

Cellphone-Mate, Inc.

TEST REPORT FOR

**5 Band Consumer Booster Model: Fusion4Home 3.1
and
Switching Power Adapter Model: GME18A-059280FUR**

Tested to The Following Standard:

FCC Part 20.21 / 22H / 24E / 27

Report No.: 101748-13

Date of issue: November 2, 2018



Test Certificate # 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 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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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

Representative: Dennis Findley
Customer Reference Number: CKC09072018

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 101748

October 1, 2018

October 1-10, 2018

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, 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.

A handwritten signature in black ink that reads "Steve Behm".

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	5.03.11
EMITest Immunity	5.03.10

Site Registration & Accreditation Information

Location	NIST CB #	TAIWAN	CANADA	FCC	JAPAN
Fremont, CA	US0082	SL2-IN-E-1148R	3082B-1	US1023	A-0149

SUMMARY OF RESULTS

Standard / Specification: FCC Part 20.21/22H/24E/27

**Wideband Consumer Signal Booster Measurement Guidance: KDB #935210 DO3 v04r02,
dated June19, 2018**

Correlation Matrix & Results					
Guidance Section	Guidance Description	FCC Section	FCC Rule Description	Mods	Results
7.1 a) - k)	Authorized Frequency Band Verification Test	20.21(e)(3)	Frequency Bands	Mod. #1 and #2	Pass
7.2.2 a) - k)	Maximum Power Measurement Procedure	2.1046/20.21(e)(8)(i)(D)	Power Limit	Mod. #1 and #2	Pass
7.3 a) - d)	Maximum Booster Gain Computation	20.21(e)(8)(i)(B)	Bidirectional Capabilities	Mod. #1 and #2	Pass
7.4 a) - n)	Intermodulation Product	20.21(e)(8)(i)(F)	Intermodulation Limit	Mod. #1 and #2	Pass
7.5 a) - n)	Out of Band Emissions	20.21(e)(8)(i)(E)	Out of Band Emission	Mod. #1 and #2	Pass
7.6 a) - e)	Conducted Spurious Emission	2.1051/22H/24E/27	Spurious emission	Mod. #1	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	Mod. #1 and #2	Pass
7.8 a) - l)	Uplink inactivity	20.21(e)(8)(i)(I)	Uplink Inactivity	Mod. #1	Pass

Standard / Specification: FCC Part 20.21/22H/24E/27 - continued

Correlation Matrix & Results					
Guidance Section	Guidance Description	FCC Section	FCC Rule Description	Mods	Results
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	Mod. #1	Pass
7.10.a) - j)	Occupied Band Width	2.1049/22H/24E/27	Occupied Band Width	Mod. #1	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	Mod. #1	Pass
7.12a) - f)	Radiated Spurious Emission	2.1053/ 22H/24E/27	Spurious Emission	Mod. #1	Pass
7.13 a) - c)	Spectrum Block Filter	NA	NA	NA	NA1
7.14	Additional requirements for dual-enclosure wideband consumer signal boosters	NA	NA	NA	NA2

NA = Not Applicable

NA1 = Not applicable because the EUT does not employ spectrum block filter.

NA2 = Not applicable because the EUT is not a dual enclosure wideband consumer signal booster.

ISO/IEC 17025 Decision Rule

The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

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

Summary of Conditions
Modification #1:
a. Reduce 1dB on Gain for UL Band 4 and 5 and DL 2, 4, and 5
b. Increase 1dB on Gain for UL Band 2 and DL 12 and 13
Modification #2:
a. Increase 1dB on Gain for DL Band 12 and Band 13
b. Adding one 8.2nH matching inductor on C73 location on output of the B12/B13 DL

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
5 Band Consumer Booster	Cellphone-Mate, Inc.	Fusion4Home 3.1	02
Switching Power Adapter	SureCall	GME18A-059280FUR	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Equipment	Wideband Consumer booster/Zone Enhancer
Operating Frequency Range:	UL: 824-849MHz DL: 869-894MHz UL: 1850-1915MHz DL: 1930-1995MHz UL: 1710-1755MHz, 698-716MHz, 776-787MHz DL: 2110-2155MHz, 728-746MHz, 746-757MHz
OBW and Emissions Type(s):	GXW (GSM) G7W (EDGE) F9W(CDMA) F9W(WCDMA) W7D (LTE))
Modulation Type(s):	0.3 GMSK (GSM) 3p/8 8-PSK (EDGE) QPSK (CDMA) BPSK/QPSK (WCDMA) OFDM (LTE)
Number of TX Chains:	1
Antenna Type(s) and Gain:	Dedicated, See antenna kitting information
Beamforming Type:	NA
Antenna Connection Type:	Donor/Outdoor antenna/ UL: 75-ohm F Server / indoor antenna/ DL: 50-ohm N
Nominal Input Voltage:	120V/60Hz
Firmware used for Test:	Firmware: Fusion4H V0.0.01 FC

FCC PART 20.21/22H/24E/27

General Test Setup

Summary of Conditions

The equipment under test (EUT) is a Fixed Wideband Consumer Booster.

The EUT is placed on the Styrofoam platform for radiated emission and a test bench for conducted emission measurement.

UL: 824-849MHz

DL: 869-894MHz

UL: 1850-1915MHz

DL: 1930-1995MHz

UL: 1710-1755MHz, 698-716MHz, 776-787MHz

DL: 2110-2155MHz, 728-746MHz, 746-757MHz

Test procedure:

The test was performed in accordance with the FCC document: 935210 D03 Signal Booster Measurements v04r02, dated June19, 2018.

Modification #1 was in place for all testing.

7.1 Authorized Frequency Band Verification

Test Conditions / Data

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 #: **101748** Date 10/01/18
 Test Type: **Conducted Emissions**
 Tested By: **Hieu Song 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: 20.3°C Relative Humidity: 50% Pressure: 102.1 kPa Modification #1 and #2 were in place during testing.
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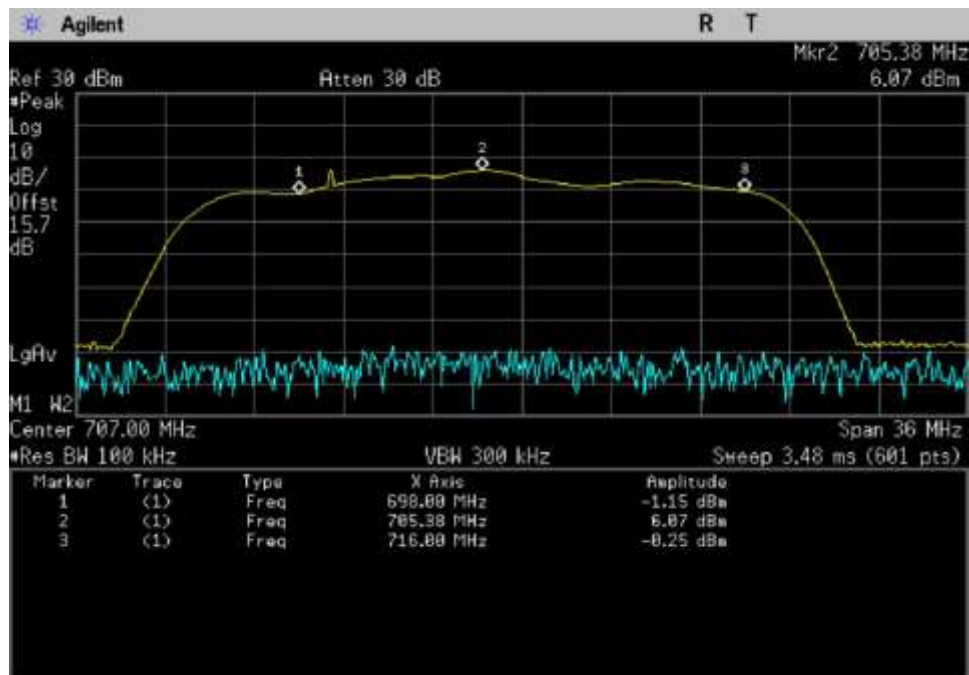
Test Equipment:

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

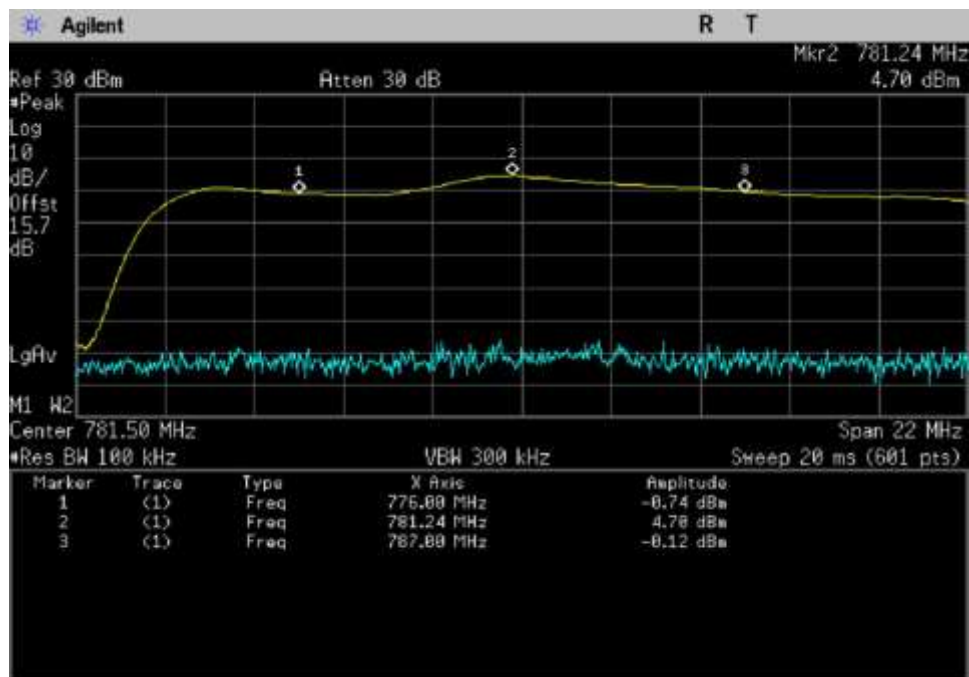
Summary of Results

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

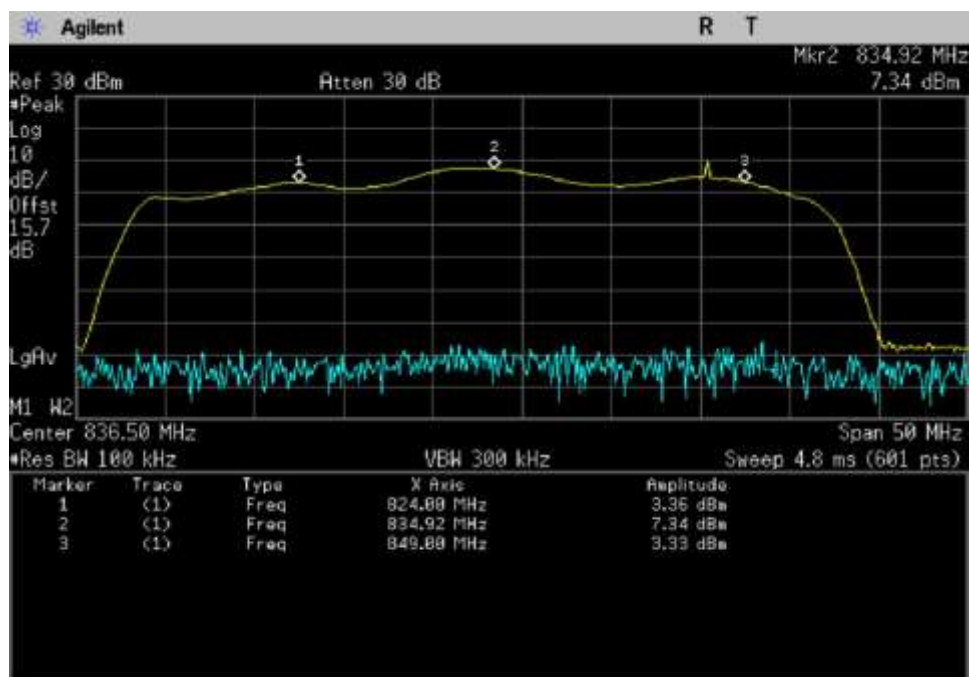
Plots



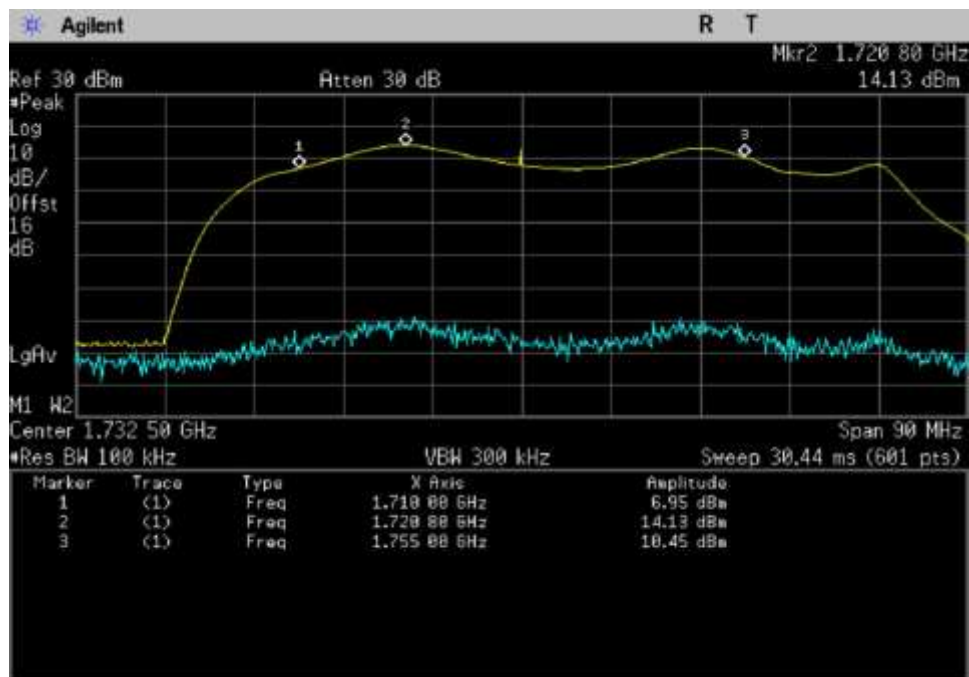
UL_698-716_ 698- 705.38MHz



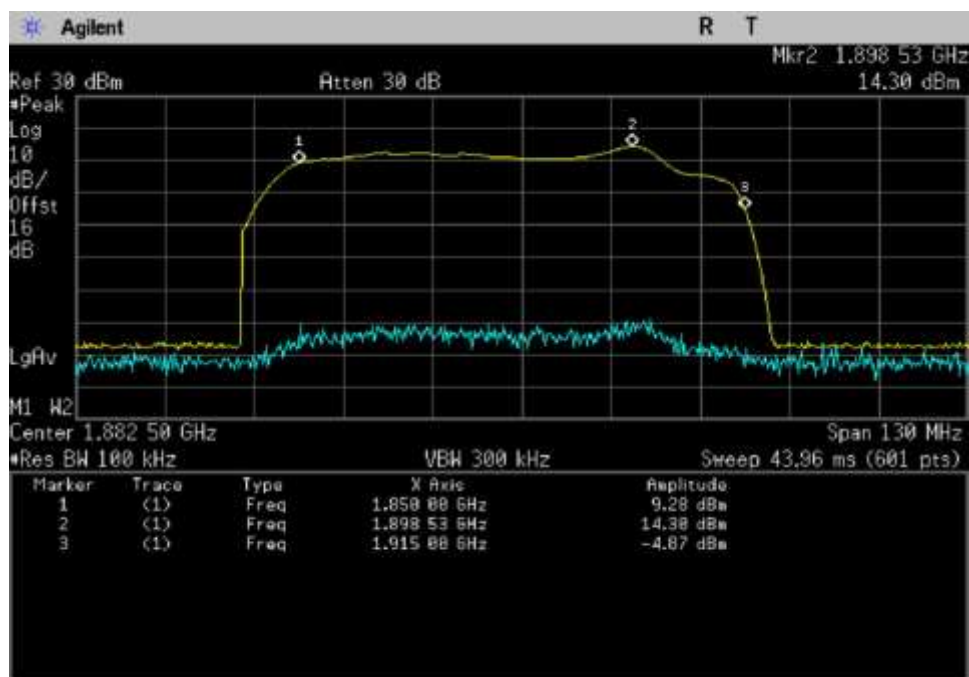
UL_776-787_ 776- 781.24MHz



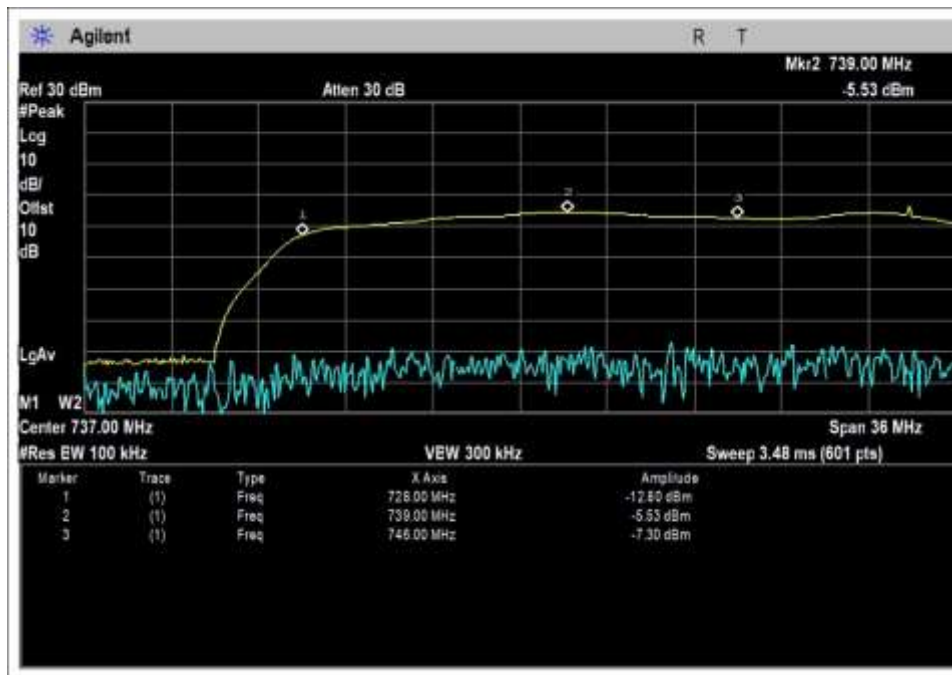
UL_824-849_ 824- 834.92MHz



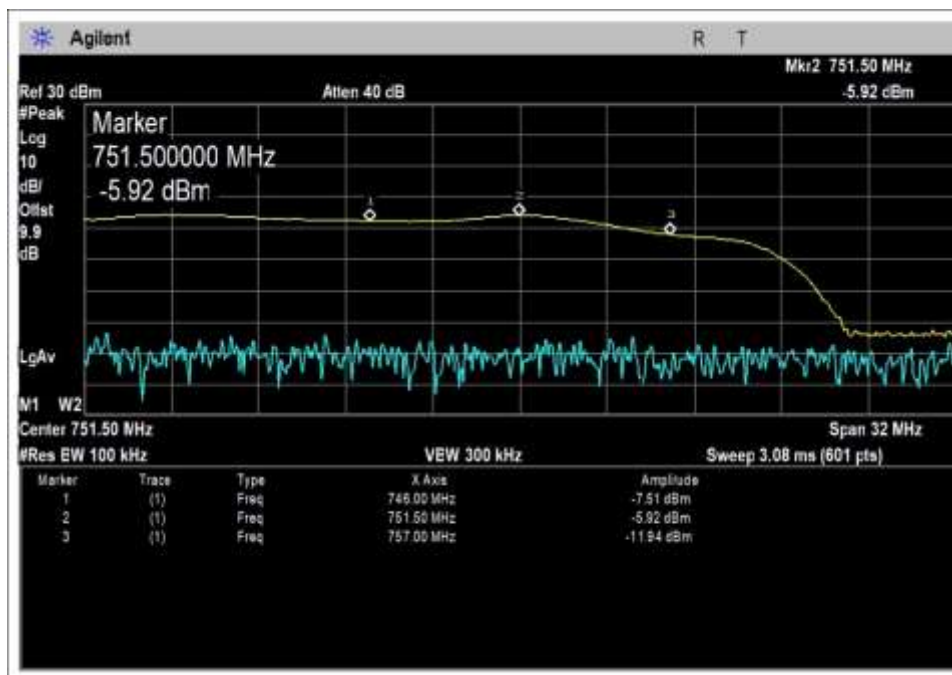
UL_1710-1755_ 1710- 1720.8MHz



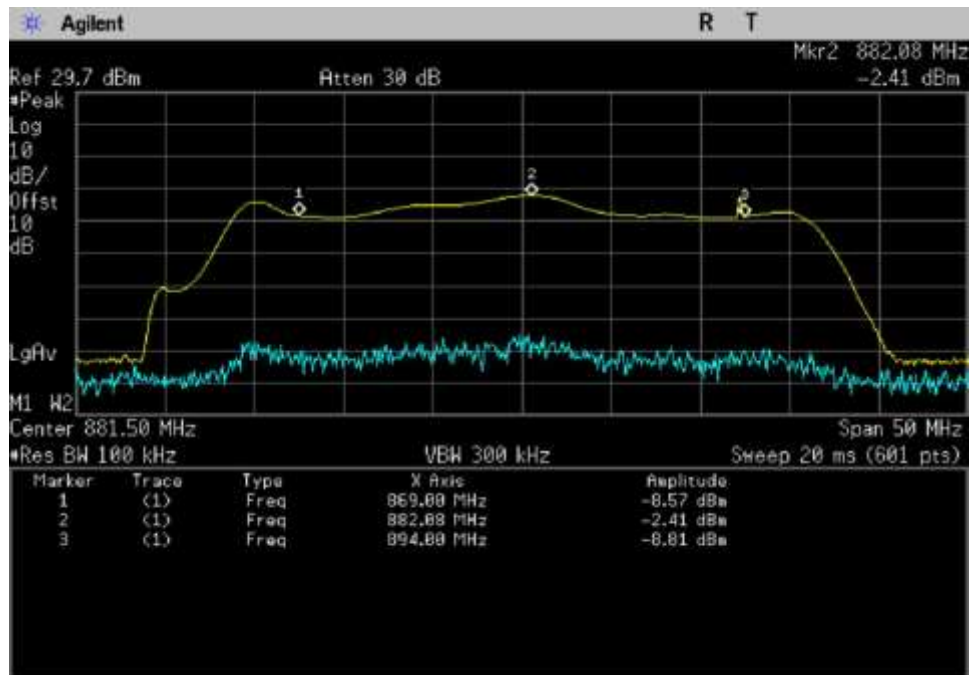
UL_1850-1915_ 1850- 1898.53MHz



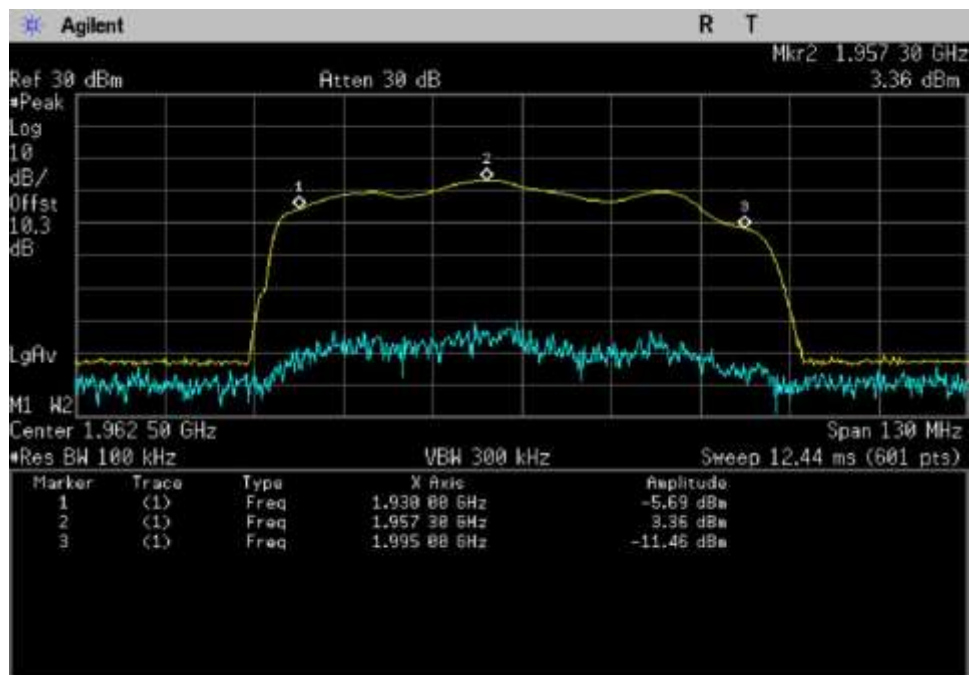
DL_728-746_ 728- 739.0MHz



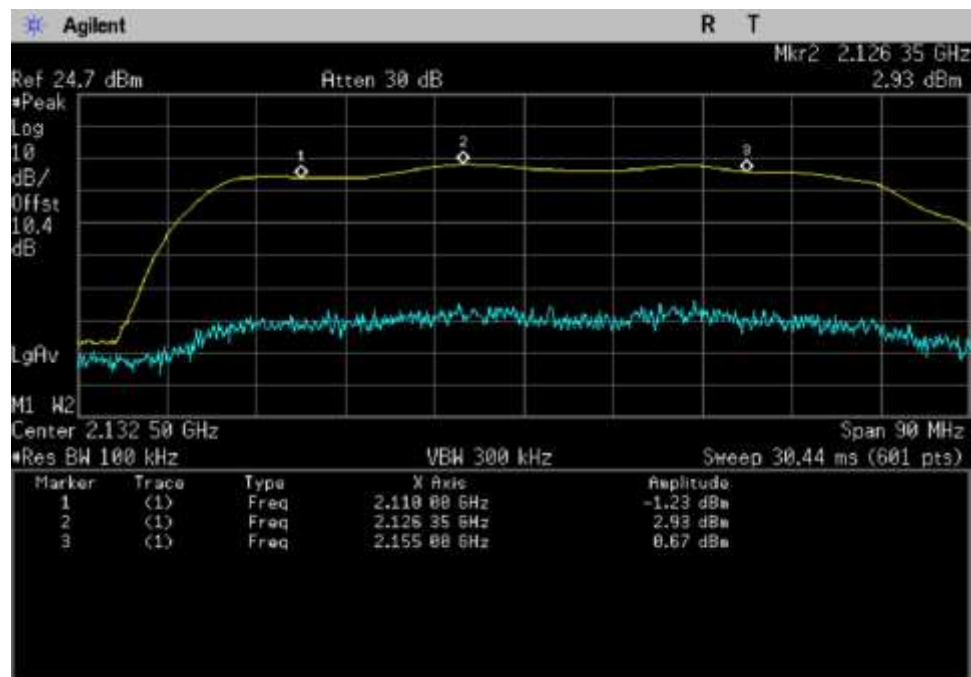
DL_746-757_ 746- 751.5MHz



DL_869-894_ 869- 882.08MHz



DL_1930-1995_ 1930- 1957.3MHz



DL_2110-2155_ 2110- 2126.35MHz

7.2 Maximum Power / 7.3 Maximum Gain

Test Conditions / Data

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 #: **101748** Date 10/01/18
 Test Type: **Conducted Emissions**
 Tested By: **Hieu Song 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: 20.3°C Relative Humidity: 50% Pressure: 102.1 kPa Modification #1 and #2 were in place during testing.
--

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 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)
UL 1710-1755	-43.4	24.4	67.8	-47.1	20.7	67.8
UL 1850-1915	-43.8	25.1	68.9	-47.0	21.0	68.0
UL 824-894	-37.9	25.6	63.5	-38.5	24.5	63.0
UL 698-716	-36.9	25.4	62.3	-37.1	23.8	60.9
UL 776-787	-36.5	25.1	61.6	-36.3	25.2	61.5
DL 2110-2155	-59.4	9.3	68.7	-60.4	8.0	68.4
DL 1930-1995	-60.4	9.5	69.9	-61.7	8.0	69.7
DL 869-894	-50.5	11.2	61.7	-51.6	9.9	61.5
DL:728-746	-50.5	11.1	61.6	-52.2	8.8	61.0
DL 746-757	-51.0	10.2	61.2	-52.3	8.1	60.4

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)
UL 1710-1755	24.4	10.0	6.2	28.2	17	30
UL 1850-1915	25.1	10.0	6.4	28.7	17	30
UL 824-894	25.6	8.0	3.8	29.9	17	30
UL 698-716	25.4	7.0	3.3	29.1	17	30
UL 776-787	25.1	7.0	3.3	28.8	17	30
DL 2110-2155	9.3	10.0	3.8	15.5	NA	17
DL 1930-1995	9.5	10.0	3.6	15.9	NA	17
DL 869-894	11.2	7.0	2.3	15.9	NA	17
DL:728-746	11.1	7.0	2.1	16.0	NA	17
DL 746-757	10.2	7.0	2.1	15.1	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)
UL 1710-1755	20.7	10.0	6.2	24.5	17	30
UL 1850-1915	21.0	10.0	6.4	24.6	17	30
UL 824-894	24.5	8.0	3.8	28.8	17	30
UL 698-716	23.8	7.0	3.3	27.5	17	30
UL 776-787	25.2	7.0	3.3	28.9	17	30
DL 2110-2155	8.0	10.0	3.8	14.2	NA	17
DL 1930-1995	8.0	10.0	3.6	14.4	NA	17
DL 869-894	9.9	7.0	2.3	14.6	NA	17
DL:728-746	8.8	7.0	2.1	13.7	NA	17
DL 746-757	8.1	7.0	2.1	13.0	NA	17

* Antenna gain and cable losses indicated from the antenna kitting Fusion4Home V3.1

UL SC231W-75Ohm and SC-RG6-50FN

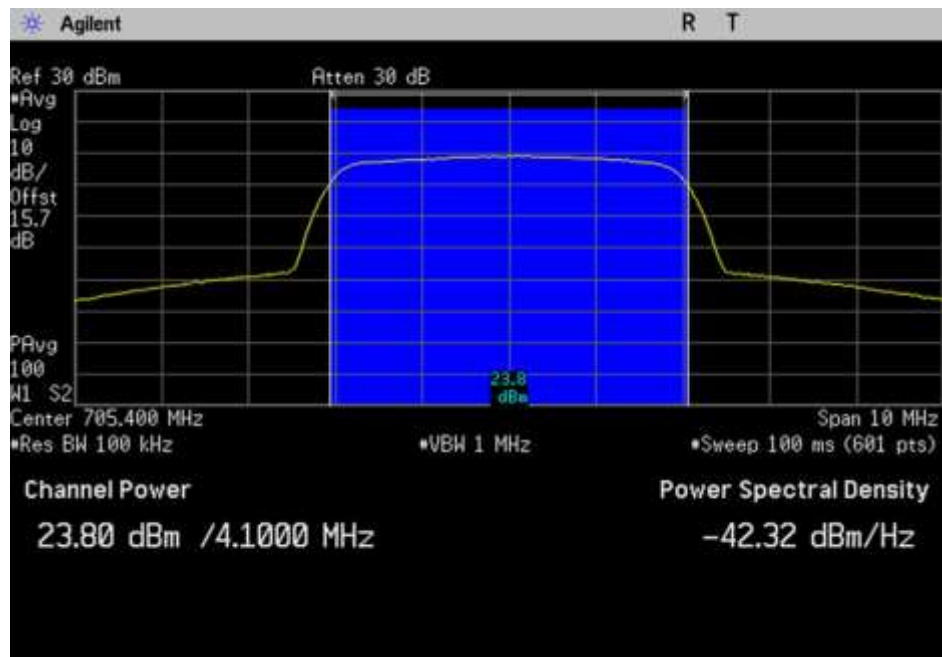
DL SC248W and SC240-20NN

Section 5.5 power						
	Pulse GSM			4.1 MHz AWGN		
Frequency (MHz)	Input (dBm)	Output (dBm)	Gain (dB)	Input (dBm)	Output (dBm)	Gain (dB)
UL 1710-1755	0.0	24.4	24.4	0.0	19.8	19.8
UL 1850-1915	0.0	24.6	24.6	0.0	19.9	19.9
UL 824-894	0.0	25.7	25.7	0.0	24.3	24.3
UL 698-716	0.0	25.4	25.5	0.0	22.3	22.4
UL 776-787	0.0	24.5	24.5	0.0	25.2	25.2
DL 2110-2155	-20.0	9.1	29.1	-20.0	7.2	27.2
DL 1930-1995	-20.0	9.0	29.0	-20.0	9.2	29.2
DL 869-894	-20.0	11.0	31.0	-20.0	9.8	29.8
DL:728-746	-20.0	10.5	30.5	-20.0	8.5	28.5
DL 746-757	-20.0	9.7	29.7	-20.0	7.7	27.7

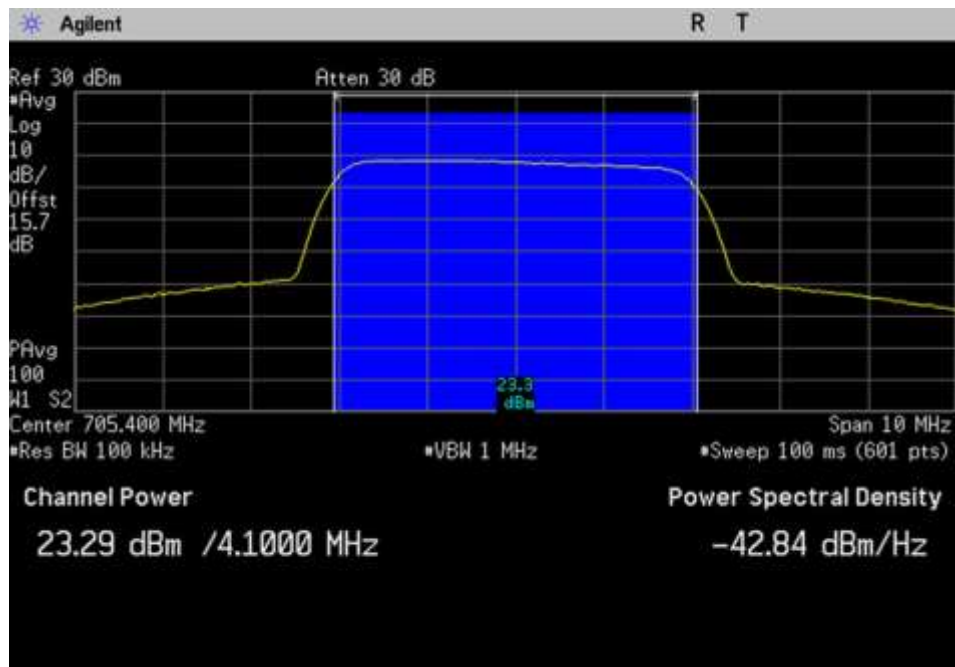
UL gain vs DL gain	Pulse GSM (dB)	4.1MHz AWGN (dB)	Limit (dB)
UL gain vs DL gain 1710/2110	-0.9	-0.6	9.0
UL gain vs DL gain 1850/1930	-1.0	-1.7	9.0
UL gain vs DL gain 824/869	1.8	1.5	9.0
UL gain vs DL gain 776/728	0.7	-0.1	9.0
UL gain vs DL gain 776/746	0.4	1.1	9.0

Plots

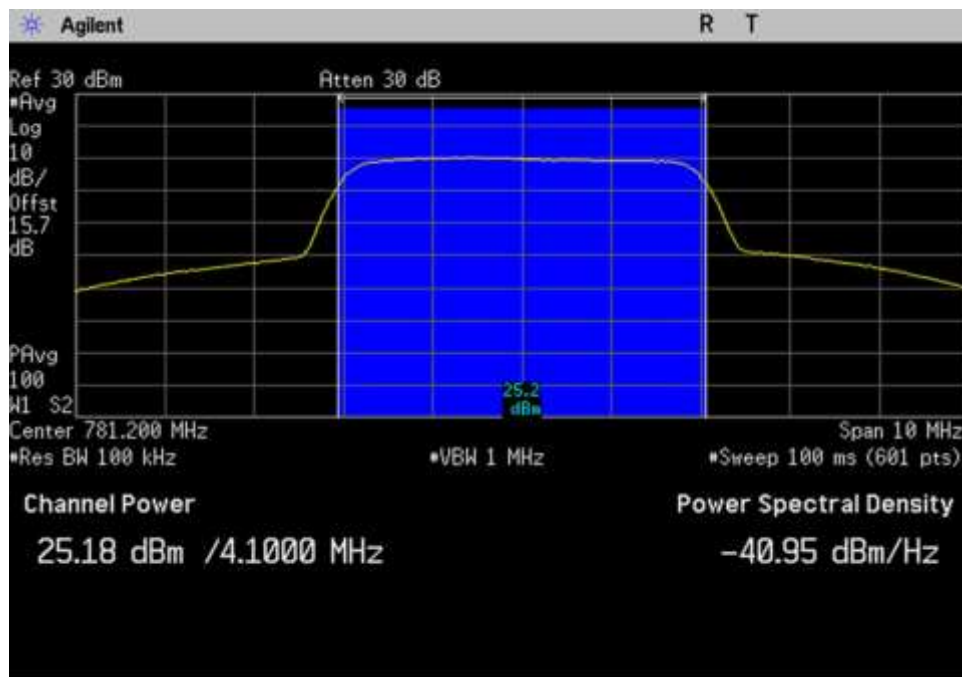
AWGN



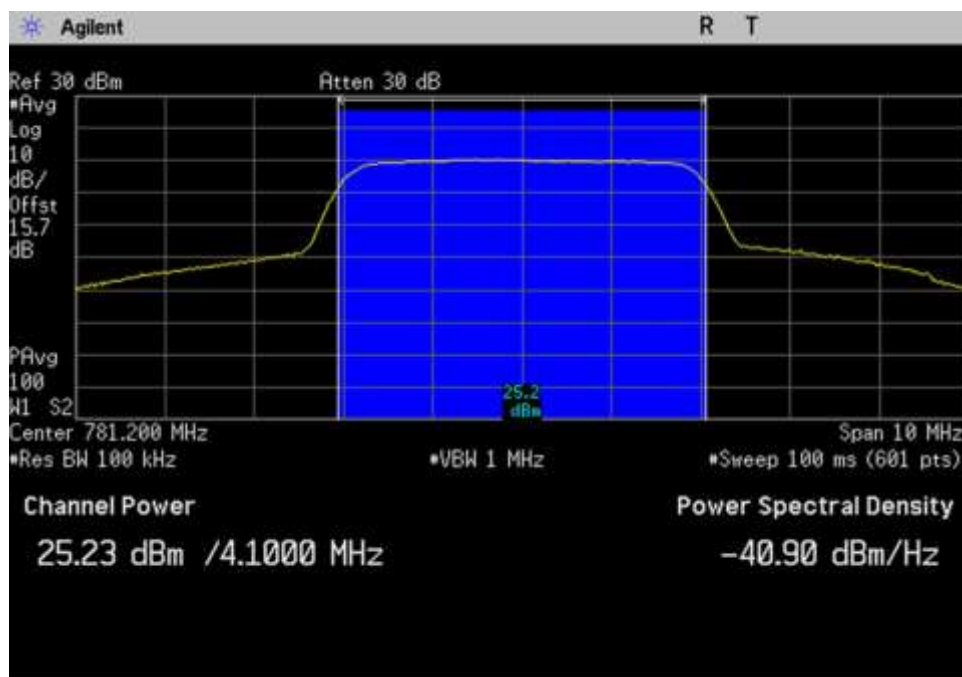
UL_698-716_AWGN_705.4MHz



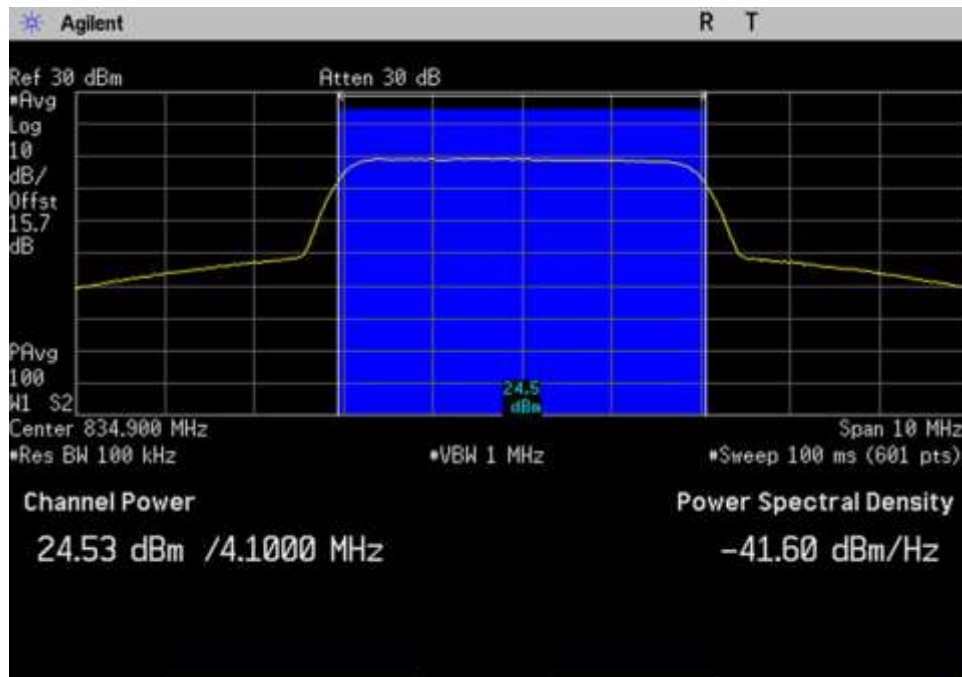
UL_698-716_AWGN_Max_705.4MHz



UL_776-787_AWGN_781.2MHz



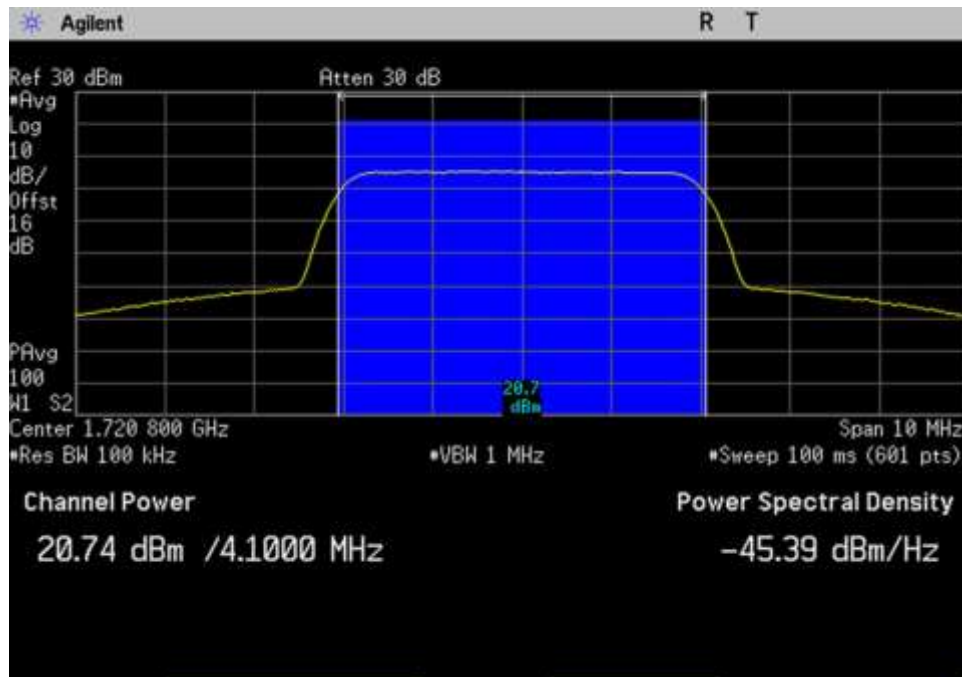
UL_776-787_AWGN_Max_781.2MHz



UL_824-849_AWGN_ 834.9MHz



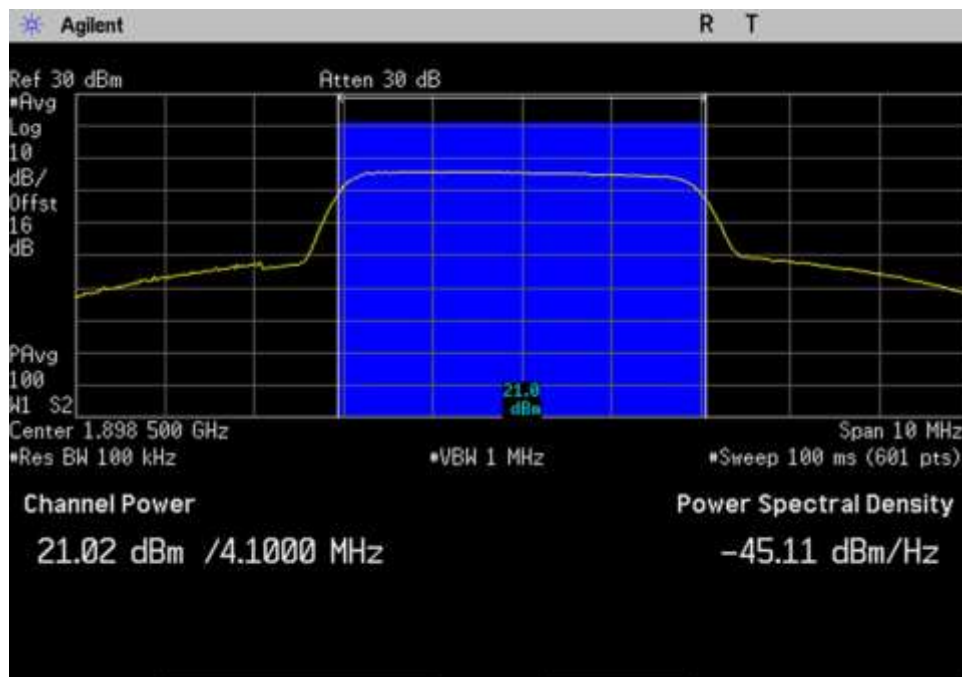
UL_824-849_AWGN_Max_ 834.9MHz



UL_1710-1755_AWGN_ 1720.8MHz



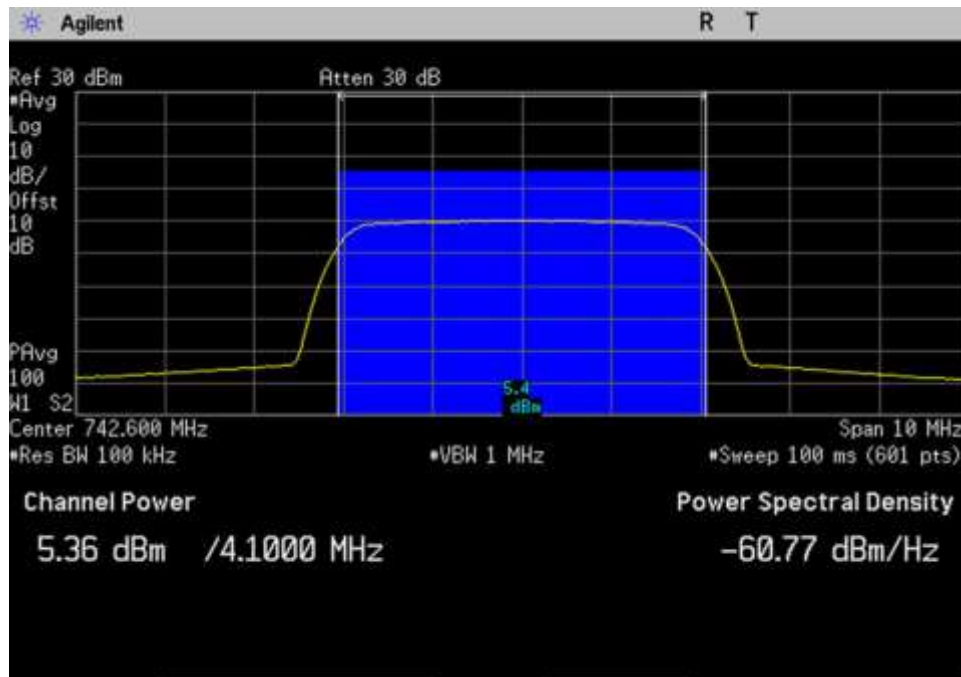
UL_1710-1755_AWGN_Max_ 1720.8MHz



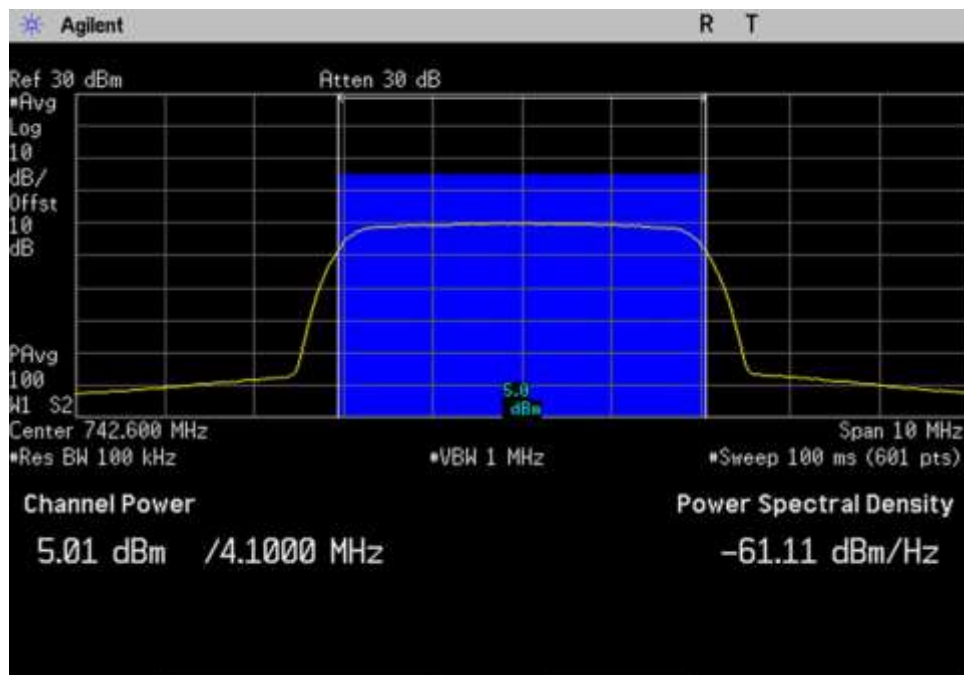
UL_1850-1915_AWGN_1898.5MHz



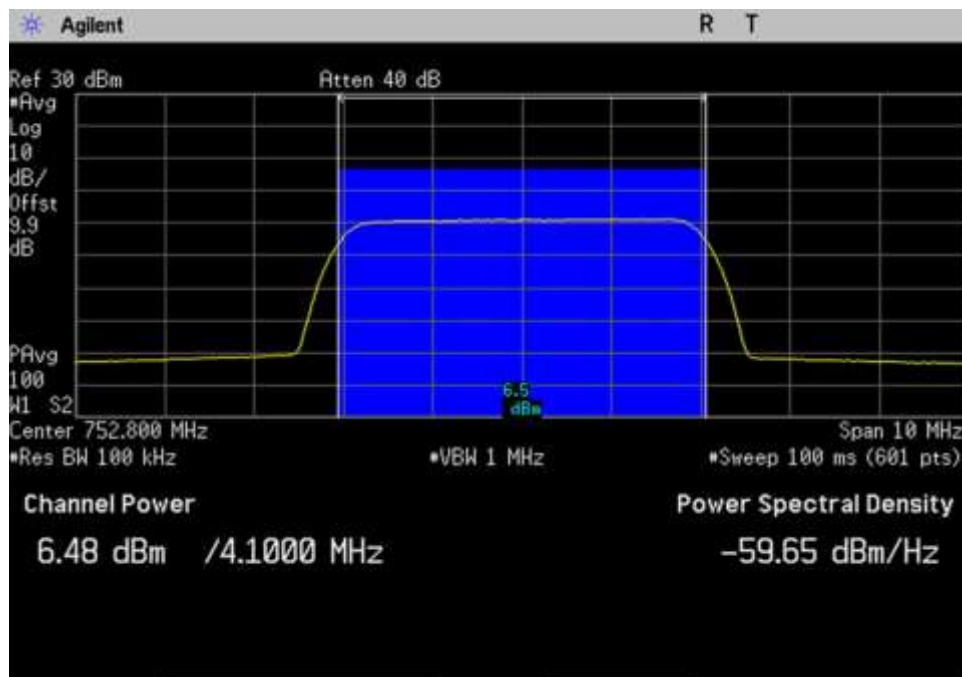
UL_1850-1915_AWGN_Max_ 1898.5MHz



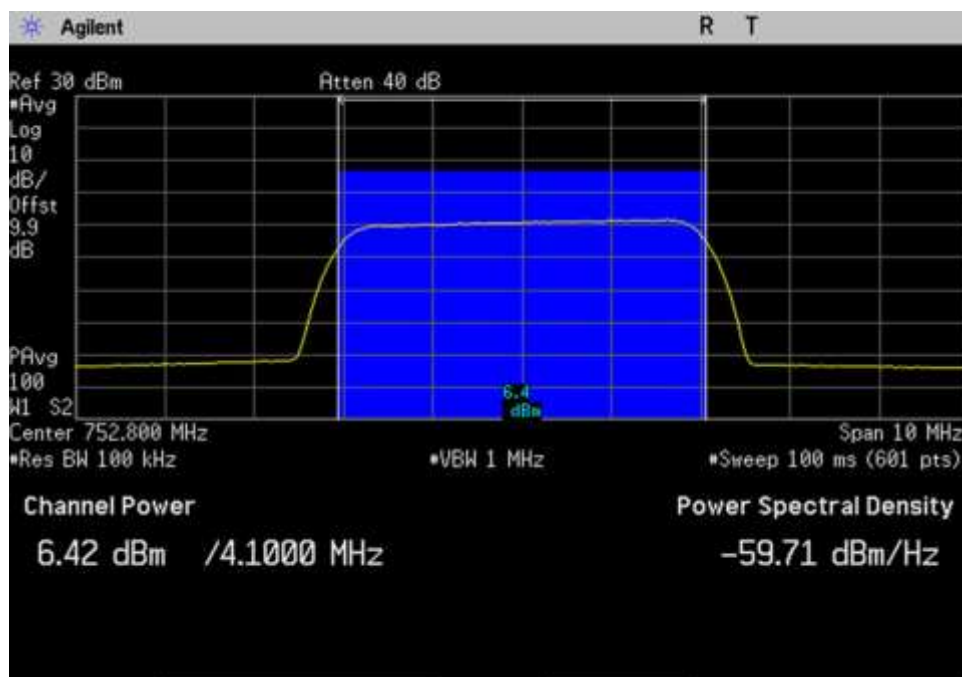
DL_728-746_AWGN_ 742.6MHz



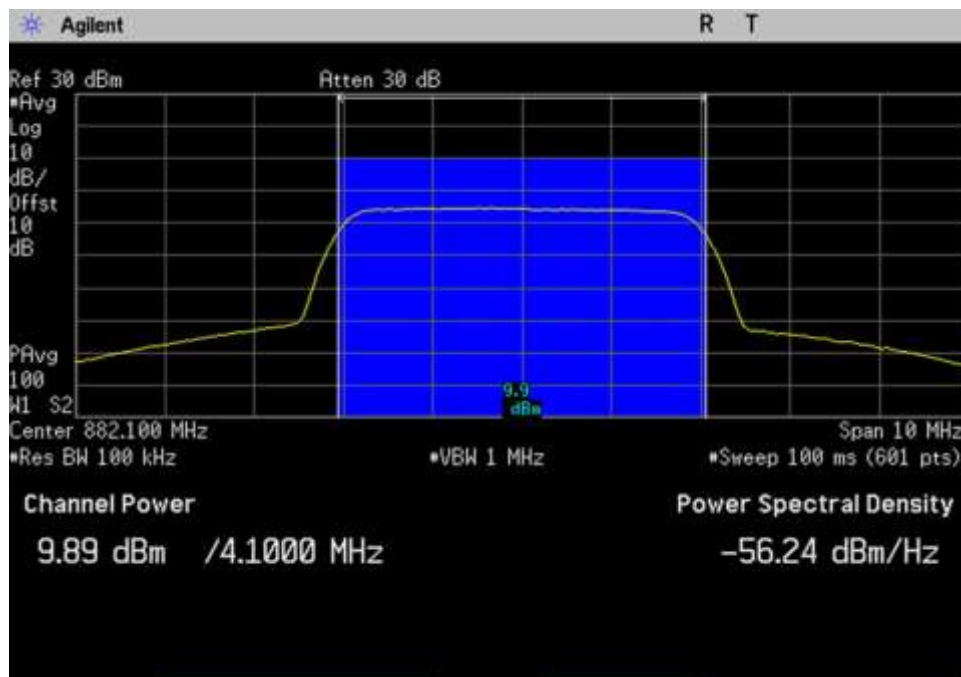
DL_728-746_AWGN_Max_ 742.6MHz



DL_746-757_AWGN_752.8MHz



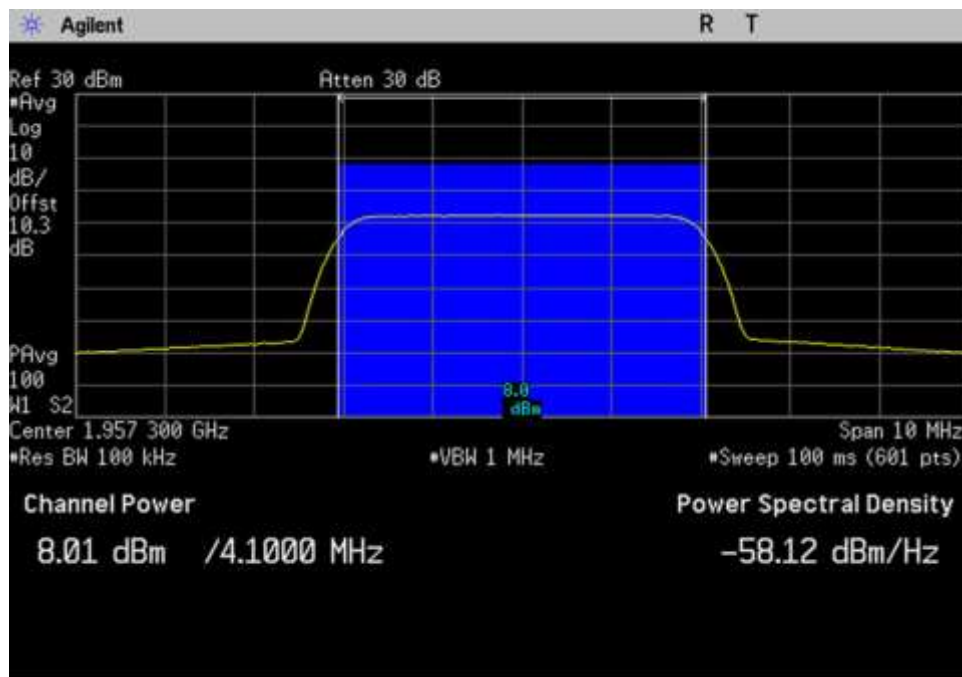
DL_746-757_AWGN_Max_752.8MHz



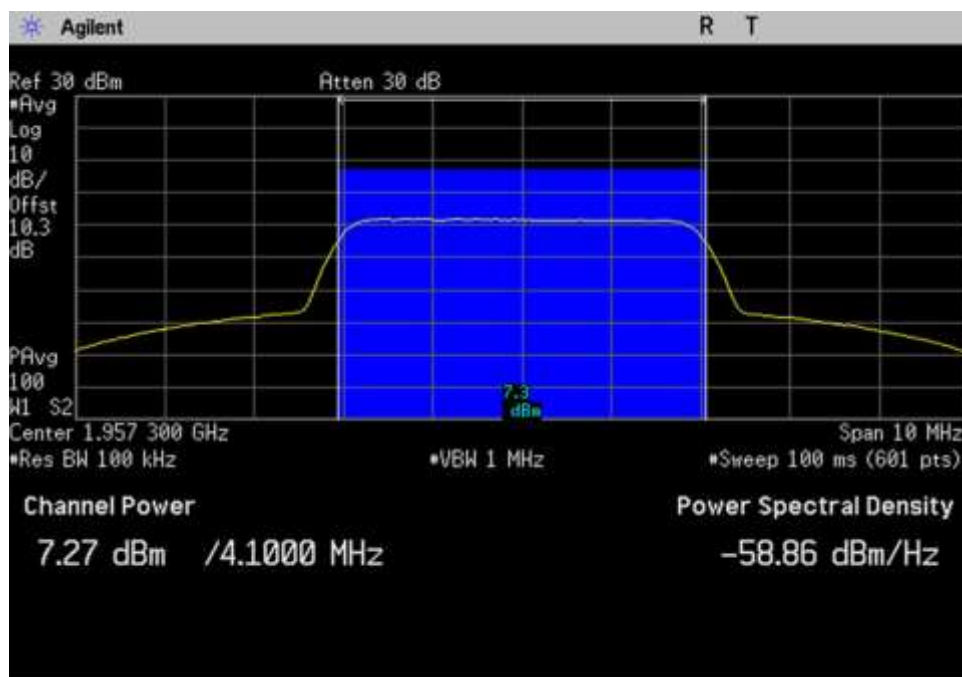
DL_869-894_AWGN_ 882.1MHz



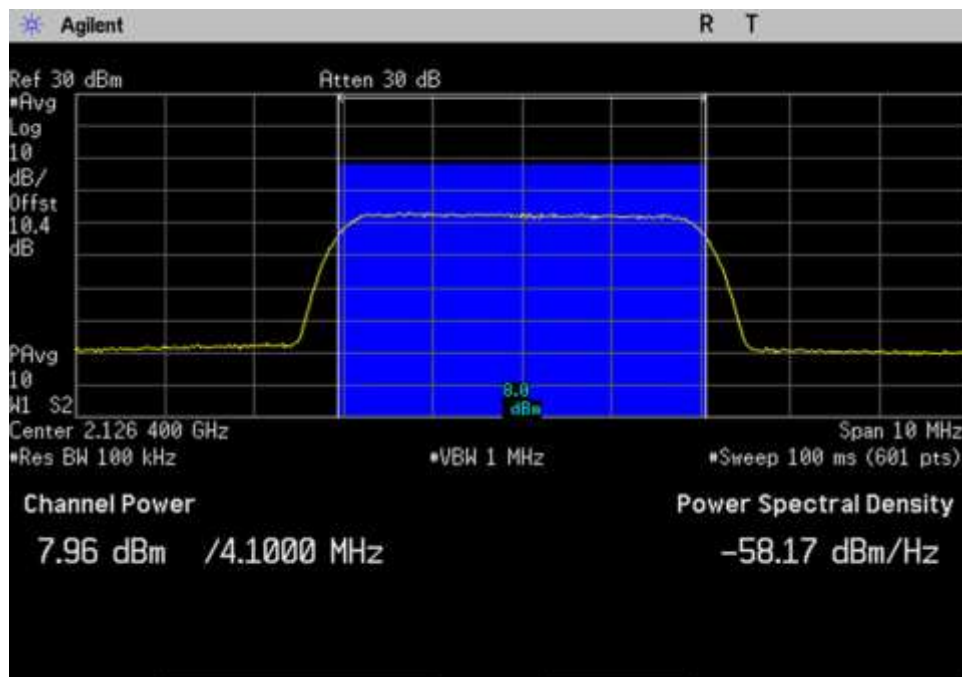
DL_869-894_AWGN_Max_ 882.1MHz



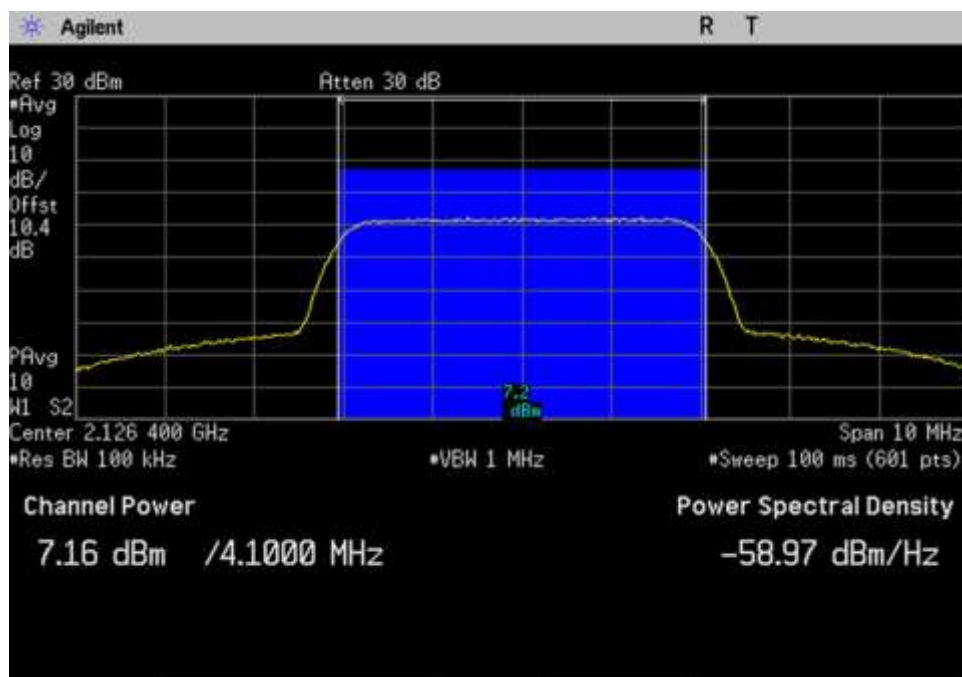
DL_1930-1995_AWGN_ 1957.3MHz



DL_1930-1995_AWGN_Max_ 1957.3MHz

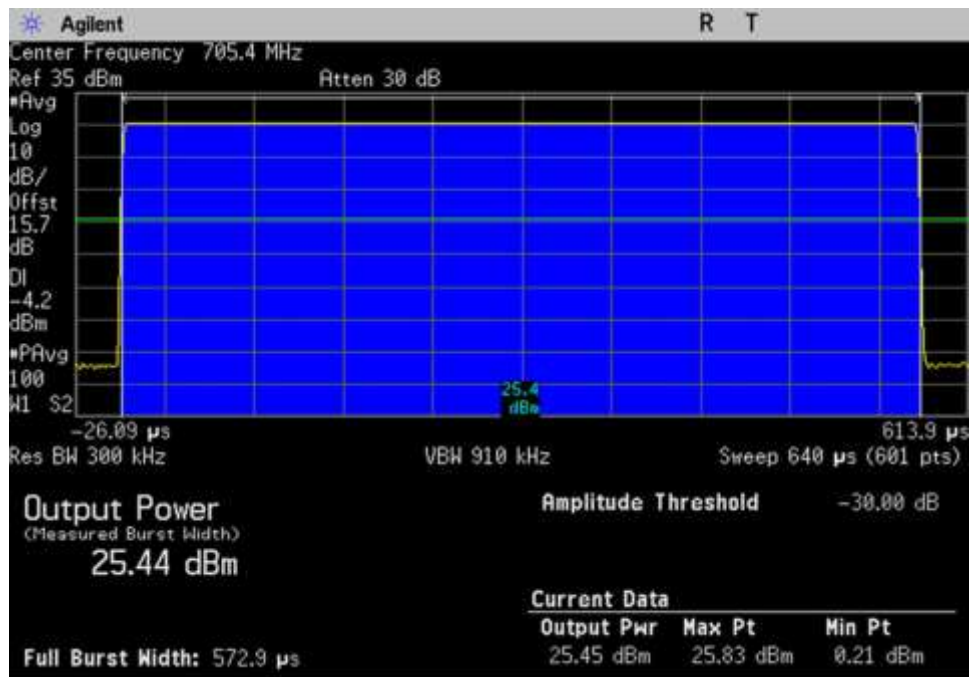


DL_2110-2155_AWGN_ 2126.4MHz

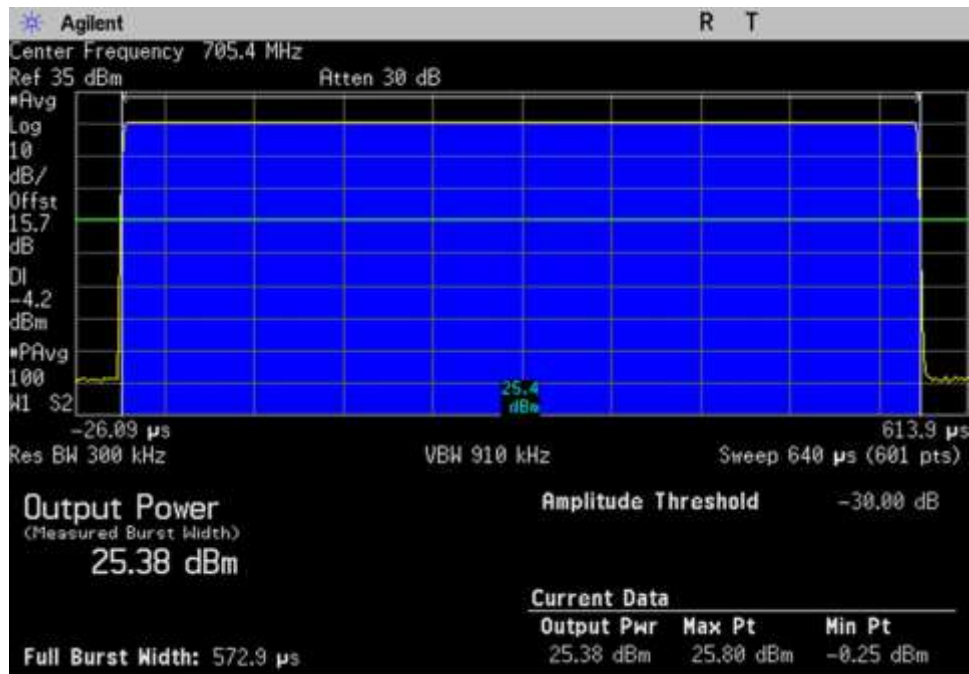


DL_2110-2155_AWGN_Max_ 2126.4MHz

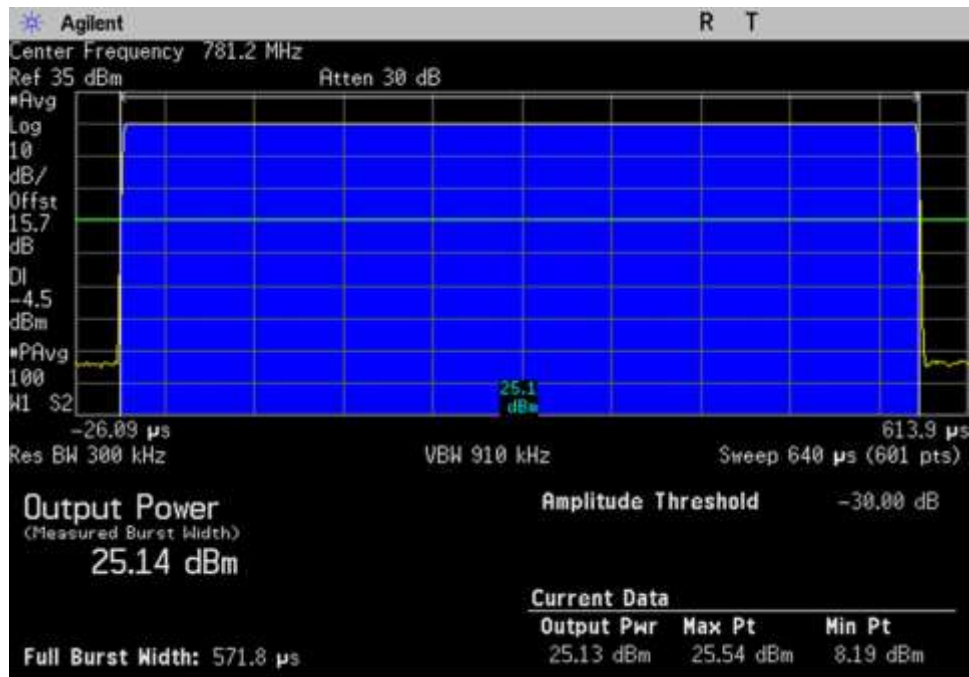
GSM



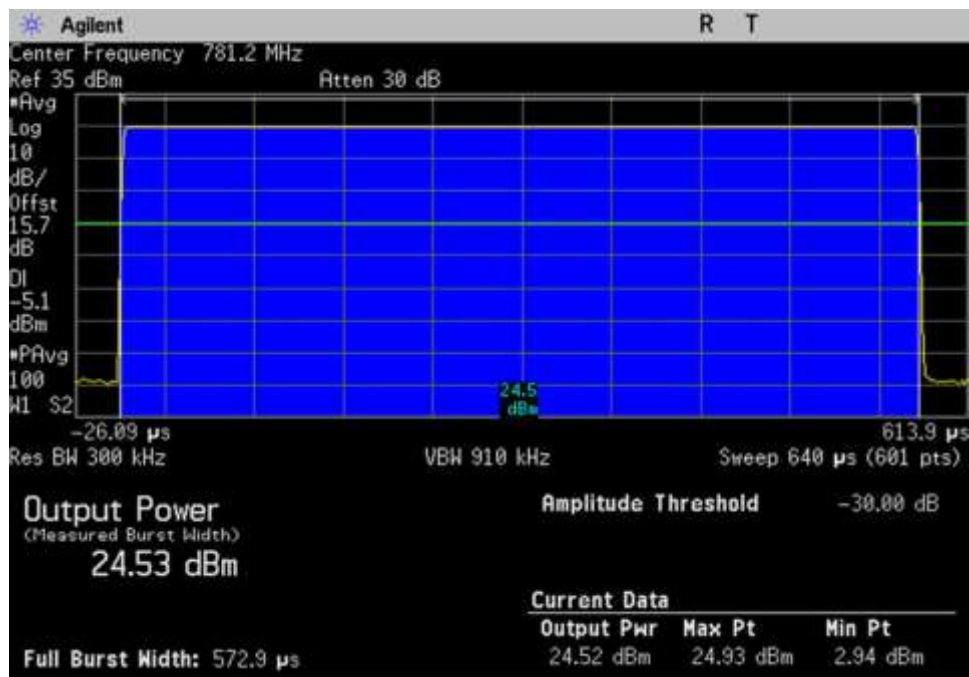
UL_698-716_GSM_705.4MHz



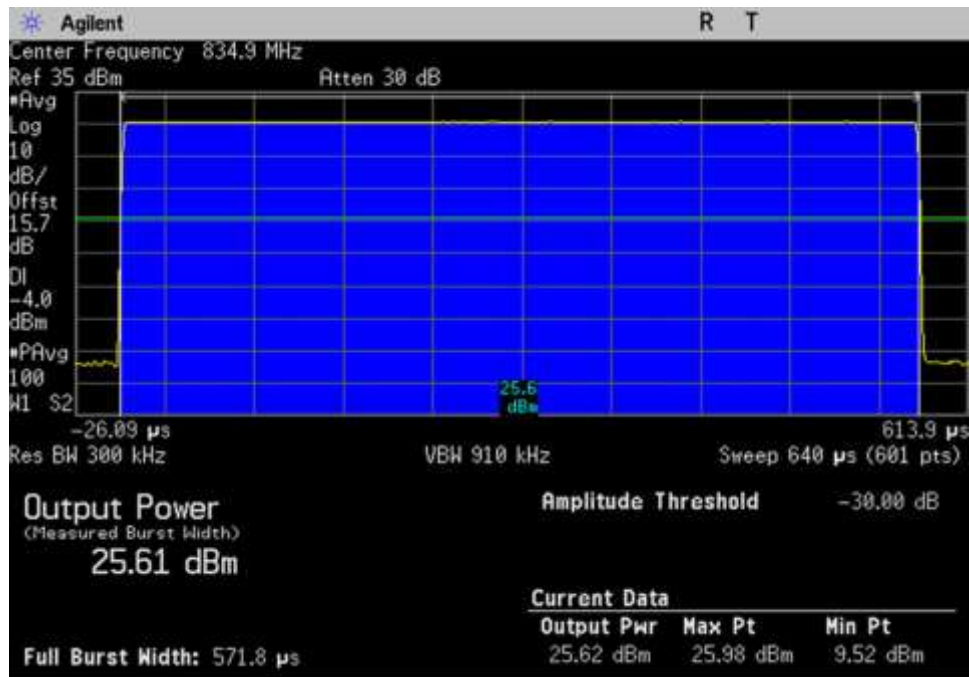
UL_698-716_GSM_Max_705.4MHz



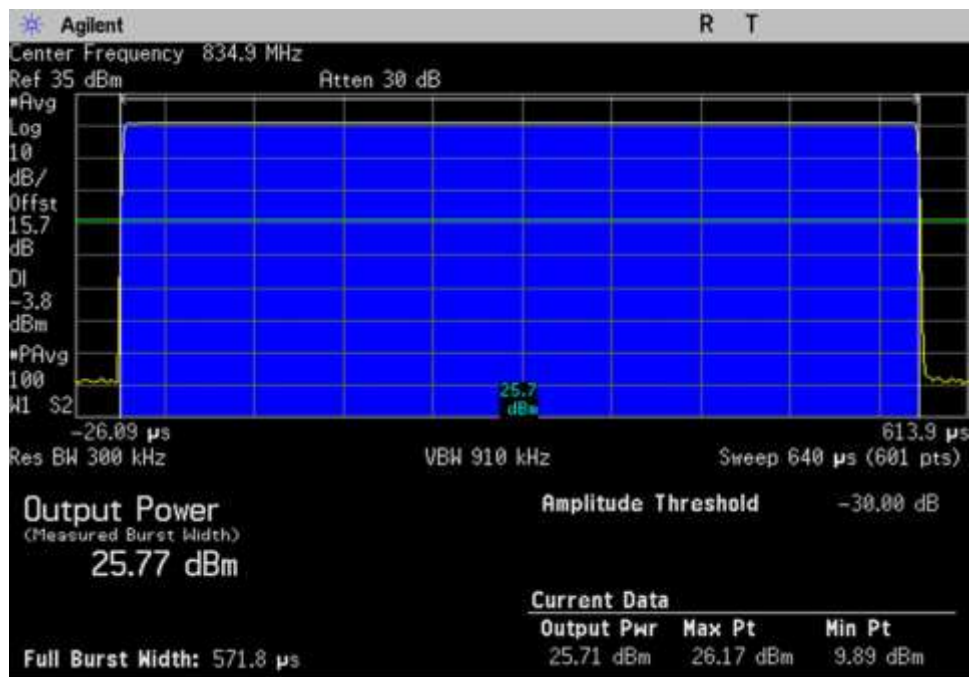
UL_776-787_GSM_ 781.2MHz



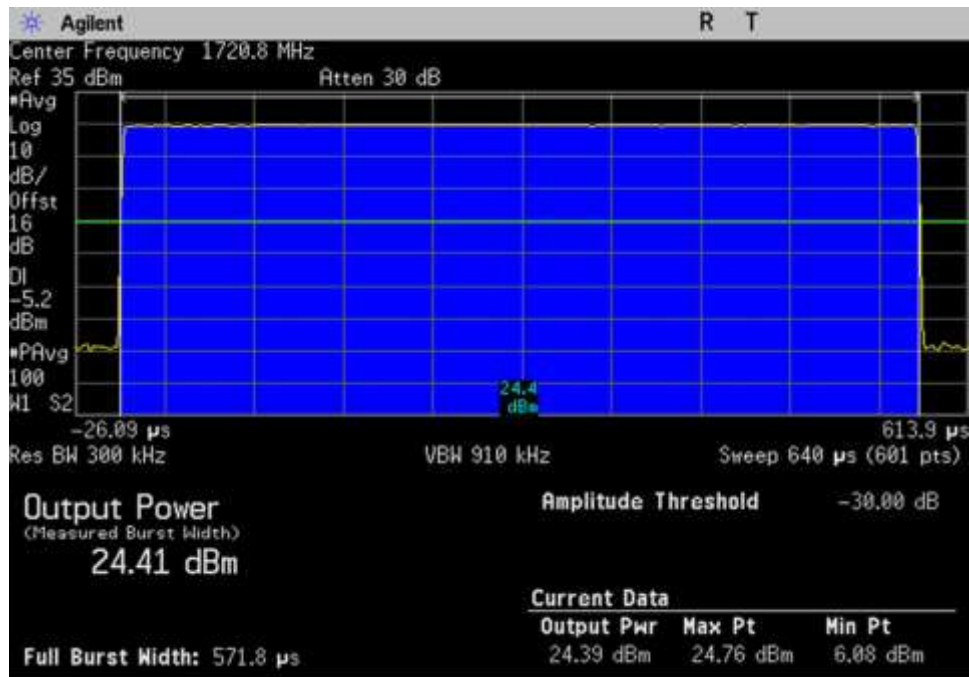
UL_776-787_GSM_Max_ 781.2MHz



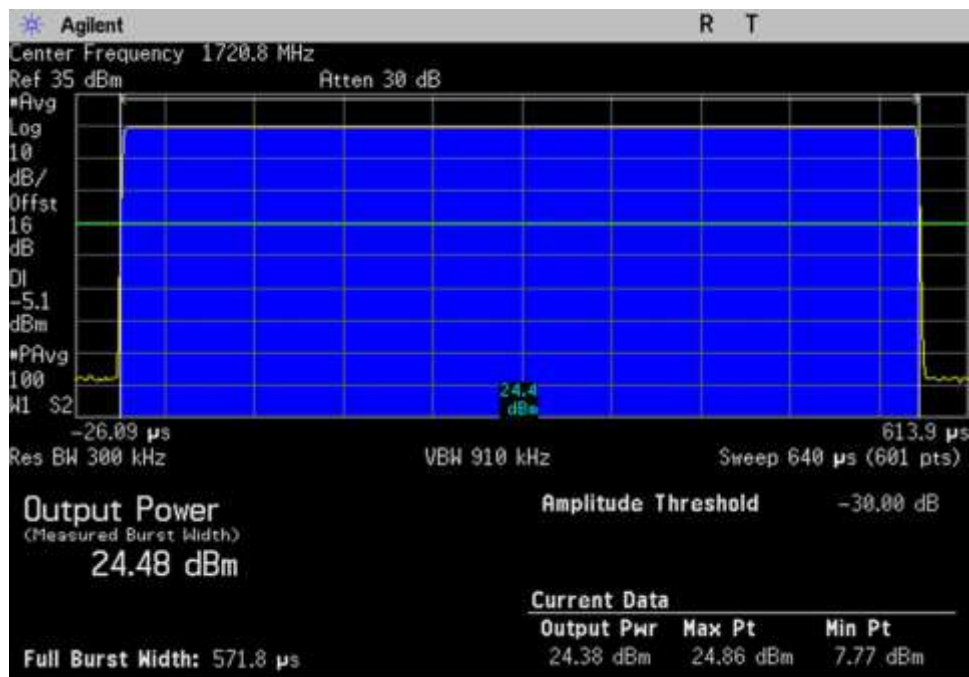
UL_824-849_GSM_ 834.9MHz



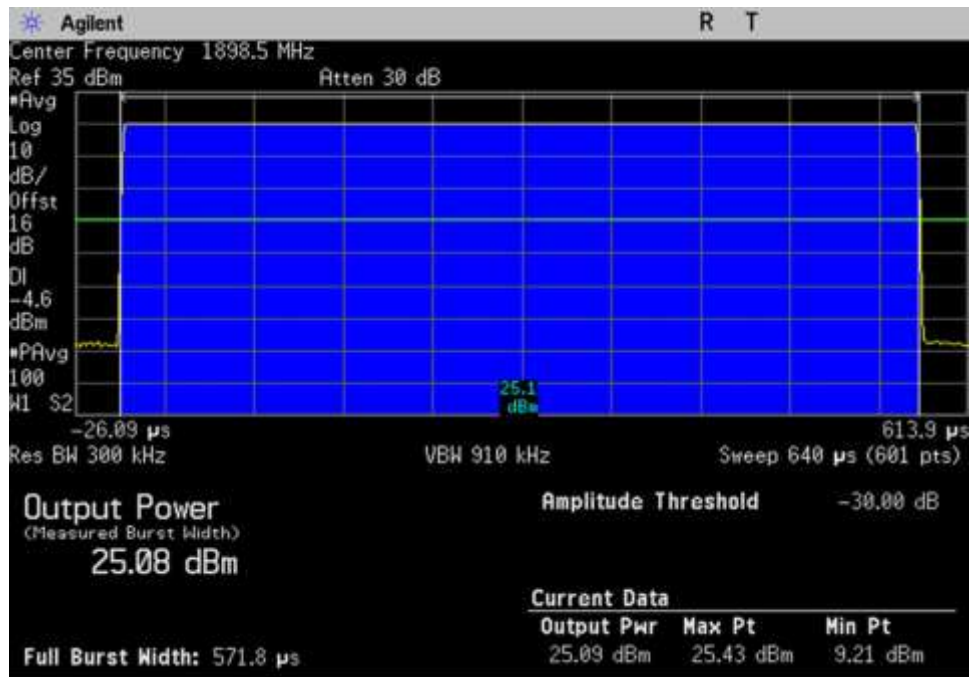
UL_824-849_GSM_Max_ 834.9MHz



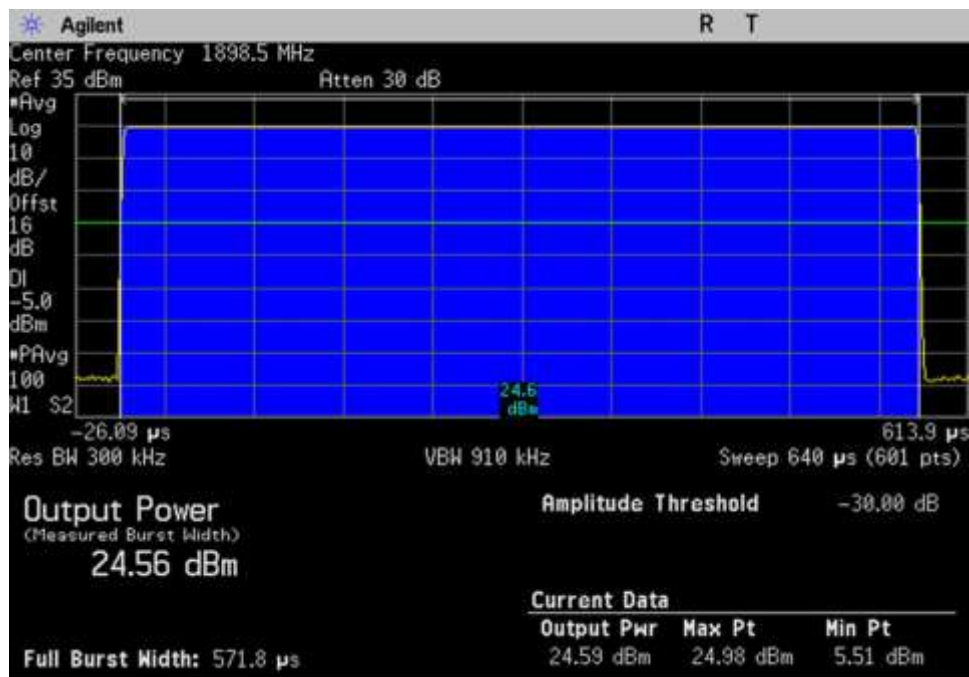
UL_1710-1755_GSM_ 1720.8MHz



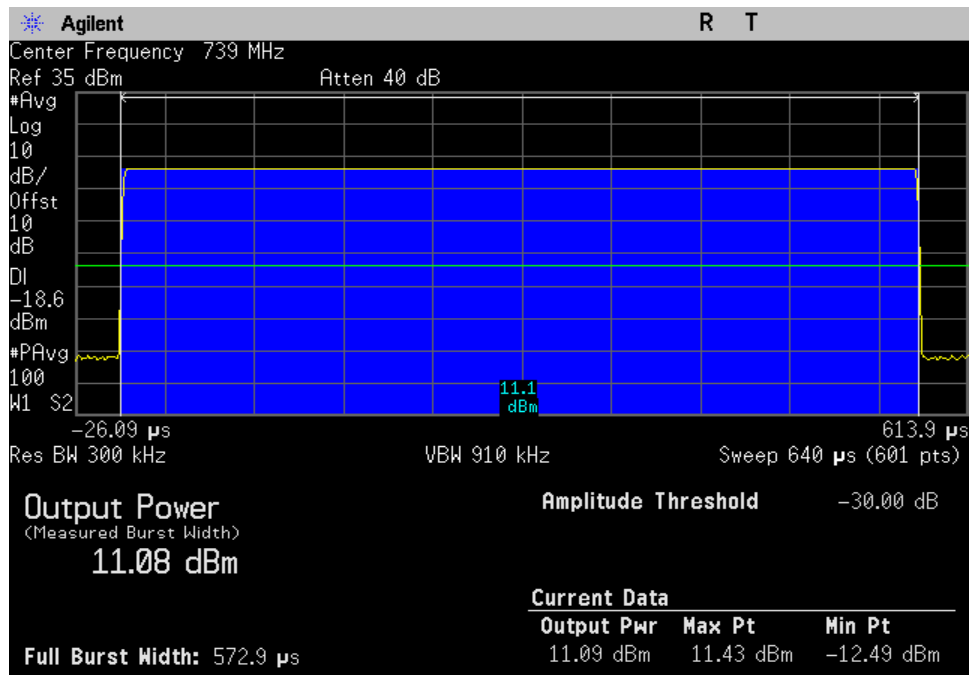
UL_1710-1755_GSM_Max_ 1720.8MHz



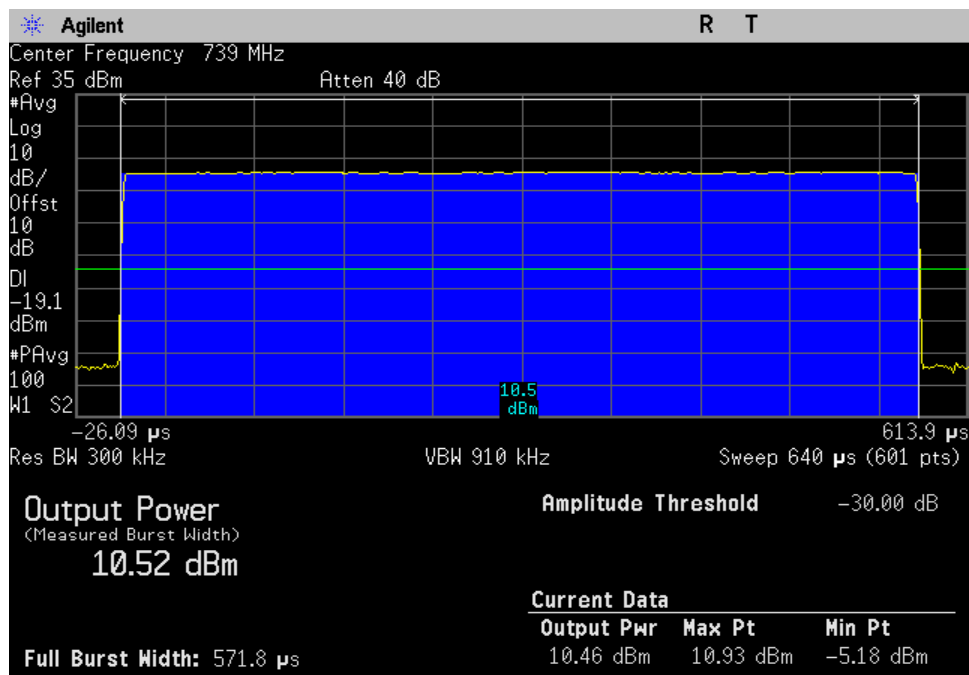
UL_1850-1915_GSM_ 1898.5MHz



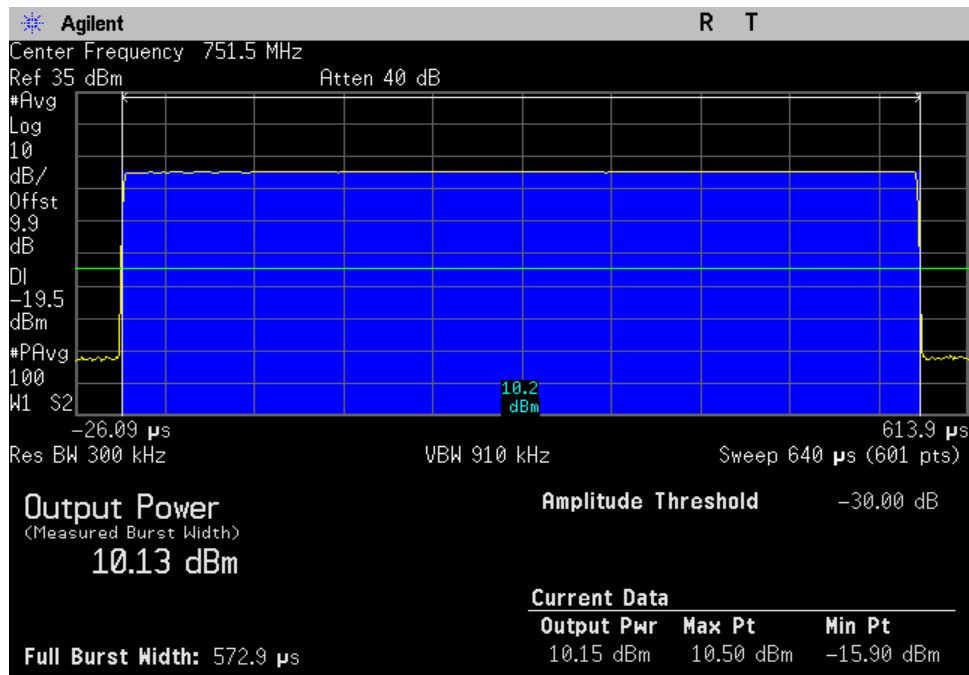
UL_1850-1915_GSM_Max_ 1898.5MHz



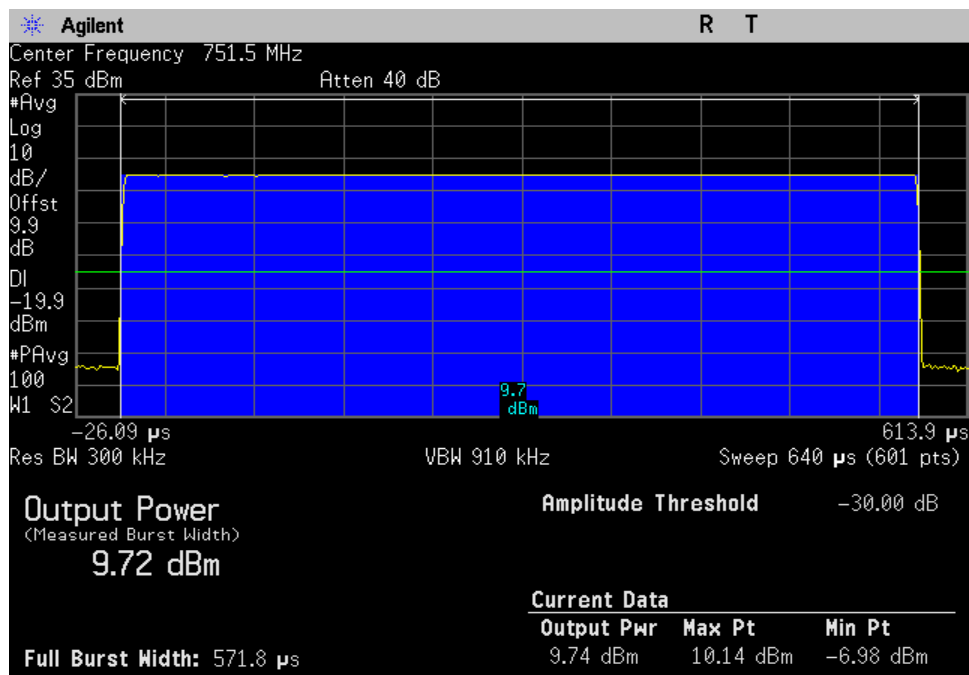
DL_728-746_GSM_739MHz



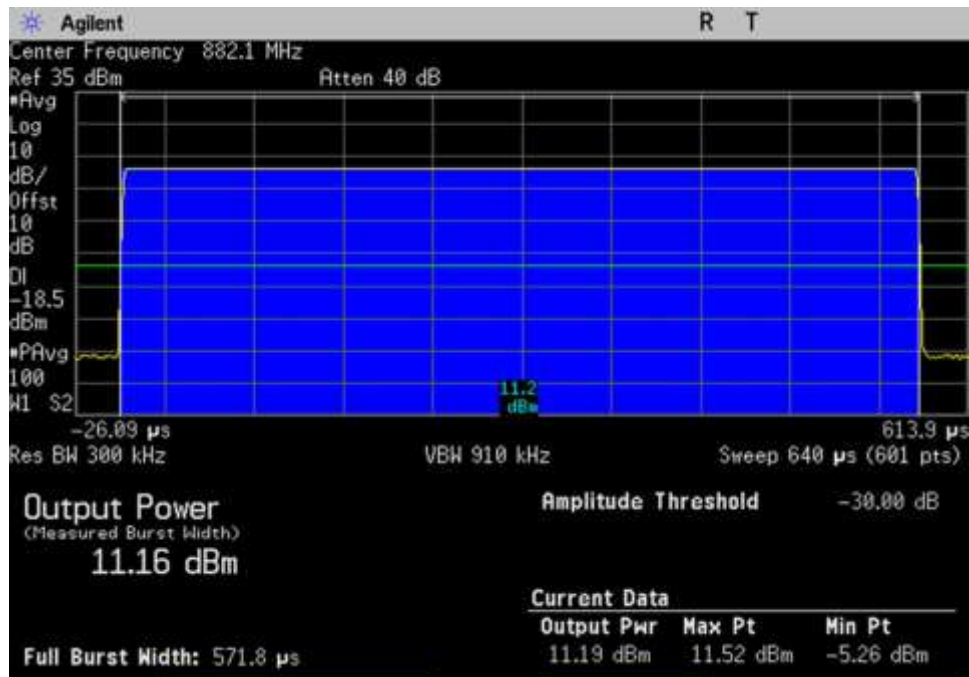
DL_728-746_GSM_Max_739MHz



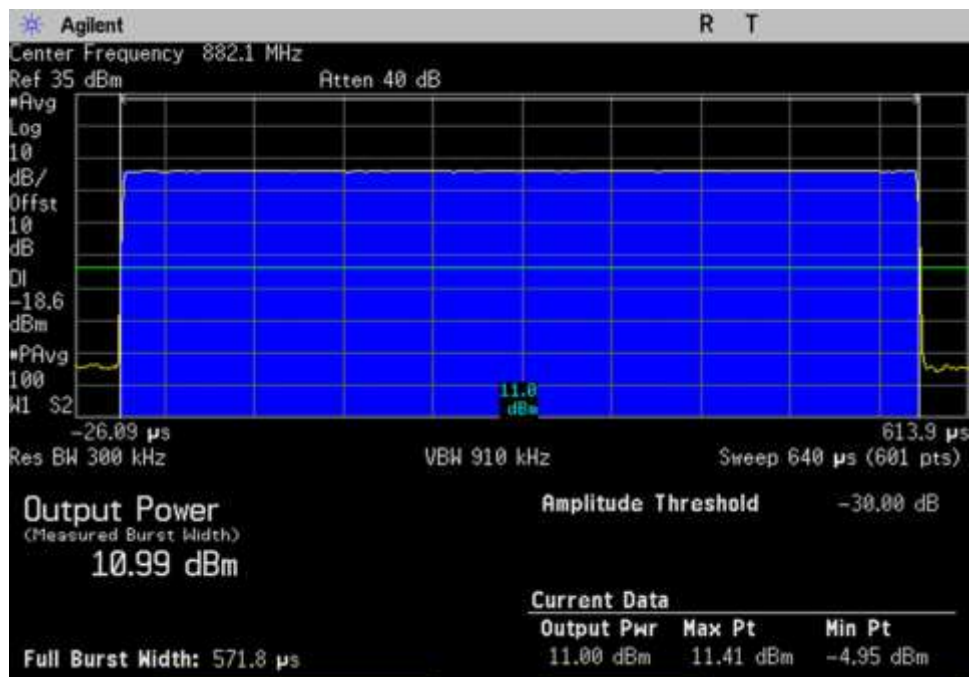
DL_746-757_GSM_ 751.5MHz



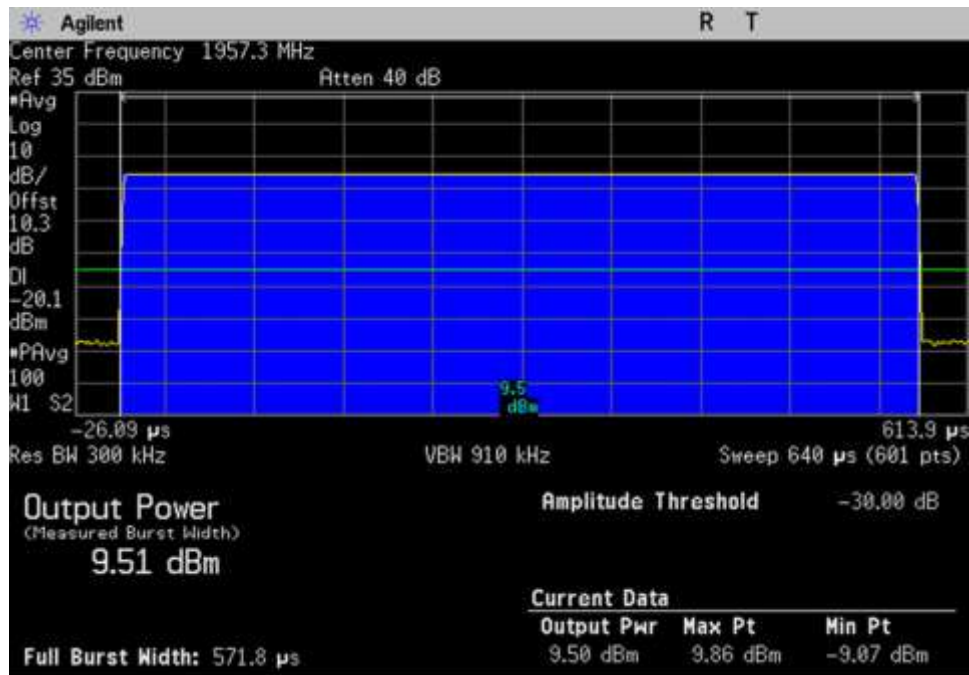
DL_746-757_GSM_Max_ 751.5MHz



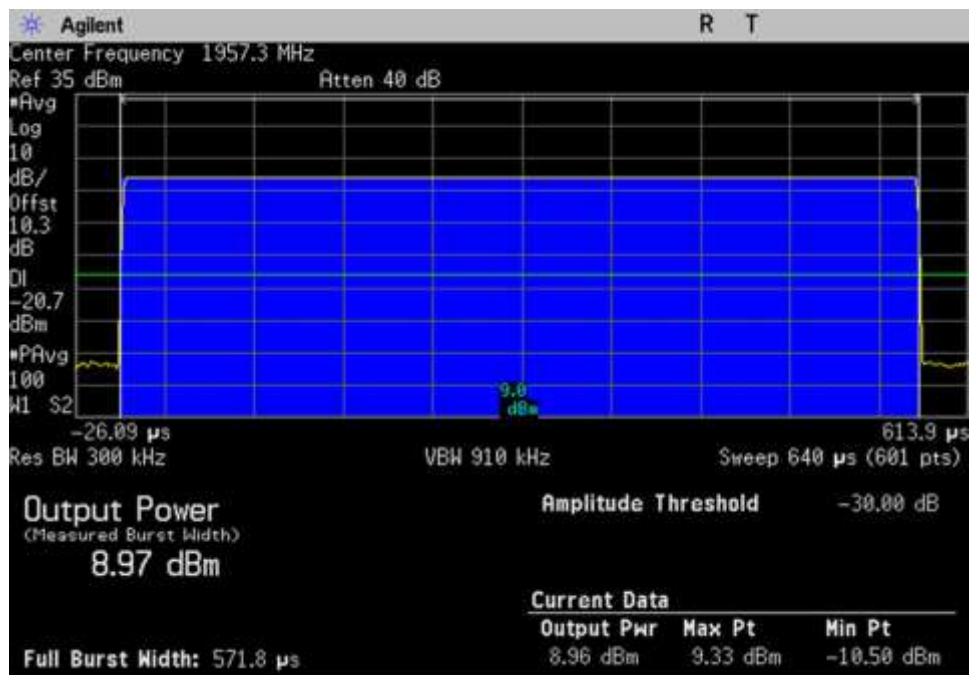
DL_869-894_GSM_ 882.1MHz



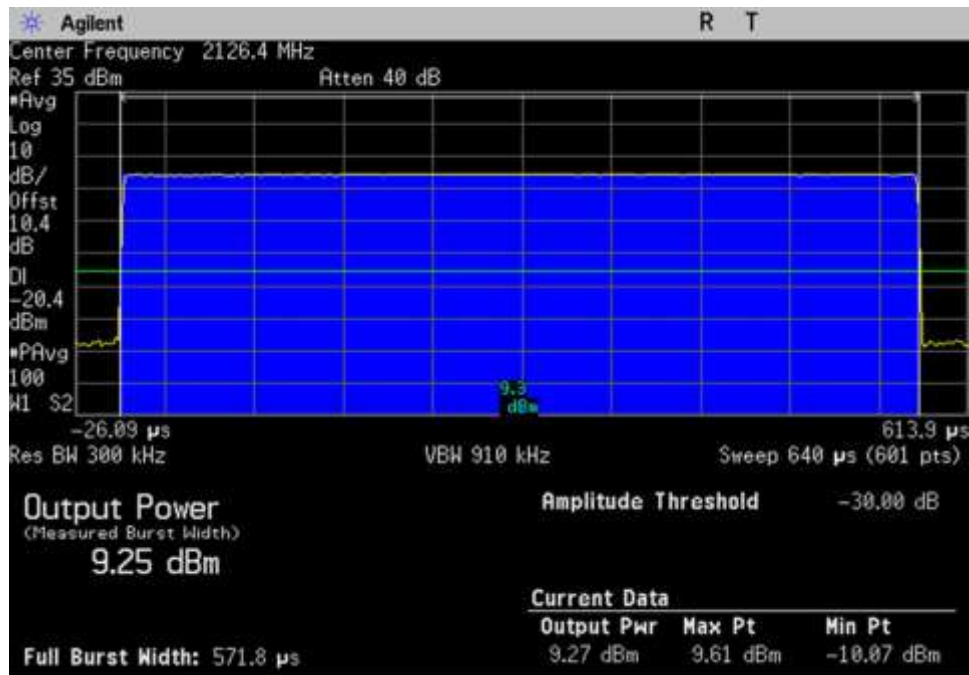
DL_869-894_GSM_Max_ 882.1MHz



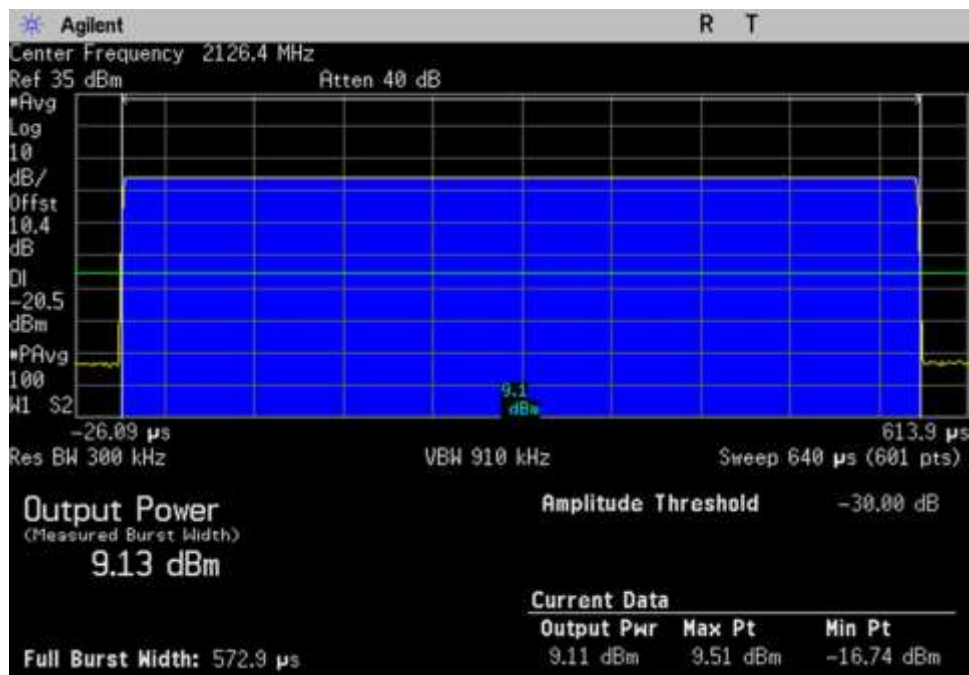
DL_1930-1995_GSM_1957.3MHz



DL_1930-1995_GSM_Max_1957.3MHz



DL_2110-2155_GSM_ 2126.4MHz



DL_2110-2155_GSM_Max_ 2126.4MHz

7.4 Intermodulation Product

Test Conditions / Data

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 #: **101748** Date 10/01/2018 and 10/02/2018
 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:

10/01/2018: Test environment conditions:

Temperature: 20.3°C
 Relative Humidity: 50%
 Pressure: 102.1 kPa

10/02/2018: Test environment conditions:

Temperature: 21.3°C
 Relative Humidity: 52.3%
 Pressure: 102.5kPa

Modification #1 and #2 were in place during testing.

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

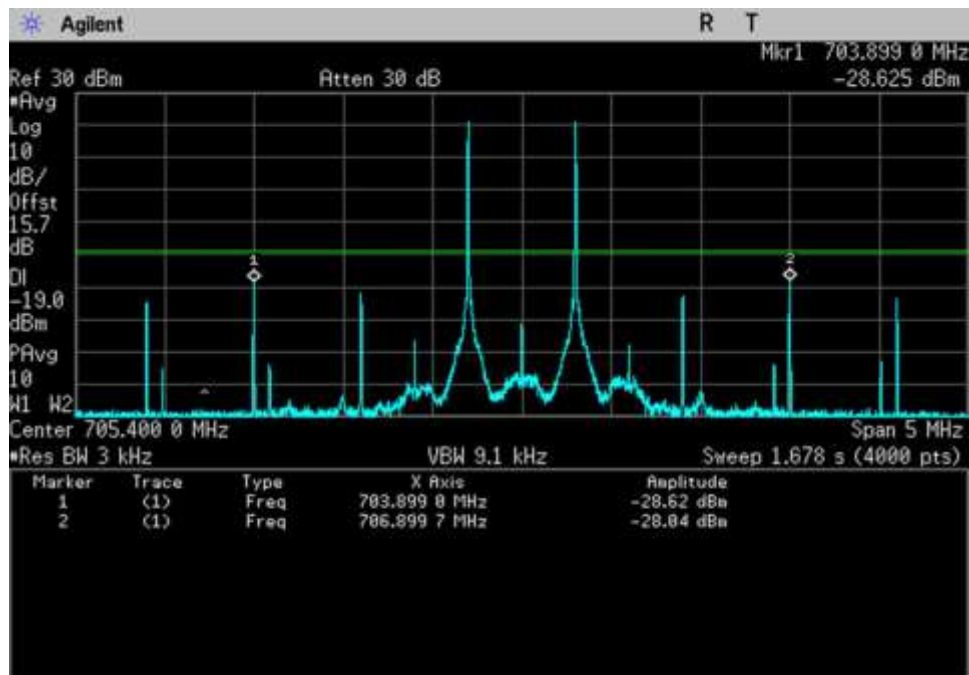
Summary of Results

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

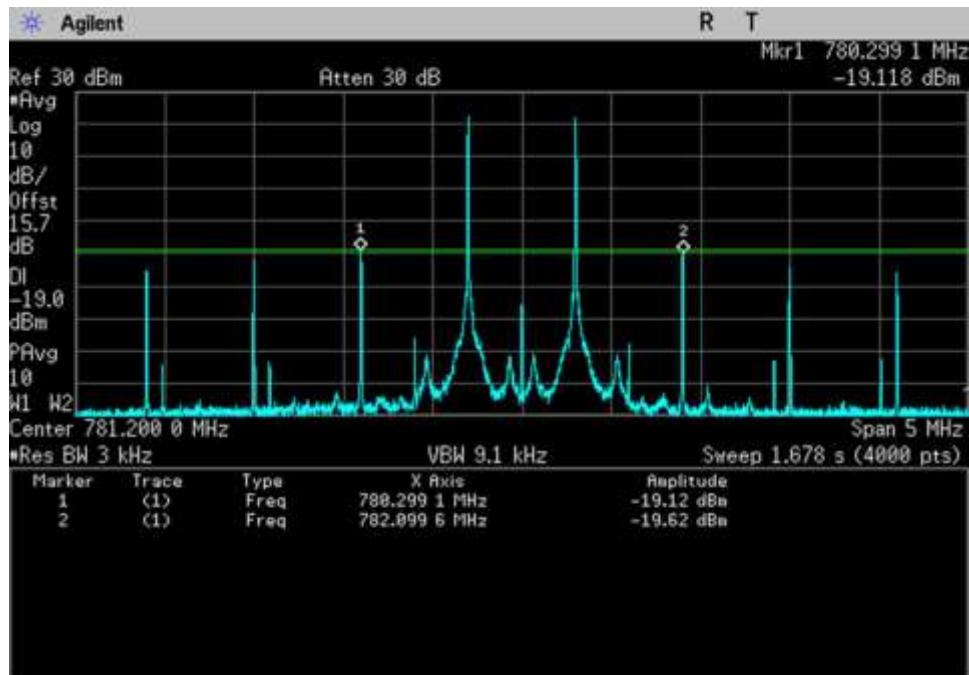
Inter Modulation Product			
Frequency (MHz)	Pre AGC (dBm)	Limit (dBm)	Results
UL 1710-1755	-25.4	-19	Pass
UL 1850-1915	-20.7	-19	Pass
UL 824-894	-21.3	-19	Pass
UL 698-716	-28.0	-19	Pass
UL 776-787	-19.1	-19	Pass
DL 2110-2155	-44.5	-19	Pass
DL 1930-1995	-37.8	-19	Pass
DL 869-894	-31.4	-19	Pass
DL 728-746	-40.3	-19	Pass
DL 746-757	-41.1	-19	Pass

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

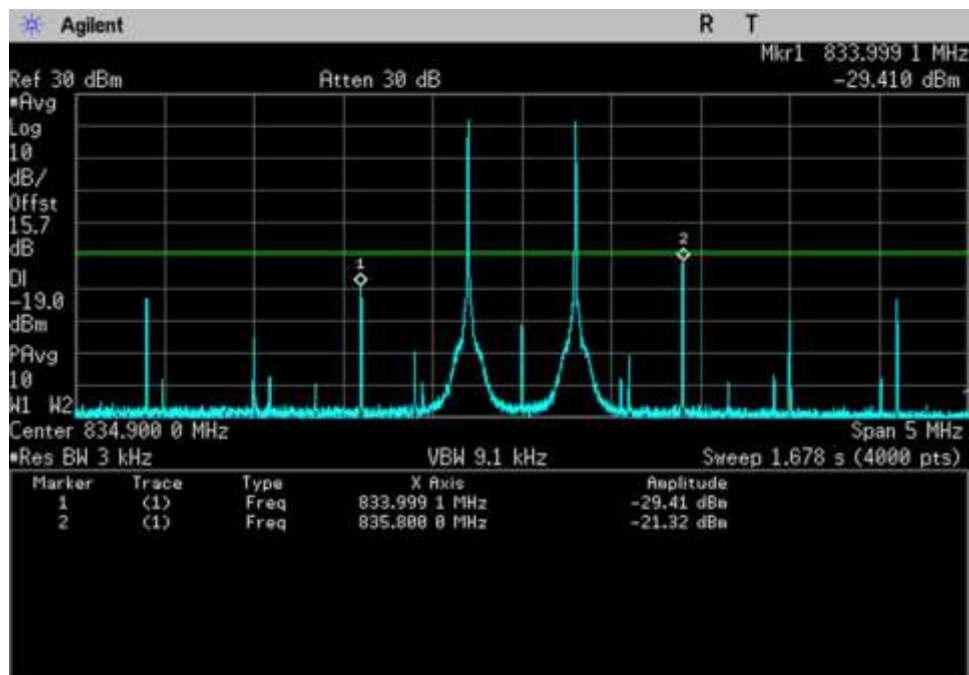
Plots



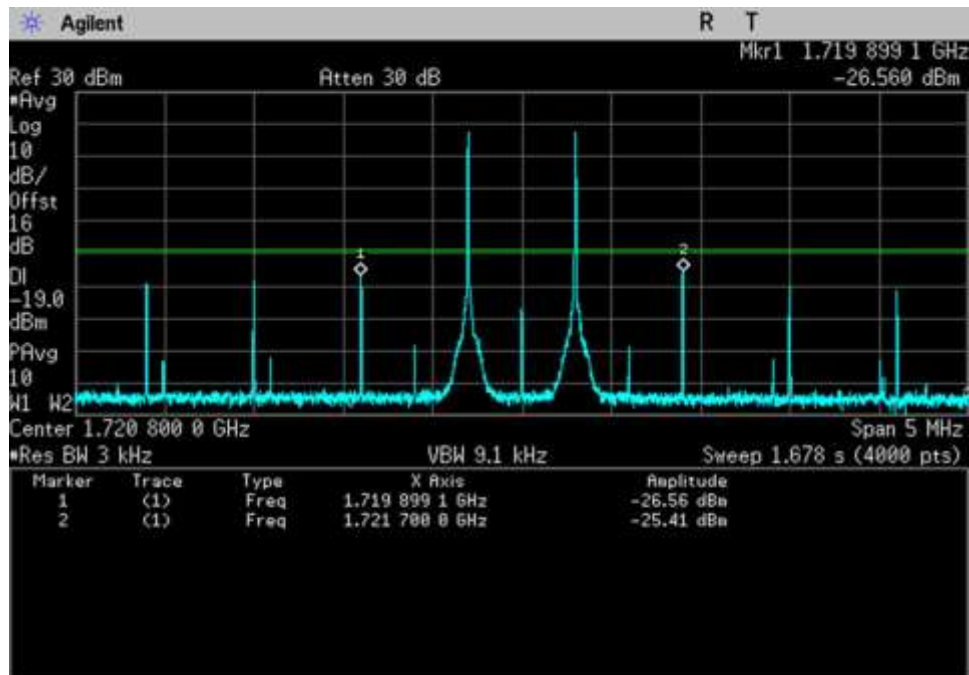
UL_698-716_ 705.4MHz



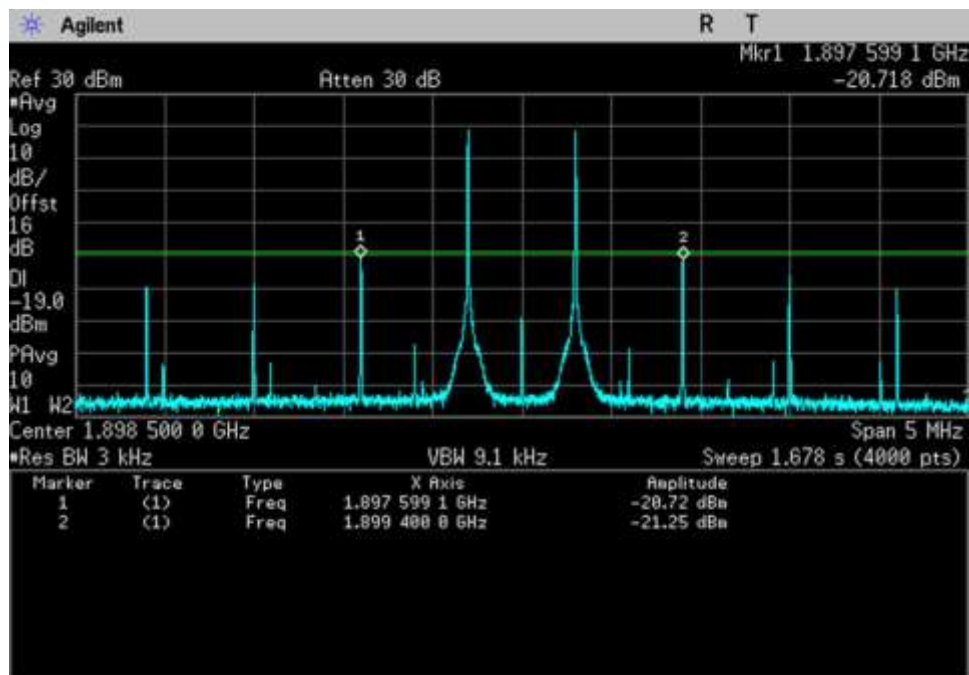
UL_776-787_ 781.2MHz



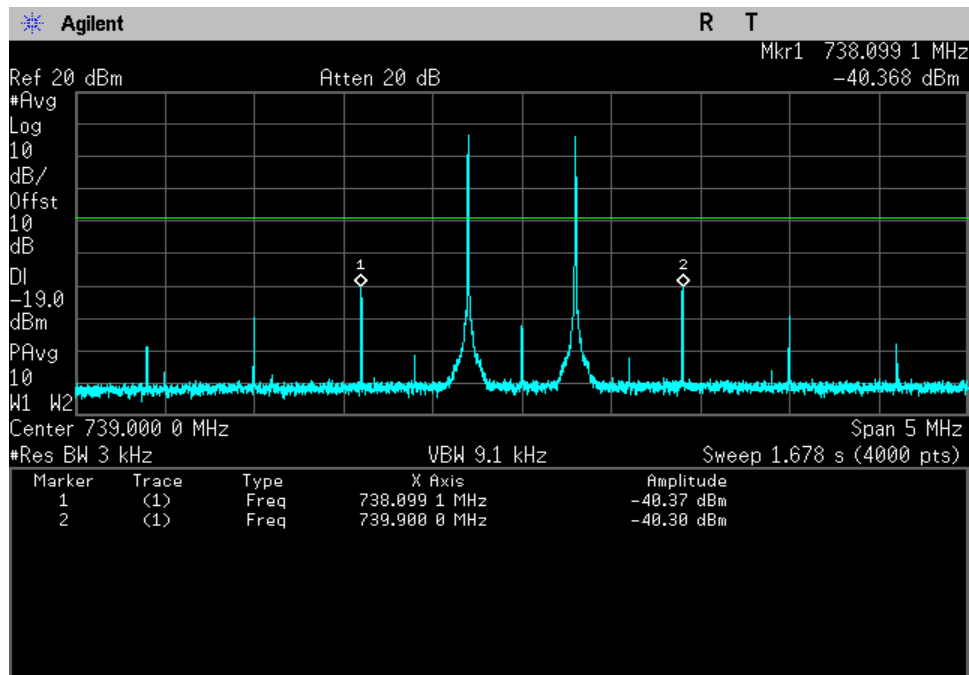
UL_824-849_ 834.9MHz



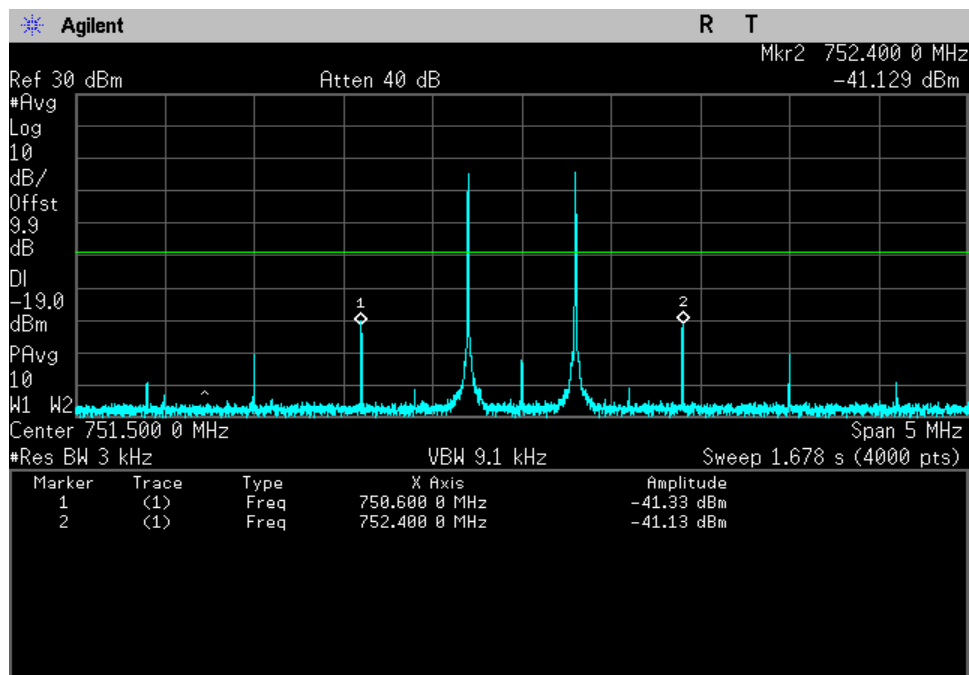
UL_1710-1755_ 1720.8MHz



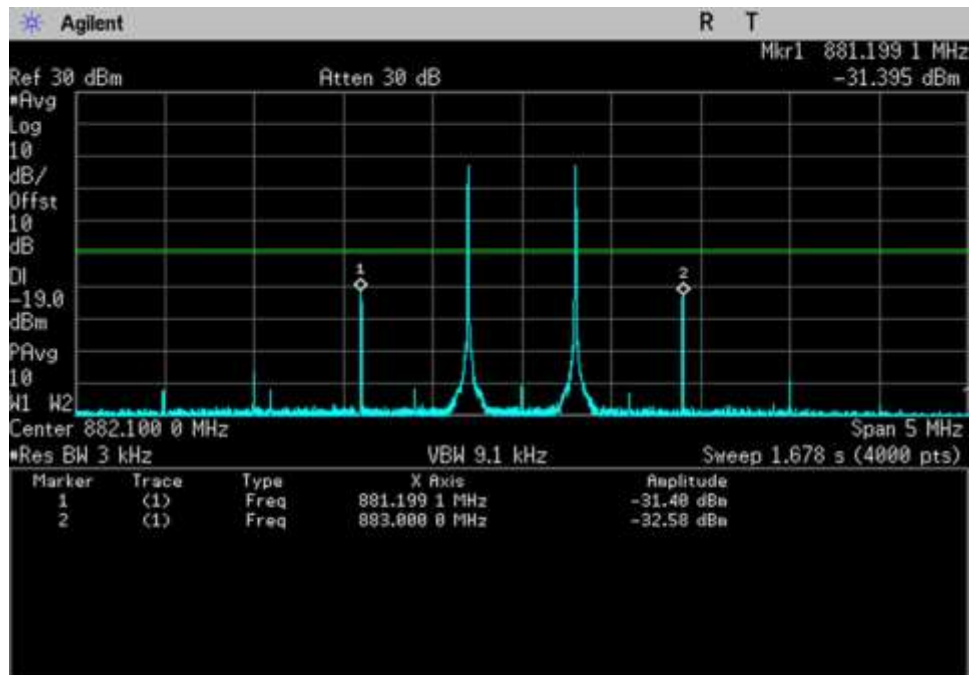
UL_1850-1915_ 1898.5MHz



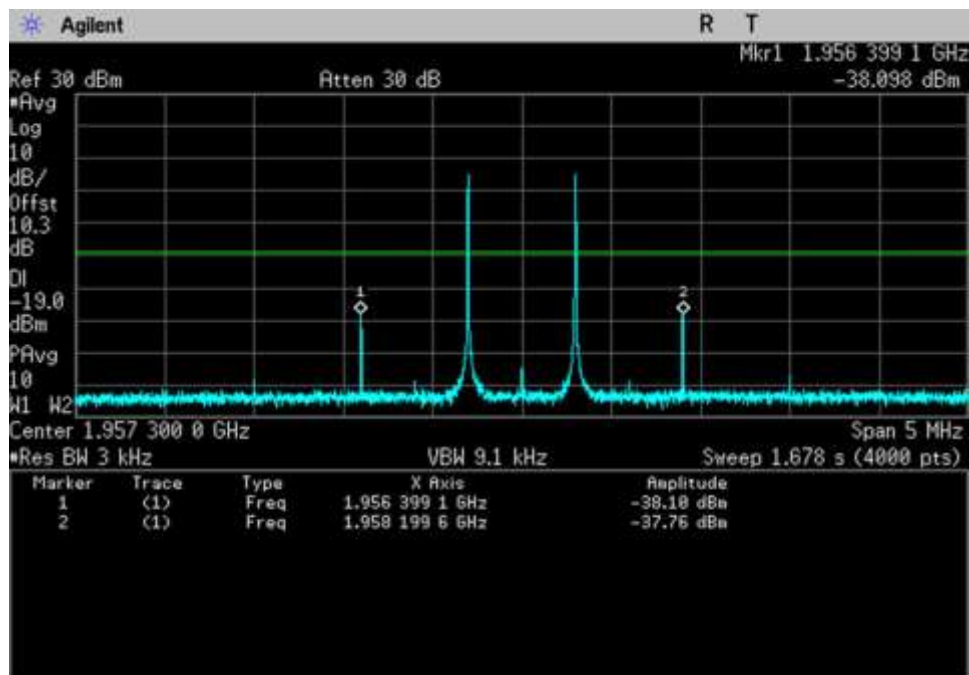
DL_728-746_ 739MHz



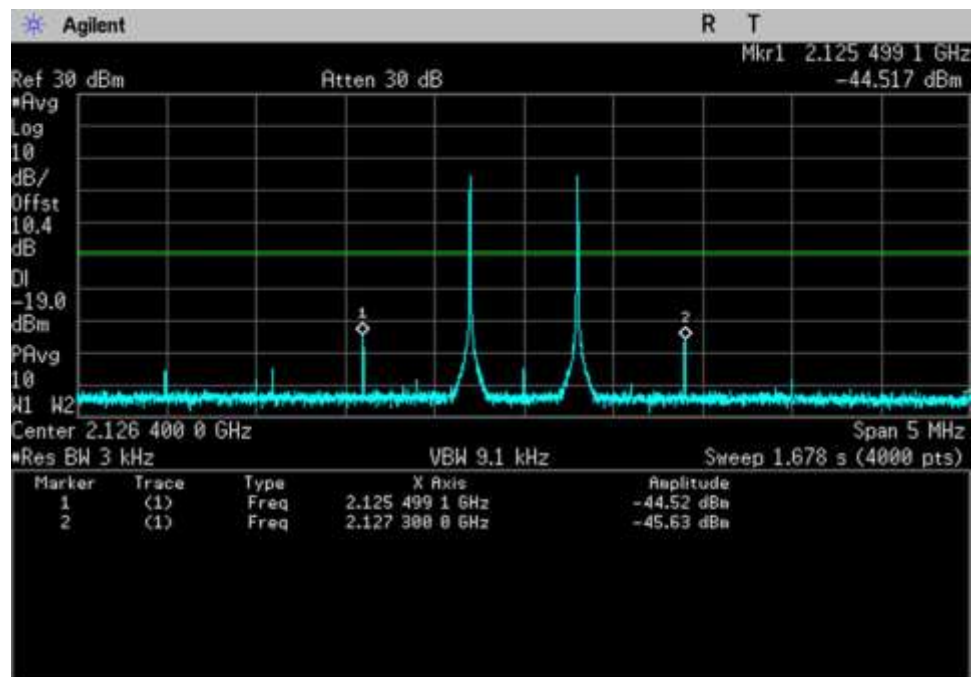
DL_746-757_ 752.8MHz



DL_869-894_ 882.1MHz



DL_1930-1995_ 1957.3MHz



DL_2110-2155_ 2126.4MHz

7.5 Out of Band Emissions

Test Conditions / Data

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 #: **101748** Date 10/02/2018 and 10/03/2018
 Test Type: **Conducted Emissions**
 Tested By: **Hieu Song 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:

10/02/2018: Test environment conditions:

Temperature: 21.3°C
 Relative Humidity: 52.3%
 Pressure: 102.5kPa

10/03/2018: Test environment conditions:

Temperature: 22.3°C
 Relative Humidity: 48%
 Pressure: 101.5kPa

Modification #1 was in place during testing.

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 indicated in plots below, all OBE are under the limit of -19dBm.

GSM

Low			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-30.0	-19	Pass
UL 1850-1915	-28.7	-19	Pass
UL 824-849	-22.3	-19	Pass
UL 698-716	-19.4	-19	Pass
UL 776-787	-19.2	-19	Pass
DL 2110-2155	-37.9	-19	Pass
DL 1930-1995	-37.8	-19	Pass
DL 869-894	-31.8	-19	Pass
DL:728-746	-40.9	-19	Pass
DL 746-757	-33.9	-19	Pass

High			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-28.9	-19	Pass
UL 1850-1915	-38.0	-19	Pass
UL 824-849	-21.8	-19	Pass
UL 698-716	-21.1	-19	Pass
UL 776-787	-19.4	-19	Pass
DL 2110-2155	-33.0	-19	Pass
DL 1930-1995	-39.2	-19	Pass
DL 869-894	-34.2	-19	Pass
DL:728-746	-35.3	-19	Pass
DL 746-757	-40.0	-19	Pass

CDMA (alternative 1.25 MHz AWGN)

Low			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-32.2	-19	Pass
UL 1850-1915	-33.5	-19	Pass
UL 824-849	-22.5	-19	Pass
UL 698-716	-31.4	-19	Pass
UL 776-787	-27.1	-19	Pass
DL 2110-2155	-40.4	-19	Pass
DL 1930-1995	-44.2	-19	Pass
DL 869-894	-43.4	-19	Pass
DL:728-746	-57.6	-19	Pass
DL 746-757	-48.9	-19	Pass

High			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-33.2	-19	Pass
UL 1850-1915	-42.4	-19	Pass
UL 824-849	-24.5	-19	Pass
UL 698-716	-30.3	-19	Pass
UL 776-787	-19.8	-19	Pass
DL 2110-2155	-36.2	-19	Pass
DL 1930-1995	-43.2	-19	Pass
DL 869-894	-47.0	-19	Pass
DL:728-746	-53.3	-19	Pass
DL 746-757	-56.3	-19	Pass

LTE (alternative 4.1MHz AWGN)

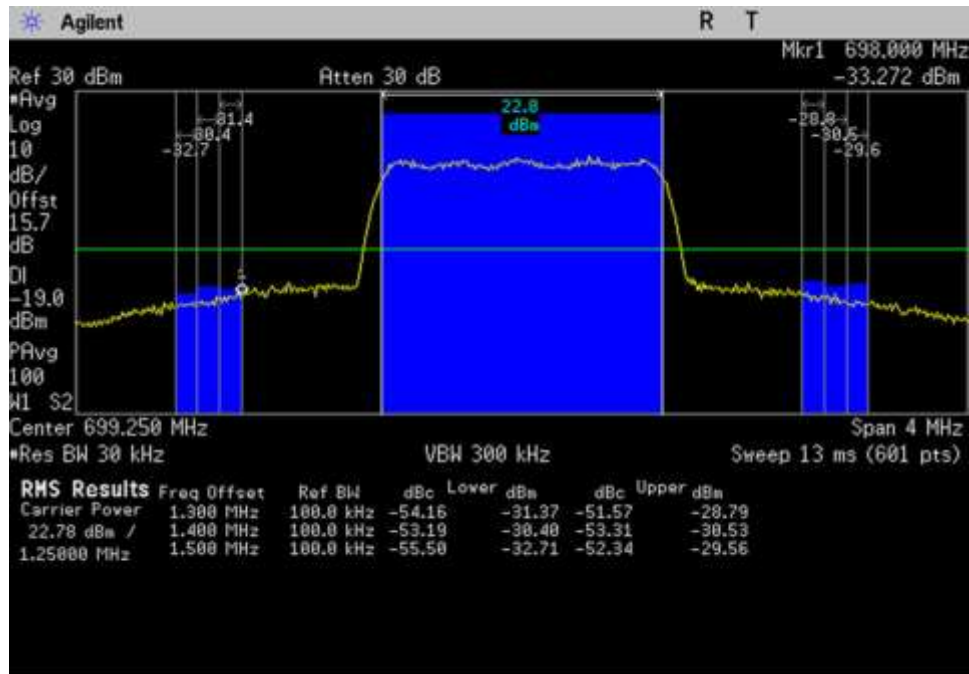
Low			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-32.0	-19	Pass
UL 1850-1915	-31.3	-19	Pass
UL 824-849	-28.8	-19	Pass
UL 698-716	-28.3	-19	Pass
UL 776-787	-28.1	-19	Pass
DL 2110-2155	-39.5	-19	Pass
DL 1930-1995	-43.1	-19	Pass
DL 869-894	-42.8	-19	Pass
DL:728-746	-50.5	-19	Pass
DL 746-757	-39.4	-19	Pass

High			
Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL 1710-1755	-34.7	-19	Pass
UL 1850-1915	-42.9	-19	Pass
UL 824-849	-30.8	-19	Pass
UL 698-716	-34.5	-19	Pass
UL 776-787	-22.5	-19	Pass
DL 2110-2155	-35.3	-19	Pass
DL 1930-1995	-41.3	-19	Pass
DL 869-894	-44.6	-19	Pass
DL:728-746	-48.1	-19	Pass
DL 746-757	-51.0	-19	Pass

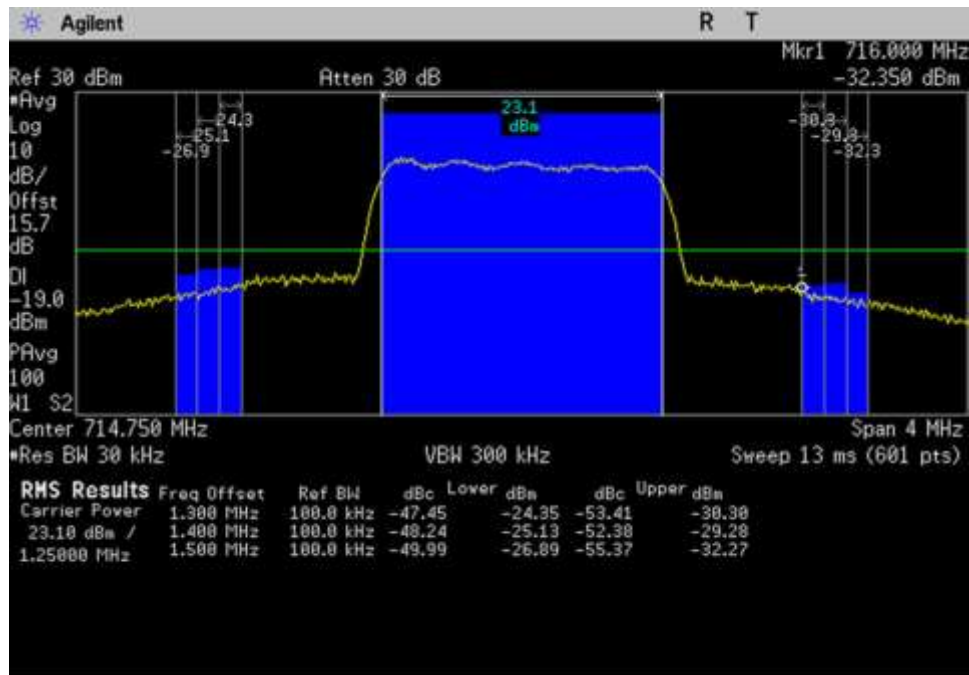
Note: The EUT also maintains compliance with the out-of-band emissions limit at input power indicated in section 5.5.

Plots

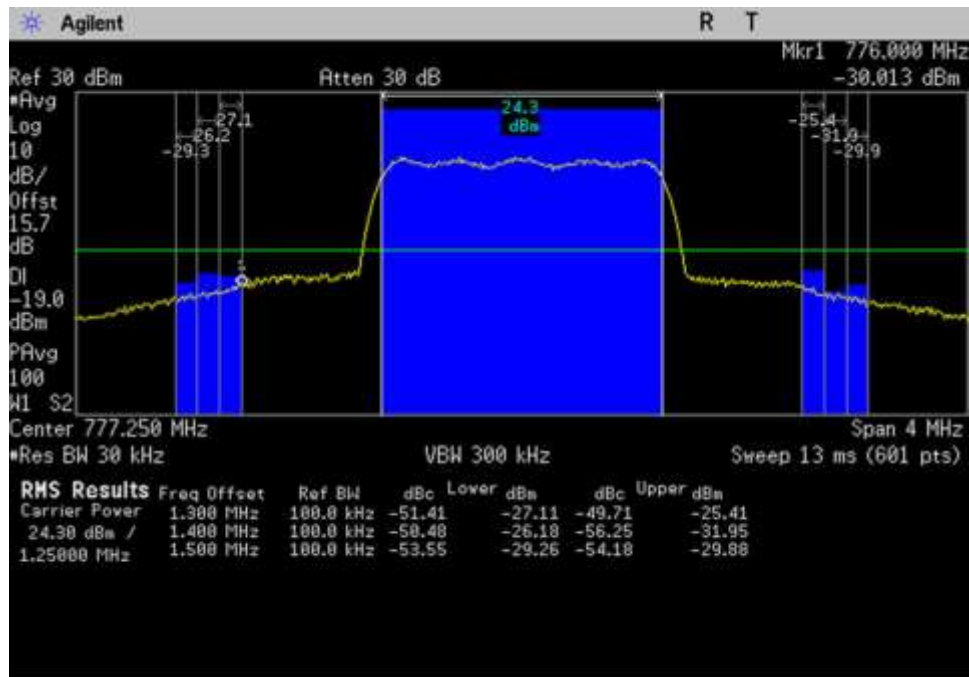
CDMA



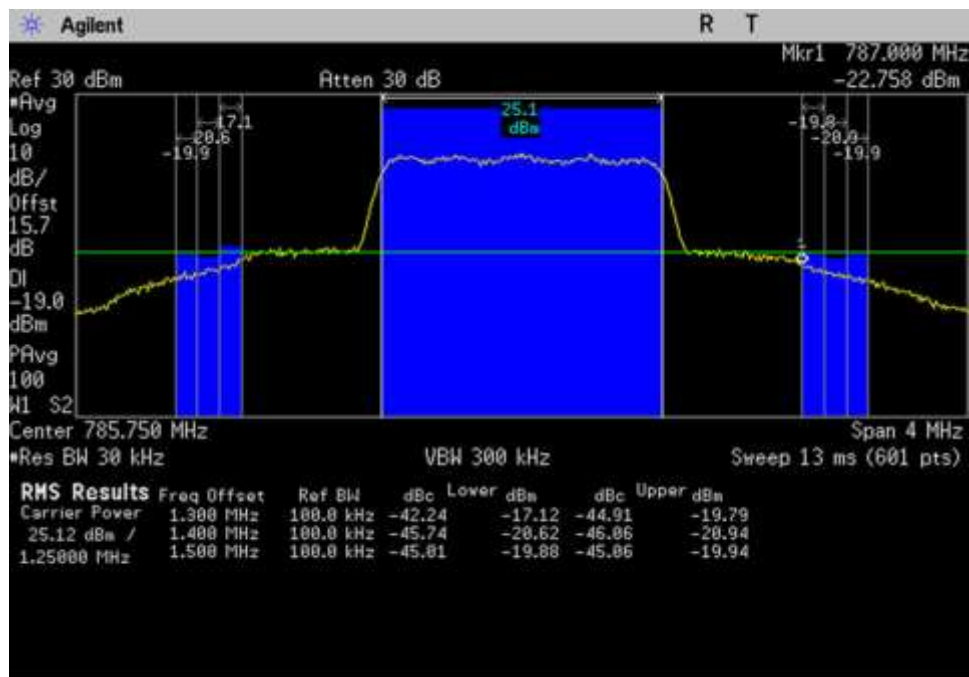
UL_698-716_CDMA_697.25-701.25MHz



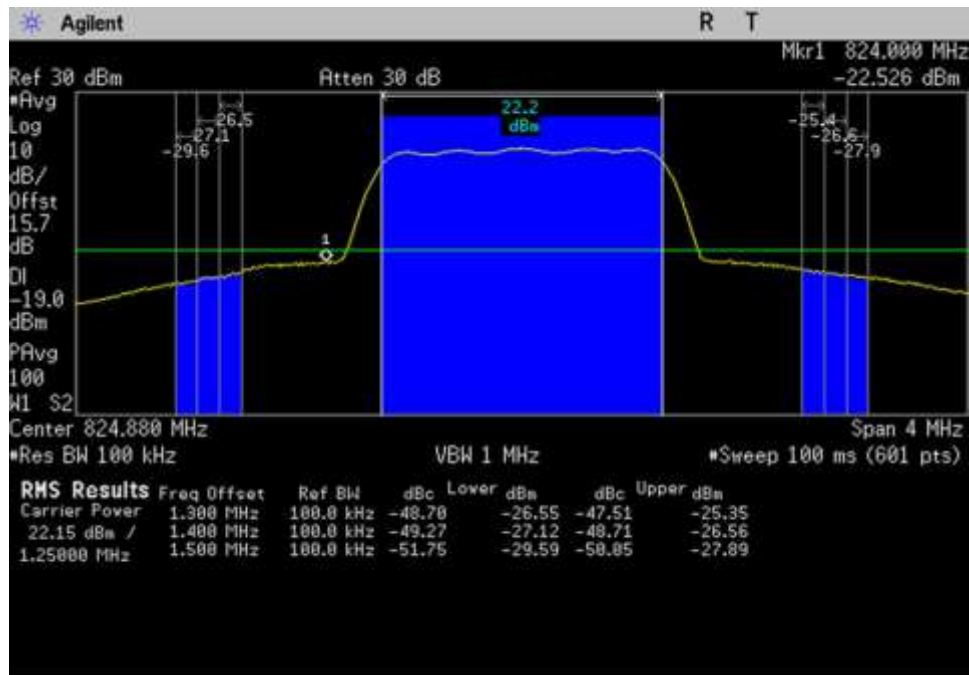
UL_698-716_CDMA_712.75-716.75MHz



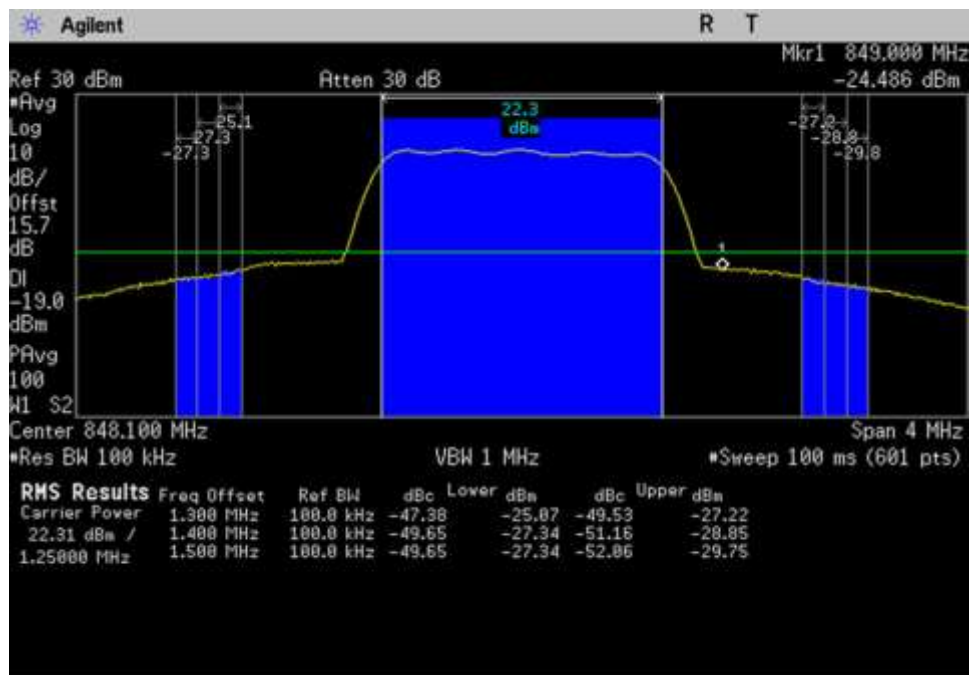
UL_776-787_CDMA_775.25-779.25MHz



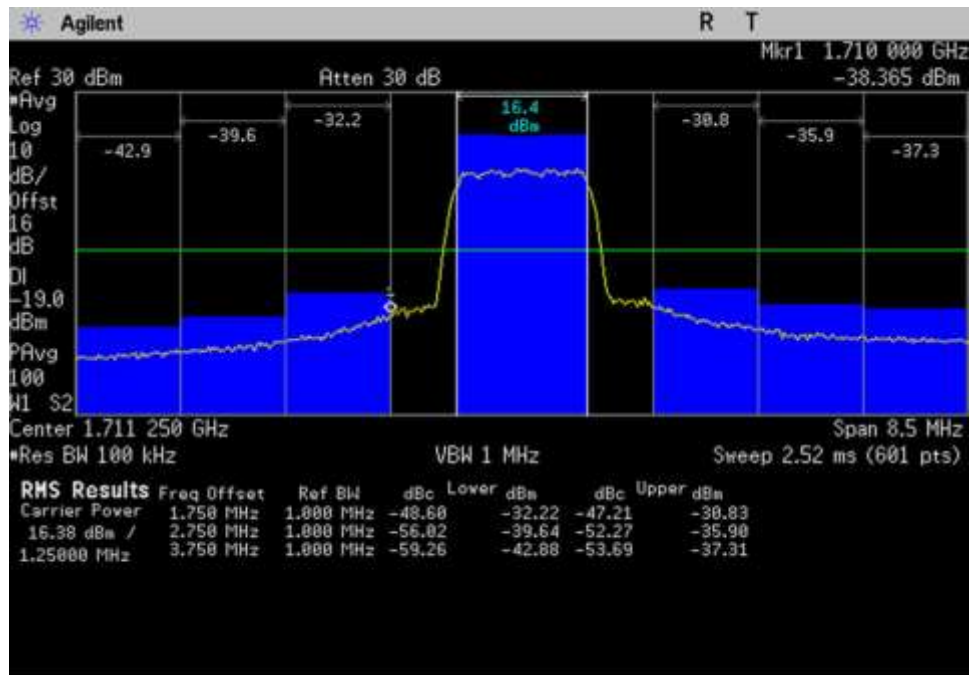
UL_776-787_CDMA_783.75-787.75MHz



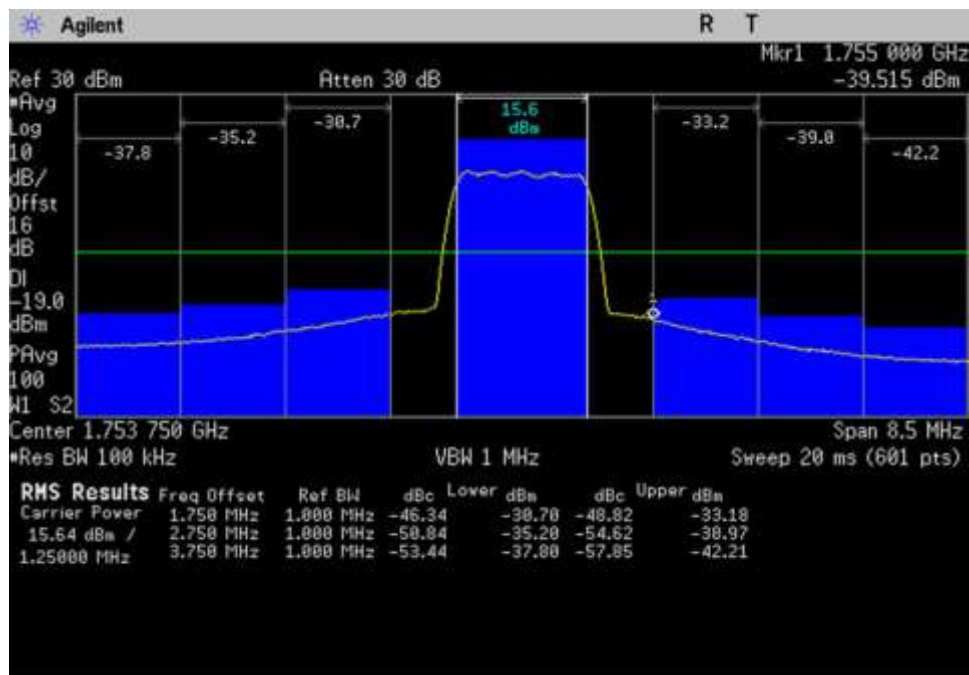
UL_824-849_CDMA_822.88-826.88MHz



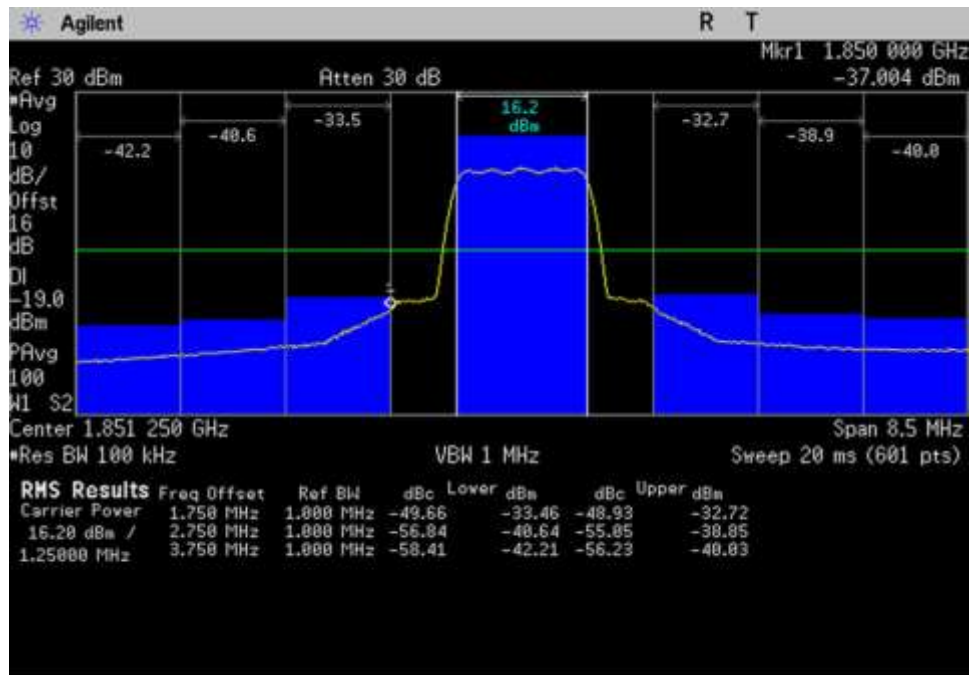
UL_824-849_CDMA_846.1-850.1MHz



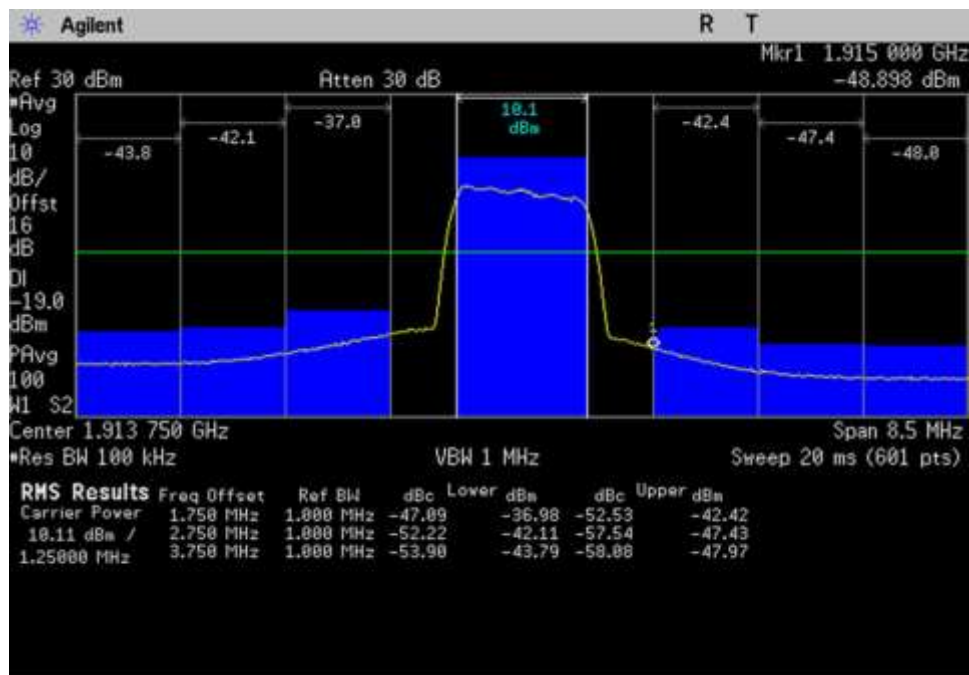
UL_1710-1755_CDMA_ 1707- 1715.5MHz



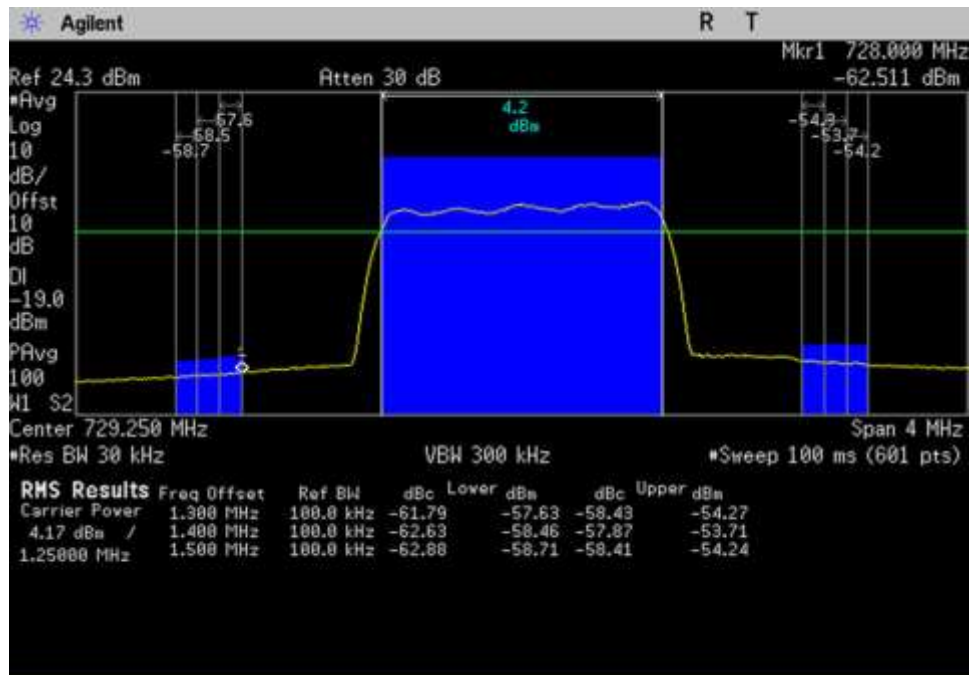
UL_1710-1755_CDMA_ 1749.5- 1758MHz



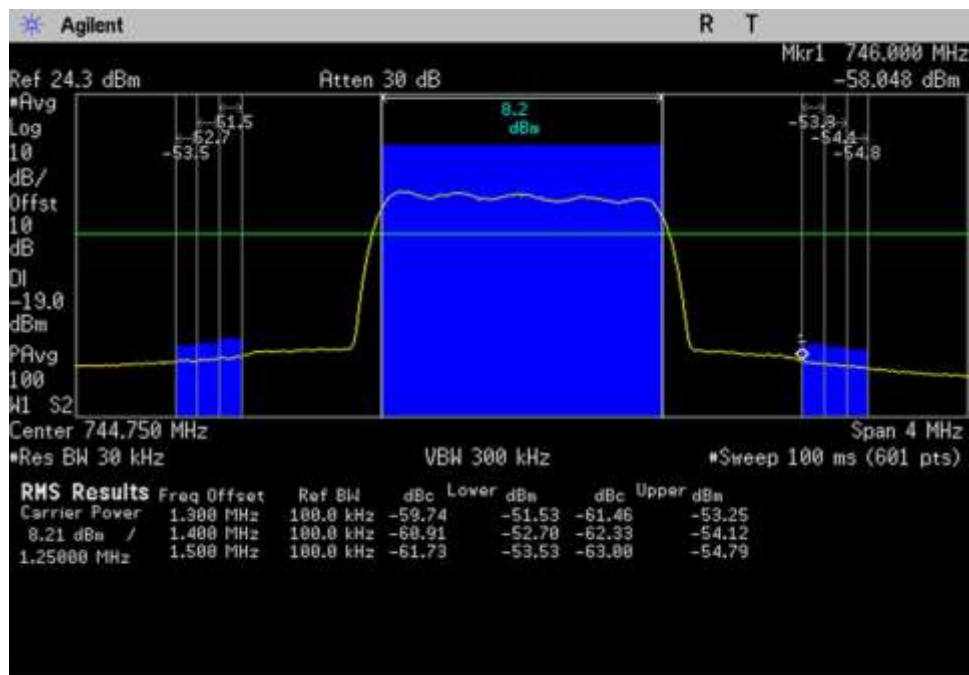
UL_1850-1915_CDMA_1847-1855.5MHz



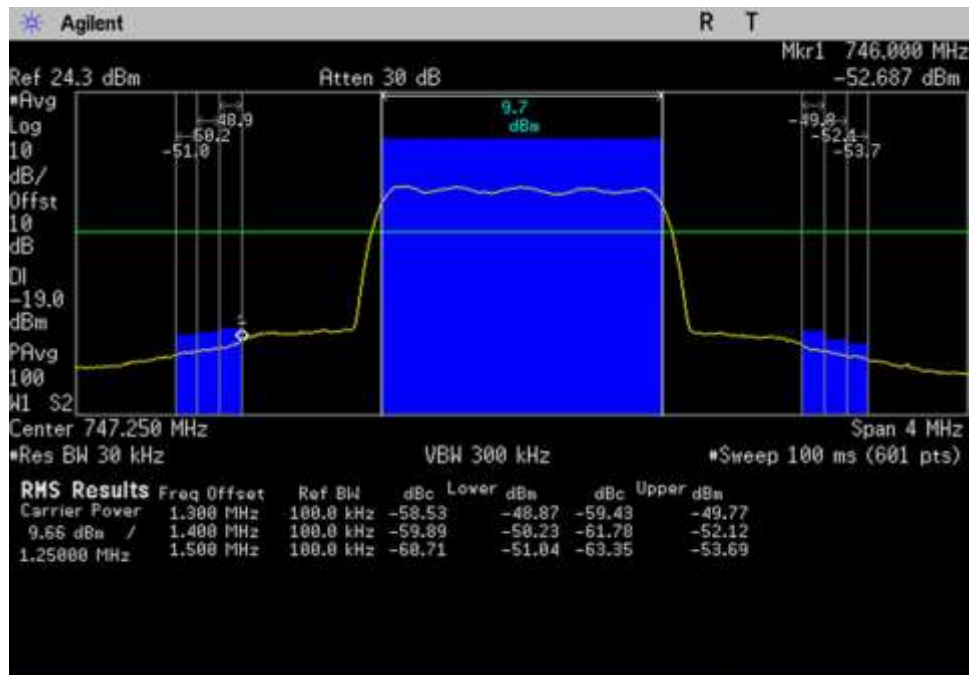
UL_1850-1915_CDMA_1909.5-1918MHz



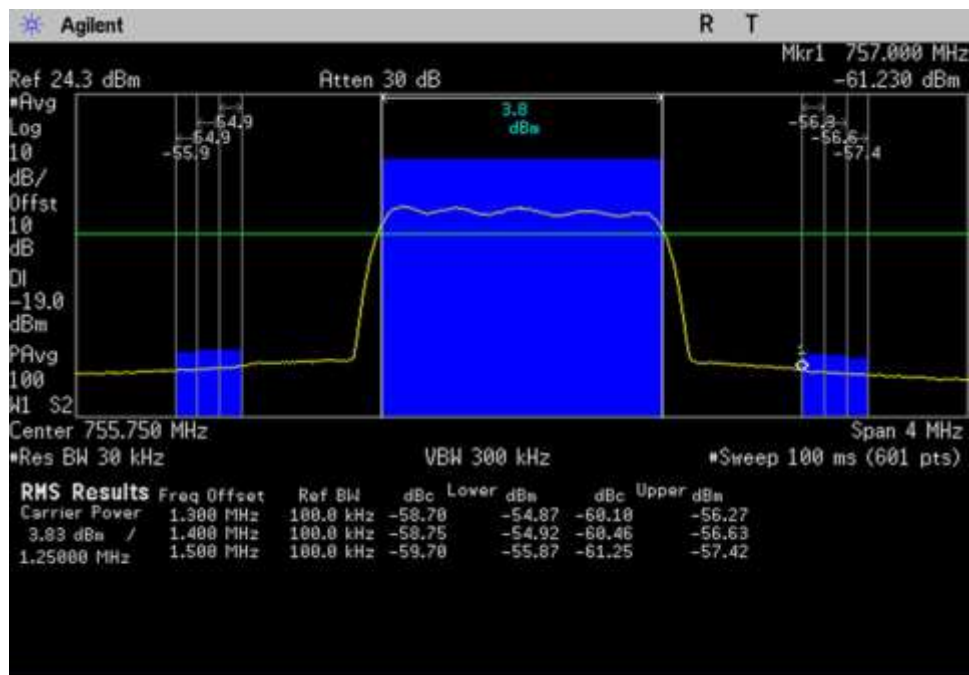
DL_728-746_CDMA_727.25-731.25MHz



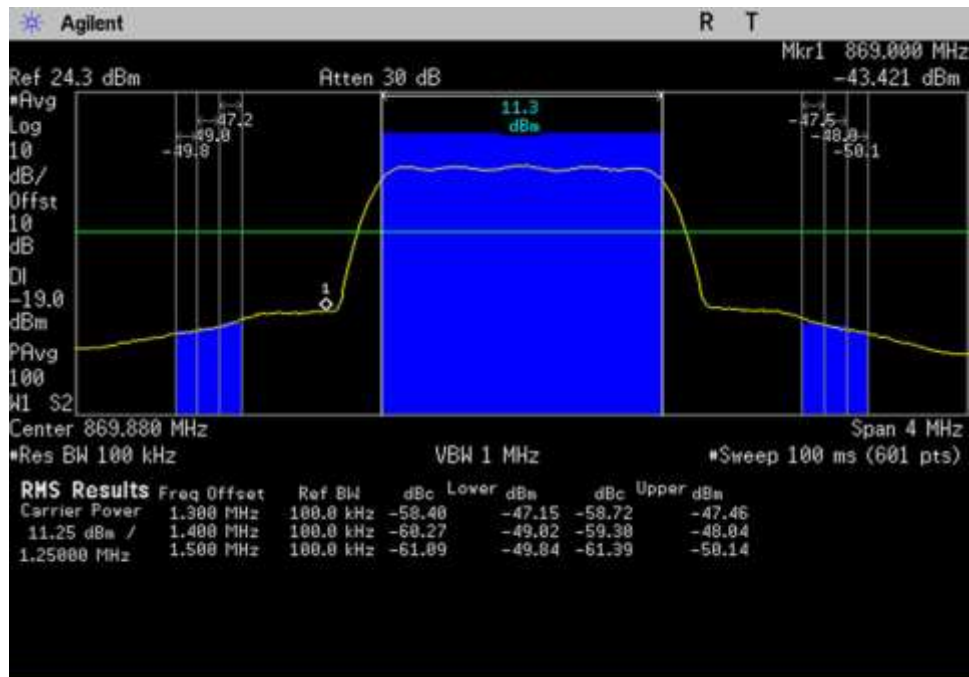
DL_728-746_CDMA_742.75-746.75MHz



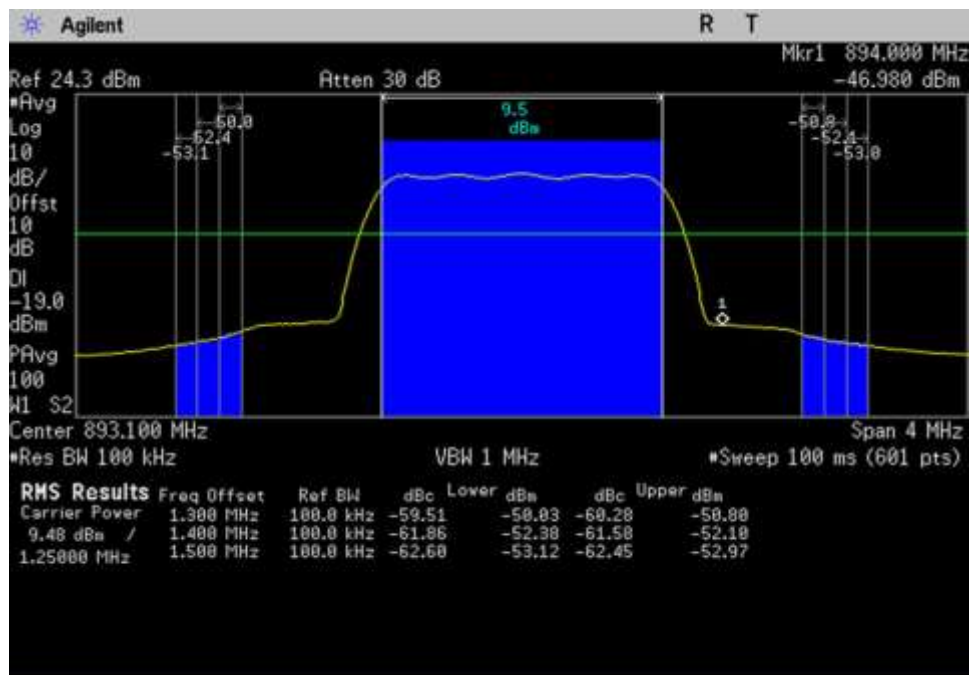
DL_746-757_CDMA_745.25-749.25MHz



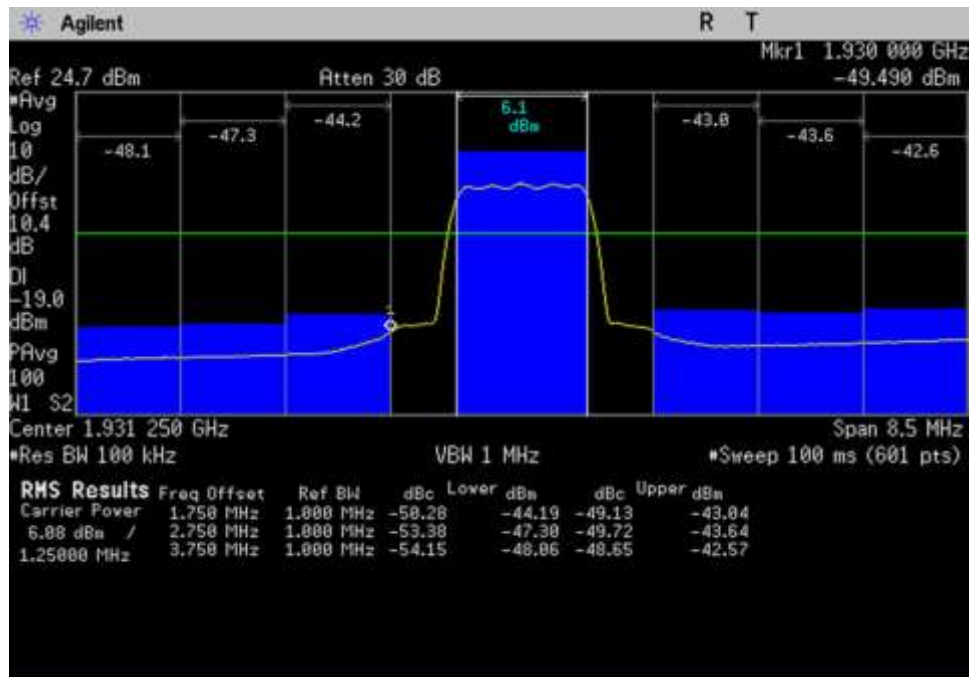
DL_746-757_CDMA_753.75-757.75MHz



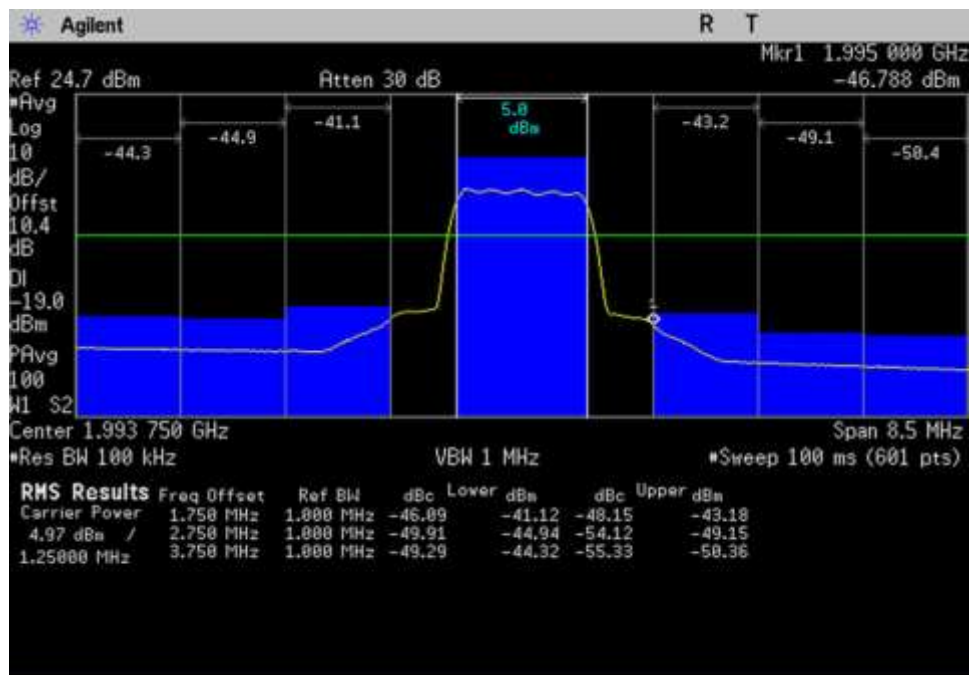
DL_869-894_CDMA_ 867.88- 871.88MHz



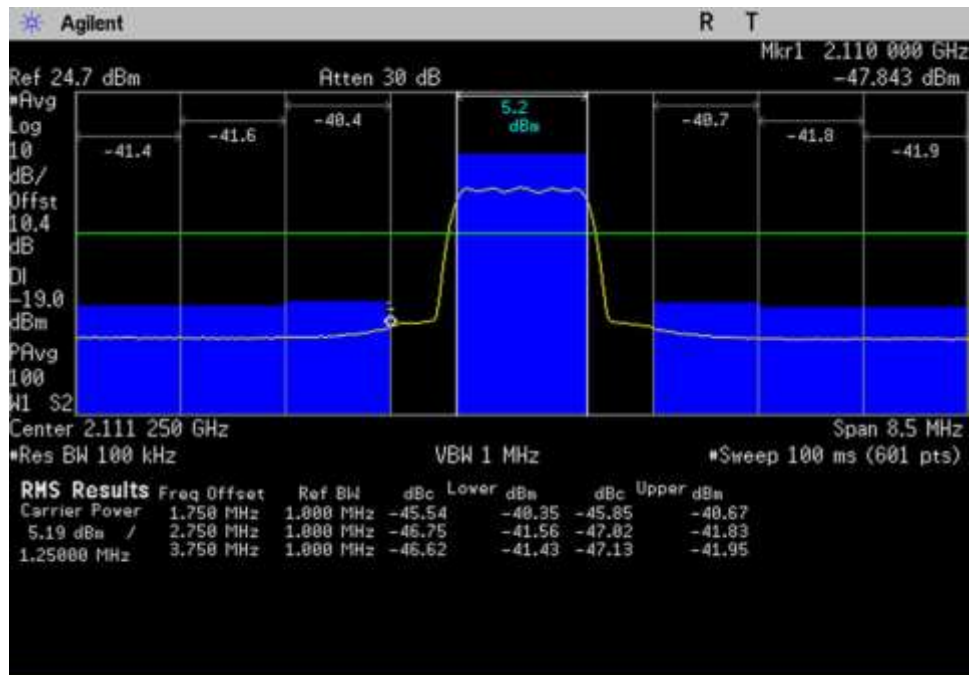
DL_869-894_CDMA_ 891.1- 895.1MHz



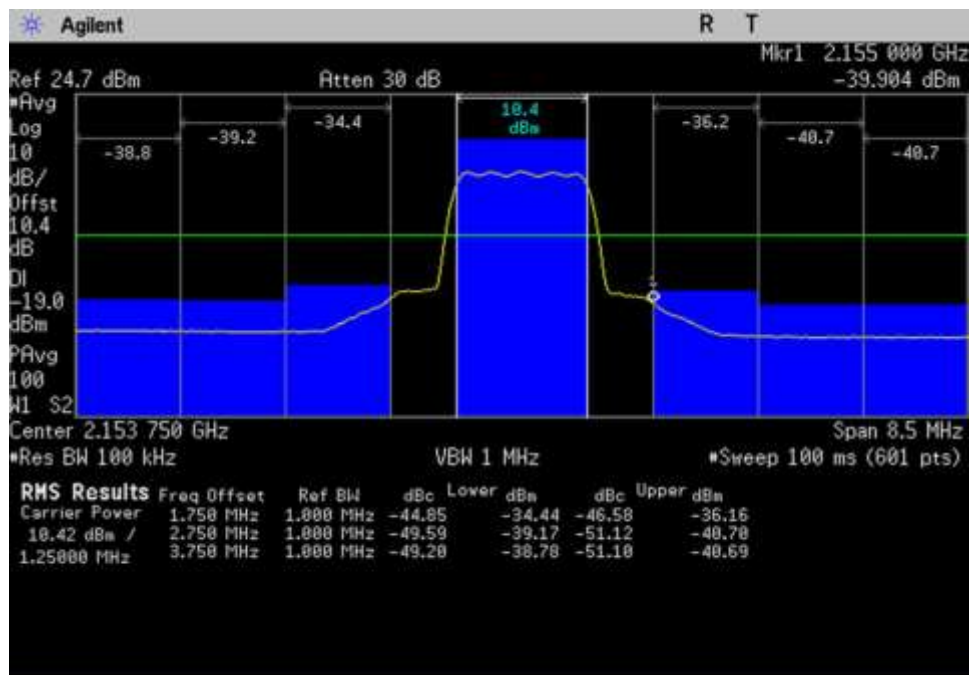
DL_1930-1995_CDMA_ 1927- 1935.5MHz



DL_1930-1995_CDMA_ 1989.5- 1998MHz

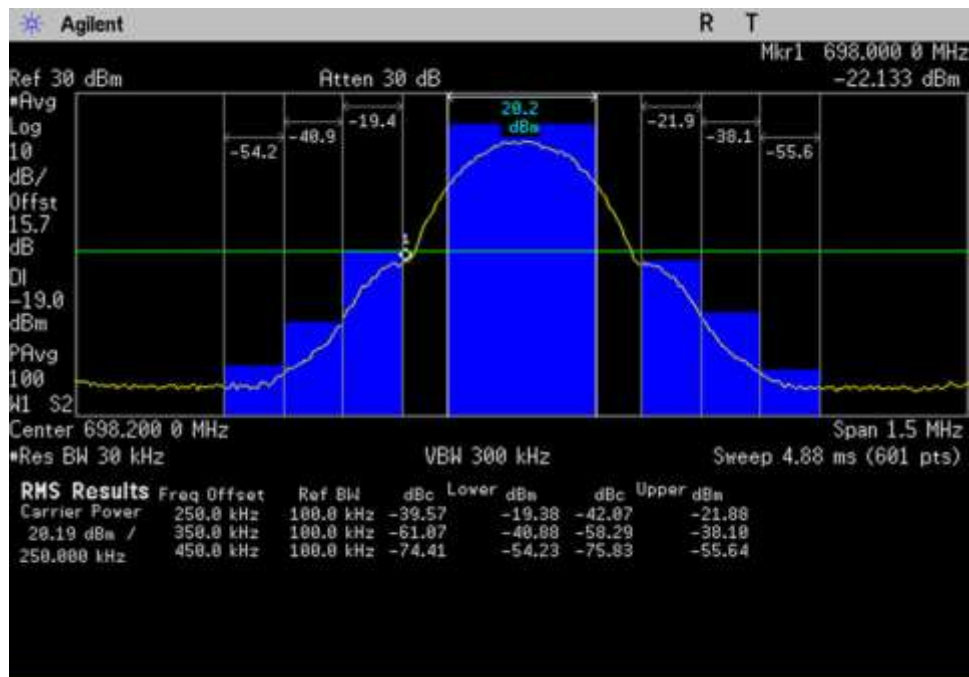


DL_2110-2155_CDMA_ 2107- 2115.5MHz

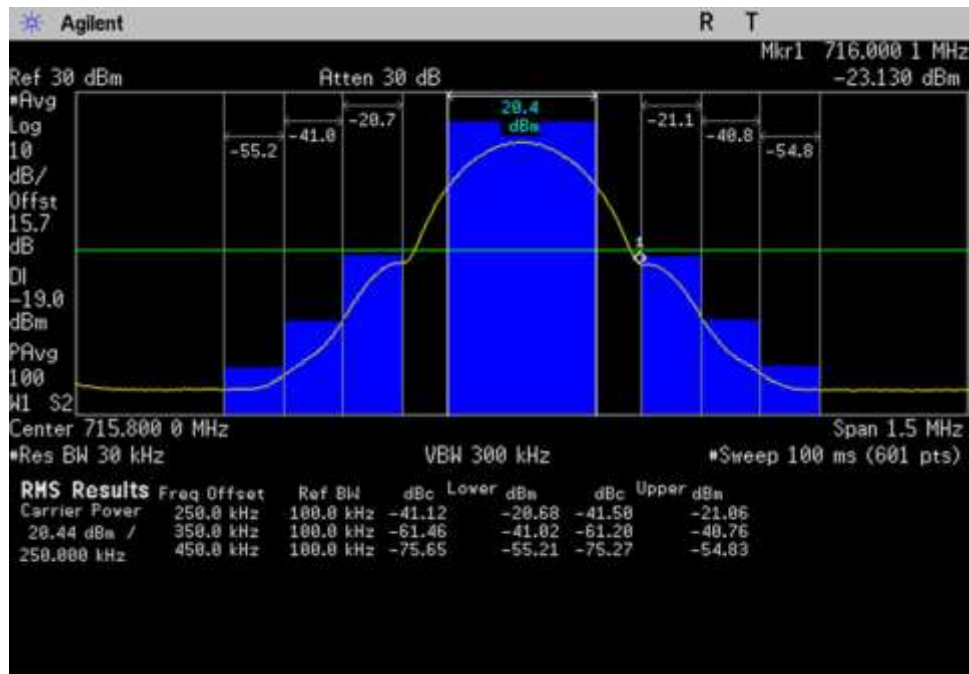


DL_2110-2155_CDMA_ 2149.5- 2158MHz

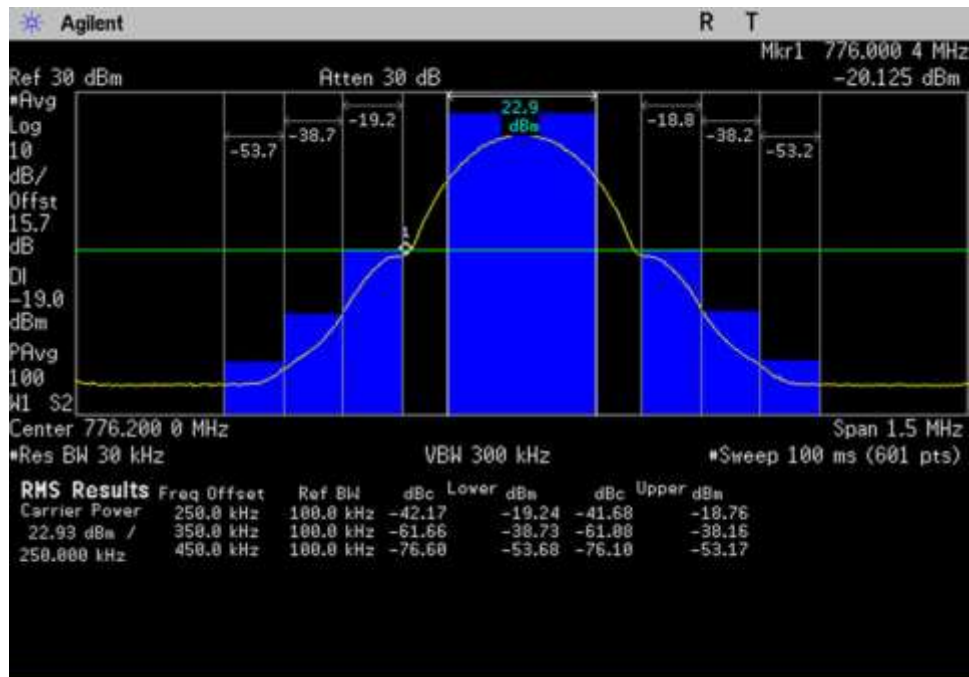
GSM



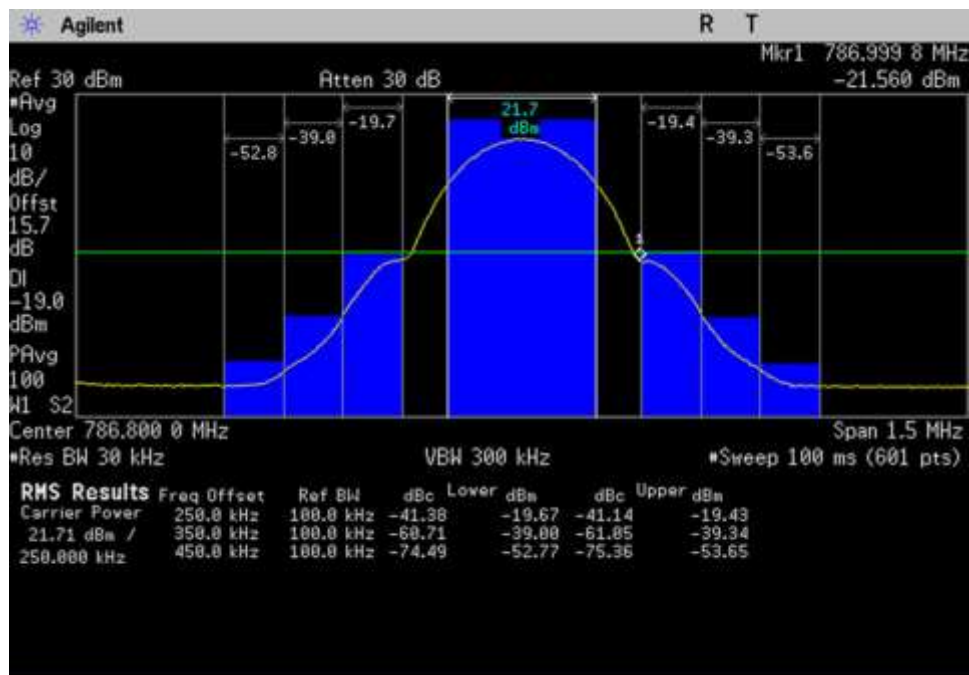
UL_698-716_GSM_ 697.45- 698.95MHz



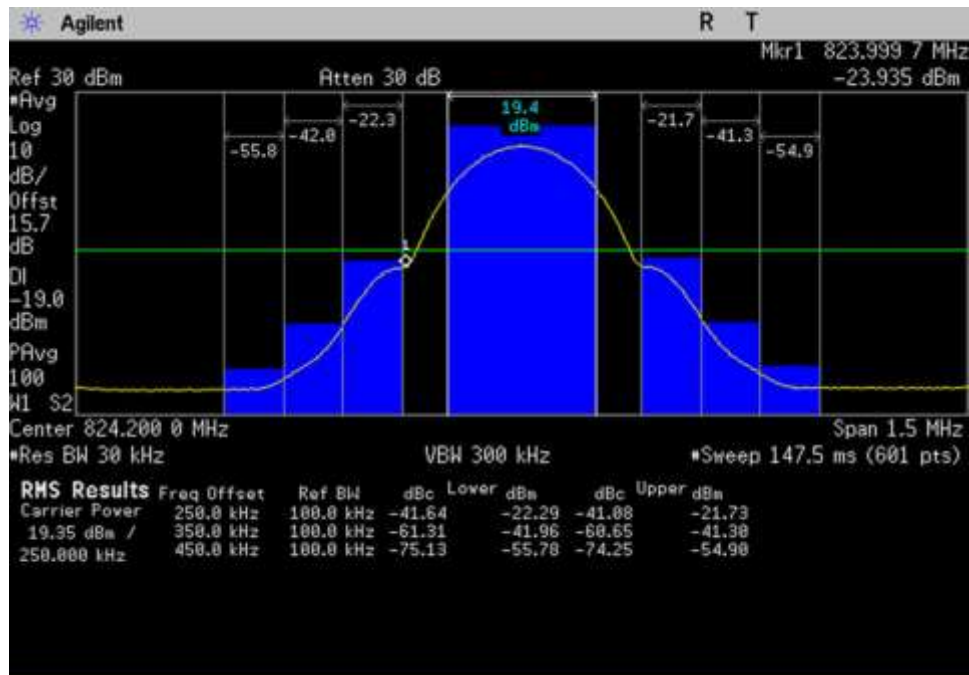
UL_698-716_GSM_ 715.05- 716.55MHz



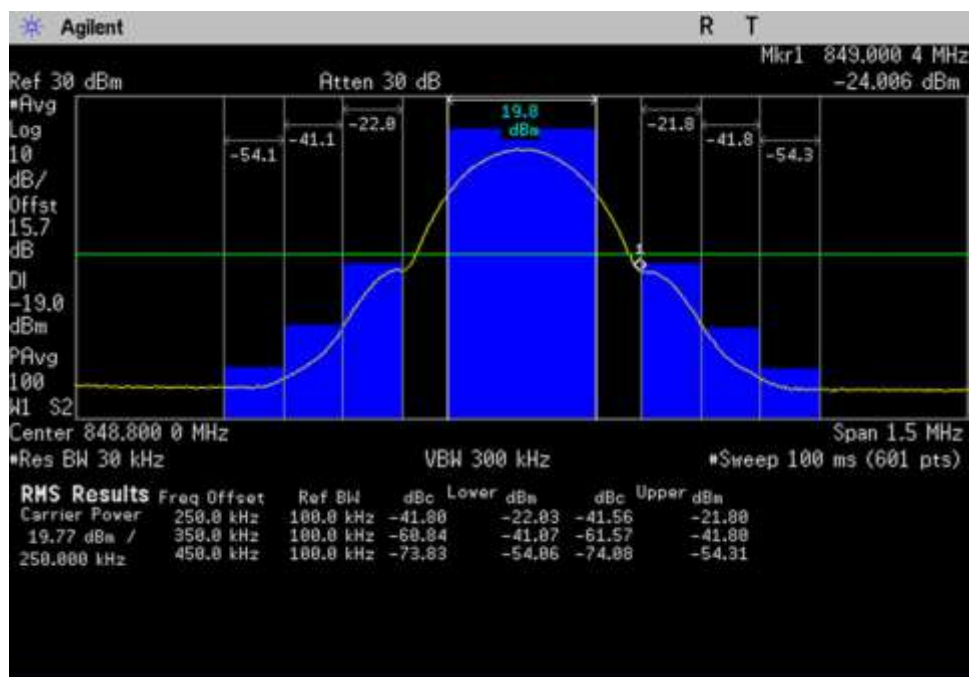
UL_776-787_GSM_ 775.45- 776.95MHz



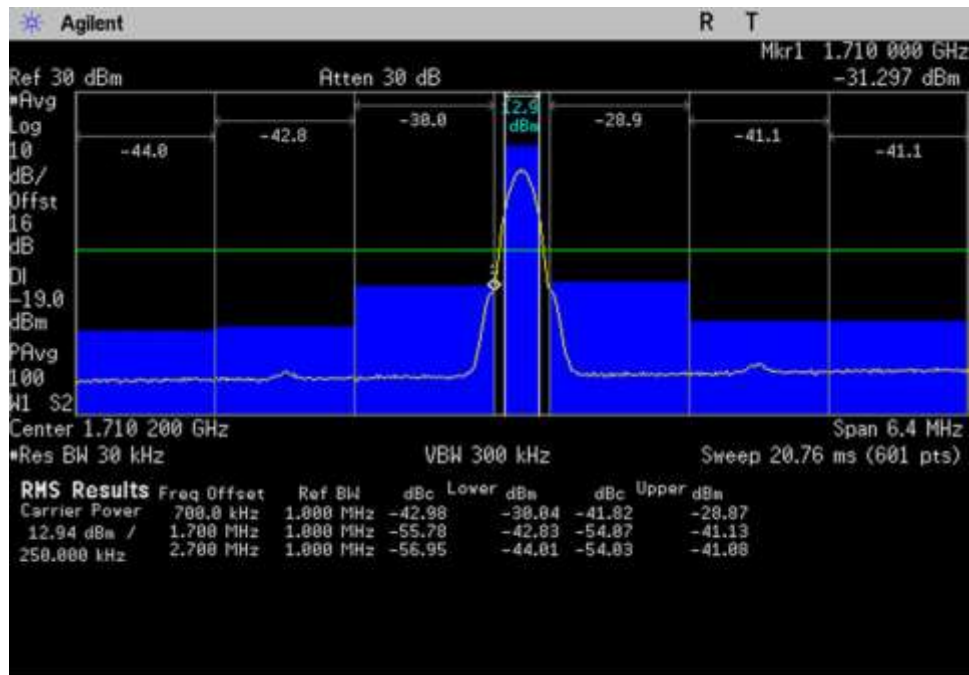
UL_776-787_GSM_ 786.05- 787.55MHz



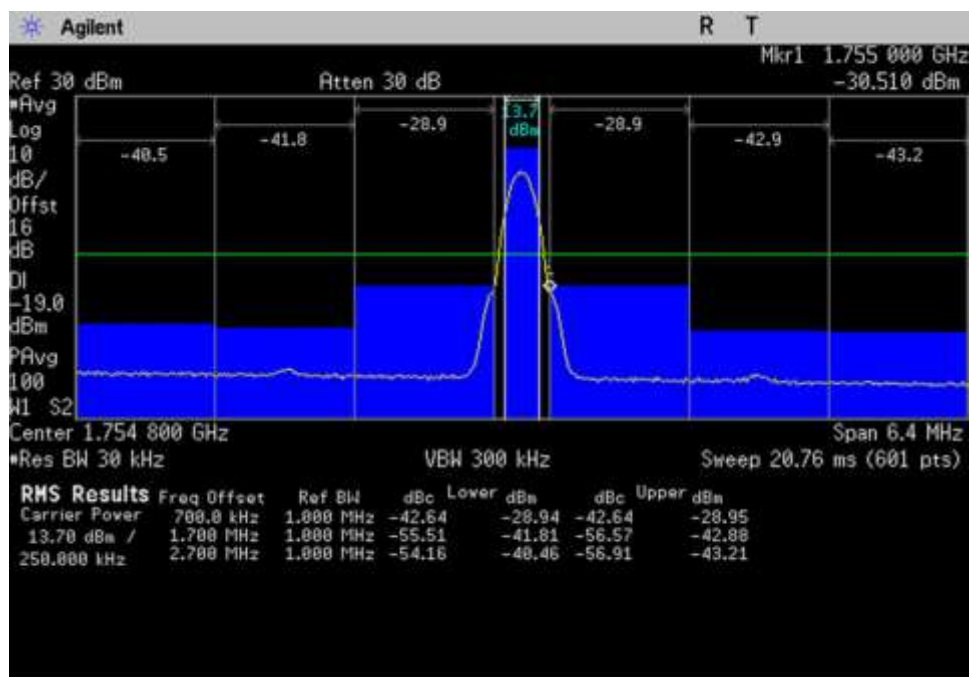
UL_824-849_GSM_ 823.45- 824.95MHz



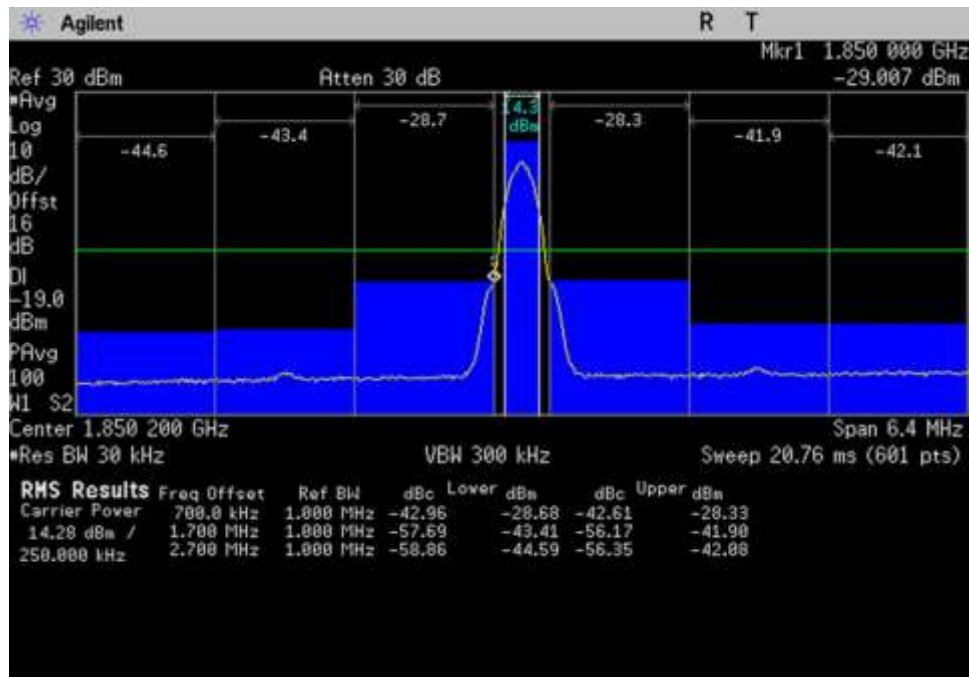
UL_824-849_GSM_ 848.05- 849.55MHz



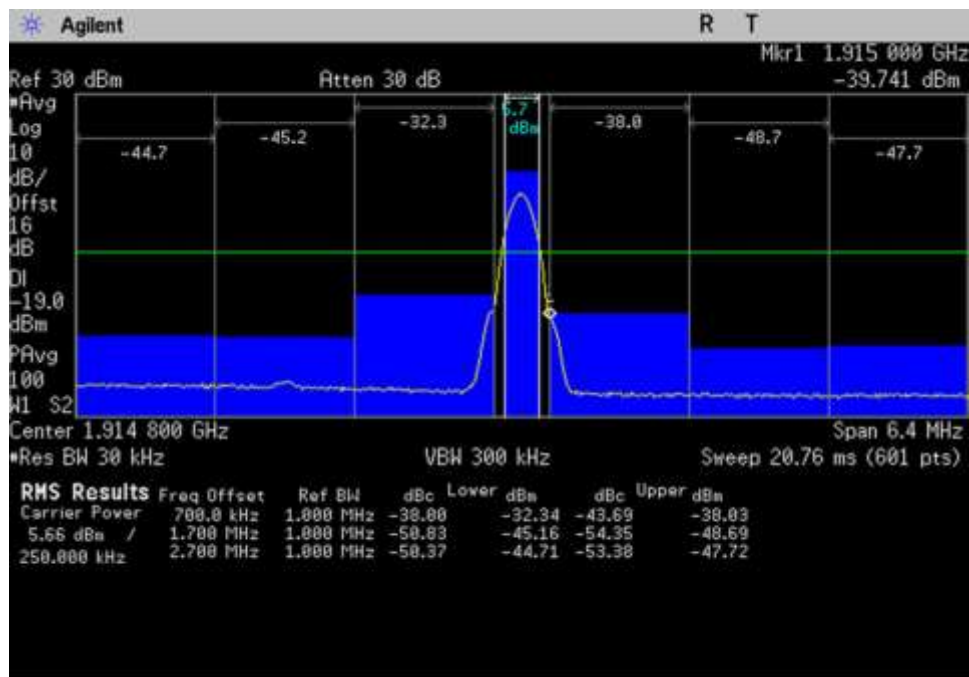
UL_1710-1755_GSM_1707-1713.4MHz



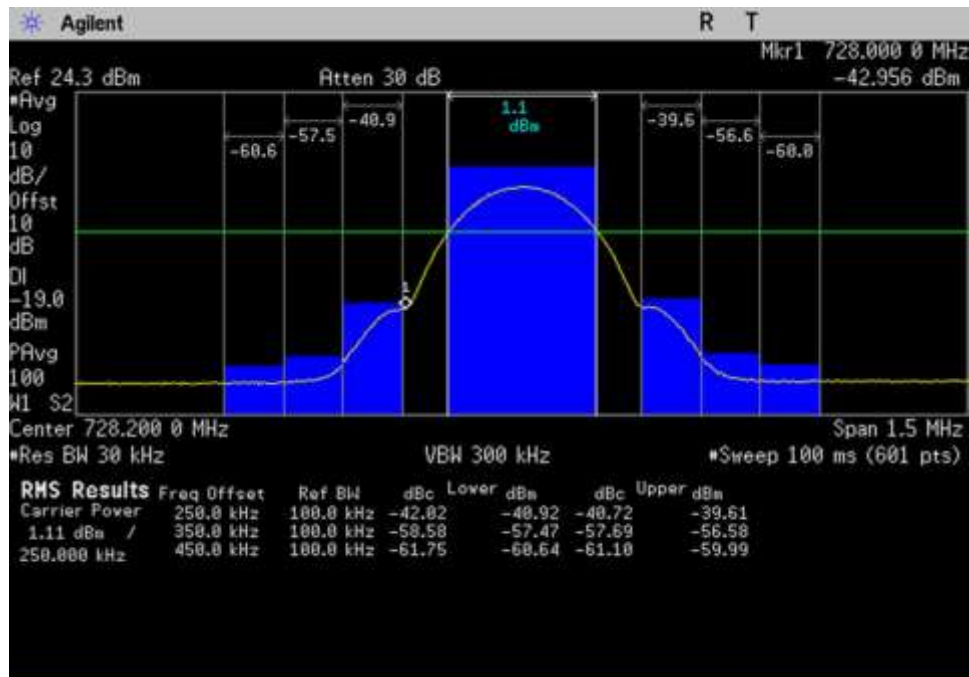
UL_1710-1755_GSM_1751.6-1758MHz



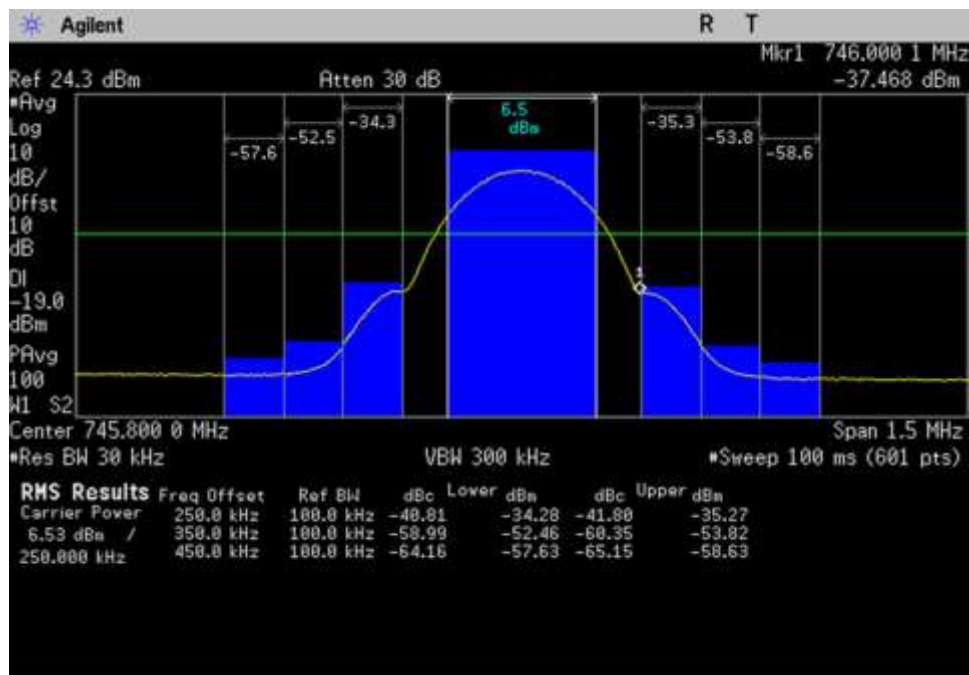
UL_1850-1915_GSM_1847-1853.4MHz



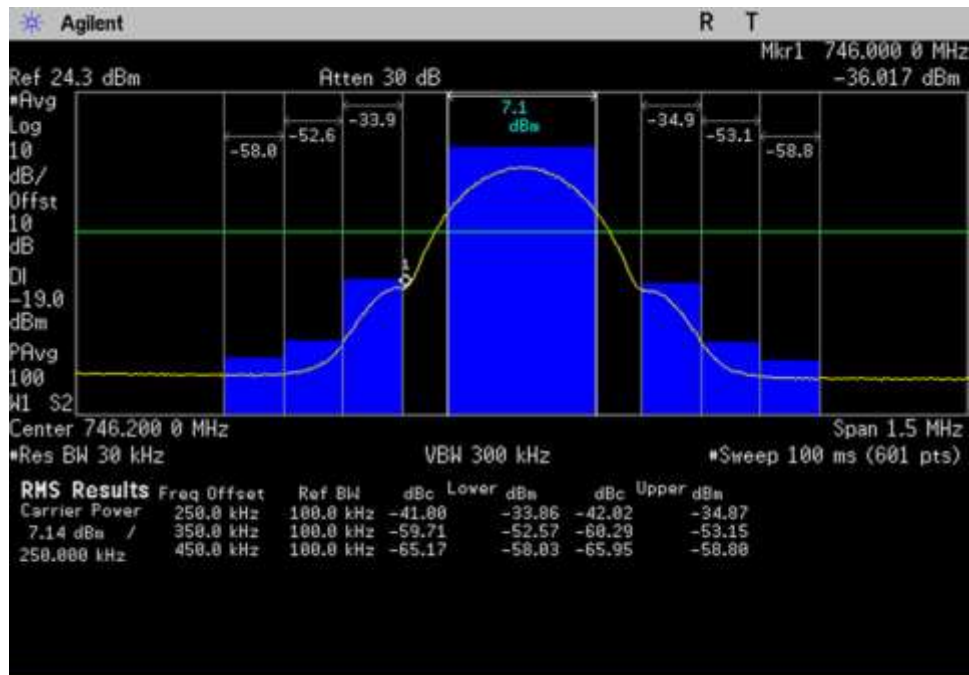
UL_1850-1915_GSM_1911.6-1918MHz



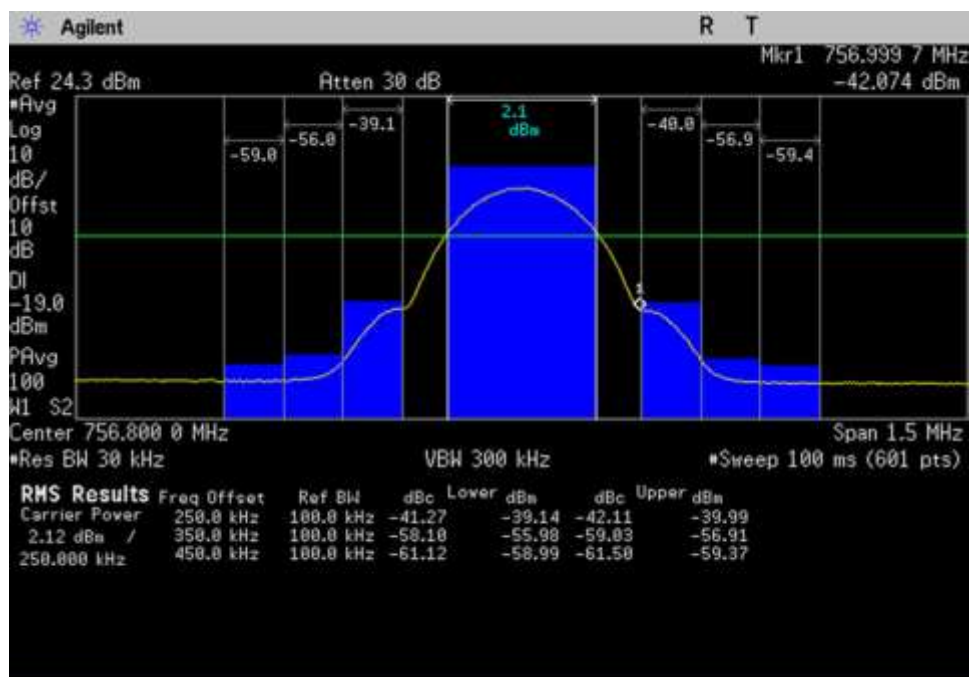
DL_728-746_GSM_ 727.45- 728.95MHz



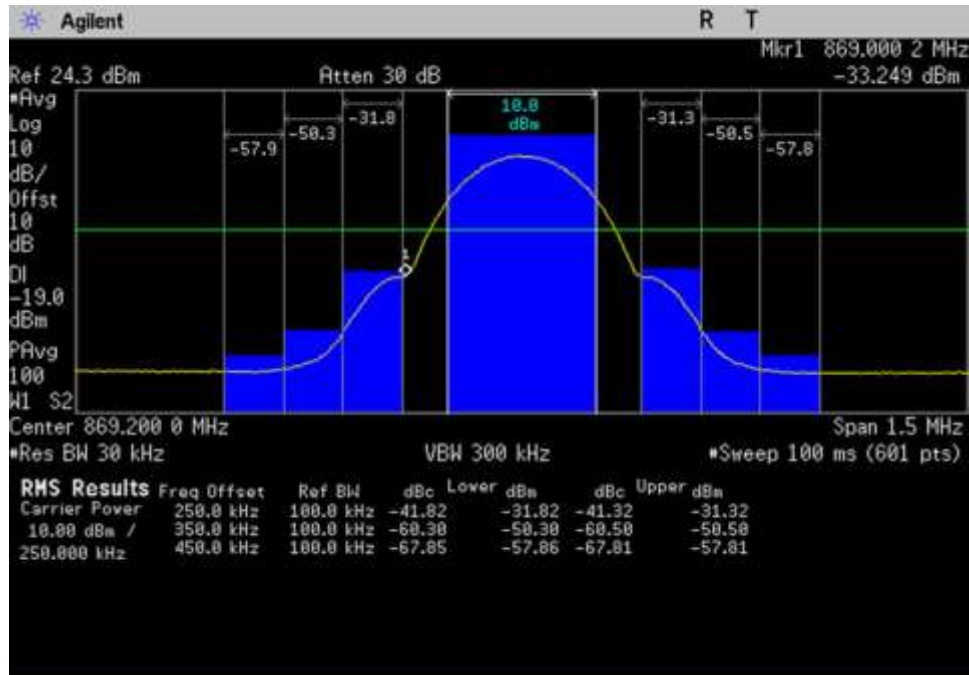
DL_728-746_GSM_ 745.05- 746.55MHz



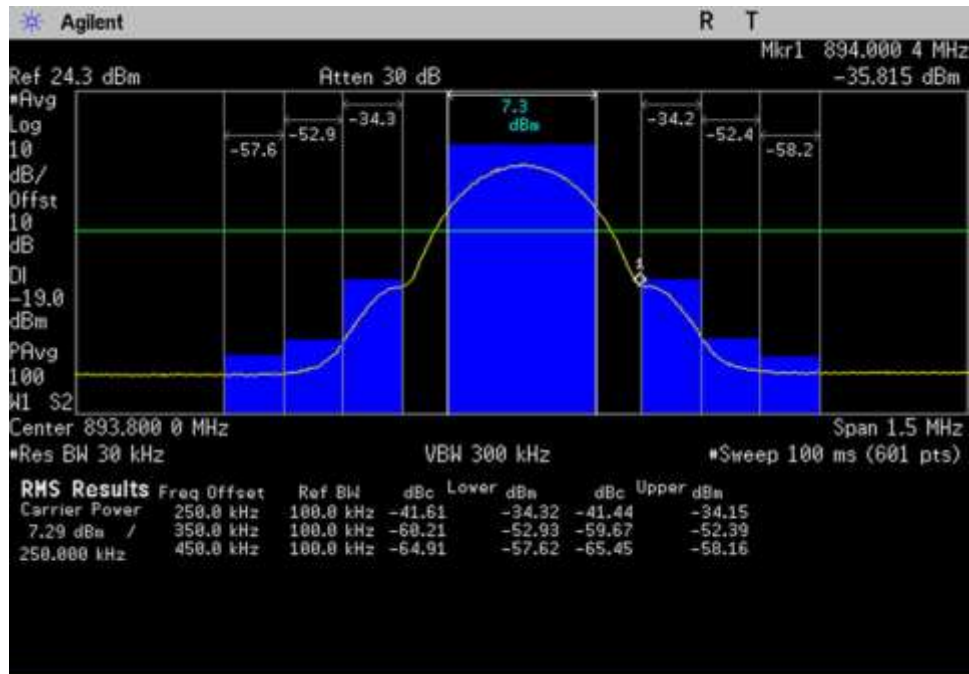
DL_746-757_GSM_ 745.45- 746.95MHz



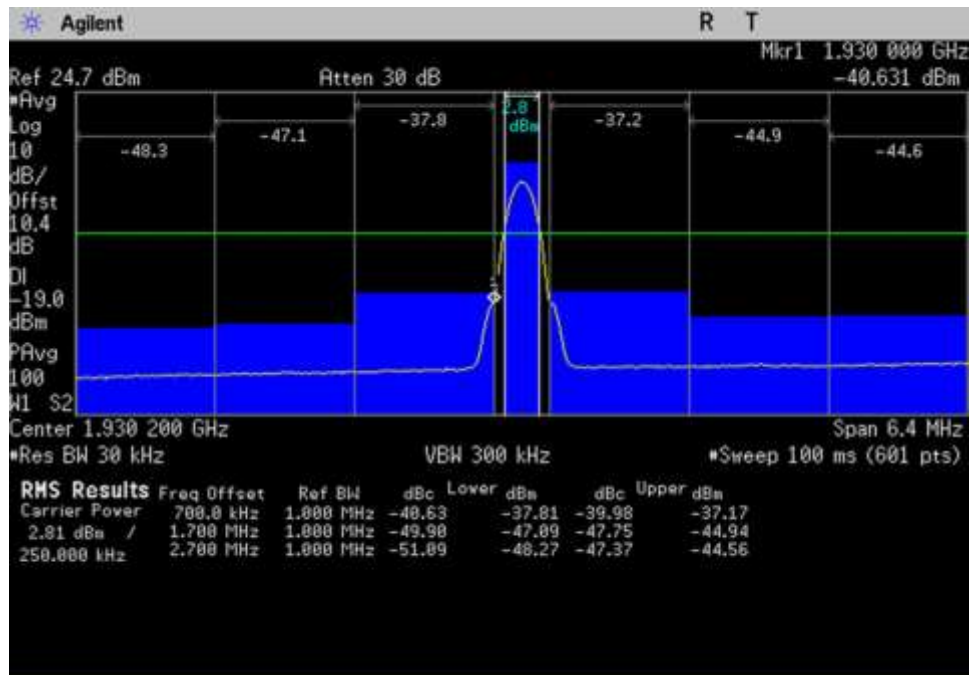
DL_746-757_GSM_ 756.05- 757.55MHz



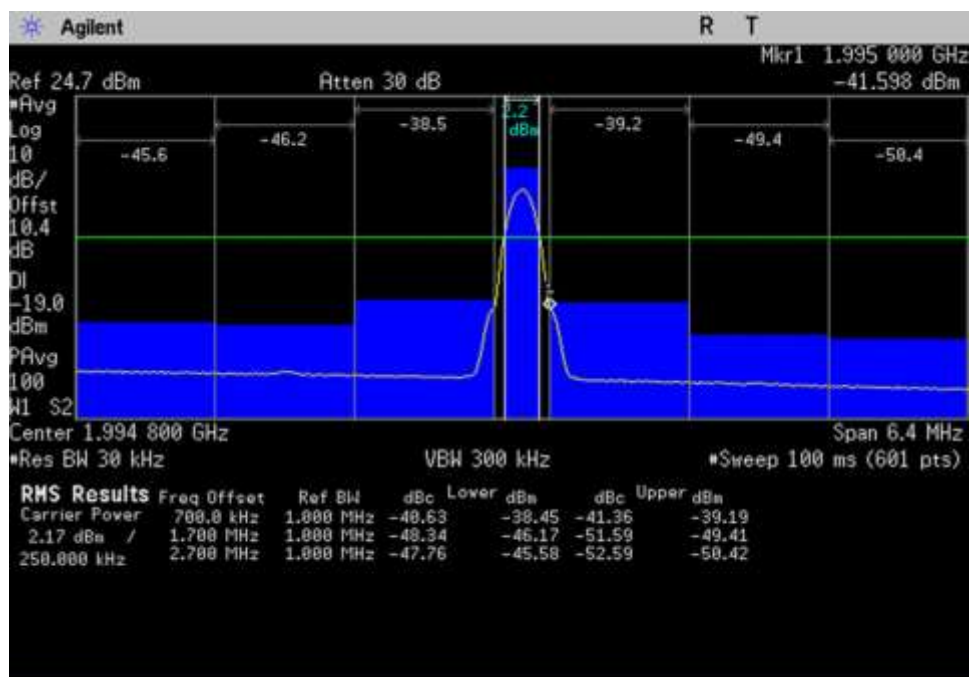
DL_869-894_GSM_868.45-869.95MHz



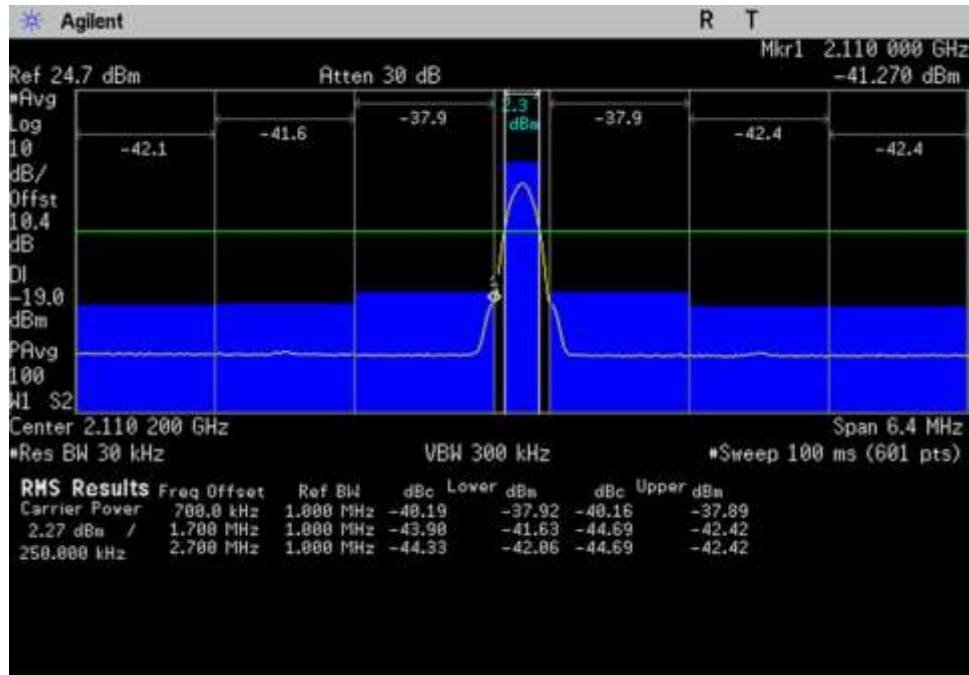
DL_869-894_GSM_893.05-894.55MHz



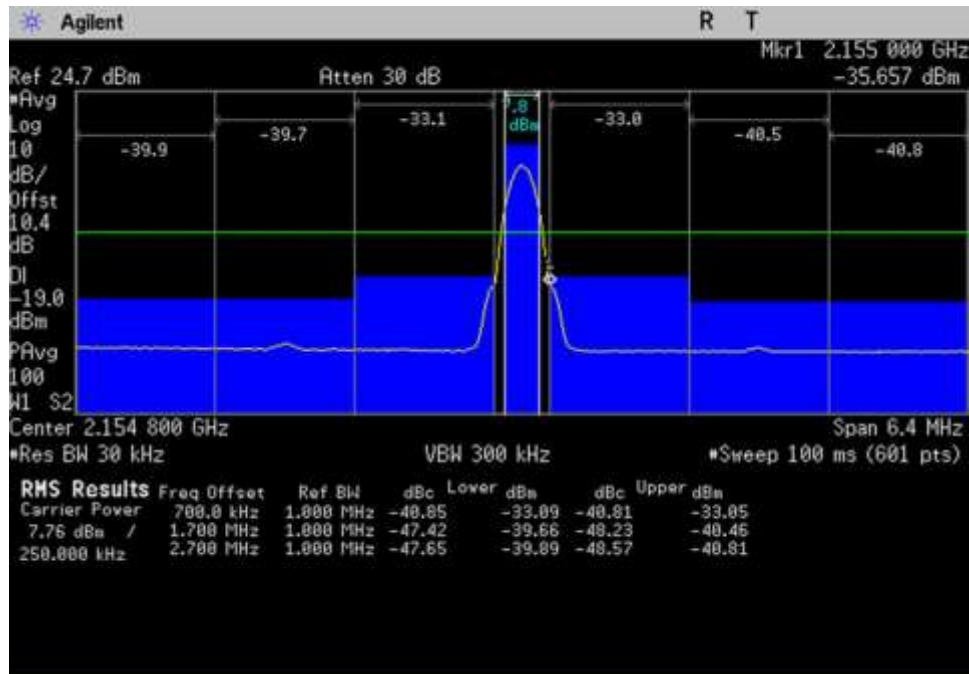
DL_1930-1995_GSM_ 1927- 1933.4MHz



DL_1930-1995_GSM_ 1991.6- 1998MHz

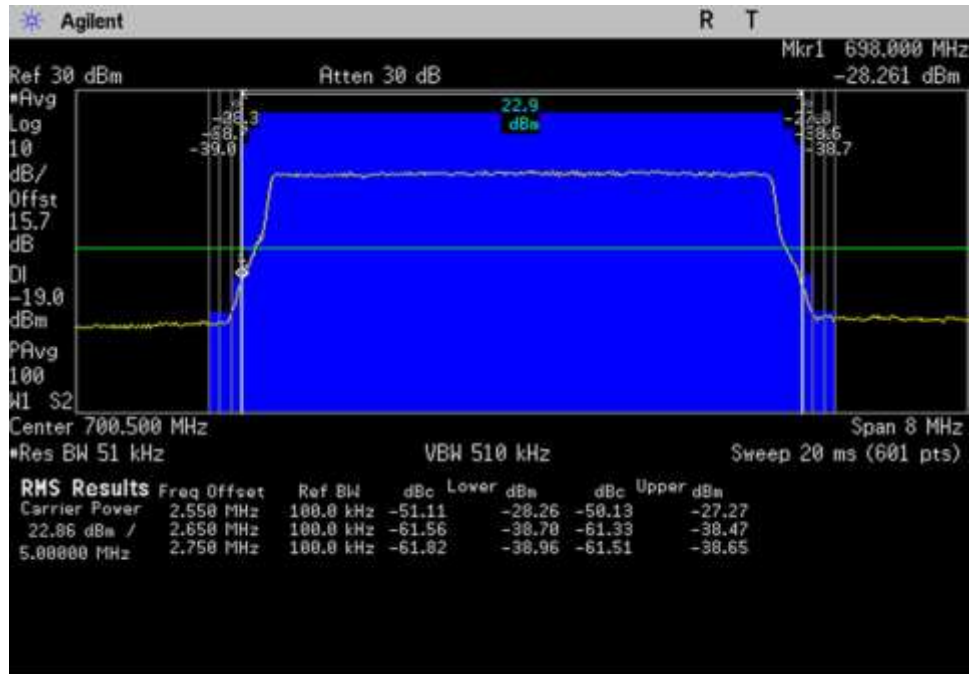


DL_2110-2155_CDMA_2149.5- 2158MHz

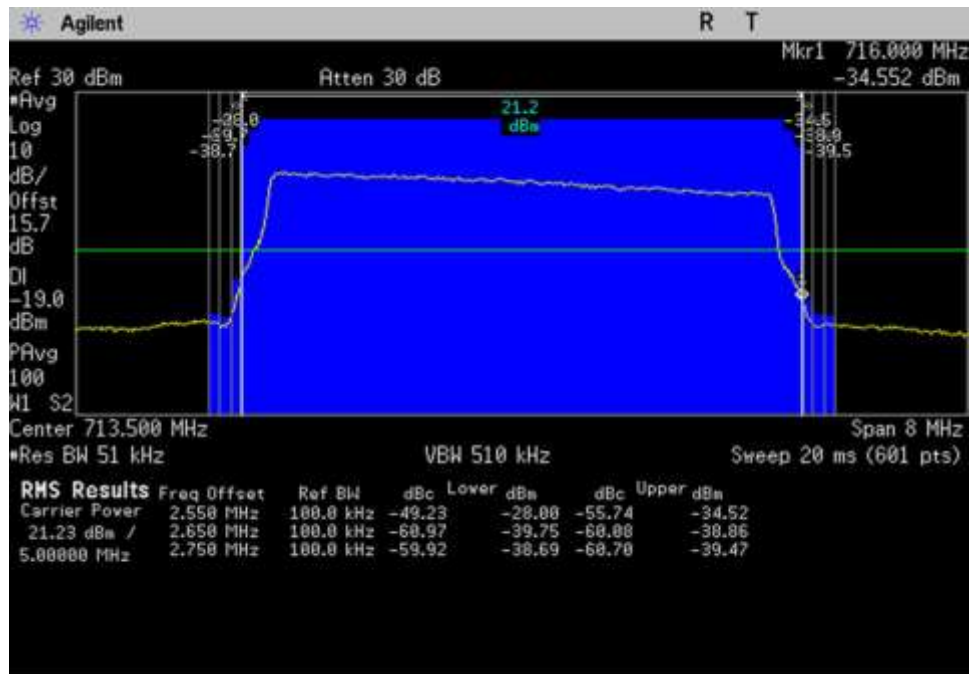


DL_2110-2155_GSM_2107- 2113.4MHz

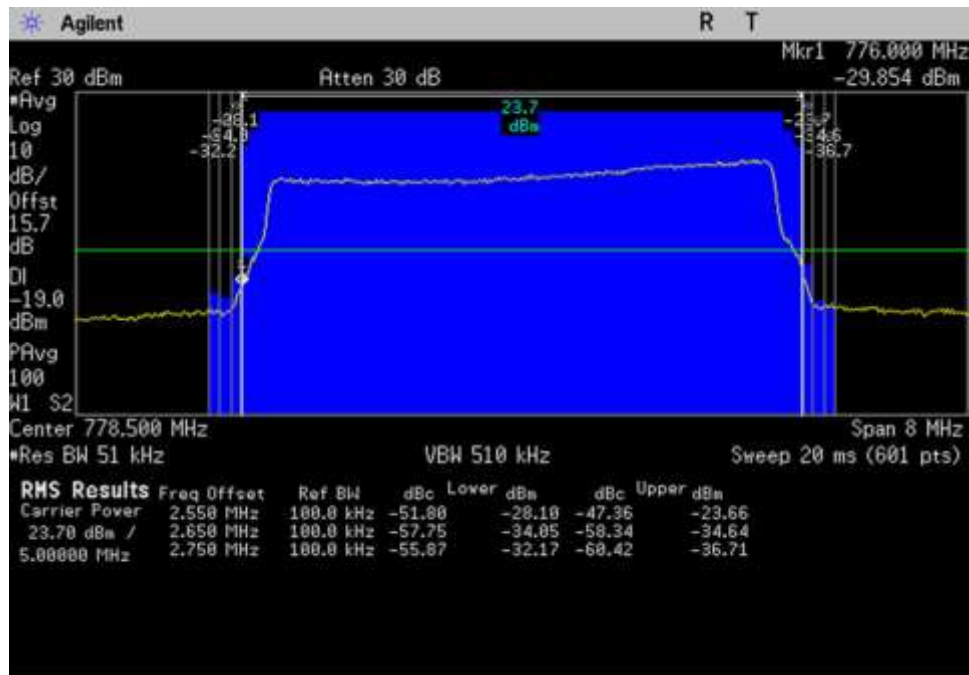
LTE



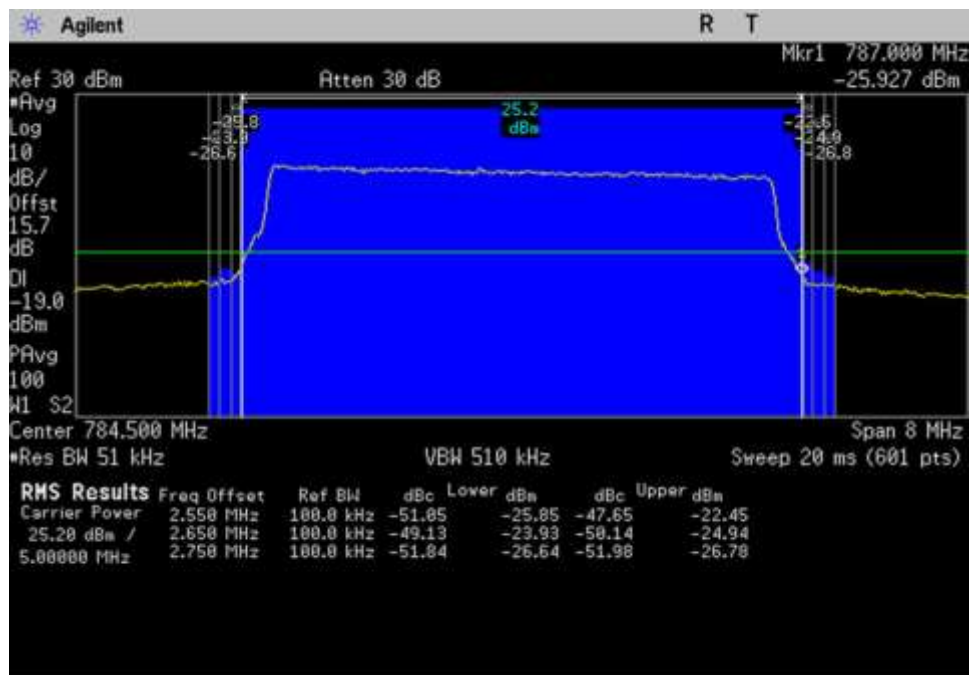
UL_698-716_LTE_696.5- 704.5MHz



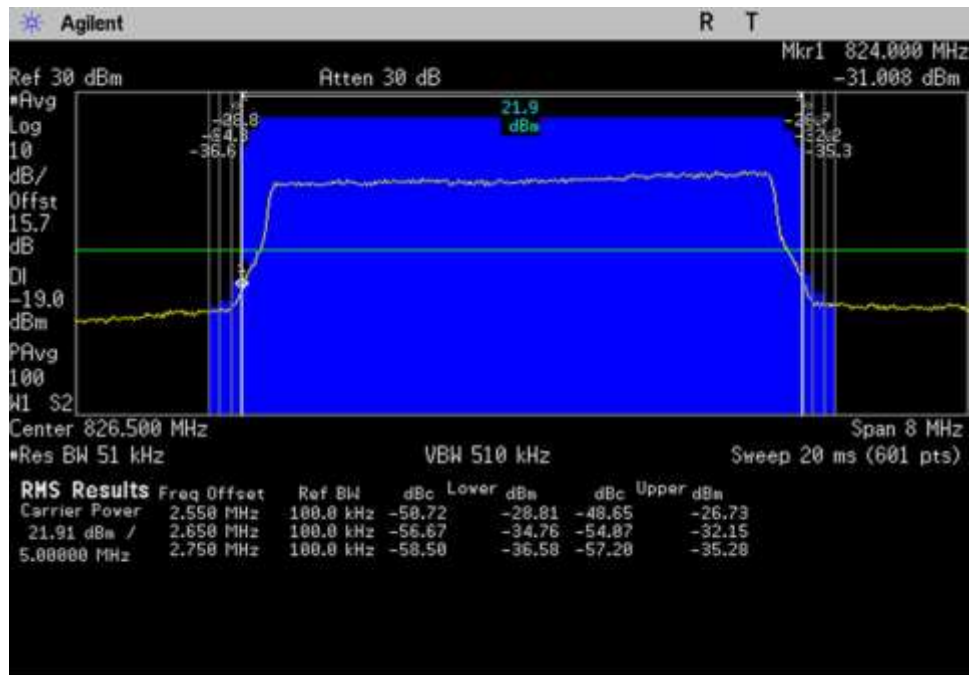
UL_698-716_LTE_709.5- 717.5MHz



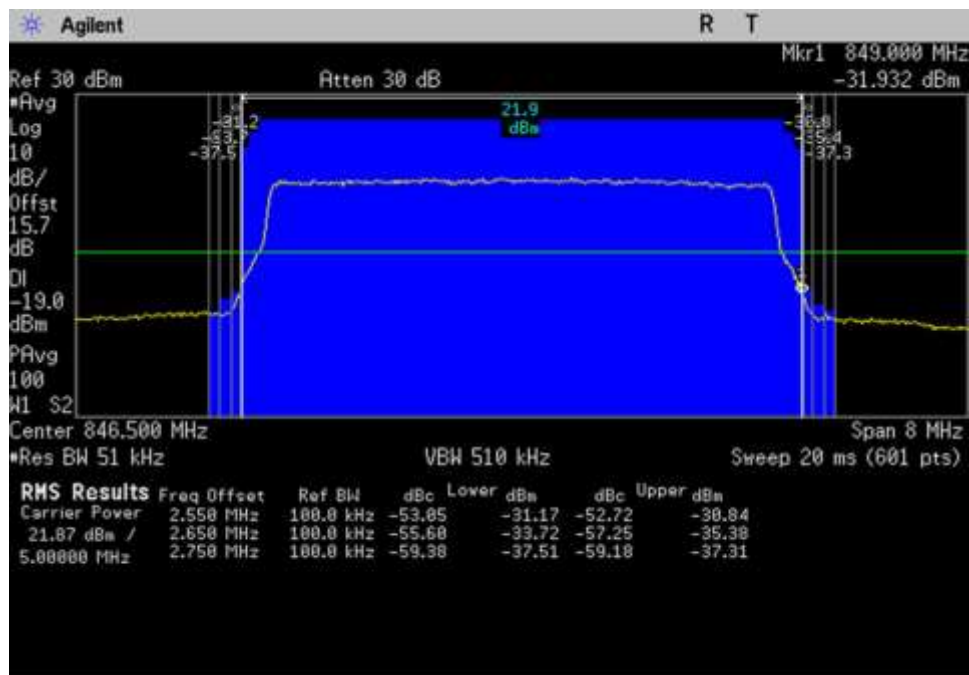
UL_776-787_LTE_774.5-782.5MHz



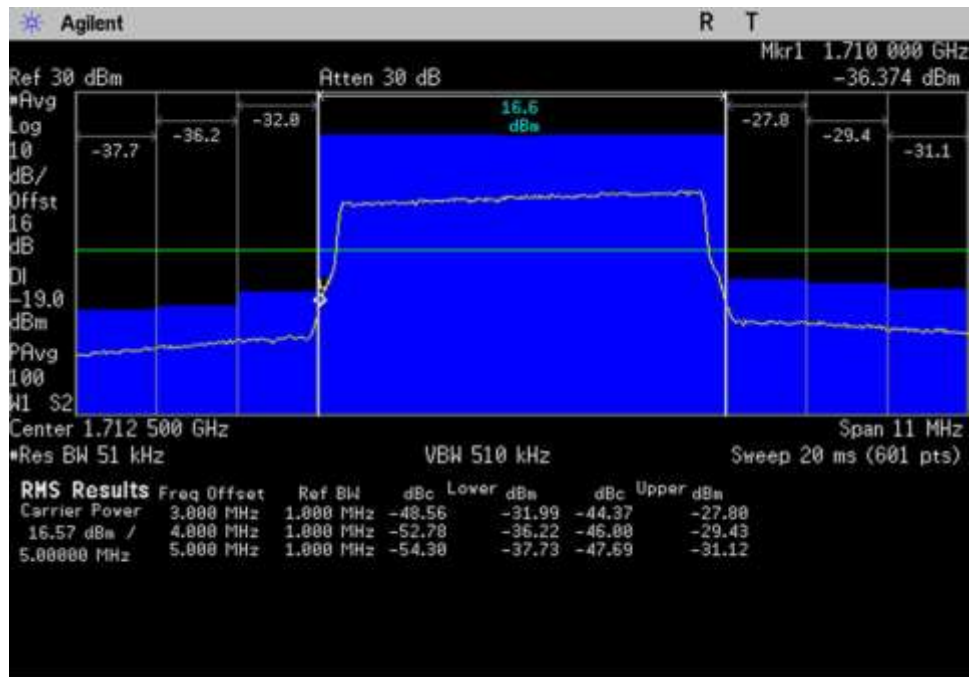
UL_776-787_LTE_780.5-788.5MHz



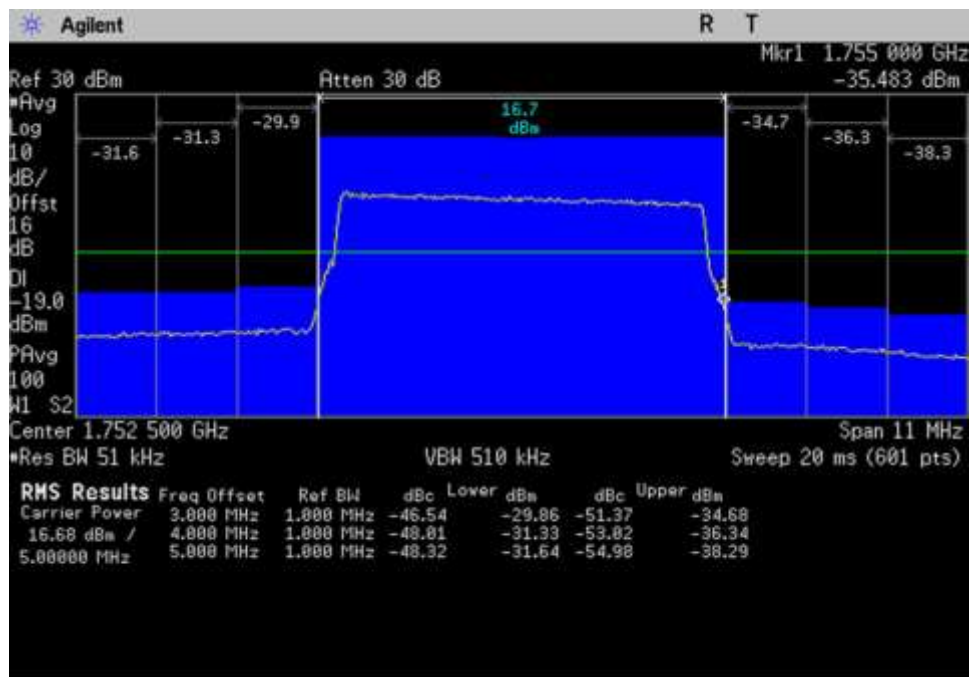
UL_824-849_LTE_822.5-830.5MHz



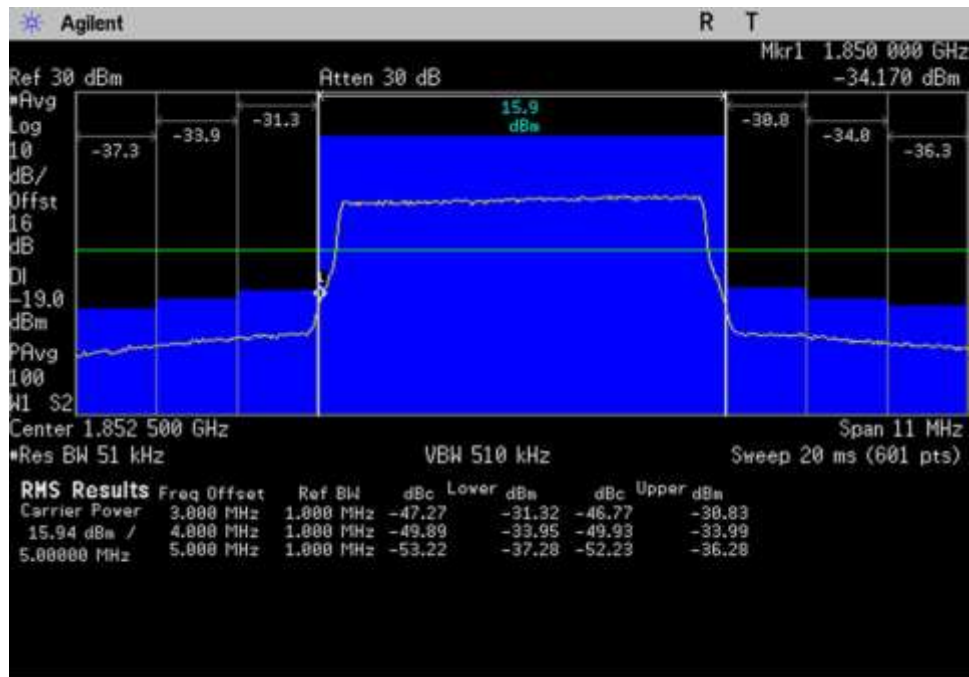
UL_824-849_LTE_842.5-850.5MHz



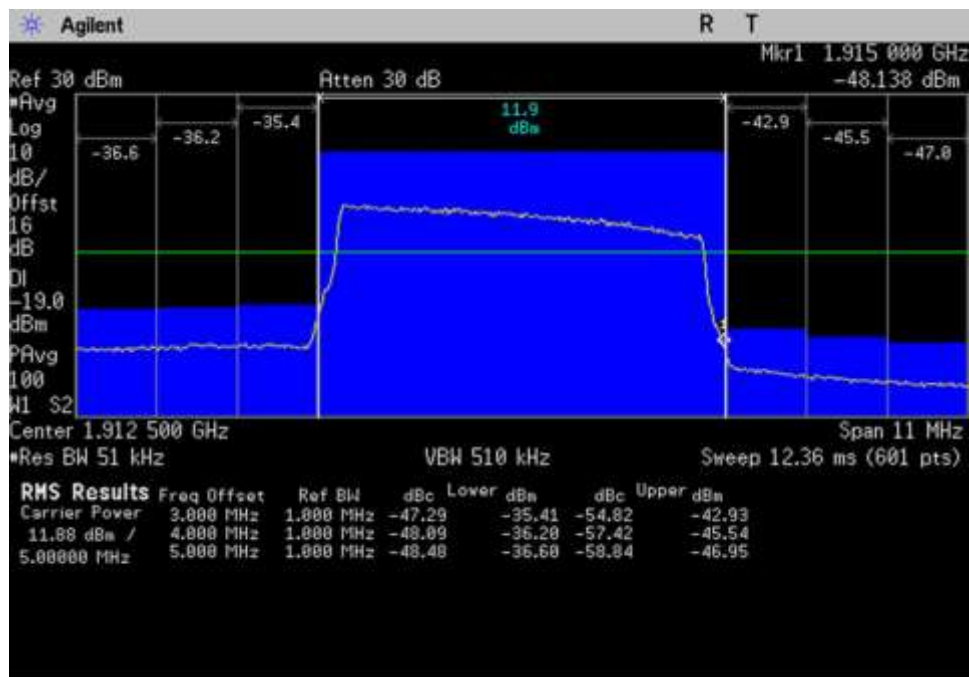
UL_1710-1755_LTE_1707-1718MHz



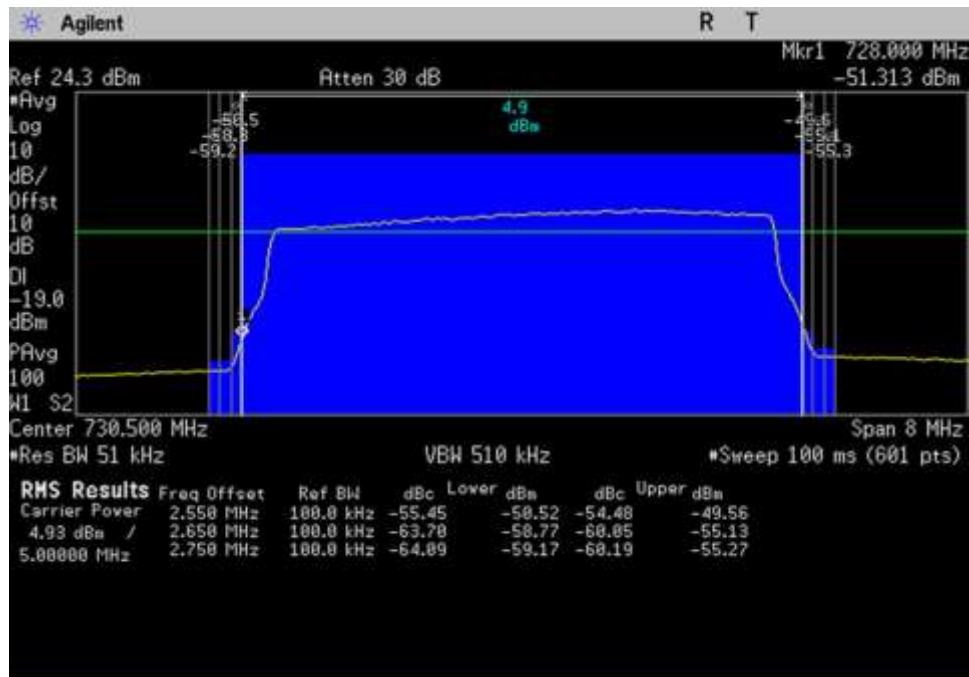
UL_1710-1755_LTE_1747-1758MHz



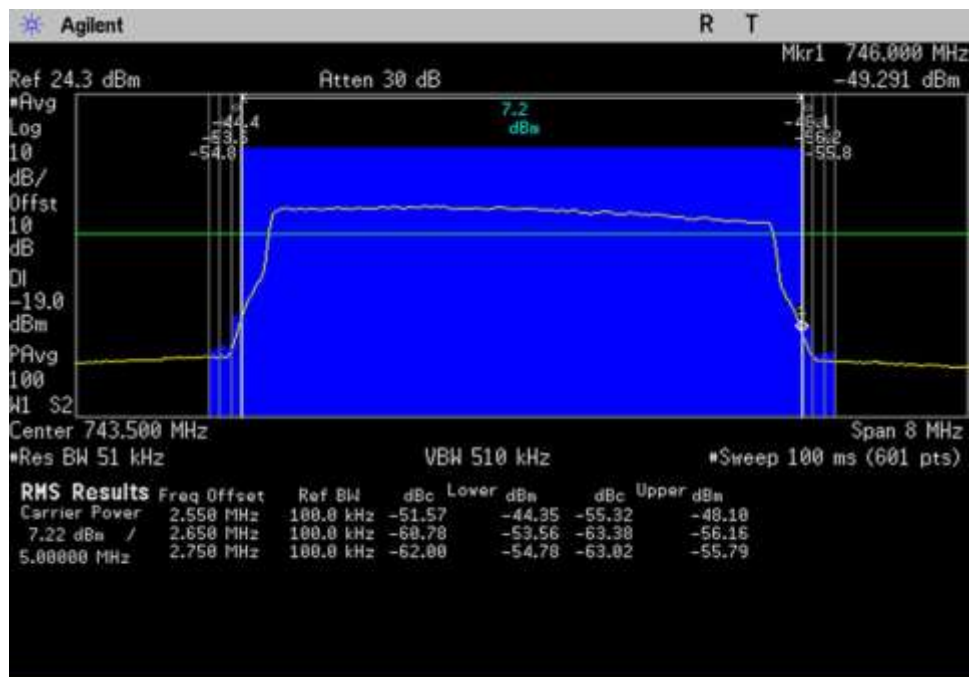
UL_1850-1915_LTE_1847-1858MHz



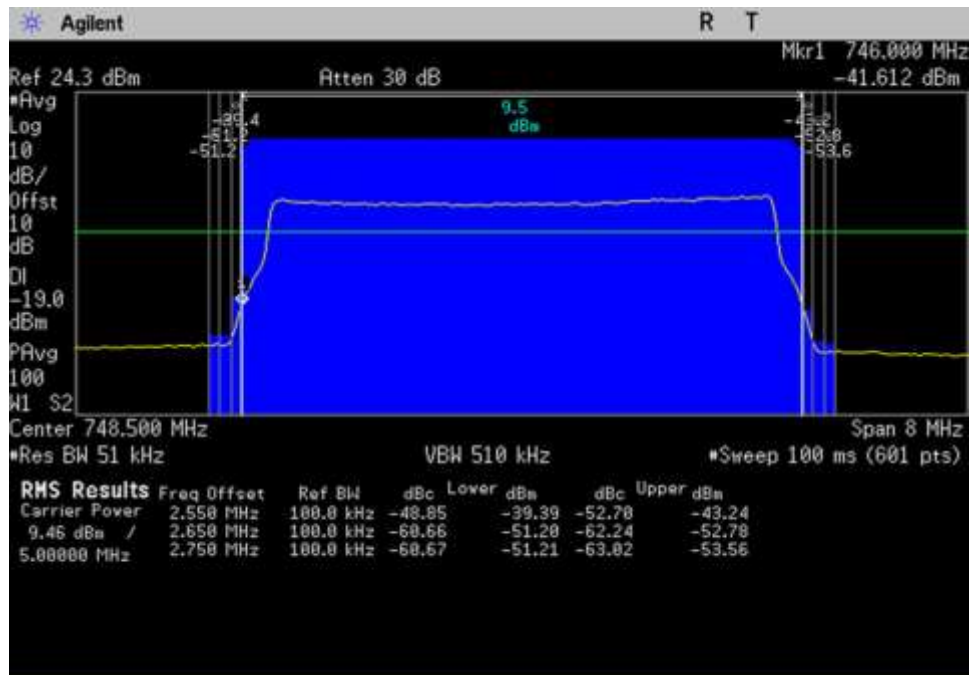
UL_1850-1915_LTE_1907-1918MHz



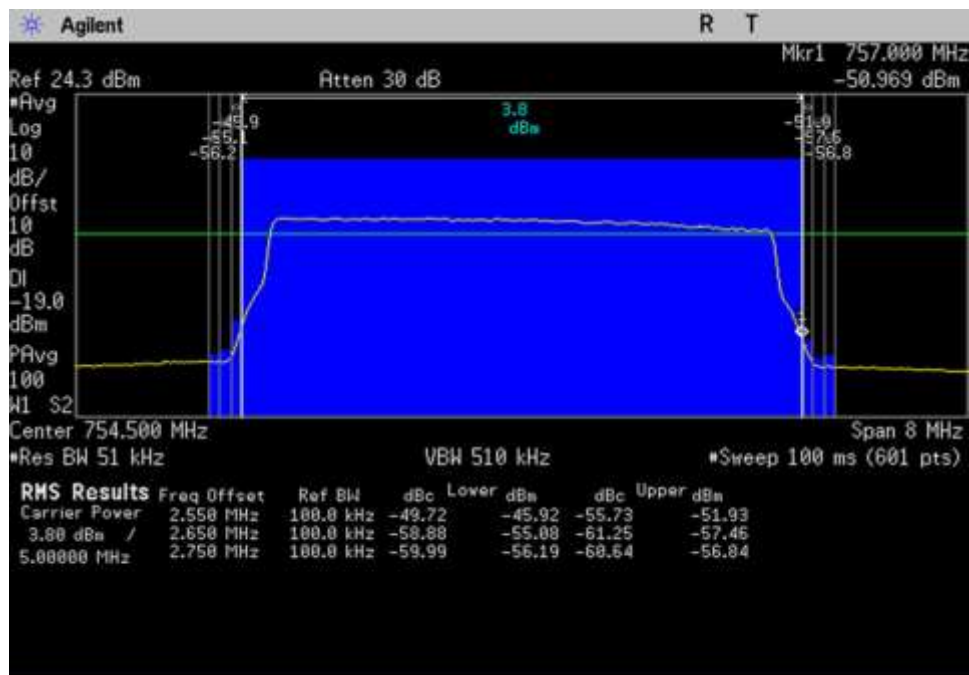
DL_728-746_LTE_ 726.5- 734.5MHz



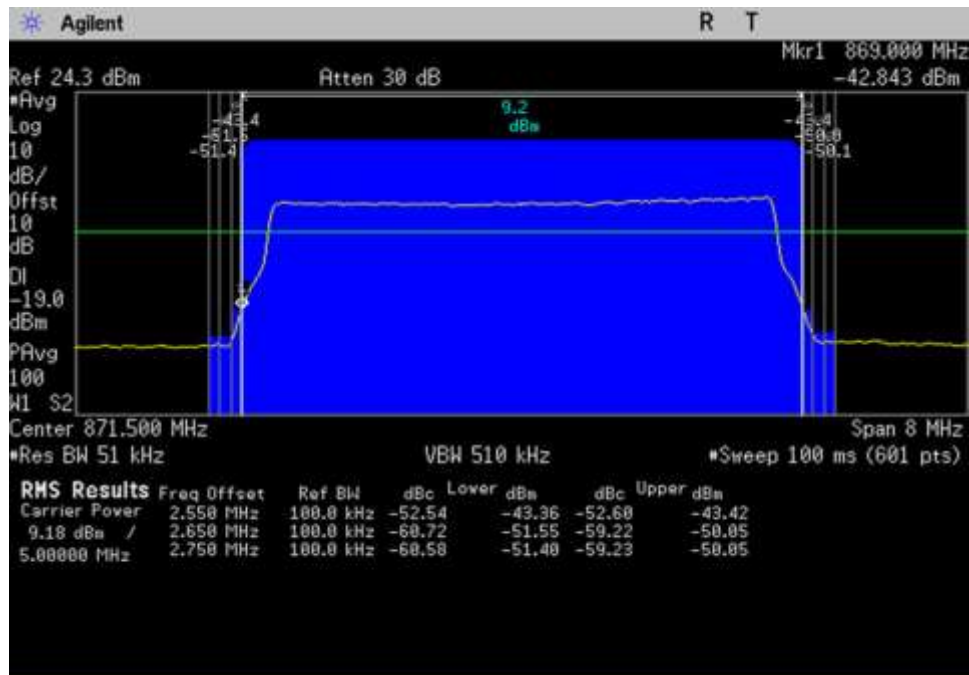
DL_728-746_LTE_ 739.5- 747.5MHz



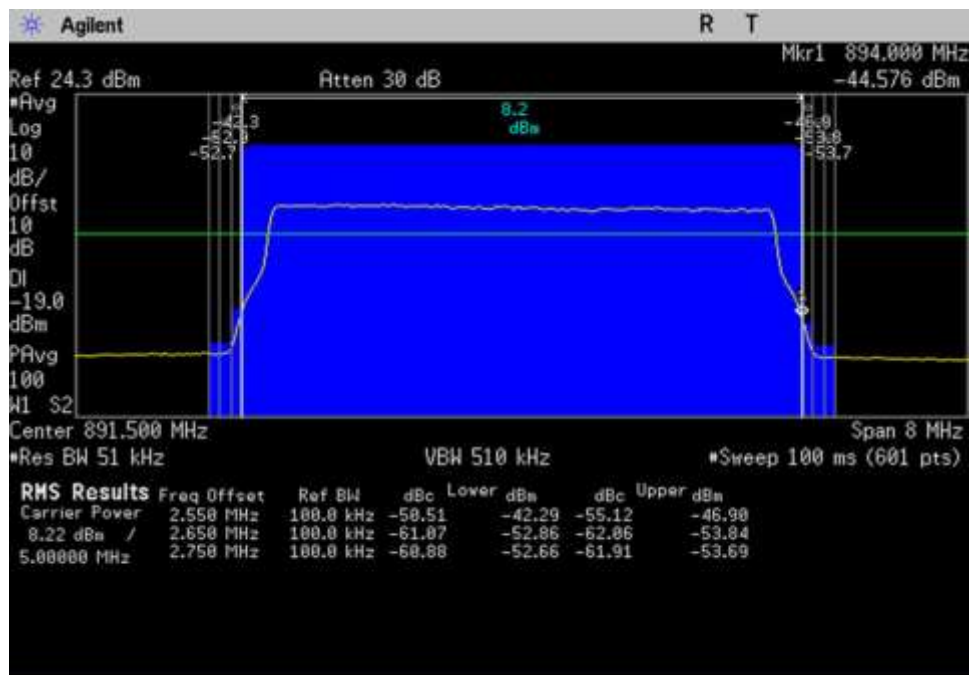
DL_746-757_LTE_ 744.5- 752.5MHz



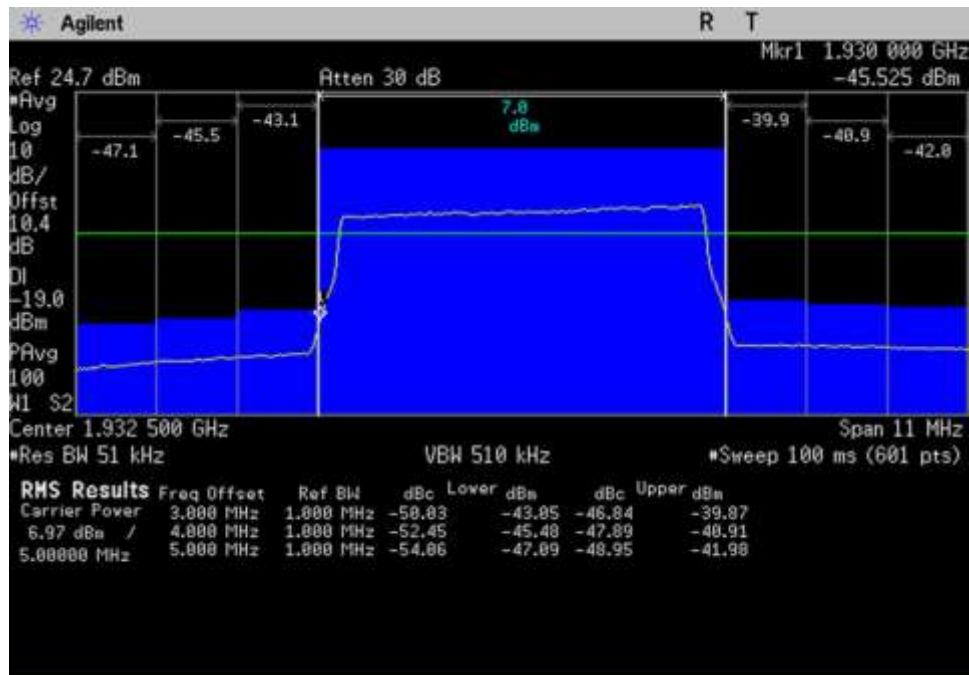
DL_746-757_LTE_ 750.5- 758.5MHz



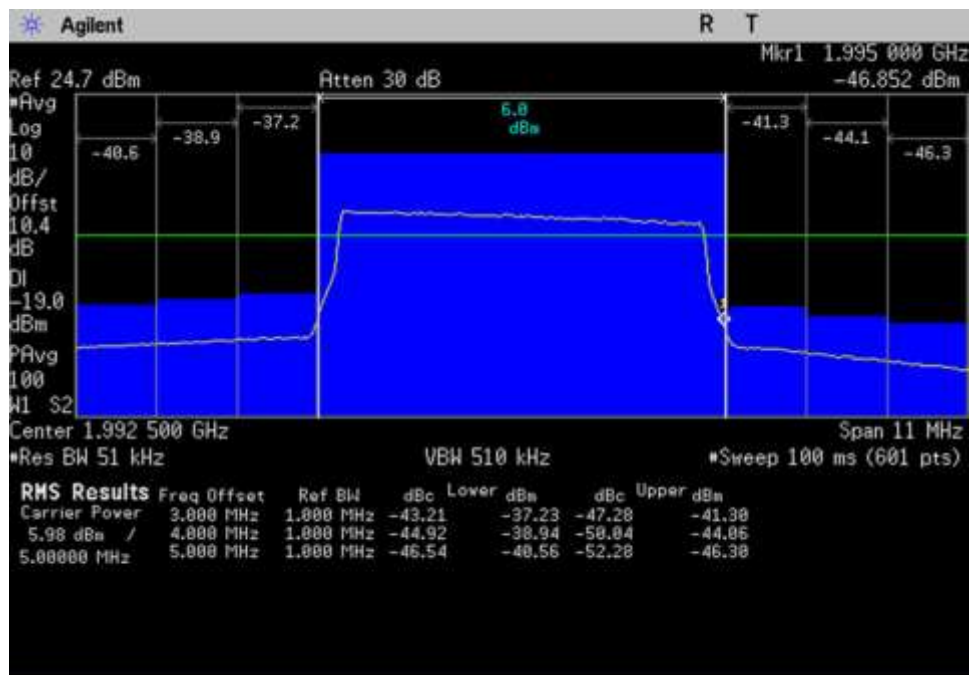
DL_869-894_LTE_867.5-875.5MHz



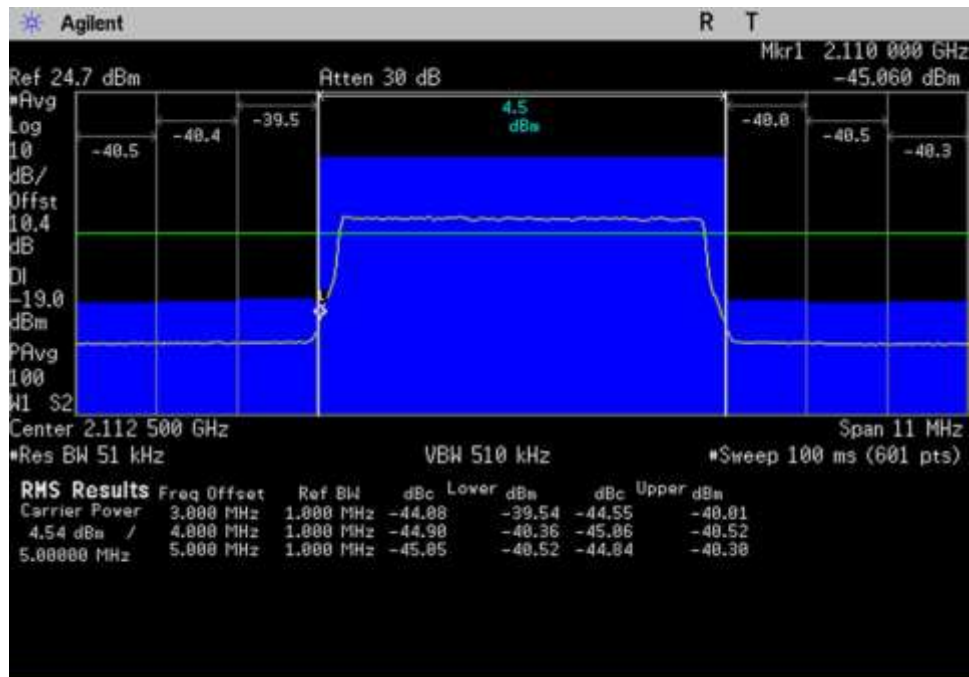
DL_869-894_LTE_887.5-895.5MHz



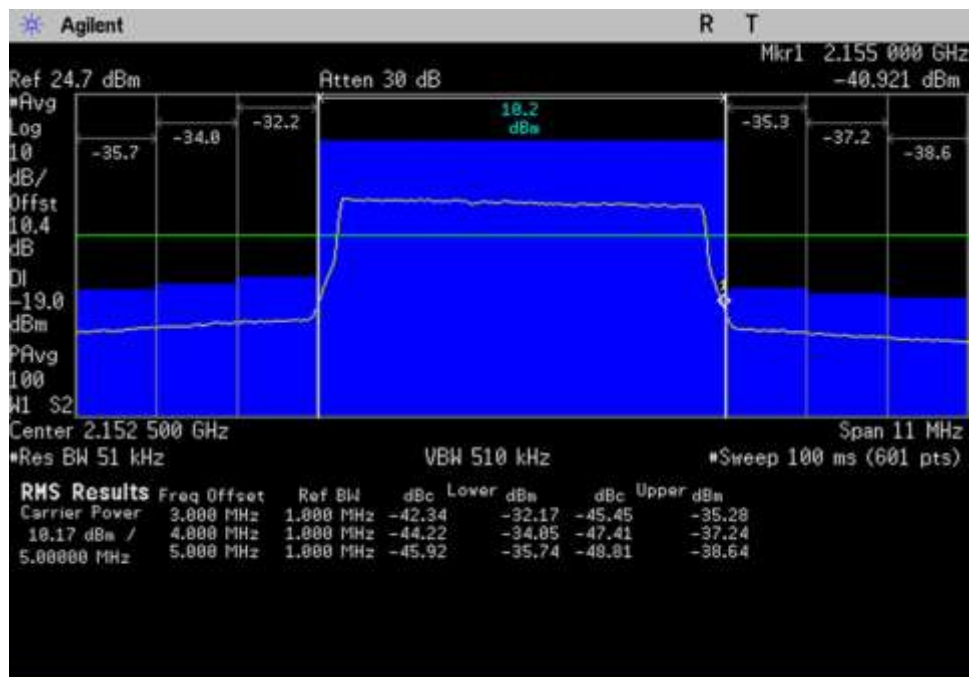
DL_1930-1995_LTE_1927-1938MHz



DL_1930-1995_LTE_1987-1998MHz



DL_2110-2155_LTE_ 2107- 2118MHz



DL_2110-2155_LTE_ 2147- 2158MHz

7.6 Conducted Spurious Emissions

Test Conditions / Data

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 #: **101748** Date 10/03/18
 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: 22.3°C
 Relative Humidity: 48%
 Pressure: 101.5kPa

Frequency range of measurement = 30MHz- 22GHz.
 30 MHz - 1000MHz -> RBW*= 1MHz VBW= 3MHz
 1000 MHz - 22000MHz ->RBW= 1MHz VBW= 3MHz

*Note: As specified on 7.6 Conducted spurious emissions test procedure of 935210 D03 Signal Booster Measurements v04r01, 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.

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.

Modification #1 was in place during testing.

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 summarized in table 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).

Limit Line Calculation*				
Frequency (MHz)	Antenna Gain- cable loss (dBi)	Limit line EIRP (dBW/MHz)	Limit line EIRP (dBm)	Limit line EIRP corrected (dBm)
UL 776-787	-3.7	-70.0	-40	-43.7

LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

$$\text{REQUIRED ATTENUATION} = 43 + 10 \log P \text{ DB}$$

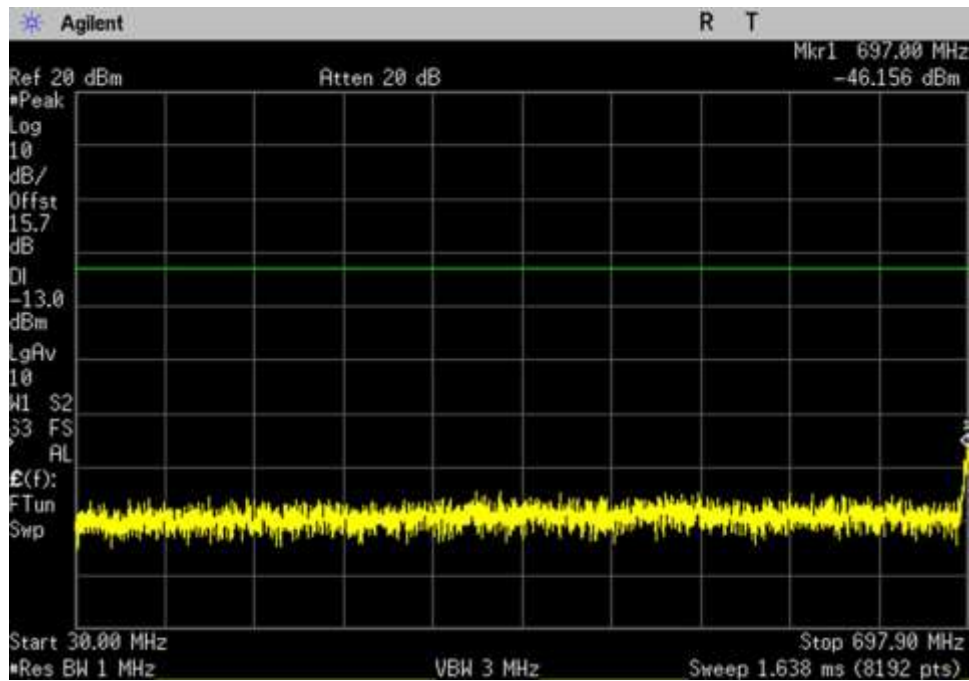
$$\text{Limit line (dBuV)} = V_{\text{dBuV}} - \text{Attenuation}$$

$$\begin{aligned} V_{\text{dBuV}} &= 20 \log \frac{V}{1 \times 10^{-6}} \\ &= 20 (\log V - \log 1 \times 10^{-6}) \\ &= 20 \log V - 20 \log 1 \times 10^{-6} \\ &= 20 \log V - 20 (-6) \\ &= 20 \log V + 120 \end{aligned}$$

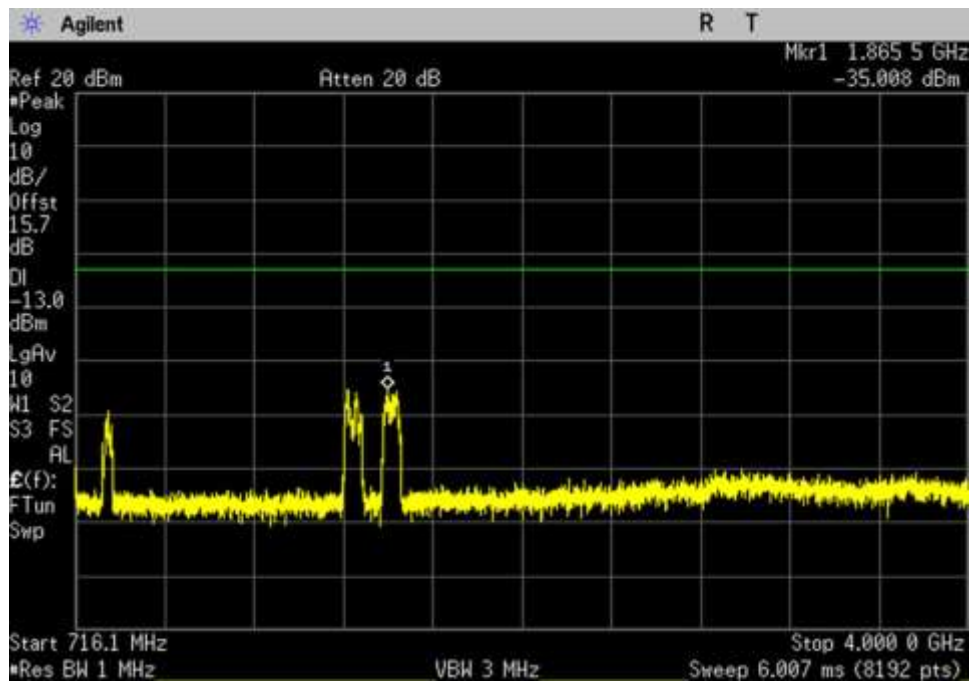
$$\begin{aligned} \text{Attenuation} &= 43 + 10 \log P \\ &= 43 + 10 \log \frac{V^2}{R} \\ &= 43 + 10 (\log V^2 - \log R) \\ &= 43 + 10 (2 \log V - \log R) \\ &= 43 + 20 \log V - 10 \log R \end{aligned}$$

$$\begin{aligned} \text{Limit line} &= V_{\text{dBuV}} - \text{Attenuation} \\ &= 20 \log V + 120 - (43 + 20 \log V - 10 \log R) \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 120 - 43 + 10 \log 50 \quad \text{Note : } R = 50 \Omega \\ &= 120 - 43 + 16.897 \\ &= 94 \text{ dBuV at any power level} \end{aligned}$$

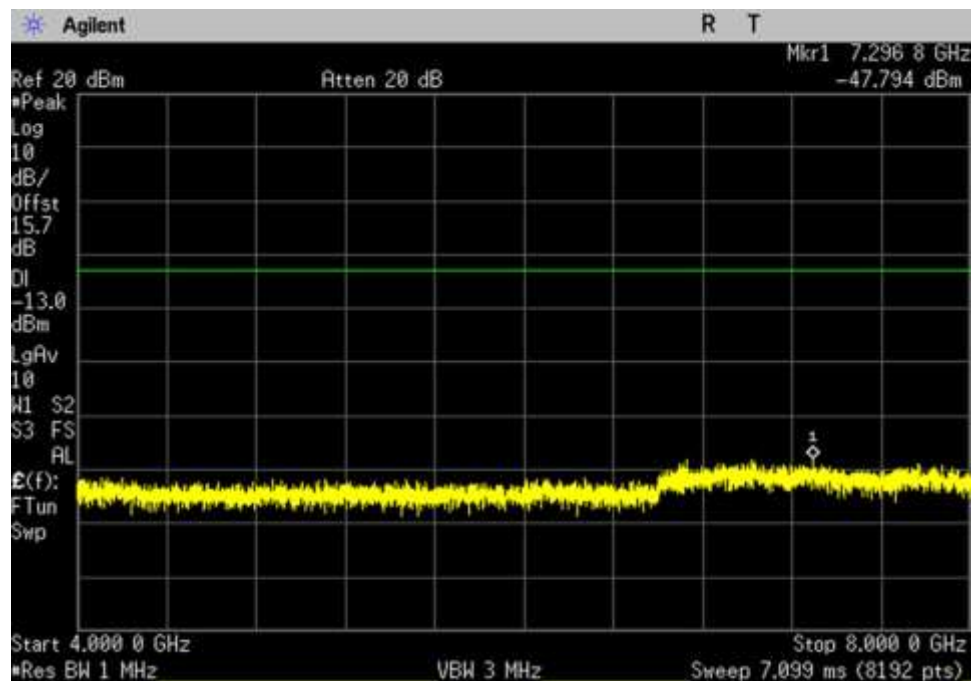
Plots



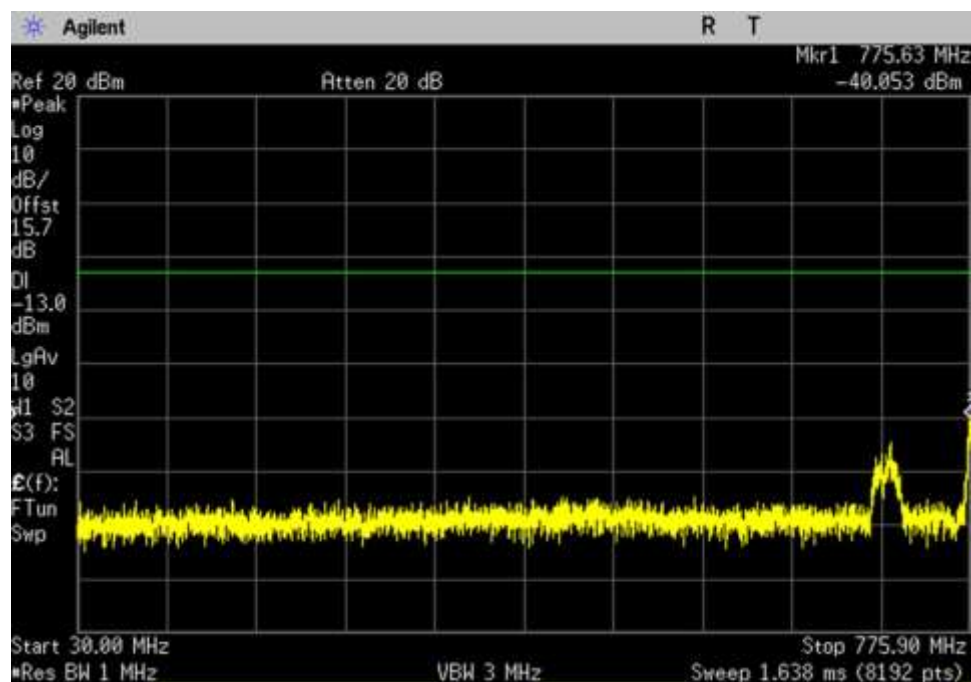
UL_698-716_30- 697.9MHz



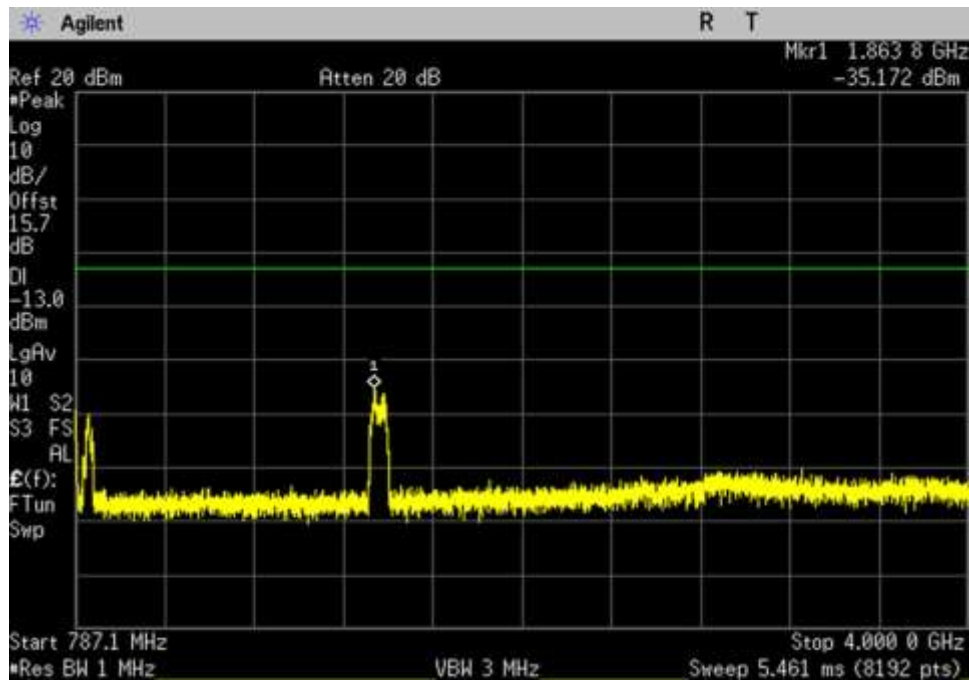
UL_698-716_716.1- 4000MHz



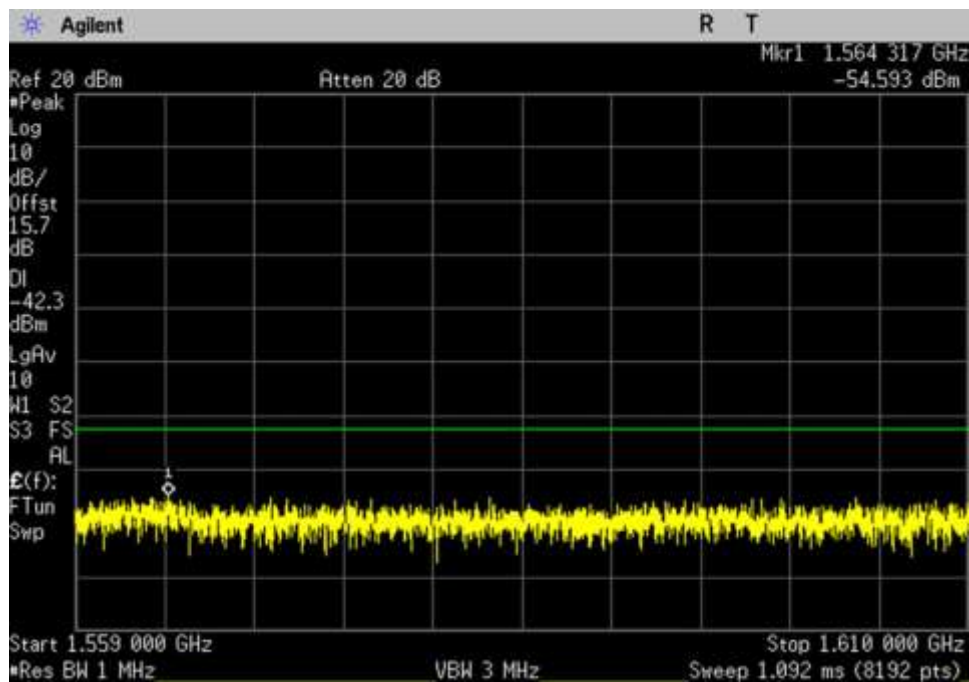
UL_698-716_ 4000- 8000MHz



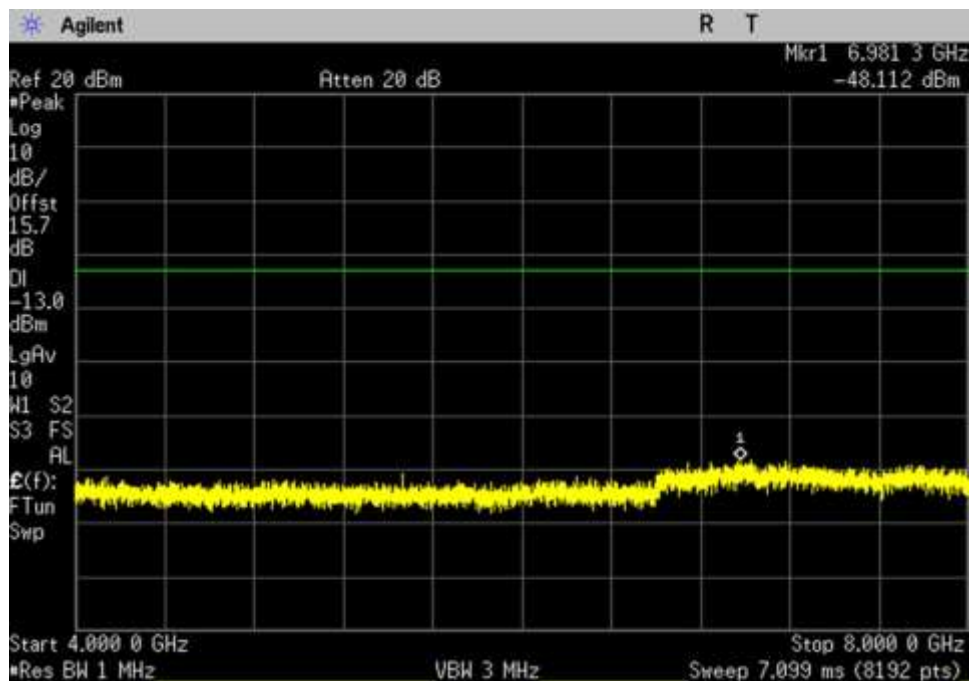
UL_776-787_ 30- 775.9MHz



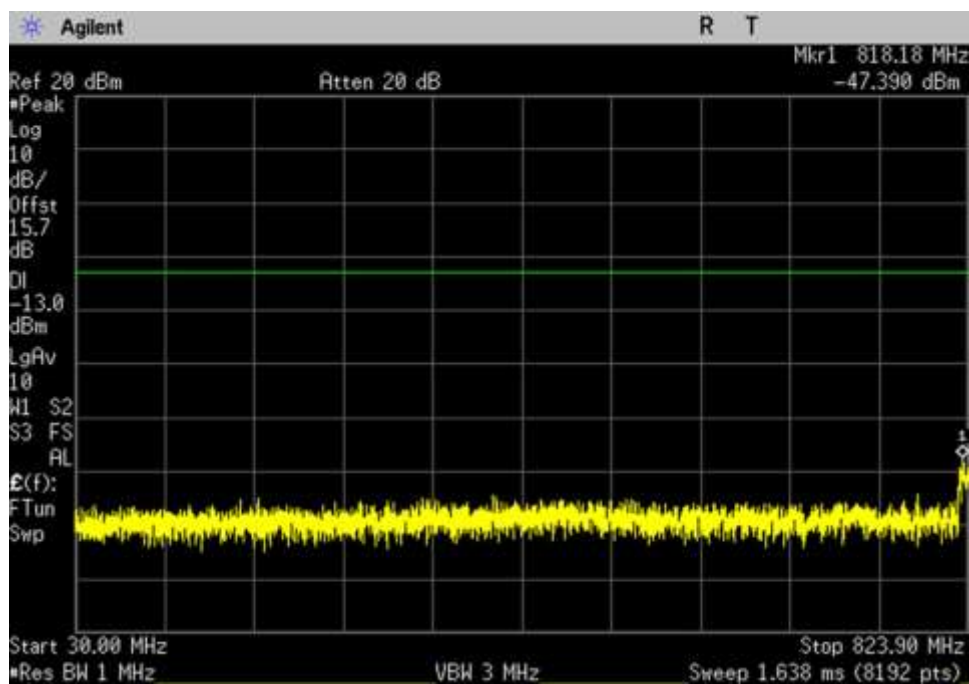
UL_776-787_ 787.1- 4000MHz



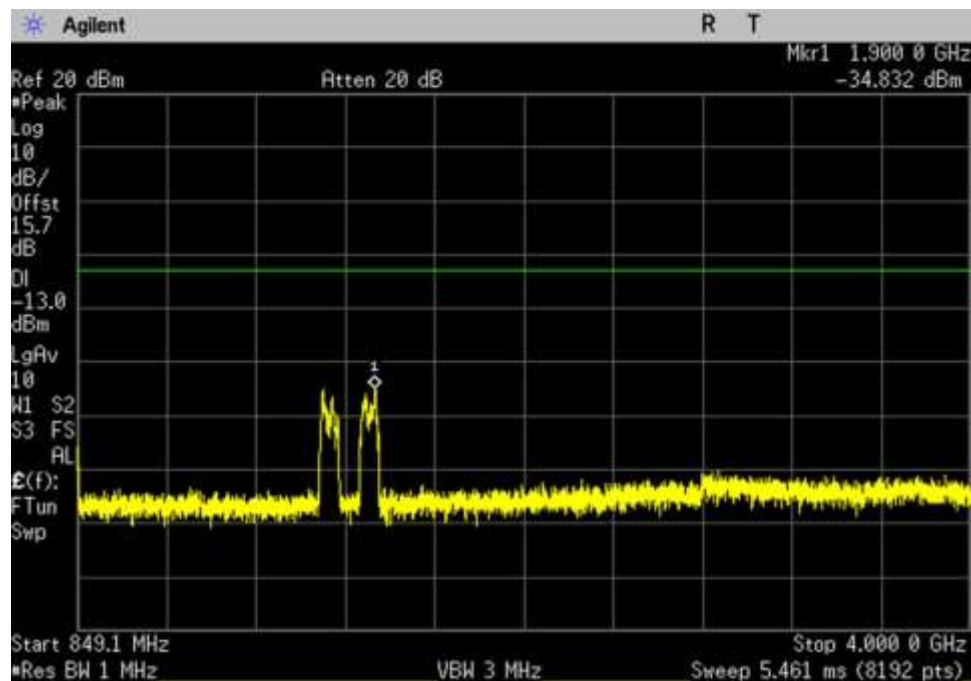
UL_776-787_ 1559- 1610MHz



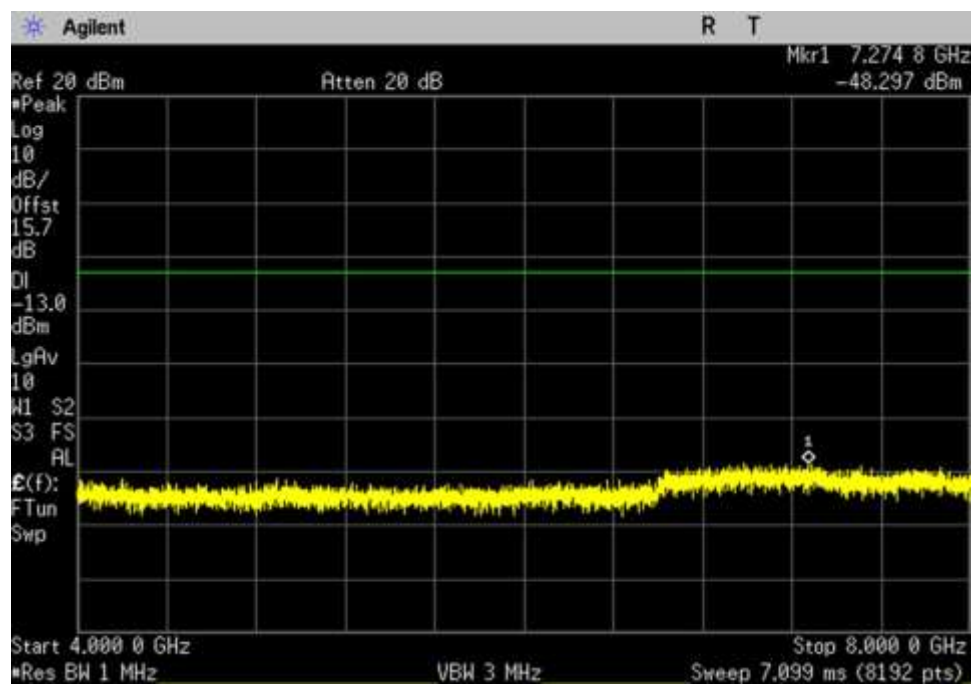
UL_776-787_ 4000- 8000MHz



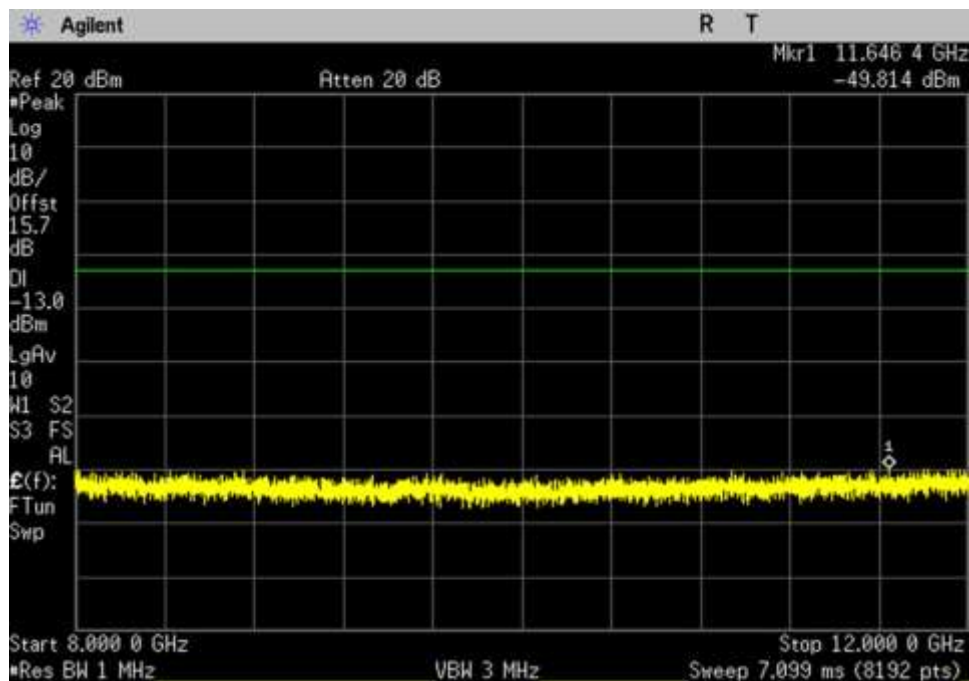
UL_824-849_ 30- 823.9MHz



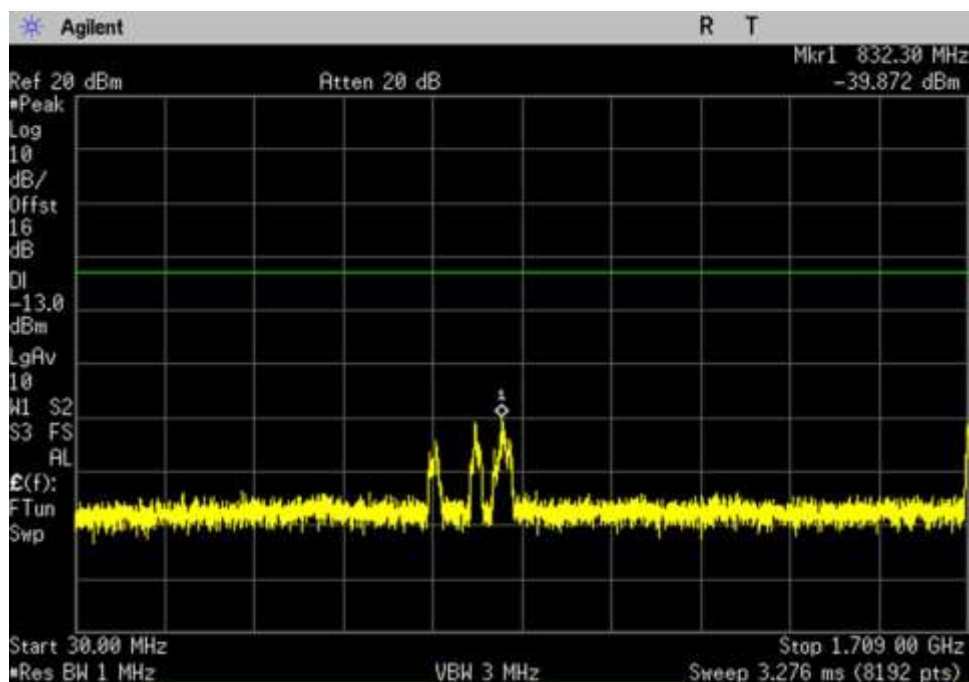
UL_824-849_ 849.1- 4000MHz



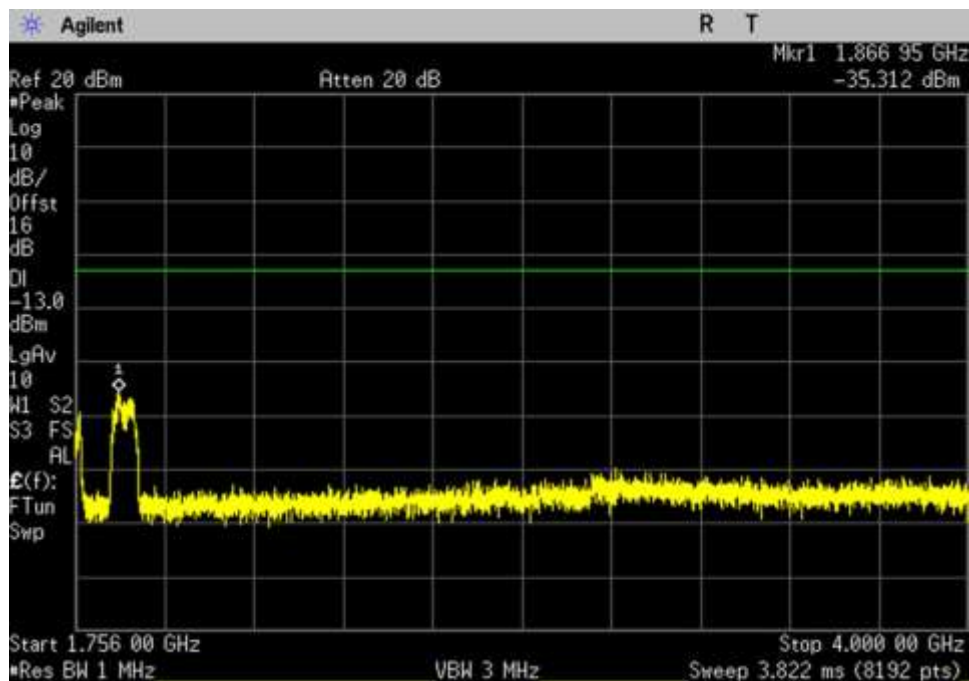
UL_824-849_ 4000- 8000MHz



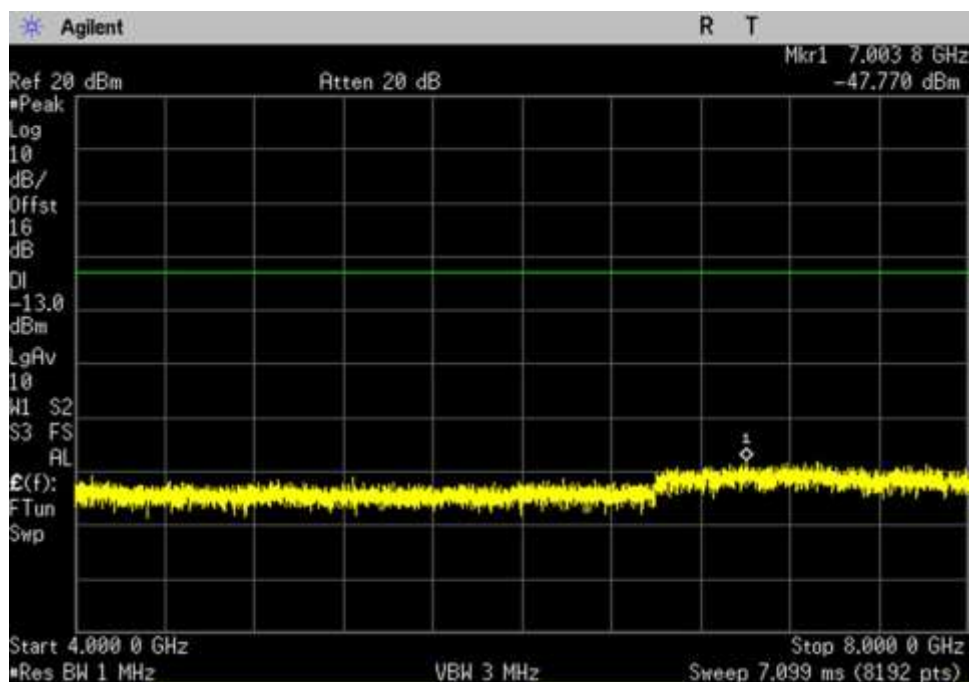
UL_824-849_ 8000- 12000MHz



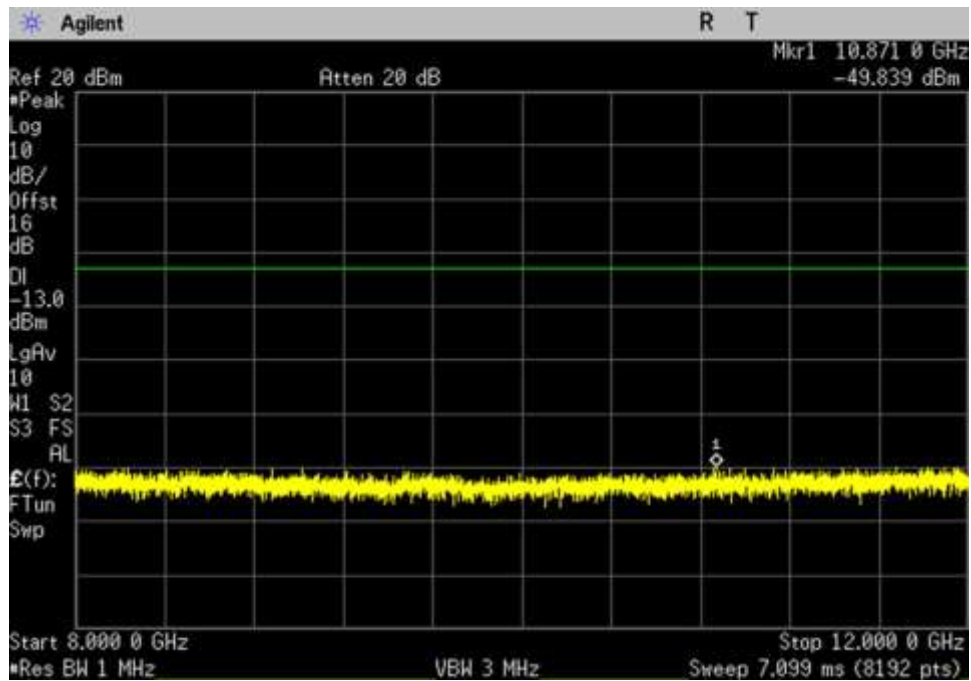
UL_1710-1755_ 30- 1709MHz



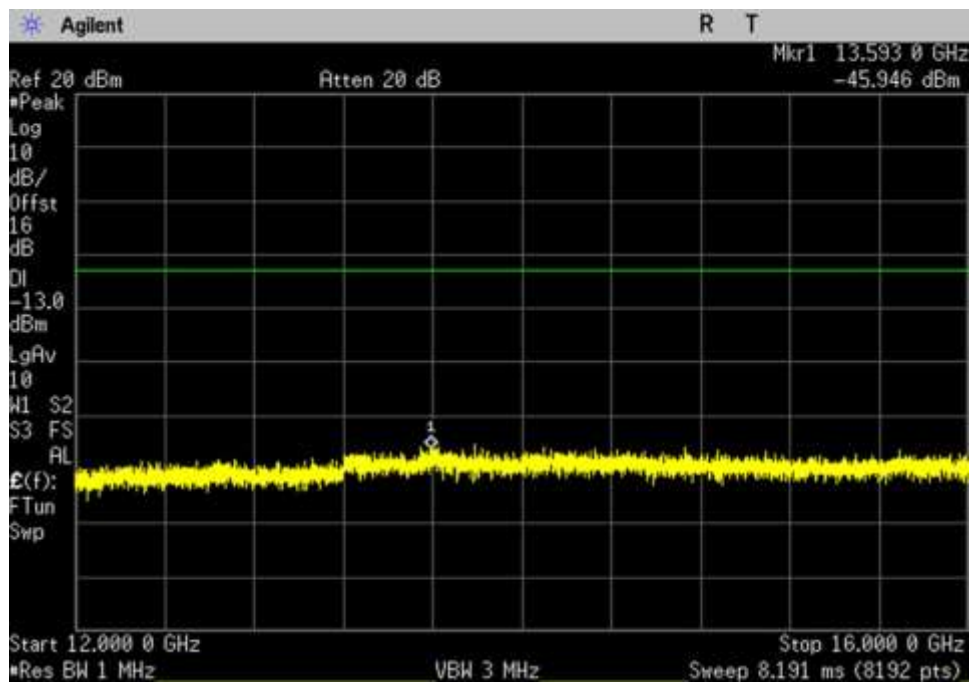
UL_1710-1755_ 1756- 4000MHz



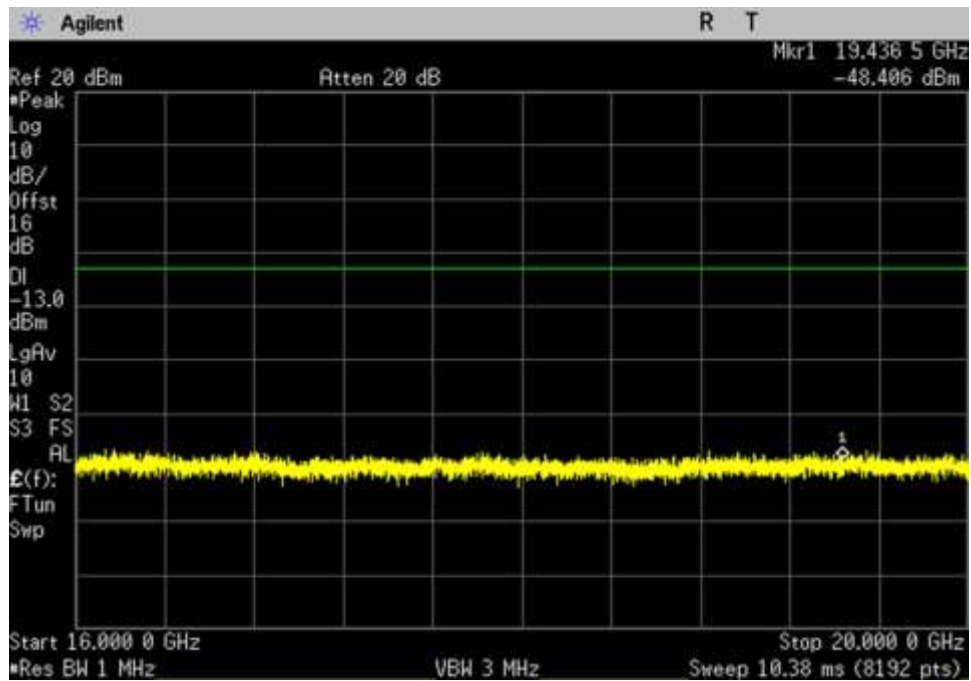
UL_1710-1755_ 4000- 8000MHz



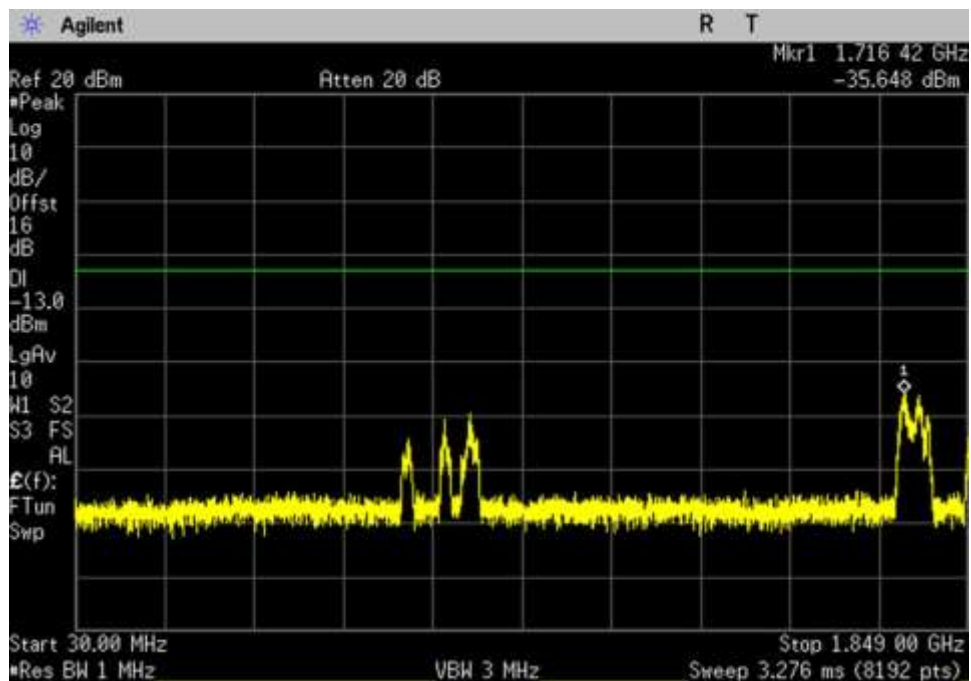
UL_1710-1755_ 8000- 12000MHz



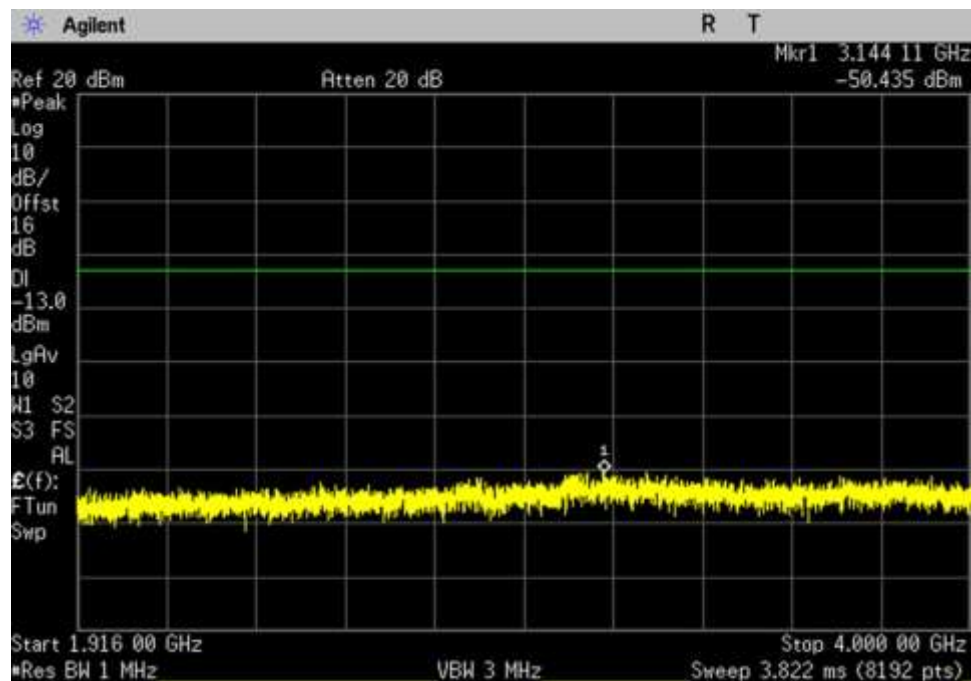
UL_1710-1755_ 12000- 16000MHz



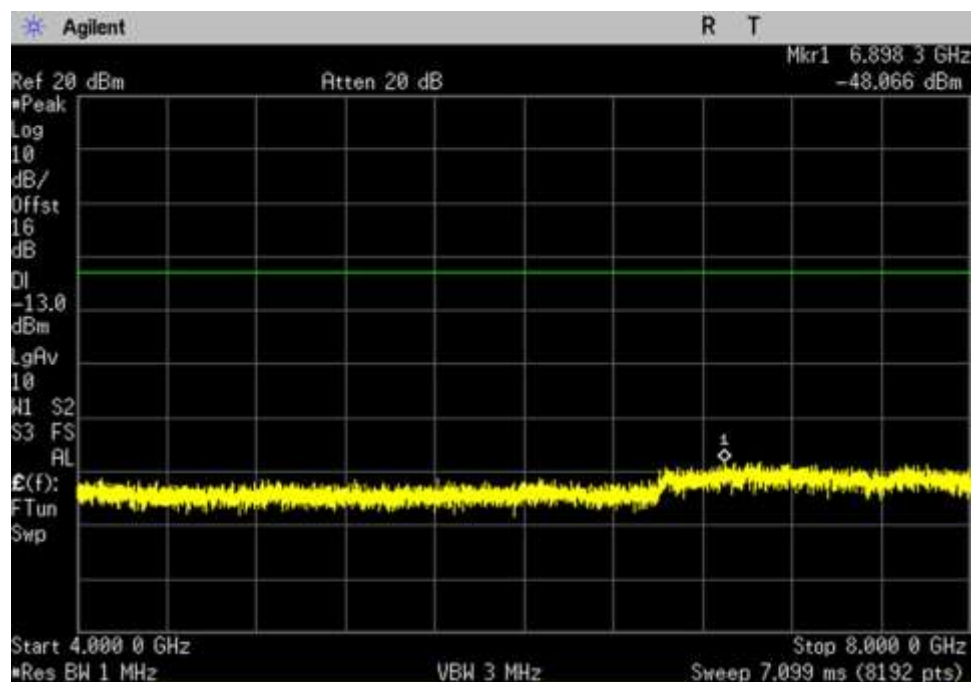
UL_1710-1755_ 16000- 20000MHz



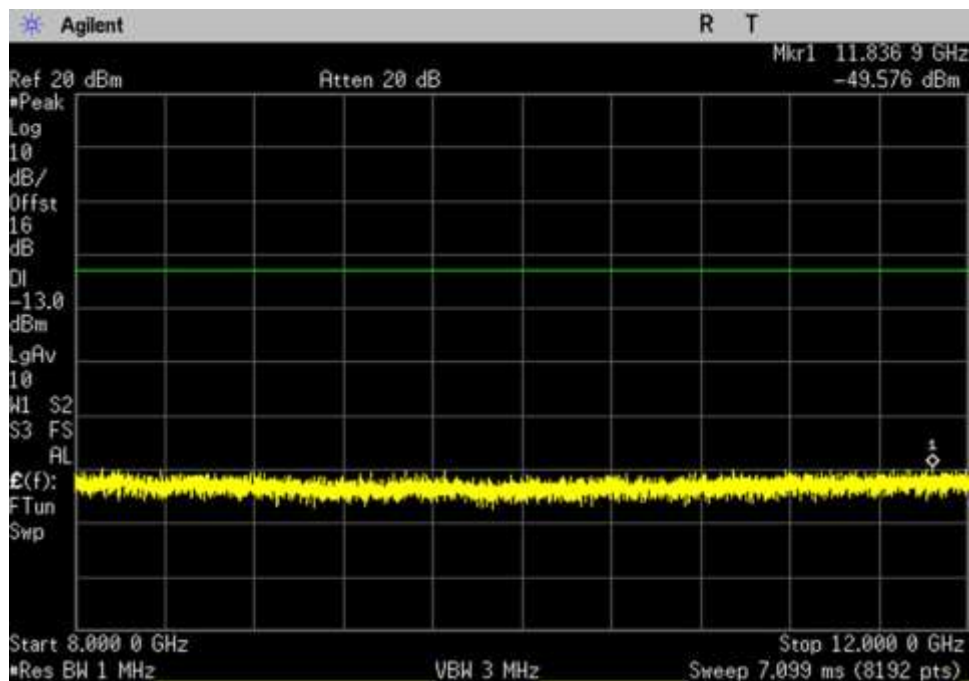
UL_1850-1915_ 30- 1849MHz



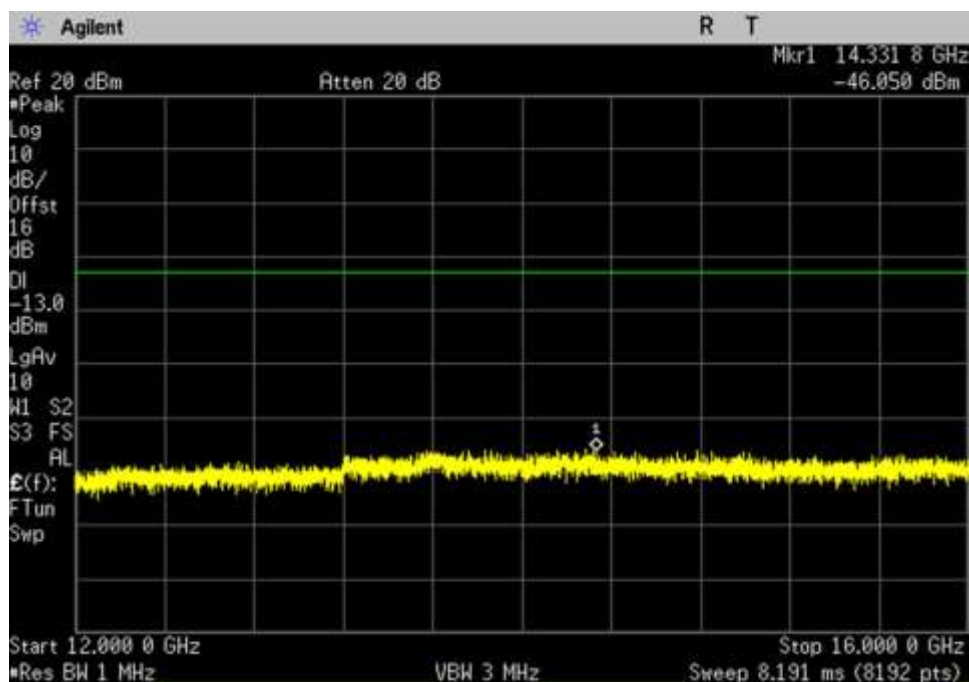
UL_1850-1915_ 1916- 4000MHz



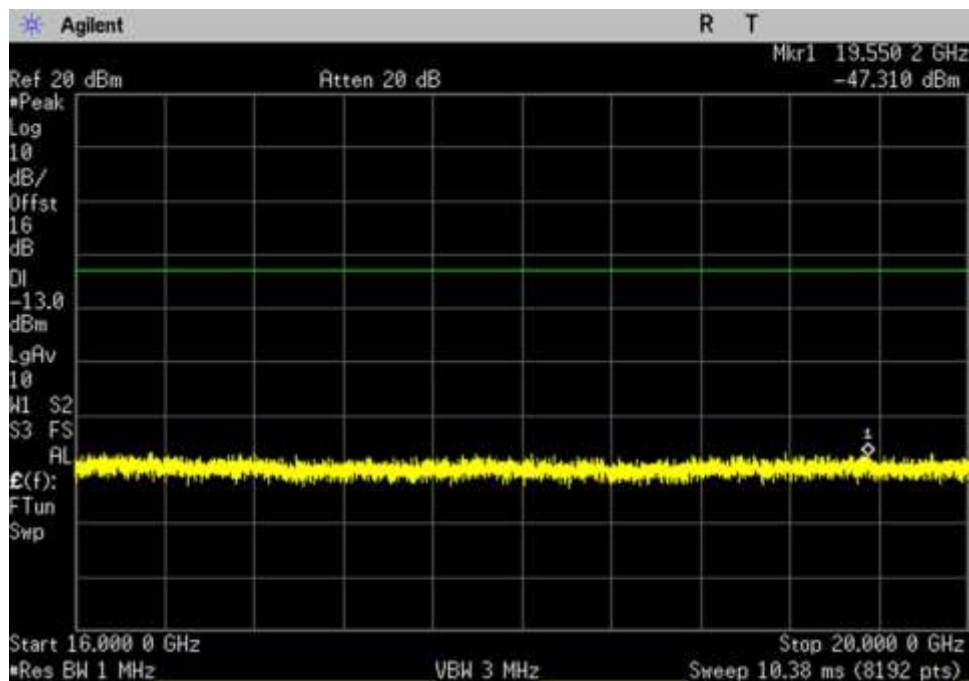
UL_1850-1915_ 4000- 8000MHz



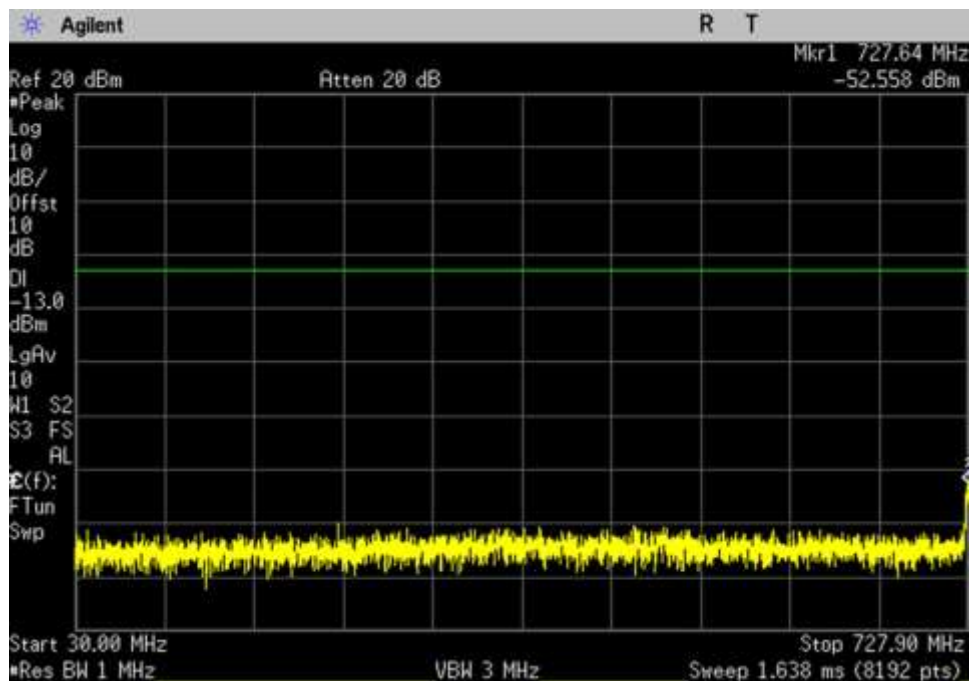
UL_1850-1915_ 8000- 12000MHz



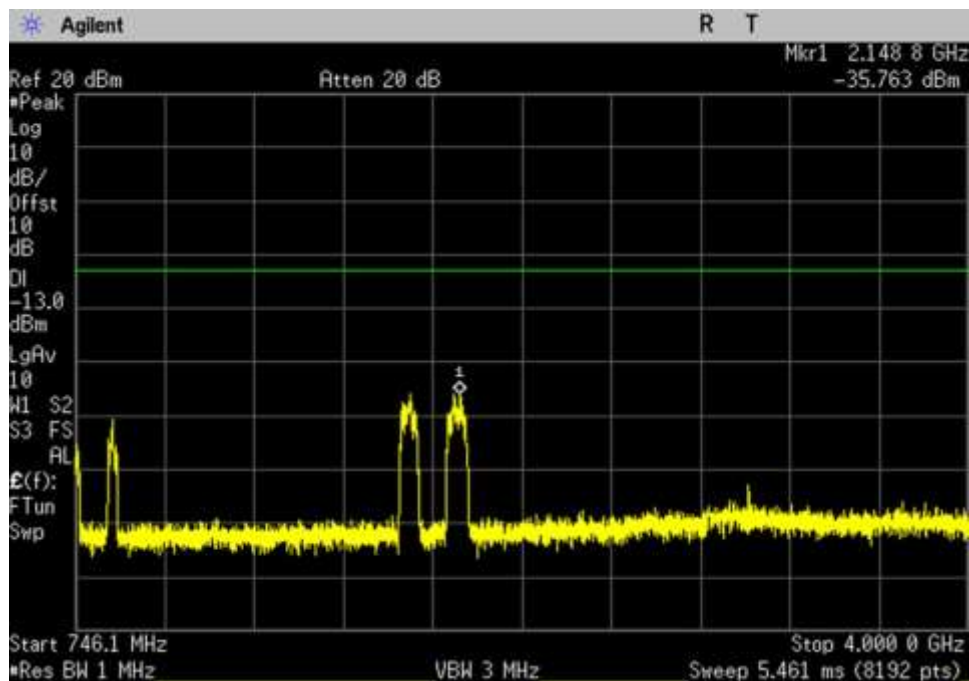
UL_1850-1915_ 12000- 16000MHz



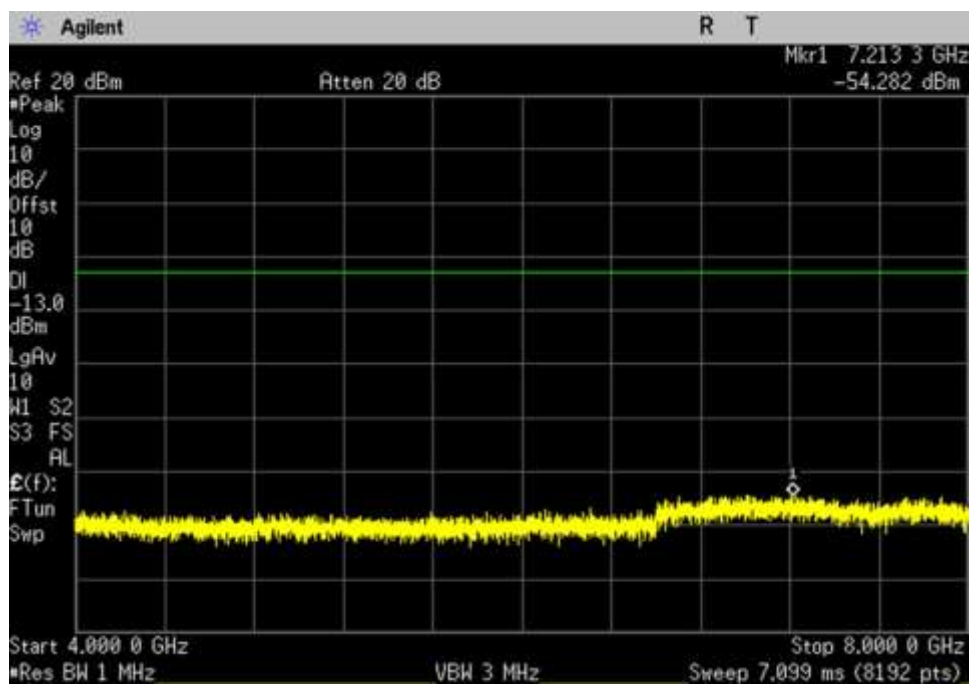
UL_1850-1915_ 16000- 20000MHz



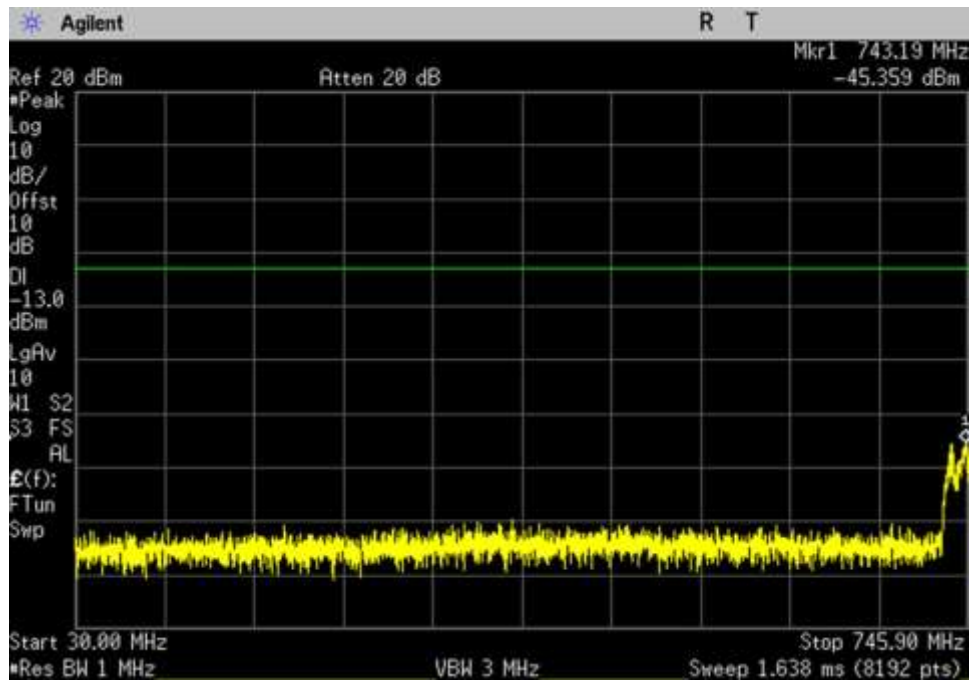
DL_728-746_ 30- 727.9MHz



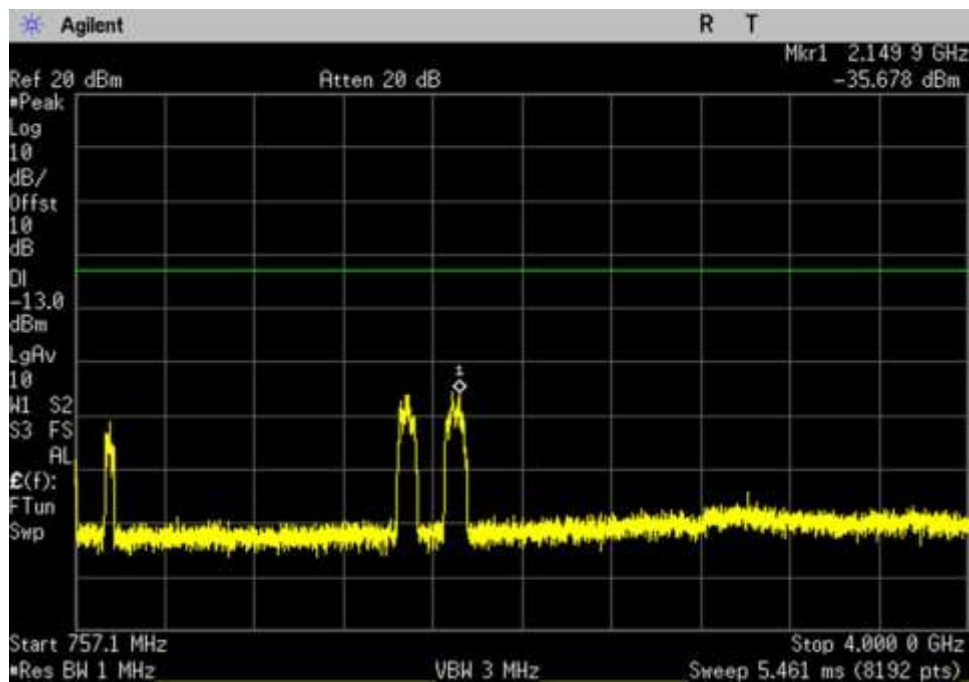
DL_728-746_ 746.1- 4000MHz



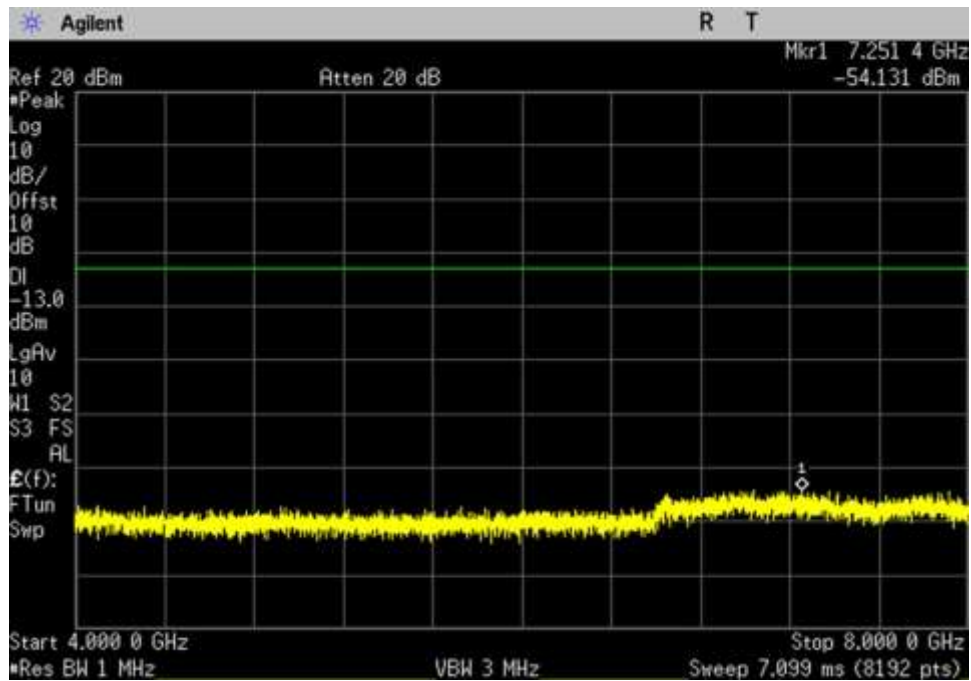
DL_728-746_ 4000- 8000MHz



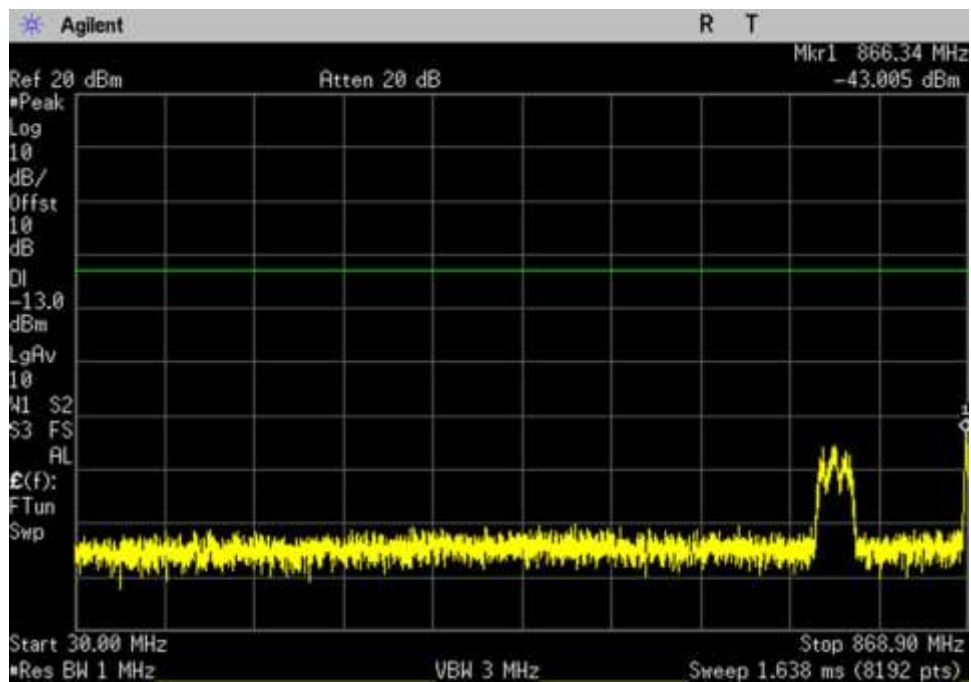
DL_746-757_ 30- 745.9MHz



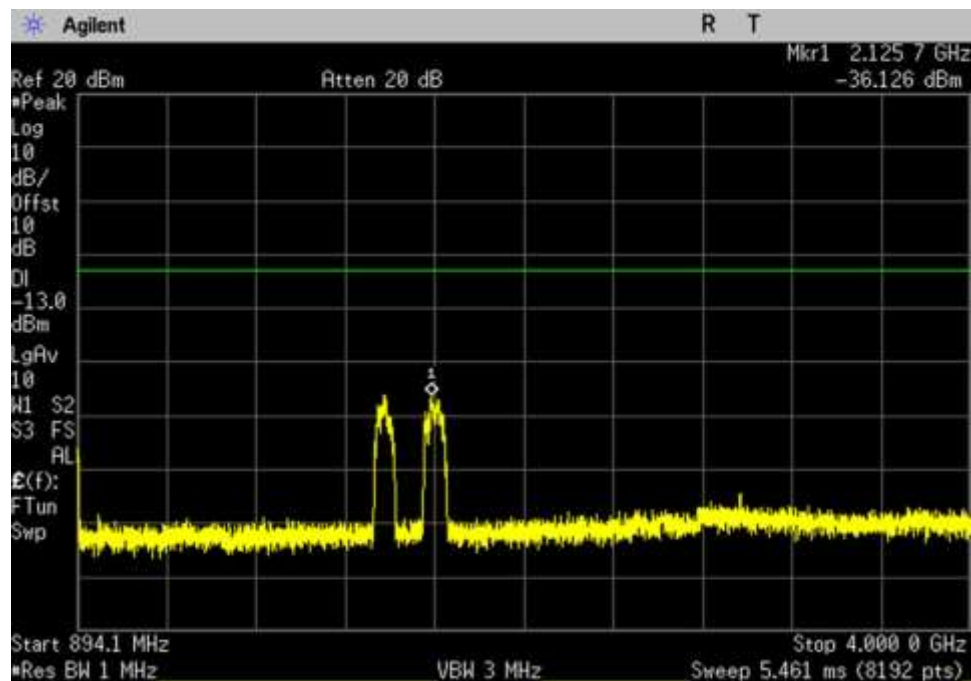
DL_746-757_ 757.1- 4000MHz



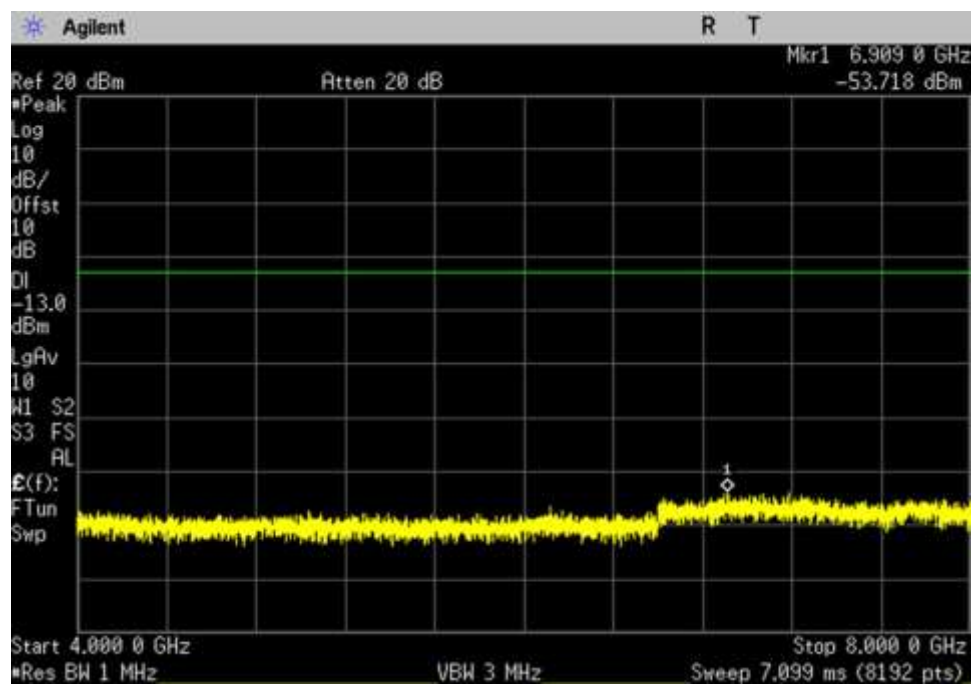
DL_746-757_ 4000- 8000MHz



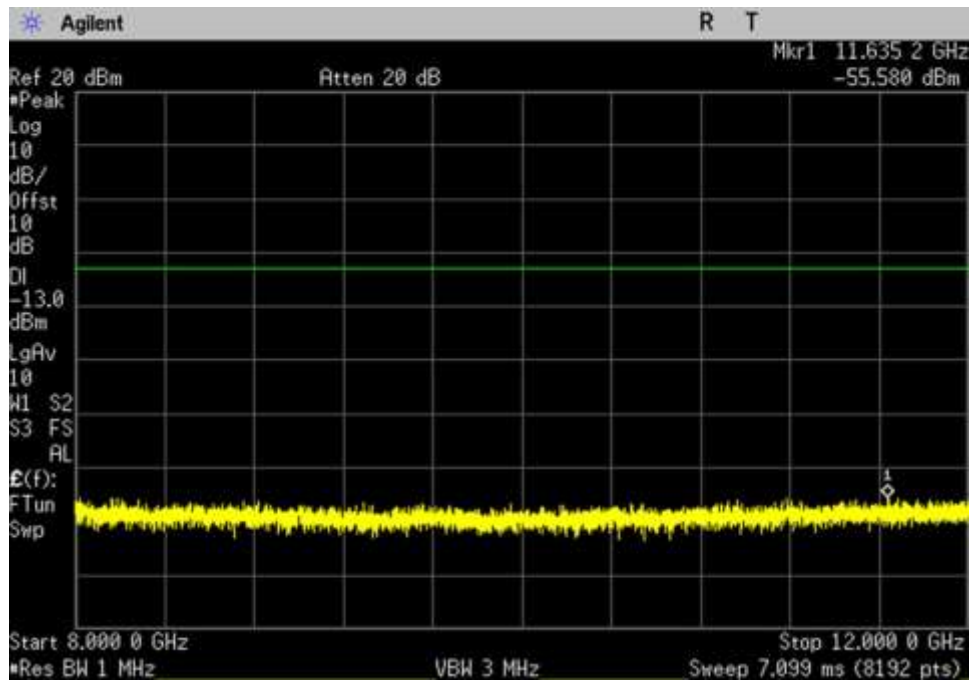
DL_869-894_ 30- 868.9MHz



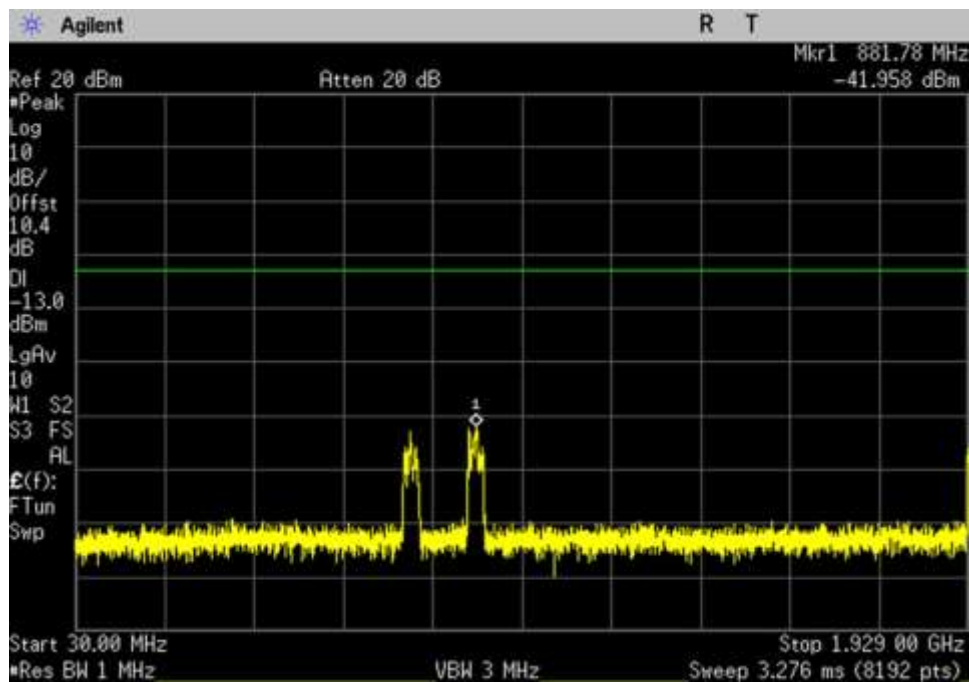
DL_869-894_ 894.1- 4000MHz



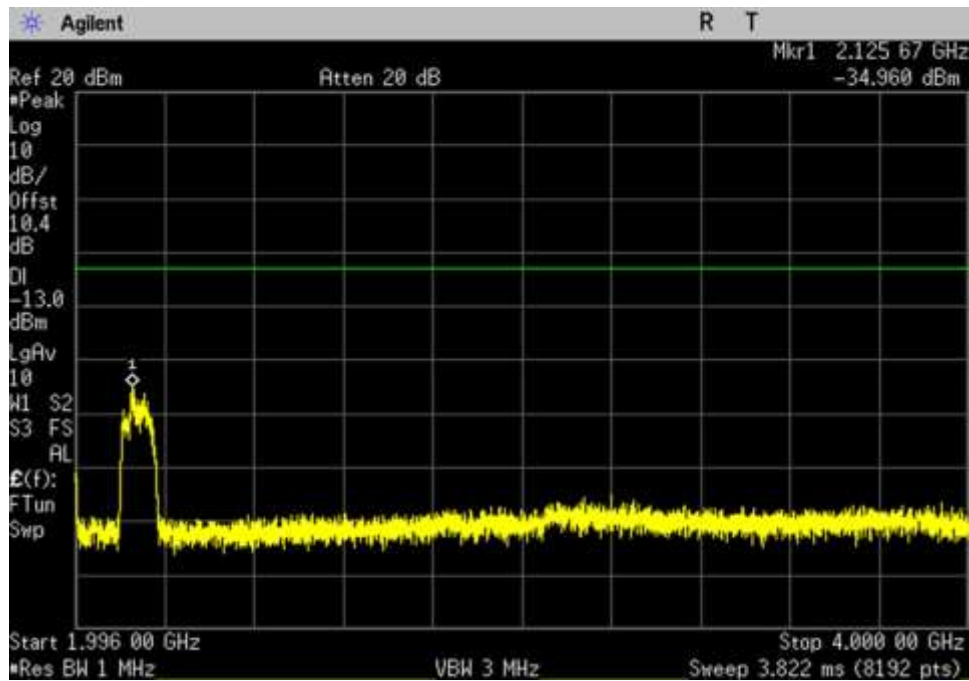
DL_869-894_ 4000- 8000MHz



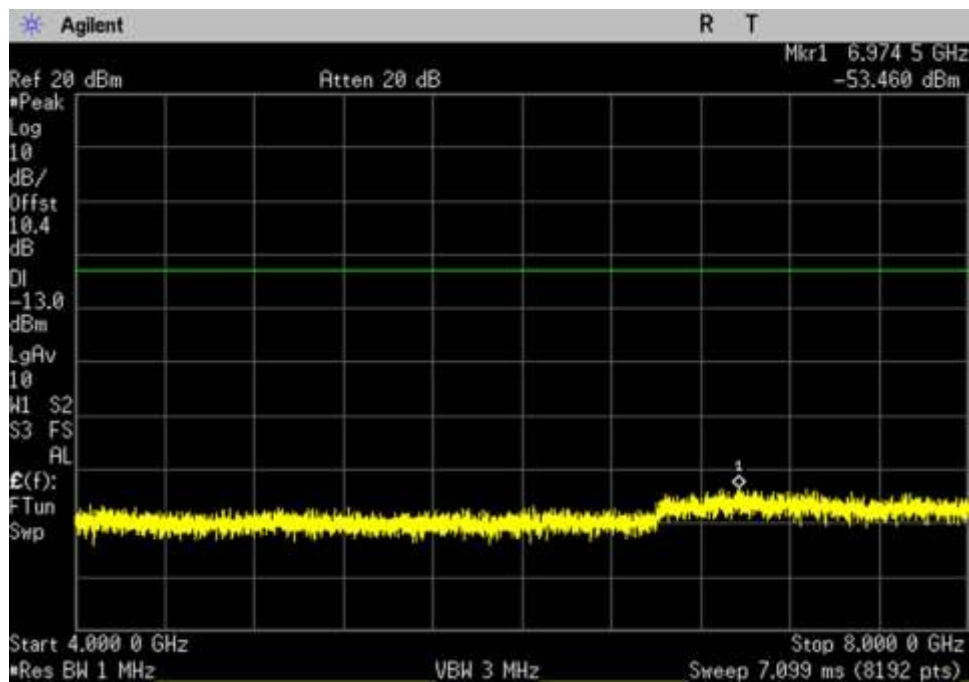
DL_869-894_ 8000- 12000MHz



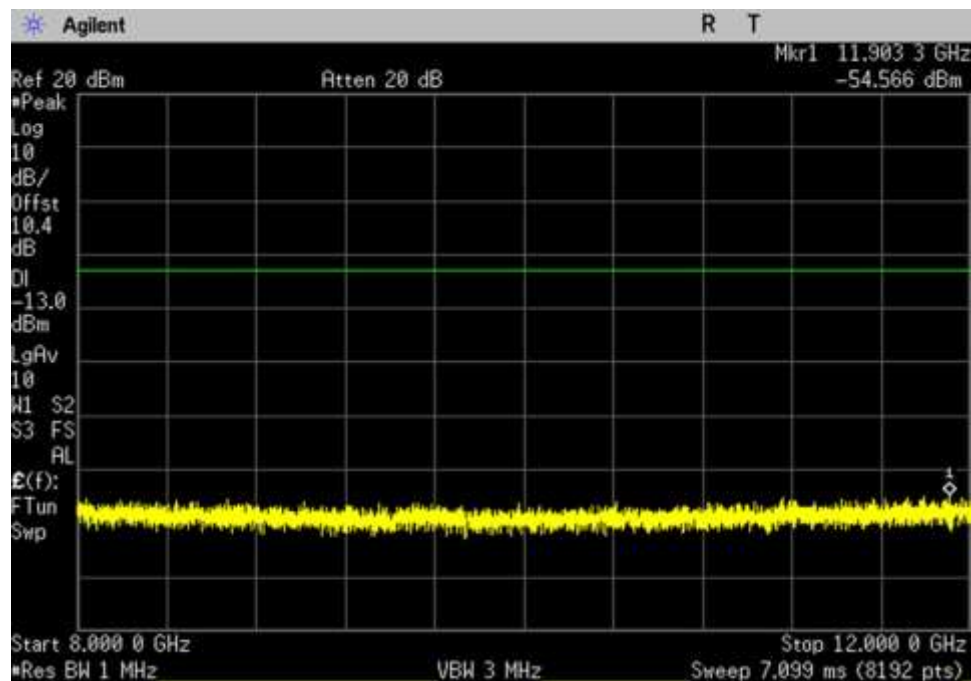
DL_1930-1995_ 30- 1929MHz



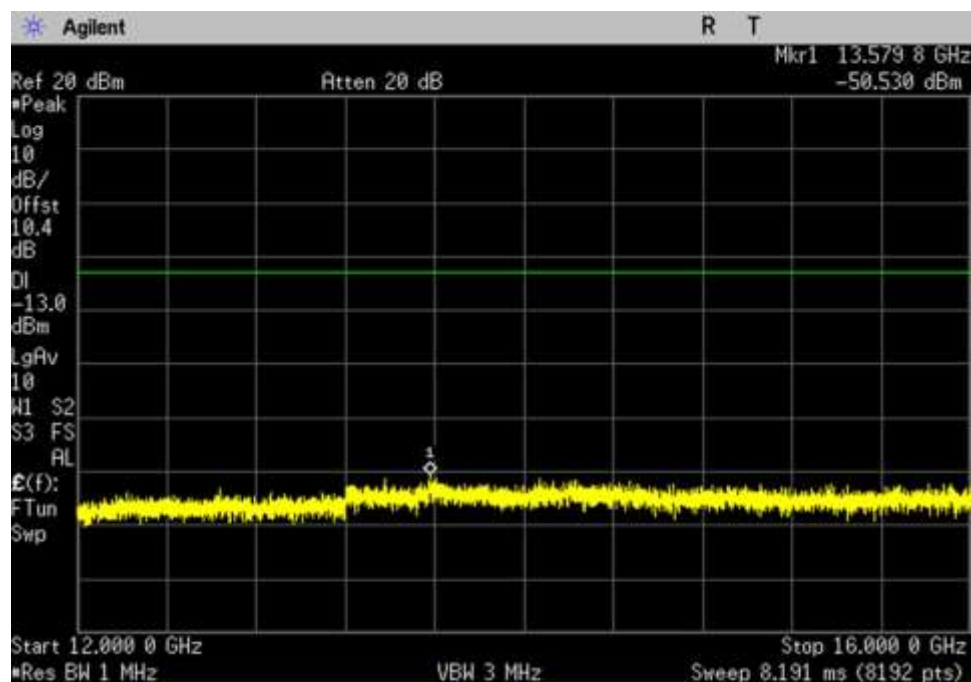
DL_1930-1995_ 1996- 4000MHz



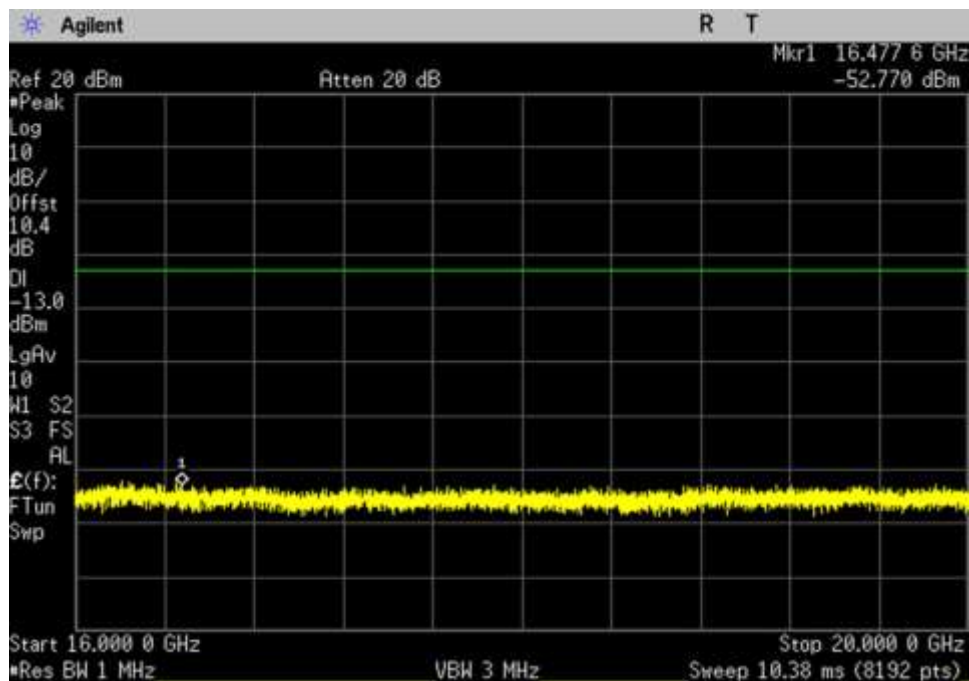
DL_1930-1995_ 4000- 8000MHz



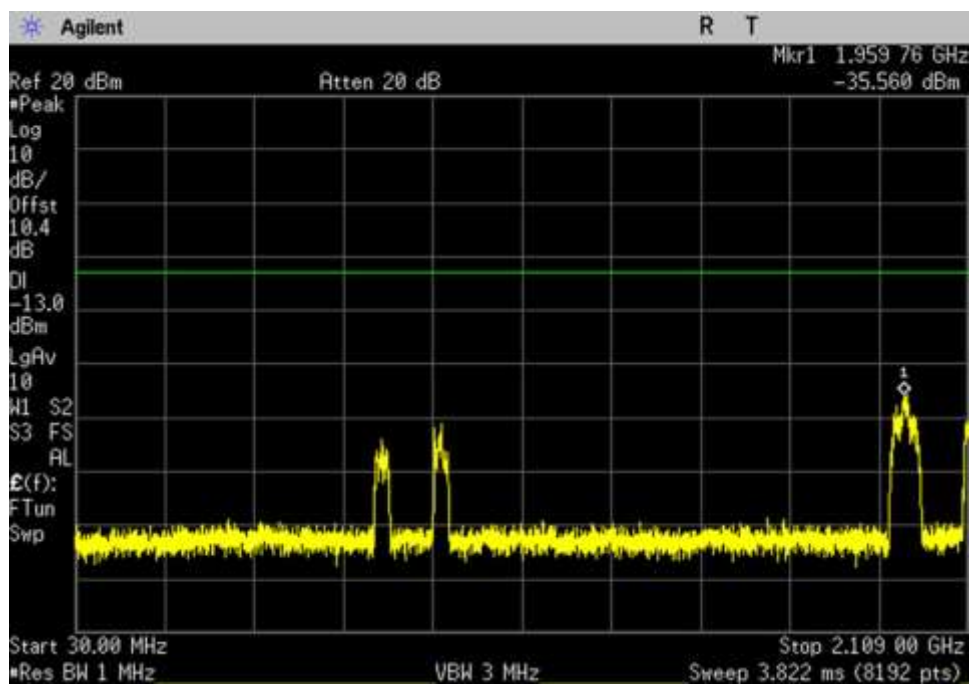
DL_1930-1995_ 8000- 12000MHz



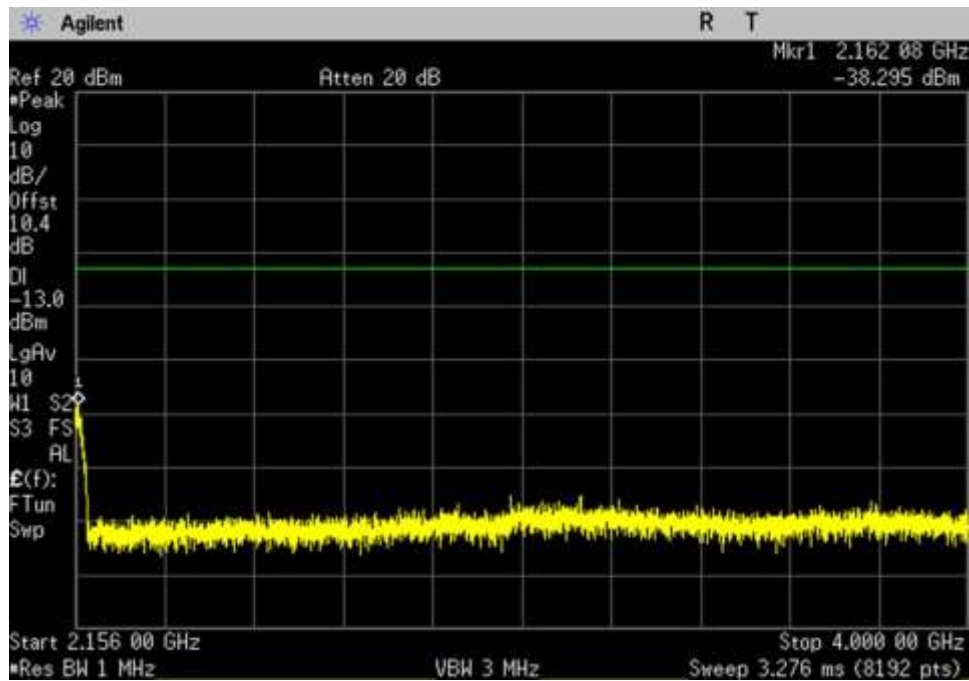
DL_1930-1995_ 12000- 16000MHz



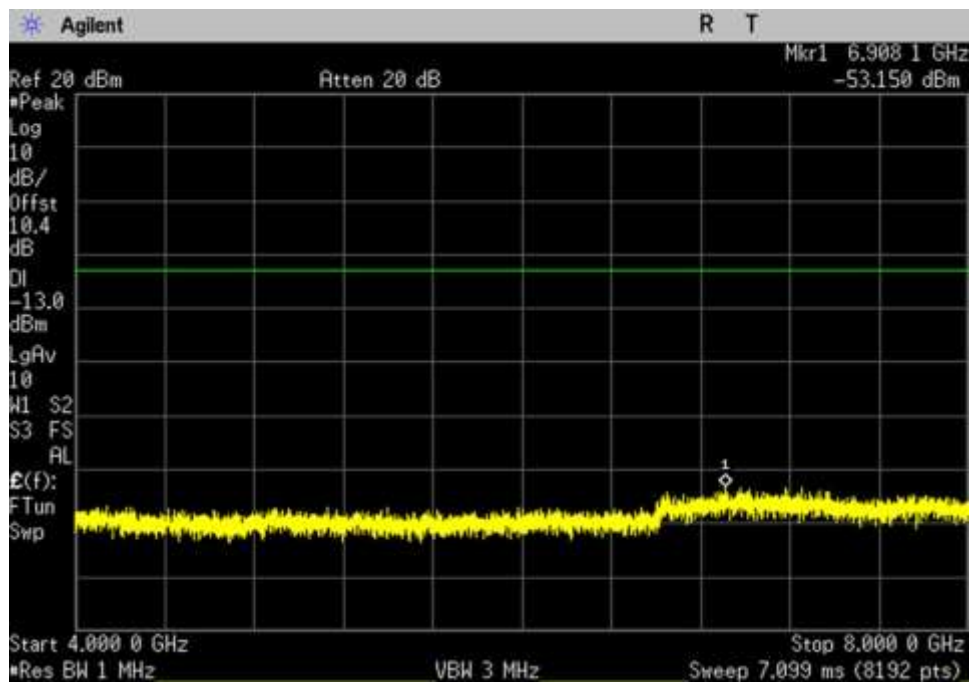
DL_1930-1995_ 16000- 20000MHz



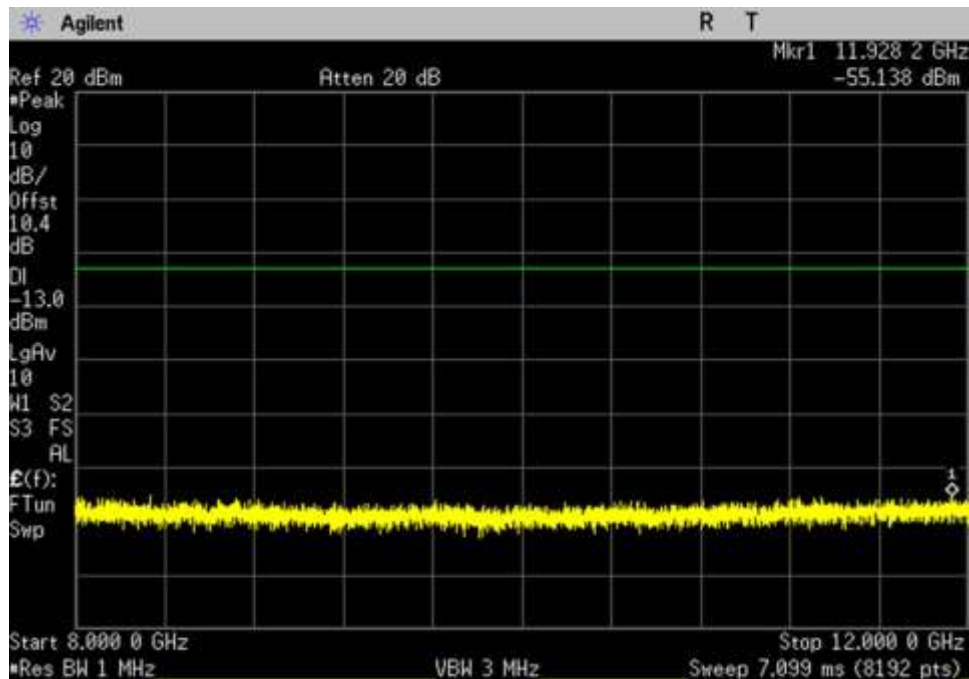
DL_2110-2155_ 30- 2109MHz



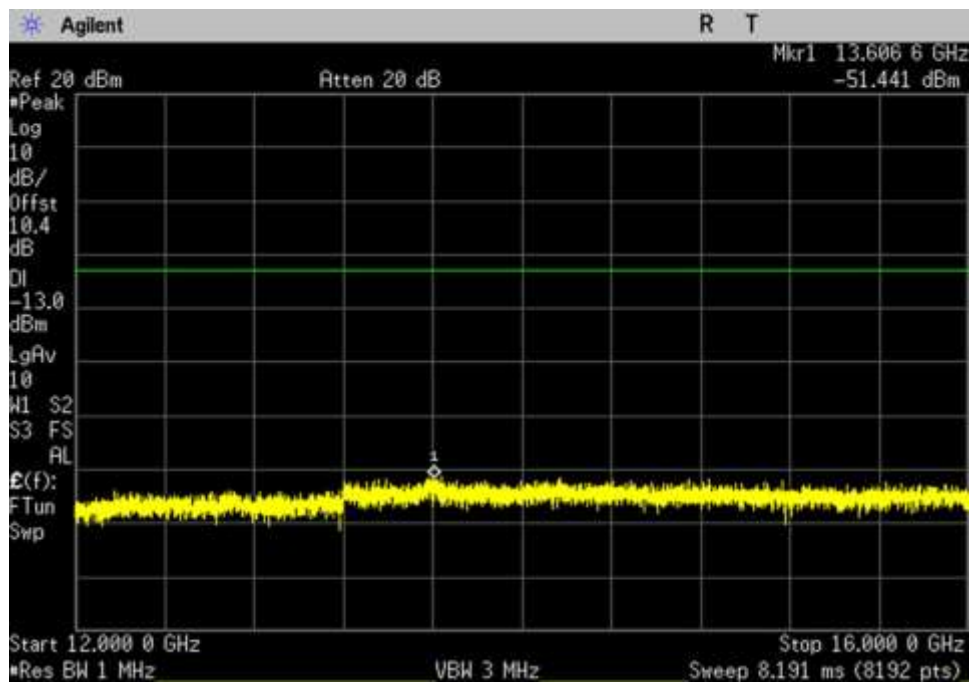
DL_2110-2155_ 2156- 4000MHz



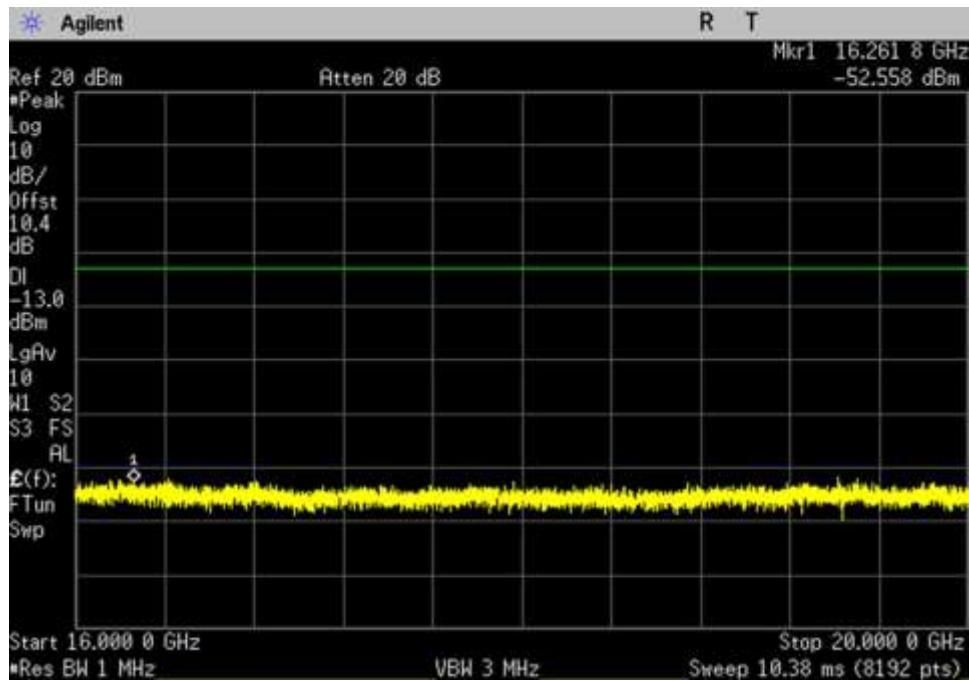
DL_2110-2155_ 4000- 8000MHz



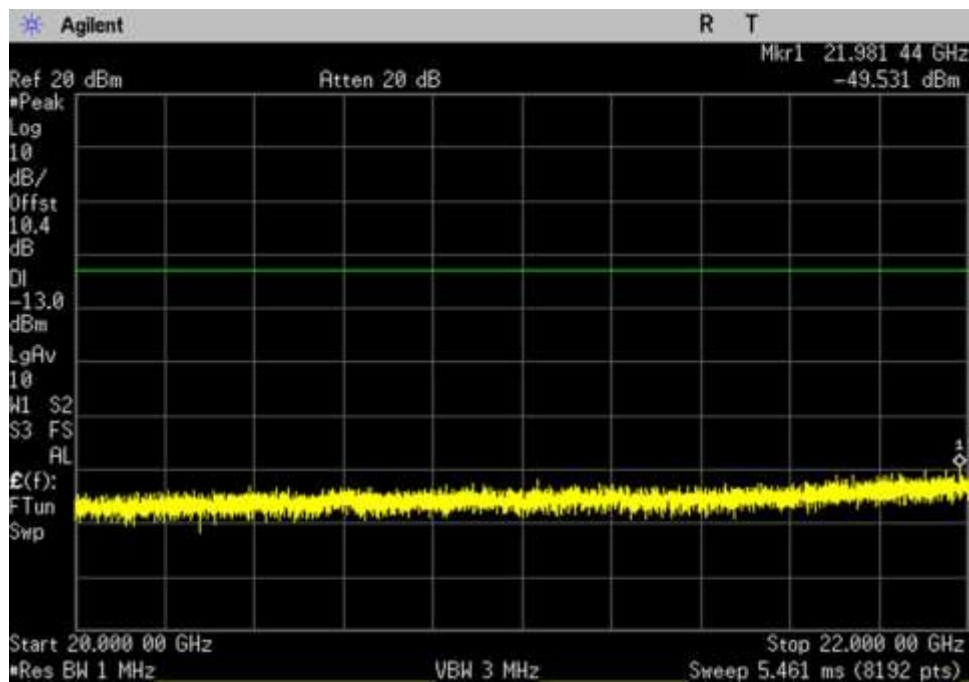
DL_2110-2155_ 8000- 12000MHz



DL_2110-2155_ 12000- 16000MHz



DL_2110-2155_ 16000- 20000MHz



DL_2110-2155_ 20000- 22000MHz

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 #: **101748** Date: 10/08/2018
 Test Type: **Conducted Emissions**
 Tested By: **Hieu Song 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: 20.3°C Relative Humidity: 35% Pressure: 102.5kPa Modification #1 and #2 were in place during testing.

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
C00082	Directional Coupler	MECA Electronics, Inc.	722-10-1.500V	9/18/2017	9/18/2019

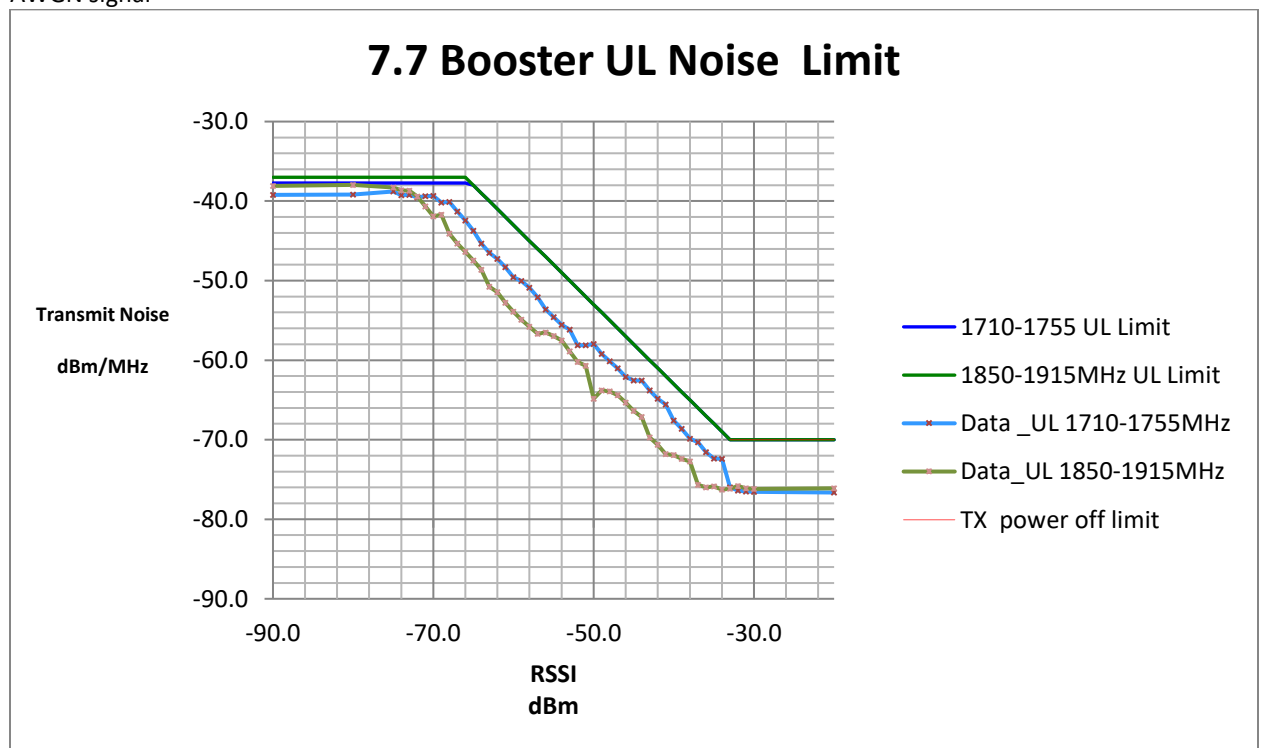
Summary of Results

7.7.1 Maximum transmitter noise power level

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

Maximum Noise Power			
Frequency MHz	Measured dBm./MHz	Limit dBm/MHz	Margin
UL 1710-1755	-38.8	-37.7	-1.1
UL 1850-1915	-39.1	-37.0	-2.1
UL 824-849	-44.6	-44.1	-0.5
UL 698-716	-45.6	-45.5	-0.1
UL 776-787	-44.7	-44.6	-0.1
DL 2110-2155	-38.17	-37.70	-0.47
DL 1930-1995	-37.75	-37.00	-0.75
DL 869-894	-44.47	-44.10	-0.37
DL 728-746	-45.51	-45.50	-0.01
DL 746-757	-45.69	-44.60	-1.09

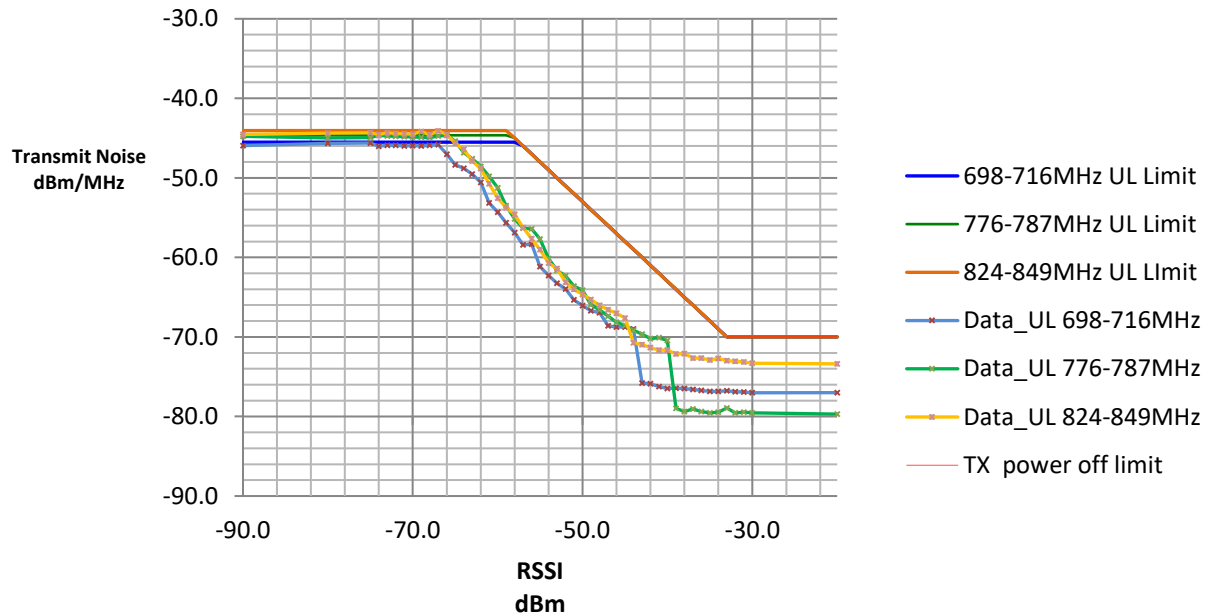
- 7.7.1 h-n: Maximum transmitter noise when varying the DL signal generator output level with a 4.1MHz AWGN signal



1710.0 - 1755.0 MHz					
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-80.0	-39.2	-	-37.7	-	-1.5
-75.0	-38.8	-	-37.7	-	-1.1
-44.0	-62.6	-59.0	-	-	-3.6
-43.0	-63.8	-60.0	-	-	-3.8
-32.0	-76.4	-	-	-70	-6.4
-31.0	-76.5	-	-	-70	-6.5

1850.0 - 1915.0 MHz					
		Limit			Margin
RSSI (dBm)	Measured Noise (dBm/MHz)	RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-38.1	-	-37.0	-	-1.1
-80.0	-38.0	-	-37.0	-	-1.0
-34.0	-76.3	-69.0	-	-	-7.3
-33.0	-76.1	-70.0	-	-	-6.1
-32.0	-75.8	-	-	-70	-5.8
-31.0	-76.1	-	-	-70	-6.1

7.7 Booster UL Noise Limit



824.0 - 849.0MHz					
RSSI (dBm)	Measured Noise (dBm/MHz)	Limit			Margin
		RSSI Dependent	Fixed Booster Limit	TX off	
-80.0	-44.4	-	-44.1	-	-0.3
-75.0	-44.3	-	-44.1	-	-0.3
-34.0	-72.7	-69.0	-	-	-3.7
-33.0	-73.0	-70.0	-	-	-3.0
-32.0	-73.1	-	-	-70	-3.1
-31.0	-73.2	-	-	-70	-3.2

698.0 - 716.0 MHz					
RSSI (dBm)	Measured Noise (dBm/MHz)	Limit			Margin
		RSSI Dependent	Fixed Booster Limit	TX off	
-80.0	-45.7	-	-45.5	-	-0.1
-75.0	-45.6	-	-45.5	-	-0.1
-34.0	-76.8	-69.0	-	-	-7.8
-33.0	-76.8	-70.0	-	-	-6.8
-32.0	-76.9	-	-	-70	-6.9
-31.0	-76.9	-	-	-70	-6.9

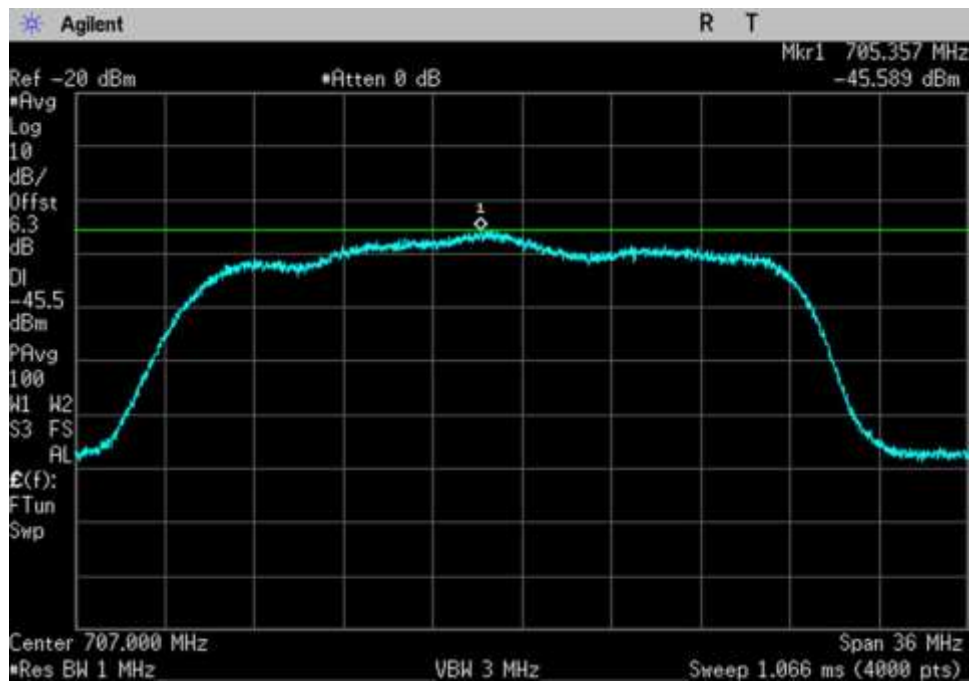
776.0 -787.0 MHz					
RSSI (dBm)	Measured Noise (dBm/MHz)	Limit			Margin
		RSSI Dependent	Fixed Booster Limit	TX off	
-73.0	-44.7	-	-44.6	-	-0.1
-72.0	-44.8	-	-44.6	-	-0.1
-41.0	-70.1	-62.0	-	-	-8.1
-40.0	-70.5	-63.0	-	-	-7.5
-32.0	-79.5	-	-	-70	-9.5
-31.0	-79.5	-	-	-70	-9.5

7.7.2 Variable uplink noise timing

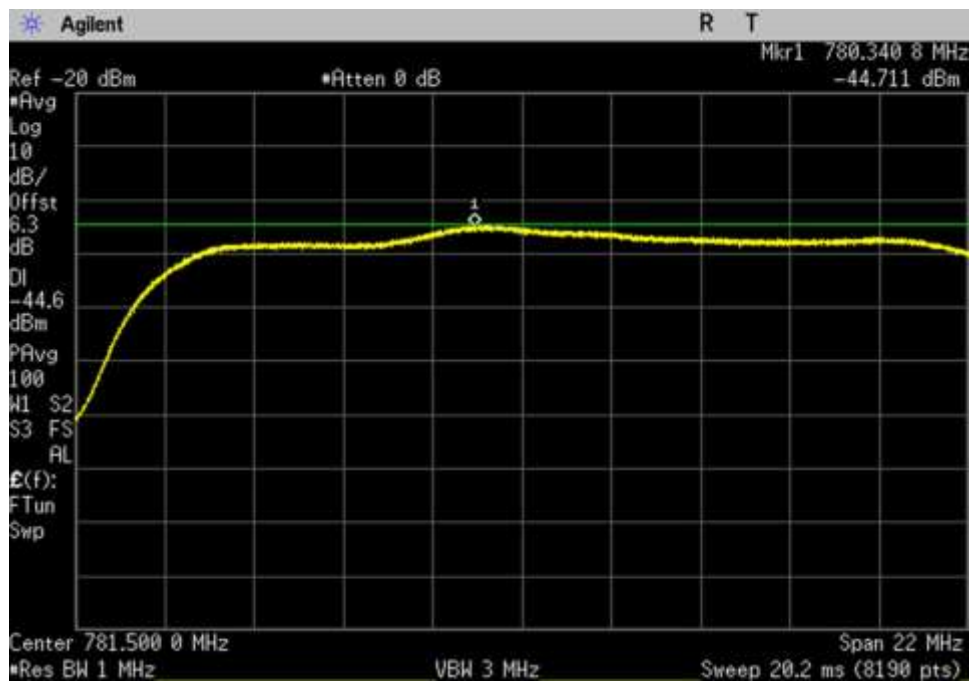
Uplink Noise timing		
Frequency MHz	Measured Sec	Limit sec
UL 1710-1755	0.35	3.00
UL 1850-1915	0.57	3.00
UL 824-849	0.65	3.00
UL 698-716	0.30	3.00
UL776-787	0.15	3.00

7.7.1 Maximum Transmitter Noise Power Level

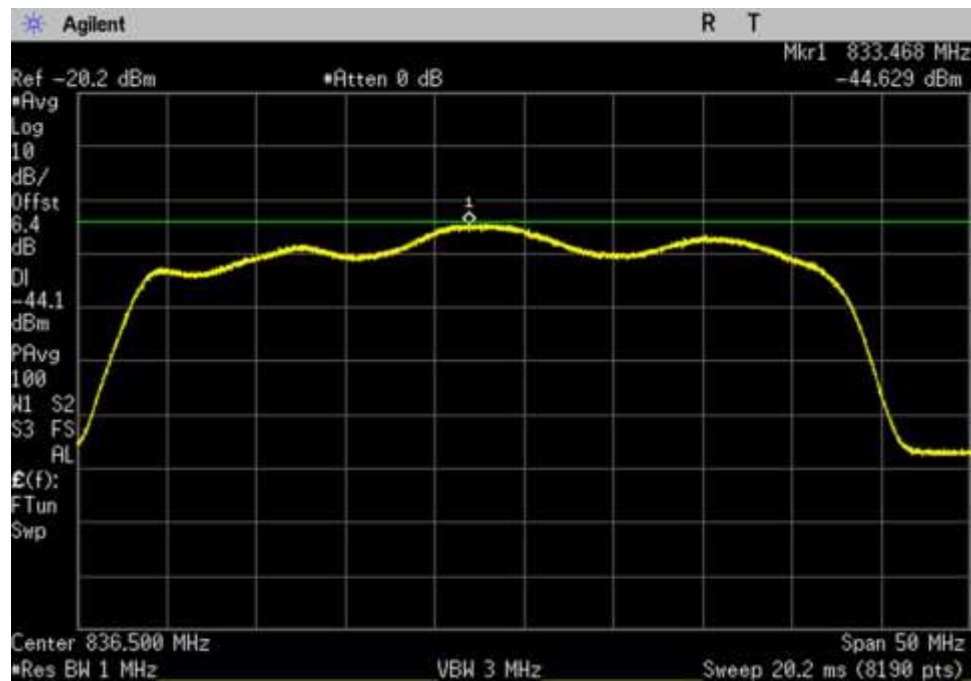
Plots



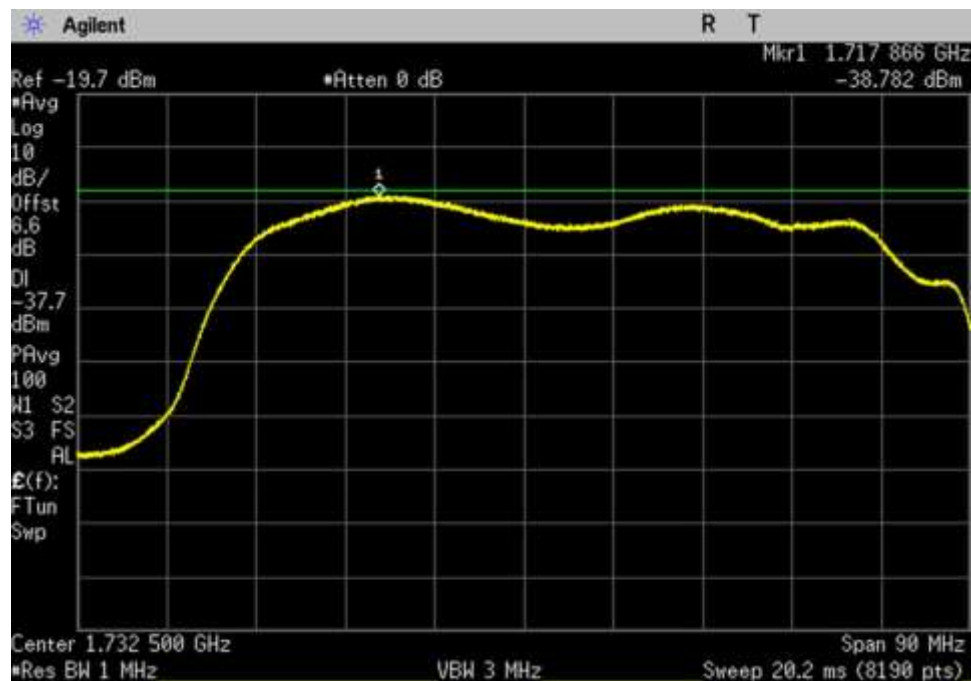
UL_698-716_707MHz



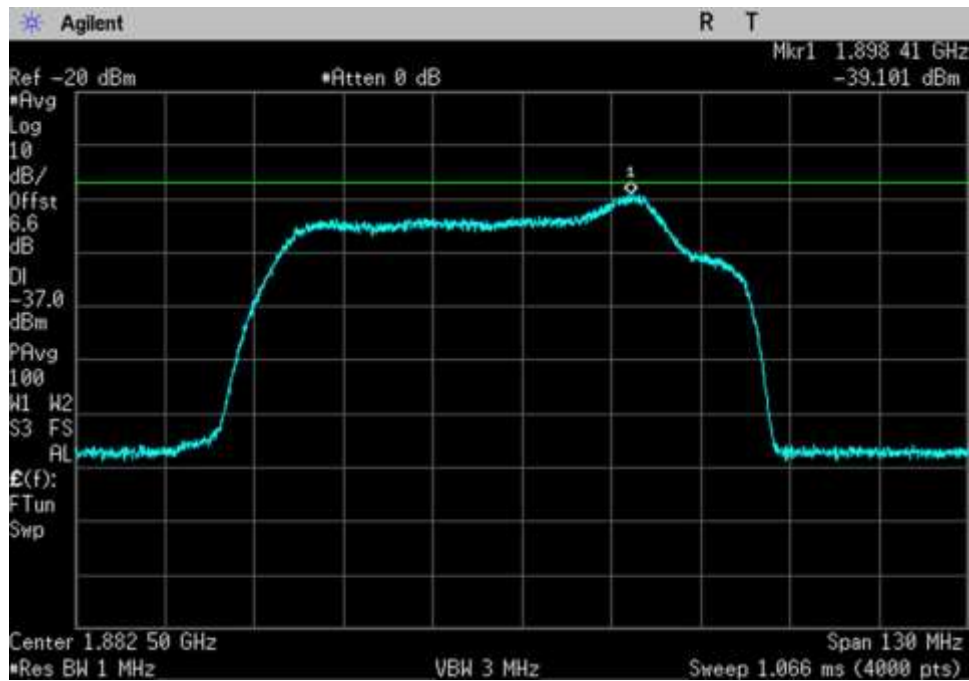
UL_776-787_781.5MHz



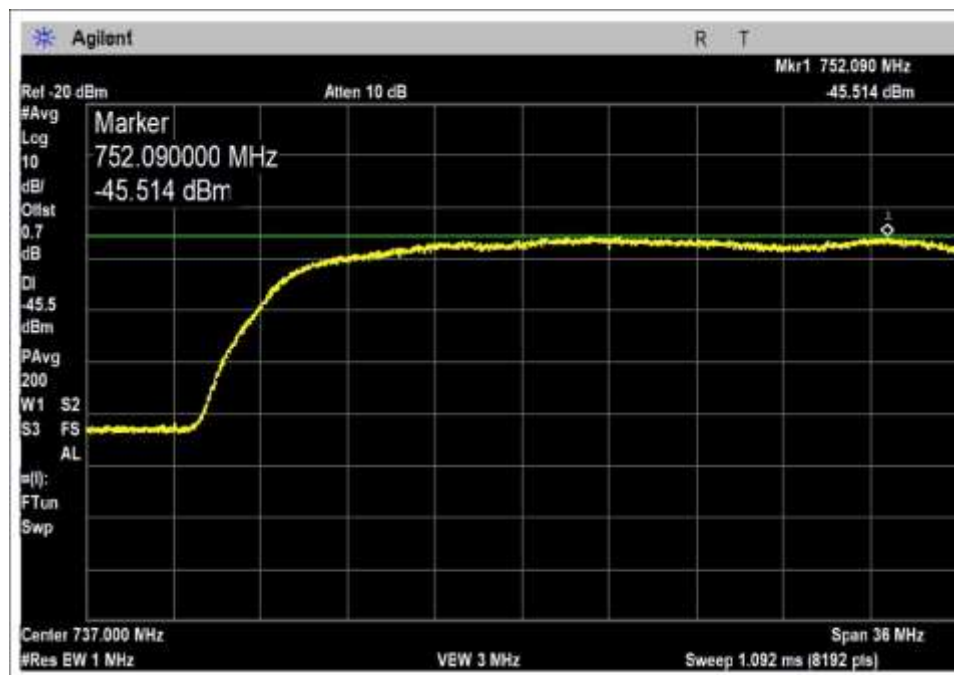
UL_824-849_ 836.5MHz



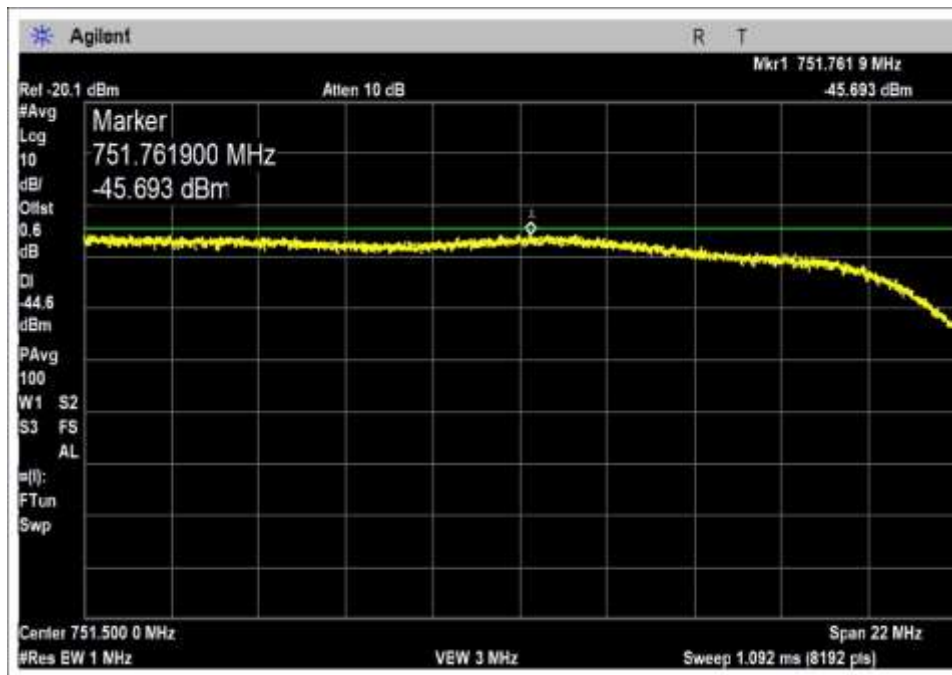
UL_1710-1755_ 1732.5MHz



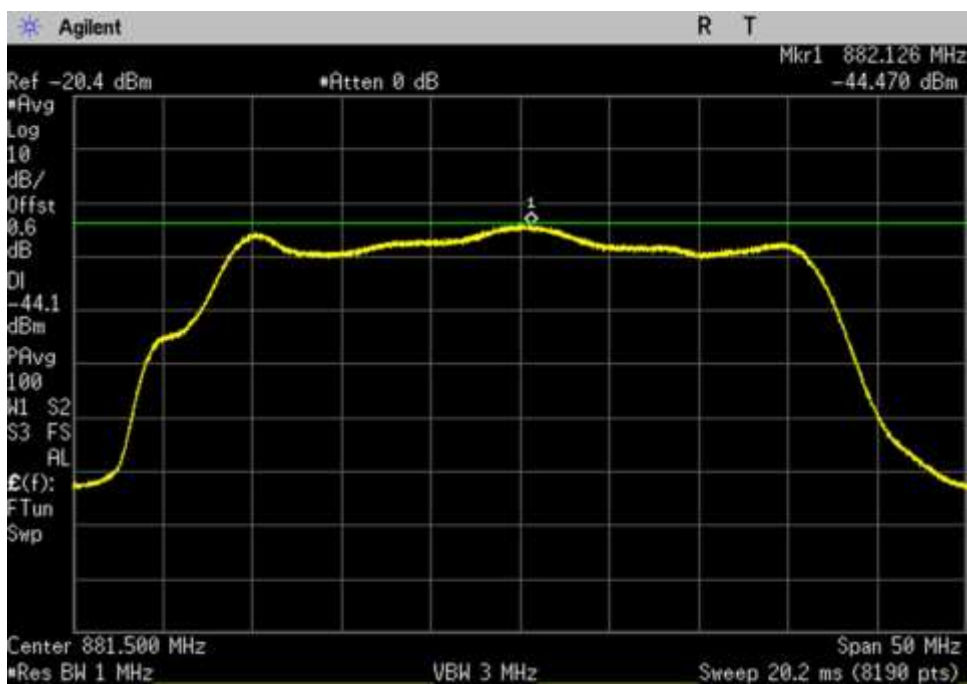
UL_1850-1915_ 1882.5MHz



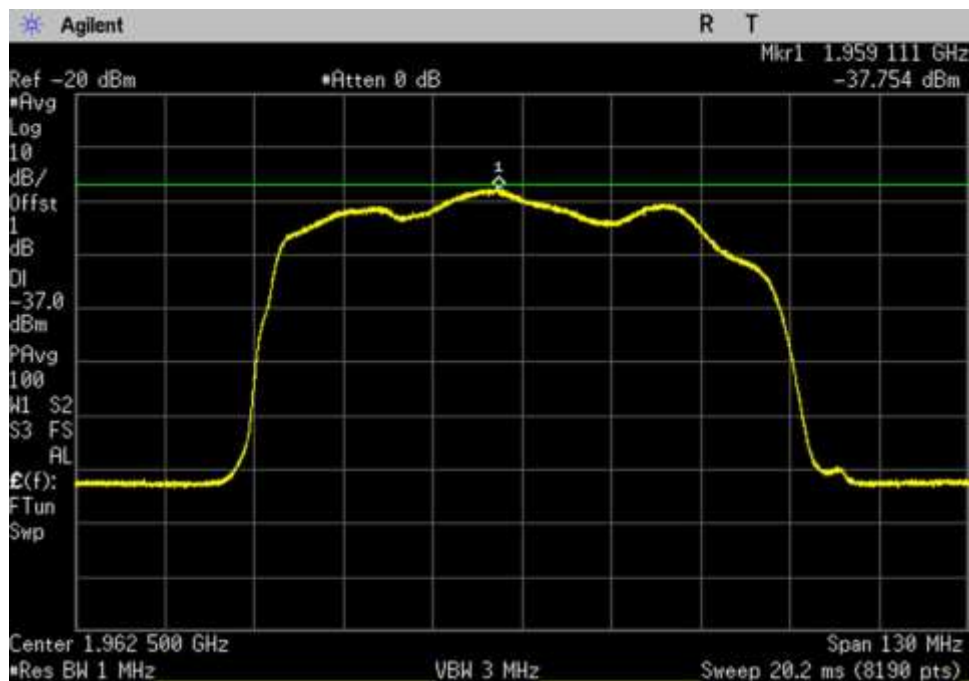
DL_728-746_ 737MHz



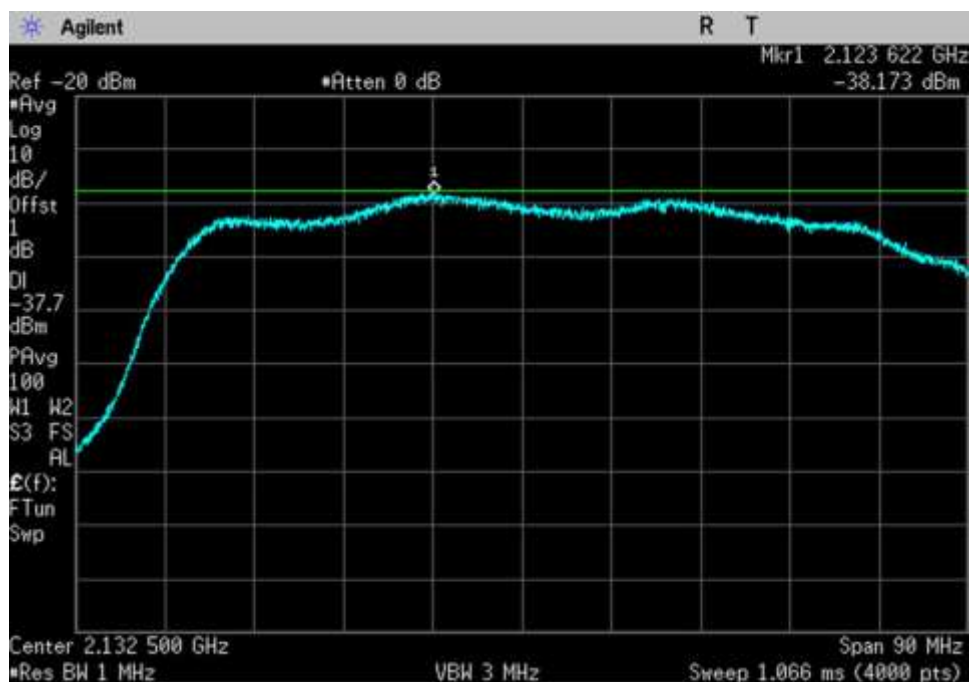
DL_746-757_ 751.5MHz



DL_869-894_ 881.5MHz



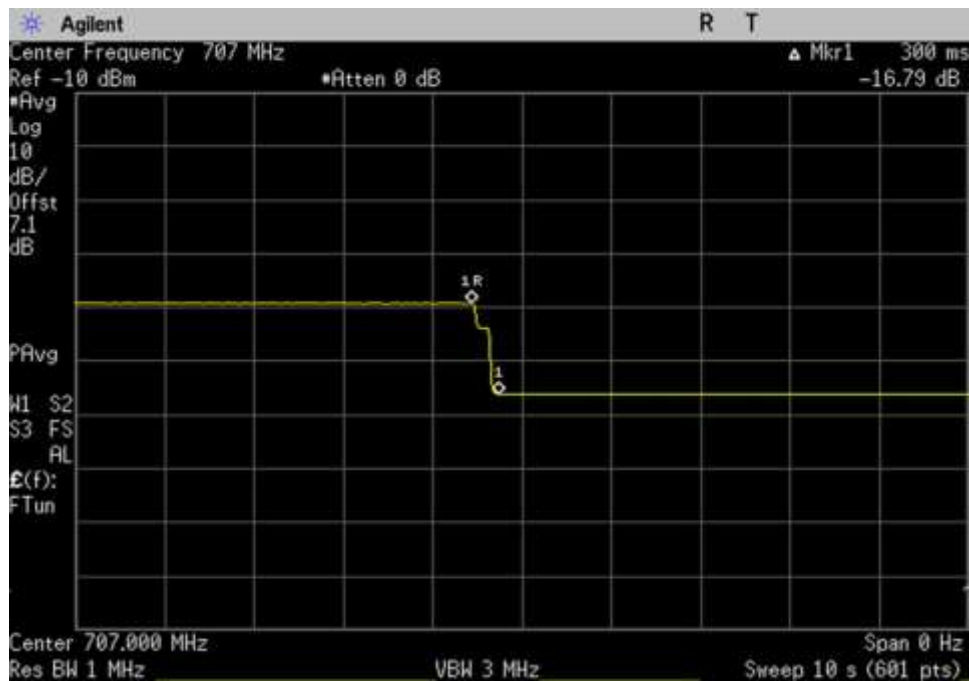
DL_1930-1995_ 1962.5MHz



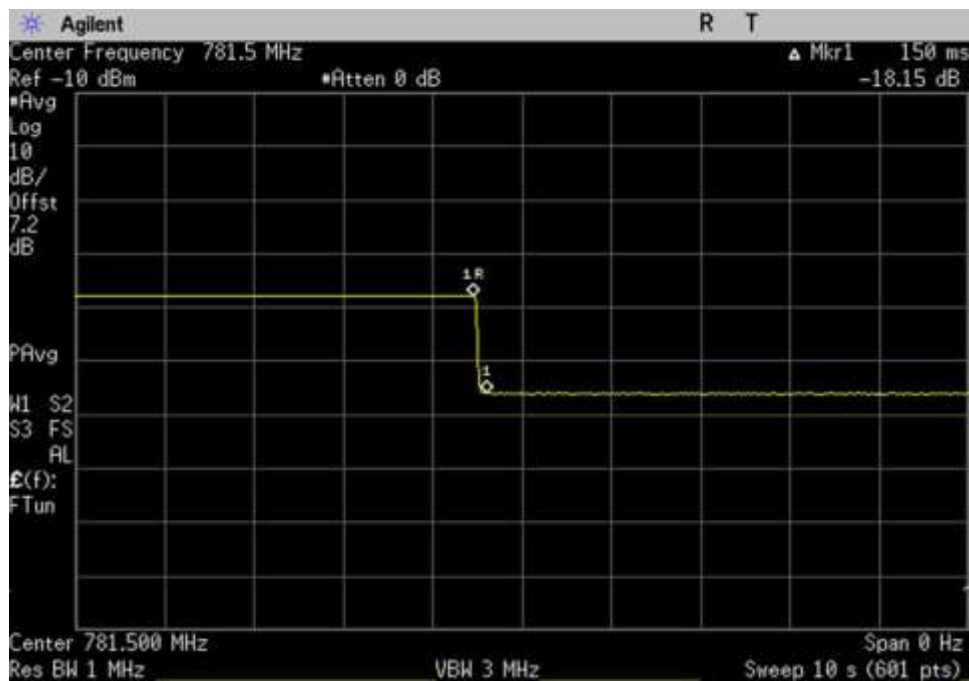
DL_2110-2155_ 2132.5MHz

7.7.2 Variable UL Noise Timing

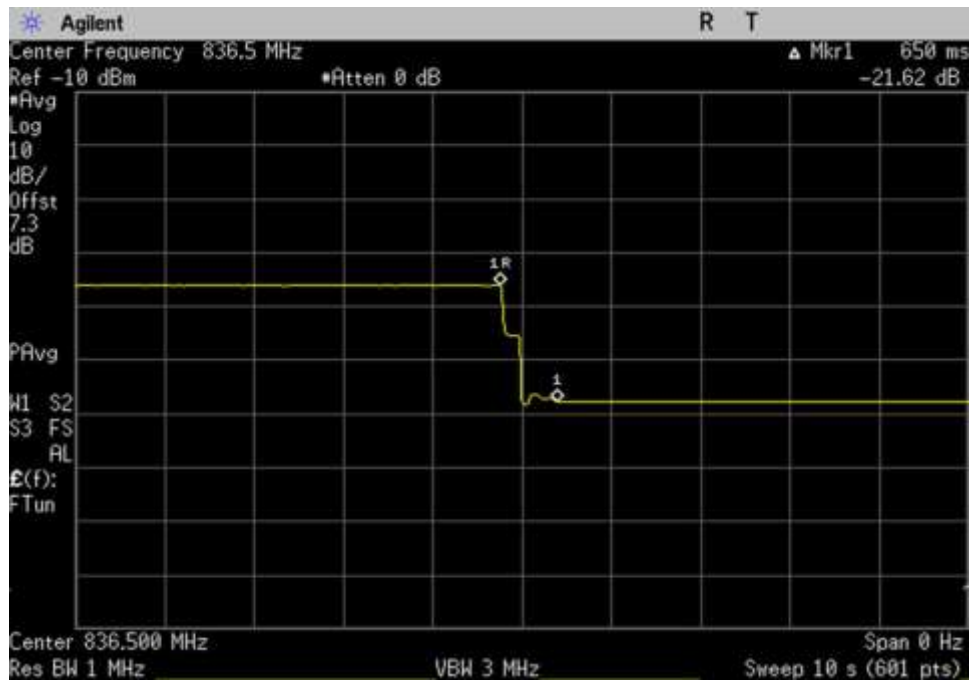
Plots



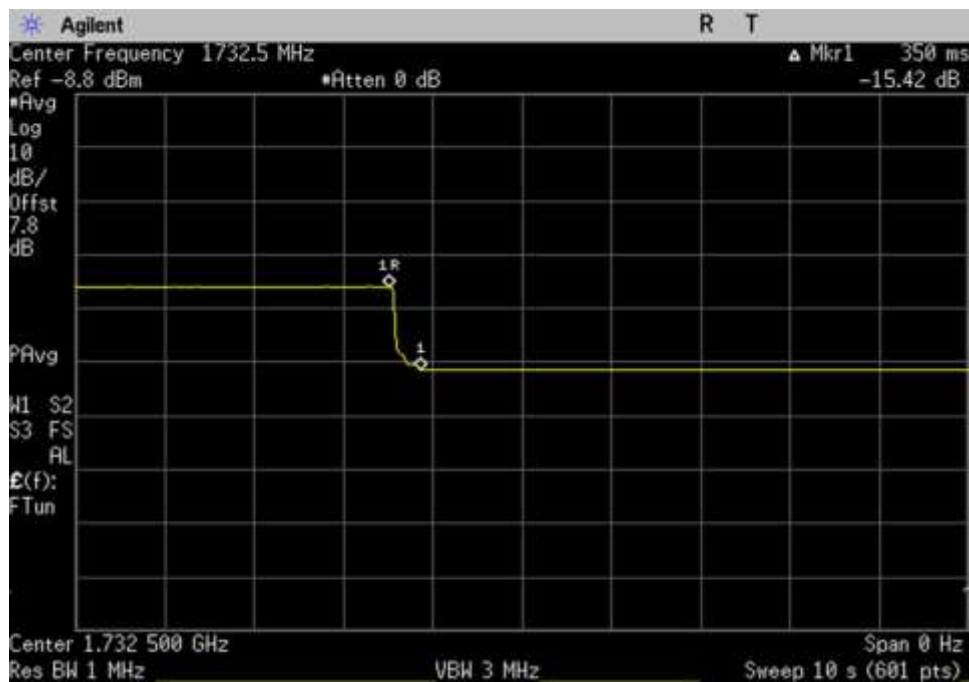
UL_698-716_707MHz_VAR



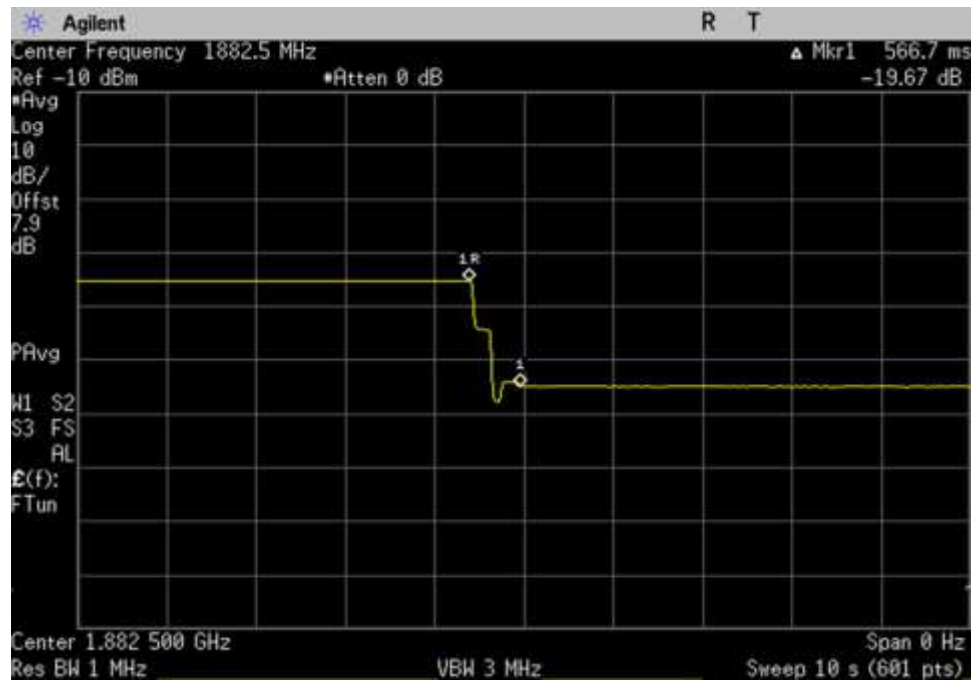
UL_776-787_781.5MHz_VAR



UL_824-849_ 836.5MHz_VAR



UL_1710-1755_ 1732.5MHz_VAR



UL_1850-1915_1882.5MHz_VAR

7.8 Uplink Inactivity

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: Cellphone-Mate, Inc.
 Specification: **7.8 Uplink Inactivity**
 Work Order #: **101748** Date: 10/08/2018
 Test Type: **Conducted Emissions**
 Tested By: **Hieu Song 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: 20.3°C
 Relative Humidity: 35%
 Pressure: 102.5kPa

Modification #1 was in place during testing.

Test Equipment:

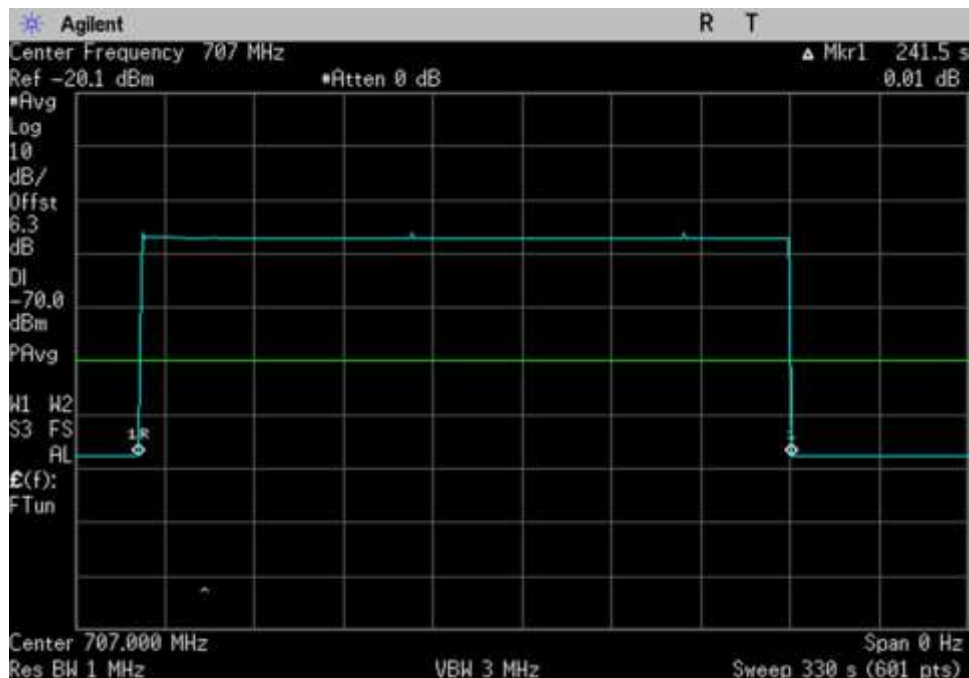
Asset #	Description	Manufacturer	Model	Calibration Date	Cal Due Date
P05411	Attenuator	Weinschel	54A-10	1/19/2018	1/19/2020
P07192	Cable	Astro	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
P07191	Cable	Astro	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
03418	Signal Generator	Agilent	E4438C	6/19/2017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

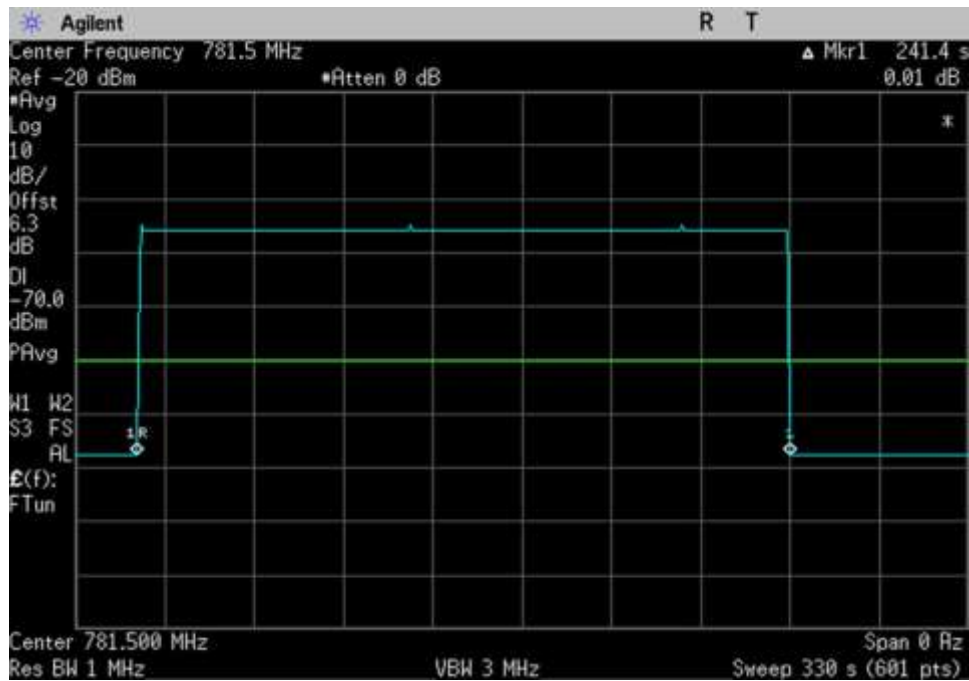
Pass: As demonstrated, when the booster is not serving an active device connection after 5 minutes the uplink noise power does not exceed -70dBm/MHz

Uplink Inactivity		
Frequency MHz	Measured Min	Limit Min
UL1710-1755	4.0	5.0
UL1850-1915	4.0	5.0
UL824-849	4.0	5.0
UL 698-716	4.0	5.0
UL776-787	4.0	5.0

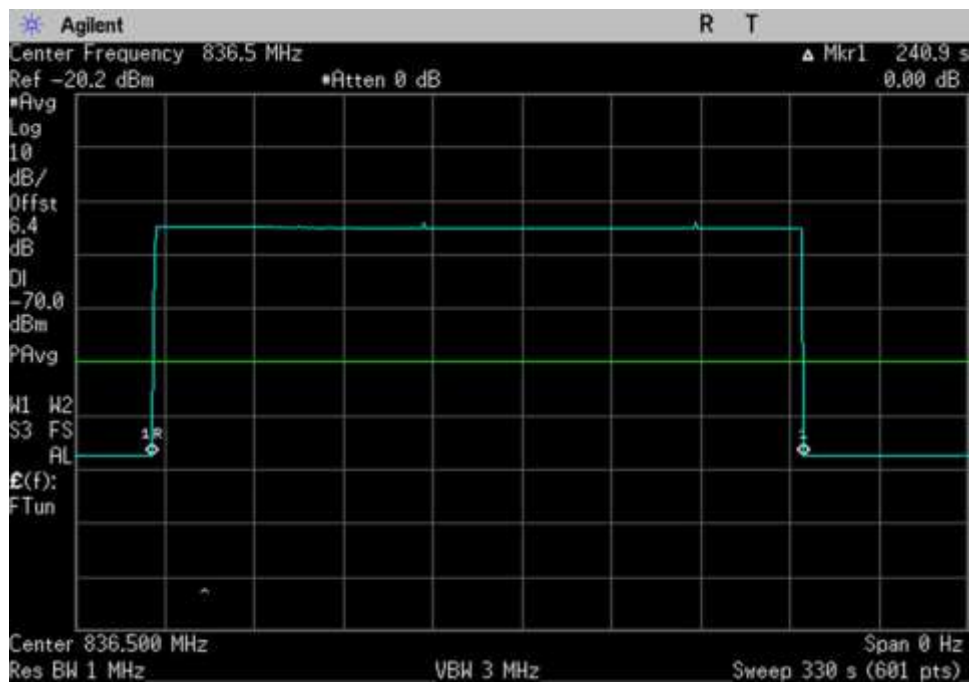
Plots



UL_698-716_707MHz



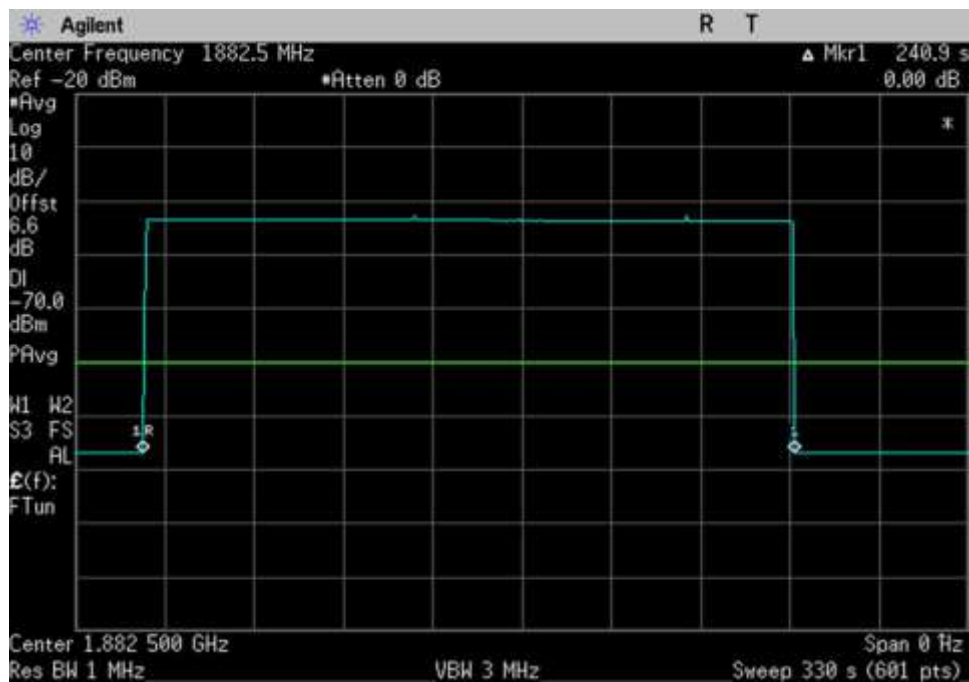
UL_776-787_ 781.5MHz



UL_824-849_ 836.5MHz



UL_1710-1755_ 1732.5MHz



UL_1850-1915_ 1882.5MHz

7.9 Booster Gain Limit

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170
 Customer: Cellphone-Mate, Inc.
 Specification: **7.9 Variable Booster gain(Max Gain / Variable Uplink Gain Timing)**
 Work Order #: **101748**
 Test Type: **Conducted Emissions** Date 10/08/2018
 Tested By: **Hieu Song 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: 20.3°C Relative Humidity: 35% Pressure: 102.5kPa Modification #1 was in place during testing.

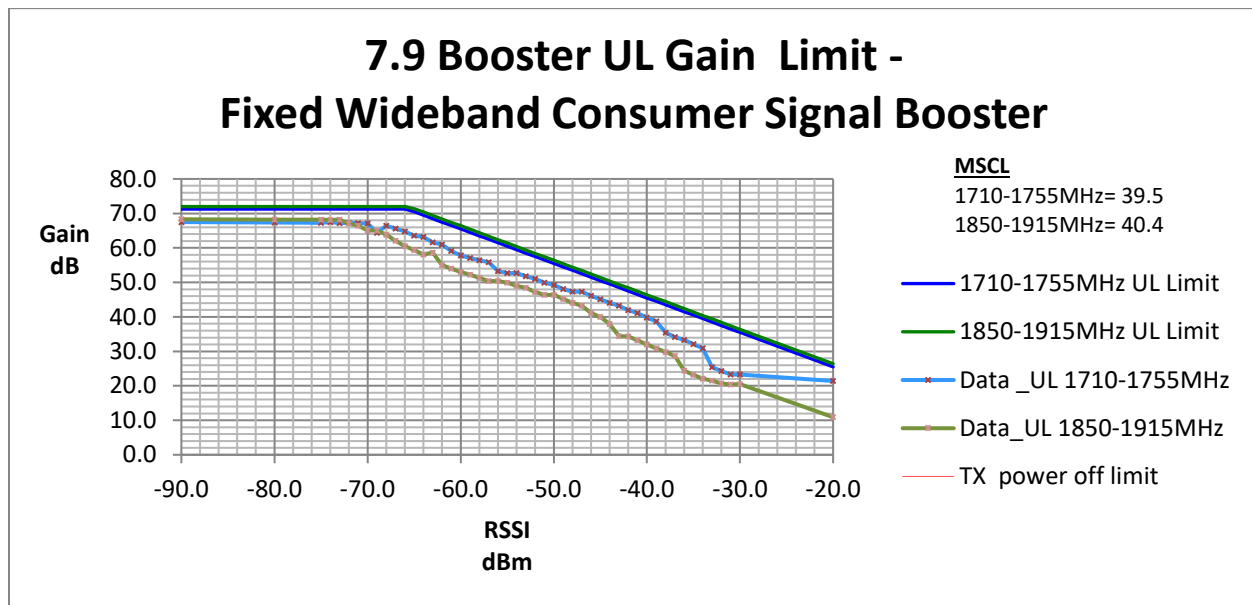
Test Equipment:

Asset #	Description	Manufacturer	Model	Calibration Date	Cal Due Date
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
P06904	Cable	Astrolab	32022-29094K-29094K-36TC	1/4/2018	1/4/2020
C00082	Directional Coupler	MECA Electronics, Inc.	722-10-1.500V	9/18/2017	9/18/2019
C00032	Arbitrary Waveform Generator	Agilent	E4433B	3/19/2018	3/19/2020

Summary of Results

Pass: As demonstrated, computed gains are within the gain limit. All maximum variable uplink gain timings are within 1 second limit.

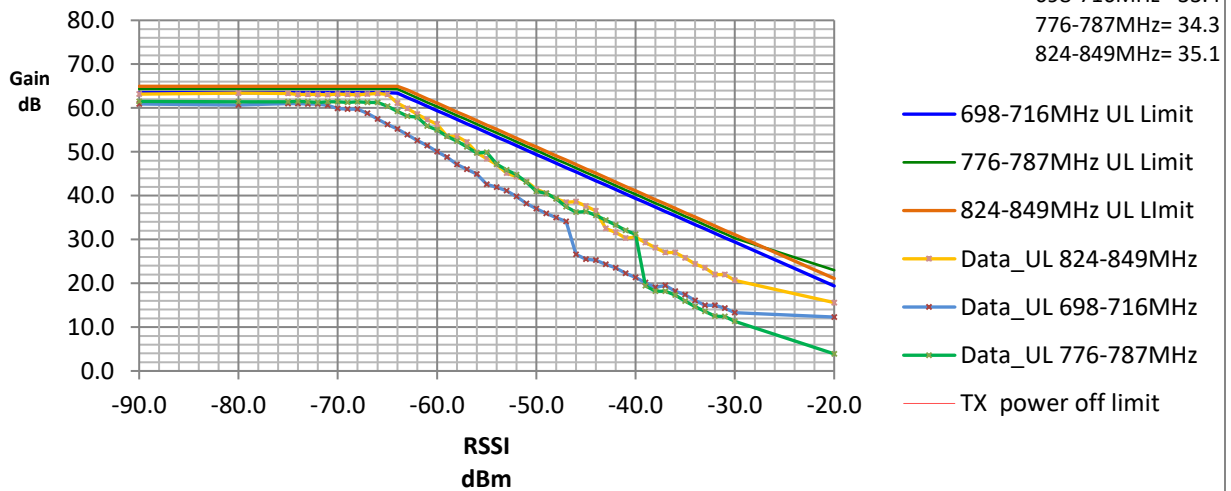
7.9.1 Maximum gain



1710.0 - 1755.0MHz							
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	Limit			Margin
				RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-52.1	15.4	67.5	-	71.3	-	-3.8
-80.0	-52.1	15.3	67.4	-	71.3	-	-3.9
-75.0	-52.1	15.2	67.3	-	71.3	-	-4.0
-64.0	-52.1	11.1	63.2	69.5	-	-	-6.3
-63.0	-52.1	9.5	61.6	68.5	-	-	-6.9
-20.0	-52.1	-30.7	21.4	25.5	-	-	-4.1

1850.0 - 1915.0 MHz							
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	Limit			Margin
				RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-51.1	17.2	68.3	-	72.0	-	-3.7
-80.0	-51.1	17.1	68.2	-	72.0	-	-3.8
-75.0	-51.1	17.1	68.2	-	72.0	-	-3.8
-65.0	-51.1	8.3	59.4	71.4	-	-	-12.0
-64.0	-51.1	7	58.1	70.4	-	-	-12.3
-63.0	-51.1	7.5	58.6	69.4	-	-	-10.8

7.9 Booster UL Gain Limit - Fixed Wideband Consumer Signal Booster



824.0 - 849.0MHz							
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-43.5	19.7	63.2	-	64.9	-	-1.7
-80.0	-43.5	19.9	63.4	-	64.9	-	-1.5
-75.0	-43.5	19.8	63.3	-	64.9	-	-1.6
-63.0	-43.5	16.4	59.9	64.1	-	-	-4.2
-62.0	-43.5	15.1	58.6	63.1	-	-	-4.5
-61.0	-43.5	13.8	57.3	62.1	-	-	-4.8

698.0 - 716.0MHz							
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-41.4	19.5	60.9		63.5		-2.6
-80.0	-41.4	19.3	60.7		63.5		-2.8
-75.0	-41.4	19.6	61.0		63.5		-2.5
-64.0	-41.4	13.8	55.2	63.4			-8.2
-63.0	-41.4	12.5	53.9	62.4			-8.5
-62.0	-41.4	11.2	52.6	61.4			-8.8

776.0 - 787.0 MHz							
				Limit			Margin
RSSI (dBm)	Input (dBm)	Measured Output (dBm)	Measured Gain (dBm)	RSSI Dependent	Fixed Booster Limit	TX off	
-90.0	-41.2	20.3	61.5	-	64.4	-	-2.9
-80.0	-41.2	20.2	61.4	-	64.4	-	-3.0
-75.0	-41.2	20.2	61.4	-	64.4	-	-3.0
-64.0	-41.2	18.0	59.2	64.3	-	-	-5.1
-63.0	-41.2	16.9	58.1	63.3	-	-	-5.2
-62.0	-41.2	16.7	57.9	62.3	-	-	-4.4

7.9.2 Variable uplink gain timing

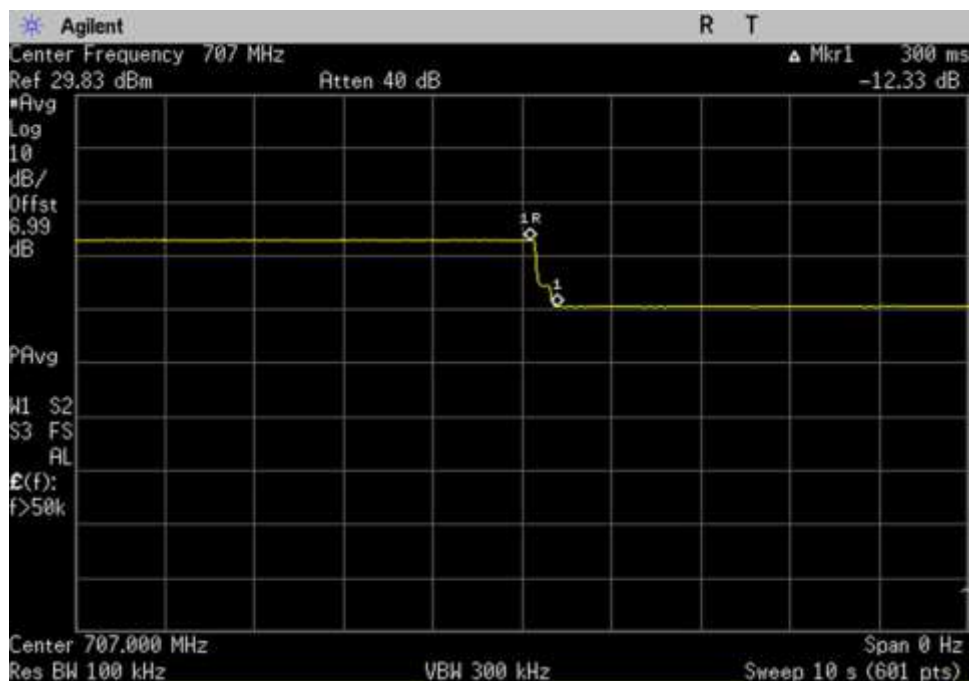
Uplink Gain Timing		
Frequency (MHz)	Measured (Sec)	Limit (Sec)
UL 1710-1755	0.20	3
UL 1850-1915	0.30	3
UL 824-849	0.30	3
UL 698-716	0.30	3
UL 776-787	0.45	3

7.9.1 Maximum Gain

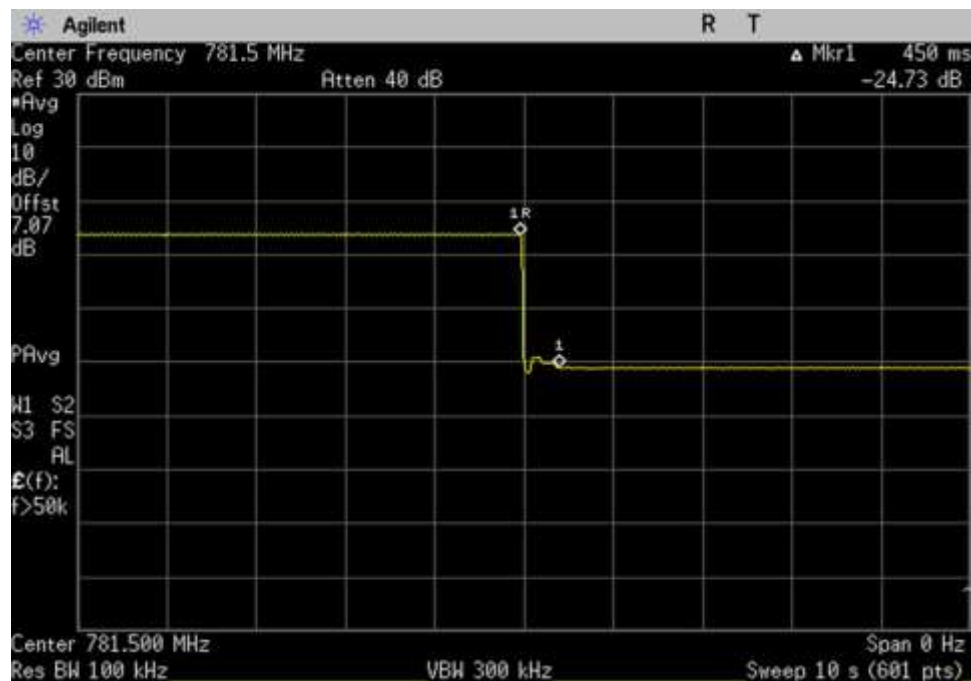
For this subsection, see summary of results of 7.9
7.9.1 Maximum gain

7.9.2 Variable uplink Gain Timing

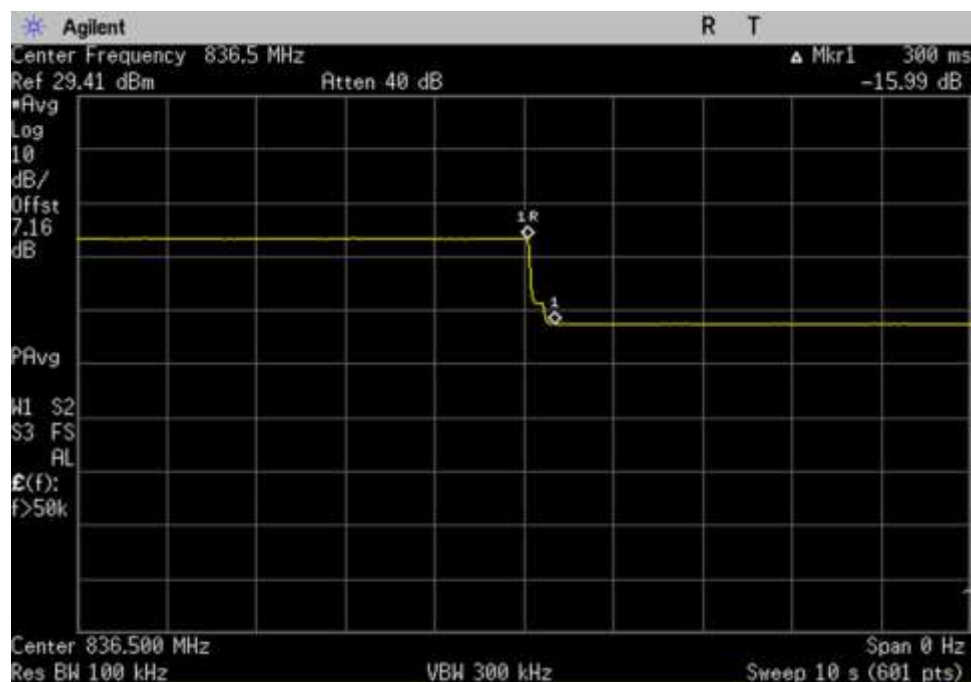
Plots



UL_698-716_ 707MHz_VAR



UL_776-787_781.5MHz_VAR



UL_824-849_836.5MHz_VAR