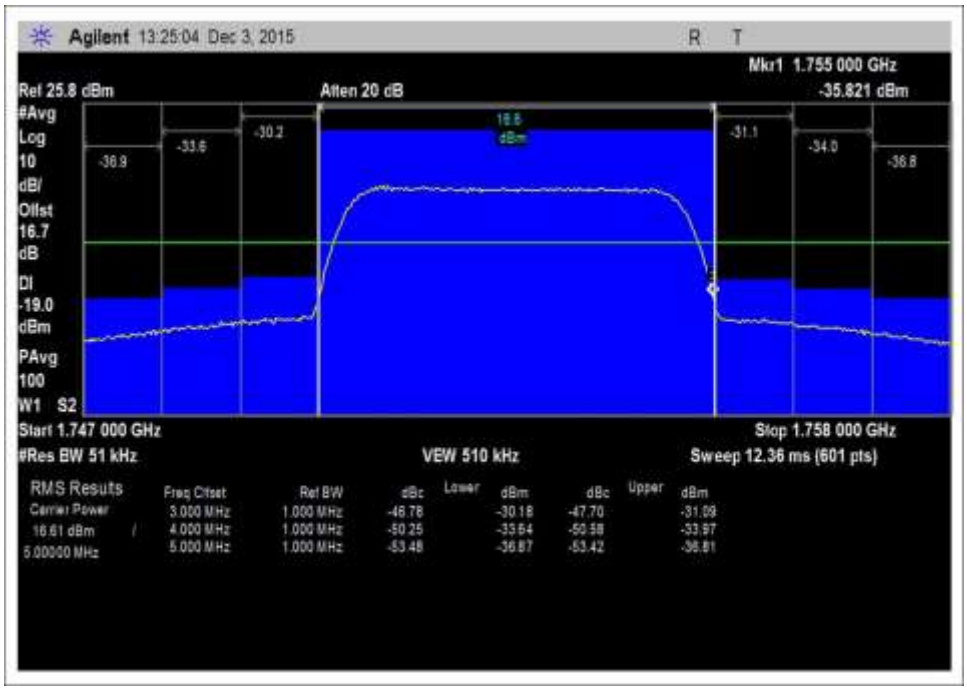


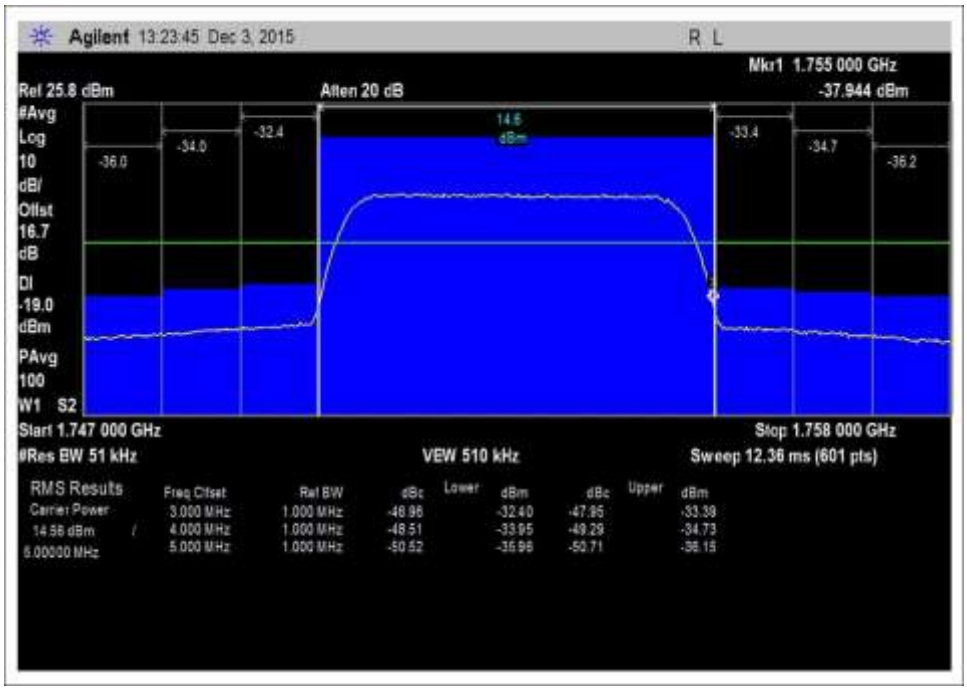
7.5_OBE_UL_824-849MHz_L_Max



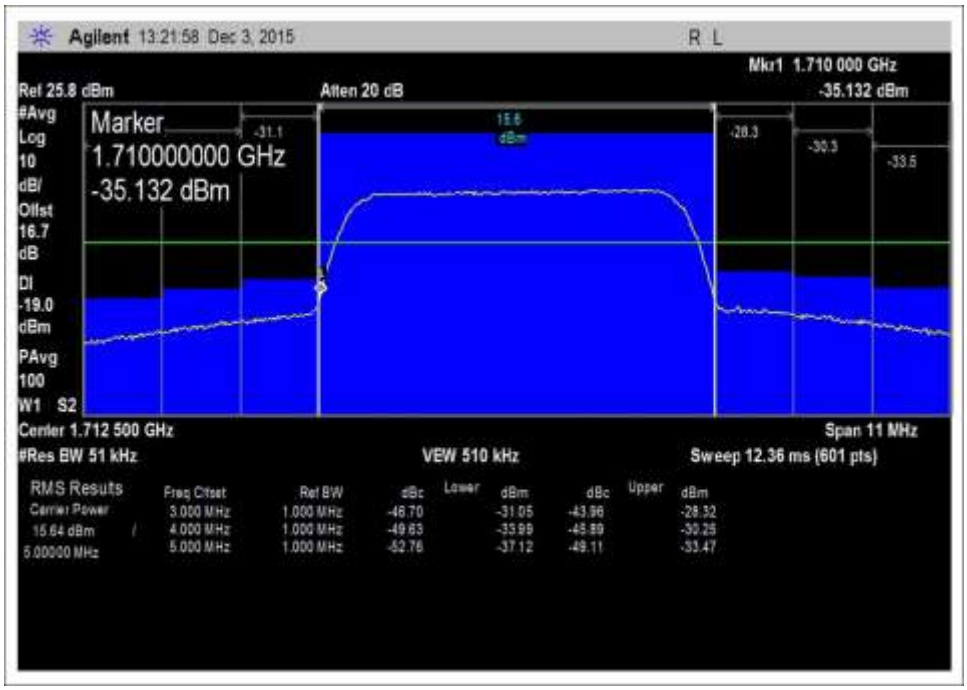
7.5_OBE_UL_824-849MHz_L_PreAGC



7.5_OBE_UL_1710-1755MHz_H_Max



7.5_OBE_UL_1710-1755MHz_H_PreAGC



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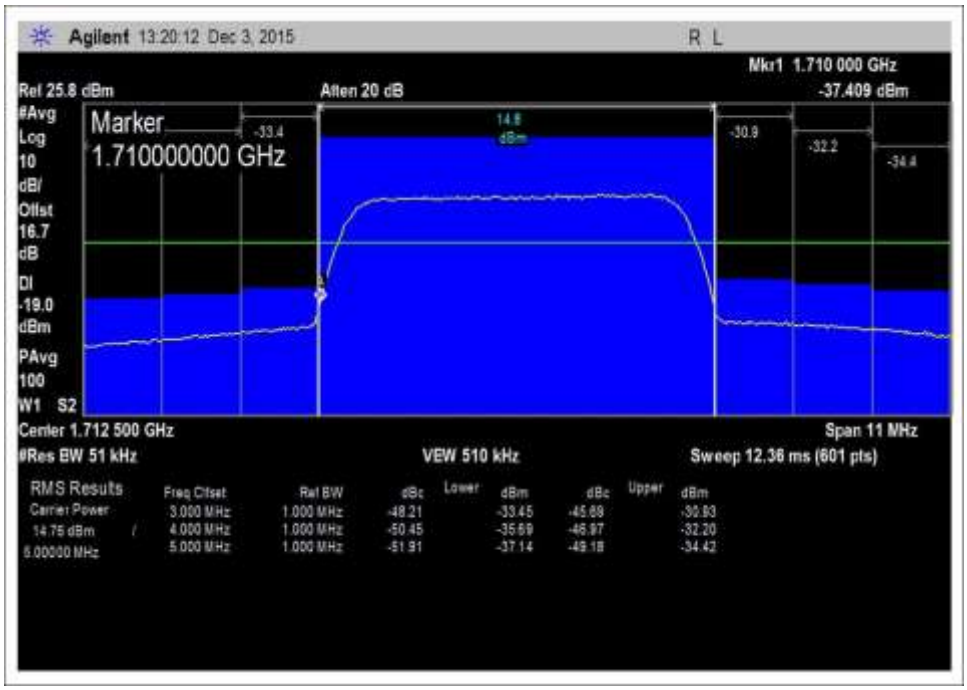

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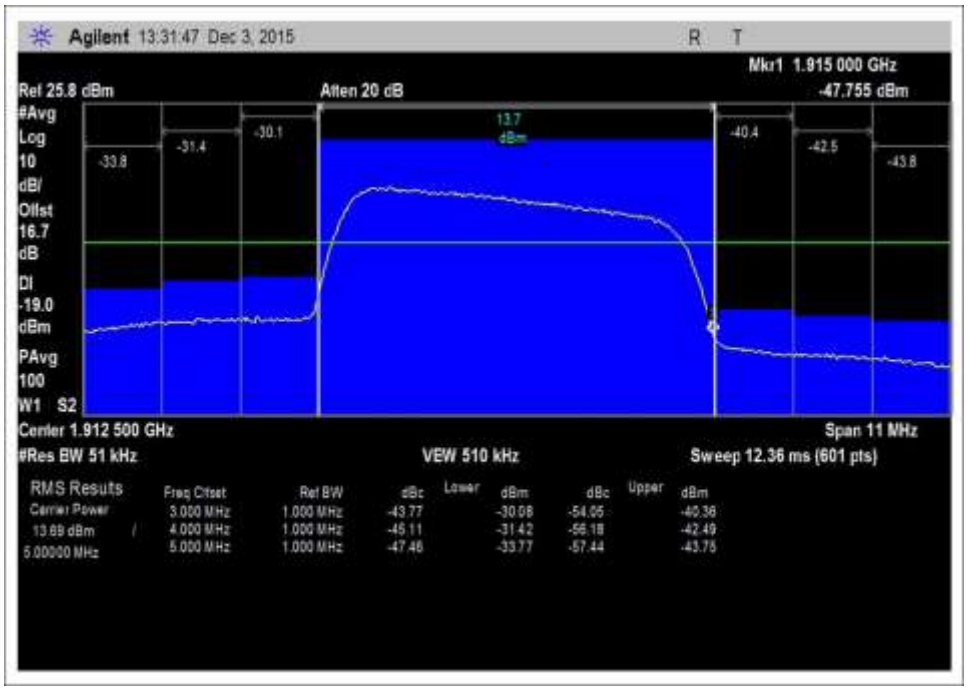
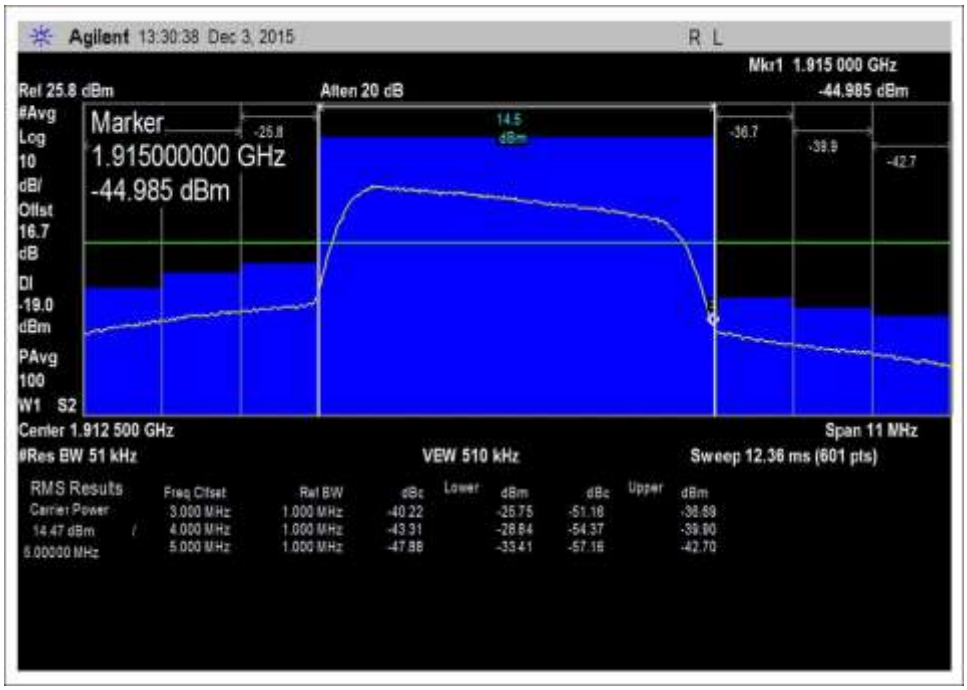


7.5_OBE_UL_1850-1915MHz_H_Max



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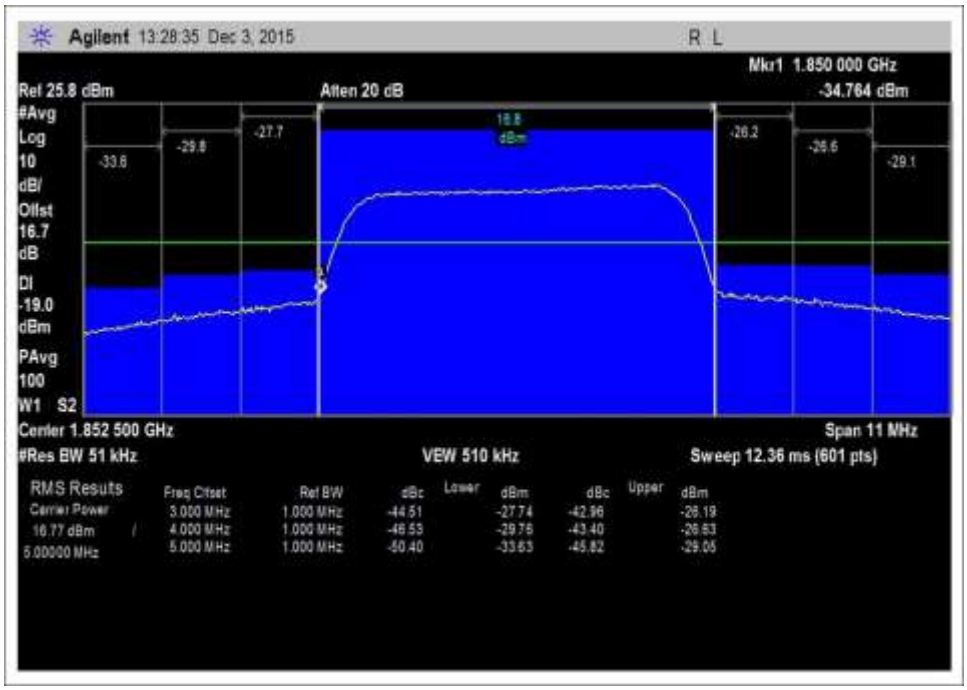

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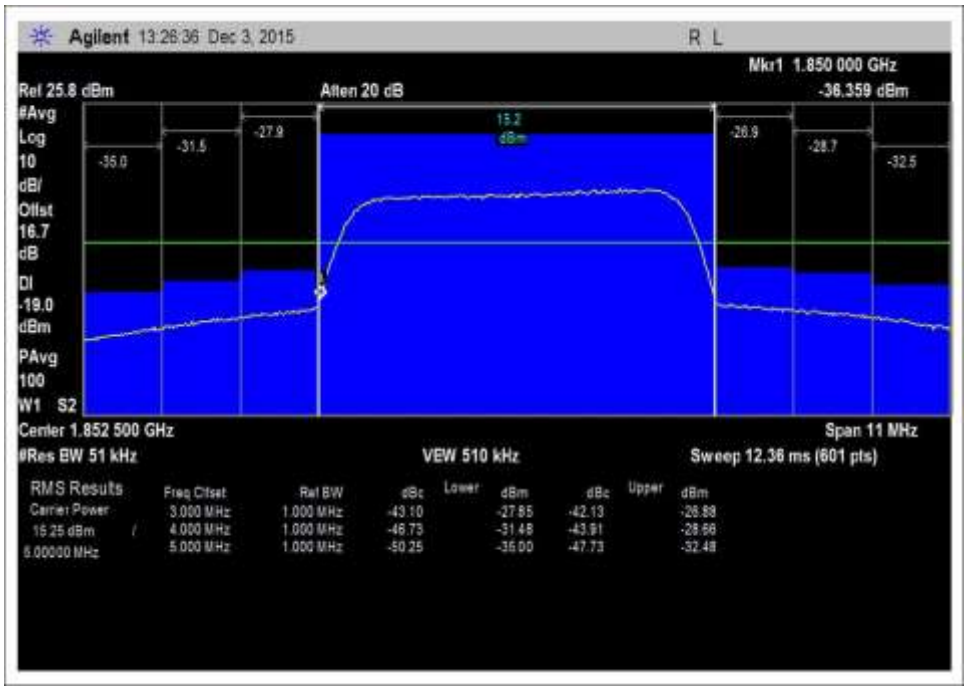
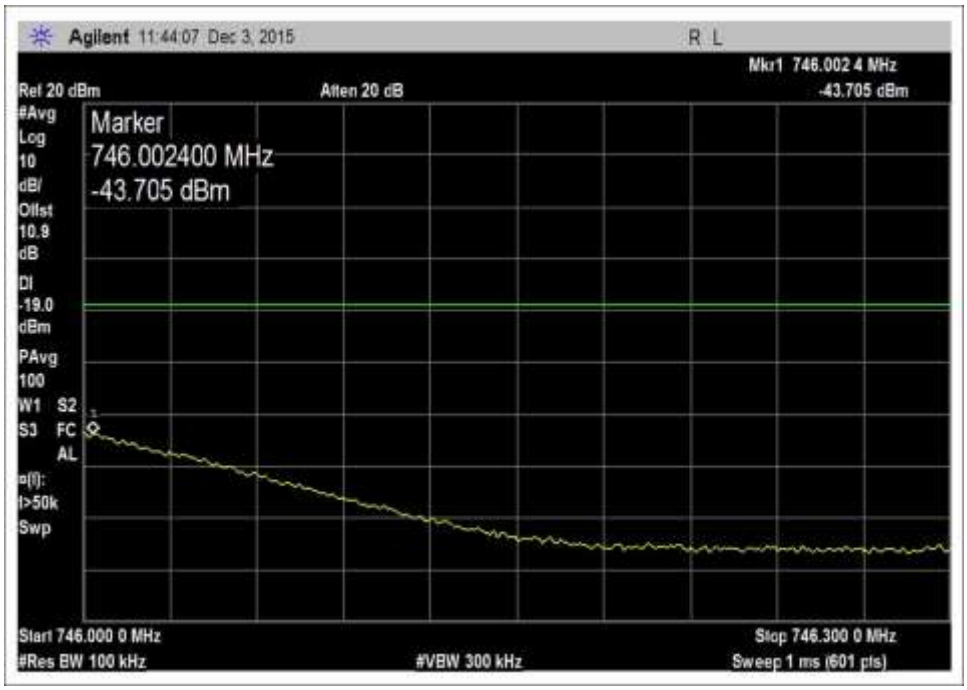
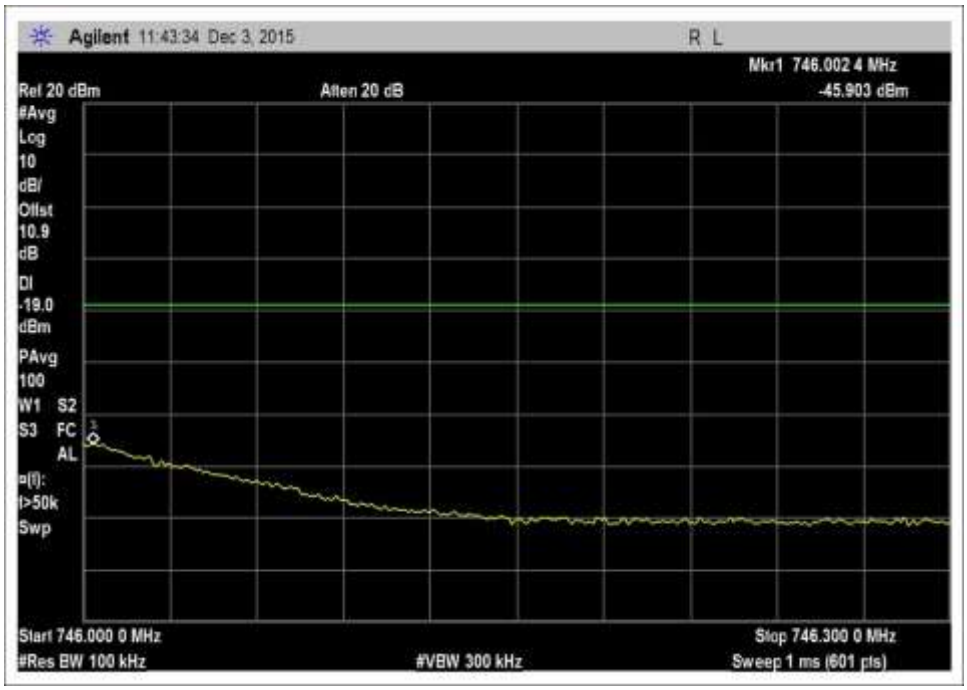


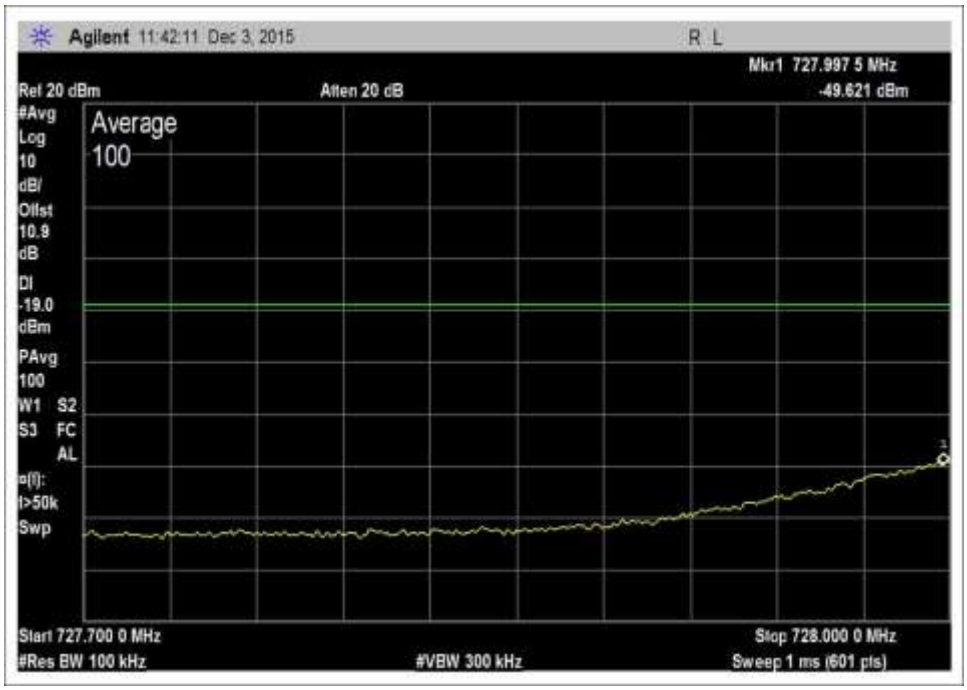
7.5_OBE_UL_1850-1915MHz_L_PreAGC



7.5_OBE_DL_728-746MHz_H_Max



7.5_OBE_DL_728-746MHz_H_PreAGC



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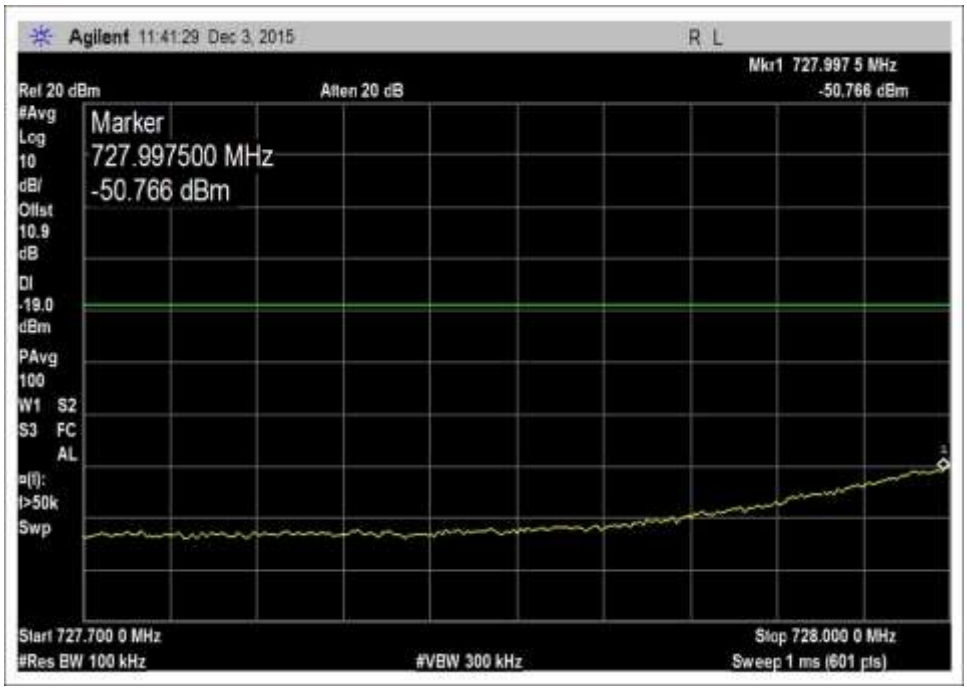

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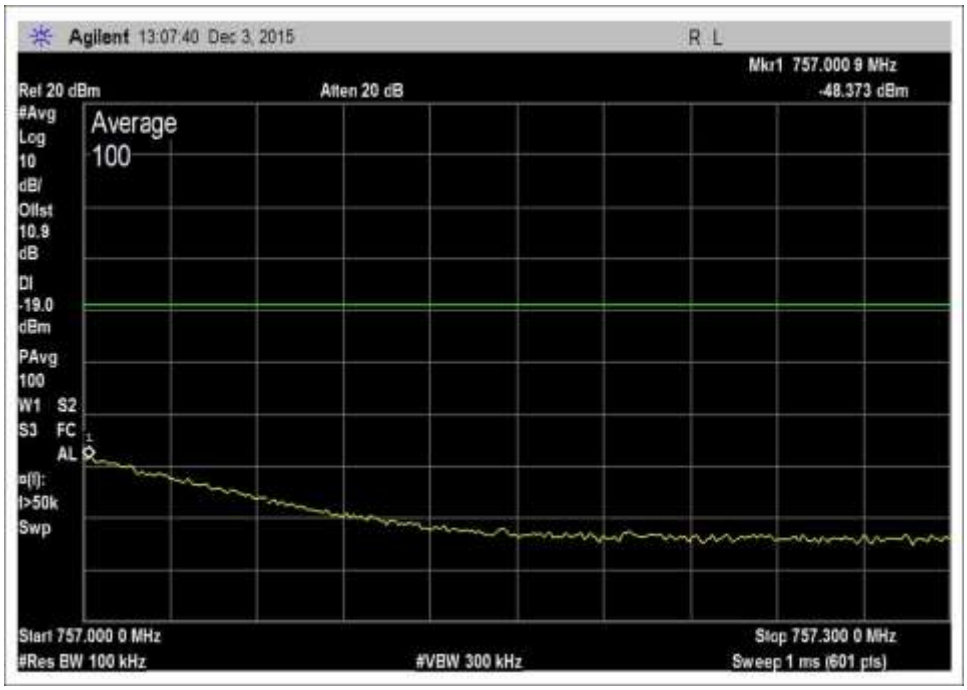
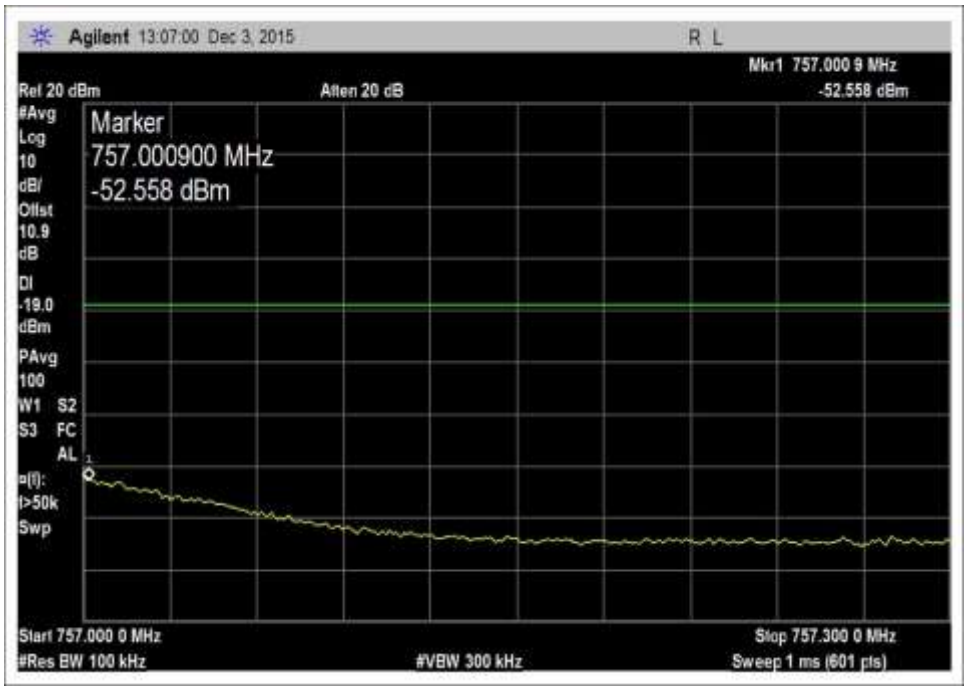
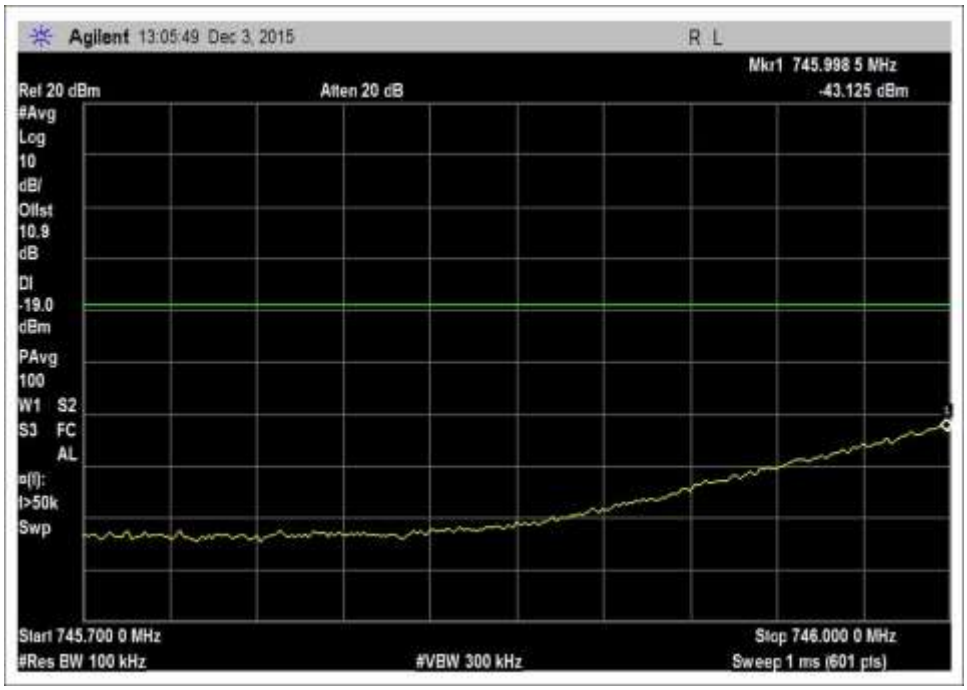


7.5_OBE_DL_746-757MHz_H_Max



7.5_OBE_DL_746-757MHz_H_PreAGC



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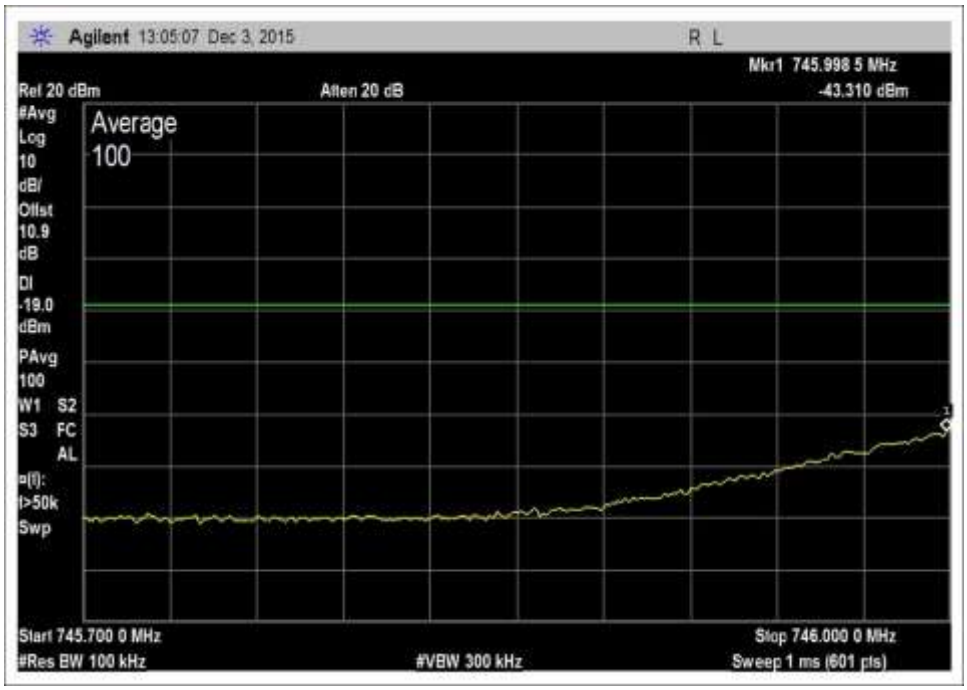
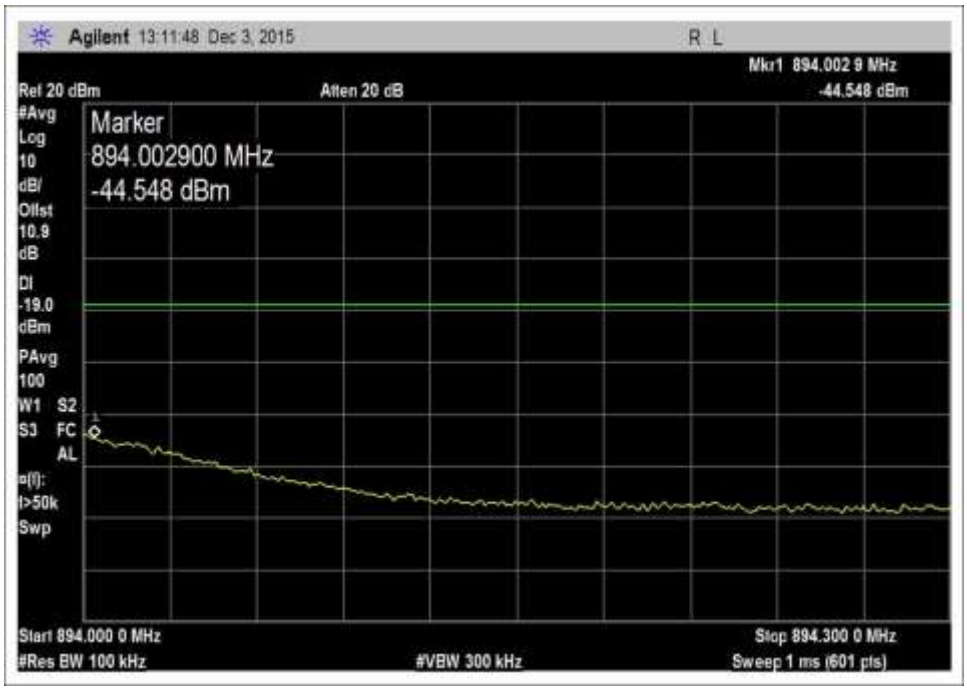
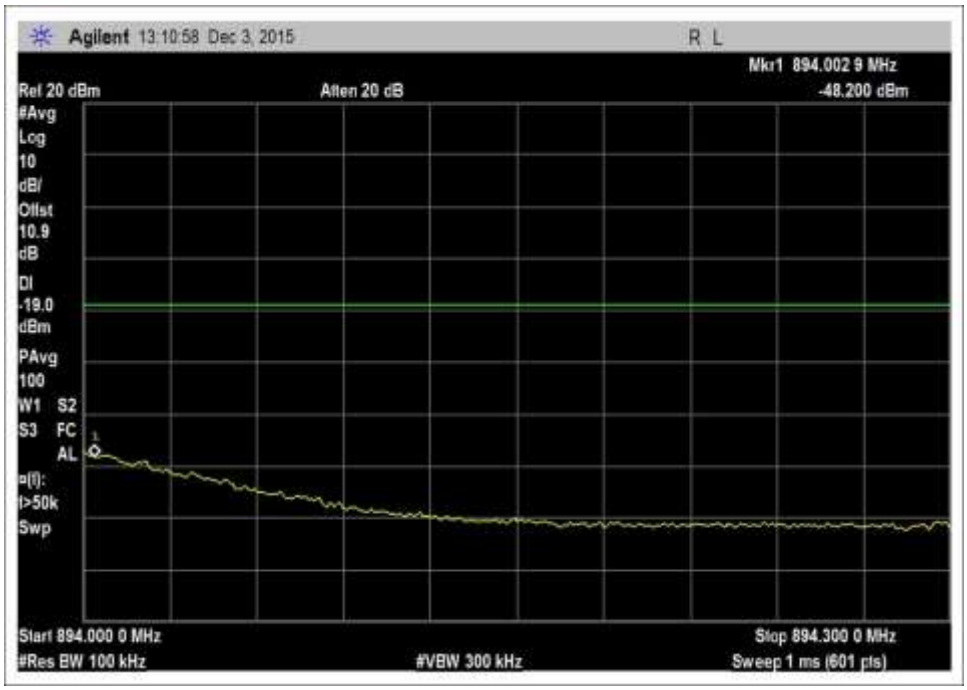


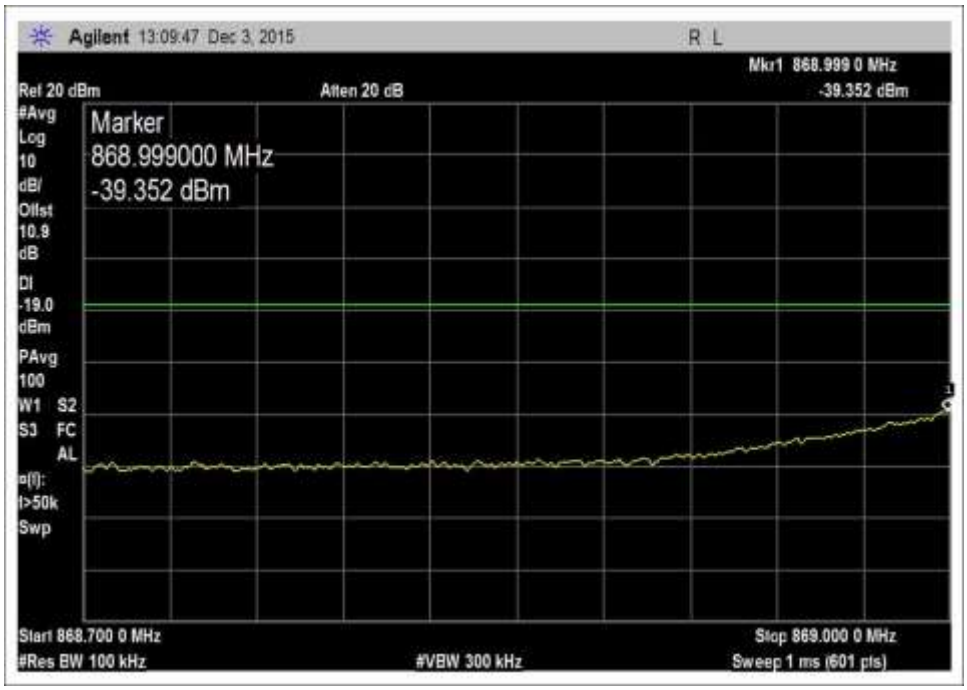
7.5_OBE_DL_746-757MHz_L_PreAGC



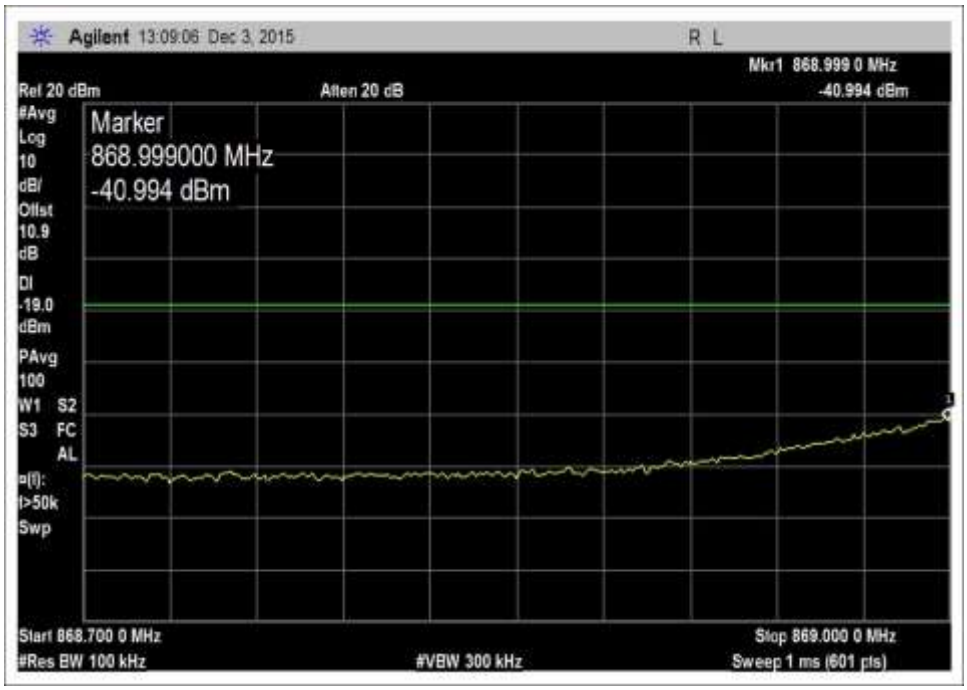
7.5_OBE_DL_869-894MHz_H_Max



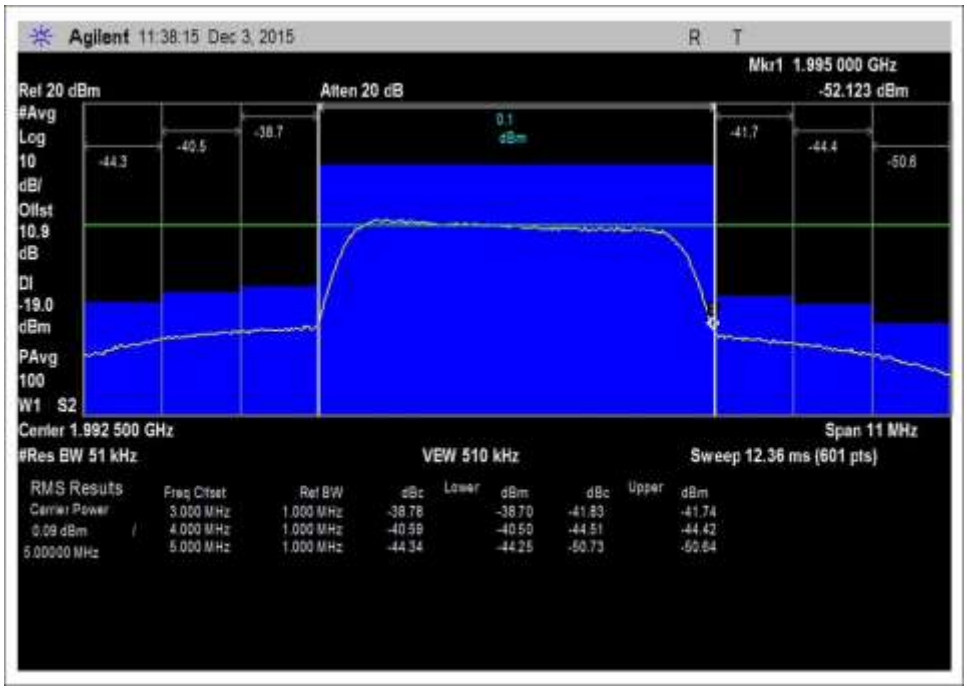
7.5_OBE_DL_869-894MHz_H_PreAGC



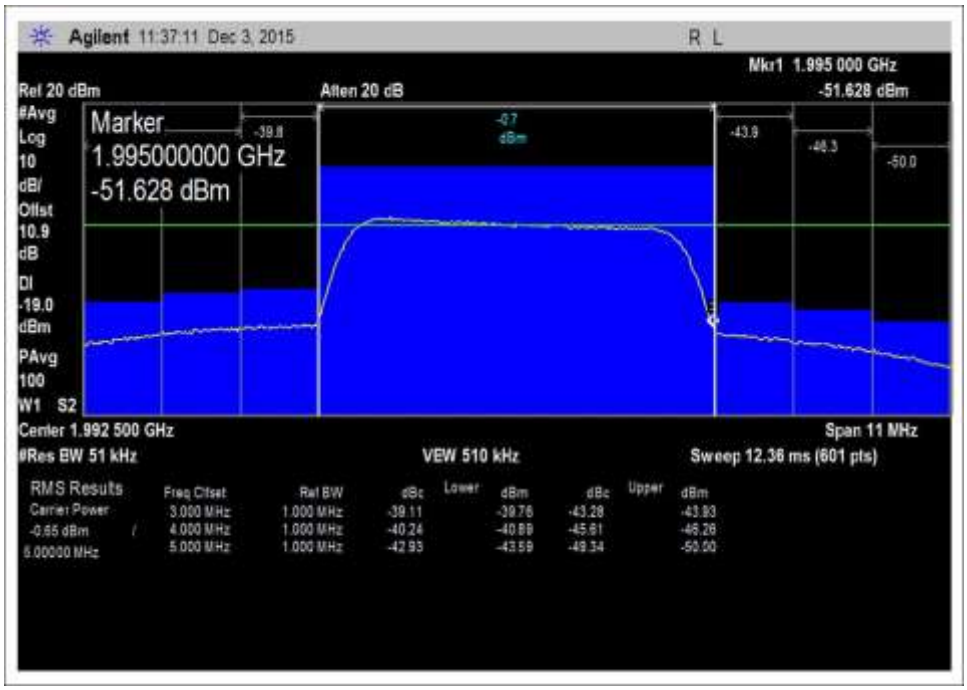
7.5_OBE_DL_869-894MHz_L_Max



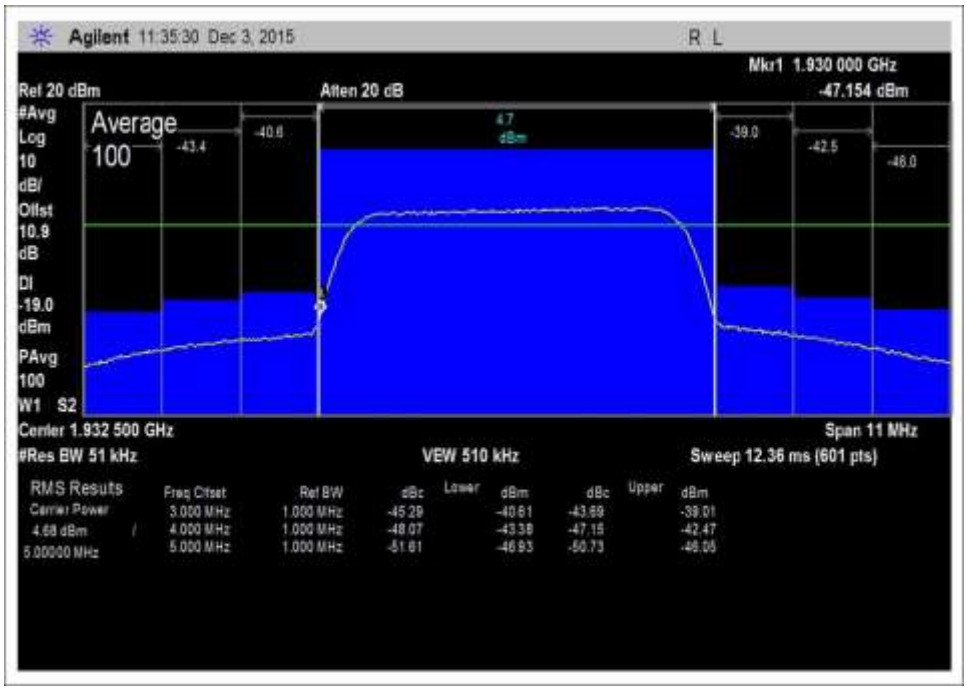
7.5_OBE_DL_869-894MHz_L_PreAGC



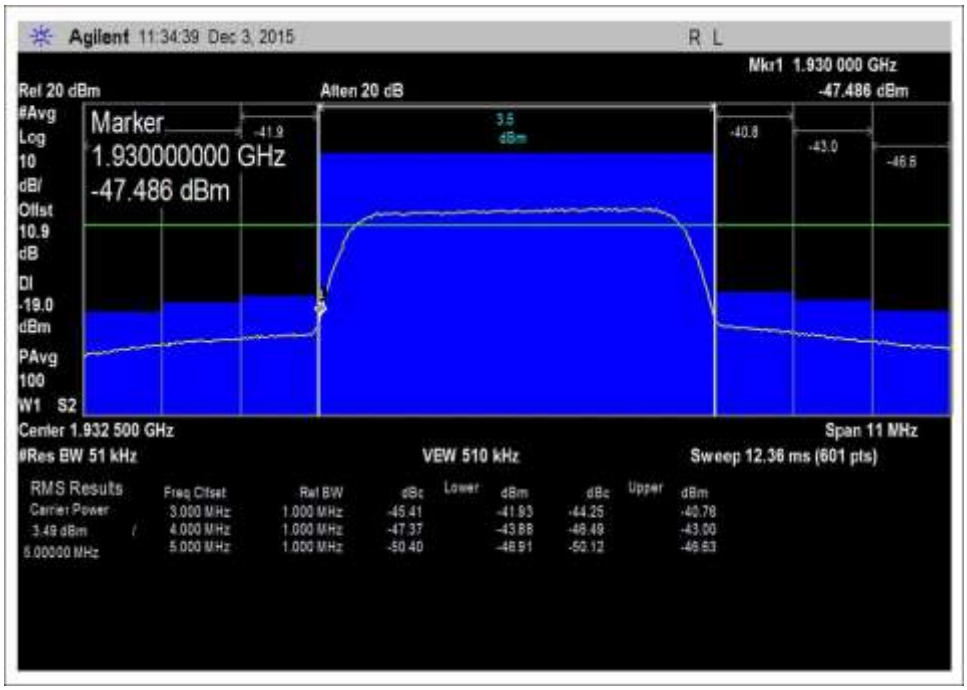
7.5_OBE_DL_1930-1995MHz_H_Max



7.5_OBE_DL_1930-1995MHz_H_PreAGC



7.5_OBE_DL_1930-1995MHz_L_Max



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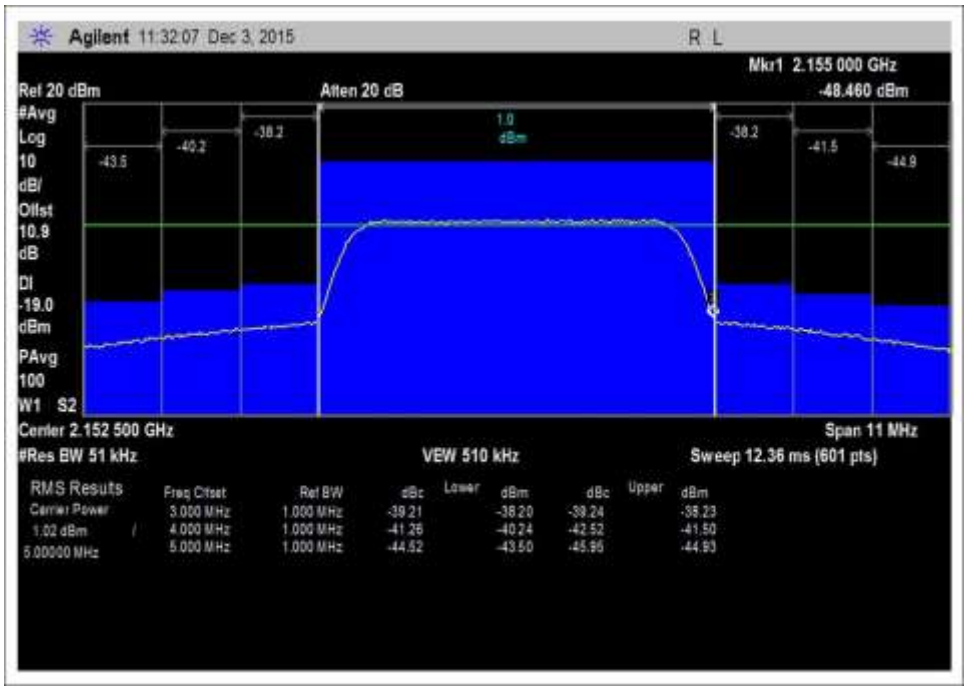
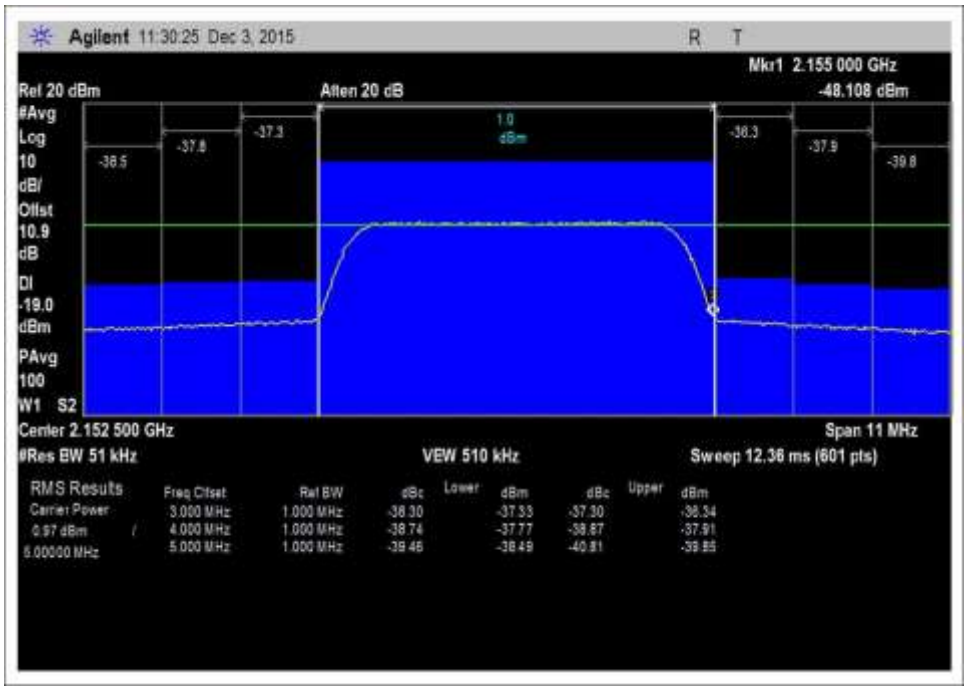
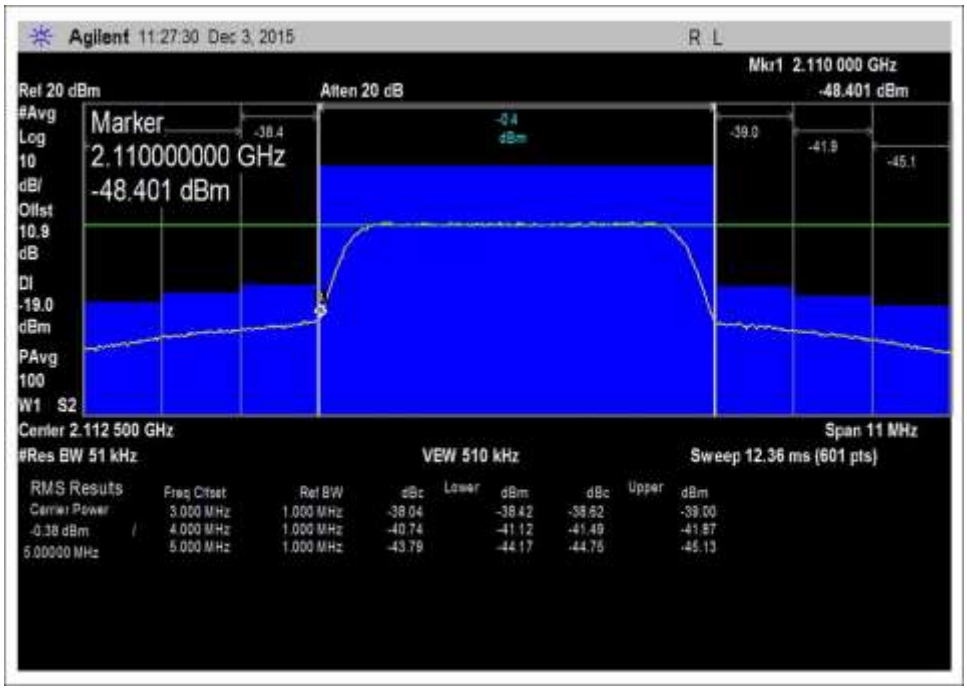


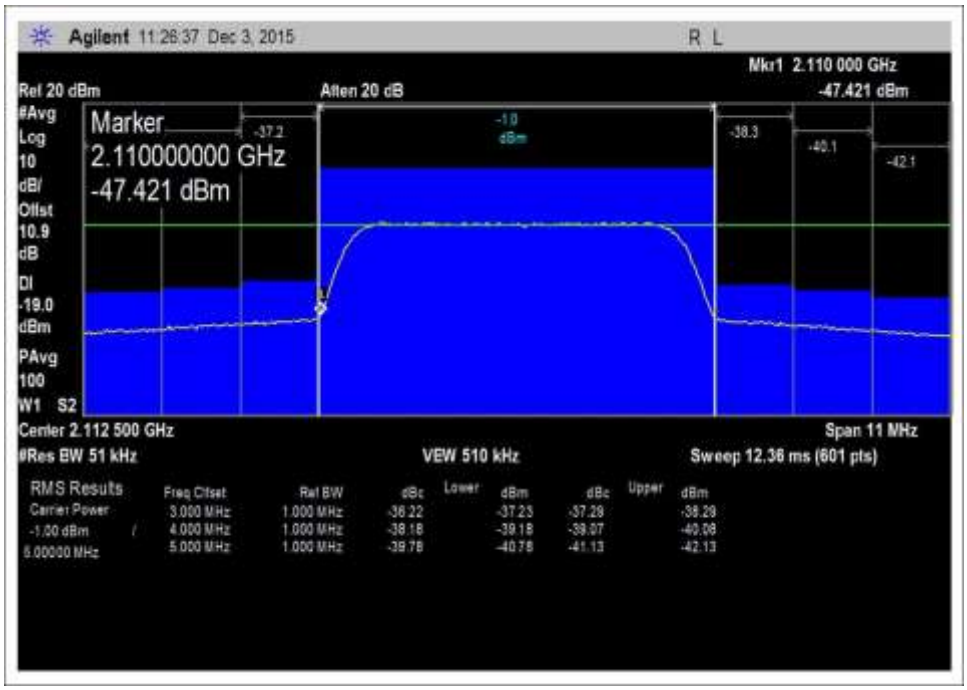
7.5_OBE_DL_2110-2155MHz_H_Max



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 #:	**97835**	Date:	12/03/2015
Test Type:	**Conducted Emissions**	Time:	15:50:22
Tested By:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.02.00		

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.
Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.

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).
For the DL path, the EUT is placed on a table inside the chamber to eliminate interference from ambient CMRS signals.
For the UL path, the EUT is placed on the test bench.

7.7.2 Variable UL Noise Timing
Per figure 4, server port was terminated with 50 Ohm Pasternack load (MN: PE6187 and SN: 1443).
The EUT is placed on the test bench.

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 environment conditions: Temperature: 18.5°C, Relative Humidity: 39%, Pressure: 101.4 kPa

Test procedure:
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:

ID	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
	AN02660	Spectrum Analyzer	E4446A	7/9/2015	7/9/2017
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP06239	Attenuator	54A-10	7/9/2014	7/9/2016

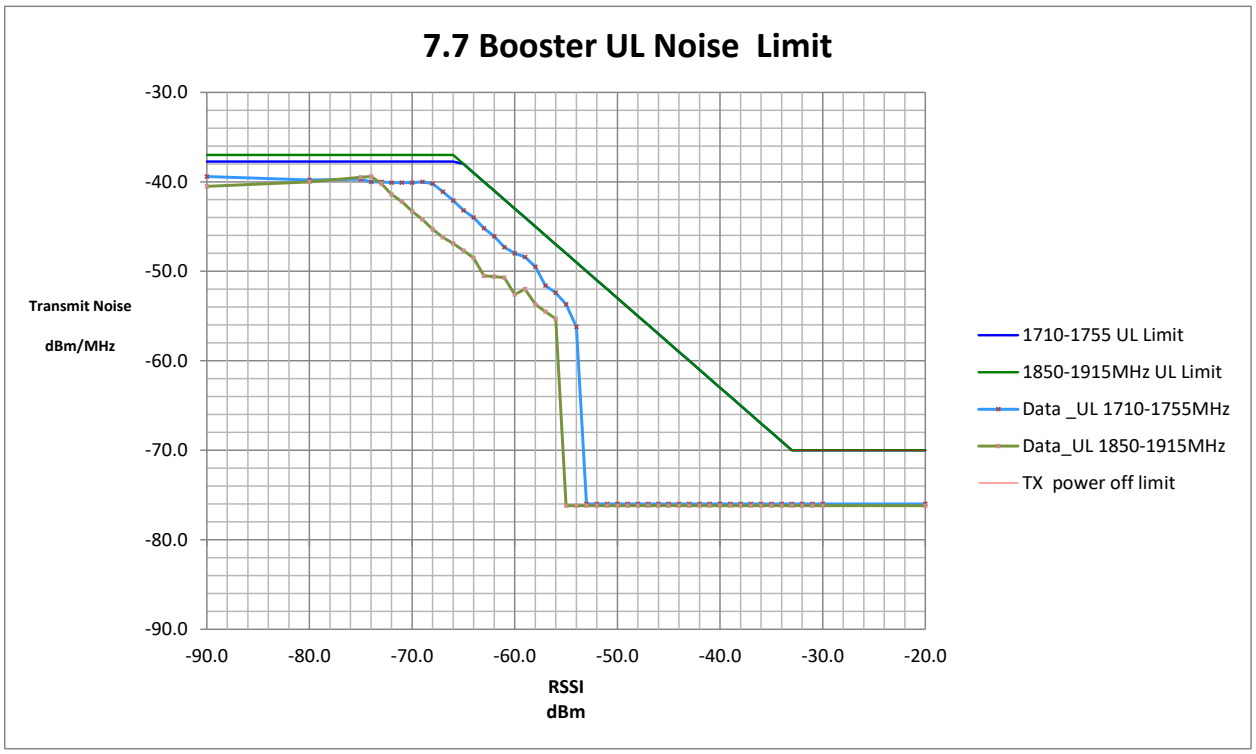
Summary of Results

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	-38.26	-37.7	-0.6
UL1850-1915	-38.47	-37.0	-1.5
UL824-894	-47.75	-44.1	-3.7
UL 698-716	-50.85	-45.5	-5.3
UL776-787	-51.43	-44.6	-6.8
DL2110-2155	-39.43	-37.7	-1.7
DL1930-1995	-40.84	-37.0	-3.8
DL869-894	-48.35	-44.1	-4.3
DL:728-746	-48.37	-45.5	-2.9
DL 746-757	-50.53	-44.6	-5.9

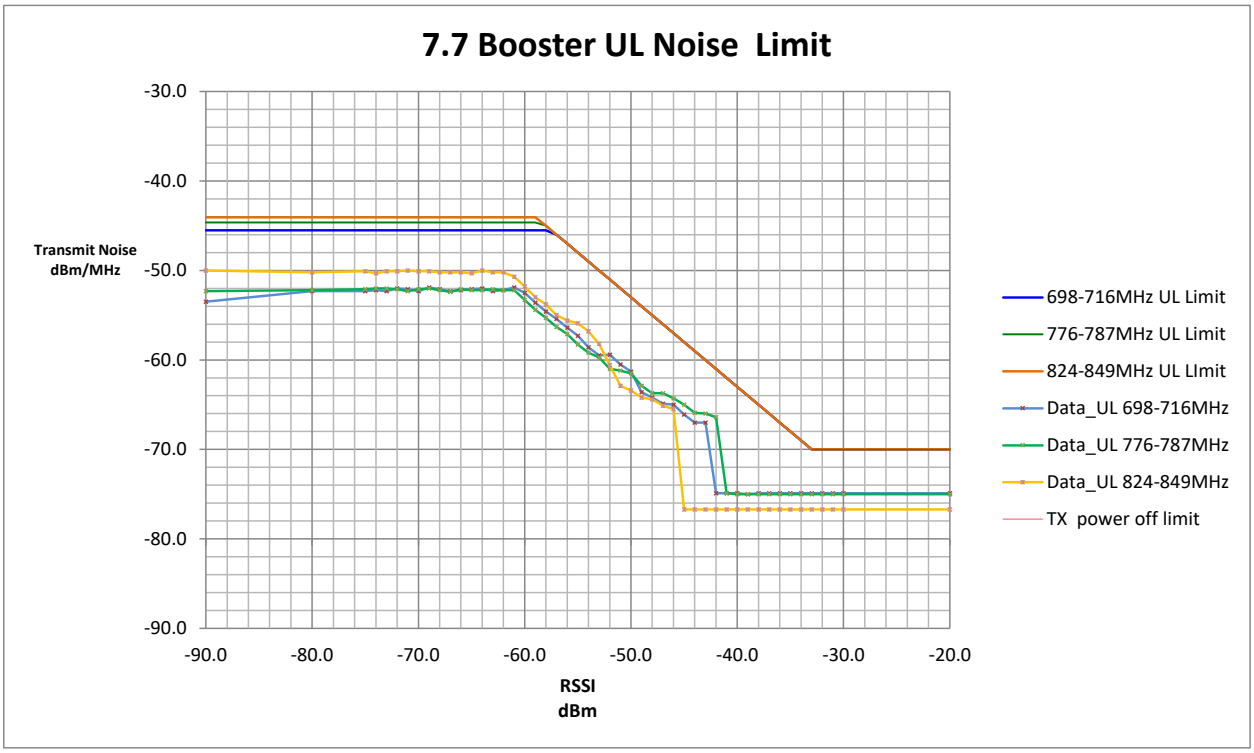
7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal


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	
-90.0	-39.4		-37.7		-1.7
-69.0	-40.0		-37.7		-2.3
-64.0	-44.0	-39.0			-5.0
-60.0	-48.0	-43.0			-5.0
-59.0	-48.4	-44.0			-4.4
-58.0	-49.5	-45.0			-4.5
-32.0	-76.0			-70	-6.0

1850.0	1915.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-75.0	-39.5		-37.0		-2.5
-74.0	-39.4		-37.0		-2.4
-59.0	-52.0	-44.0			-8.0
-58.0	-53.7	-45.0			-8.7
-57.0	-54.5	-46.0			-8.5
-56.0	-55.3	-47.0			-8.3
-32.0	-76.2			-70	-6.2

698.0	716.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-69.0	-51.9		-45.5		-6.4
-61.0	-51.9		-45.5		-6.4
-43.0	-67.0	-60.0			-7.0
-36.0	-74.9	-67.0			-7.9
-35.0	-74.9	-68.0			-6.9
-34.0	-74.9	-69.0			-5.9
-32.0	-74.9			-70	-4.9


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	
-74.0	-52.0		-44.6		-7.4
-63.0	-52.1		-44.6		-7.5
-44.0	-65.9	-59.0			-6.9
-43.0	-66.0	-60.0			-6.0
-42.0	-66.4	-61.0			-5.4
-34.0	-75.0	-69.0			-6.0
-32.0	-75.0			-70	-5.0

824.0	849.0	MHz			
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-75.0	-50.1		-44.1		-6.0
-69.0	-50.1		-44.1		-6.0
-55.0	-55.9	-48.0			-7.9
-54.0	-56.8	-49.0			-7.8
-35.0	-76.7	-68.0			-8.7
-34.0	-76.7	-69.0			-7.7
-32.0	-76.7			-70	-6.7

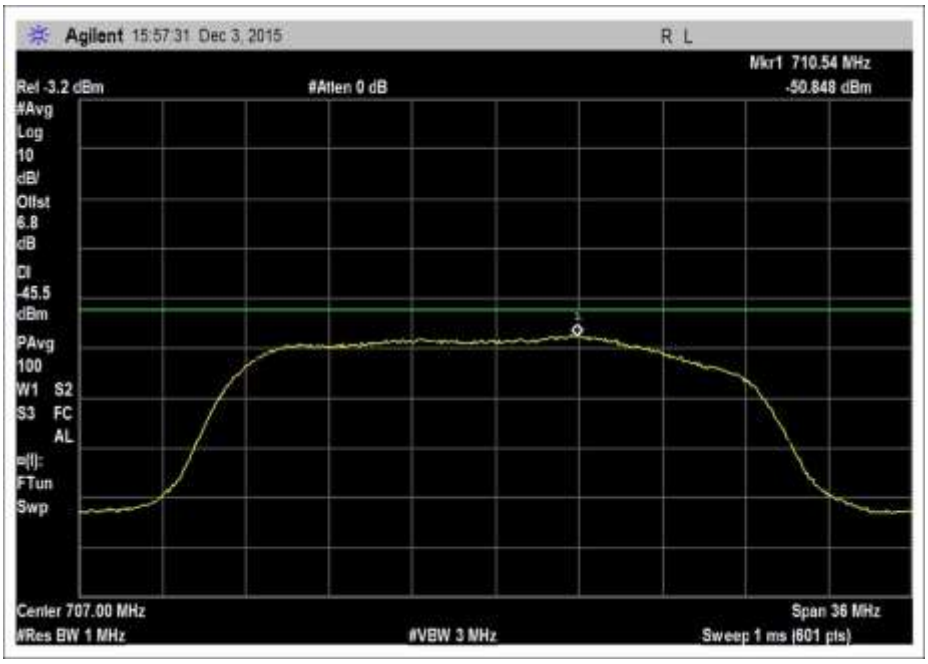
7.7.2 Variable uplink noise timing

Uplink Noise timing		
Freq	Measured	Limit
MHz	Sec	sec
UL1710-1755	0.48	3
UL1850-1915	0.53	3
UL824-894	0.55	3
UL 698-716	0.55	3
UL776-787	0.57	3

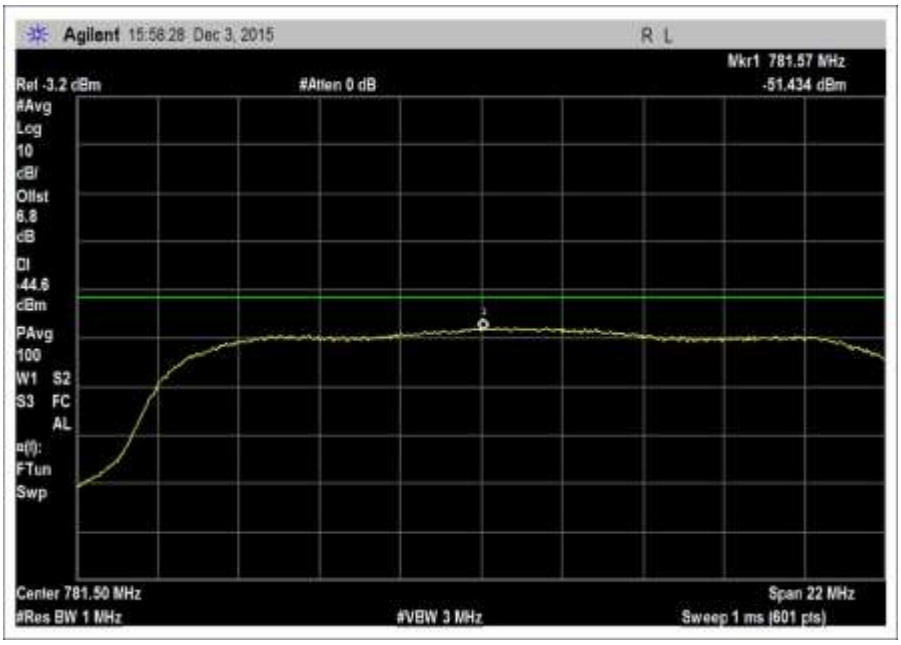
7.7.1 Maximum Transmitter Noise Power Level

Plots

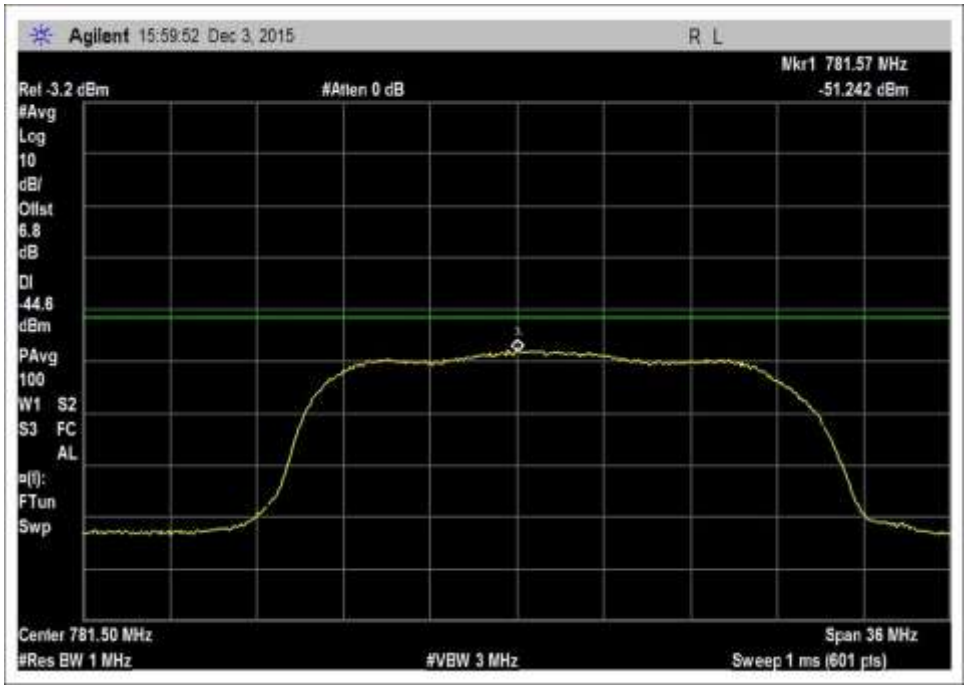
a – g_Noise 50



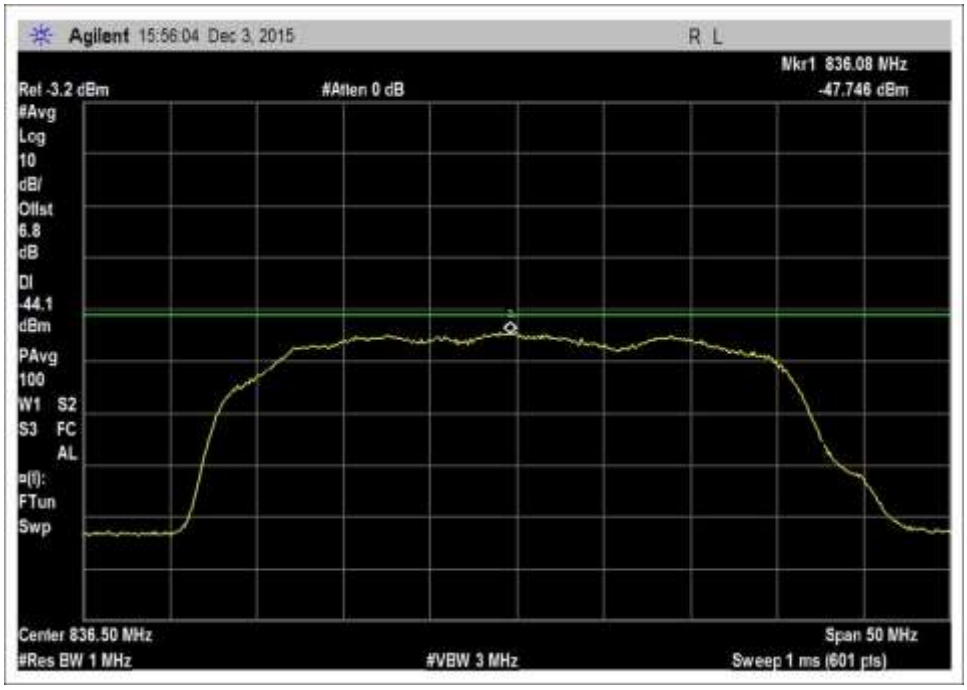
7.7_Noise_UL_698-716MHz



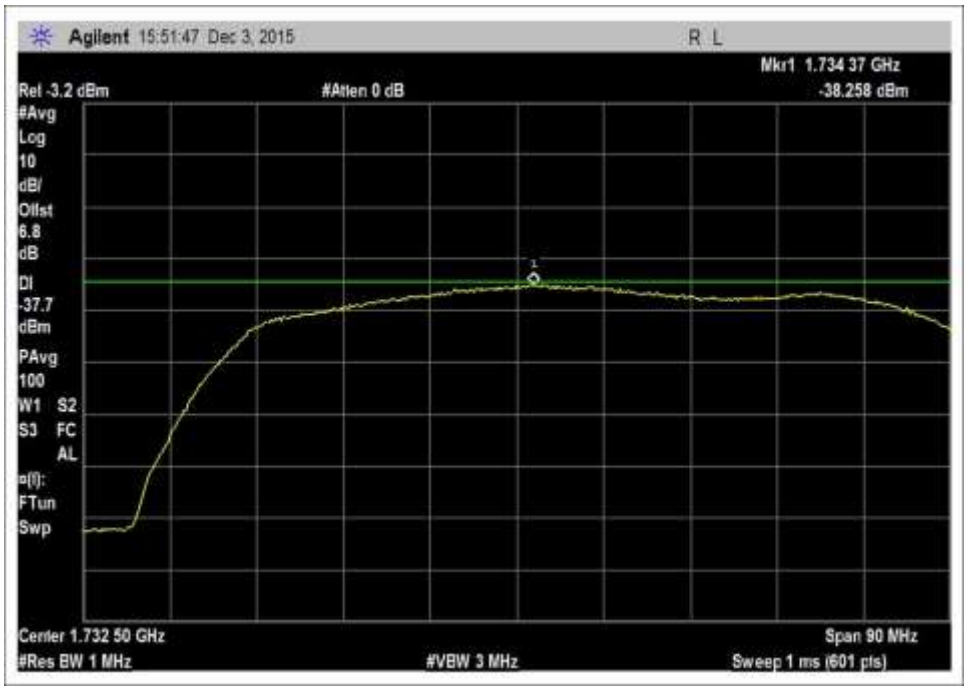
7.7_Noise_UL_776-787MHz



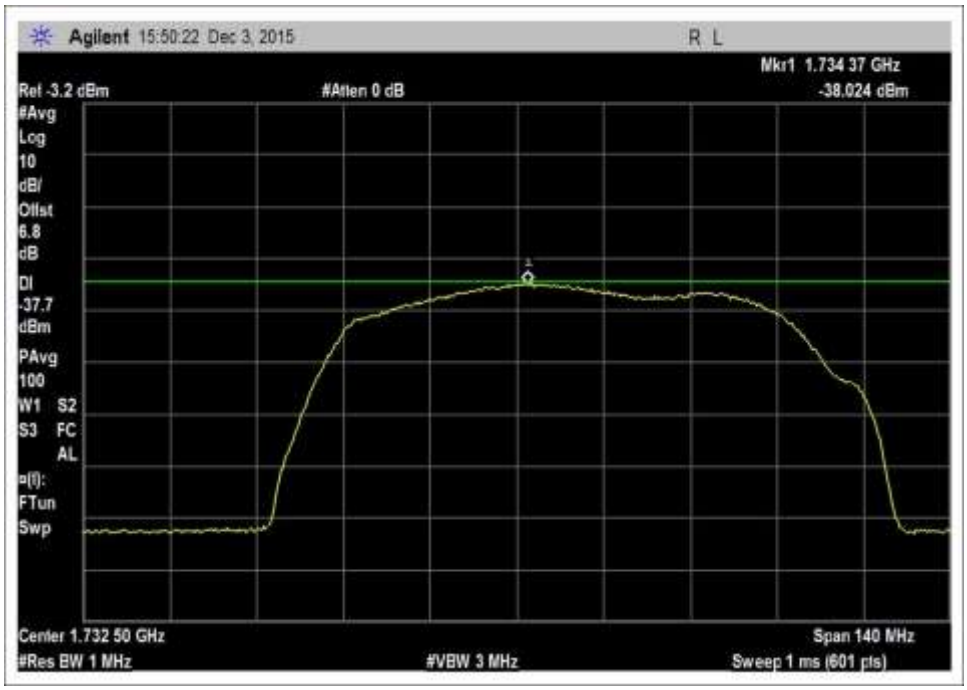
7.7_Noise_UL_776-787MHz-Zoom



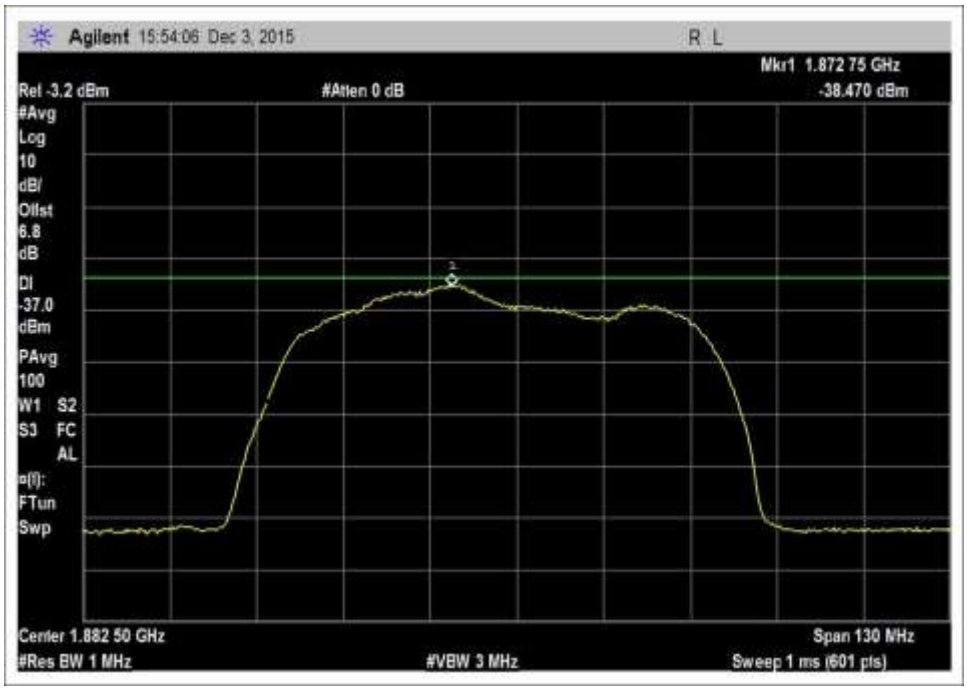
7.7_Noise_UL_824-849MHz



7.7_Noise_UL_1710-1755MHz



7.7_Noise_UL_1710-1755MHz-Zoom



7.7_Noise_UL_1850-1915MHz