Cellphone-Mate, Inc.

REVISED TEST REPORT TO 100826-13B

5 Band Mobile Consumer Booster
Model: Fusion-Trek

Tested to The Following Standard:

FCC Part 20.21 / 22H / 24E / 27

Report No.: 100826-13C

Date of issue: August 14, 2018

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

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

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

Testing the Future
CKC LABORATORIES, INC.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Cellphone-Mate, Inc.
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Fremont, CA 94538

Representative: Dennis Findley
Customer Reference Number: CKC01232018

REPORT PREPARED BY:

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

Project Number: 100826

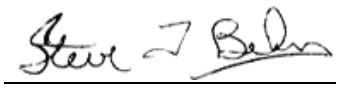
DATE OF EQUIPMENT RECEIPT: January 29, 2018
DATE(S) OF TESTING: January 29, 2018 – February 8, 2018 and September 4, 2018

Revision History

Original: Testing of the 5 Band Mobile Consumer Booster Model: Fusion-Trek to FCC Part 20.21 / 22H / 24E / 27.
Revision A: To add plot data for Section 7.6, revised the Section 7.9 Summary Booster Gain Limit plot titles and corrected the Limit Sec table for Section 7.9.2.
Revision B: Corrected Section 7.11, Table 7.11.3 UL1710-1755 +3dB Pk-Pk Difference dB value by adding an asterisk.
Revision C: Original testing of section 7.4 was tested at the wrong frequency. Data is being replaced with new test results at the proper frequency. Removed the Supplemental Information from the end of the report, as it was not applicable. Updated the references to FCC Part 22H and 24E by adding the letter reference.

Report Authorization

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



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

Test Facility Information

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

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

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.11
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 v04r01, October 27, 2017

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	NA	Pass
7.2.2 a) - k)	Maximum Power Measurement Procedure	2.1046/20.21(e)(8)(i)(D)	Power Limit	NA	Pass
7.3 a) - d)	Maximum Booster Gain Computation	20.21(e)(8)(i)(B)	Bidirectional Capabilities	NA	Pass
7.4 a) - n)	Intermodulation Product	20.21(e)(8)(i)(F)	Intermodulation Limit	NA	Pass
7.5 a) - n)	Out of Band Emissions	20.21(e)(8)(i)(E)	Out of Band Emission	NA	Pass
7.6 a) - e)	Conducted Spurious Emission	2.1051/22H/24E/27	Spurious emission	NA	Pass
7.7.1 a) - g) 7.7.1 h) - n) 7.7.2 a) - g)	Noise Limit Procedure Variable Noise Variable Noise Timing	20.21(e)(8)(i)(A)(2)(i) 20.21(e)(8)(i)(A)(1) 20.21(e)(8)(i)(H)	Noise Limits Transmit Power Off Mode	NA	Pass
7.8 a) - l)	Uplink inactivity	20.21(e)(8)(i)(I)	Uplink Inactivity	NA	Pass

NA = Not Applicable

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	NA	Pass
7.10.a) - j)	Occupied Band Width	2.1049/22H/24E/27	Occupied Band Width	NA	Pass
7.11.2 a) - r) 7.11.3 a) - h) 7.11.4 a) - h) (alternate to 7.11.3)	Anti-Oscillation	20.21(e)(8)(ii)(A)	Anti-Oscillation	NA	Pass
7.12a) - f)	Radiated Spurious Emission	2.1053/ 22H/24E/27	Spurious Emission	NA	Pass
7.13 a) - c)	Spectrum Block Filter	NA	NA	NA	NA1

NA = Not Applicable

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

Modifications During Testing

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

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

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

Summary of Conditions
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 Mobile Consumer Booster	Cellphone-Mate, Inc.	Fusion-Trek	002

Support Equipment:

Device	Manufacturer	Model #	S/N
Power Supply	SureCall	G101U-12100B-1	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Equipment	Zone Enhancer
Operating Frequency Range:	UL: 824-849MHz DL: 869-894MHz UL: 1850-1915MHz DL: 1930-1995MHz UL: 1710-1755MHz, 698-716MHz, 777-787MHz DL: 2110-2155MHz, 728-746MHz, 746-756MHz
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:	UL: 50 Ohm/ UFL DL: 50 Ohm/ SME
Nominal Input Voltage:	12VDC
Firmware / Software used for Test:	2.0

FCC PART 20.21/22H/24E/27

General Test Setup

Summary of Conditions
General test condition. The equipment under test (EUT) is a Mobile Wideband Consumer Booster with direct contact coupling (cradle-type) antenna. The EUT is placed on the test bench. Evaluation performed at the Outside (Donor) and Inside (Server) antenna port. The EUT Server port is a SME type connector and 50-ohm impedance. The EUT Donor port is type UFL connector and 50-ohm impedance. Part 22 UL: 824-849MHz DL: 869-894MHz Part 24 UL: 1850-1915MHz DL: 1930-1995MHz Part 27 UL: 1710-1755MHz, 698-716MHz, 776-787MHz DL: 2110-2155MHz, 728-746MHz, 746-757MHz Test procedure: The test was performed in accordance with the FCC document: 935210 D03 Signal Booster Measurements v04r01, dated October 27, 2017. Firmware: 2.0 Test environment conditions: Temperature: 21 -25°C Relative Humidity: 41-45 % Pressure: 100kPa Device is powered by a support 12V AC/DC power supply during testing.

7.1 Authorized Frequency Band Verification

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510 249 1170		
Customer:	**Cellphone-Mate, Inc.**		
Specification:	7.1 Band verification		
Work Order #:	**100826**	Date:	1/29/2018
Test Type:	**Conducted Emissions**	Time:	10:04:00 AM
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.11		12VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

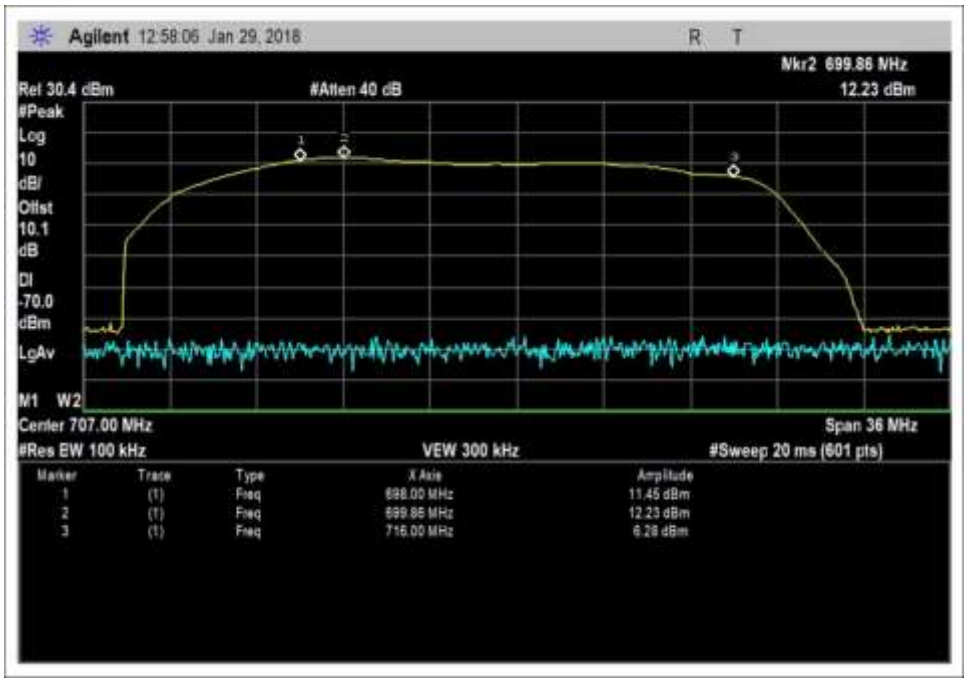
Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
P05411	Attenuator	54A-10	1/19/2018	1/19/2020
03470	Spectrum Analyzer	E4440A	1/3/2018	1/3/2020
P07191	Cable	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
P07192	Cable	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
03418	Signal Generator	E4438C	6/19/2017	6/19/2019

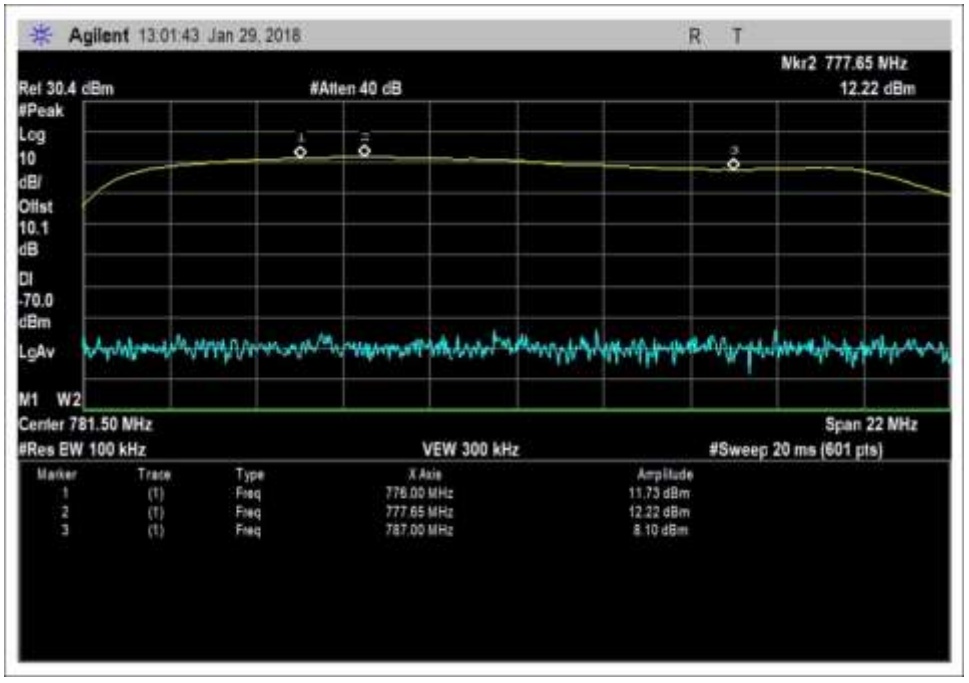
Summary of Results

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

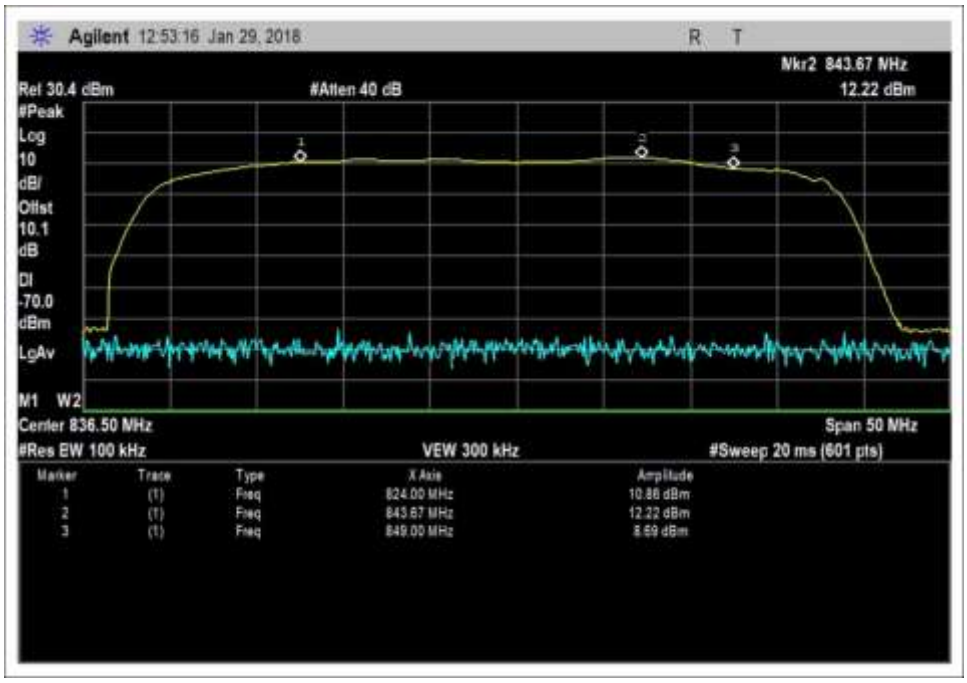
Plots



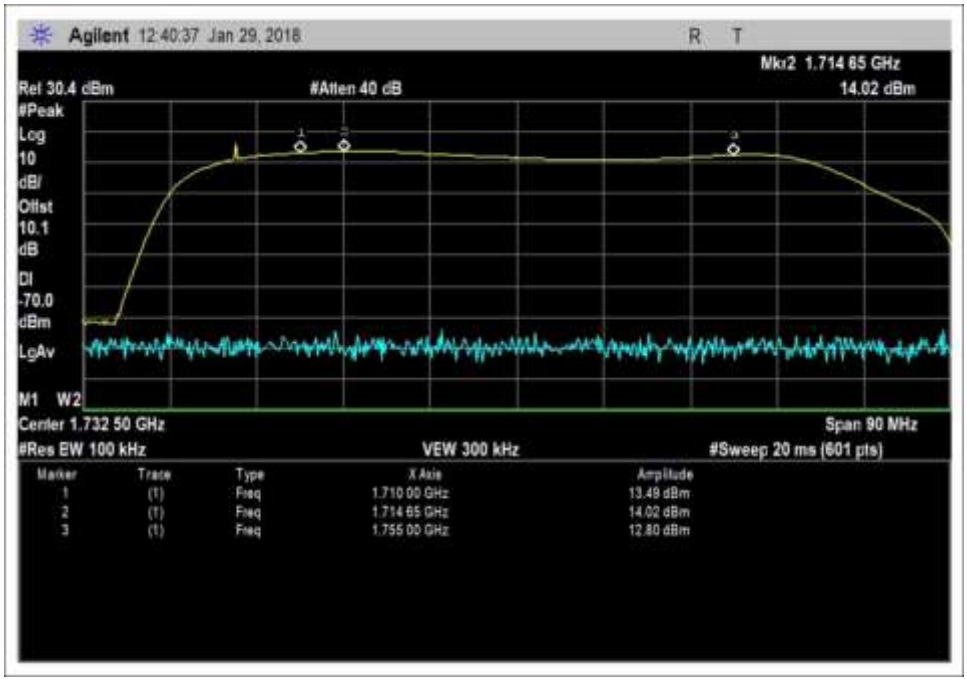
UL_698-716MHz



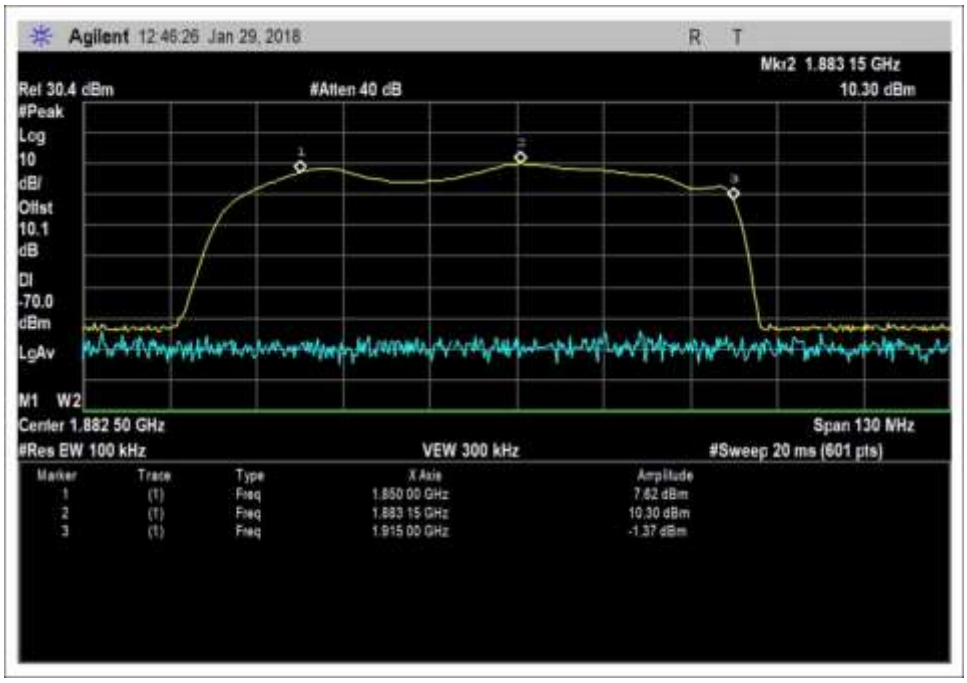
UL_776-787MHz



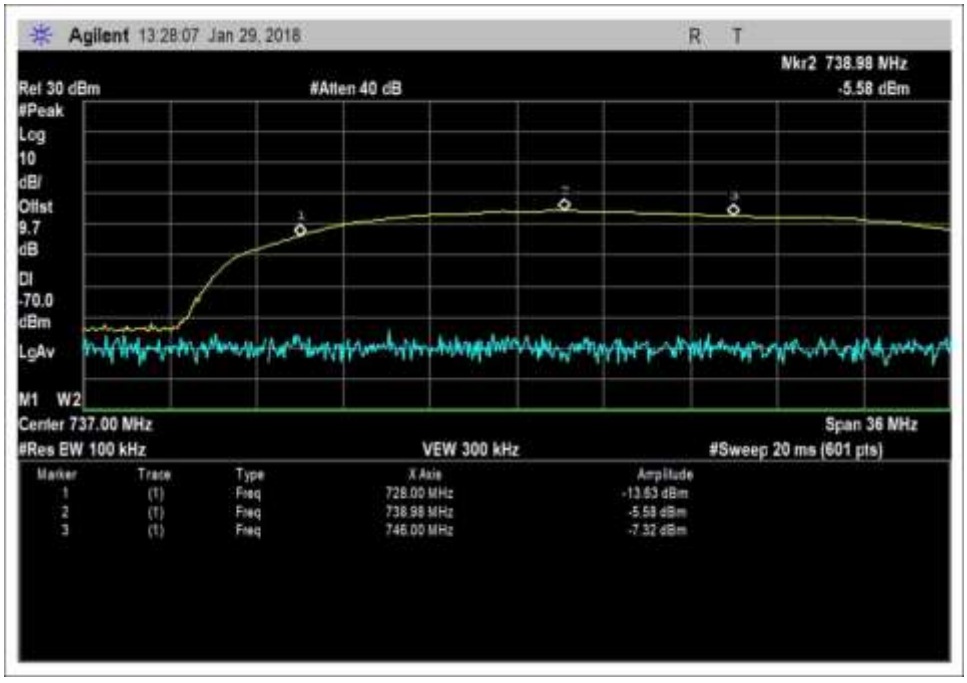
UL_ 824-849MHz



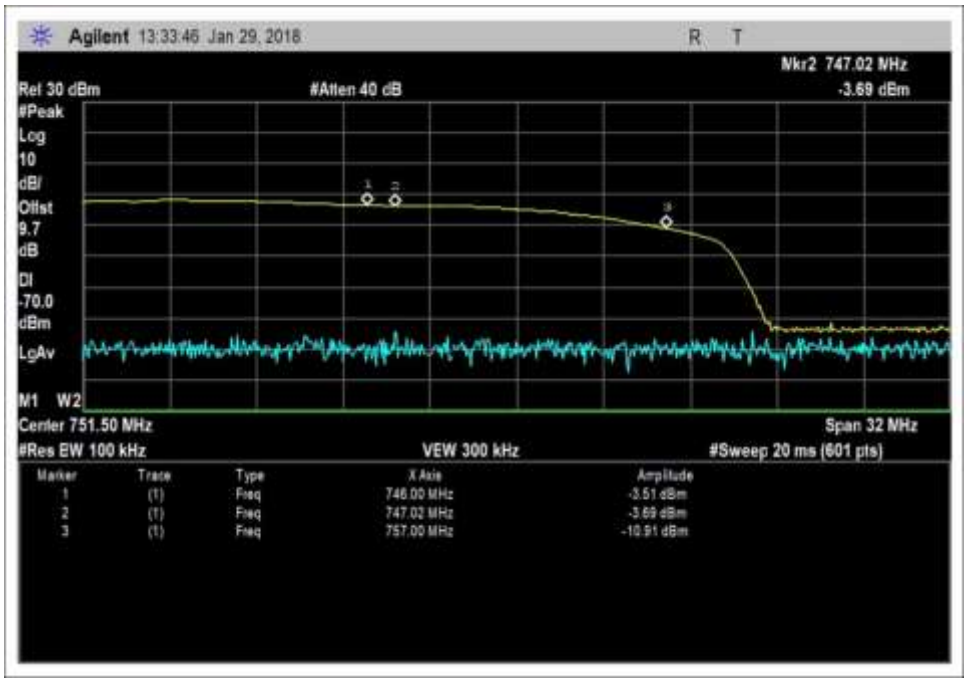
UL_ 1710- 1755MHz



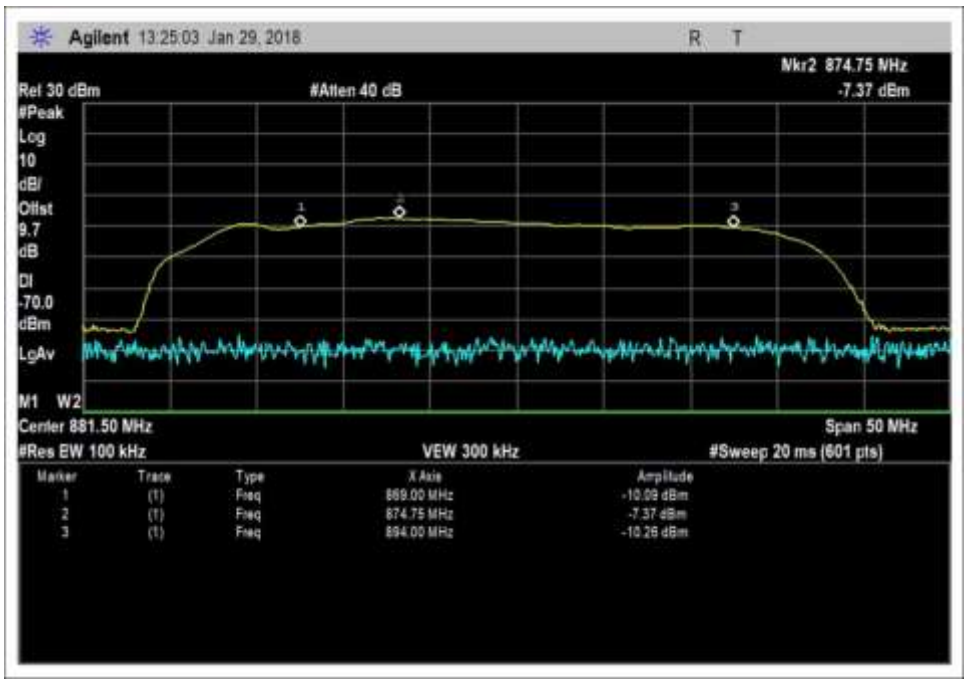
UL_ 1850-1915MHz



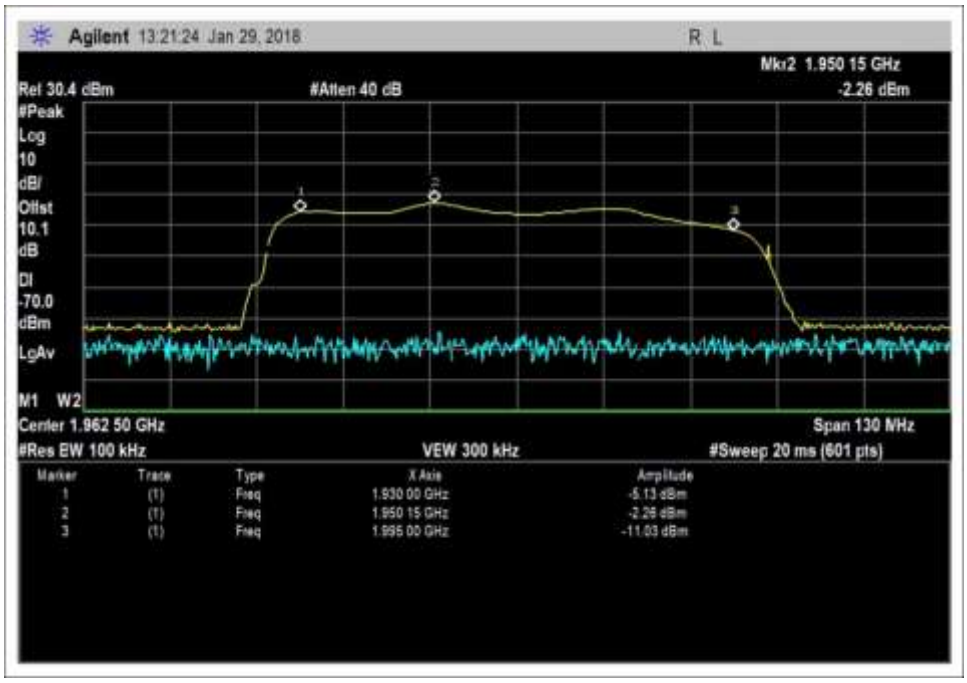
DL_728-749



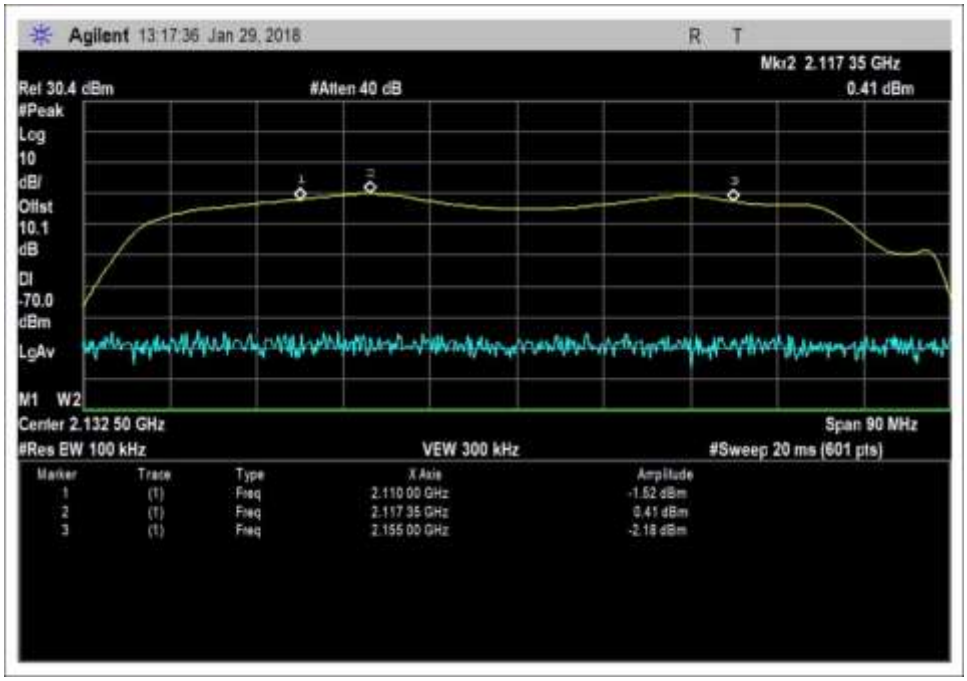
DL_746-757MHz



DL_869-894MHz



DL_1930-1995MHz



DL_2110-2155MHz

7.2 Maximum Power Measurement / 7.3 Maximum Booster Gain

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510 249 1170		
Customer:	**Cellphone-Mate, Inc.**		
Specification:	**7.2 Maximum Power Measurement** **7.3 Maximum Booster Gain**		
Work Order #:	**100826**	Date:	1/29/2018
Test Type:	**Conducted Emissions**	Time:	1:44:00 PM
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.11		12VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
P05411	Attenuator	54A-10	1/19/2018	1/19/2020
03470	Spectrum Analyzer	E4440A	1/3/2018	1/3/2020
P07191	Cable	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
P07192	Cable	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
03418	Signal Generator	E4438C	6/19/2017	6/19/2019

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)
UL1710-1755	0.4	20.8	20.4	0.2	18.8	18.6
UL1850-1915	2.2	**23.6**	21.4	1.6	21.0	19.4
UL824-894	1.4	21.4	20.0	-2.2	17.7	19.9
UL 698-716	0.3	21.4	21.1	-1.1	19.6	20.7
UL776-787	-0.9	20.4	21.3	-1.2	19.9	21.1
DL2110-2155	-18.4	2.3	20.7	-20.7	0.8	21.5
DL1930-1995	-19.8	2.2	22.0	-20.8	0.8	21.6
DL869-894	-19.6	1.5	21.1	-19.4	1.4	20.8
DL:728-746	-17.5	**3.7**	21.2	-18.4	2.4	20.8
DL 746-757	-16.9	1.9	18.8	-18.0	0.8	18.8

Pulse GSM					Conducted	Conducted and EIRP
Frequency (MHz)	Output Power (dBm)	*Ant Gain- (dBi)	Cable loss (dB)	EIRP (dBm)	Limit Min (dBm)	Limit Max (dBm)
UL1710-1755	20.8	3.0	0.0	23.8	17	30
UL1850-1915	23.6	2.0	0.0	**25.6**	17	30
UL824-894	21.4	2.0	0.0	23.4	17	30
UL 698-716	21.4	0.5	0.0	21.9	17	30
UL776-787	20.4	0.5	0.0	20.9	17	30
DL2110-2155	2.3	3.2	6.2	-0.7	NA	17
DL1930-1995	2.2	3.0	6.0	-0.8	NA	17
DL869-894	1.5	-0.3	3.7	-2.5	NA	17
DL:728-746	3.7	-0.1	3.4	**0.2**	NA	17
DL 746-757	1.9	-0.1	3.4	-1.6	NA	17

4.1MHz AWGN					Conducted	Conducted and EIRP
Frequency (MHz)	Output Power (dBm)	*Ant Gain- (dBi)	Cable loss (dB)	EIRP (dBm)	Limit Min (dBm)	Limit Max (dBm)
UL1710-1755	18.8	3.0	0.0	21.8	17	30
UL1850-1915	21.0	2.0	0.0	23.0	17	30
UL824-894	17.7	2.0	0.0	19.7	17	30
UL 698-716	19.6	0.5	0.0	20.1	17	30
UL776-787	19.9	0.5	0.0	20.4	17	30
DL2110-2155	0.8	3.2	6.2	-2.2	NA	17
DL1930-1995	0.8	3.0	6.0	-2.2	NA	17
DL869-894	1.4	-0.3	3.7	-2.6	NA	17
DL:728-746	2.4	-0.1	3.4	-1.1	NA	17
DL 746-757	0.8	-0.1	3.4	-2.7	NA	17

* Antenna gain and cable losses indicated from the antenna kitting:

UL Ant kit	WPANT10104-S3A (SC325W-WP)
DL Ant Kit	SC128W, SC174-15FT

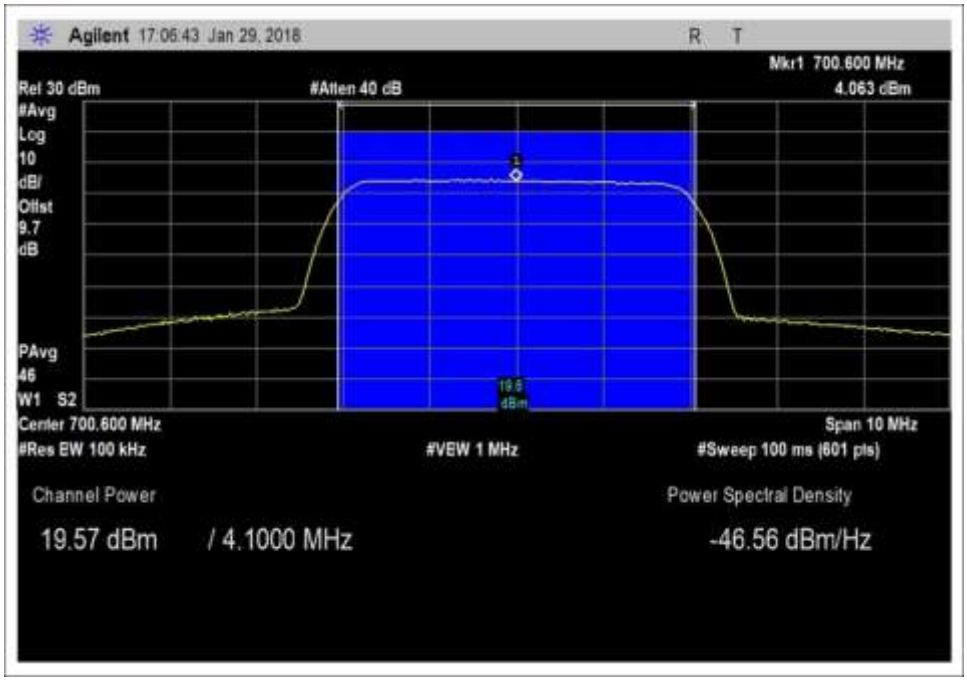
Section 5.5 power						
	Pulse GSM			4.1 MHz AWGN		
Frequency (MHz)	Input (dBm)	Output (dBm)	Gain (dB)	Input (dBm)	Output (dBm)	Gain (dB)
UL1710-1755	1.9	20.4	18.5	1.6	18.9	17.3
UL1850-1915	3.6	23.3	19.7	2.8	21.1	18.3
UL824-894	3.3	21.5	18.2	-0.5	17.6	18.1
UL 698-716	2.0	21.3	19.3	0.1	18.9	18.8
UL776-787	1.5	20.4	18.9	2.9	19.9	17.0
DL2110-2155	-10.8	1.9	12.7	-12.4	0.0	12.4
DL1930-1995	-11.2	1.6	12.8	-12.3	-0.1	12.2
DL869-894	-9.6	1.2	10.8	-9.5	1.1	10.6
DL:728-746	-7.5	3.1	10.6	-8.5	2.1	10.6
DL 746-757	-6.6	1.8	8.4	-7.9	0.8	8.7

Note: The booster went into Transmitter off mode at Max input power in accordance with section 5.5. Results presented on the above table are at 1 dB below the Transmit off RF input level.

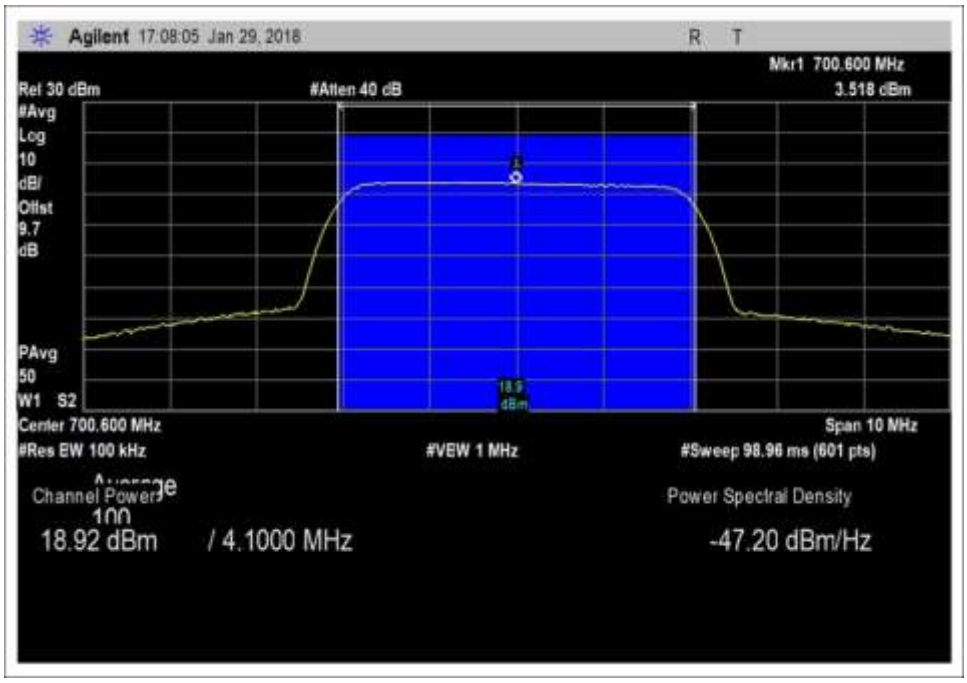
UL gain vs DL gain	Pulse GSM (dB)	4.1MHz AWGN (dB)	Limit (dB)
UL gain vs DL gain 1710/2110	-0.3	-2.9	9.0
UL gain vs DL gain 1850/1930	-0.6	-2.2	9.0
UL gain vs DL gain 824/869	-1.1	-0.9	9.0
UL gain vs DL gain 698/728	-0.1	-0.1	9.0
UL gain vs DL gain 776/746	2.5	2.3	9.0

Plots

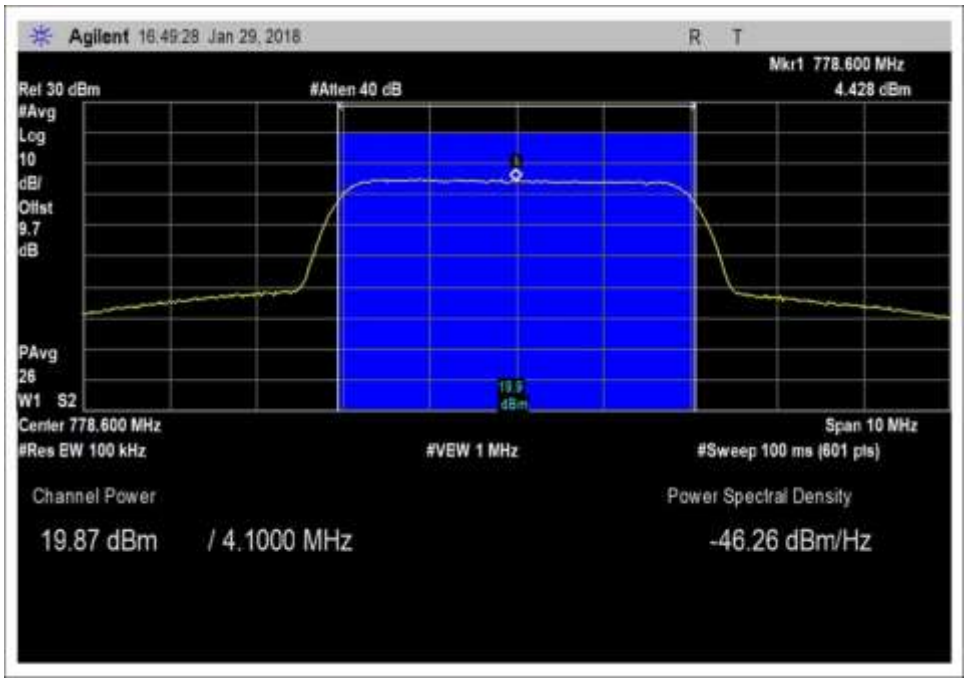
AWGN



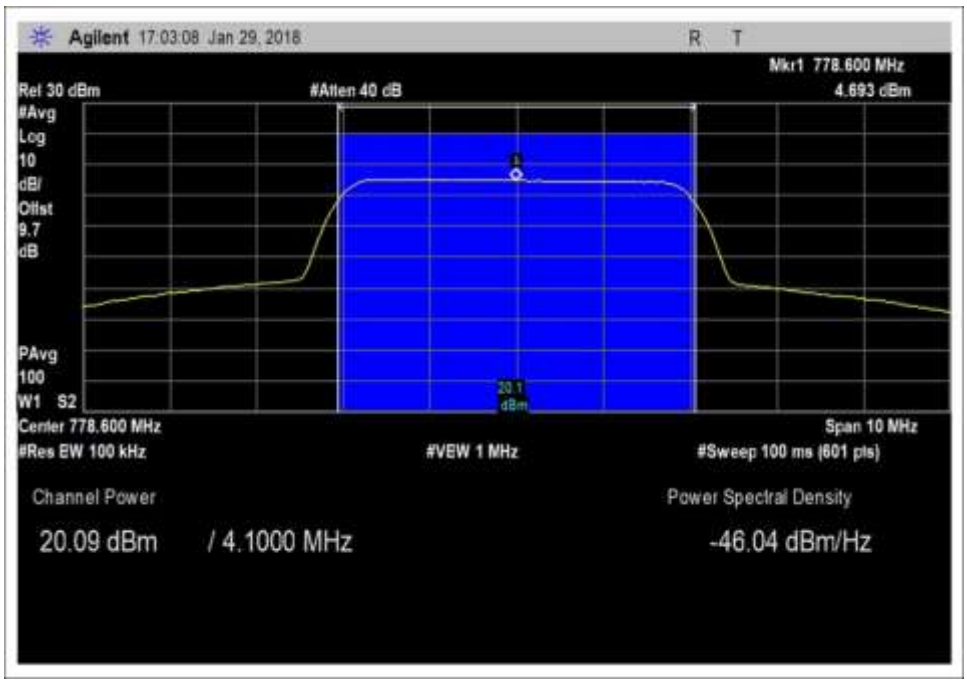
UL_698-716MHz_AWGN



UL_698-716MHz_AWGN_max



UL_776-787MHz_AWGN



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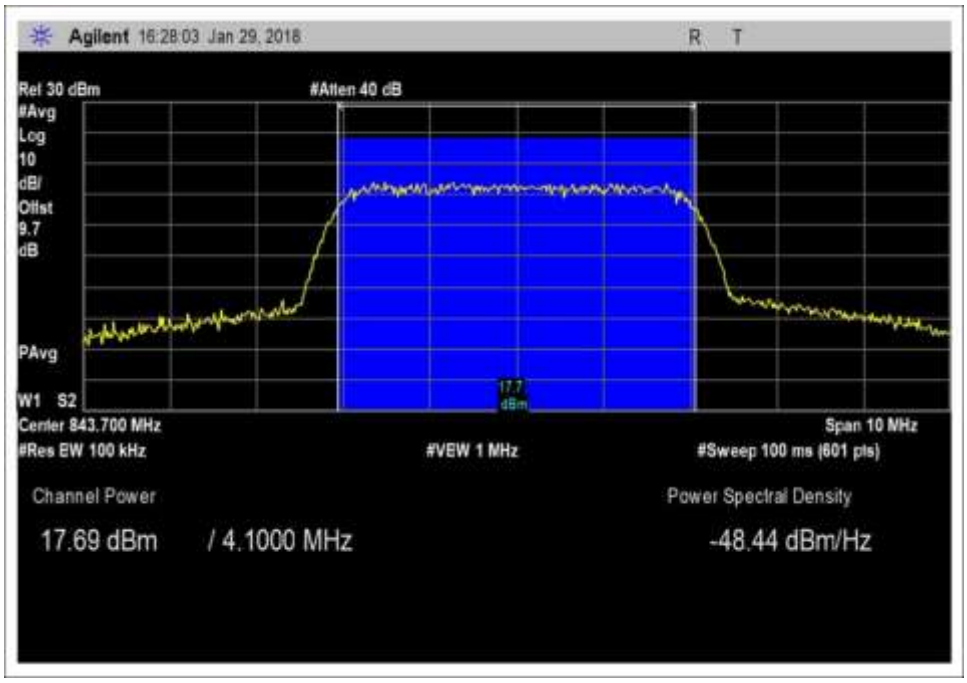
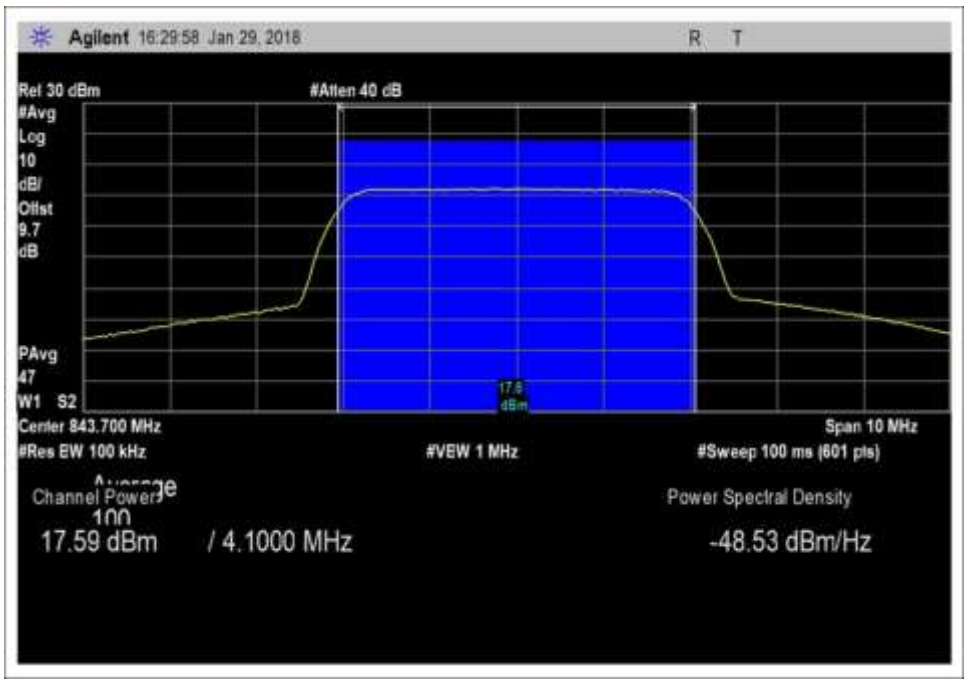


UL_824-894MHz_AWGN



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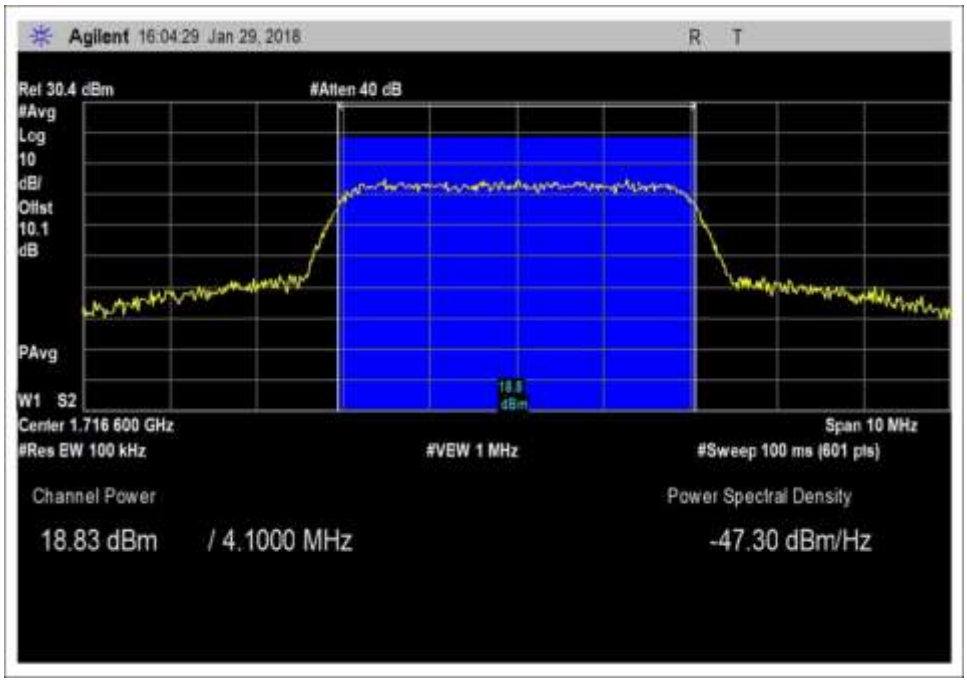
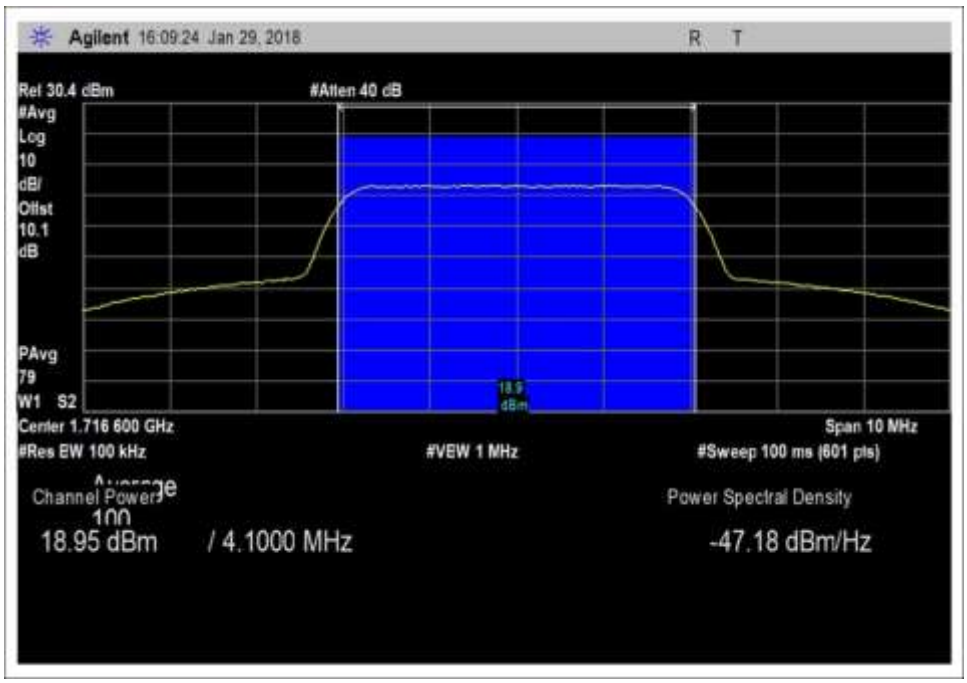


UL_1710-1755MHz_AWGN



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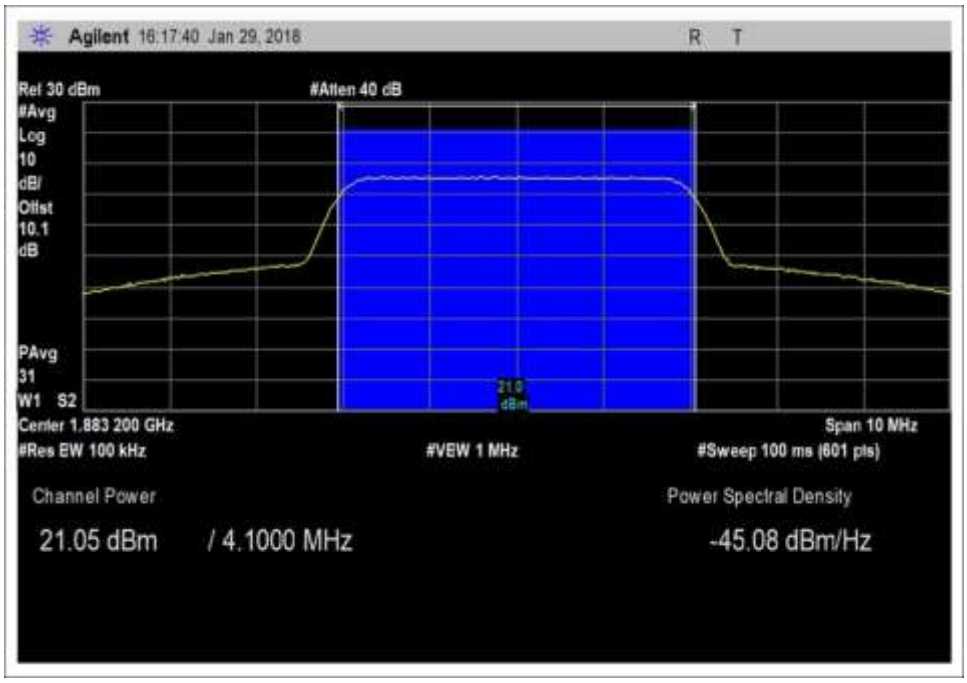
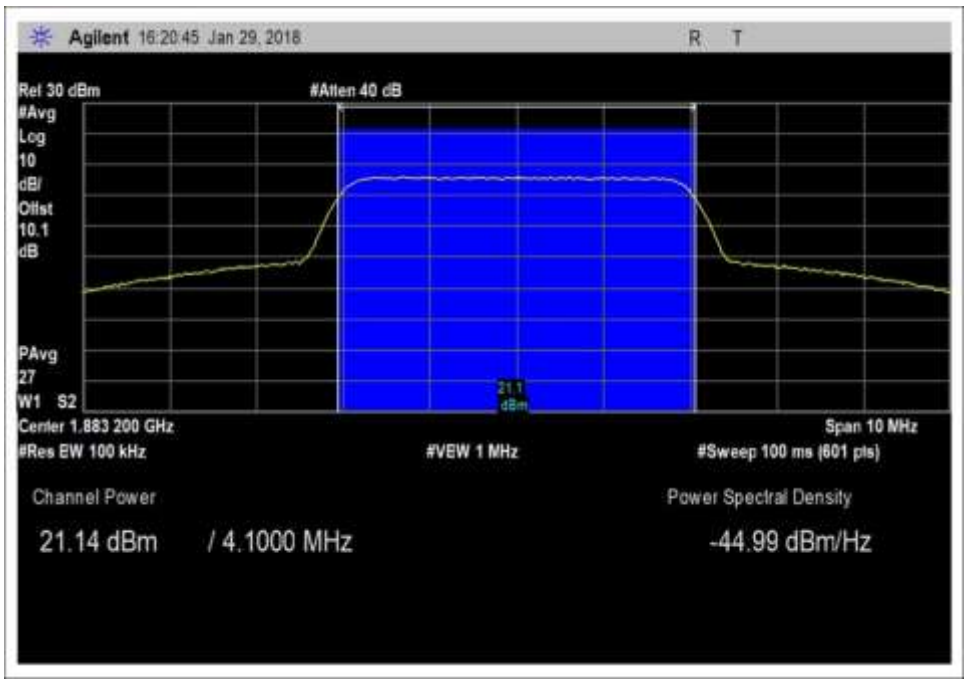
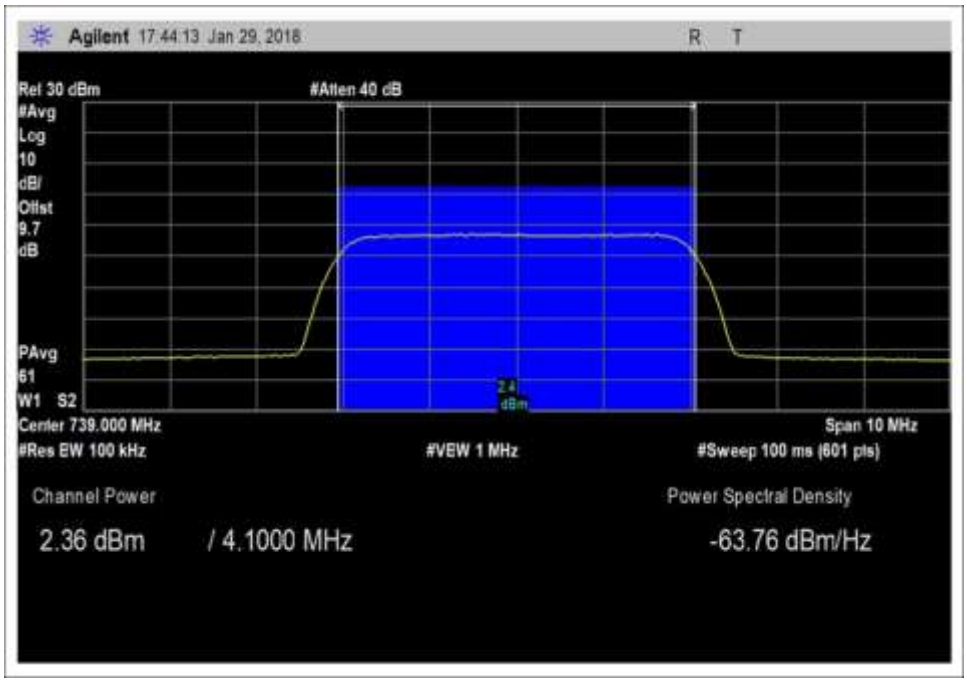


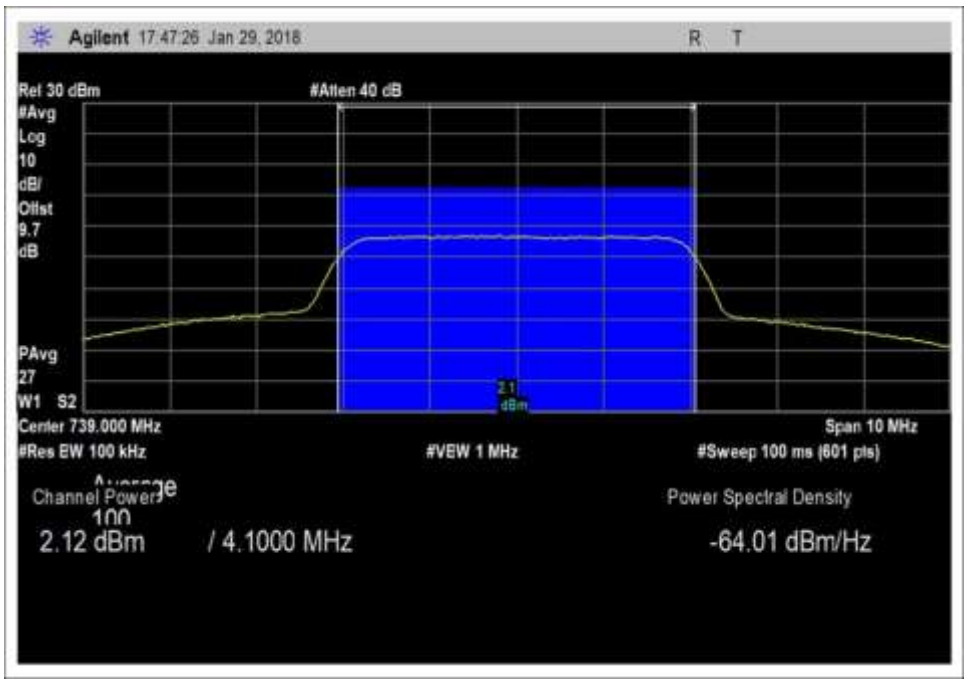
UL_1850-1915MHz_AWGN



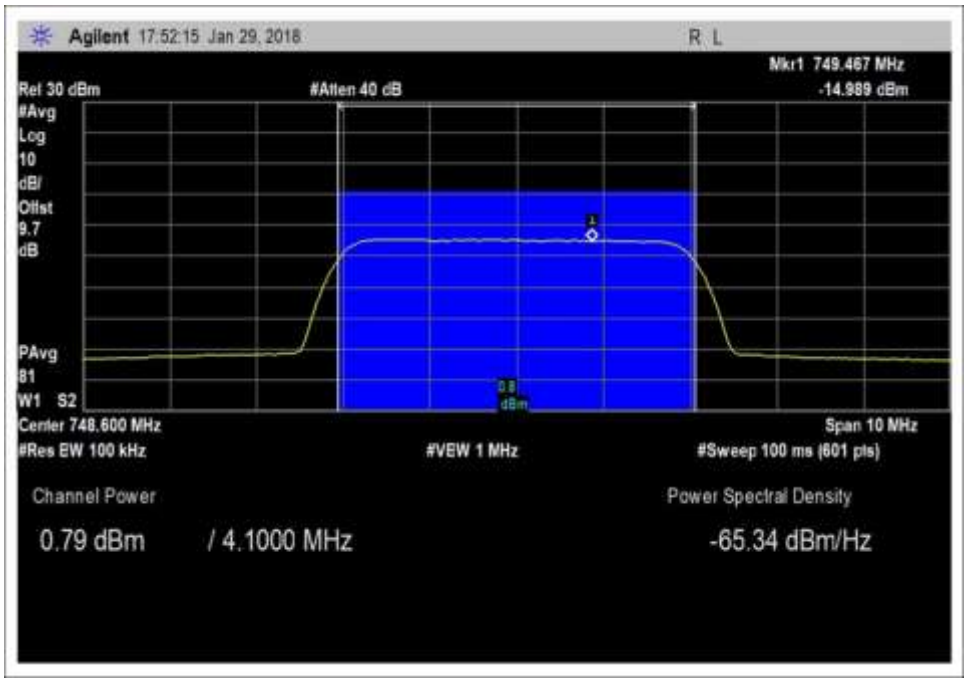
UL_1850-1915MHz_AWGN_max



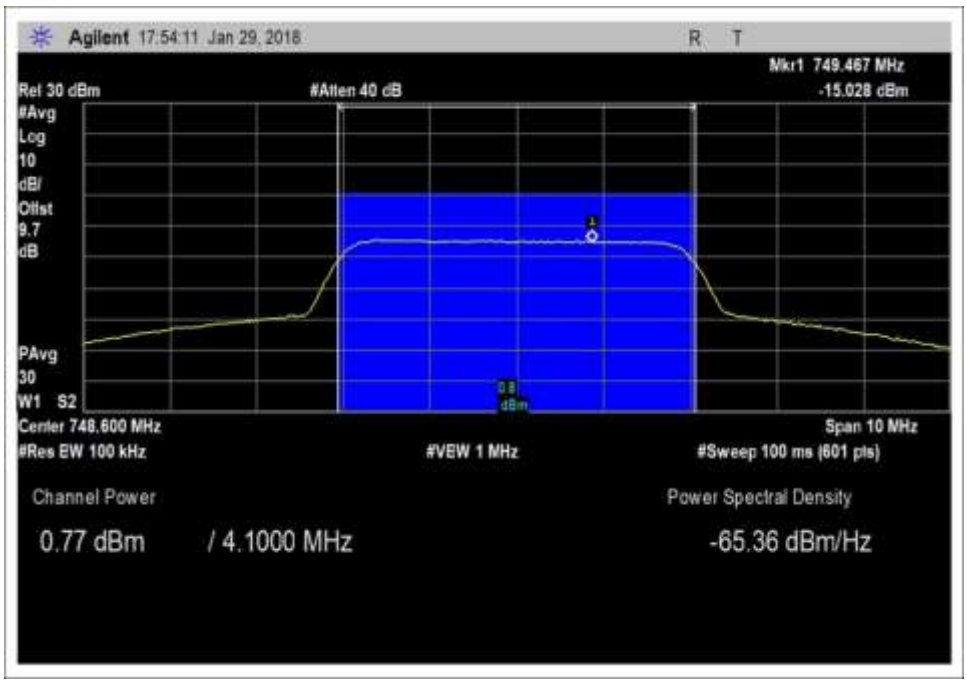
DL_728-746MHz_AWGN



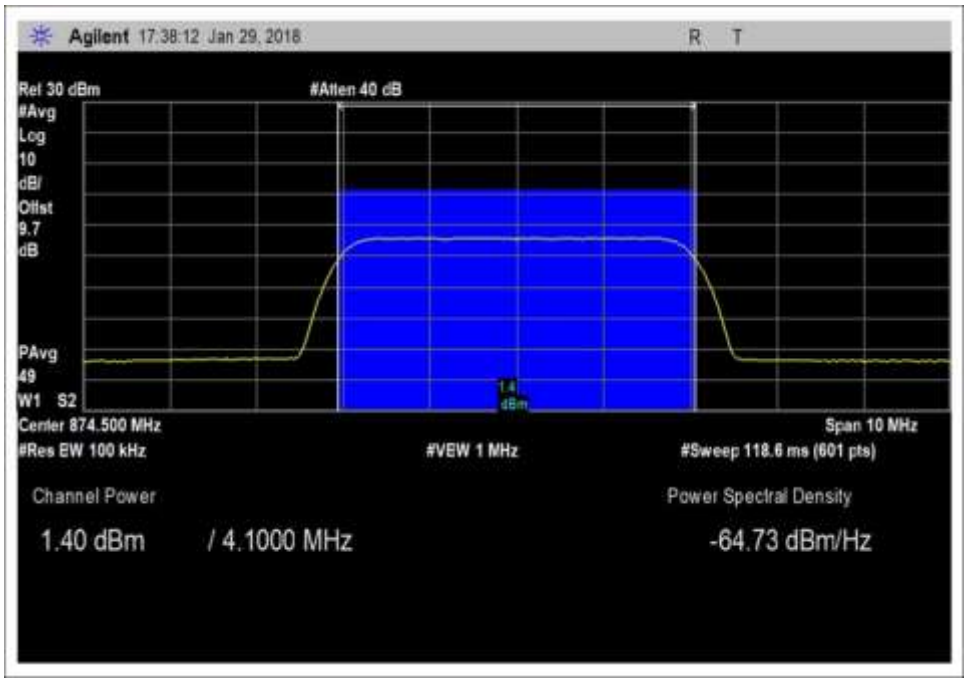
DL_728-746MHz_AWGN_max



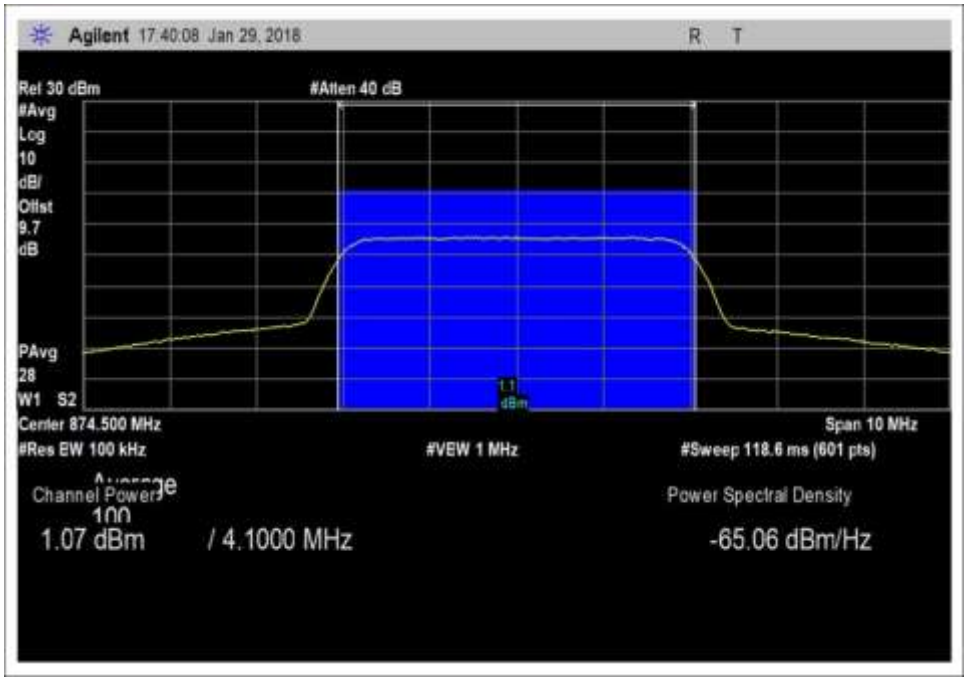
DL_746-757MHz_AWGN



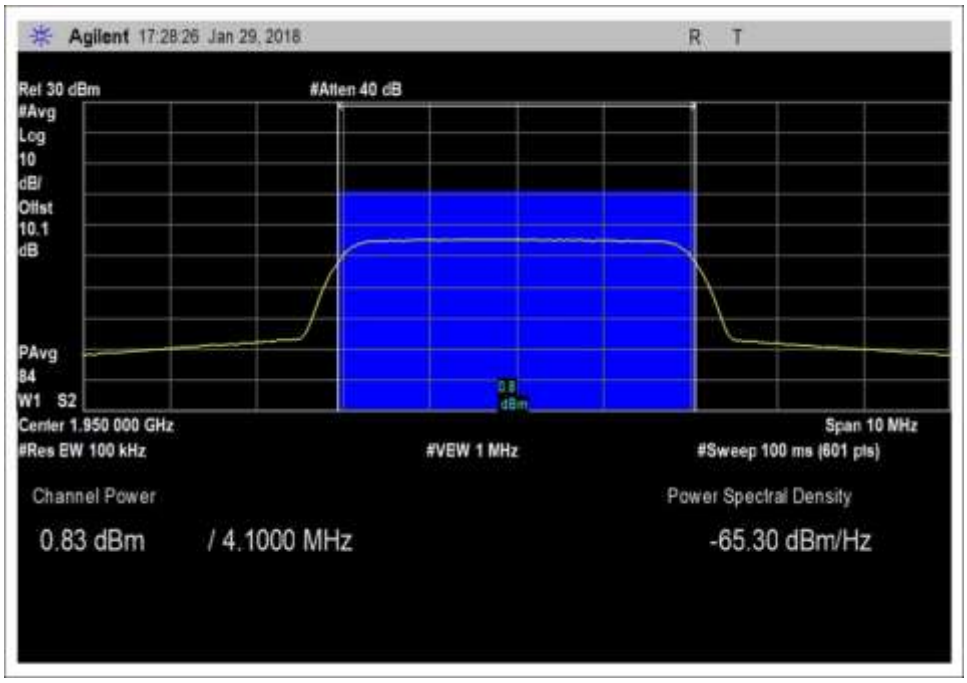
DL_746-757MHz_AWGN_max.



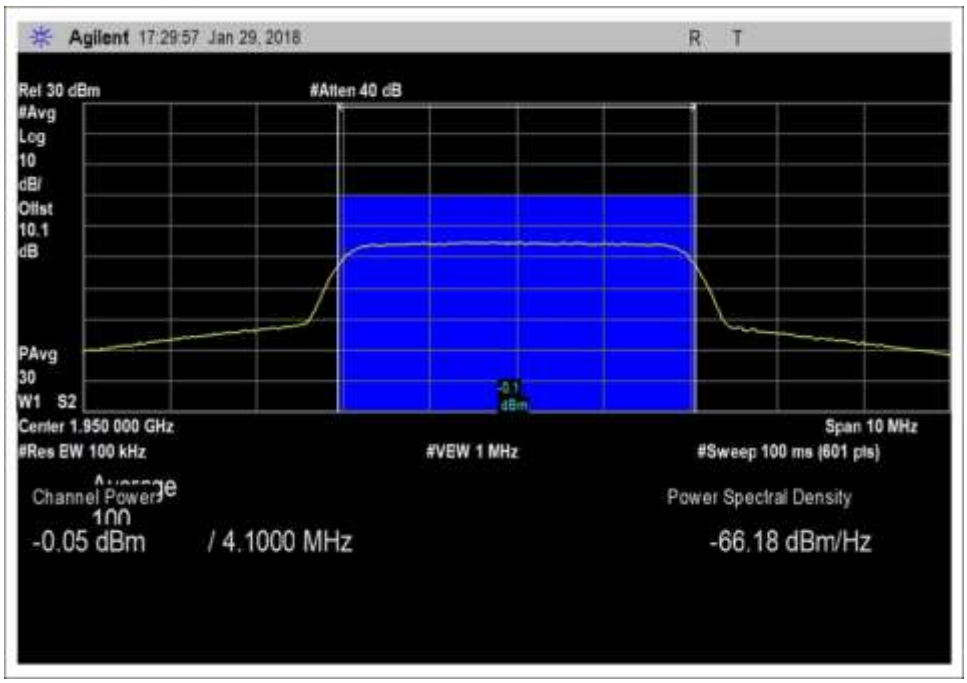
DL_869-894MHz_AWGN



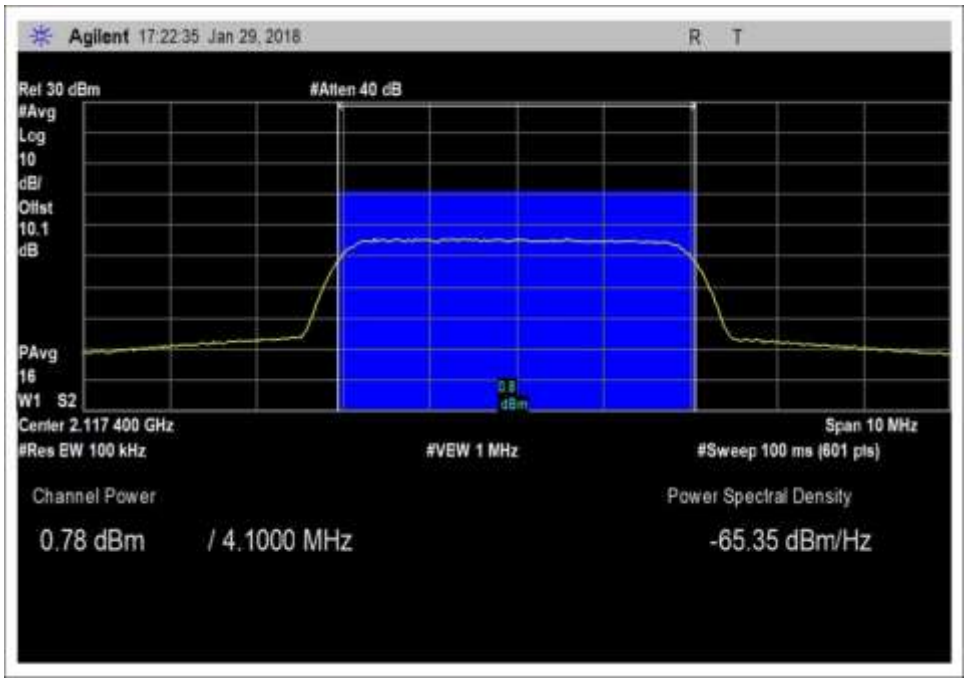
DL_869-894MHz_AWGN_max



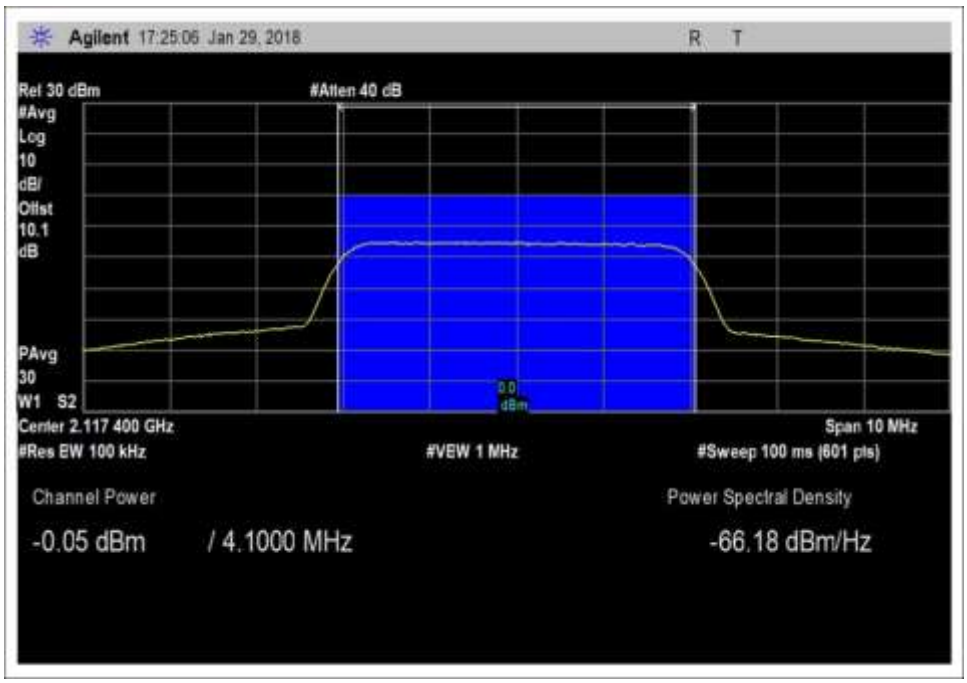
DL_1930-1995MHz_AWGN.



DL_1930-1995MHz_AWGN_max

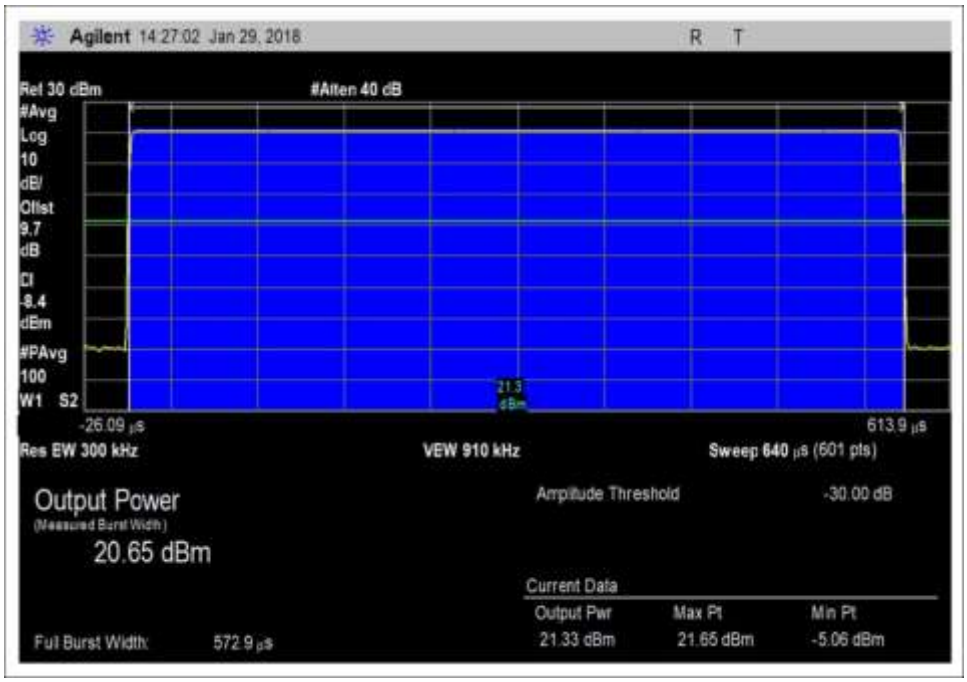


DL_2110-2155MHz_AWGN

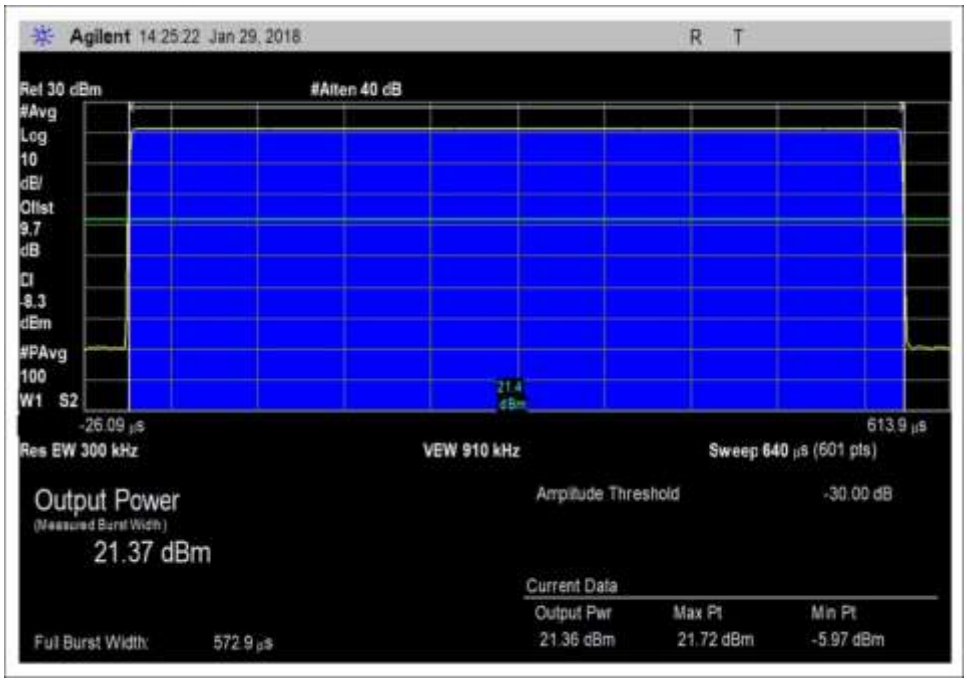


DL_2110-2155MHz_AWGN_max

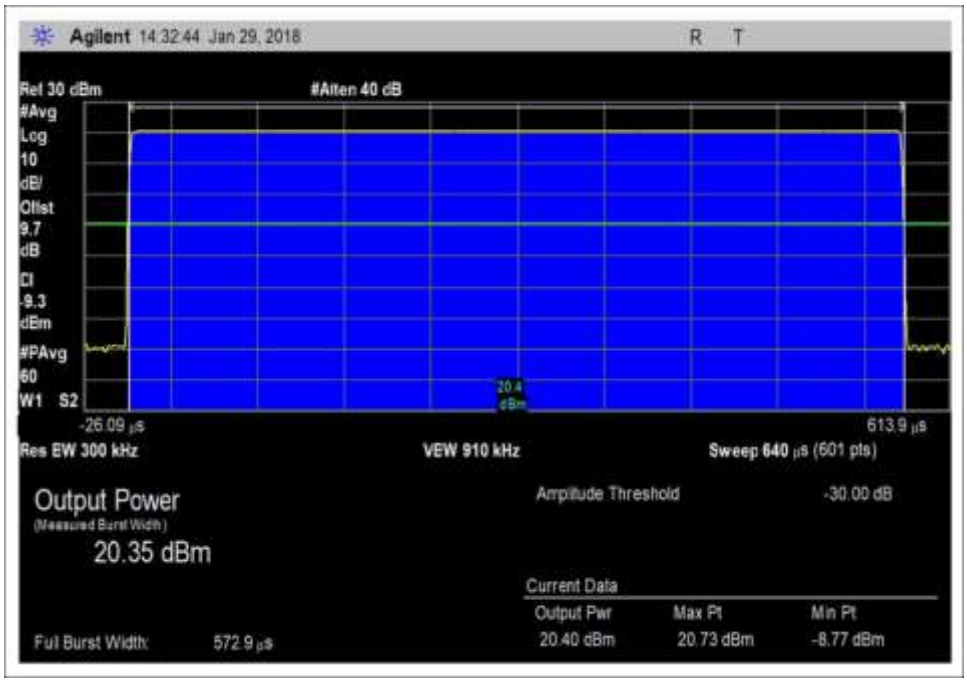
PULSE GSM



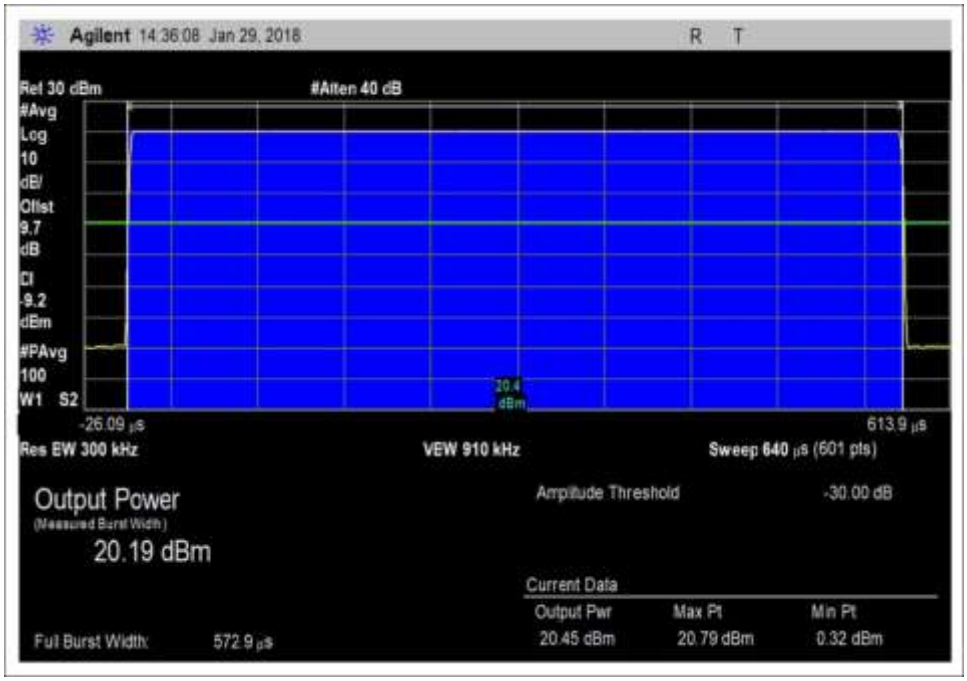
UL_698-716_GSM_max



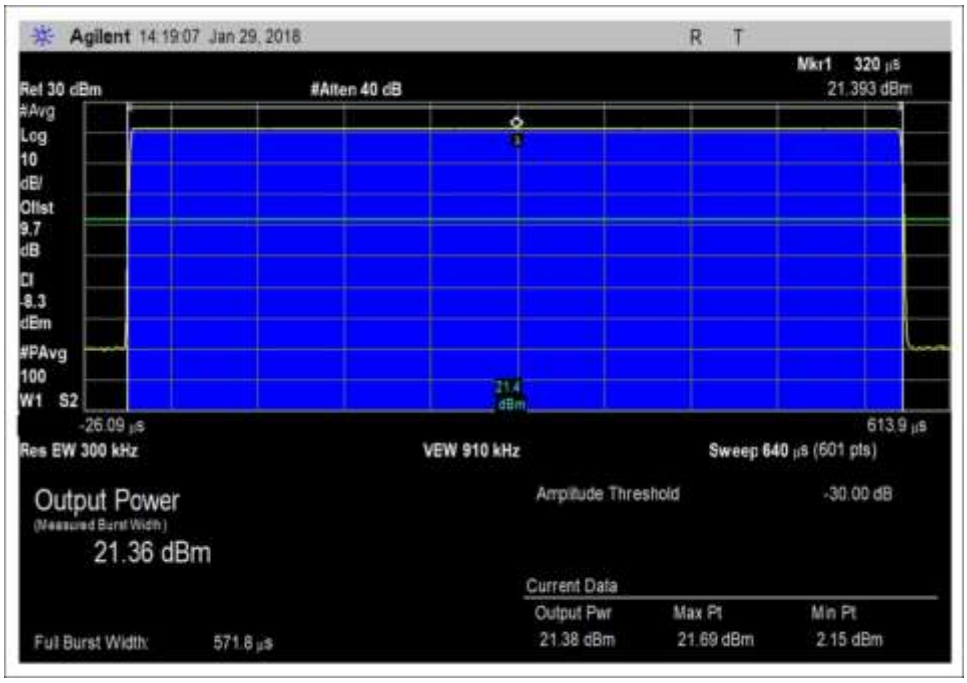
UL_698-716_GSM



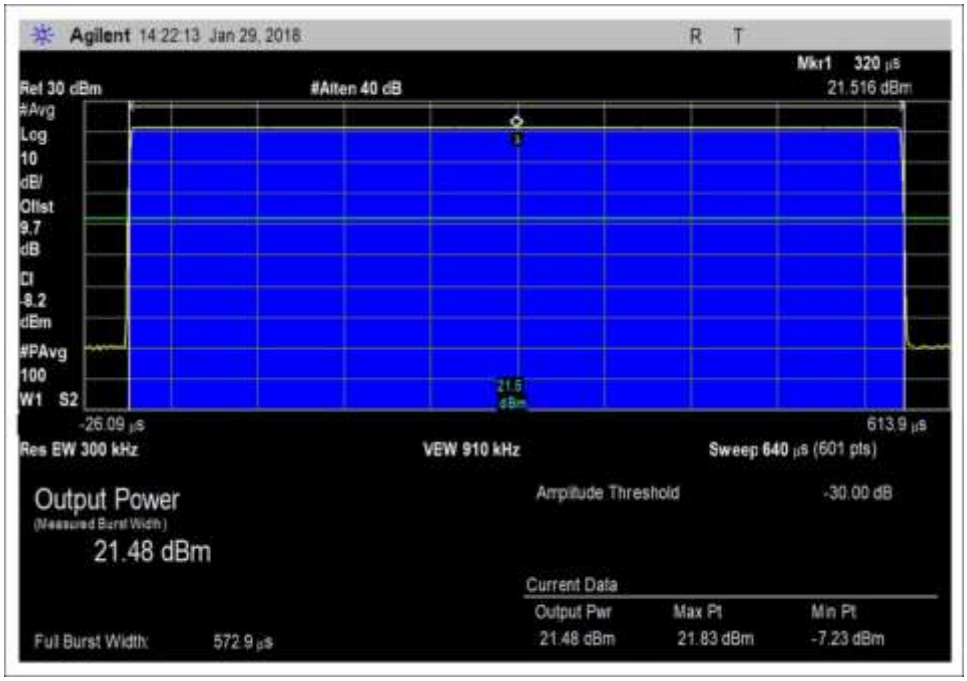
UL_776-787_GSM



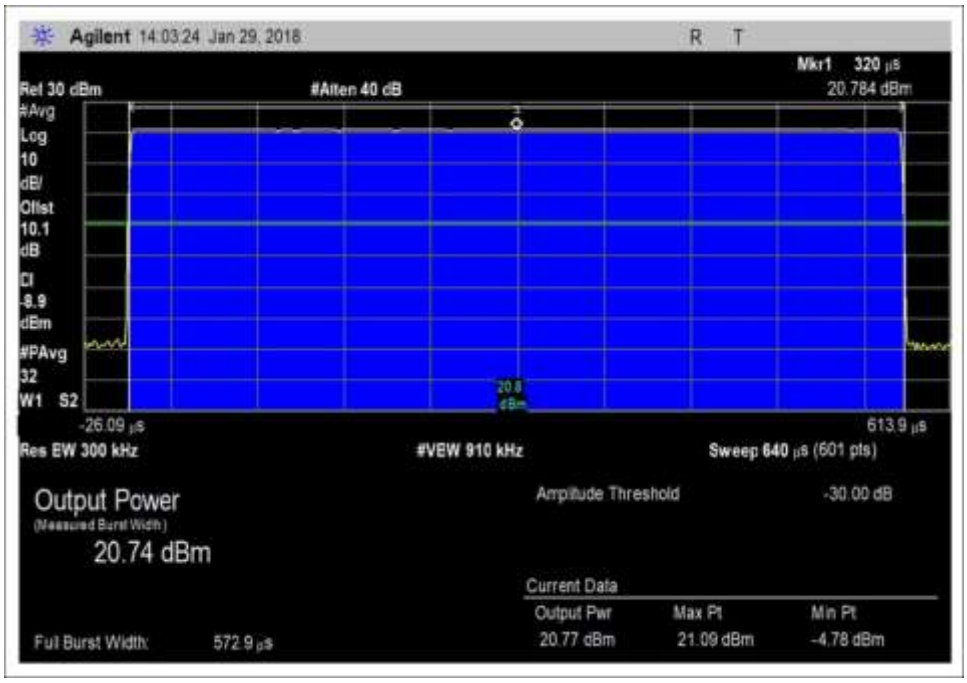
UL_776-787_GSM_Max



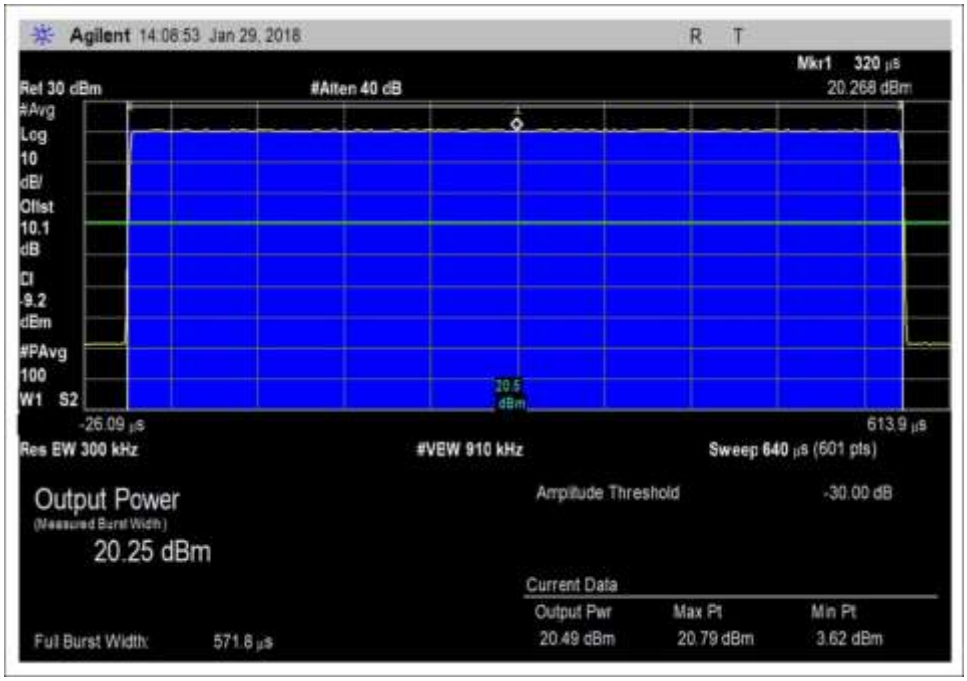
UL_824-849MHz_GSM



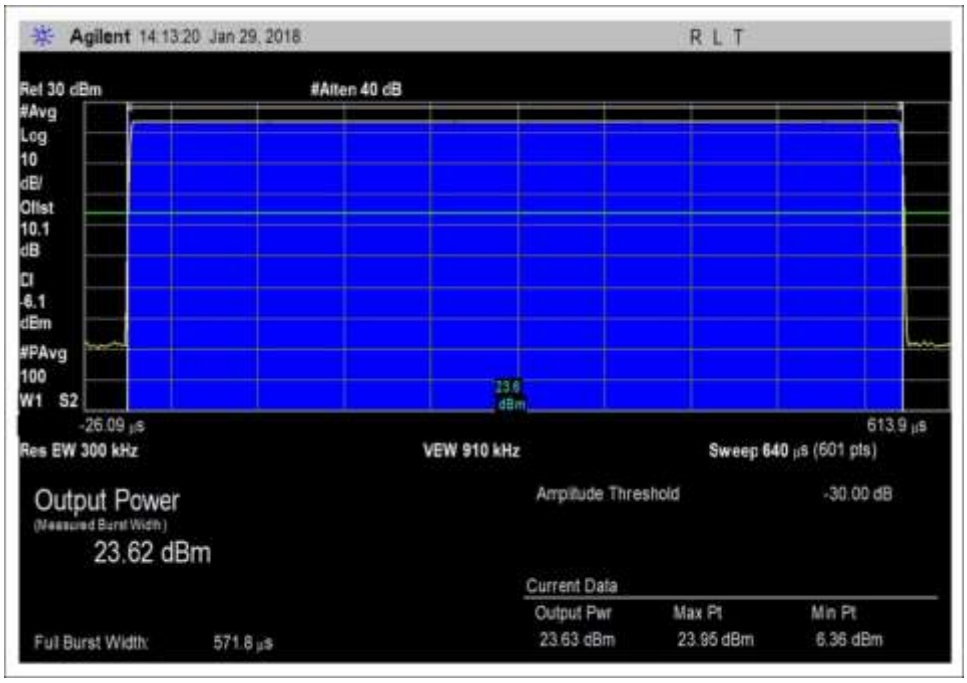
UL_824-849MHz_GSM_Max



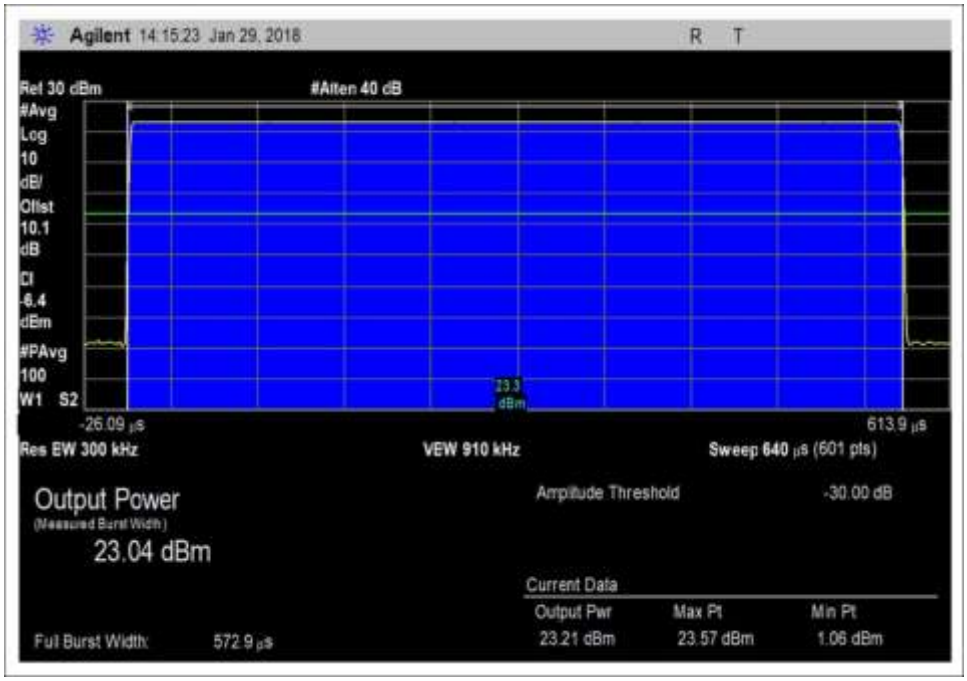
UL_1710-1755MHz_GSM



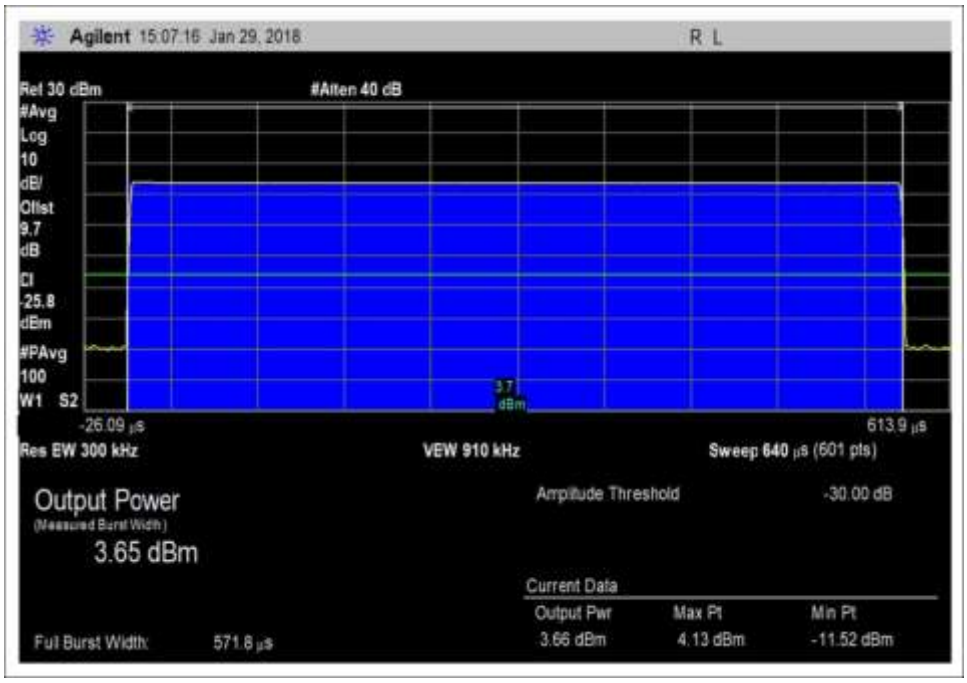
UL_1710-1755MHz_GSM_max



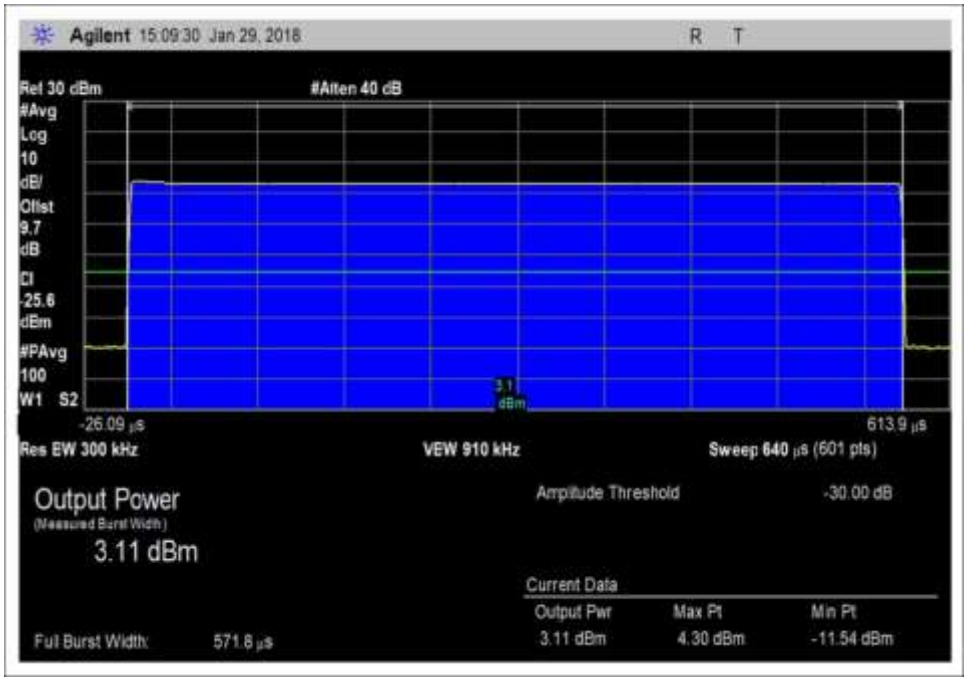
UL_1850-1915MHz_GSM



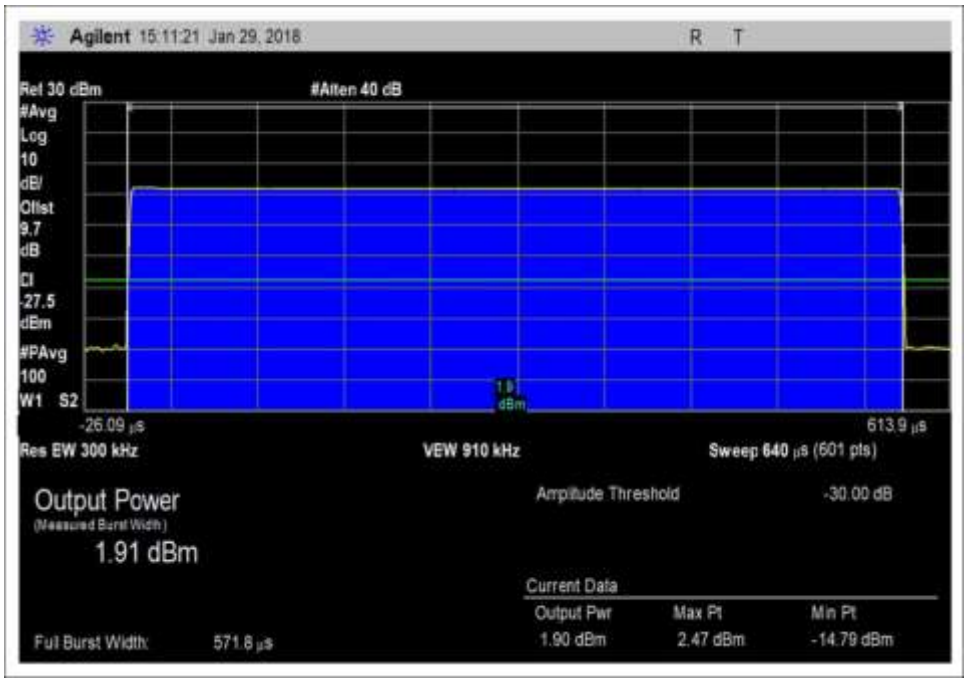
UL_1850-1915MHz_GSM_Max



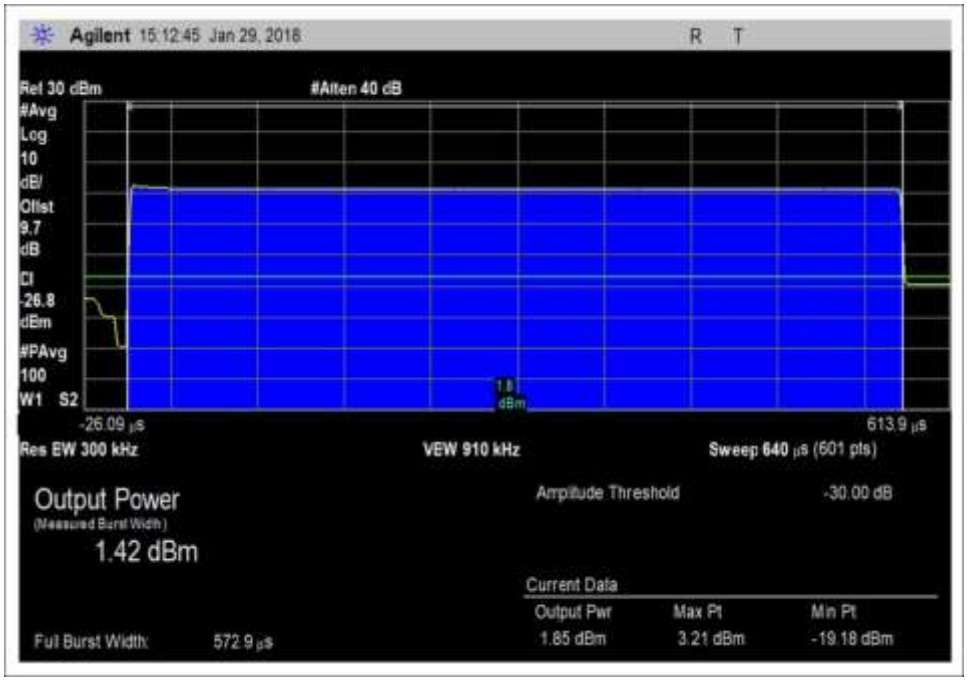
DL_728-746_GSM



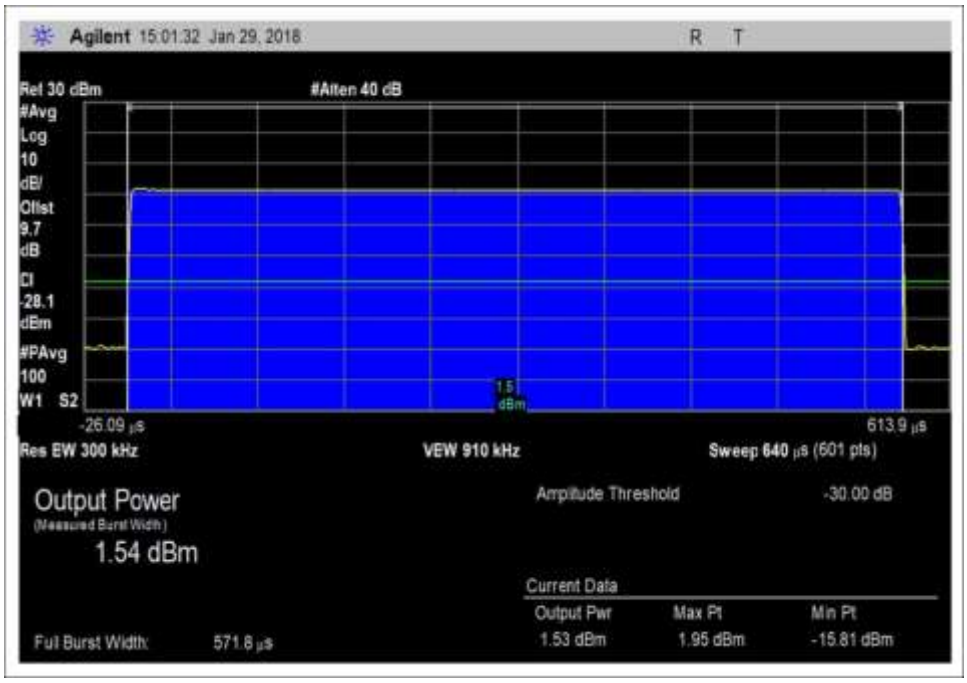
DL_728-746_GSM_Max



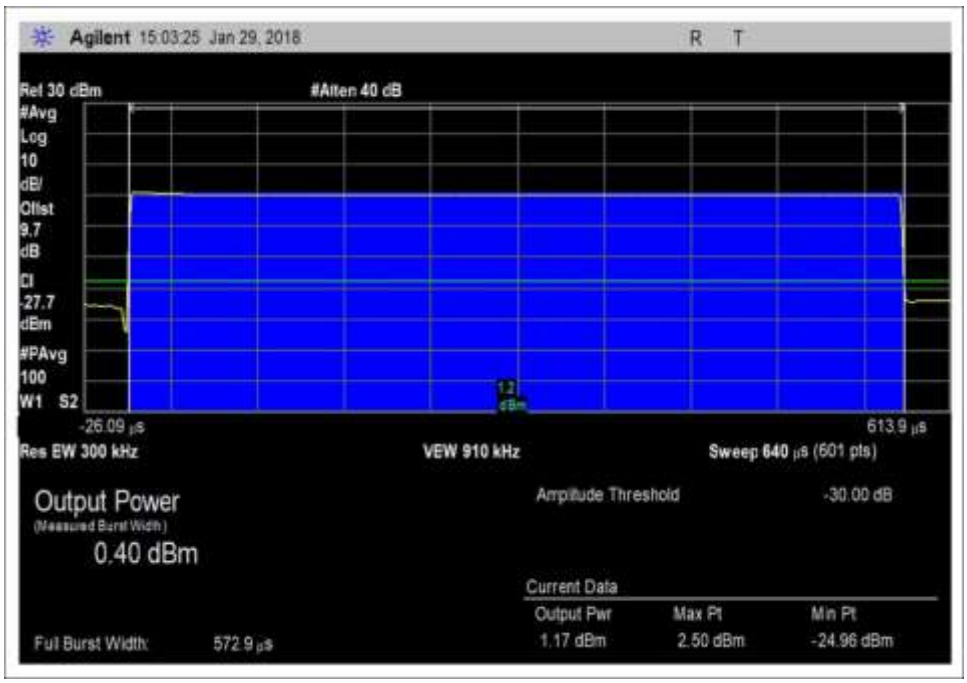
DL_746-757_GSM



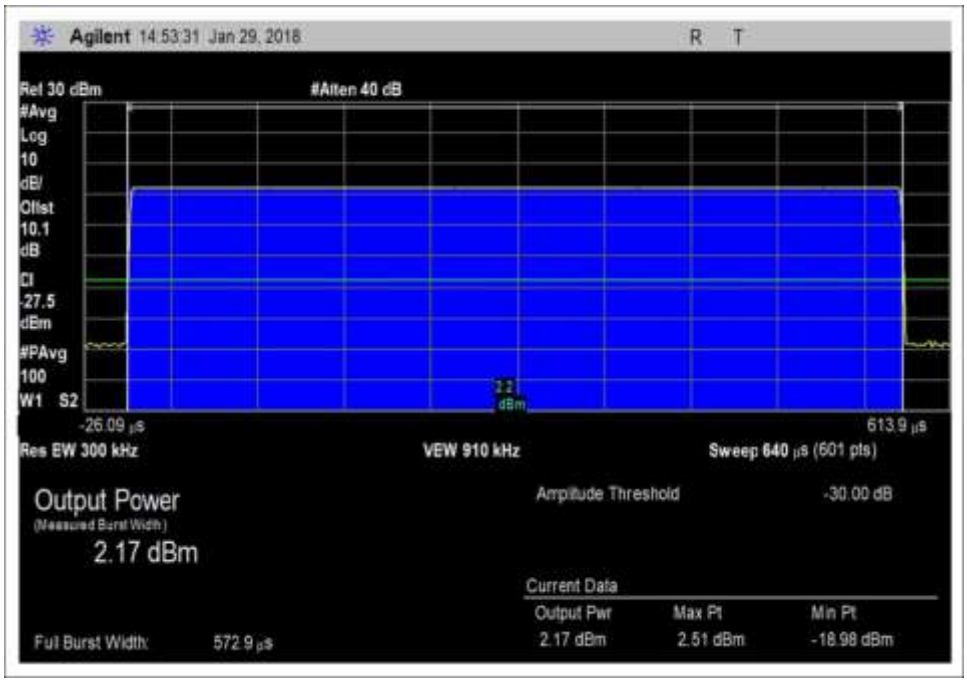
DL_746-757_GSM_max



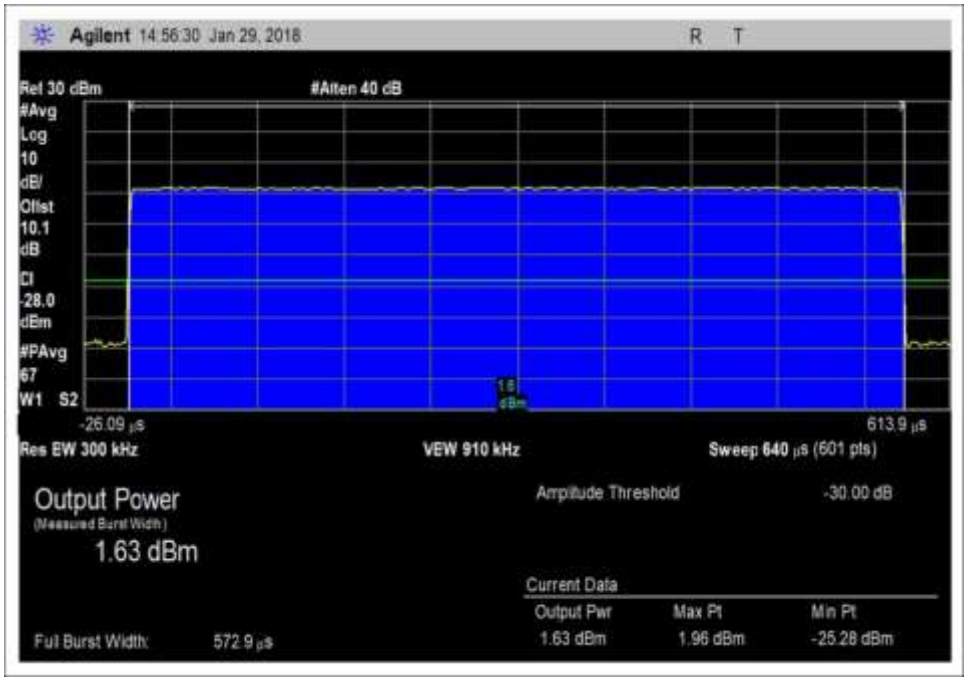
DL_868-894_GSM



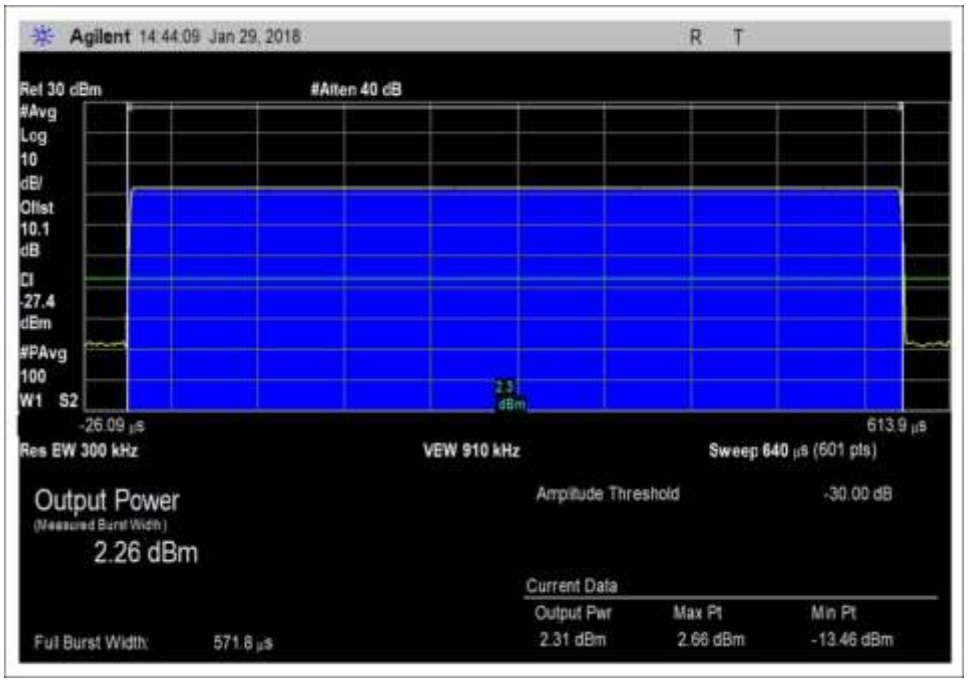
DL_868-894_GSM_max



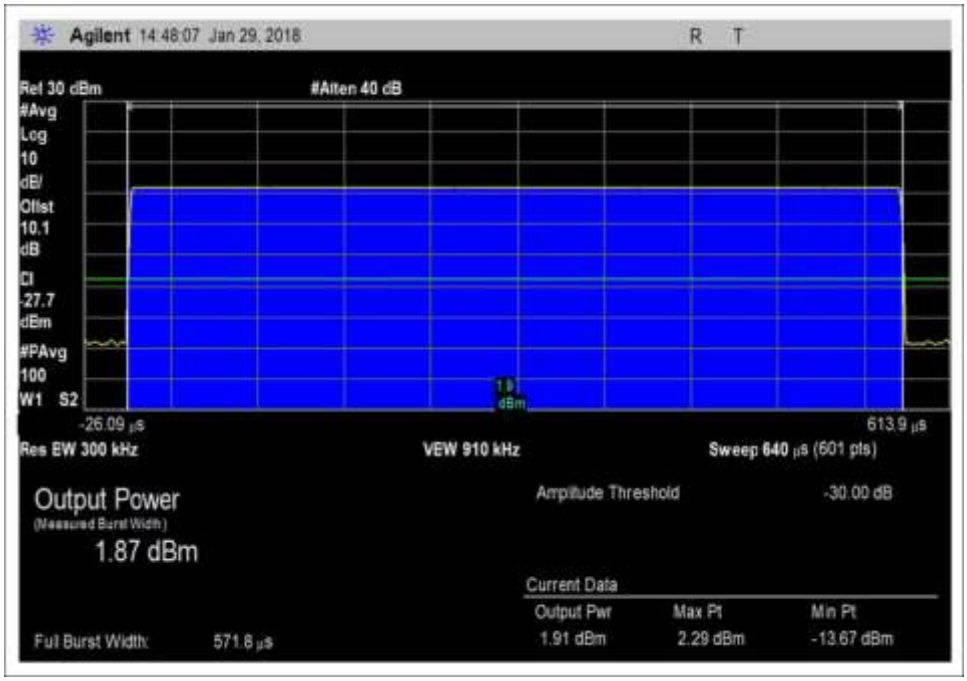
DL_1930-1995_GSM



DL_1930-1995_GSM_max



DL_2110-2155MHz_GSM



DL_2110-2155MHz_GSM_Max

7.4 Intermodulation Product

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510 249 1170
Customer:	**Cellphone-Mate, Inc.**
Specification:	**7.4 Intermodulation**
Work Order #:	**100826** Date: 09/04/2018
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:

Test environment conditions:
Temperature: 21.0°C
Relative Humidity: 57.8%
Pressure: 102.5kPa

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
03470	Spectrum Analyzer	Agilent	E4440A	1/3/2018	1/3/2020

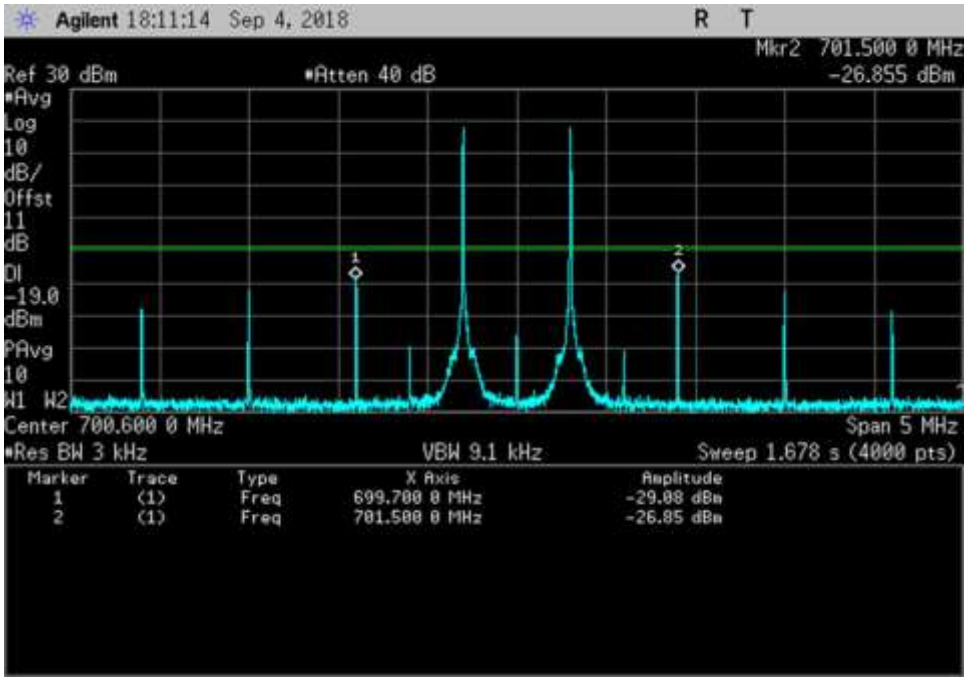
Summary of Results

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

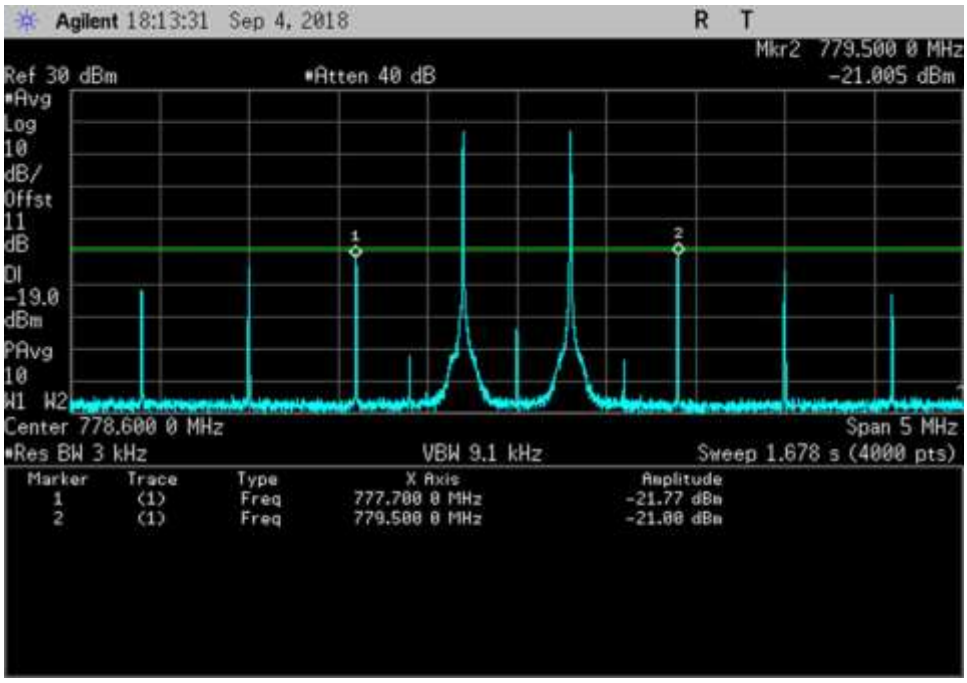
Inter Modulation Product			
Frequency (MHz)	**Pre AGC (dBm)**	**Limit (dBm)**	**Results**
UL 1710-1755	-19.3	-19	Pass
UL 1850-1915	-27.8	-19	Pass
UL 824-894	-19.2	-19	Pass
UL 698-716	-26.9	-19	Pass
UL 776-787	-21.0	-19	Pass
DL 2110-2155	-35.6	-19	Pass
DL 1930-1995	-34.6	-19	Pass
DL 869-894	-43.9	-19	Pass
DL 728-746	-40.8	-19	Pass
DL 746-757	-38.2	-19	Pass

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

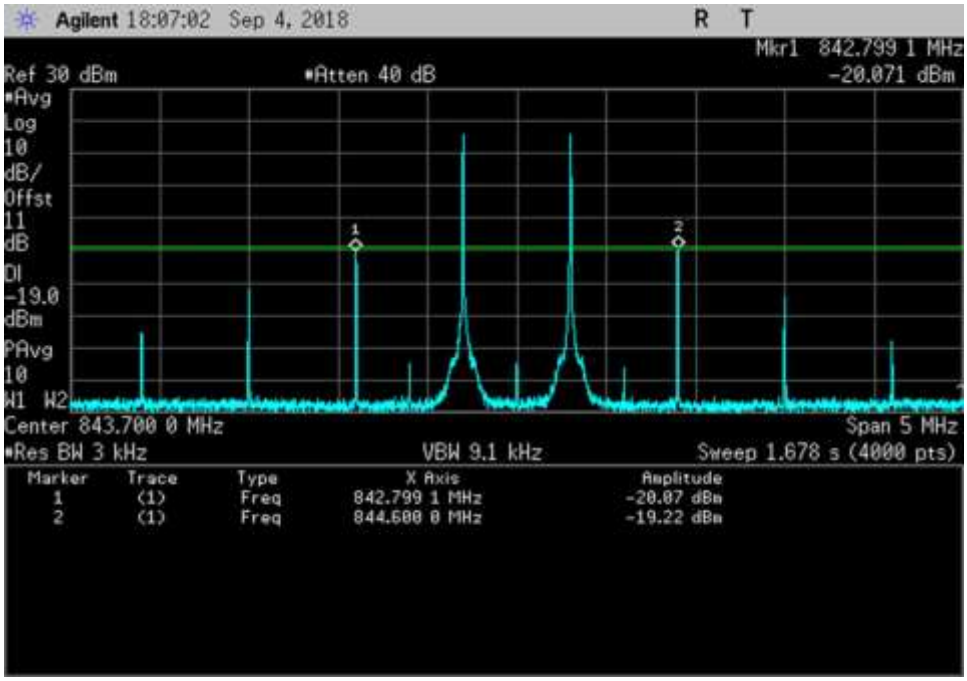
Plots



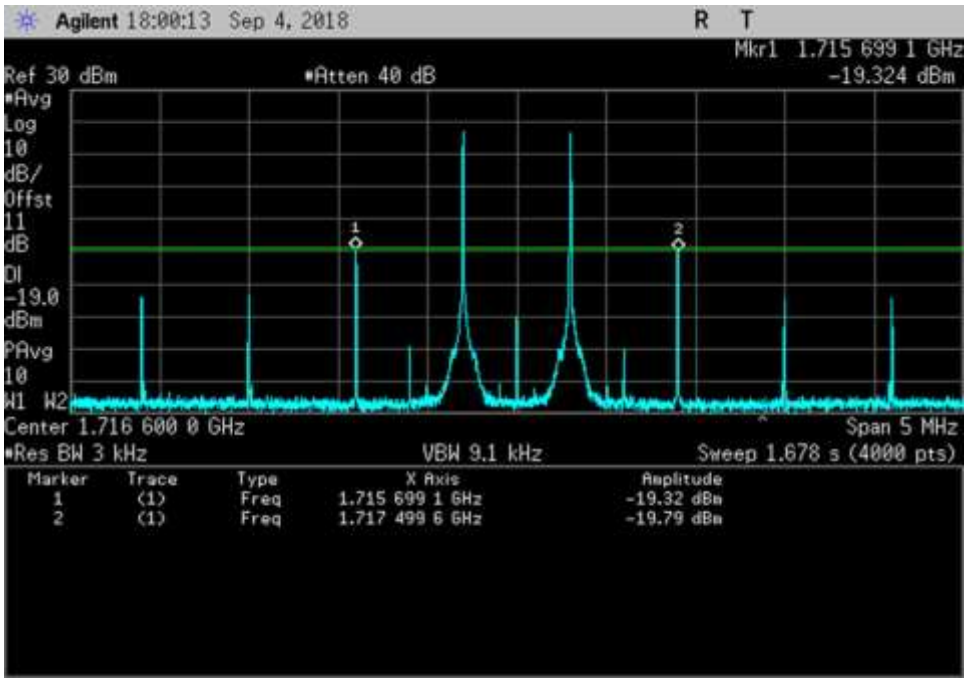
UL_698-716MHz, 700.6MHz



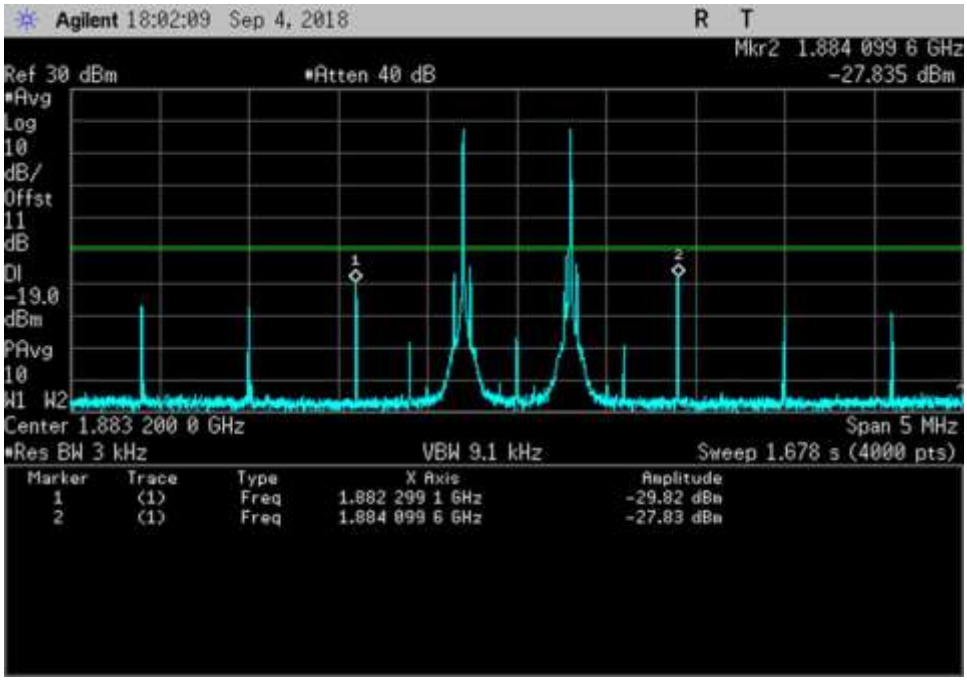
UL_776-787MHz, 778.6MHz



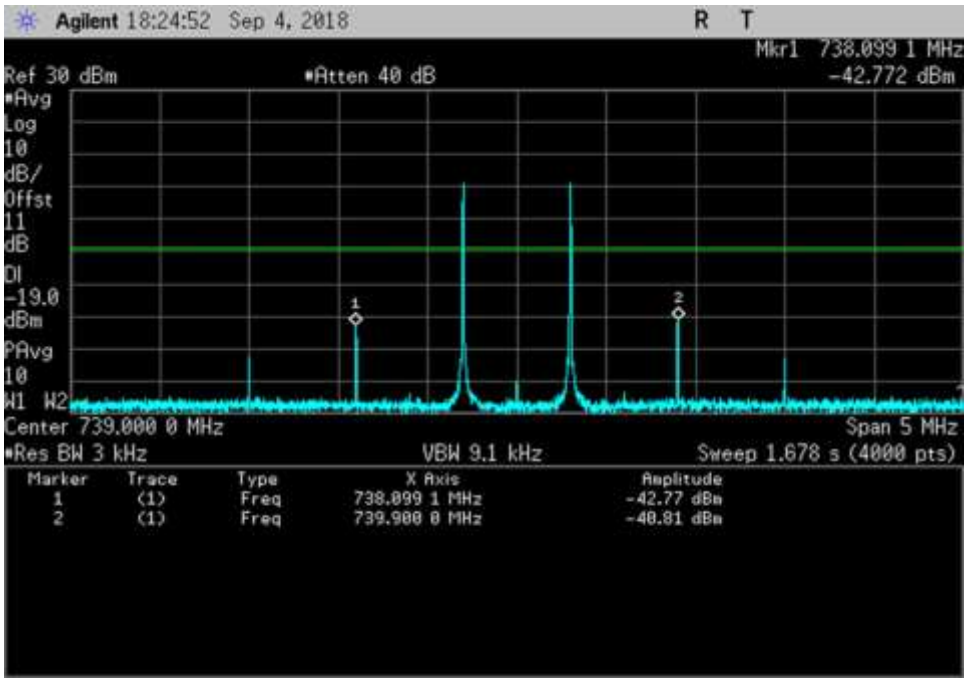
UL_824-849MHz, 843.7MHz



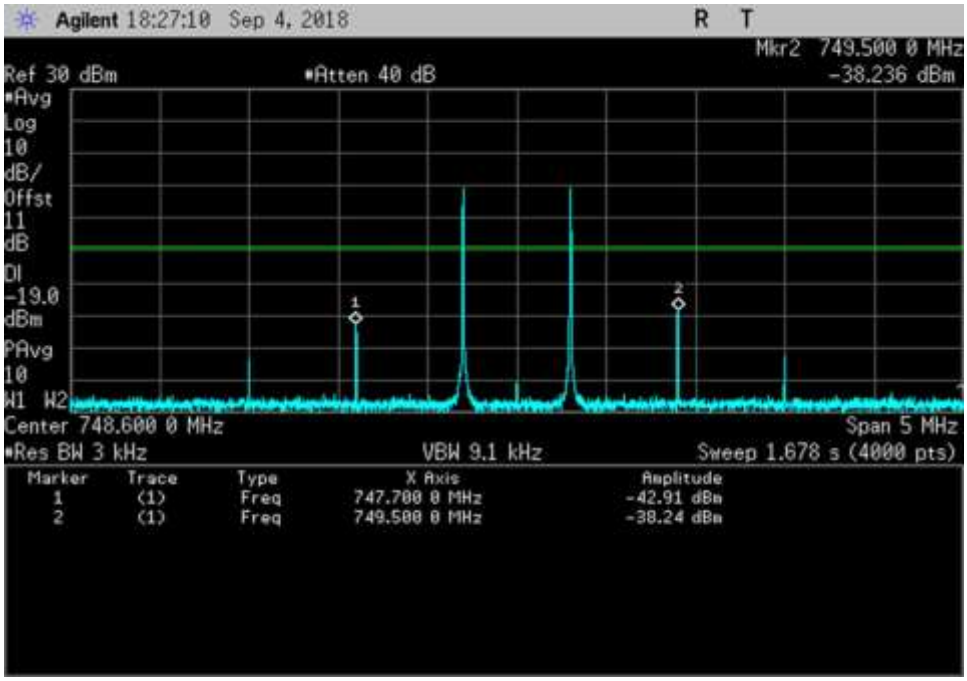
UL_1710-1755MHz, 1716.6MHz



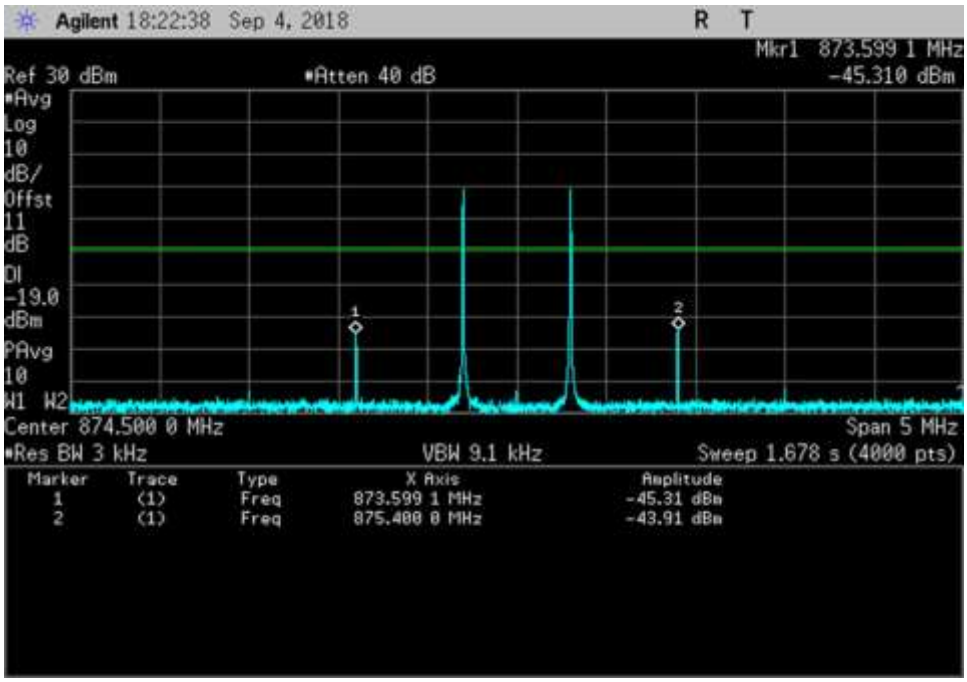
UL_1850-1915MHz, 1883.2MHz



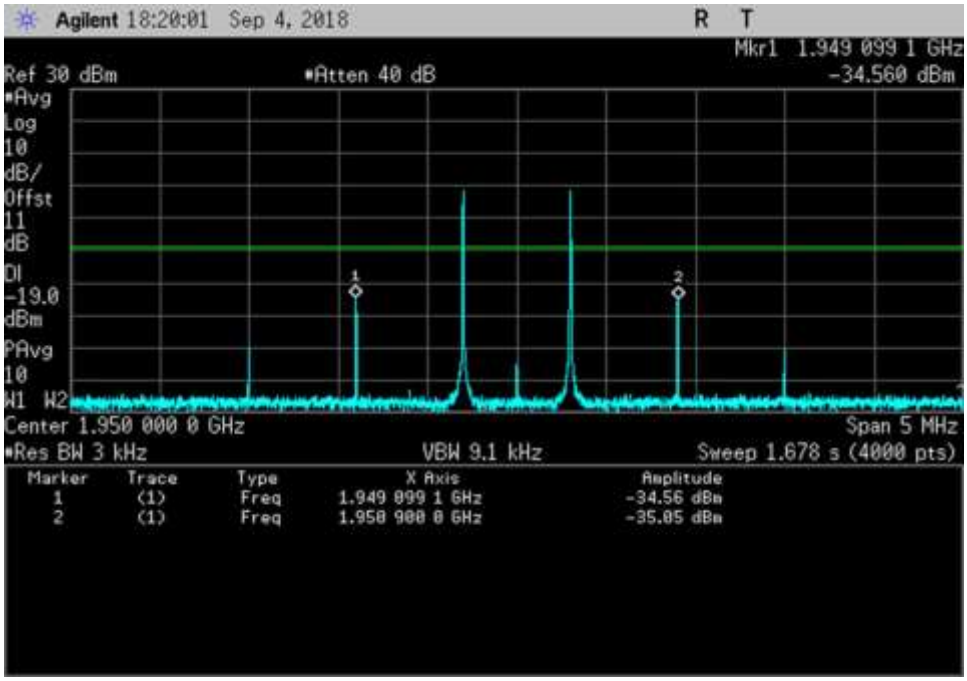
DL_728-746MHz, 739MHz



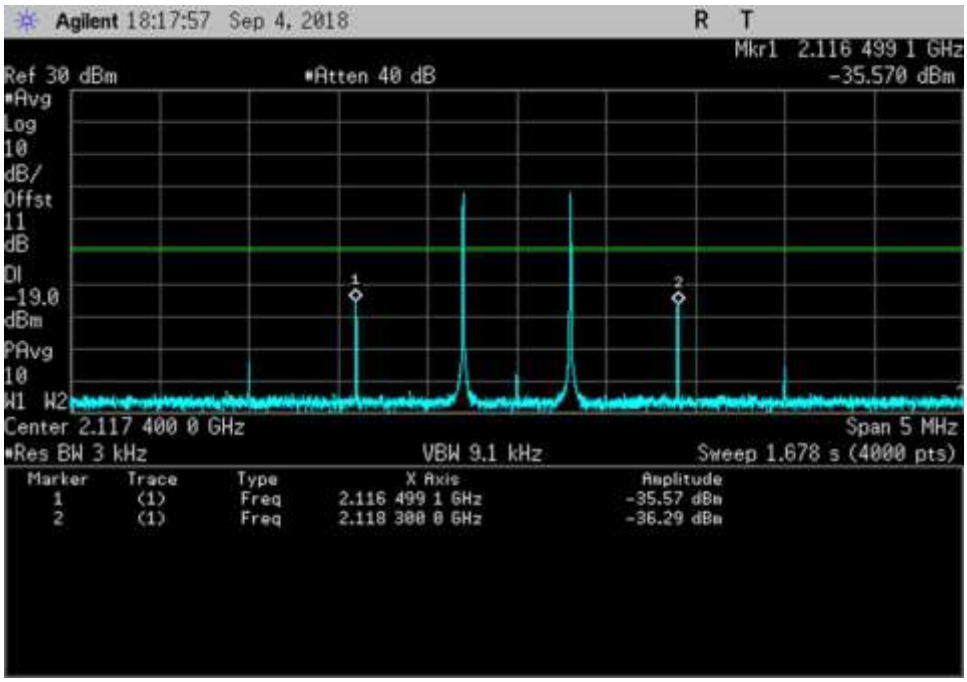
DL_746-757MHz, 748.6MHz



DL_869-894MHz, 874.5MHz



DL_1930-1995MHz, 1950MHz



DL_2110-2155MHz, 2117.4MHz

7.5 Out of Band Emissions

Test Conditions / Setup

Test Location:	CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510 249 1170		
Customer:	**Cellphone-Mate, Inc.**		
Specification:	**7.5 Out of Band Emission**		
Work Order #:	**100826**	Date:	1/30/2018
Test Type:	**Conducted Emissions**	Time:	7:19:00 PM
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.11		12VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Additional plots taken to show compliance under different RBW requirement as applicable.

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
P05411	Attenuator	54A-10	1/19/2018	1/19/2020
03470	Spectrum Analyzer	E4440A	1/3/2018	1/3/2020
P07191	Cable	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
P07192	Cable	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
03418	Signal Generator	E4438C	6/19/2017	6/19/2019

Summary of Results

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

GSM

Low					High			
Out of Band Emission					Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results		Freq (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-29.6	-19	Pass		UL1710-1755	-26.0	-19	Pass
UL1850-1915	-29.4	-19	Pass		UL1850-1915	-31.4	-19	Pass
UL824-849	-30.2	-19	Pass		UL824-849	-28.5	-19	Pass
UL 698-716	-28.7	-19	Pass		UL 698-716	-32.1	-19	Pass
UL776-787	-29.5	-19	Pass		UL776-787	-31.3	-19	Pass
DL2110-2155	-38.7	-19	Pass		DL2110-2155	-38.8	-19	Pass
DL1930-1995	-40.6	-19	Pass		DL1930-1995	-41.2	-19	Pass
DL869-894	-23.7	-19	Pass		DL869-894	-30.7	-19	Pass
DL:728-746	-25.8	-19	Pass		DL:728-746	-25.8	-19	Pass
DL 746-757	-25.1	-19	Pass		DL 746-757	-28.3	-19	Pass

CDMA (alternative 1.25 MHz AWGN)

Low					High			
Out of Band Emission					Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results		Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-29.4	-19	Pass		UL1710-1755	-28.8	-19	Pass
UL1850-1915	-33.2	-19	Pass		UL1850-1915	-39.7	-19	Pass
UL824-849	-35.0	-19	Pass		UL824-849	-36.0	-19	Pass
UL 698-716	-36.4	-19	Pass		UL 698-716	-38.8	-19	Pass
UL776-787	-34.9	-19	Pass		UL776-787	-34.8	-19	Pass
DL2110-2155	-41.7	-19	Pass		DL2110-2155	-41.5	-19	Pass
DL1930-1995	-41.2	-19	Pass		DL1930-1995	-41.2	-19	Pass
DL869-894	-50.3	-19	Pass		DL869-894	-52.0	-19	Pass
DL:728-746	-52.0	-19	Pass		DL:728-746	-51.2	-19	Pass
DL 746-757	-51.1	-19	Pass		DL 746-757	-52.3	-19	Pass

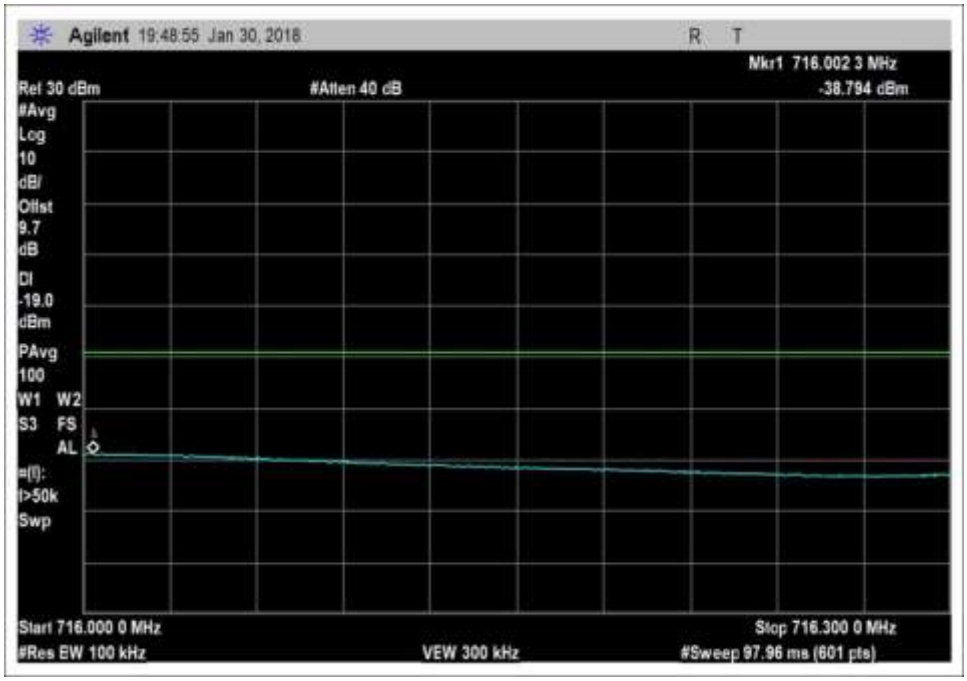
LTE (alternative 4.1MHz AWGN)

Low					High			
Out of Band Emission					Out of Band Emission			
Frequency (MHz)	Pre AGC	Limit (dBm)	Results		Frequency (MHz)	Pre AGC	Limit (dBm)	Results
UL1710-1755	-29.3	-19	Pass		UL1710-1755	-24.5	-19	Pass
UL1850-1915	-30.8	-19	Pass		UL1850-1915	-36.4	-19	Pass
UL824-849	-31.1	-19	Pass		UL824-849	-32.0	-19	Pass
UL 698-716	-29.3	-19	Pass		UL 698-716	-31.5	-19	Pass
UL776-787	-27.3	-19	Pass		UL776-787	-30.7	-19	Pass
DL2110-2155	-43.3	-19	Pass		DL2110-2155	-43.6	-19	Pass
DL1930-1995	-42.0	-19	Pass		DL1930-1995	-42.4	-19	Pass
DL869-894	-46.3	-19	Pass		DL869-894	-49.7	-19	Pass
DL:728-746	-50.0	-19	Pass		DL:728-746	-46.1	-19	Pass
DL 746-757	-44.9	-19	Pass		DL 746-757	-51.4	-19	Pass

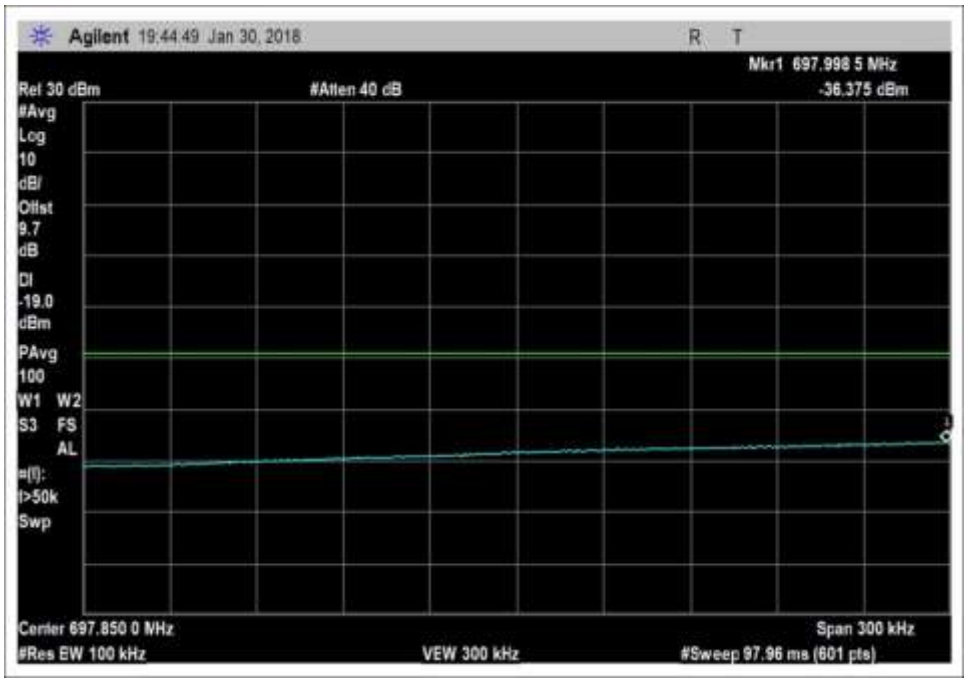
Note: The EUT also maintains compliance with the out-of-band emissions limit at input power indicated in section 5.5.

Plots

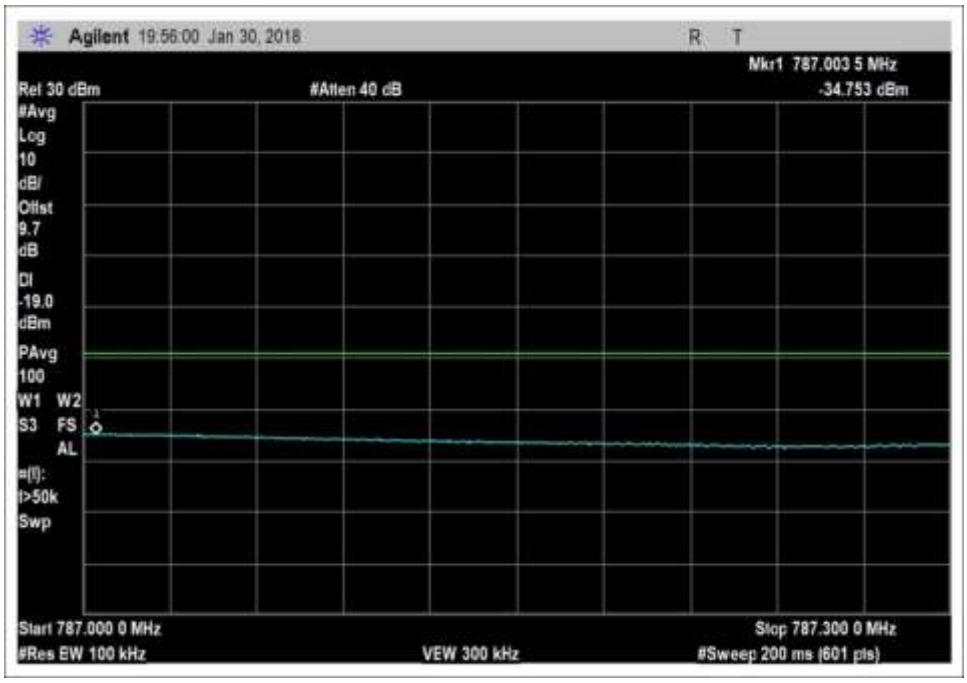
CDMA



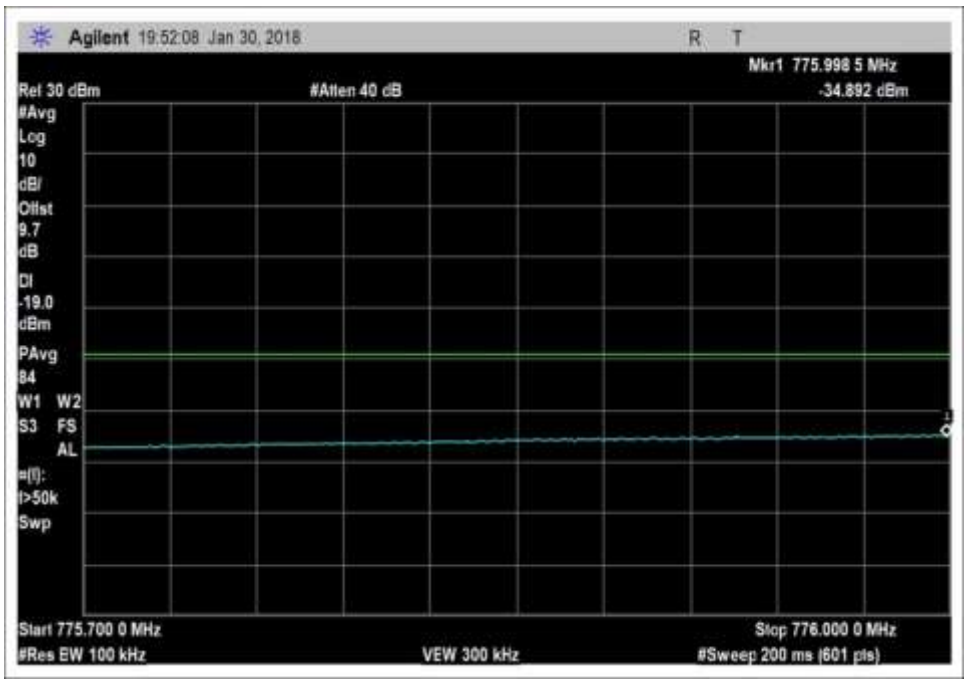
UL_698-716MHz_CDMA_H



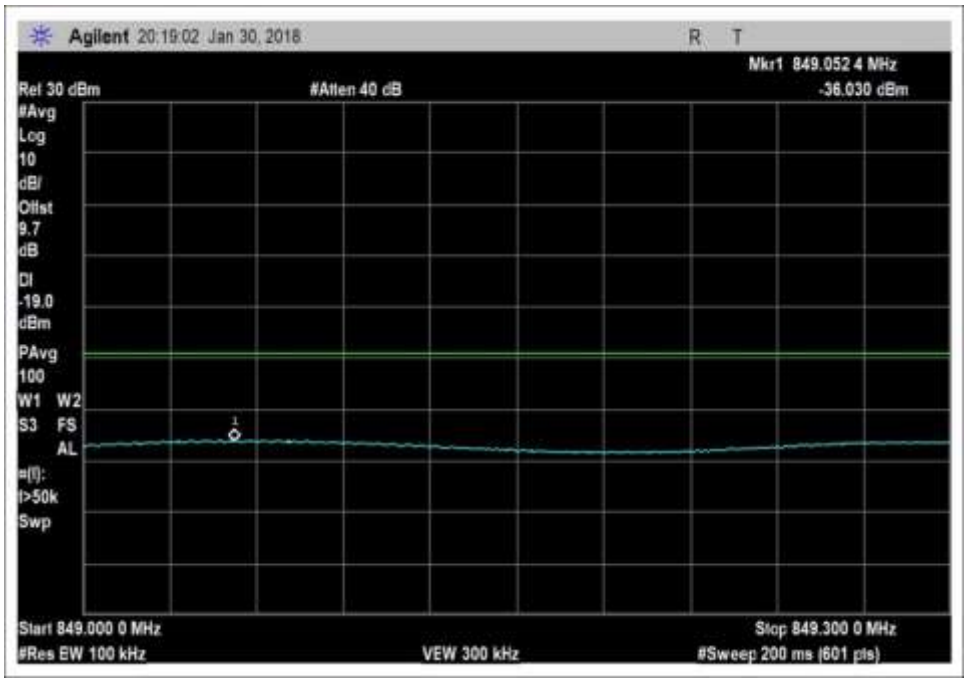
UL_698-716MHz_CDMA_L



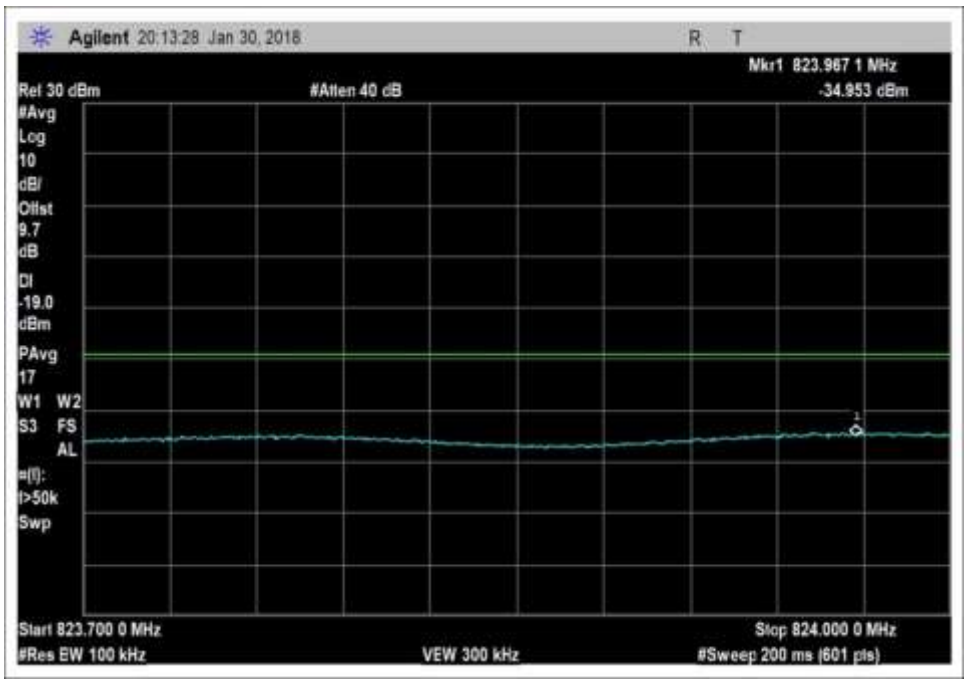
UL_776-787MHz_CDMA_H



UL_776-787MHz_CDMA_L



UL_824-849MHz_CDMA_H



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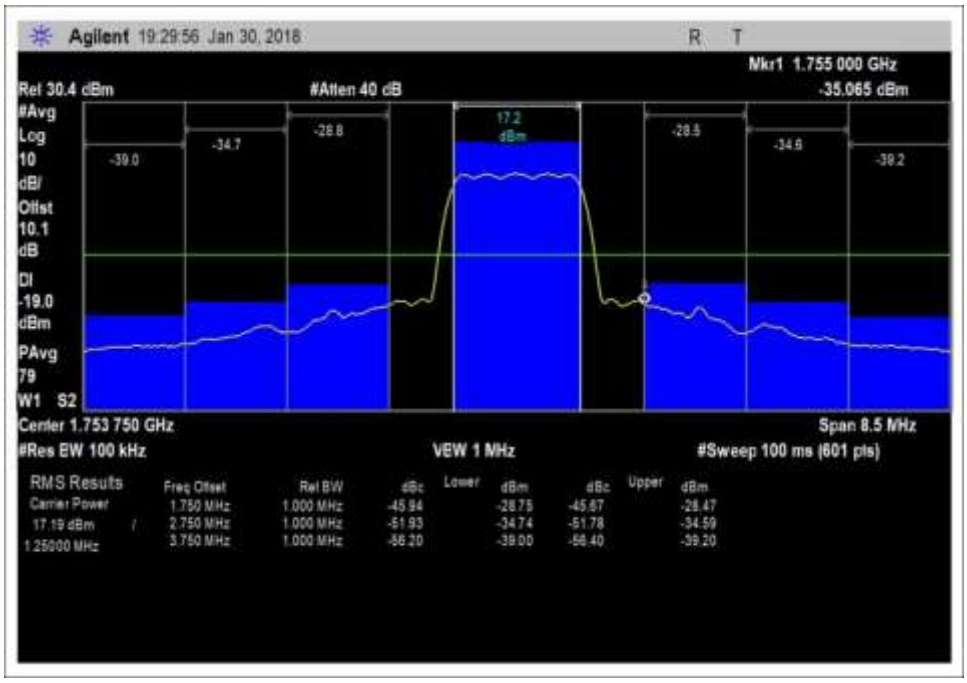
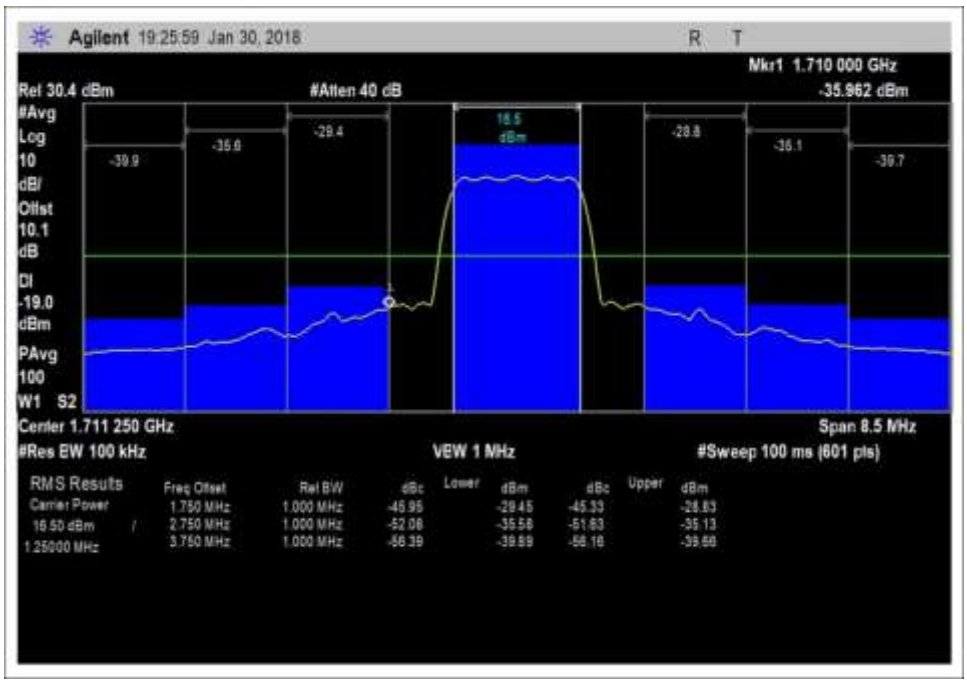


UL_1710-1755MHz_CDMA_H



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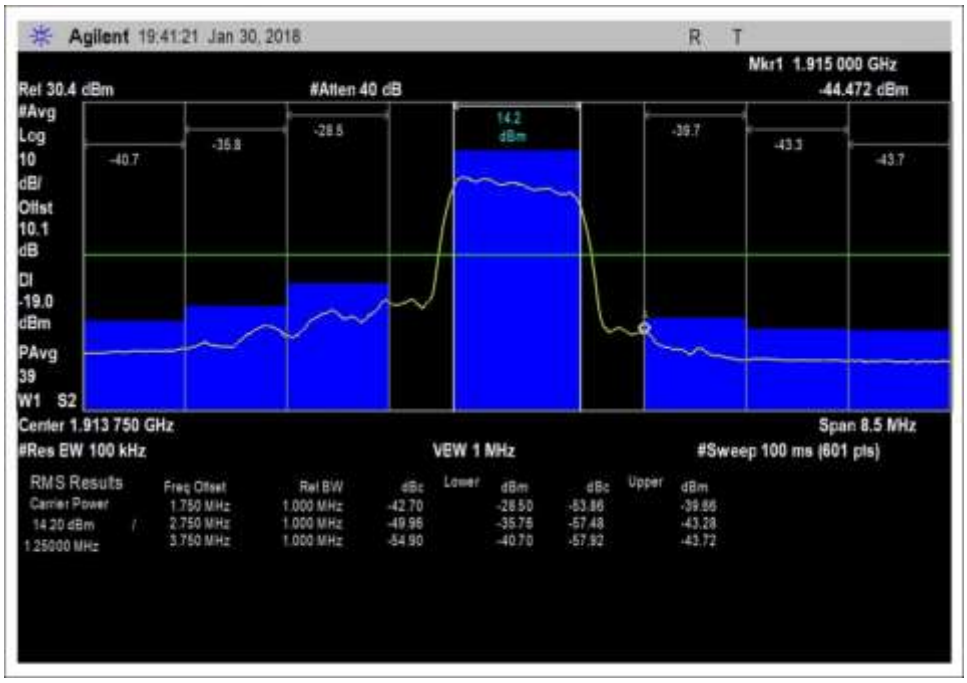
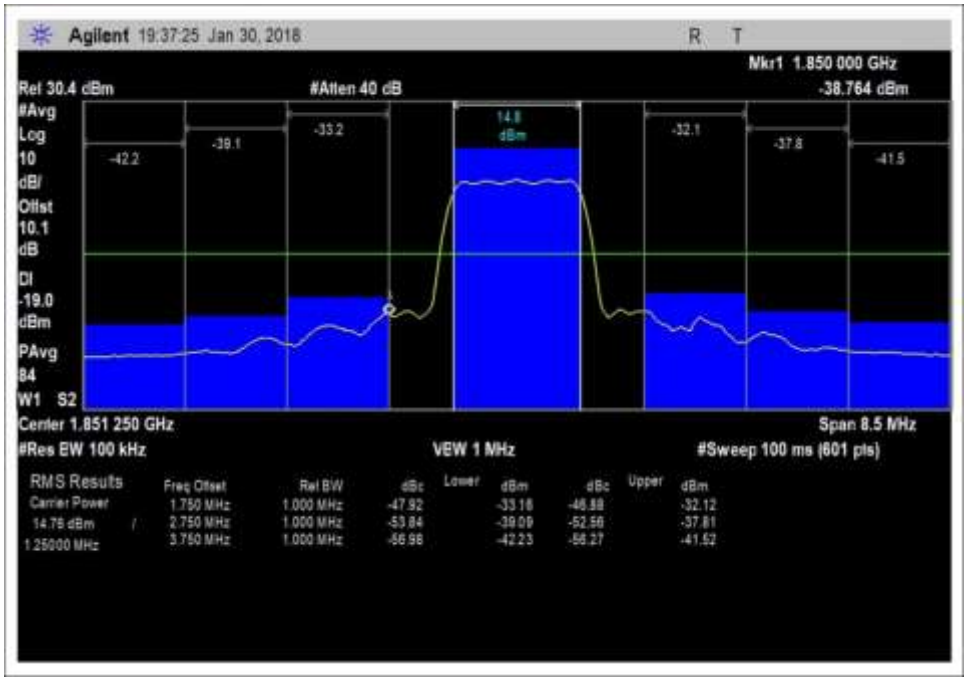
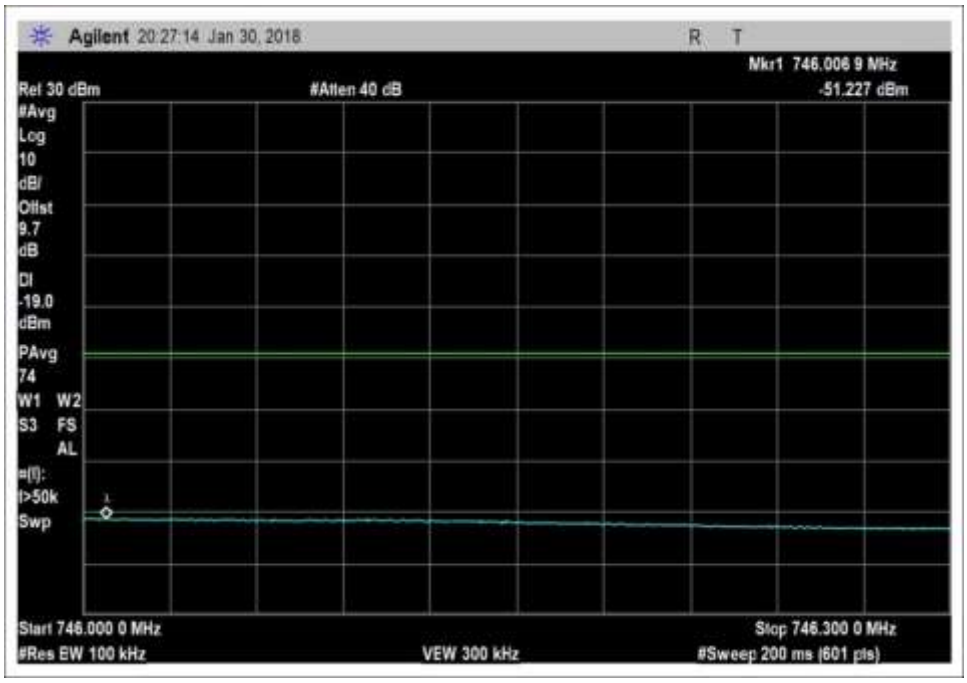


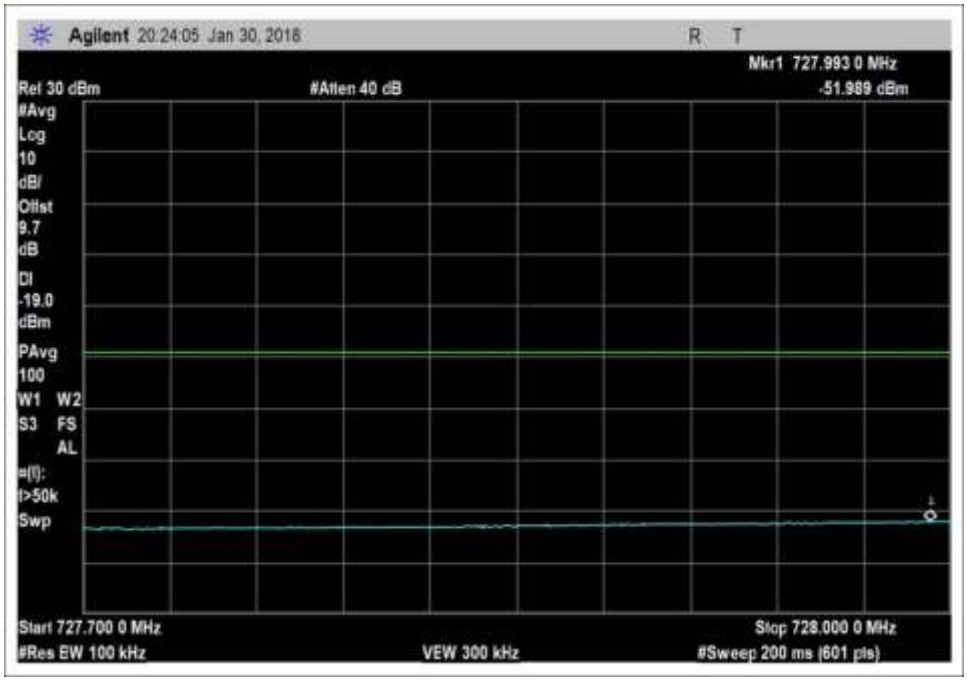
UL_1850-1915MHz_CDMA_H



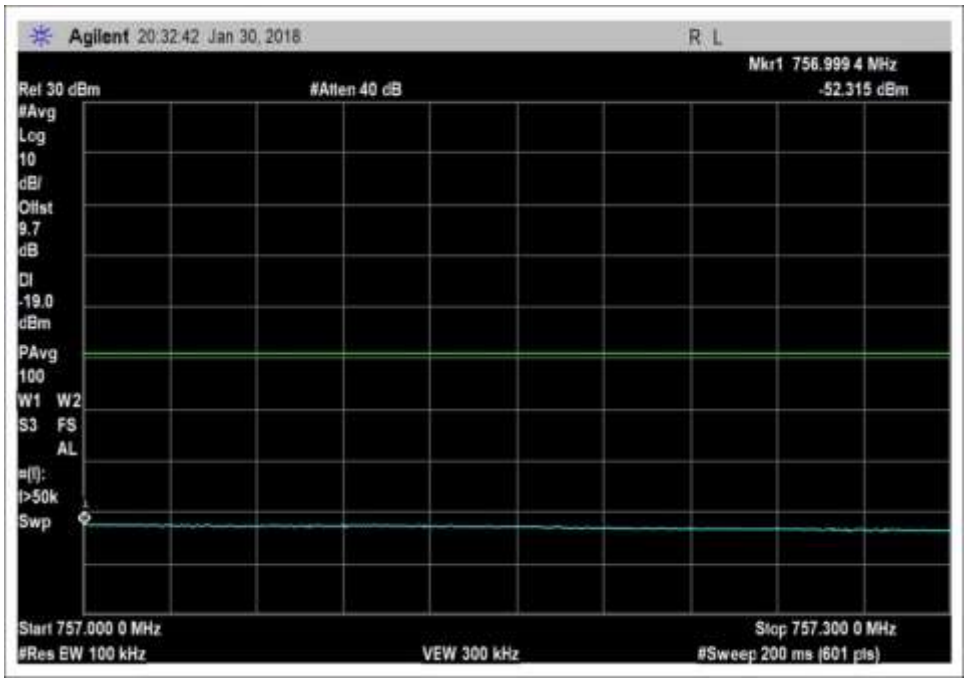
UL_1850-1915MHz_CDMA_L



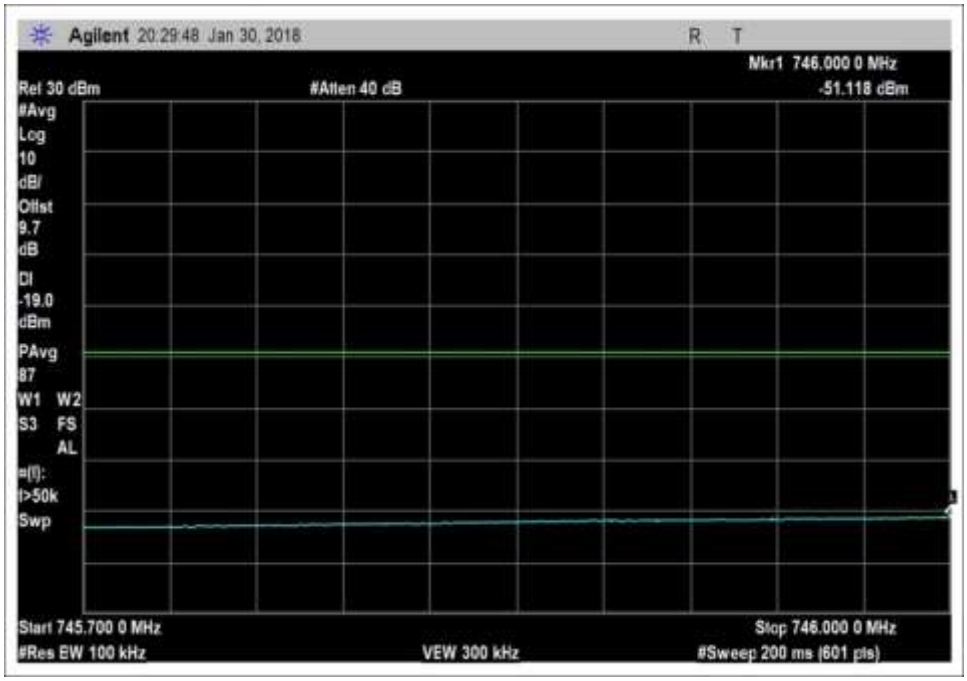
DL_728-746MHz_CDMA_H



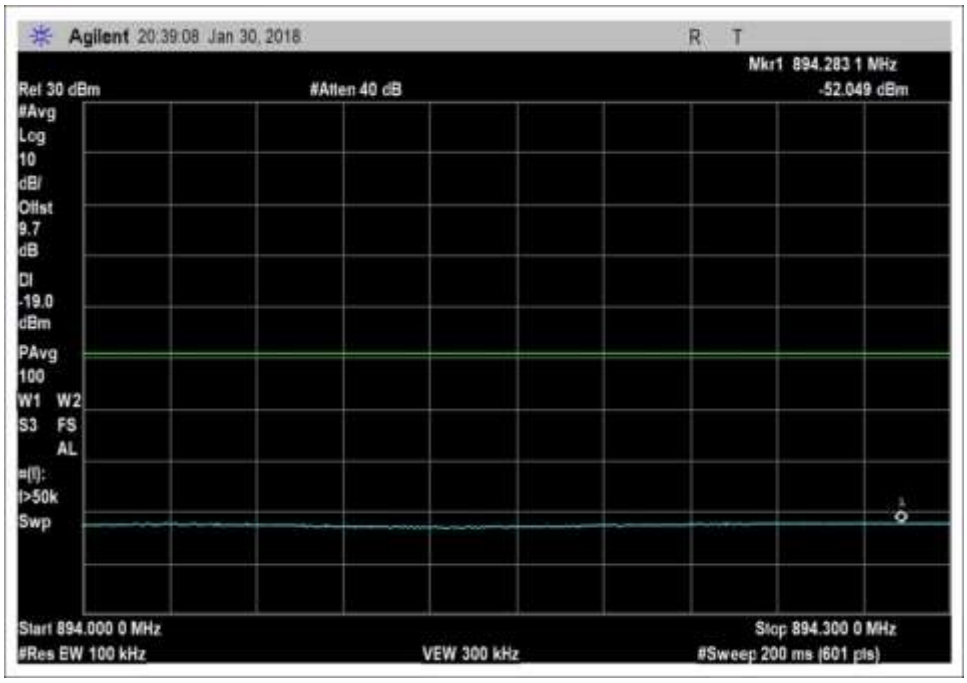
DL_728-746MHz_CDMA_L



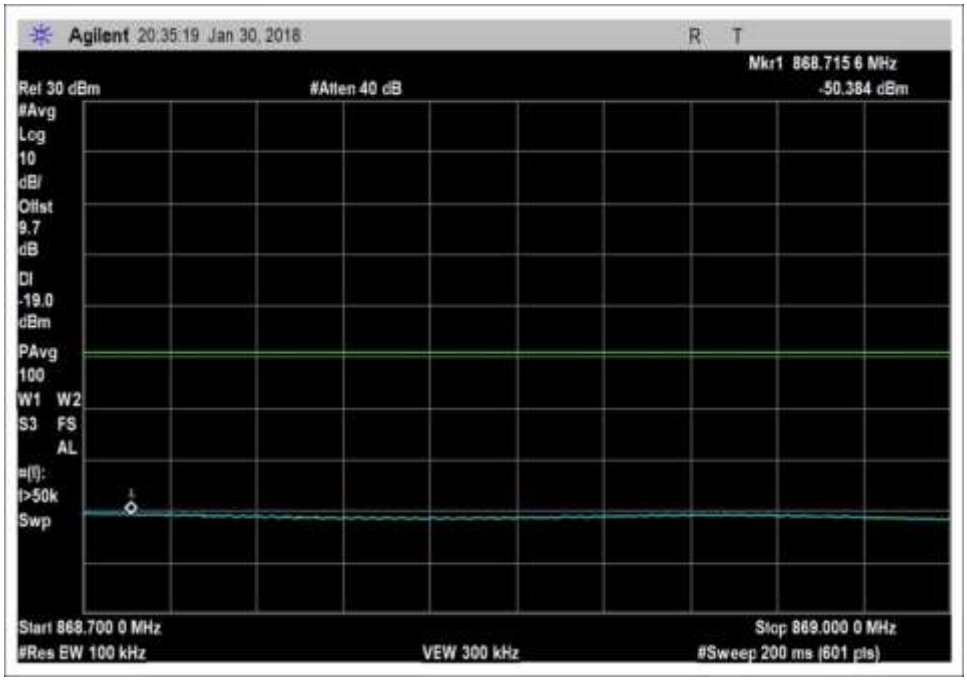
DL_746-757MHz_CDMA_H



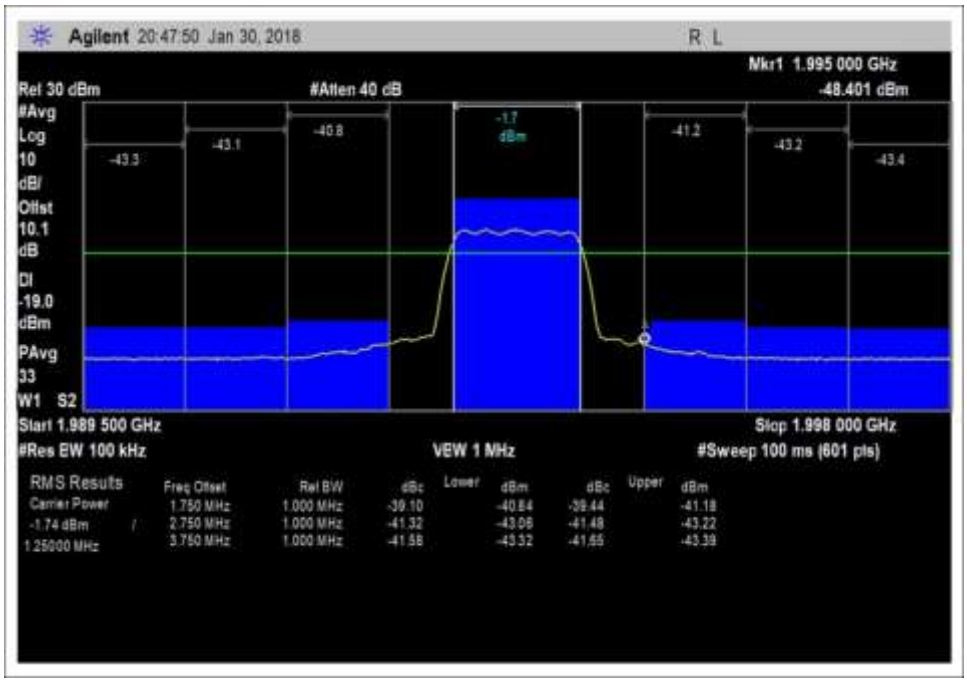
DL_746-757MHz_CDMA_L



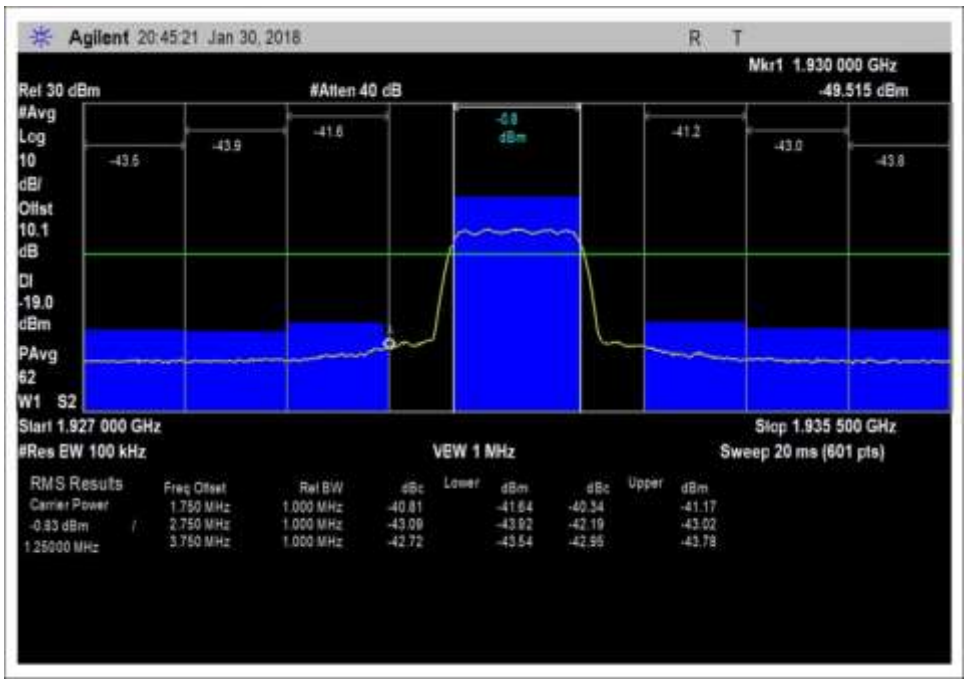
DL_869-894MHz_CDMA_H



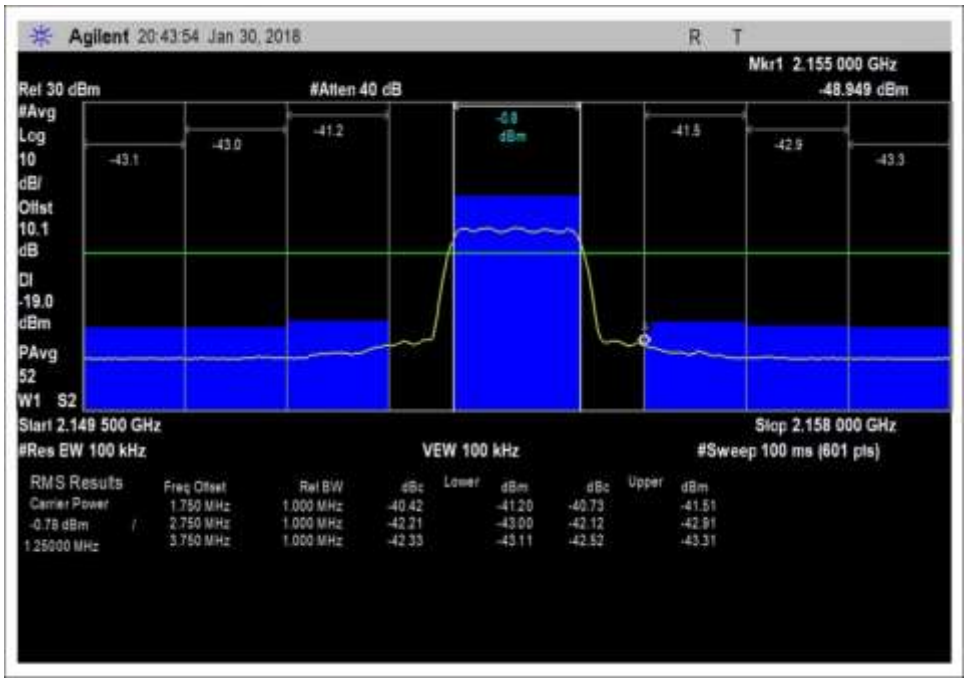
DL_869-894MHz_CDMA_L



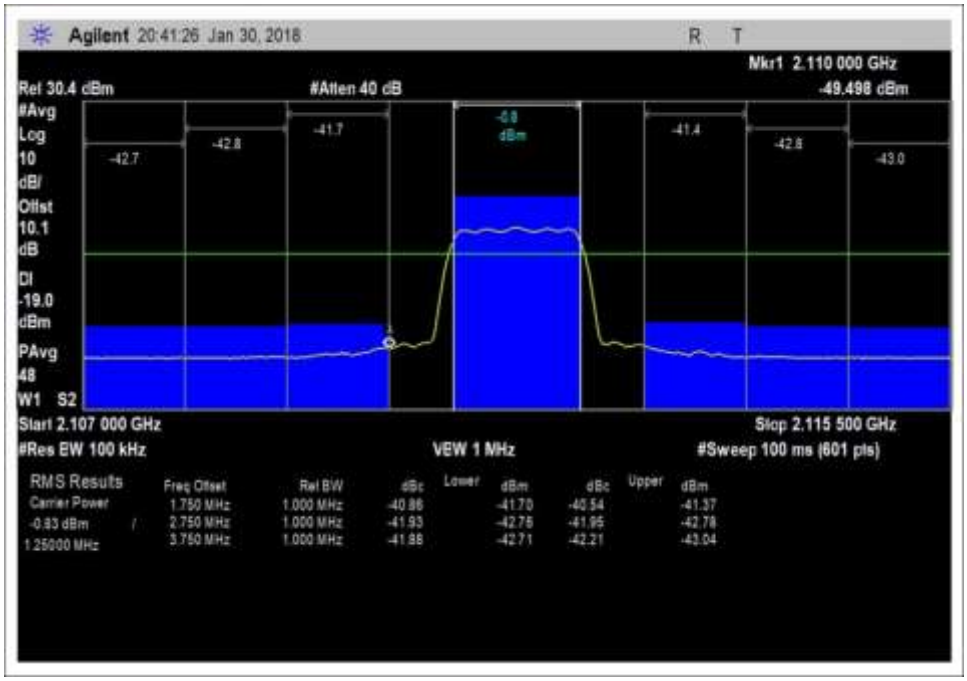
DL_1930-1995MHz_CDMA_H



DL_1930-1995MHz_CDMA_L

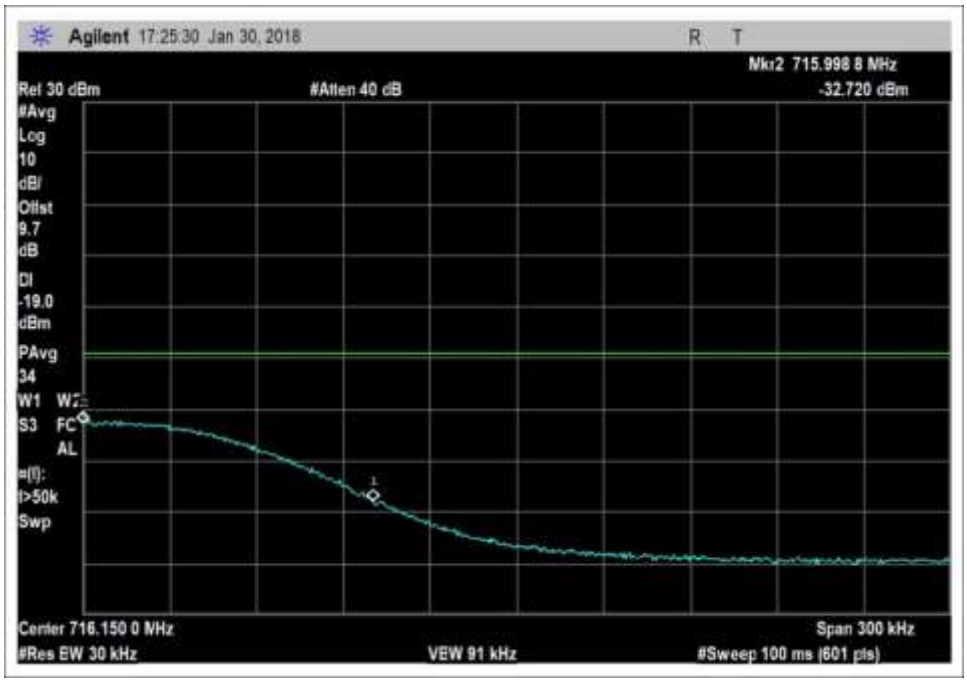


DL_2110-2155MHz_CDMA_H

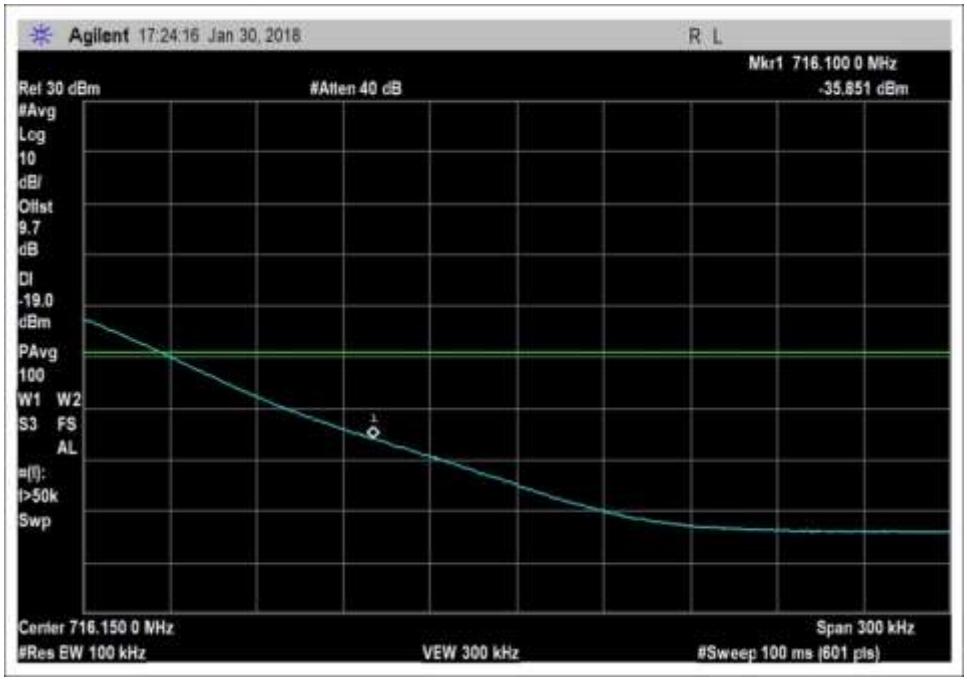


DL_2110-2155MHz_CDMA_L

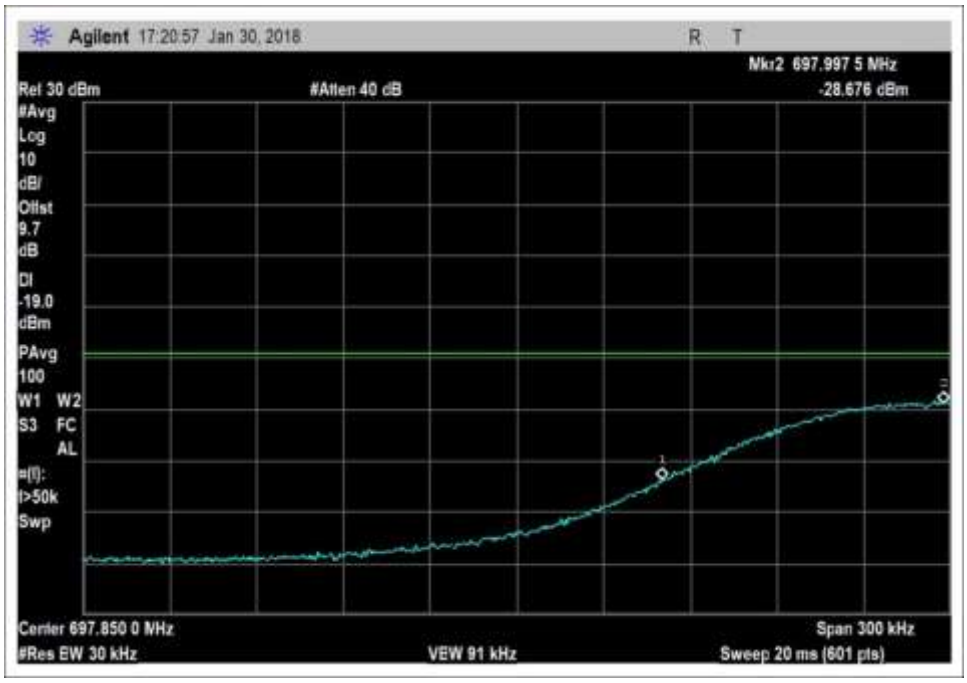
GSM



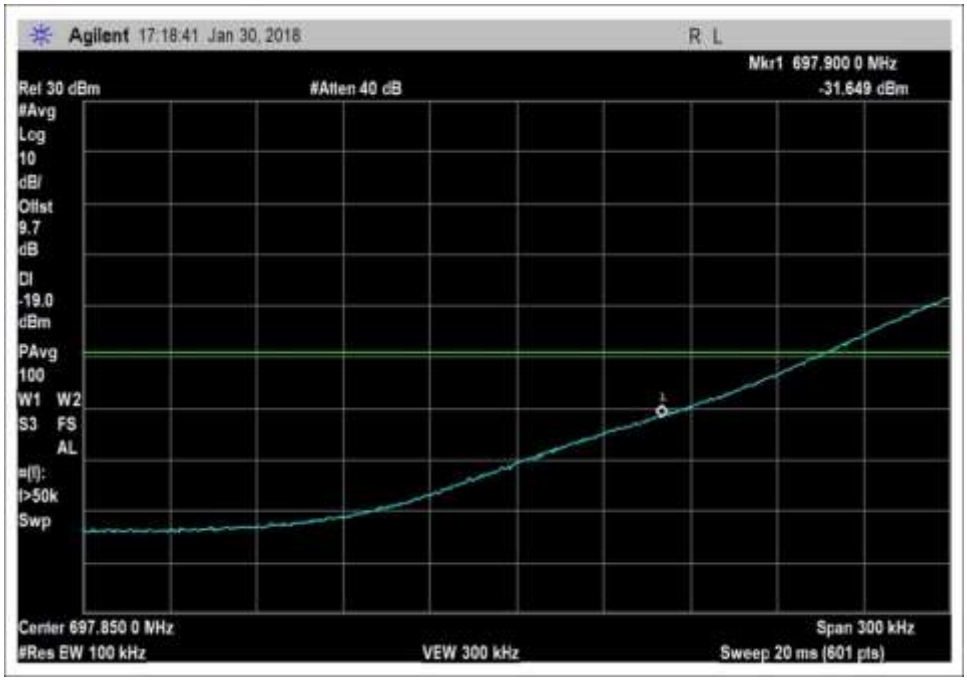
UL_698-716MHz_GSM_H_rbw=30kHz



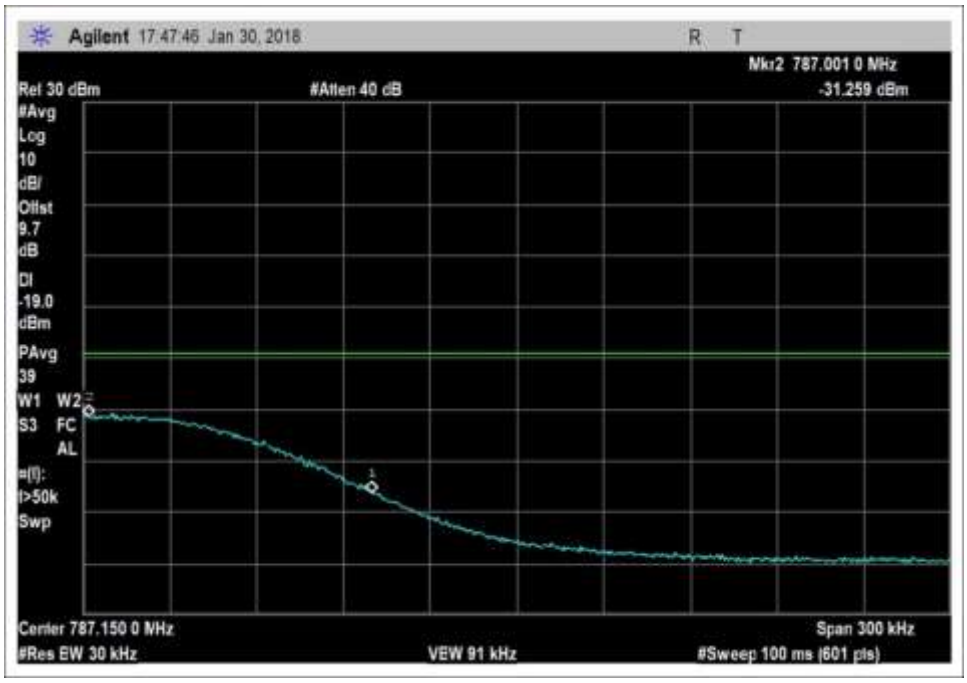
UL_698-716MHz_GSM_H_rbw=100kHz



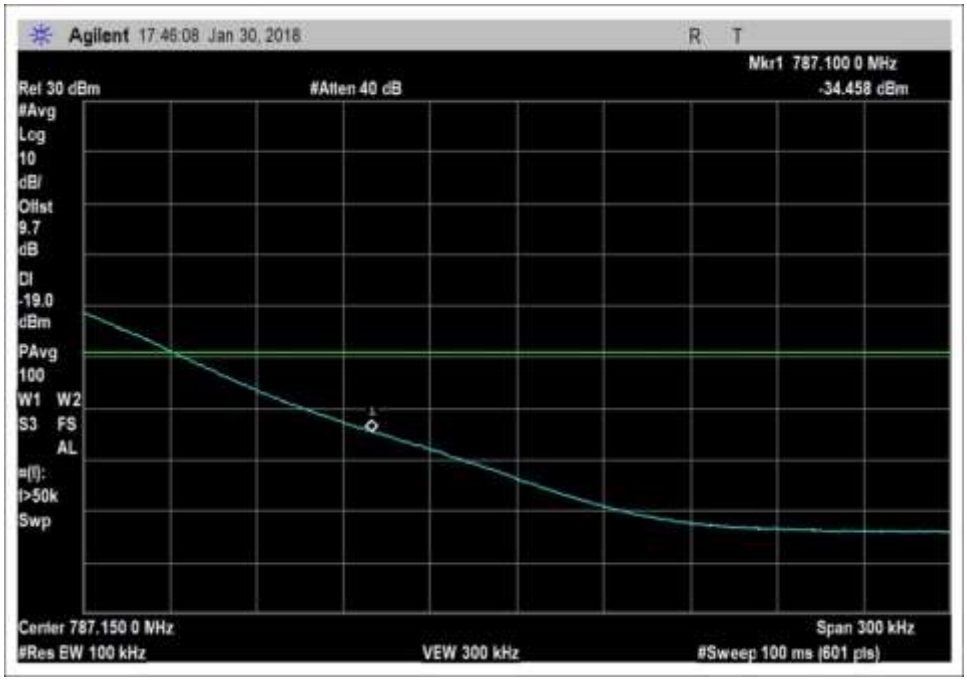
UL_698-716MHz_GSM_L_rbw=30kHz



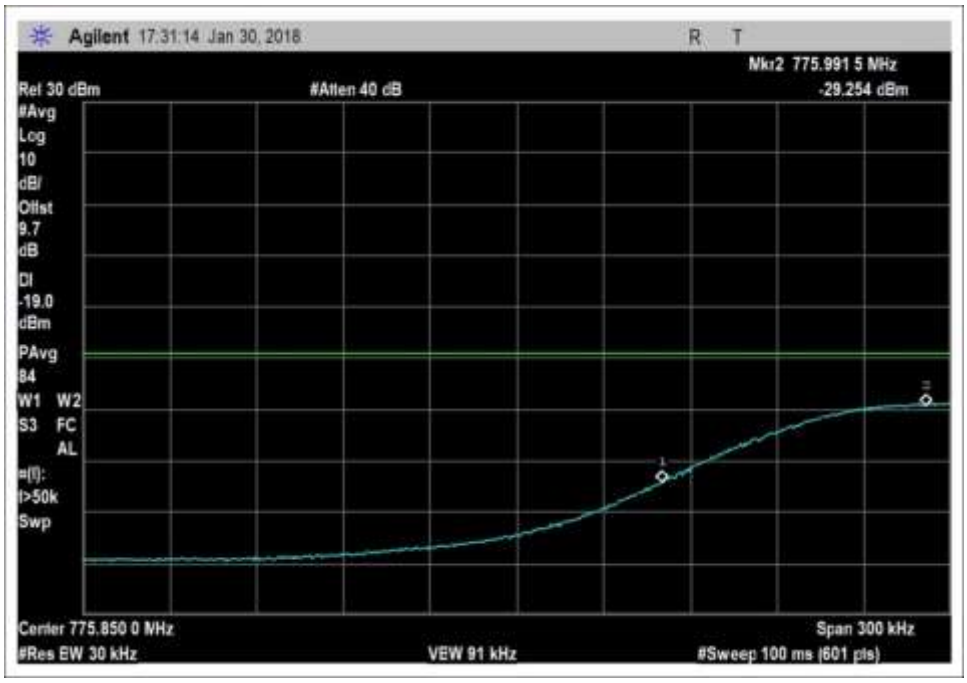
UL_698-716MHz_GSM_L_rbw=100kHz



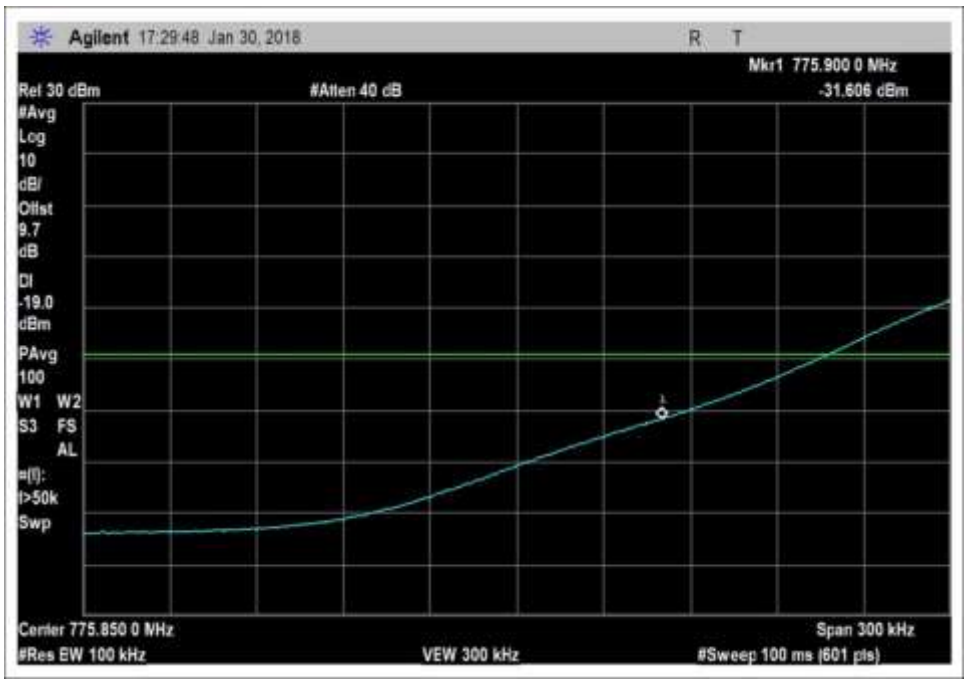
UL_776-787MHz_GSM_H_rbw=30kHz



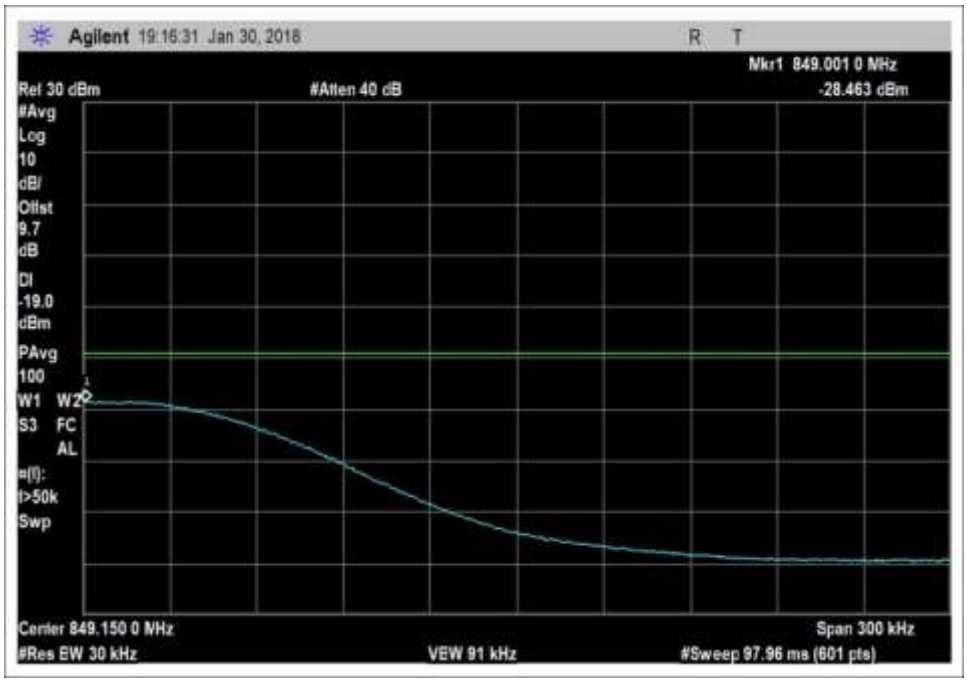
UL_776-787MHz_GSM_H_rbw=100kHz



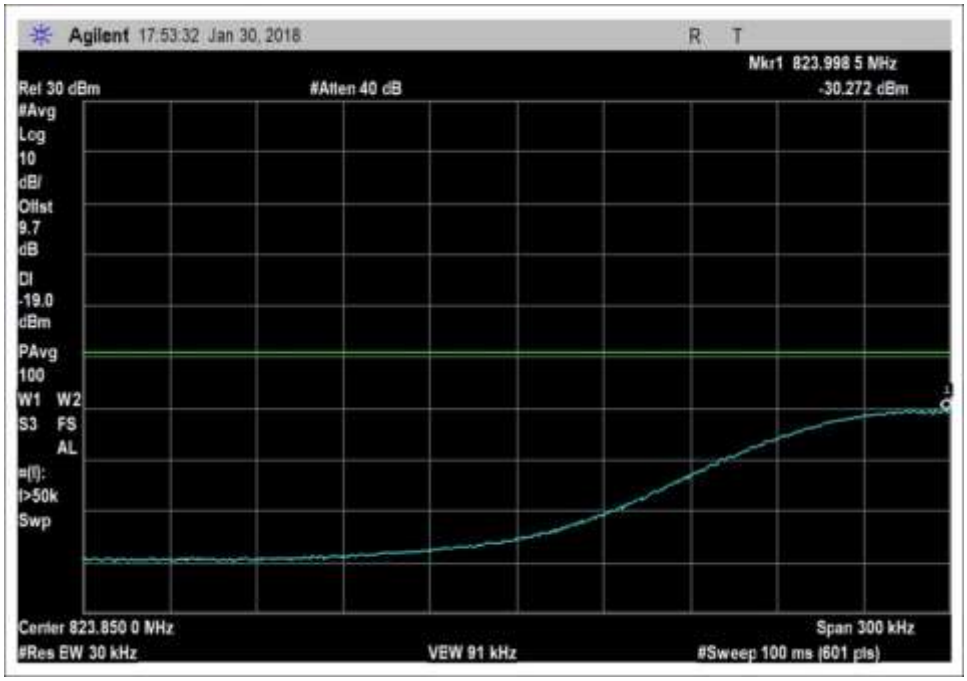
UL_776-787MHz_GSM_L_rbw=30kHz



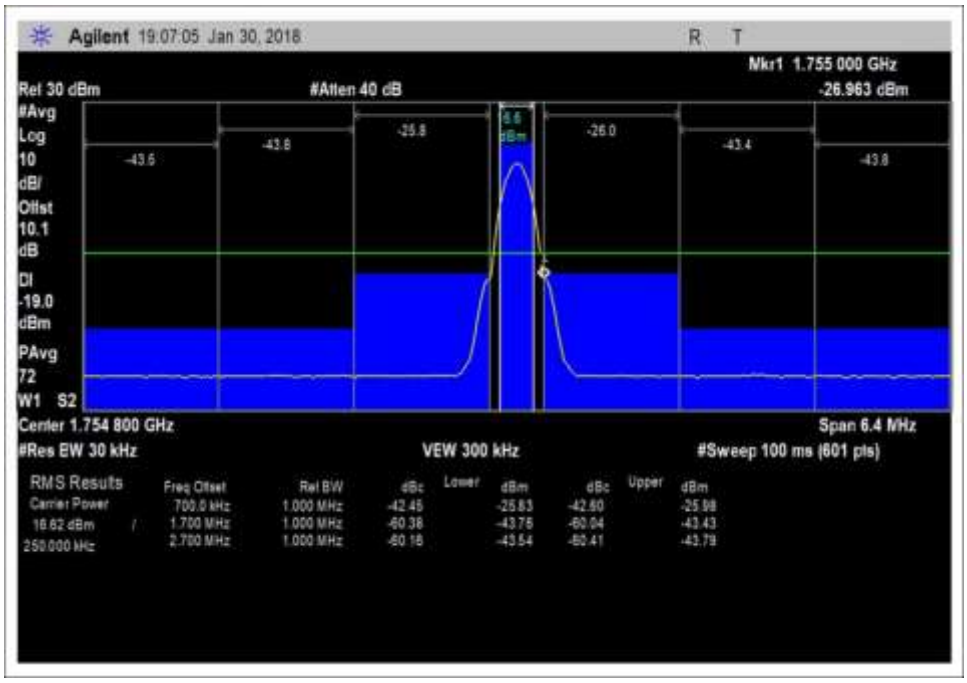
UL_776-787MHz_GSM_L_rbw=100kHz



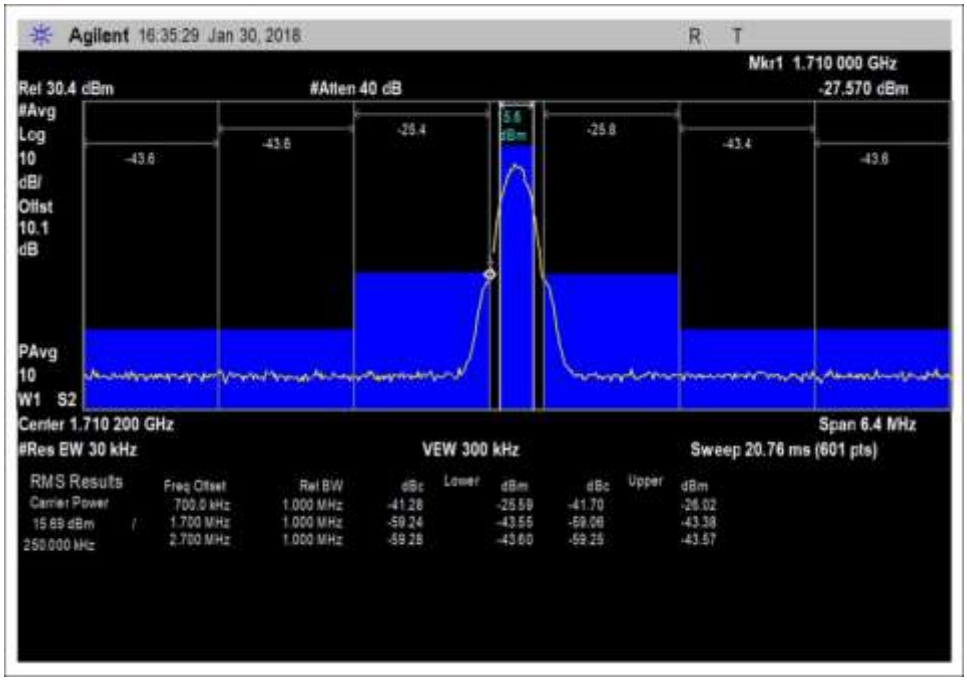
UL_824-849_GSM_H_rbw=30kHz



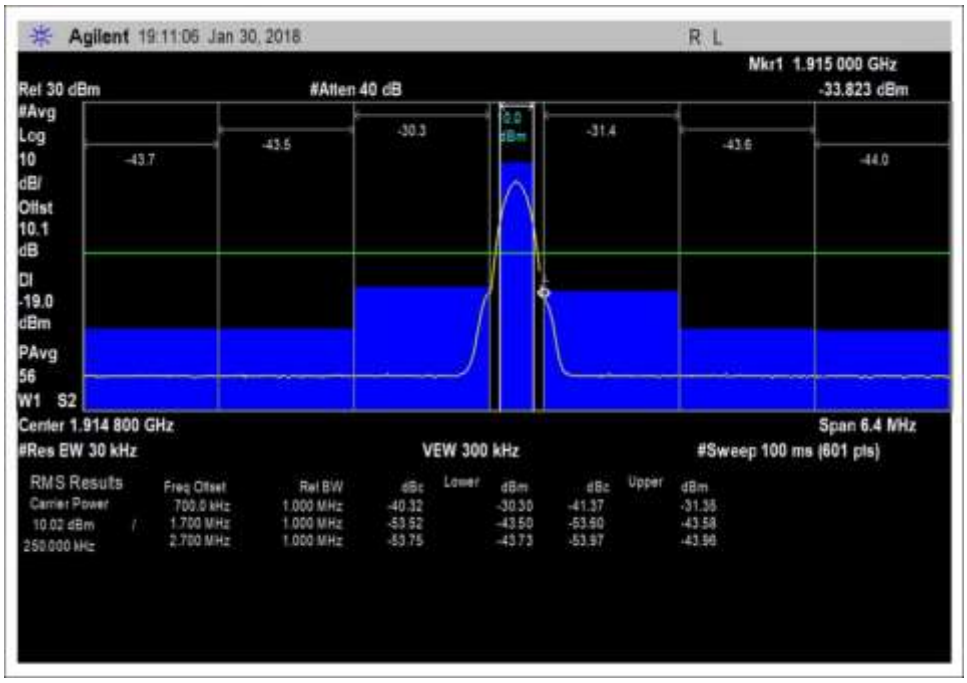
UL_824-849_GSM_L_rbw=30kHz



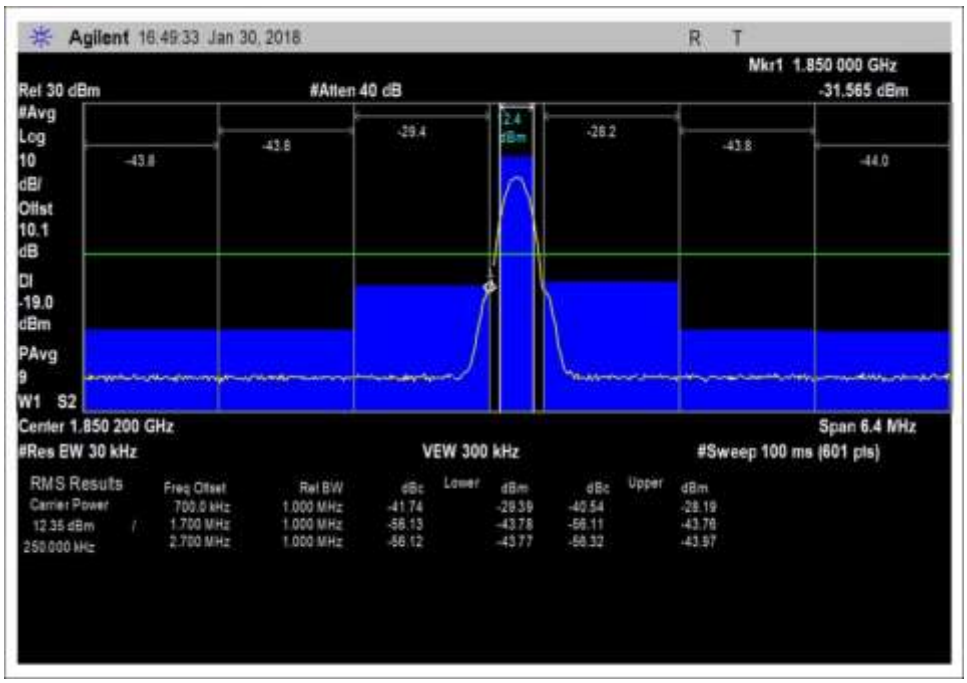
UL_1710-1755MHz_GSM_H



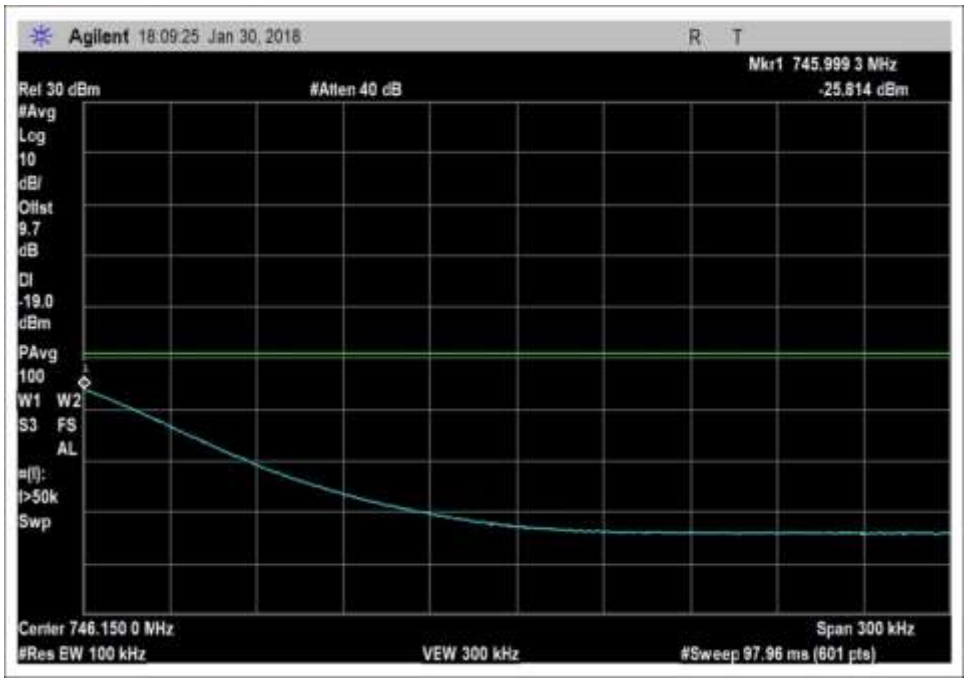
UL_1710-1755MHz_GSM_L



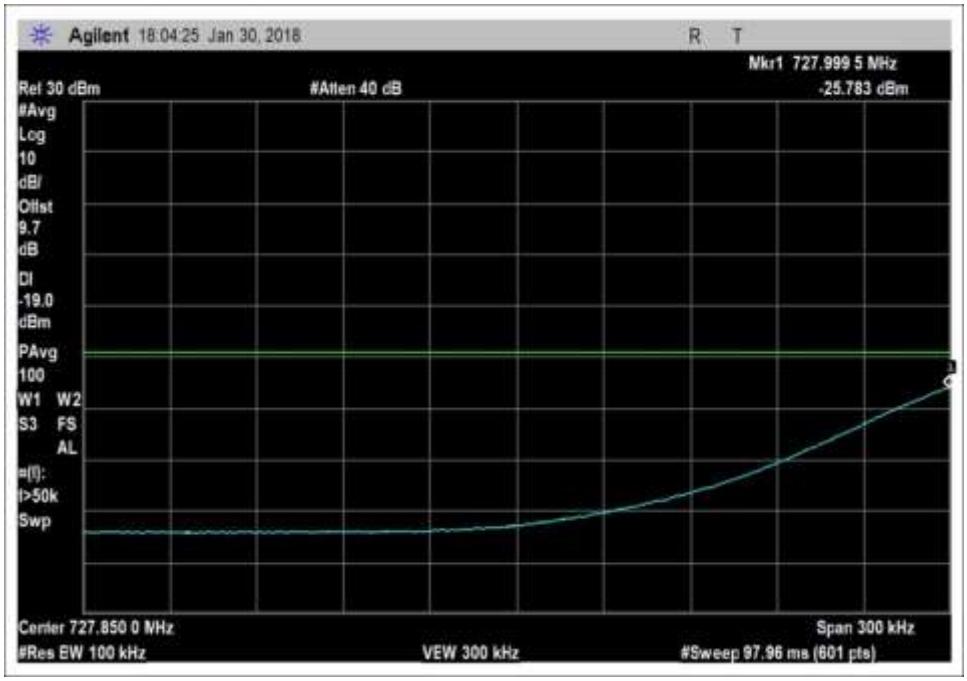
UL_1850-1915MHz_GSM_H



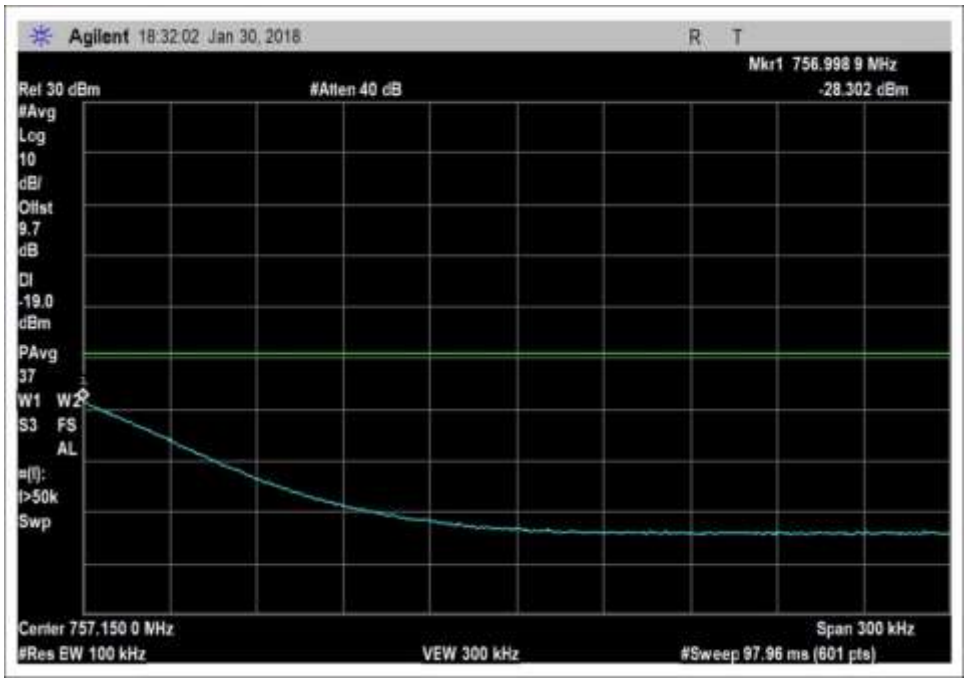
UL_1850-1915MHz_GSM_L



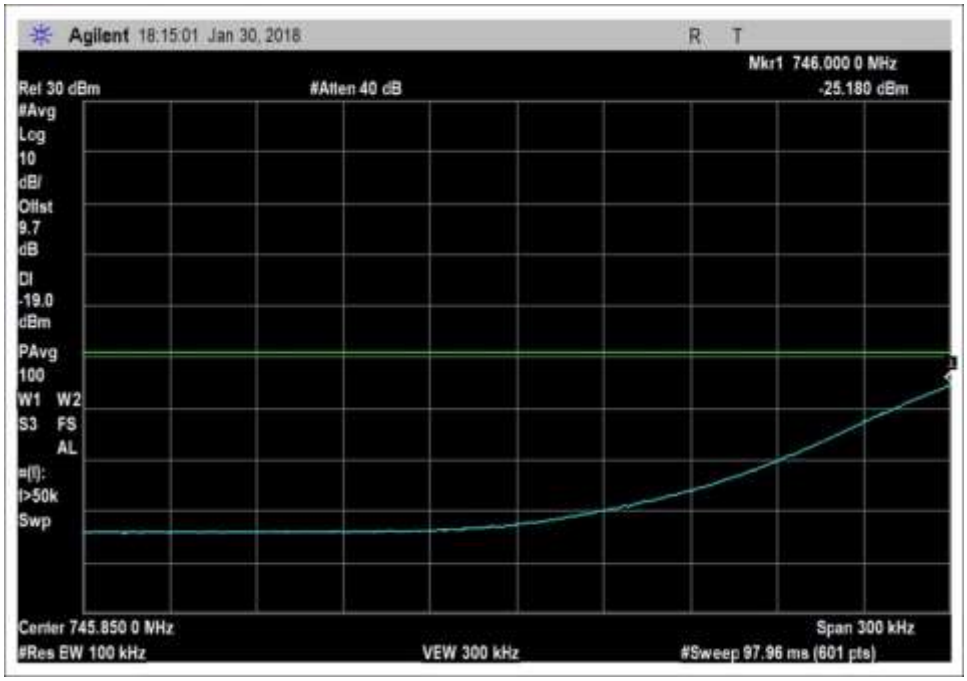
DL_728-746MHz_GSM_H_rbw=100kHz



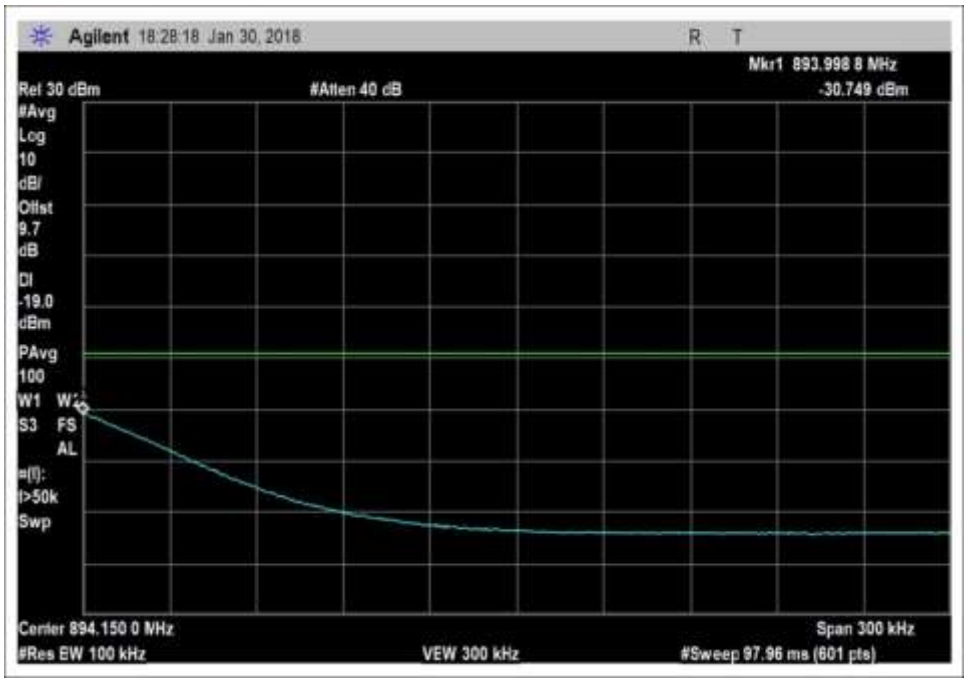
DL_728-746MHz_GSM_L_rbw=100kHz



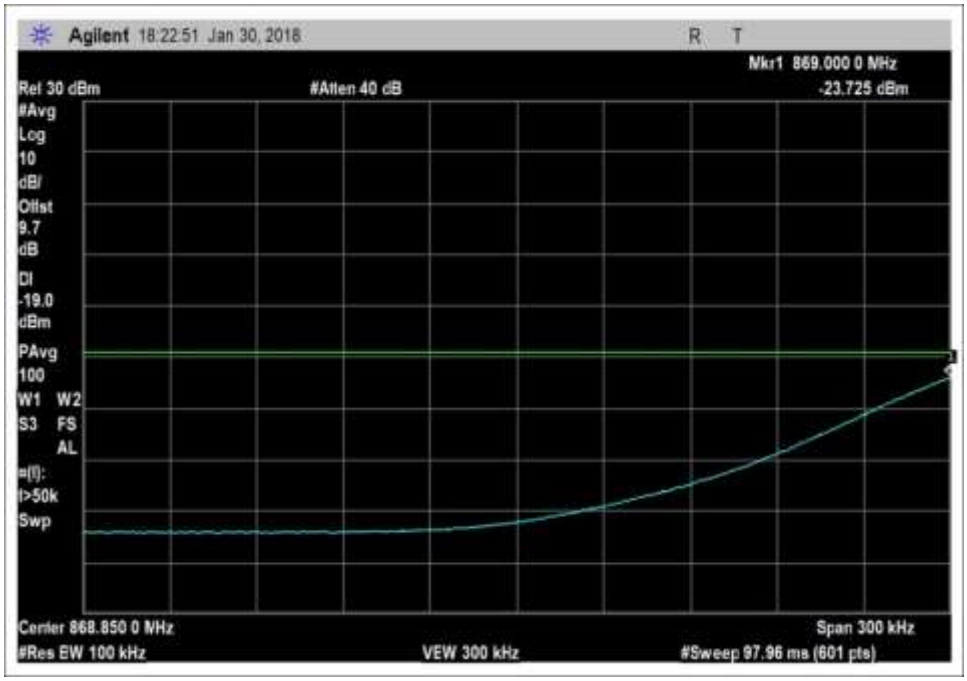
DL_746-757MHz_GSM_H_rbw=100kHz



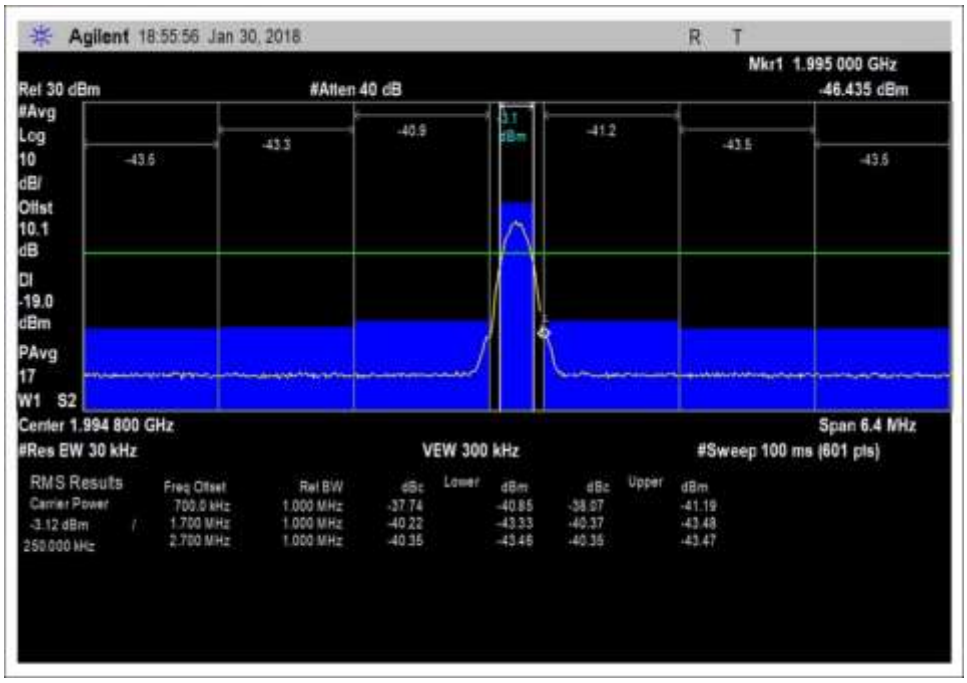
DL_746-757MHz_GSM_L_rbw=100kHz



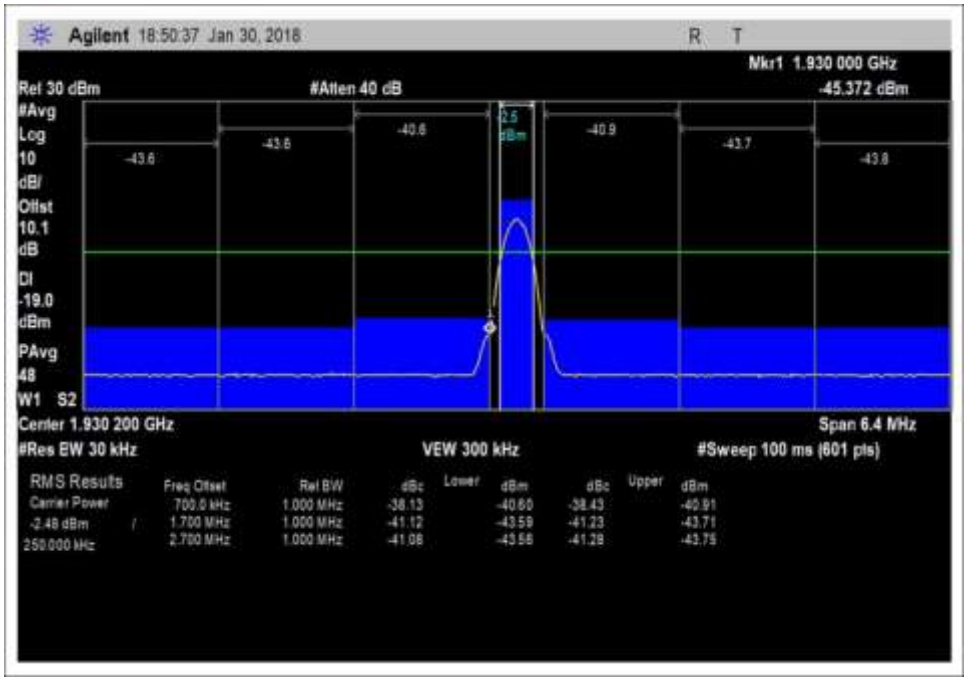
DL_869-894MHz_GSM_H_rbw=100kHz



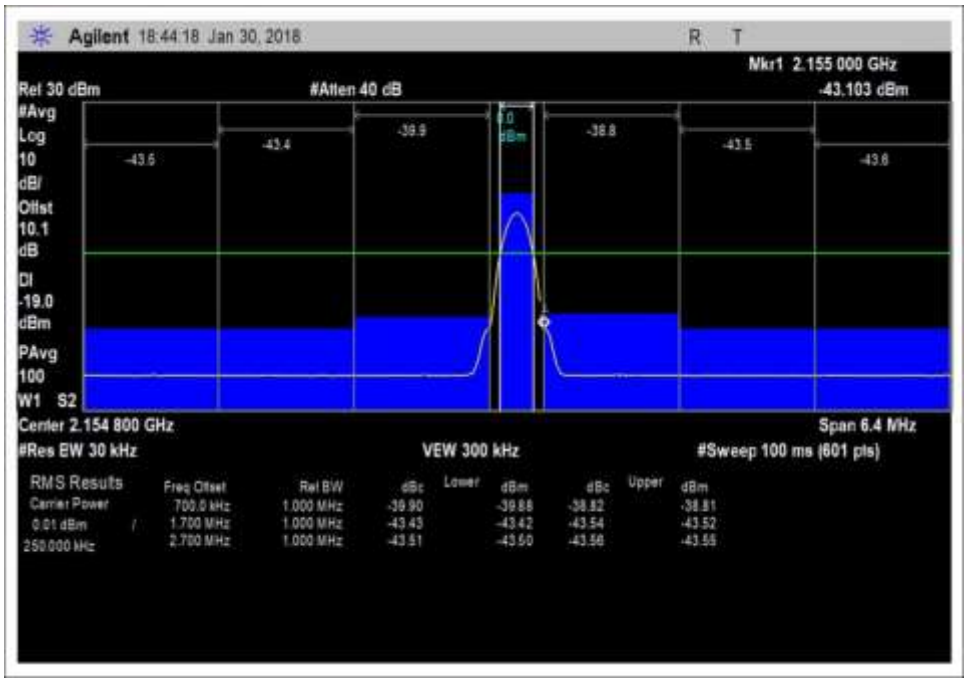
DL_869-894MHz_GSM_L_rbw=100kHz



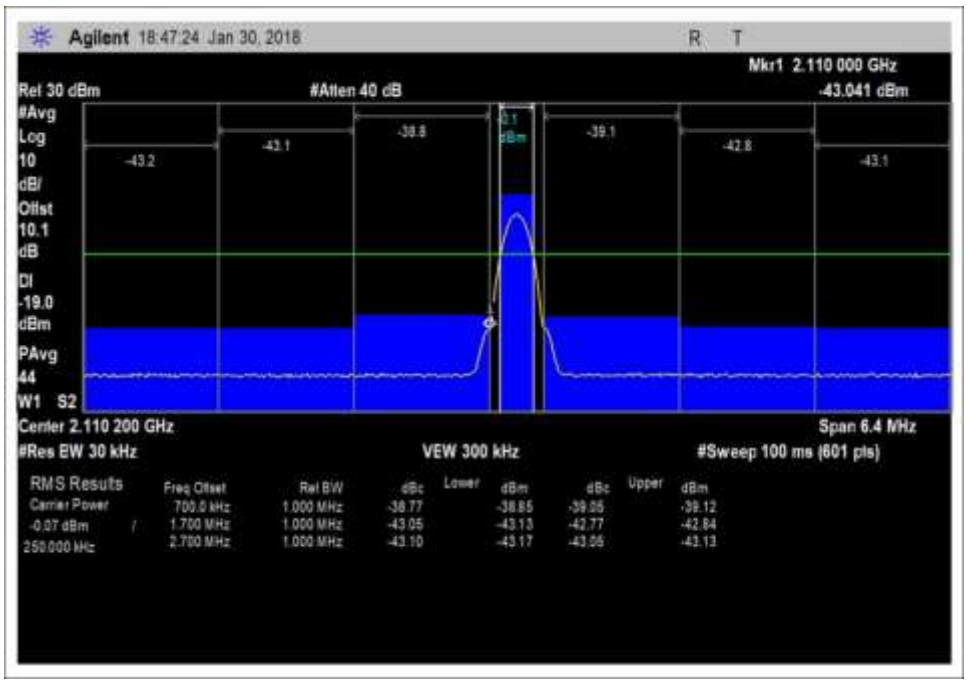
DL_1930-1995MHz_GSM_H



DL_1930-1995MHz_GSM_L

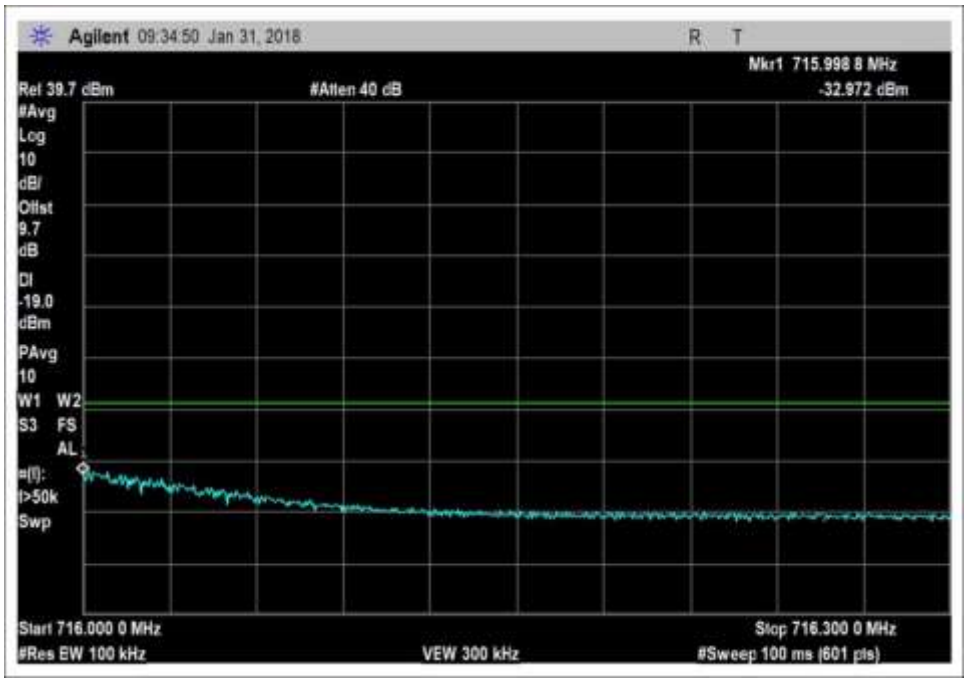


DL_2110-2155MHz_GSM_H

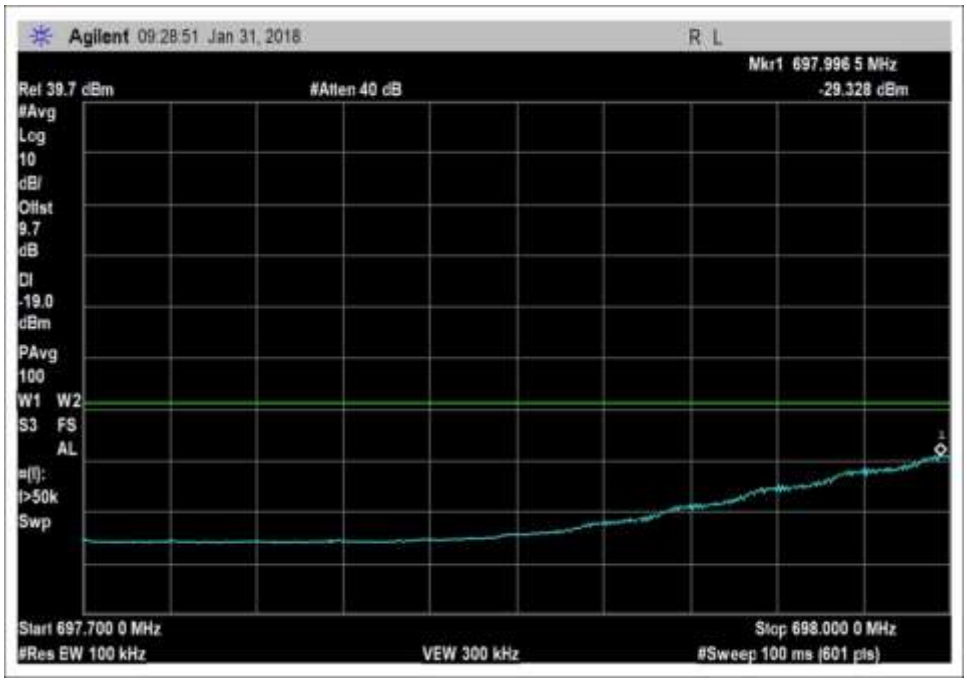


DL_2110-2155MHz_GSM_L

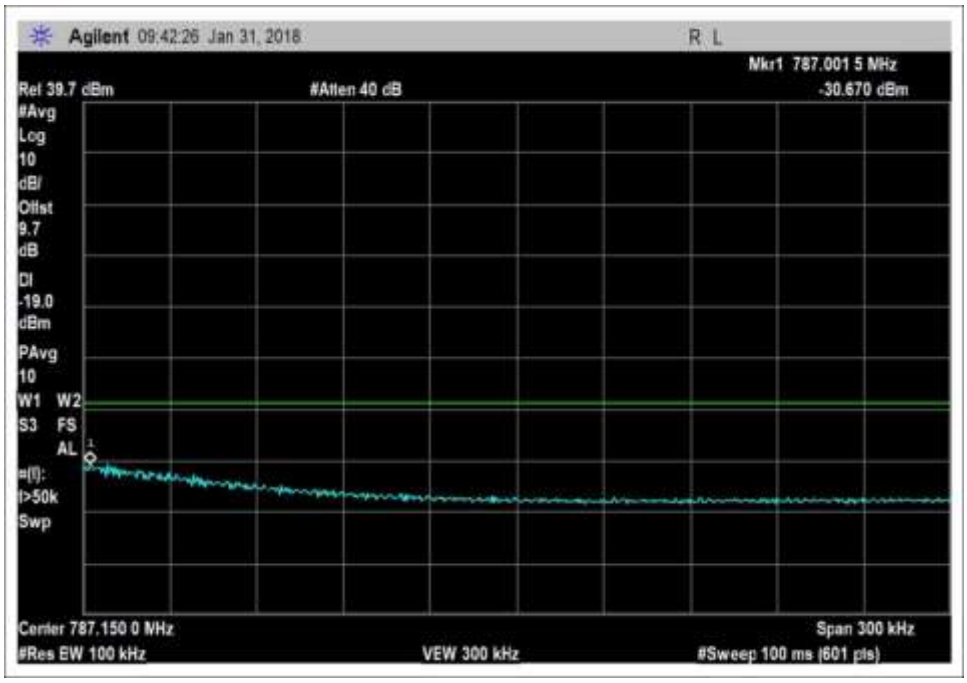
LTE



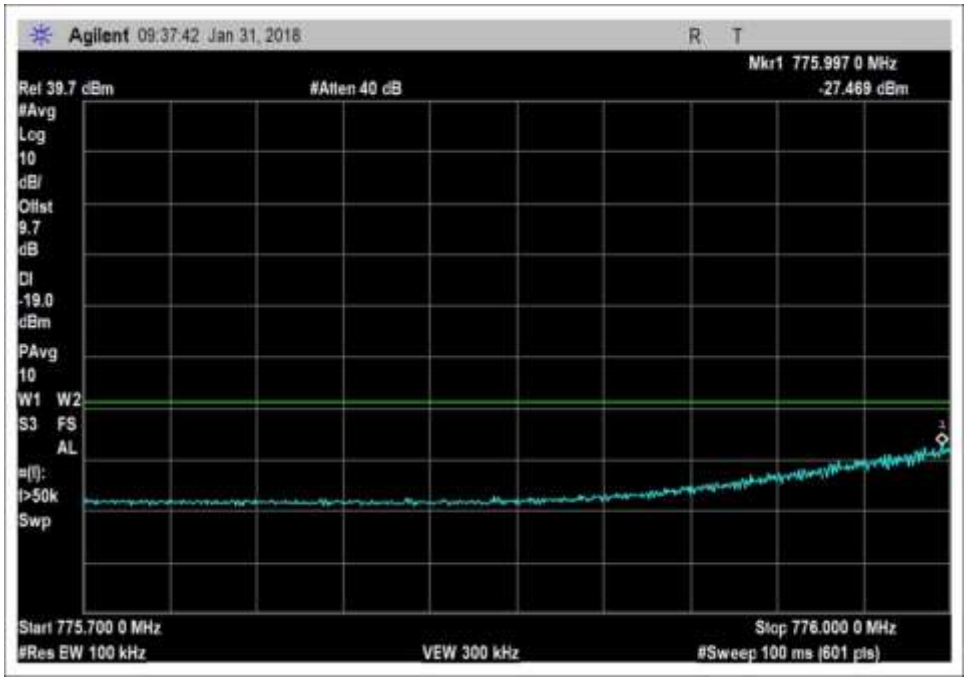
UL_698-716MHz_LTE_H



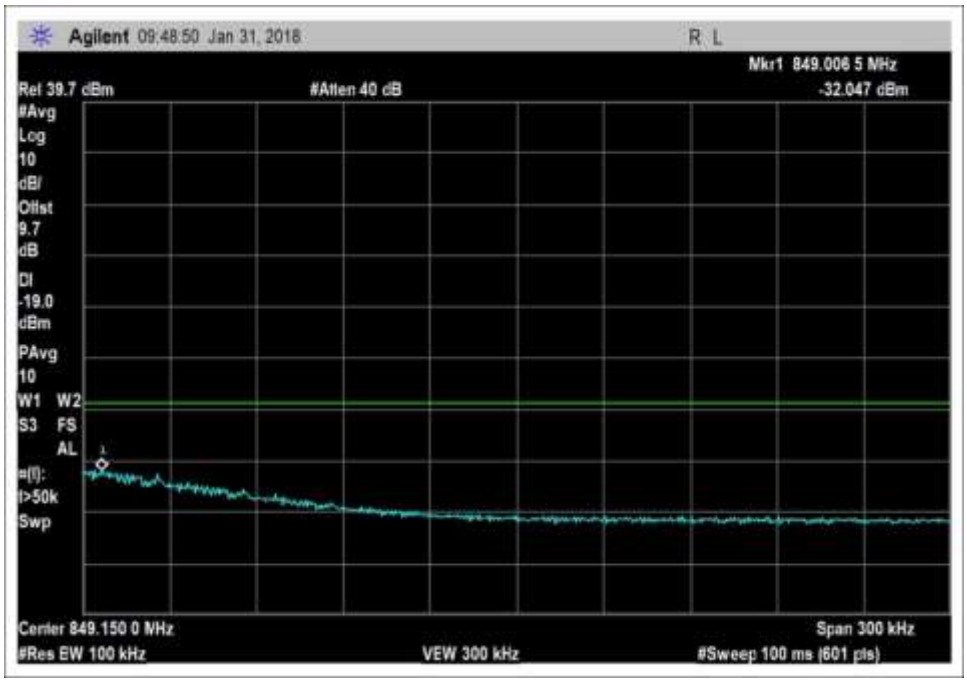
UL_698-716MHz_LTE_L



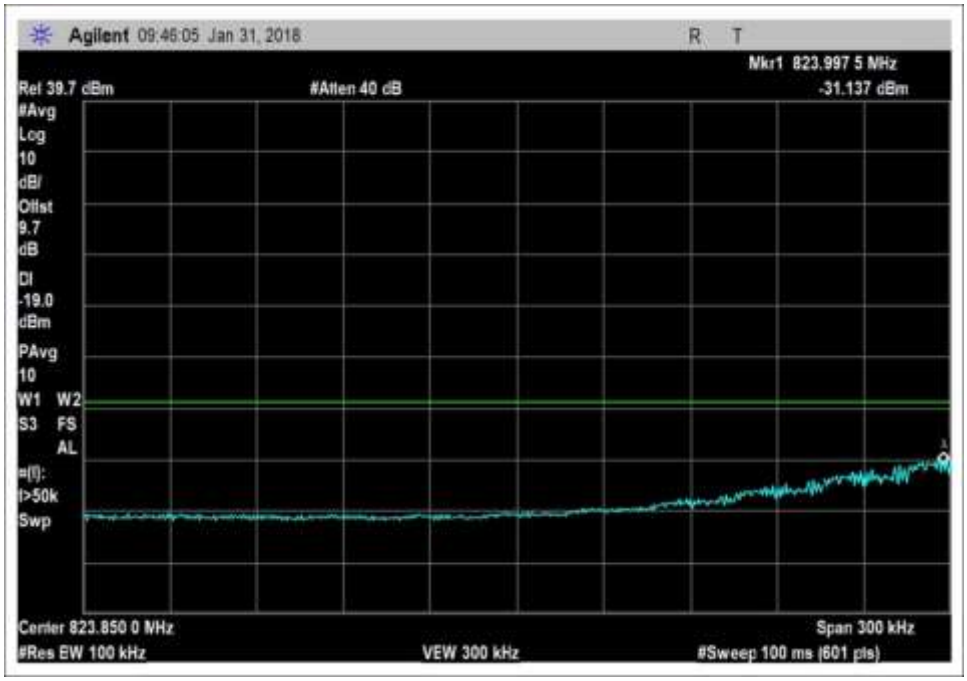
UL_776-787MHz_LTE_H



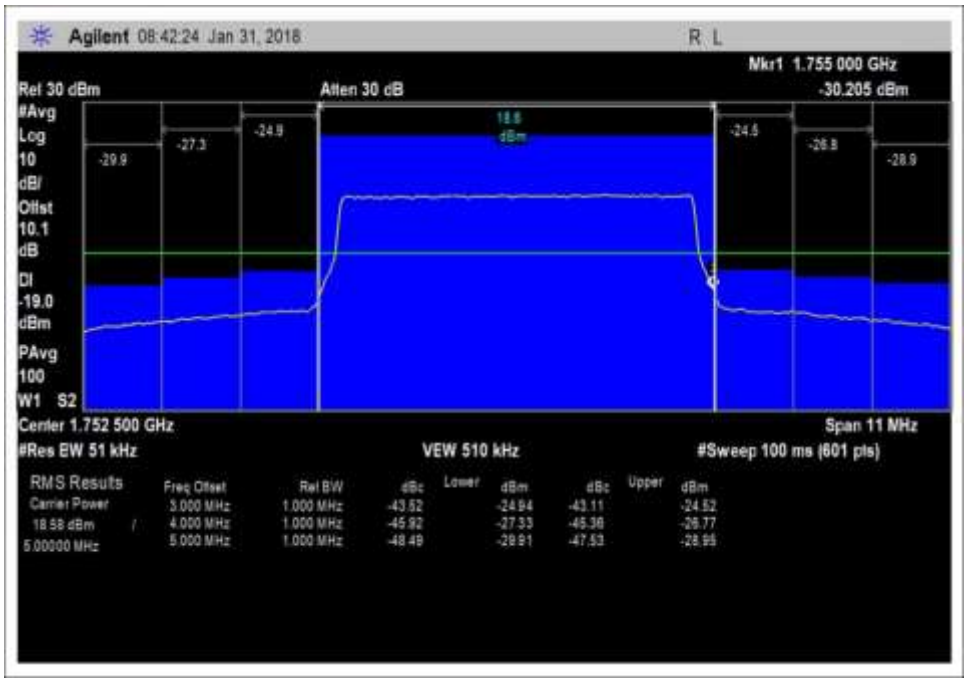
UL_776-787MHz_LTE_L



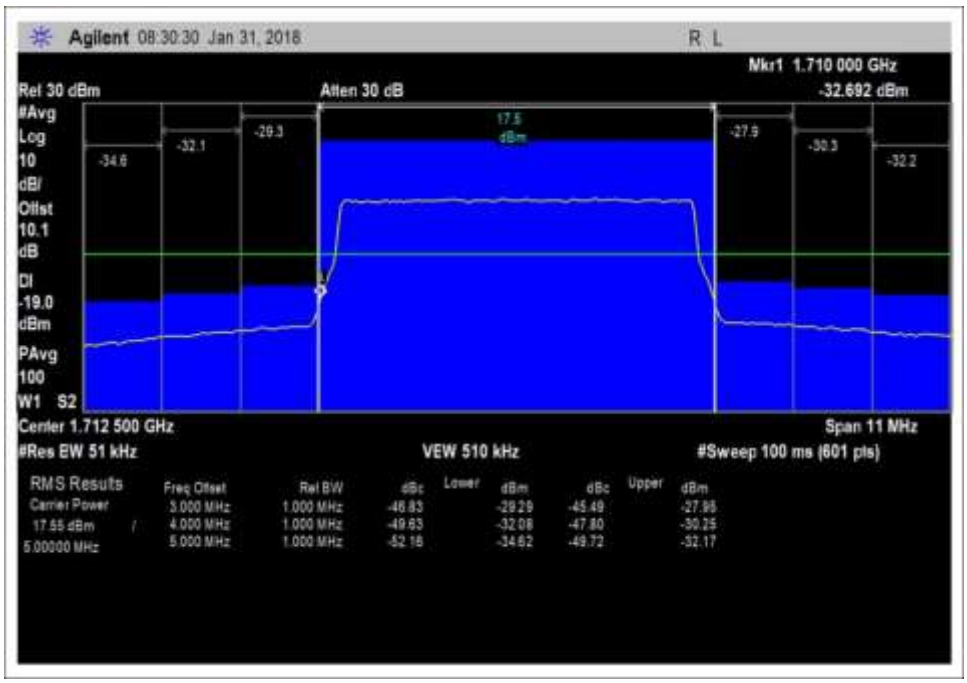
UL_824-849MHz_LTE_H



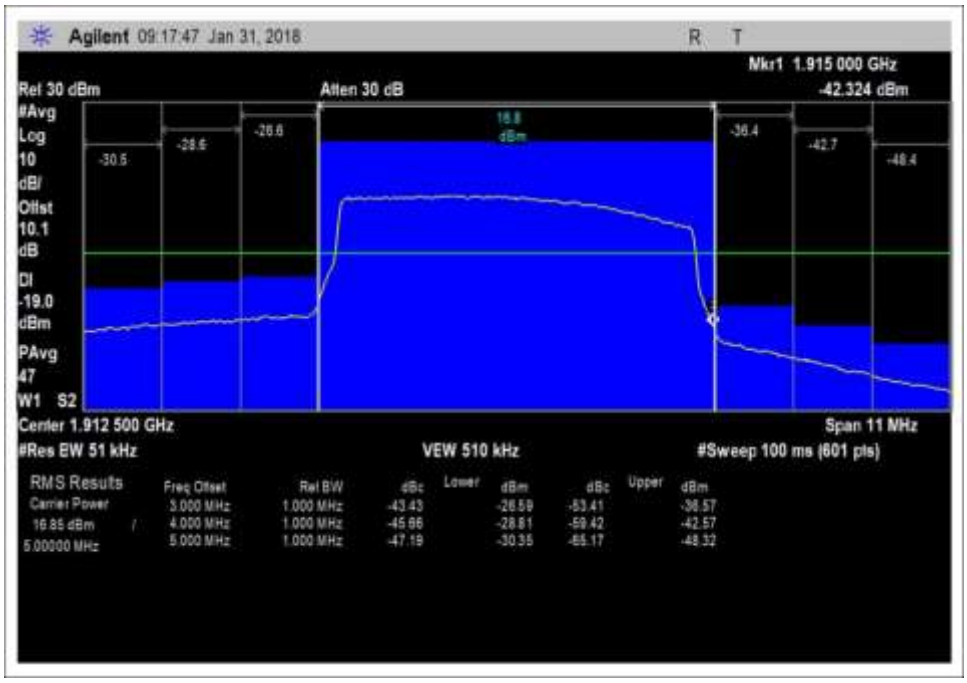
UL_824-849MHz_LTE_L



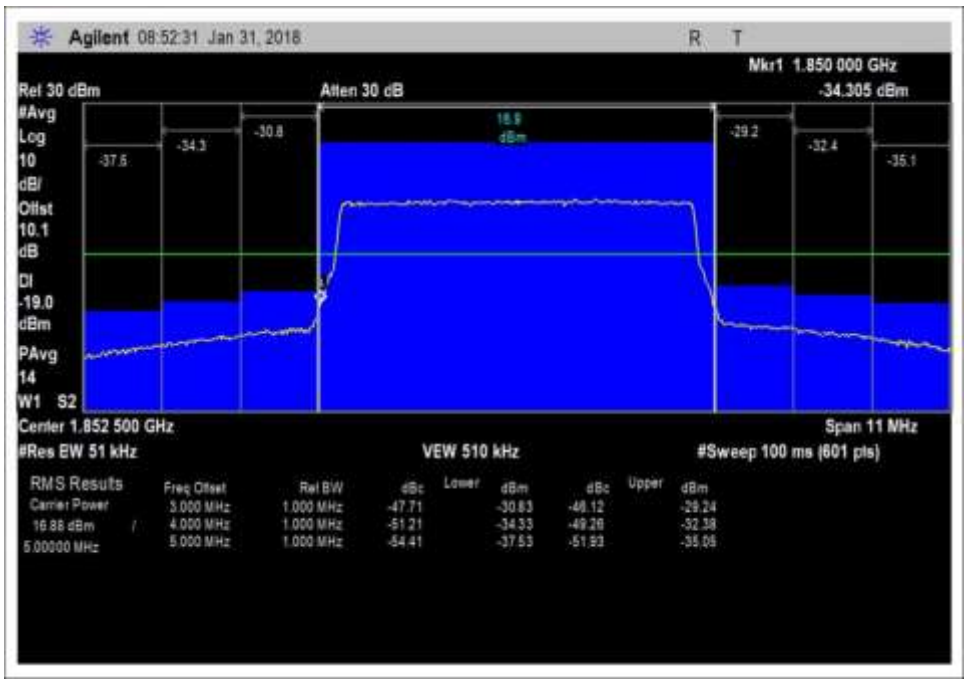
UL_1710-1755MHz_LTE_H



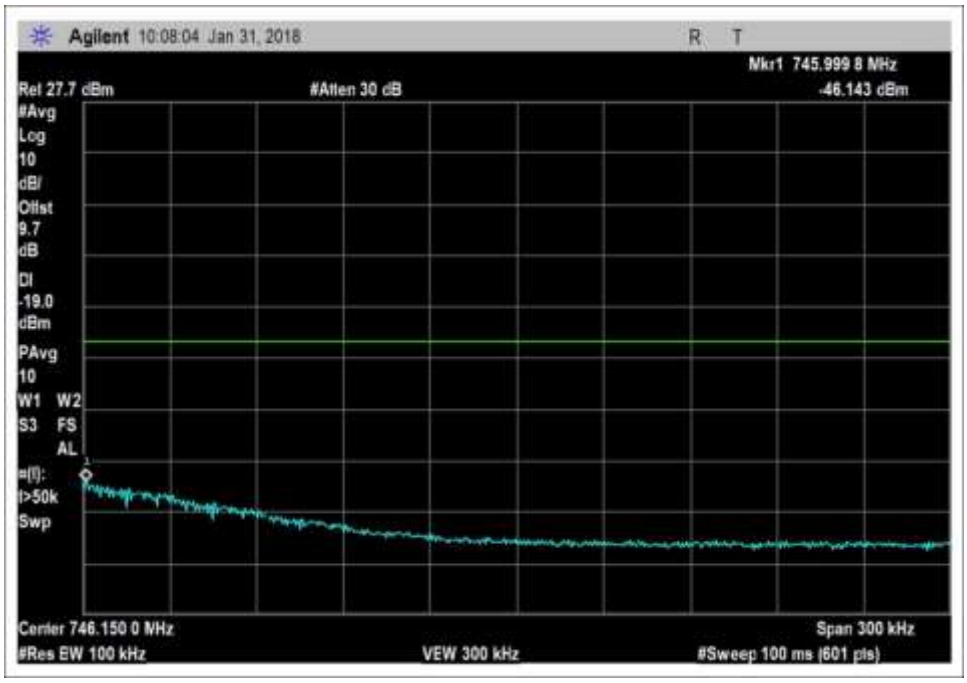
UL_1710-1755MHz_LTE_L



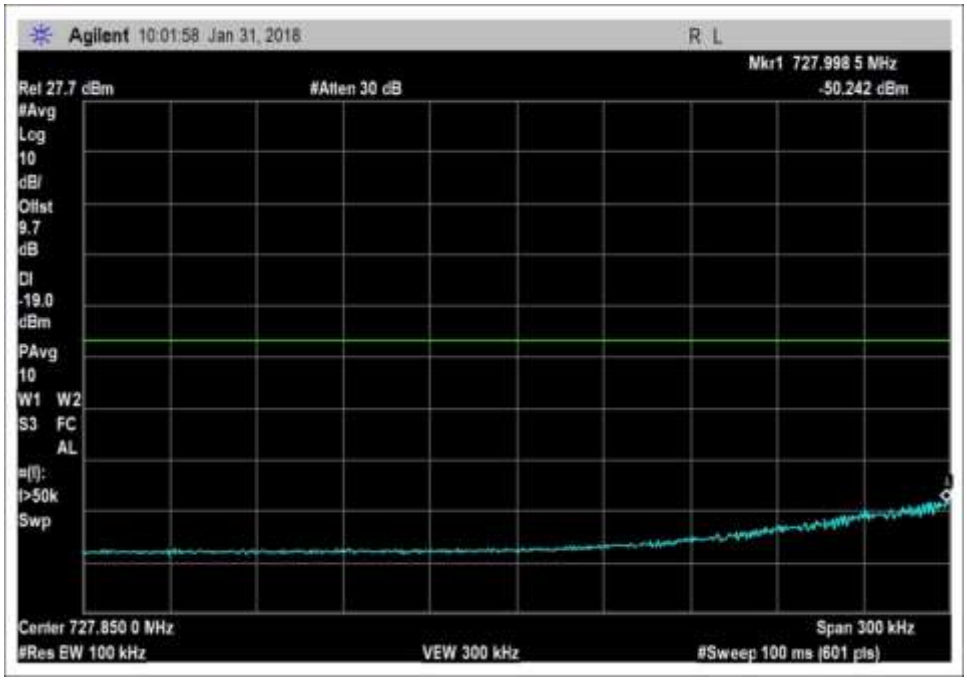
UL_1850-1915MHz_LTE_H



UL_1850-1915MHz_LTE_L



DL_728-746MHz_LTE_H



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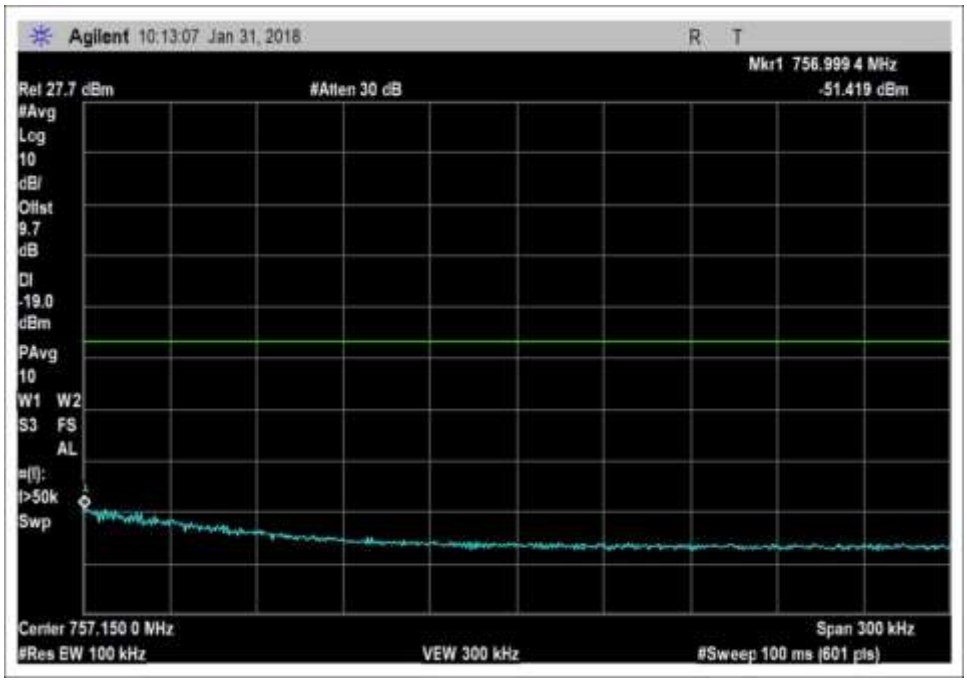
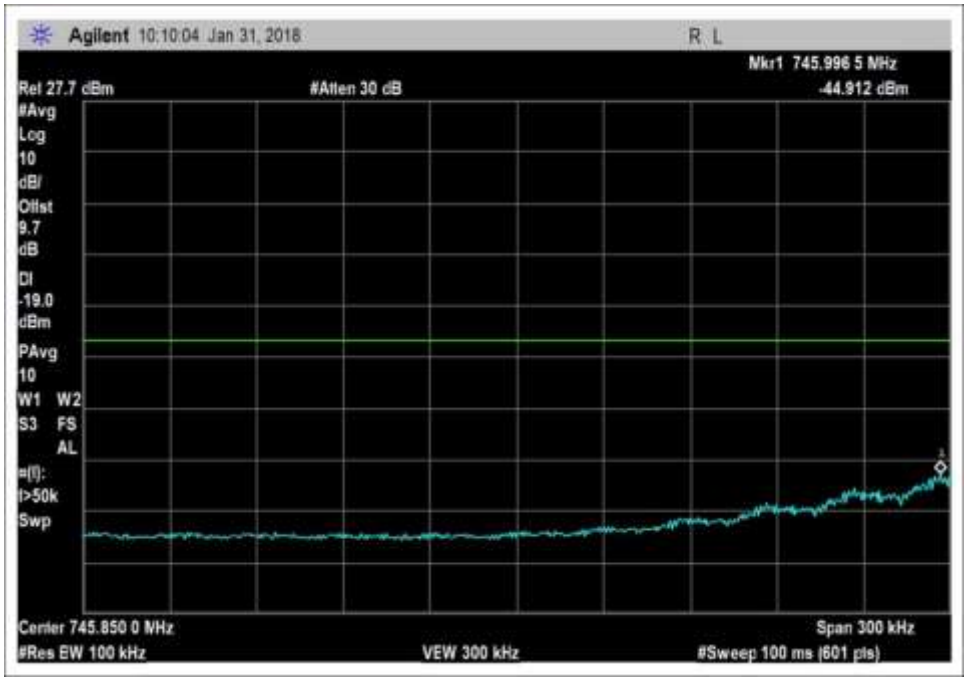
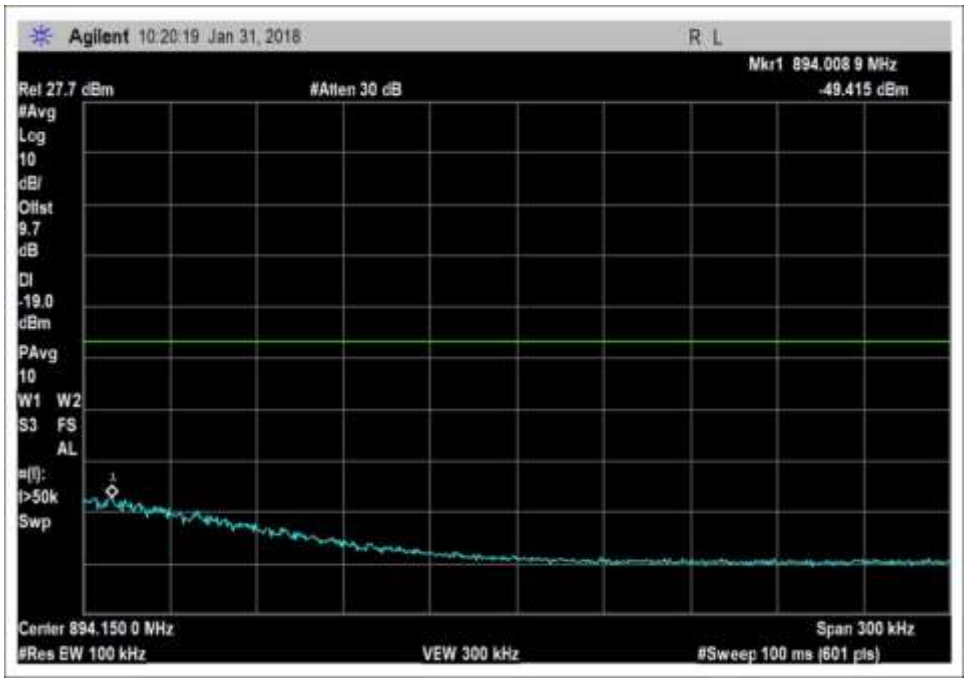


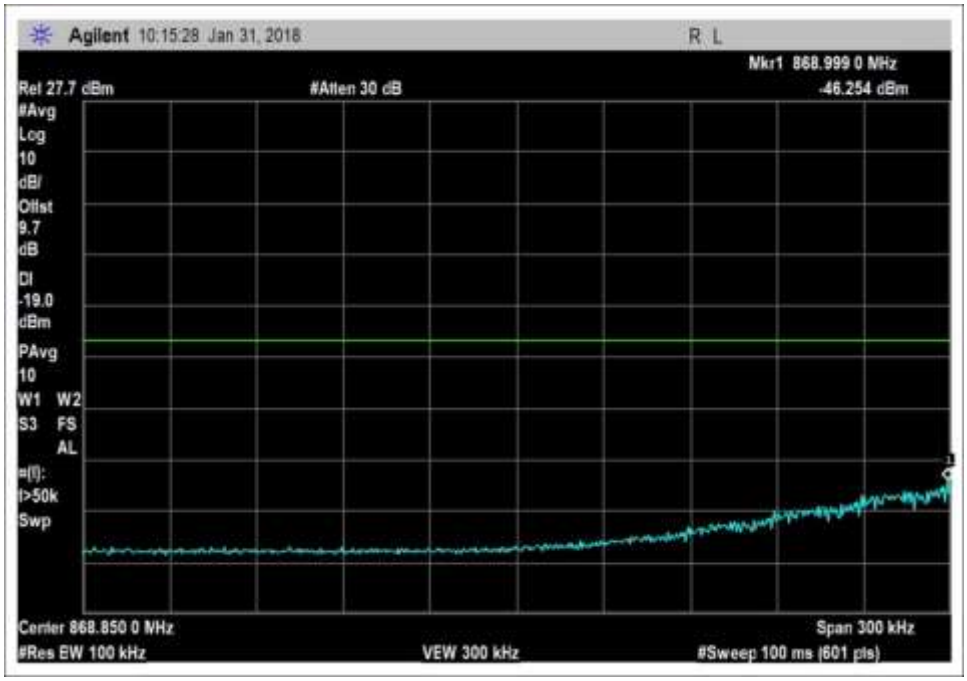
DL_746-757MHz_LTE_H



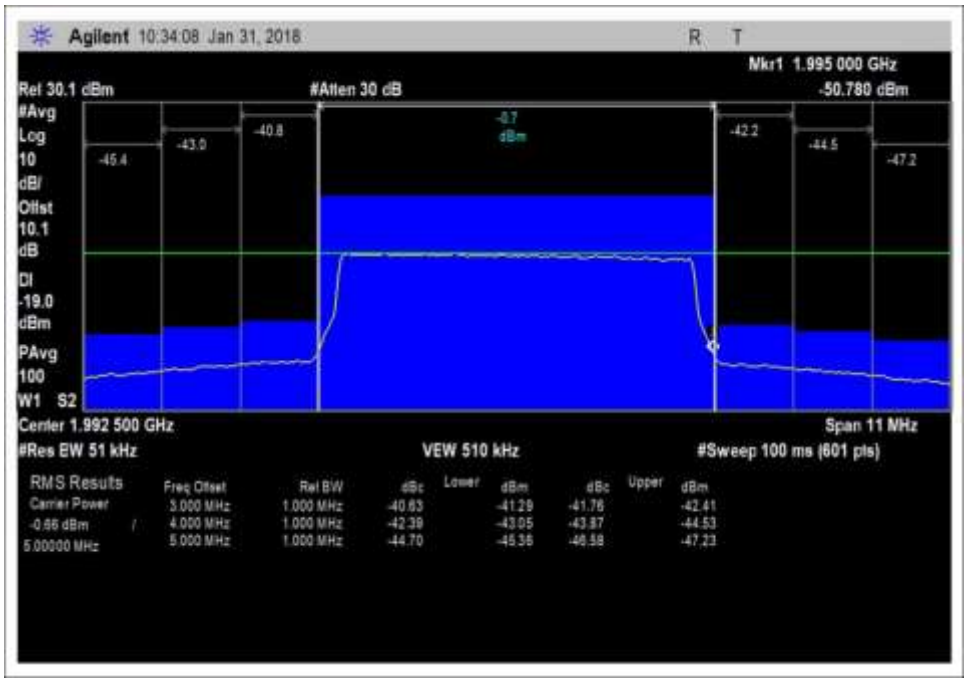
DL_746-757MHz_LTE_L



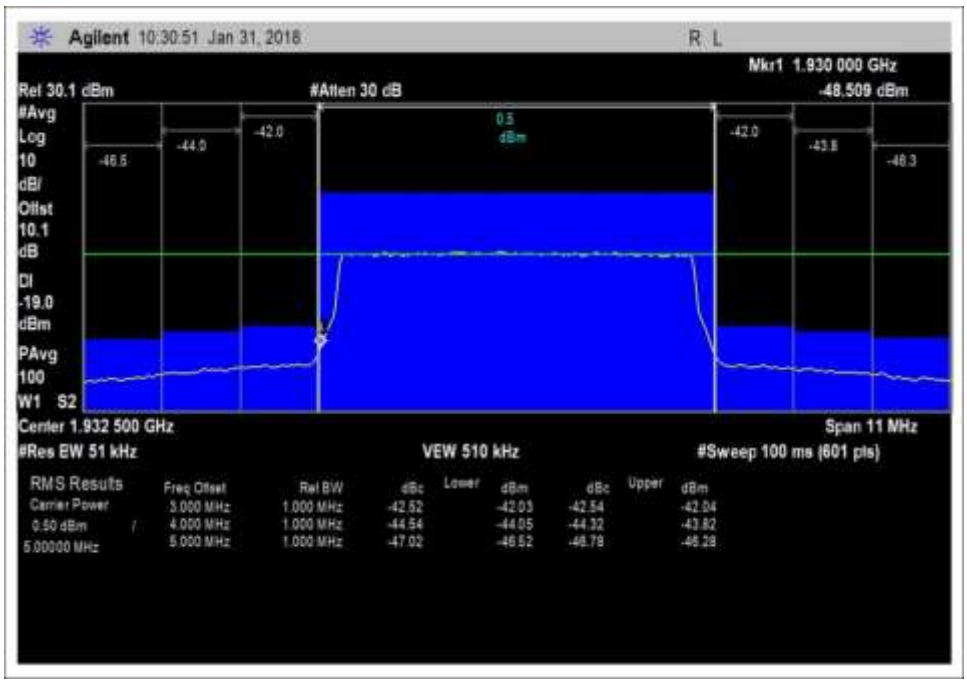
DL_869-894MHz_LTE_H



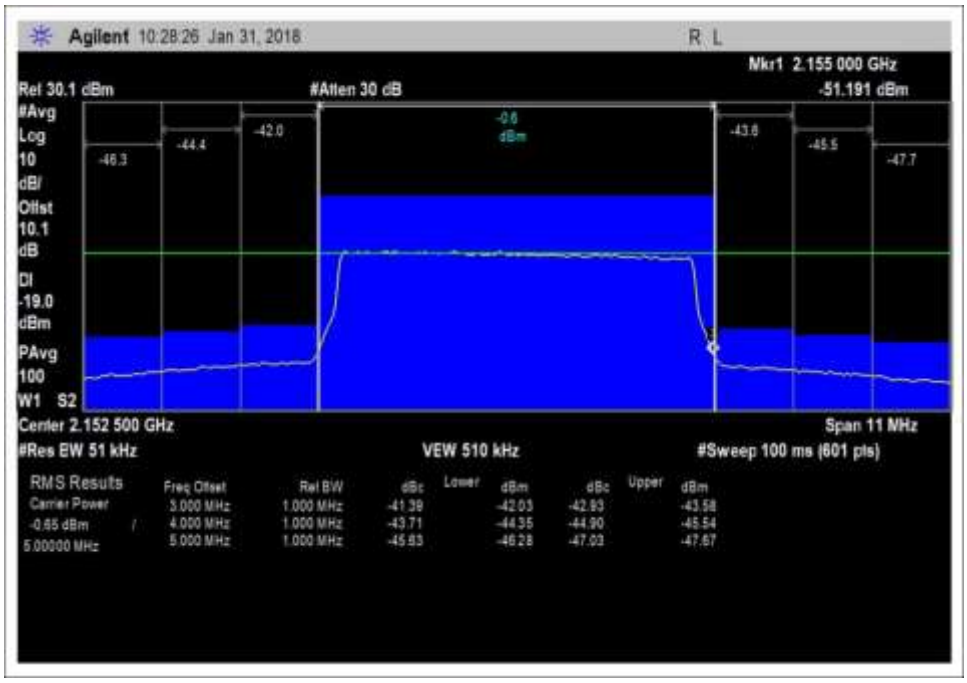
DL_869-894MHz_LTE_L



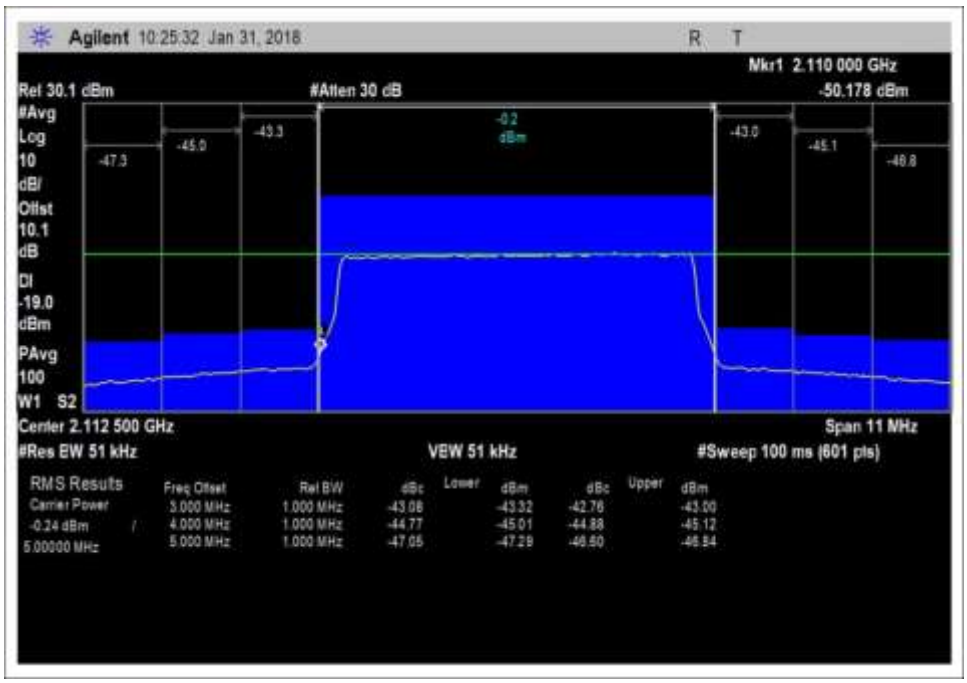
DL_1930-1995MHz_LTE_H



DL_1930-1995MHz_LTE_L



DL_2110-2155MHz_LTE_H



DL_2110-2155MHz_LTE_L

7.6 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:	**7.6 Conducted Spurious Emissions**		
Work Order #:	**100826**	Date:	1/31/2018
Test Type:	**Conducted Emissions**	Time:	10:36:00 AM
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.11		12VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Frequency range of measurement = 9kHz- 22GHz.
9 kHz - 150 kHz -> RBW= 200Hz VBW= 200Hz
150 kHz - 30 MHz -> RBW= 9kHz VBW= 9kHz
30 MHz - 1000MHz -> RBW*= 1MHz VBW= 3MHz
1000 MHz - 22000MHz ->RBW= 1MHz VBW= 3MHz

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

** visual inspection of analyzer trace from 9kHz-30MHz, no emission found, trace not included in plots.

In addition, 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.

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
P05411	Attenuator	54A-10	1/19/2018	1/19/2020
03470	Spectrum Analyzer	E4440A	1/3/2018	1/3/2020
P07191	Cable	32022-29094K-29094K-48TC	10/30/2017	10/30/2019
P07192	Cable	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
03418	Signal Generator	E4438C	6/19/2017	6/19/2019

Summary of Results

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

9 kHz-30 MHz

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

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	-0.52	-70.0	-40	-40.52

LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

REQUIRED ATTENUATION = 43+10 LOG P DB

Limit line (dBuV) = V_{dBuv} - Attenuation

$$V_{dBuV} = 20\,\text{Log}\,\frac{V}{1\,x\,10^{-6}}$$

$$= 20\left(\text{Log}\,V - \text{Log}\,1\,x\,10^{-6}\right)$$

$$= 20\,\text{Log}\,V - 20\,\text{Log}1\,x\,10^{-6}$$

$$= 20\,\text{Log}\,V - 20\left(-6\right)$$

$$= 20\,\text{Log}\,V + 120$$

$$\text{Attenuation} = 43 + 10\,\text{Log}\,P$$

$$= 43 + 10\,\text{Log}\,\frac{V^2}{R}$$

$$= 43 + 10\left(\text{Log}\,V^2 - \text{Log}\,R\right)$$

$$= 43 + 10\left(2\,\text{Log}\,V - \text{Log}\,R\right)$$

$$= 43 + 20\,\text{Log}\,V - 10\,\text{Log}\,R$$

Limit line = V_{dBuv} - Attenuation

= 20 Log V + 120 – (43 + 20 Log V – 10Log R)

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

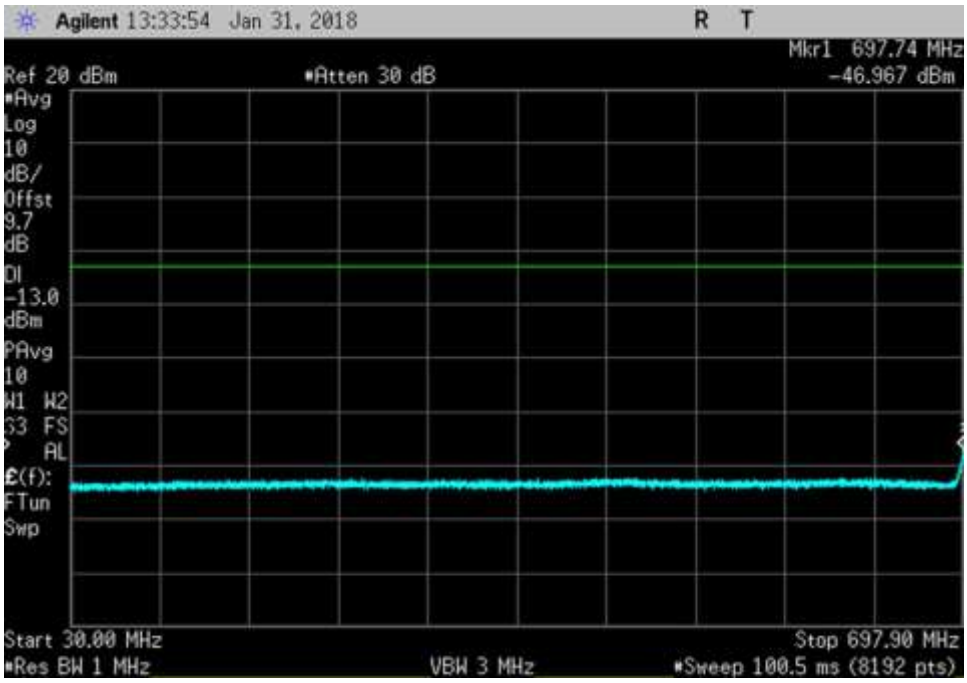
= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 120 – 43 + 10 Log 50 Note : R = 50 Ω

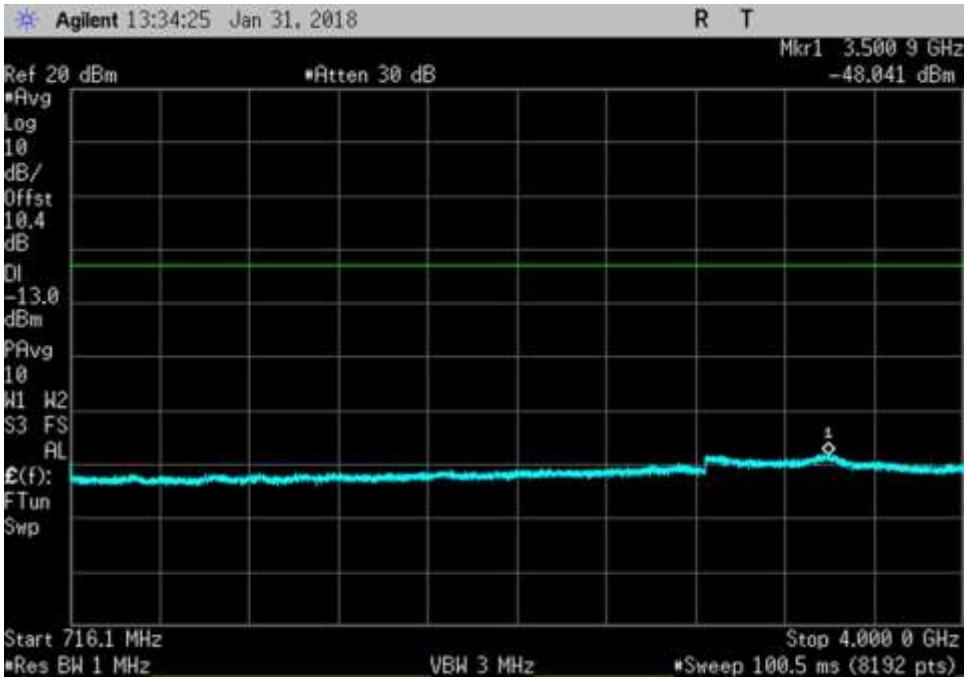
= 120 –43 + 16.897

= 94 dBuV at any power level

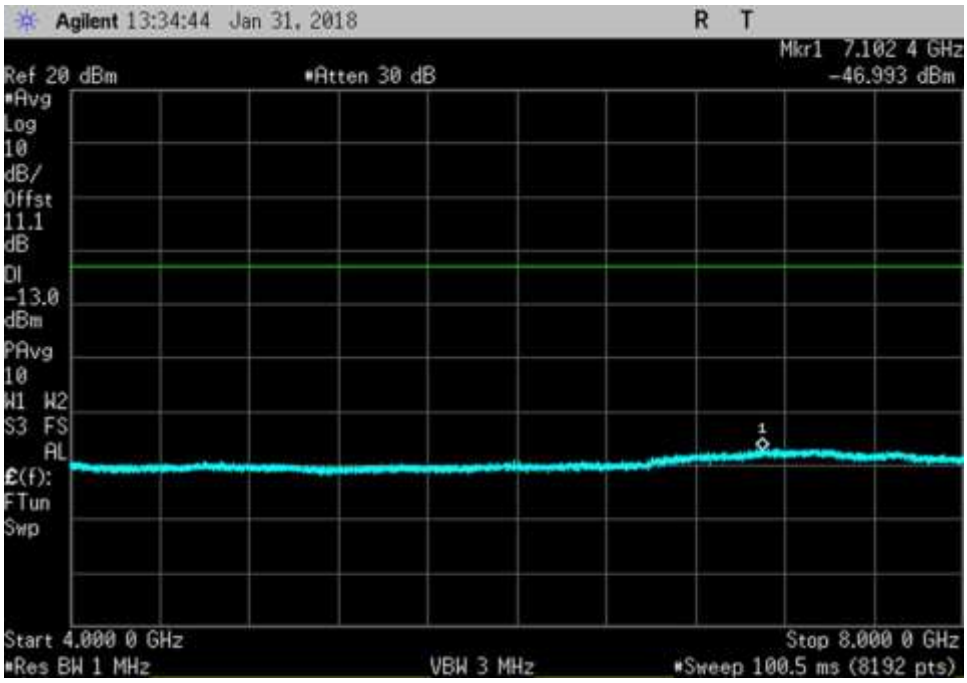
Plots



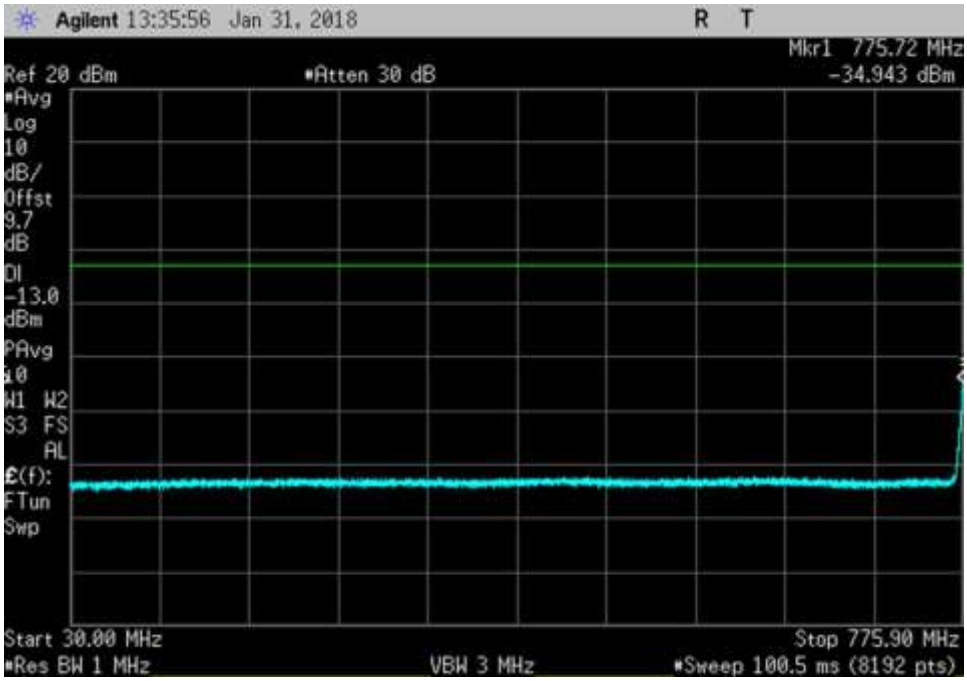
UL_698-716_ 30- 697.9MHz



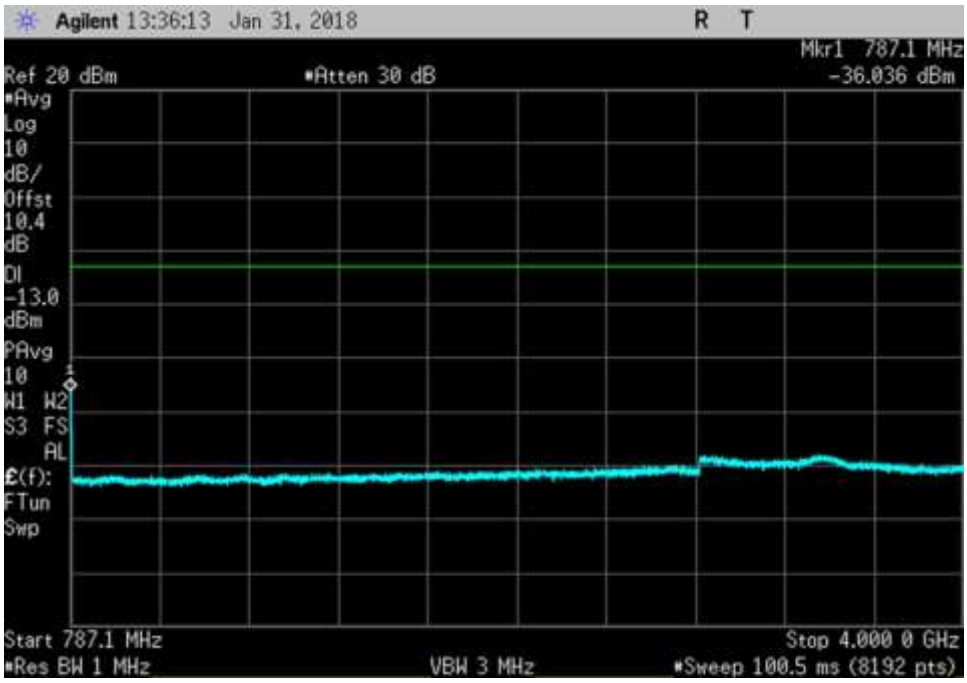
UL_698-716_ 716.1- 4000MHz



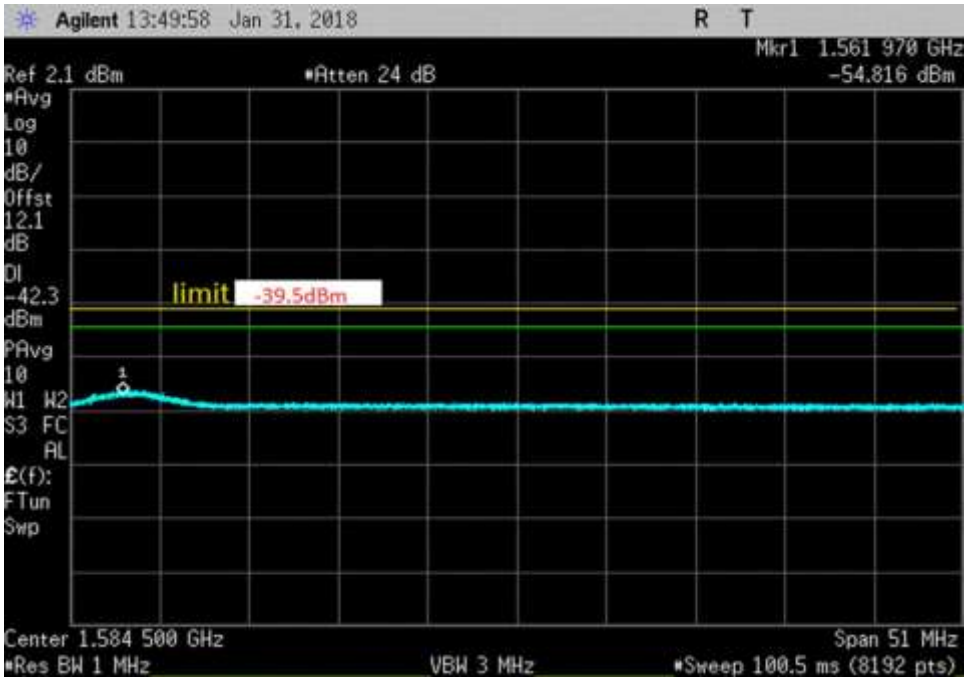
UL_698-716_ 4000- 8000MHz



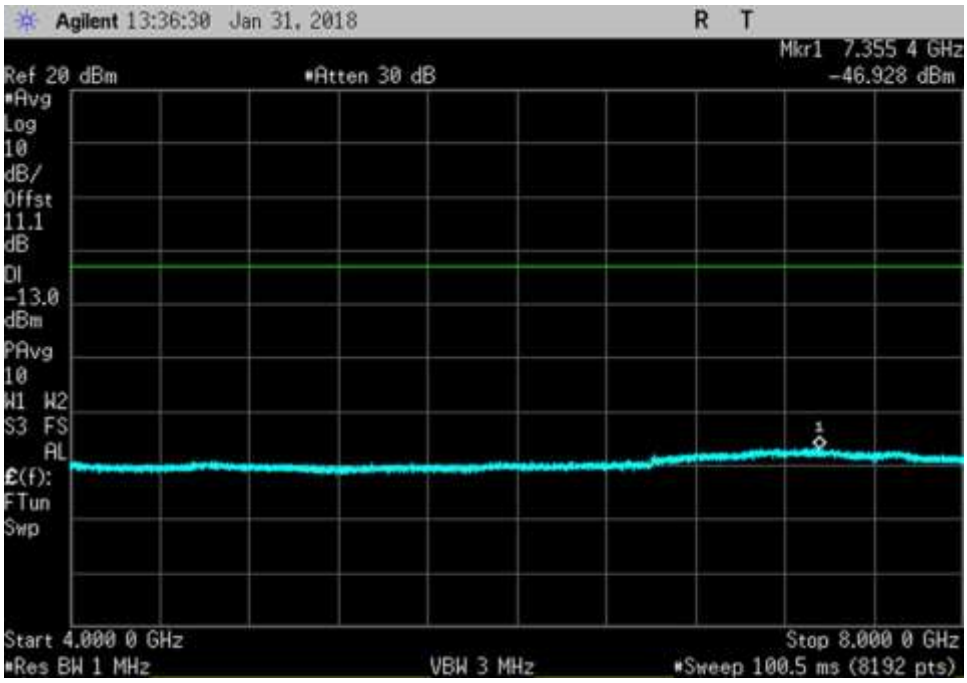
UL_776-787_ 30- 775.9MHz



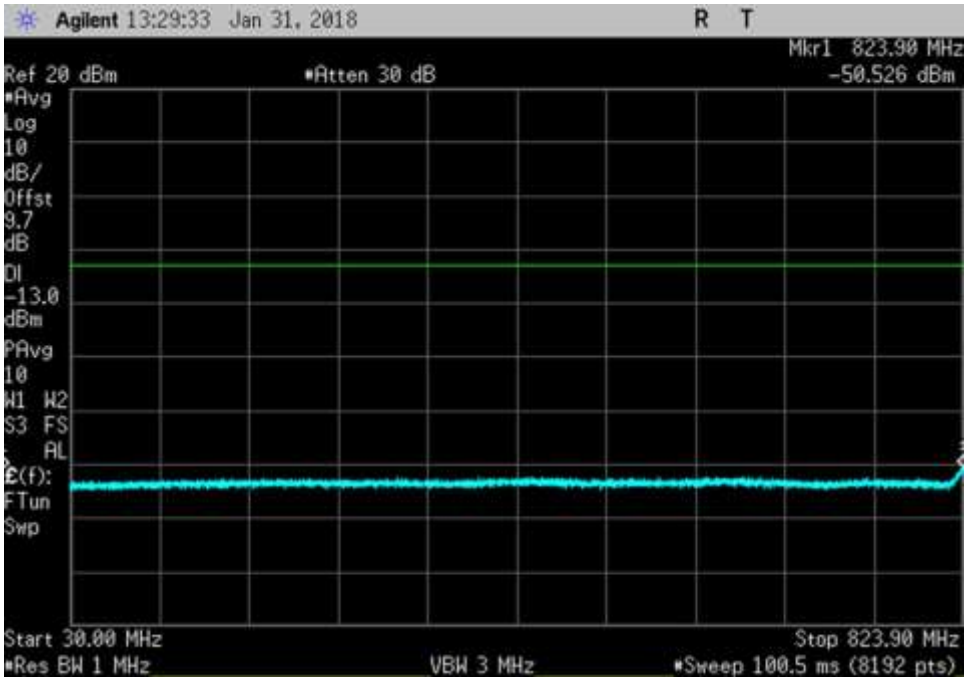
UL_776-787_ 787.1- 4000MHz



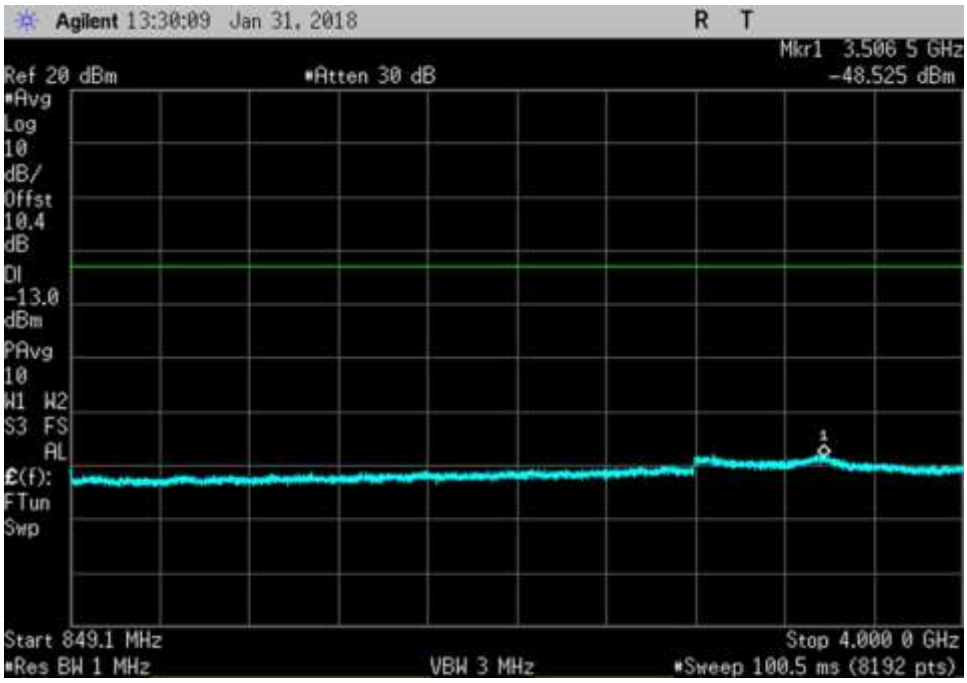
UL_776-787_ 1559- 1610MHz_gps



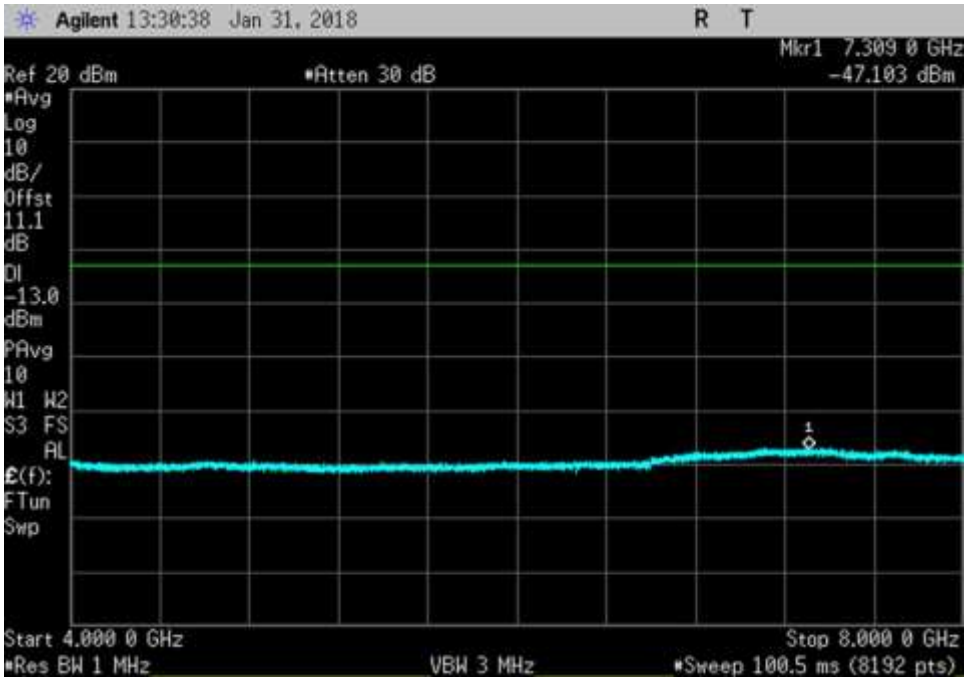
UL_776-787_ 4000- 8000MHz



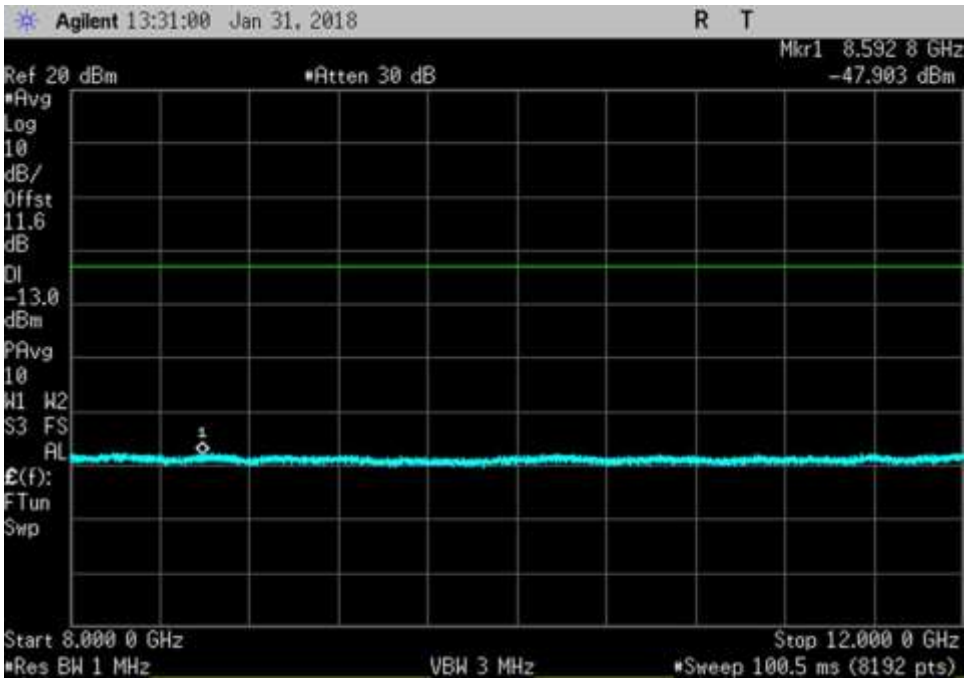
UL_824-849_ 30- 824MHz



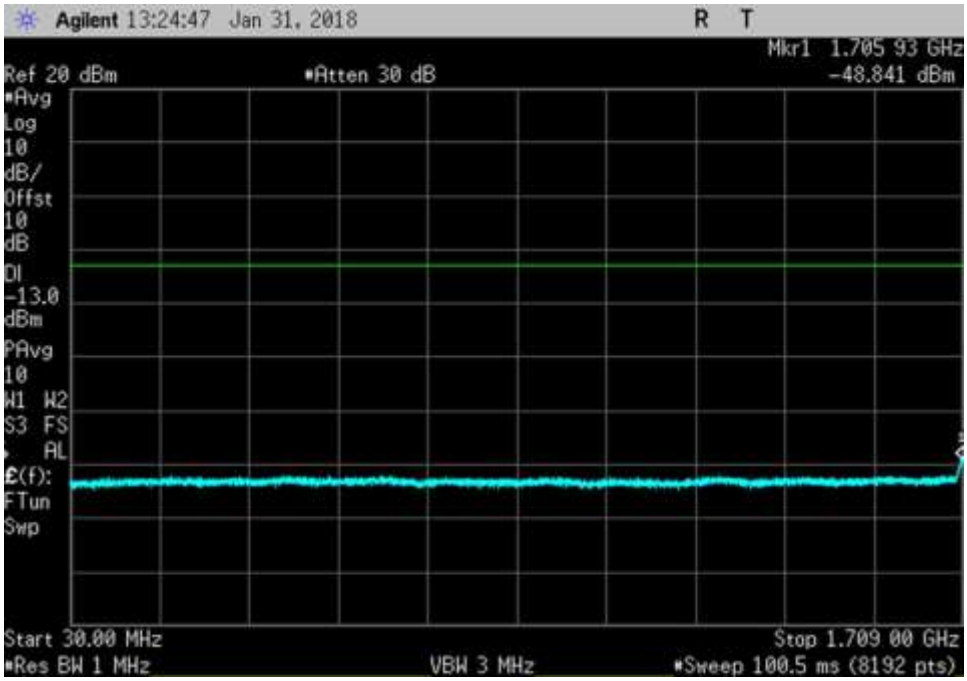
UL_824-849_ 849.1- 4000MHz



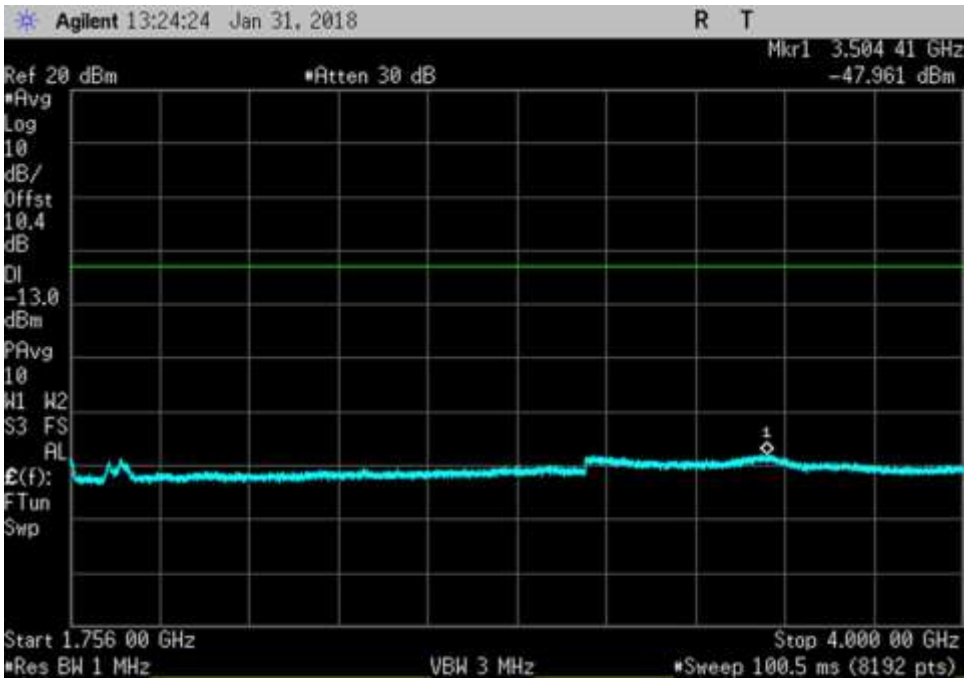
UL_824-849_ 4000- 8000MHz



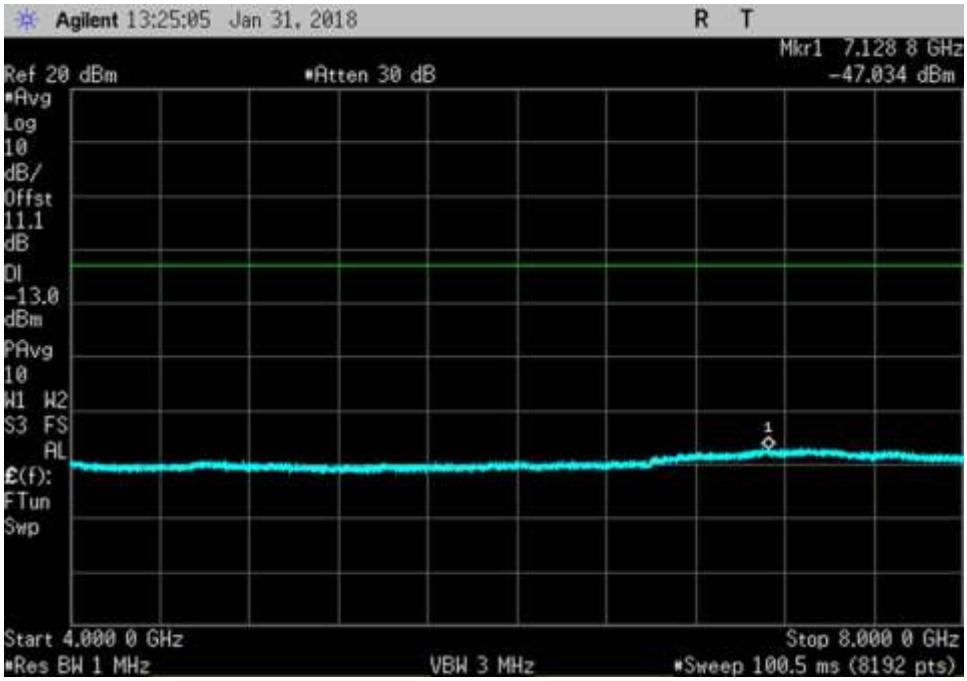
UL_824-849_ 8000- 12000MHz



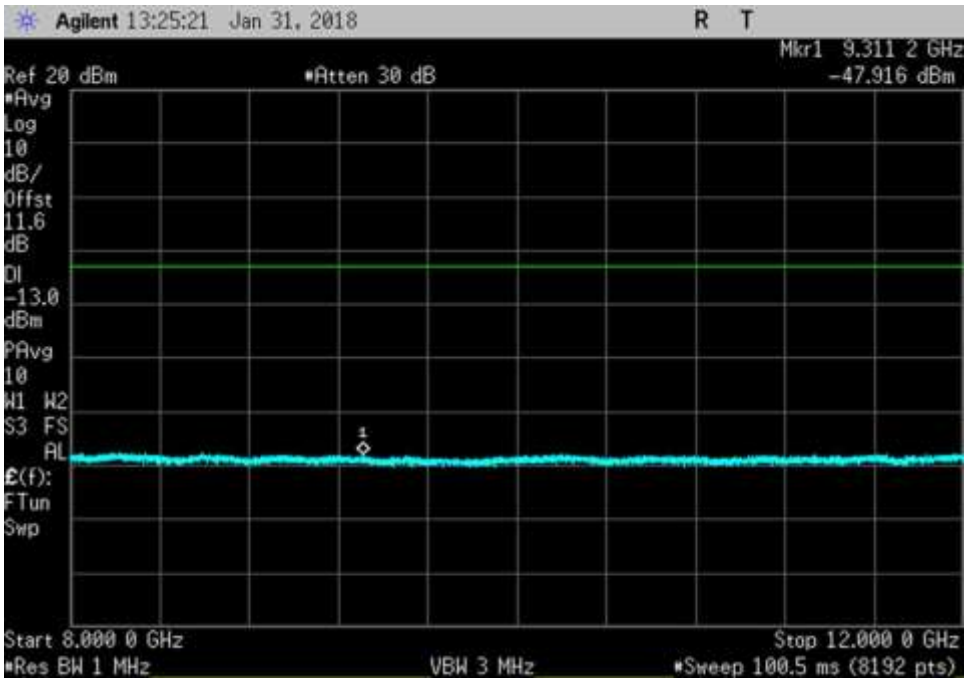
UL_1710-1755_ 30- 1709MHz



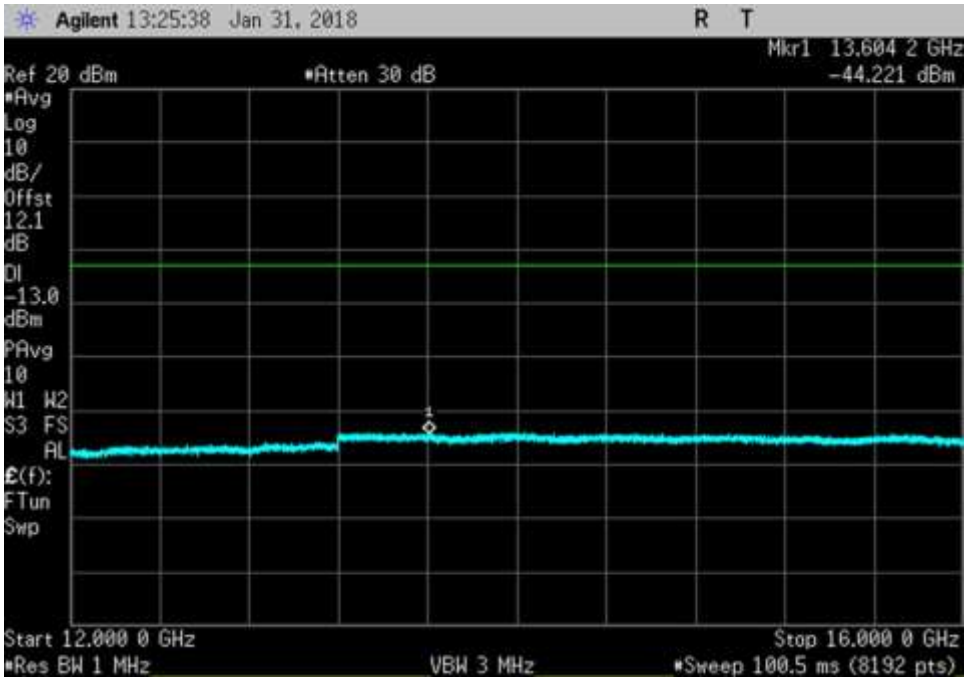
UL_1710-1755_ 1756- 4000MHz



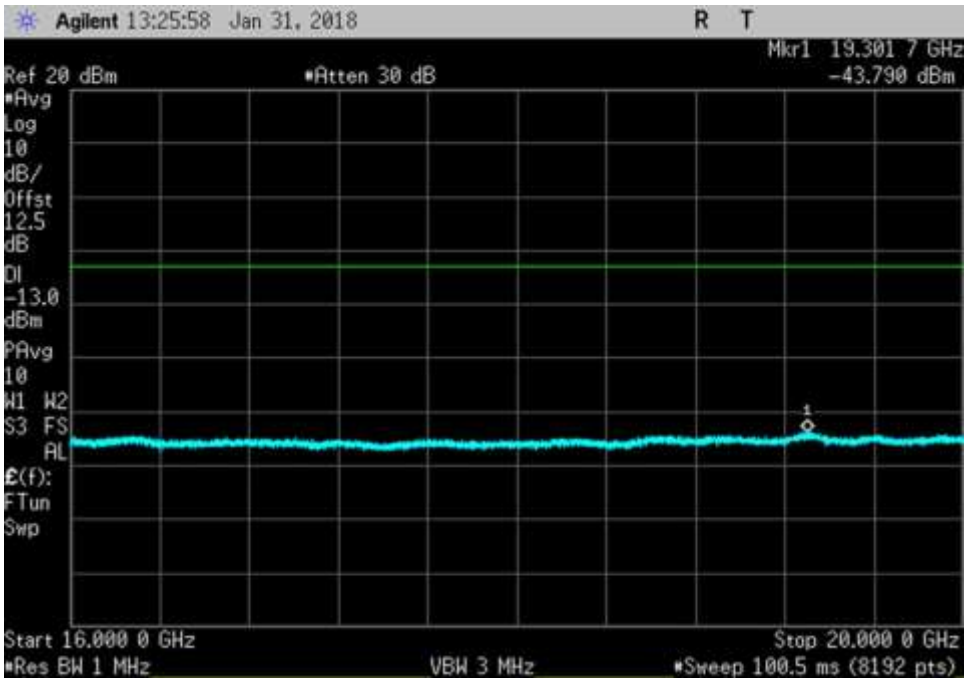
UL_1710-1755_ 4000- 8000MHz



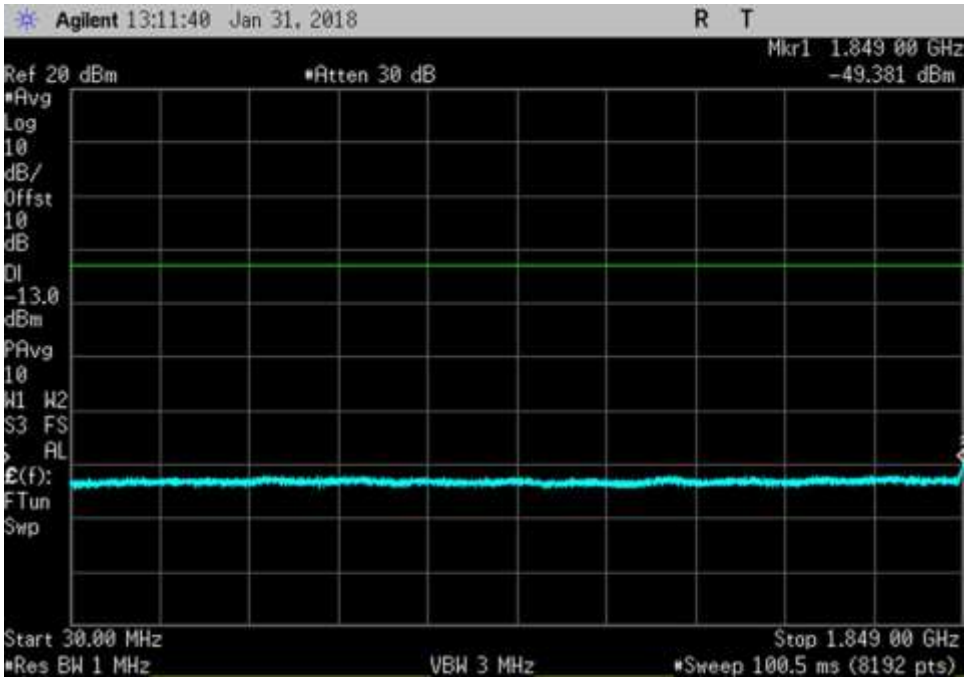
UL_1710-1755_ 8000- 12000MHz



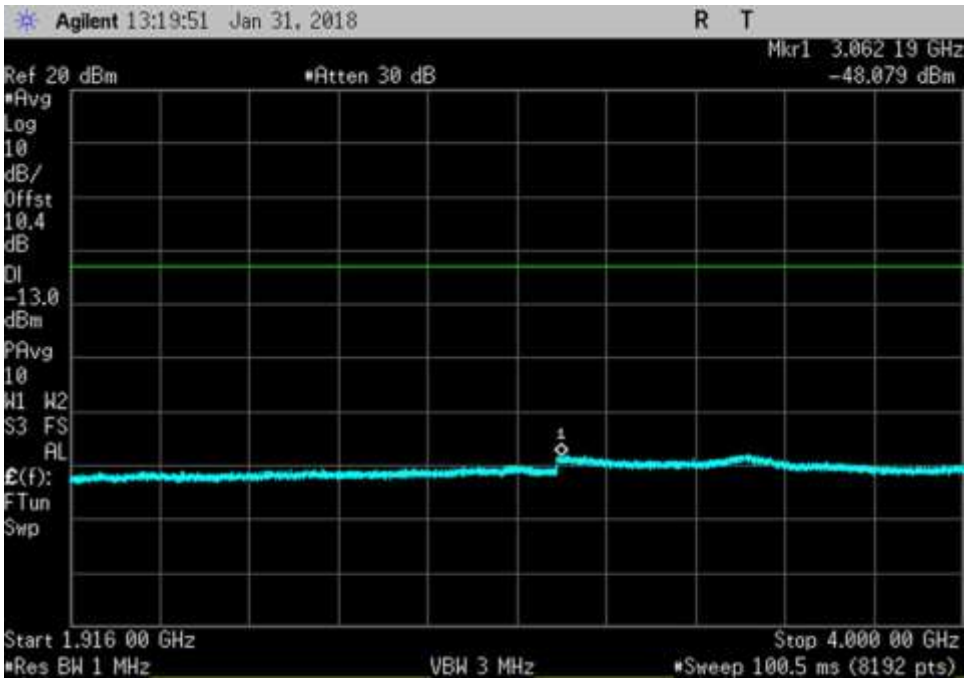
UL_1710-1755_ 12000- 16000MHz



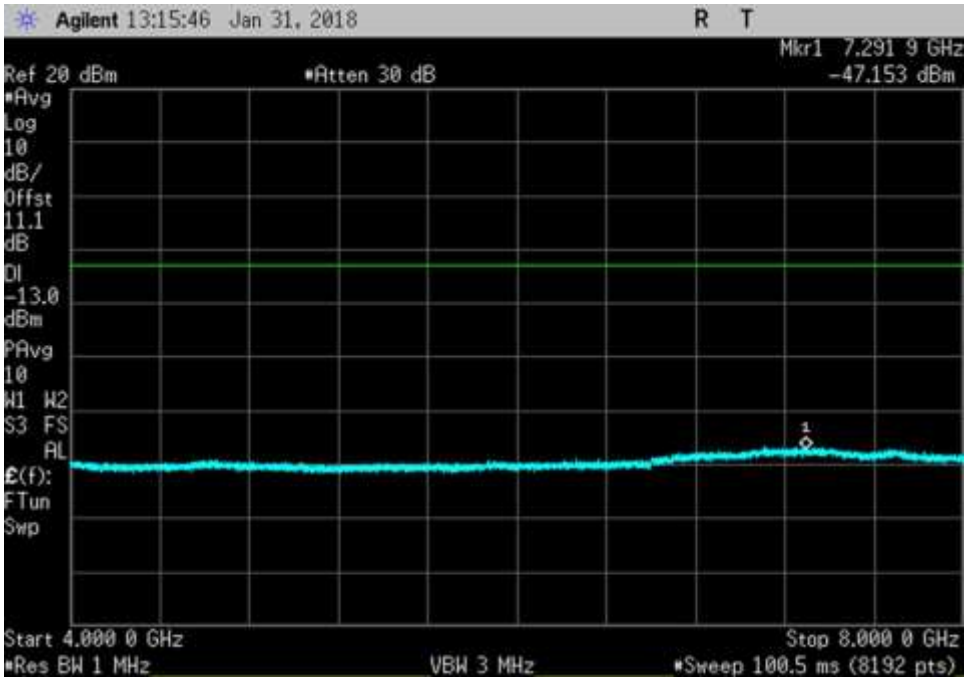
UL_1710-1755_ 16000- 20000MHz



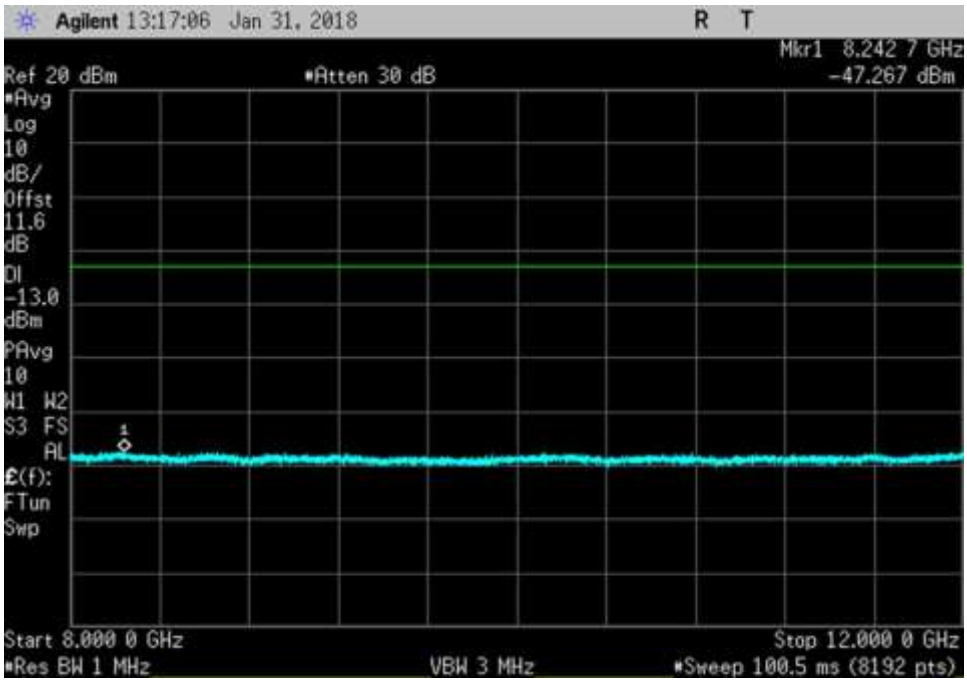
UL_1850-1915_ 30- 1849MHz



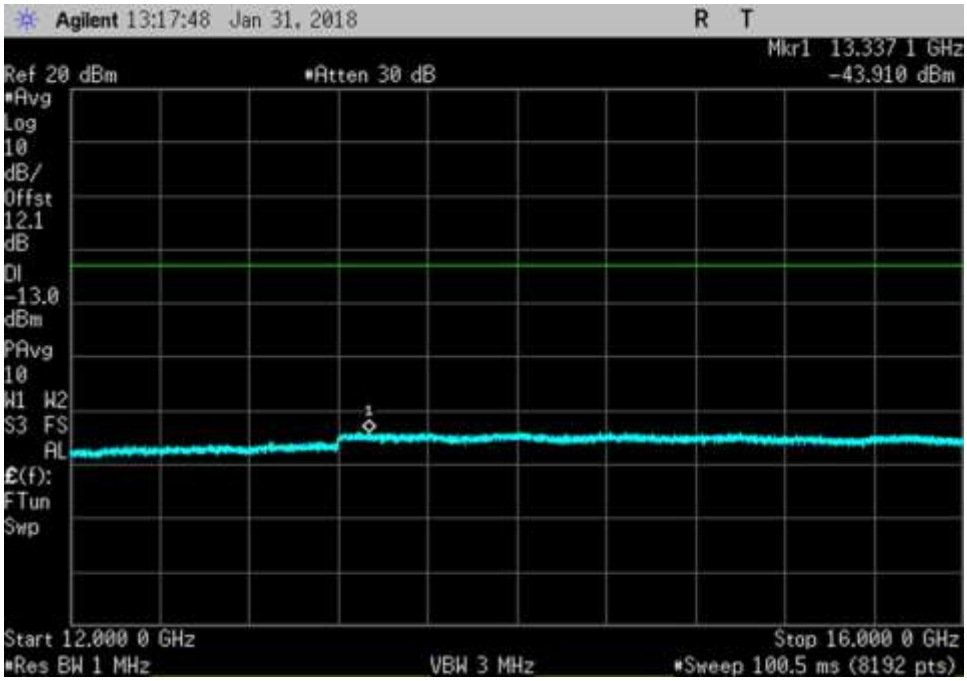
UL_1850-1915_ 1916- 4000MHz



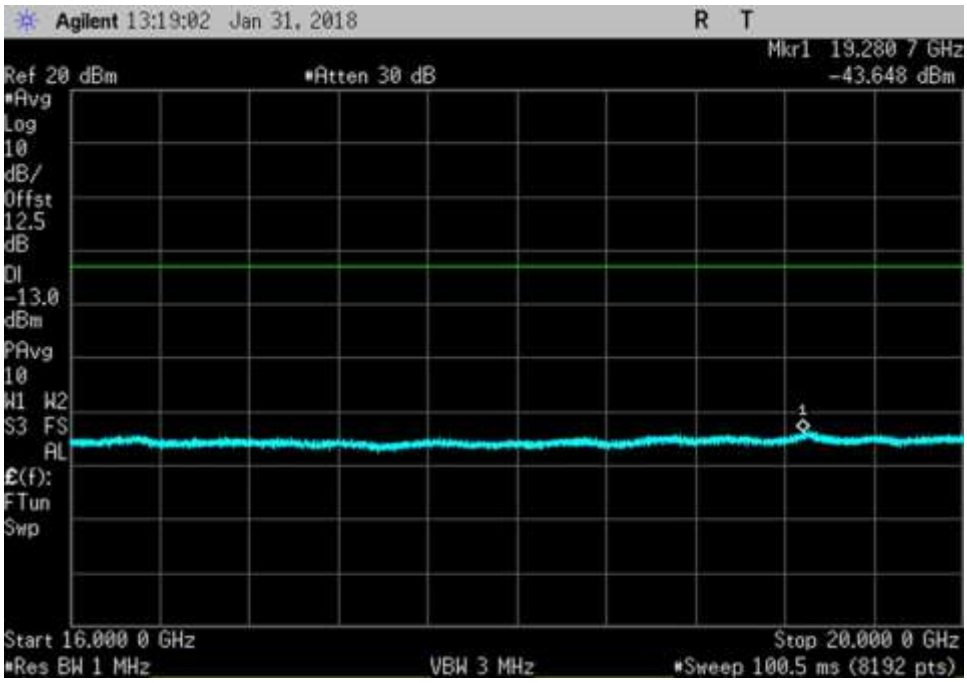
UL_1850-1915_ 4000- 8000MHz



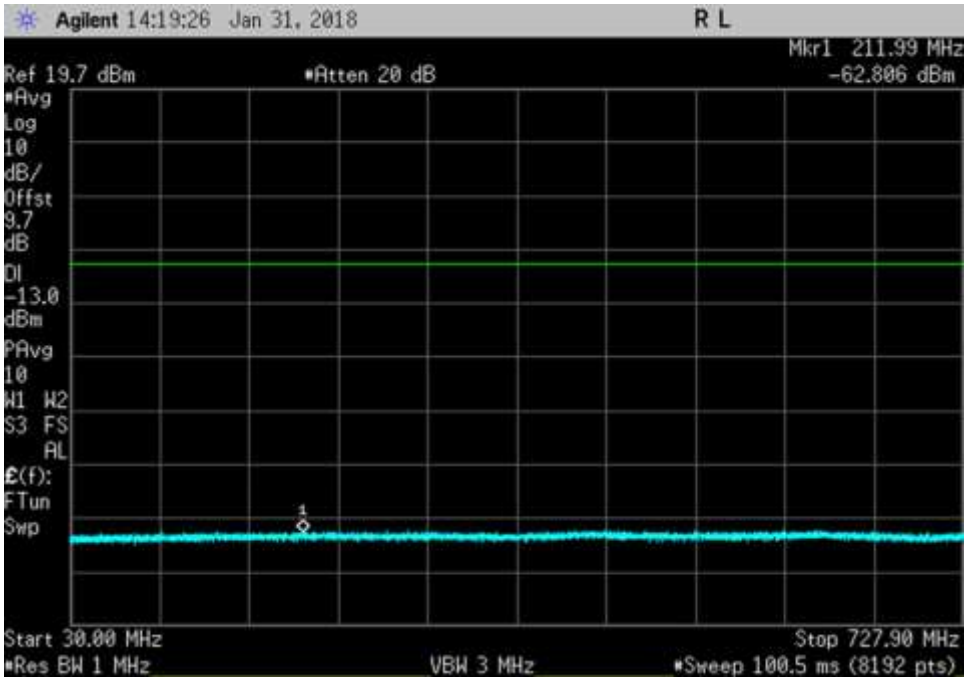
UL_1850-1915_ 8000- 12000MHz



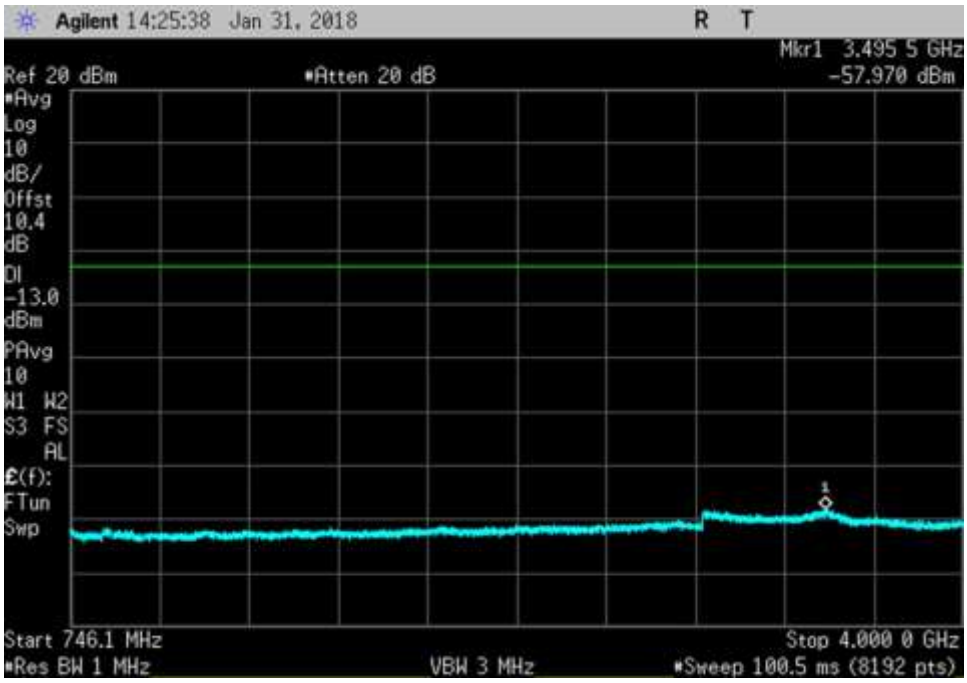
UL_1850-1915_ 12000- 16000MHz



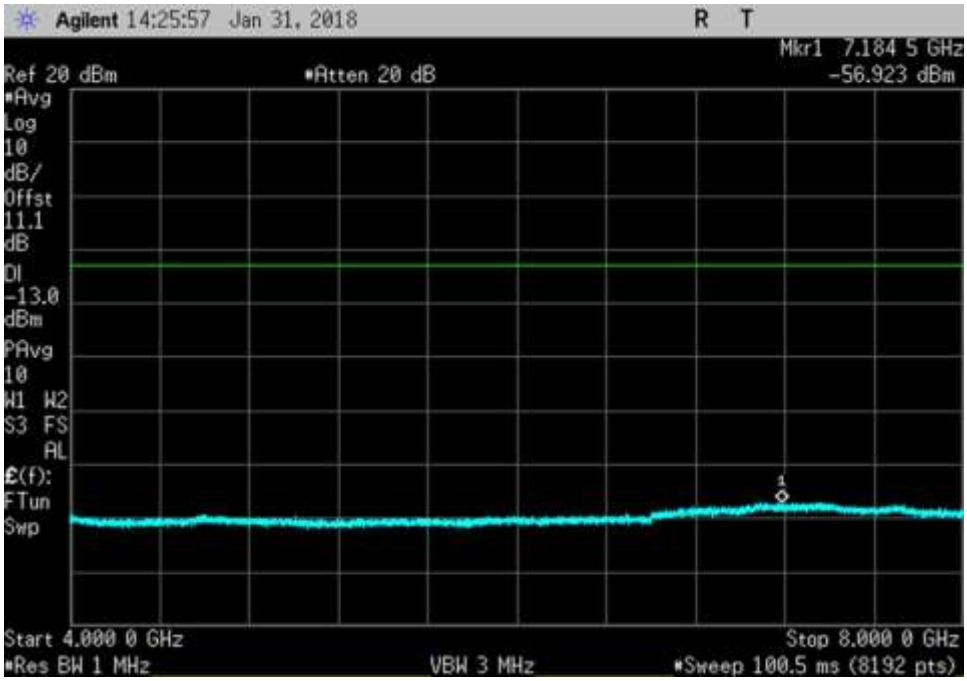
UL_1850-1915_ 16000- 20000MHz



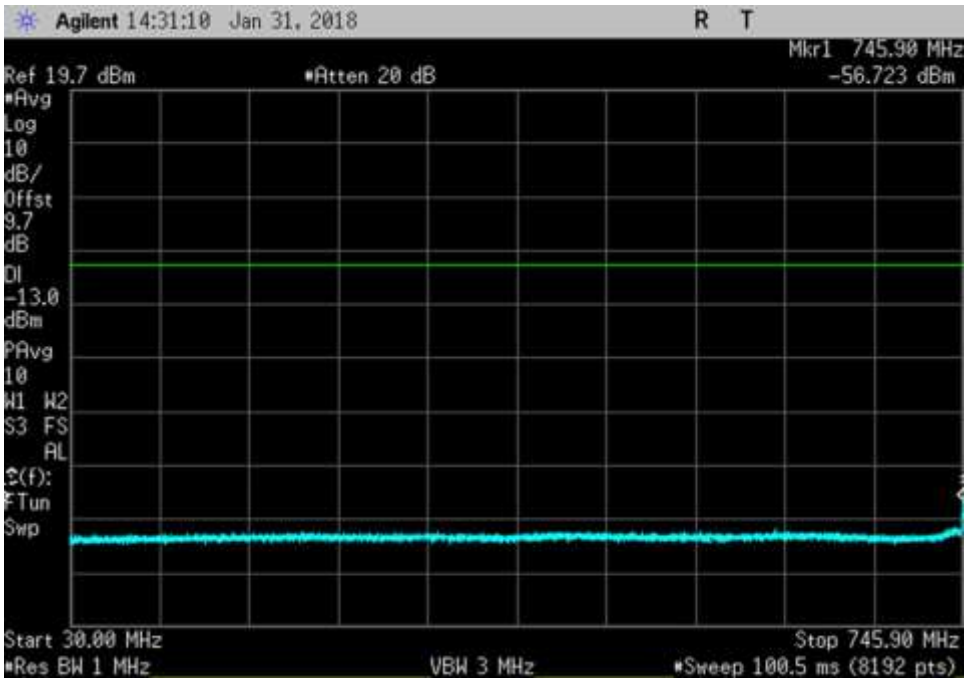
DL_728-746_ 30- 727.9MHz



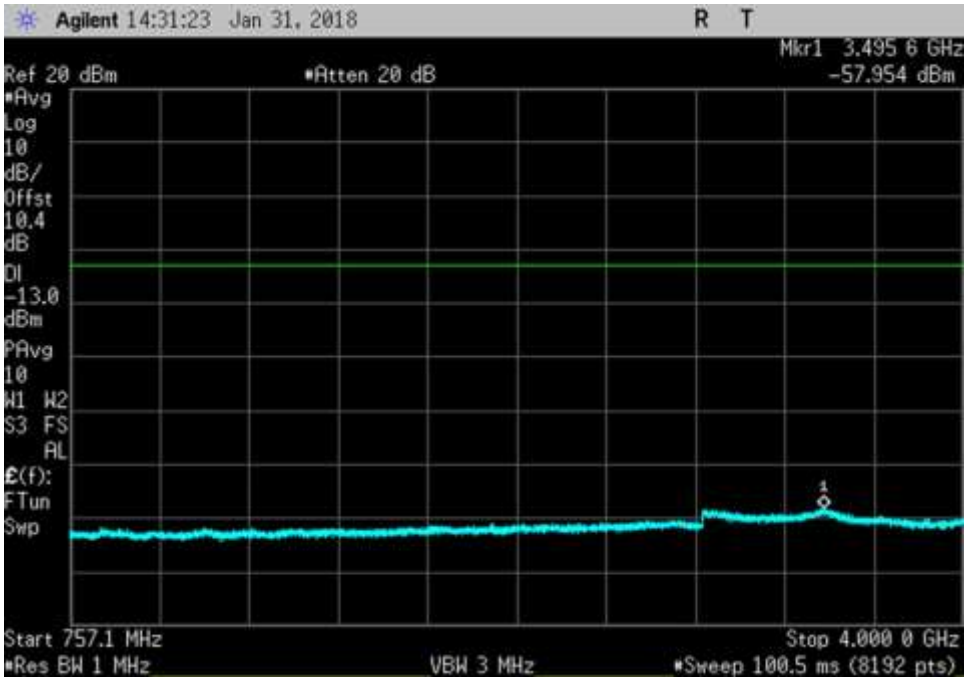
DL_728-746_ 746.1- 4000MHz



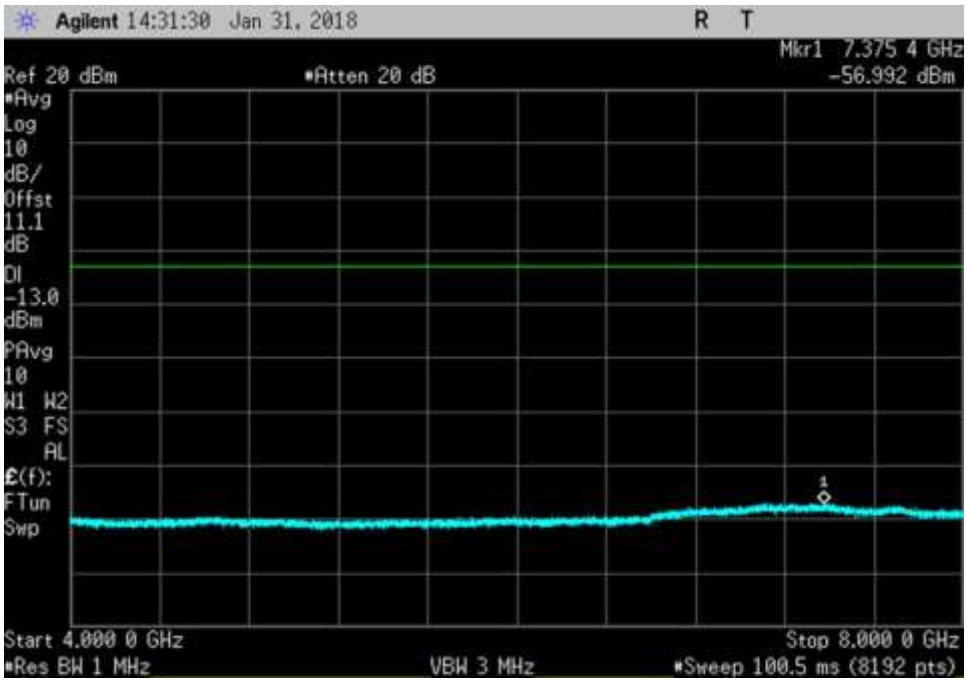
DL_728-746_ 4000- 8000MHz



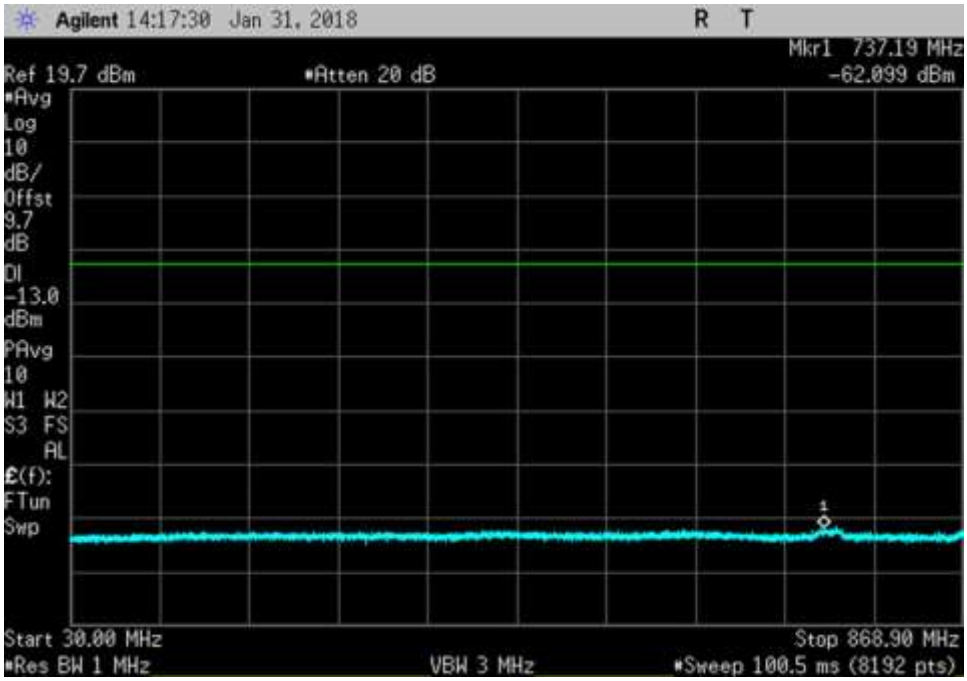
DL_746-757_ 30- 745.9MHz



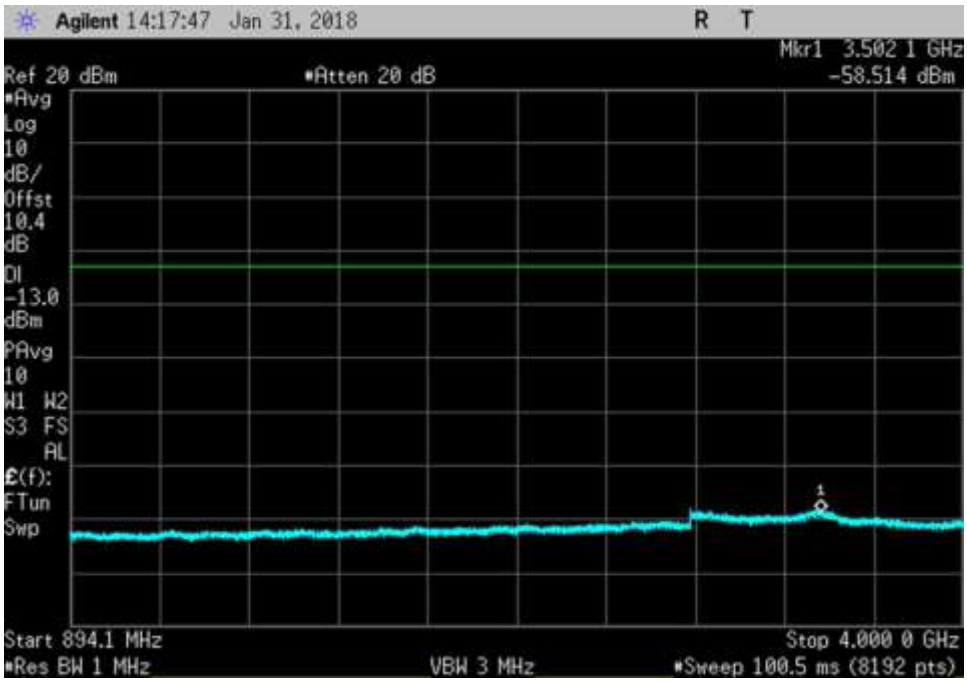
DL_746-757_ 757.1- 4000MHz



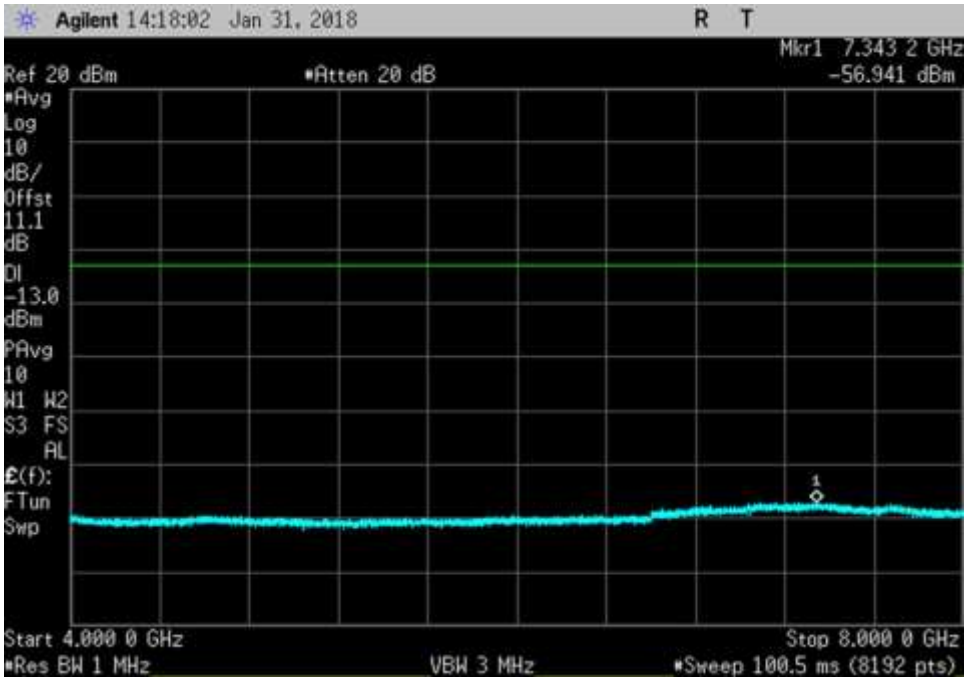
DL_746-757_ 4000- 8000MHz



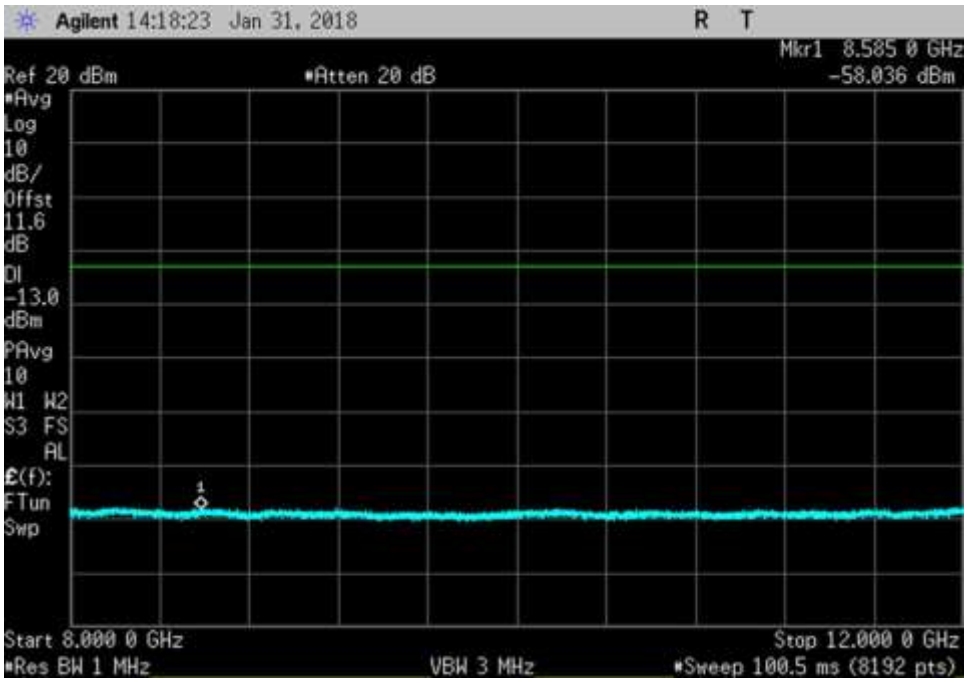
DL_869-894_ 30- 868.9MHz



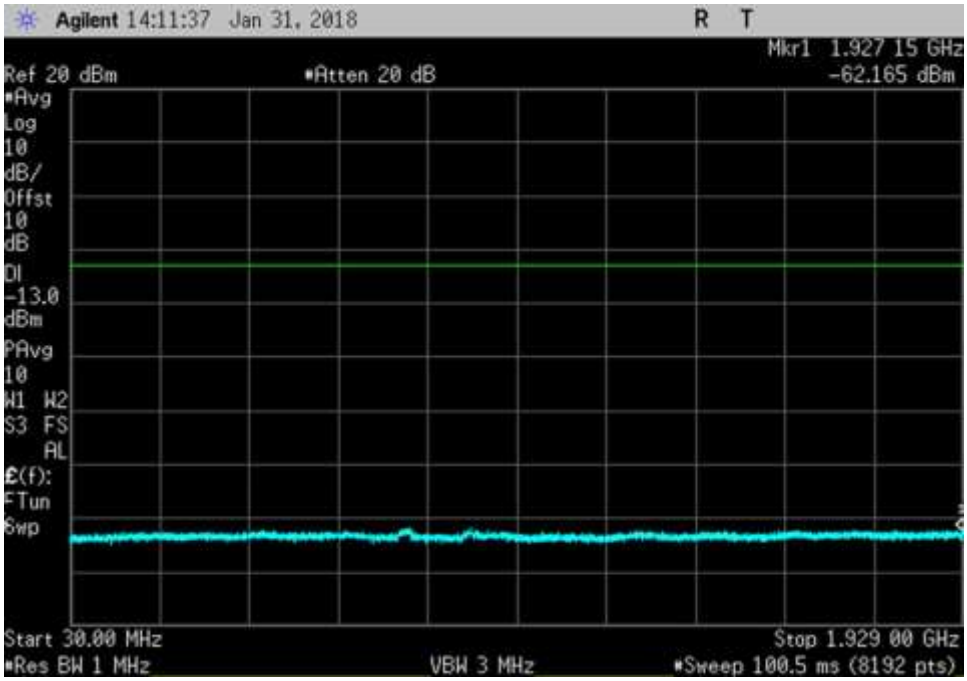
DL_869-894_ 894.1- 4000MHz



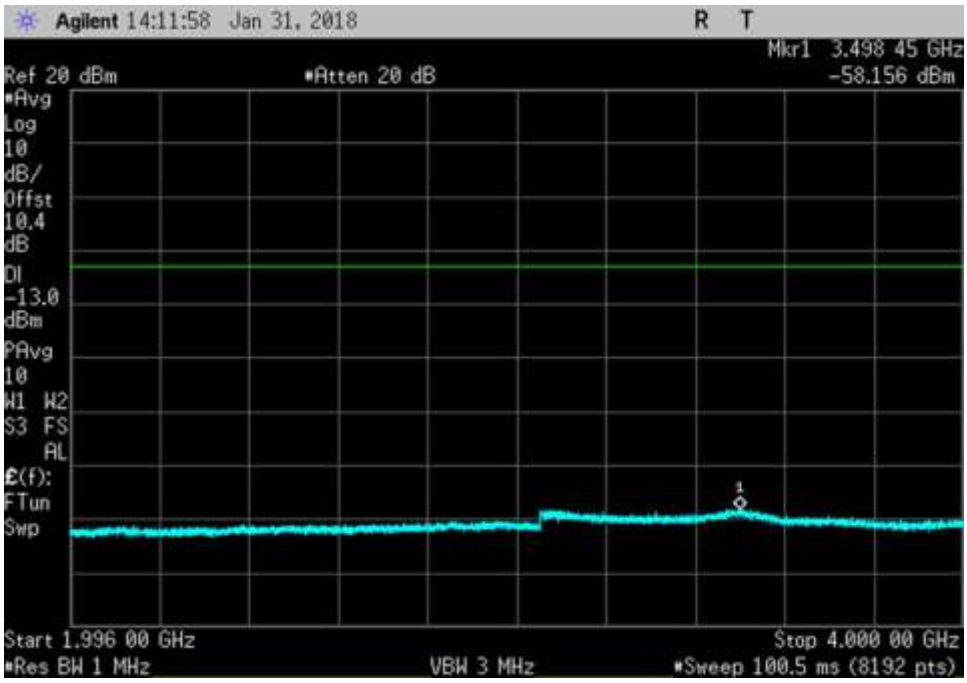
DL_869-894_ 4000- 8000MHz



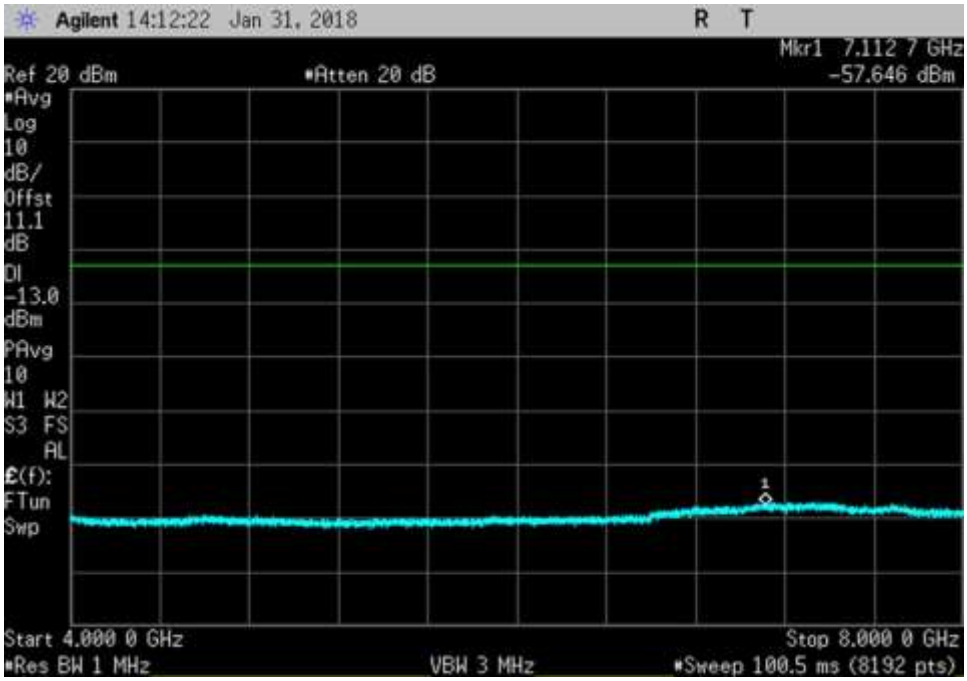
DL_869-894_ 8000- 12000MHz



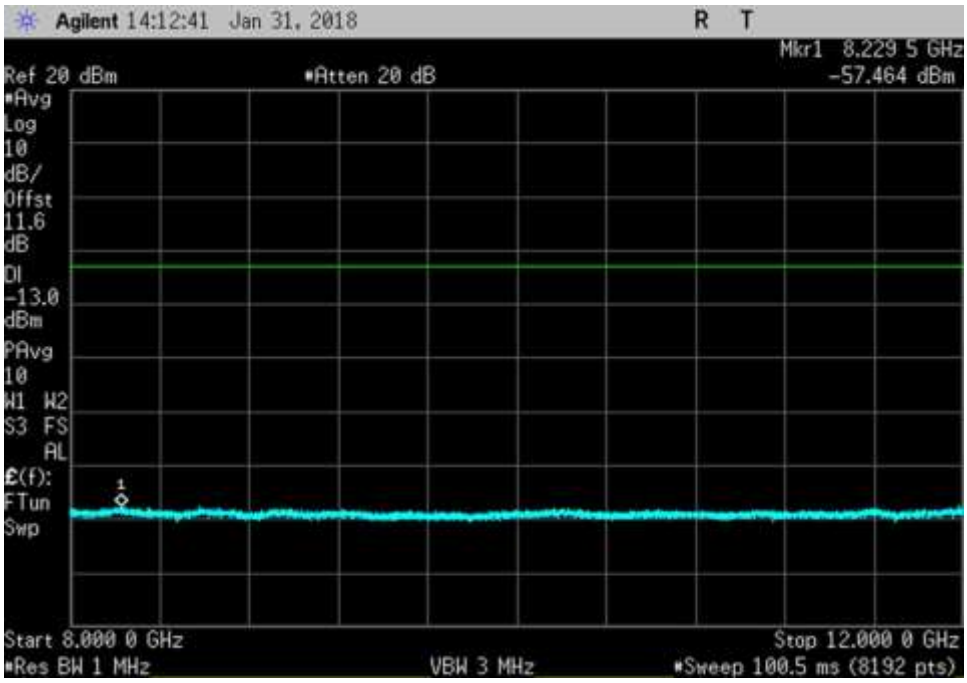
DL_1930-1995_ 30- 1929MHz



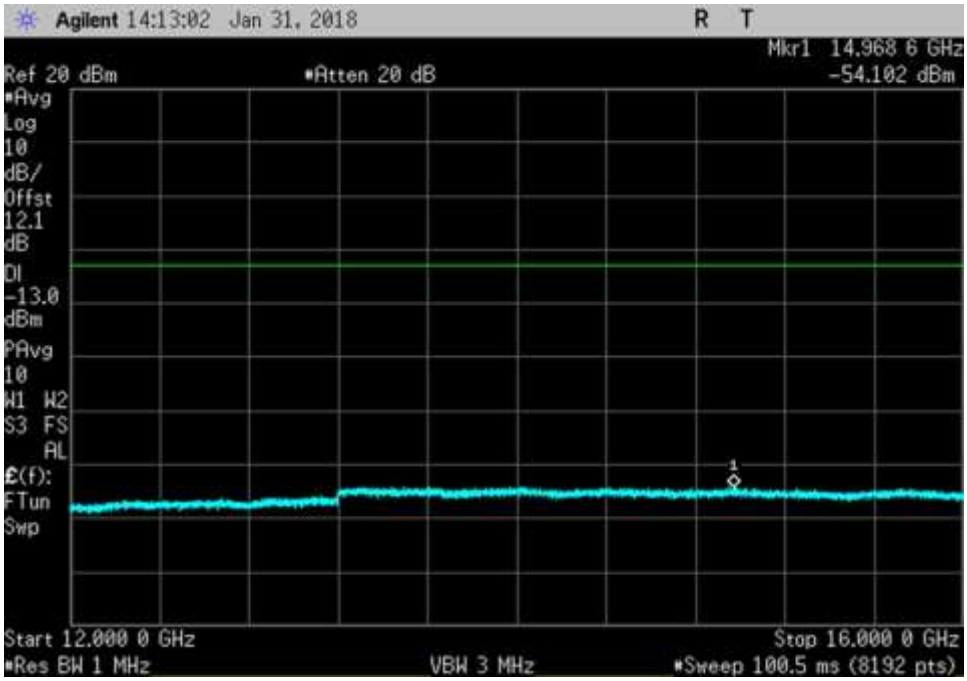
DL_1930-1995_ 1996- 4000MHz



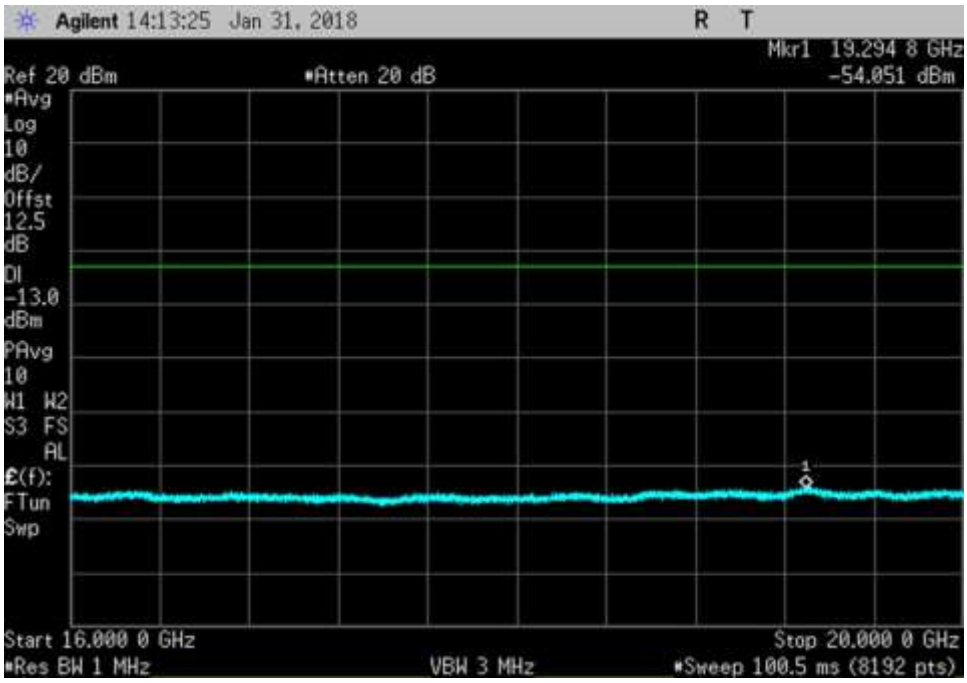
DL_1930-1995_ 4000- 8000MHz



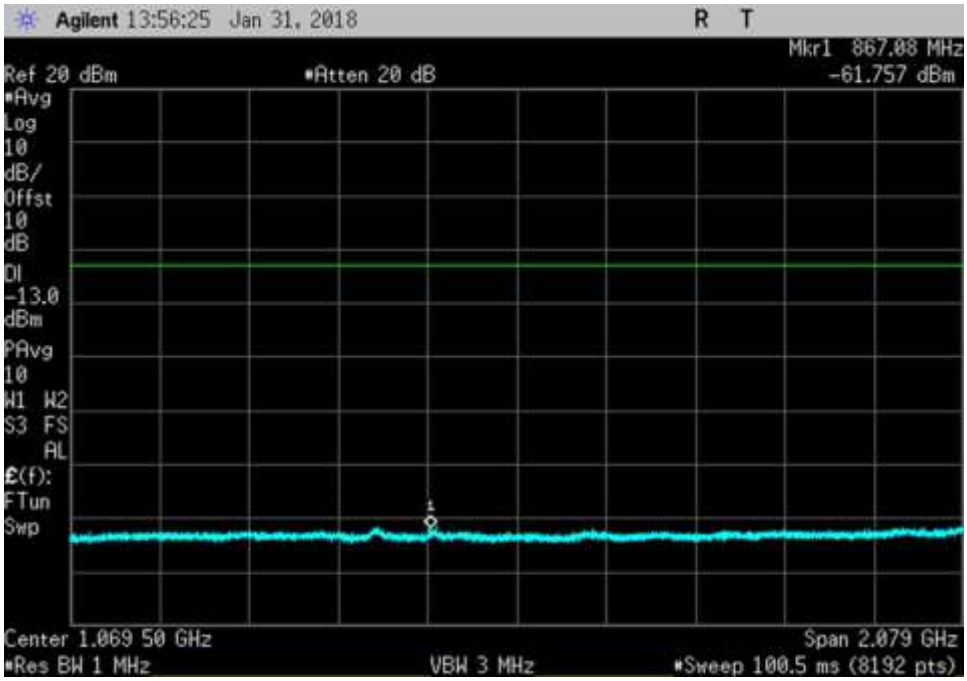
DL_1930-1995_ 8000- 12000MHz



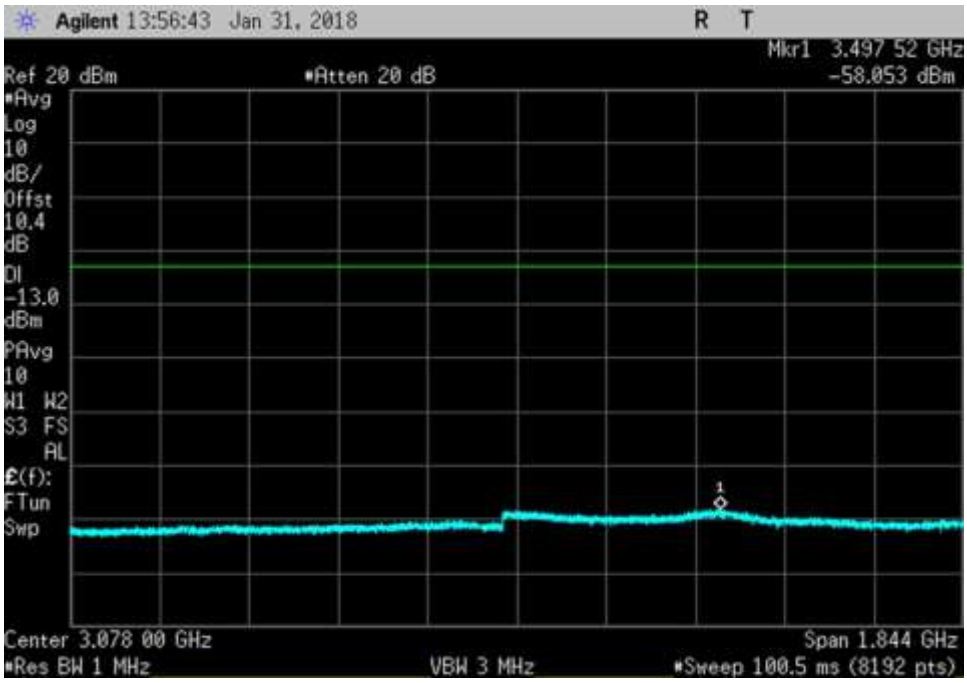
DL_1930-1995_ 12000- 16000MHz



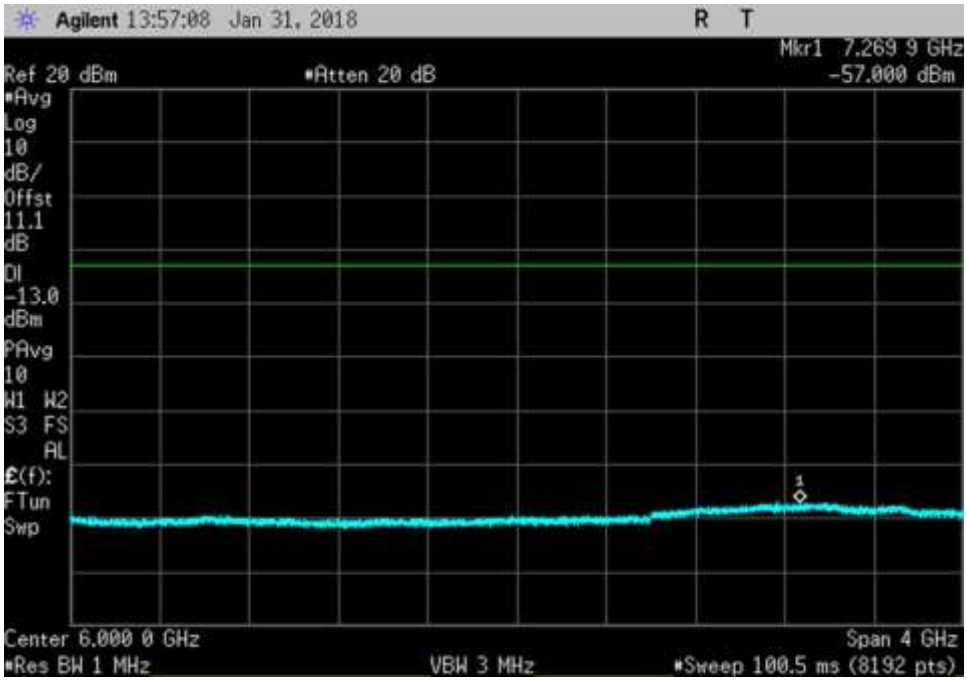
DL_1930-1995_ 16000- 20000MHz



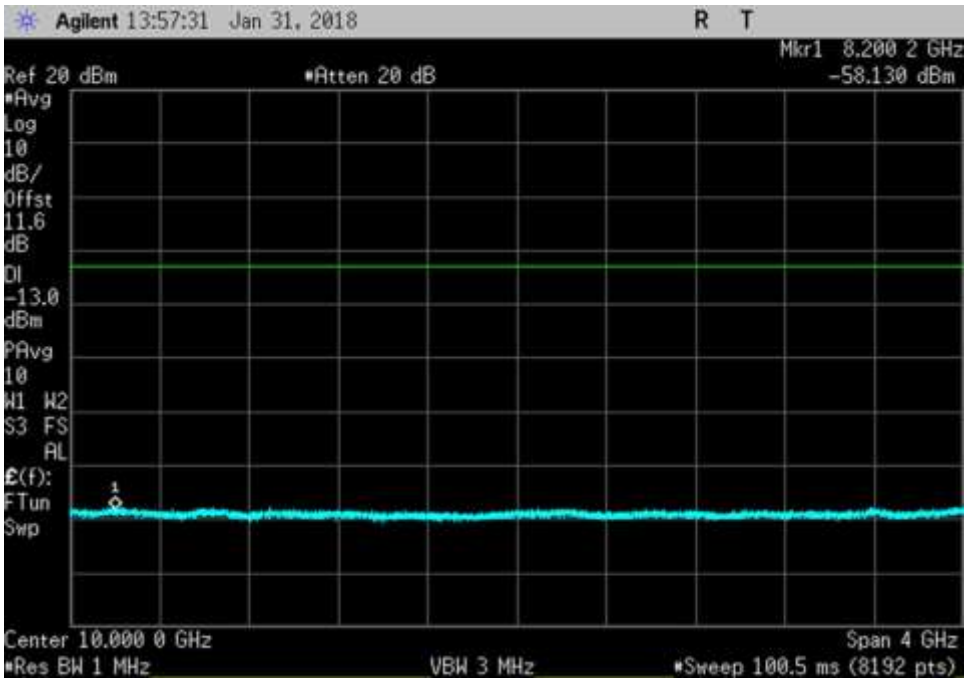
DL_2110-2155_ 30- 2109MHz



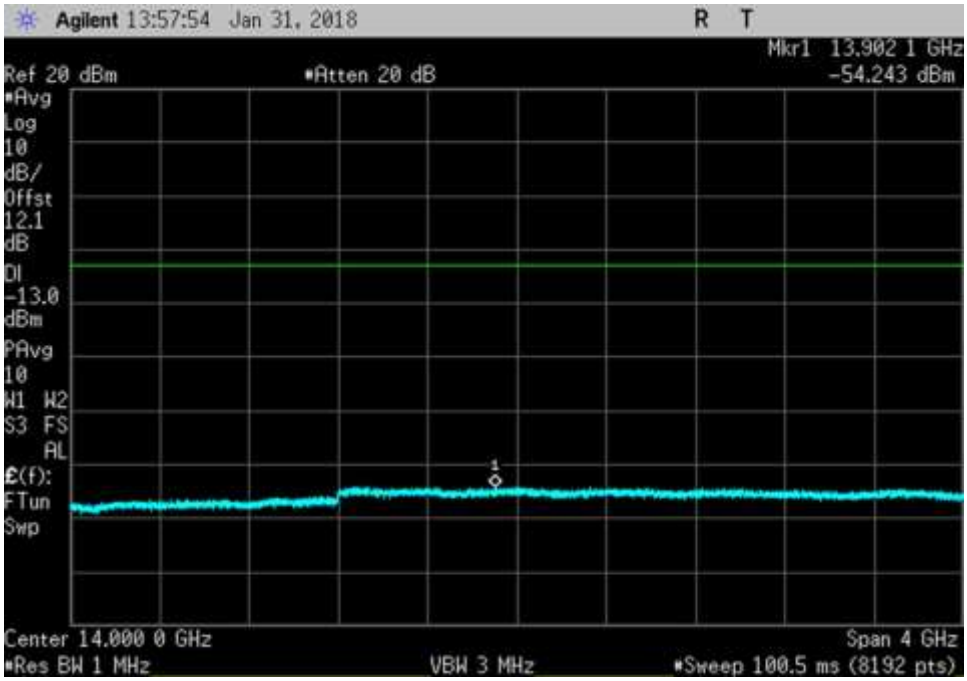
DL_2110-2155_ 2156- 4000MHz



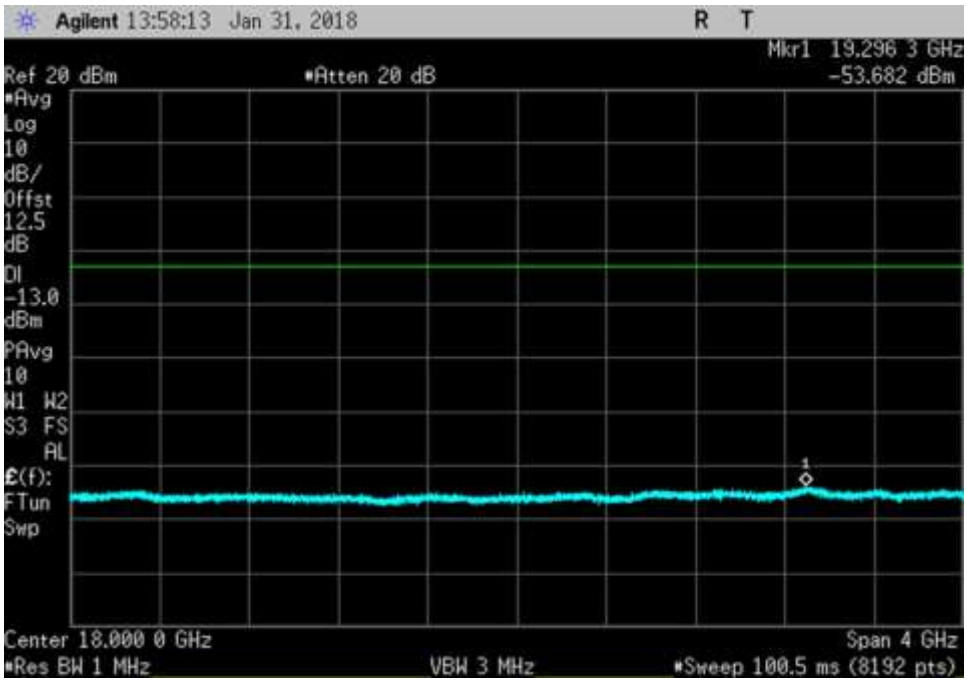
DL_2110-2155_ 4000- 8000MHz



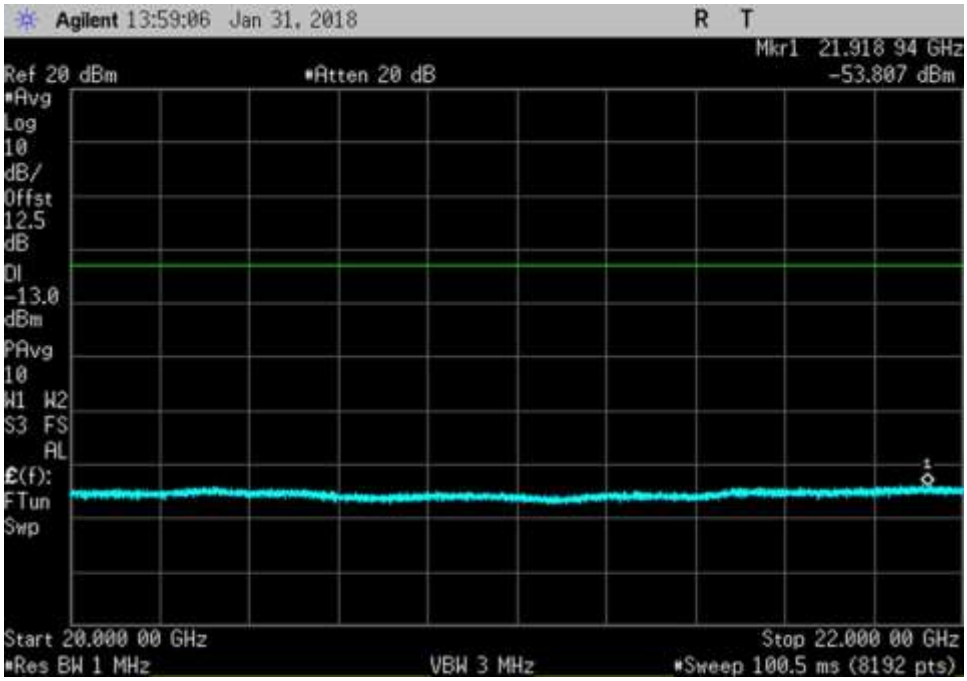
DL_2110-2155_ 8000- 12000MHz



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 #:	**100826**	Date:	1/29/2018
Test Type:	**Conducted Emissions**	Time:	6:19:00 PM
Tested By:	E. Wong	Sequence#:	1
Software:	EMITest 5.03.11		12VDC

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
03470	Spectrum Analyzer	E4440A	1/3/2018	1/3/2020
03418	Signal Generator	E4438C	6/19/2017	6/19/2019
P07192	Cable	32022-29094K-29094K-48TC	10/9/2017	10/9/2019
C00082	Directional Coupler	722-10-1.500V	9/18/2017	9/18/2019
P07191	Cable	32022-29094K-29094K-48TC	10/30/2017	10/30/2019

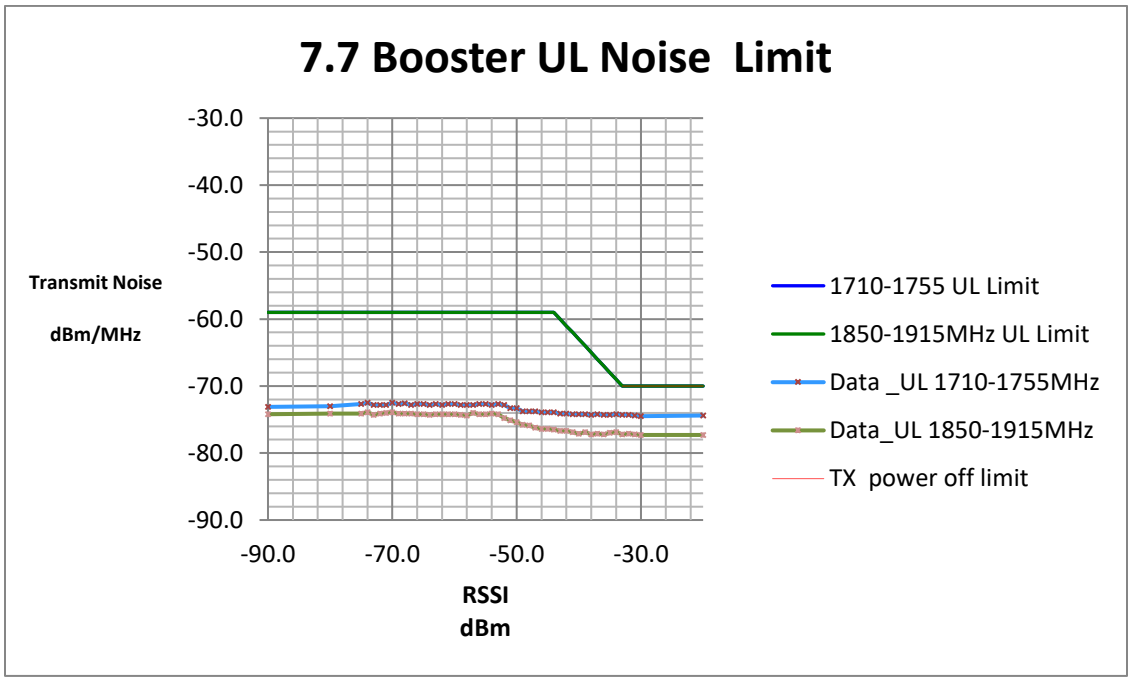
Summary of Results

7.7.1 Maximum transmitter noise power level

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

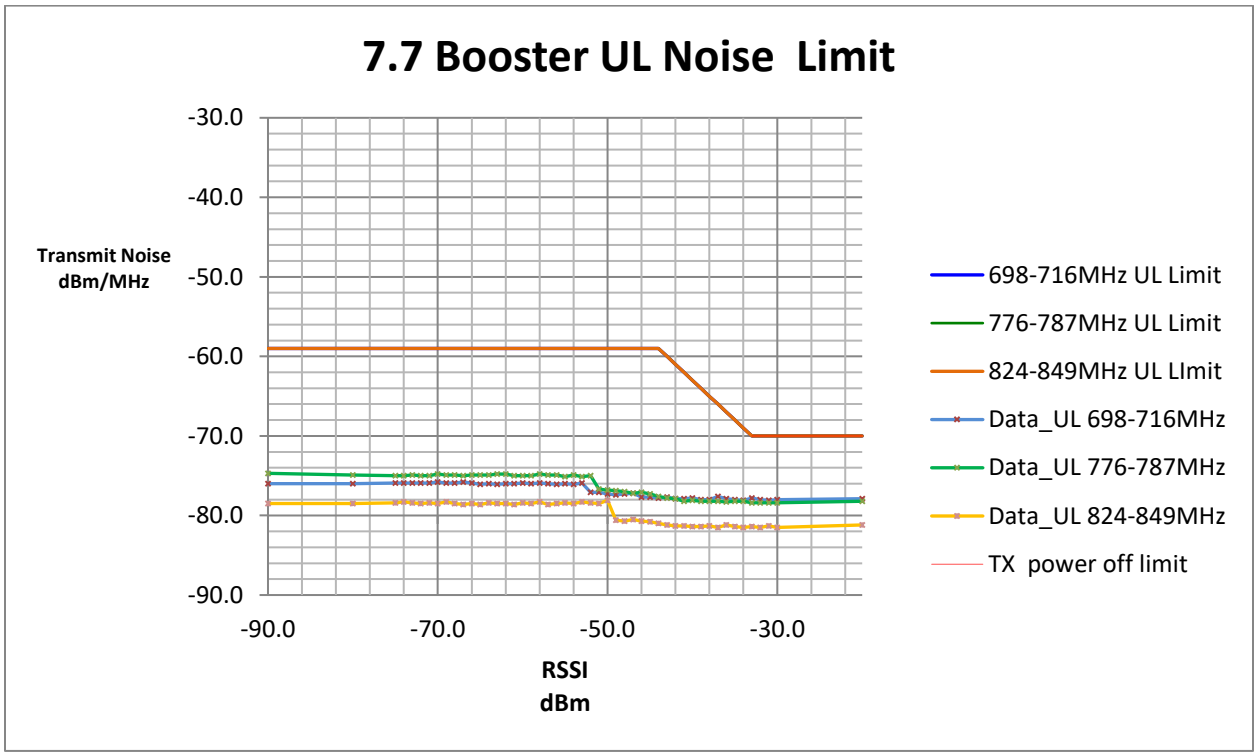
Maximum Noise Power			
Frequency MHz	**Measured dBm./MHz**	**Limit dBm/MHz**	**Margin**
UL 1710-1755	-73.1	-59.0	-14.1
UL 1850-1915	-74.6	-59.0	-15.6
UL 824-849	-79.0	-59.0	-20.0
UL 698-716	-77.0	-59.0	-18.0
UL 776-787	-75.5	-59.0	-16.5
DL 2110-2155	-83.3	-59.0	-24.3
DL 1930-1995	-84.4	-59.0	-25.4
DL 869-894	-73.9	-59.0	-14.9
DL 728-746	-75.8	-59.0	-16.8
DL 746-757	-75.1	-59.0	-16.1

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



1710.0 -1755.0MHz					
		Limit			Margin
RSSI	Measured	RSSI Dependent	Mobile Booster	TX off	
(dBm)	Noise (dBm/MHz)				
-74.0	-72.5		-59.0		-13.5
-34.0	-74.2	-69.0	-	-	-5.2
-35.0	-74.3	-68.0	-	-	-6.3
-36.0	-74.3	-67.0	-	-	-7.3
-37.0	-74.2	-66.0	-	-	-8.2
-33.0	-	-	-	-70	-4.3
-32.0	-	-	-	-70	-4.4

1850.0 -1915.0MHz					
		Limit			Margin
RSSI	Measured	RSSI Dependent	Mobile Booster	TX off	
(dBm)	Noise (dBm/MHz)				
-74.0	-73.9		-59.0	-	-14.9
-70.0	-73.9		-59.0	-	-14.9
-33.0	-77.2	-70.0	-	-	-7.2
-34.0	-76.9	-69.0	-	-	-7.9
-35.0	-77.0	-68.0	-	-	-9.0
-36.0	-77.2	-67.0	-	-	-10.2
-32.0	-77.1		-	-70	-7.1



824.0 - 849.0MHz					
		Limit			Margin
RSSI	Measured	RSSI Dependent	Mobile Booster	TX off	
(dBm)	Noise (dBm/MHz)				
-74.0	-78.3		-59.0	-	-19.3
-69.0	-78.3		-59.0	-	-19.3
-33.0	-81.4	-70.0	-	-	-11.4
-34.0	-81.5	-69.0	-	-	-12.5
-35.0	-81.4	-68.0	-	-	-13.4
-36.0	-81.2	-67.0	-	-	-14.2
-20.0	-81.2	-	-	-70	-11.2

698.0 - 716.0MHz					
		Limit			Margin
RSSI	Measured	RSSI Dependent	Mobile Booster	TX off	
(dBm)	Noise (dBm/MHz)				
-33.0	-70.0	-	-59.0	-	-16.8
-36.0	-67.0	-	-59.0	-	-16.8
-34.0	-78.1	-69.0	-	-	-9.1
-35.0	-78.0	-68.0	-	-	-10.0
-36.0	-77.9	-67.0	-	-	-10.9
-37.0	-77.6	-66.0	-	-	-11.6
-33.0	-77.8	-	-	-70	-7.8

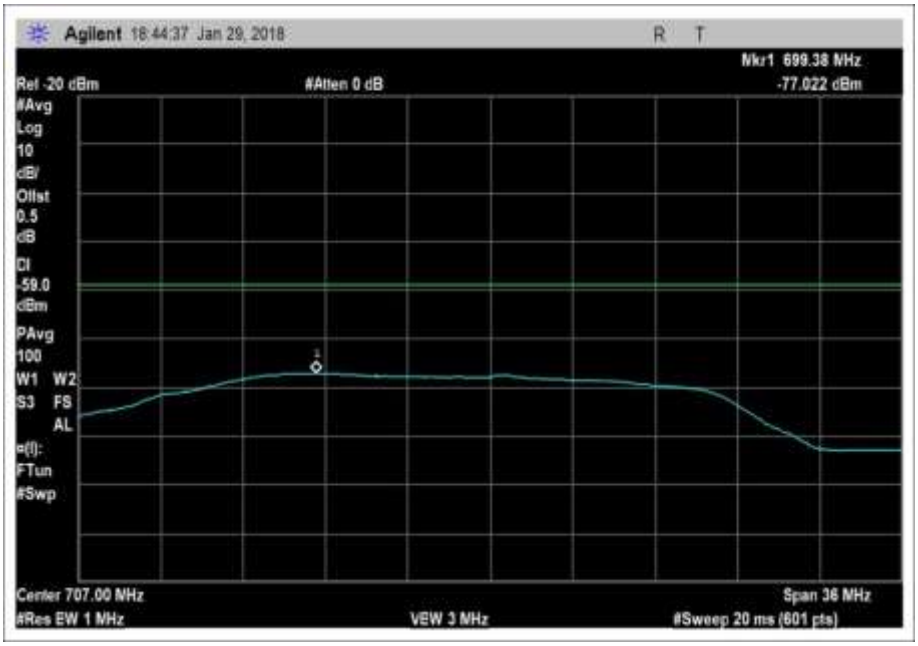
776.0 - 787.0MHz					
		Limit			Margin
RSSI	Measured	RSSI Dependent	Mobile Booster	TX off	
(dBm)	Noise (dBm/MHz)				
-90.0	-74.7	-	-59.0	-	-15.7
-70.0	-74.8	-	-59.0	-	-15.8
-34.0	-78.2	-69.0	-	-	-9.2
-35.0	-78.2	-68.0	-	-	-10.2
-36.0	-78.3	-67.0	-	-	-11.3
-37.0	-78.2	-66.0	-	-	-12.2
-20.0	-78.2	-	-	-70	-8.2

7.7.2 Variable uplink noise timing

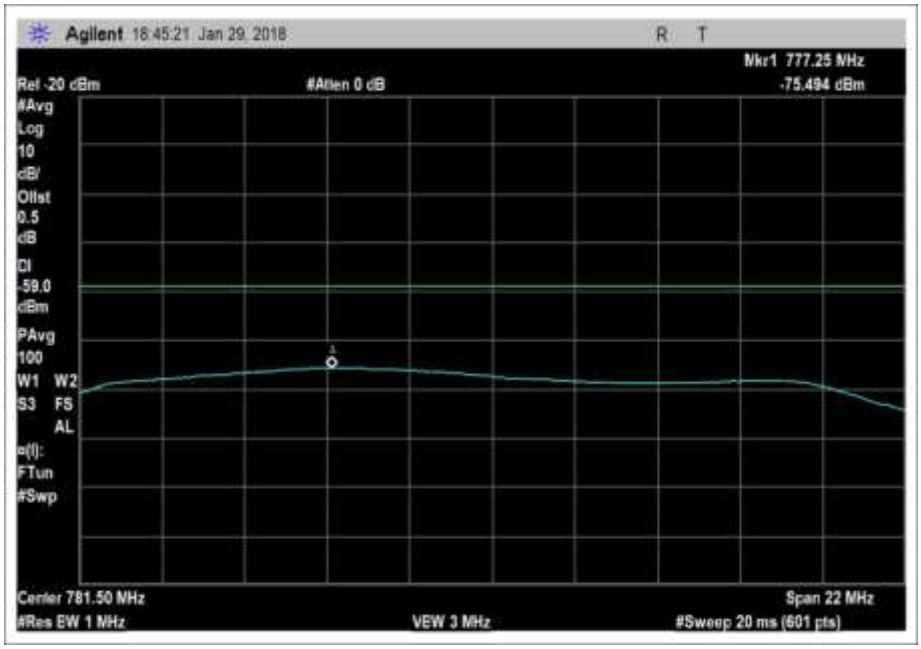
Uplink Noise timing		
Frequency MHz	Measured Sec	Limit (Mobile) sec
UL1710-1755	0.96	1.00
UL1850-1915	0.81	1.00
UL824-849	0.78	1.00
UL 698-716	0.74	1.00
UL776-787	0.34	1.00

7.7.1 Maximum Transmitter Noise Power Level

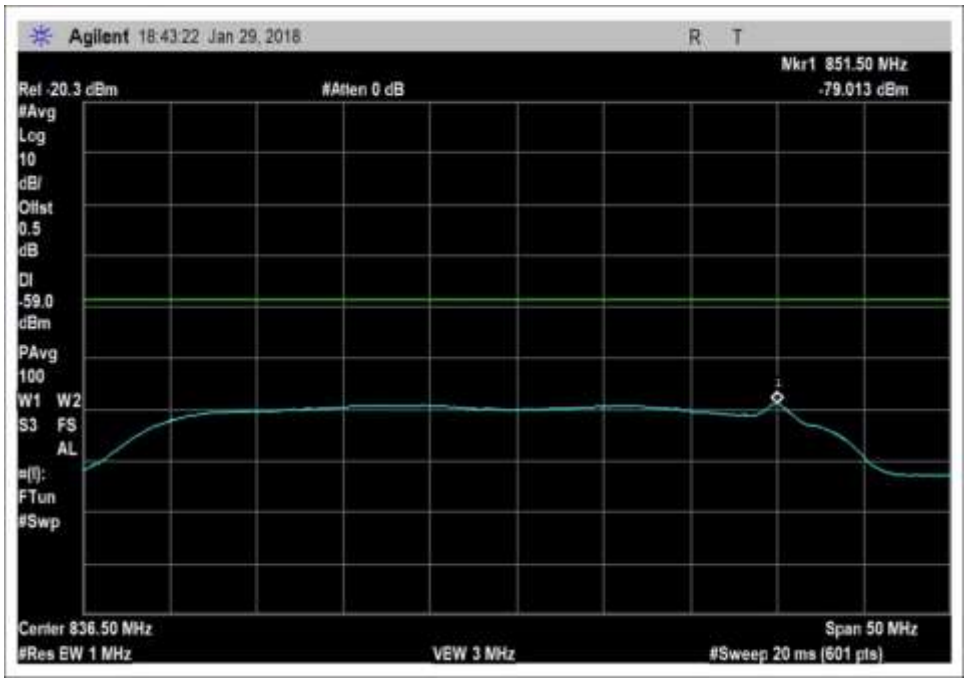
Plots



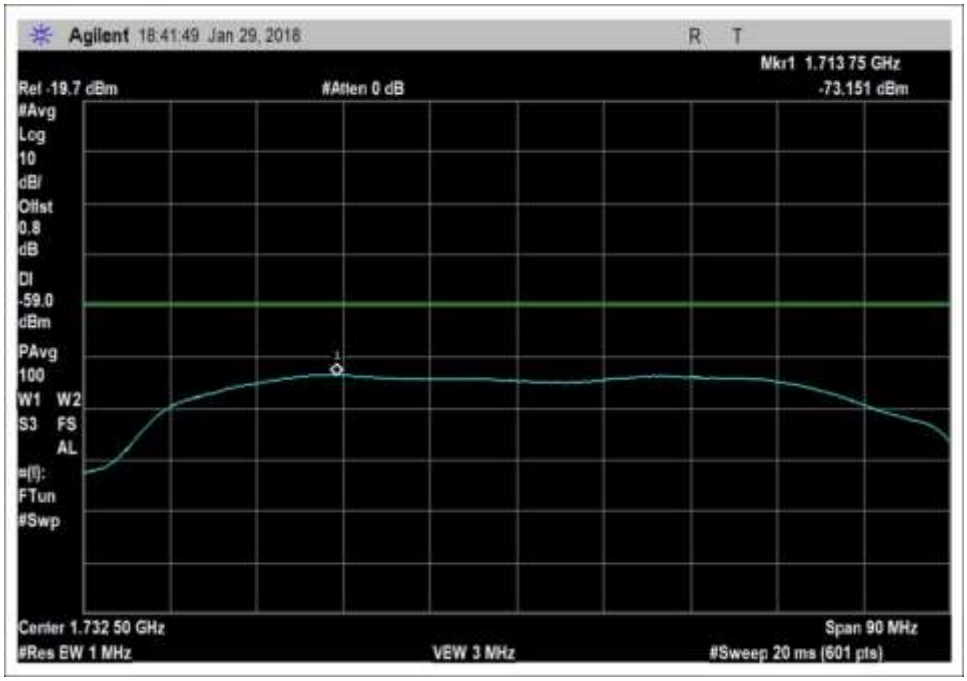
UL_698-716MHz_b



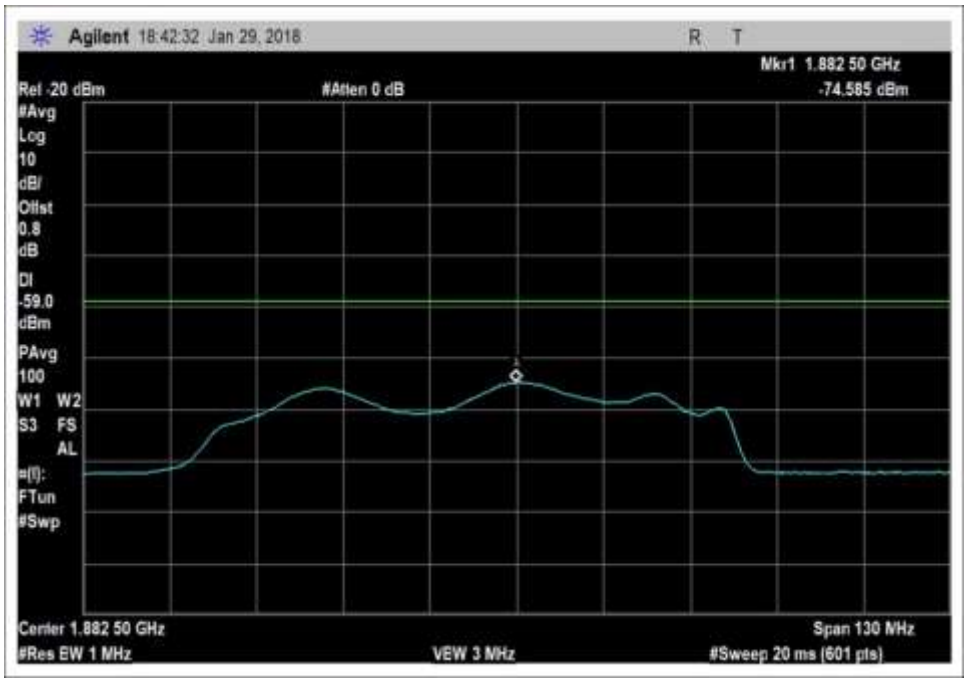
UL_776-787MHz_b



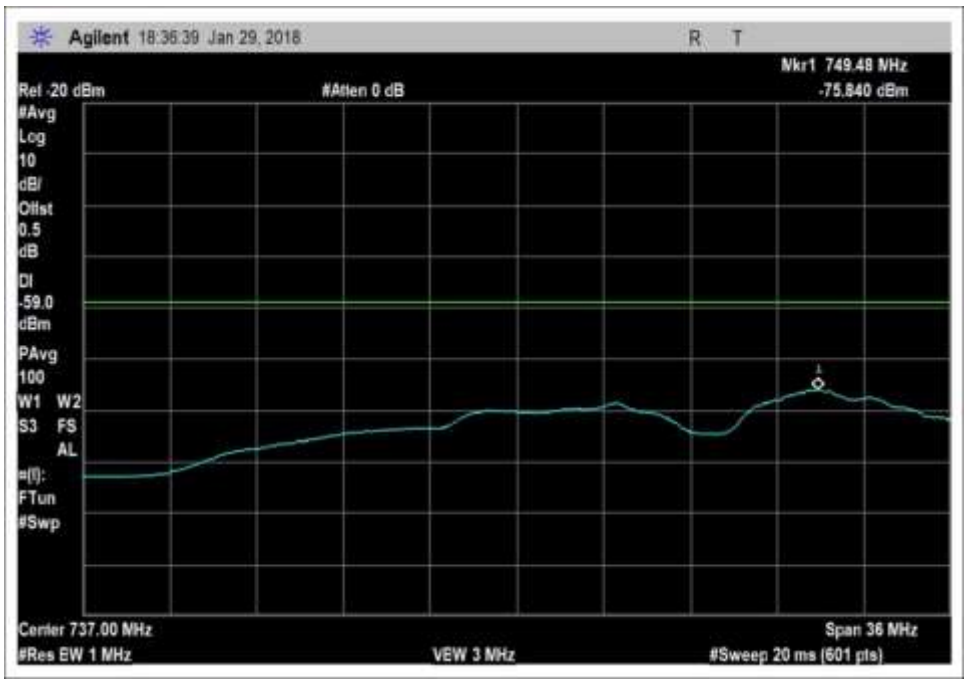
UL_824-849MHz_b



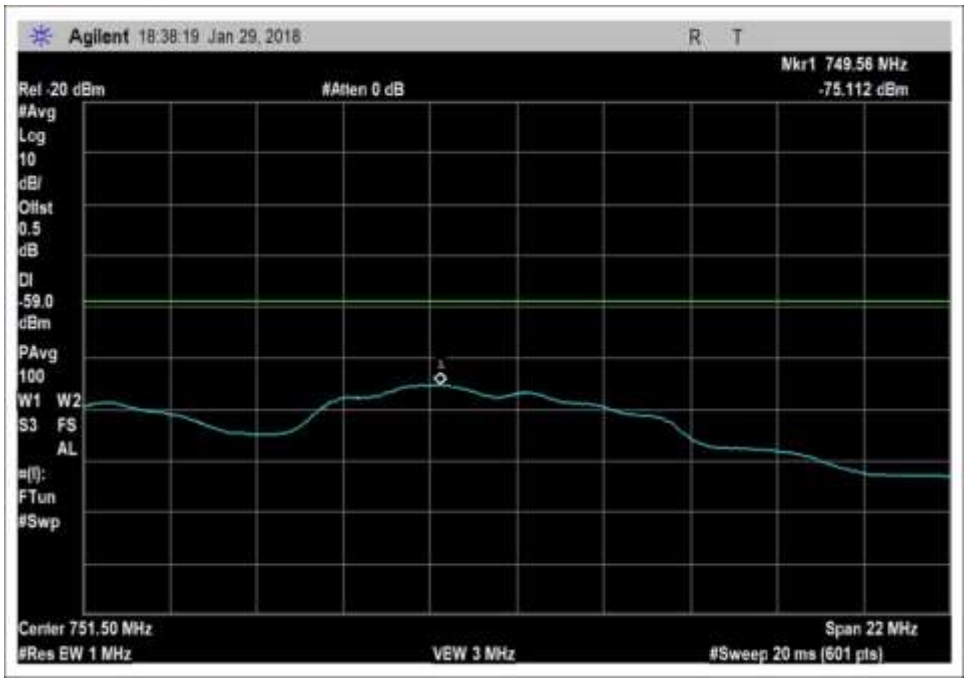
UL_1710-1755MHz_c



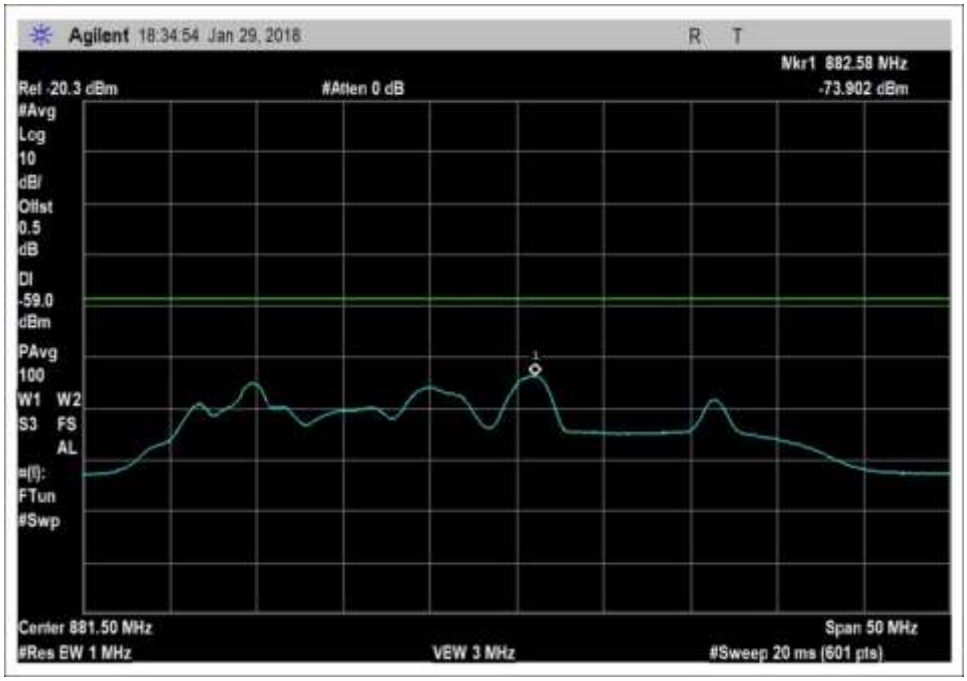
UL_1850-1915MHz_b



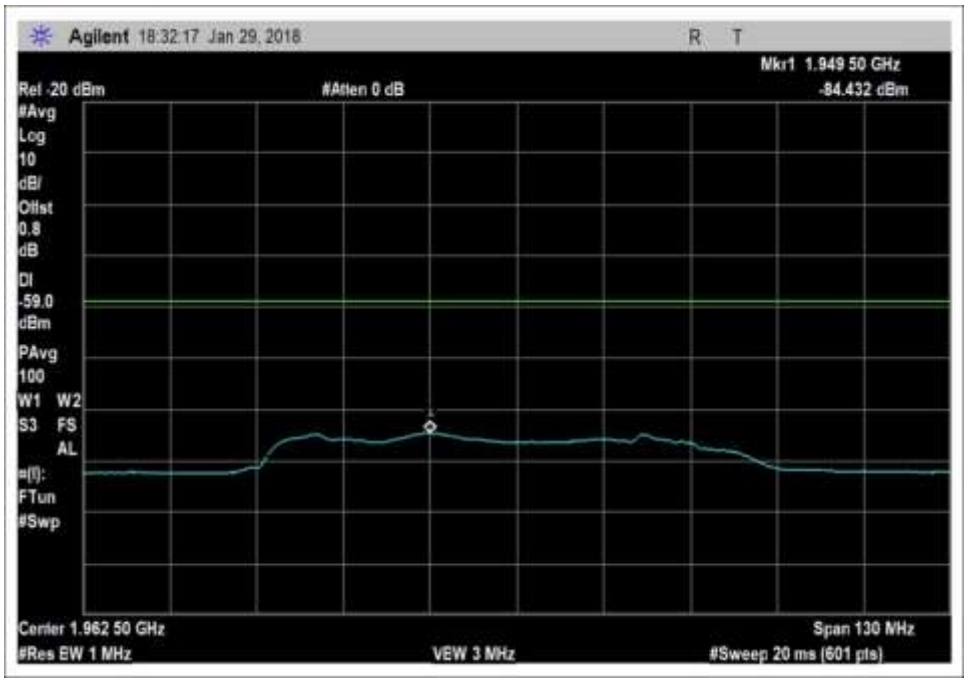
DL_728-746MHz



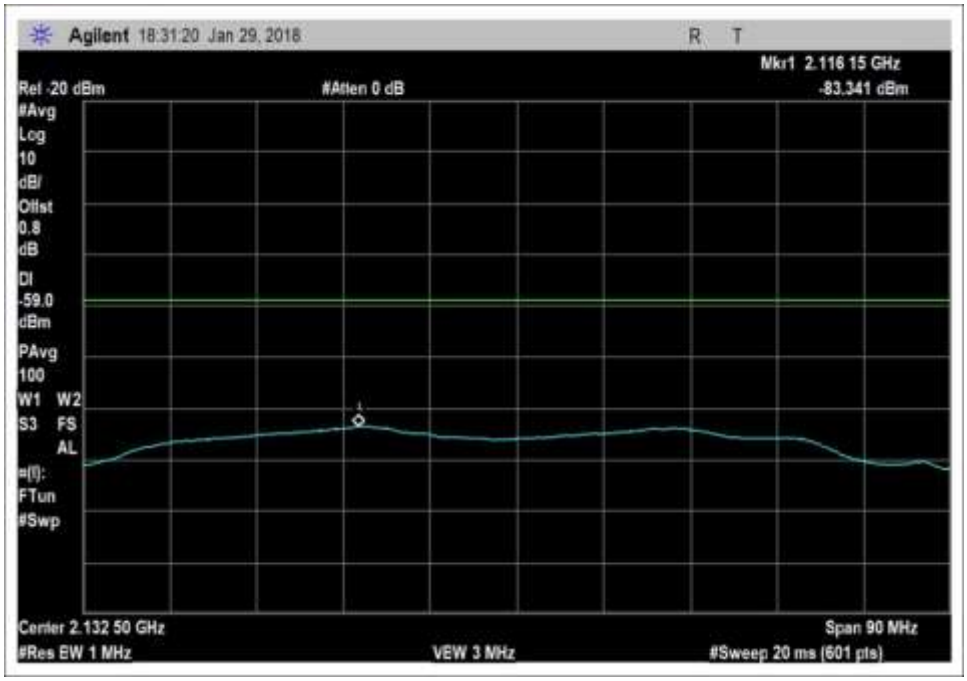
DL_746-757MHz



DL_869-894MHz



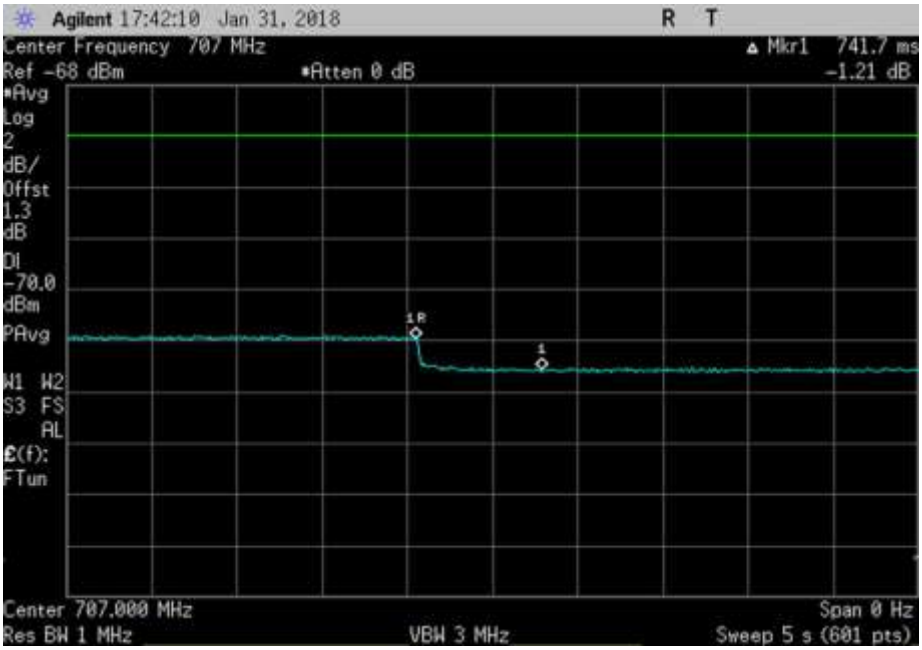
DL_1930-1995MHz



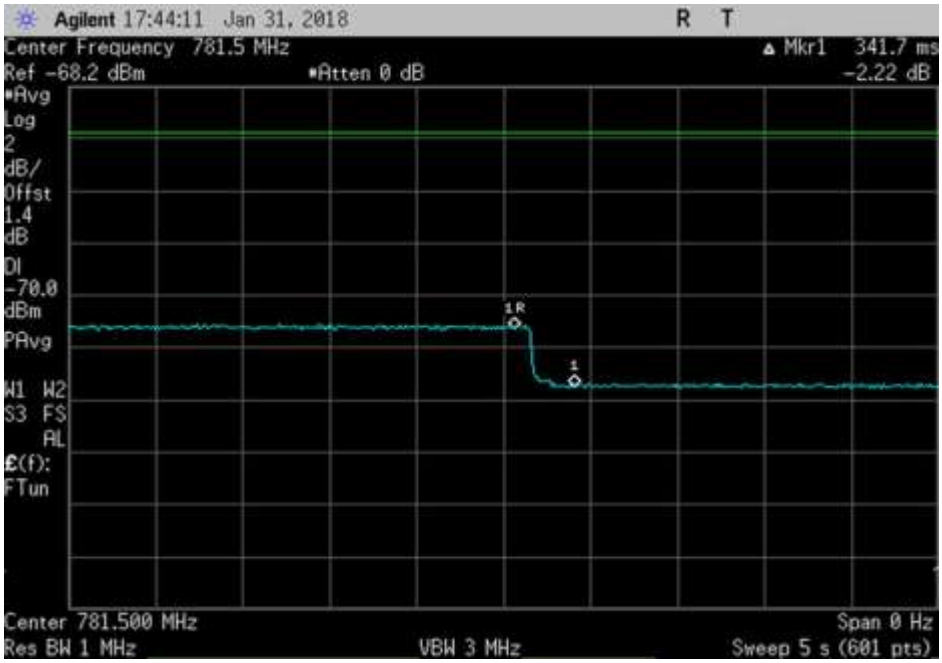
DL_2110-2155MHz

7.7.2 Variable UL Noise Timing

Plots



UL_698-716_ 707MHz_timing



UL_776-787_ 781.5MHz_timing