Cellphone-Mate, Inc.

REVISED TEST REPORT TO 98648-12

Wideband Consumer Booster
Model: SC-POLY-DT

Tested to The Following Standard:

FCC Parts: 20.21, 22, 24 and 27

Report No.: 98648-12A

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.

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CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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Representative: Dennis Findley
Customer Reference Number: CKC20160607

REPORT PREPARED BY:

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CKC Laboratories, Inc.
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Project Number: 98648

DATE OF EQUIPMENT RECEIPT: June 2, 2016
DATE(S) OF TESTING: June 2-15, 2016 and March 4, 2019

Revision History

Original: Testing of the Wideband Consumer Booster Model: SC-POLY-DT 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	5.03.02
EMITest Emissions	5.03.11
EMITest Immunity	5.03.02

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 Parts 20.21, 22, 24 and 27

KDB 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04, Feb 12, 2016		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	Pass
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
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

NA = Not Applicable

SUMMARY OF RESULTS CONTINUED

KDB 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04, Feb 12, 2016		FCC Part Section Correlation		Mods	Results
Guidance Sec #	**Guidance Description**	**FCC Sec #**	**FCC Rule Description**		
7.10.a) - j)	Occupied Band Width	2.1049/22/24/27	Occupied Band Width	NA	Pass
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	MOD 1	Pass
7.13 a) - c)	Spectrum Block Filter	NA[1]	NA[1]	NA	NA[1]

NA = Not Applicable
NA[1] = 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
MOD 1: Added copper foil on the bottom side of PCB.
.

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
None

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
Switching Power Adapter	GME	GME18A-050300FUR	1511-0000069
Wideband Consumer Booster	Cellphone-Mate, Inc.	SC-POLY-DT	01

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

FCC PARTS 20.21, 22, 24 and 27

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 #:	**98648**	Date:	06/02/2016
Test Type:	**Conducted Emissions**	Time:	10:44:49
Tested by:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

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

Test environment conditions:
Temperature: 23°C
Relative Humidity: 40%
Pressure: 101.4 kPa

Part 22
UL: 824-849MHz
DL: 869-894MHz
Part 24
UL: 1850-1915MHz
DL: 1930-1995MHz
Part 27
UL: 1710-1755MHz, 698-716MHz, 776-787MHz
DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure: The test was performed in accordance with section 7.1 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Test Equipment:

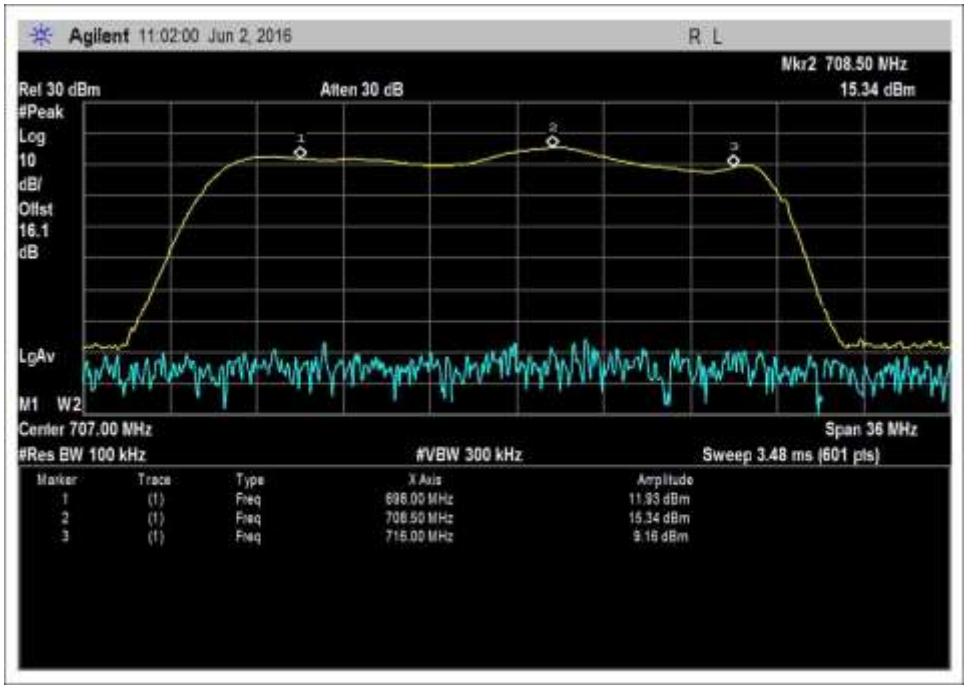
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06467	Attenuator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

Summary of Results

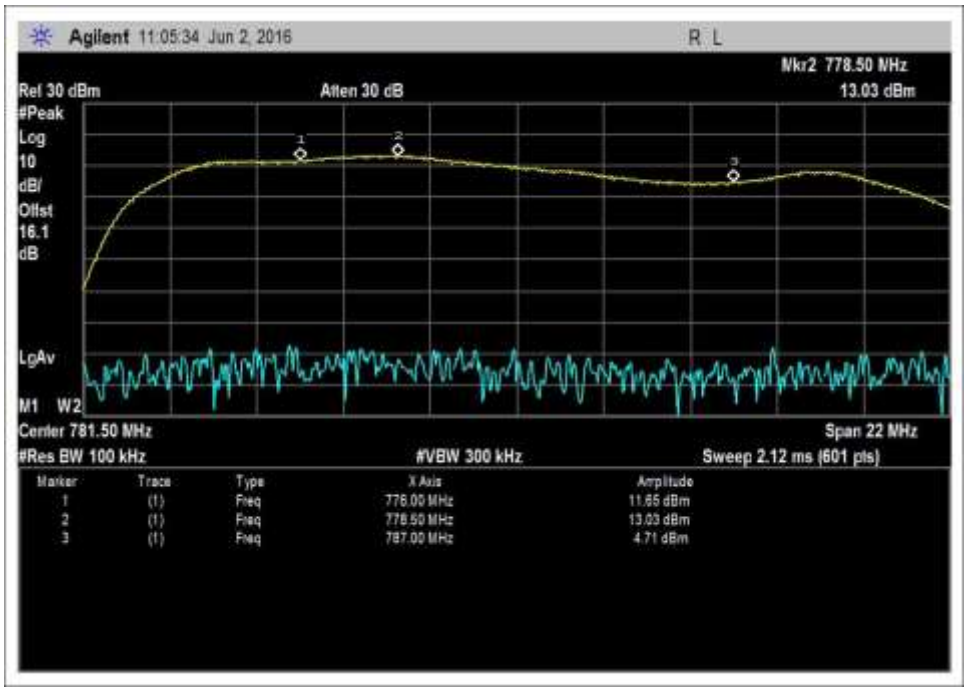
Pass: The plots below show the device only operates on the CMRS frequency bands authorized for use by the NPS.

Plots

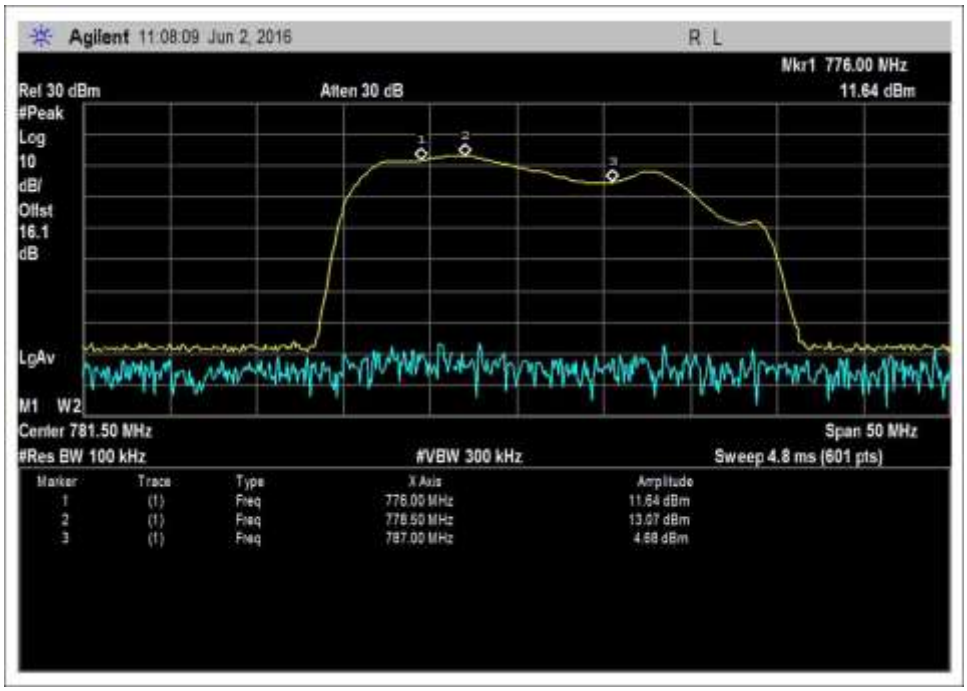
UL



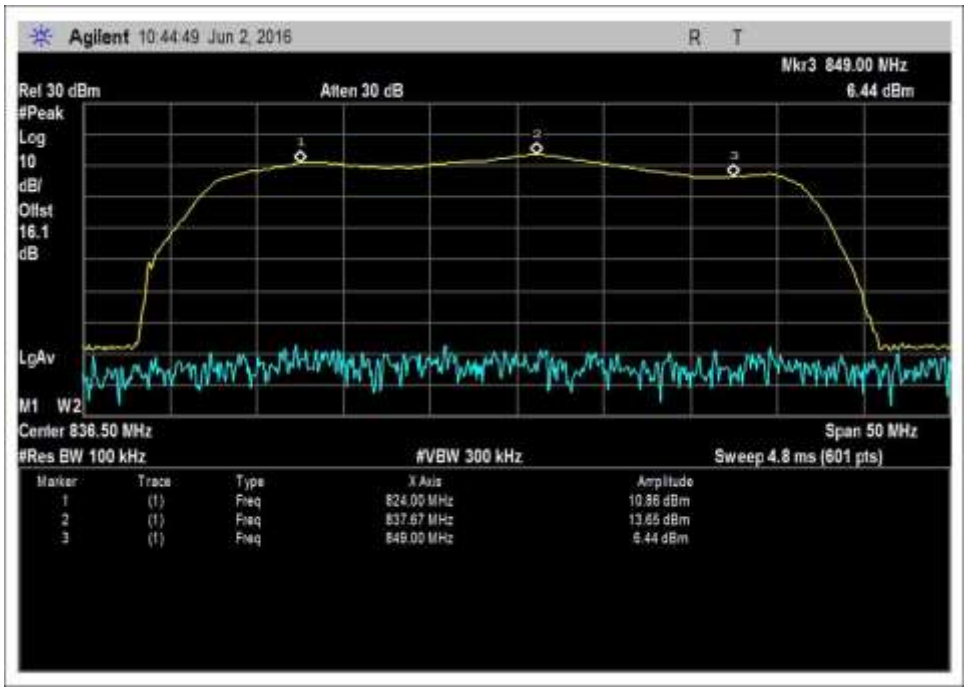
7.1_band verify_UL_698-716MHz



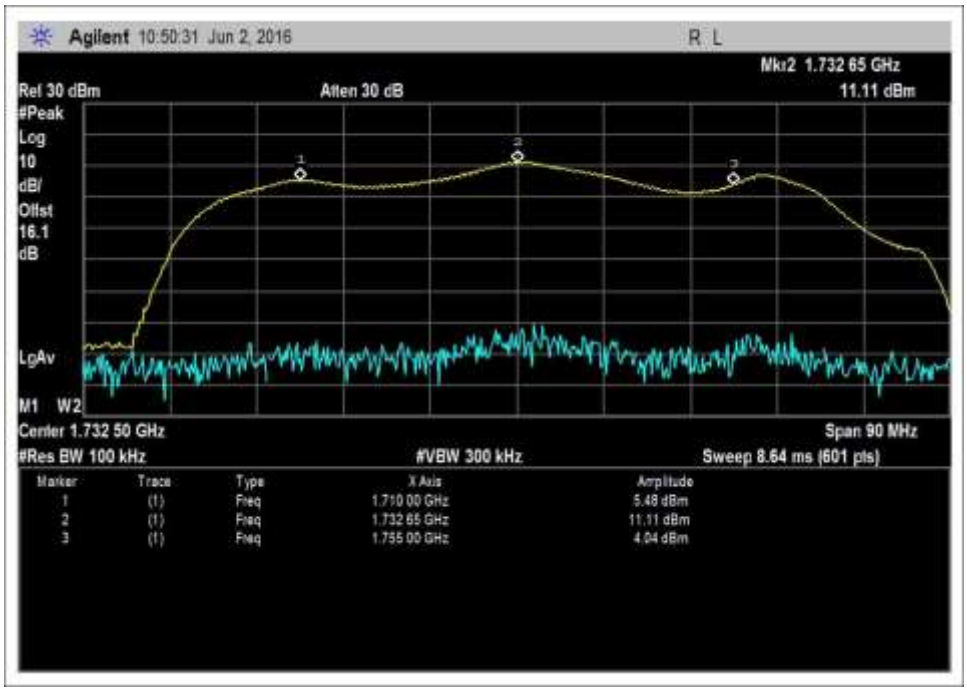
7.1_band verify_UL_776-787MHz



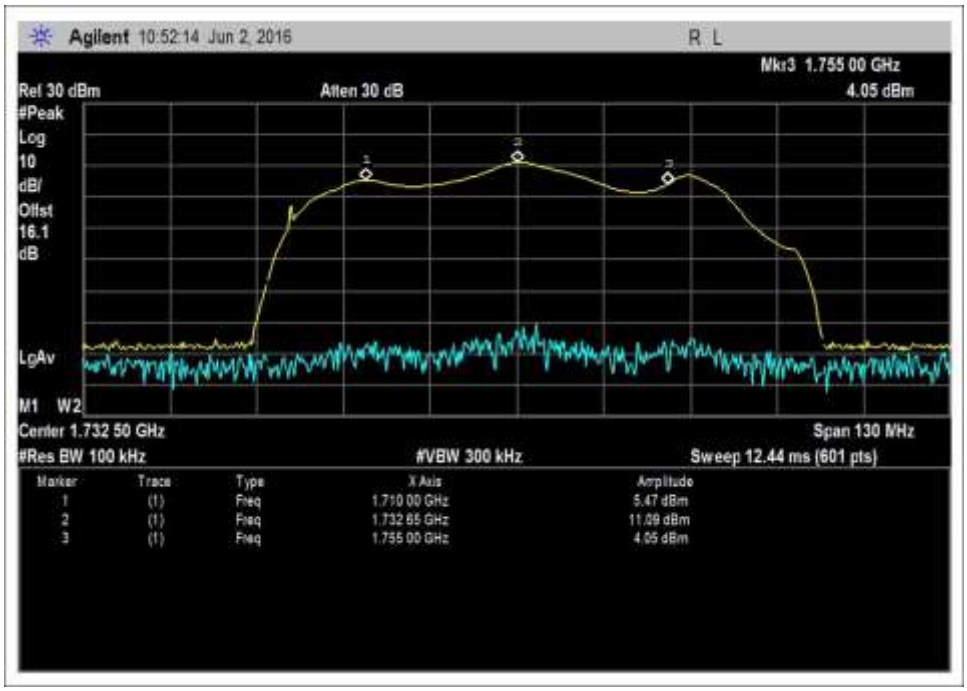
7.1_band verify_UL_776-787MHz-Zoom



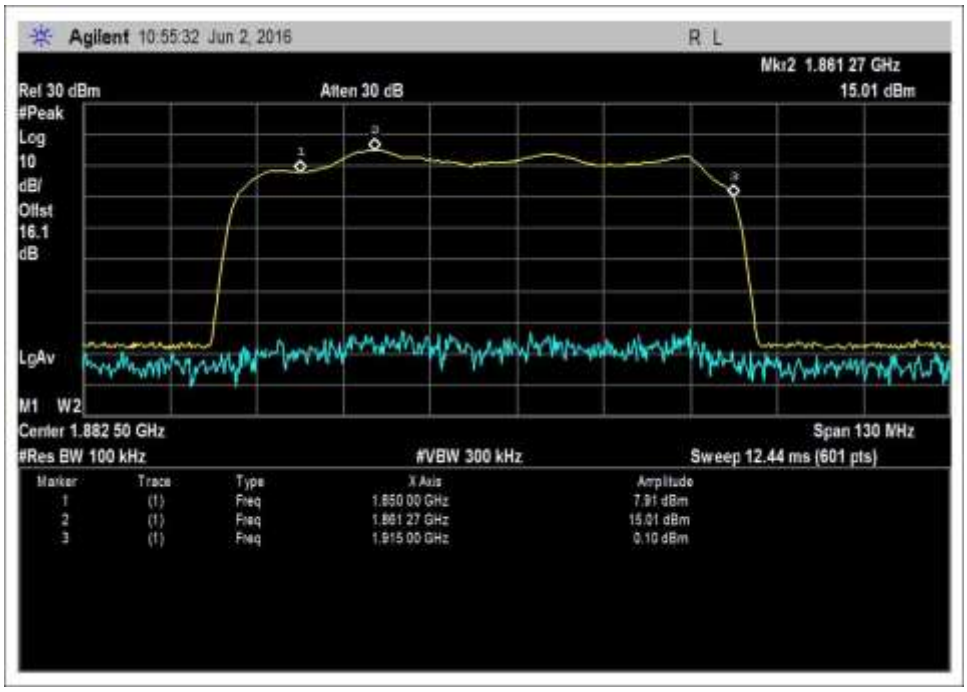
7.1_band verify_UL_824-849MHz



7.1_band verify_UL_1710-1755MHz

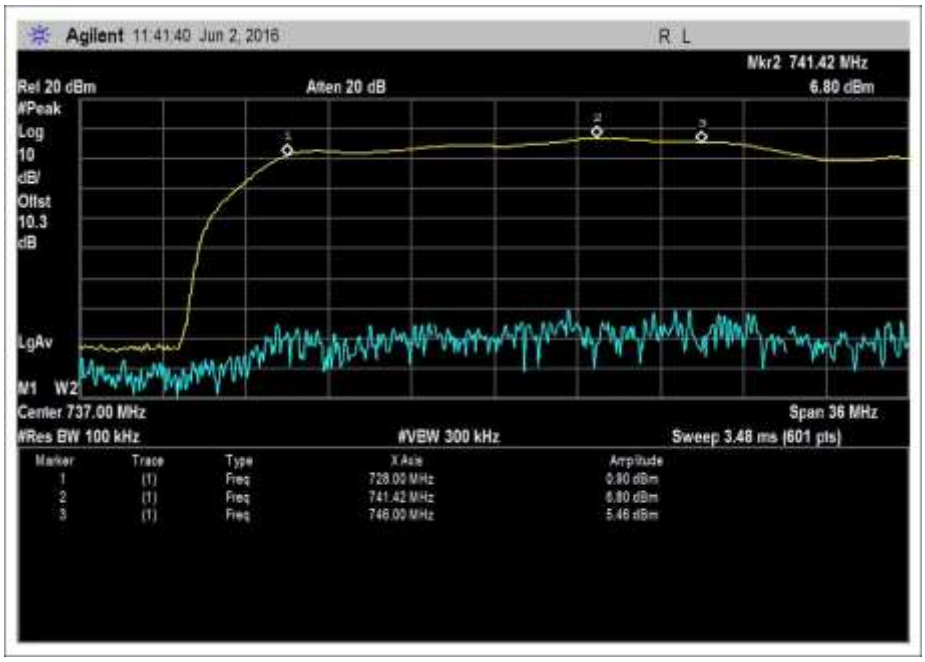


7.1_band verify_UL_1710-1755MHz-Zoom1

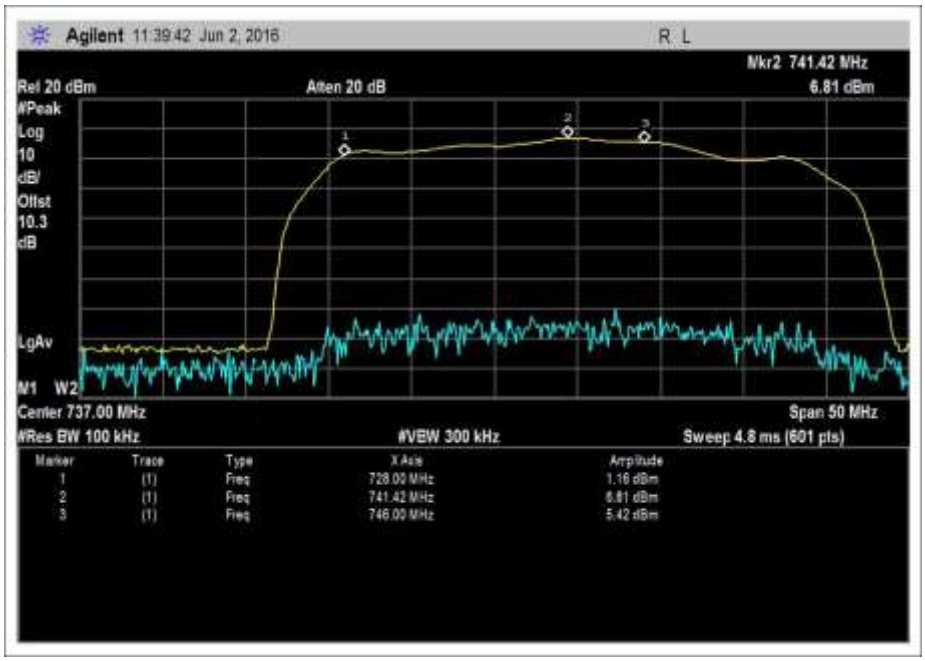


7.1_band verify_UL_1850-1915MHz

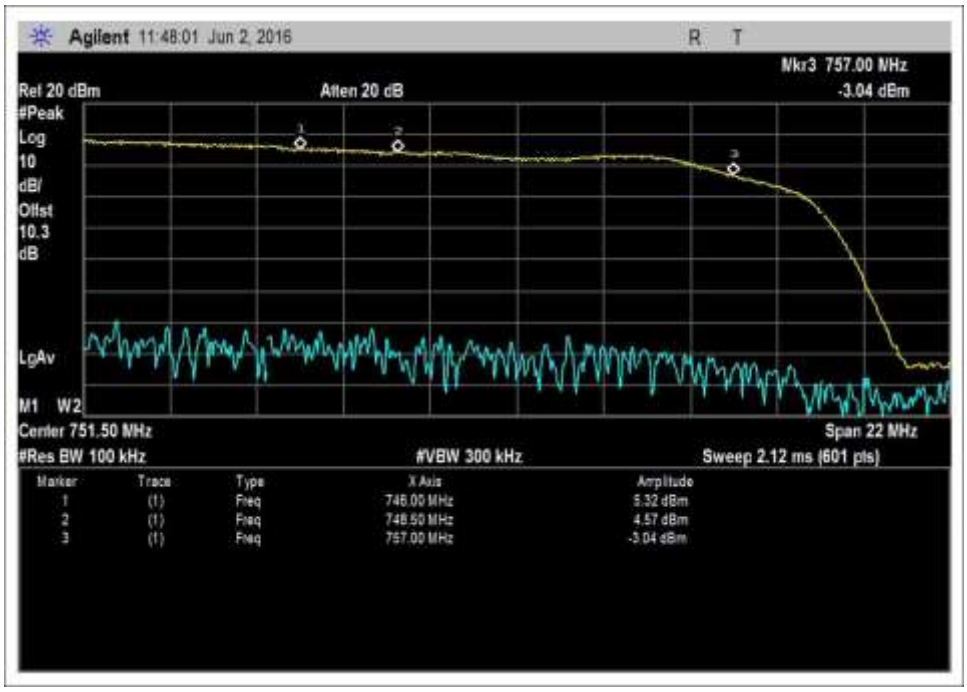
DL



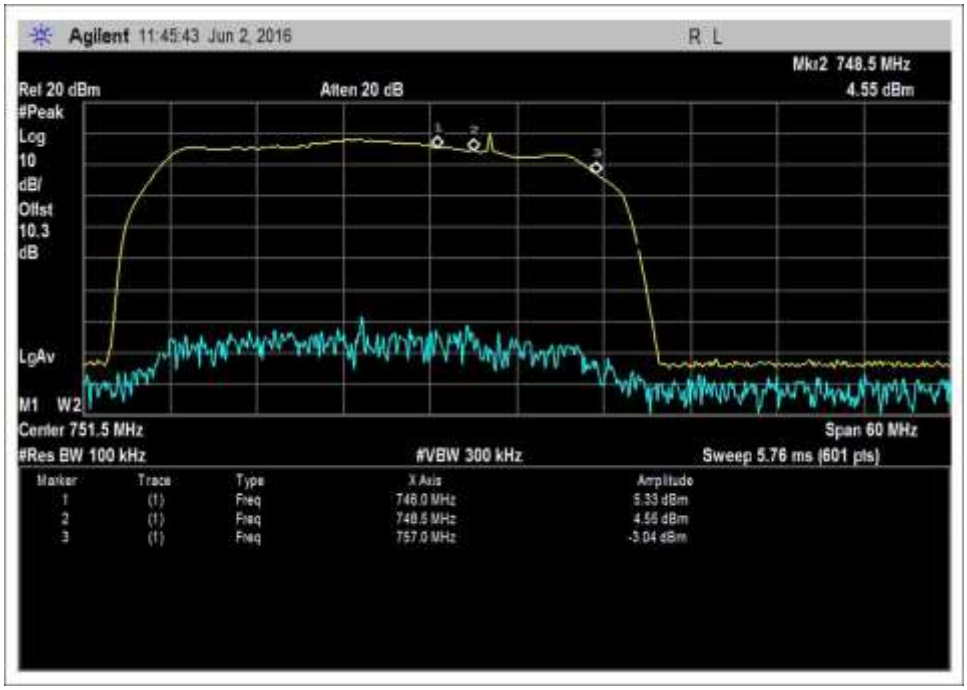
7.1_band verify_DL_728-746MHz



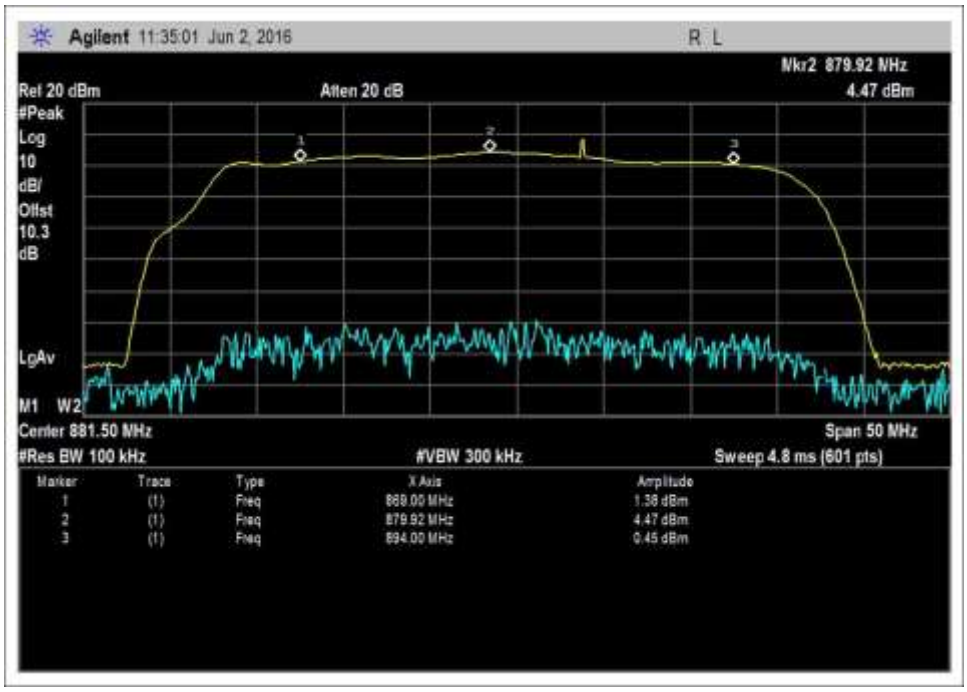
7.1_band verify_DL_728-746MHz-Zoom



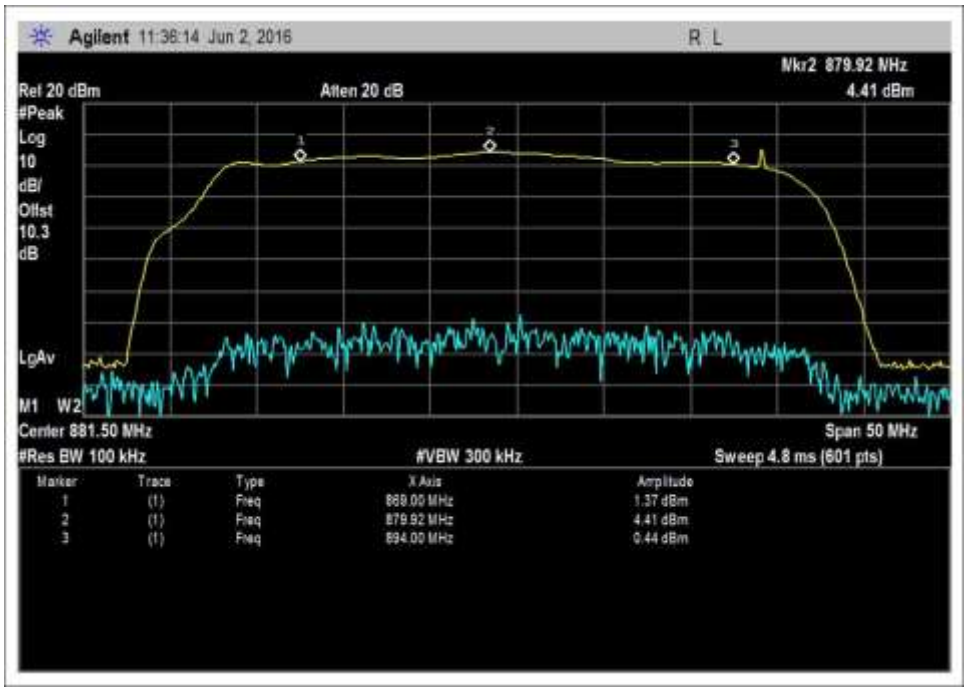
7.1_band verify_DL_746-757MHz



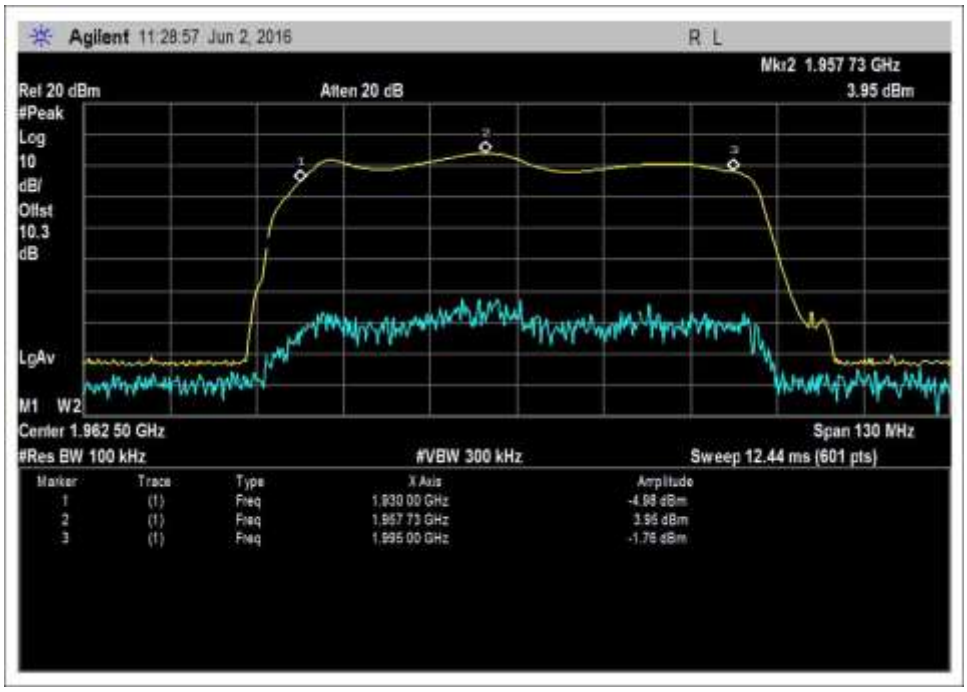
7.1_band verify_DL_746-757MHz-Zoom



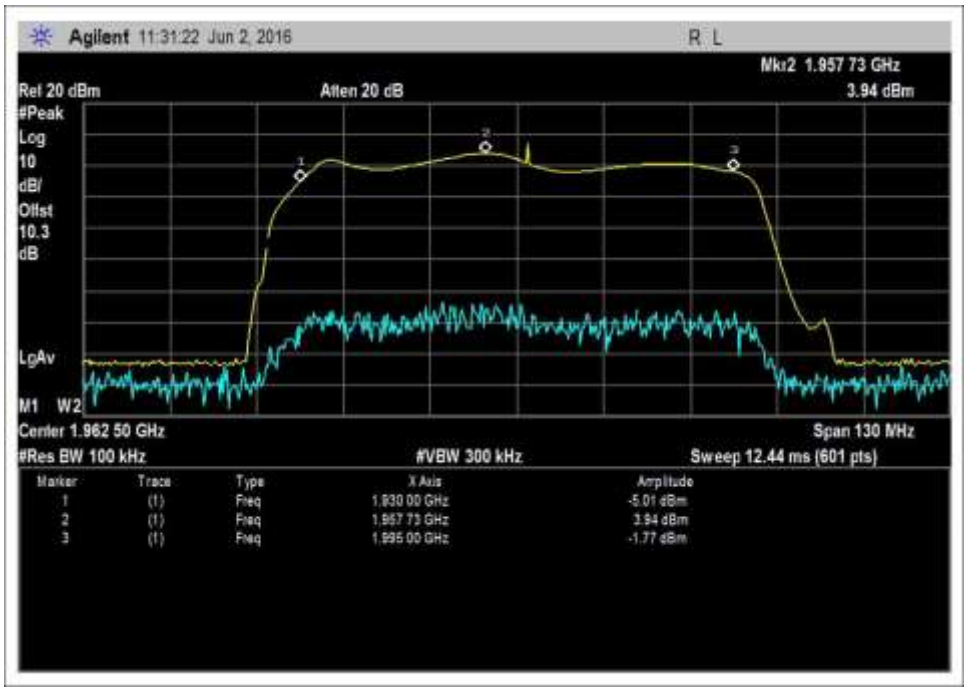
7.1_band verify_DL_869-894MHz-1



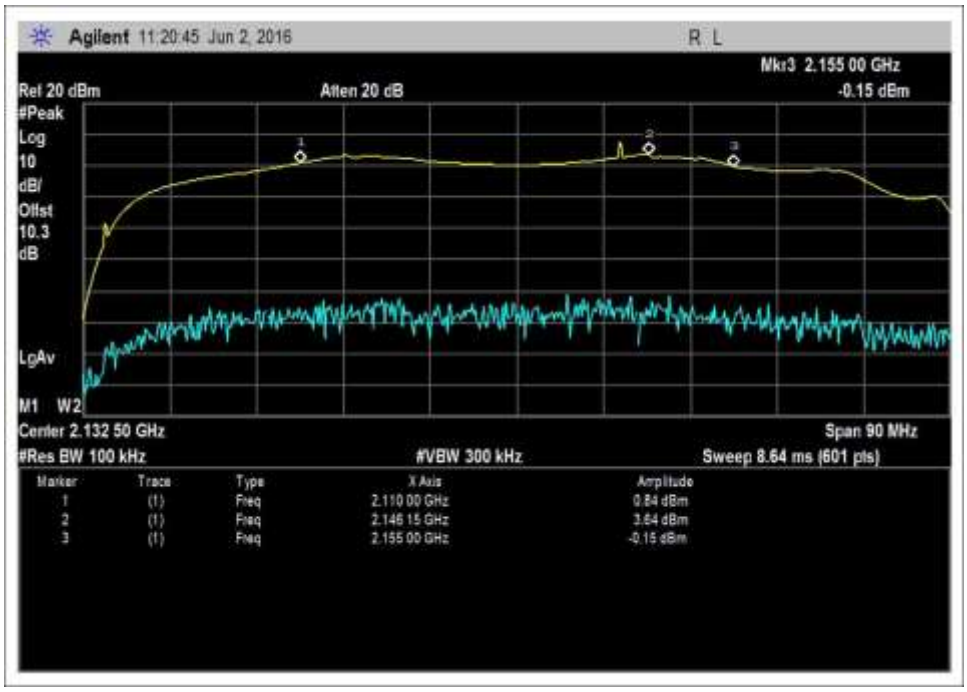
7.1_band verify_DL_869-894MHz-2



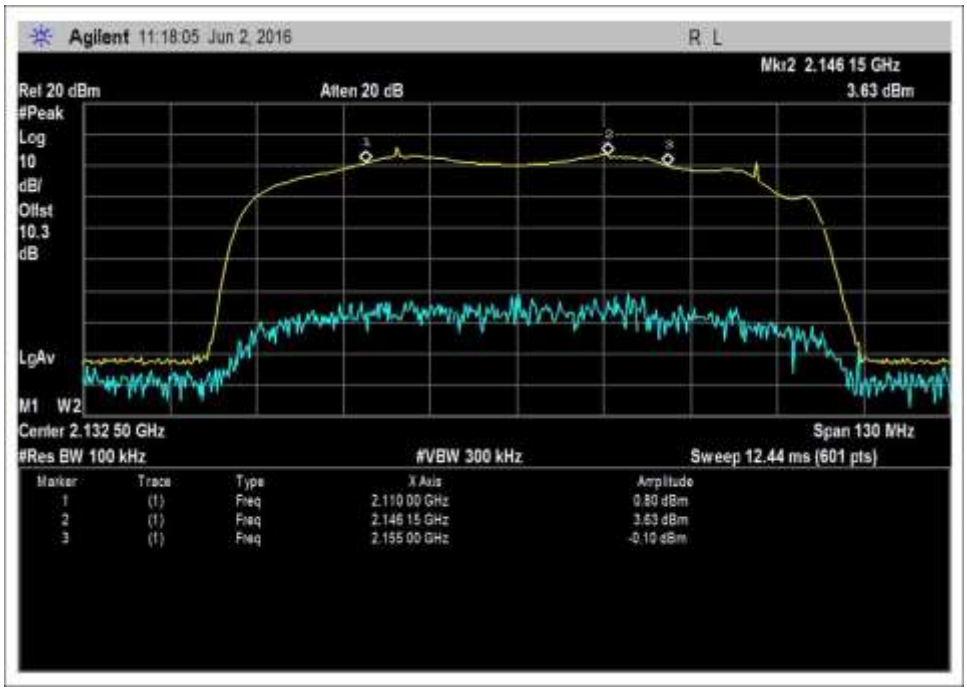
7.1_band verify_DL_1930-1995MHz-1



7.1_band verify_DL_1930-1995MHz-2



7.1_band verify_DL_2110-2155MHz



7.1_band verify_DL_2110-2155MHz-Zoom

7.2 Maximum Power/ 7.3 Power Gain

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** **7.3 Maximum Booster Gain**		
Work Order #:	**98648**	Date:	06/03/2016
Test Type:	**Conducted Emissions**	Time:	10:36:34
Tested by:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed Wideband Consumer Booster.
The EUT is placed on the test bench. Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.
The EUT Server port is a type SMA connector and 50-ohm impedance.
The EUT Donor port is type F connector and 75-ohm impedance.
During testing there is a 75 ohm to 50 ohm matching pad connected to the EUT type F connector.
This matching pad has a 5.8dB correction factor.
Firmware: V1.0
Test environment conditions:
Temperature: 23°C
Relative Humidity: 40%
Pressure: 101.4 kPa

Part 22
UL: 824-849MHz
DL: 869-894MHz
Part 24
UL: 1850-1915MHz
DL: 1930-1995MHz
Part 27
UL: 1710-1755MHz, 698-716MHz, 776-787MHz
DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure: The test was performed in accordance with section 7.2 and 7.3 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

Test Equipment:

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

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*	CM288W	3dBi	3dBi	3dBi	4dBi	4dBi\4dBi	
	CM230W	10dBi	10dBi	10dBi	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 Antenna*	SC322W	2.5dBi	2.5dBi	3dBi	5dBi	4dBi\5dBi	
* All equivalent antennas and cables are suitable for use with the SC-POLY-DT. As above information. Remark: Lower gain antenna can also be used.							

Summary of Results

Pass: as summarized in 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	-46.3	18.6	64.9	-47.5	17.0	64.5
UL1850-1915	-44.5	19.6	64.1	-45.1	17.7	62.8
UL824-894	-41.8	19.9	61.7	-43.6	17.2	60.8
UL 698-716	-40.2	21.1	61.3	-43.1	17.2	60.3
UL776-787	-41.1	19.4	60.5	-42.5	17.3	59.8
DL2110-2155	-54.4	10.6	65.0	-59.3	4.9	64.2
DL1930-1995	-51.7	10.7	62.4	-53.9	8.0	61.9
DL869-894	-47.9	12.4	60.3	-51.0	8.5	59.5
DL:728-746	-47.5	11.8	59.3	-48.1	9.6	57.7
DL 746-757	-46.5	9.5	56.0	-47.8	7.0	54.8

*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					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	19.6	10	6.42	23.2	17	30
UL824-894	19.9	10	3.75	26.2	17	30
UL 698-716	21.1	10	3.32	27.8	17	30
UL776-787	19.4	10	3.32	26.1	17	30
DL2110-2155	10.6	5	0	15.6	na	17
DL1930-1995	10.7	5	0	15.7	na	17
DL869-894	12.4	3	0	15.4	na	17
DL:728-746	11.8	2.5	0	14.3	na	17
DL 746-757	9.5	2.5	0	12.0	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	17.0	10	6.22	20.8	17	30
UL1850-1915	17.7	10	6.42	21.3	17	30
UL824-894	17.2	10	3.75	23.5	17	30
UL 698-716	17.2	10	3.32	23.9	17	30
UL776-787	17.3	10	3.32	24.0	17	30
DL2110-2155	4.9	5	0	9.9	na	17
DL1930-1995	8.0	5	0	13.0	na	17
DL869-894	8.5	3	0	11.5	na	17
DL:728-746	9.6	2.5	0	12.1	na	17
DL 746-757	7.0	2.5	0	9.5	na	17

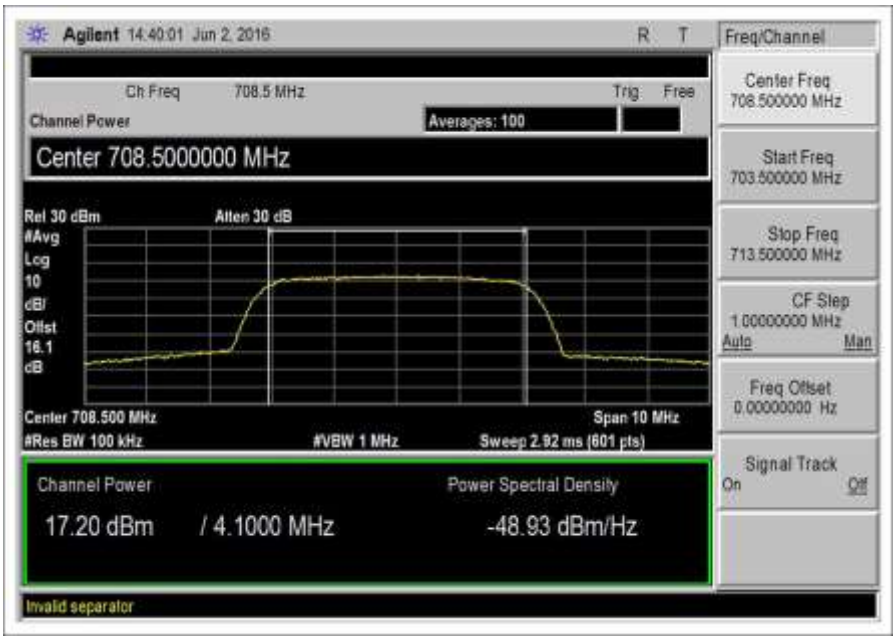
Section 5.5 power						
		Pulse GSM			4.1 MHz AWGN	
Frequency (MHz)	Input (dBm)	Output (dBm)	Gain (dB)	Input (dBm)	Output (dBm)	Gain (dB)
UL1710-1755	-35.9	18.0	53.9	-38.3	16.6	54.9
UL1850-1915	-35.6	19.6	55.2	-36.1	18.1	54.2
UL824-894	-32.8	19.6	52.4	-34.1	18.3	52.4
UL 698-716	-31.2	21.0	52.2	-31.0	20.0	51.0
UL776-787	-33.2	18.8	52.0	-31.6	19.3	50.9
DL2110-2155	-43.9	10.1	54.0	-50.4	4.2	54.6
DL1930-1995	-47.7	10.6	58.3	-47.4	8.0	55.4
DL869-894	-41.9	11.9	53.8	-43.0	8.8	51.8
DL:728-746	-40.0	12.4	52.4	-42.5	9.4	51.9
DL 746-757	-41.5	9.1	50.6	-43.0	6.9	49.9

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 it is for reference only.

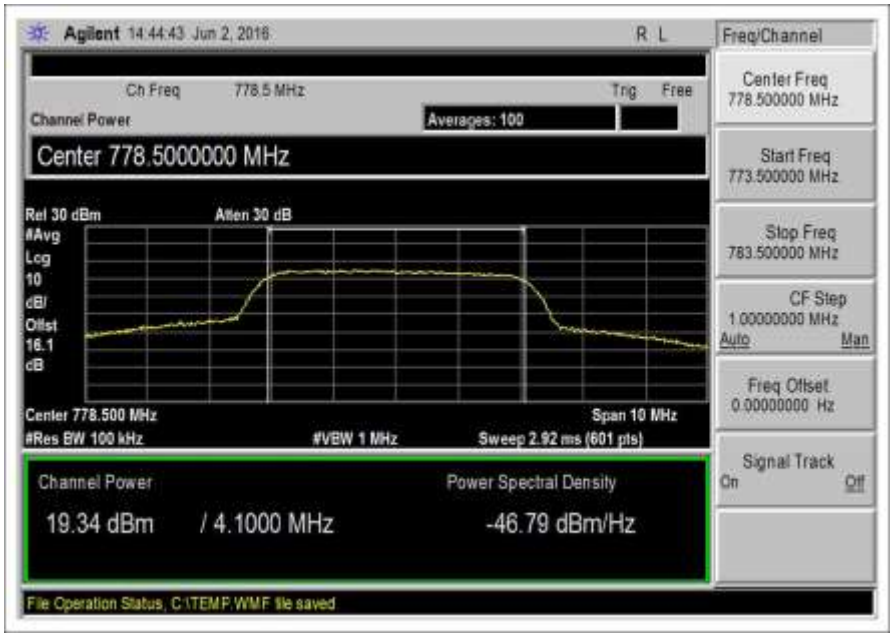
	Pulse GSM	4.1MHz AWGN	Limit (dB)
UL gain vs DL gain 1710/2110	-0.1	0.3	9.0
UL gain vs DL gain 1850/1930	1.7	0.8	9.0
UL gain vs DL gain 824/869	1.4	1.3	9.0
UL gain vs DL gain 776/728	2.0	2.6	9.0
UL gain vs DL gain 776/746	4.5	5.0	9.0

Plots

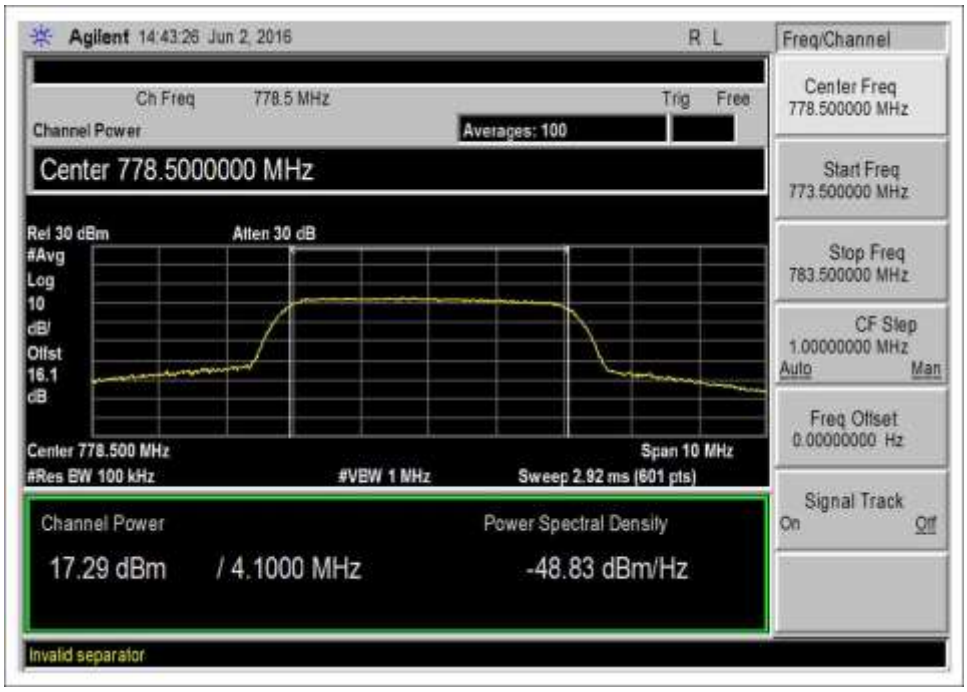
UL-AWGN



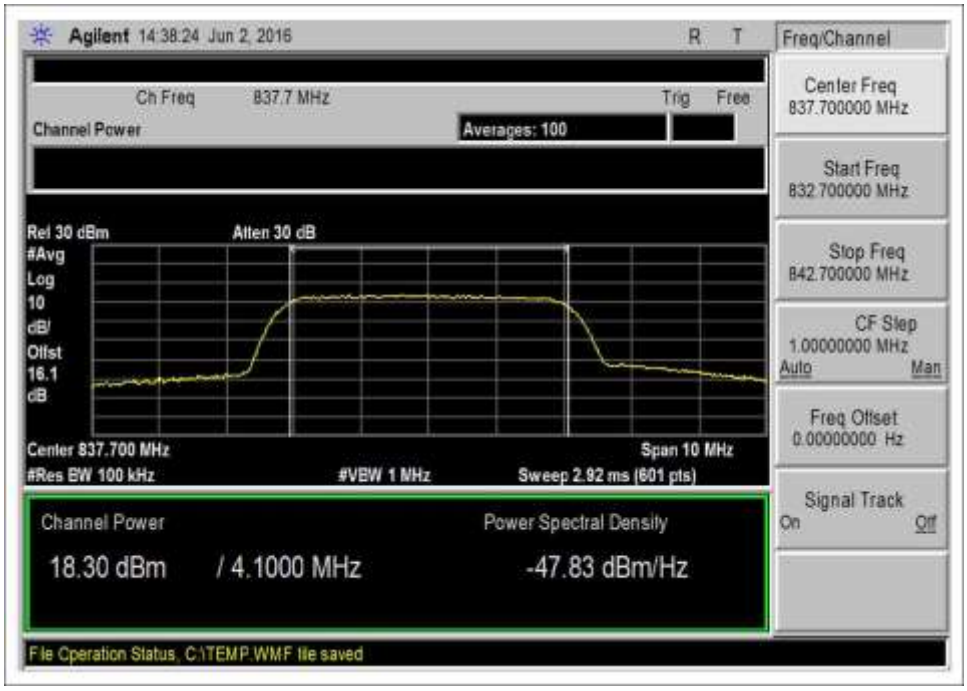
7.2_Power_UL_698-716_AWGN



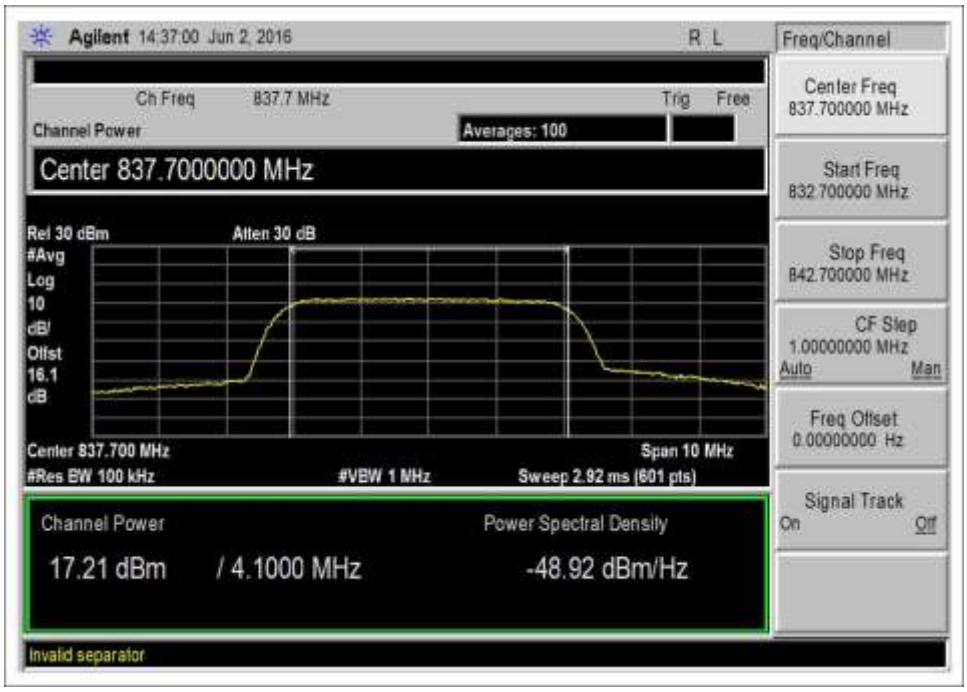
7.2_Power_UL_698-716_AWGN-Max



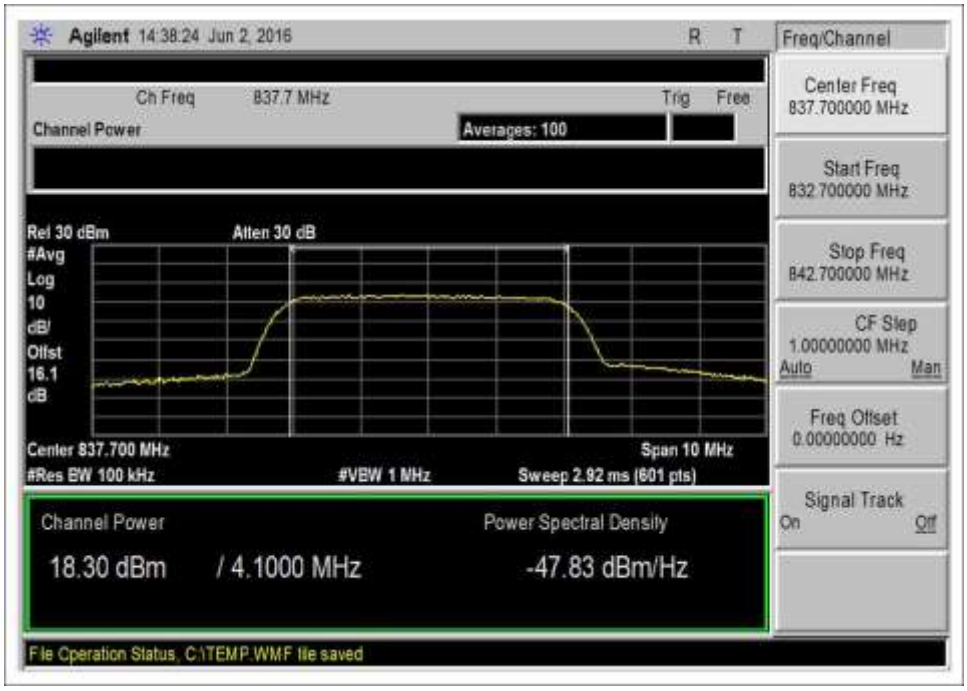
7.2_Power_UL_776-787_AWGN



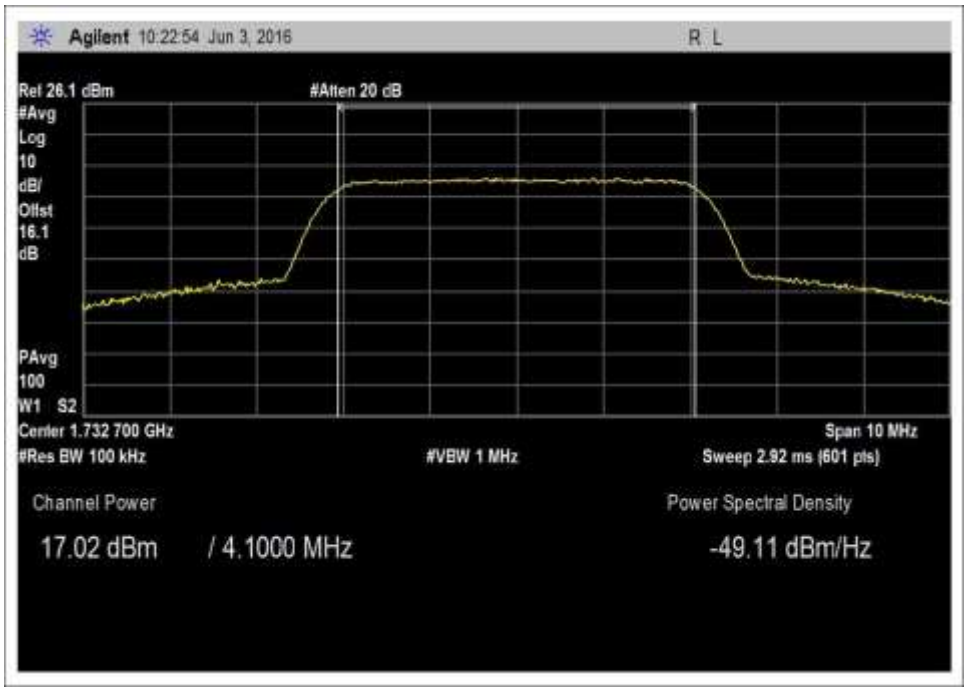
7.2_Power_UL_776-787_AWGN-Max



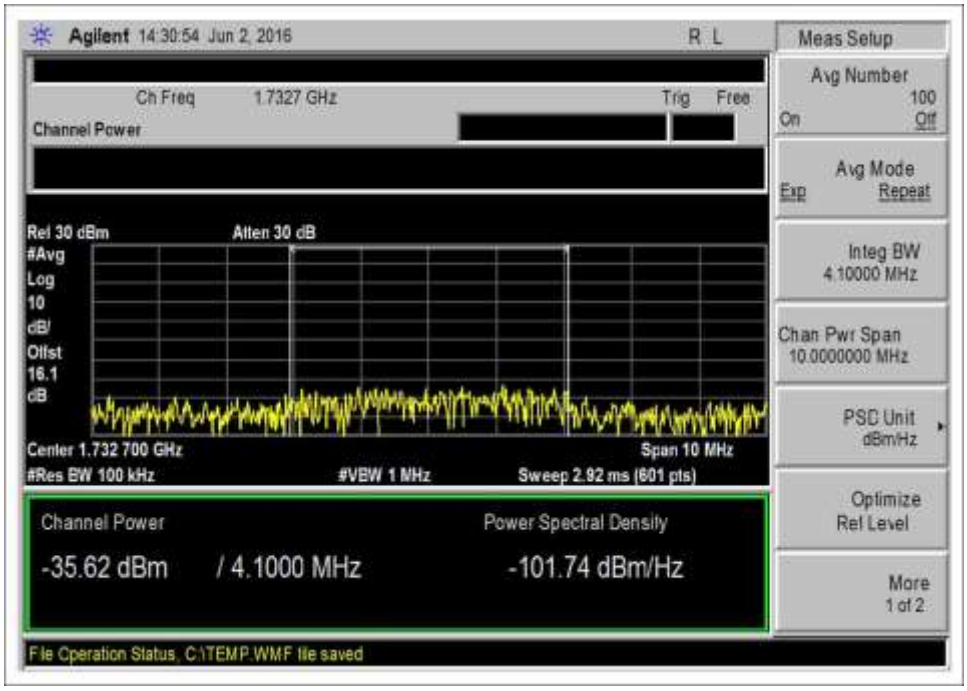
7.2_Power_UL_824-849_AWGN



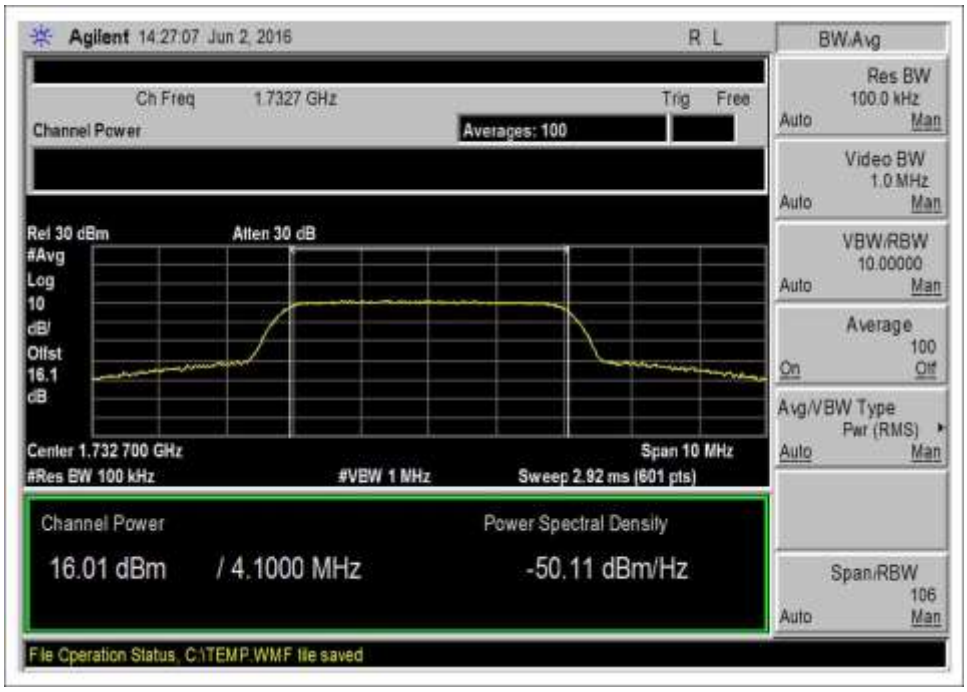
7.2_Power_UL_824-849_AWGN-Max



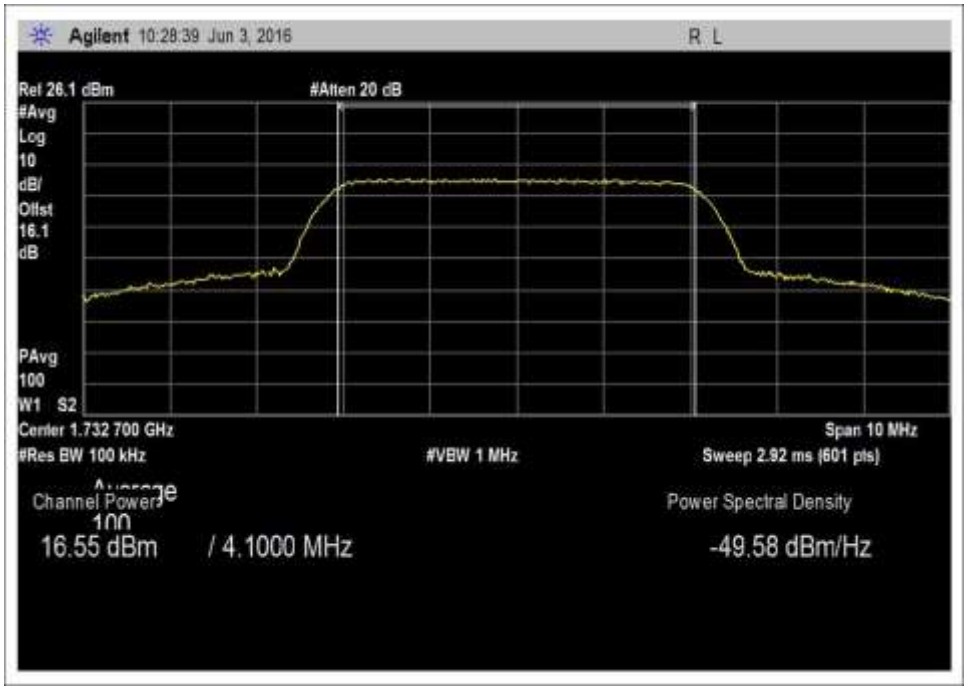
7.2_Power_UL_1710-1755_AWGN



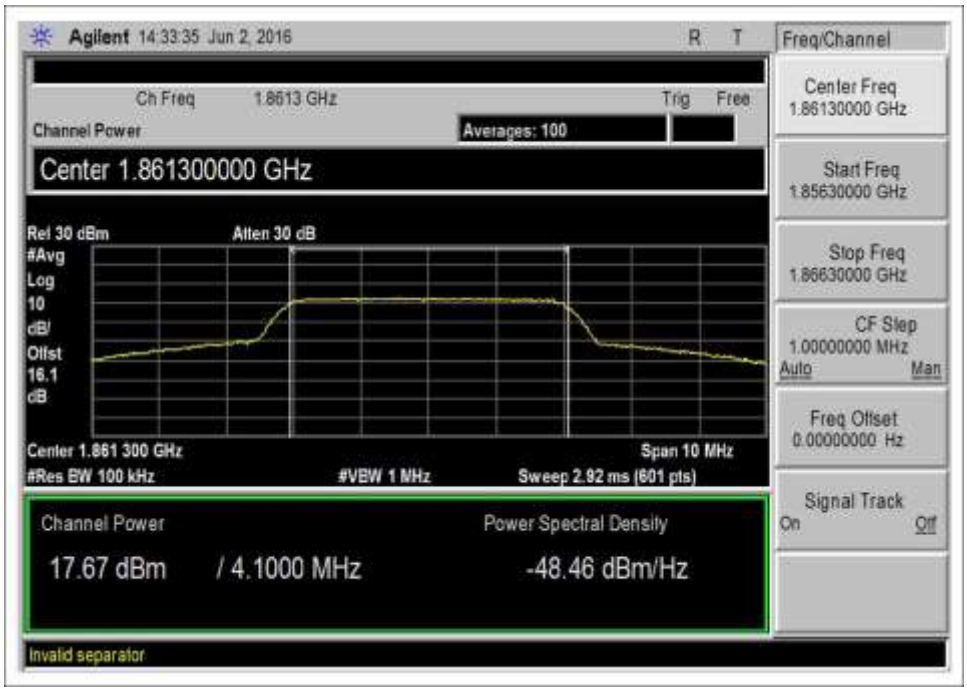
7.2_Power_UL_1710-1755_AWGN-0dBm



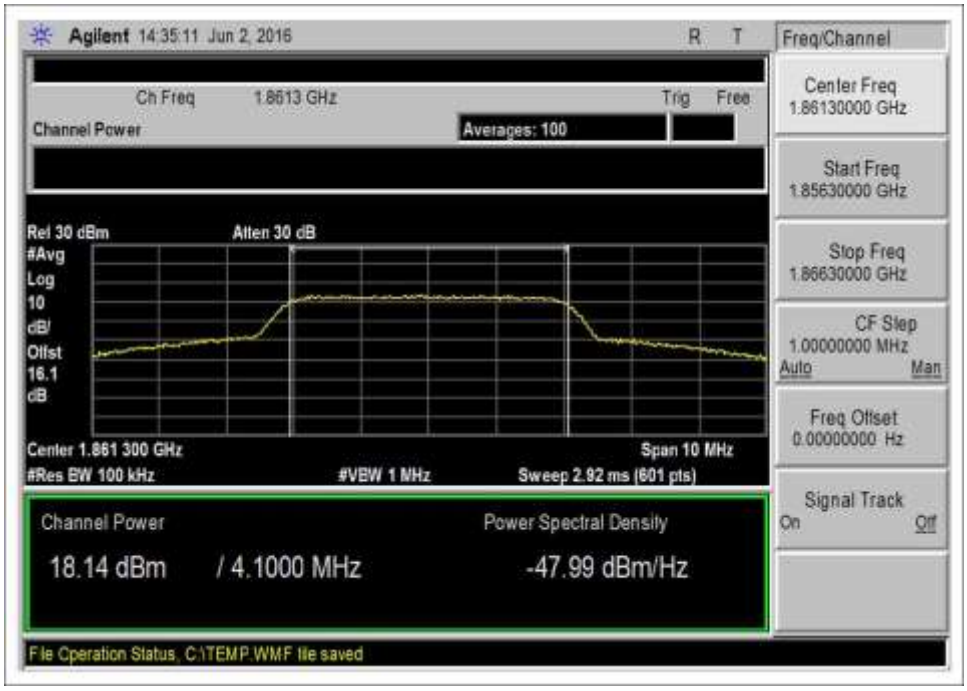
7.2_Power_UL_1710-1755_AWGN-ko



7.2_Power_UL_1710-1755_AWGN-Max

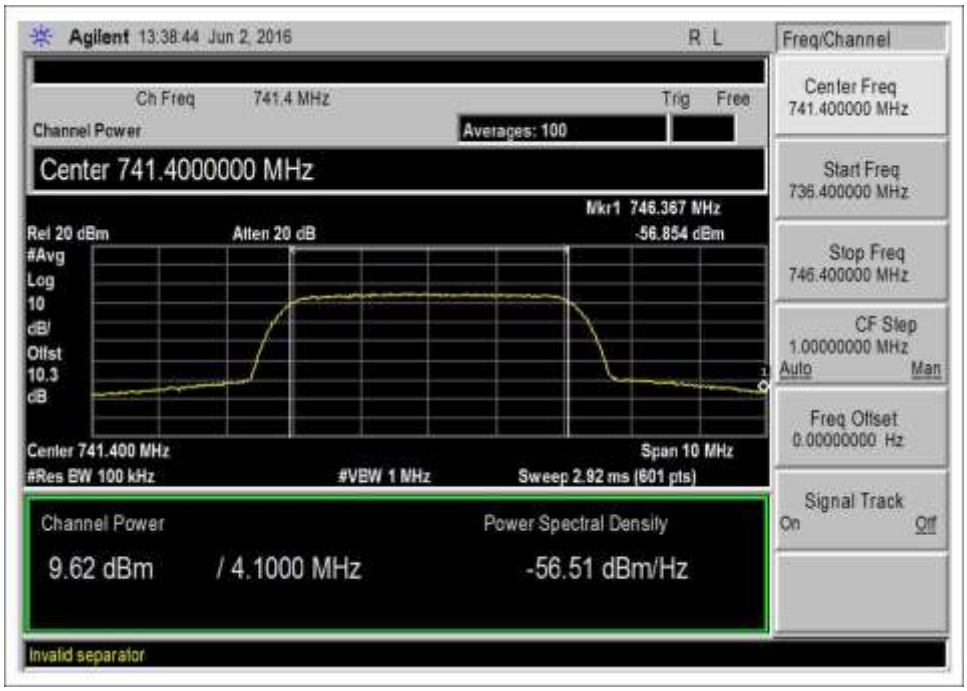


7.2_Power_UL_1850-1915_AWGN

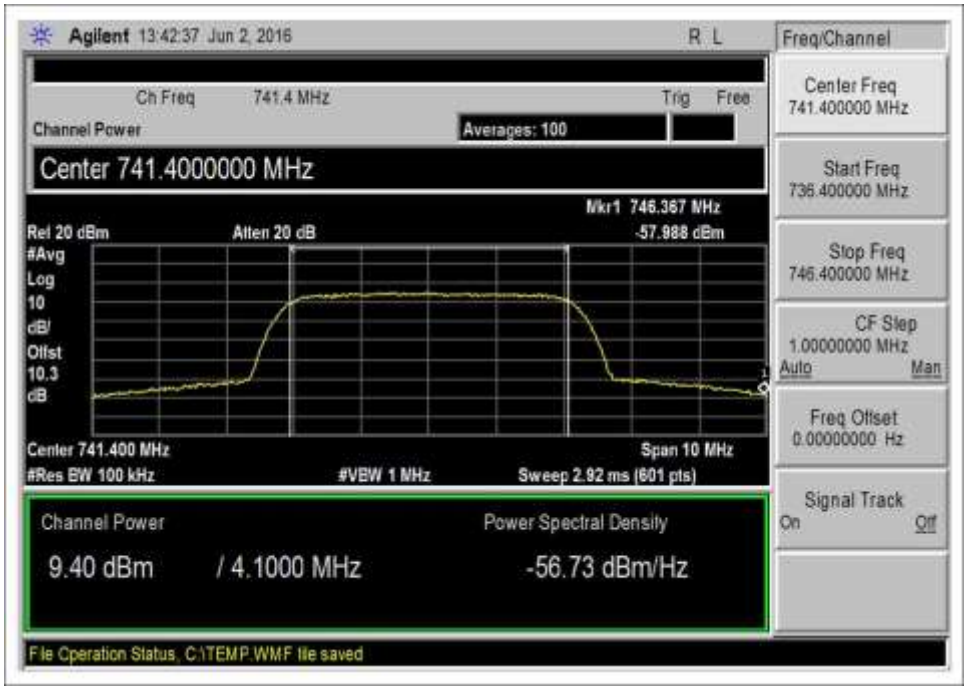


7.2_Power_UL_1850-1915_AWGN-Max

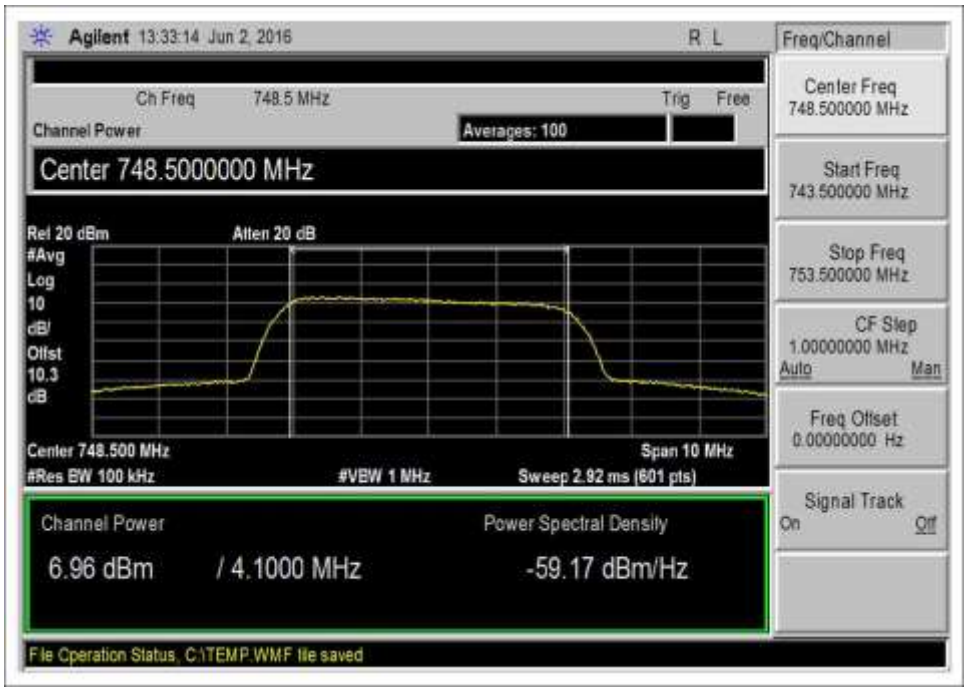
DL-AWGN



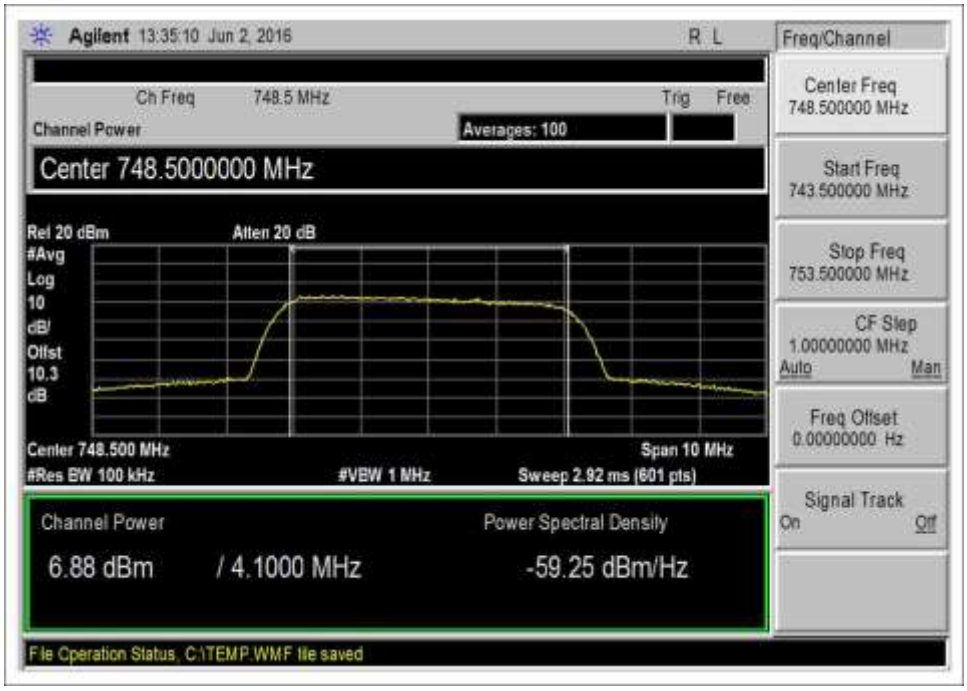
7.2_Power_DL_728-746_AWGN



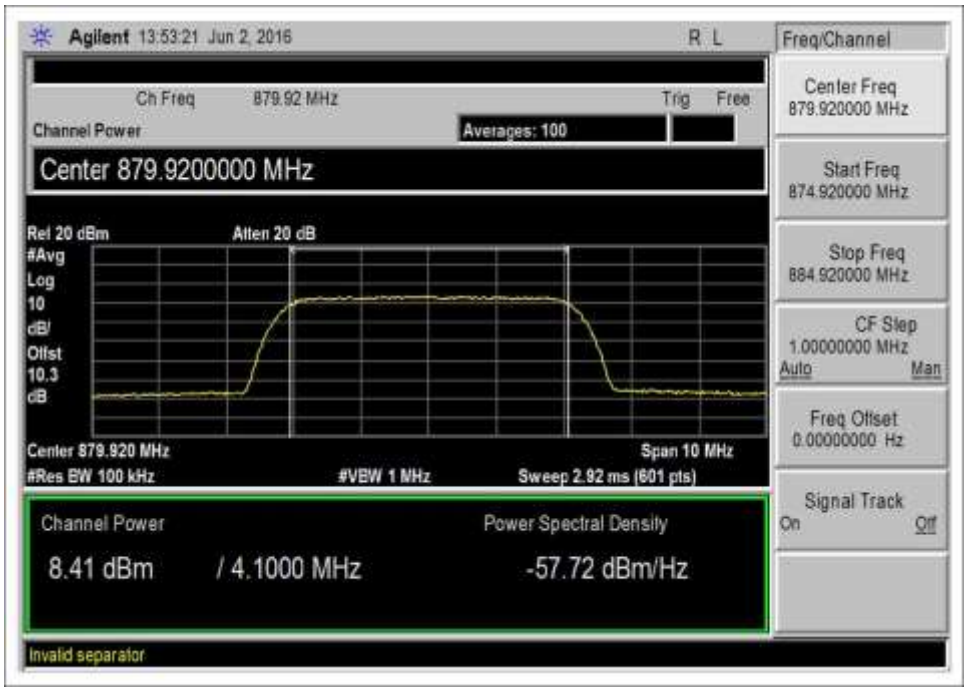
7.2_Power_DL_728-746_AWGN-Max



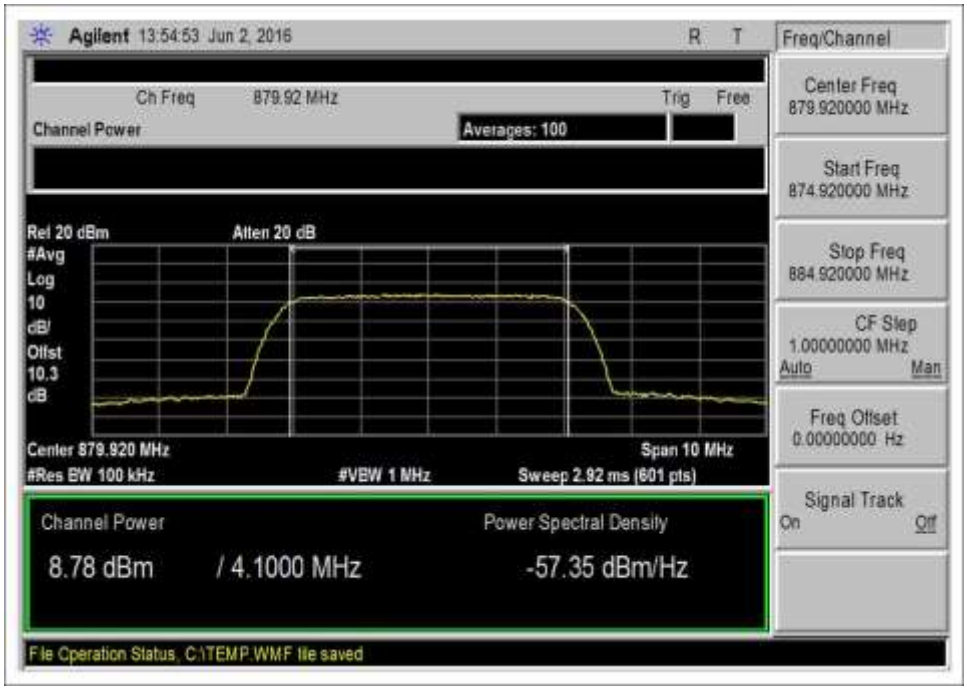
7.2_Power_DL_746-757_AWGN



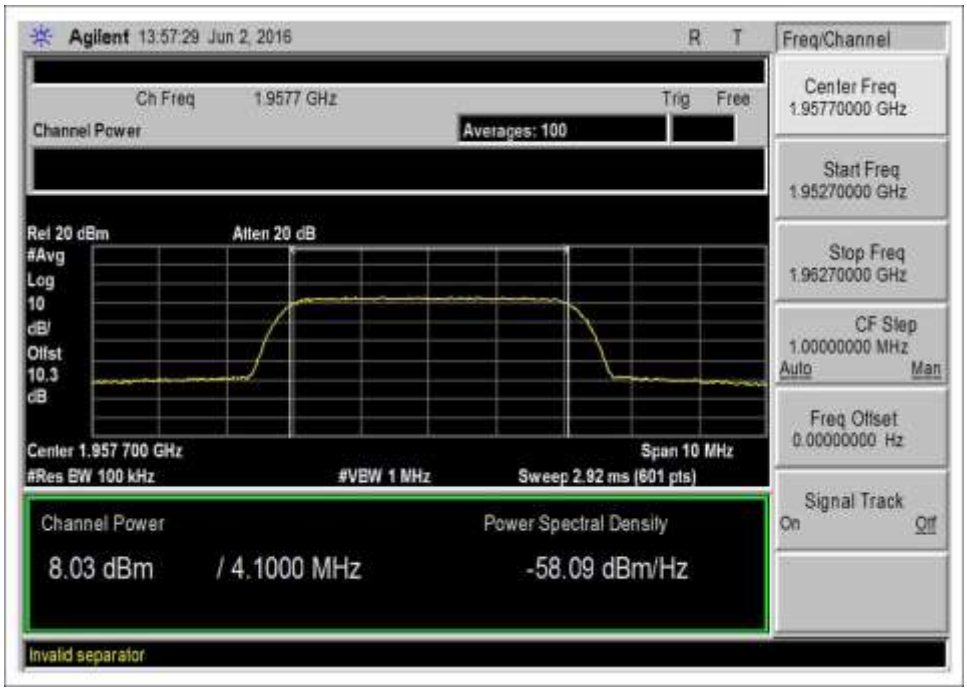
7.2_Power_DL_746-757_AWGN-Max



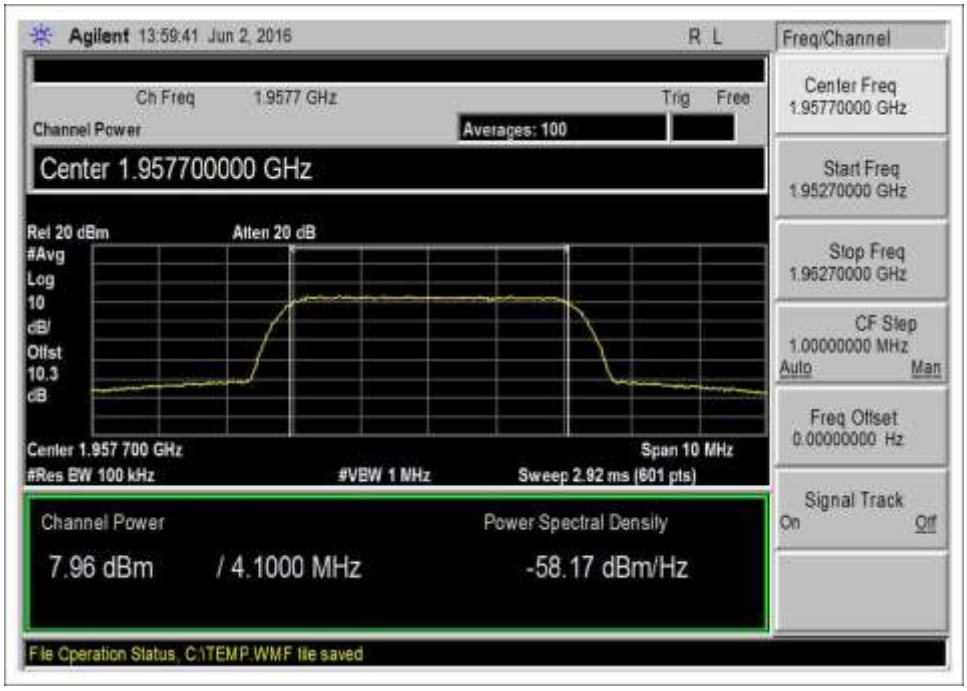
7.2_Power_DL_869-894_AWGN



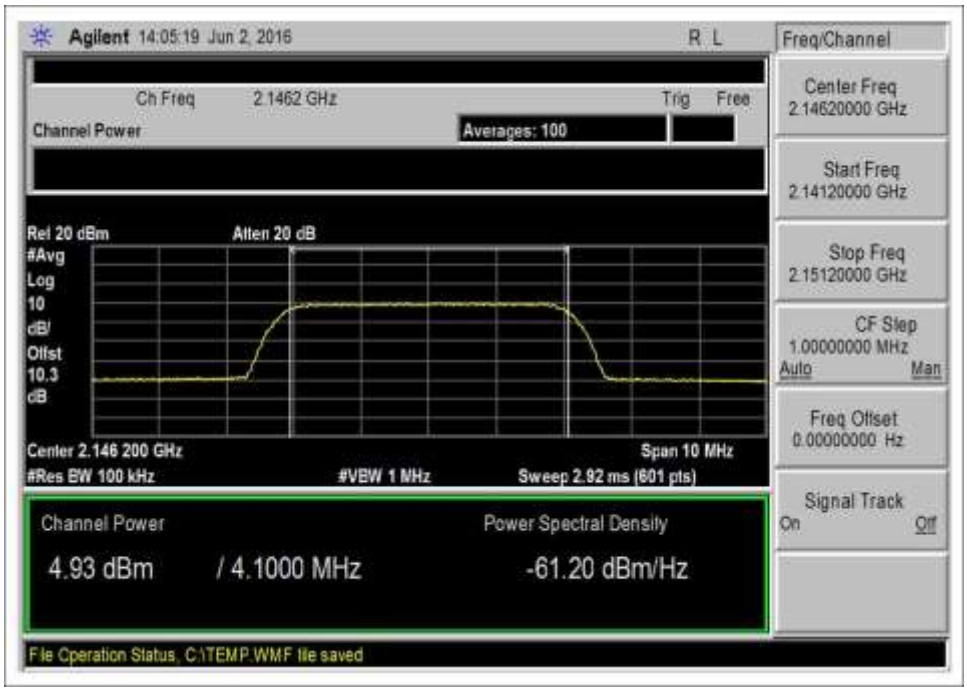
7.2_Power_DL_869-894_AWGN-Max



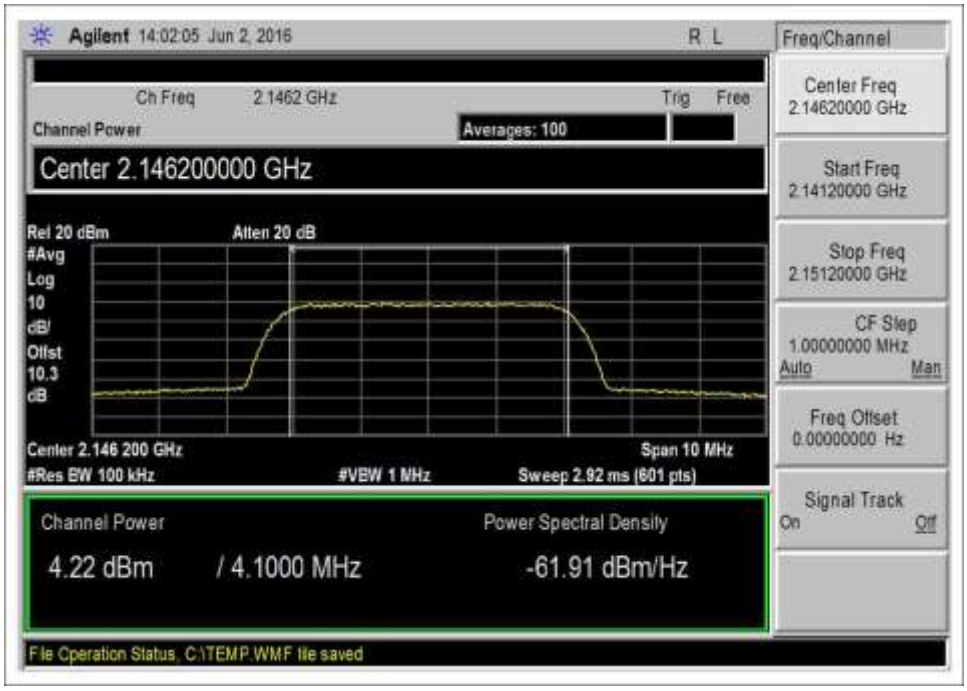
7.2_Power_DL_1930-1995_AWGN



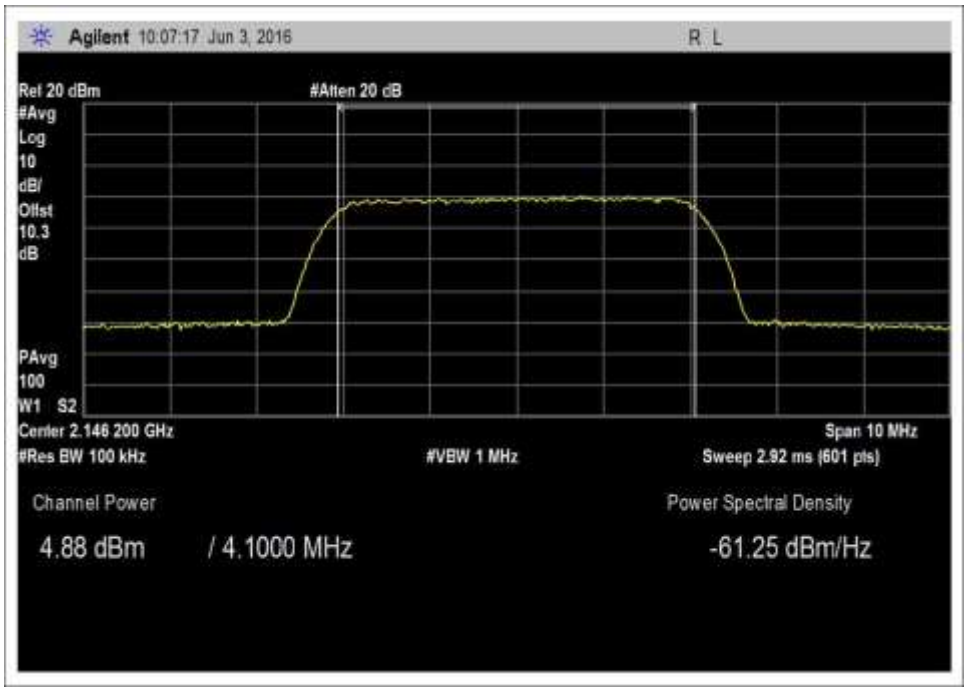
7.2_Power_DL_1930-1995_AWGN-Max



7.2_Power_DL_2110-2155_AWGN



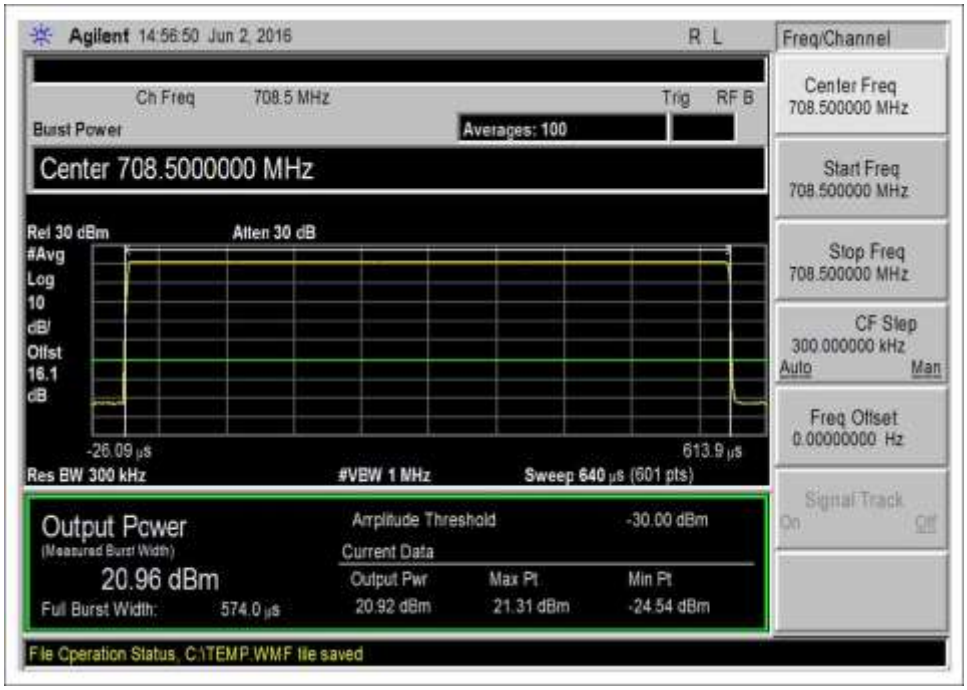
7.2_Power_DL_2110-2155_AWGN-Max



7.2_Power_DL_2110-2155_AWGN-Spare

UL-GSM

7.2_Power_UL_698-716_GSM



7.2_Power_UL_698-716_GSM-Max

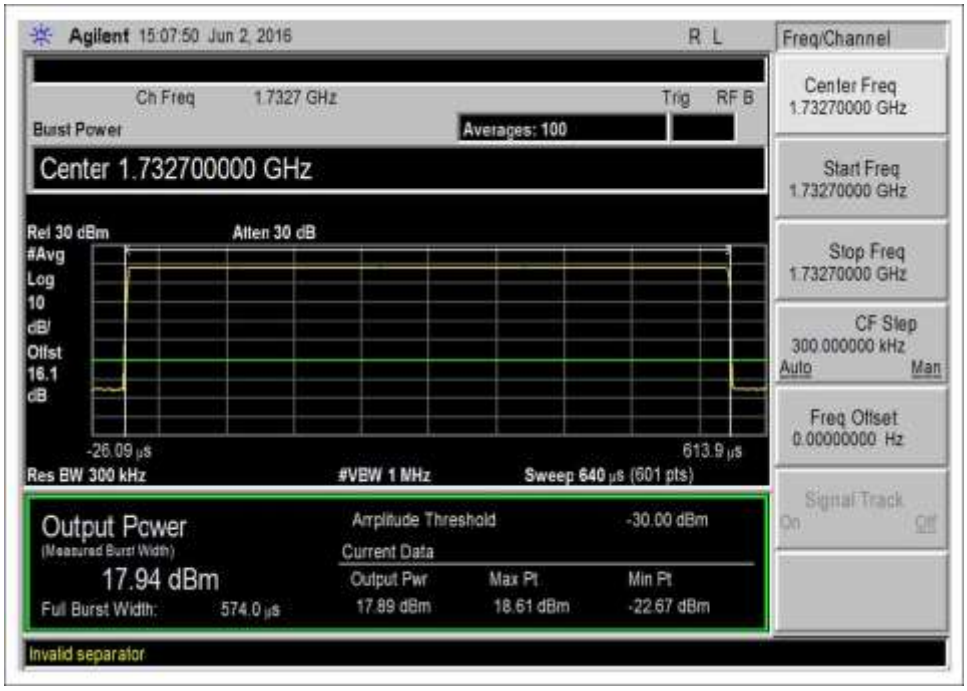
7.2_Power_UL_776-787_GSM

7.2_Power_UL_776-787_GSM-Max

7.2_Power_UL_824-849_GSM

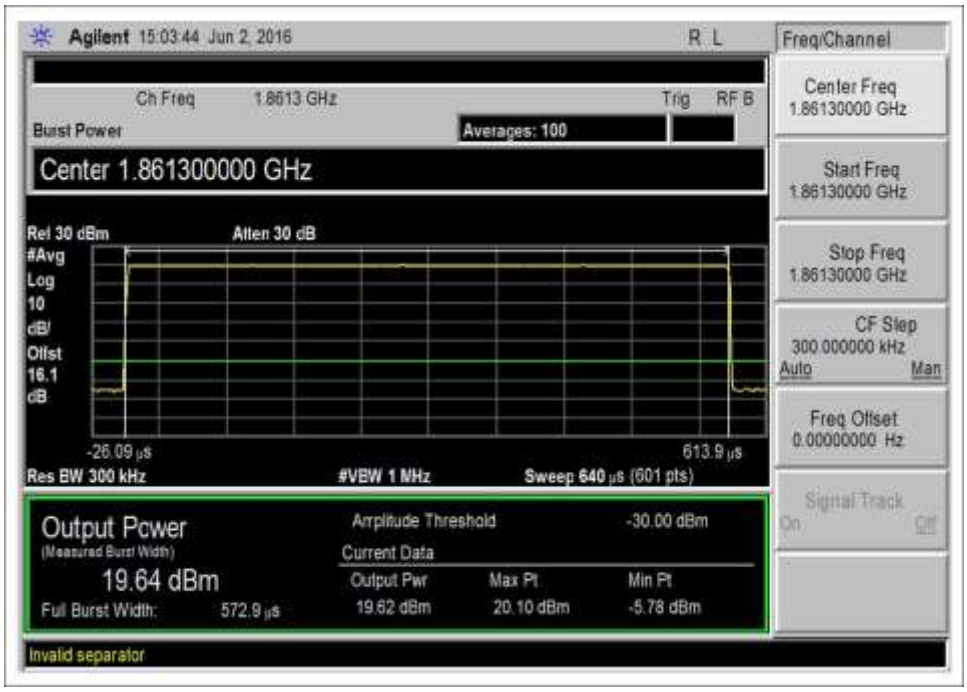
7.2_Power_UL_824-849_GSM-Max

7.2_Power_UL_1710-1755_GSM



7.2_Power_UL_1710-1755_GSM-ko

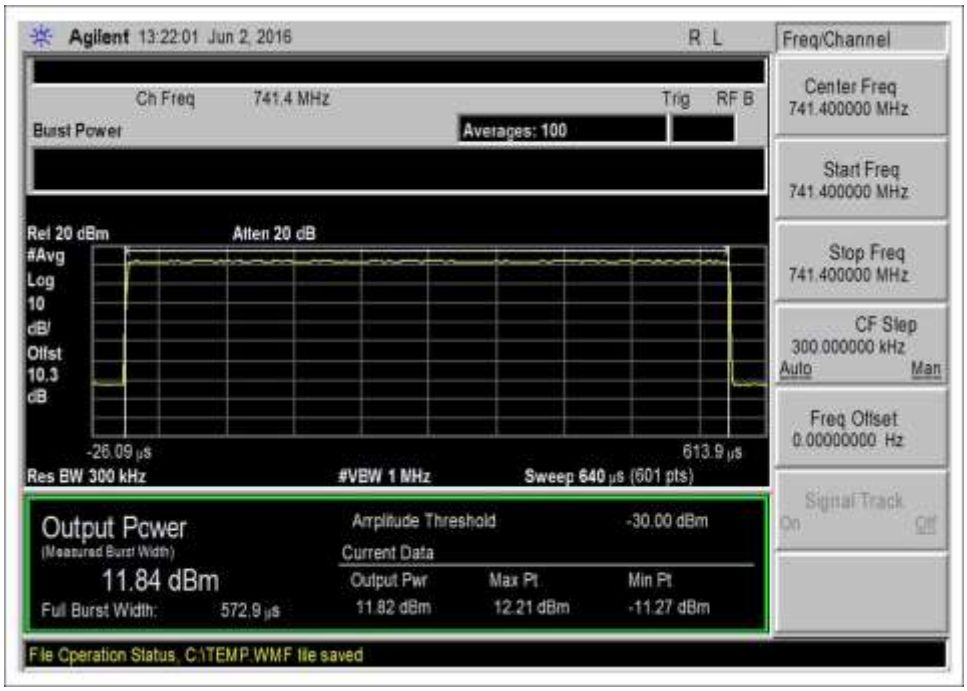
7.2_Power_UL_1710-1755_GSM-Max



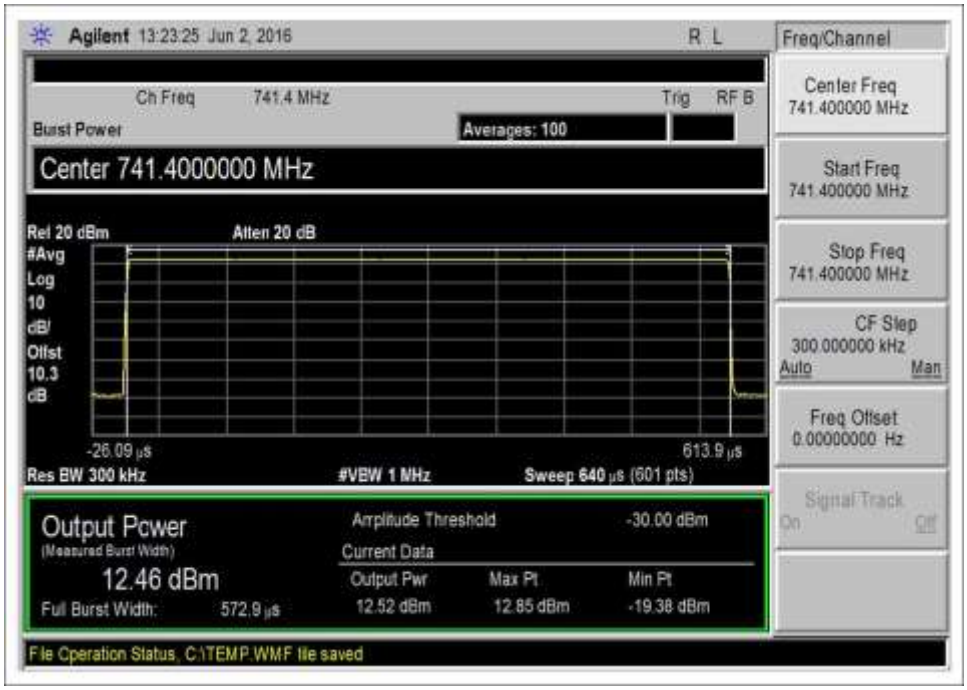
7.2_Power_UL_1850-1915_GSM

7.2_Power_UL_1850-1915_GSM-Max

DL-GSM



7.2_Power_DL_728-746_GSM



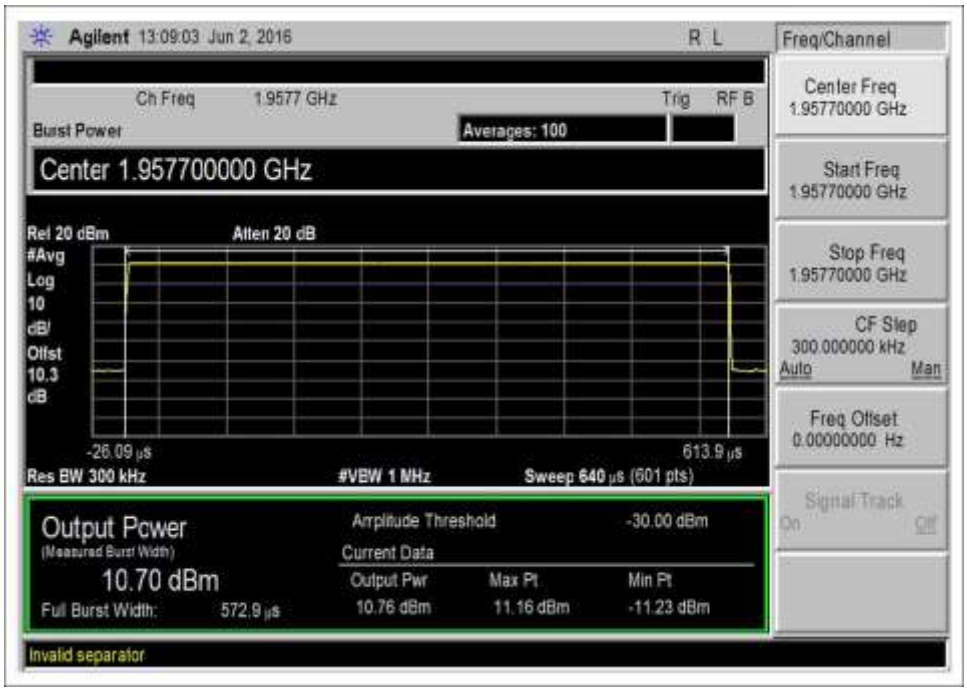
7.2_Power_DL_728-746_GSM-Max

7.2_Power_DL_746-757_GSM

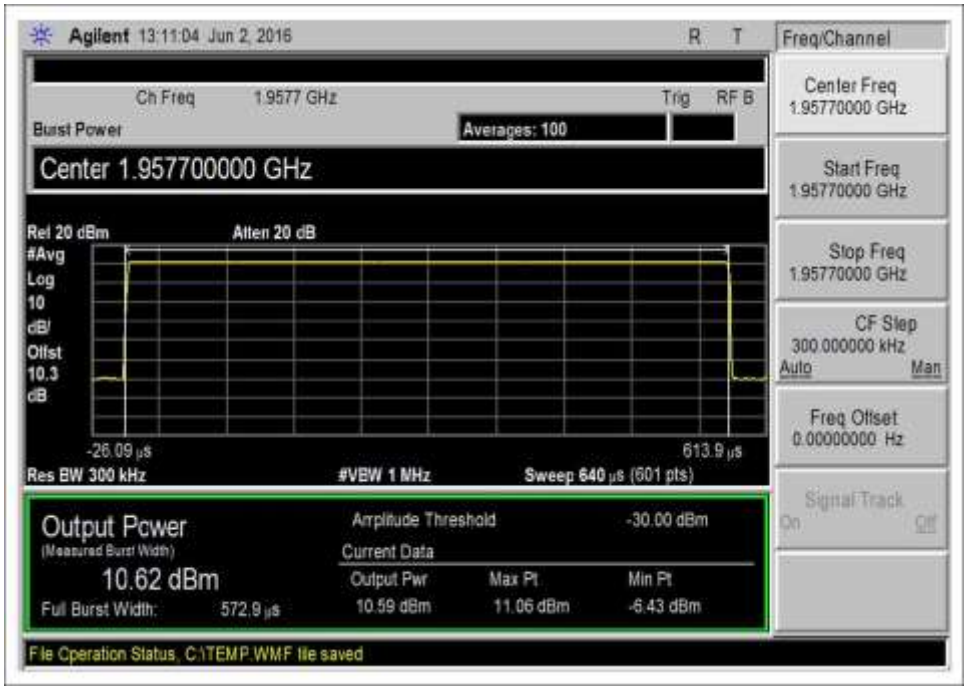
7.2_Power_DL_746-757_GSM-Max

7.2_Power_DL_869-894_GSM

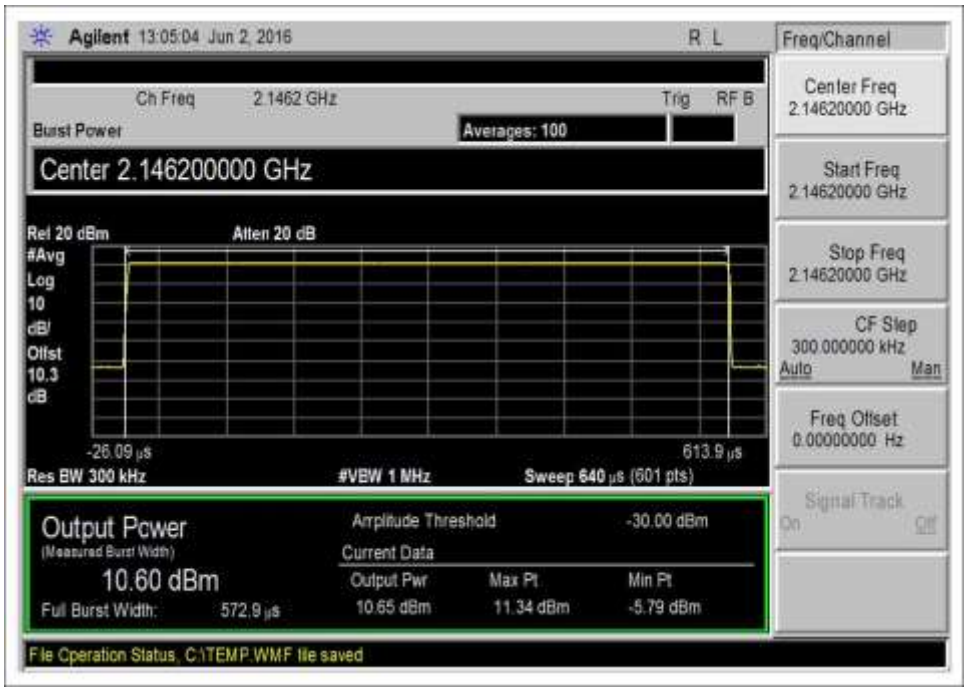
7.2_Power_DL_869-894_GSM-Max



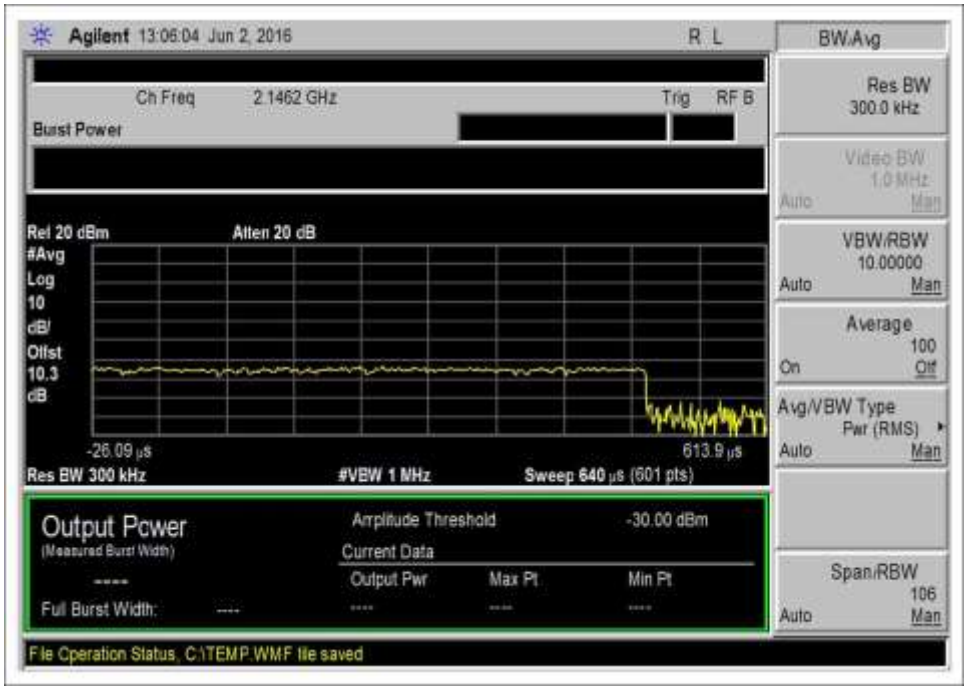
7.2_Power_DL_1930-1995_GSM



7.2_Power_DL_1930-1995_GSM-Max



7.2_Power_DL_2110-2155_GSM



7.2_Power_DL_2110-2155_GSM-20dBm

7.2_Power_DL_2110-2155_GSM-Max

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 #:	**98648** Date 03/04/2019
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: 20.8° C
Relative Humidity: 40%
Pressure: 102.1kPa

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

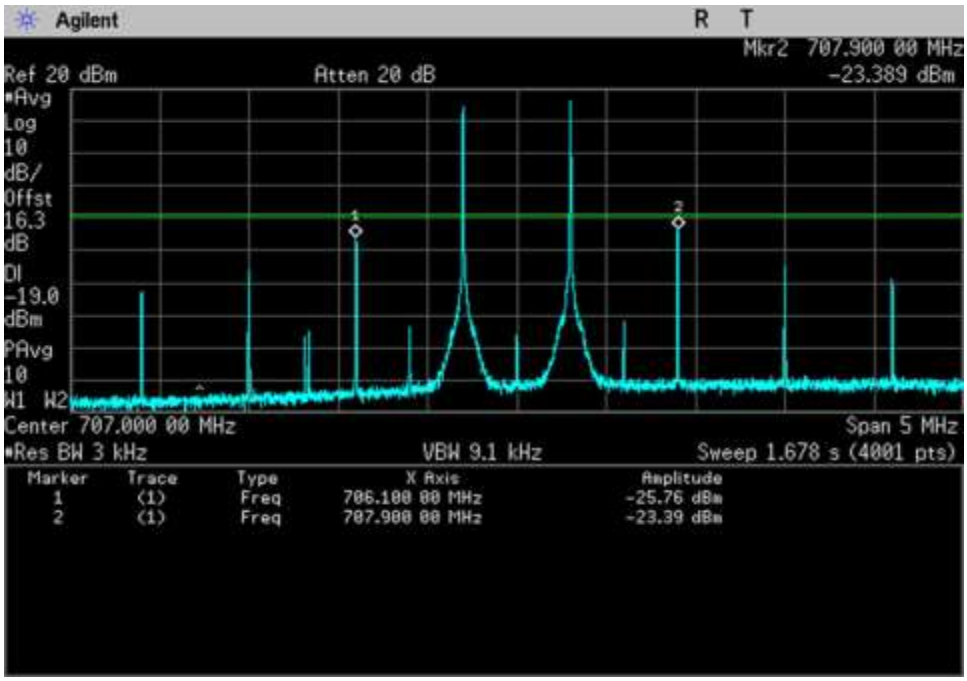
Pass: As shown on the plots, all intermodulation products are measured below -19dbm limit.

Inter Modulation Product			
Freq (MHz)	Pre AGC (dBm)	Limit (dBm)	Results
UL 1710-1755	-20.5	-19	Pass
UL 1850-1915	-19.1	-19	Pass
UL 824-894	-21.7	-19	Pass
UL 698-716	-23.4	-19	Pass
UL 776-787	-25.7	-19	Pass
DL 2110-2155	-44.5	-19	Pass
DL 1930-1995	-39.5	-19	Pass
DL 869-894	-49.6	-19	Pass
DL 728-746	-34.1	-19	Pass
DL 746-757	-36.2	-19	Pass

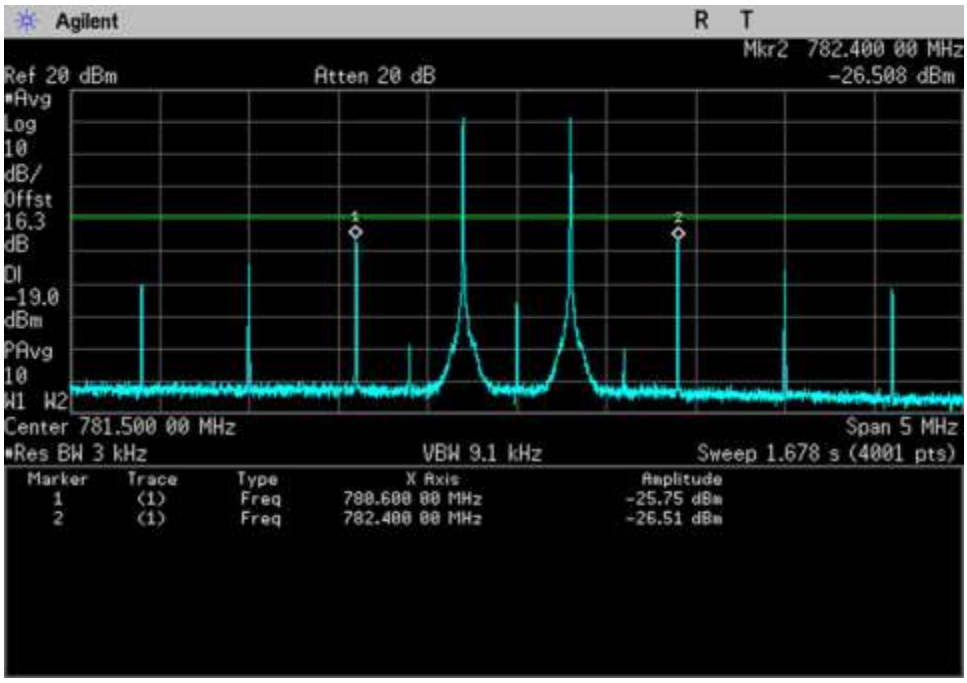
Note: The EUT maintains compliance with the intermodulation limit at input power of AGC+10dB

Plots

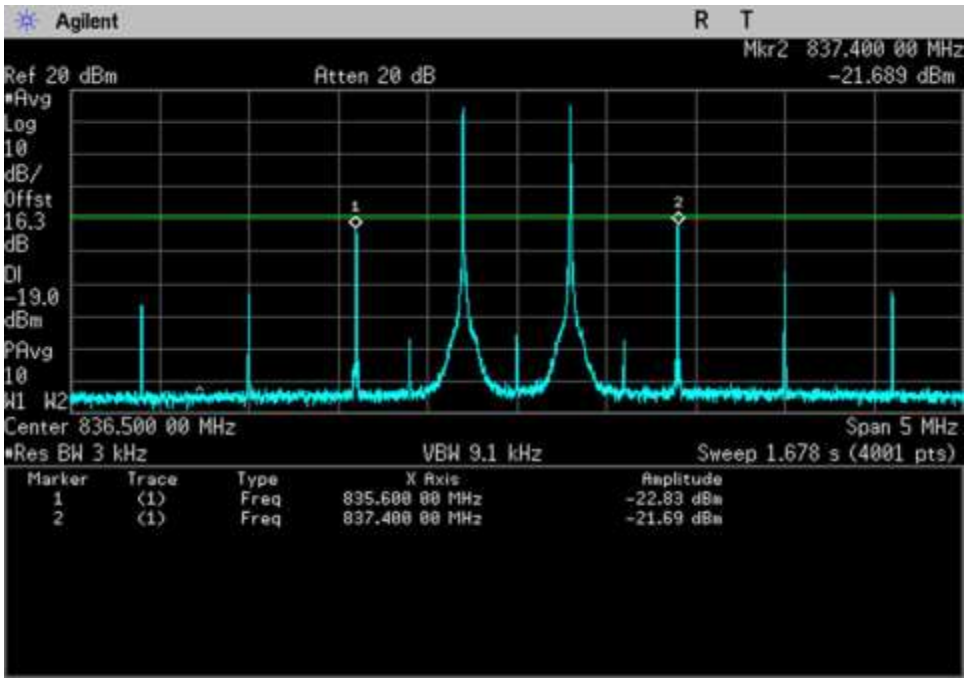
UL



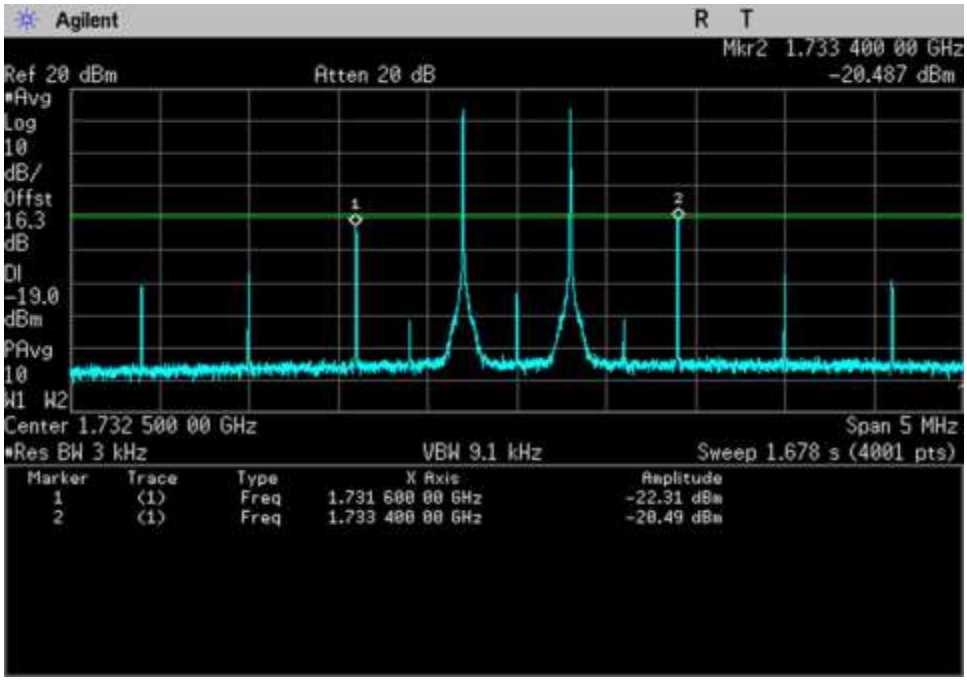
7.4_Intermod_UL_698-716MHz



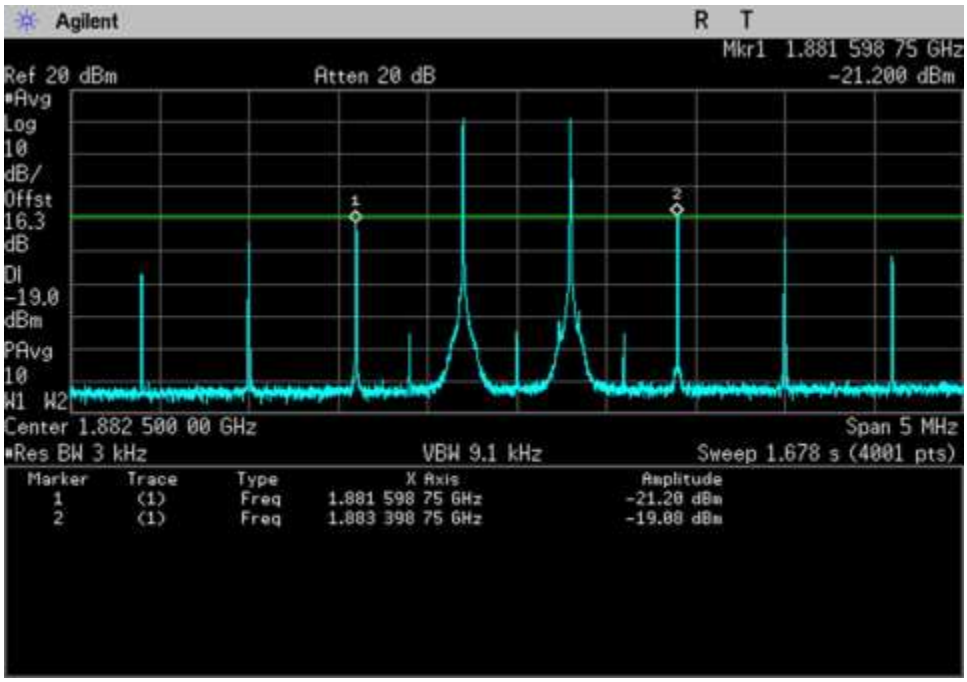
7.4_Intermod_UL_776-787MHz



7.4_Intermod_UL_824-849MHz

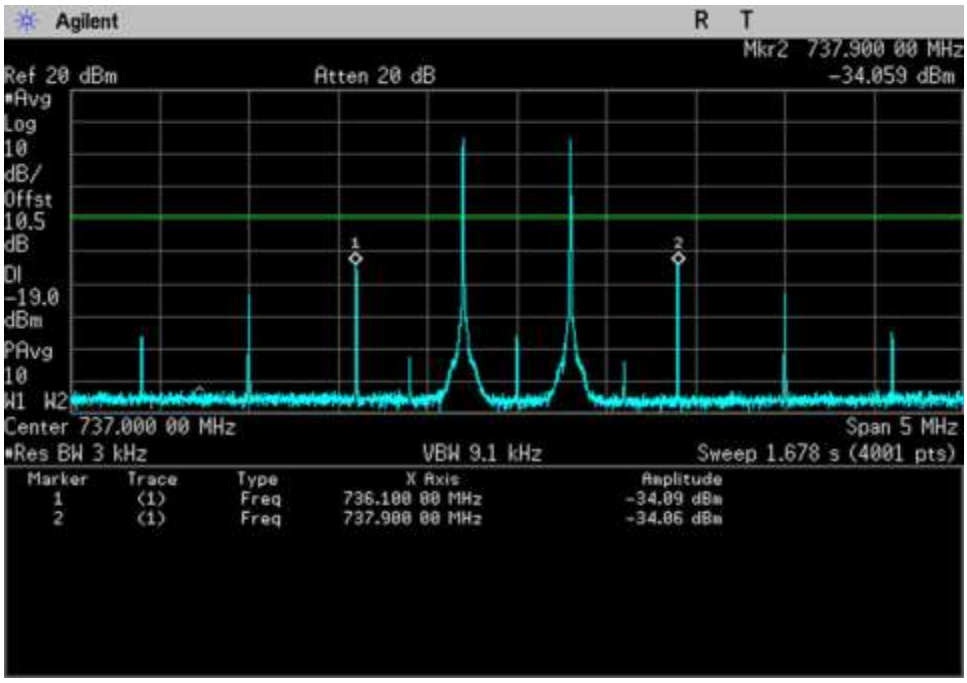


7.4_Intermod_UL_1710-1755MHz

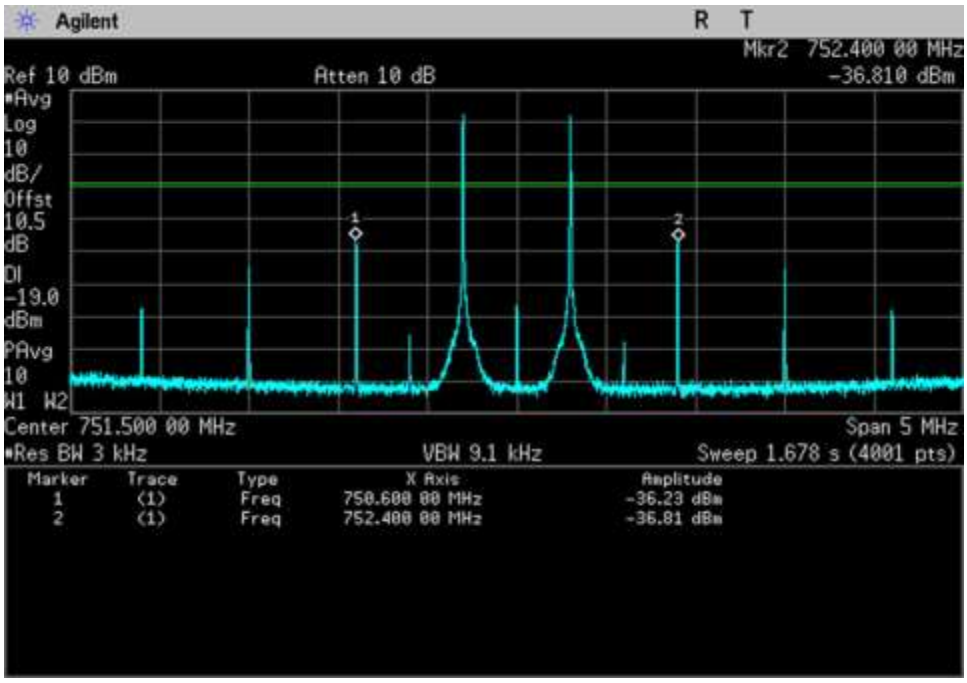


7.4_Intermod_UL_1850-1915MHz

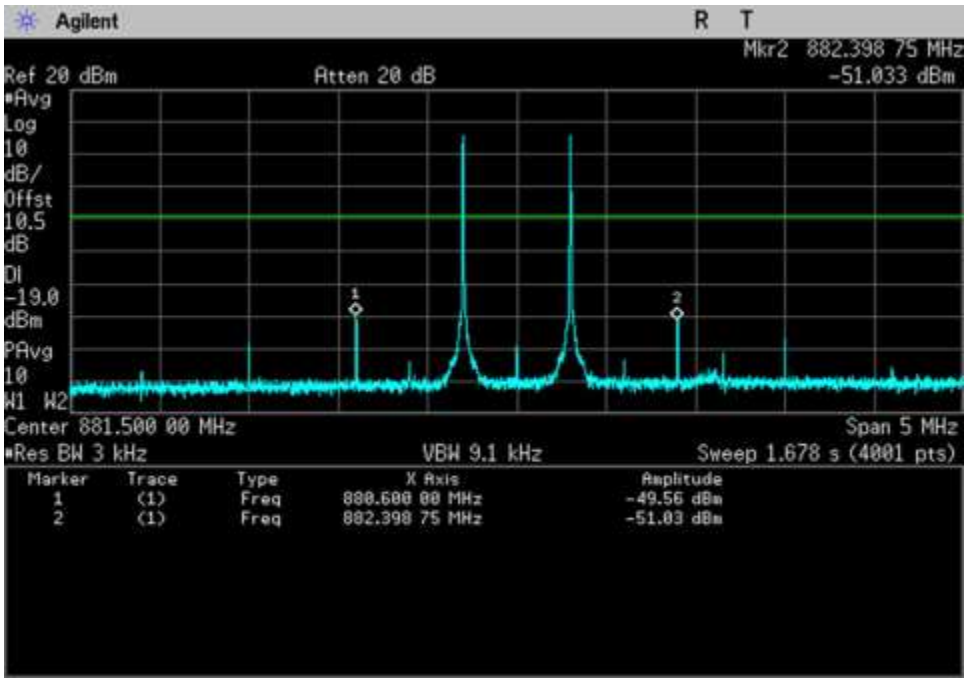
DL



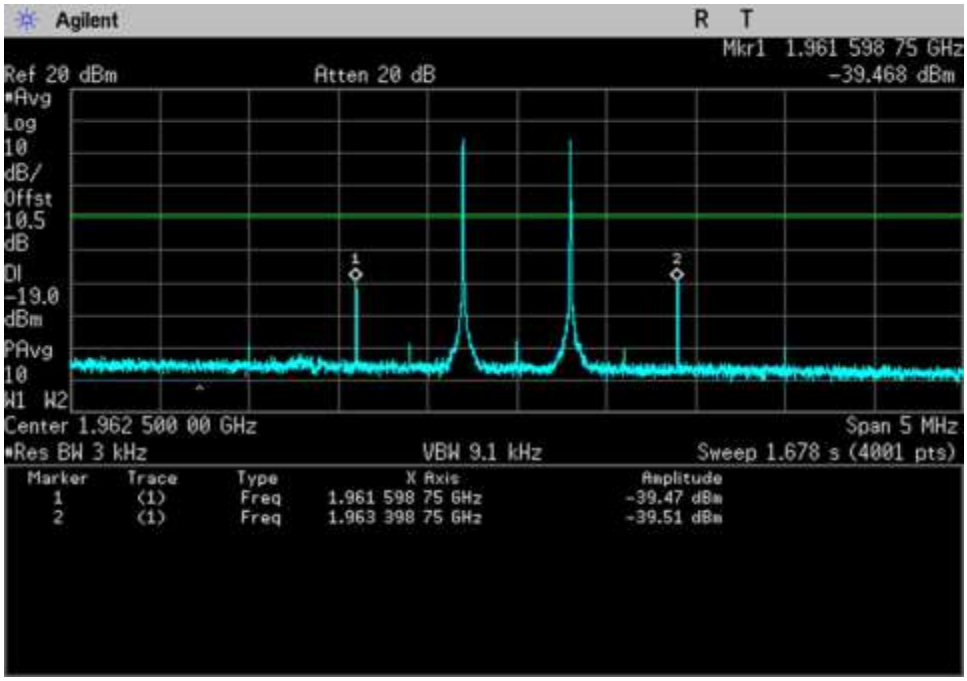
7.4_Intermod_DL_728-746MHz



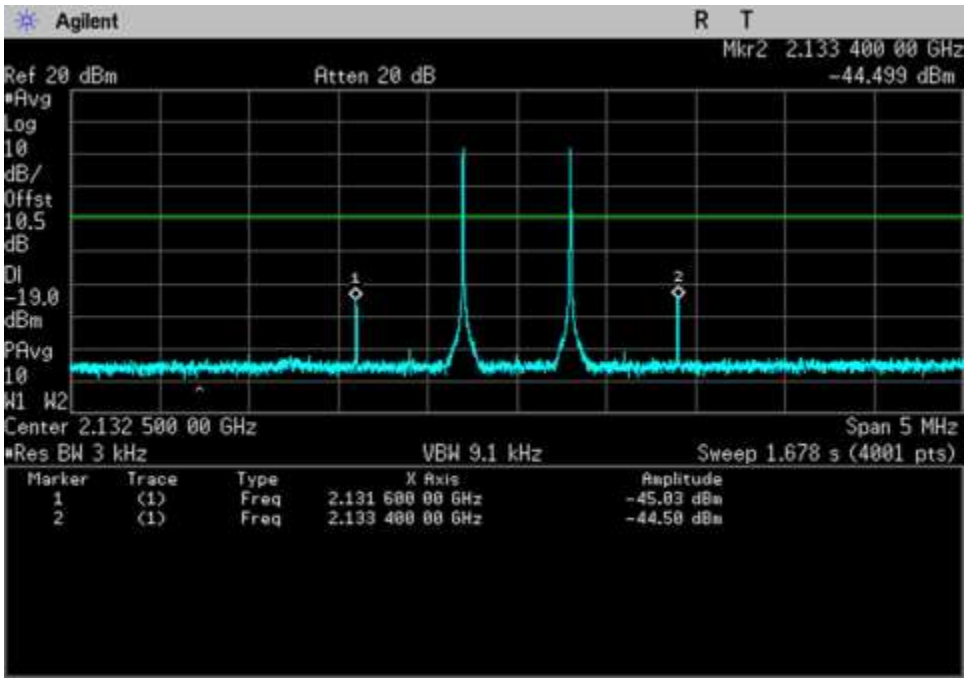
7.4_Intermod_DL_746-757MHz



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 #:	**98648**	Date:	06/03/2016
Test Type:	**Conducted Emissions**	Time:	08:29:53
Tested by:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

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

Test environment conditions:
Temperature: 23°C
Relative Humidity: 40%
101.4 kPa

Part 22
UL: 824-849MHz
DL: 869-894MHz
Part 24
UL: 1850-1915MHz
DL: 1930-1995MHz
Part 27
UL: 1710-1755MHz, 698-716MHz, 776-787MHz
DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure:
The test was performed in accordance with section 7.5 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

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

Test Conditions / Notes continued:
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
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

Summary of Results

Pass: as indicated in plots above, all OBE are under the limit of -19dBm.

GSM

Low				Hi			
Out of Band Emission				Out of Band Emission			
Freq (MHz)	Pre AGC	Limit (dBm)	Results	Freq (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-32.0	-19.0	Pass	UL1710-1755	-31.0	-19.0	Pass
UL1850-1915	-31.4	-19.0	Pass	UL1850-1915	-32.3	-19.0	Pass
UL824-849	-29.8	-19.0	Pass	UL824-849	-30.4	-19.0	Pass
UL 698-716	-26.1	-19.0	Pass	UL 698-716	-29.3	-19.0	Pass
UL776-787	-27.9	-19.0	Pass	UL776-787	-34.3	-19.0	Pass
DL2110-2155	-37.5	-19.0	Pass	DL2110-2155	-39.5	-19.0	Pass
DL1930-1995	-37.9	-19.0	Pass	DL1930-1995	-37.5	-19.0	Pass
DL869-894	-37.8	-19.0	Pass	DL869-894	-38.0	-19.0	Pass
DL:728-746	-38.6	-19.0	Pass	DL:728-746	-37.9	-19.0	Pass
DL 746-757	-44.4	-19.0	Pass	DL 746-757	-43.2	-19.0	Pass

CDMA

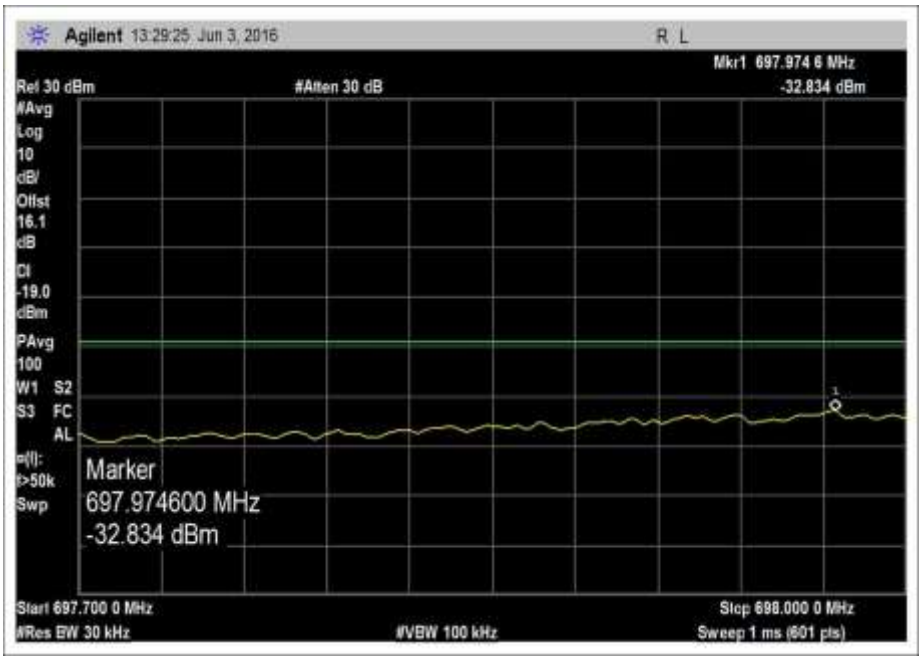
Low				Hi			
Out of Band Emission				Out of Band Emission			
Freq (MHz)	Pre AGC	Limit (dBm)	Results	Freq (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-39.4	-19.0	Pass	UL1710-1755	-36.5	-19.0	Pass
UL1850-1915	-37.5	-19.0	Pass	UL1850-1915	-32.9	-19.0	Pass
UL824-849	-29.9	-19.0	Pass	UL824-849	-29.6	-19.0	Pass
UL 698-716	-32.8	-19.0	Pass	UL 698-716	-45.3	-19.0	Pass
UL776-787	-26.8	-19.0	Pass	UL776-787	-41.6	-19.0	Pass
DL2110-2155	-41.6	-19.0	Pass	DL2110-2155	-43.4	-19.0	Pass
DL1930-1995	-45.5	-19.0	Pass	DL1930-1995	-44.6	-19.0	Pass
DL869-894	-53.0	-19.0	Pass	DL869-894	-55.7	-19.0	Pass
DL:728-746	-49.8	-19.0	Pass	DL:728-746	-52.3	-19.0	Pass
DL 746-757	-51.7	-19.0	Pass	DL 746-757	-56.3	-19.0	Pass

LTE							
Low				Hi			
Out of Band Emission				Out of Band Emission			
Freq (MHz)	Pre AGC	Limit (dBm)	Results	Freq (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-29.3	-19.0	Pass	UL1710-1755	-23.8	-19.0	Pass
UL1850-1915	-30.6	-19.0	Pass	UL1850-1915	-33.9	-19.0	Pass
UL824-849	-25.7	-19.0	Pass	UL824-849	-26.4	-19.0	Pass
UL 698-716	-21.7	-19.0	Pass	UL 698-716	-29.7	-19.0	Pass
UL776-787	-24.0	-19.0	Pass	UL776-787	-28.8	-19.0	Pass
DL2110-2155	-42.0	-19.0	Pass	DL2110-2155	-42.2	-19.0	Pass
DL1930-1995	-41.6	-19.0	Pass	DL1930-1995	-39.4	-19.0	Pass
DL869-894	-35.1	-19.0	Pass	DL869-894	-36.1	-19.0	Pass
DL:728-746	-35.5	-19.0	Pass	DL:728-746	-33.7	-19.0	Pass
DL 746-757	-33.3	-19.0	Pass	DL 746-757	-43.6	-19.0	Pass

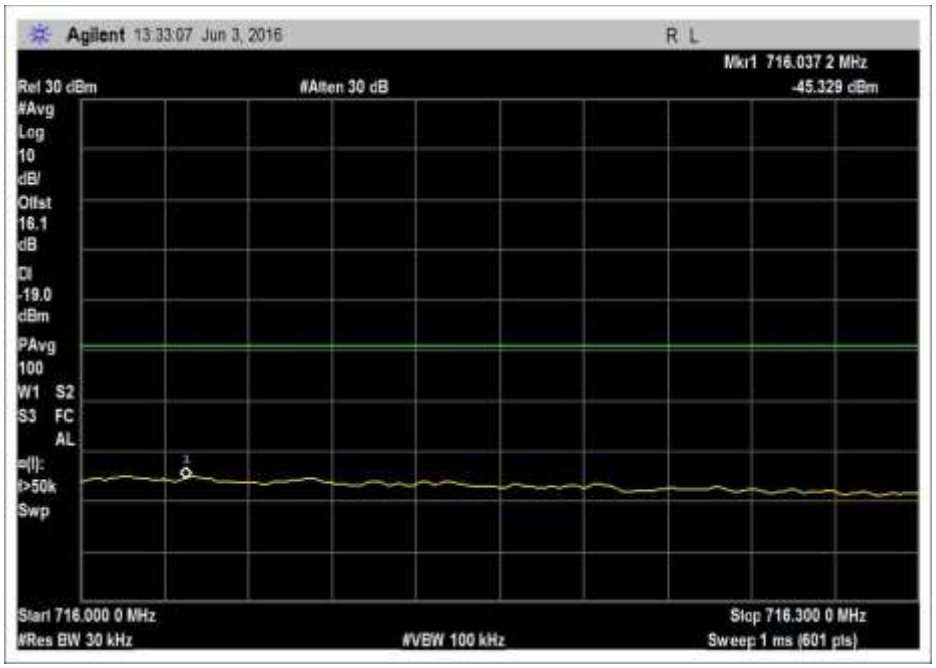
Note: The EUT also maintains compliance with the out-of-band emissions limit at input power indicated in section 5.5.

Plots

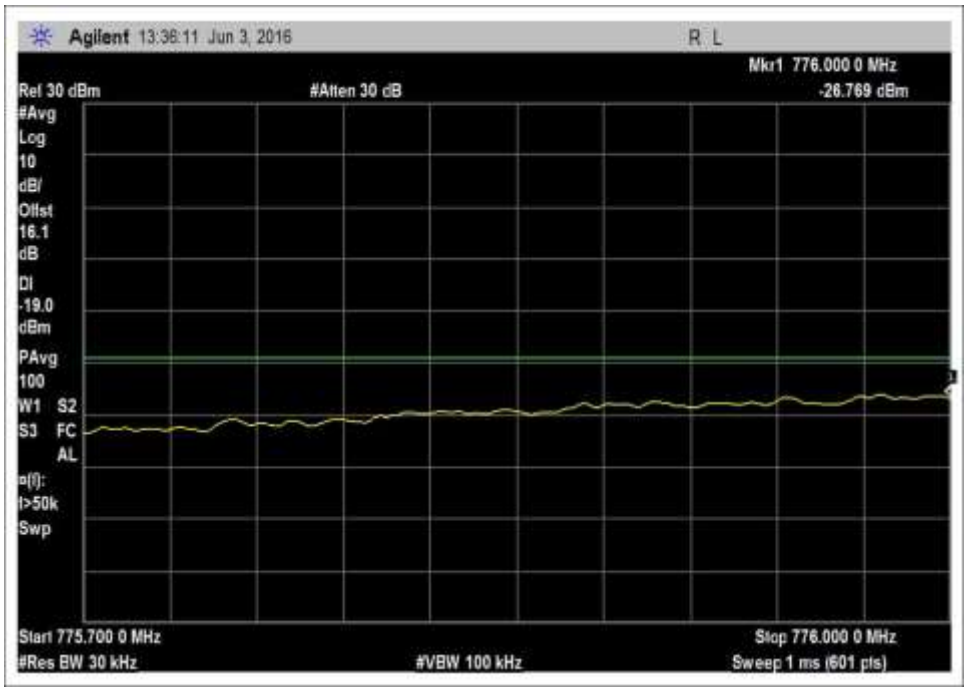
CDMA, UL



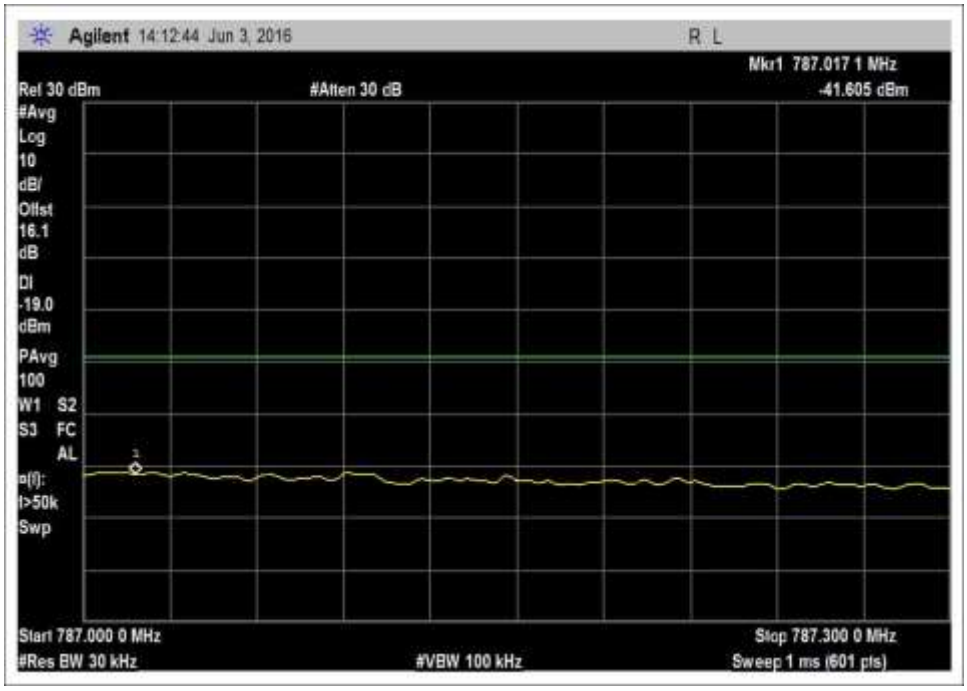
7.5_OBE_UL_698-716MHz_L_PreAGC



7.5_OBE_UL_698-716MHz_H_PreAGC



7.5_OBE_UL_776-787MHz_L_PreAGC



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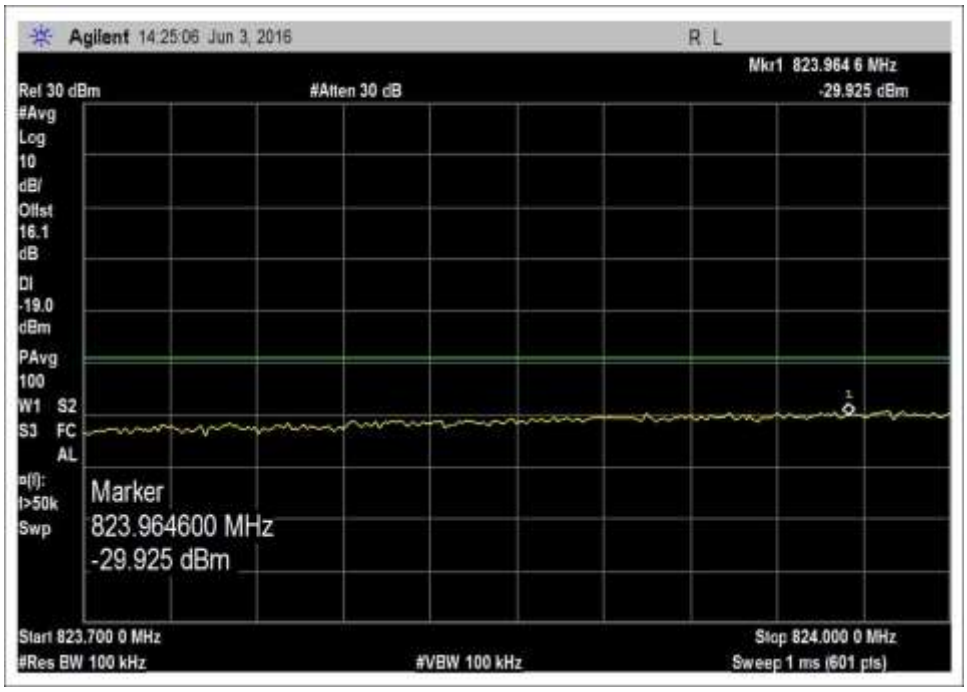
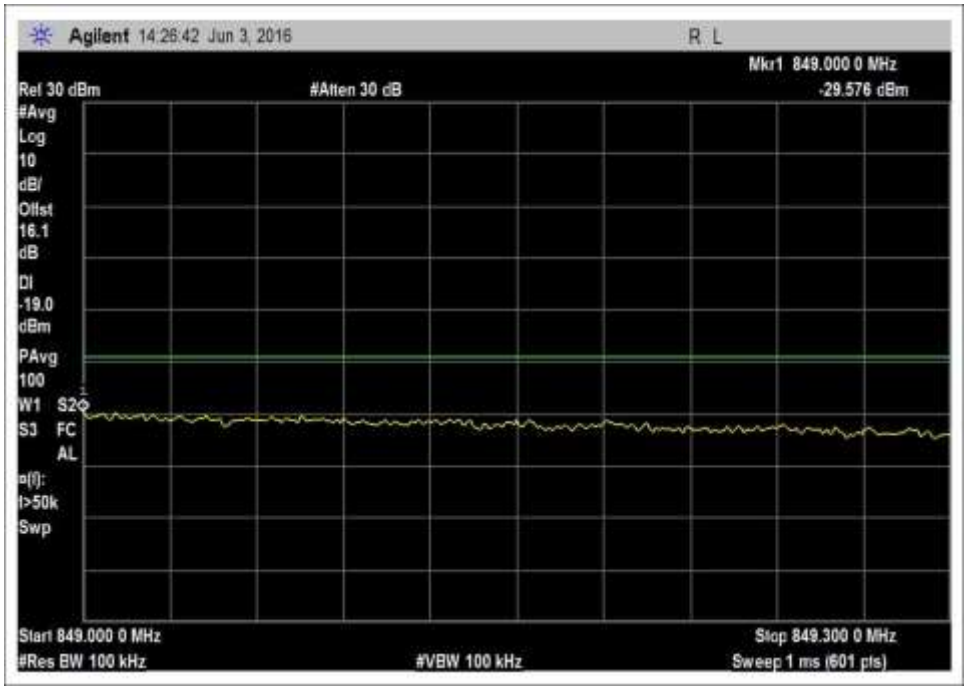
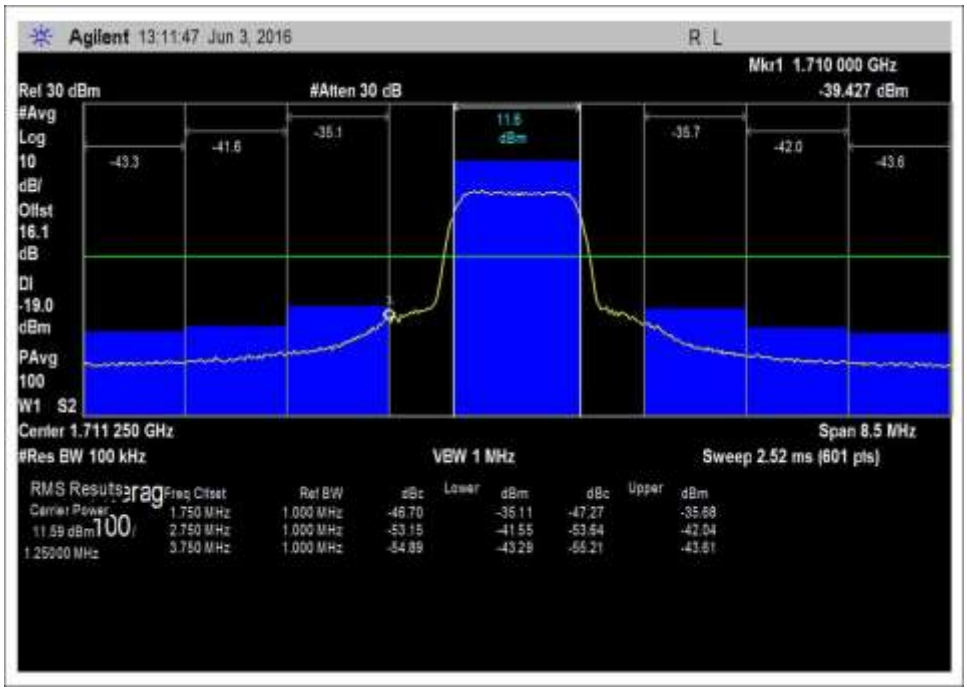


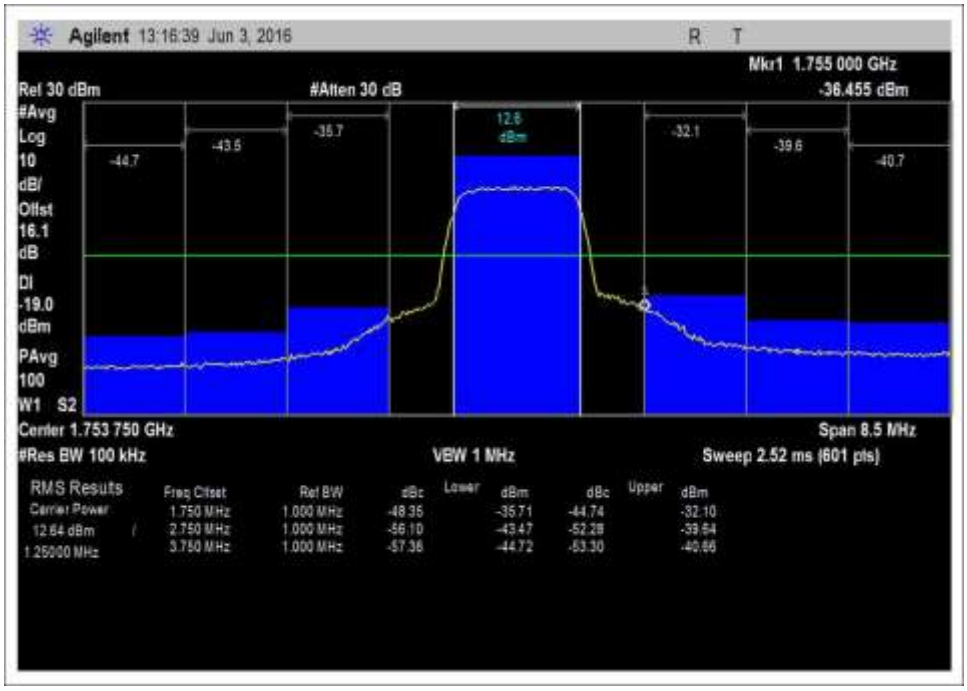
7.5_OBE_UL_824-849MHz_L_PreAGC



7.5_OBE_UL_824-849MHz_H_PreAGC



7.5_OBE_UL_1710-1755MHz_L_PreAGC



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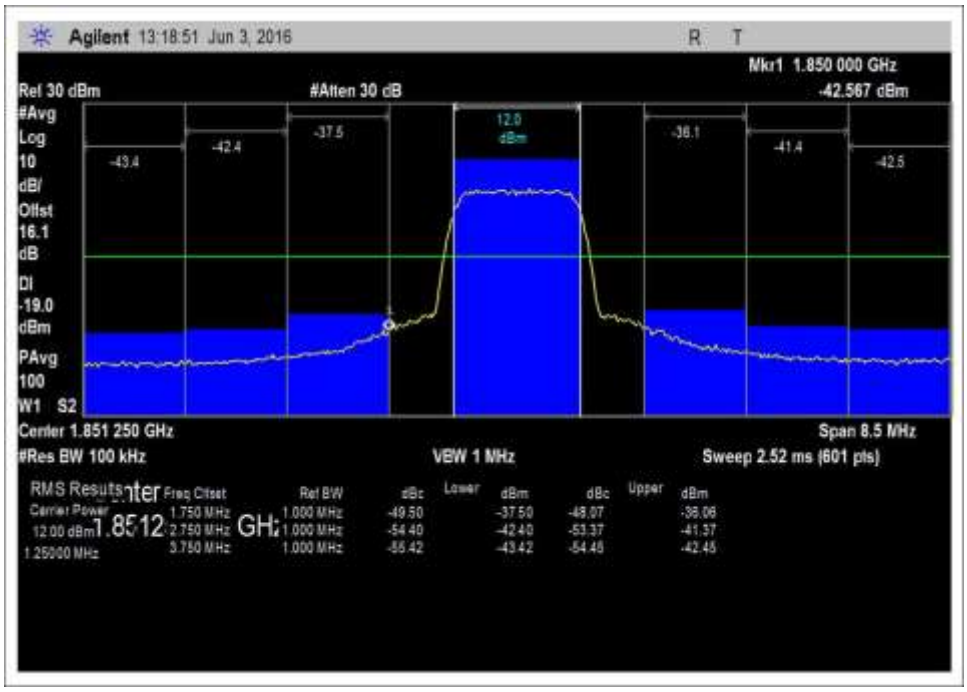
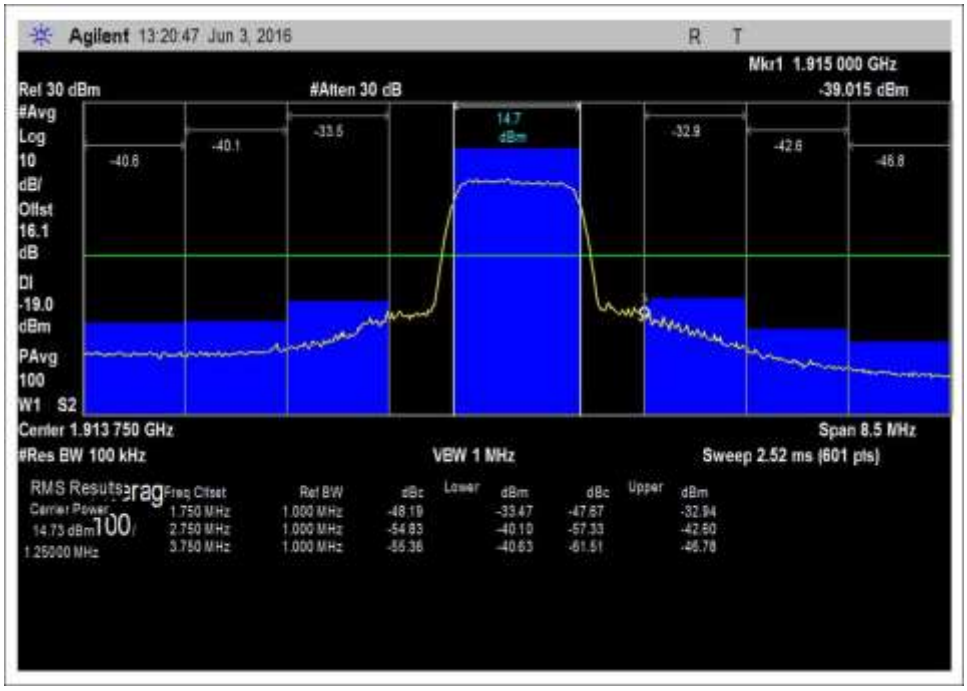
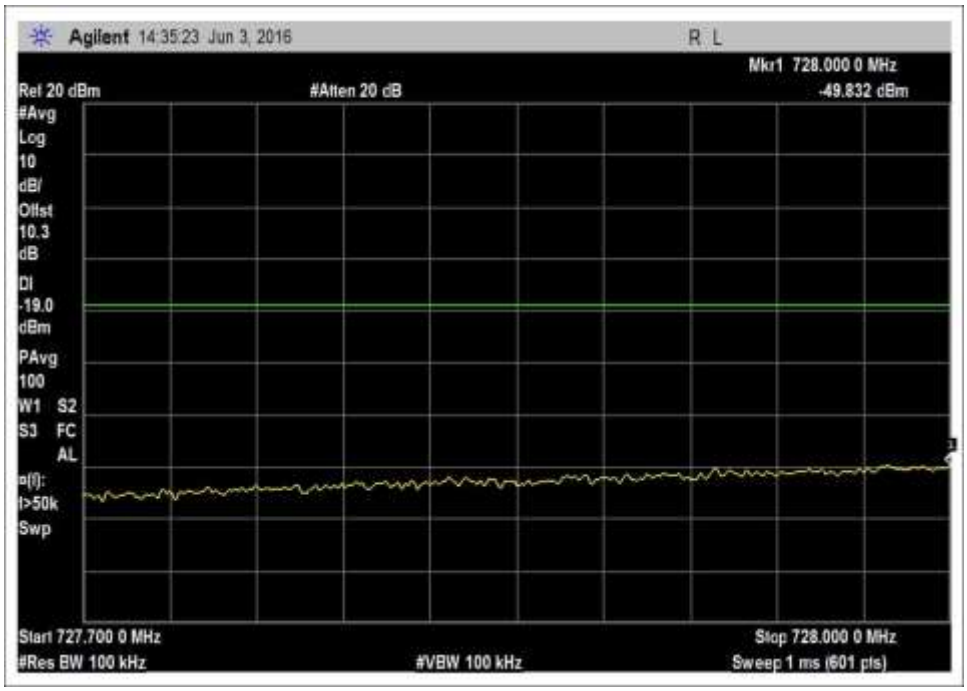


7.5_OBE_UL_1850-1915MHz_L_PreAGC

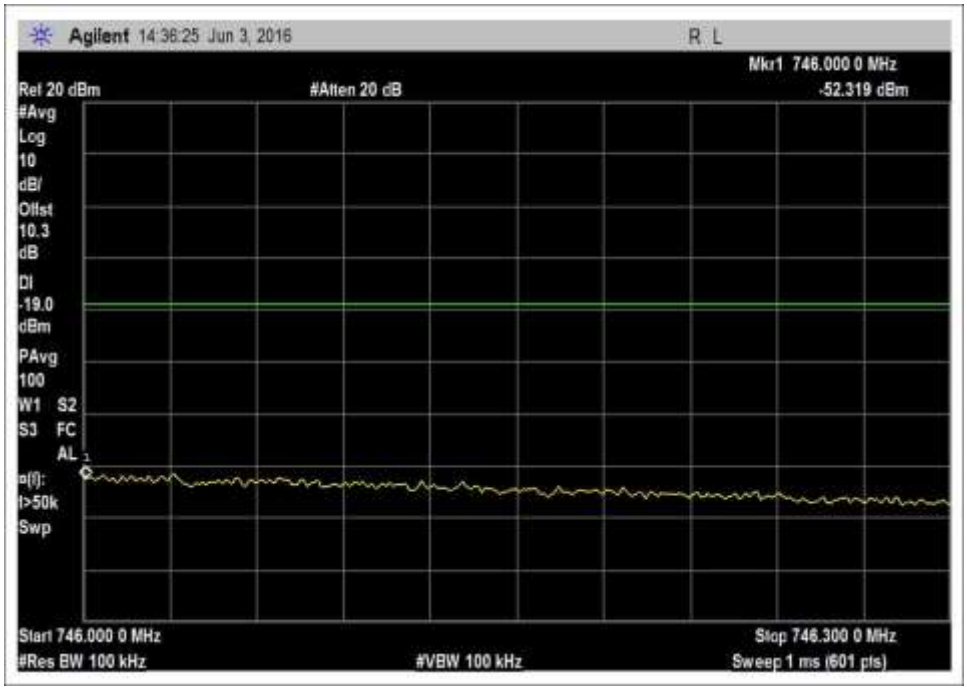


7.5_OBE_UL_1850-1915MHz_H_PreAGC

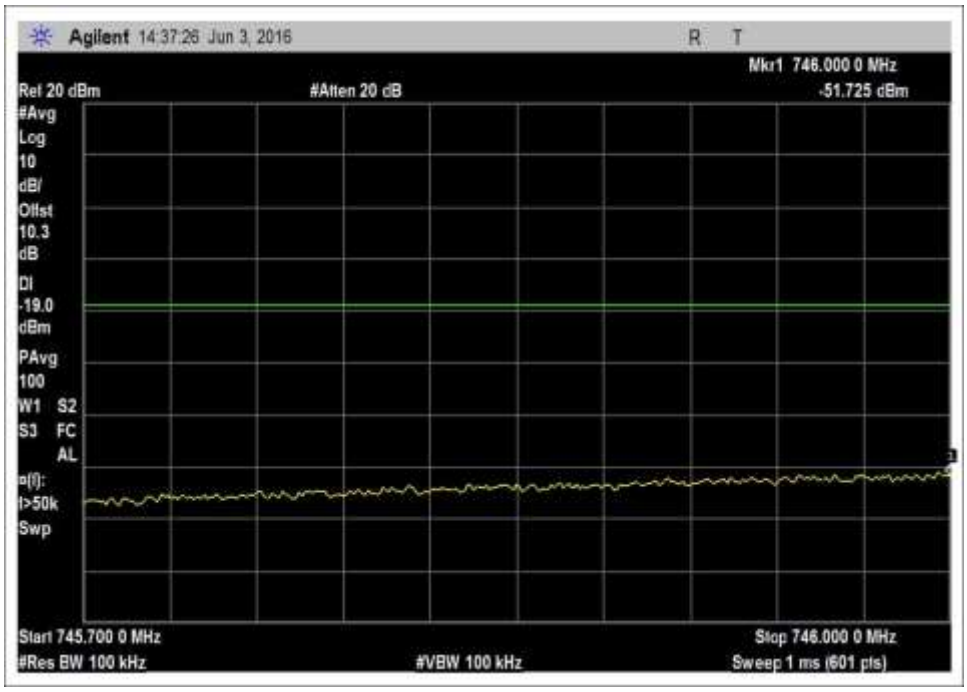
CDMA, DL



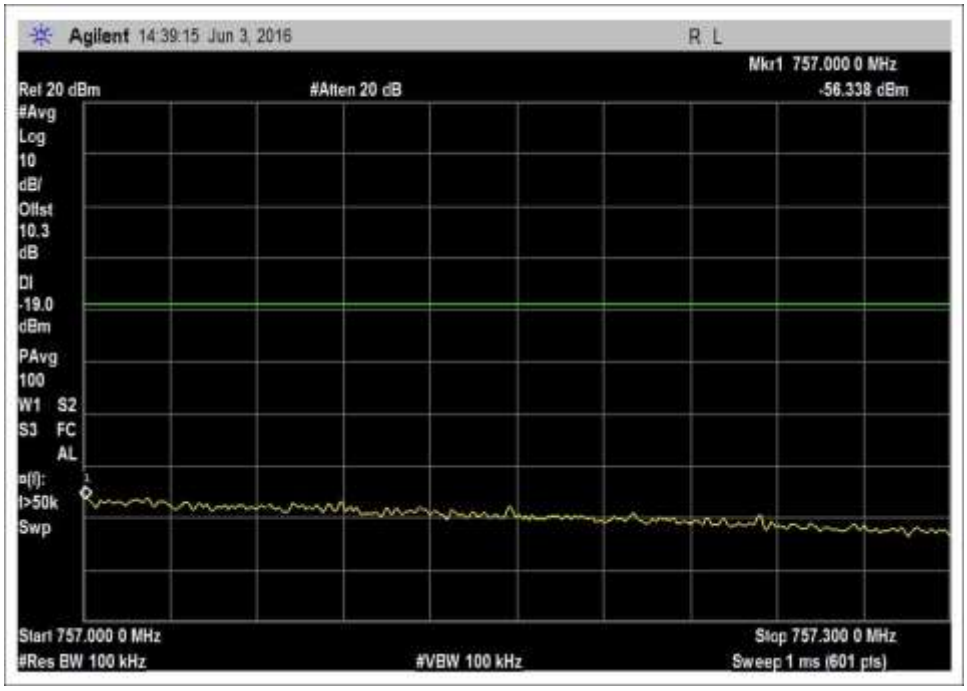
7.5_OBE_DL_728-746MHz_L_PreAGC



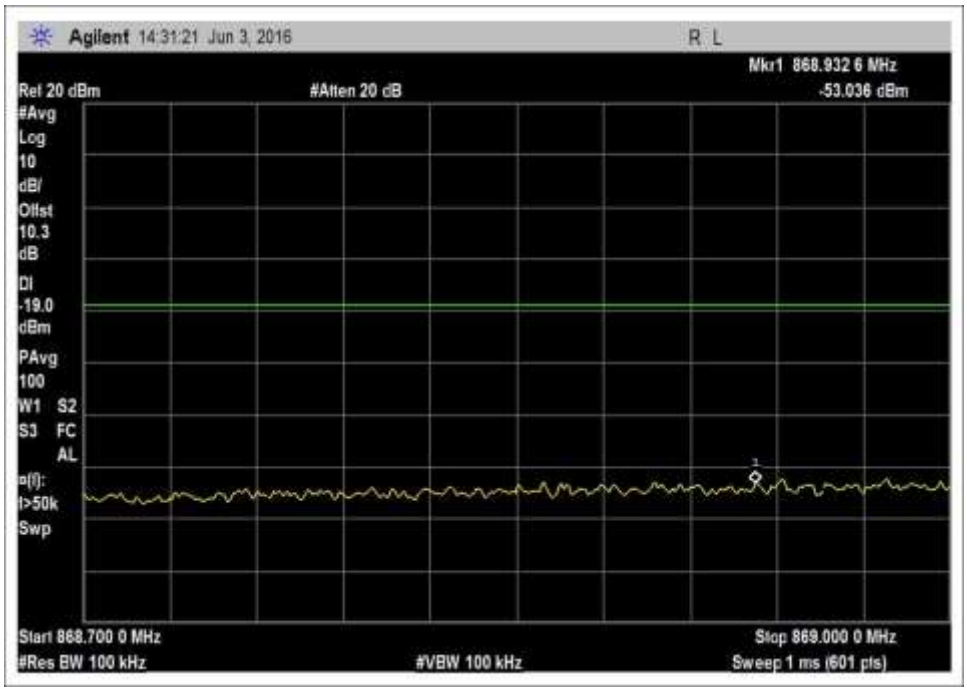
7.5_OBE_DL_728-746MHz_H_PreAGC



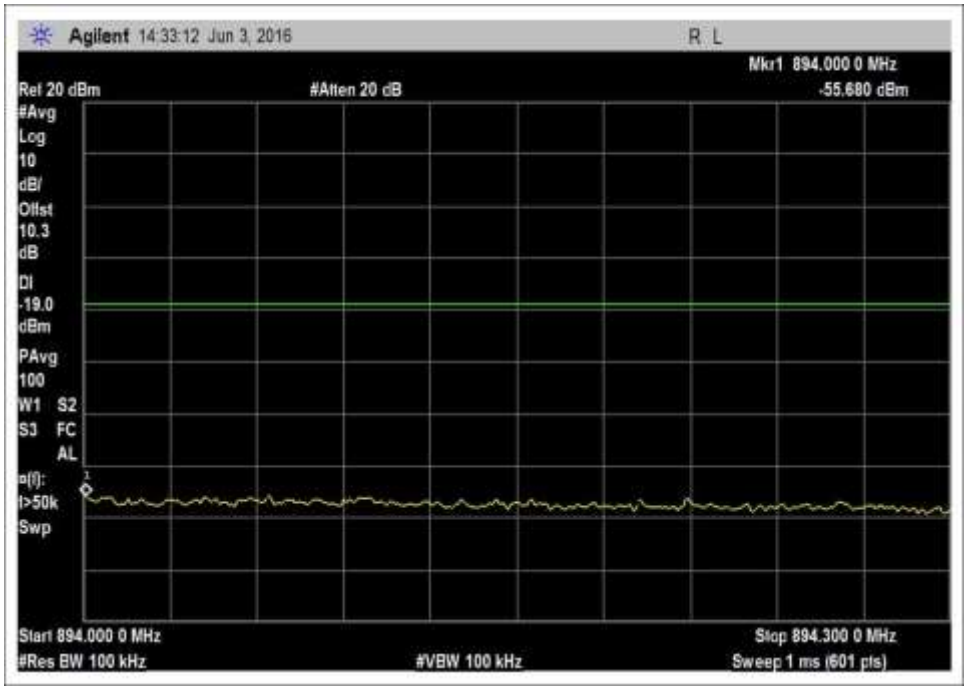
7.5_OBE_DL_746-757MHz_L_PreAGC



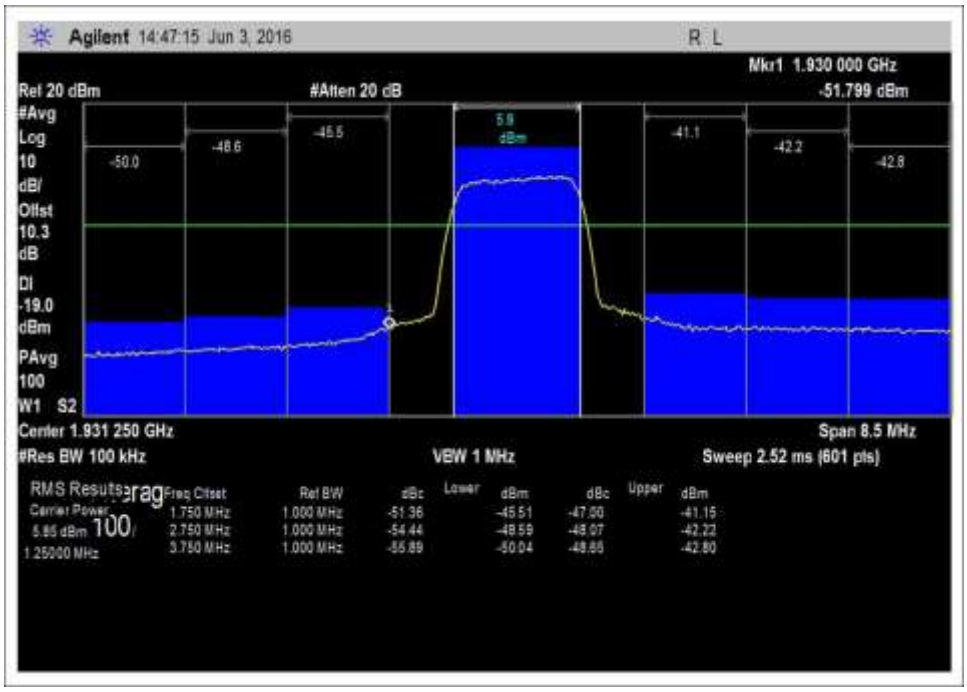
7.5_OBE_DL_746-757MHz_H_PreAGC



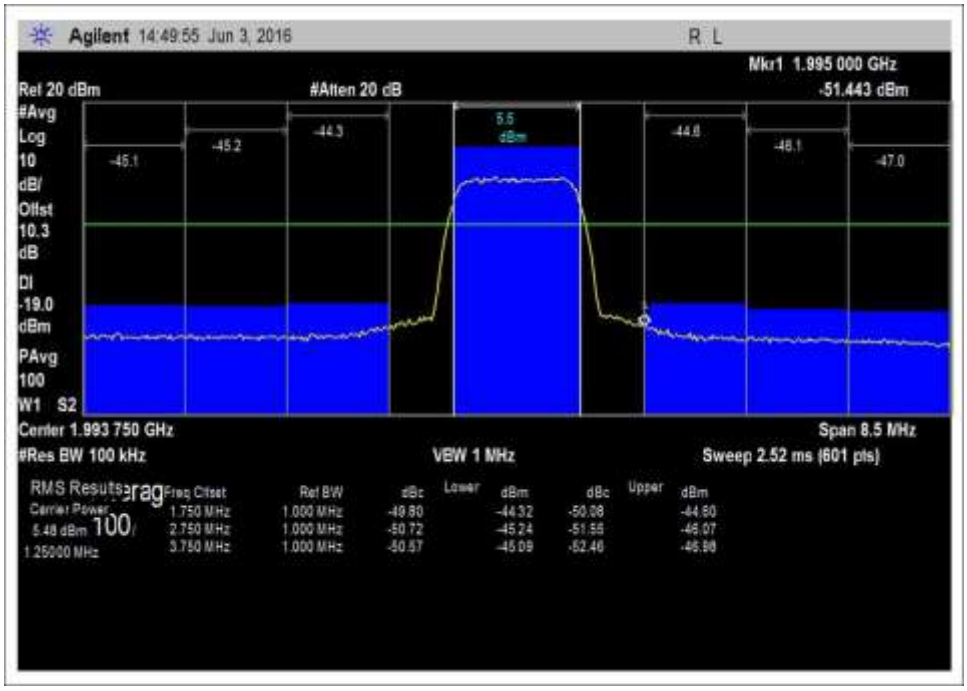
7.5_OBE_DL_869-894MHz_L_PreAGC



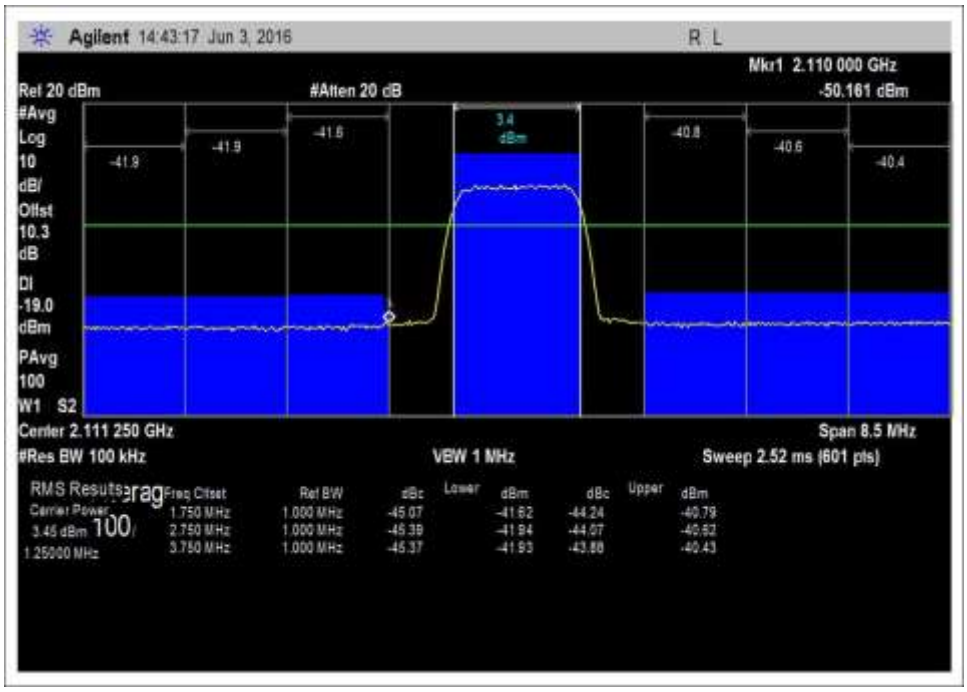
7.5_OBE_DL_869-894MHz_H_PreAGC



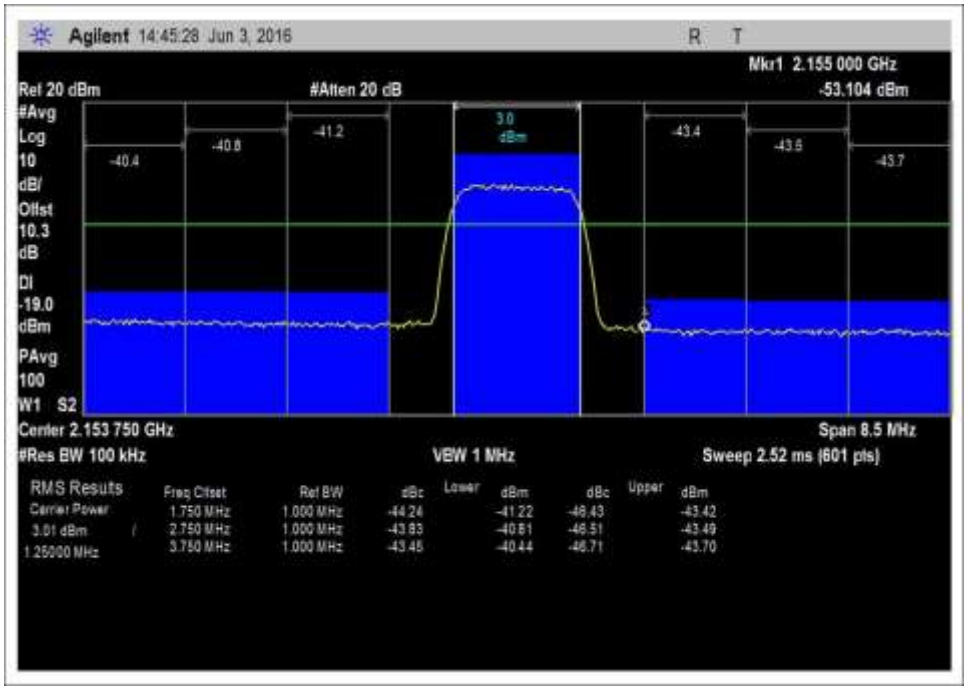
7.5_OBE_DL_1930-1995MHz_L_PreAGC



7.5_OBE_DL_1930-1995MHz_H_PreAGC

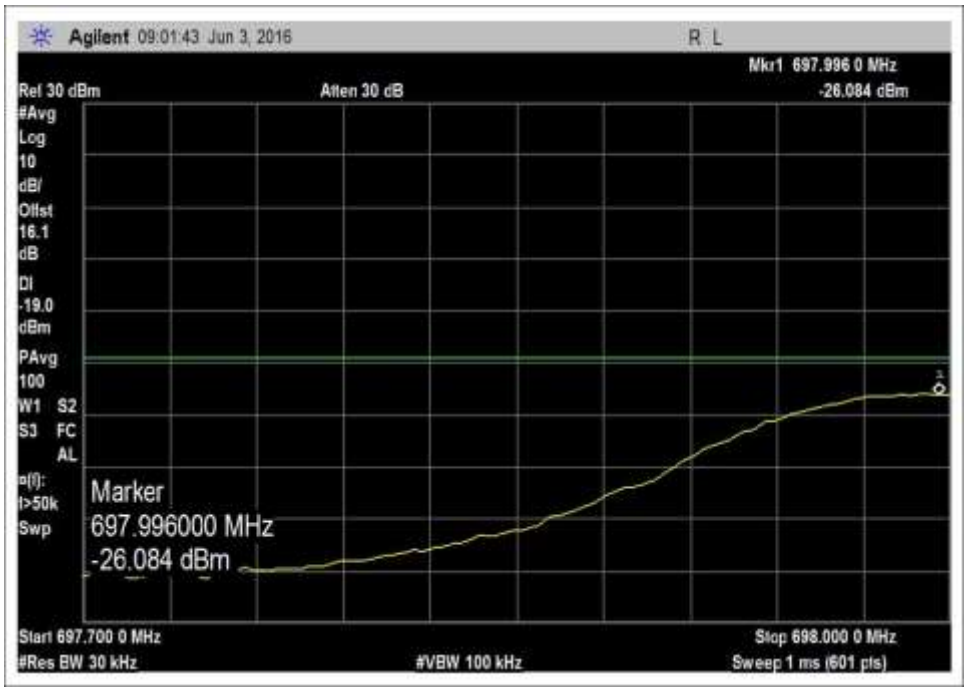


7.5_OBE_DL_2110-2155MHz_L_PreAGC

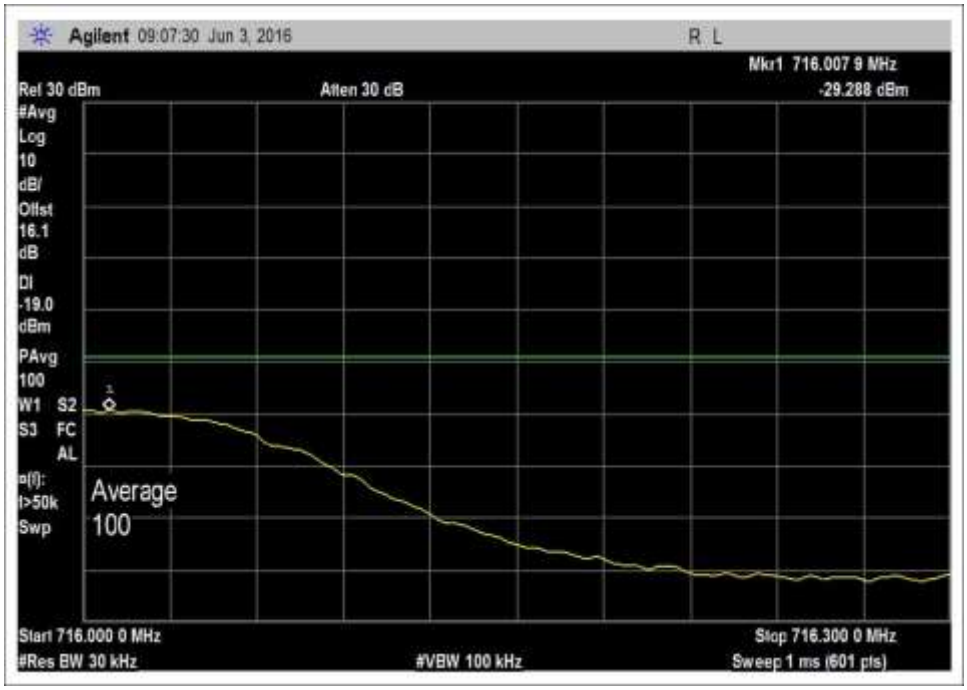


7.5_OBE_DL_2110-2155MHz_H_PreAGC

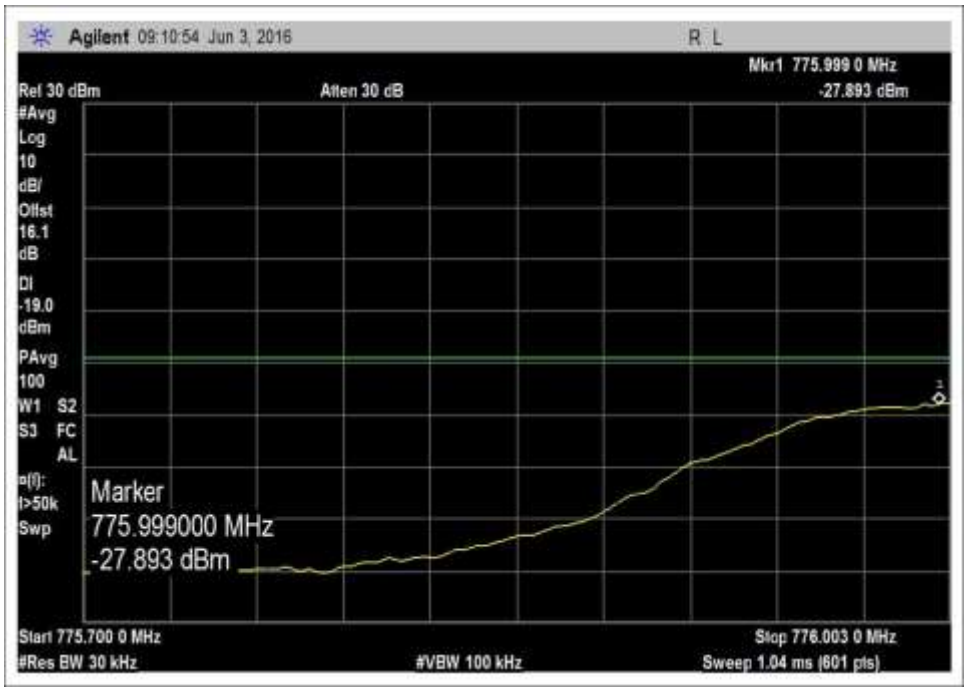
GSM, UL



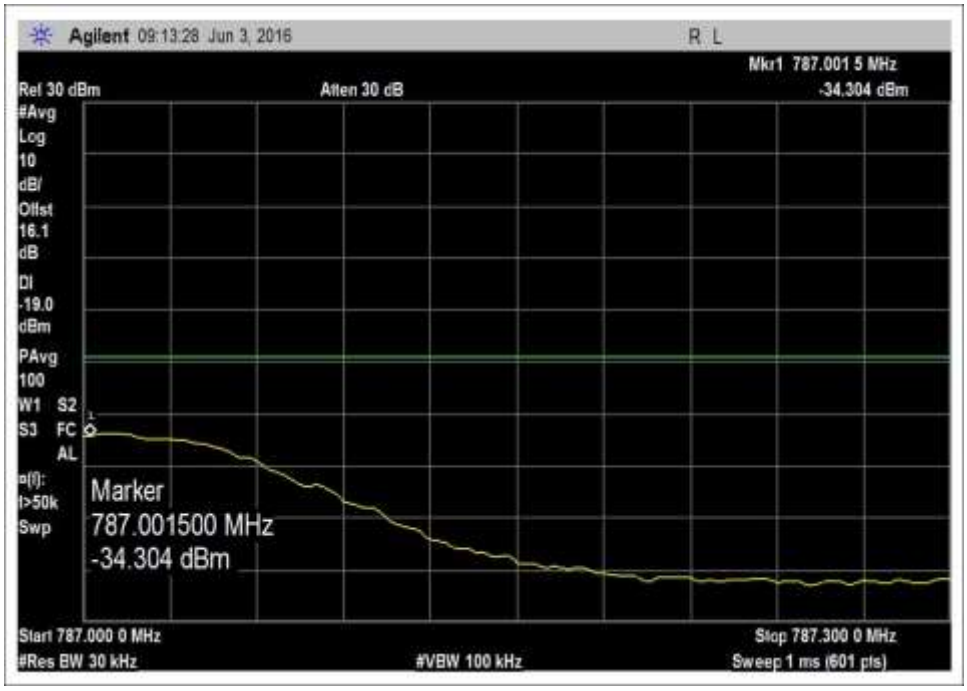
7.5_OBE_UL_698-716MHz_L_PreAGC



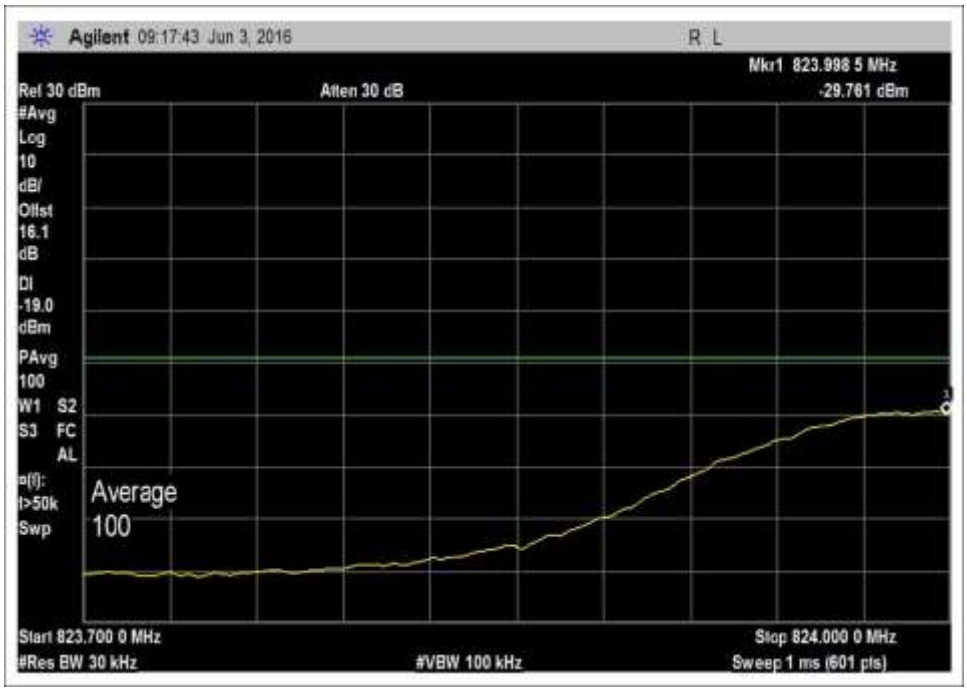
7.5_OBE_UL_698-716MHz_H_PreAGC



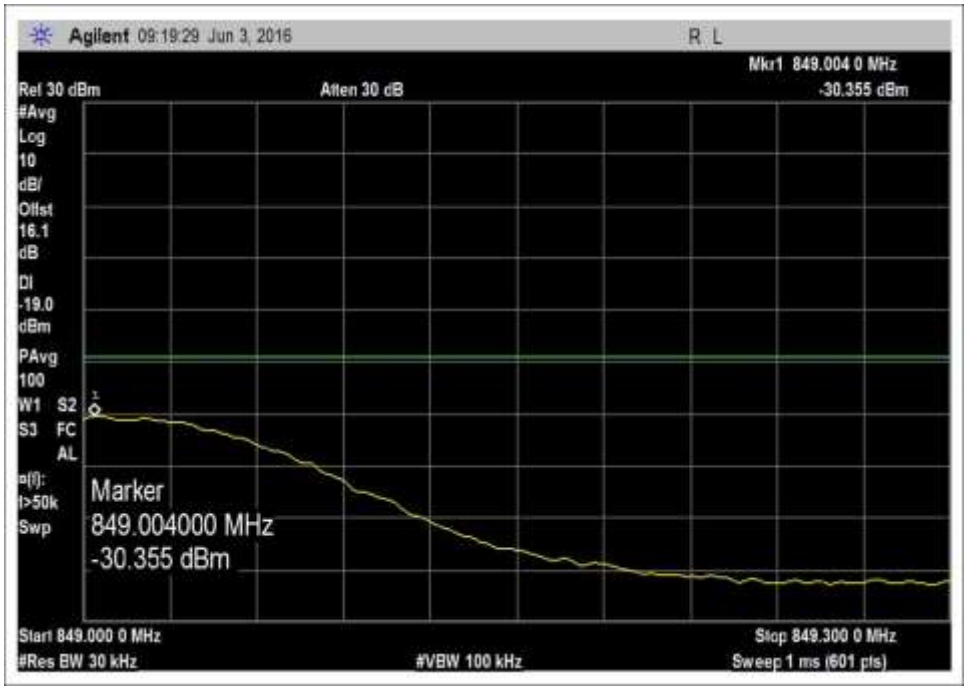
7.5_OBE_UL_776-787MHz_L_PreAGC



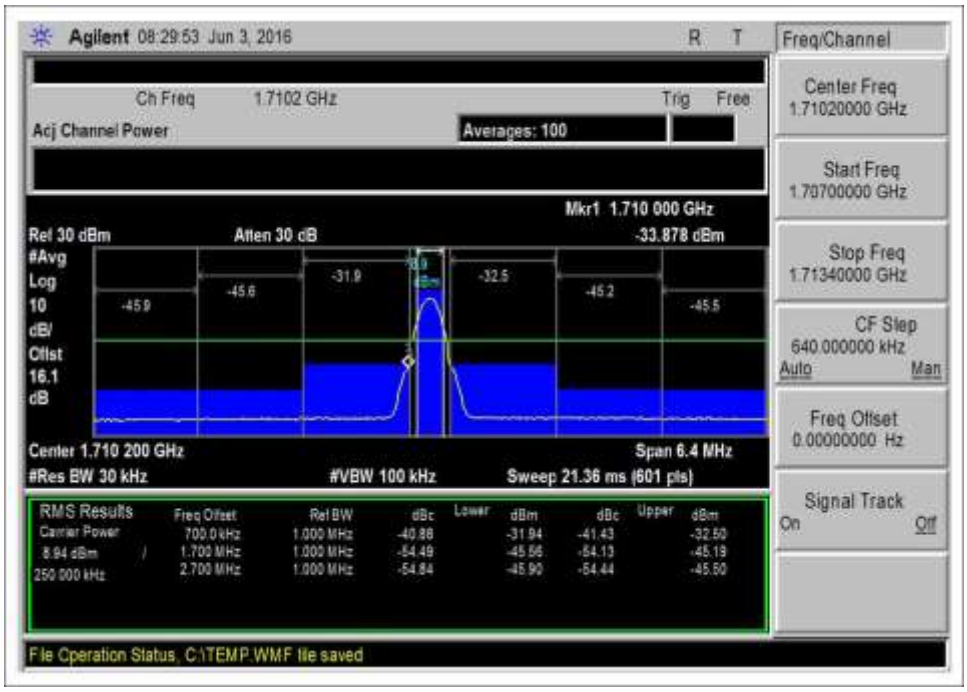
7.5_OBE_UL_776-787MHz_H_PreAGC



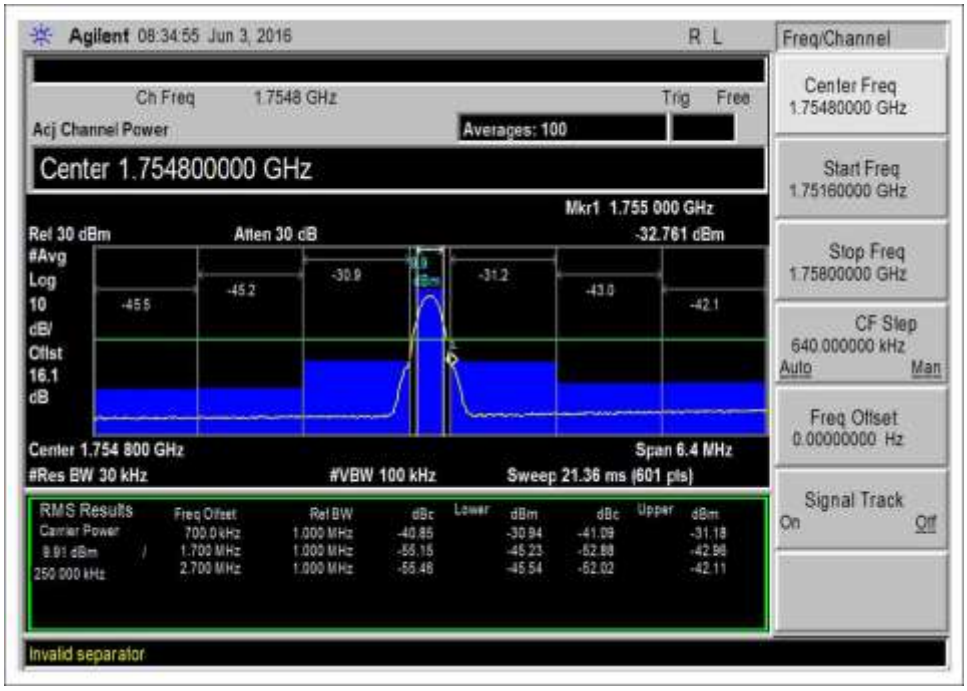
7.5_OBE_UL_824-849MHz_L_PreAGC



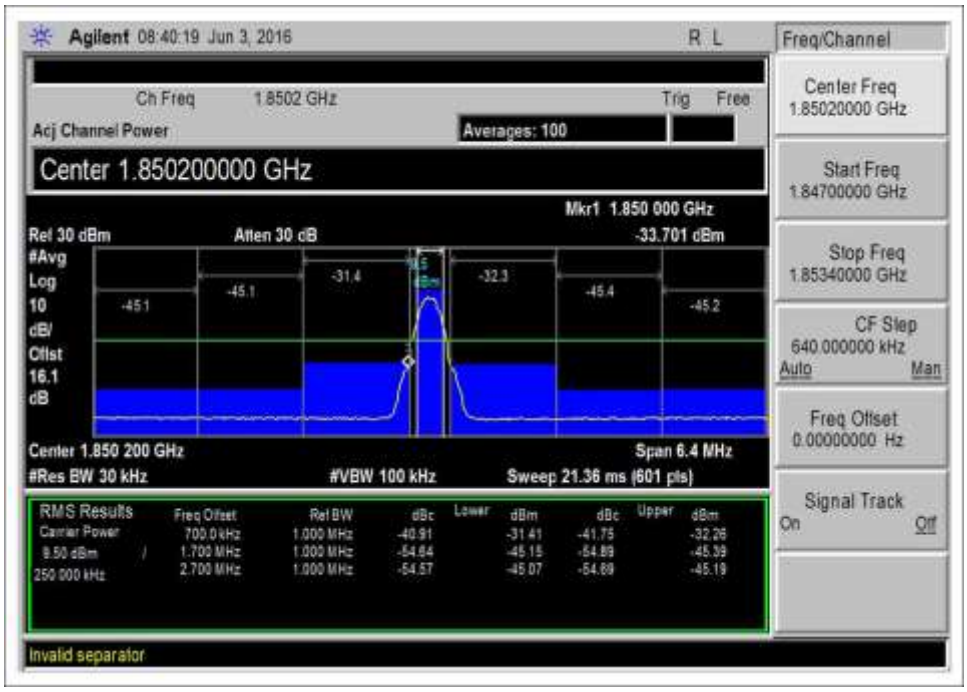
7.5_OBE_UL_824-849MHz_H_PreAGC



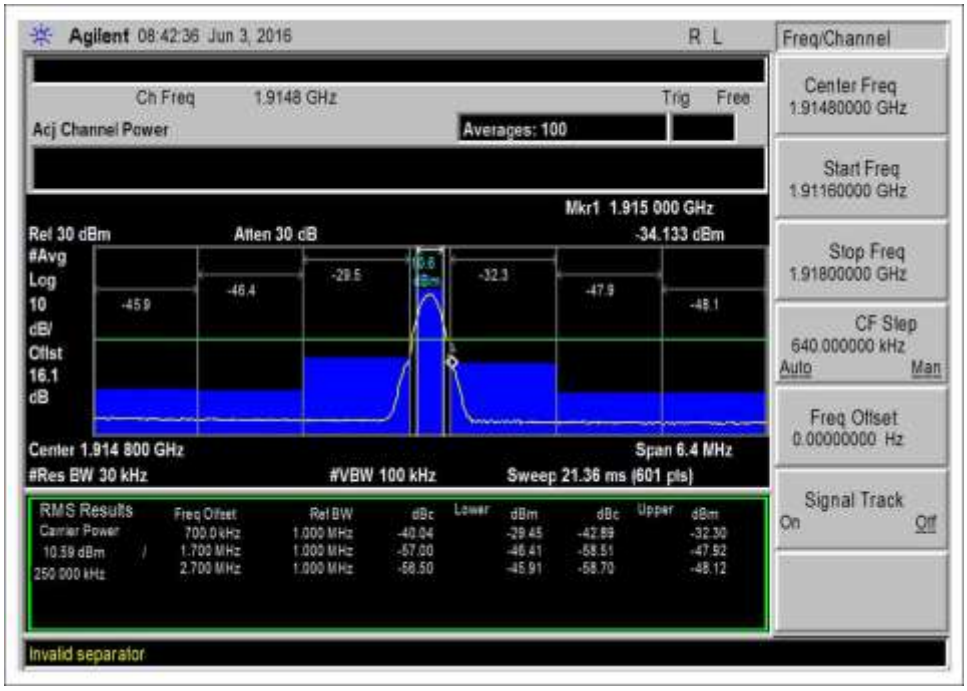
7.5_OBE_UL_1710-1755MHz_L_PreAGC



7.5_OBE_UL_1710-1755MHz_H_PreAGC

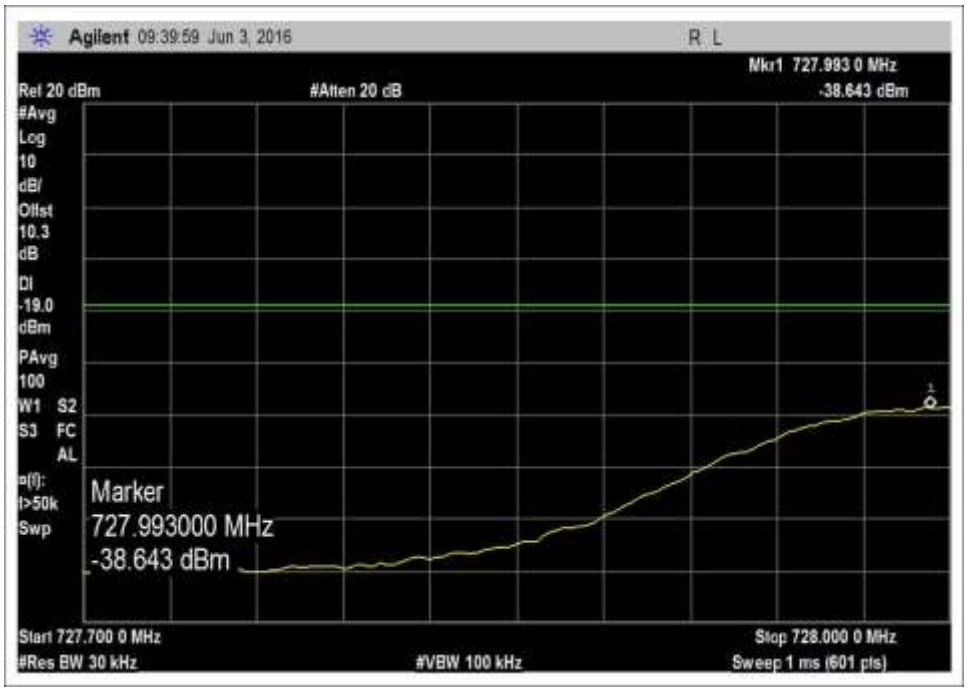


7.5_OBE_UL_1850-1915MHz_L_PreAGC

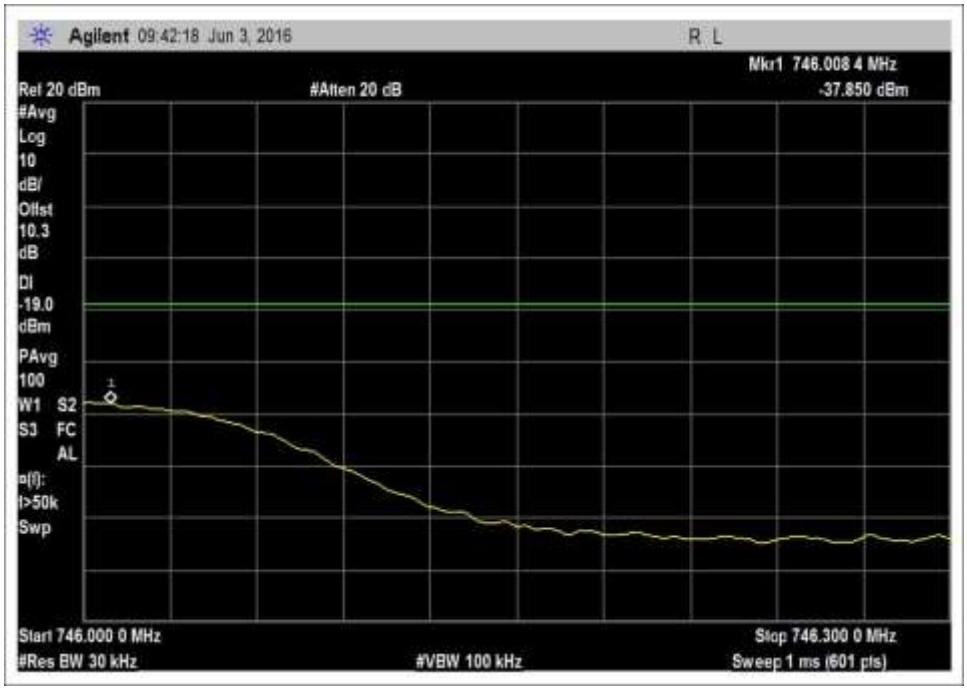


7.5_OBE_UL_1850-1915MHz_H_PreAGC

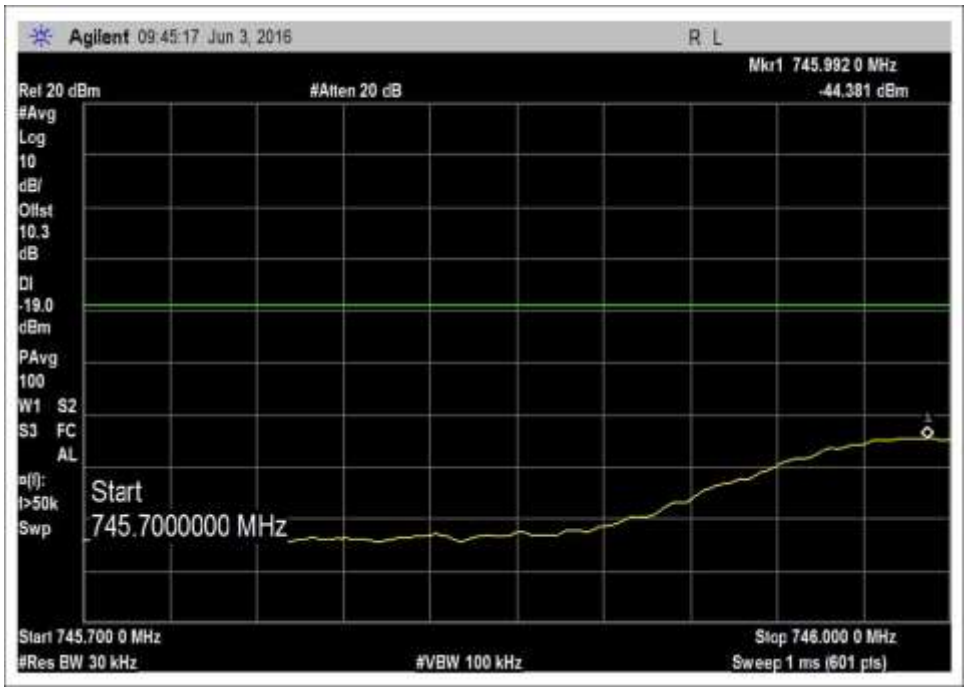
GSM, DL



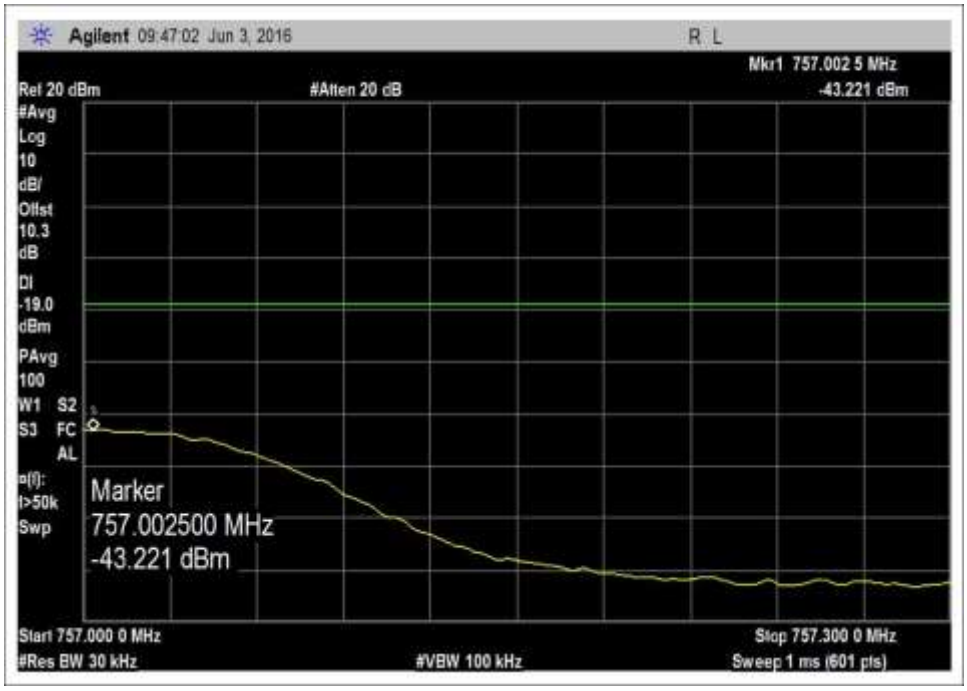
7.5_OBE_DL_728-746MHz_L_PreAGC



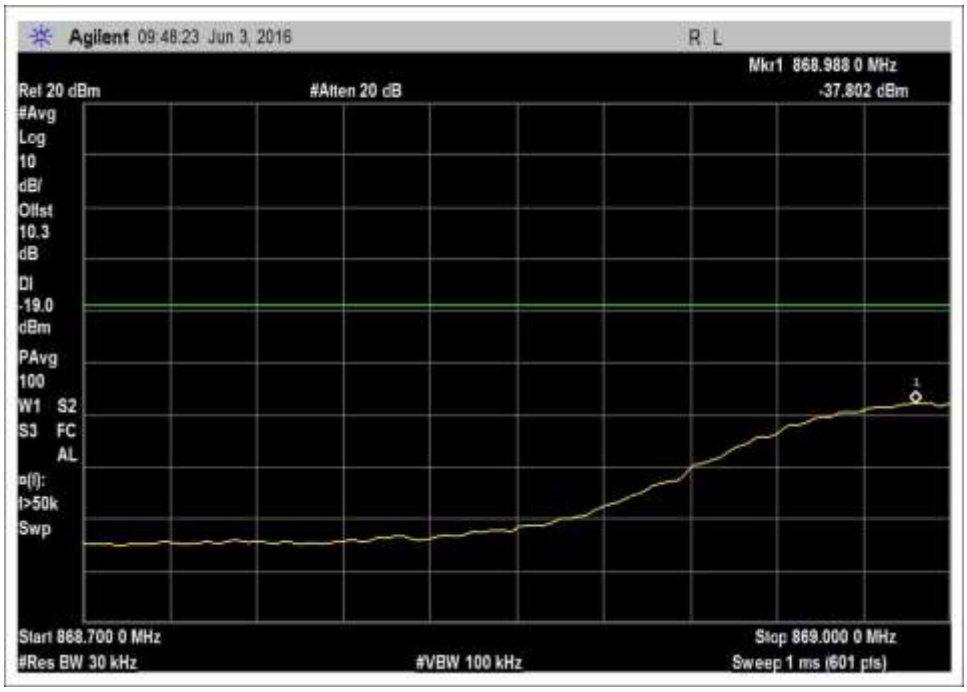
7.5_OBE_DL_728-746MHz_H_PreAGC



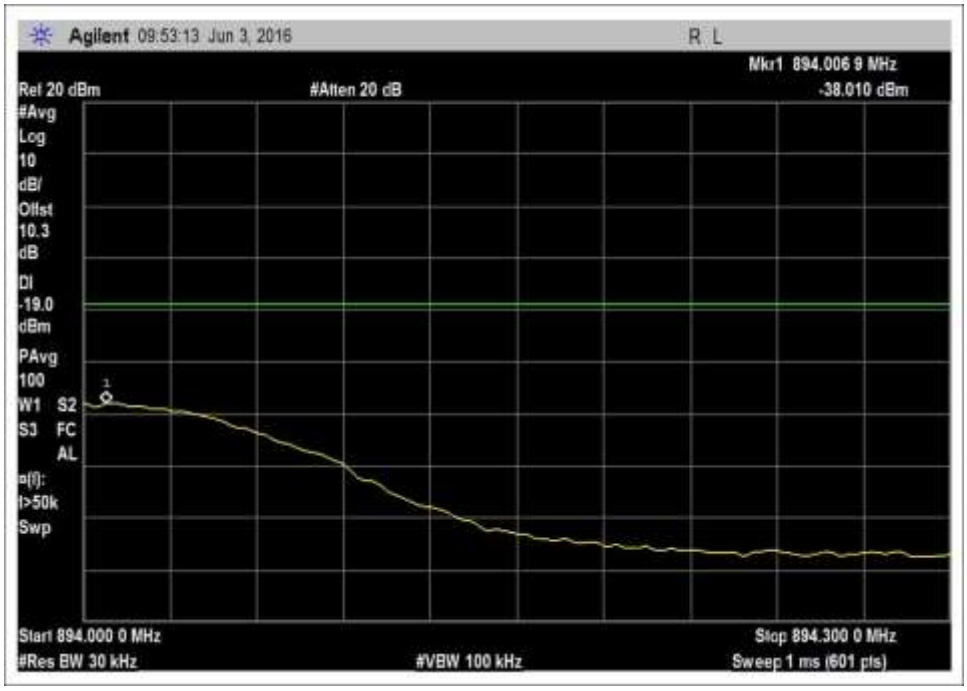
7.5_OBE_DL_746-757MHz_L_PreAGC



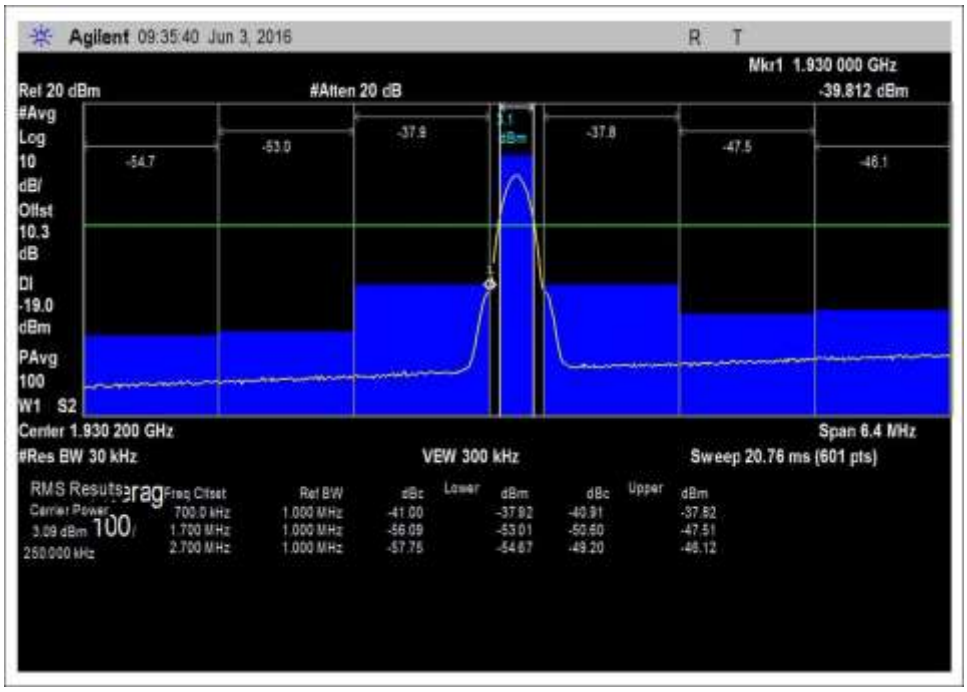
7.5_OBE_DL_746-757MHz_H_PreAGC



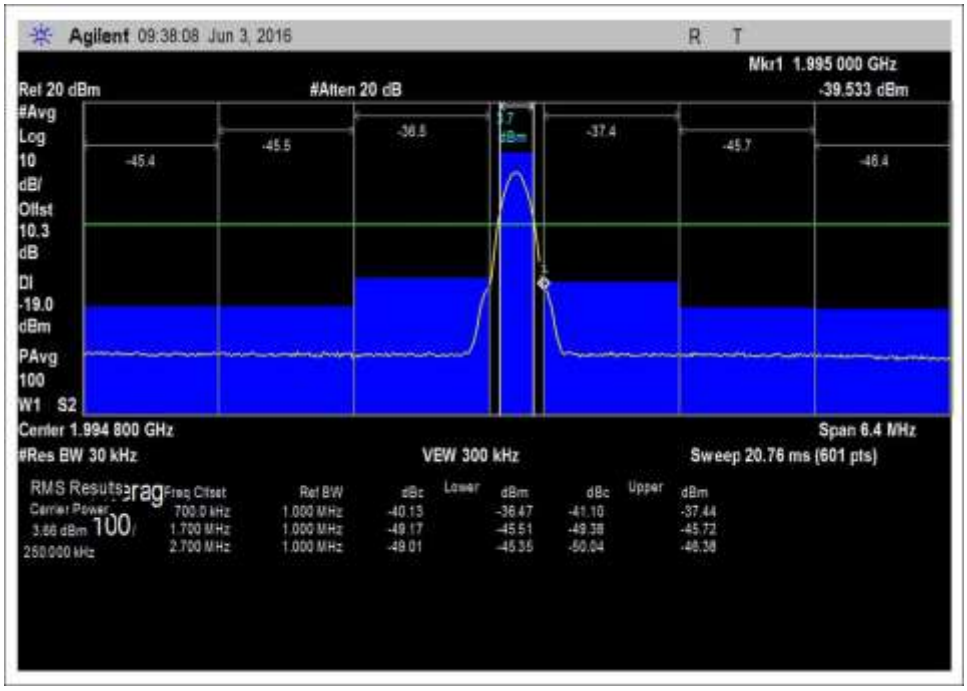
7.5_OBE_DL_869-894MHz_L_PreAGC



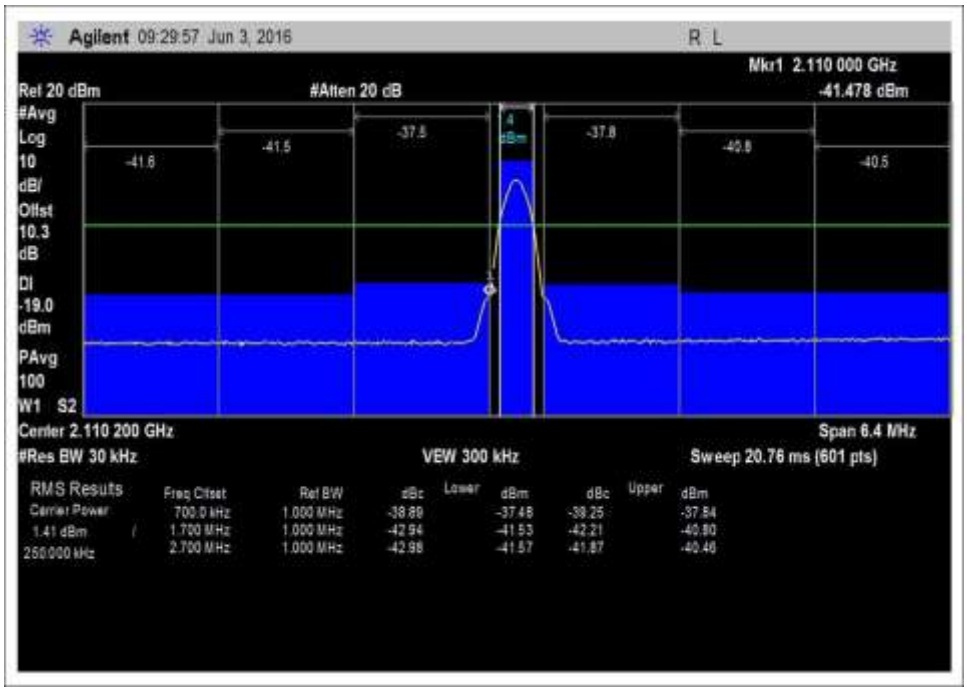
7.5_OBE_DL_869-894MHz_H_PreAGC



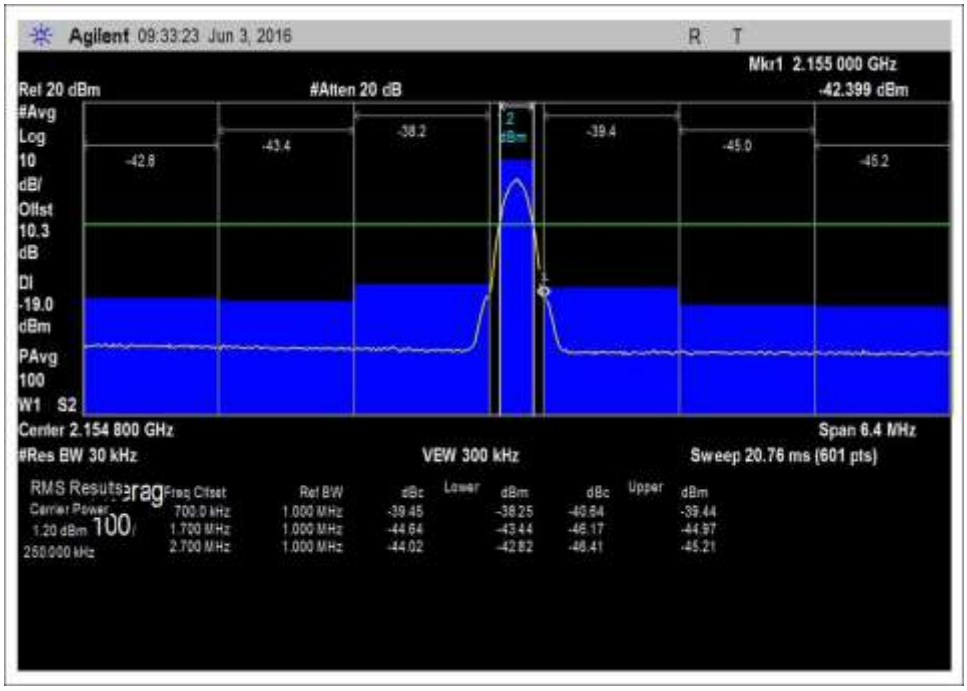
7.5_OBE_DL_1930-1995MHz_L_PreAGC



7.5_OBE_DL_1930-1995MHz_H_PreAGC

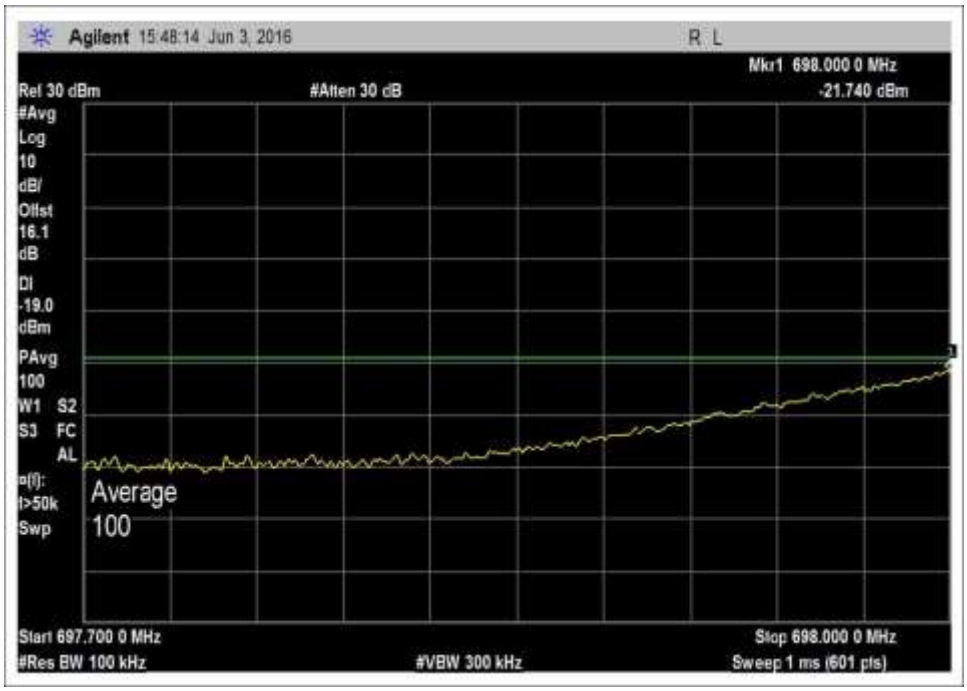


7.5_OBE_DL_2110-2155MHz_L_PreAGC

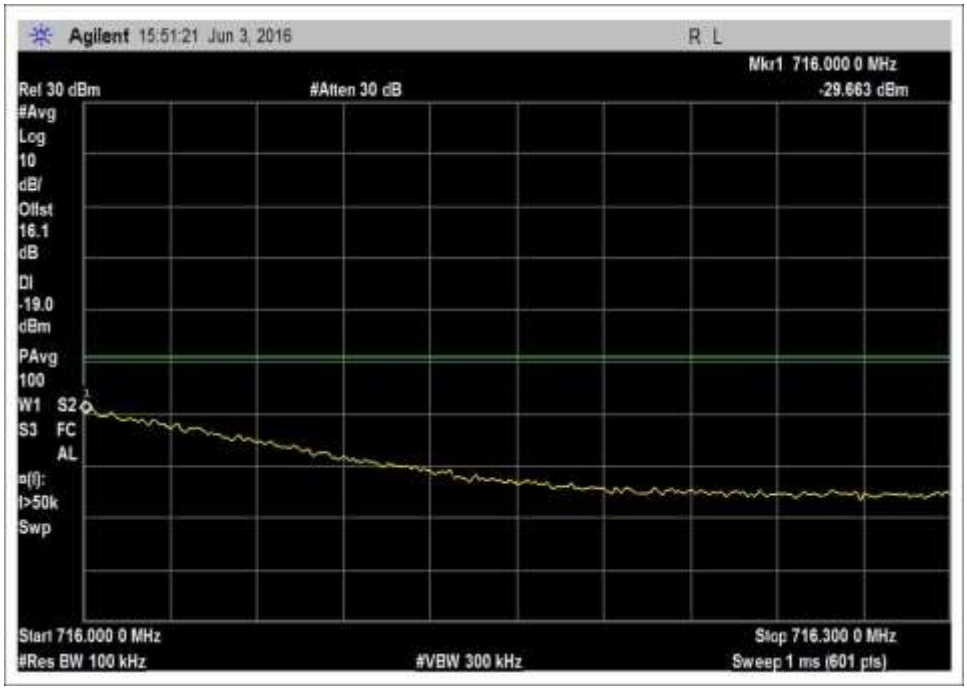


7.5_OBE_DL_2110-2155MHz_H_PreAGC

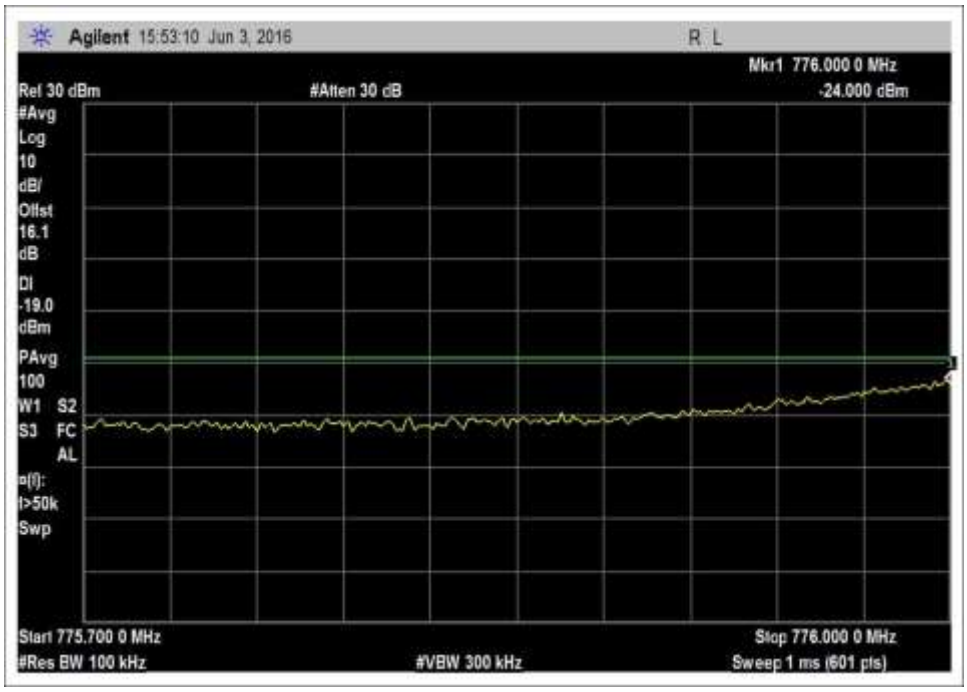
LTE, UL



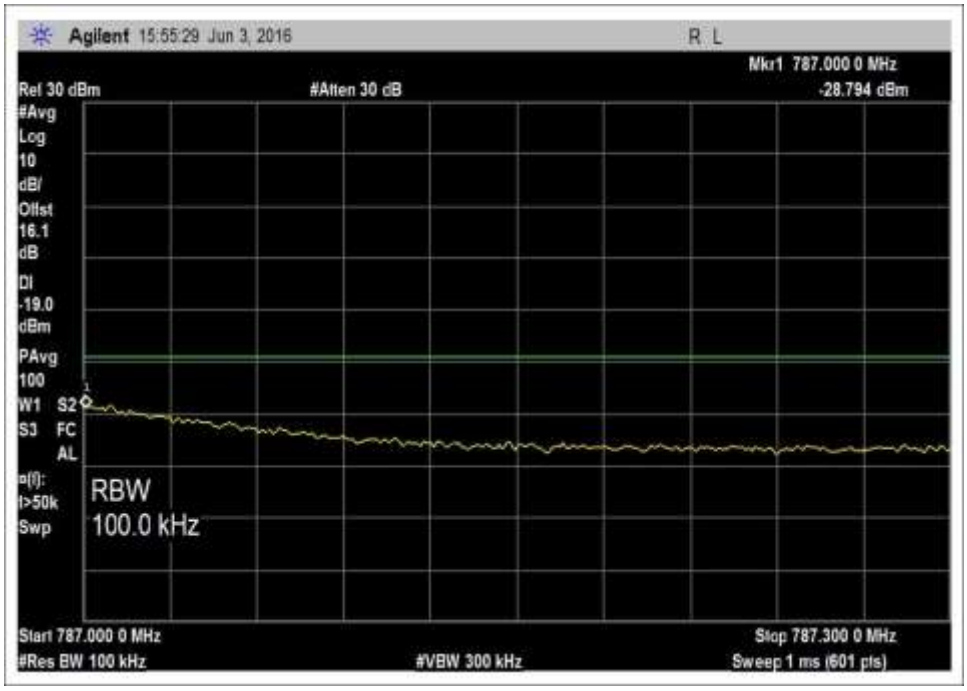
7.5_OBE_UL_698-716MHz_L_PreAGC



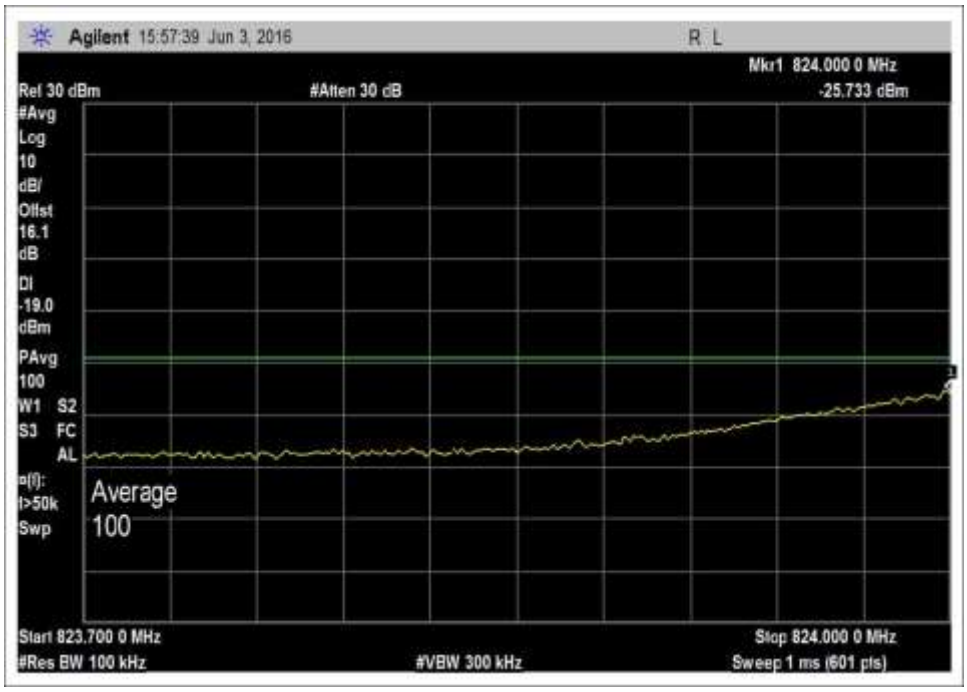
7.5_OBE_UL_698-716MHz_H_PreAGC



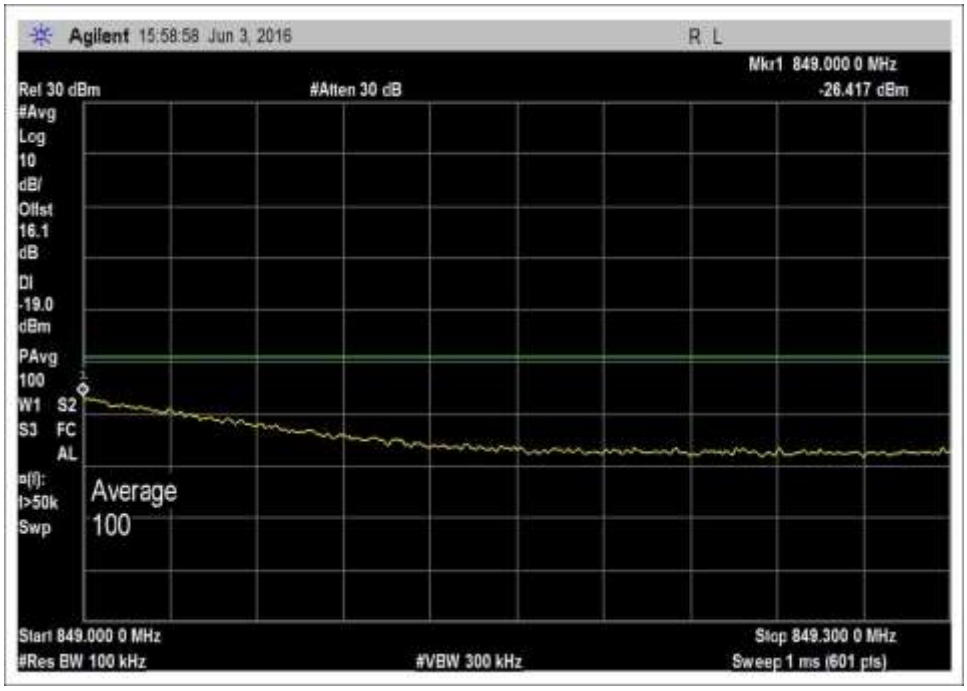
7.5_OBE_UL_776-787MHz_L_PreAGC



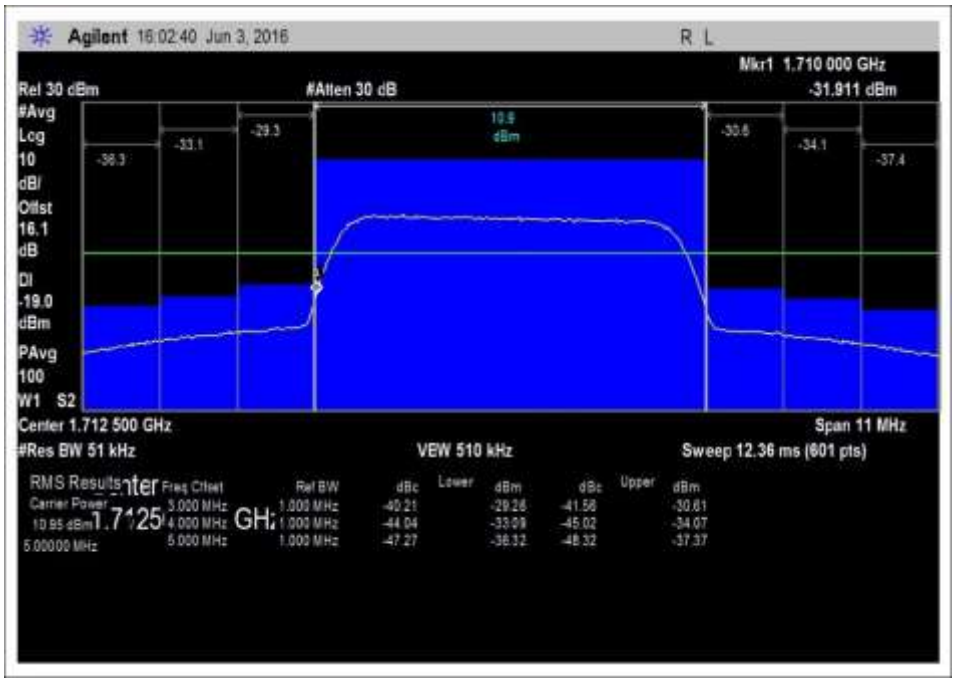
7.5_OBE_UL_776-787MHz_H_PreAGC



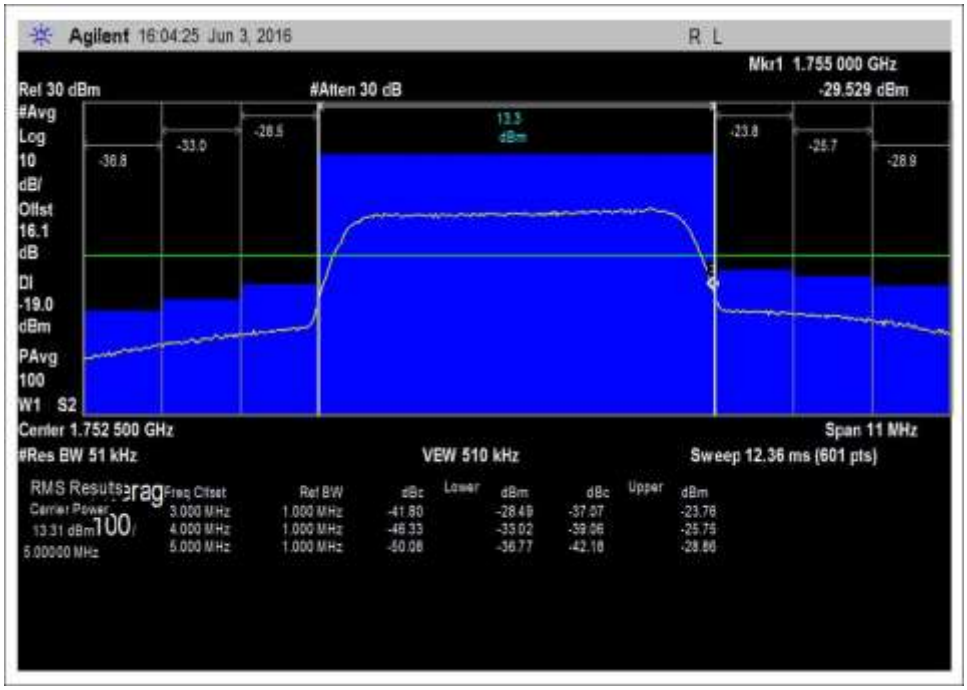
7.5_OBE_UL_824-849MHz_L_PreAGC



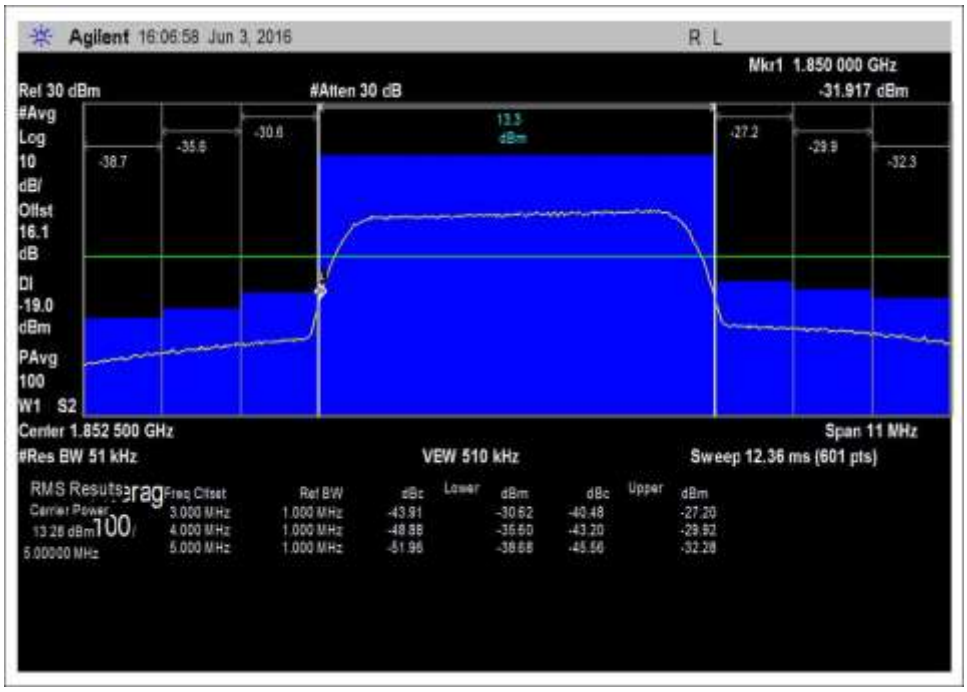
7.5_OBE_UL_824-849MHz_H_PreAGC



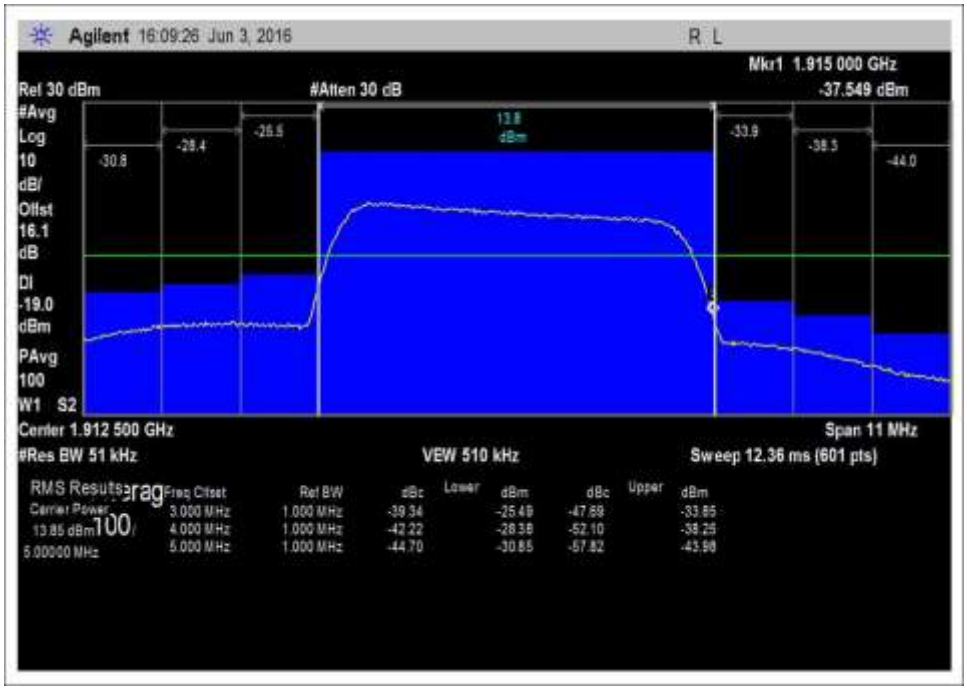
7.5_OBE_UL_1710-1755MHz_L_PreAGC



7.5_OBE_UL_1710-1755MHz_H_PreAGC

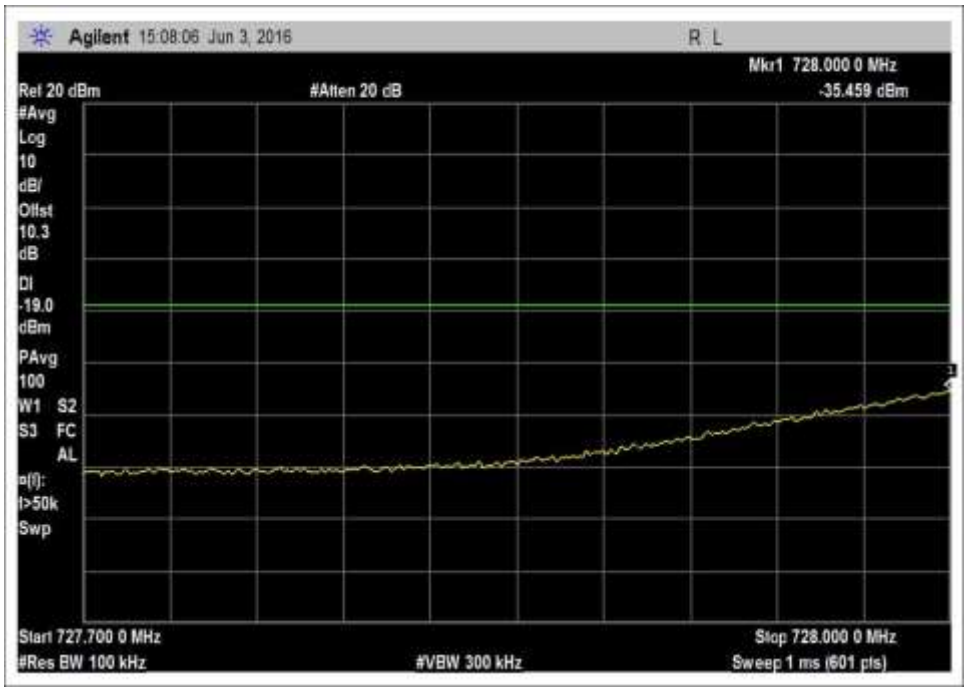


7.5_OBE_UL_1850-1915MHz_L_PreAGC

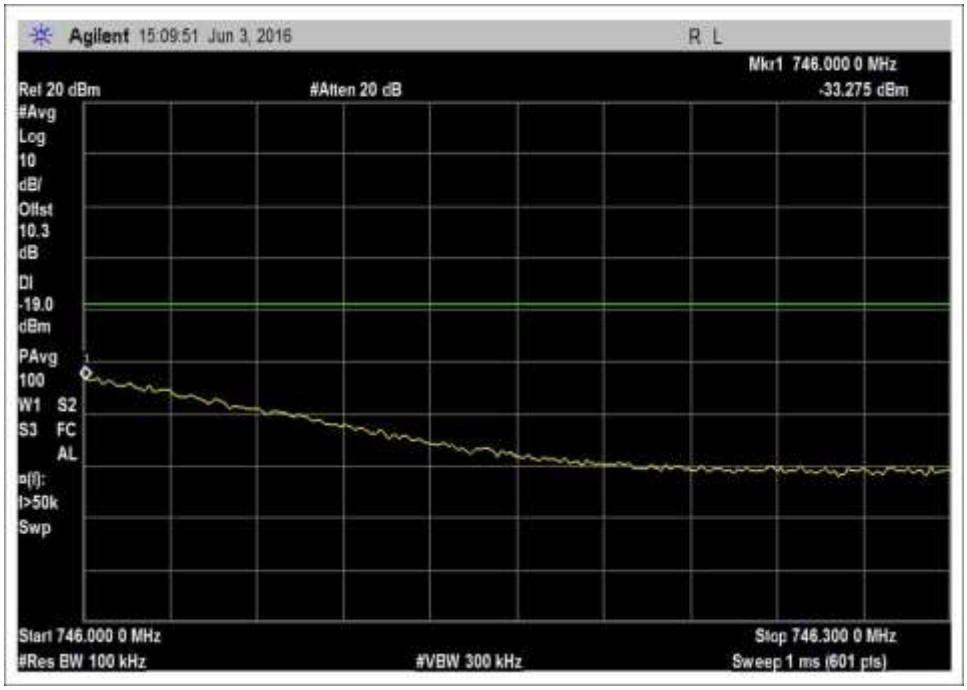


7.5_OBE_UL_1850-1915MHz_H_PreAGC

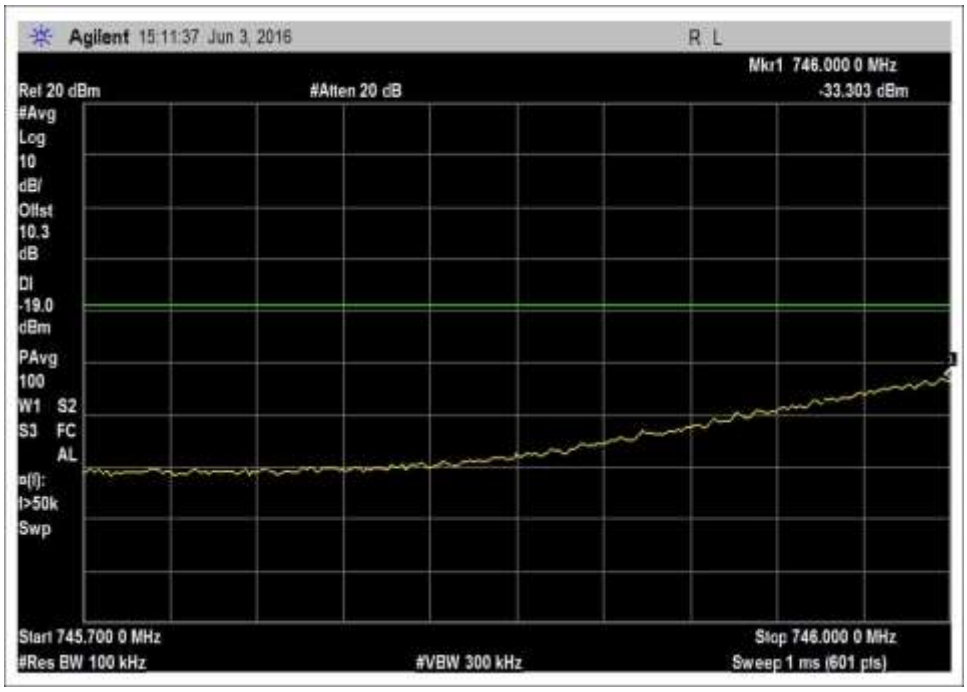
LTE, DL



7.5_OBE_DL_728-746MHz_L_PreAGC



7.5_OBE_DL_728-746MHz_H_PreAGC



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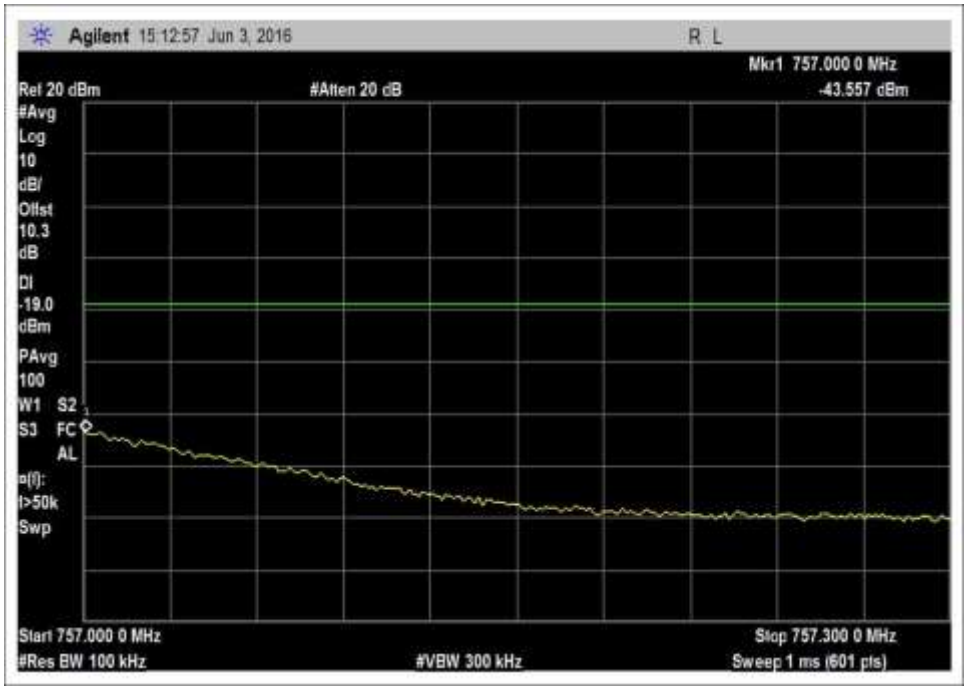
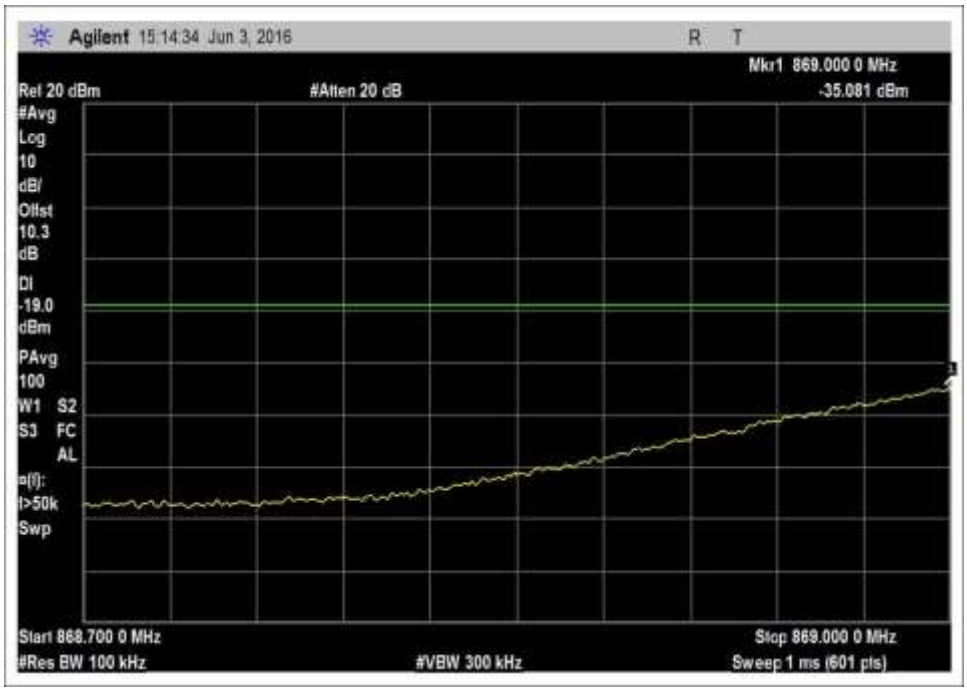
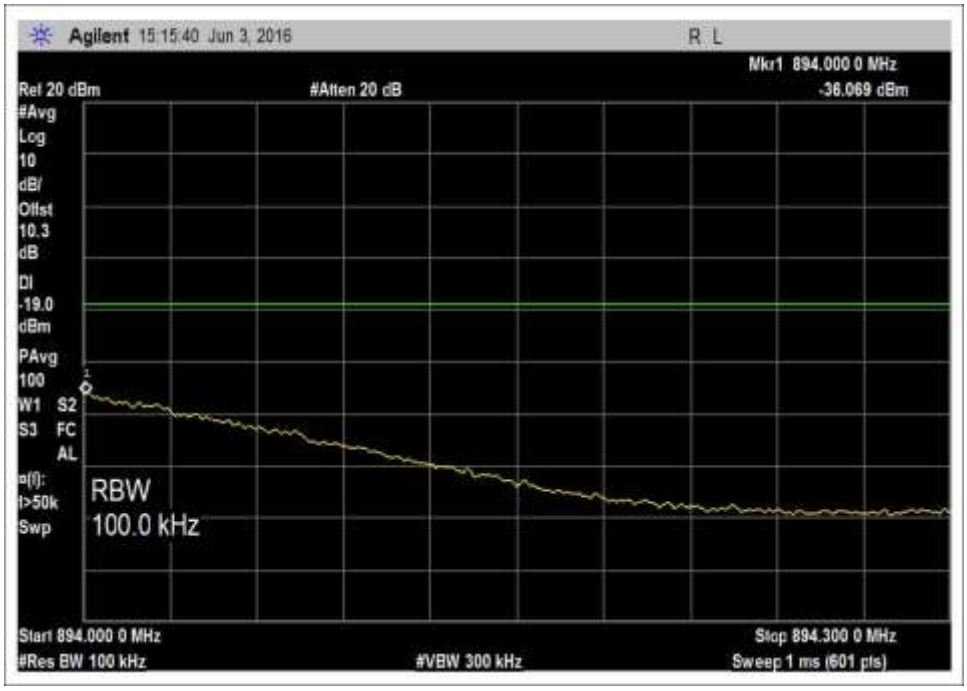


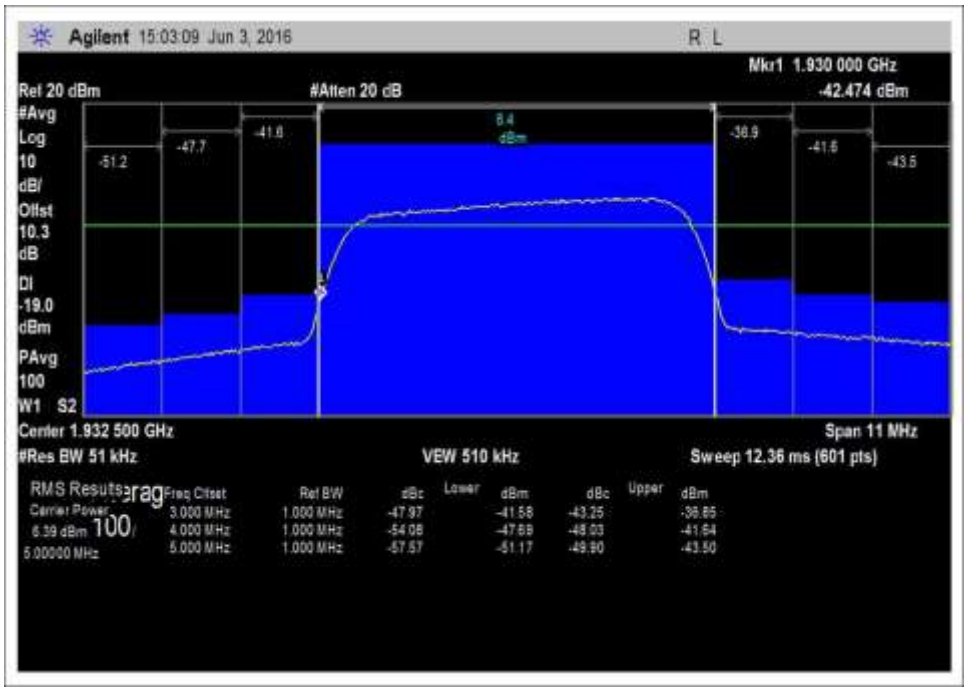
7.5_OBE_DL_746-757MHz_H_PreAGC



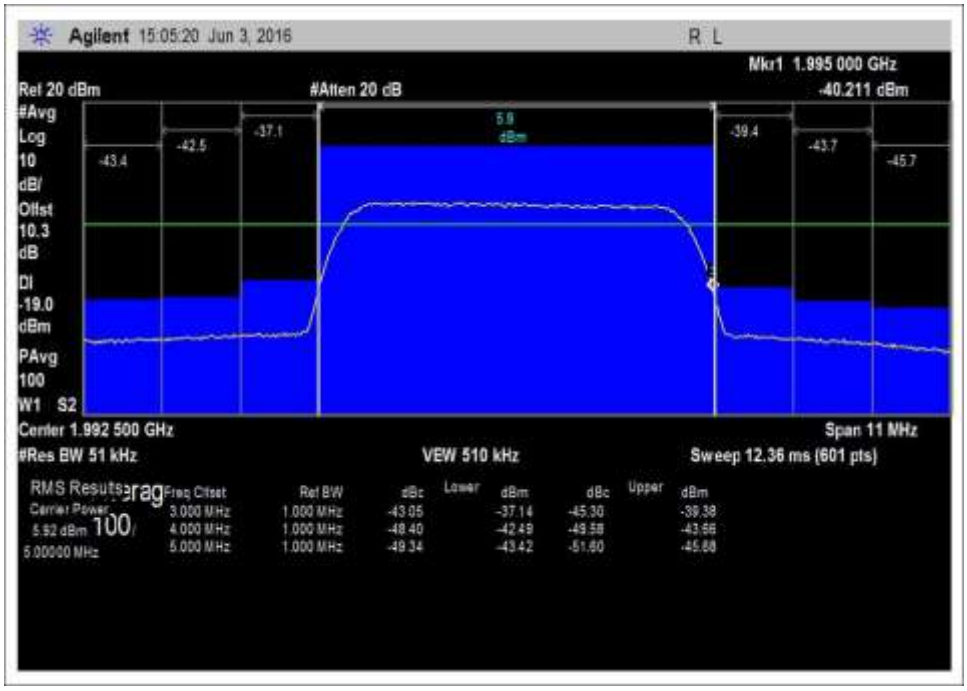
7.5_OBE_DL_869-894MHz_L_PreAGC



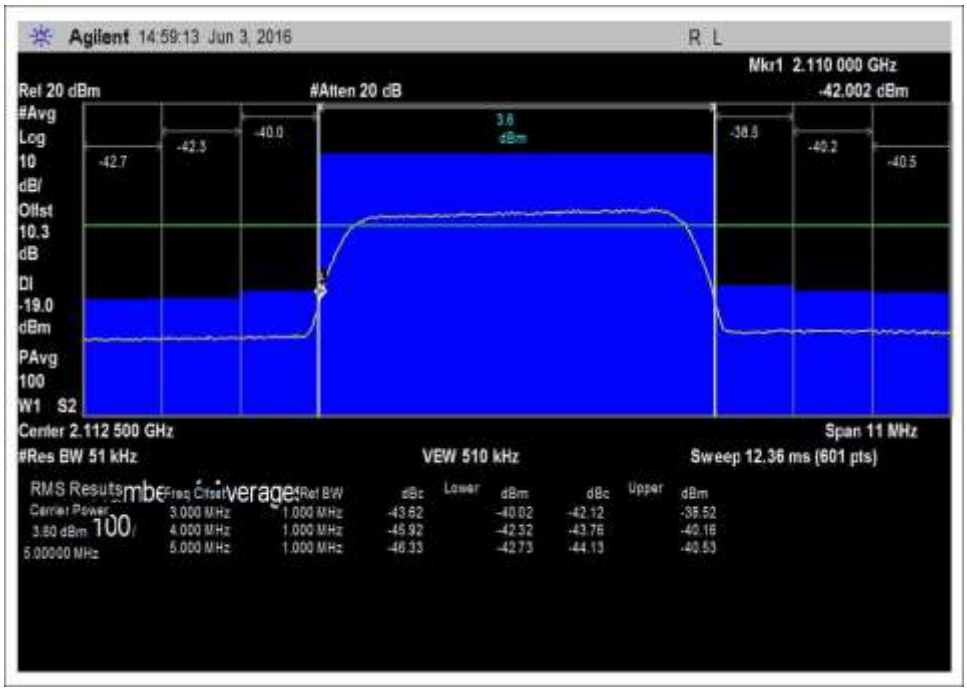
7.5_OBE_DL_869-894MHz_H_PreAGC



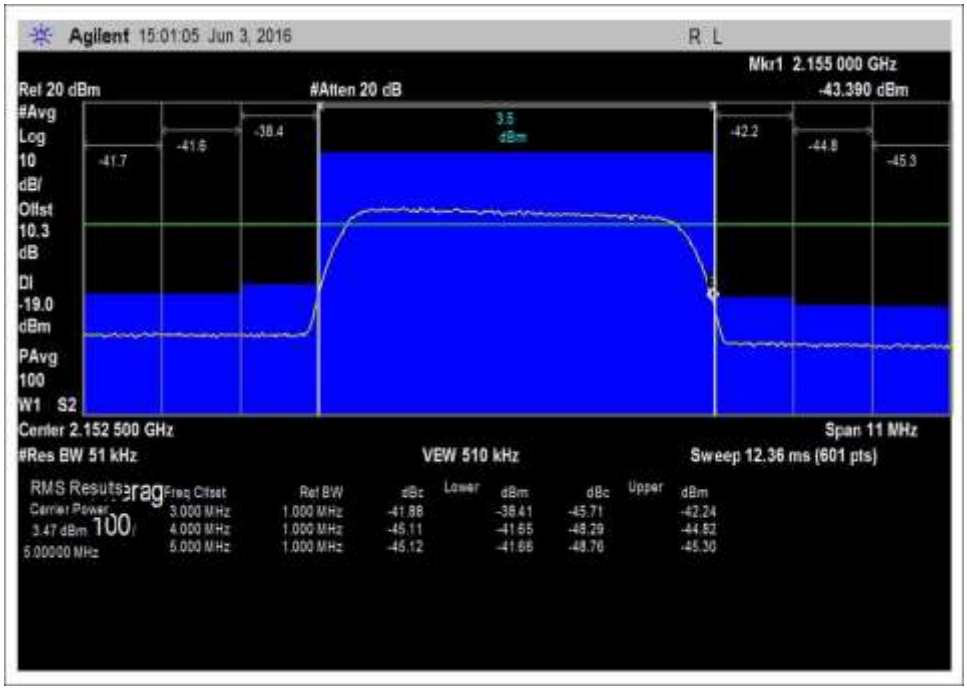
7.5_OBE_DL_1930-1995MHz_L_PreAGC



7.5_OBE_DL_1930-1995MHz_H_PreAGC



7.5_OBE_DL_2110-2155MHz_L_PreAGC



7.5_OBE_DL_2110-2155MHz_H_PreAGC

7.6 Conducted Spurious

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.6 Conducted Spurious Emissions / 47 CFR §2.1051 Spurious Emissions at Antenna Terminals**		
Work Order #:	**98648**	Date:	06/08/2016
Test Type:	**Conducted Emissions**	Time:	10:11:02
Tested by:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

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

Test environment conditions:
Temperature: 23.1°C
Relative Humidity: 42%
101.2 kPa

Part 22
UL: 824-849MHz
DL: 869-894MHz
Part 24
UL: 1850-1915MHz
DL: 1930-1995MHz
Part 27
UL: 1710-1755MHz, 698-716MHz, 776-787MHz
DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Frequency range of measurement = 9kHz- 22GHz.

9 kHz -	150 kHz ->	RBW= 200Hz	VBW= 200Hz
150 kHz -	30 MHz ->	RBW= 9kHz	VBW= 9kHz
30 MHz -	1000MHz ->	RBW*= 1MHz	VBW= 3MHz
1000 MHz -	22000MHz ->	RBW= 1MHz	VBW= 3MHz

Test Conditions / Notes Continued:

*Note: As specified on 7.6 Conducted spurious emissions test procedure of 935210 D03 Signal Booster Measurements v04, for frequencies below 1 GHz, an RBW of 1 MHz may be used in a preliminary measurement. If non-compliant emissions are detected, a final measurement shall be made with a 100 kHz RBW. Additionally, a peak detector may also be used for the preliminary measurement. If non-compliant emissions are detected, then a final measurement of these emissions shall be made with the power averaging (RMS) detector.

Test procedure:
The test was performed in accordance with section 7.6 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016

Note:
27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN03418	Signal Generator	E4438C	7/30/2015	7/30/2017
	ANC00032	Signal Generator	E4433B	2/26/2016	2/26/2018
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03471	Spectrum Analyzer	E4440A	1/4/2016	1/4/2018
	ANP06467	Attenuator	PE7014-10	5/13/2015	5/13/2017
	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

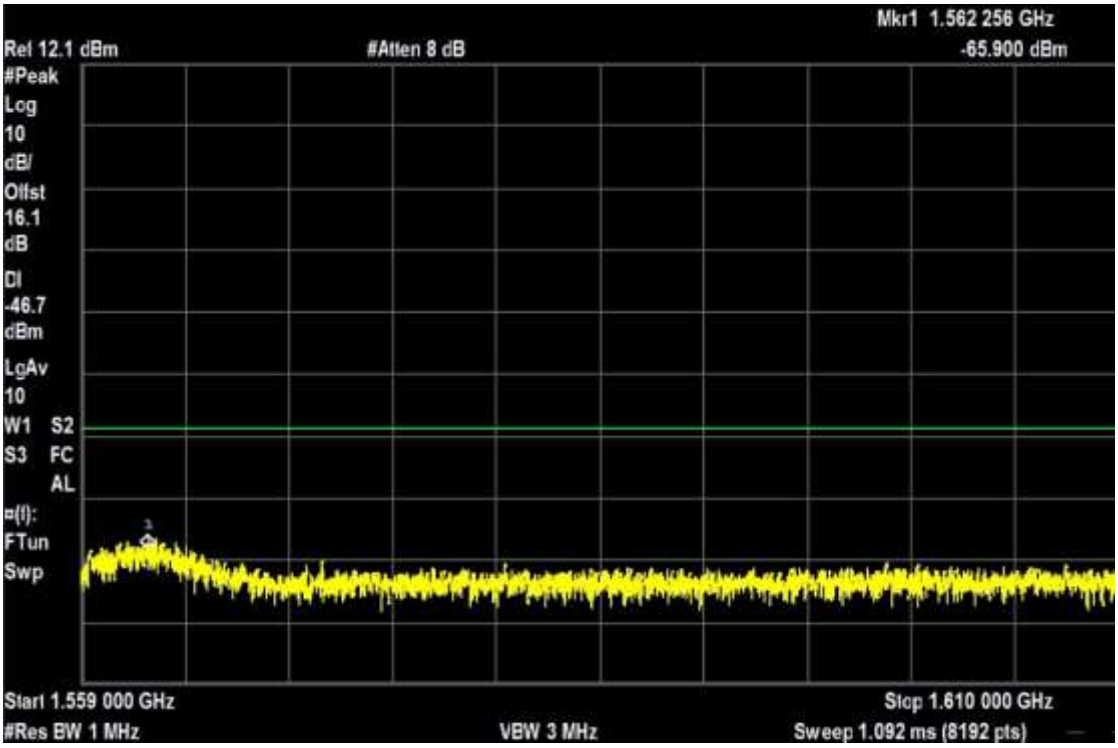
Summary of Results

Pass: As summarized in plots below, the conducted spurious emissions are within limits.

9 KHz-30 MHz

No Conducted Spurious Emissions were found within 20dB of the limit.

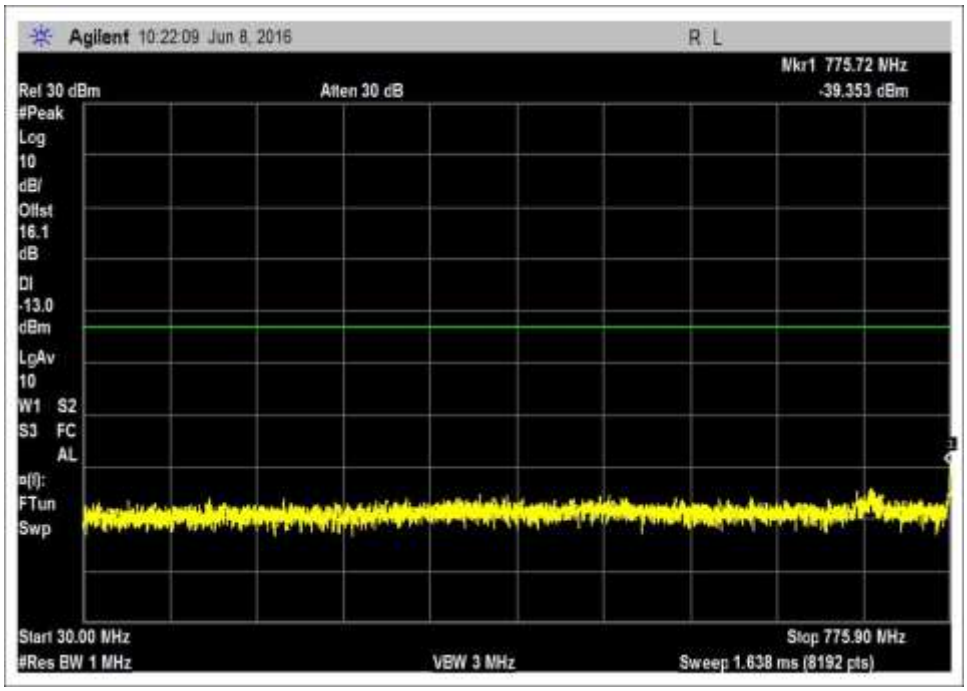
Per section 27.53 (f), the 1559-1610 band was also investigated and found emission within limits using applied correction (see calculation below).



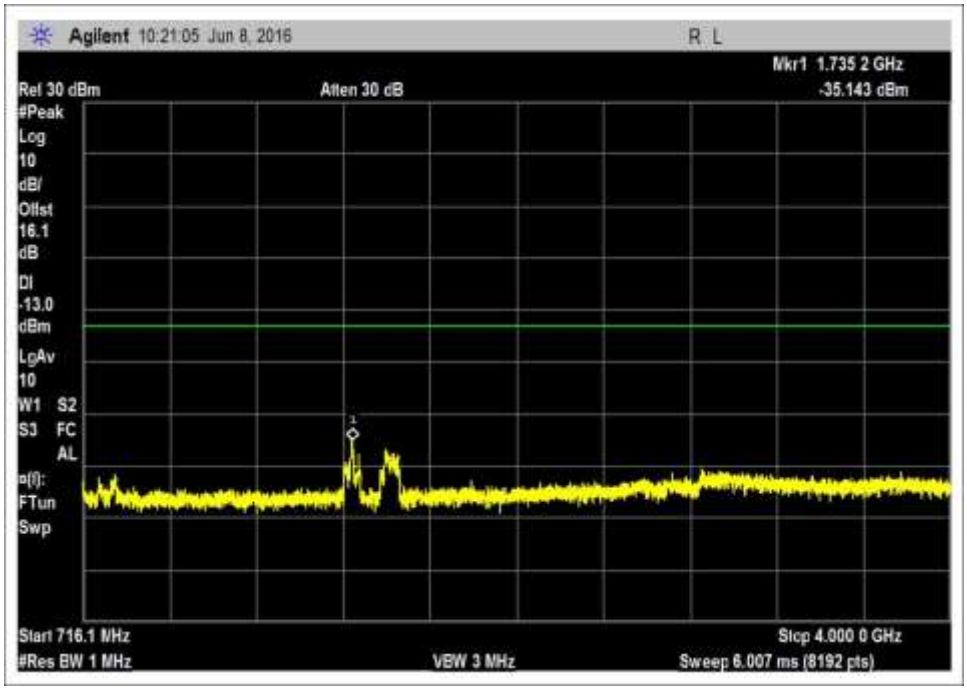
Calculation:

UL776-787MHz=>	Antenna Gain (10dB) / Cable Loss (3.32dB)
Limit line EIRP on this band 1559-1610MHz =>	−70 dBW/MHz =>-40dBm
Limit line EIRP corrected =>	-40dBm-10dBi+3.32dB=> -46.68dBm

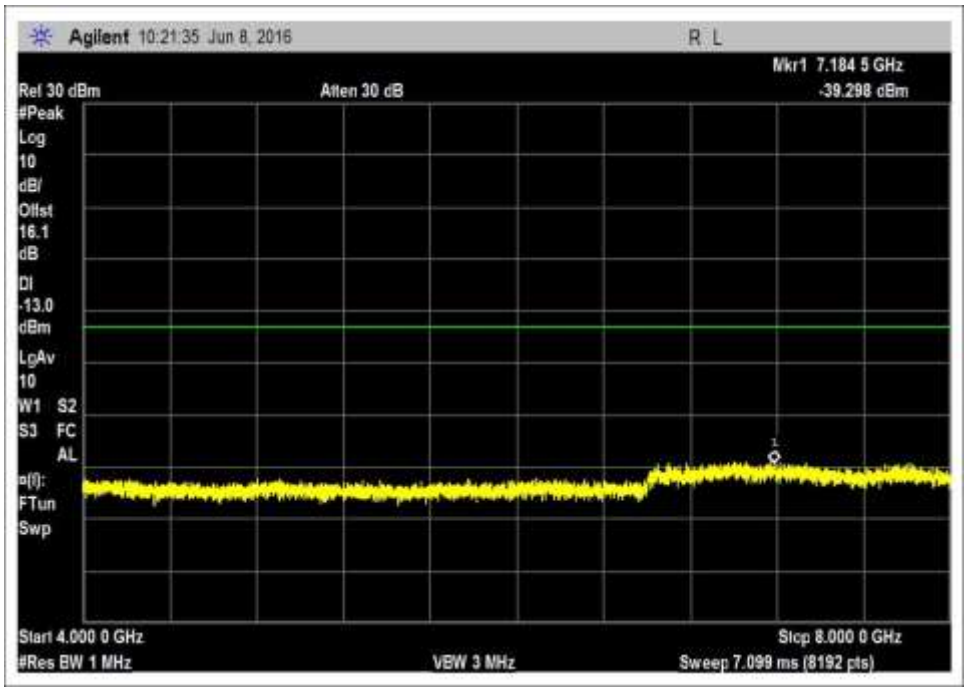
UL



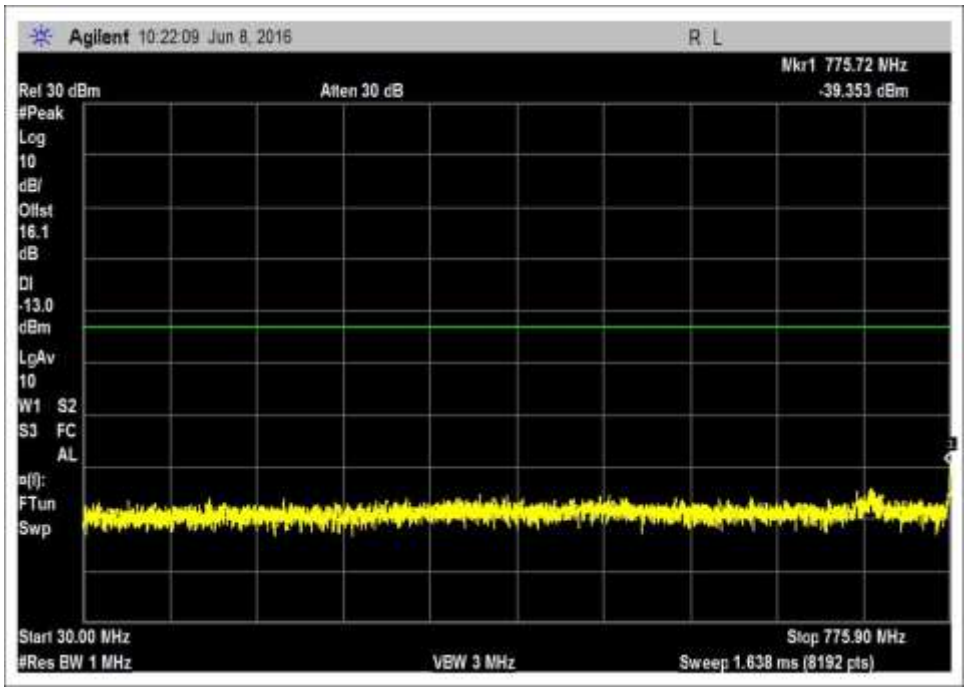
UL_698-716L



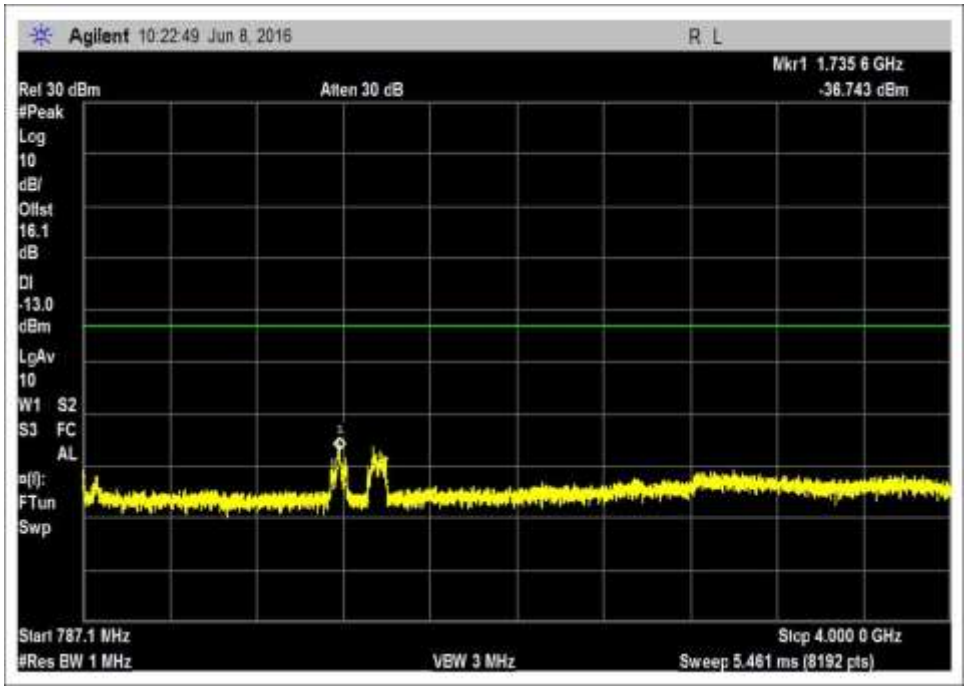
UL_698-716R1


Agilent 10:21:35 Jun 8, 2016
R L
Mkr1 7.184 5 GHz
-39.298 dBm
Ref 30 dBm
Atten 30 dB
#Peak
Log
10
dB/
Offst
16.1
dB
Dl
-13.0
dBm
LgAv
10
W1 S2
S3 FC
AL
p(f):
FTun
Swp
1
Start 4.000 0 GHz
Stop 8.000 0 GHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 7.099 ms (8192 pts)

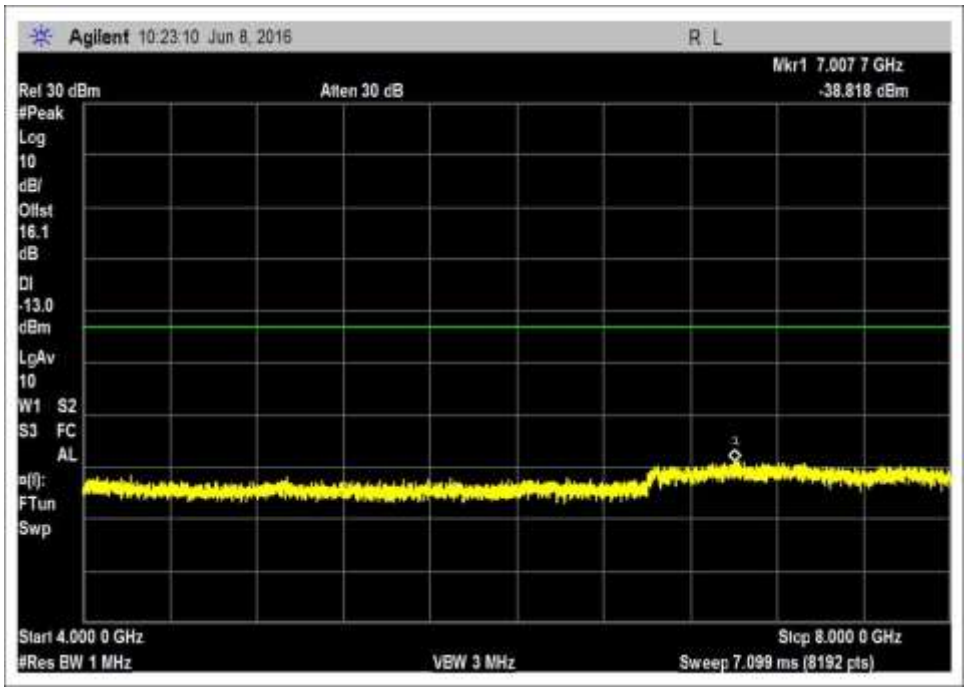
UL_698-716R2



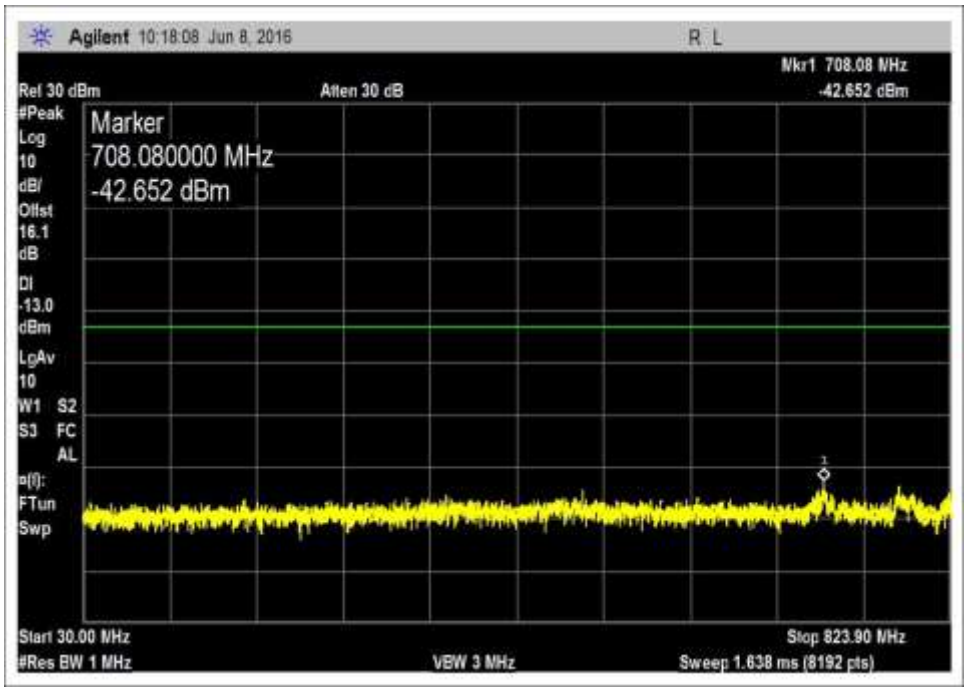
UL_776-787L



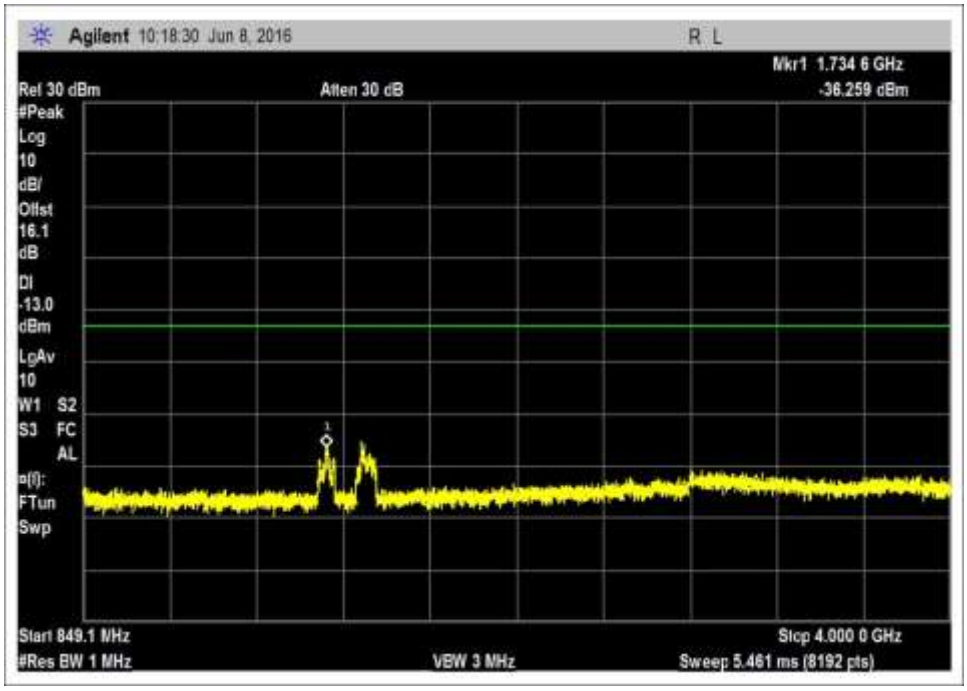
UL_776-787R1


Agilent 10:23:10 Jun 8, 2016
R L
Mkr1 7.007 7 GHz
-38.818 dBm
Ref 30 dBm
Atten 30 dB
#Peak
Log
10
dB/
Offst
16.1
dB
Dl
-13.0
dBm
LgAv
10
W1 S2
S3 FC
AL
p(f):
FTun
Swp
Start 4.000 0 GHz
Stop 8.000 0 GHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 7.099 ms (8192 pts)

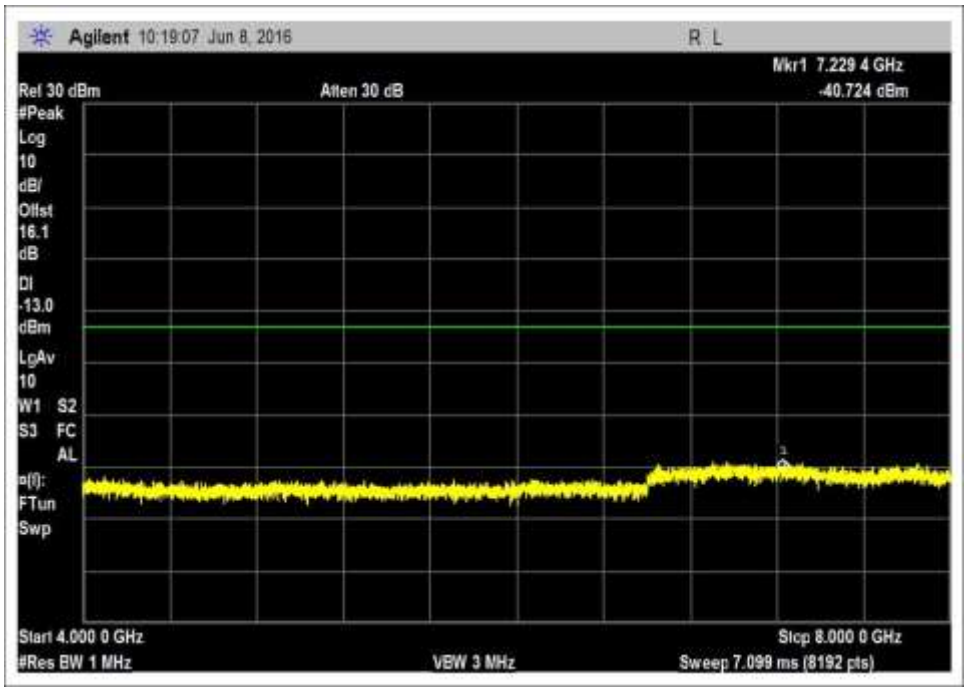
UL_776-787R2



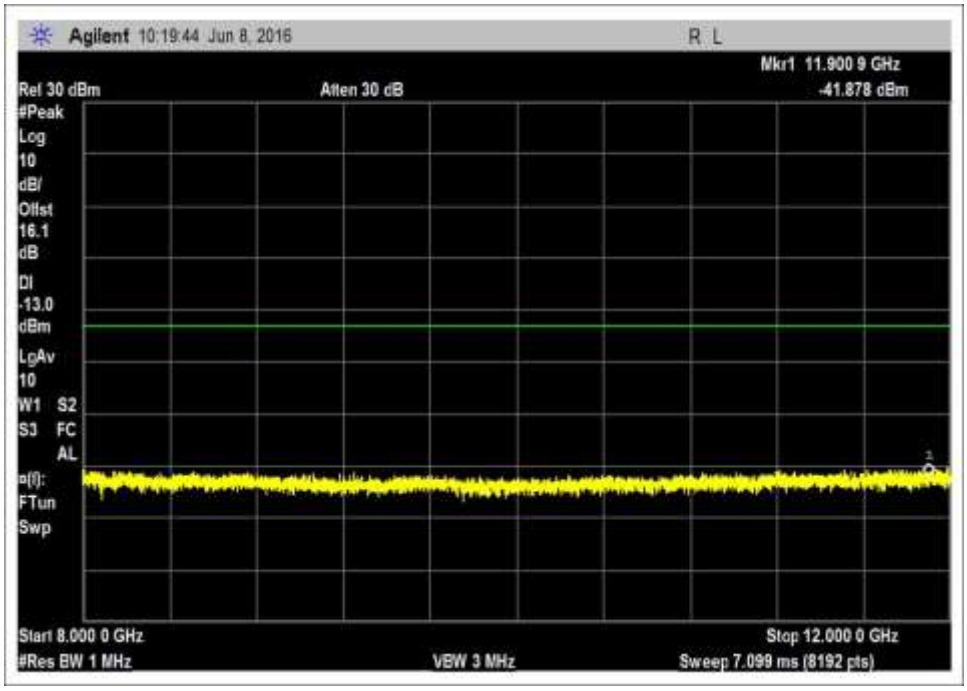
UL_824-849L



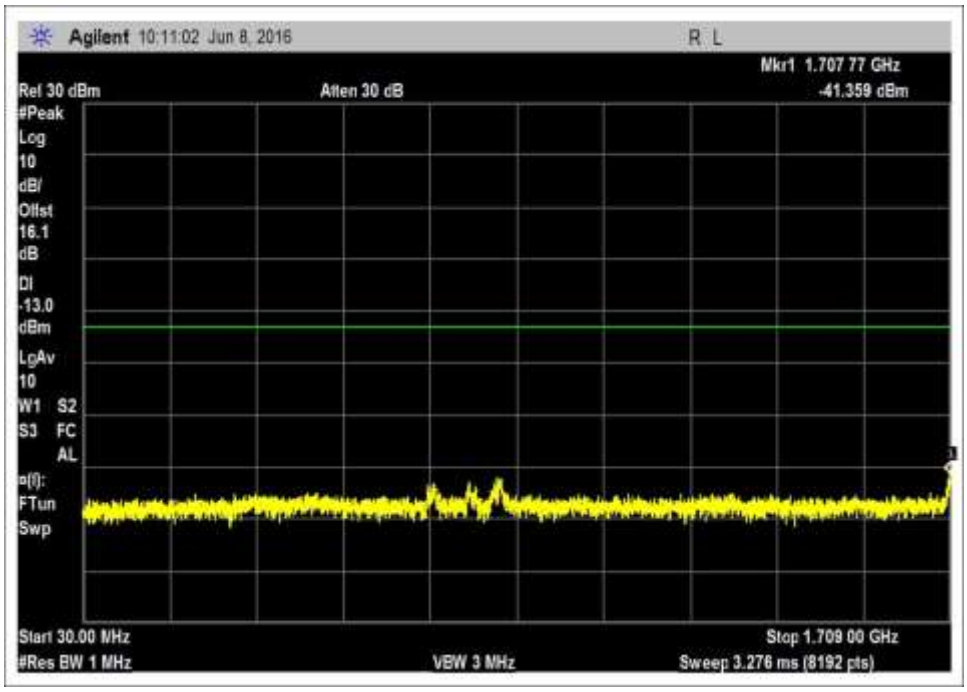
UL_824-849R1



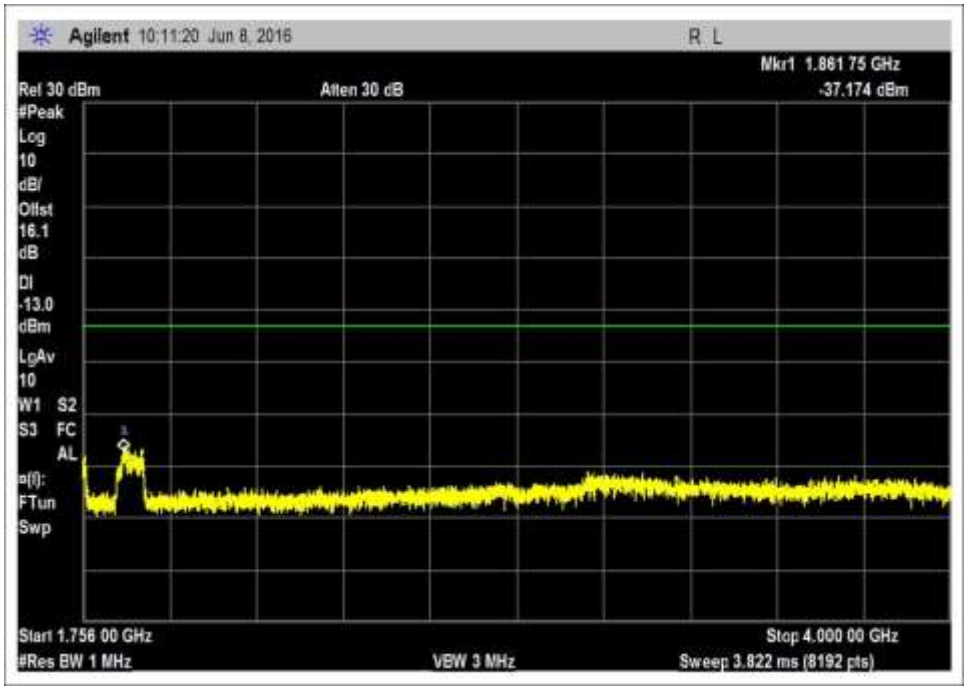
UL_824-849R2



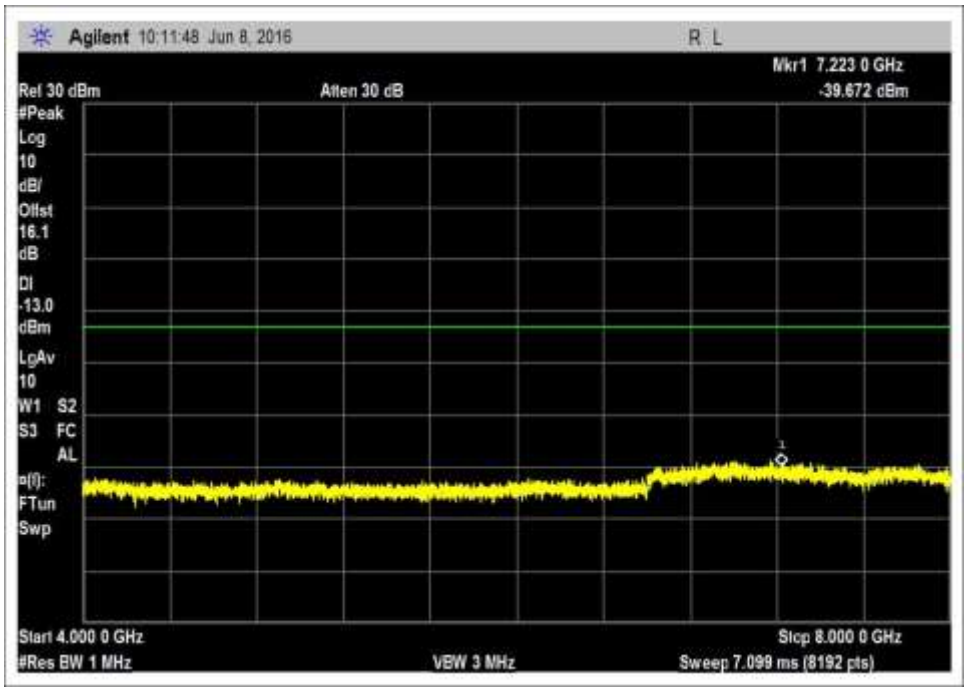
UL_824-849R3



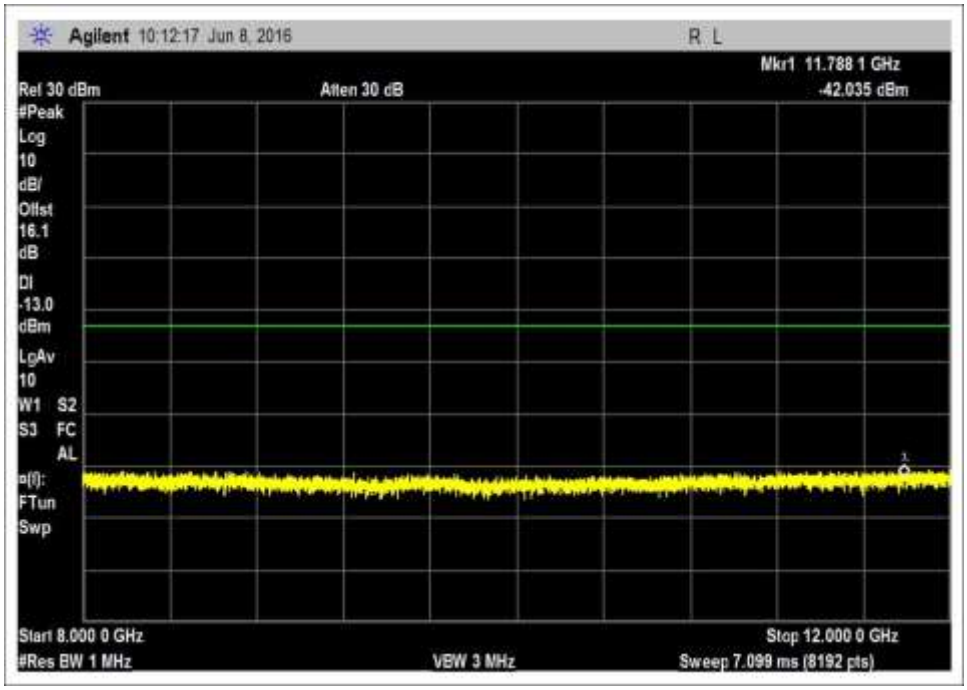
UL_1710-1755L



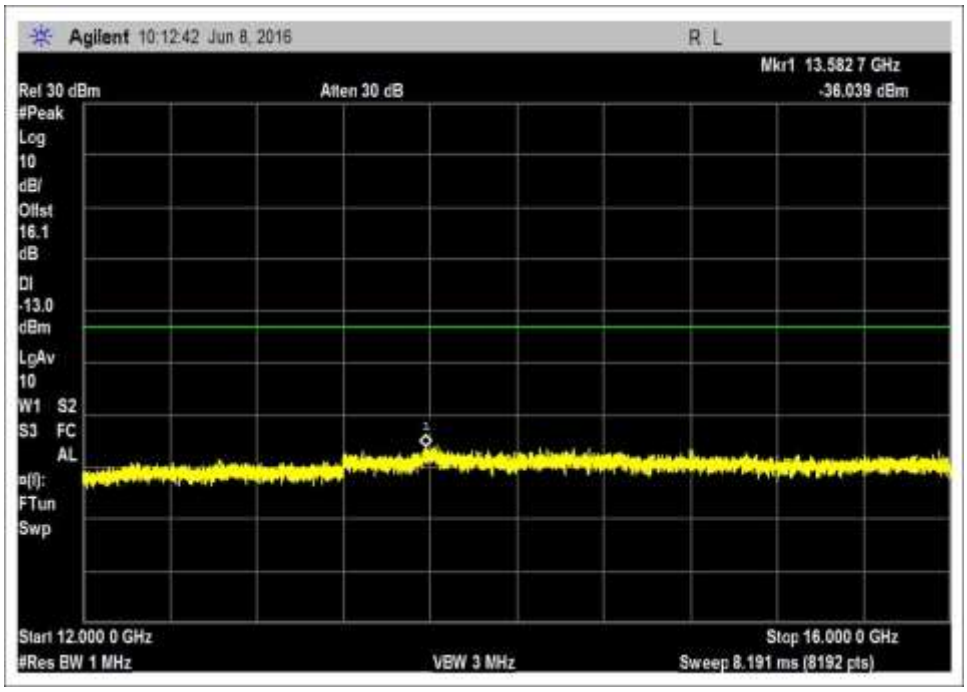
UL_1710-1755R1



UL_1710-1755R2



UL_1710-1755R3



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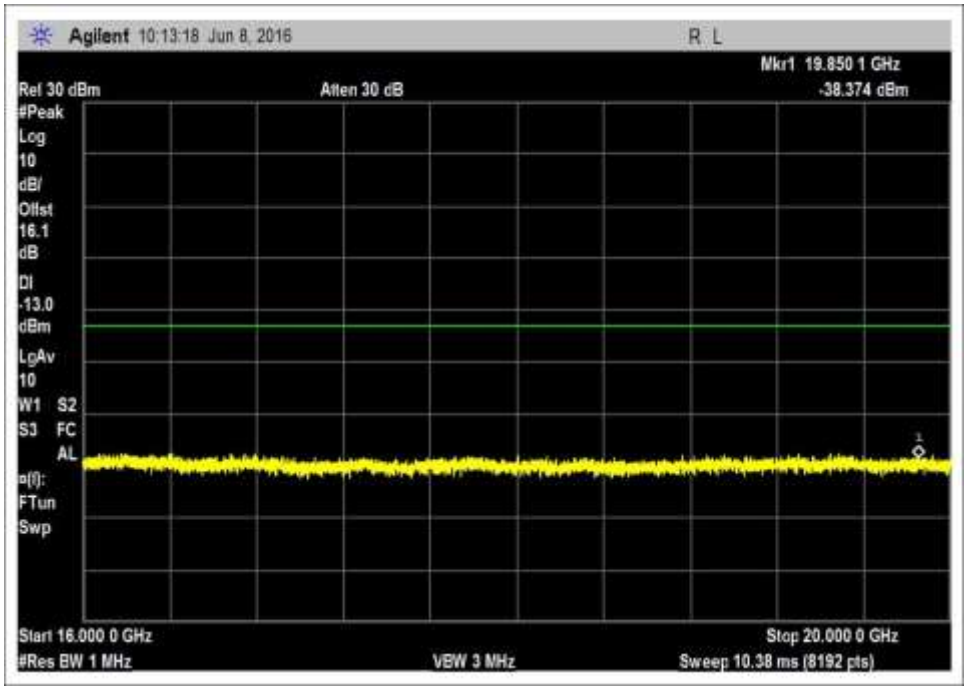
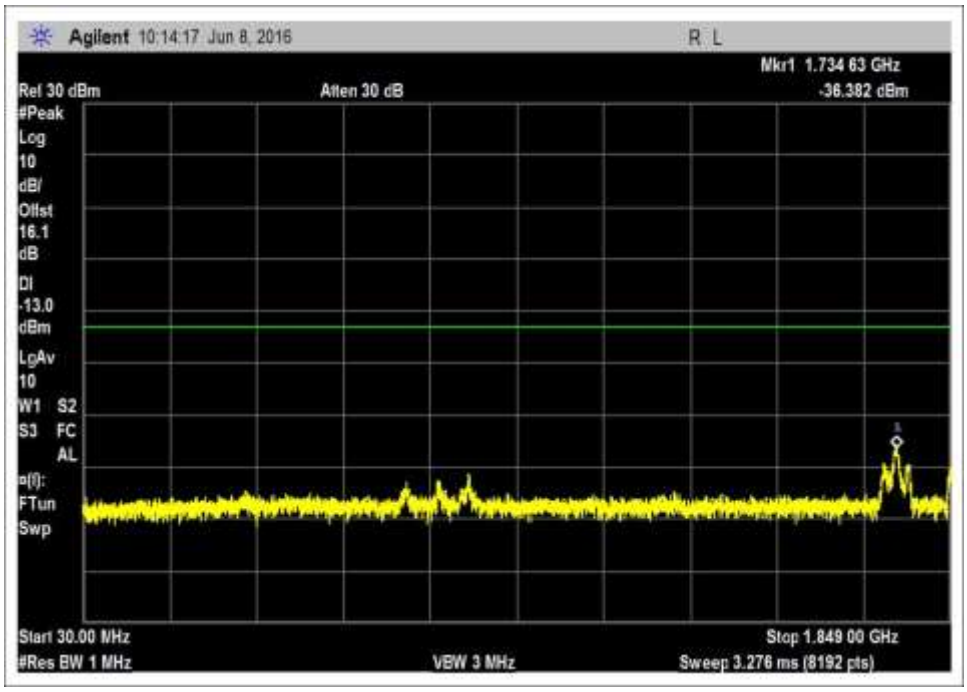
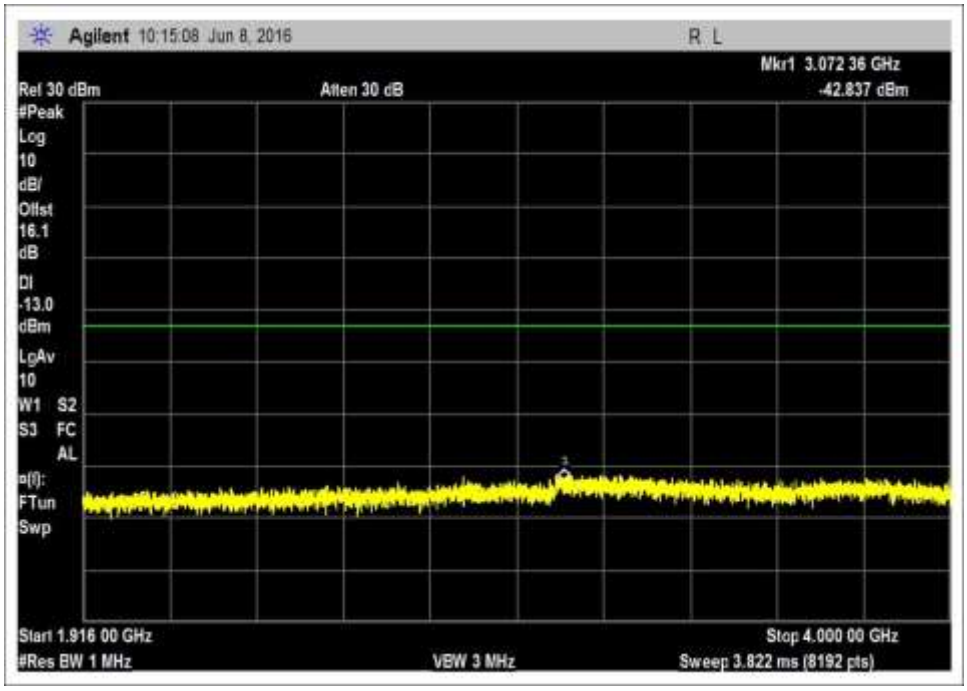


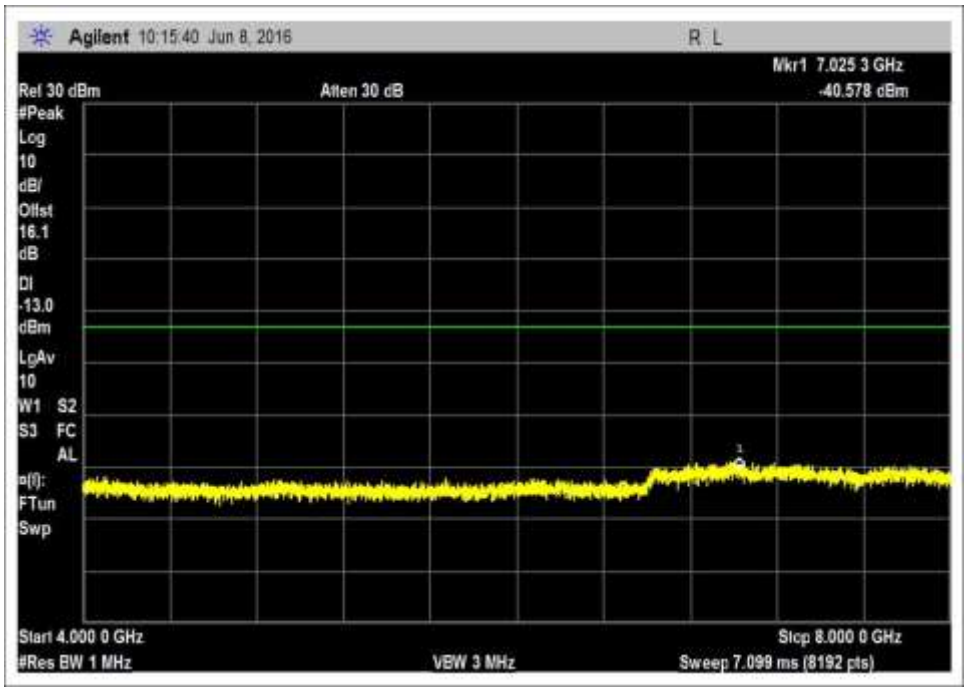
UL_1710-1755R5



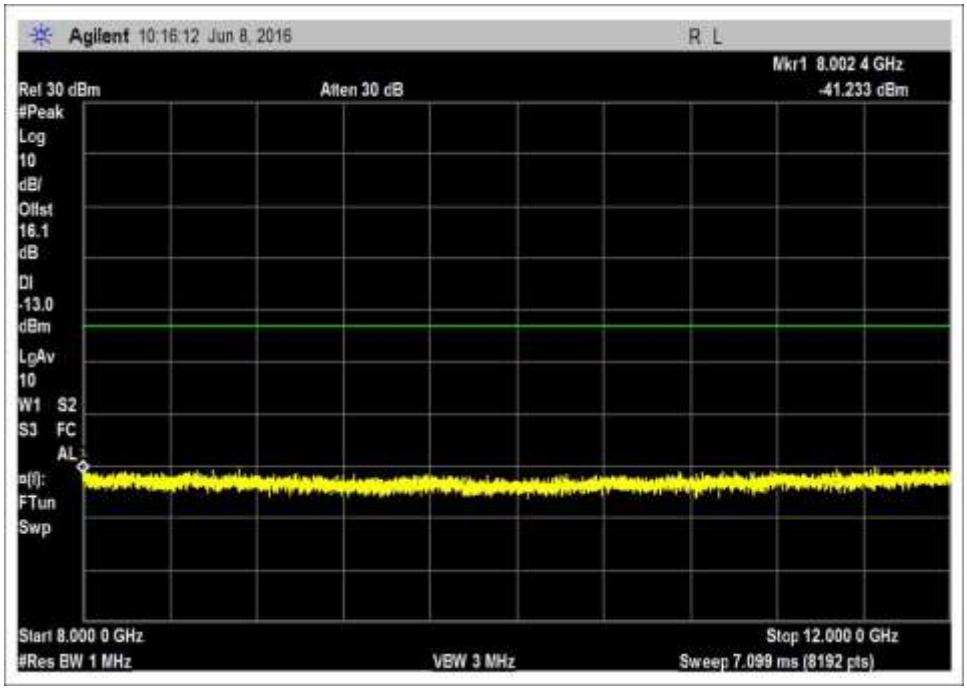
UL-1850-1915L



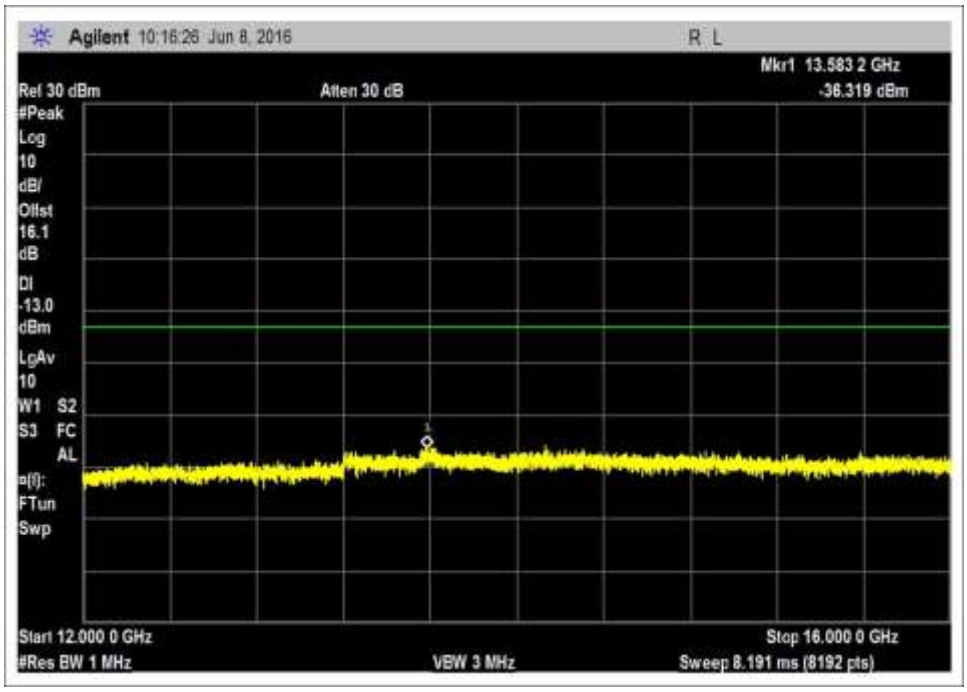
UL-1850-1915R1



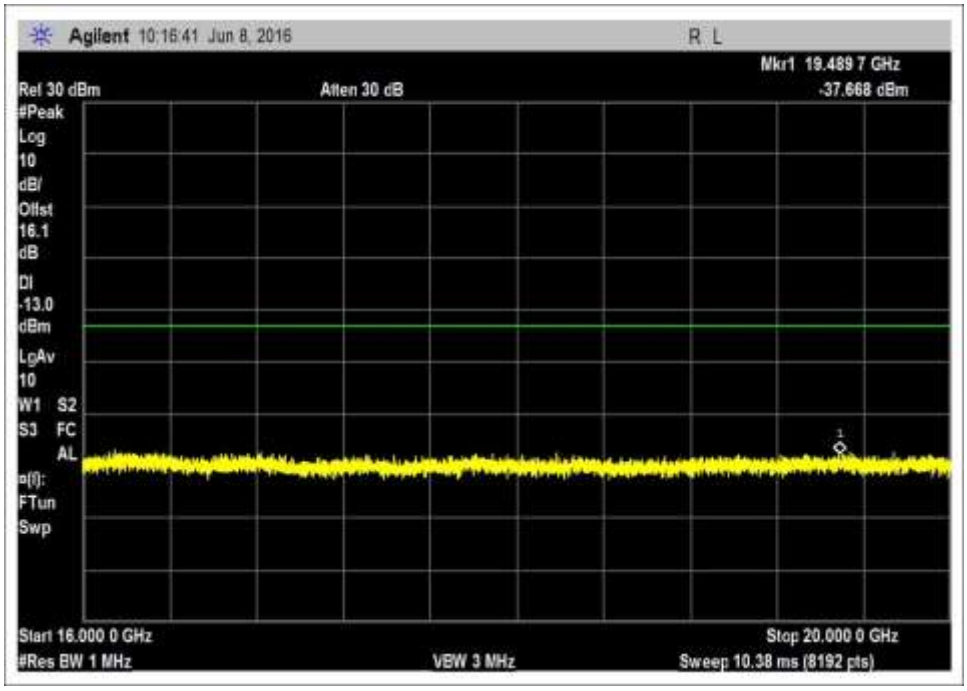
UL-1850-1915R2



UL-1850-1915R3

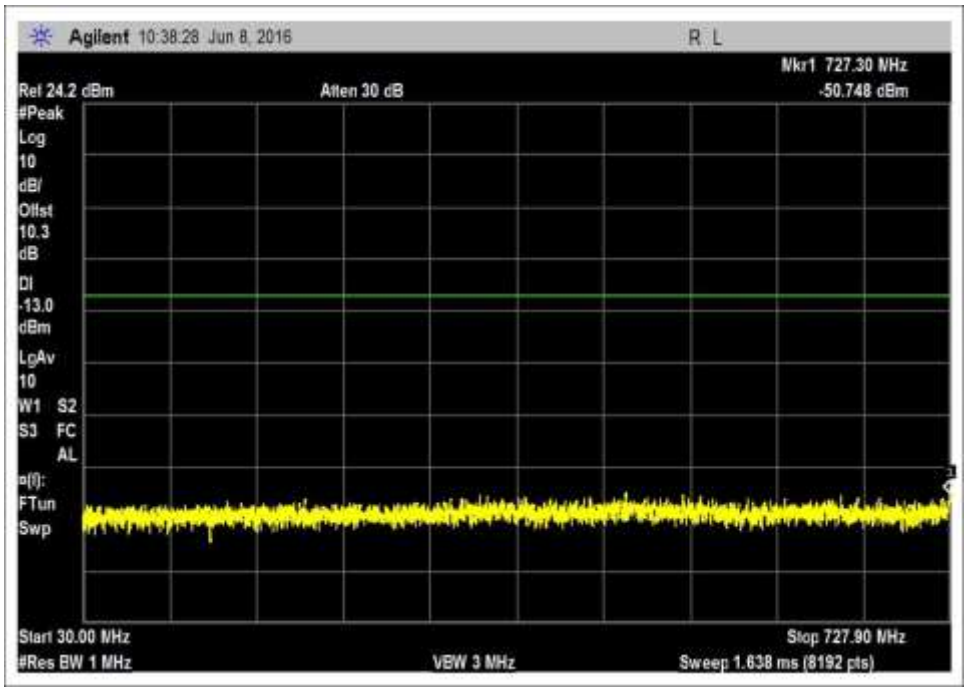


UL-1850-1915R4

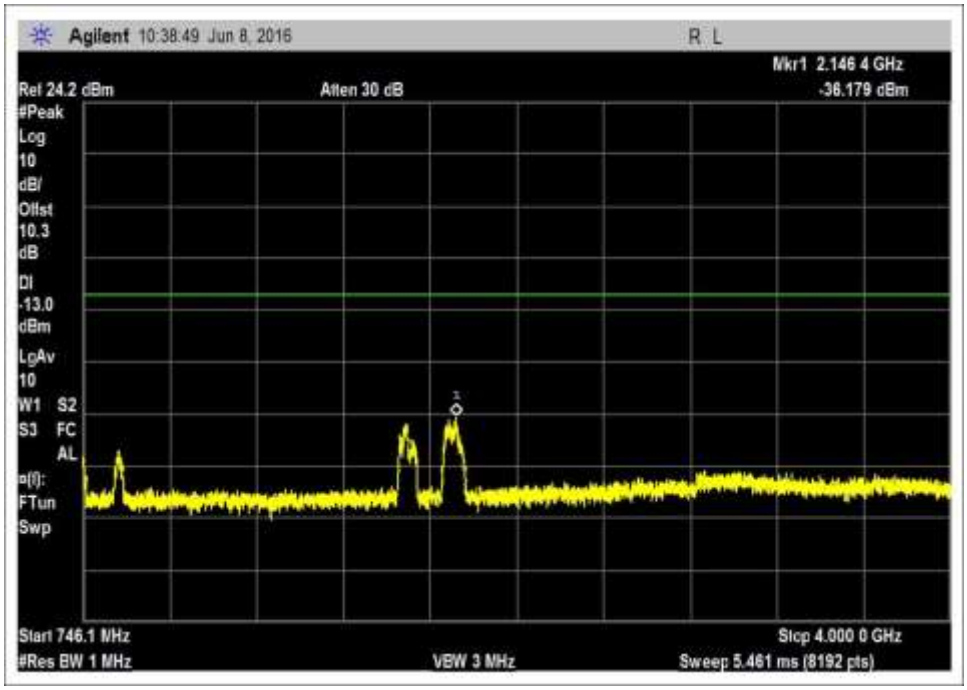


UL-1850-1915R5

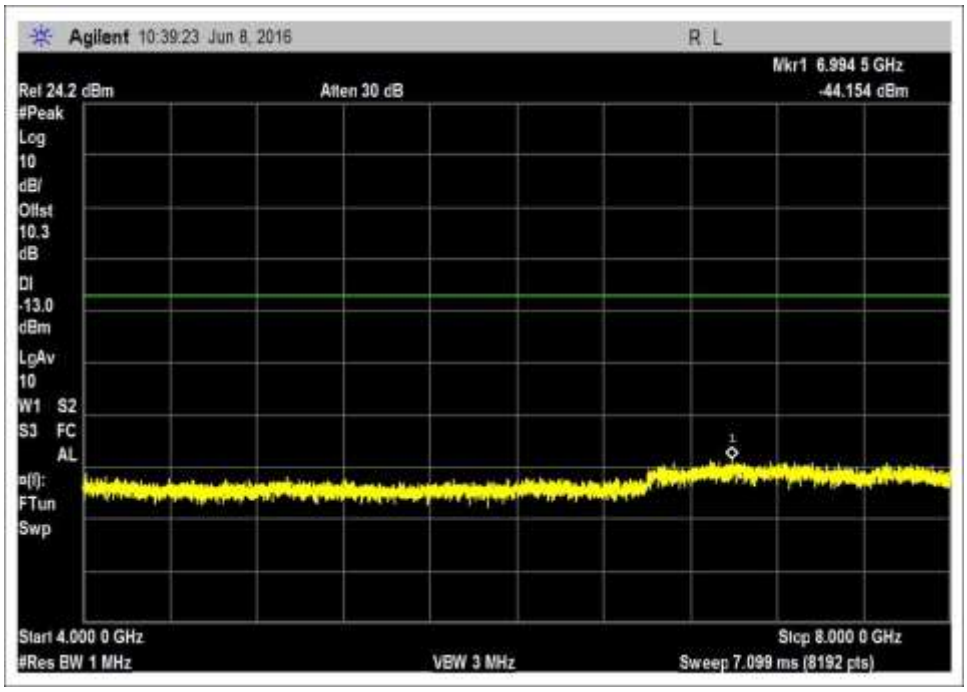
DL



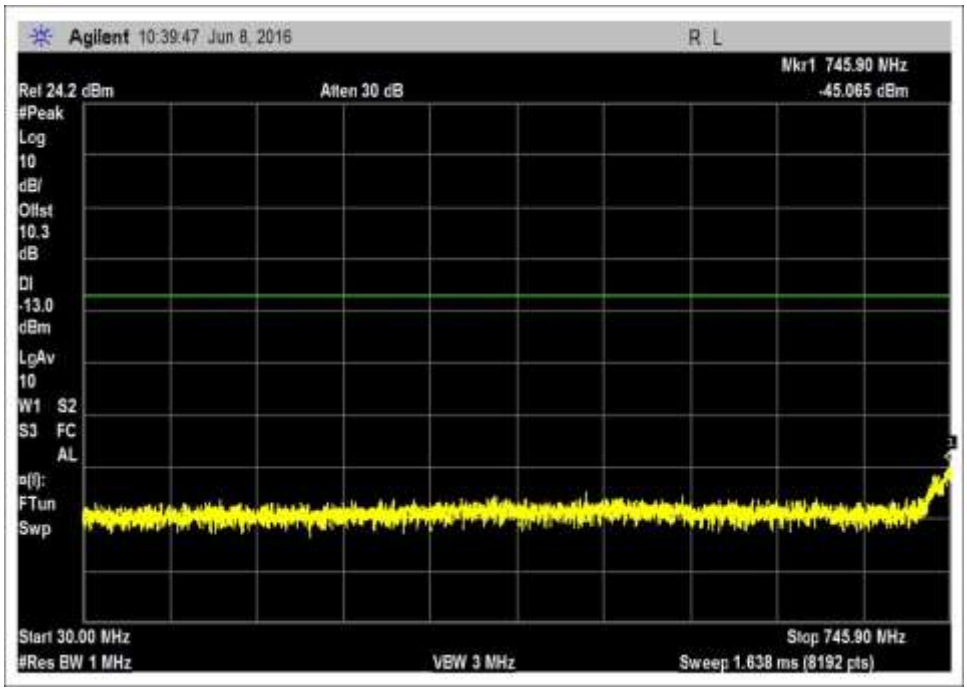
DL_728-746L



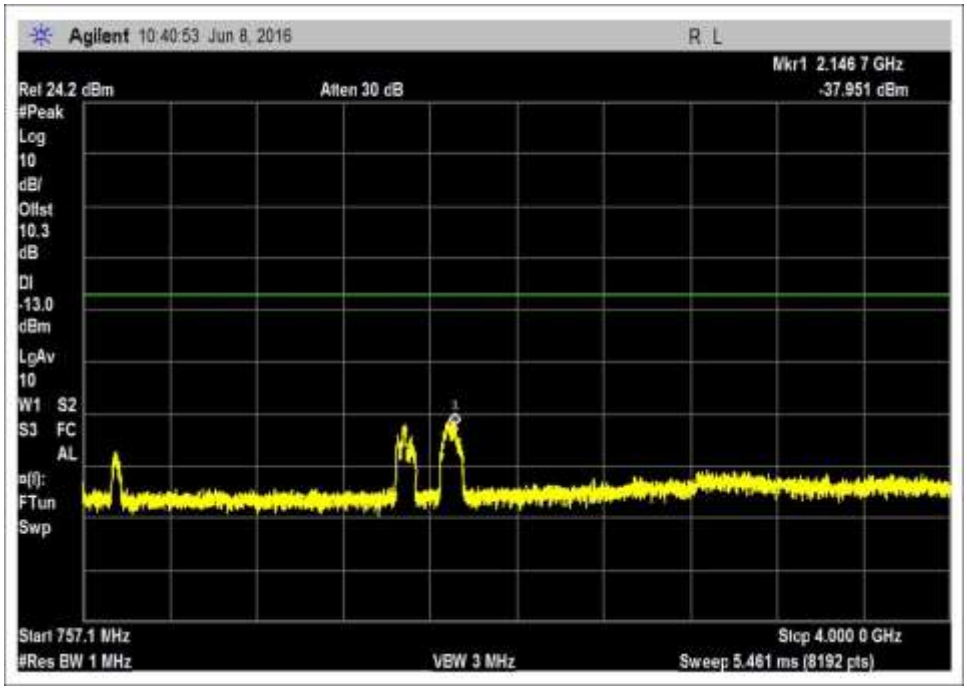
DL_728-746R1


Agilent 10:39:23 Jun 8, 2016
R L
Mkr1 6.994 5 GHz
Ref 24.2 dBm
Atten 30 dB
-44.154 dBm
#Peak
Log
10
dB/
Offst
10.3
dB
Dl
-13.0
dBm
LgAv
10
W1 S2
S3 FC
AL
p(f):
FTun
Swp
1
Start 4.000 0 GHz
Stop 8.000 0 GHz
#Res BW 1 MHz
VBW 3 MHz
Sweep 7.099 ms (8192 pts)

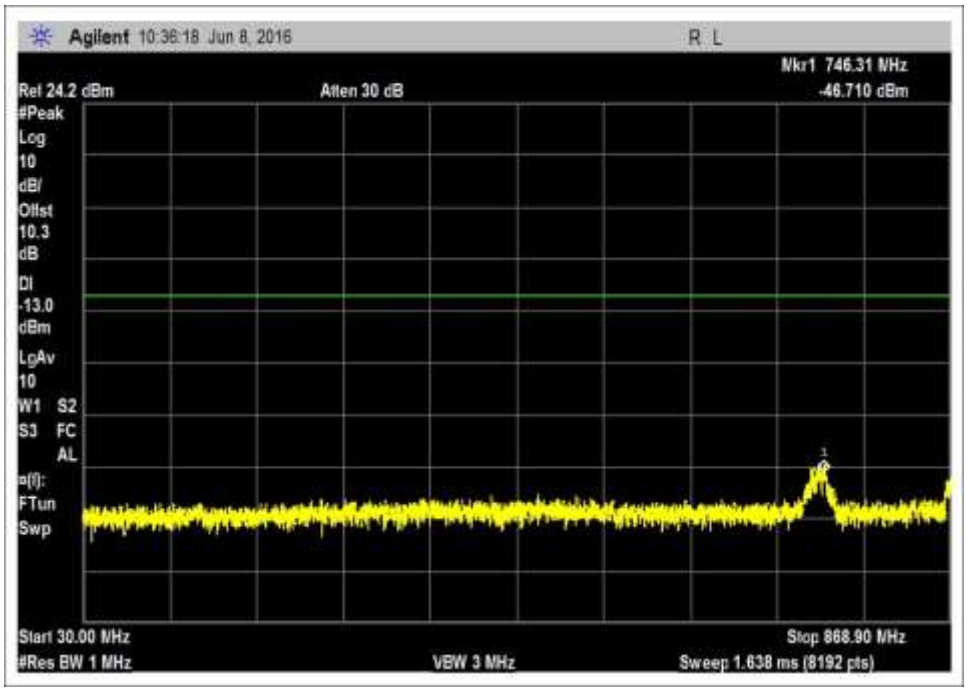
DL_728-746R2



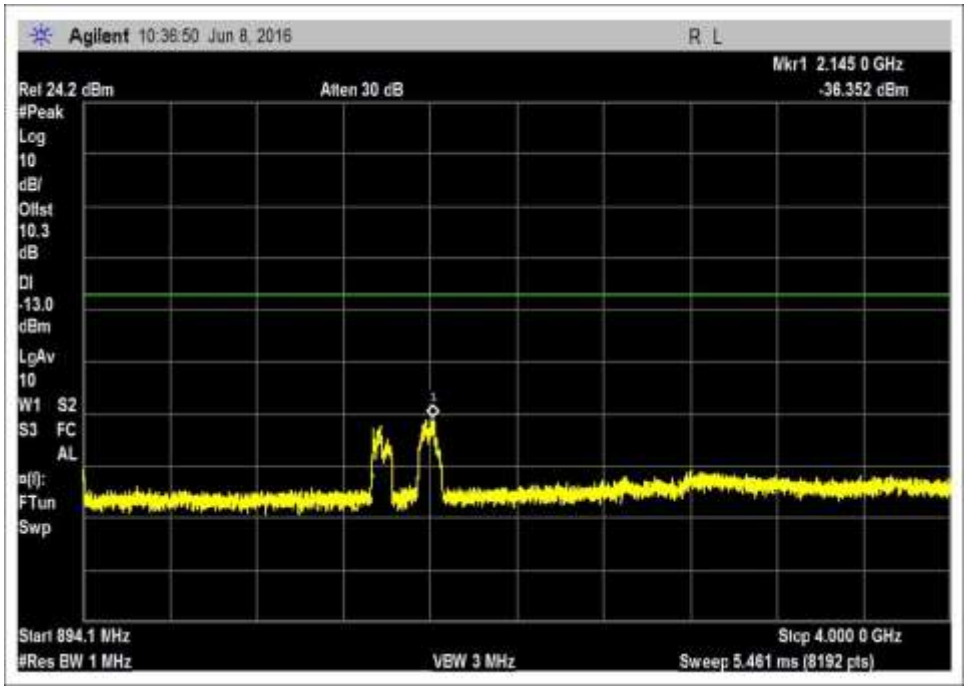
DL_746-757L



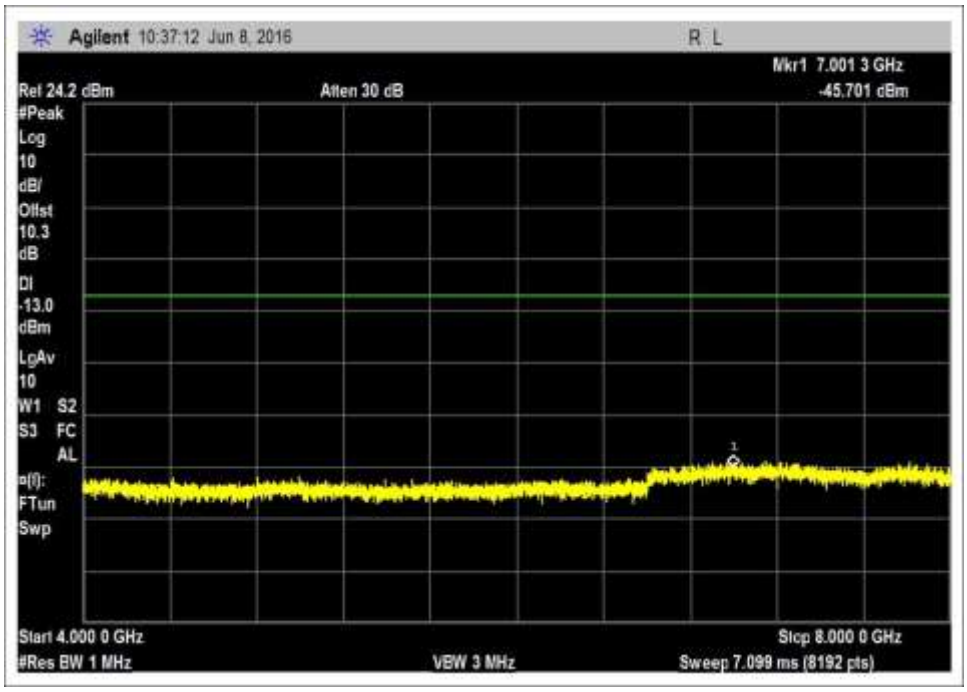
DL_746-757R2



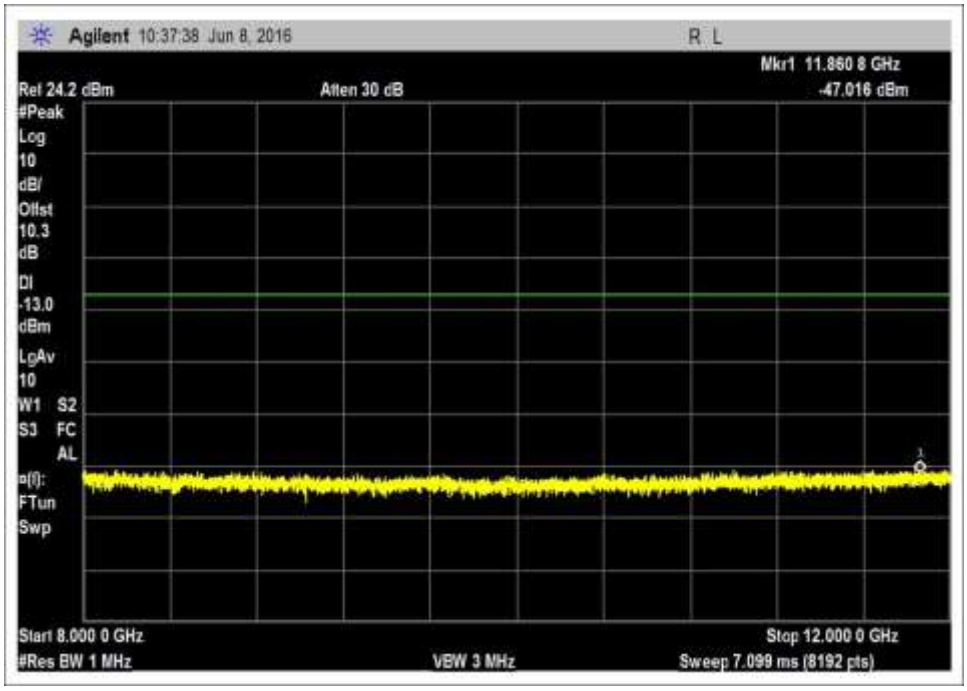
DL_869-894L



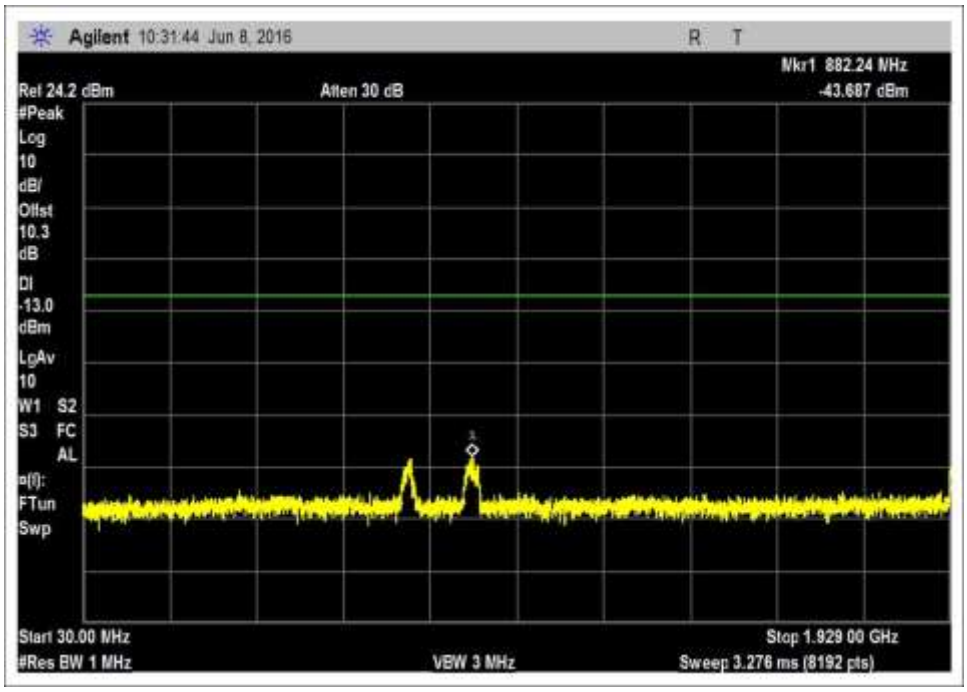
DL_869-894R1



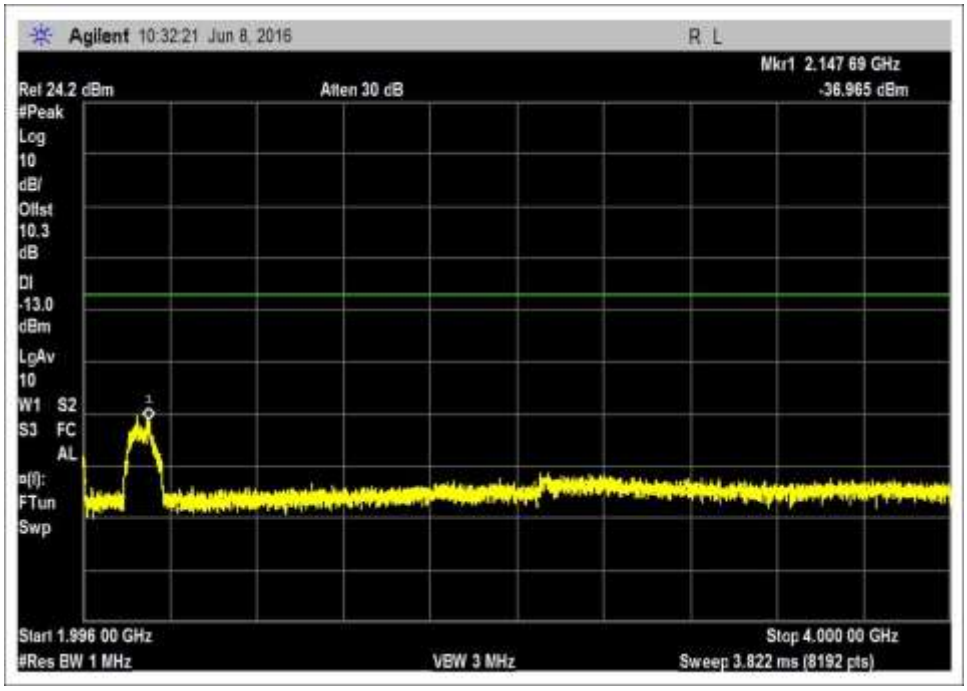
DL_869-894R2



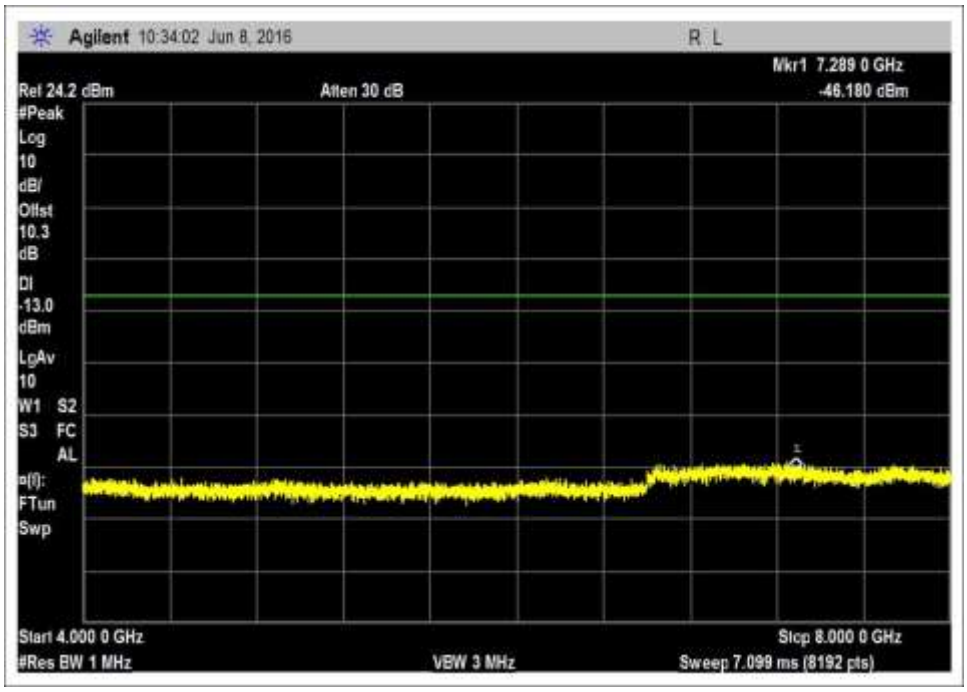
DL_869-894R3



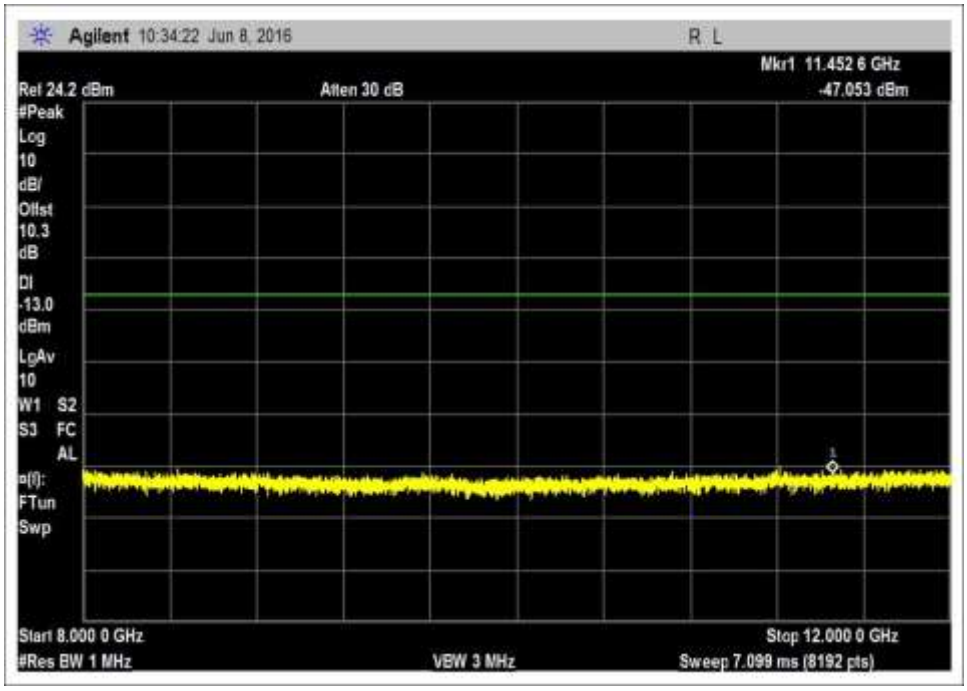
DL_1930-1995L



DL_1930-1995R1



DL_1930-1995R2



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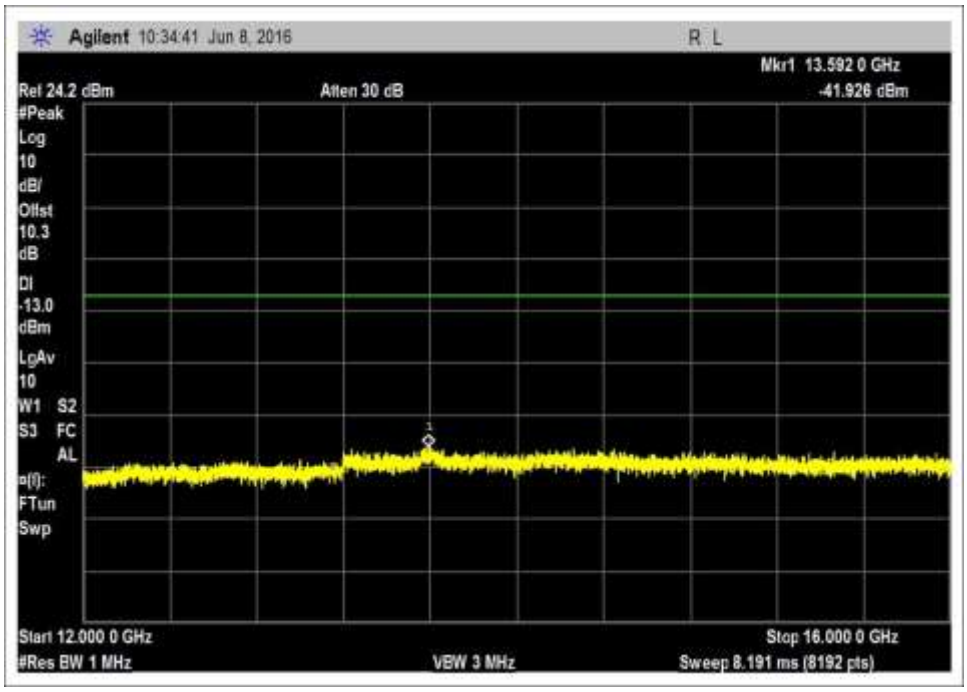
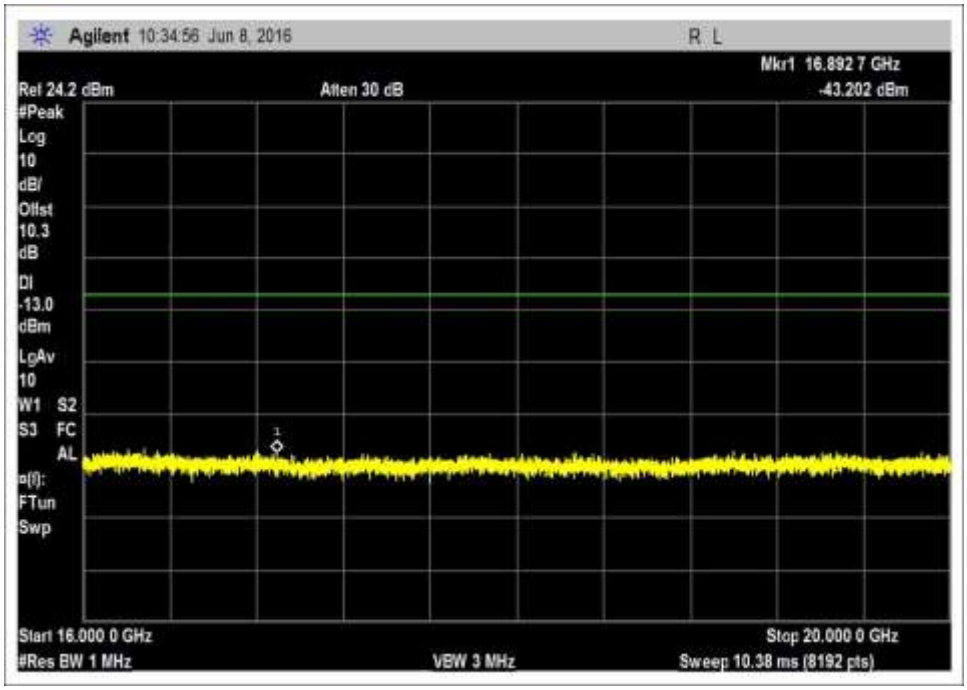
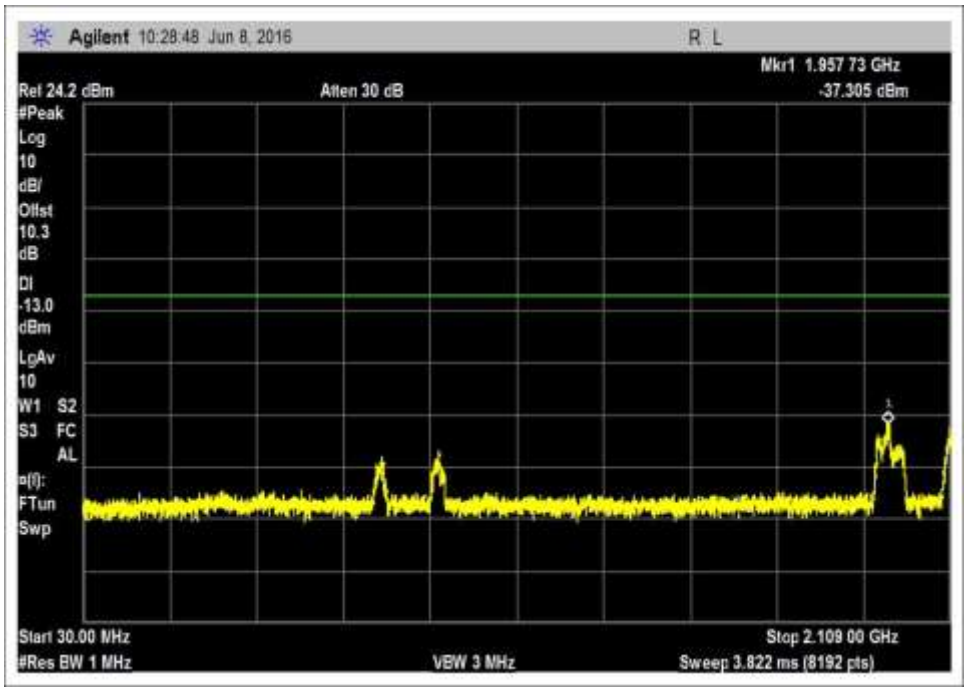


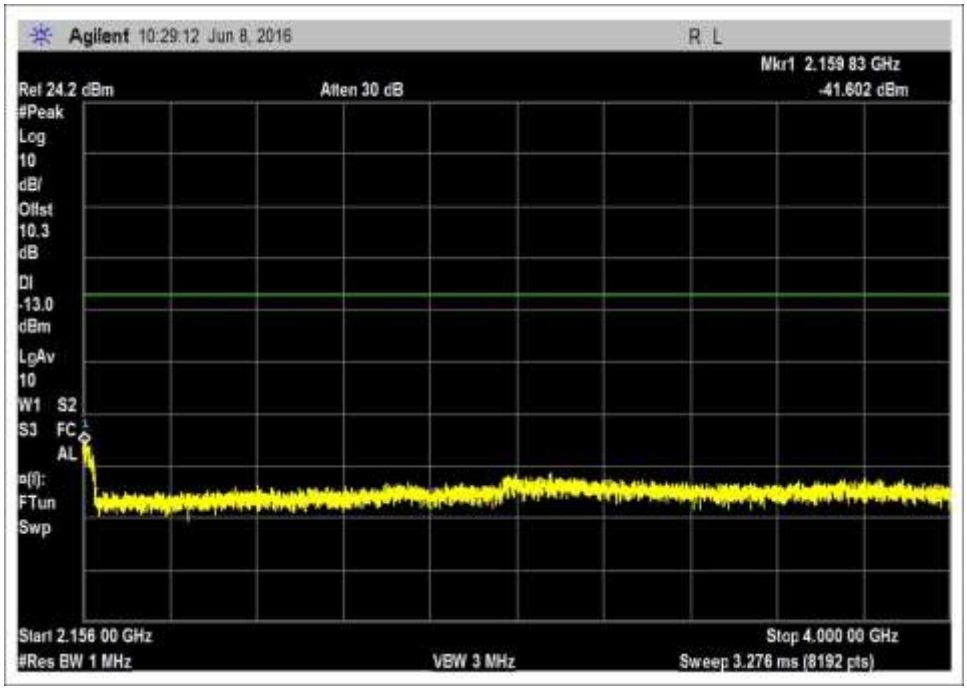
DL_1930-1995R4



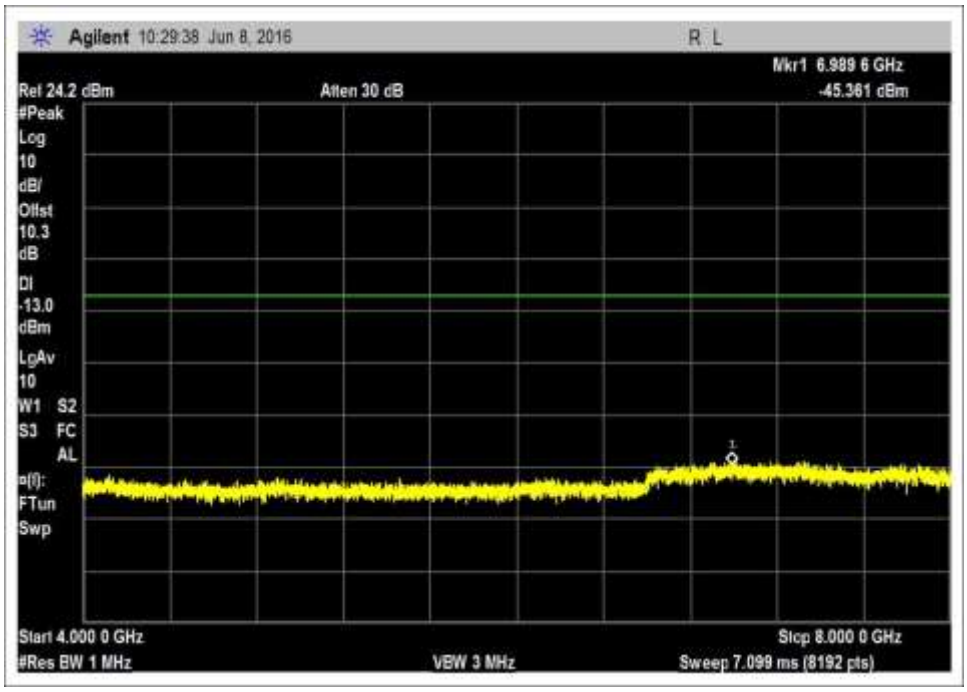
DL_1930-1995R5



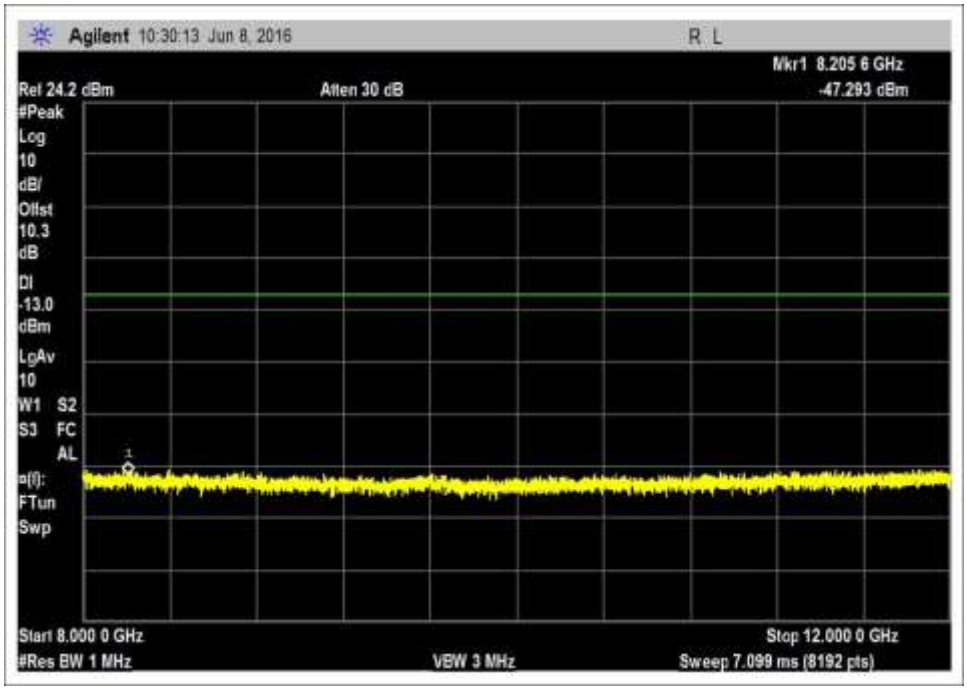
DL_2110-2155L



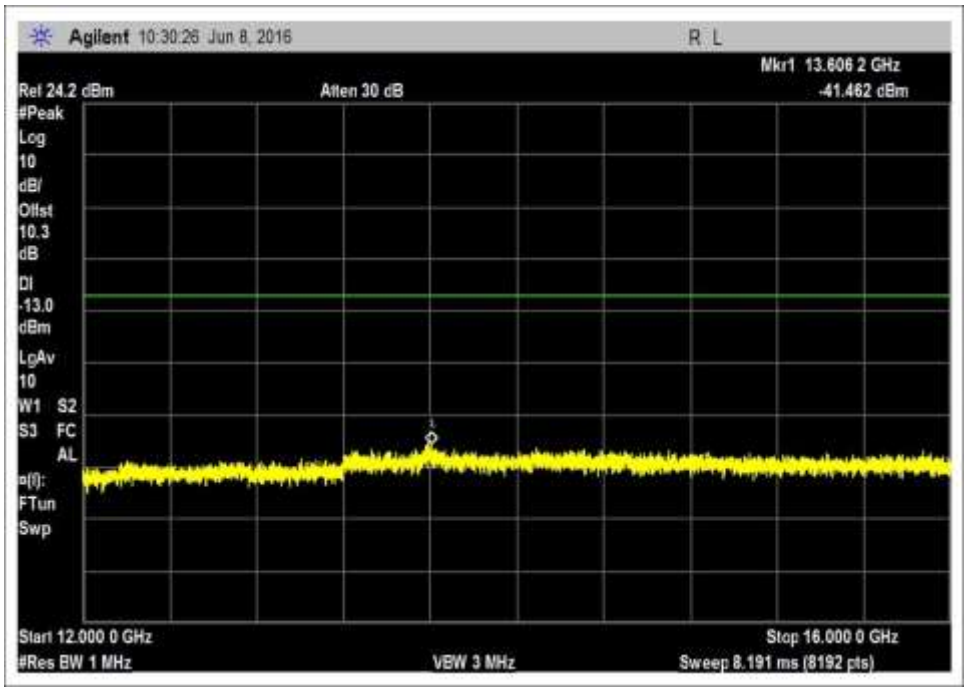
DL_2110-2155R1



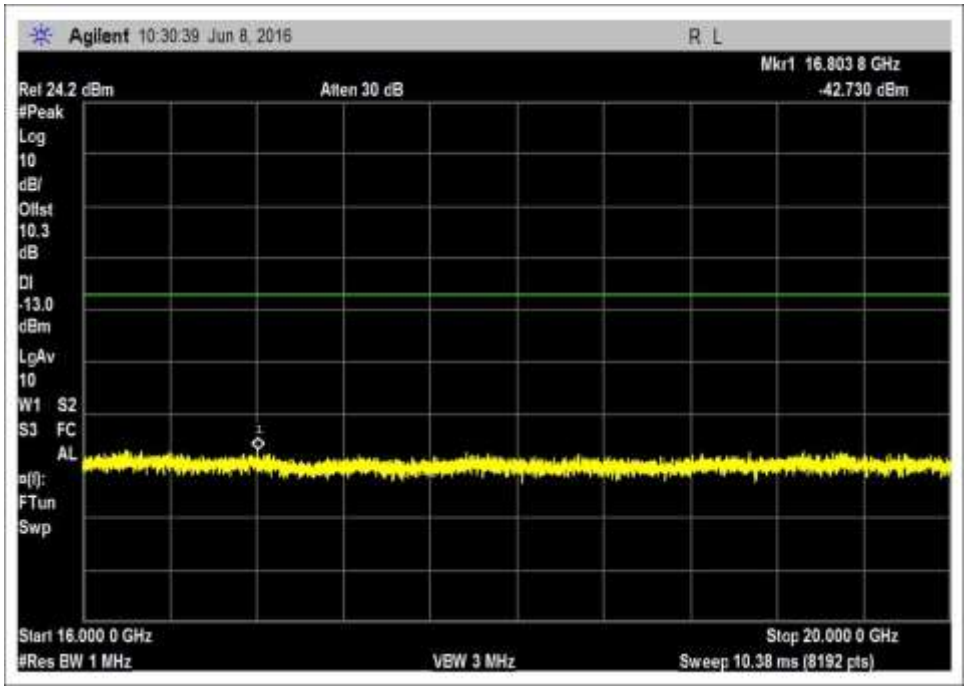
DL_2110-2155R2



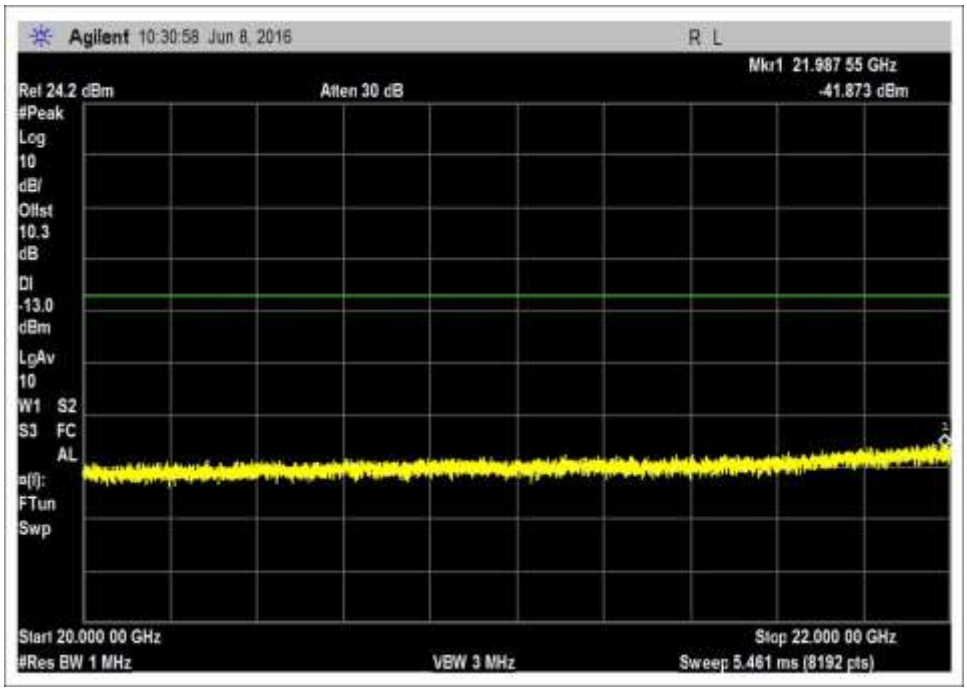
DL_2110-2155R3



DL_2110-2155R4



DL_2110-2155R5



DL_2110-2155R6

7.7 Noise limit

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170		
Customer:	Cellphone-Mate, Inc.		
Specification:	**7.7 Noise Limit (Maximum Transmitter Noise Power Level / Variable UL Noise Timing)**		
Work Order #:	**98648**	Date:	06/06/2016
Test Type:	**Conducted Emissions**	Time:	09:03:37
Tested by:	Daniel Bertran	Sequence#:	1
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is a Fixed Wideband Consumer Booster.
The EUT is placed on the test bench. Evaluation performed at the Outside (Donor) and Inside (Server) antenna port.
The EUT Server port is a type SMA connector and 50-ohm impedance.
The EUT Donor port is type F connector and 75-ohm impedance.
During testing there is a 75 ohm to 50 ohm matching pad connected to the EUT type F connector.
This matching pad has a 5.8dB correction factor.
Firmware: V1.0
Test environment conditions:
Temperature: 22.3°C
Relative Humidity: 40%
101.1 kPa

Part 22
UL: 824-849MHz
DL: 869-894MHz
Part 24
UL: 1850-1915MHz
DL: 1930-1995MHz
Part 27
UL: 1710-1755MHz, 698-716MHz, 776-787MHz
DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure: The test was performed in accordance with section 7.7 of the FCC document: 935210 D03 Wideband Consumer Signal Booster Measurement Guidance v04 Dated February 12, 2016.

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

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

Test Equipment:

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

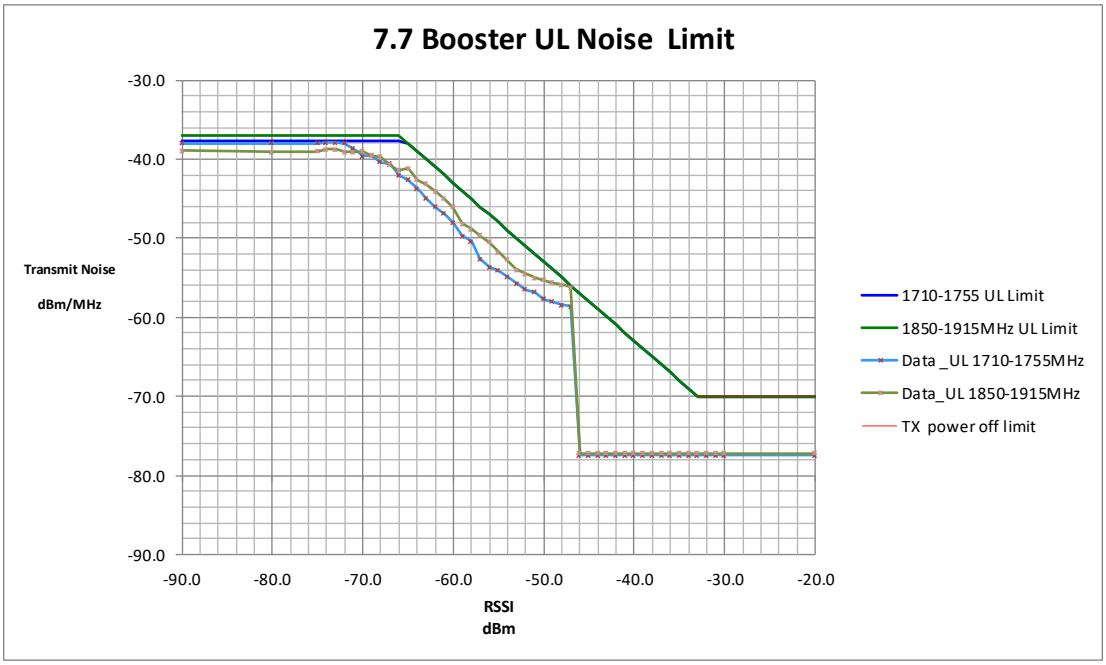
Summary of Results

7.7.1 Maximum transmitter noise power level

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

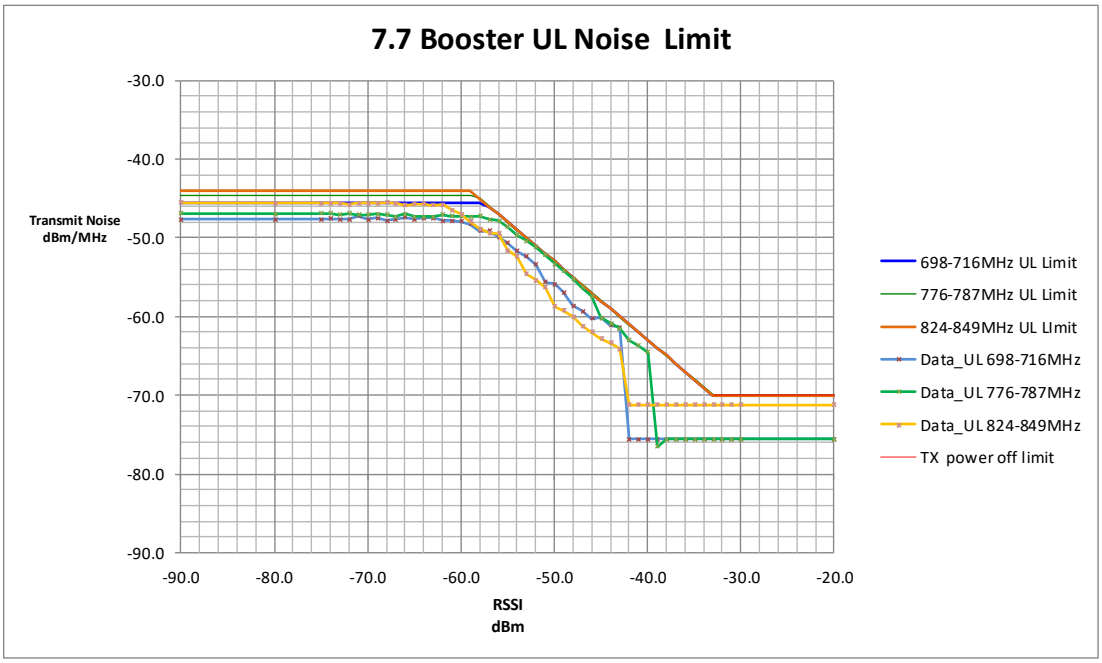
Maximum Noise Power			
Freq	Measured	Limit	Margin
MHz	dBm./MHz	dBm/MHz	
UL 1710-1755	-38.20	-37.7	-0.5
UL 1850-1915	-38.30	-37.0	-1.3
UL 824-849	-45.40	-44.1	-1.3
UL 698-716	-46.50	-45.5	-1.0
UL 776-787	-45.60	-44.6	-1.0
DL 2110-2155	-38.30	-37.7	-0.6
DL 1930-1995	-39.00	-37.0	-2.0
DL 869-894	-45.70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

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



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

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



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

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

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

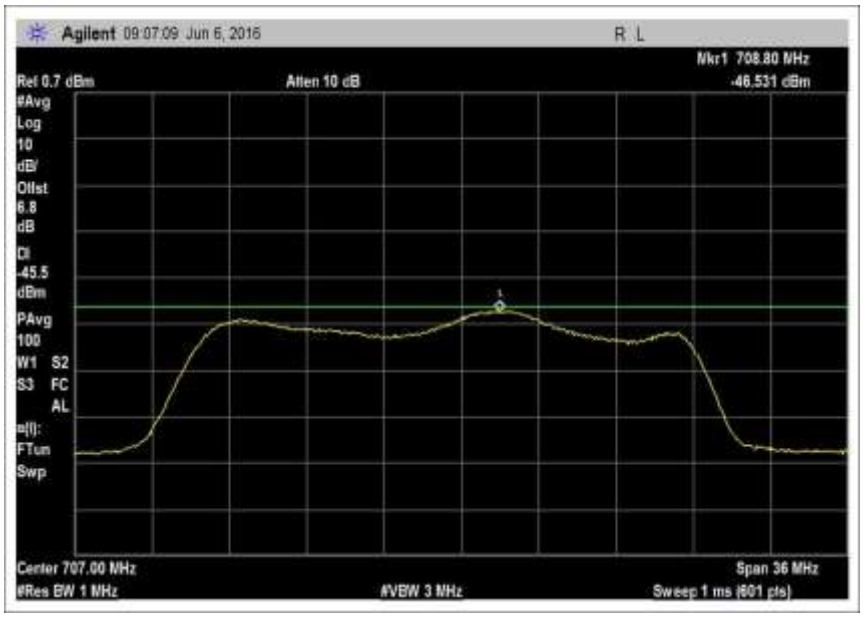
7.7.2 Variable uplink noise timing

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

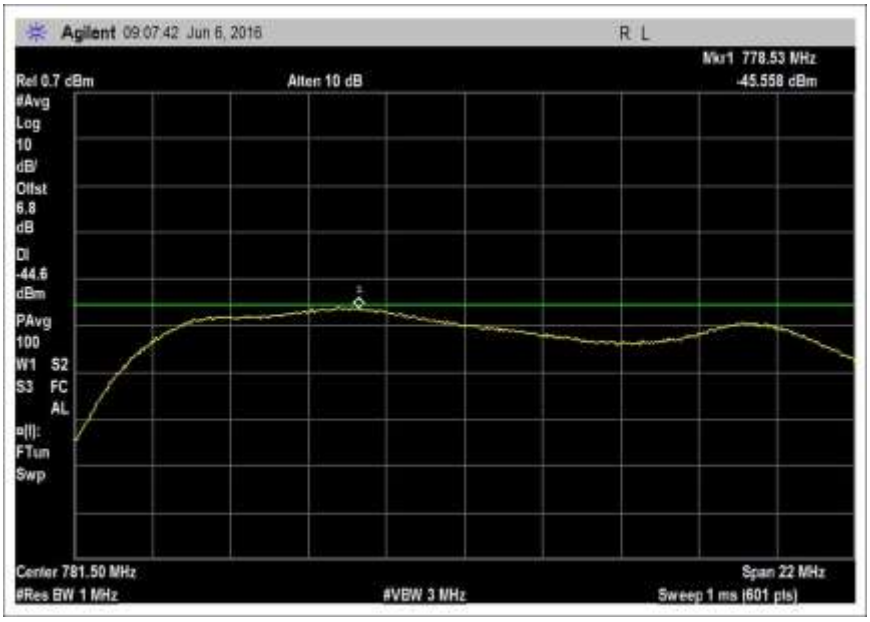
7.7.1 Maximum Transmitter Noise Power Level

Plots

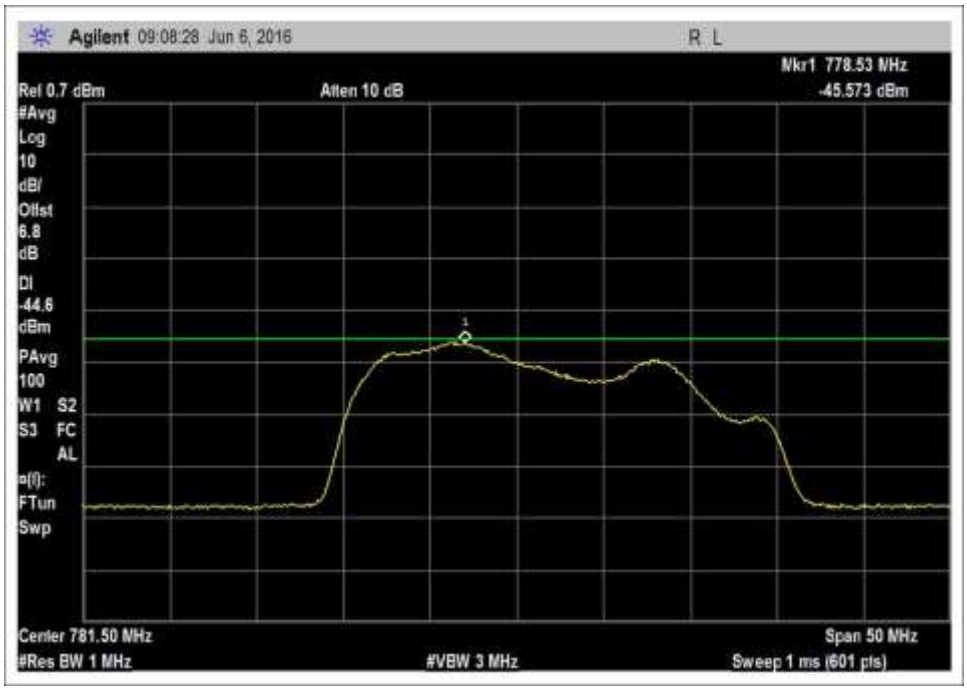
a – g Noise 50, UL



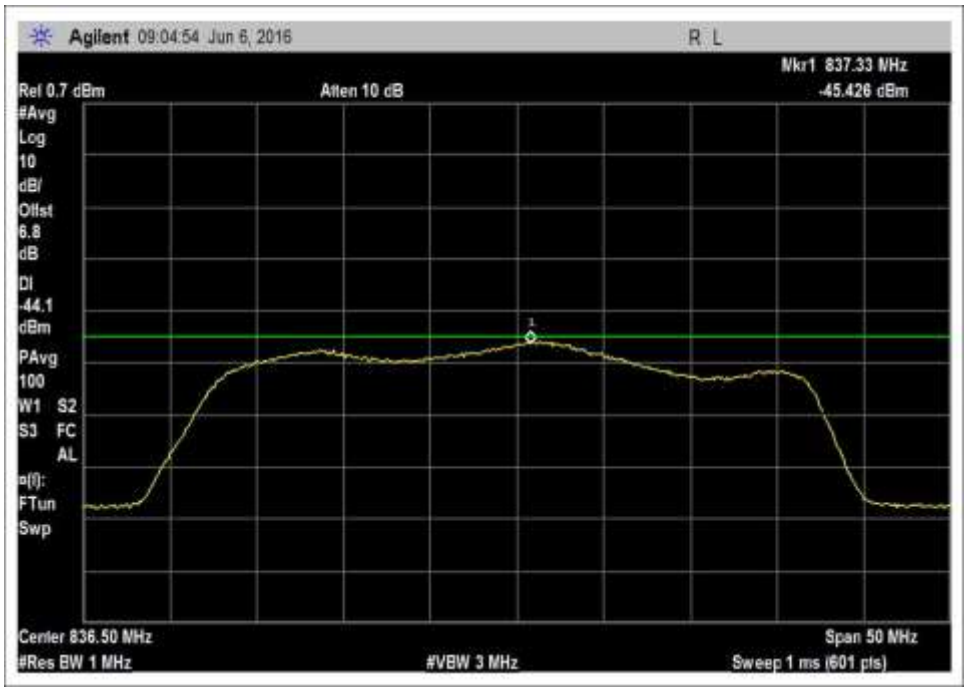
7.7_Noise_UL_698-716MHz



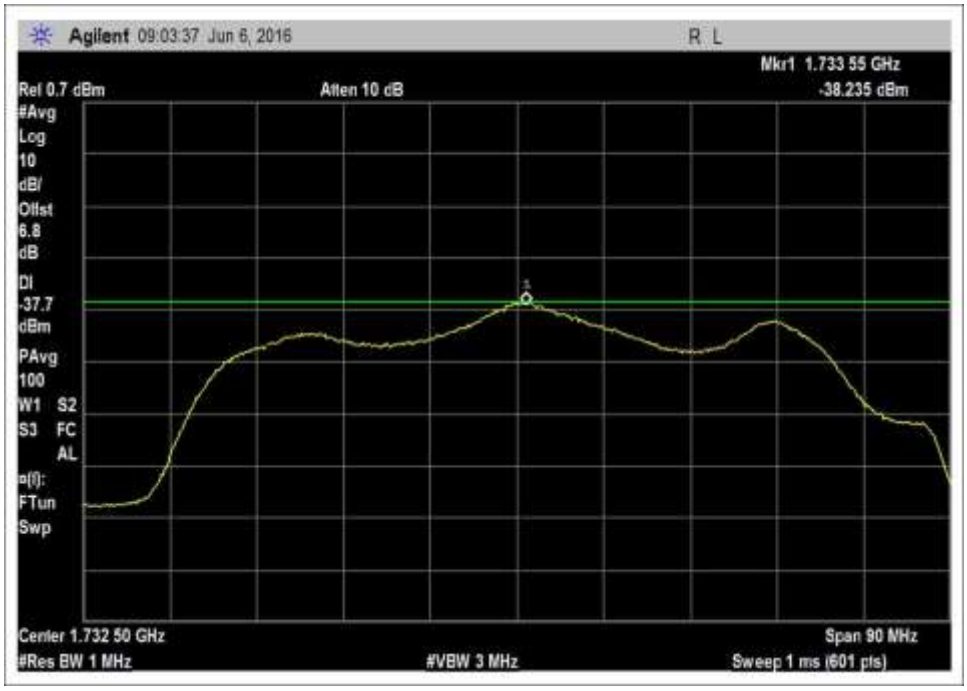
7.7_Noise_UL_776-787MHz



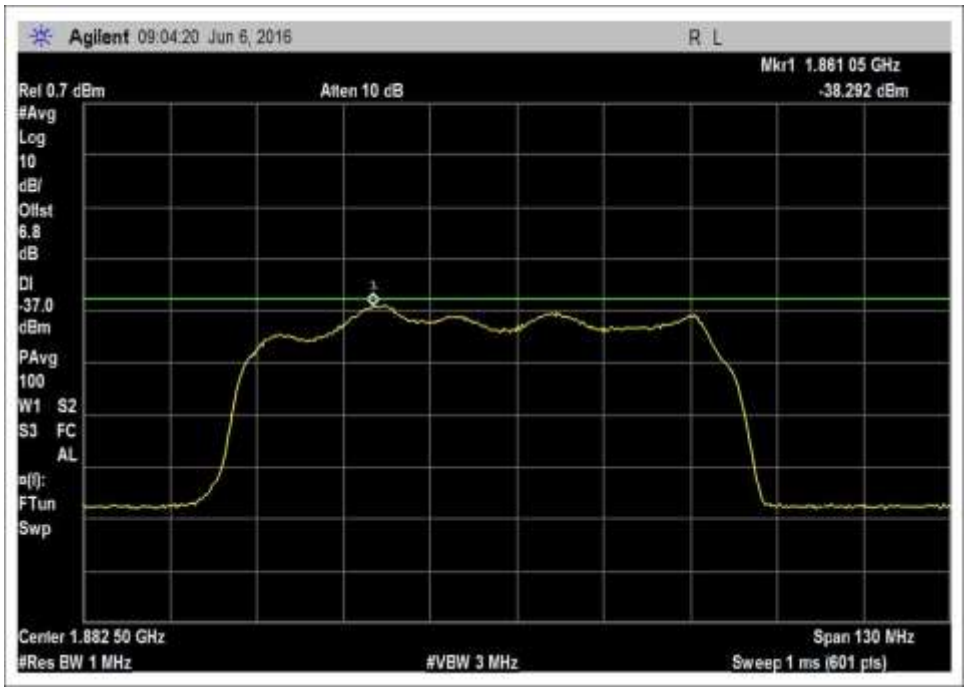
7.7_Noise_UL_776-787MHz-Zoom



7.7_Noise_UL_824-849MHz



7.7_Noise_UL_1710-1755MHz



7.7_Noise_UL_1850-1915MHz