Cellphone-Mate, Inc.

TEST REPORT FOR

Distributed Antenna System/ Booster
Model: Force3 PSB

Tested To The Following Standards:

FCC Part 90I

Report No.: 96794-7
Volume 2 of 2

Date of issue: May 14, 2015

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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SUMMARY OF RESULTS

Standard / Specification: FCC Part(s) 2 / 90I

Test Procedure/Method	Description	Modifications	Results
2.1051 / Part 90 § 219(e)(3)	Conducted Spurious Emissions	NA	Pass
2.1049 / 2.1051 / Part 90 §219(e)	Intermodulation	NA	Pass
2.1046 / Part 90 § 219(e)(1)	Output Power	NA	Pass
Part 90 § 219(e)(2)	Noise Figure	NA	Pass
2.1053 / Part 90 § 219(e)(3)	Radiated Spurious Emissions	NA	Pass

NA = Not applicable

Volume 1 contains the following Sections:
2.1049 / Part 90 § 219(a) - Occupied Bandwidth
Part 90 § 219(b) / 90.531(f) and (g) - Band Verification
2.1047 / 2.1051 / Part 90 § 219(b) / 210(c)(h)(g) and (j) - Emissions Mask

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 for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Distributed Antenna System/ Booster
Manuf: Cellphone-Mate, Inc.
Model: Force3 PSB
Serial: 201502PS000001

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

FCC PART(S) 2 / 90I

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) requirements for licensed devices.

47 CFR Part 90: Private Land Mobile Radio Services

2.1051 / Part 90 § 219(e)(3) Conducted Spurious Emissions

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**Conducted Spurious Emissions, 47 CFR §90.219(e)(3)**		
Work Order #:	**96794**	Date:	4/15/2015
Test Type:	**Conducted Emissions**	Time:	10:40:12
Equipment:	**Distributed Antenna System/Booster**	Sequence#:	1
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	Daniel Bertran
Model:	Force3 PSB		120V 60Hz
S/N:	201502PS000001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06131	Attenuator	18N20W-20	2/27/2014	2/27/2016
	ANP05713	Attenuator	PE7015-20	3/24/2015	3/24/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Distributed Antenna System/Booster *	Cellphone-Mate, Inc.	Force3 PSB	201502PS000001

Support Devices:

Function	Manufacturer	Model #	S/N
AC Adapter	Adapter Tech.	STD-1805	NA
Signal Generator	Agilent	E4433B	US40052164
Signal Generator	Agilent	E4438C	MY42082260

Test Conditions / Notes:

The EUT is placed on the test bench. Evaluation performed at the Outside and Inside antenna port.

UL: 788-798, 799-805, 806-817, 817-824, 896-901 MHz
DL: 758-768, 769-775, 851-862, 862-869, 935-940 MHz

TXFreq = > Frequency of low/mid/high channels of each band listed above.
Modulation=> CW

Frequency range of measurement = 9 kHz- 10GHz.
30 MHz - 1000MHz -> RBW=120 kHz VBW=120 kHz
1000MHz-10000MHz -> RBW=1 MHz VBW=1 MHz

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

Test environment conditions: 20°C, 40% Relative Humidity, 102.5kPa

Test procedure: The test was performed in accordance with 47CFR, Section 2.1051 and Appendix D3 of the FCC document: 935210 D02 Signal Booster Certification Requirements v02r01 Dated July 24, 2014.

Software: SC_S1_Public_V3.0
Firmware: V1.0

No emissions above 1GHz were found within 20dB of the limit line, including the 1559-1610 MHz band in accordance with 90.543 (f).
No emissions below 1GHz were found within 20dB of the limit line, excluding the fundamental frequency.

§90.543 Emission limitations.

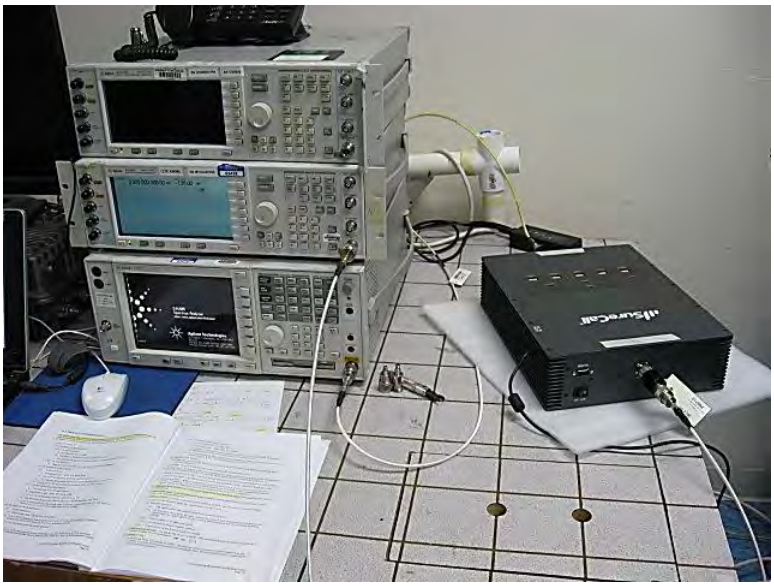
(c) Out-of-band emission limit. On any frequency outside of the frequency ranges covered by the ACP tables in this section, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics 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.

Conducted Spurious Emissions - Summary of Results

Pass: No data provided since all emissions above and below 1GHz were found within 20dB of the limit line.

Test Setup Photo(s)



2.1049 / 2.1051 / Part 90 § 219(e) Intermodulation

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Cellphone-Mate, Inc.**
Specification: **Intermodulation, Part 90 Section 219 (e)**
Work Order #: **96794** Date: 4/15/2015
Test Type: **Conducted Emissions** Time: 10:40:12
Equipment: **Distributed Antenna System/Booster** Sequence#: 1
Manufacturer: Cellphone-Mate, Inc. Tested By: Daniel Bertran
Model: Force3 PSB 120V 60Hz
S/N: 201502PS000001

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06131	Attenuator	18N20W-20	2/27/2014	2/27/2016
	ANP05713	Attenuator	PE7015-20	3/24/2015	3/24/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06711	Cable	32022-29094K-29094K-132TC	11/21/2014	11/21/2014
	AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015
	C00087	Combiner	44000	010914	1/9/2016
	AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Distributed Antenna System/Booster *	Cellphone-Mate, Inc.	Force3 PSB	201502PS000001

Support Devices:

Function	Manufacturer	Model #	S/N
AC Adapter	Adapter Tech.	STD-1805	NA
Signal Generator	Agilent	E4433B	US40052164
Signal Generator	Agilent	E4438C	MY42082260

Test Conditions / Notes:

The EUT is placed on the test bench. Evaluation performed at the Outside and Inside antenna port.
UL: 788-798, 799-805, 806-817, 817-824, 896-901 MHz; DL: 758-768, 769-775, 851-862, 862-869, 935-940 MHz
All adjustable settings on the test sample are set at max.
Test environment conditions: 20°C, 40% Relative Humidity, 102.5kPa
The EUT is connected to the SA via a 20dB attenuator and two signal generators are used to inject two CWS signals to the EUT via an RF combiner.
Signal generator A is configured for CW operation at the low frequency of appropriate frequency band. Signal generator B is configured for CW operation tuned 600kHz above the low frequency band. The signal generator amplitudes are set so that the power from each into RF combiner is equivalent. The signal generator's amplitudes are increased equally until just before the EUT AGC threshold (0.5dB below) and all intermodulation products are measured with spectrum analyzer. The EUT is tested at the AGC level and AGC+10dB to show AGC operation, worst case results are shown. The same test is repeated for high frequency of appropriate frequency band with signal generator B configured for CW operation tuned 600kHz below the high frequency band. Same test is repeated for all uplink and downlink operational bands. Software: SC_S1_Public_V3.0; Firmware: V1.0

Intermodulation - Summary of Results

Pass: As summarized in tables and plots below, all intermodulation products are measured below -13dBm. Worst case results are reported for intermodulation test, done with and without AGC circuitry activated.

900MHz Interleaved and Public Safety 700MHz/800MHz bands

Band	Link	Channel	Frequency (MHz)	PreAGC (dBm)	AGC+10dB (dBm)	Margin (dB)
700M	Uplink	L	788	-25.02	-17.18	-4.18
700M	Uplink	H	798	-21.61	-13.70	-0.70
700M	Uplink	L	799	-21.11	-13.94	-0.94
700M	Uplink	H	805	-21.29	-21.91	-8.29
700M	Downlink	L	758	-19.05	-18.71	-5.71
700M	Downlink	H	768	-18.53	-18.24	-5.24
700M	Downlink	L	769	-17.92	-17.92	-4.92
700M	Downlink	H	775	-22.31	-20.65	-7.65
800M	Uplink	L	806	-21.72	-17.21	-4.21
800M	Uplink	H	817	-21.63	-17.67	-4.67
800M	Downlink	L	851	-21.99	-17.97	-4.97
800M	Downlink	H	862	-22.94	-20.47	-7.47
900M	Uplink	L	896	-19.55	-18.76	-5.76
900M	Uplink	H	901	-15.67	-15.35	-2.35
900M	Downlink	L	935	-19.32	-16.85	-3.85
900M	Downlink	H	940	-17.62	-15.84	-2.84

ESMR band

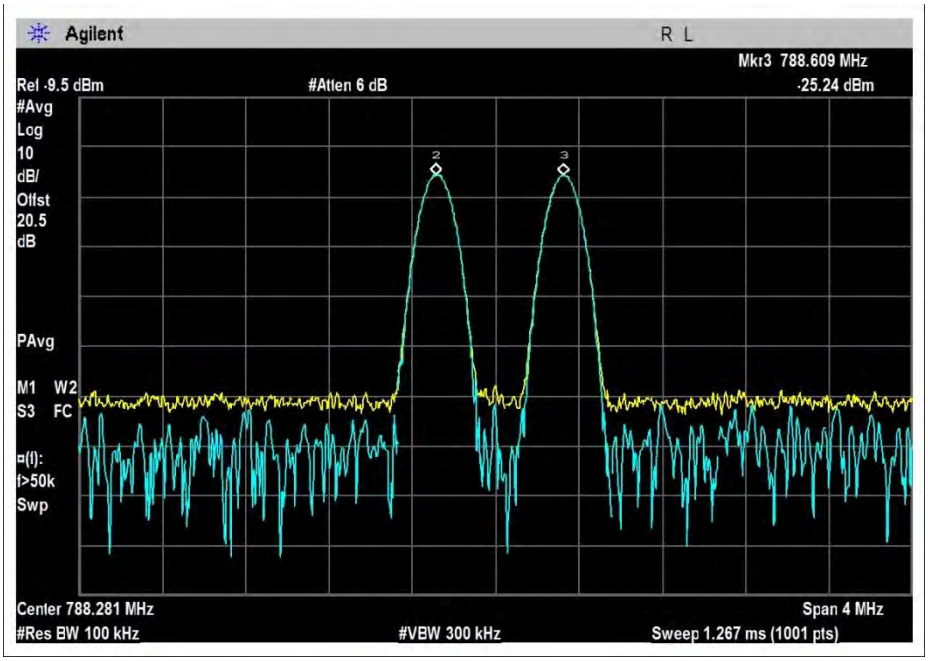
Band	Link	Channel	Frequency (MHz)	PreAGC	AGC+10dB	Column1
800M	Uplink	L	817	-23.55	-16.26	-3.26
800M	Uplink	H	824	-19.09	-14.76	-1.76
800M	Downlink	L	862	-22.48	-20.41	-7.41
800M	Downlink	H	869	-17.91	-16.48	-3.48

*There are no specific antennas and cables supplied with the EUT. Cable loss and antenna gain must not exceed the power margin in dB.

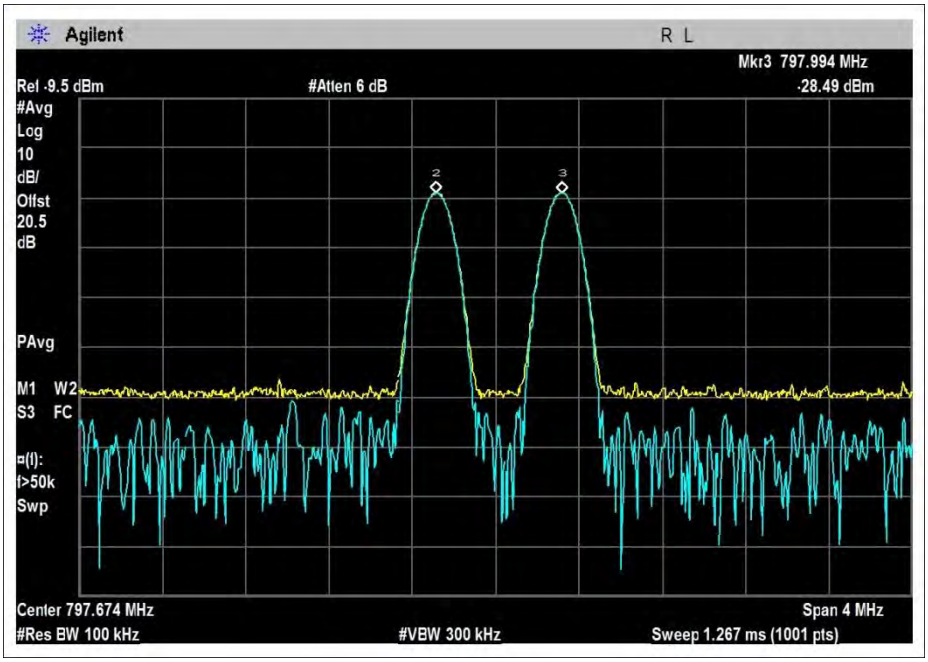
Antenna Assembly Gain (dBd) = Antenna Gain (dBd)-Feeder Loss (dB) = Antenna Gain (dBi)-2.15-Feeder Loss (dB)

Test Data

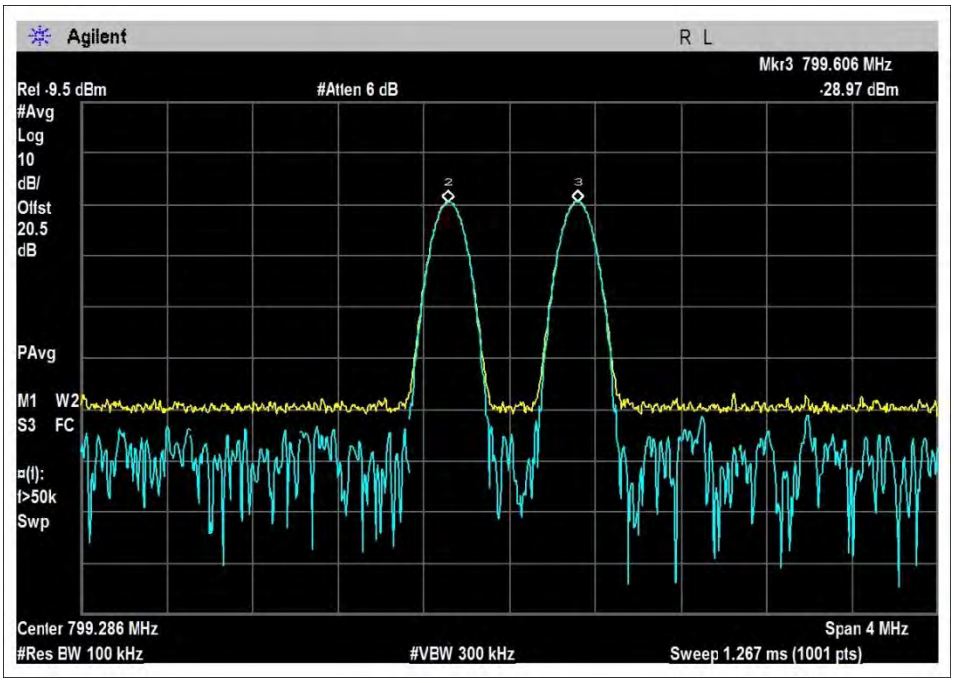
700MHz – UL - Input



In-700M-UL-788-798L



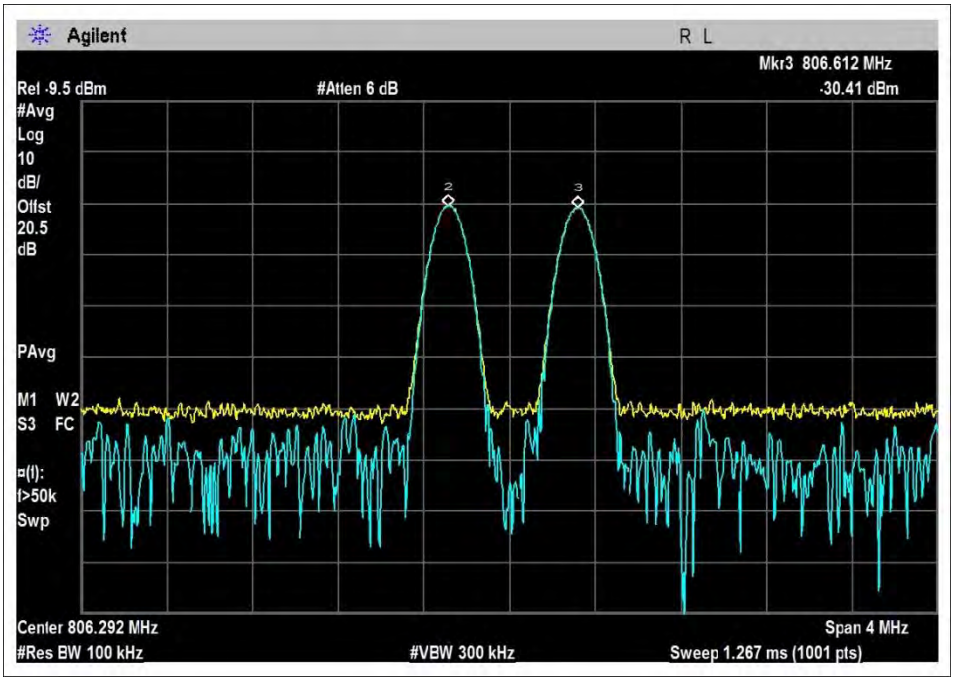
In-700M-UL-788-798H



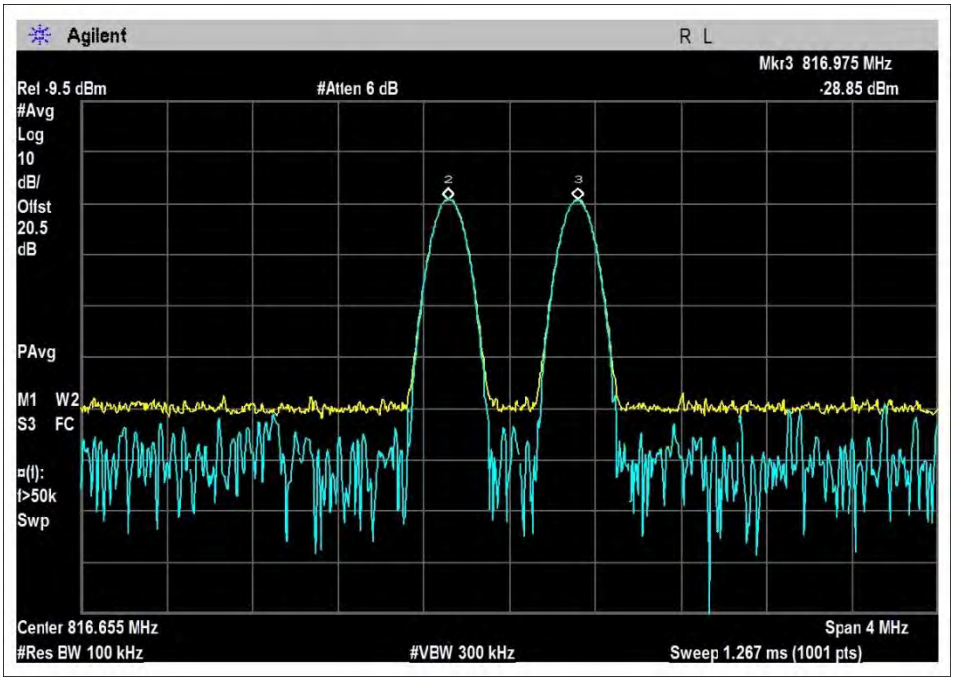
In-700M-UL-799-805L

In-700M-UL-799-805H

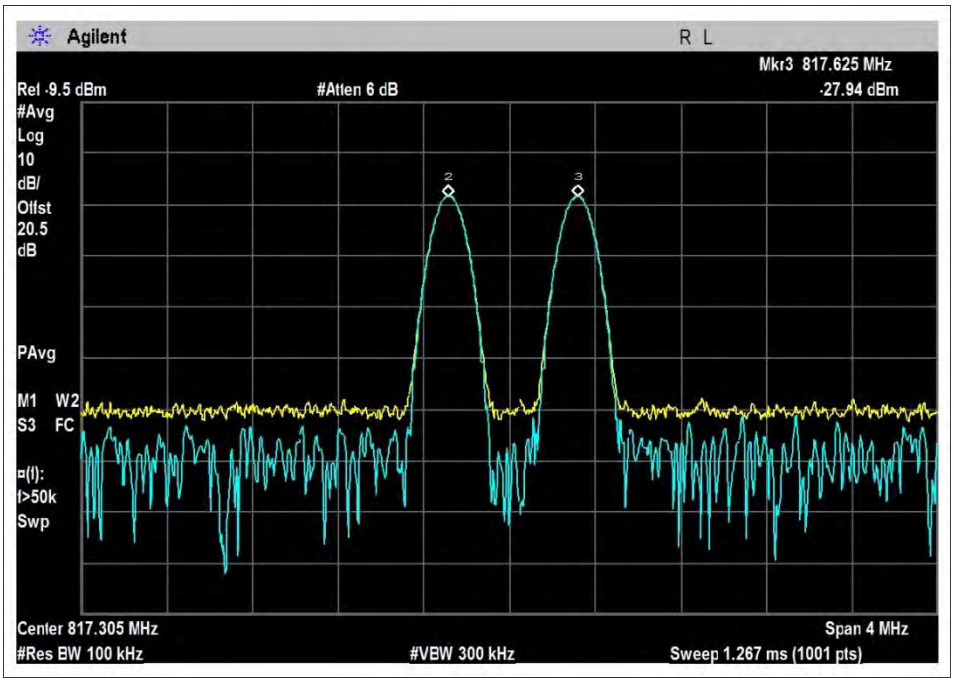
800MHz – UL - Input



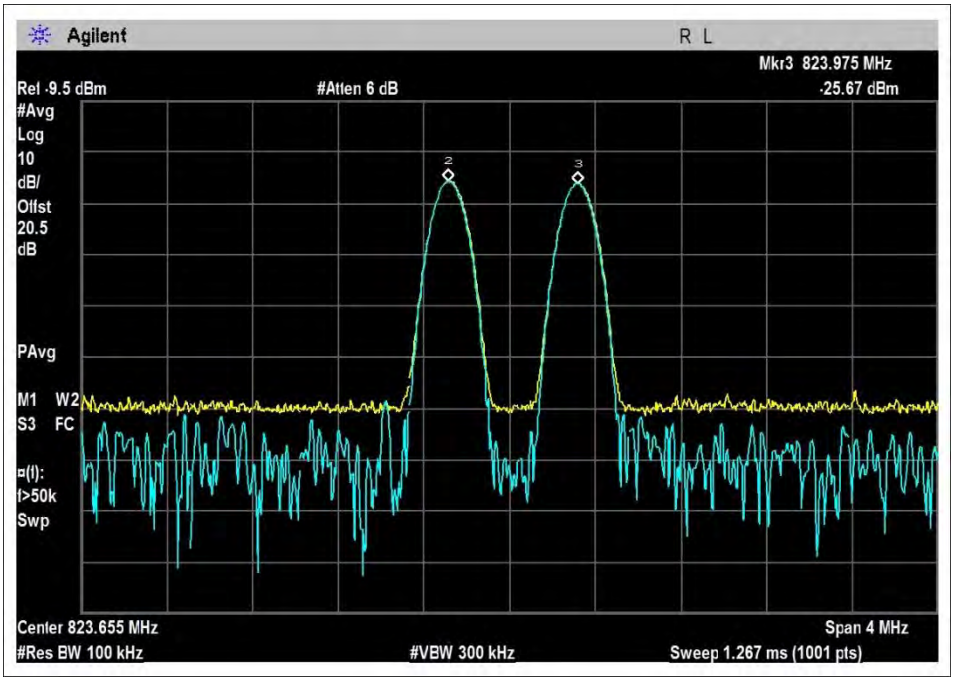
In-800M-UL-806-817L



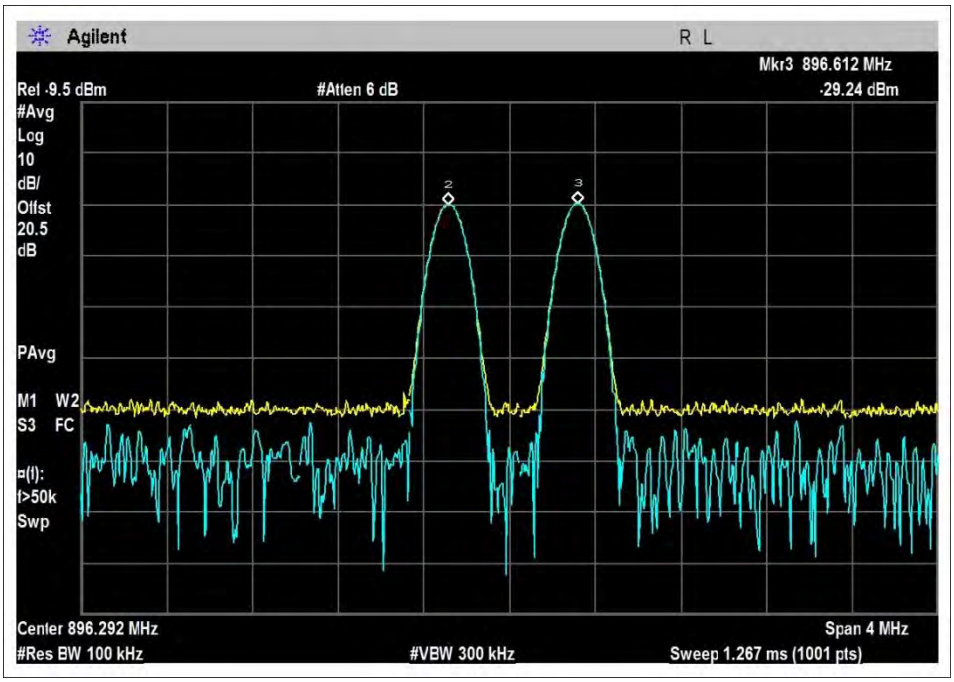
In-800M-UL-806-817H



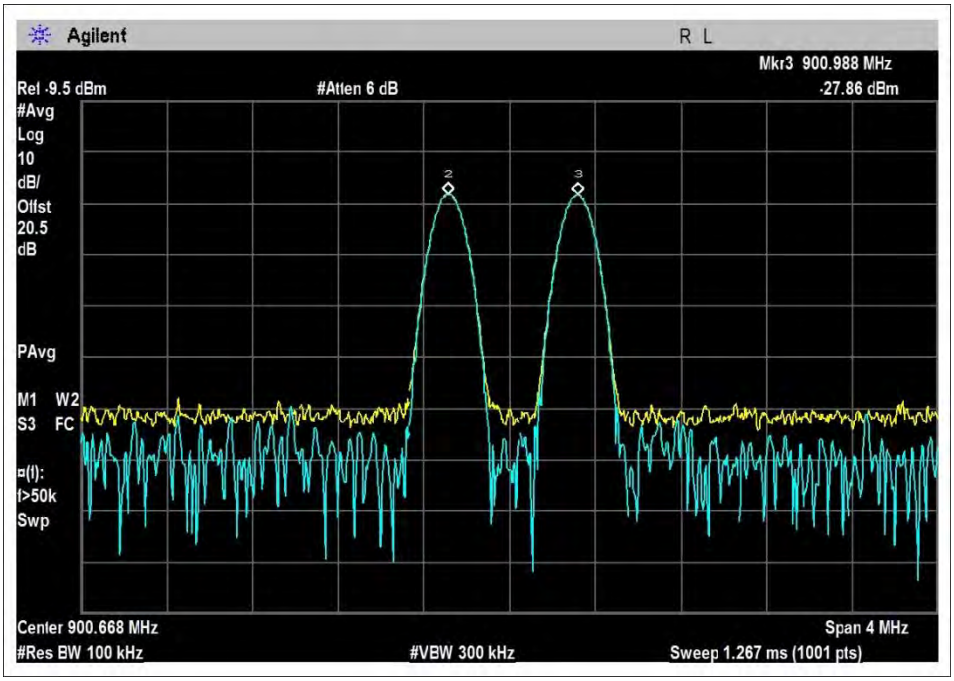
InterCW-In-800M-UL-817-824L



In-800M-UL-817-824H

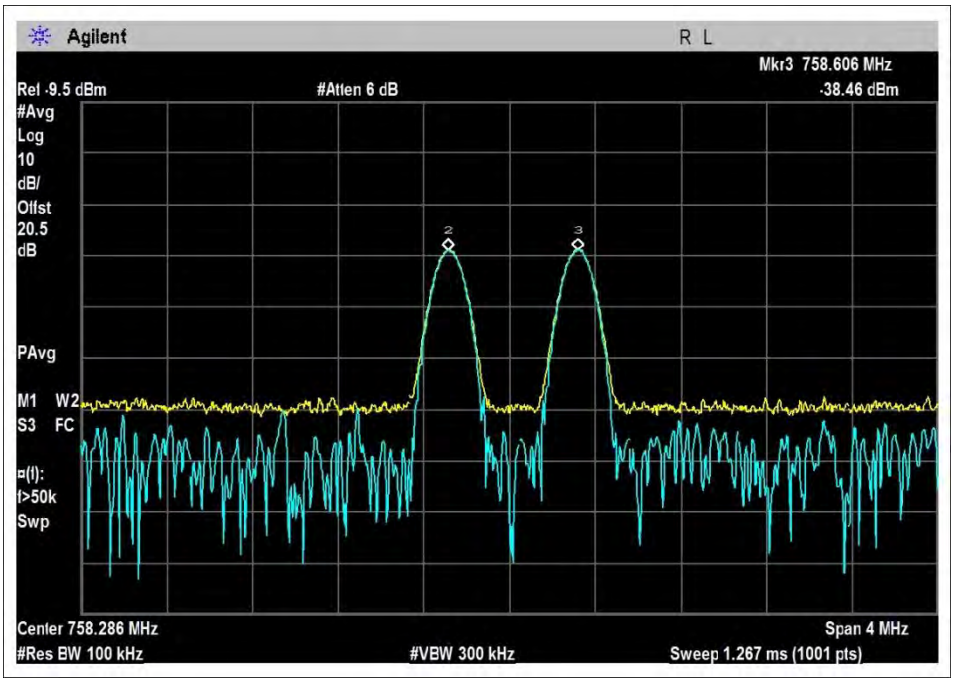


In-800M-UL-896-901L

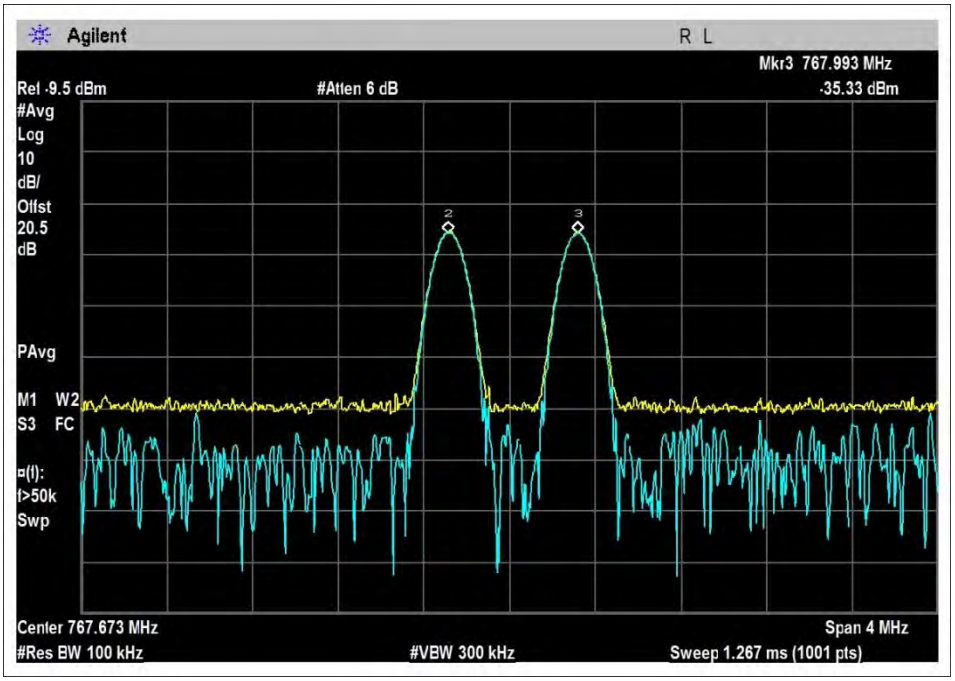


In-800M-UL-896-901H

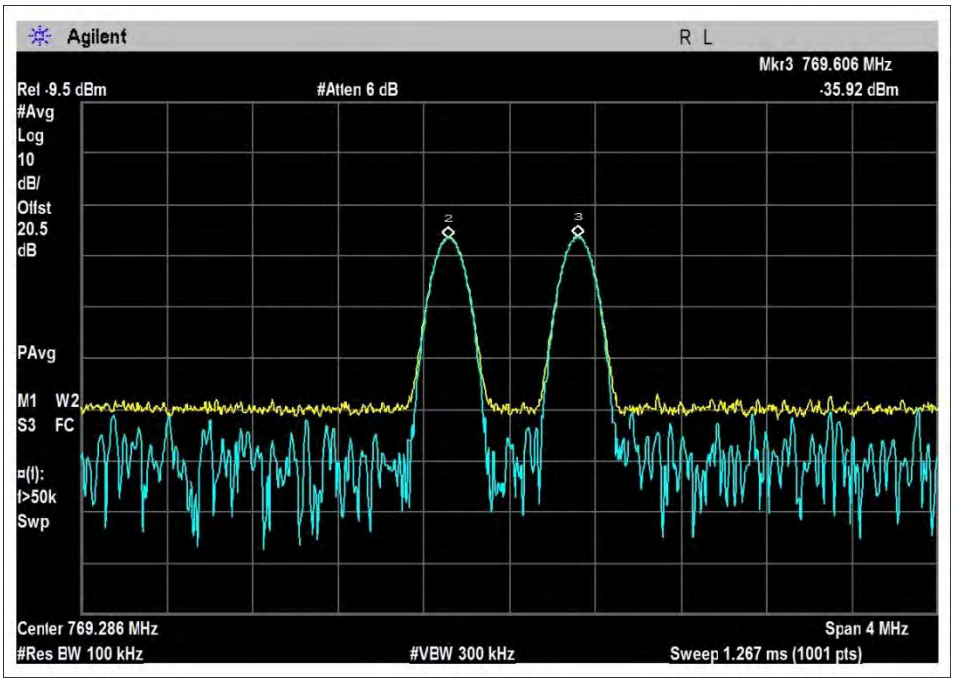
700MHz – DL - Input



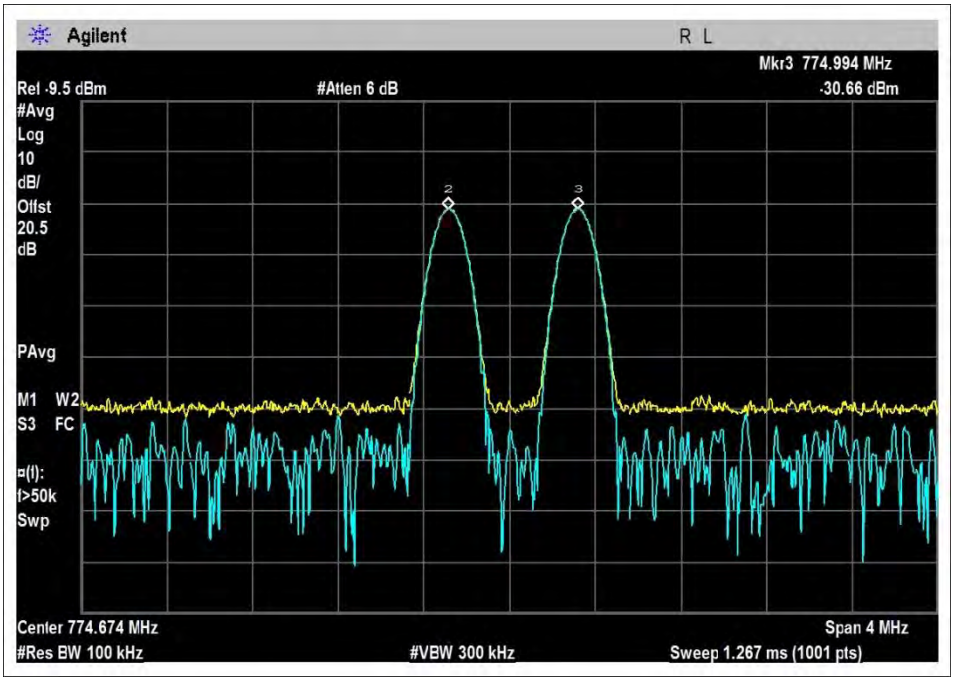
In-700M-DL-758-768L



In-700M-DL-758-768H

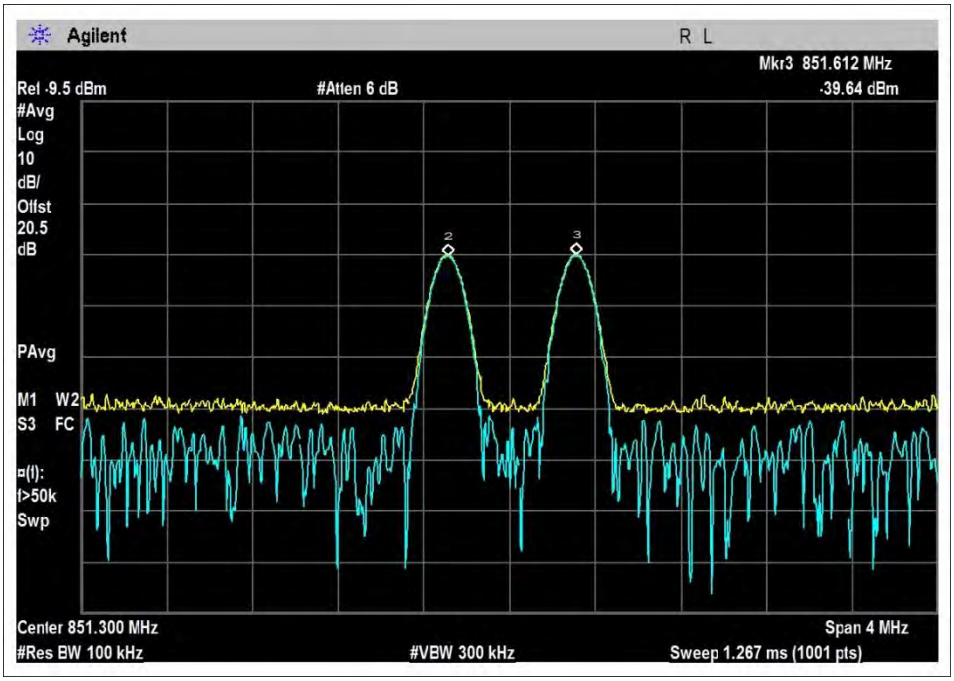


In-700M-DL-769-775L

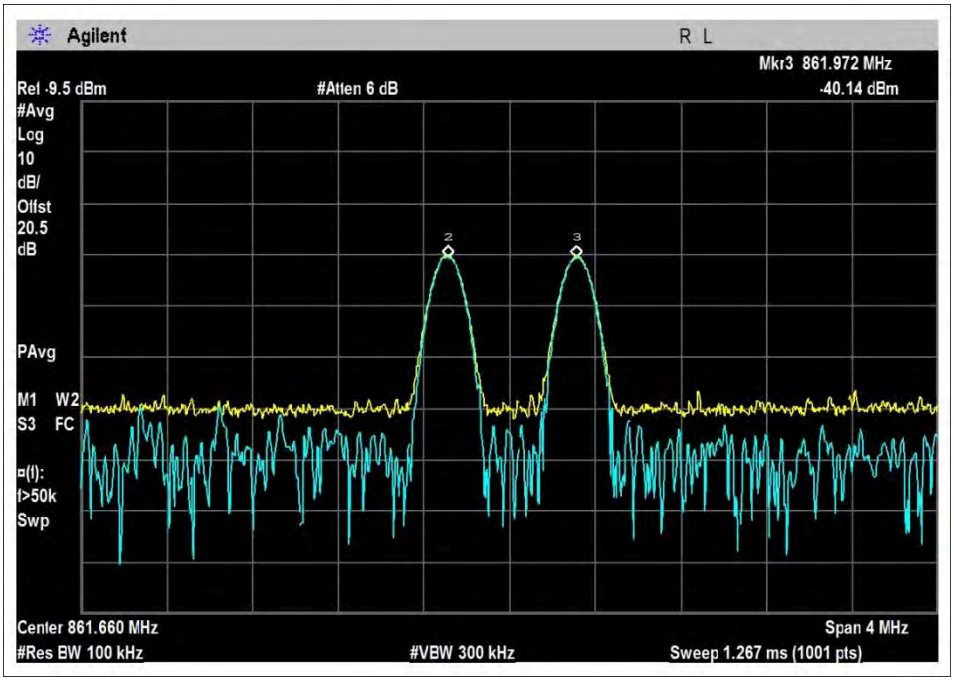


In-700M-DL-769-775H

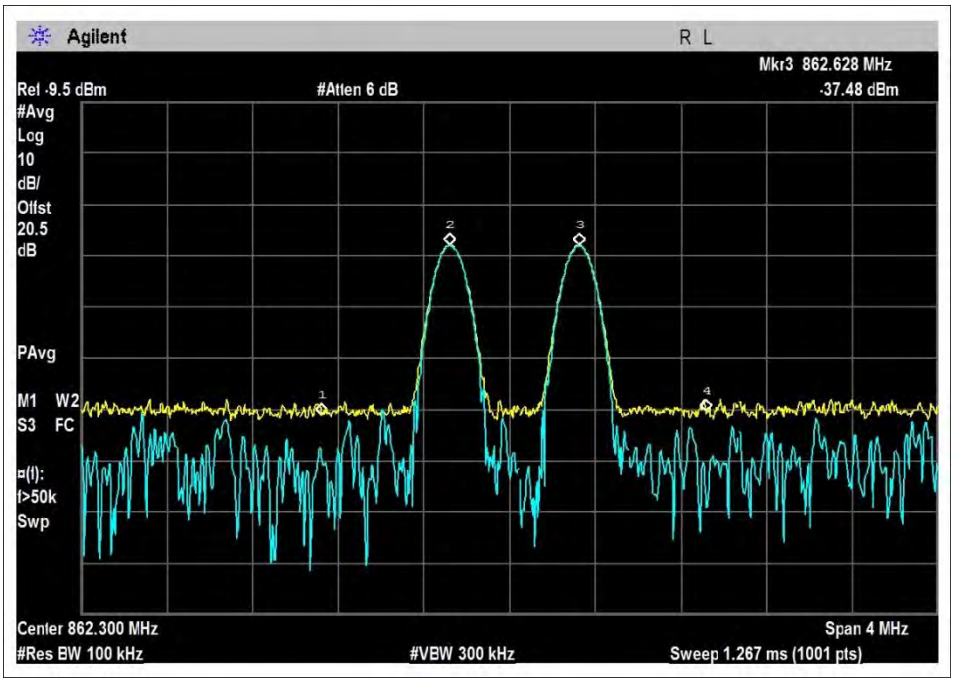
800MHz – DL - Input



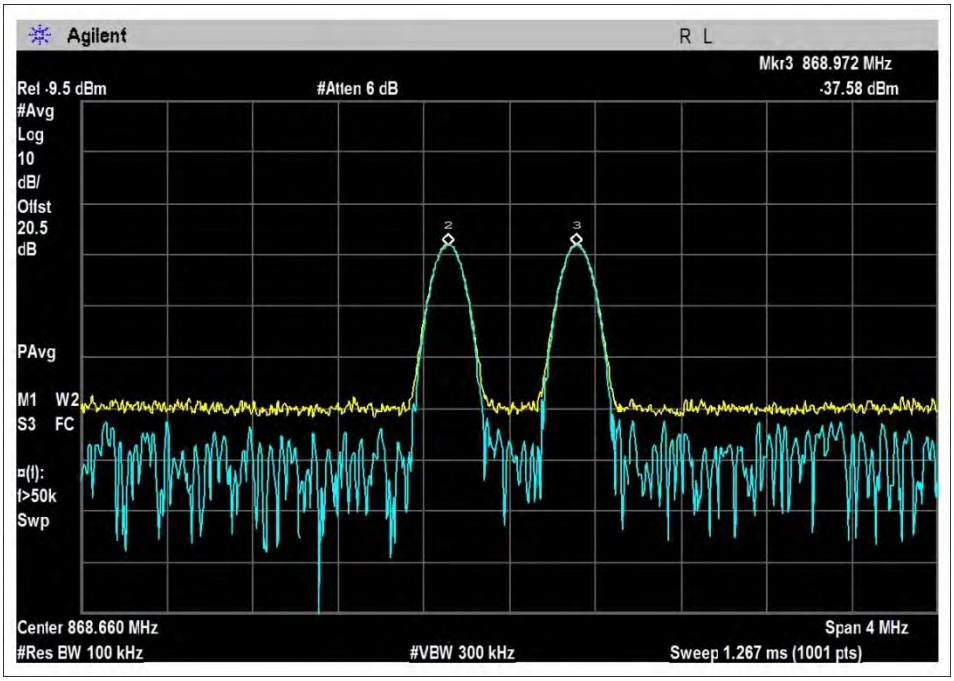
In-800M-DL-851-862L



In-800M-DL-851-862H

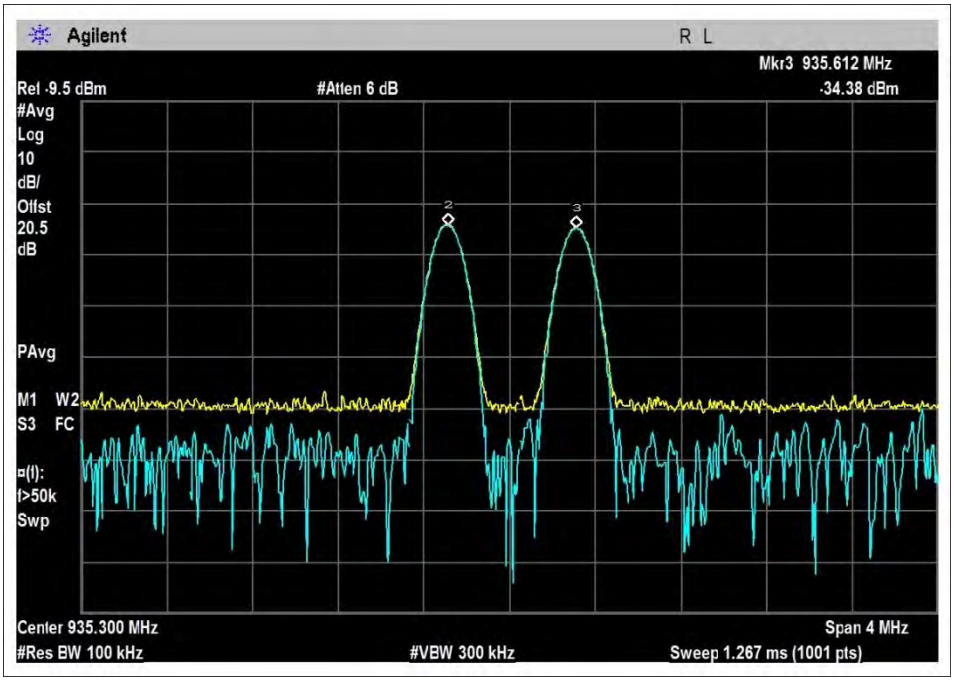


In-800M-DL-862-869L

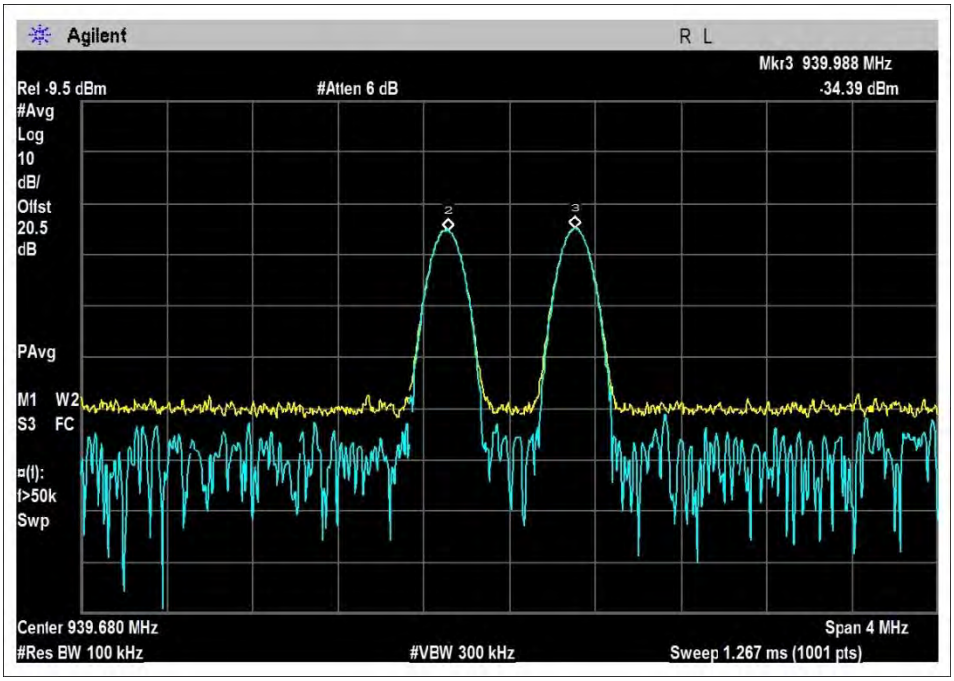


In-800M-DL-862-869H

900MHz – DL - Input

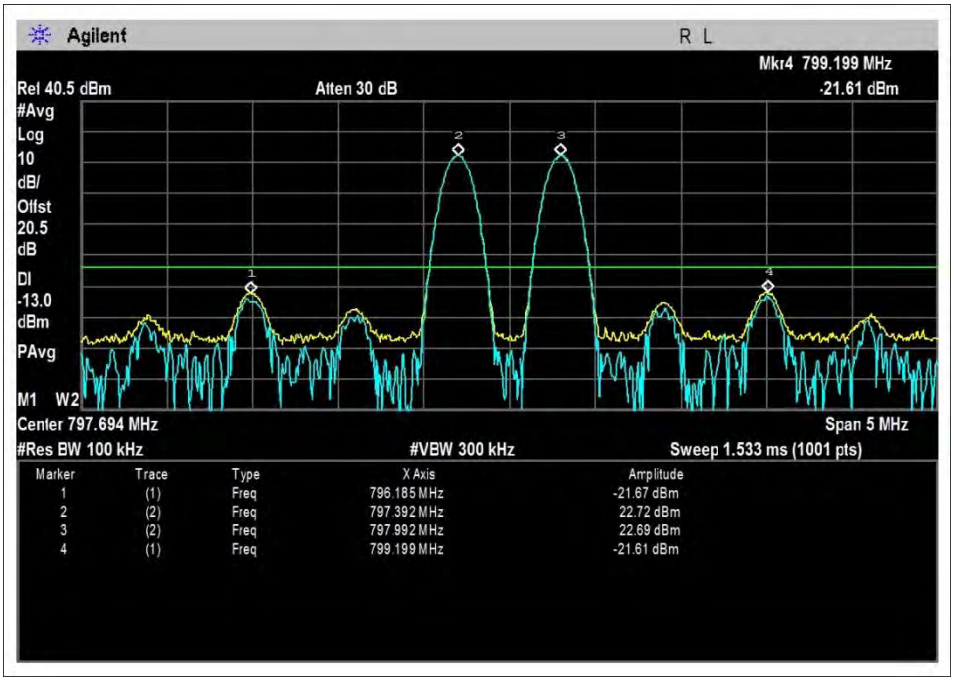


In-900M-DL-935-940L

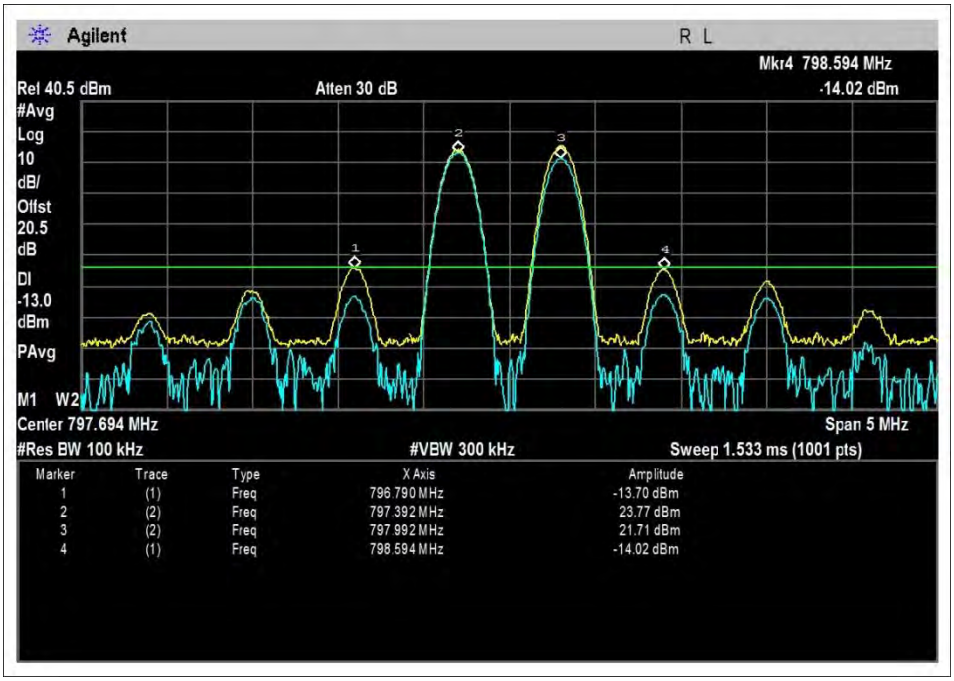


In-900M-DL-935-940H

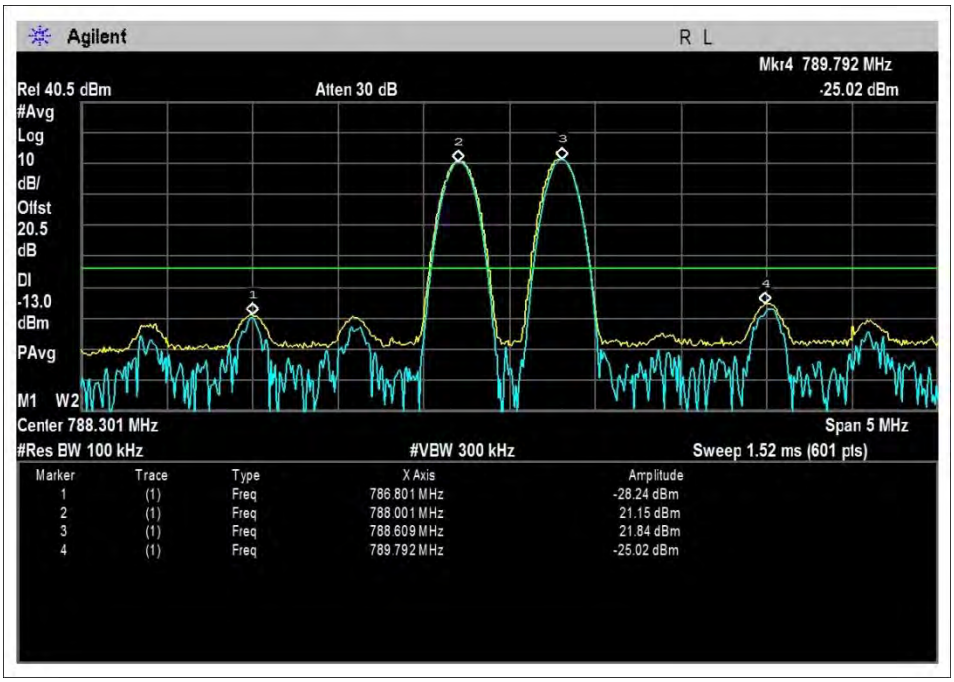
700MHz – UL - Output



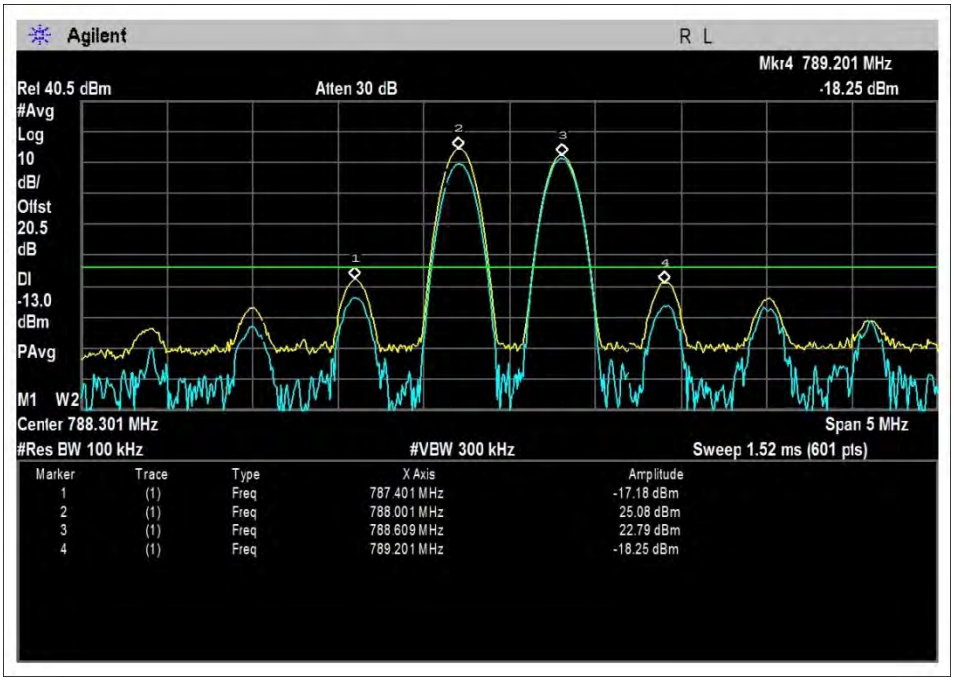
700M-UL-788-798H-22.3



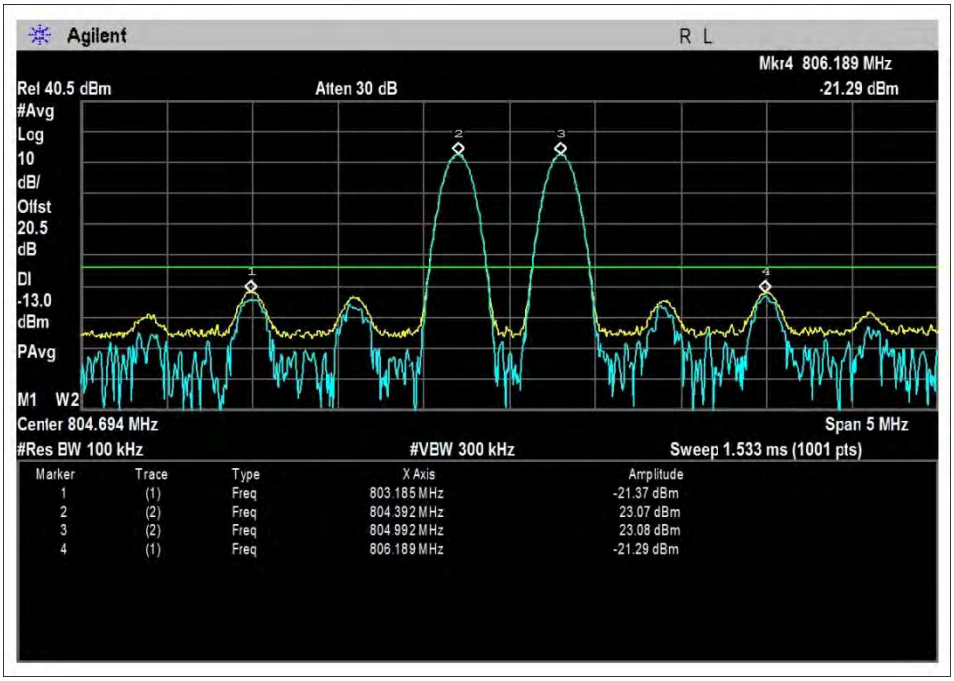
700M-UL-788-798H-AGC+10dB



700M-UL-788-798L-19



700M-UL-788-798L-AGC+10dB



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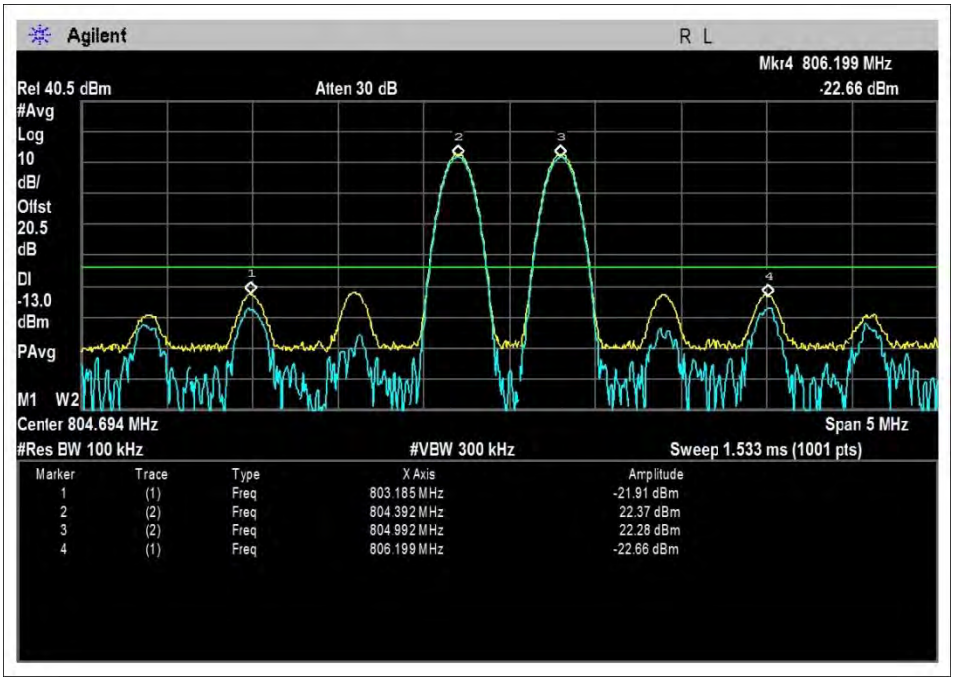
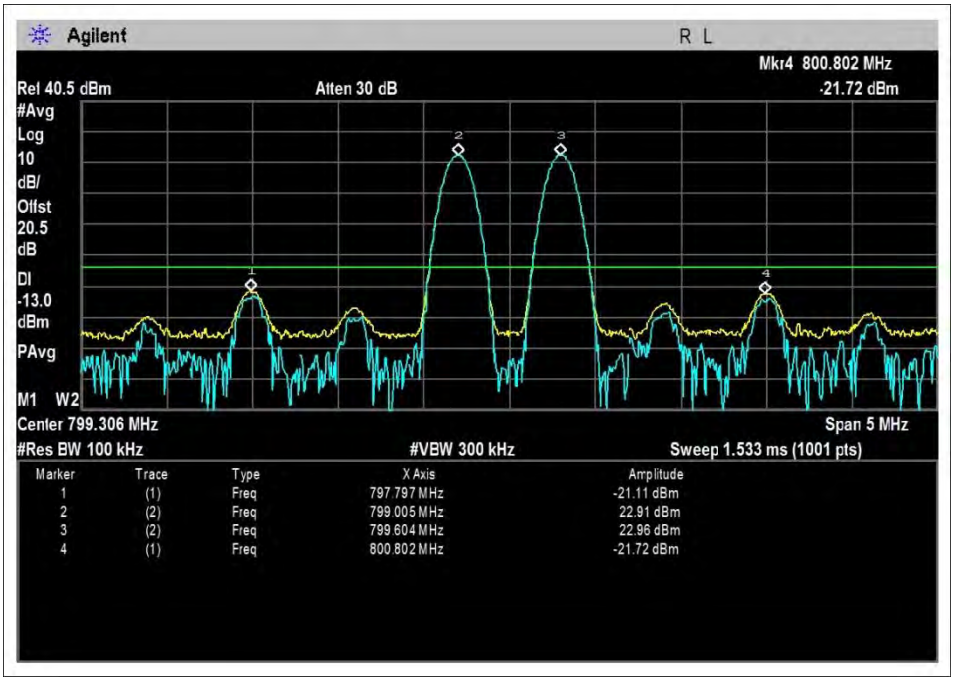
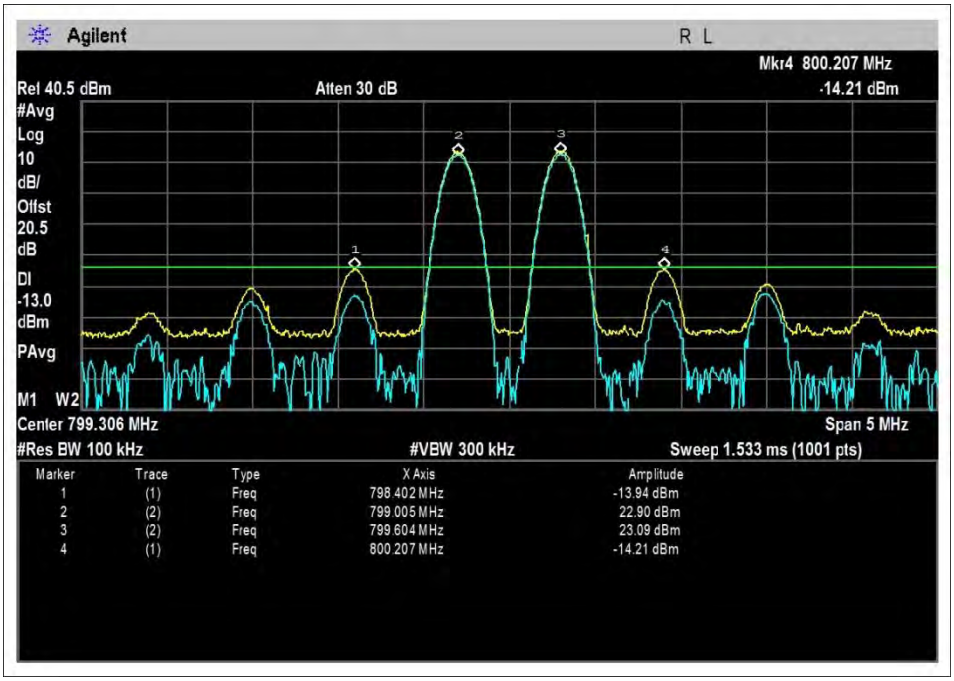


700M-UL-799-805H-AGC+10dB

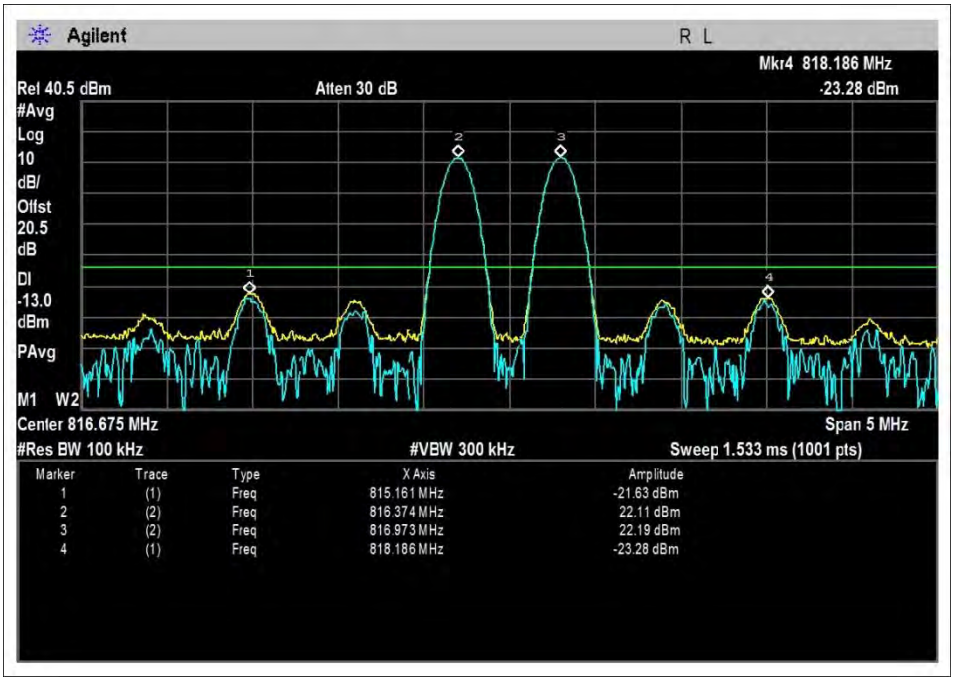


700M-UL-799-805L-22.7

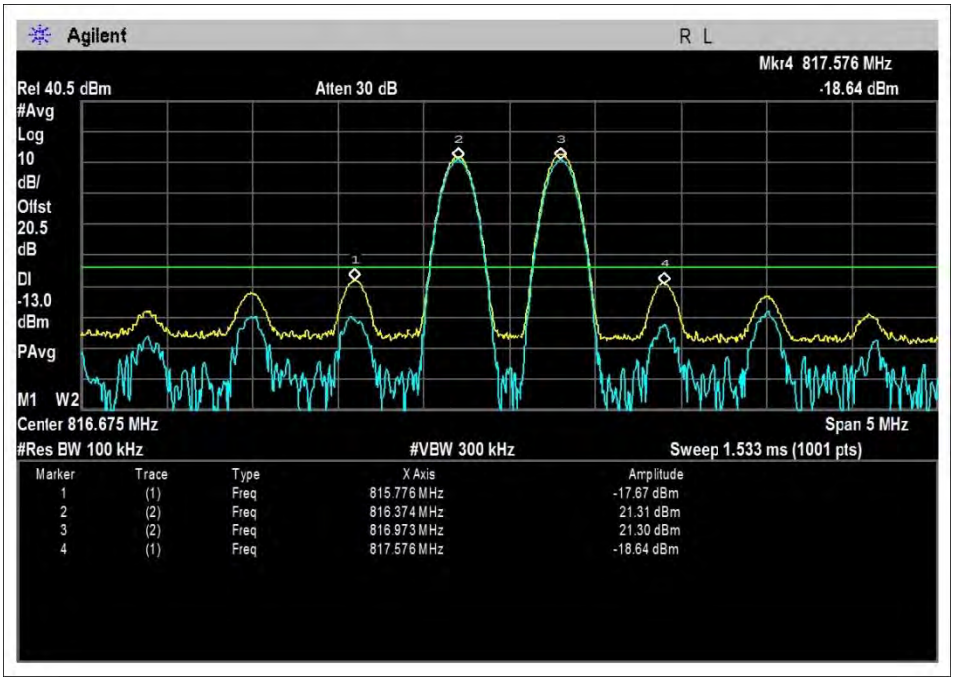


700M-UL-799-805L-AGC+10dB

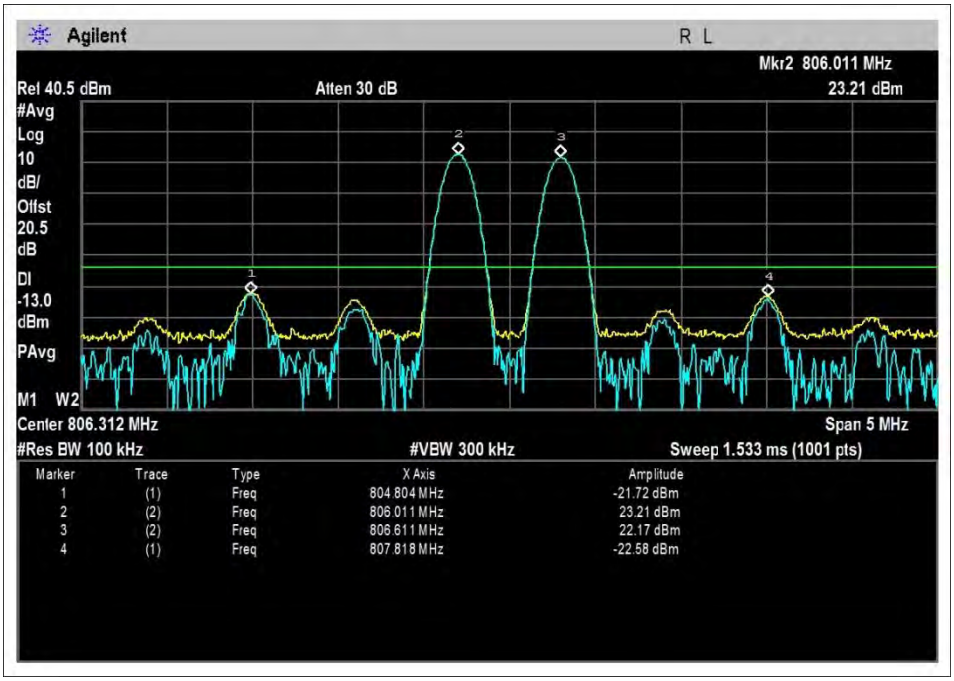
800MHz – UL - Output



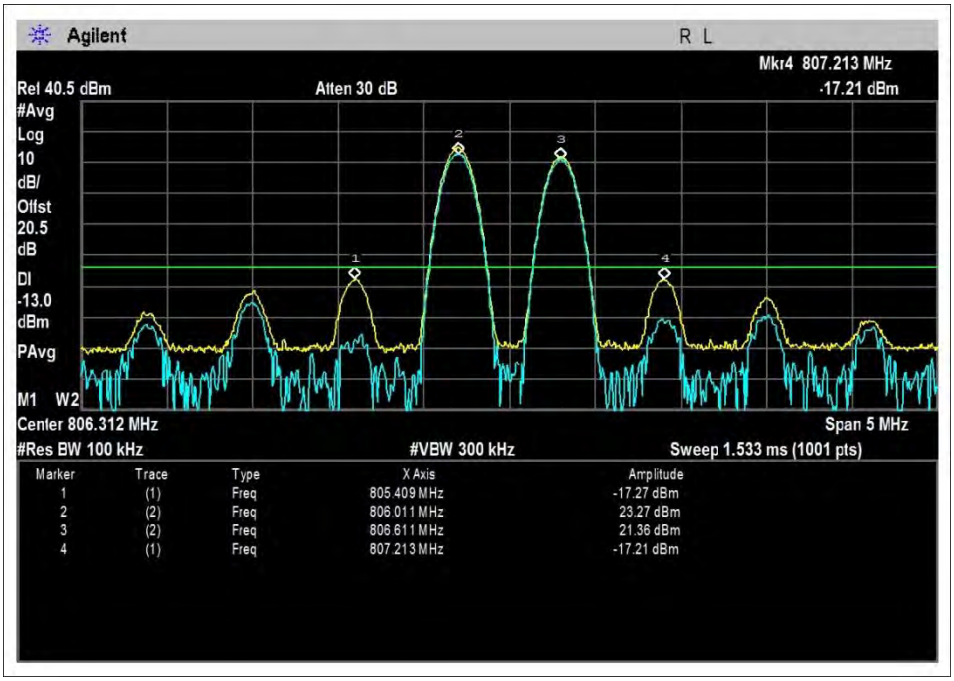
800M-UL-806-817H-22.6



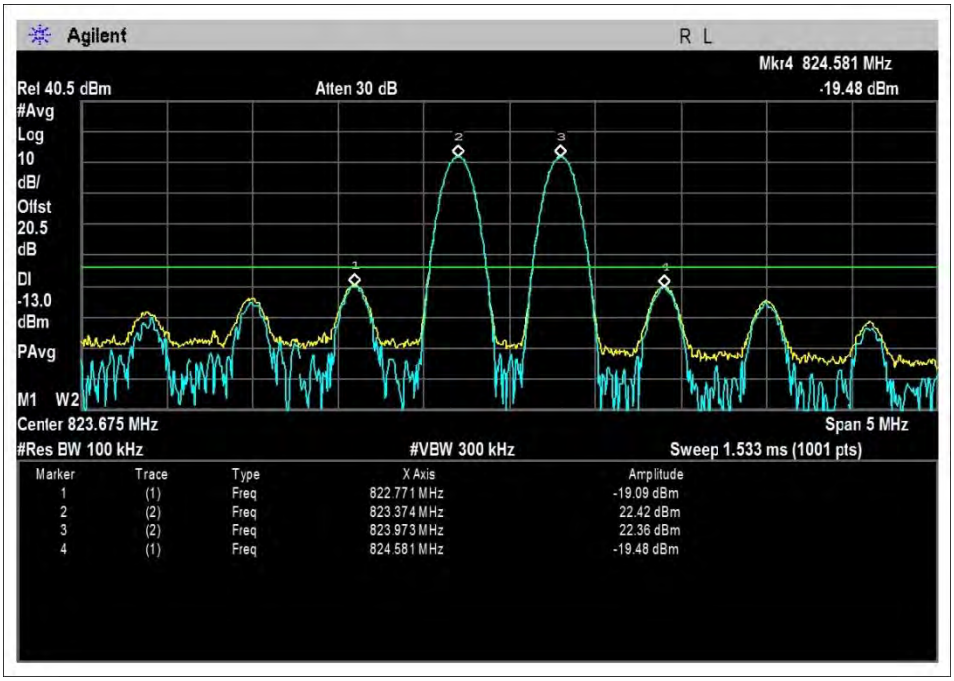
800M-UL-806-817H-AGC+10dB



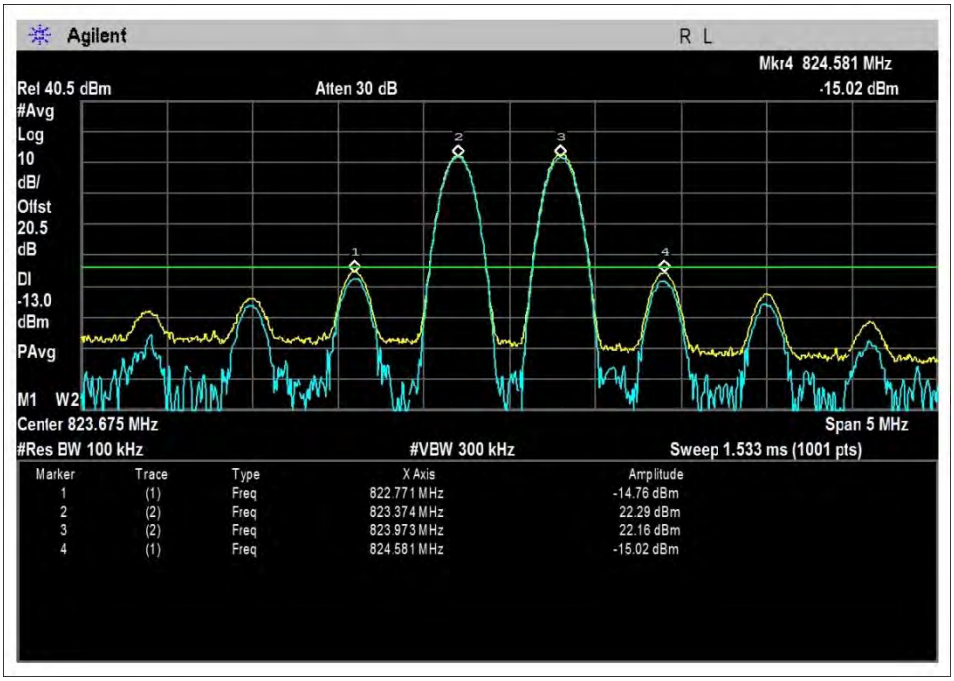
800M-UL-806-817L-24.2



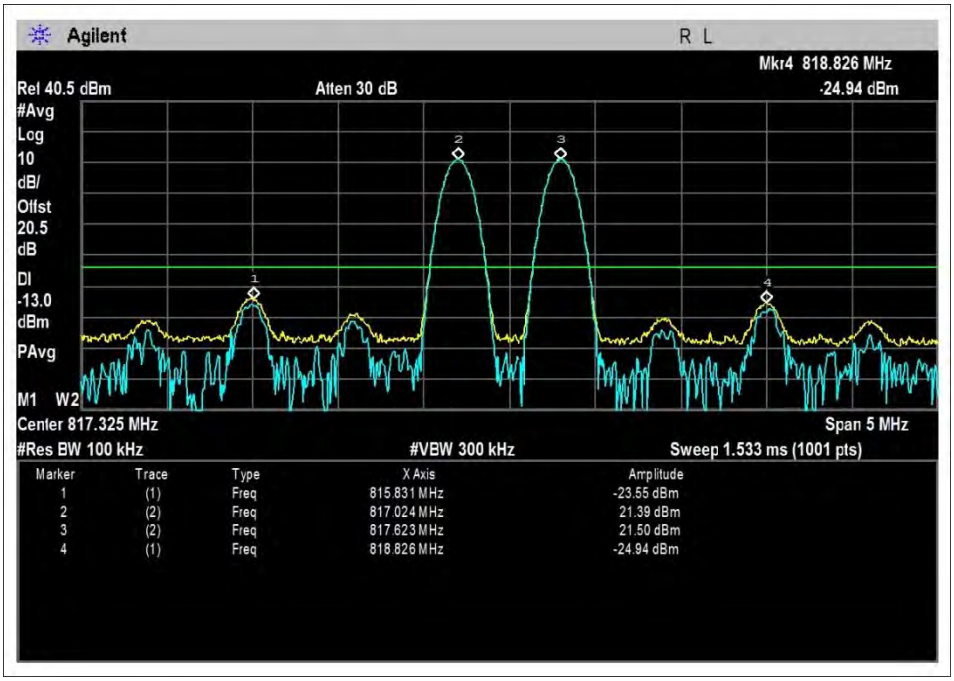
800M-UL-806-817L-AGC+10dB



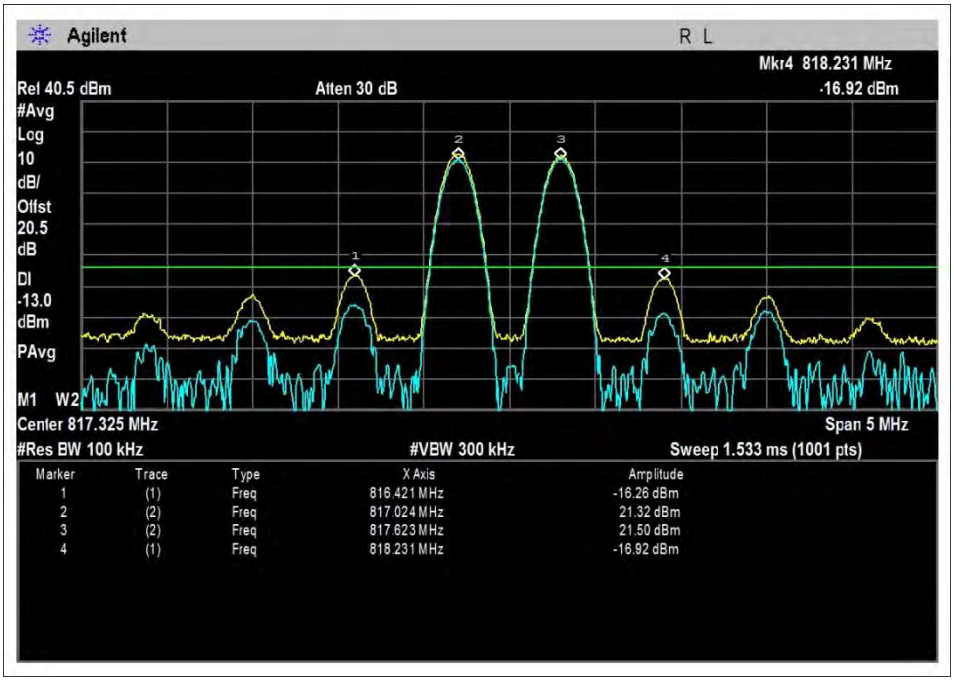
800M-UL-817-824H-19.4



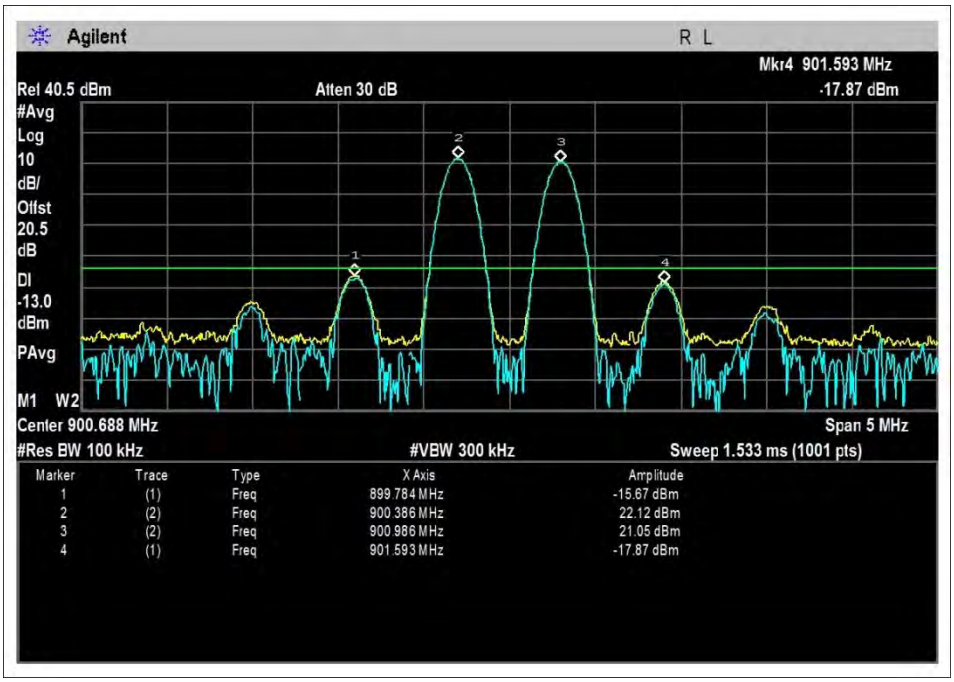
800M-UL-817-824H-AGC+10dB



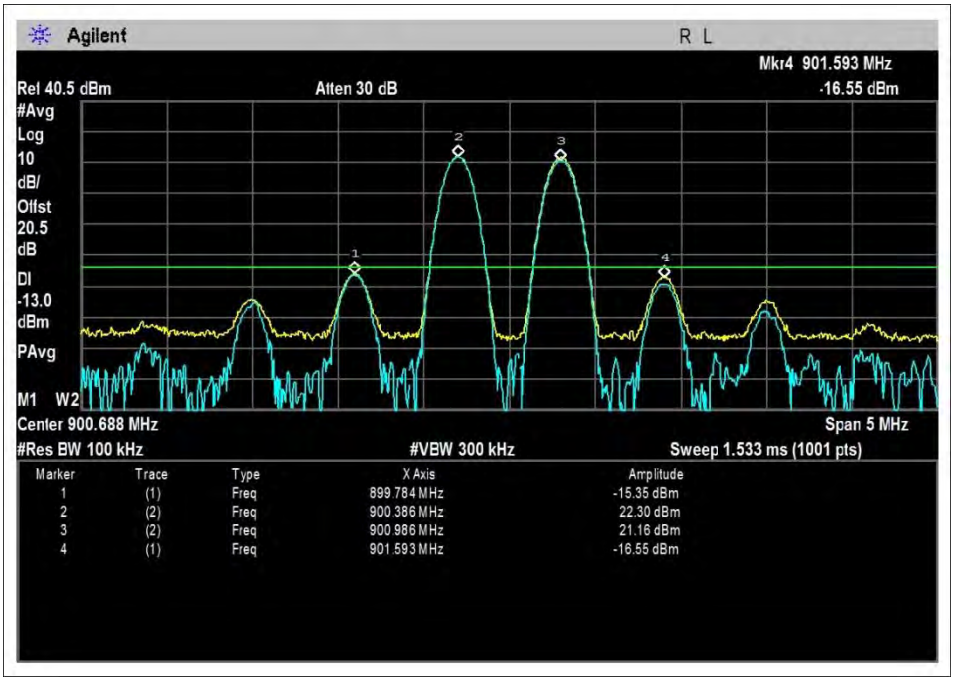
800M-UL-817-824L-21.7



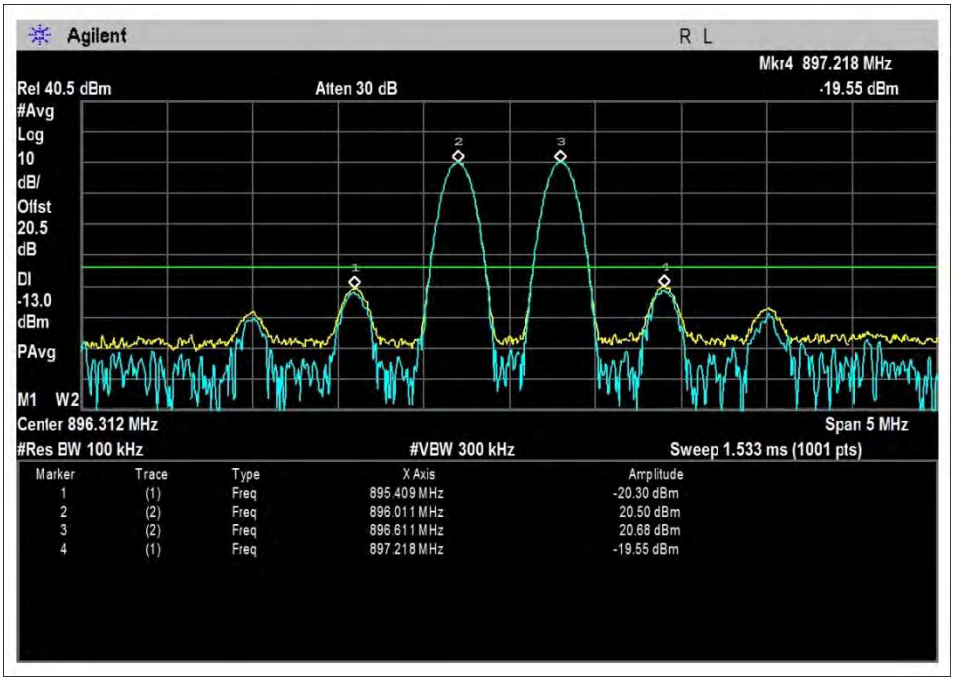
800M-UL-817-824L-AGC+10dB



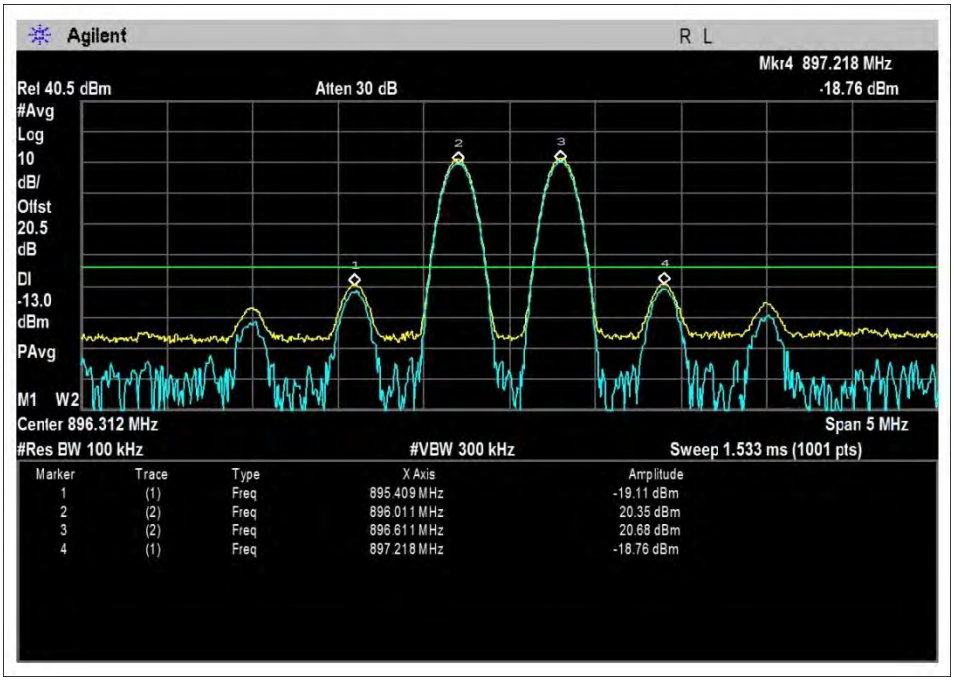
InterCW-800M-UL-896-901H-21.6



800M-UL-896-901H-AGC+10dB

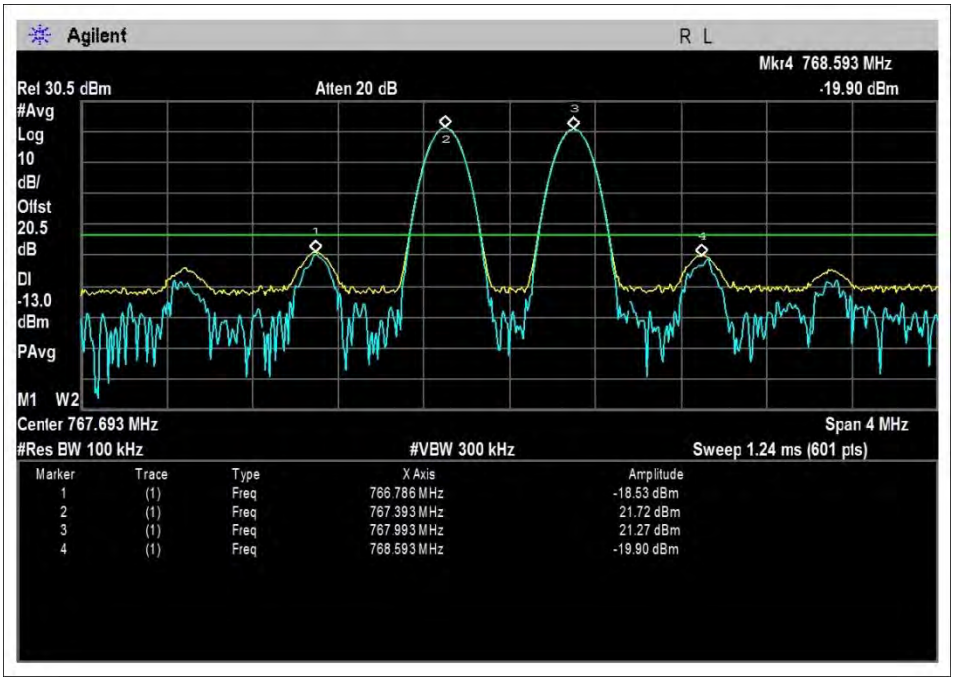


800M-UL-896-901L-23

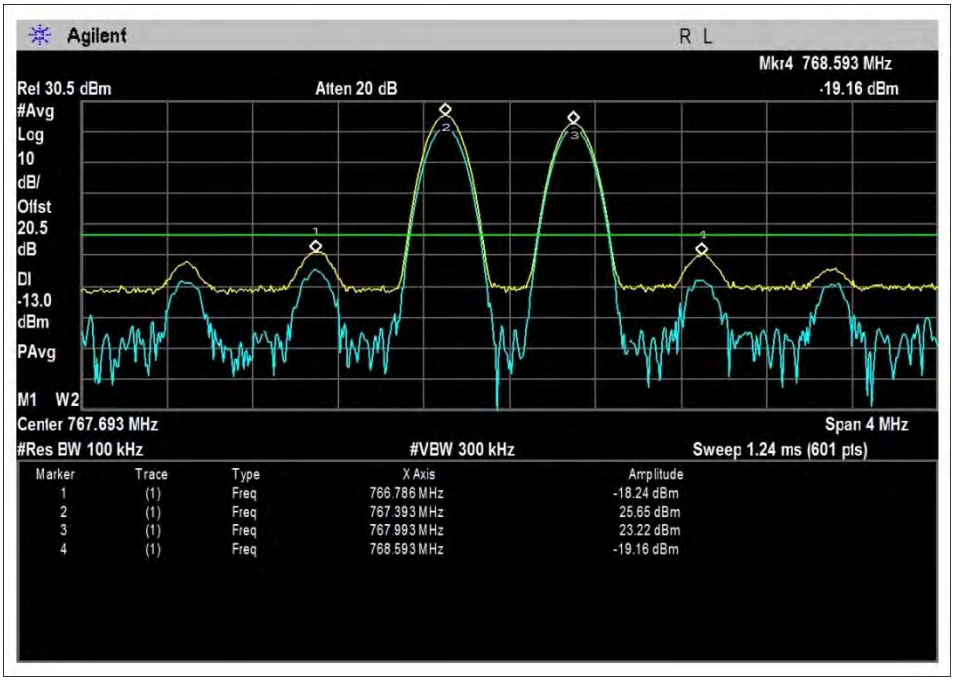


800M-UL-896-901L-AGC+10dB

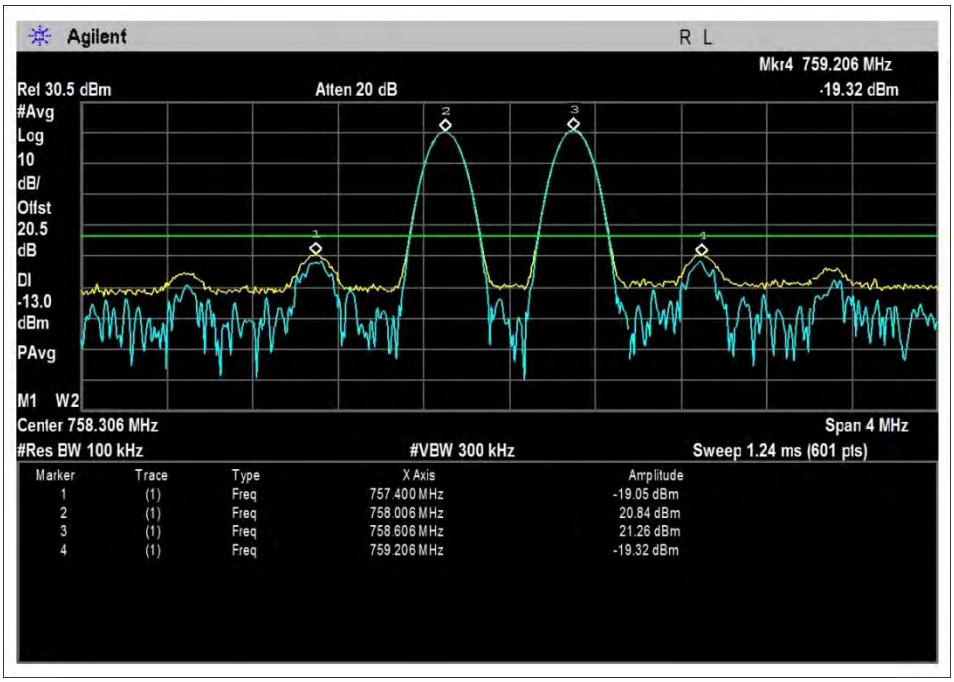
700MHz – DL - Output



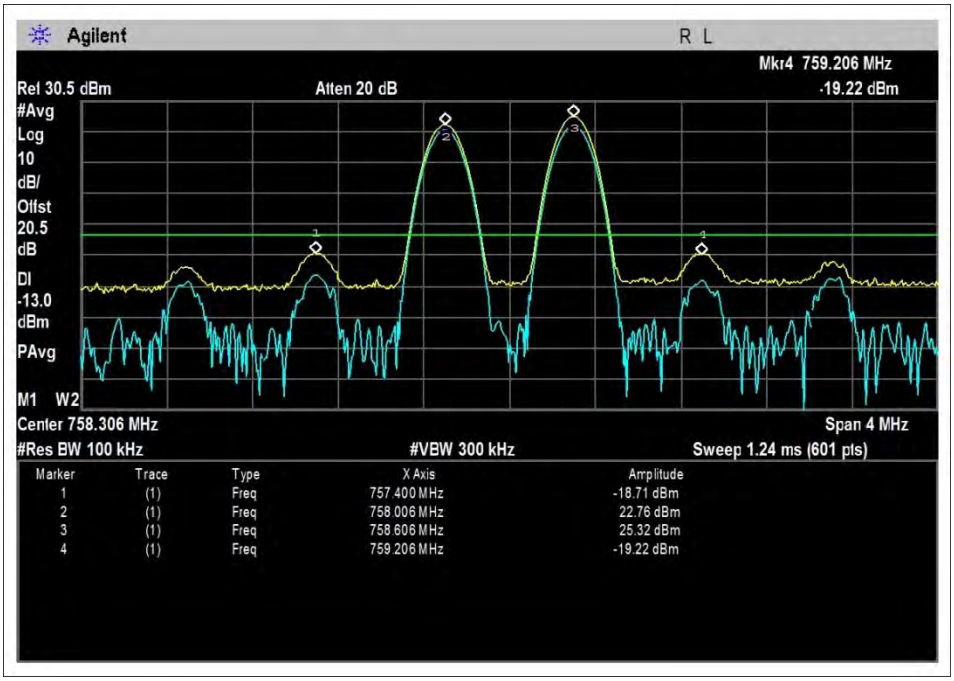
700M-DL-758-768H-29.1



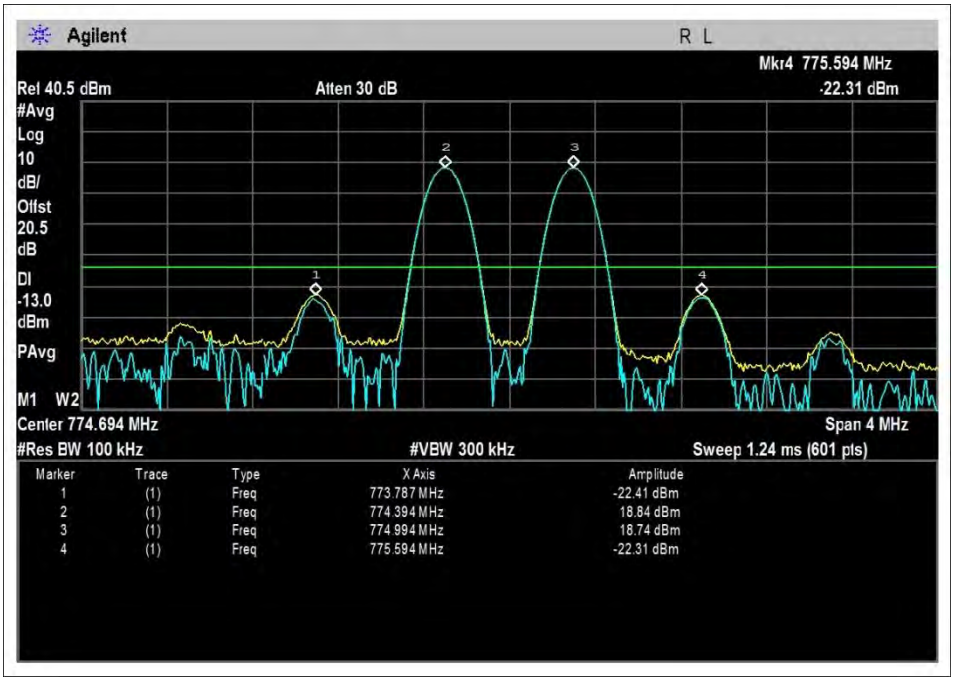
InterCW-700M-DL-758-768H-AGC+10dB



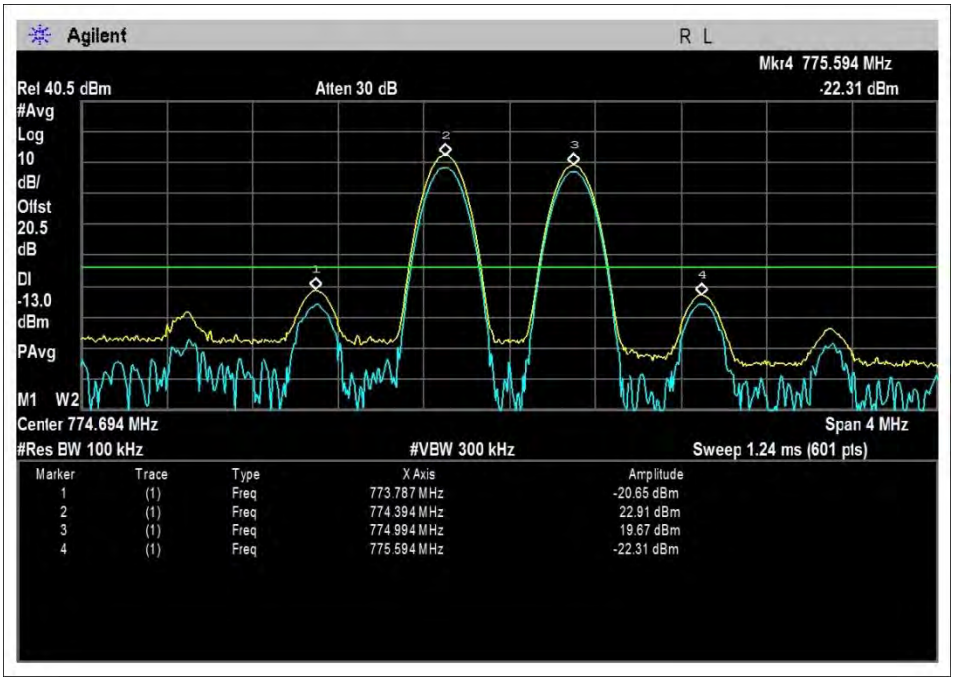
700M-DL-758-768L-32.2



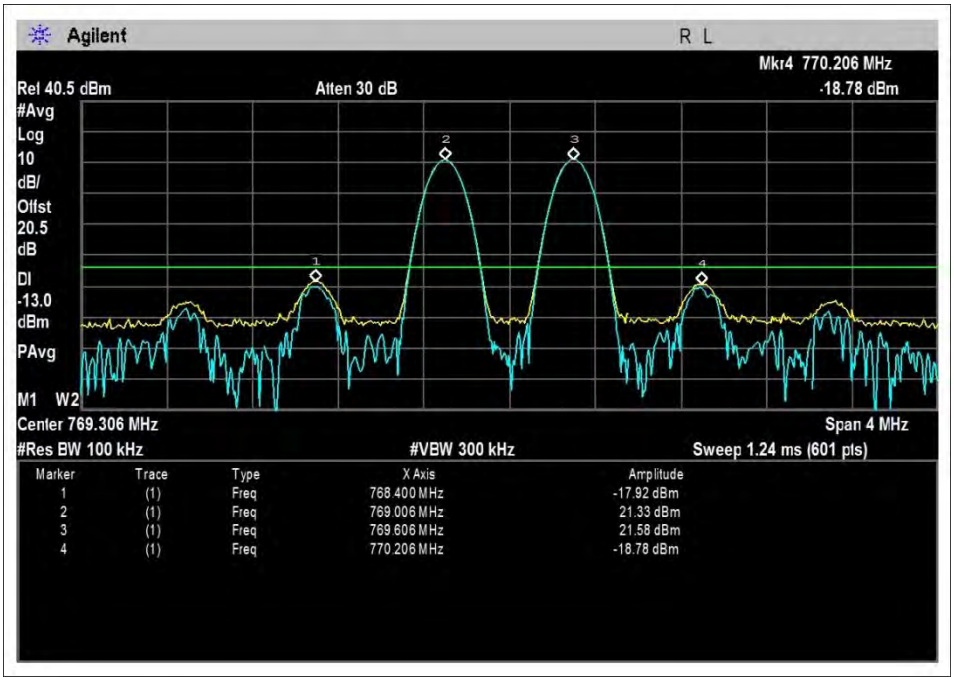
700M-DL-758-768L-AGC+10dB



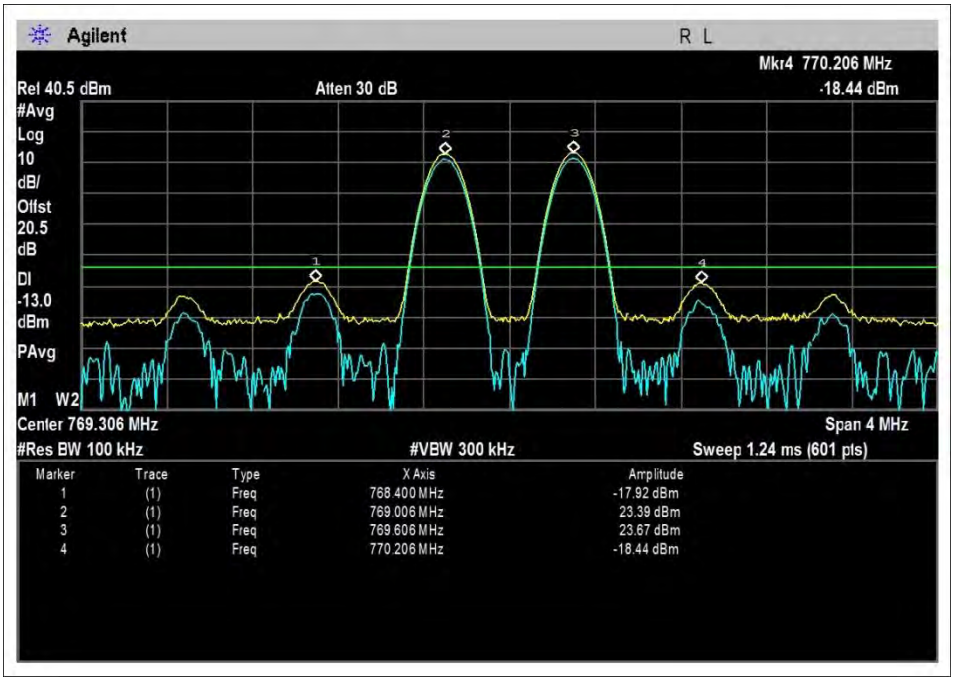
700M-DL-769-775H-24.4



700M-DL-769-775H-AGC+10dB

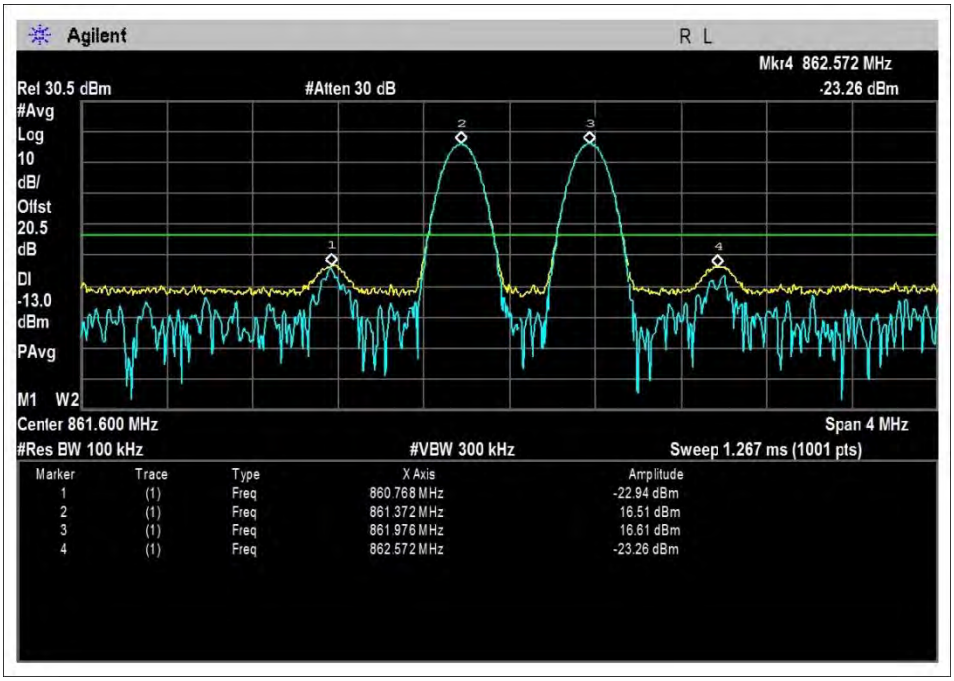


700M-DL-769-775L-29.7



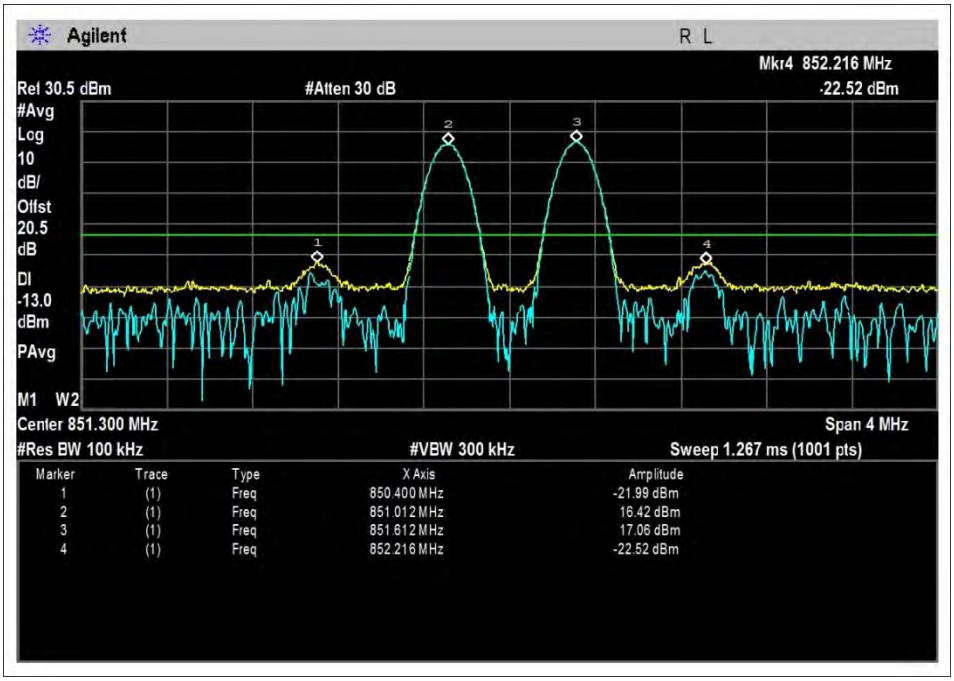
700M-DL-769-775L-AGC+10dB

800MHz – DL - Output

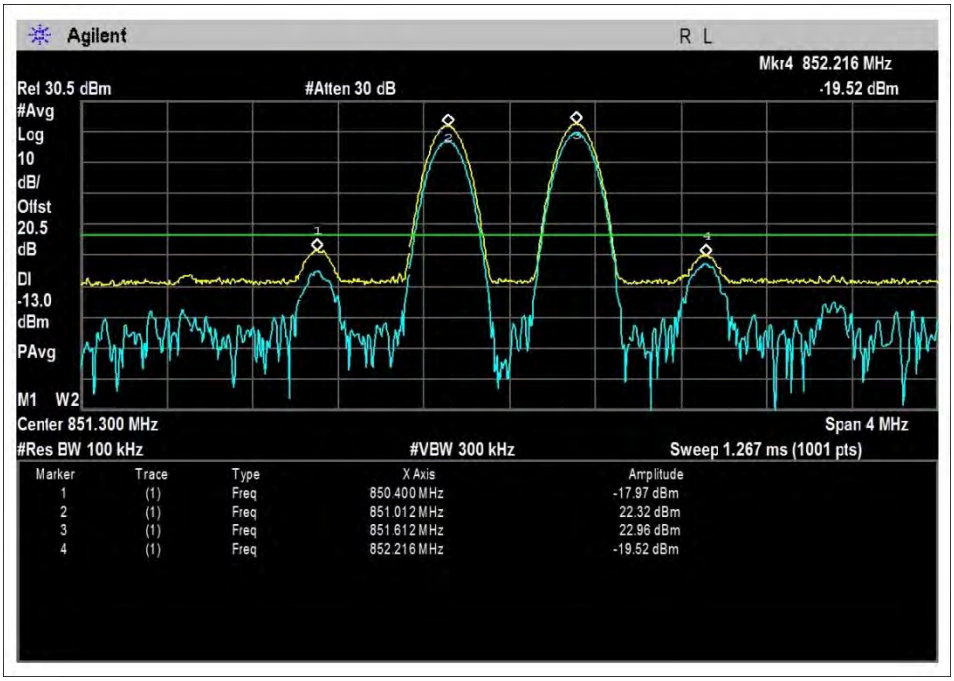


800M-DL-851-862H-33.7

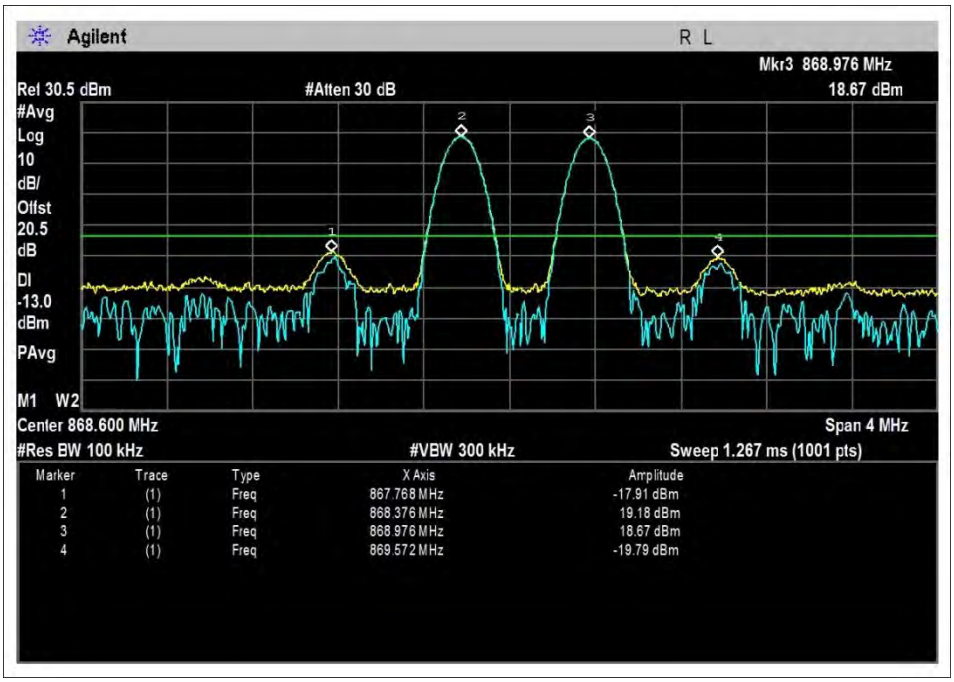
800M-DL-851-862H-AGC+10dB



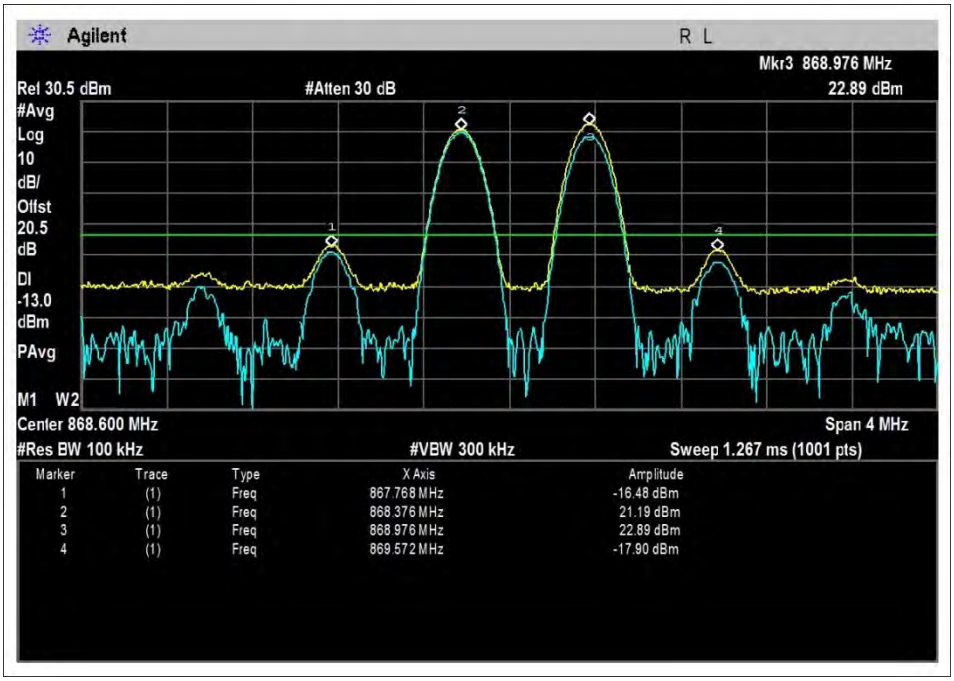
InterCW-800M-DL-851-862L-33.4



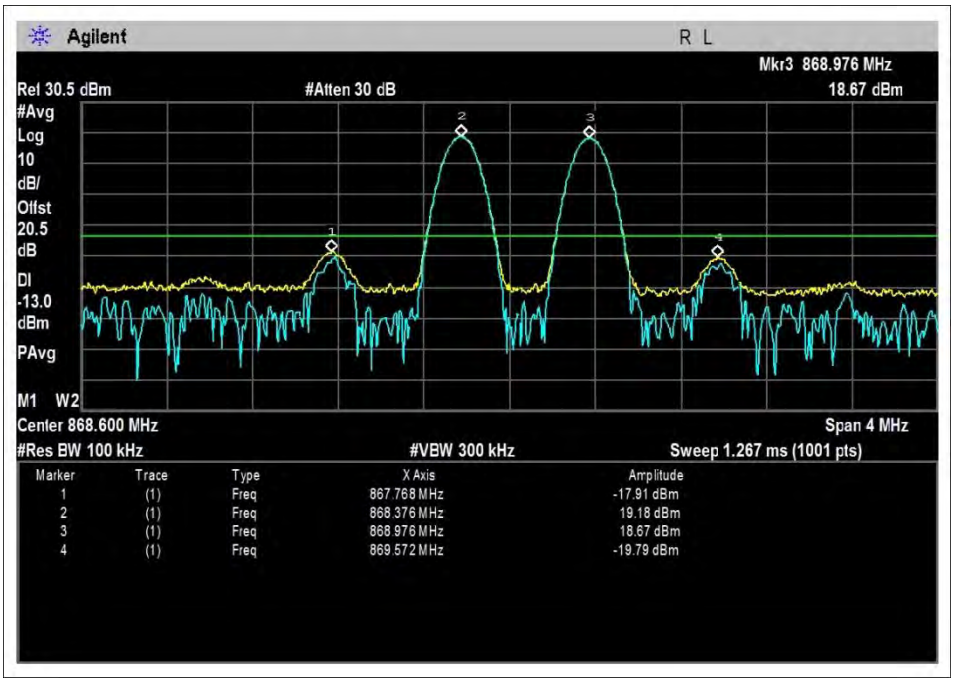
800M-DL-851-862L-AGC+10dB



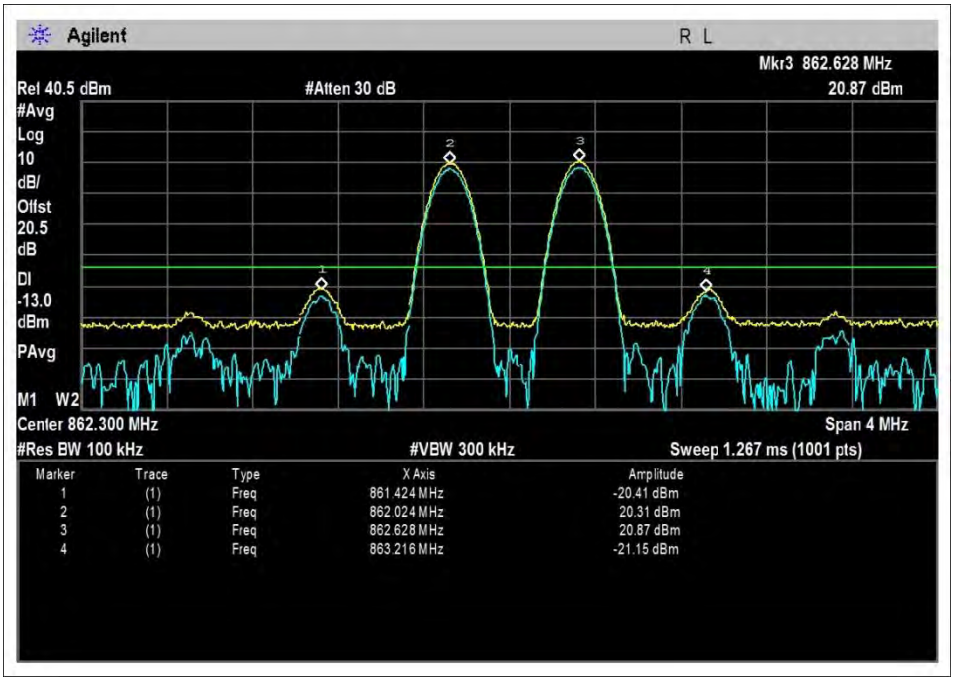
800M-DL-862-869H-31.3



800M-DL-862-869H-AGC+10dB

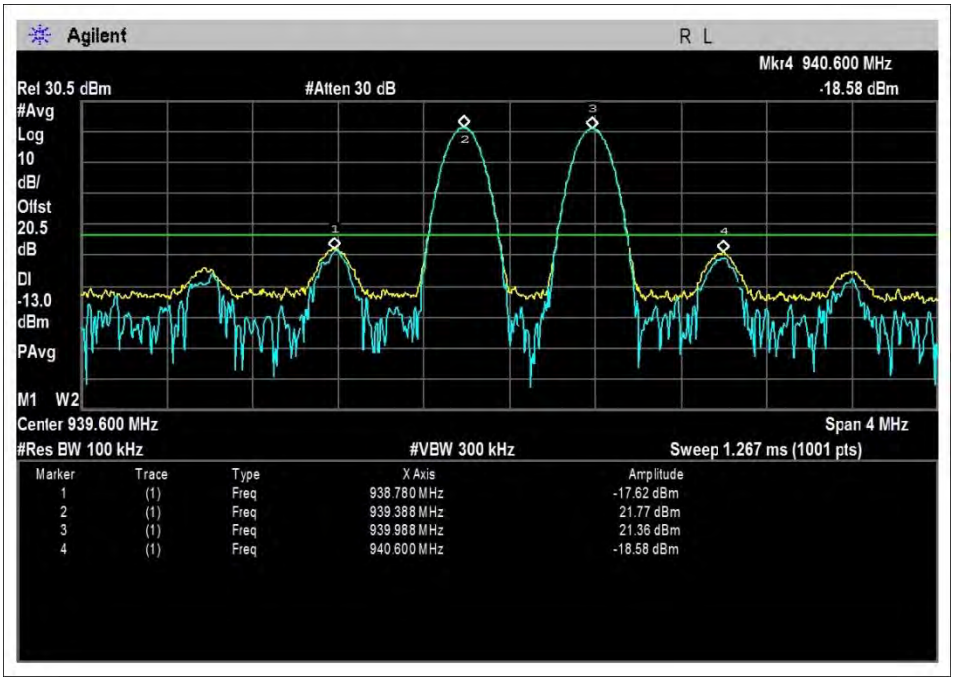


800M-DL-862-869L-31.3

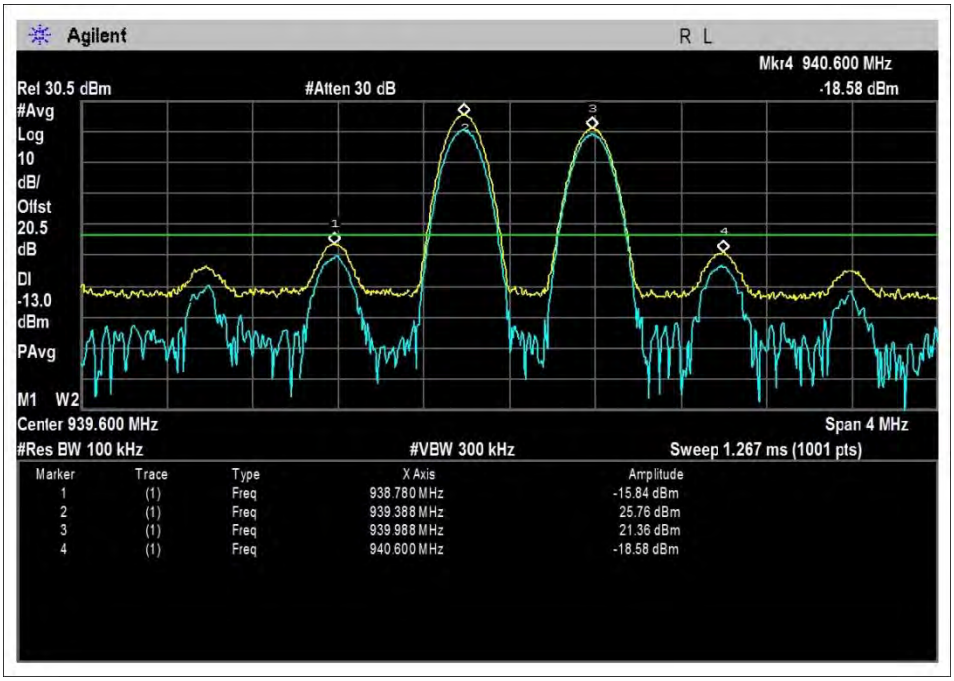


800M-DL-862-869L-AGC+10dB

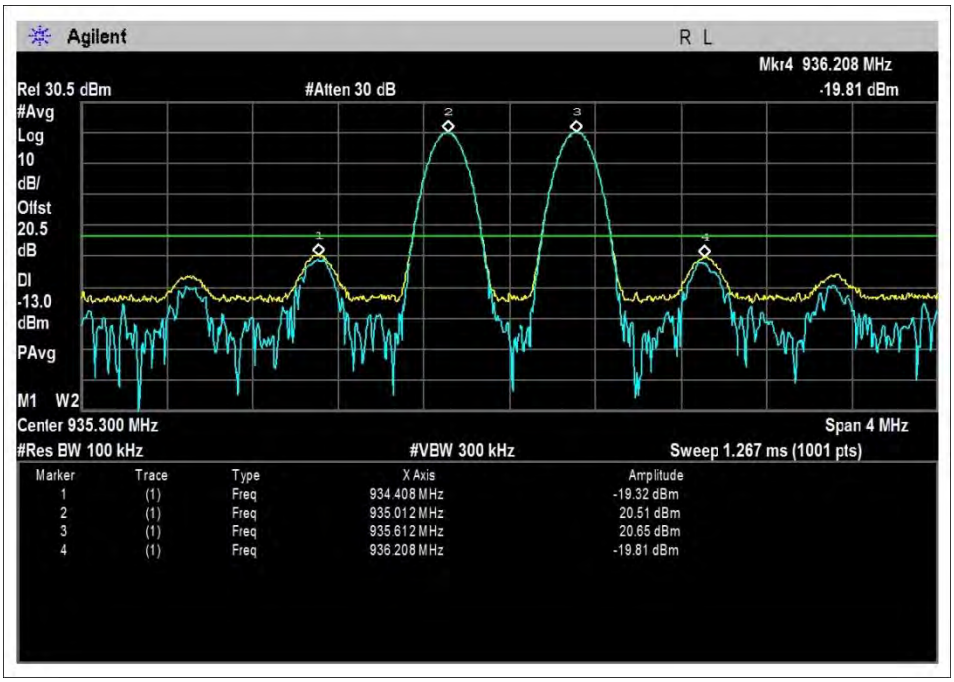
900MHz – DL - Output



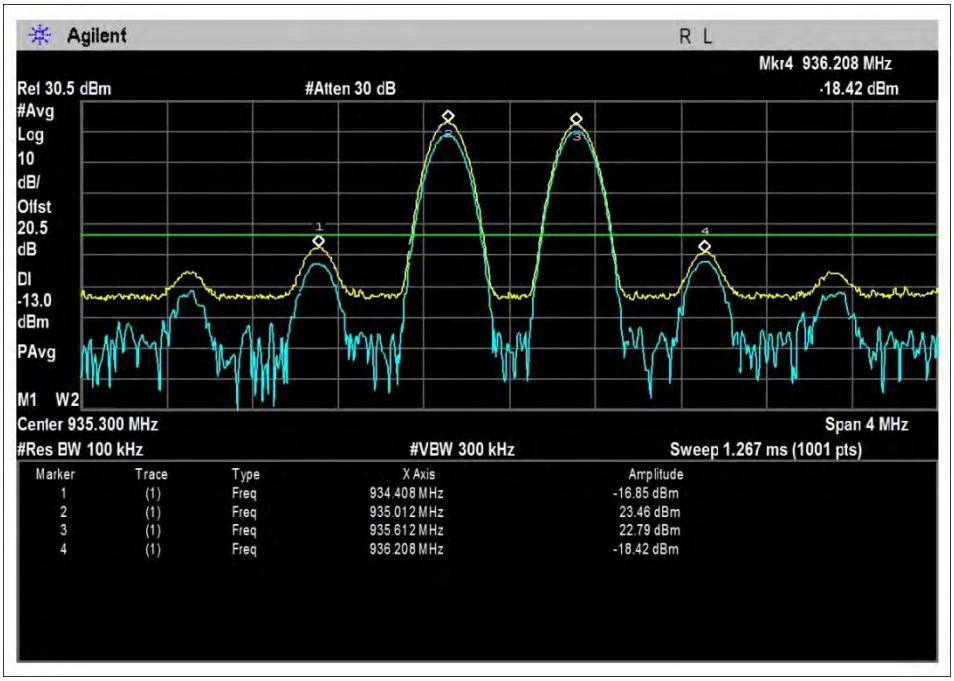
900M-DL-935-940H-28.1



InterCW-900M-DL-935-940H-AGC+10dB

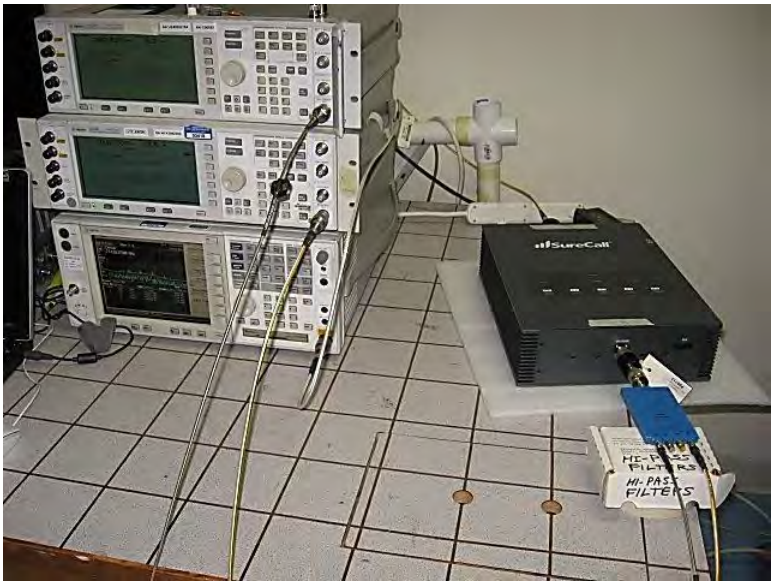


900M-DL-935-940L-28



900M-DL-935-940L-AGC+10dB

Test Setup Photo



2.1046 / Part 90 § 219(e)(1) Output Power

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**Maximum Power Measurement, 47 CFR §90.219(e)(1)**		
Work Order #:	**96794**	Date:	4/15/2015
Test Type:	**Conducted Emissions**	Time:	10:40:12
Equipment:	**Distributed Antenna System/Booster**	Sequence#:	1
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	Daniel Bertran
Model:	Force3 PSB		120V 60Hz
S/N:	201502PS000001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP06131	Attenuator	18N20W-20	2/27/2014	2/27/2016
	ANP05713	Attenuator	PE7015-20	3/24/2015	3/24/2017
	ANP06709	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	ANP06710	Cable	32026-29094K-29094K-72TC	9/18/2014	9/18/2016
	AN03470	Spectrum Analyzer	E4440A	12/2/2013	12/2/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Distributed Antenna System/Booster *	Cellphone-Mate, Inc.	Force3 PSB	201502PS000001

Support Devices:

Function	Manufacturer	Model #	S/N
AC Adapter	Adapter Tech.	STD-1805	NA
Signal Generator	Agilent	E4433B	US40052164
Signal Generator	Agilent	E4438C	MY42082260

Test Conditions / Notes:

The EUT is placed on the test bench. Evaluation performed at the Outside and Inside antenna port.
UL: 788-798, 799-805, 806-817, 817-824, 896-901 MHz
DL: 758-768, 769-775, 851-862, 862-869, 935-940 MHz
All adjustable settings on the test sample are set at max.
Test environment conditions: 20°C, 40% Relative Humidity, 102.5kPa
Test procedure: The test was performed in accordance with Appendix D3 of the FCC document: 935210 D02 Signal Booster Certification Requirements v02r01 Dated July 24, 2014
Software: SC_S1_Public_V3.0; Firmware: V1.0
Notes: The frequency with the highest power level in each operational band is measured.
Since the equipment under test (EUT) uses automatic gain control (AGC), results are shown with and without AGC activated. Results, unless otherwise noted, are worst-case measurements. Maximum gain is also verified; plots show the output power is maintained or decreased while the input drive level is increased 3dB over the AGC level.
As shown on the plots in the below test data section, the output power was maintained at the measured output level while input power was increased until the booster shuts down.

Part 90.219– Emission Limits

(e)(1) The output power capability of a signal booster must be designed for deployments providing a radiated power not exceeding 5 Watts ERP for each retransmitted channel.

Carrier Output Power (Conducted) Summary of Results

Pass: As summarized in tables below, calculated ERP from measured Conducted Power and Gain, are within limits.

900MHz Interleaved and Public Safety 700MHz/800MHz bands

Band	Link	Carrier frequency*	SA reading (dBm) PreAGC (AGC-0.5dB)	SA reading (dBm) AGC	SA reading (dBm) AGC+3dB	Conducted Output Power (dBm)	Limit (dBm)	Margin (dBm)	Result
700M	Uplink	799	24.93	26.13	26.98	26.98	37	-10.02	Pass**
800M	Uplink	808.9	26.04	26.31	26.31	26.31	37	-10.69	Pass**
700M	Downlink	770.5	25.91	26.17	27.20	27.20	37	-9.80	Pass**
800M	Downlink	858.95	24.45	25.85	26.87	26.87	37	-10.13	Pass**
700M	Uplink	795.5	25.95	25.89	25.25	25.95	37	-11.05	Pass**
700M	Downlink	763	25.42	25.62	27.81	27.81	37	-9.19	Pass**

ESMR band

Band	Link	Carrier frequency*	SA reading (dBm) PreAGC (AGC-0.5dB)	SA reading (dBm) AGC	SA reading (dBm) AGC+3dB	Output Power (dBm)	Limit (dBm)	Margin (dBm)	Result
800M	Uplink	817	25.11	25.37	25.48	25.48	37	-11.52	Pass**
900M	Uplink	898.2	24.79	25.04	25.97	25.97	37	-11.03	Pass**
800M	Downlink	865.95	24.19	24.25	25.42	25.42	37	-11.58	Pass**
900M	Downlink	938.696	25.03	26.03	26.9	26.9	37	-10.1	Pass**

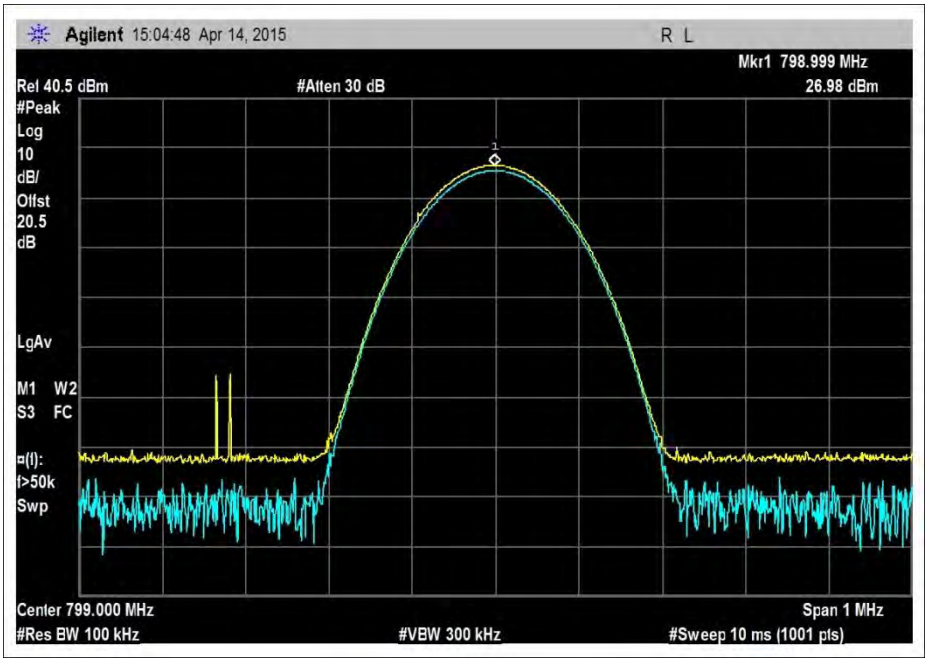
*The frequency with the highest power level in each operational band is measured using procedure as determined in section 7.1 of 935210 D03 Signal Booster Measurements v02r01 Dated July 24, 2014.

**There are no specific antennas and cables supplied with the EUT. Cable loss and antenna gain must not exceed the power margin in dB.

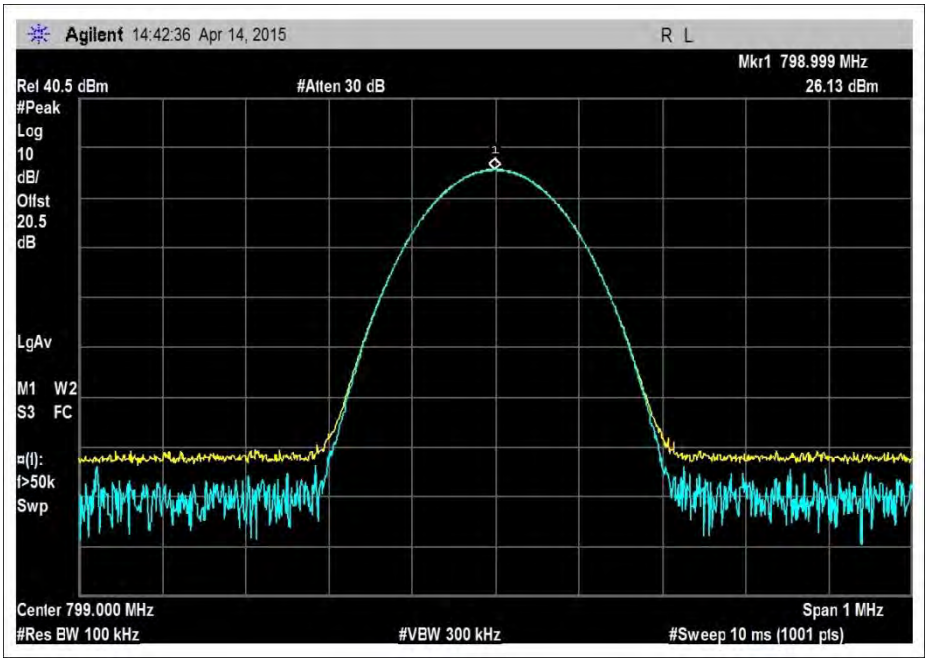
Antenna Assembly Gain (dBd) = Antenna Gain (dBd)-Feeder Loss (dB) = Antenna Gain (dBi)-2.15-Feeder Loss (dB)

Test Data

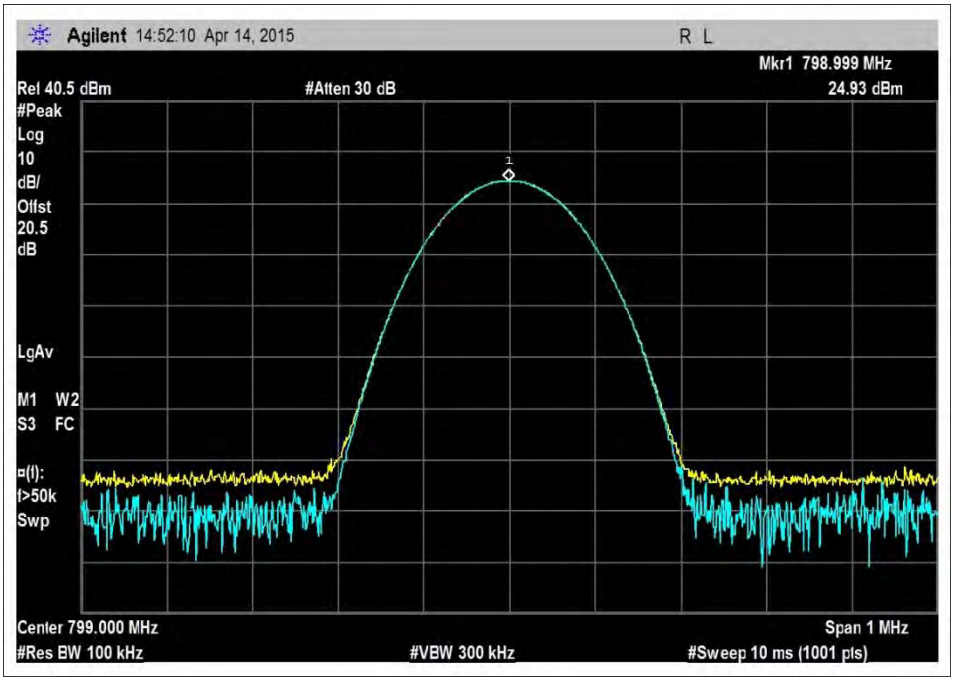
700MHz – UL



PS_700M_UL_M+3

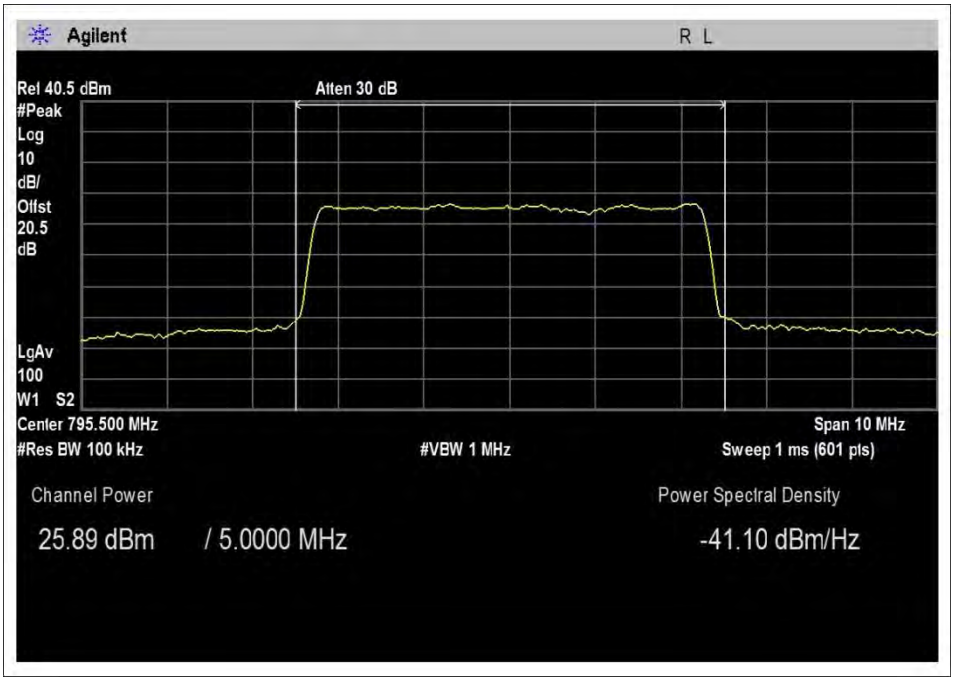


PS_700M_UL_M-29.5

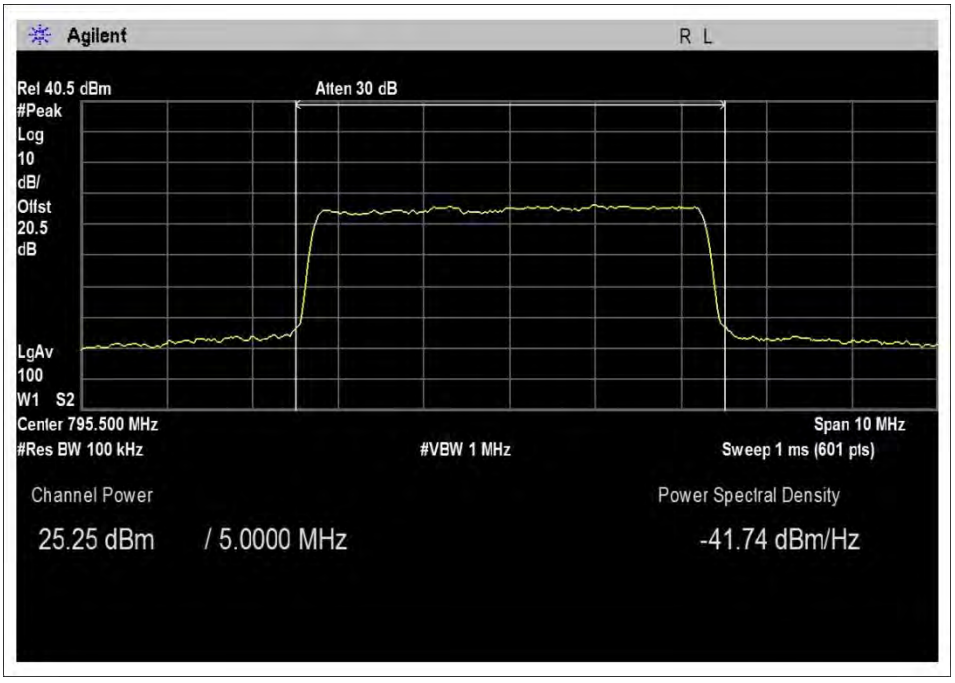


PS_700M_UL_M-AGC

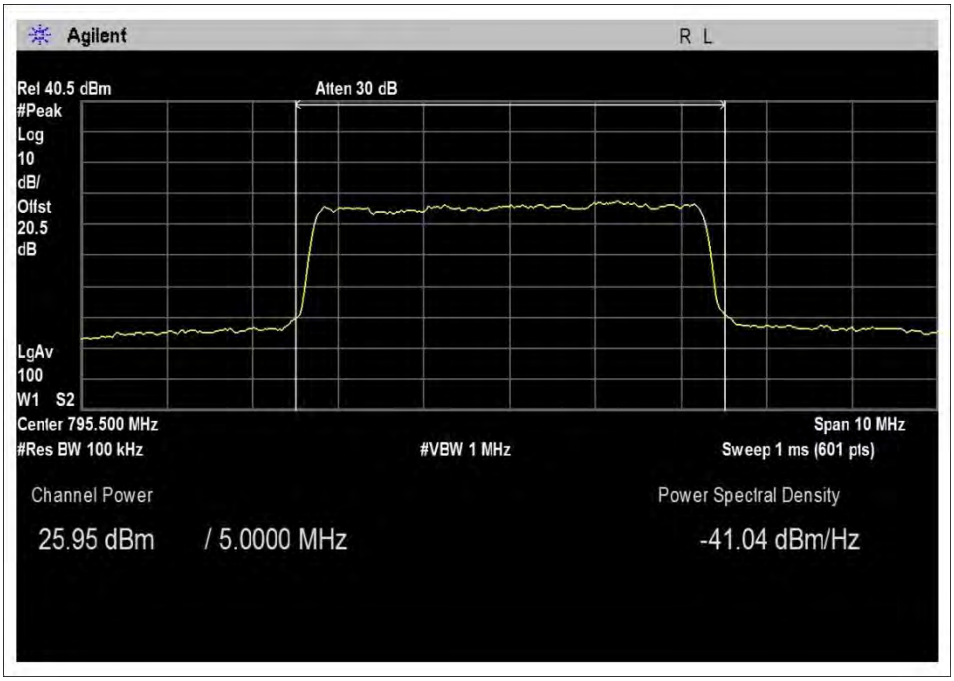
LTE- 700MHz – UL



LTE_700M_UL-788-798H-AGC

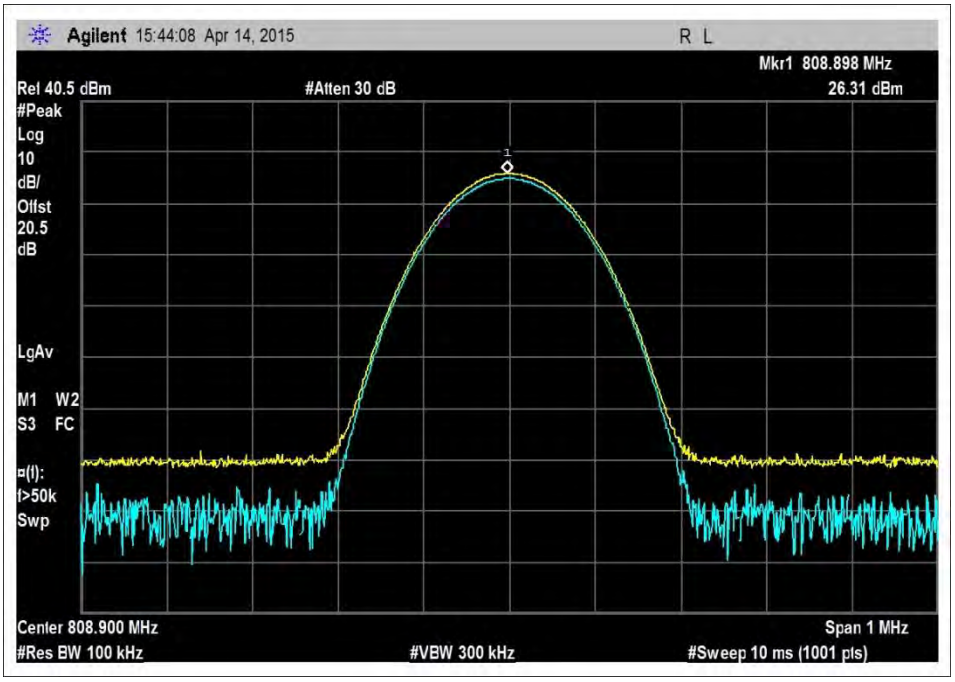


LTE_700M_UL-788-798H-AGC+3

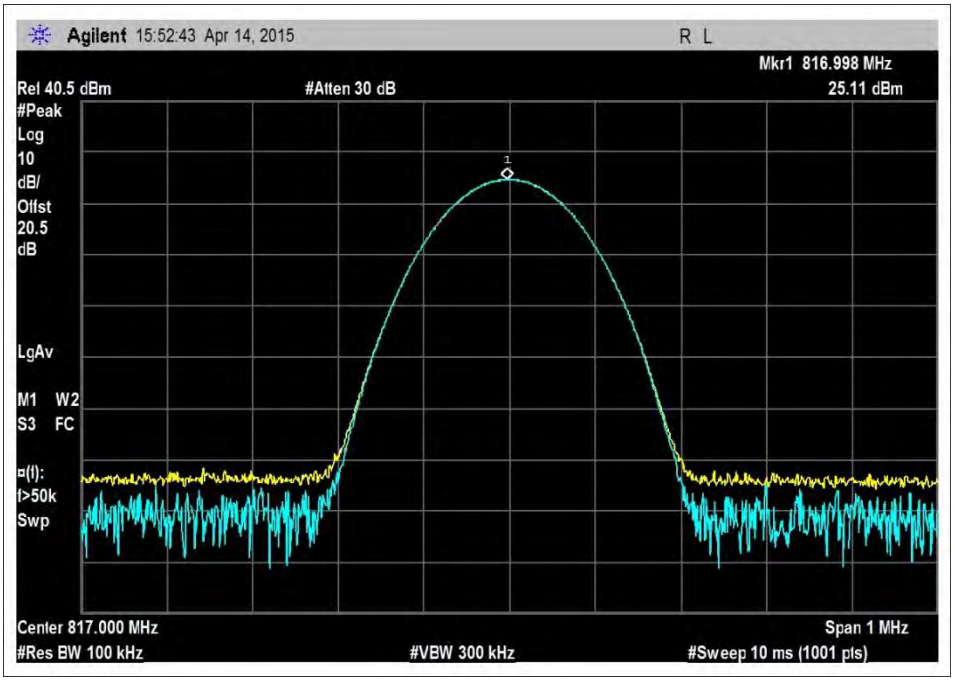


LTE_700M_UL-788-798H-PreAGC

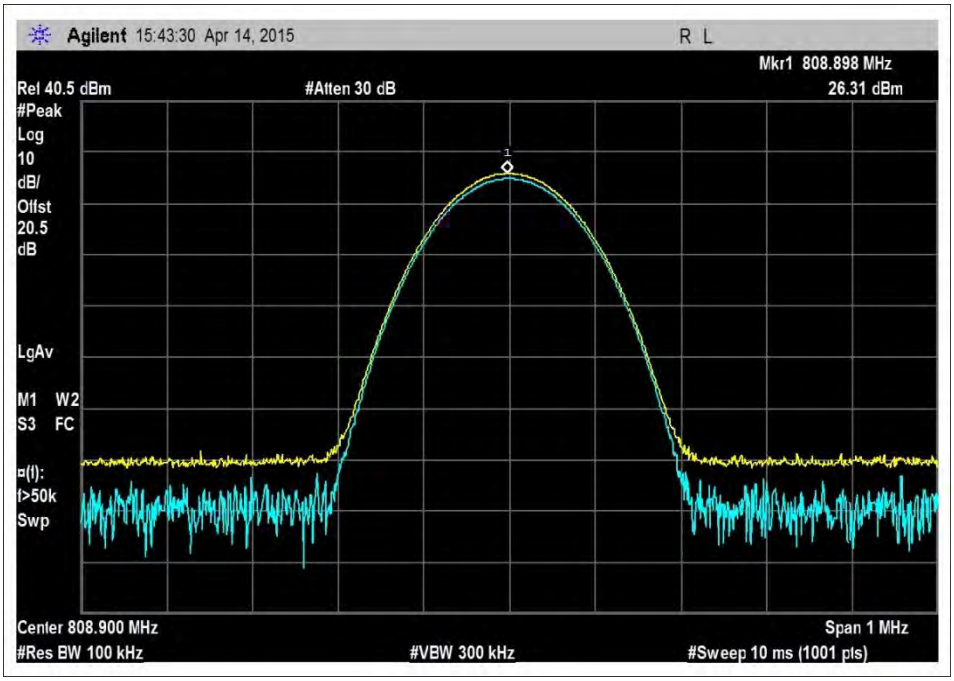
PS 800MHz – UL



PS_800M_UL_M+3

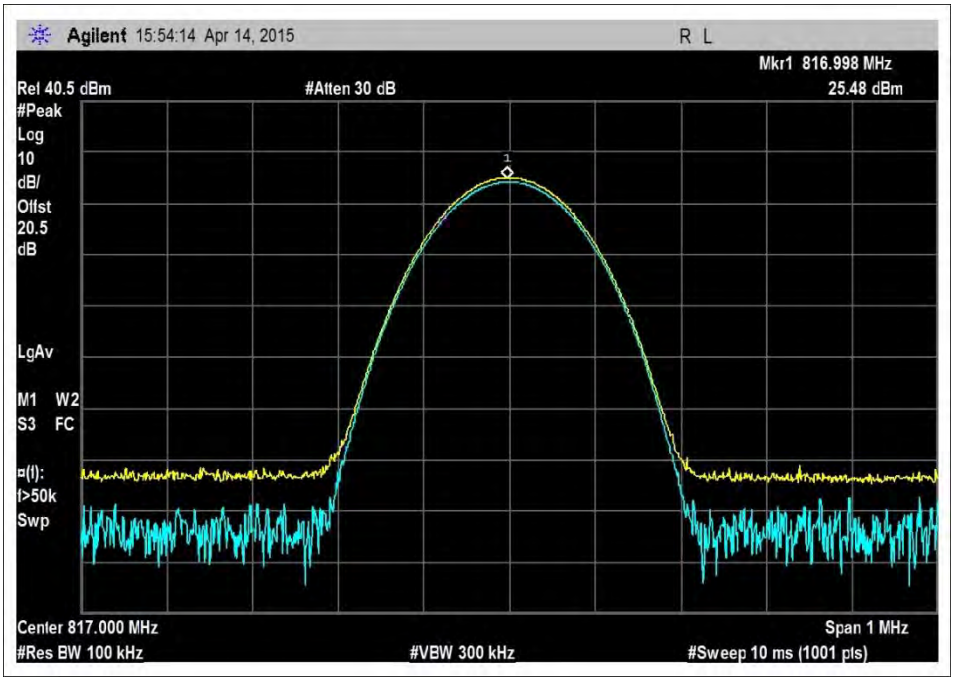


PS_800M_UL_M-31.1

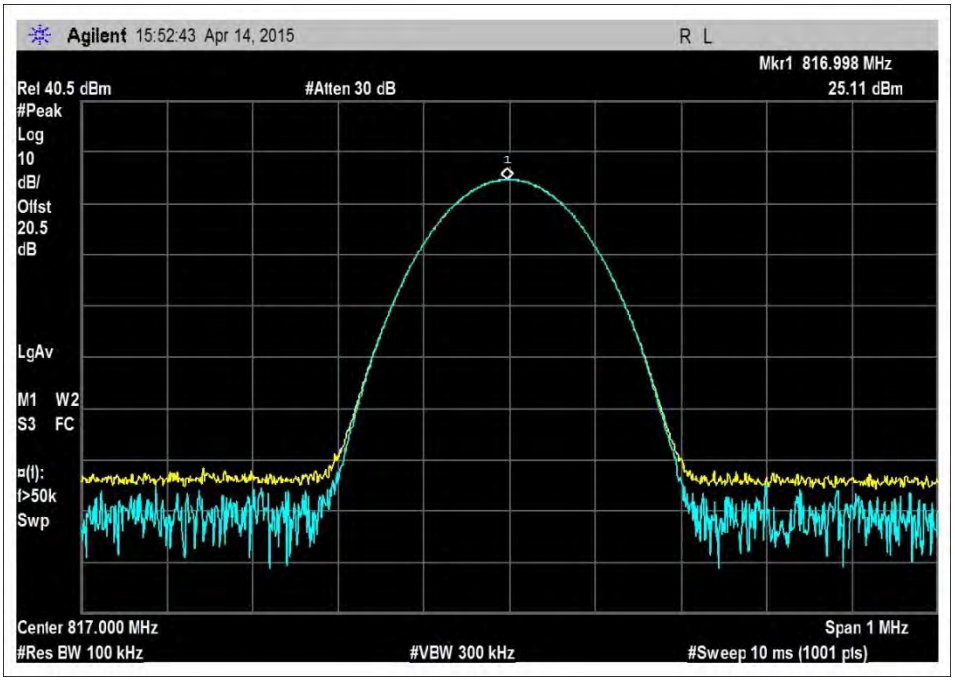


PS_800M_UL_M-AGC

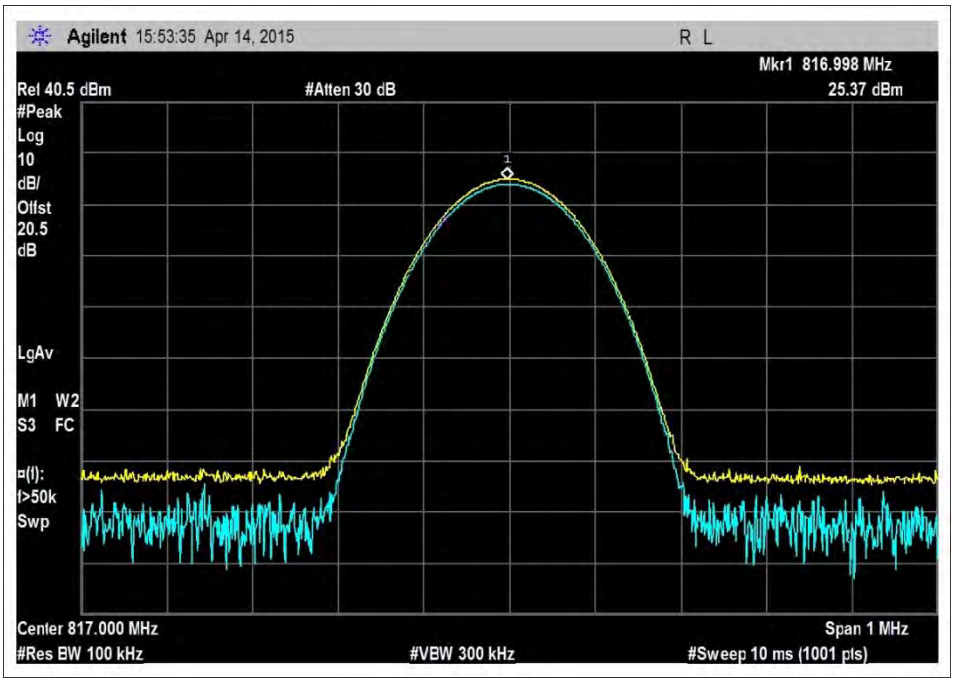
SMR 800MHz – UL



SMR_800M_UL_M+3

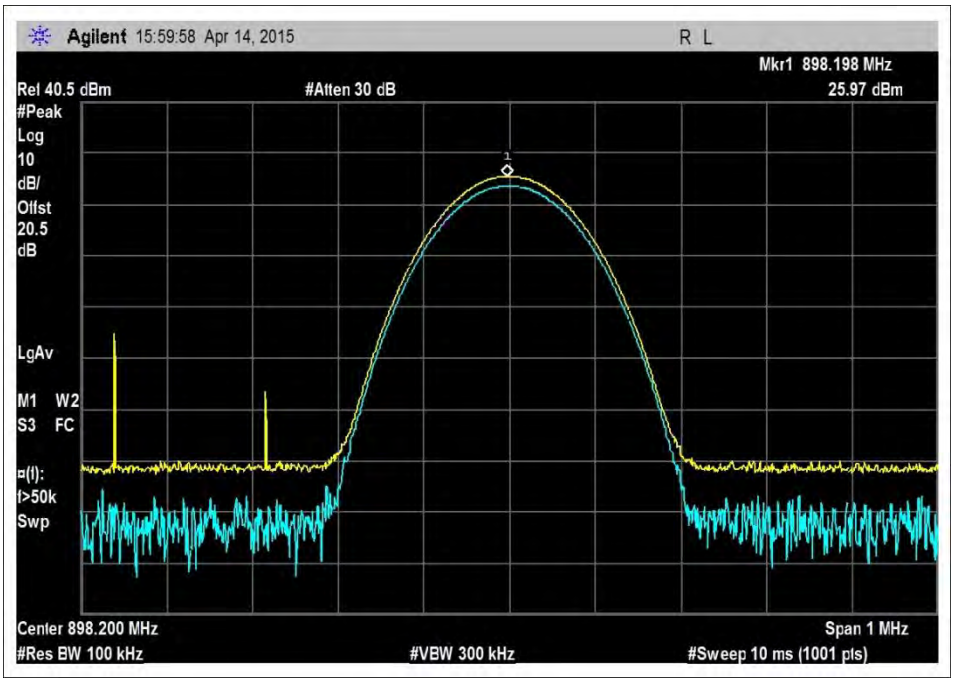


SMR_800M_UL_M-28.8

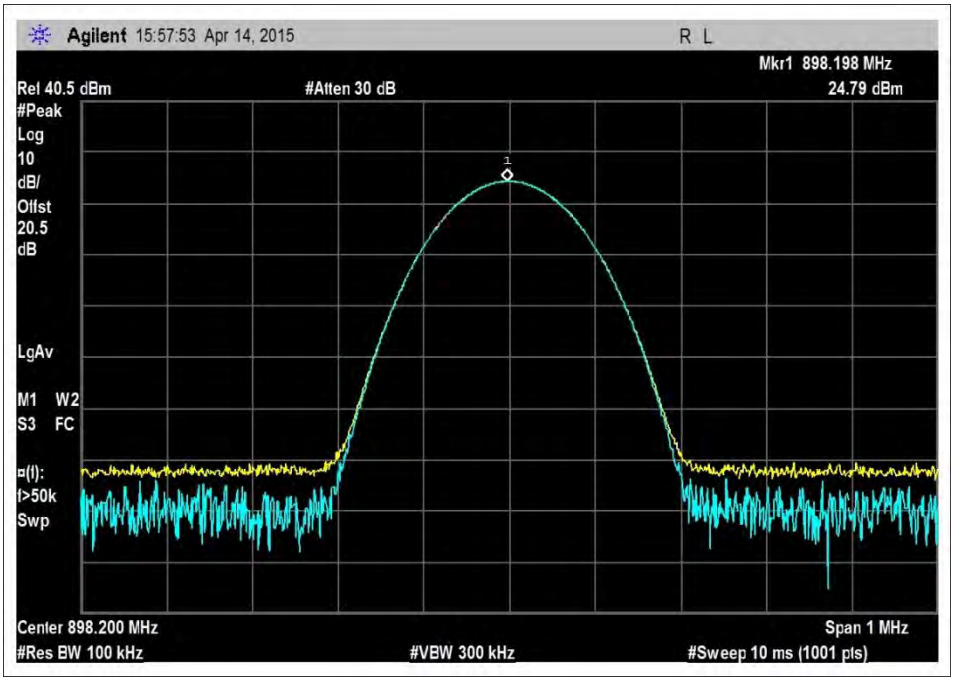


SMR_800M_UL_M-AGC

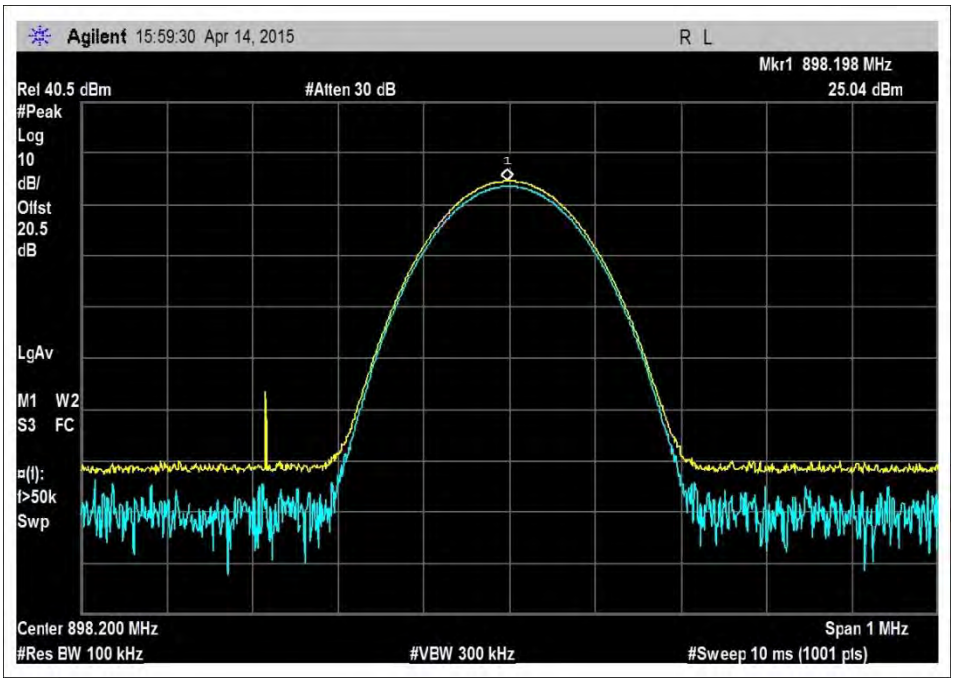
SMR 900MHz – UL



SMR_900M_UL_M+3

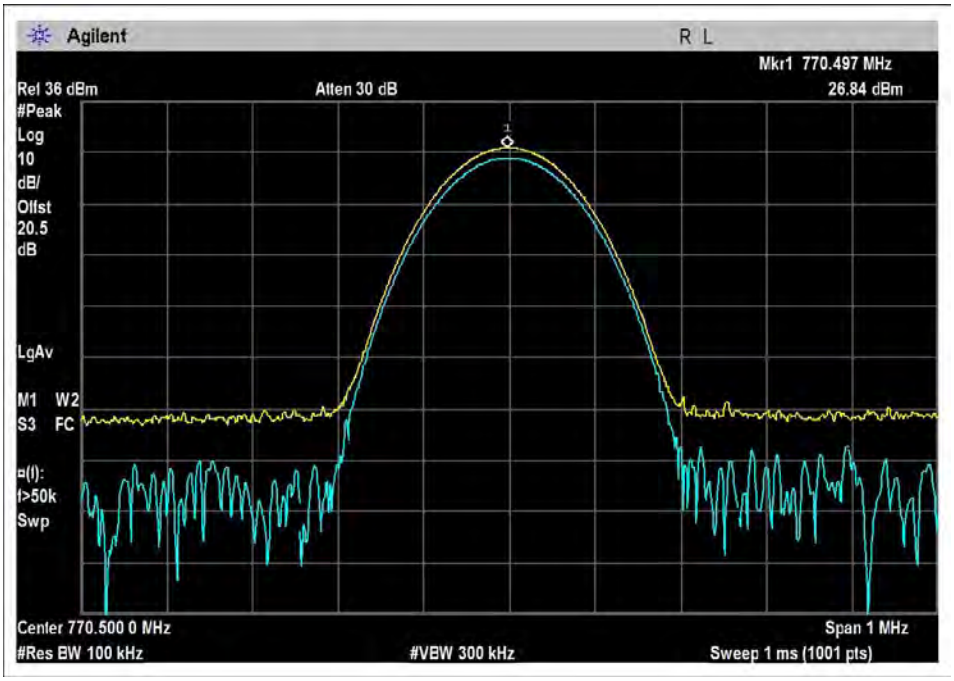


SMR_900M_UL_M-30.2

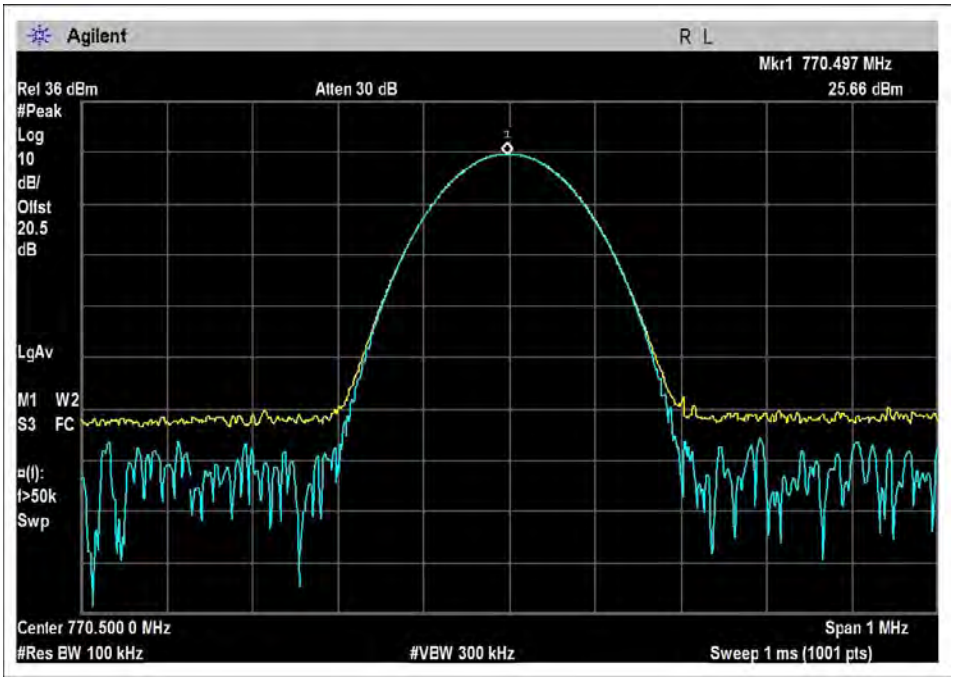


SMR_900M_UL_M-AGC

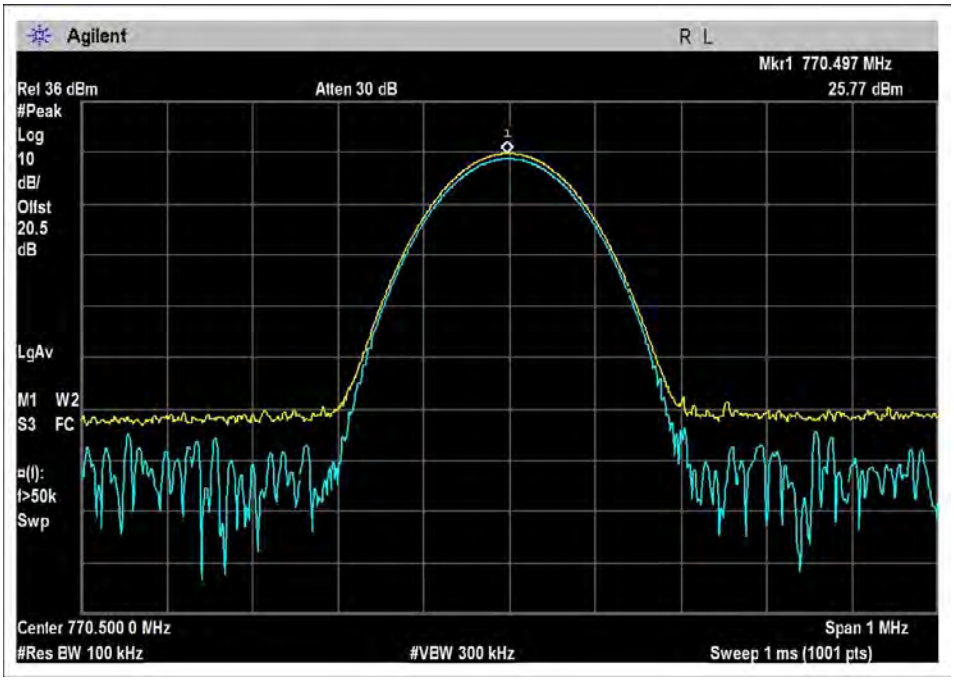
PS 700MHz – DL



PS_700M_DL_M+3

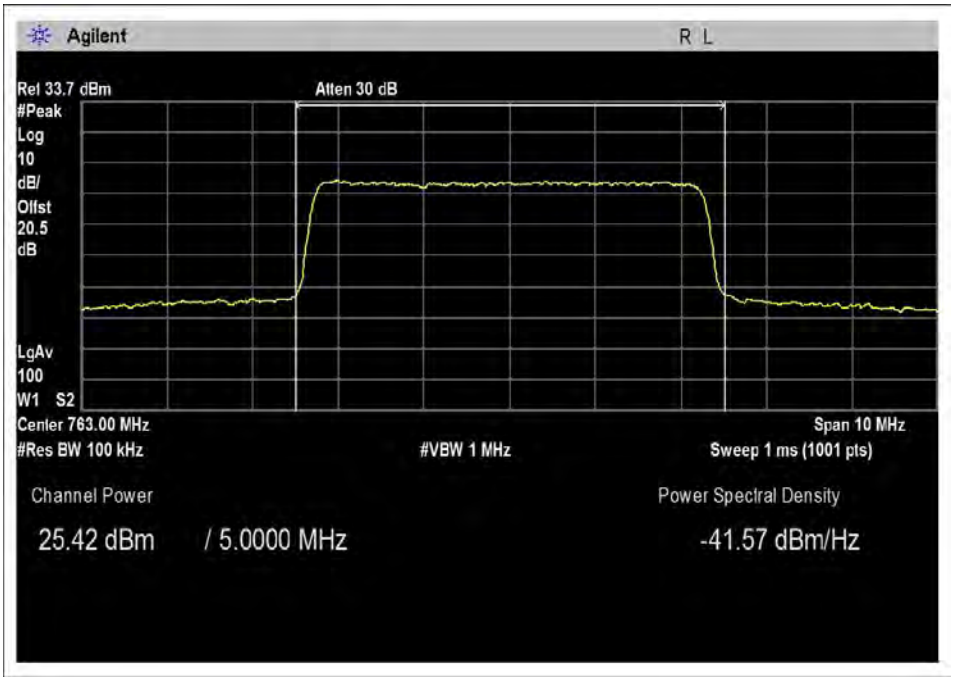


PS_700M_DL_M-36.1

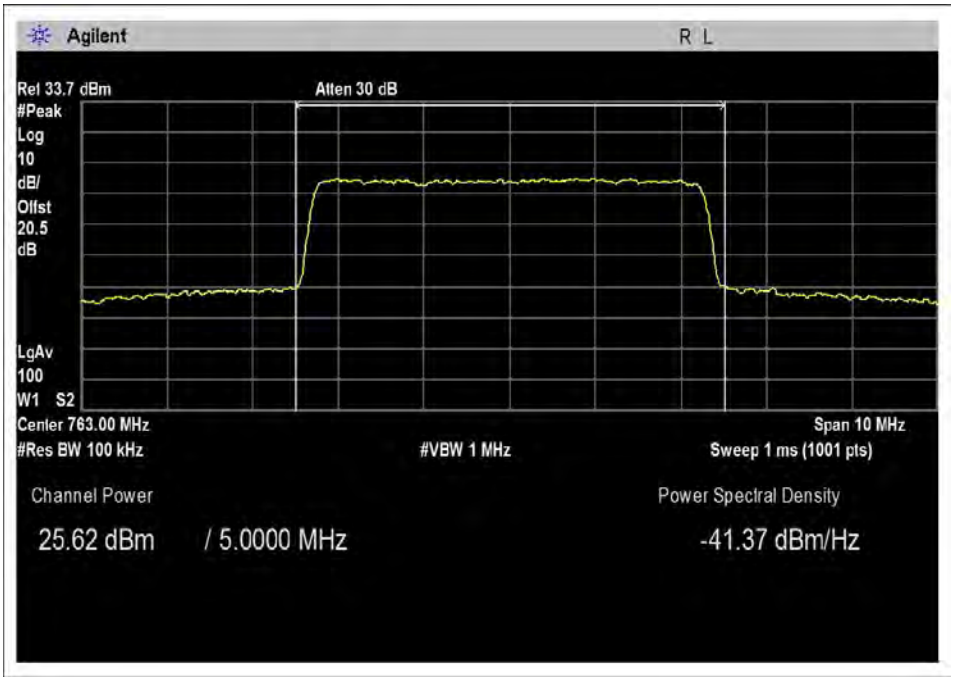


PS_700M_DL_M-AGC

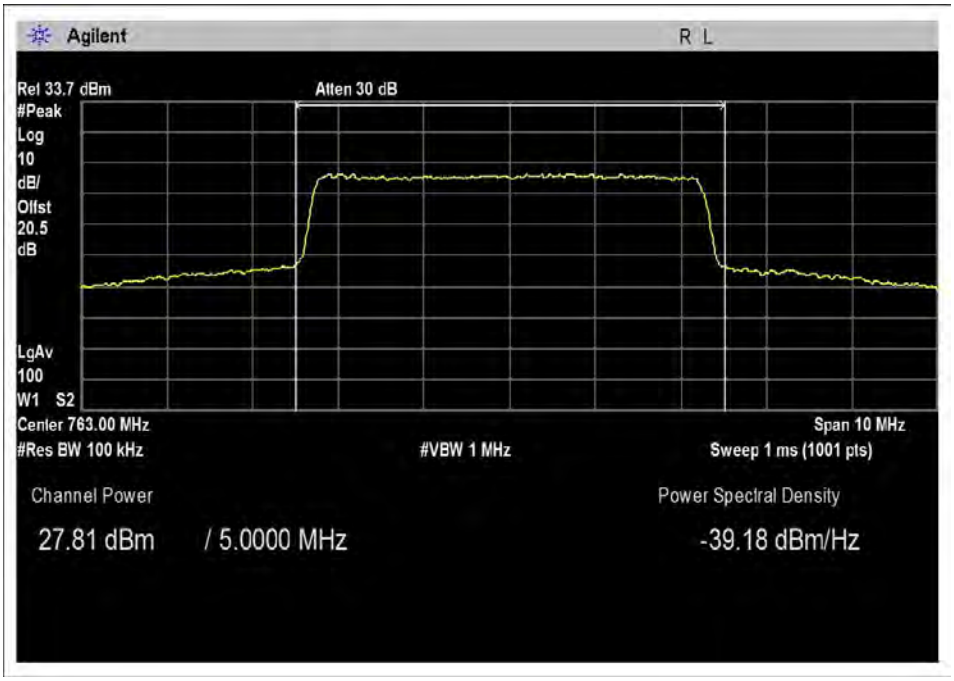
LTE- 700MHz – DL



LTE_700M_DL-758-768M-PreAGC

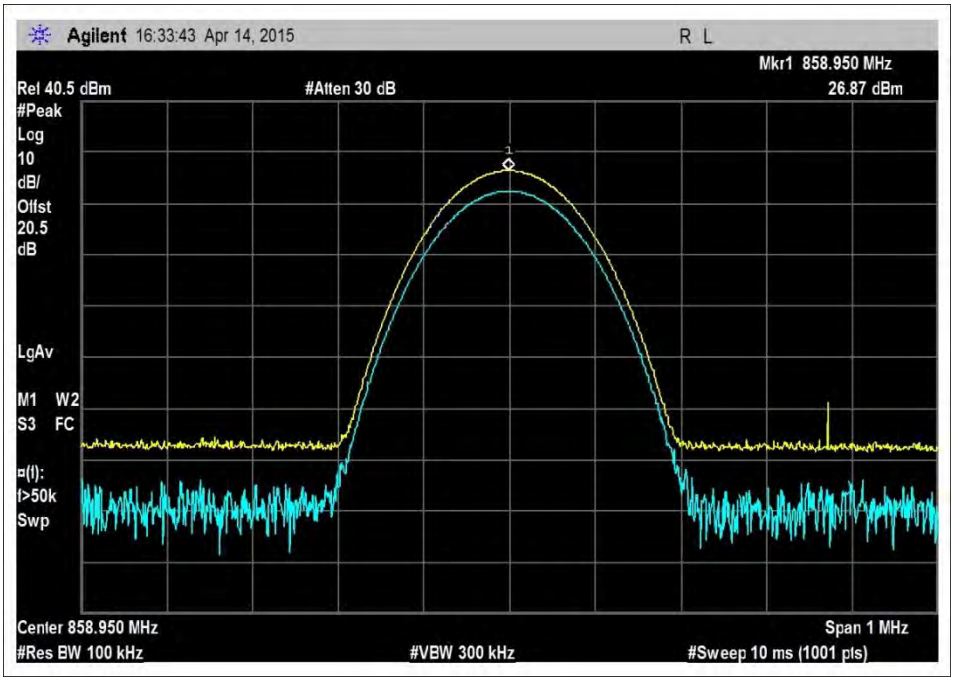


LTE_700M_DL-758-768M-AGC

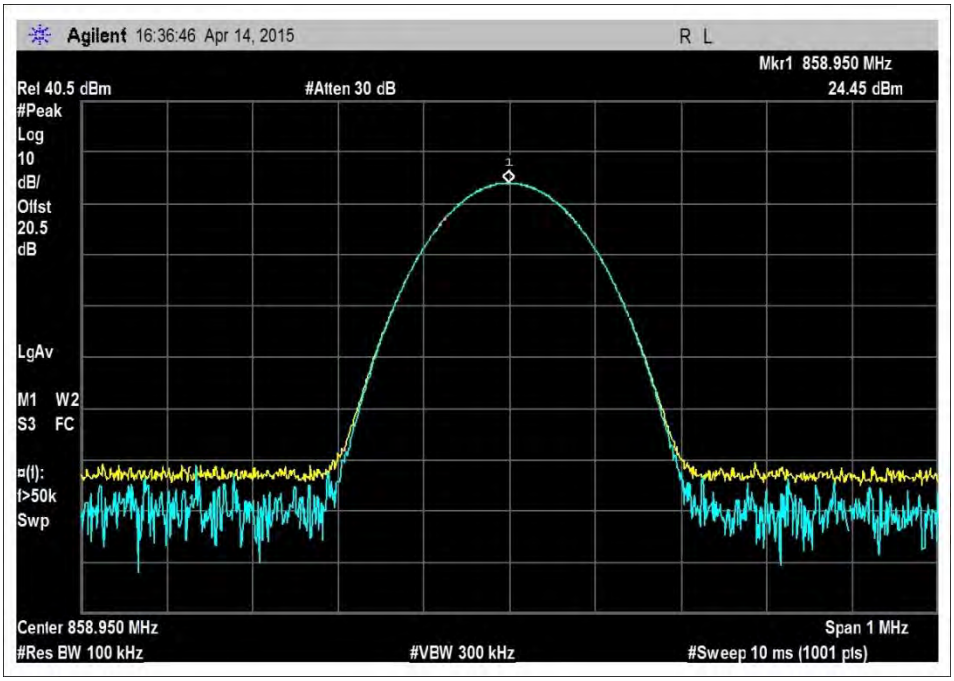


LTE_700M_DL-758-768M-AGC +3

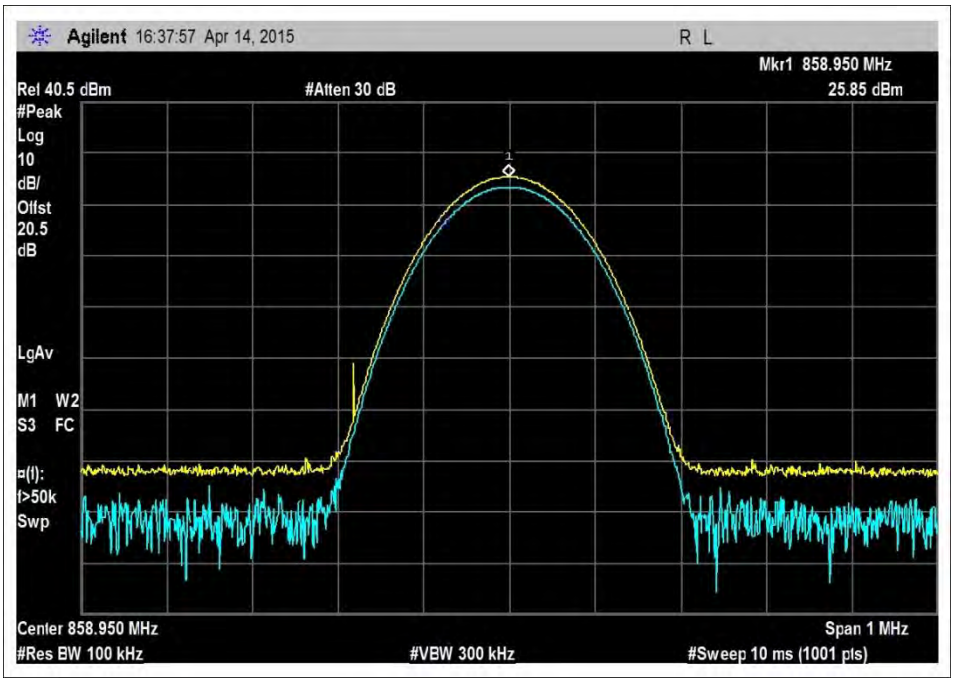
PS 800MHz –DL



PS_800M_DL_M+3

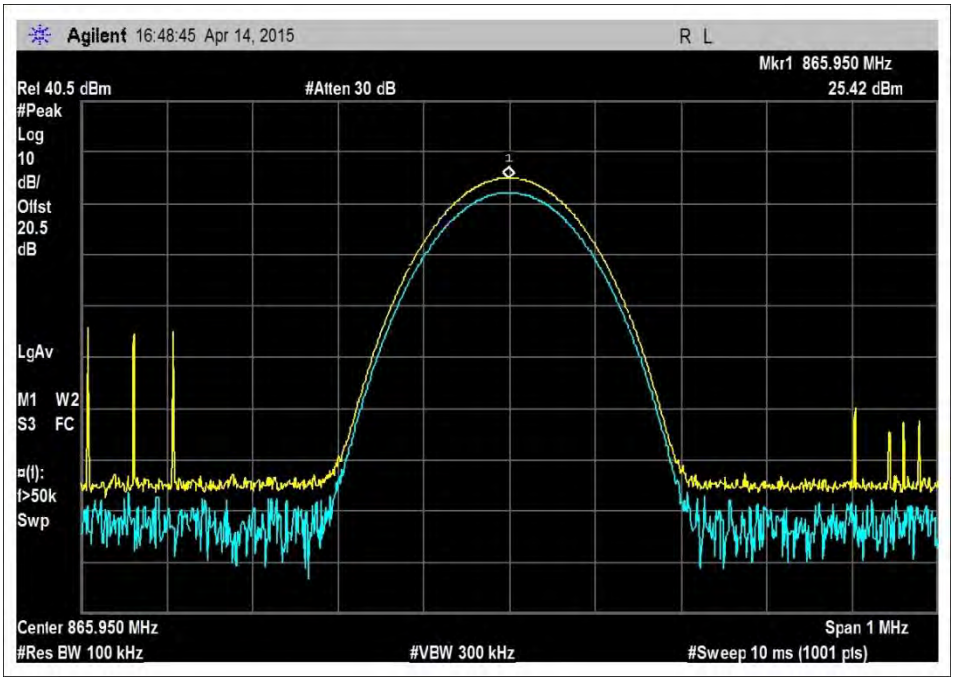


PS_800M_DL_M-30.4

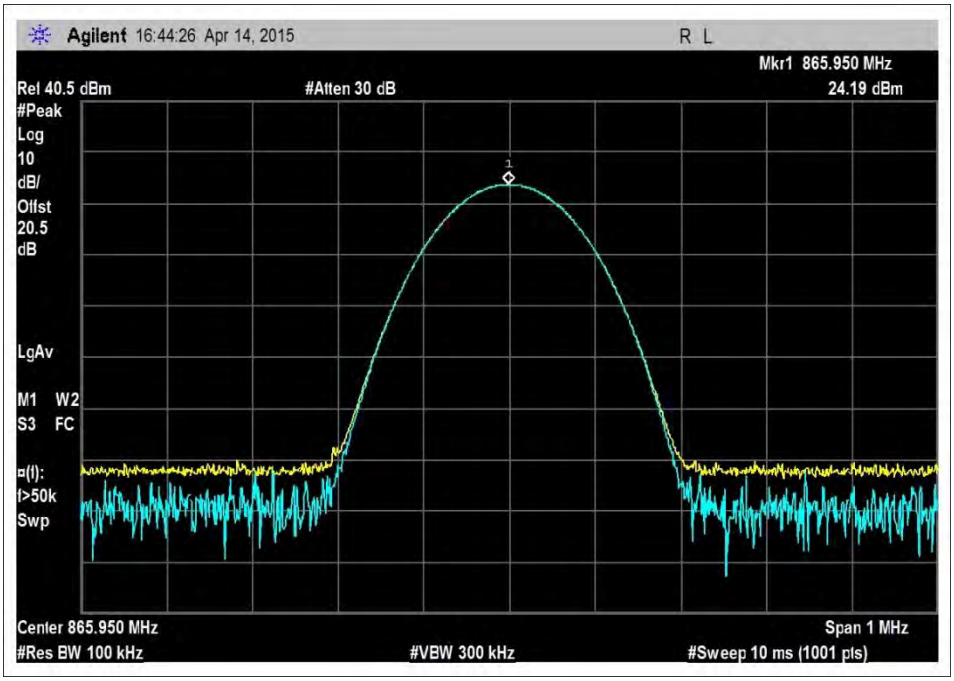


PS_800M_DL_M-AGC

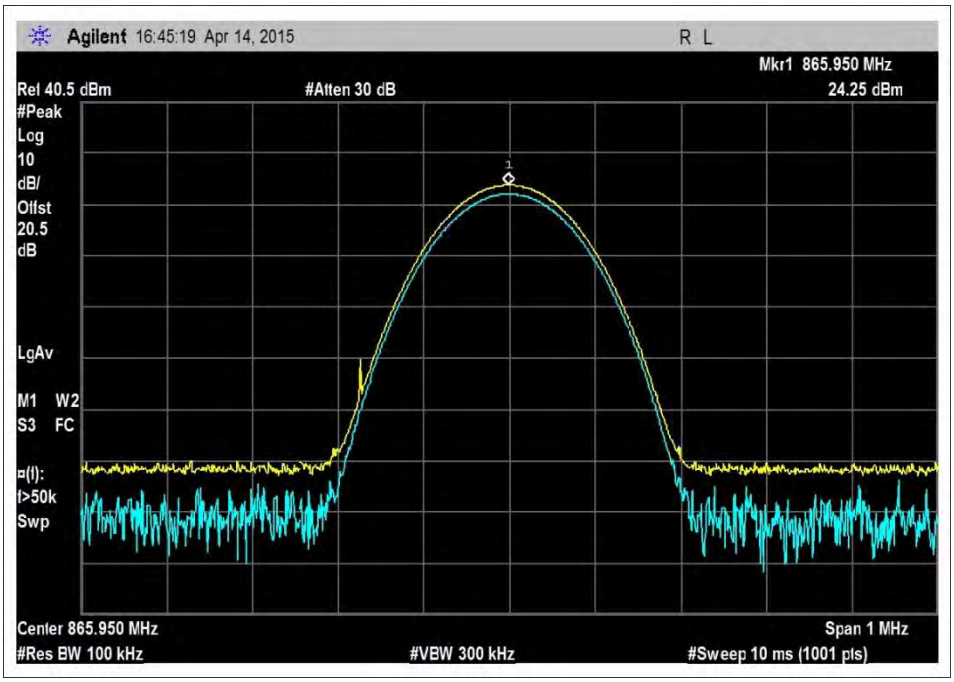
SMR 800MHz –DL



SMR_800M_DL_M+3

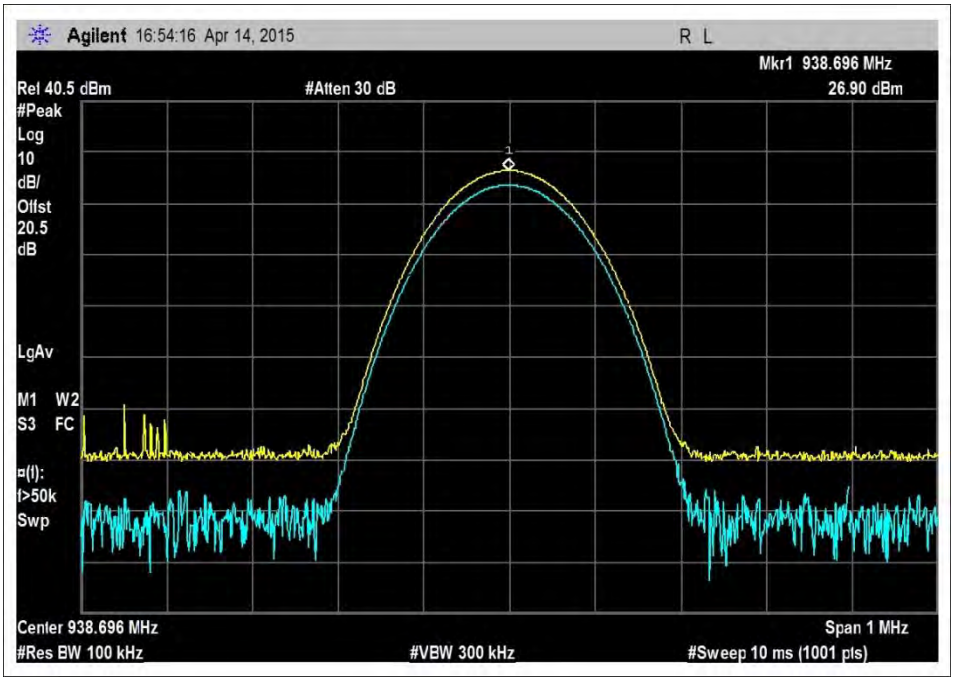


SMR_800M_DL_M-30.7

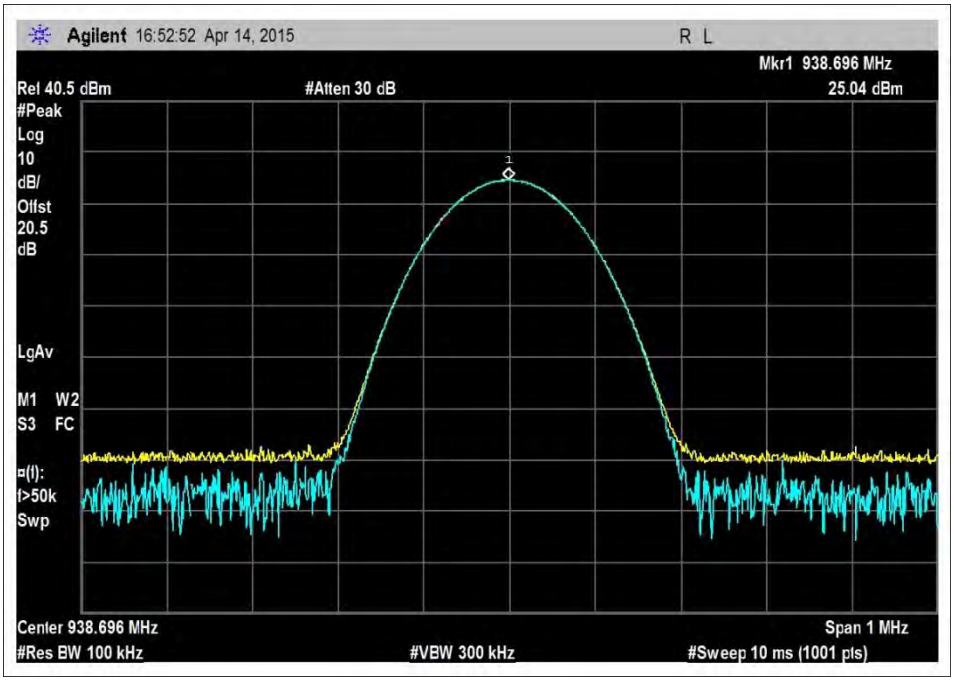


SMR_800M_DL_M-AGC

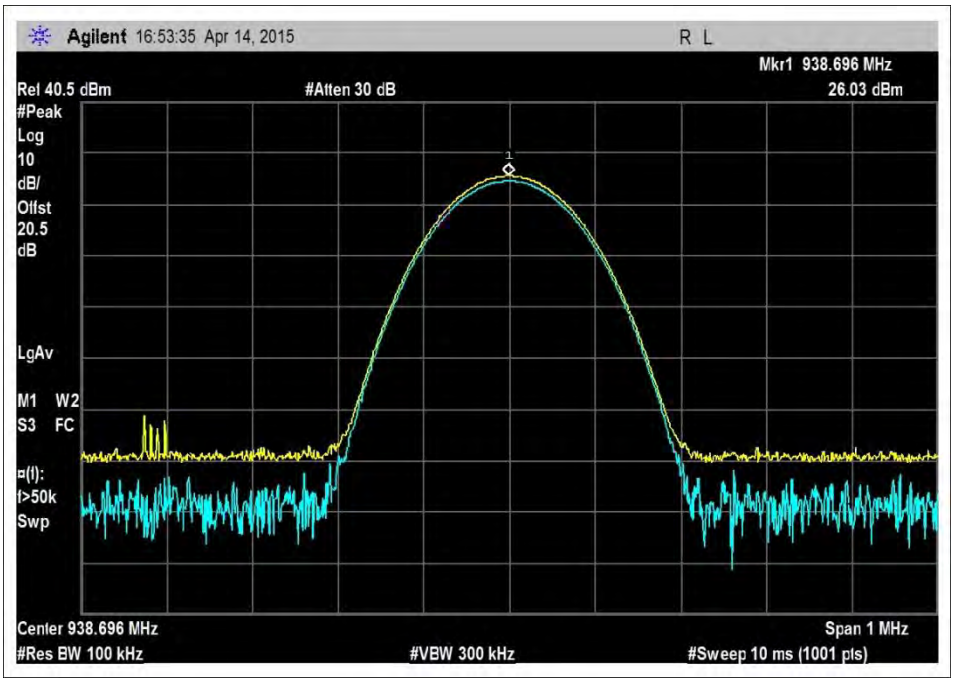
SMR 900MHz –DL



SMR_900M_DL_M+3

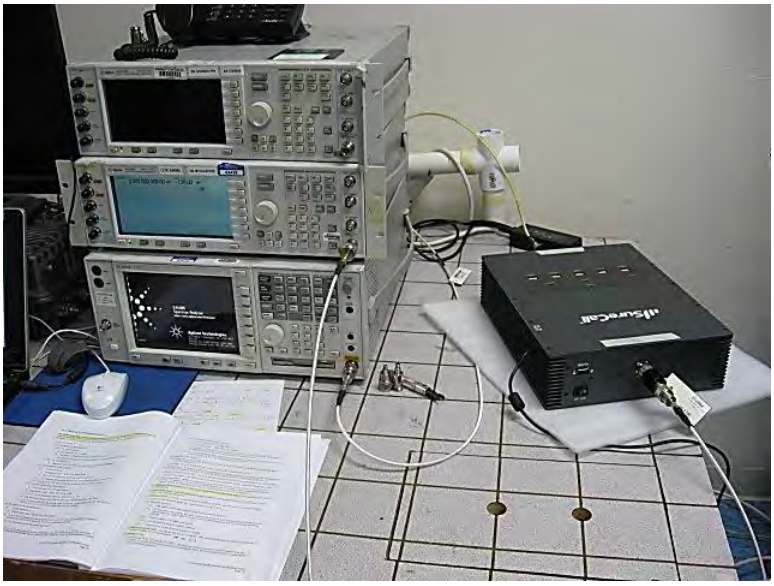


SMR_900M_DL_M-33.6



SMR_900M_DL_M-AGC

Test Setup Photo



Part 90 § 219(e)(2) Noise Figure

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer:	**Cellphone-Mate, Inc.**		
Specification:	**47 CFR §90.219(e)(2) Noise Figure**		
Work Order #:	**96794**	Date:	4/15/2015
Test Type:	**Conducted Emissions**	Time:	10:40:12
Equipment:	**Distributed Antenna System/Booster**	Sequence#:	1
Manufacturer:	Cellphone-Mate, Inc.	Tested By:	Daniel Bertran
Model:	Force3 PSB		120V 60Hz
S/N:	201502PS000001		

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
	AN03537	Noise Source	346A	3/10/2015	3/10/2017

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Distributed Antenna System /Booster*	Cellphone-Mate, Inc.	Force3 PSB	201502PS000001

Support Devices:

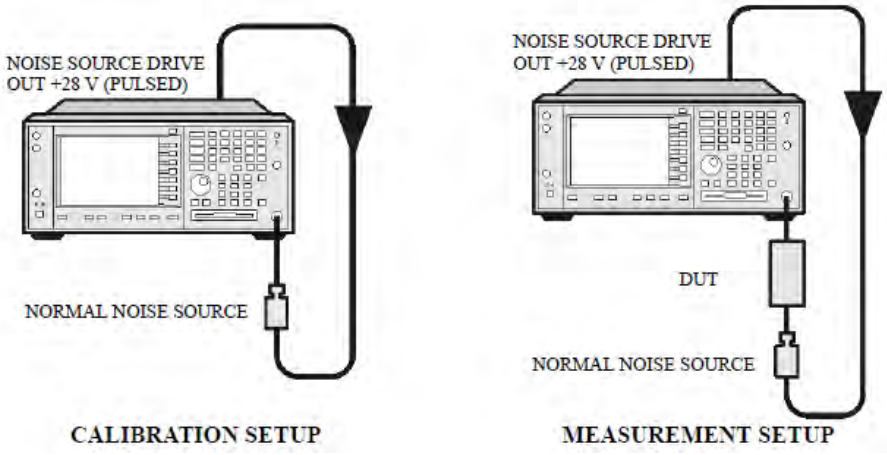
Function	Manufacturer	Model #	S/N
AC Adapter	Adapter Tech.	STD-1805	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the test bench. Evaluation performed at the Outside and Inside antenna port. EUT set at maximum gain.
Evaluation of DL path was performed with signal fed into the Outside antenna port while Inside antenna port terminated with 50 Ohm load.
Evaluation of UL path was performed with signal fed into the Inside antenna port while Outside antenna port terminated with 50 Ohm load.
UL: 788-798, 799-805, 806-817, 817-824, 896-901 MHz
DL: 758-768, 769-775, 851-862, 862-869, 935-940 MHz
All adjustable settings on the test sample are set at max.
Test environment conditions: 20°C, 40% Relative Humidity, 102.5kPa

The EUT is set up as shown in the setup picture. A calibrated noise source is connected to outside port and powered with a +28 (pulsed) using a 1 meter BNC cable (50 ohms) which is connected at the rear of the spectrum analyzer.
Noise figure is measured on the downlink path following the Noise Figure Measurements Personality Guide provided by Agilent. The same test is repeated for all uplink operational bands with the calibrated noise source connected to inside port.
Software: SC_S1_Public_V3.0
Firmware: V1.0

Figure 4-1 PSA Basic Noise Figure Measurement - No Frequency Conversion

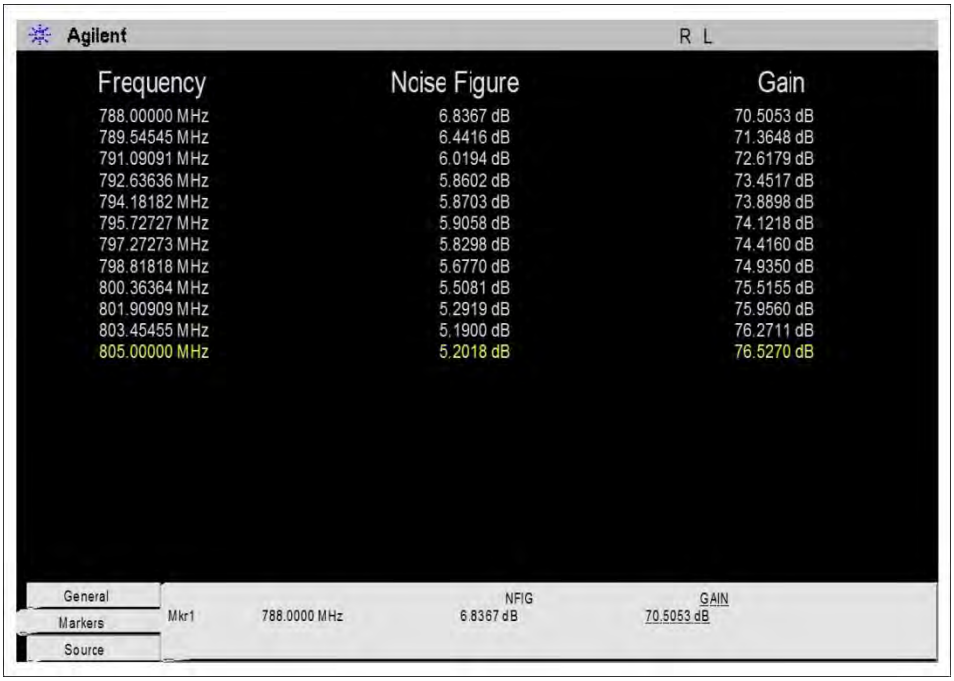


Noise Figure - Summary of Results

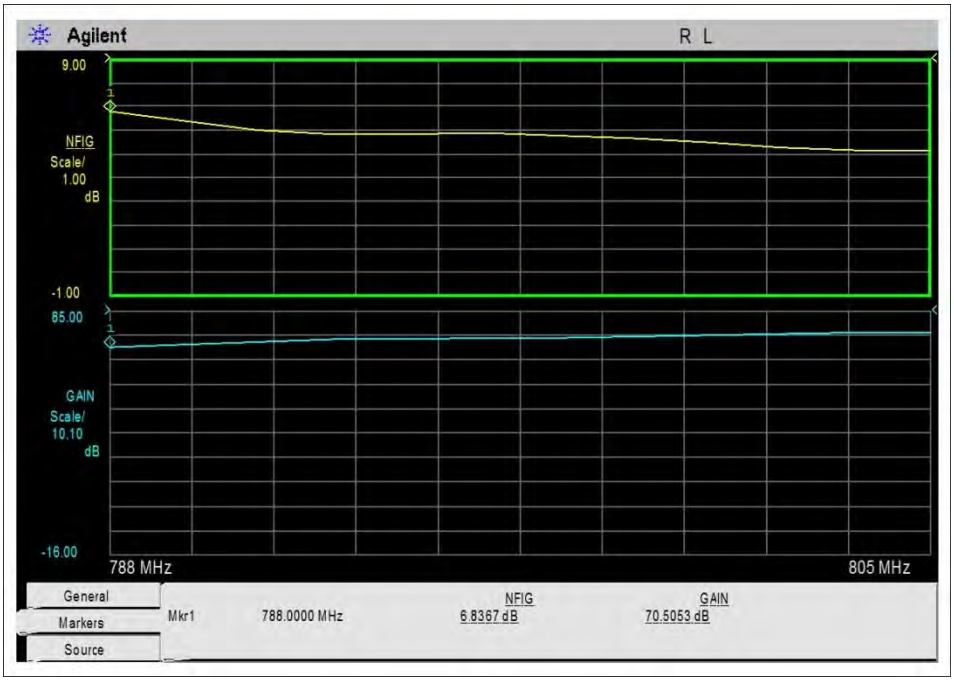
Pass: As summarized in tables and plots below, the noise figure are within limits.

Link	Band	Noise Figure (dB)	Limit (dB)	Margin (dB)
UL	PS-700M	6.84	9	2.16
UL	PS-800M	5.58	9	3.42
UL	ESMR-800M	6.44	9	2.56
UL	Interleaved-900M	6.68	9	2.32
DL	PS-700M	6.14	9	2.86
DL	PS-800ML	5.73	9	3.27
DL	ESMR-800MH	6.09	9	2.91
DL	Interleaved-900M	5.46	9	3.54

700MHz –UL

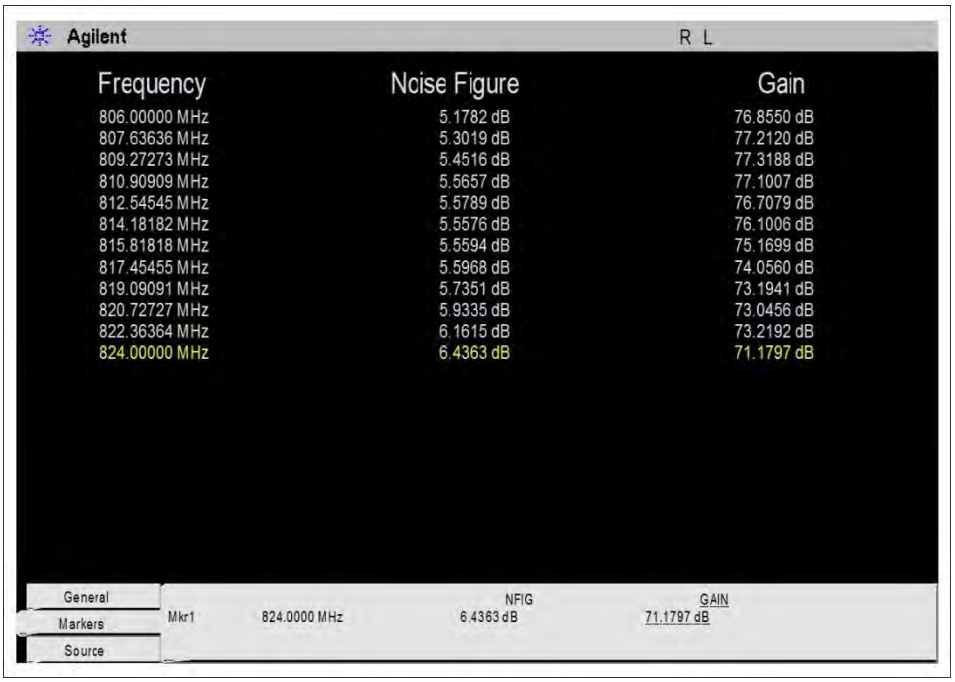


NF-UL-700M-Data

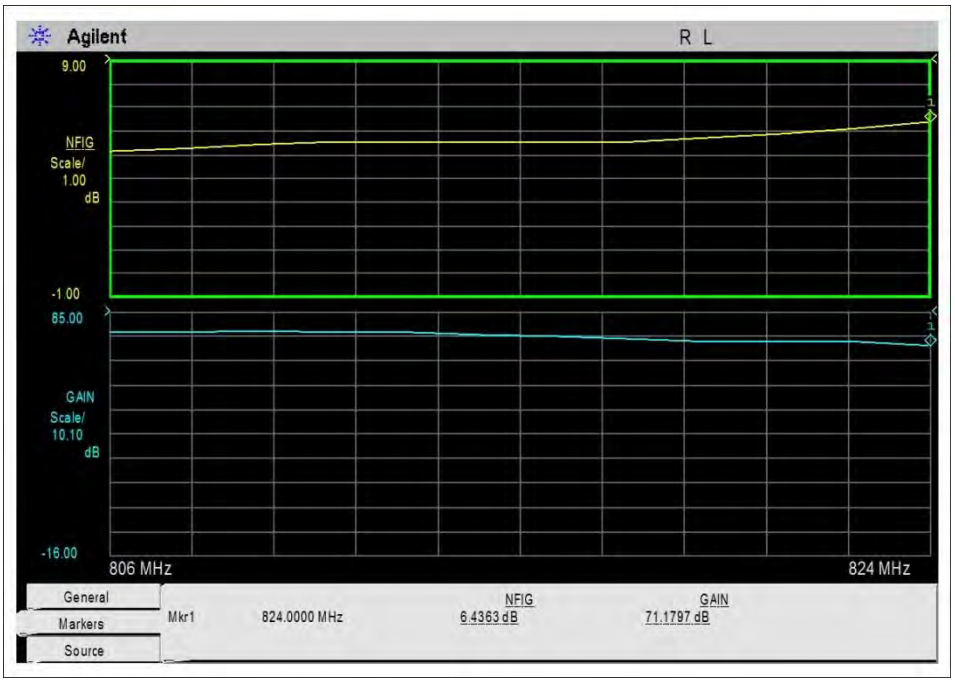


UL-700M-Graphs

800MHz –UL

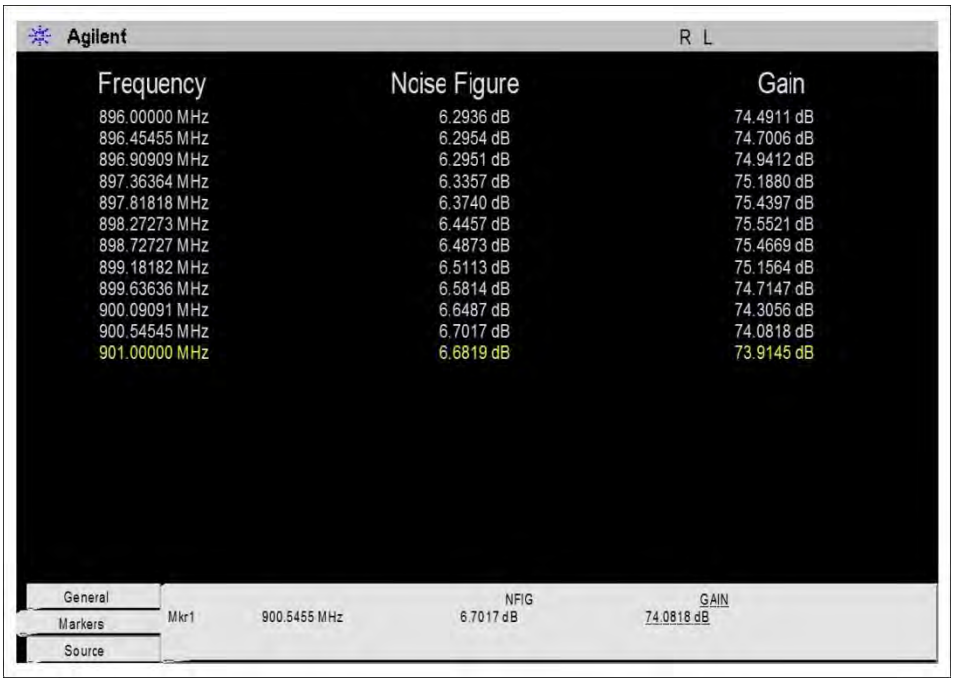


UL-800M-Data

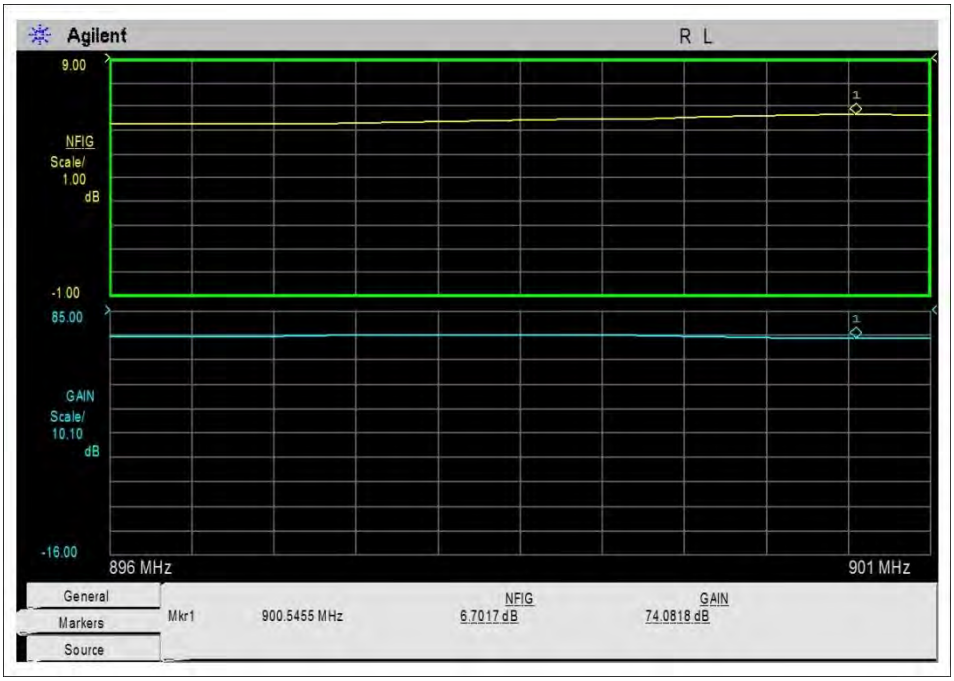


UL-800M-Graphs

900MHz –UL

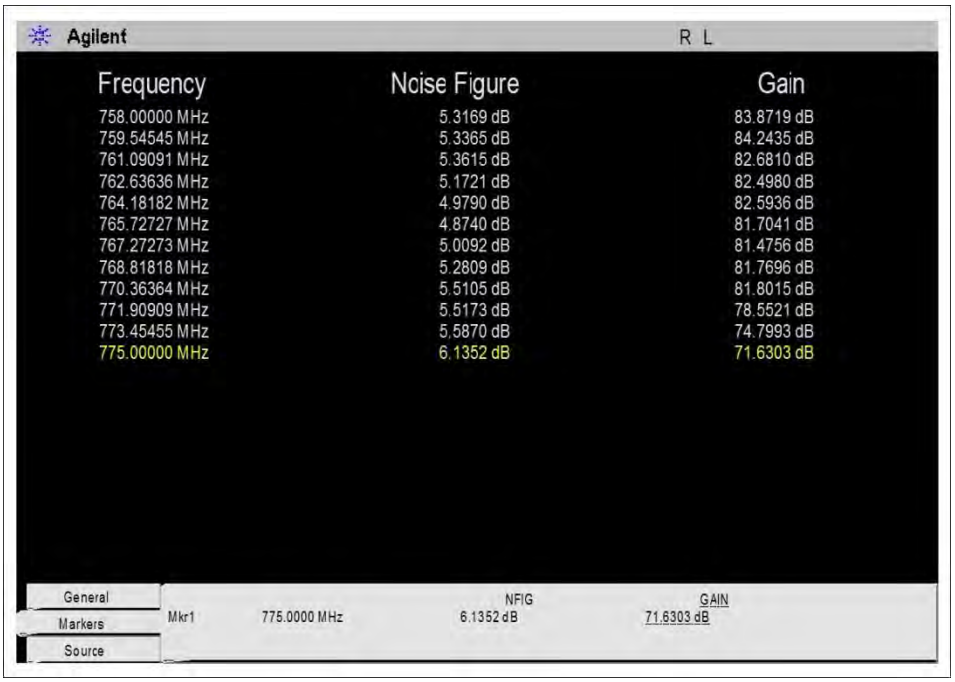


UL-900M-Data

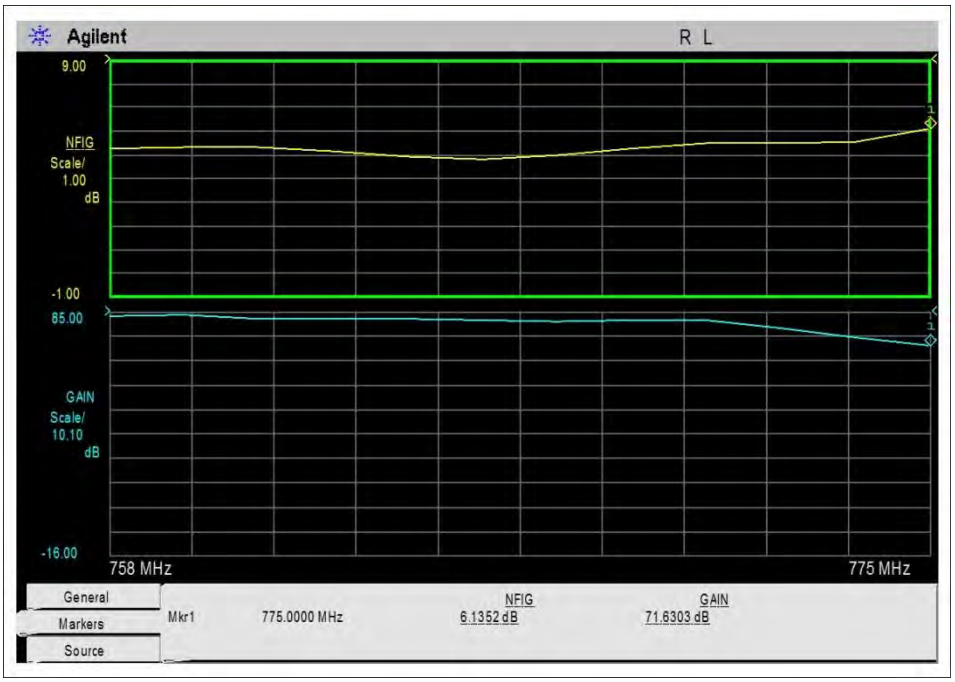


UL-900M-Graphs

700MHz –DL

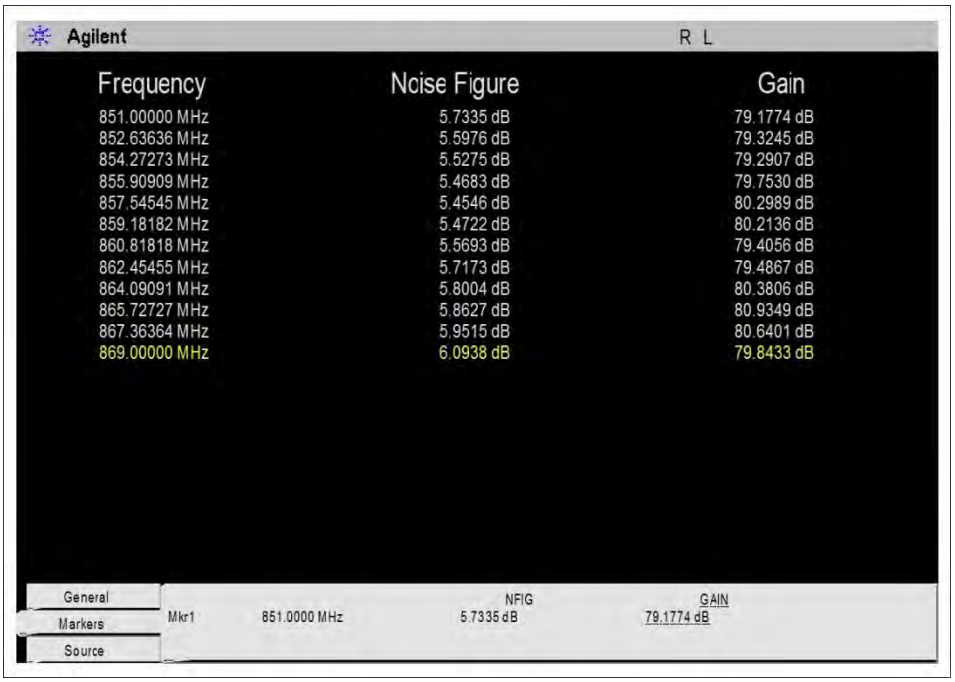


DL-700M-Data

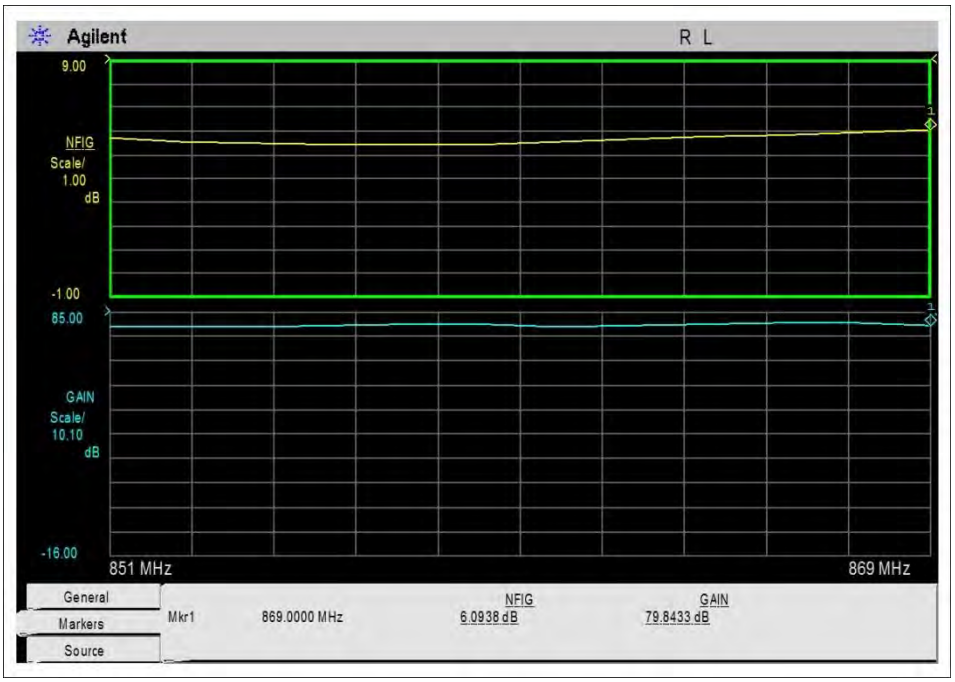


DL-700M-Graphs

800MHz – DL

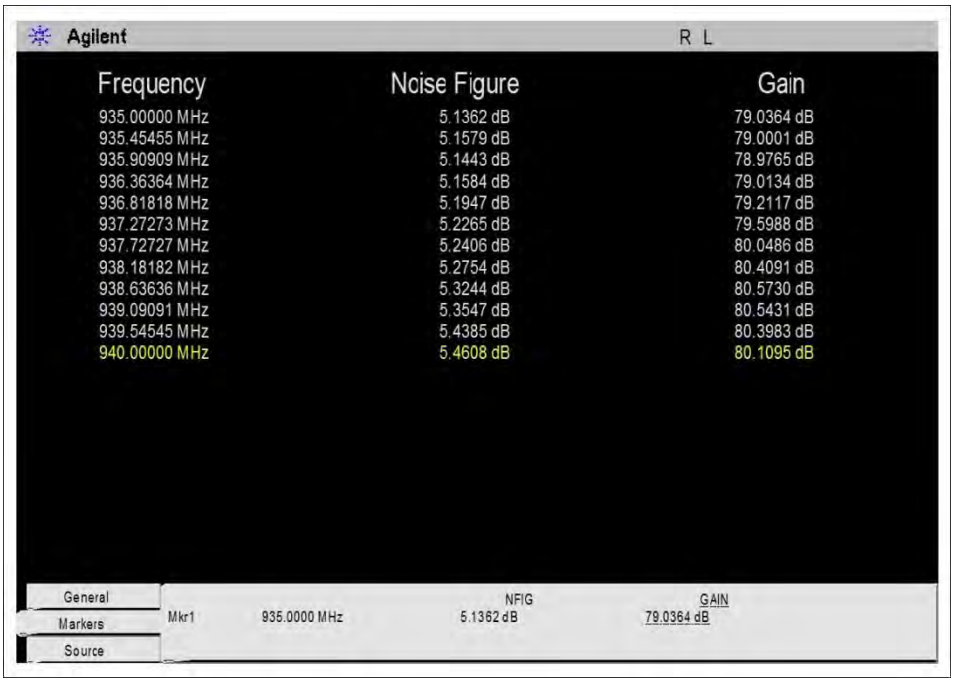


DL-800M-Data

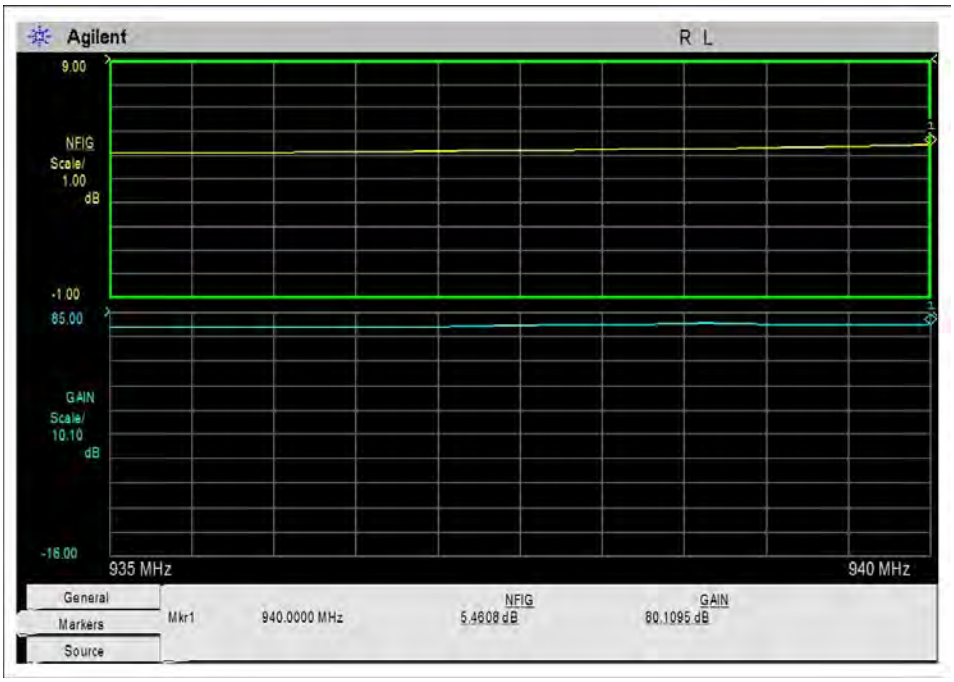


DL-800M-Graphs

900MHz –DL



DL-900M-Data



DL-900M-Graphs

Test Setup Photos

2.1053 / Part 90 § 219(e)(3) Radiated Spurious Emissions

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Cellphone-Mate, Inc.**
Specification: **Radiated Spurious Emissions, 47 CFR §90.219(e)(3)**
Work Order #: **96794** Date: 4/15/2015
Test Type: **Maximized Emissions** Time: 10:40:12
Equipment: **Distributed Antenna System/Booster** Sequence#: 1
Manufacturer: Cellphone-Mate, Inc. Tested By: Daniel Bertran
Model: Force3 PSB 120V 60Hz
S/N: 201502PS000001

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00852	Biconilog Antenna	CBL 6111C	11/24/2014	11/24/2016
	ANP00880	Cable	RG214U	6/13/2014	6/13/2016
	AN00686	Preamp	8447D Opt 010	5/27/2014	5/27/2016
	ANP06691	Cable	PE3062-180	8/8/2014	8/8/2016
	ANP01183	Cable	CNT-195	9/3/2013	9/3/2015
	AN02157	Horn Antenna-ANSI C63.5 Calibration	3115	12/2/2014	12/2/2016
	ANP06712	Cable	32022-29094K-29094K-48TC	9/18/2014	9/18/2016
	AN03172	High Pass Filter	HM1155-11SS	1/15/2014	1/15/2016
	AN02810	Preamp	83051A	2/19/2014	2/19/2016
	ANP01210	Cable	FSJ1P-50A-4A	1/15/2015	1/15/2017
	AN03302	Cable	32026-29094K-29094K-72TC	3/24/2014	3/24/2016
	AN03471	RF Characteristics Analyzer	E4440A	12/19/2013	12/19/2015
	AN00052	Loop Antenna	6502	5/20/2014	5/20/2016

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Distributed Antenna System/Booster *	Cellphone-Mate, Inc.	Force3 PSB	201502PS000001

Support Devices:

Function	Manufacturer	Model #	S/N
AC Adapter	Adapter Tech.	STD-1805	NA
Signal Generator	Agilent	E4433B	US40052164
Signal Generator	Agilent	E4438C	MY42082260

Test Conditions / Notes:

The equipment under test (EUT) is placed on the Styrofoam table top. EUT set at maximum gain.
A remotely located signal generator is connected to input of EUT.

Evaluation of DL path was performed with signal fed into the Outside antenna port while Inside antenna port terminated with 50 Ohm load.
Evaluation of UL path was performed with signal fed into the Inside antenna port while Outside antenna port terminated with 50 Ohm load.

UL: 788-798, 799-805, 806-817, 817-824, 896-901 MHz
DL: 758-768, 769-775, 851-862, 862-869, 935-940 MHz

TXFreq = > Frequency of low/mid/high channels of each band listed above.
Modulation=> CW

Frequency range of measurement = 9 kHz- 10GHz.

9 kHz - 150 kHz ->	RBW=200 Hz	VBW=200 Hz
150 kHz - 30 MHz ->	RBW=9 kHz	VBW=9 kHz
30 MHz - 1000MHz ->	RBW=120 kHz	VBW=120 kHz
1000MHz-10000MHz ->	RBW=1 MHz	VBW=1 MHz

Test environment conditions: Temperature: 21.4°C, Relative Humidity: 45%, Pressure: 100.9kPa
FC3

Test procedure: The test was performed in accordance with 47CFR, Section 2.1053 and Appendix D3 of the FCC document: 935210 D02 Signal Booster Certification Requirements v02r01 Dated July 24, 2014.

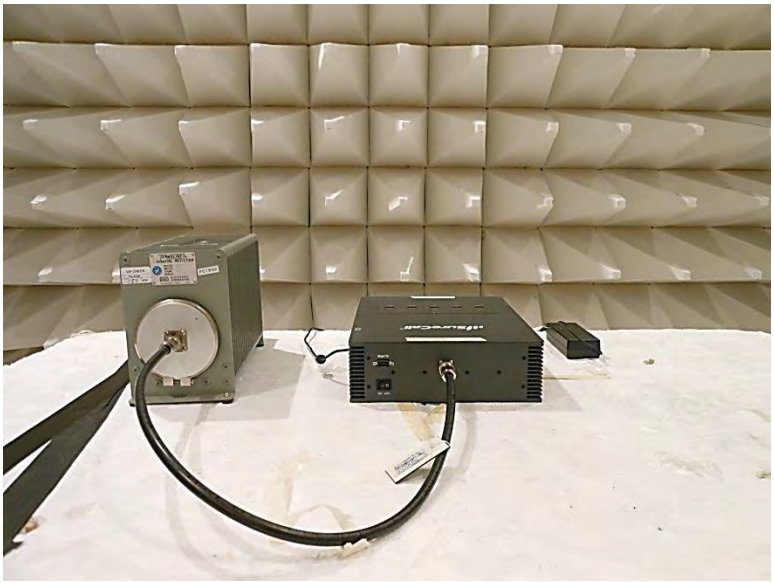
Software: SC_S1_Public_V3.0
Firmware: V1.0

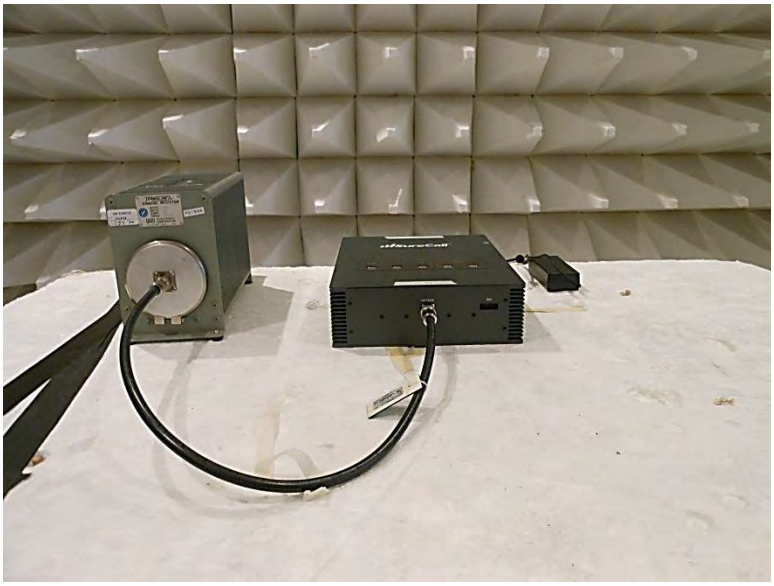
No emissions below 30MHz were found within 20dB of the limit line.
No emissions above 30MHz were found within 20dB of the limit line.

Radiated Spurious Emissions - Summary of Results

Pass: No data provided since all emissions above and below 30MHz were found within 20dB of the limit line.

Test Setup Photo





Emissions Designator

2.1033 Application for certification.
(c)

(4) Type or types of emission & (5) Frequency range.

Emission Designator / Band	Public safety				Public Safety	ESMR	Public Safety	ESMR	900 Interleaved	
					NPSPAC/Interleave		NPSPAC/Interleave			
	UL		DL		UL		DL		UL	DL
	788-805		758-775		806-824		851-869		896-901	935-940
	788-798	799-805	758-768	769-775	806-817	817-824	851-862	862-869		
8K10F1E/F1D		X		X						
5M00G7D	X		X							
8K10F1E/F1D					X		X			
10K1F3E					X		X			
8K70D1W						X		X		
10K1F3E									X	X

(13) For equipment employing digital modulation techniques, a detailed description of the modulation system to be used, including the response characteristics (frequency, phase and amplitude) of any filters provided, and a description of the modulating wavetrain, shall be submitted for the maximum rated conditions under which the equipment will be operated.

CW signals were used for all tests except for occupied bandwidth and emissions masks since CW signals gives worst case results IAW Appendix D3 of the FCC document: 935210 D02 Signal Booster Certification Requirements v02r01 Dated July 24, 2014

8K10F1E/F1D (C4FM, compatible four-level frequency modulation) in a 12.5 kHz channel
The basic characteristics of Project 25 radios (Phase I) C4FM is an APCO 25-compliant, 4-level FSK (frequency shift keying) modulation that transmits data at the rate of 2 bits per symbol (4.8 ksps).
For F1E / F1D according to the APCO 25 information, the necessary bandwidth is calculated from the P25 high deviation pattern of 2850 Hz deviation at a 1200 Hz symbol rate.

Bn = 2 x D + 2 x M
Where D = high deviation pattern: 2850 kHz
Where M = symbol rate: 1200Hz
Bn = 8.1 kHz

This is confirmed in the emission designations 8k10F1E & 8k10F1D

*F1E emission designator provides usage for telephony and F1D provides usage for data/telecommand.
Since these are spectrally identical, worst measurements are provided for occupied bandwidth and emission masks.

5M00G7D (Long Term Evolution) in a 5MHz channel
LTE uses 5MHz signal 25 resource blocks transmitting uplink with SC-FDMA and downlink with OFDM modulation.

The necessary bandwidth is based upon a 99% power measurement of the transmitter spectrum, per §2.202(a) / TRC-43 section

8K70D1W (Linear Simulcast Modulation) in a 12.5 kHz channel

The necessary bandwidth of the modulation signal is not directly calculable per the composite modulation formulas defined in 47 CFR §2.202(g) / TRC-43 section 8.

Quadrature Phase Shift Keying is used to modulate a carrier with a digital bit stream: Data Rate: R = 9600 bps; Bits per Symbol: S=4; Bn =2BK; B = R/log2(s) = 9600/log2 (4) = 4800; K= 0.9; Bn = 2*4800*0.9; Bn = 8700 Hz.

*D1W emission designator provides for usage as a combination of data /Telecommand and telephony.

10K1F3E

Using the formulas contained in Part 2.202 the necessary bandwidth calculation will be:

Bn = 2 x D + 2 x M
Where D = maximum deviation: 2.5 kHz
Where M = maximum modulation frequency: 2.55 kHz
Bn = 10.1 kHz

This is confirmed in the emission designation 10k10F3

Measurements have also been made to verify these calculated bandwidths.
Measurements have been made of each modulation type using a spectrum analyzer.