

# FCC CFR47 PART 27 CERTIFICATION TEST REPORT FCC ID: 2AR3HBWC-R1

**Product:** Body Worn Camera  
**Trade Mark:** N/A  
**Model Number:** BWC-R1  
**Family Model:** BWC-S1, BWC-R2, BWC-S2  
**Report No.:** S18090301503E005

## Prepared for

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## Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen HUADEAN Technology Co.,Ltd.
Address : 5th Floor, No.3 Building, No.10 Industrial Park, Tian Liao Community,Guang Ming New District, Shenzhen, China
Manufacturer's Name : Shenzhen HUADEAN Technology Co.,Ltd.
Address : 5th Floor, No.3 Building, No.10 Industrial Park, Tian Liao Community,Guang Ming New District, Shenzhen, China
Product name : Body Worn Camera
Model and/or type reference : BWC-R1
Family Model: BWC-S1, BWC-R2, BWC-S2
Standards : FCC CFR 47 Part 27
Test procedure : ANSI C63.26:2015
ANSI/TIA-603-E-2016

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test
Date (s) of performance of tests : 13 Sep. 2018 ~ 07 Dec. 2018
Date of Issue : 12 Dec. 2018
Test Result : Pass

Testing Engineer : Eileen Liu. (Eileen Liu)
Technical Manager : Jason Chen (Jason Chen)
Authorized Signatory : Sam. Chen (Sam Chen)

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# 1. GENERAL INFORMATION

## 1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	Body Worn Camera
Trade Mark	N/A
Model Name	BWC-R1
Family Model	BWC-S1, BWC-R2, BWC-S2
Model Difference	All models are the same circuit and RF module, except the model name.
FCC ID:	2AR3HBWC-R1
Frequency Bands:	U.S. Bands: <input checked="" type="checkbox"/> LTE TDD Band 41
Frequency Range:	LTE TDD Band 41 <small>Note2</small>
Type of Modulation:	QPSK/16QAM
Antenna:	FPCB Antenna
Antenna gain:	0 dBi
Power Supply:	DC 3.8V from Battery or DC 5V from USB Port.
Battery parameter:	DC 3.8V/2500mAh
Adapter:	N/A
Extreme Vol. Limits:	DC 3.2V to 4.4V (Nominal DC 3.8V) <small>Note1</small>
Extreme Temp.	-30°C to +50°C
HW Version	S700_MB_V3.1
SW Version	N/A

\*\* Note: 1. The High Voltage 4.4V and Low Voltage 3.2V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.

### 2. Frequency Range:

Test Frequency ID	Bandwidth(MHz)	EARFCN	Frequency (UL and DL) (MHz)
Low Range	5	40265	2557.5
	10	40290	2560
	15	40315	2562.5
	20	40340	2565
Mid Range	5/10/15/20	40740	2605
High Range	5	41215	2652.5
	10	41190	2650
	15	41165	2648.5
	20	41140	2645

## 1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AR3HBWC-R1** filing to comply with the FCC Part 27.

## 1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 27, ANSI C63.26:2015.

## 1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R.China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

## 1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

## 1.6 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has LTE Bands of: LTE TDD Band 41

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all LTE bands.

## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

**2.2 EUT EXERCISE**

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

**2.3 CONFIGURATION OF EUT SYSTEM**

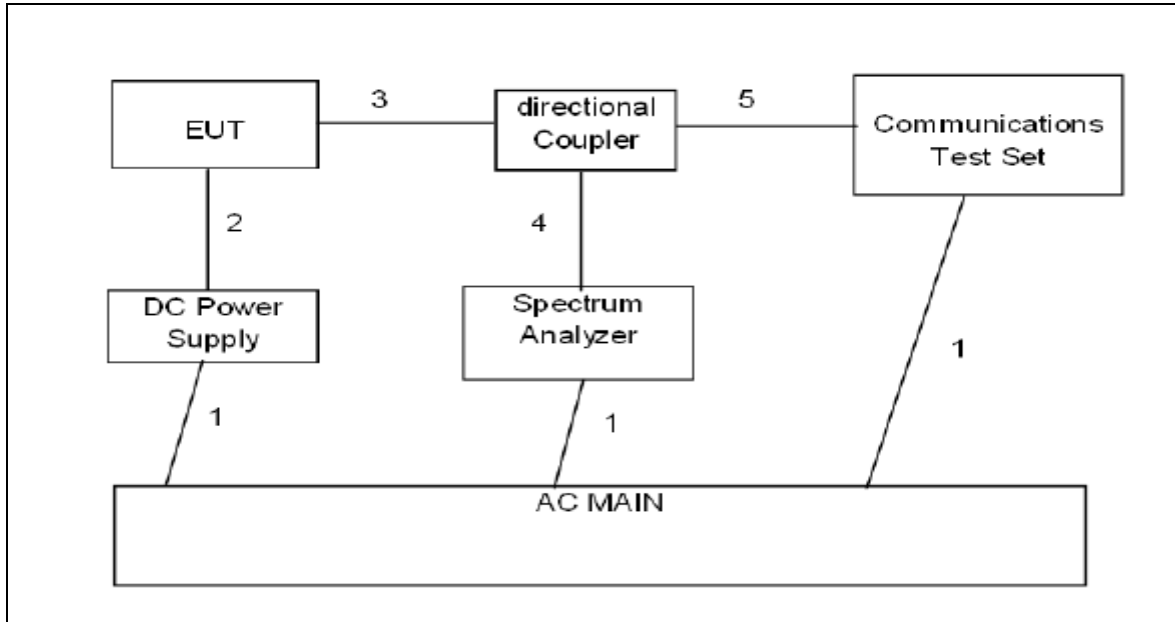
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Series No.	Note
1	Body Worn Camera	BWC-R1	N/A	EUT

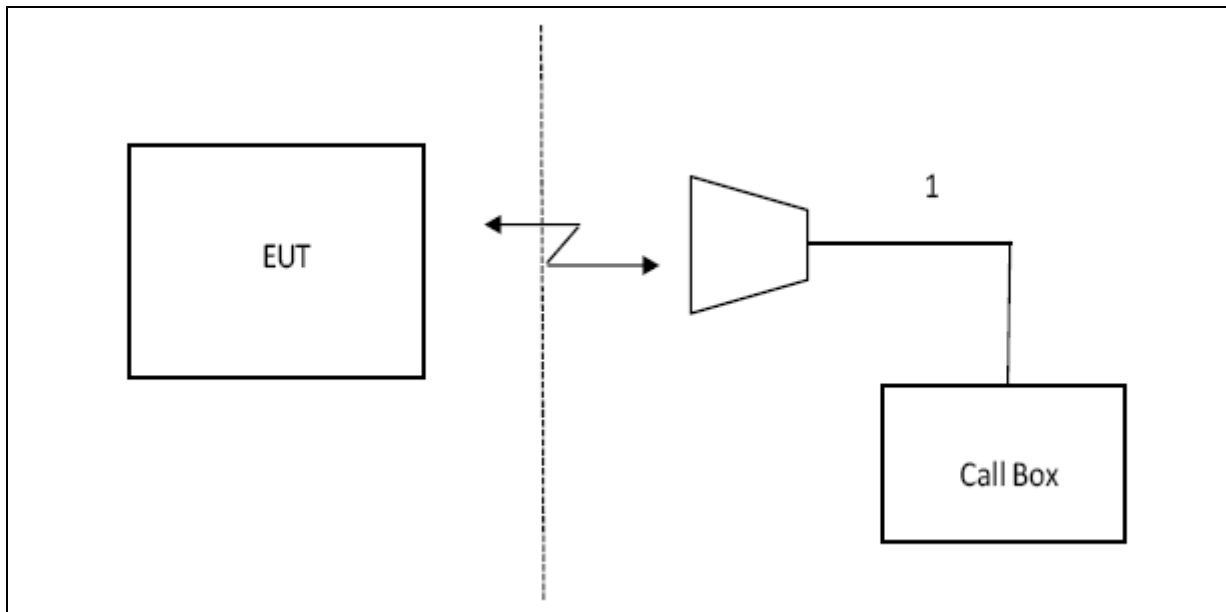
*Note: All the accessories have been used during the test.  
the following "EUT" in setup diagram means EUT system.*

2.4 TEST SETUP

CONDUCTED SETUP DIAGRAM FOR TESTS



RADIATED SETUP DIAGRAM FOR TESTS





### 3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	NEXT CAL. DATE
SPECTRUM ANALYZER	AGILENT	N9020A	MY49100060	2019.10.07
TEST RECEIVER	R&S	ESCI	101318	2019.05.18
COMMUNICATION TESTER	R&S	CMU200	117858	2019.05.18
COMMUNICATION TESTER	R&S	CMW500	148500	2019.05.18
TEST RECEIVER	R&S	FCKL1528	A0304230	2019.05.18
LISN	SCHWARZBECK	NSLK8127	A0304233	2019.05.18
CLIMATE CHAMBER	ALBATROSS	--	--	2019.05.18
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	2019.05.18
Horn Antenna	EM	EM-AH-10180	2011071402	2019.05.18
DC Power Source	N/A	PS-6005D	20170402923	2019.05.18

## 4. OUTPUT POWER

### 4.1 OUTPUT POWER MEASUREMENT

#### LTE Measurement Procedure:

All LTE bands conducted power peak and average are obtained from the CMW500 telecommunication test set. The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".3

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks ( $N_{RB}$ )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	$\leq 1$
			5	>6	$\leq 1$
			10	>6	$\leq 1$
			15	>8	$\leq 1$
			20	>10	$\leq 1$
NS_04	6.6.2.2.2	41	5	>6	$\leq 1$
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	$\geq 50$	$\leq 1$
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	$\leq 3$
NS_09	6.6.3.3.4	21	10, 15	> 40	$\leq 1$
				> 55	$\leq 2$
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 <sup>1</sup>	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

4.2 LTE BAND 41  
OUTPUT POWER FOR LTE BAND 41 (5MHZ)

Band	Band Width	Channel	Frequency (MHz)	Modulation	RB Configuration		Average Power(dBm)	Peak Power(dBm)
					RB Size	RB Offset		
Band 41	5.0 MHz	40265	2557.5	QPSK	1	Low	21.96	27.50
					1	Mid	22.00	27.46
					1	High	21.95	27.45
					12	Low	21.85	27.90
					12	High	21.76	27.90
					25	Low	21.70	27.94
				16QAM	1	Low	21.64	27.33
					1	Mid	21.58	27.30
					1	High	21.54	27.33
					12	Low	21.49	27.72
					12	High	21.46	27.80
					25	Low	21.00	28.31
	5.0 MHz	40740	2605.0	QPSK	1	Low	21.39	26.98
					1	Mid	21.36	26.94
					1	High	21.34	26.96
					12	Low	21.31	27.95
					12	High	21.30	27.87
					25	Low	21.27	27.95
				16QAM	1	Low	21.25	26.91
					1	Mid	21.23	26.90
					1	High	21.22	26.89
					12	Low	21.20	27.15
					12	High	21.19	27.01
					25	Low	20.97	27.43
	5.0 MHz	41215	2652.5	QPSK	1	Low	21.15	26.74
					1	Mid	21.13	26.77
					1	High	21.12	26.74
					12	Low	21.10	27.44
					12	High	21.09	27.45
					25	Low	21.08	27.96
16QAM				1	Low	21.07	26.56	
				1	Mid	21.05	26.57	
				1	High	21.04	26.55	
				12	Low	21.02	27.38	
				12	High	21.01	27.36	
				25	Low	20.96	26.65	

OUTPUT POWER FOR LTE BAND 41 (10.0MHZ)

Band	Band Width	Channel	Frequency (MHz)	Modulation	RB Configuration		Average Power(dBm)	Peak Power(dBm)
					RB Size	RB Offset		
Band 41	10.0 MHz	40290	2560.0	QPSK	1	Low	20.99	27.59
					1	Mid	20.96	27.59
					1	High	20.94	27.58
					25	Low	20.92	27.84
					25	High	20.90	27.82
					50	Low	20.89	28.54
				16QAM	1	Low	20.88	27.44
					1	Mid	20.87	27.38
					1	High	20.87	27.53
					25	Low	20.86	28.13
					25	High	20.85	28.19
					50	Low	20.84	28.29
	10.0 MHz	40740	2605.0	QPSK	1	Low	20.83	27.08
					1	Mid	20.82	26.98
					1	High	20.82	27.01
					25	Low	20.81	28.06
					25	High	20.80	28.07
					50	Low	20.79	27.90
				16QAM	1	Low	20.78	27.15
					1	Mid	20.77	27.03
					1	High	20.77	27.07
					25	Low	20.76	27.05
					25	High	20.75	27.04
					50	Low	20.75	27.72
	10.0 MHz	41190	2650.0	QPSK	1	Low	20.74	26.97
					1	Mid	20.74	26.88
					1	High	20.73	26.95
					25	Low	20.72	27.43
					25	High	20.72	27.45
					50	Low	20.72	27.55
16QAM				1	Low	20.71	27.01	
				1	Mid	20.70	26.91	
				1	High	20.70	26.92	
				25	Low	20.70	27.28	
				25	High	20.68	27.35	
				50	Low	20.68	27.64	

OUTPUT POWER FOR LTE BAND 41 (15.0MHZ)

Band	Band Width	Channel	Frequency (MHz)	Modulation	RB Configuration		Average Power(dBm)	Peak Power(dBm)
					RB Size	RB Offset		
Band 41	15.0 MHz	40315	2562.5	QPSK	1	Low	20.86	27.64
					1	Mid	20.83	27.62
					1	High	20.81	27.56
					36	Low	20.80	28.44
					36	High	20.79	28.23
					75	Low	20.78	28.15
				16QAM	1	Low	20.77	27.49
					1	Mid	20.77	27.34
					1	High	20.76	27.43
					36	Low	20.76	27.93
					36	High	20.75	28.04
					75	Low	20.74	28.56
	15.0 MHz	40740	2605.0	QPSK	1	Low	20.74	27.16
					1	Mid	20.73	27.07
					1	High	20.73	27.05
					36	Low	20.72	27.69
					36	High	20.72	27.65
					75	Low	20.71	28.19
				16QAM	1	Low	20.71	26.83
					1	Mid	20.71	26.79
					1	High	20.70	26.77
					36	Low	20.70	27.51
					36	High	20.69	27.51
					75	Low	20.69	27.94
	15.0 MHz	41165	2648.5	QPSK	1	Low	20.68	26.98
					1	Mid	20.68	26.88
					1	High	20.67	26.84
36					Low	20.66	27.69	
36					High	20.66	27.69	
75					Low	20.66	28.19	
16QAM				1	Low	20.65	26.98	
				1	Mid	20.65	26.87	
				1	High	20.64	26.95	
				36	Low	20.64	27.63	
				36	High	20.63	27.69	
				75	Low	20.63	27.88	

OUTPUT POWER FOR LTE BAND 41 (20.0MHZ)

Band	Band Width	Channel	Frequency (MHz)	Modulation	RB Configuration		Average Power(dBm)	Peak Power(dBm)
					RB Size	RB Offset		
Band 41	20.0 MHz	40340	2565.0	QPSK	1	Low	20.81	27.59
					1	Mid	20.76	27.21
					1	High	20.75	27.25
					50	Low	20.74	28.45
					50	High	20.73	28.20
					100	Low	20.73	28.42
				16QAM	1	Low	20.74	27.45
					1	Mid	20.73	26.90
					1	High	20.72	27.36
					50	Low	20.72	28.07
					50	High	20.71	27.95
					100	Low	20.72	28.36
	20.0 MHz	40740	2605.0	QPSK	1	Low	20.71	27.40
					1	Mid	20.71	27.22
					1	High	20.70	27.30
					50	Low	20.70	27.88
					50	High	20.70	27.80
					100	Low	20.70	27.99
				16QAM	1	Low	20.70	27.03
					1	Mid	20.70	26.89
					1	High	20.70	26.93
					50	Low	20.69	27.60
					50	High	20.69	27.58
					100	Low	20.69	28.02
	20.0 MHz	41140	2645.0	QPSK	1	Low	20.69	26.79
					1	Mid	20.69	26.77
					1	High	20.68	26.91
					50	Low	20.68	27.61
					50	High	20.67	27.63
					100	Low	20.67	27.73
16QAM				1	Low	20.67	26.81	
				1	Mid	20.66	26.56	
				1	High	20.65	26.70	
				50	Low	20.65	27.69	
				50	High	20.66	27.74	
				100	Low	20.68	27.66	

## 5. OCCUPIED BANDWIDTH

### RULE PART(S)

FCC: §2.1049

### LIMITS

For reporting purposes only

### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

### MODES TESTED

- LTE Band 41

### RESULTS

**PASS**



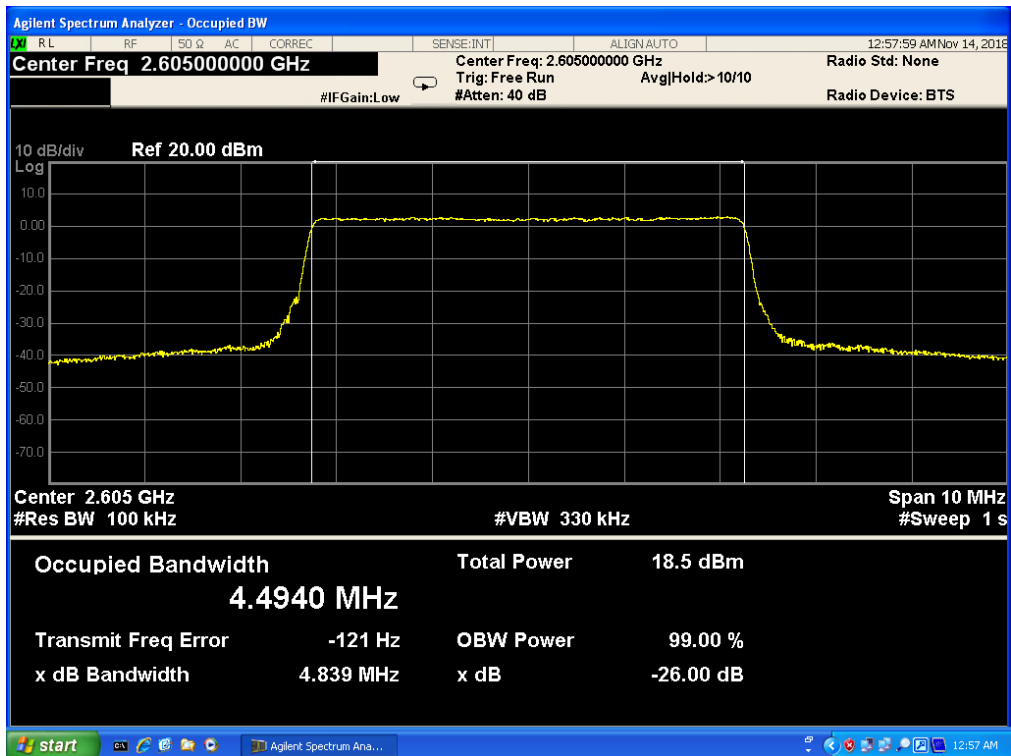
**Test results:**

Band	Mode	RB Size/RB Offset	Frequency (MHz)	99% Occupied Bandwidth (MHz)	-26dBc Occupied Bandwidth (MHz)
LTE Band 41	5.0MHz BAND QPSK	25/0	2605.0	4.49	4.84
	5.0MHz BAND 16QAM	25/0	2605.0	4.49	4.82
	10.0MHz BAND QPSK	50/0	2605.0	8.95	9.48
	10.0MHz BAND 16QAM	50/0	2605.0	8.96	9.50
	15.0MHz BAND QPSK	75/0	2605.0	13.45	14.23
	15.0MHz BAND 16QAM	75/0	2605.0	13.44	14.22
	20.0MHz BAND QPSK	100/0	2605.0	17.94	19.02
	20.0MHz BAND 16QAM	100/0	2605.0	17.94	19.00

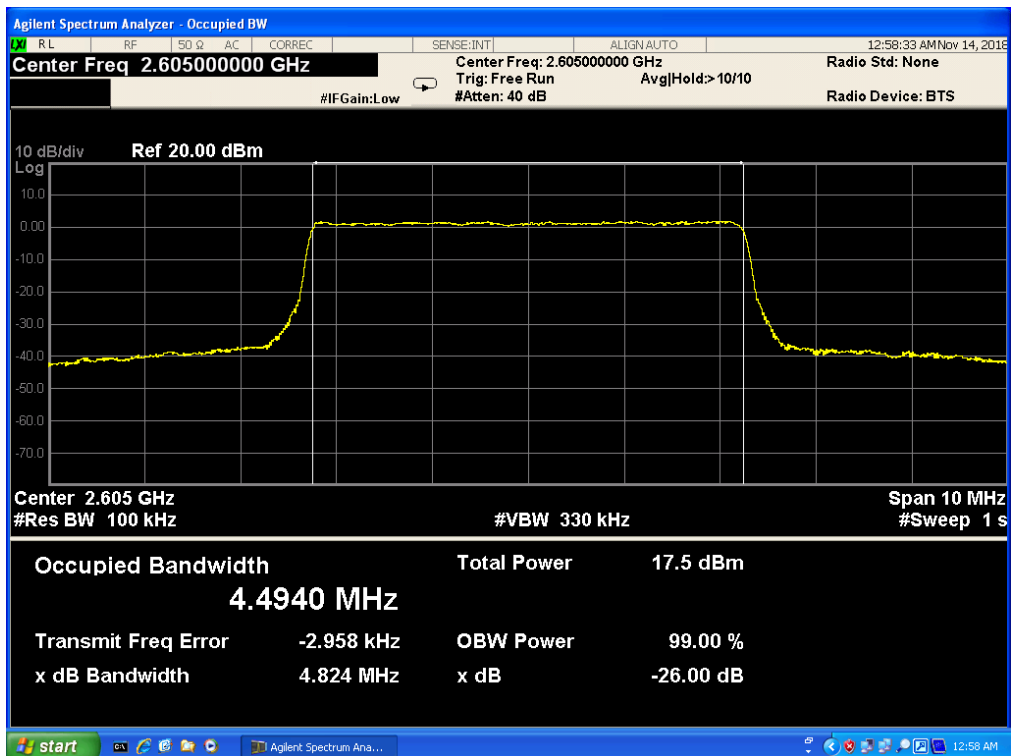
Note: This test was only measured at maximum RB allocation and at CENTER of band for each LTE BW

### 5.1 LTE BAND 41

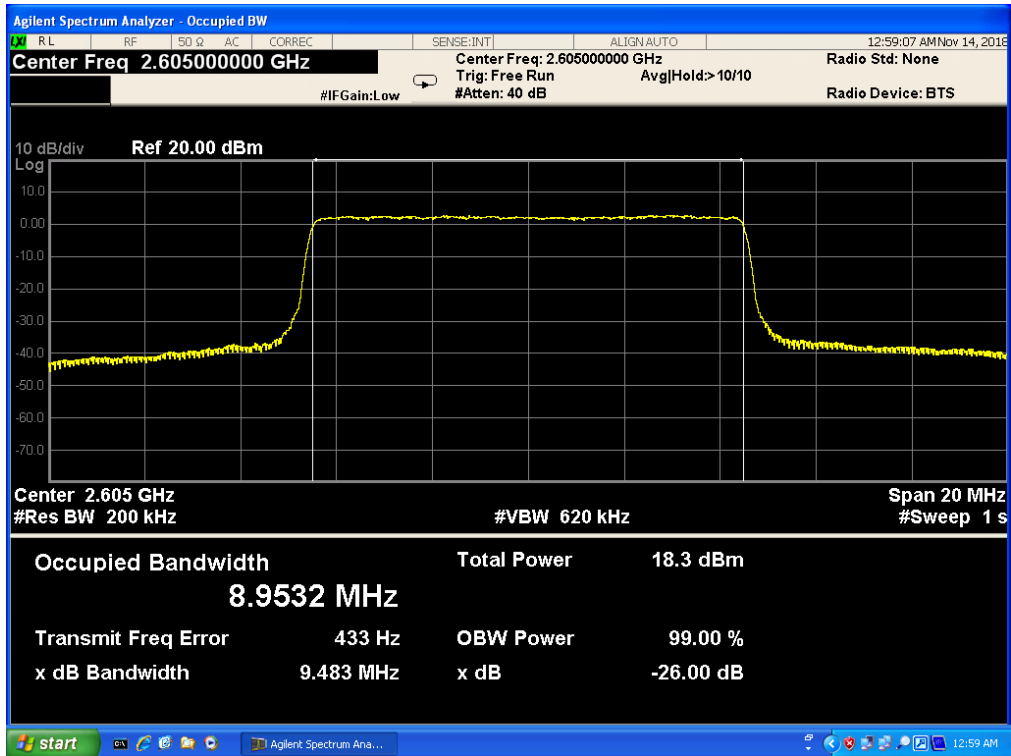
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 25, RB POS. Low, QPSK



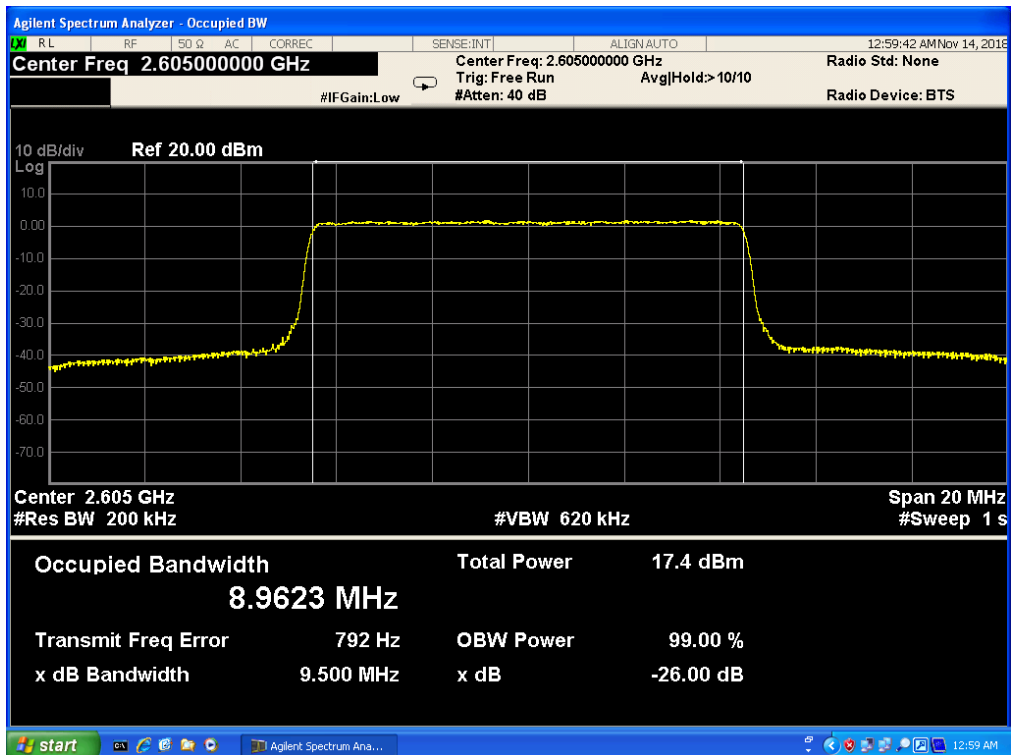
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



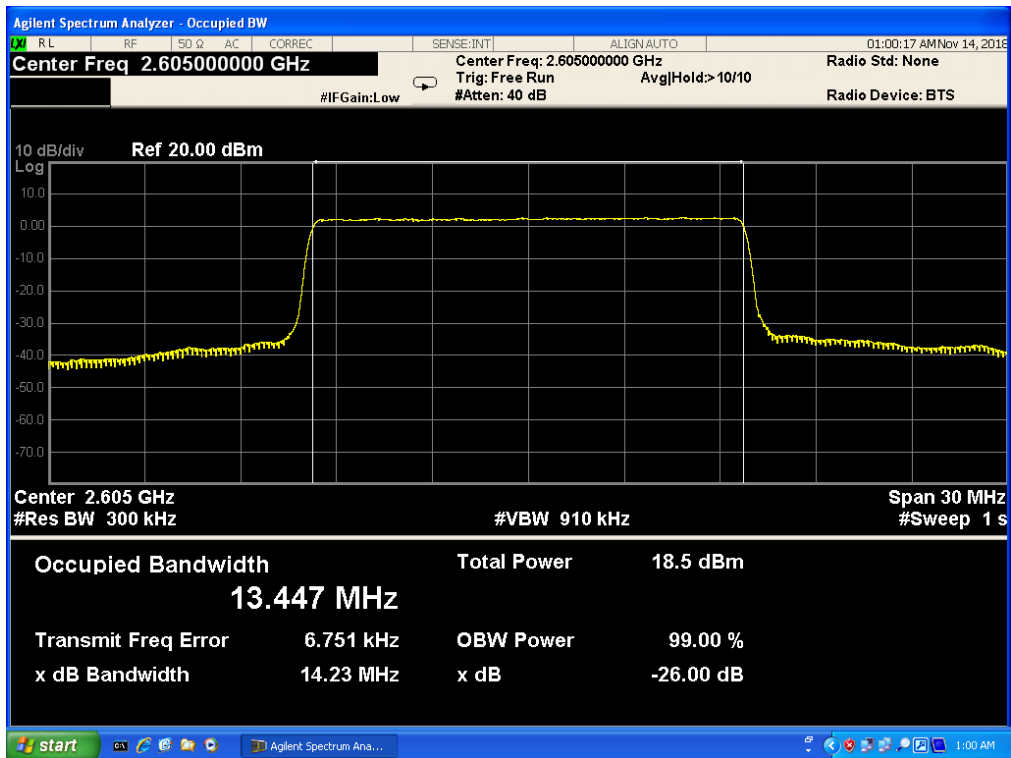
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



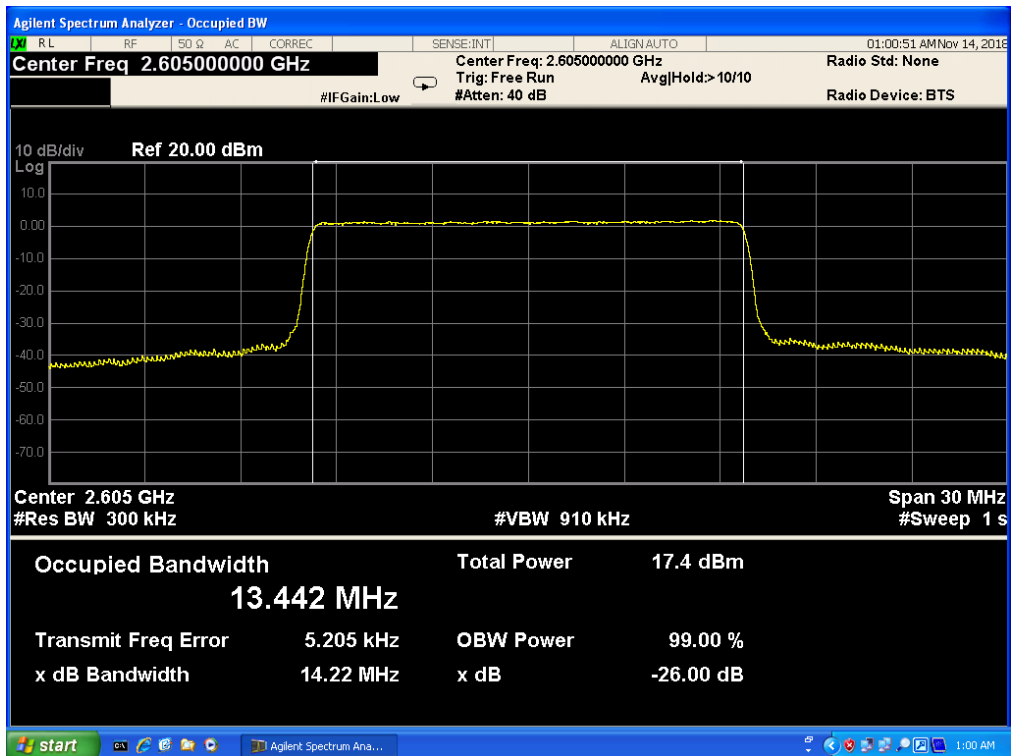
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



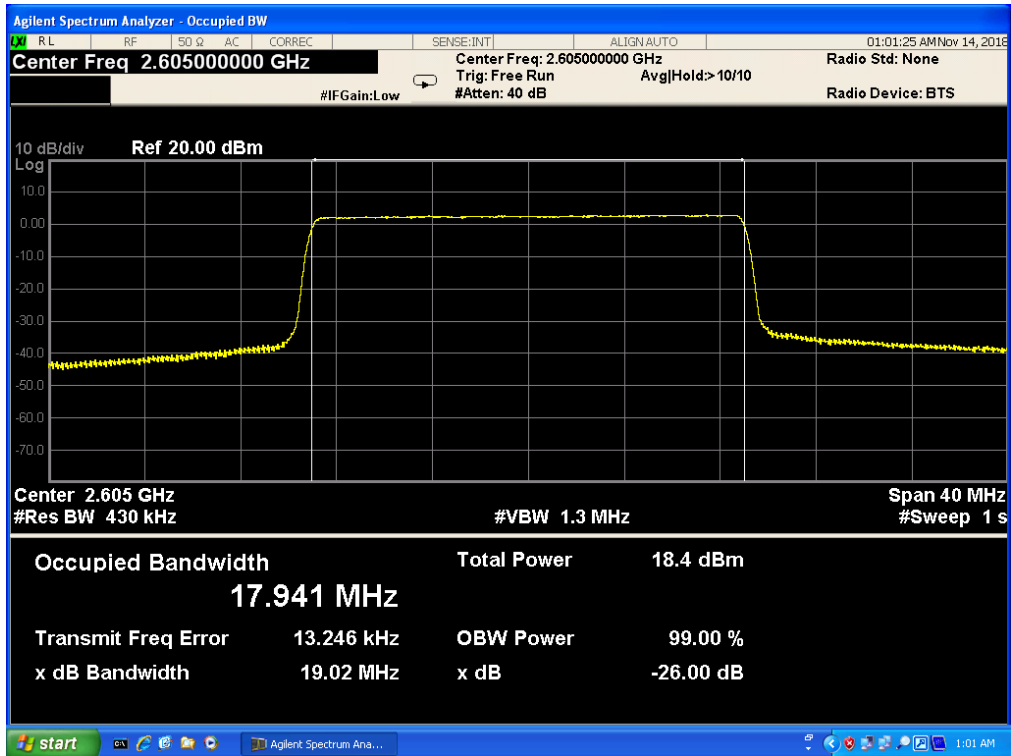
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 15.0, NO. RB 75, RB POS. Low, QPSK



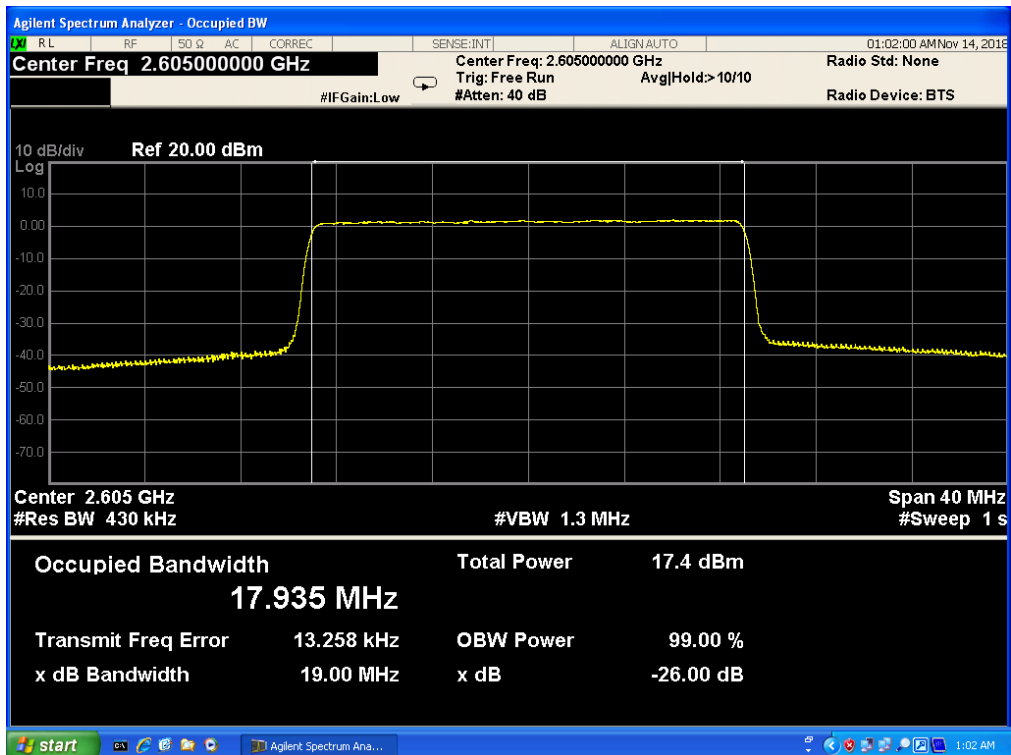
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



Band 41, UL Channel 40740, UL Frequency 2605.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 41, UL Channel 40740, UL Frequency 2605.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



## 6. BANDEDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §27.53

FCC: §27.53

### LIMITS

FCC: §27.53

(m)(6) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

(m)(4) For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Show citation box.

### TEST PROCEDURE

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency.

Set a marker to point the corresponding band edge frequency in each test case.

Set display line at -13 dBm

Set resolution bandwidth to at least 1% of emission bandwidth.

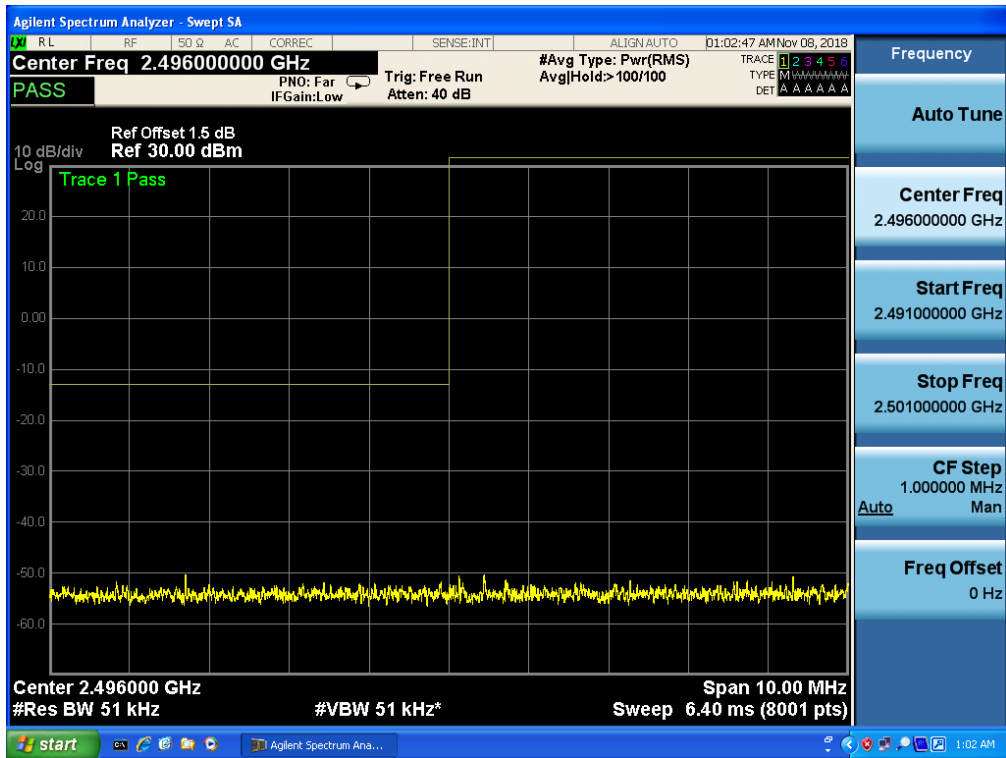
**MODES TESTED**

- LTE Band 41

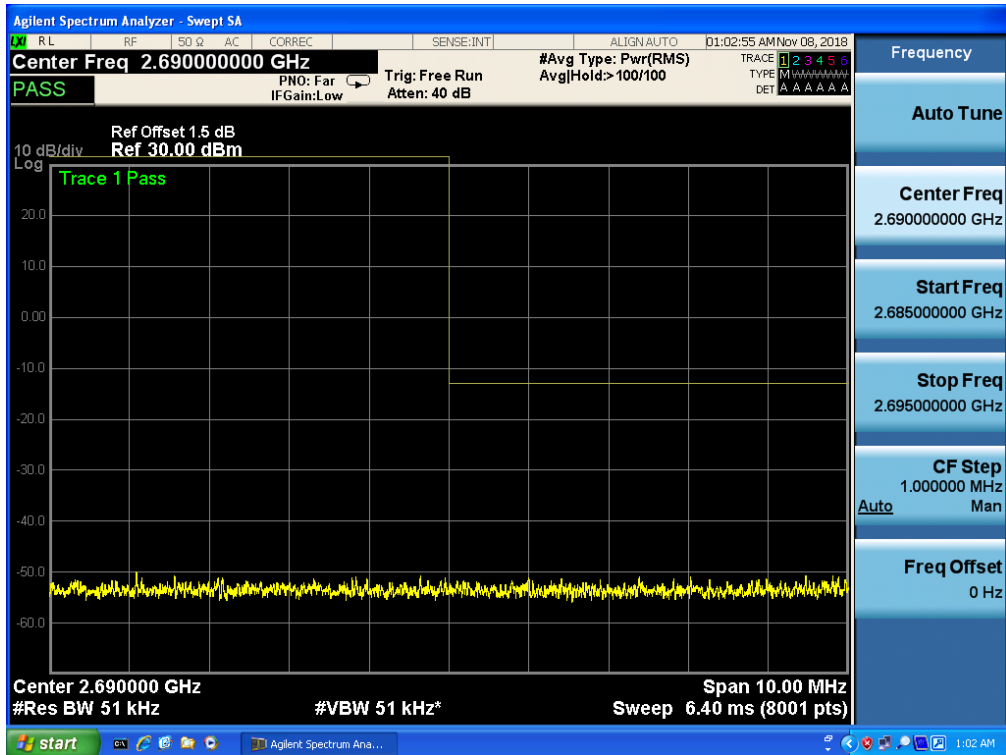
**RESULTS**

6.1 LTE BAND 41

Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK

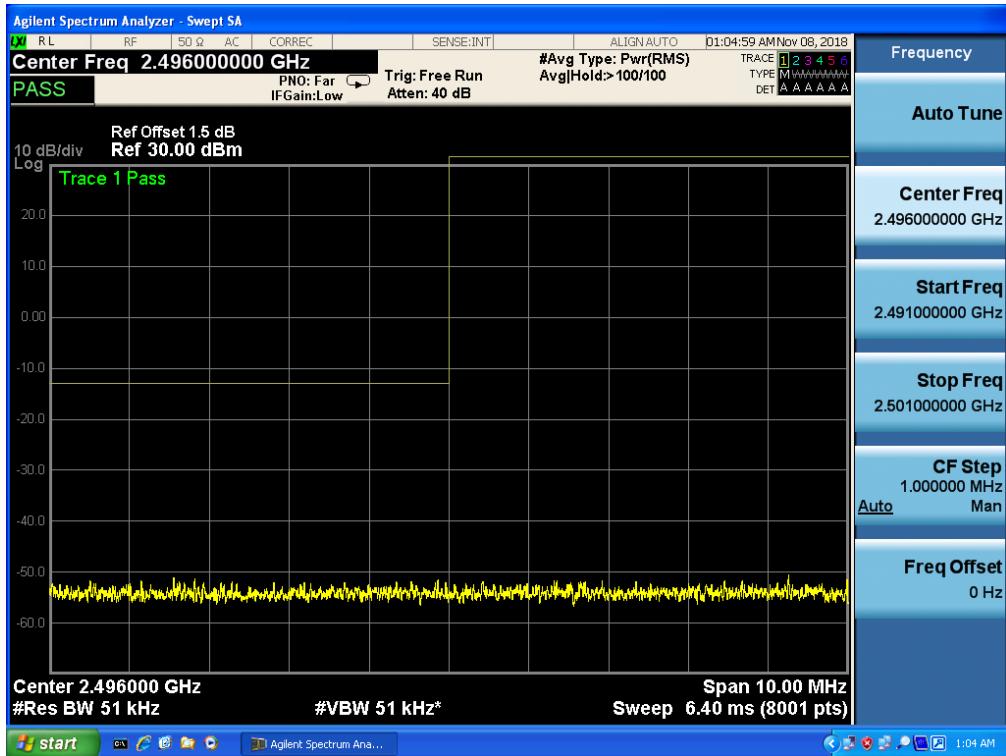


Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK

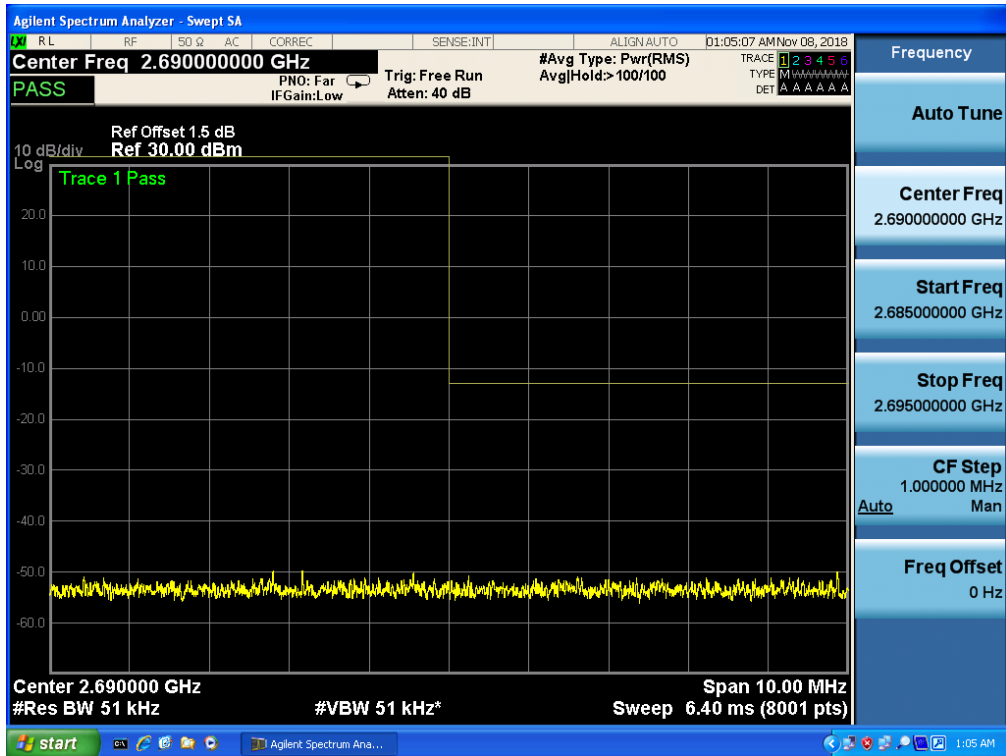




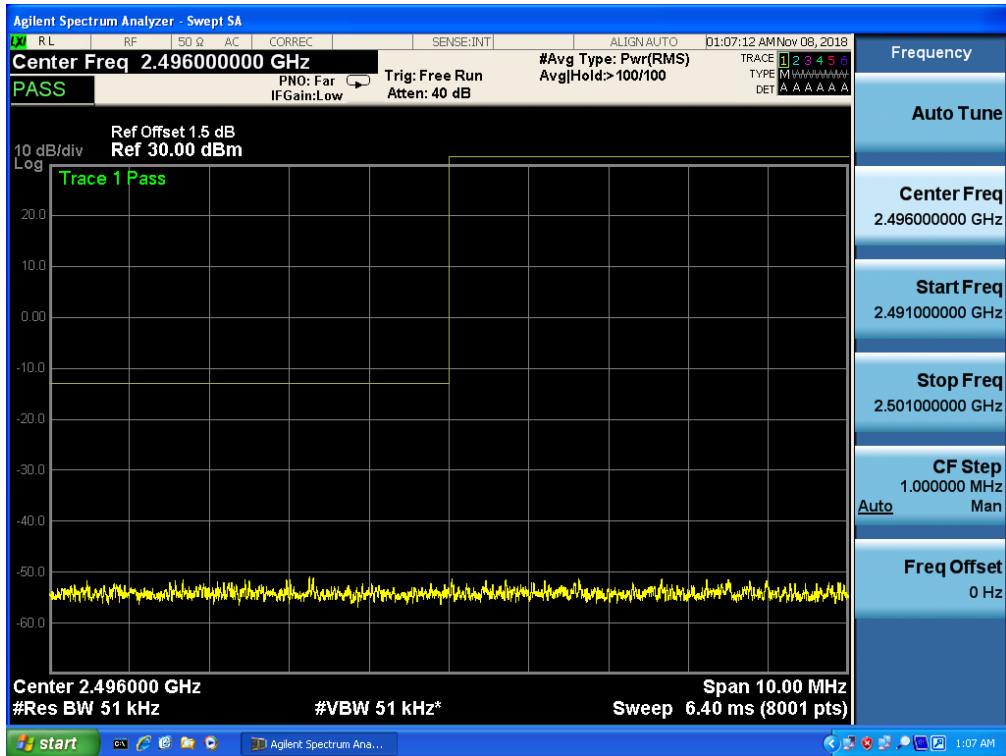
Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



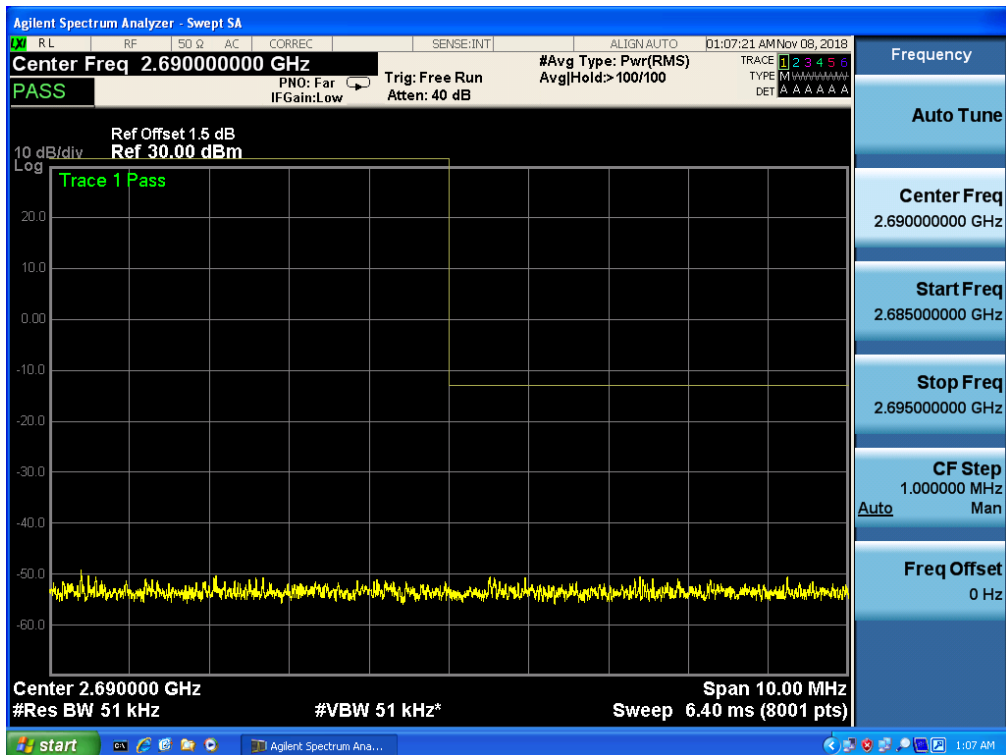
Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



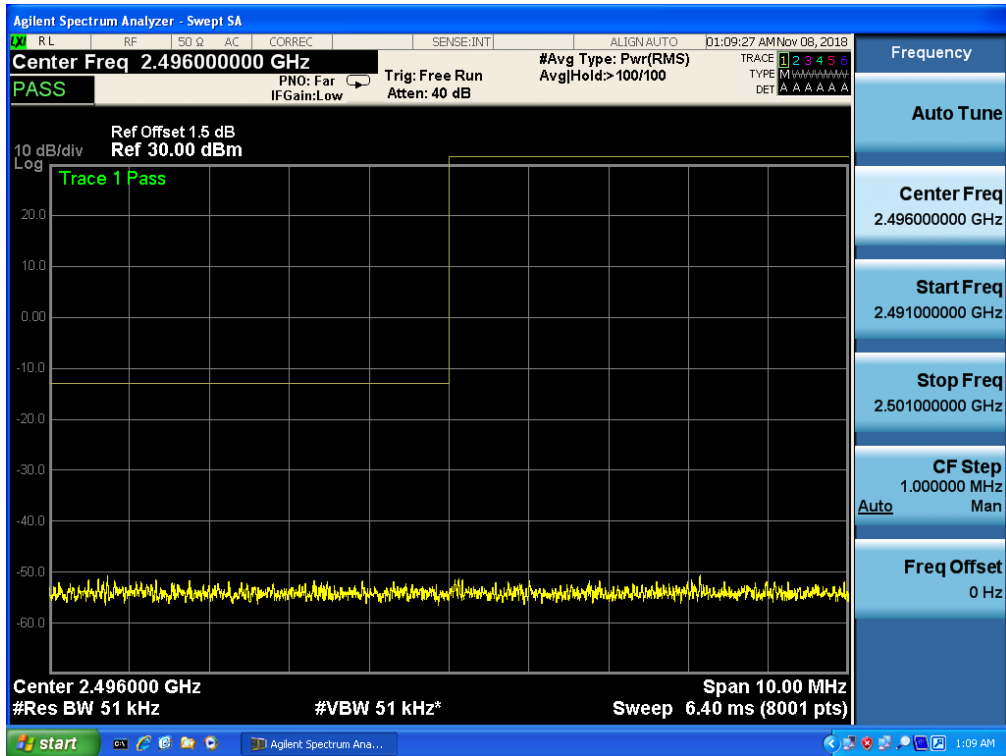
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



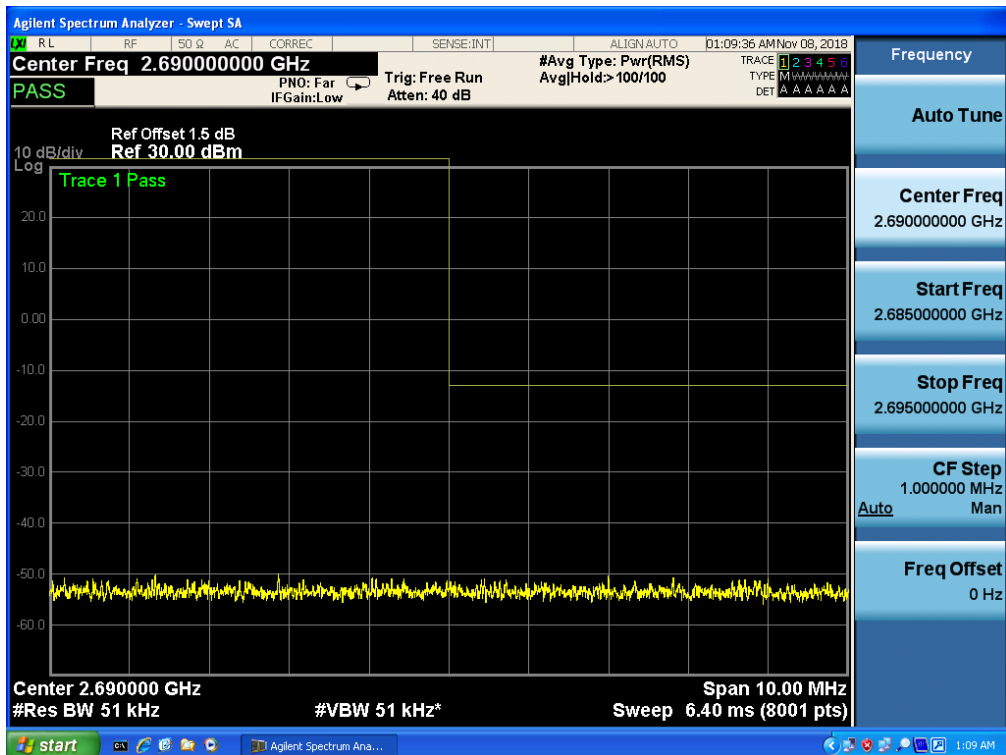
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



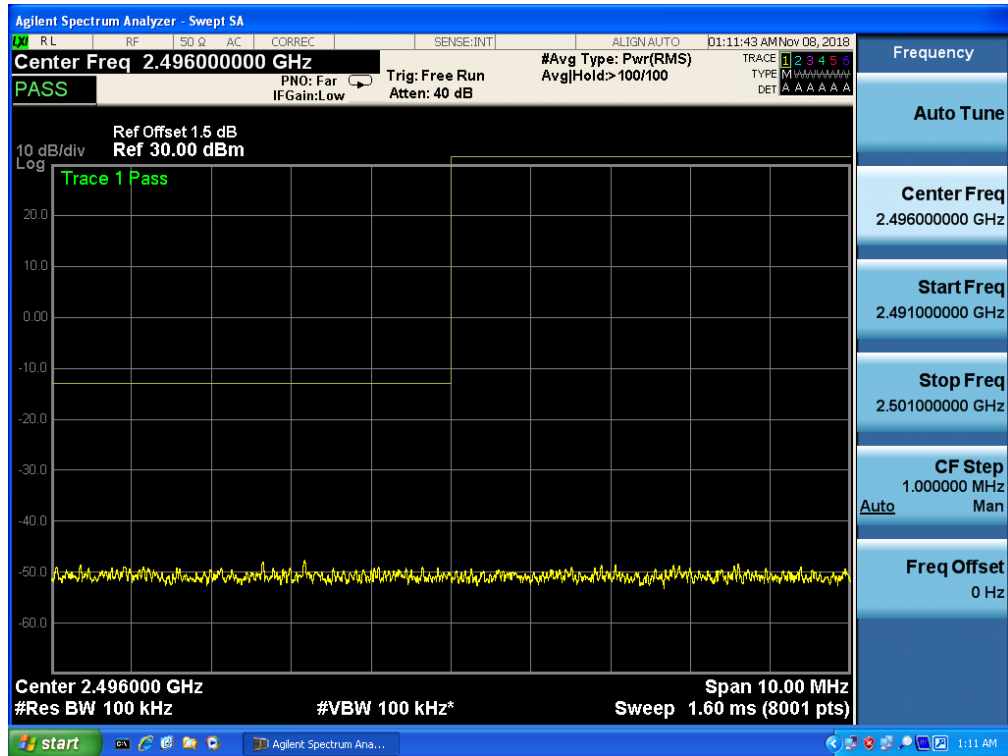
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



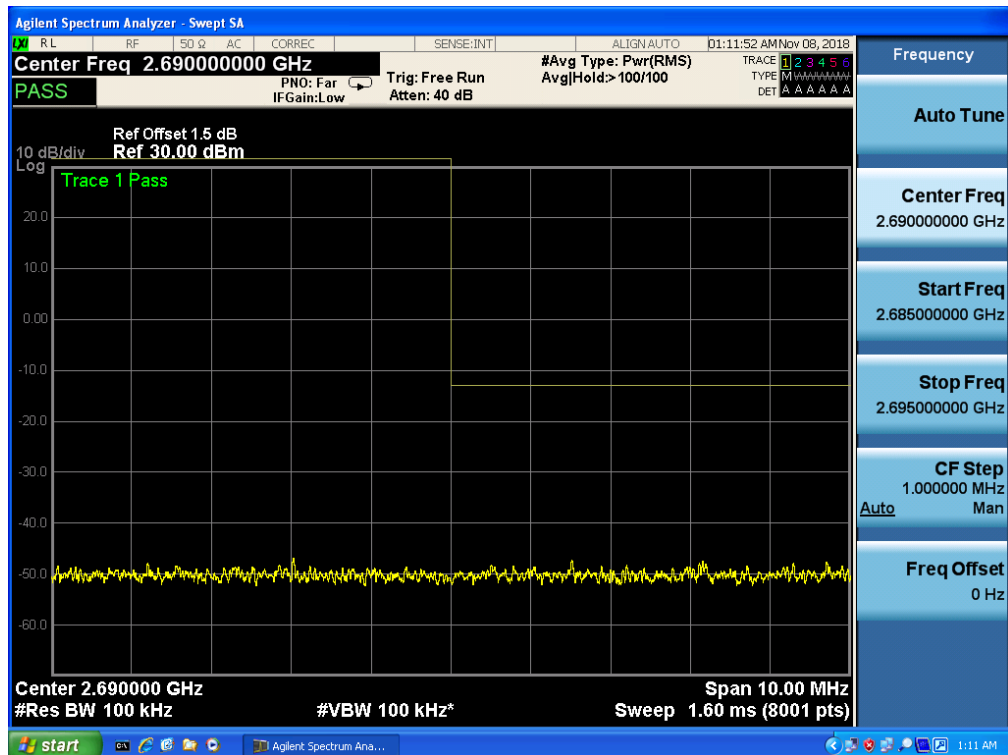
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



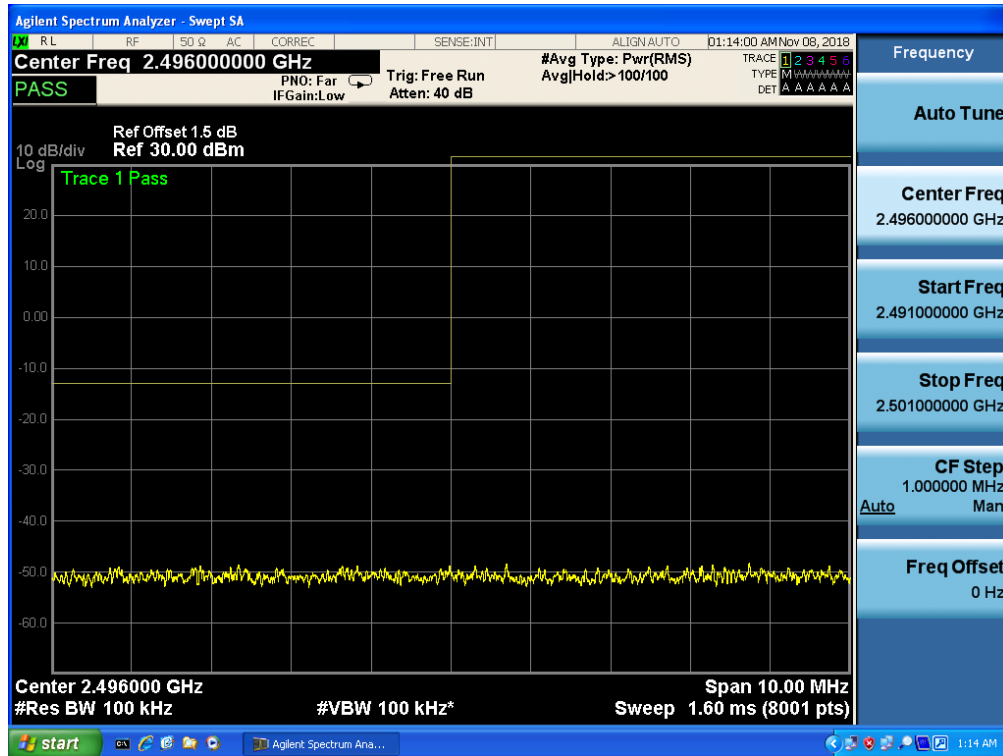
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



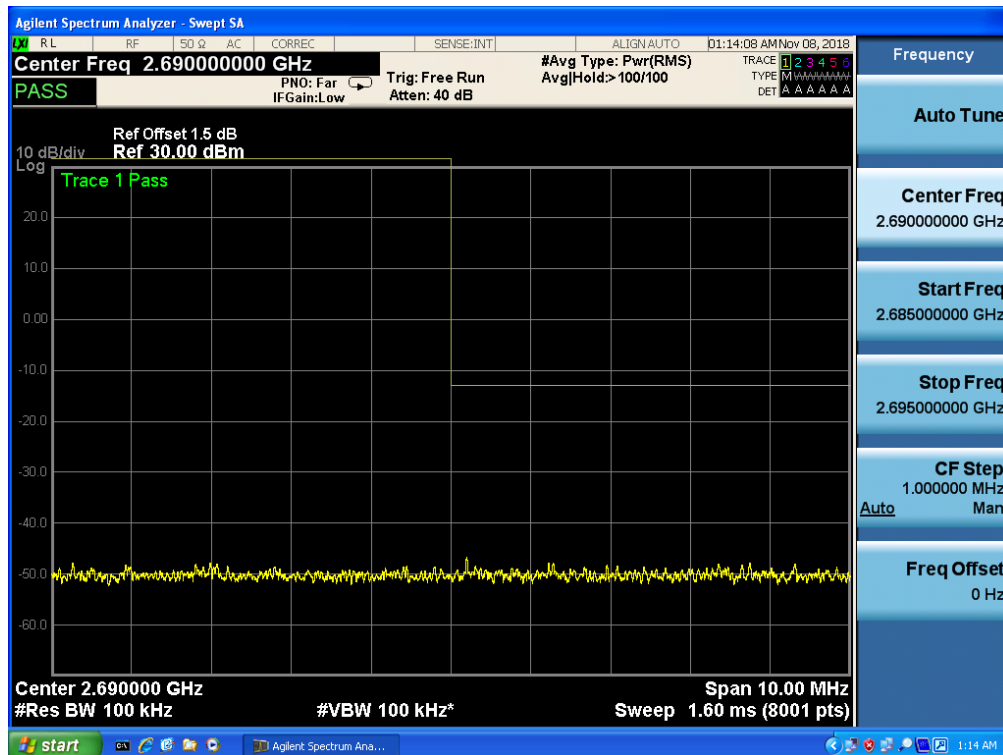
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



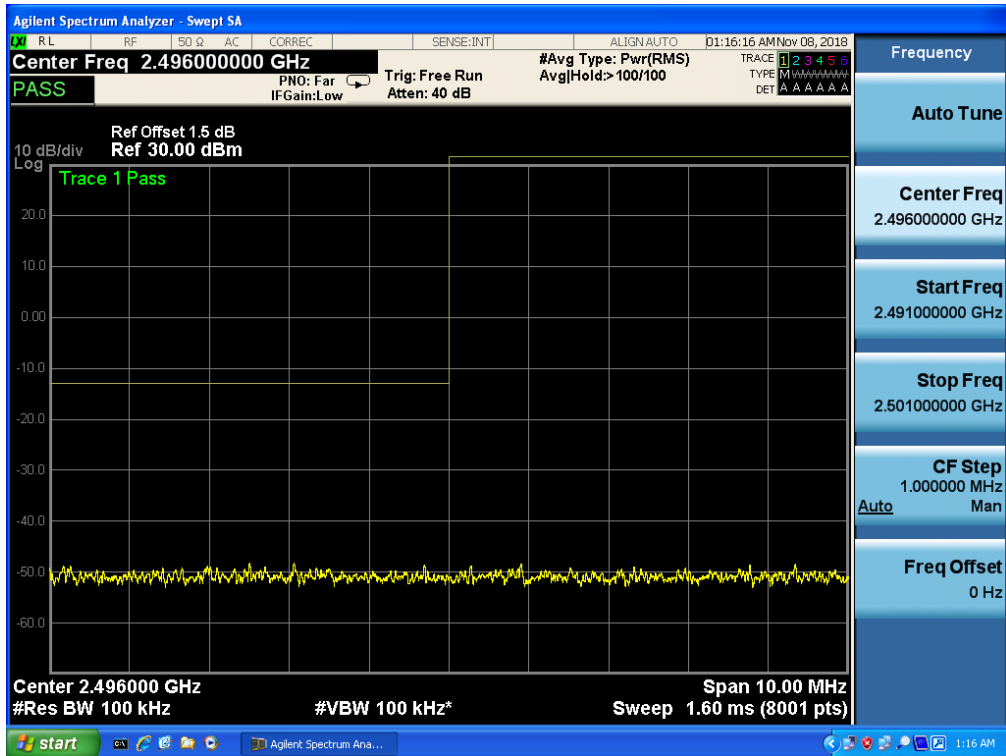
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



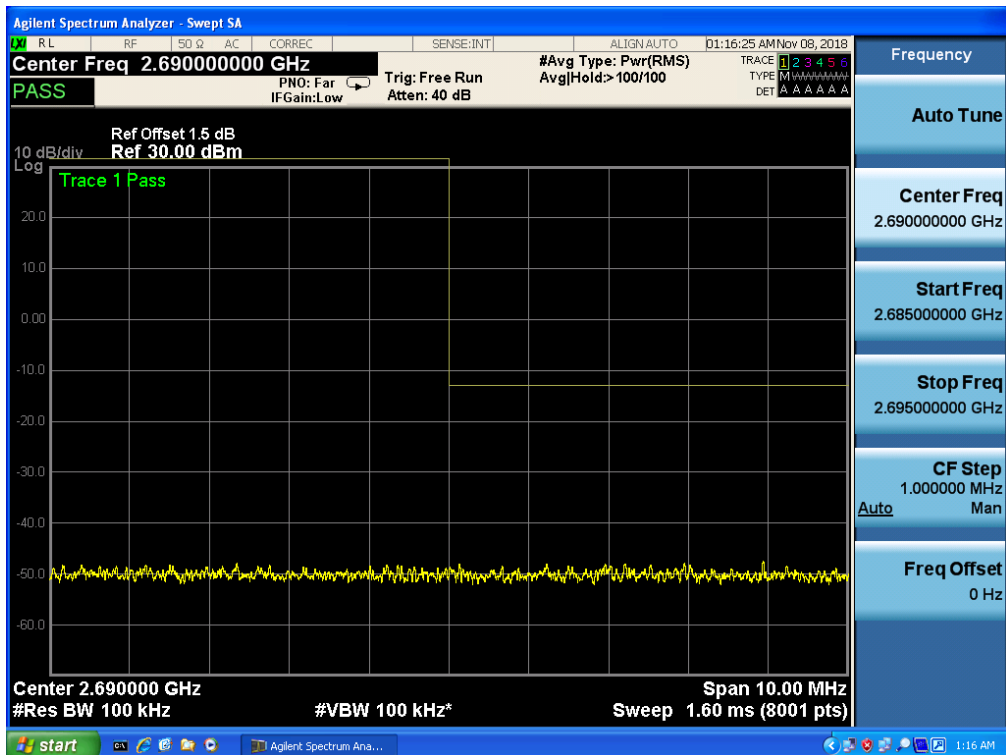
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



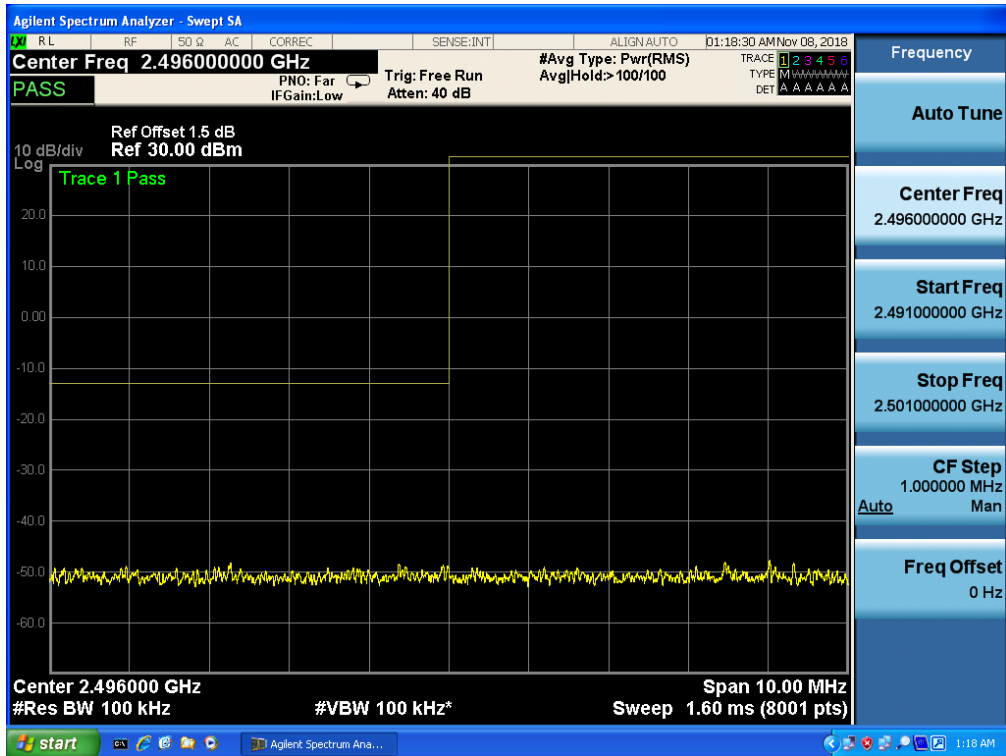
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



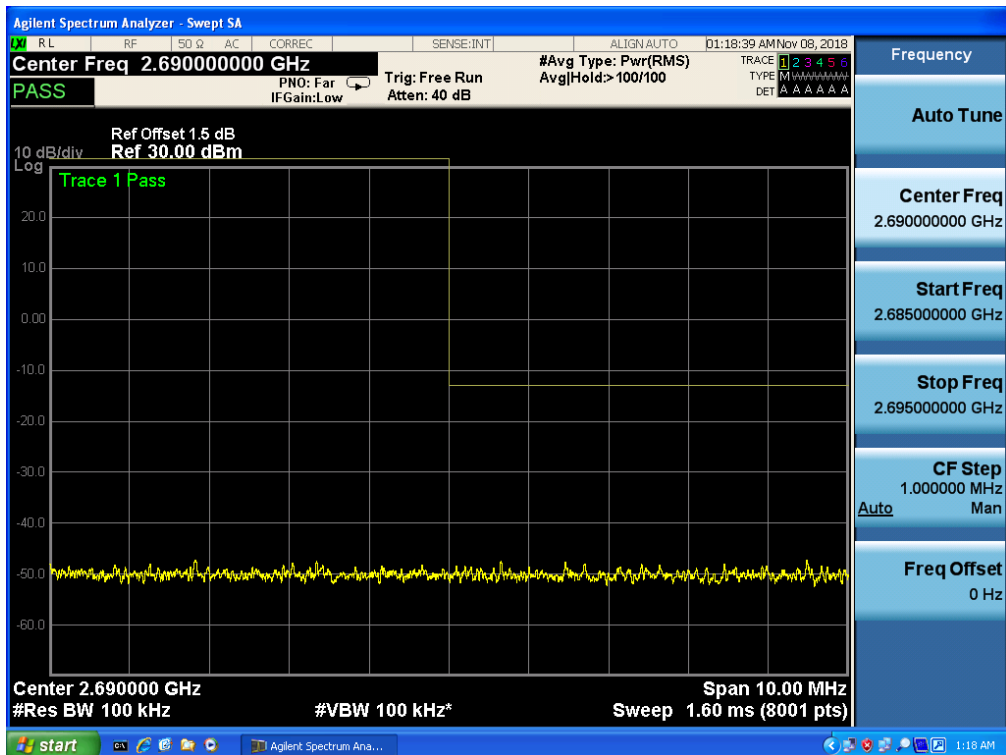
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



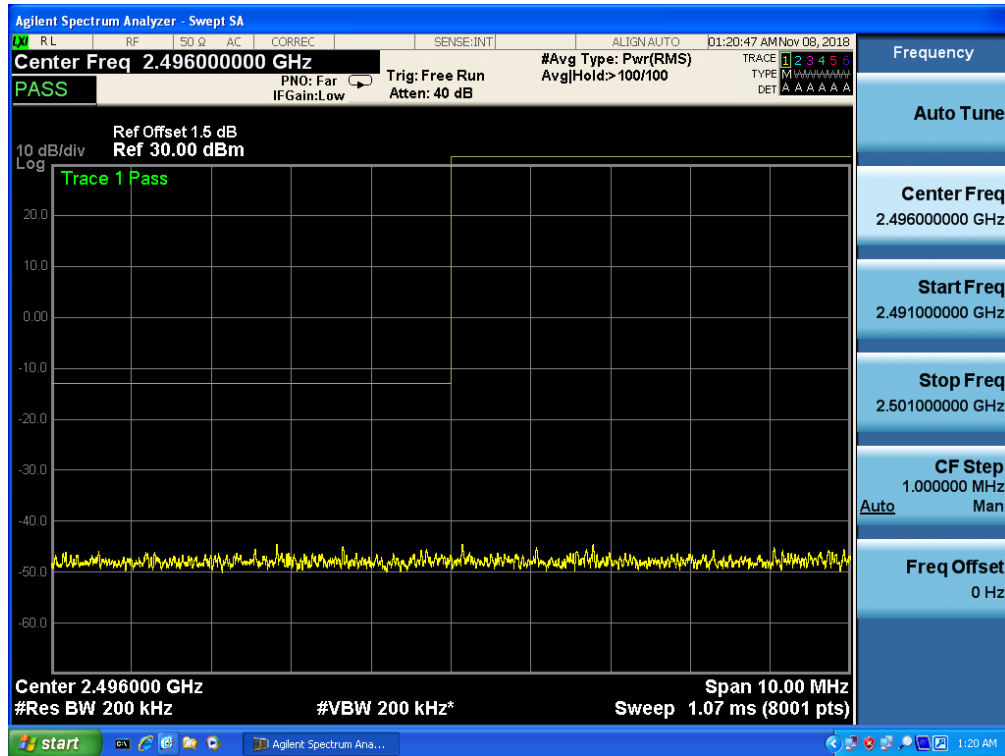
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



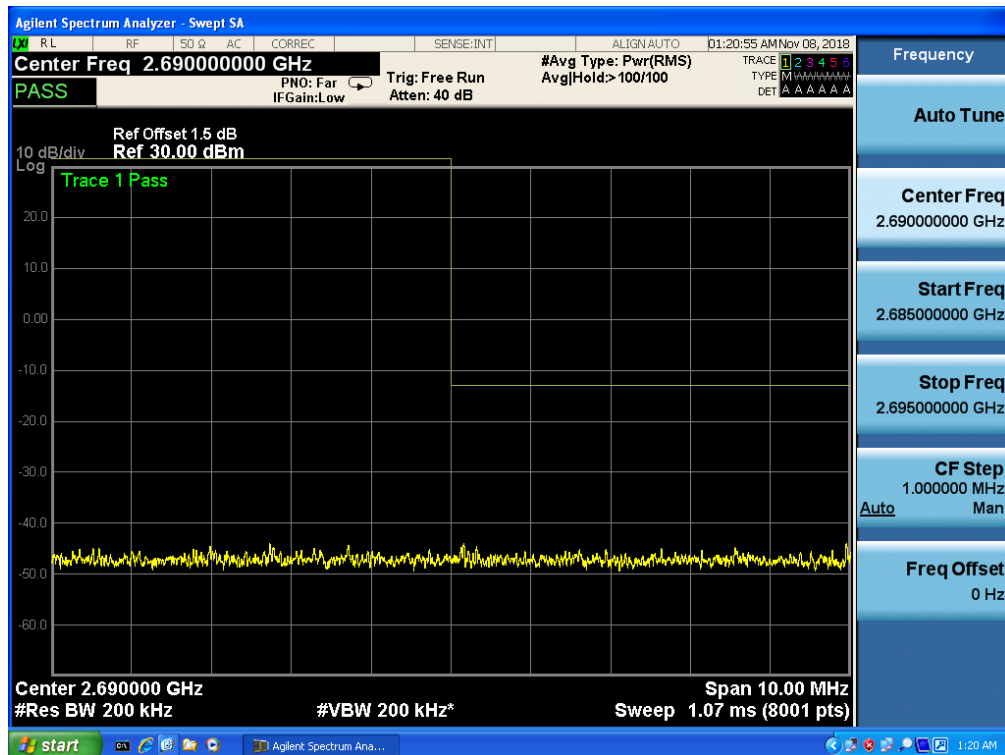
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK

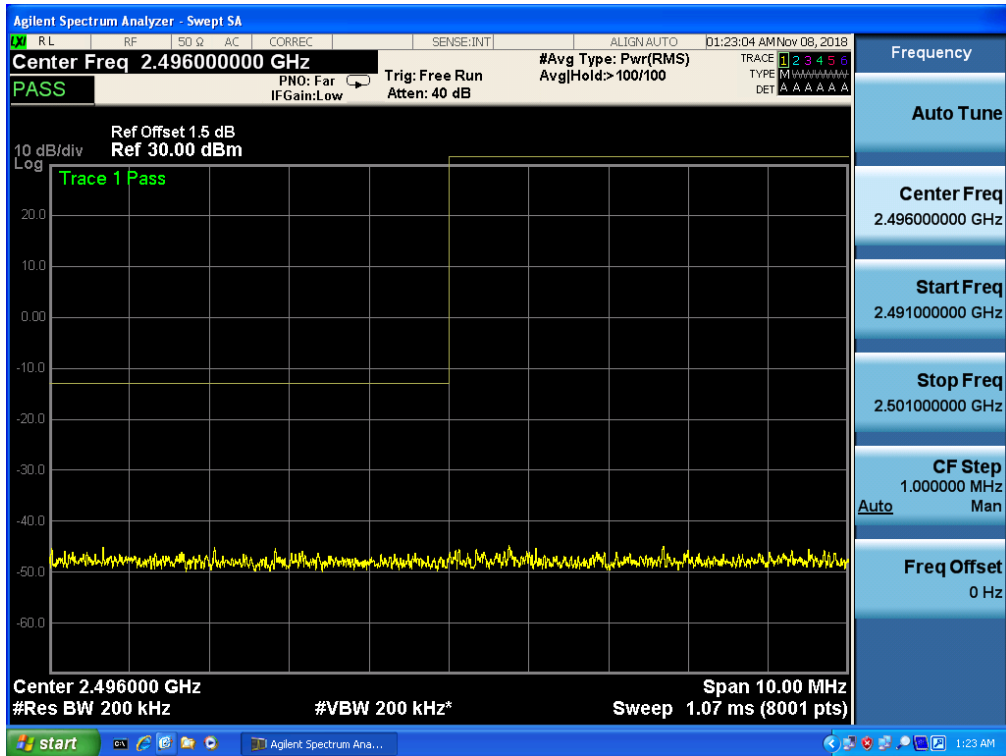


Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK

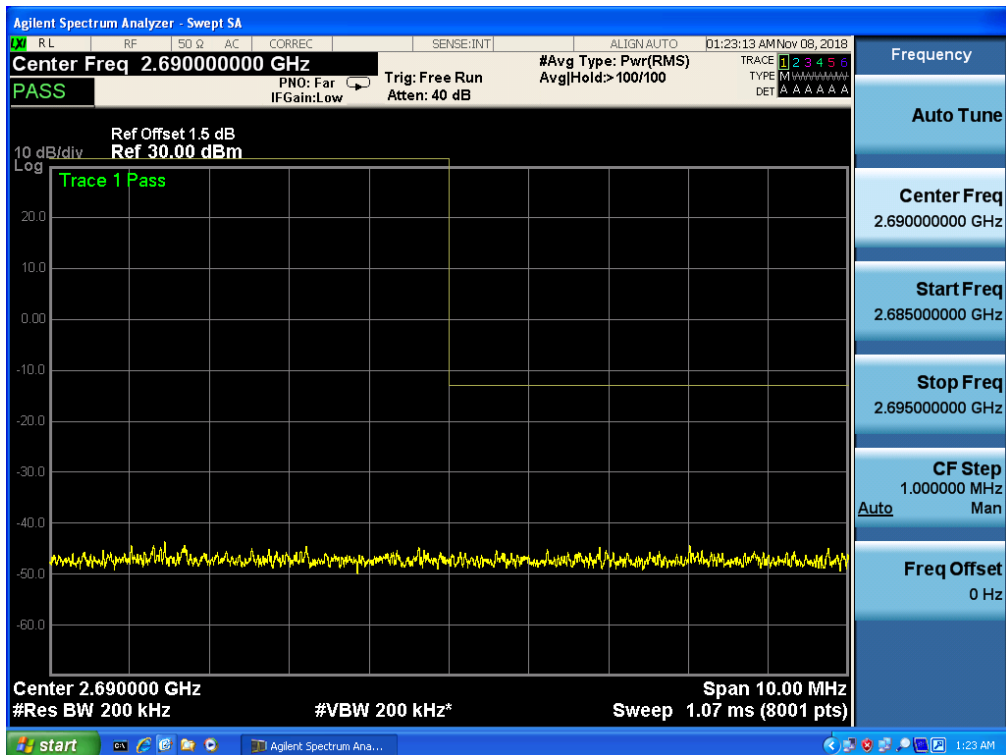




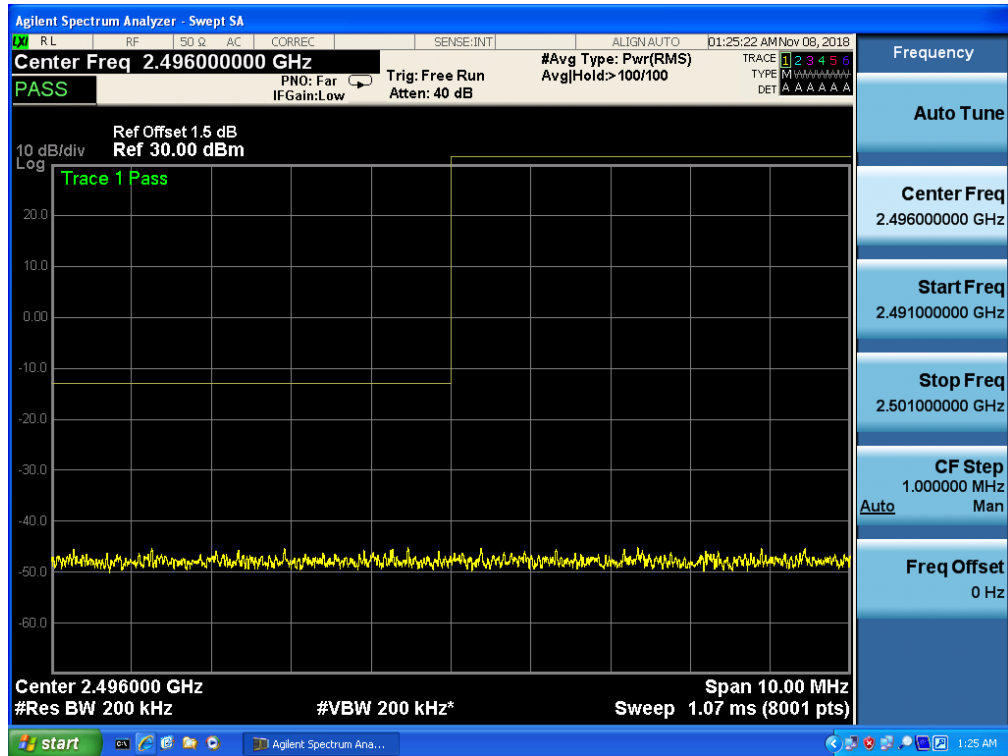
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



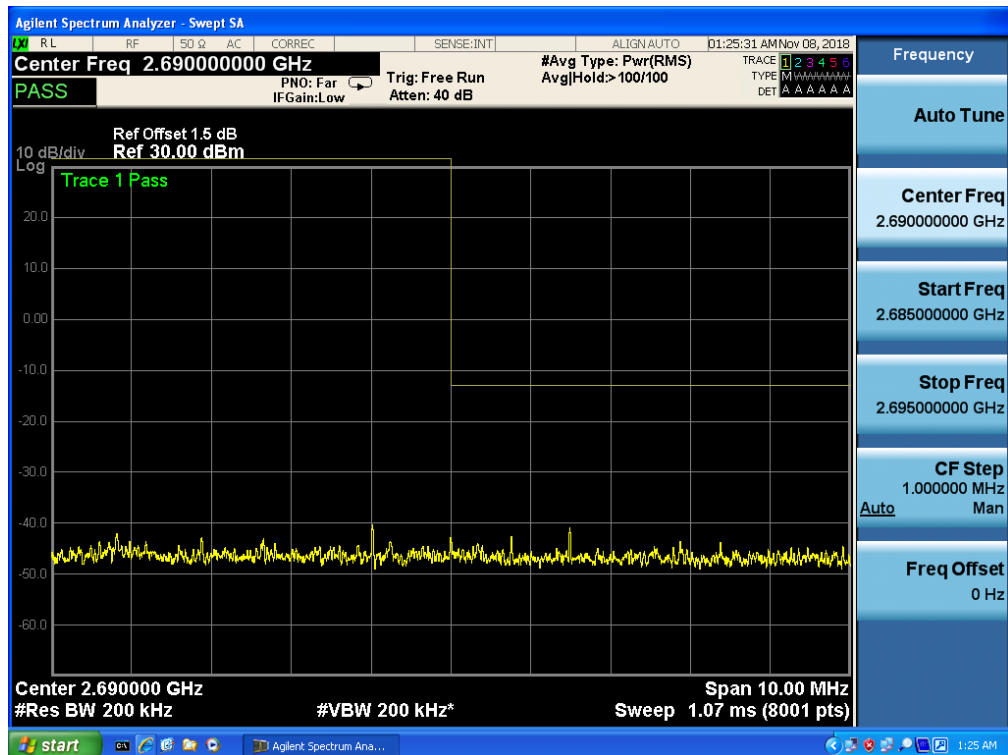
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



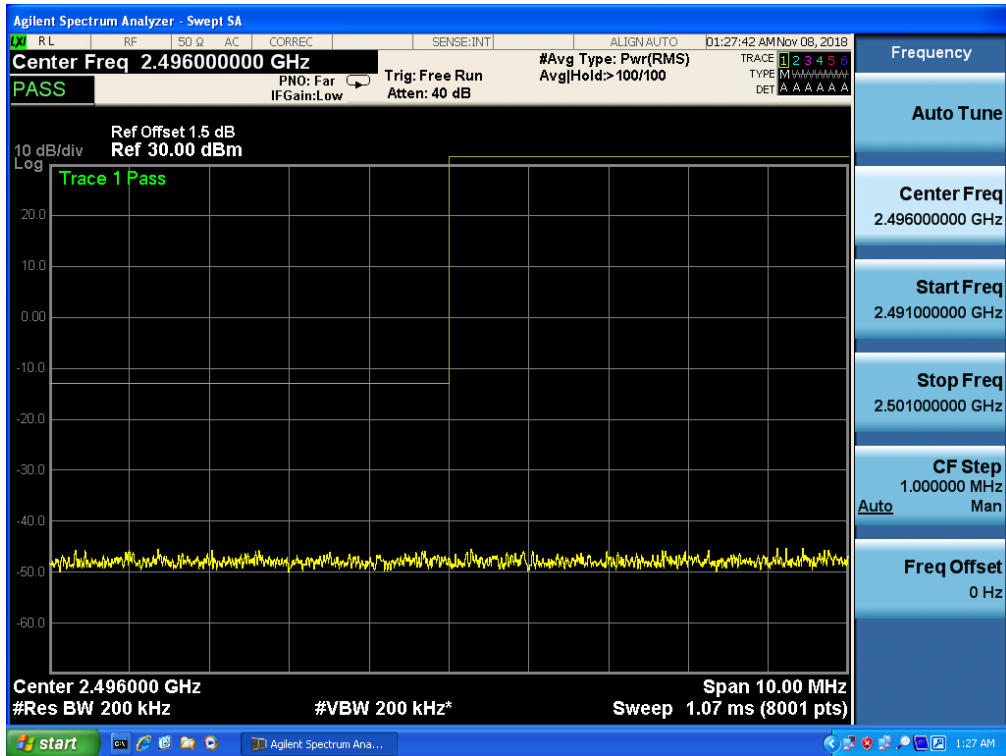
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



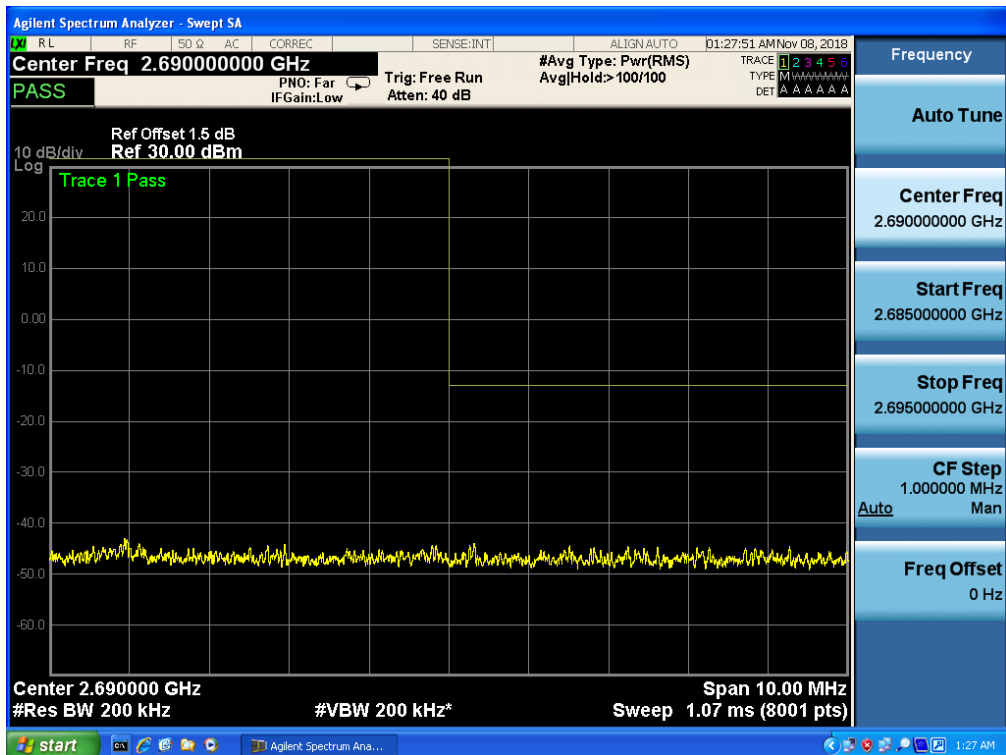
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



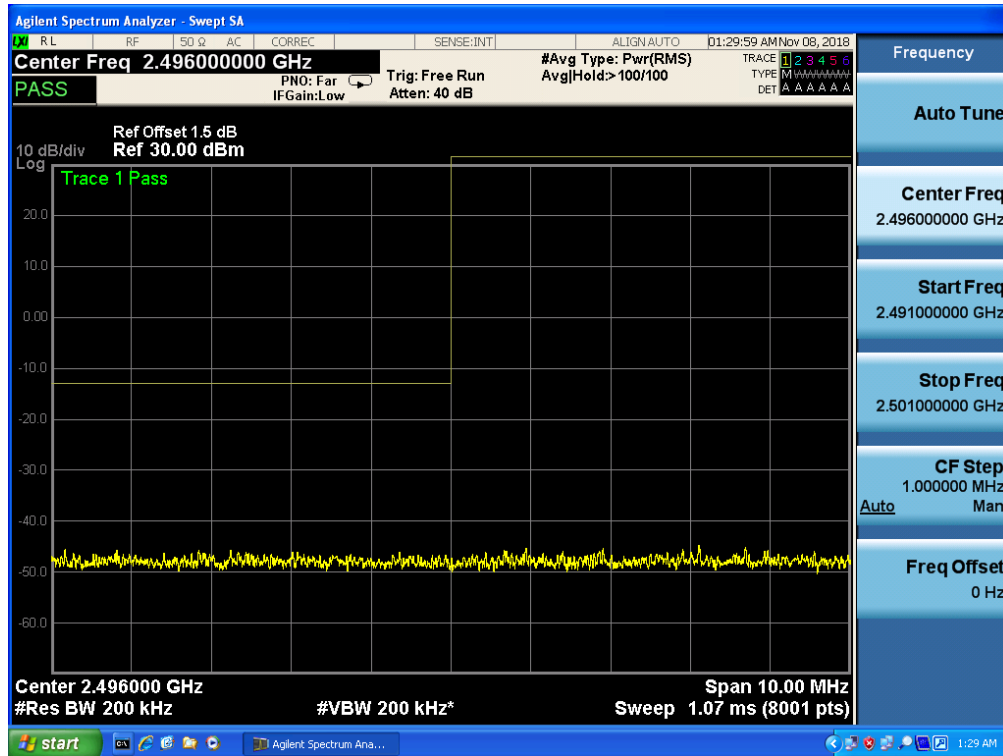
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



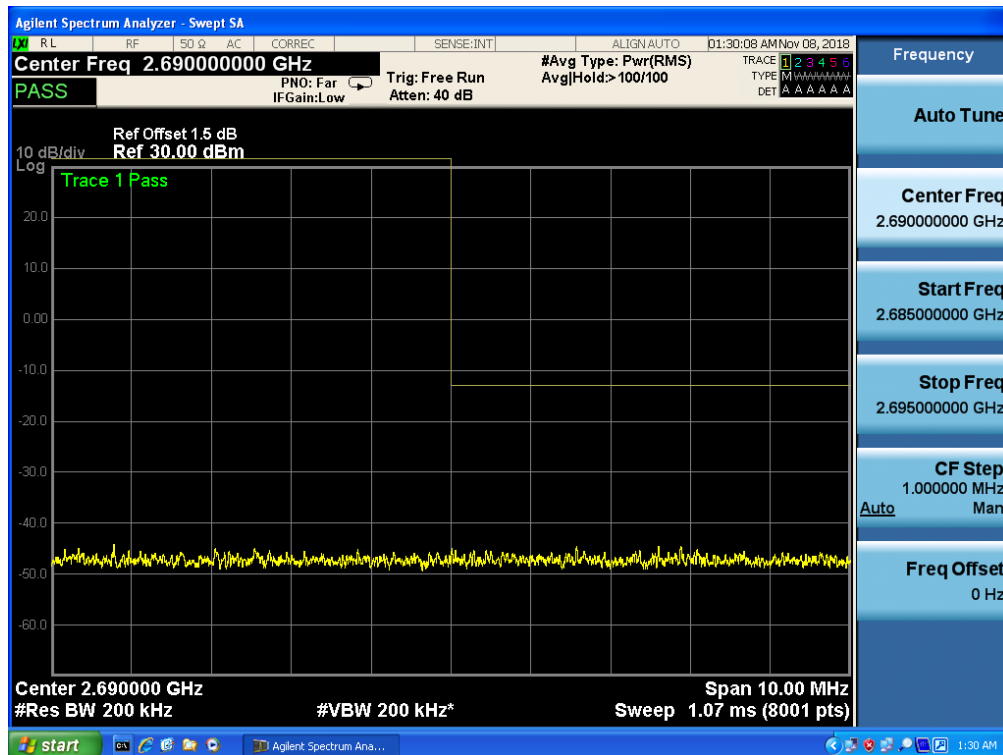
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



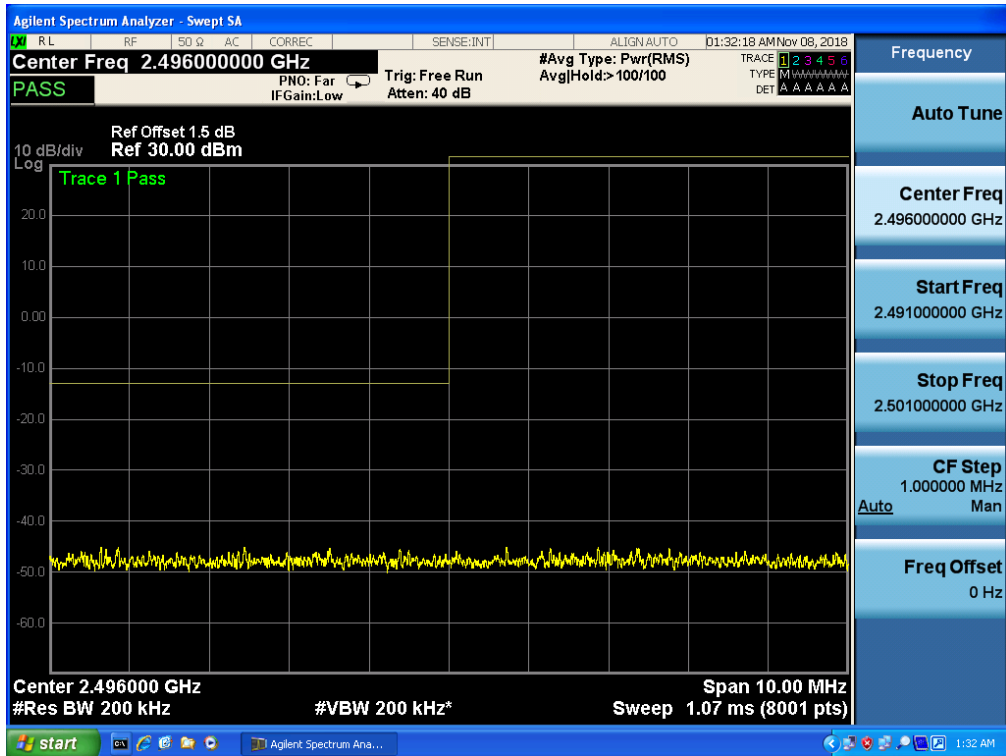
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



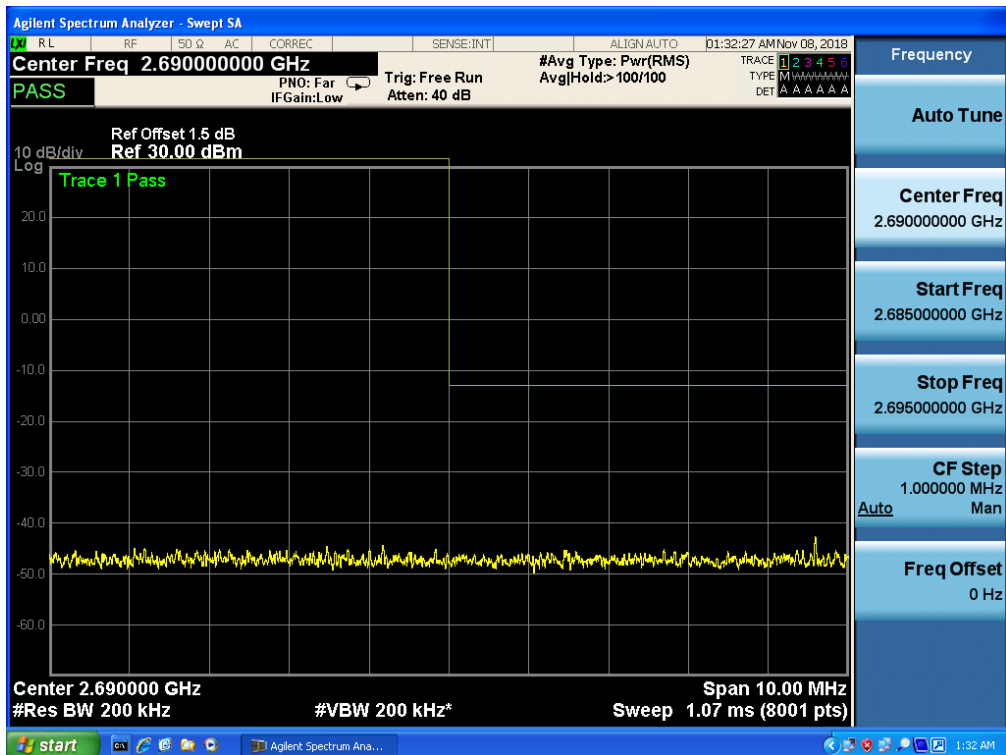
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



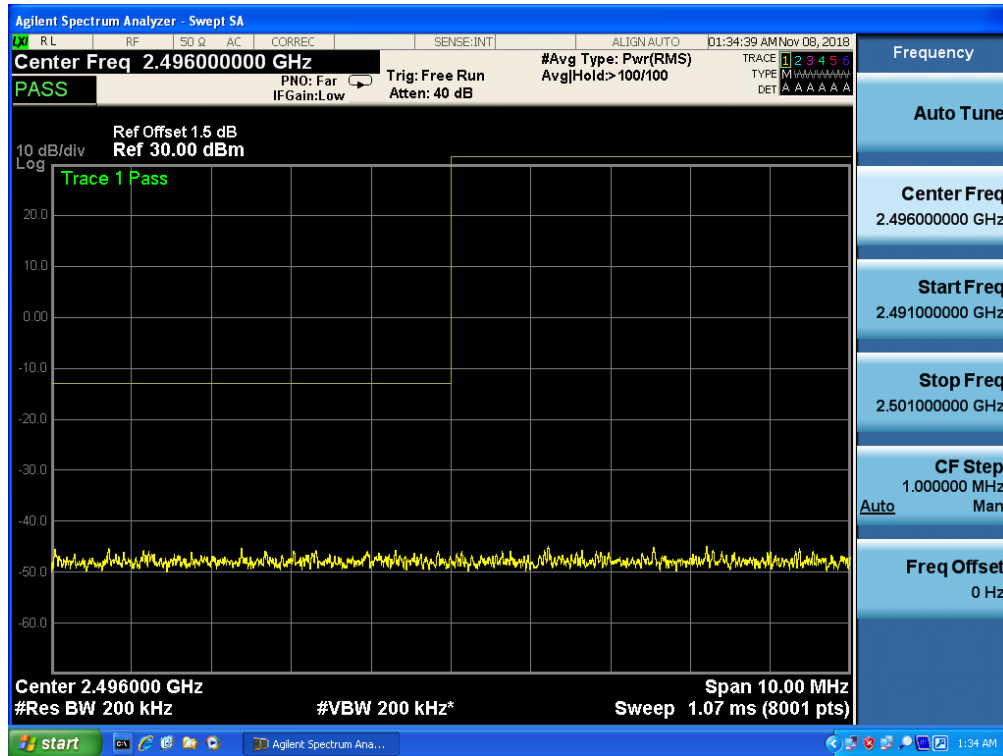
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



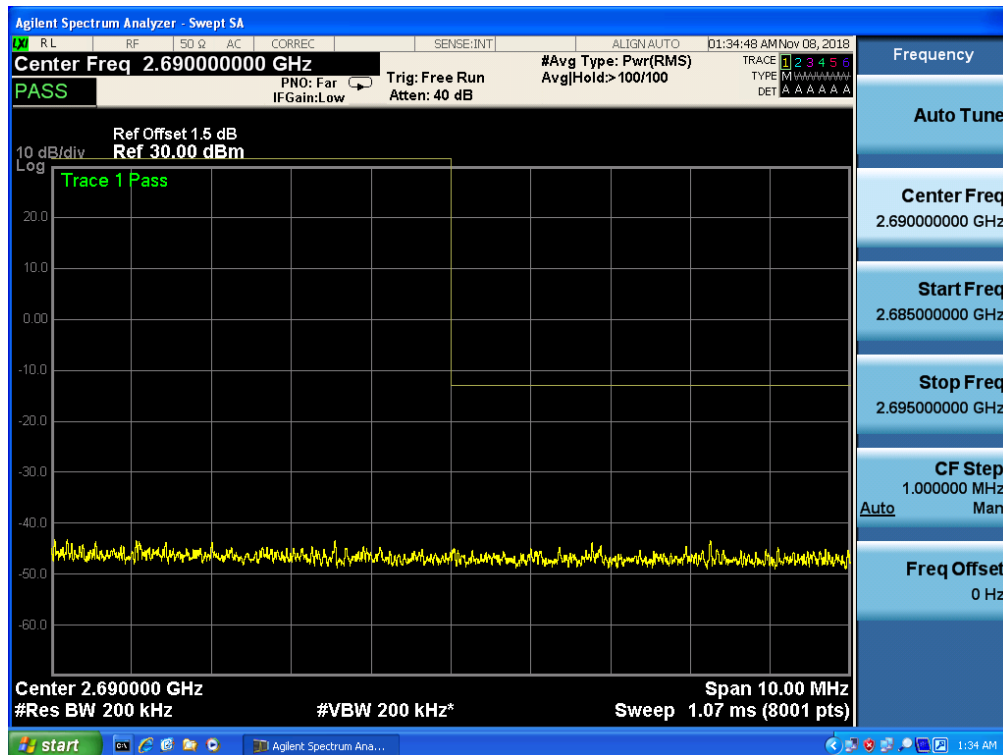
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



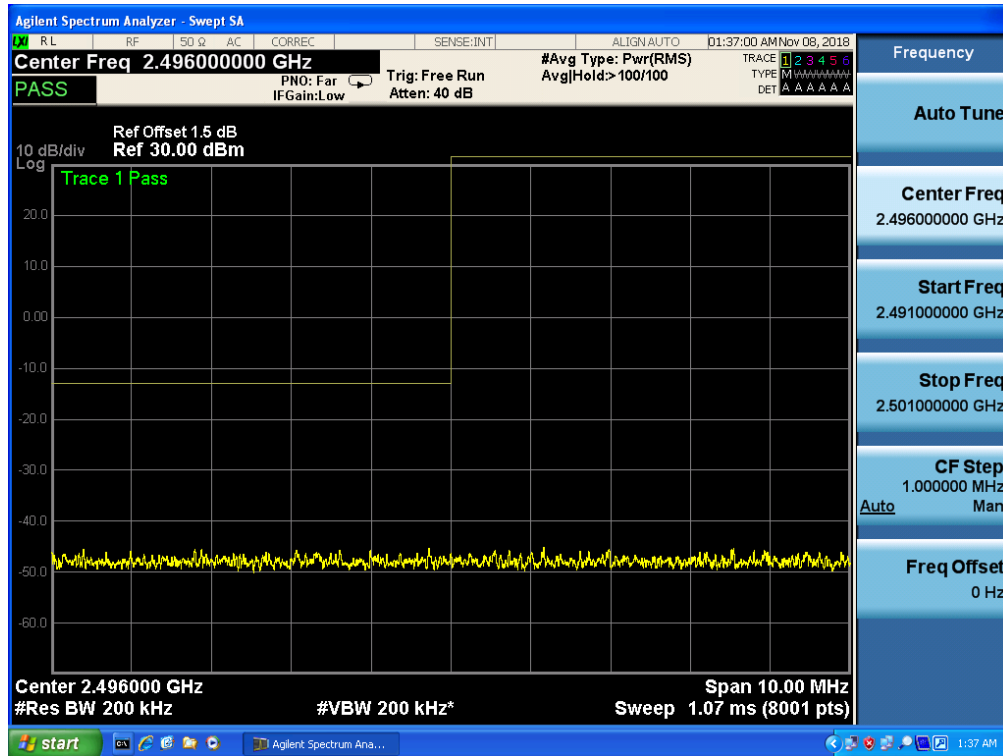
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



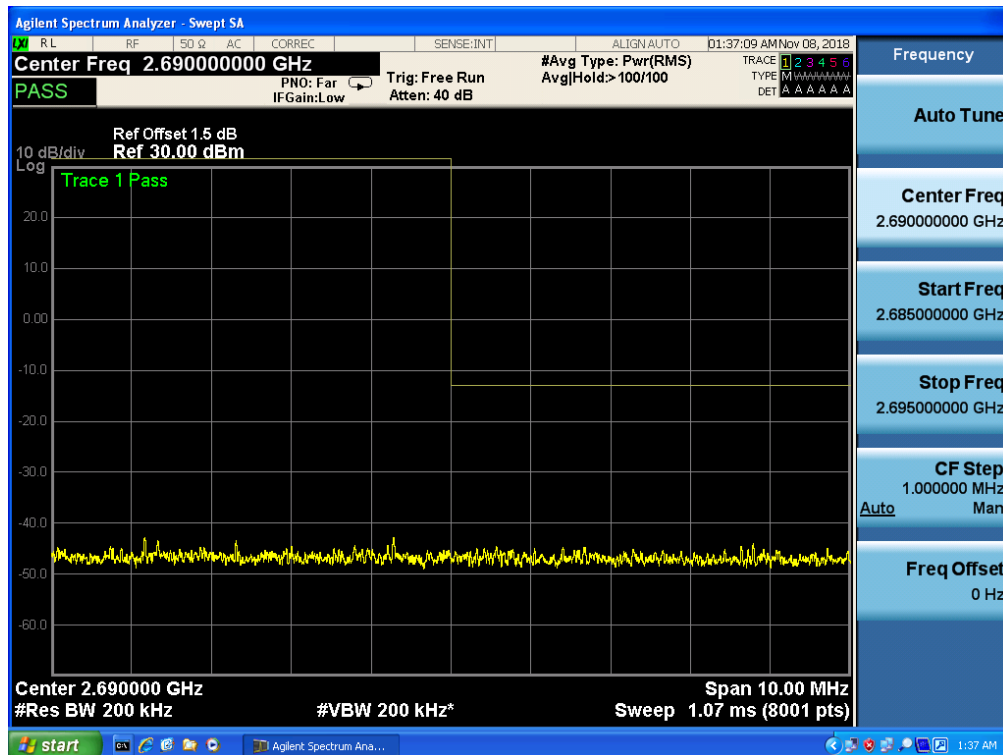
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



## 7. OUT OF BAND EMISSIONS

### RULE PART(S)

FCC: §2.1051, §27.53

### LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

### MODES TESTED

- LTE Band 41

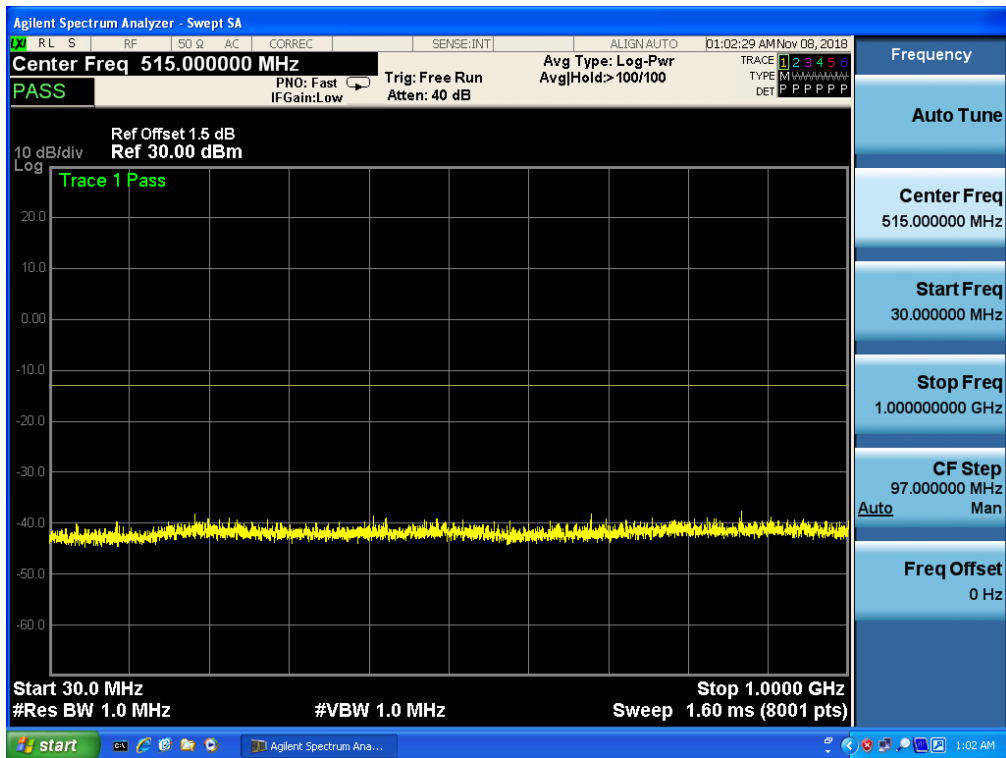
### 7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

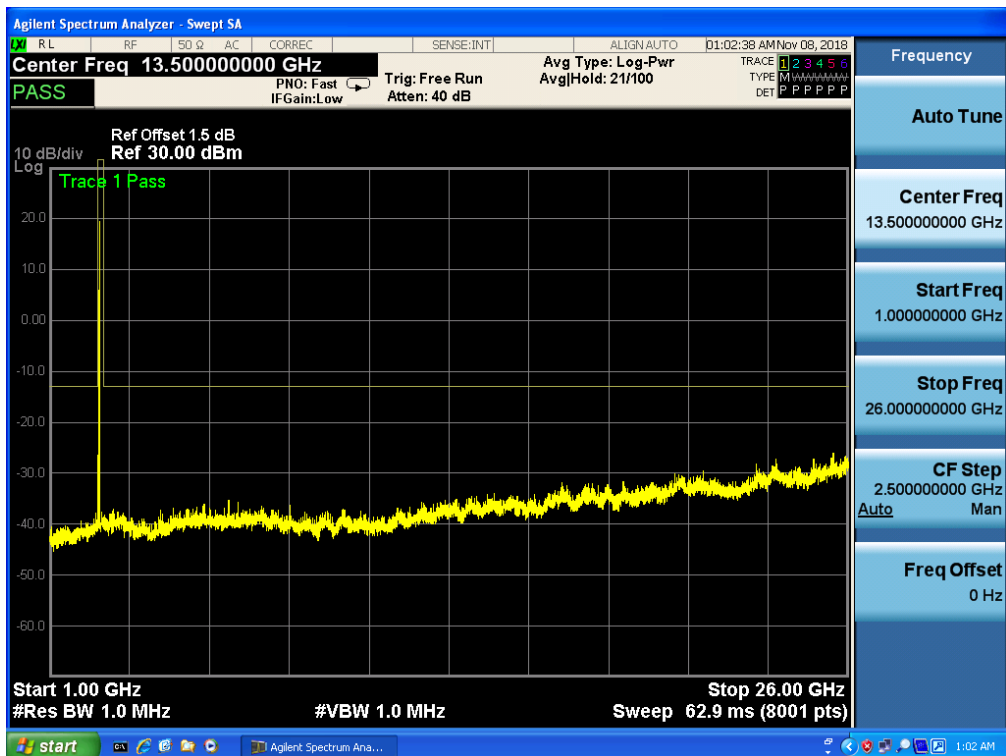


### 7.1 LTE BAND 41

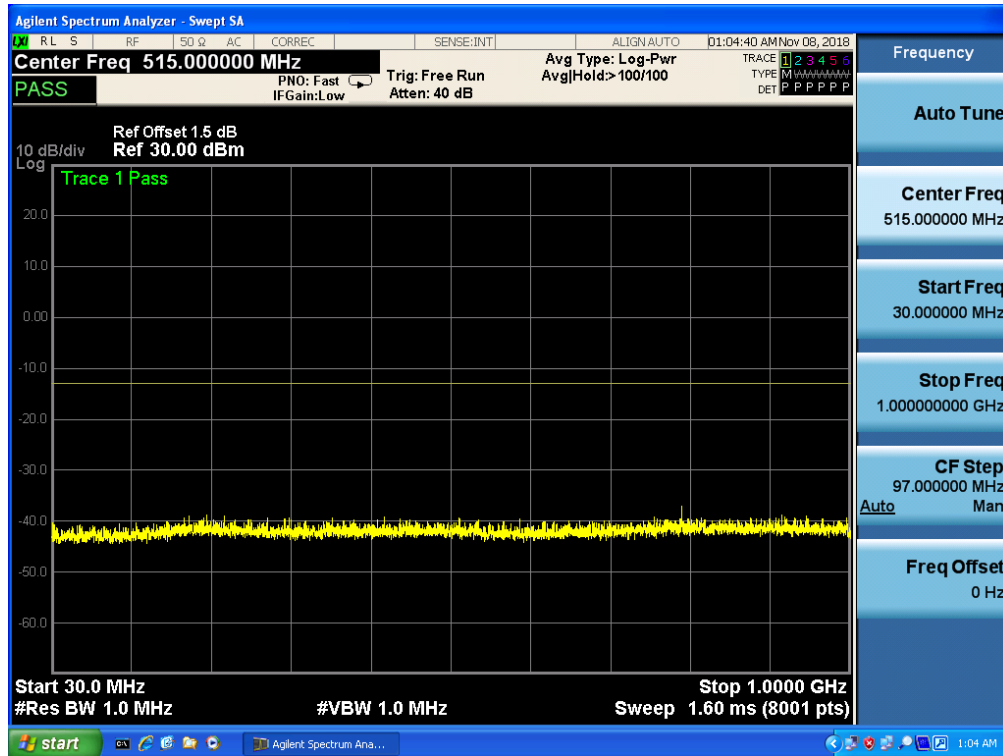
*Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK*



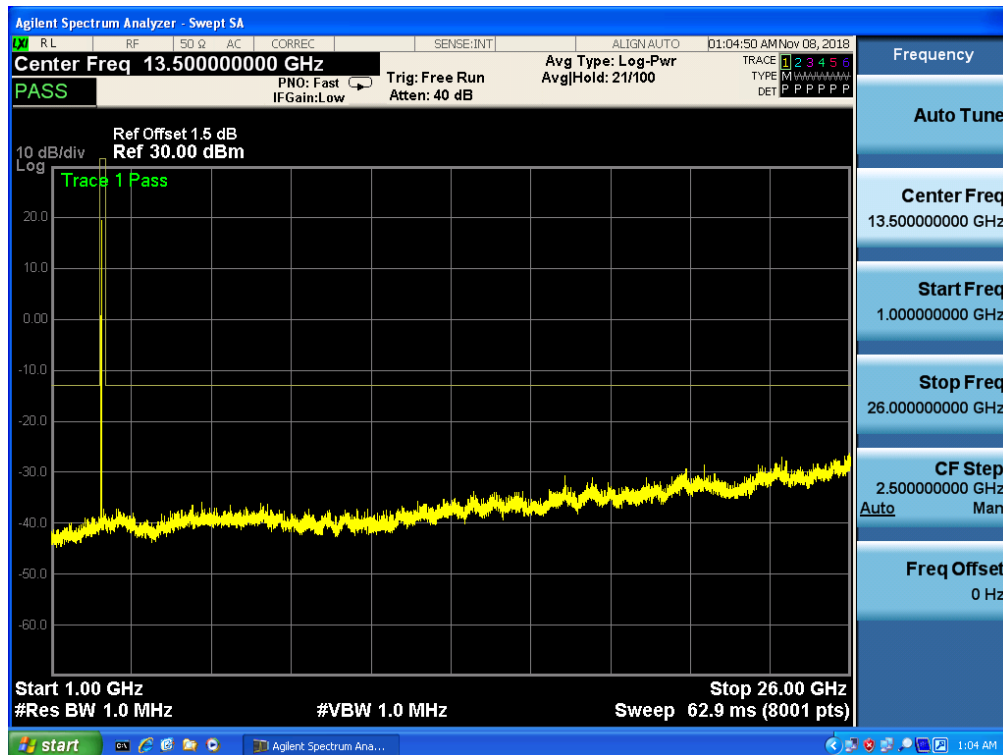
*Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK*



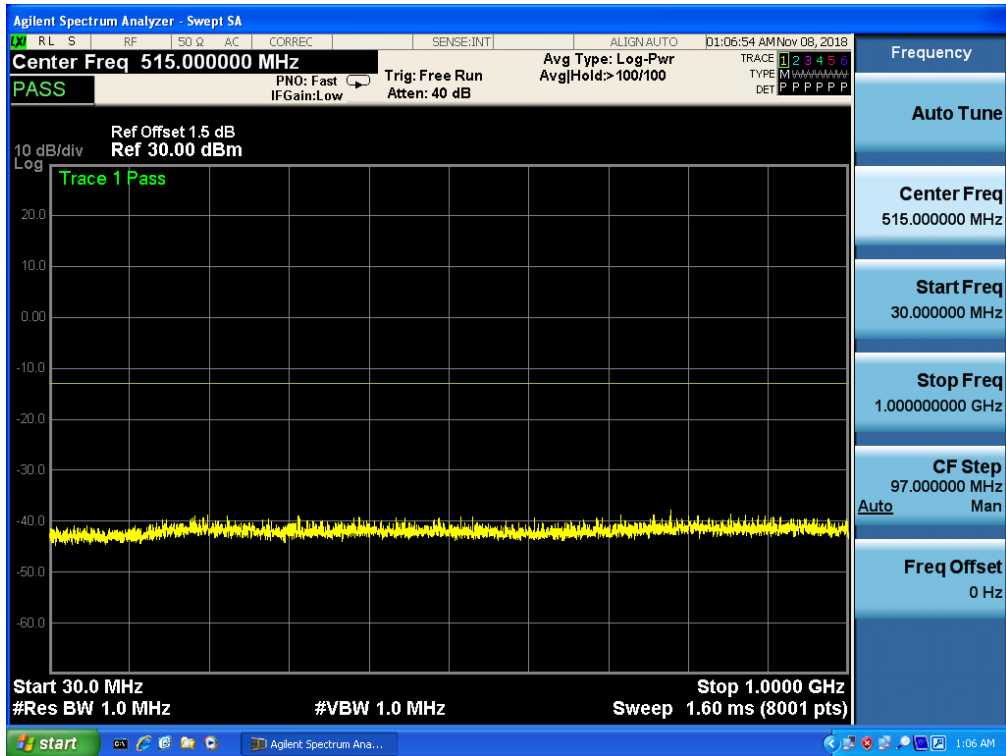
Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



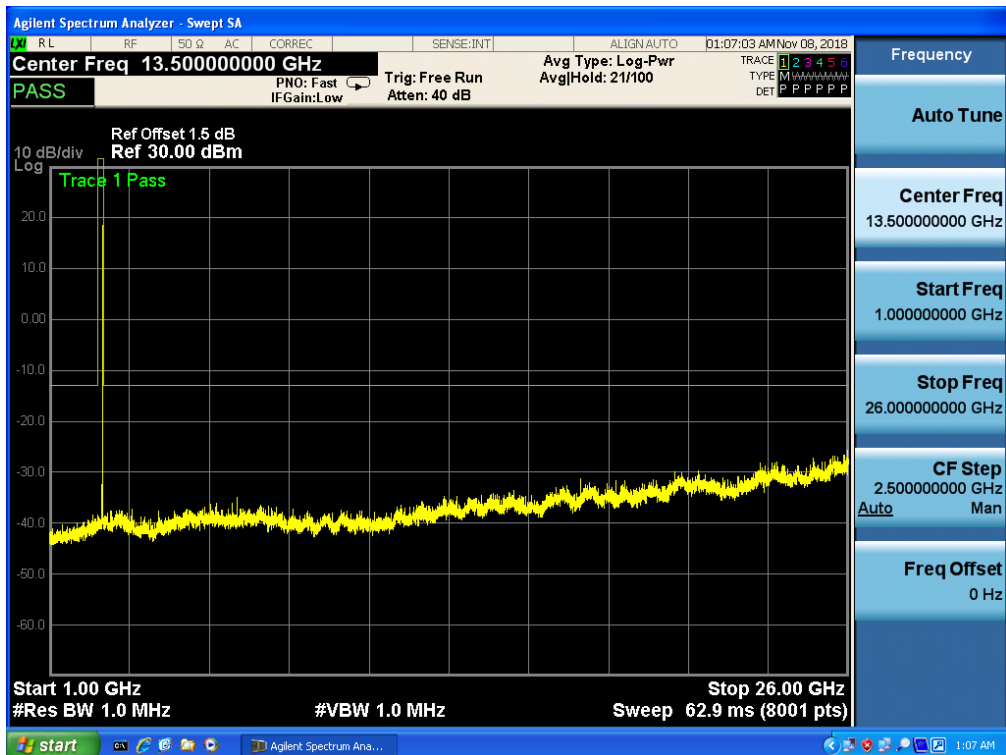
Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



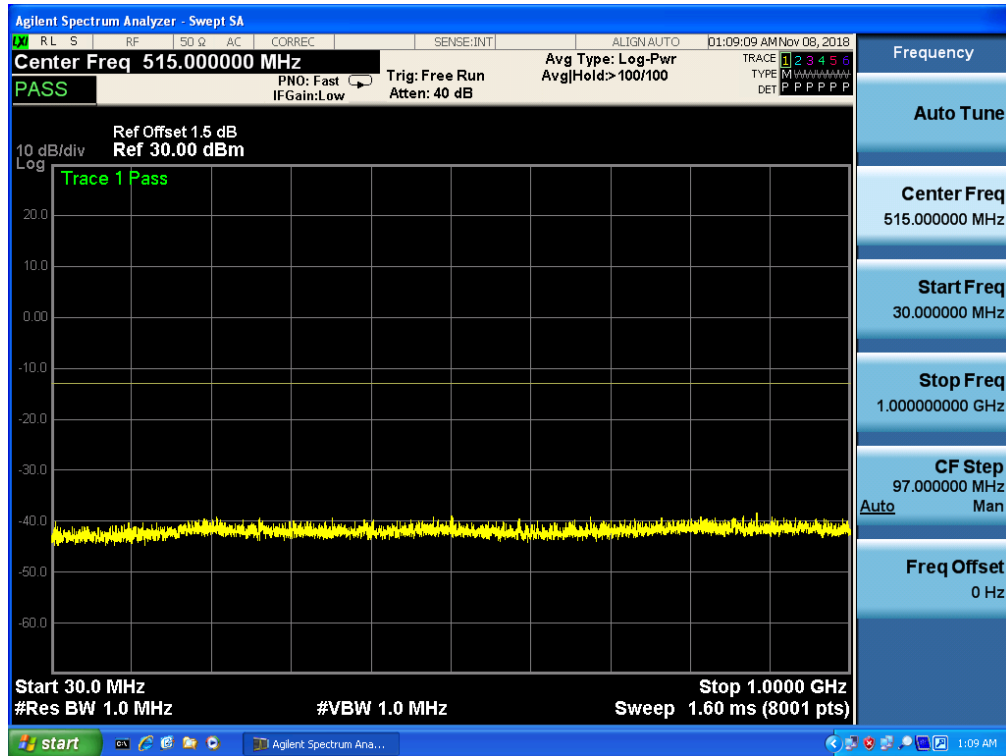
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



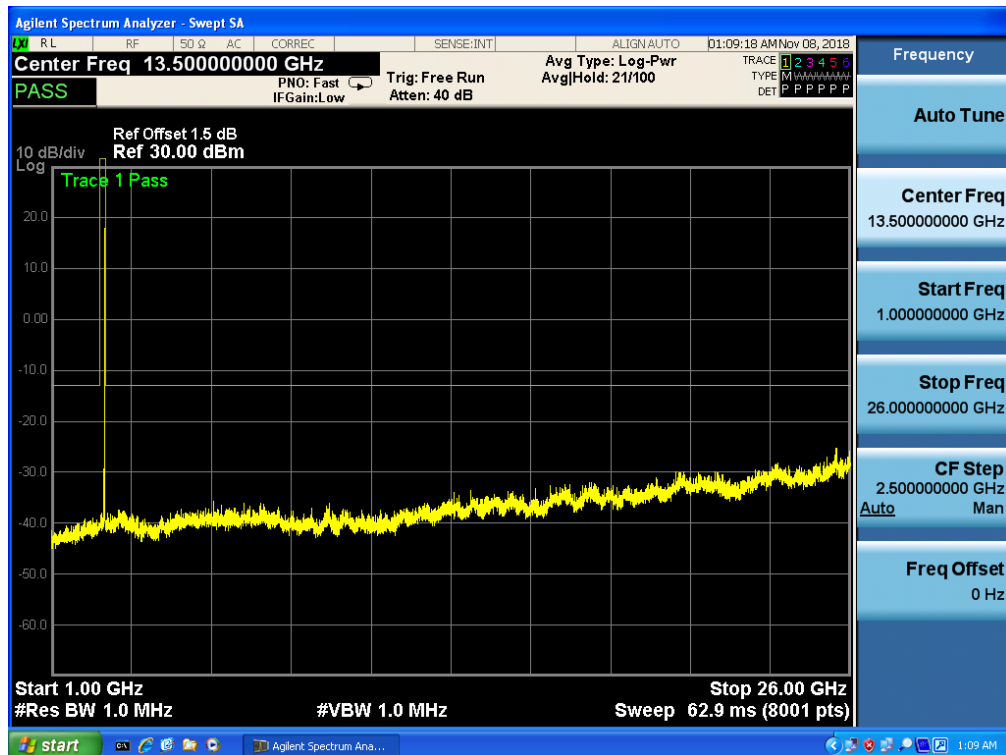
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



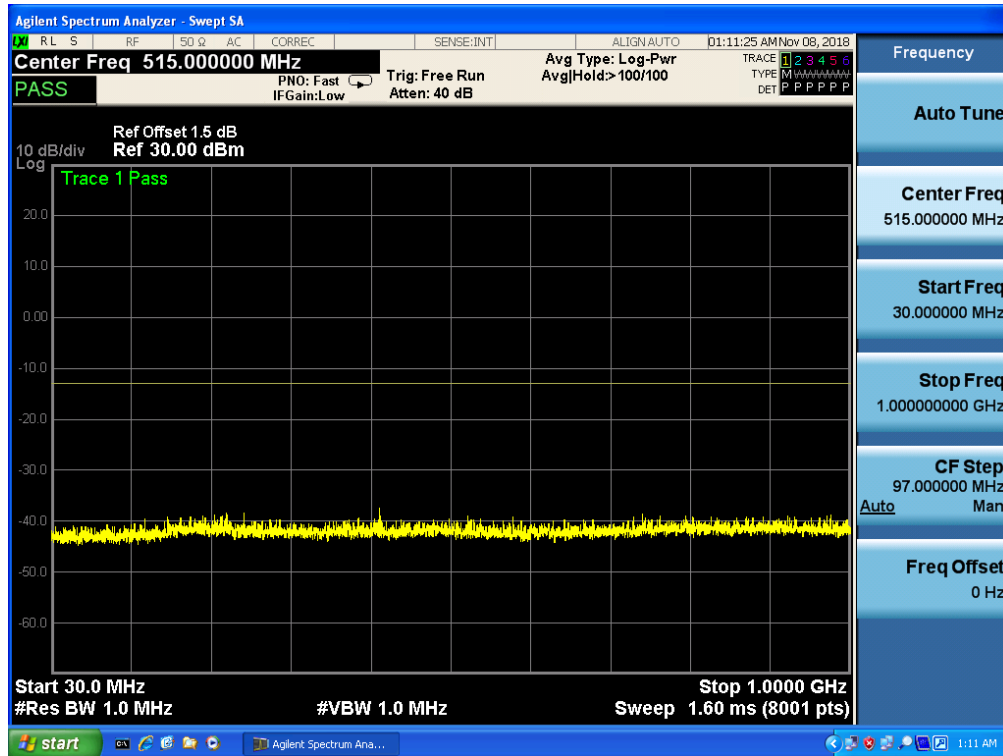
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



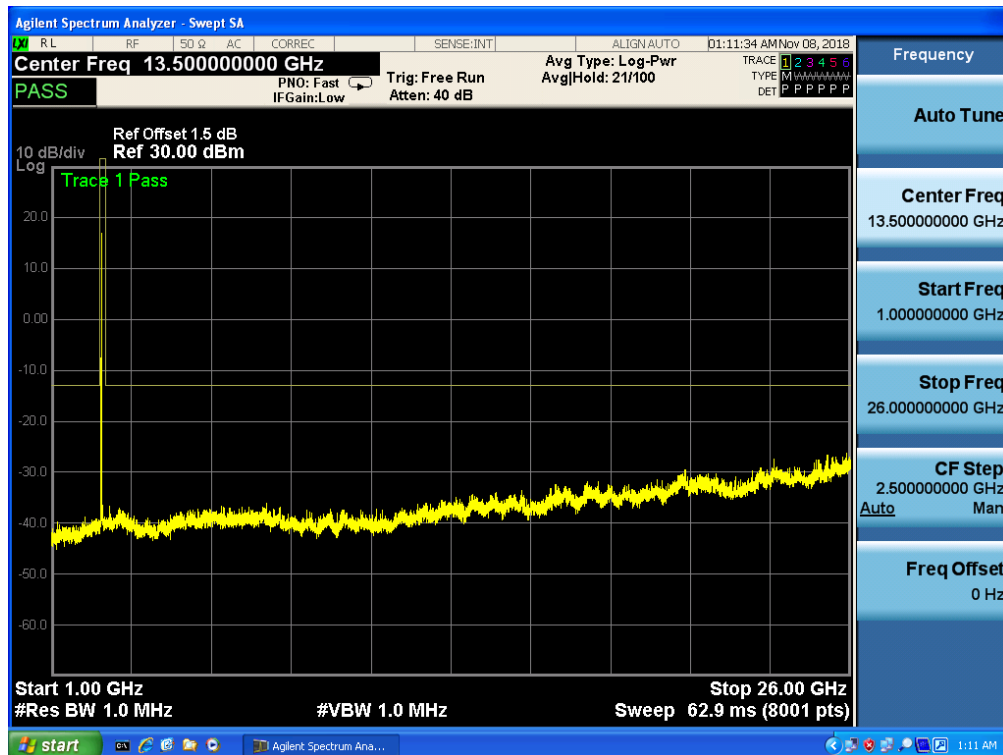
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



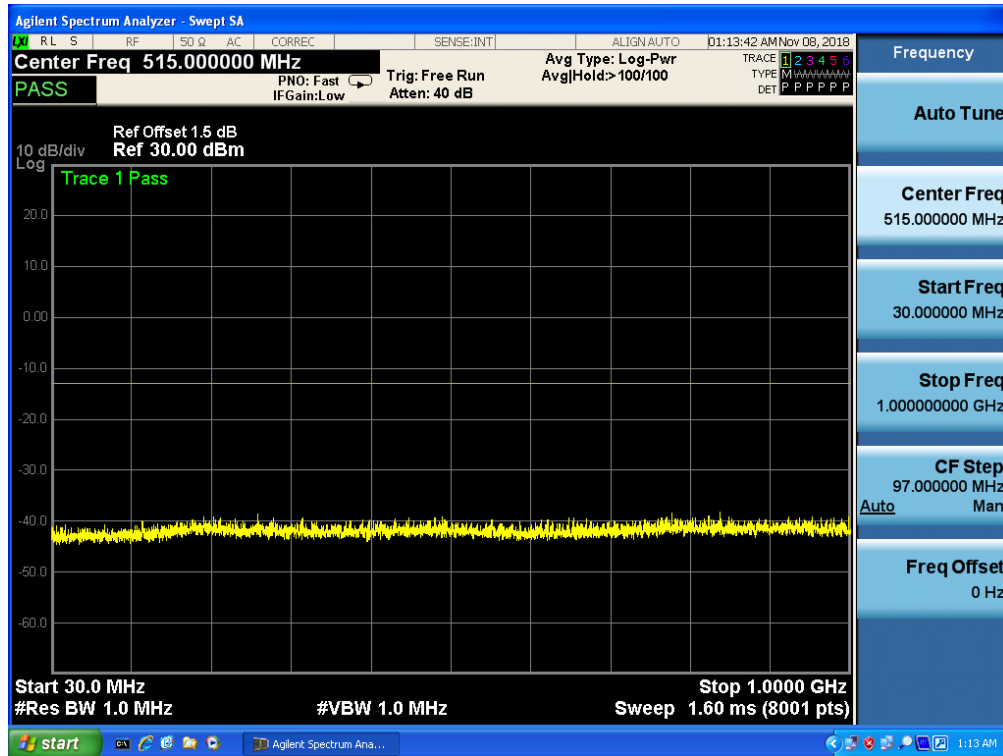
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



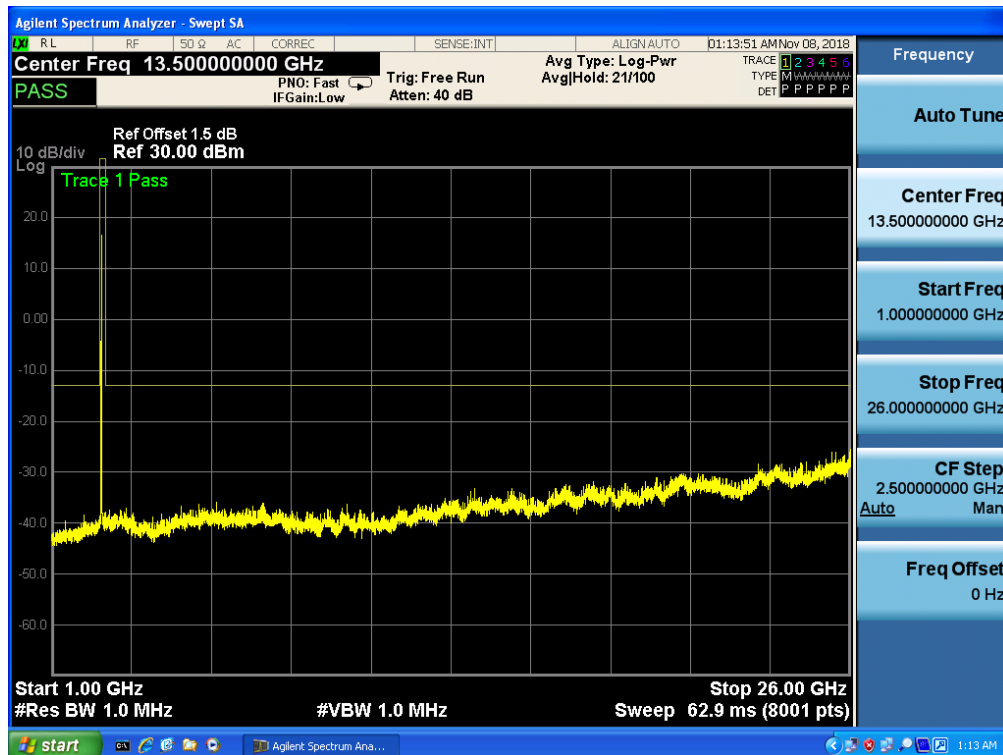
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



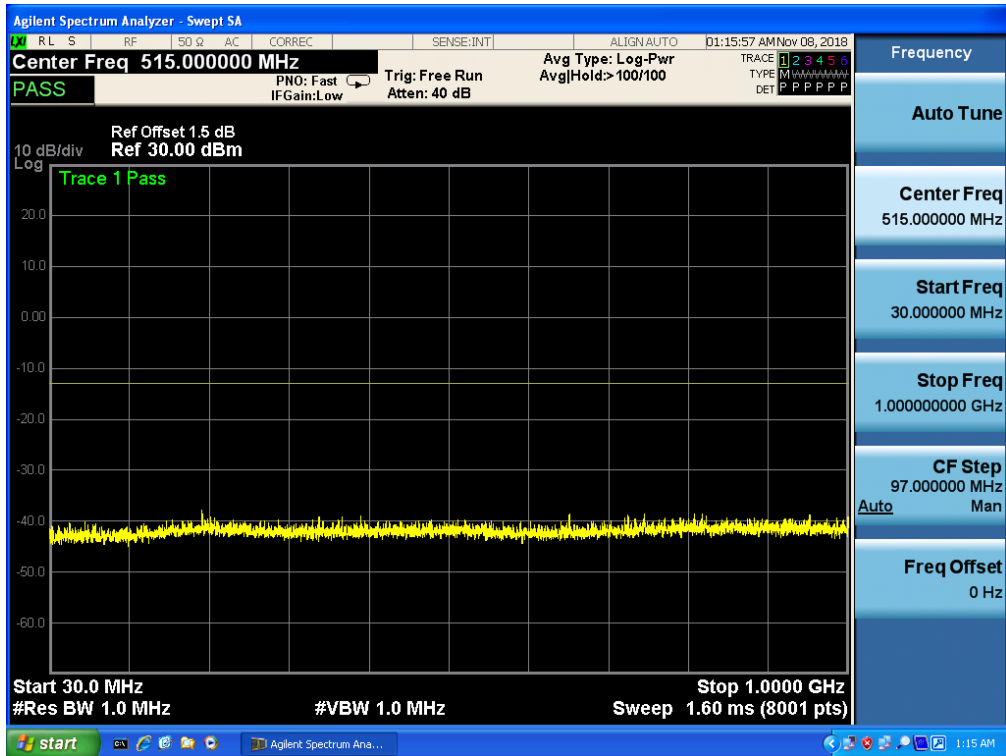
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



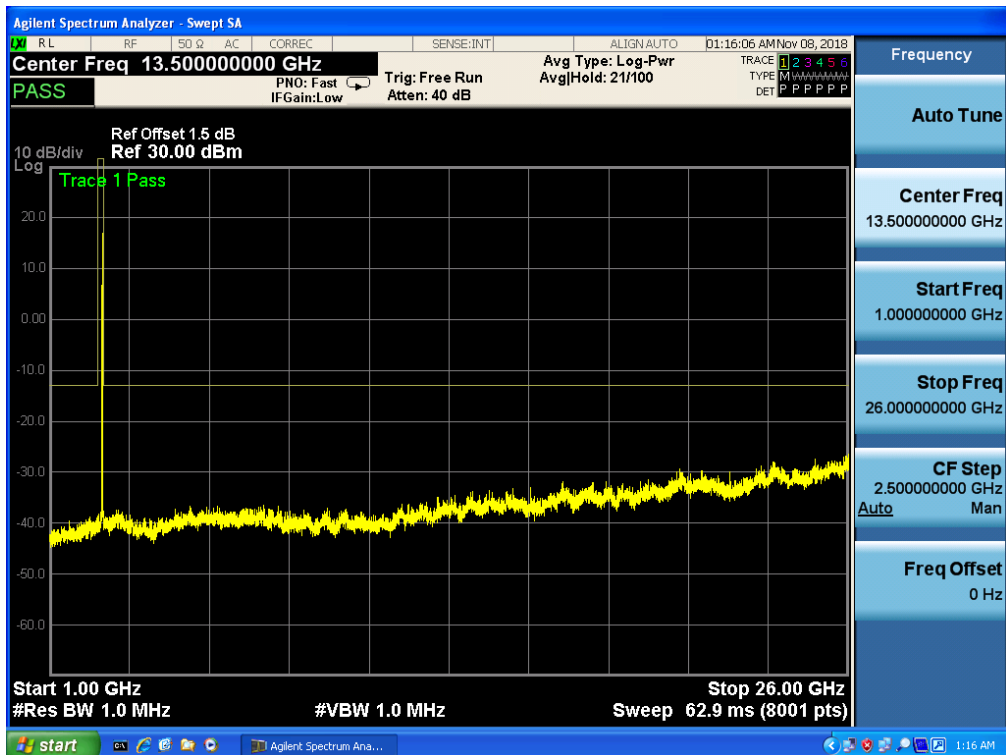
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



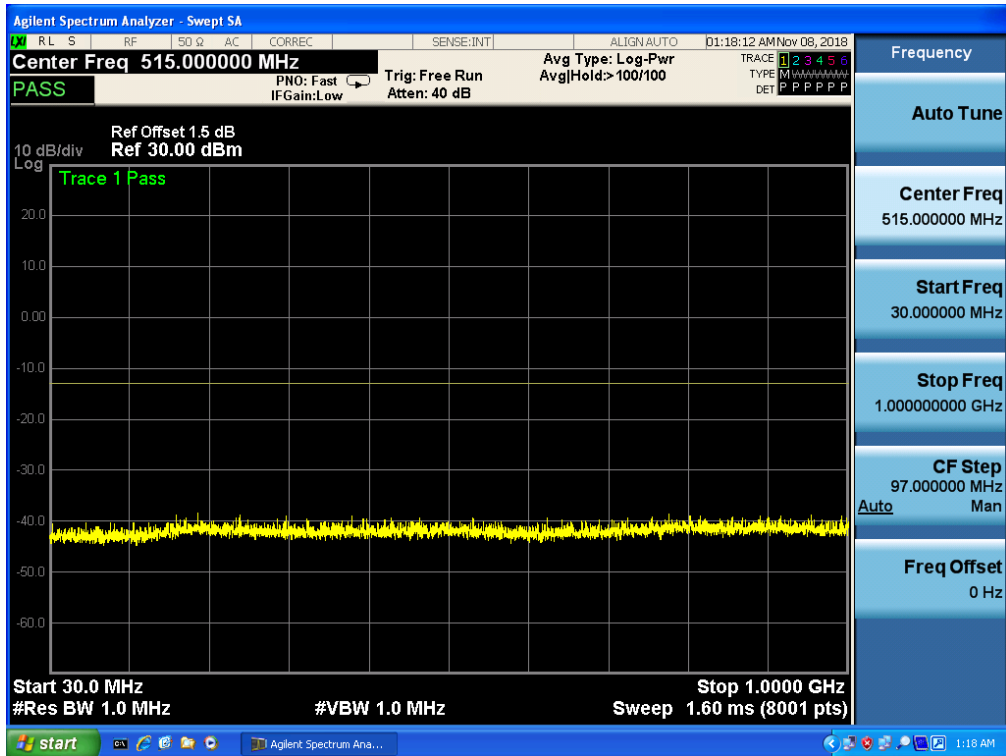
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



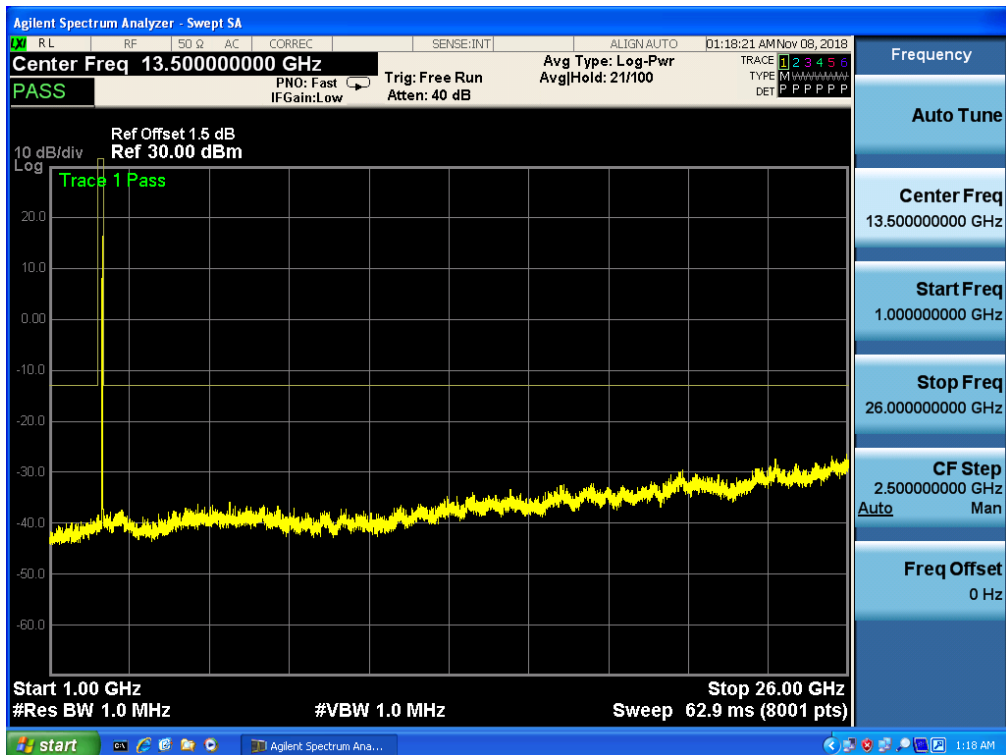
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM

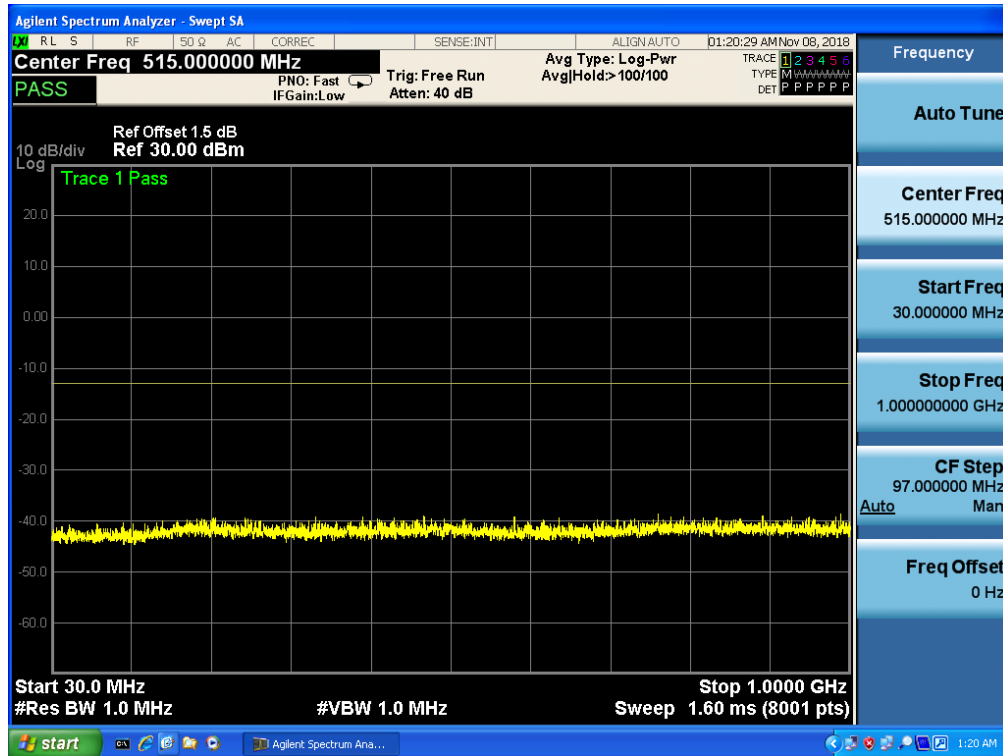


Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM

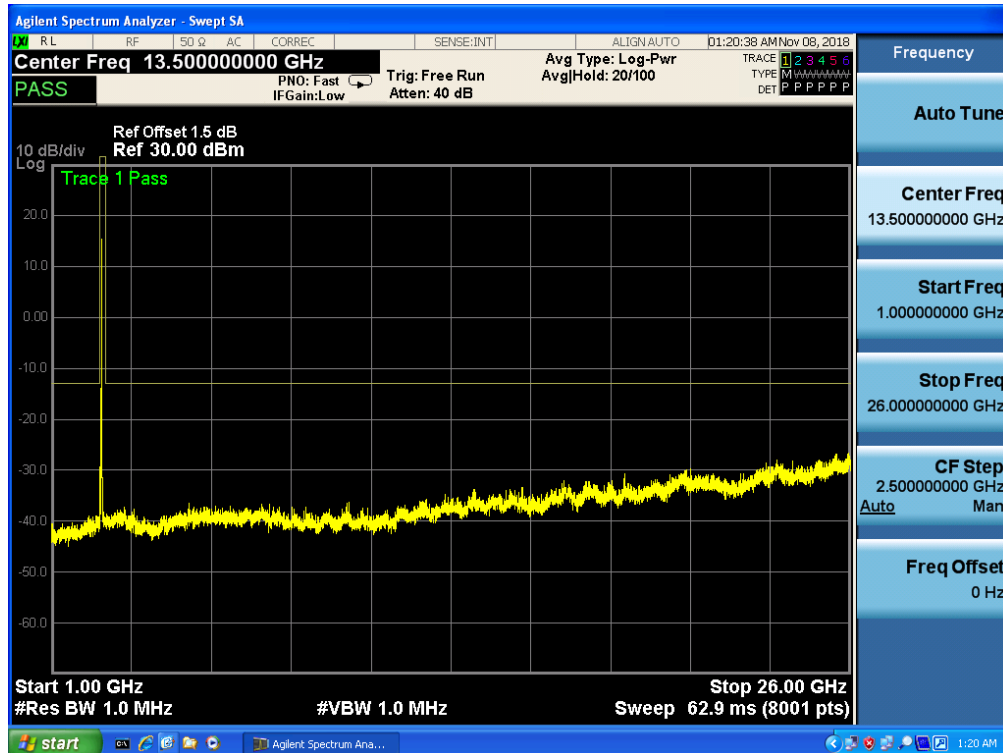




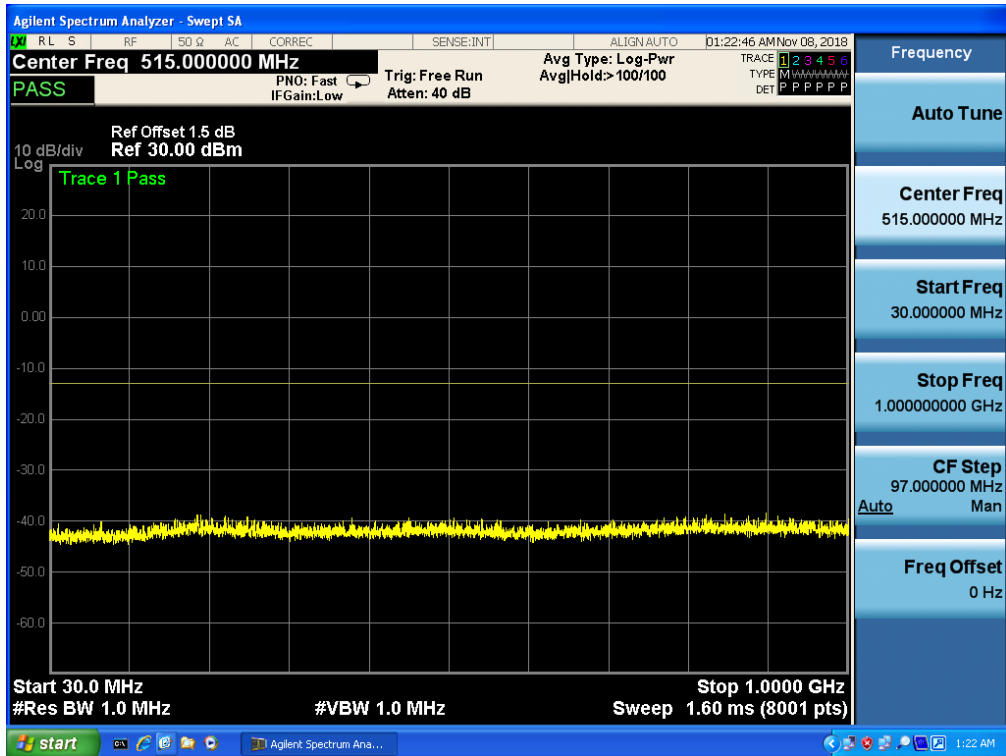
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



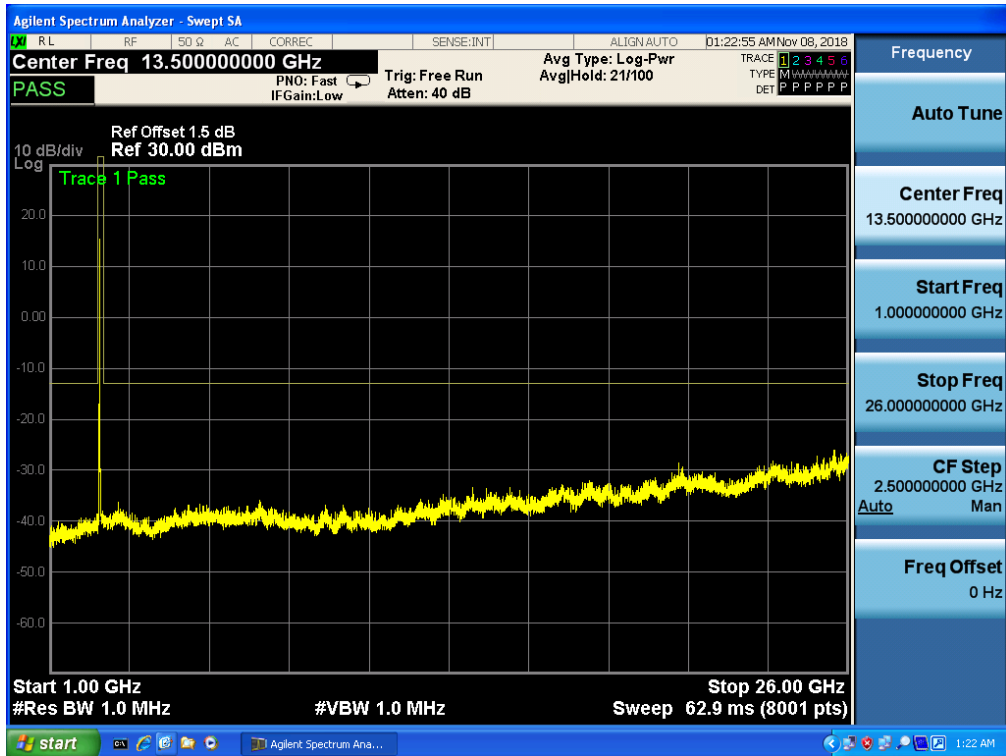
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



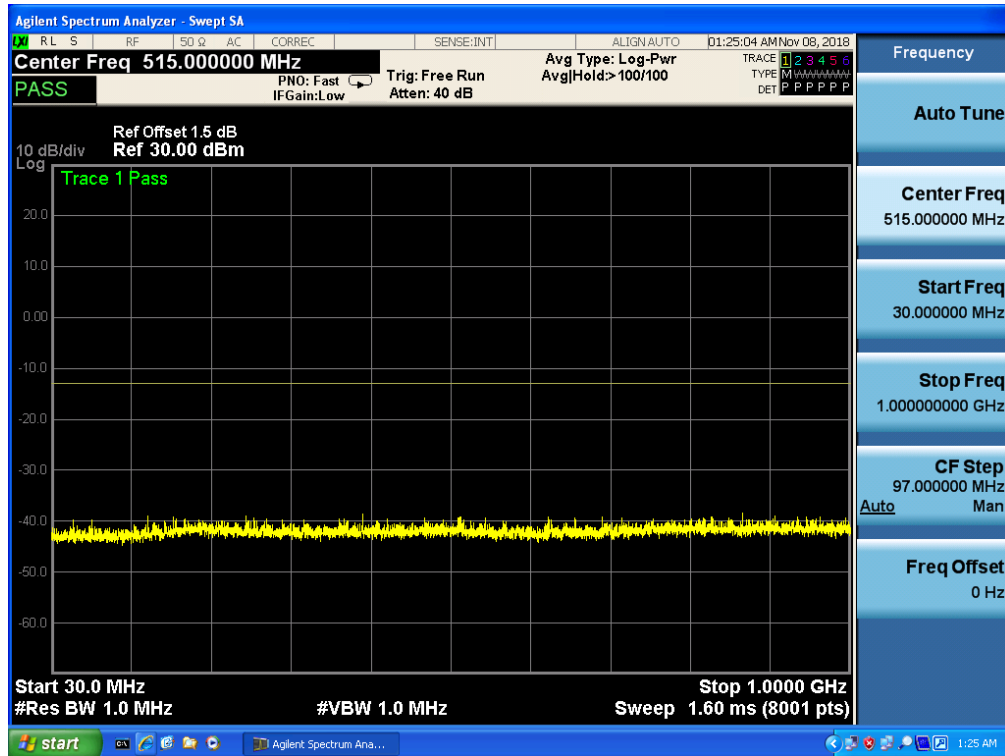
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



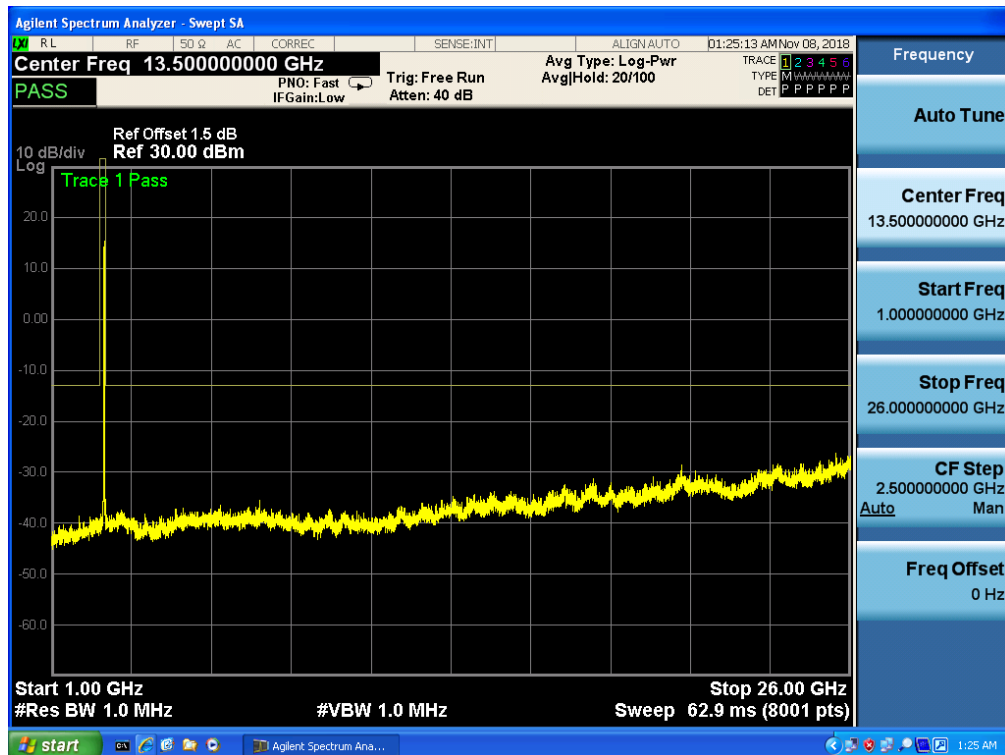
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



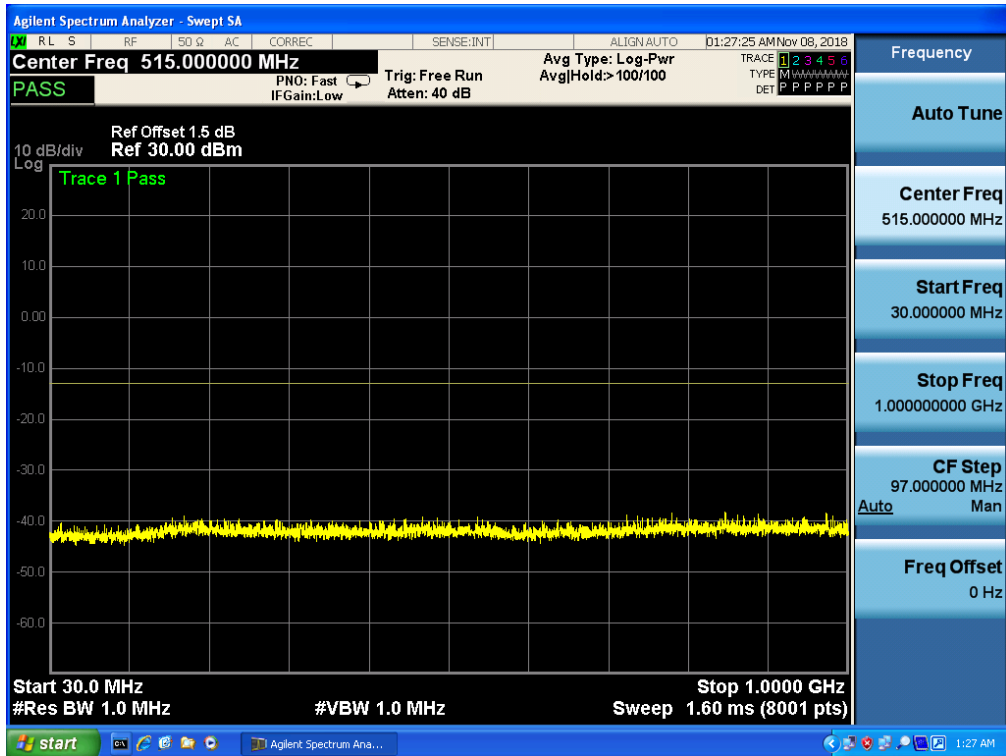
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



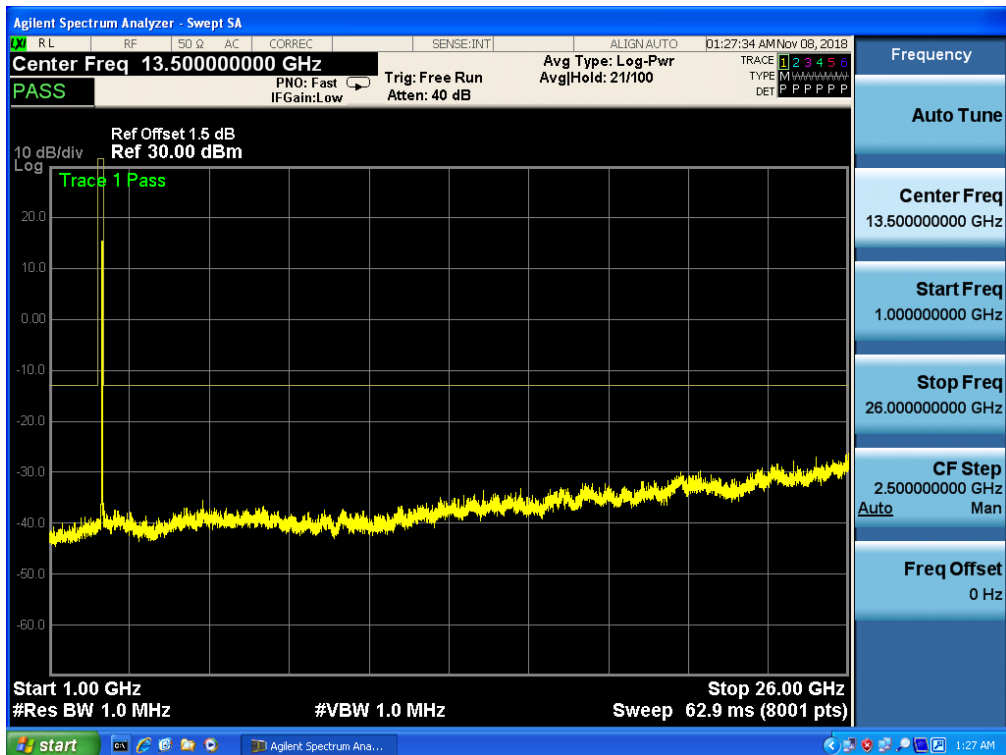
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



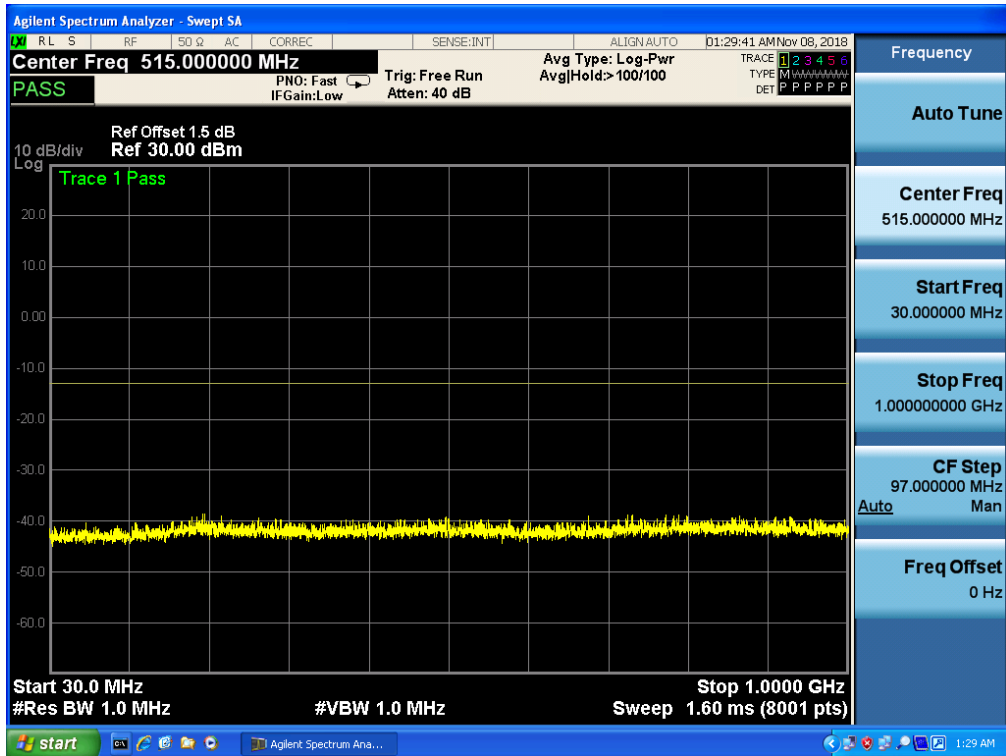
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



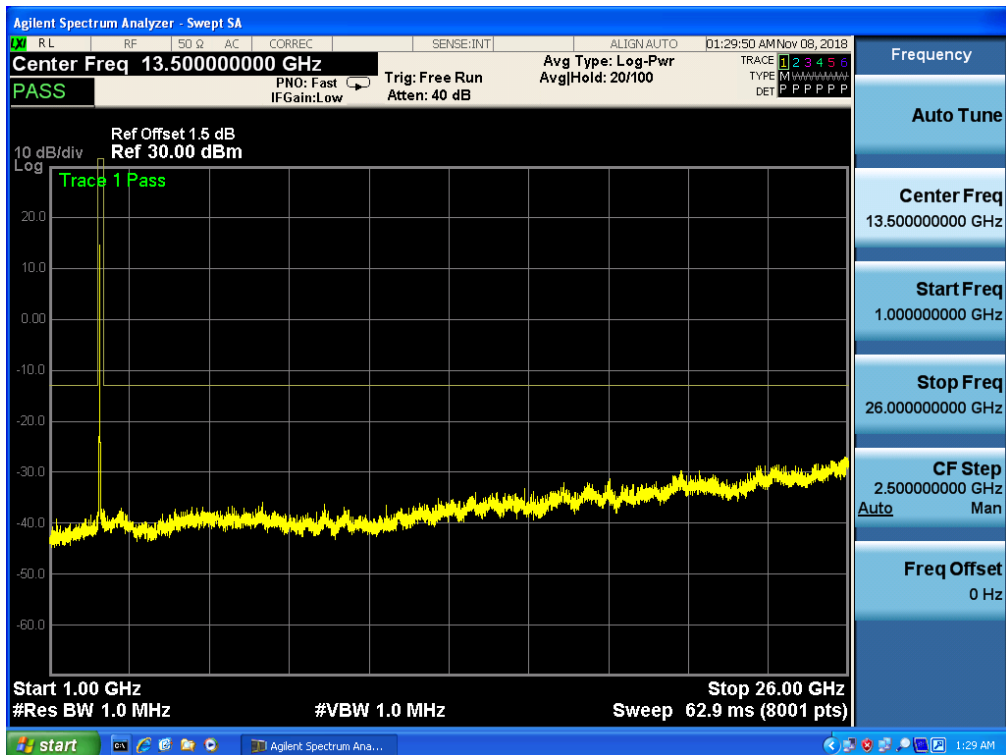
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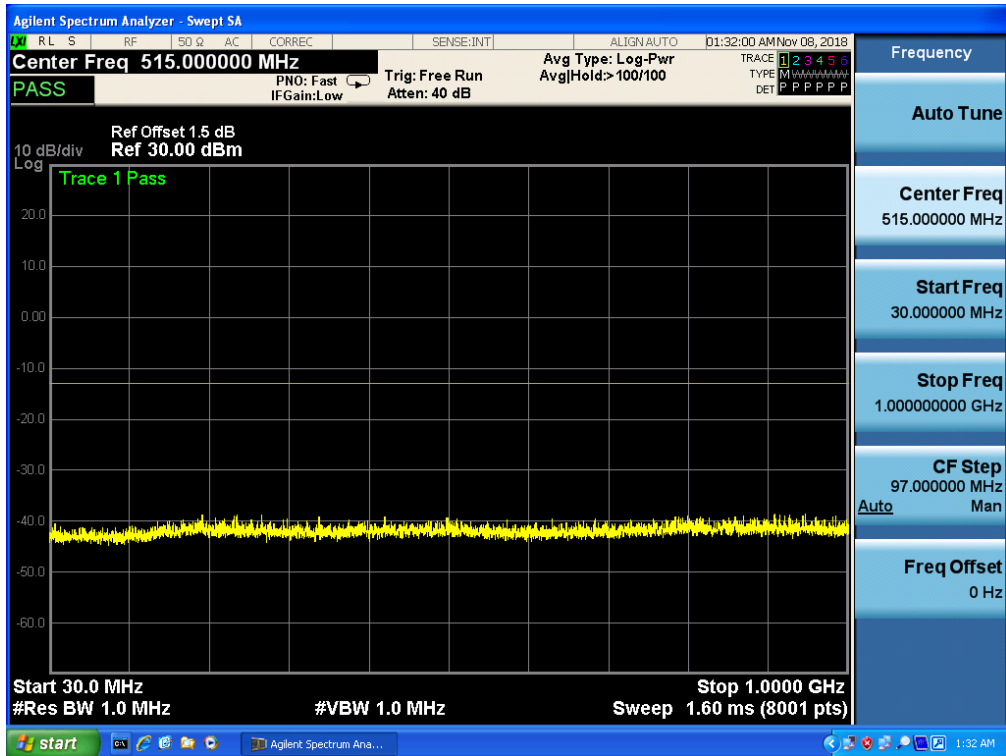
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



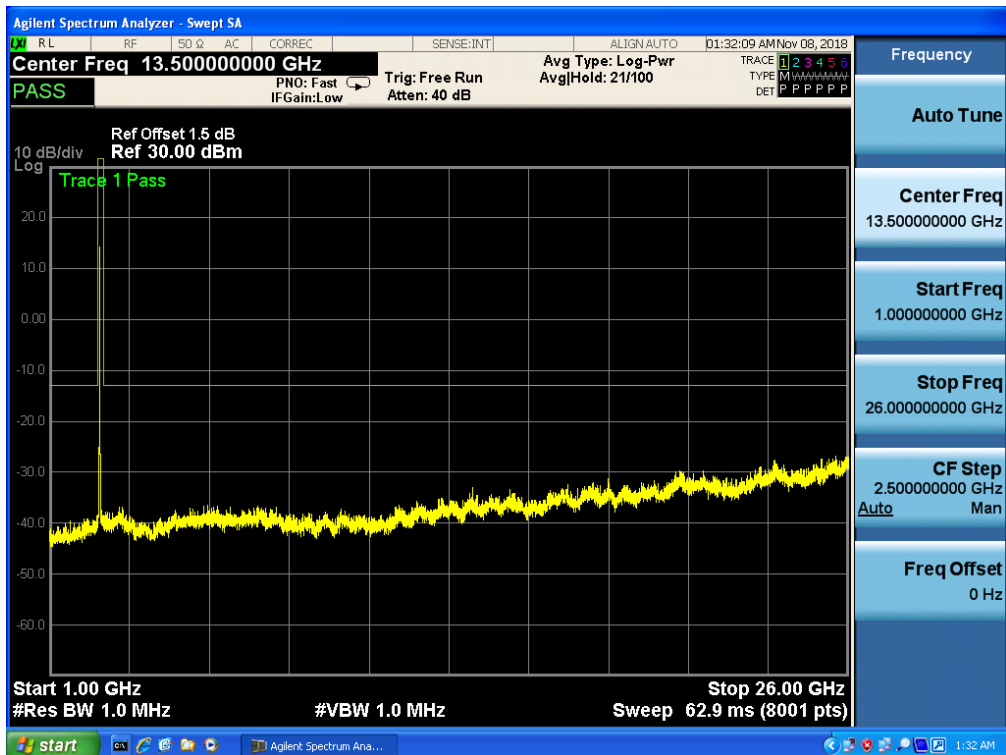
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



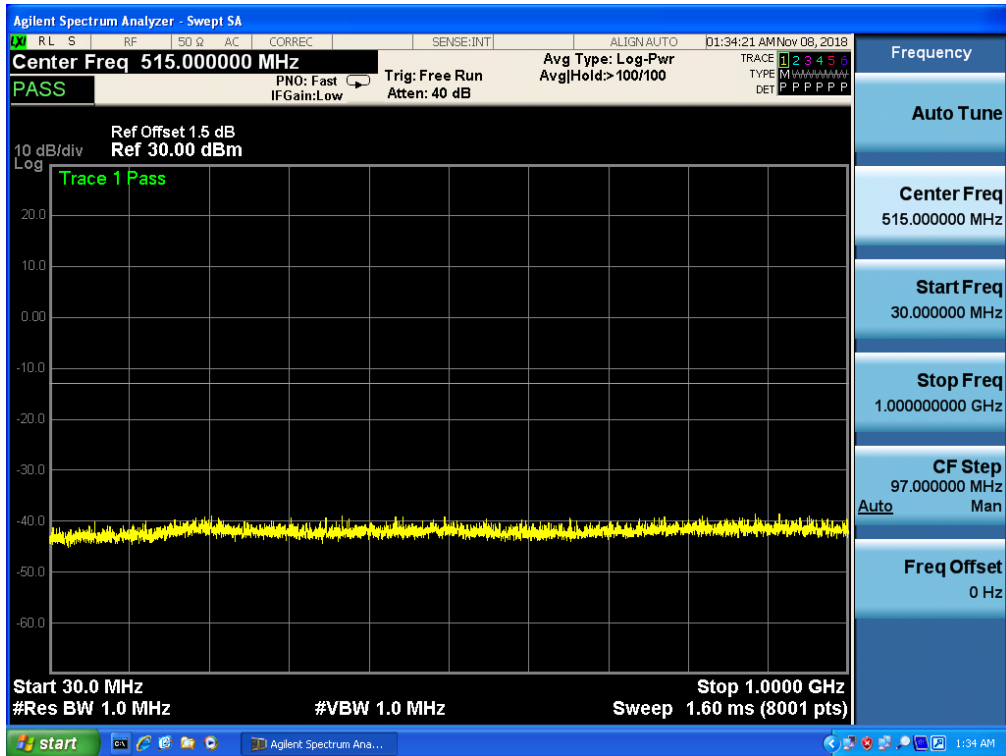
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



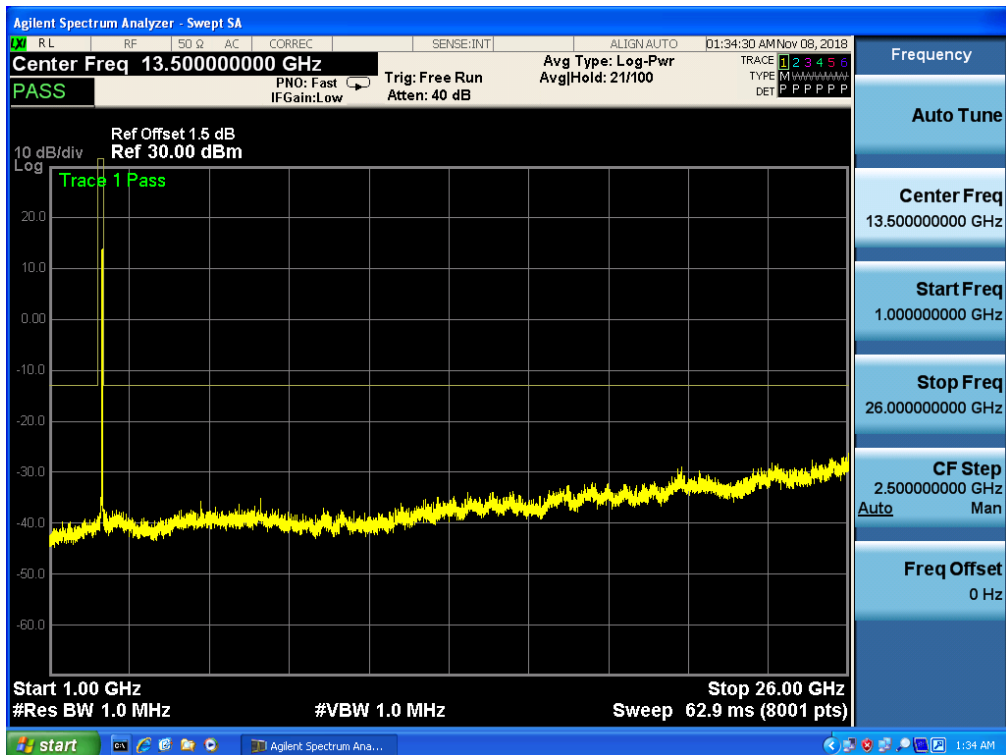
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



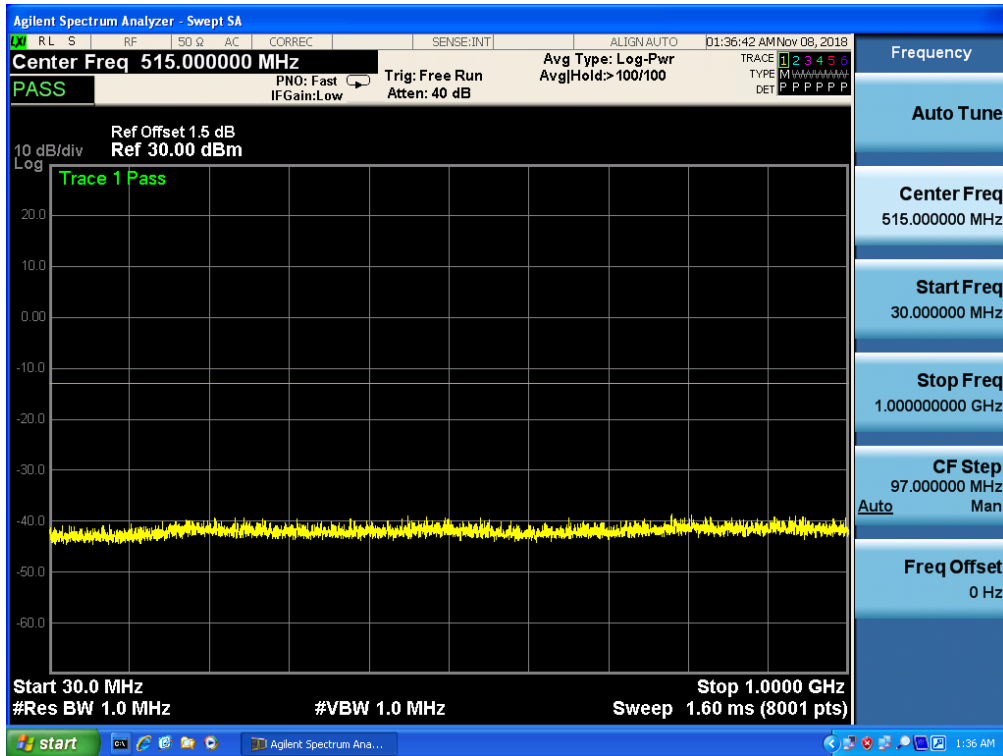
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



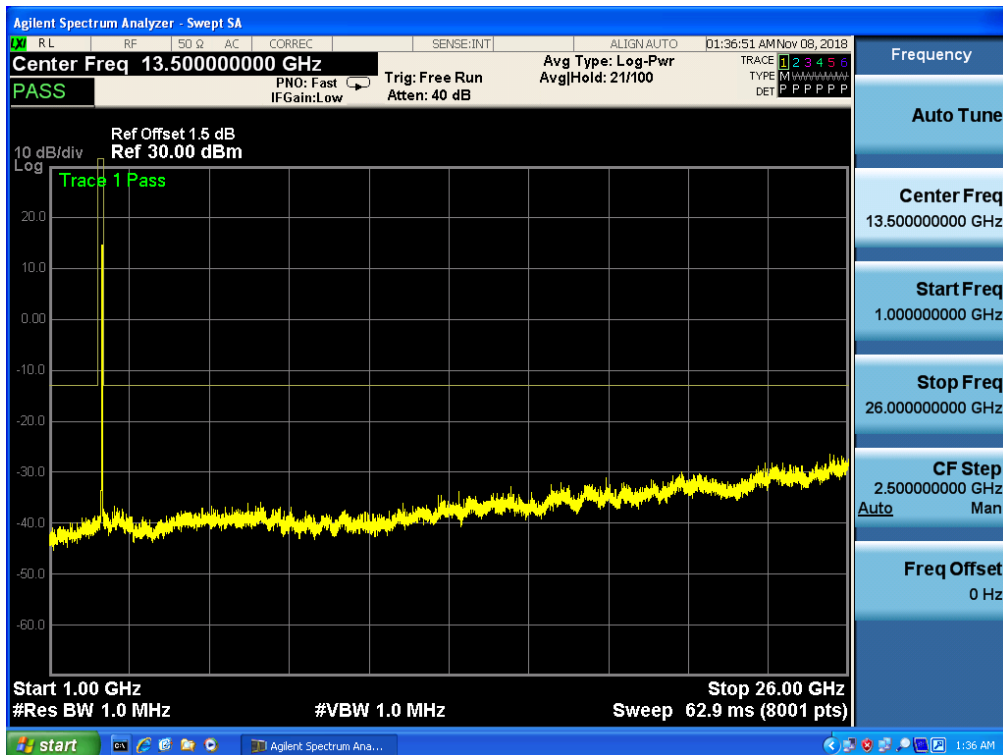
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM





## 8. Radiated Measurement

### 8.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §27.50

#### LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

#### TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

#### MODES TESTED

- LTE Band 41

#### RESULTS

PASS

8.2 LTE BAND 41

Radiated Power (EIRP) for Band 41										
Mode	RB/ RB SIZE	Frequency	Result						Polarizati on Of Max. ERP	Conclusio n
			SG Level (dBm )	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Avera ge (dBm)	Max. EIRP			
							Average (mW)			
5.0MHz Band QPSK	25/0	2557.5	-2.82	4.75	27.68	20.11	102.565	Horizontal	Pass	
		2605	-2.82	4.75	27.72	20.15	103.514	Horizontal	Pass	
		2652.5	-2.83	4.78	27.78	20.17	103.992	Horizontal	Pass	
5.0MHz Band 16 QAM	25/0	2557.5	-2.95	4.75	27.68	19.98	99.541	Horizontal	Pass	
		2605	-2.89	4.75	27.72	20.08	101.859	Horizontal	Pass	
		2652.5	-2.86	4.78	27.78	20.14	103.276	Horizontal	Pass	
10.0MH z Band QPSK	50/0	2560	-2.71	4.75	27.68	20.22	105.196	Horizontal	Pass	
		2605	-2.80	4.75	27.72	20.17	103.992	Horizontal	Pass	
		2650	-3.04	4.78	27.78	19.96	99.083	Horizontal	Pass	
10.0MH z Band 16 QAM	50/0	2560	-2.94	4.75	27.68	19.99	99.770	Horizontal	Pass	
		2605	-2.94	4.75	27.72	20.03	100.693	Horizontal	Pass	
		2650	-2.96	4.77	27.78	20.05	101.158	Horizontal	Pass	
15.0MH z Band QPSK	75/0	2562.5	-2.87	4.75	27.68	20.06	101.391	Horizontal	Pass	
		2605	-2.86	4.75	27.72	20.11	102.565	Horizontal	Pass	
		2648.5	-2.85	4.78	27.78	20.15	103.514	Horizontal	Pass	
15.0MH z Band 16 QAM	75/0	2562.5	-2.77	4.75	27.68	20.16	103.753	Horizontal	Pass	
		2605	-2.76	4.75	27.72	20.21	104.954	Horizontal	Pass	
		2648.5	-2.78	4.77	27.78	20.23	105.439	Horizontal	Pass	
20.0MH z Band QPSK	100/ 0	2565	-2.86	4.75	27.68	20.07	101.625	Horizontal	Pass	
		2605	-2.86	4.75	27.72	20.11	102.565	Horizontal	Pass	
		2645	-2.87	4.78	27.78	20.13	103.039	Horizontal	Pass	
20.0MH z Band 16 QAM	100/ 0	2565	-2.74	4.75	27.68	20.19	104.472	Horizontal	Pass	
		2605	-2.74	4.75	27.72	20.23	105.439	Horizontal	Pass	
		2645	-2.85	4.77	27.78	20.16	103.753	Horizontal	Pass	

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 41									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm )	Cable Loss (dBm)	Anten na Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2557.5	-2.35	4.75	27.68	20.58	114.288	Vertical	Pass
		2605	-2.50	4.75	27.72	20.47	111.429	Vertical	Pass
		2652.5	-2.34	4.78	27.78	20.66	116.413	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2557.5	-2.58	4.75	27.68	20.35	108.393	Vertical	Pass
		2605	-2.60	4.75	27.72	20.37	108.893	Vertical	Pass
		2652.5	-2.59	4.78	27.78	20.41	109.901	Vertical	Pass
10.0MH z Band QPSK	50/0	2560	-2.75	4.75	27.68	20.18	104.232	Vertical	Pass
		2605	-2.56	4.75	27.72	20.41	109.901	Vertical	Pass
		2650	-2.74	4.78	27.78	20.26	106.170	Vertical	Pass
10.0MH z Band 16 QAM	50/0	2560	-2.58	4.75	27.68	20.35	108.393	Vertical	Pass
		2605	-2.59	4.75	27.72	20.38	109.144	Vertical	Pass
		2650	-2.69	4.77	27.78	20.32	107.647	Vertical	Pass
15.0MH z Band QPSK	75/0	2562.5	-2.66	4.75	27.68	20.27	106.414	Vertical	Pass
		2605	-2.52	4.75	27.72	20.45	110.917	Vertical	Pass
		2648.5	-2.71	4.78	27.78	20.29	106.905	Vertical	Pass
15.0MH z Band 16 QAM	75/0	2562.5	-2.71	4.75	27.68	20.22	105.196	Vertical	Pass
		2605	-2.71	4.75	27.72	20.26	106.170	Vertical	Pass
		2648.5	-2.77	4.77	27.78	20.24	105.682	Vertical	Pass
20.0MH z Band QPSK	100/ 0	2565	-2.60	4.75	27.68	20.33	107.895	Vertical	Pass
		2605	-2.61	4.75	27.72	20.36	108.643	Vertical	Pass
		2645	-2.86	4.78	27.78	20.14	103.276	Vertical	Pass
20.0MH z Band 16 QAM	100/ 0	2565	-2.67	4.75	27.68	20.26	106.170	Vertical	Pass
		2605	-2.69	4.75	27.72	20.28	106.660	Vertical	Pass
		2645	-2.58	4.77	27.78	20.43	110.408	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

## 9. SPURIOUS RADIATION EMISSION

### RULE PART(S)

FCC: §2.1053, §27.53

### LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB.

### TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power,  $P$  (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \text{ Log}_{10}(p)$ , dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than  $43 + 10 \text{ Log}_{10}(p)$ , dB at the channel edges and  $55 + 10 \text{ Log}_{10}(p)$  at 5.5 MHz away and beyond the channel edges where  $p$  in (a) and (b) is the transmitter power measured in watts.

**MODES TESTED**

- LTE Band 41

**RESULTS**

PASS

9.1 LTE BAND 41

**QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)**

Test Results for Low Channel 2557.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5115.0	-55.24	5.28	35.81	-24.71	-13	-11.71	Horizontal
5115.0	-54.96	5.28	35.81	-24.43	-13	-11.43	Vertical
7672.5	-57.13	5.74	36.85	-26.02	-13	-13.02	Vertical
7672.5	-56.22	5.74	36.85	-25.11	-13	-12.11	Horizontal
Test Results for Mid Channel 2605MHz							
5210.0	-57.08	5.28	35.82	-26.54	-13	-13.54	Horizontal
5210.0	-56.69	5.28	35.82	-26.15	-13	-13.15	Vertical
7815.0	-57.23	5.78	36.85	-26.16	-13	-13.16	Vertical
7815.0	-58.51	5.78	36.85	-27.44	-13	-14.44	Horizontal
Test Results for High Channel 2652.5MHz							
5305.0	-57.93	5.31	35.83	-27.41	-13	-14.41	Horizontal
5305.0	-56.82	5.31	35.83	-26.30	-13	-13.30	Vertical
7957.5	-57.11	5.80	36.87	-26.04	-13	-13.04	Vertical
7957.5	-59.95	5.80	36.87	-28.88	-13	-15.88	Horizontal

**QPSK EIRP POWER FOR LTE BAND 41 (20.0MHZ BANDWIDTH)**

Test Results for Low Channel 2565MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5130	-59.13	5.28	35.82	-28.59	-13	-15.59	Horizontal
5130	-57.46	5.28	35.82	-26.92	-13	-13.92	Vertical
7695	-57.52	5.76	36.86	-26.42	-13	-13.42	Vertical
7695	-57.42	5.76	36.86	-26.32	-13	-13.32	Horizontal
Test Results for Mid Channel 2605MHz							
5210.0	-55.58	5.28	35.82	-25.04	-13	-12.04	Horizontal
5210.0	-59.95	5.28	35.82	-29.41	-13	-16.41	Vertical
7815.0	-56.81	5.78	36.85	-25.74	-13	-12.74	Vertical
7815.0	-55.63	5.78	36.85	-24.56	-13	-11.56	Horizontal
Test Results for High Channel 2645MHz							
5290	-57.23	5.3	35.83	-26.70	-13	-13.70	Horizontal
5290	-57.42	5.3	35.83	-26.89	-13	-13.89	Vertical
7935	-58.95	5.8	36.88	-27.87	-13	-14.87	Vertical
7935	-59.56	5.8	36.88	-28.48	-13	-15.48	Horizontal

Note: P<sub>Mea</sub>(dBm)= Power(dBm)+ ARpl (dBm)

. Over Limit= : P<sub>Mea</sub>(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

## 10. FREQUENCY STABILITY

### RULE PART(S)

FCC: §2.1055, §27.54

### LIMITS

§ 7.54 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$
- Voltage = low voltage, DC 3.6V, Normal, DC 3.8V and High voltage, DC 4.4V.

### Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to  $-30^{\circ}\text{C}$  and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

### Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

### MODES TESTED

- LTE Band 41

## RESULTS

See the following pages.



10.1 LTE BAND 41

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.2	2605	-12.3	-0.004722	2.5
3.8	2605	-13.8	-0.005298	2.5
4.4	2605	-11	-0.004223	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2605	-12	-0.004607	2.5
Extreme (50C)	2605	-19	-0.007294	2.5
Extreme (40C)	2605	-17.4	-0.006679	2.5
Extreme (30C)	2605	-11.3	-0.004338	2.5
Extreme (10C)	2605	-13.5	-0.005182	2.5
Extreme (0C)	2605	6.8	0.002610	2.5
Extreme (-10C)	2605	9	0.003455	2.5
Extreme (-20C)	2605	-13.5	-0.005182	2.5
Extreme (-30C)	2605	-15.4	-0.005912	2.5

**16QAM, (20MHz BANDWIDTH)**

**Frequency error vs. Voltage**

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
3.2	2605	-11.6	-0.004453	2.5
3.8	2605	-12.5	-0.004798	2.5
4.4	2605	-13	-0.004990	2.5

**Frequency error vs. Temperature**

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
<b>16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)</b>				
Normal (25C)	2605	-10.9	-0.004184	2.5
Extreme (50C)	2605	-11.2	-0.004299	2.5
Extreme (40C)	2605	-10.6	-0.004069	2.5
Extreme (30C)	2605	-10.1	-0.003877	2.5
Extreme (10C)	2605	-11.4	-0.004376	2.5
Extreme (0C)	2605	-12.6	-0.004837	2.5
Extreme (-10C)	2605	-12.5	-0.004798	2.5
Extreme (-20C)	2605	-13.9	-0.005336	2.5
Extreme (-30C)	2605	-14.7	-0.005643	2.5

\*Note: Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

## 11. Peak-to-Average Ratio

### 11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

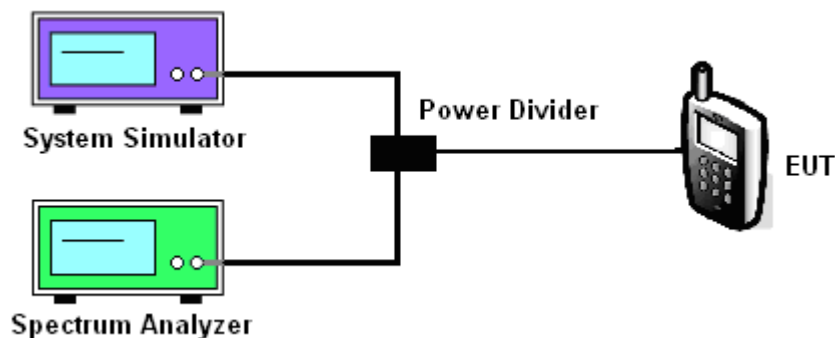
### 11.2 Measuring Instruments

See list of measuring instruments of this test report.

### 11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
  - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
  - b. Set EUT in maximum power output, and triggered the burst signal.
  - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

### 11.4 Test Setup



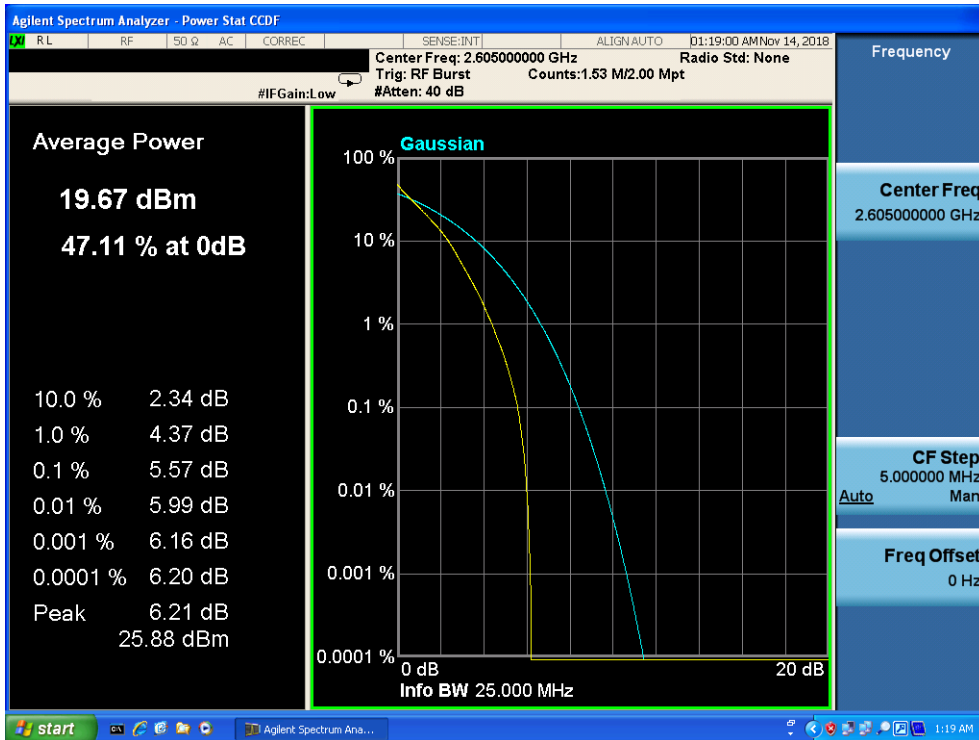
#### MODES TESTED

- LTE Band41

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
41	40740	2605.0	5.0	1	Low	QPSK	5.57
41	40740	2605.0	5.0	1	Low	16-QAM	6.13
41	40740	2605.0	10.0	1	Low	QPSK	5.45
41	40740	2605.0	10.0	1	Low	16-QAM	6.19
41	40740	2605.0	15.0	1	Low	QPSK	5.77
41	40740	2605.0	15.0	1	Low	16-QAM	6.26
41	40740	2605.0	20.0	1	Low	QPSK	5.55
41	40740	2605.0	20.0	1	Low	16-QAM	6.31

11.5 LTE BAND 41

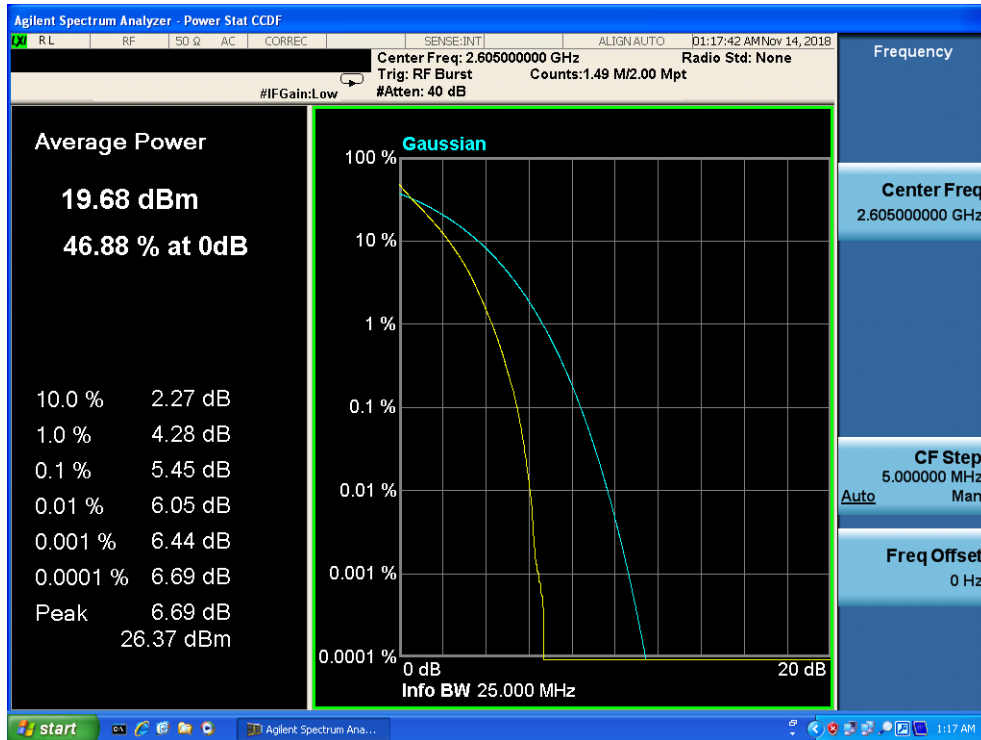
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 1, RB POS. Low, QPSK



Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



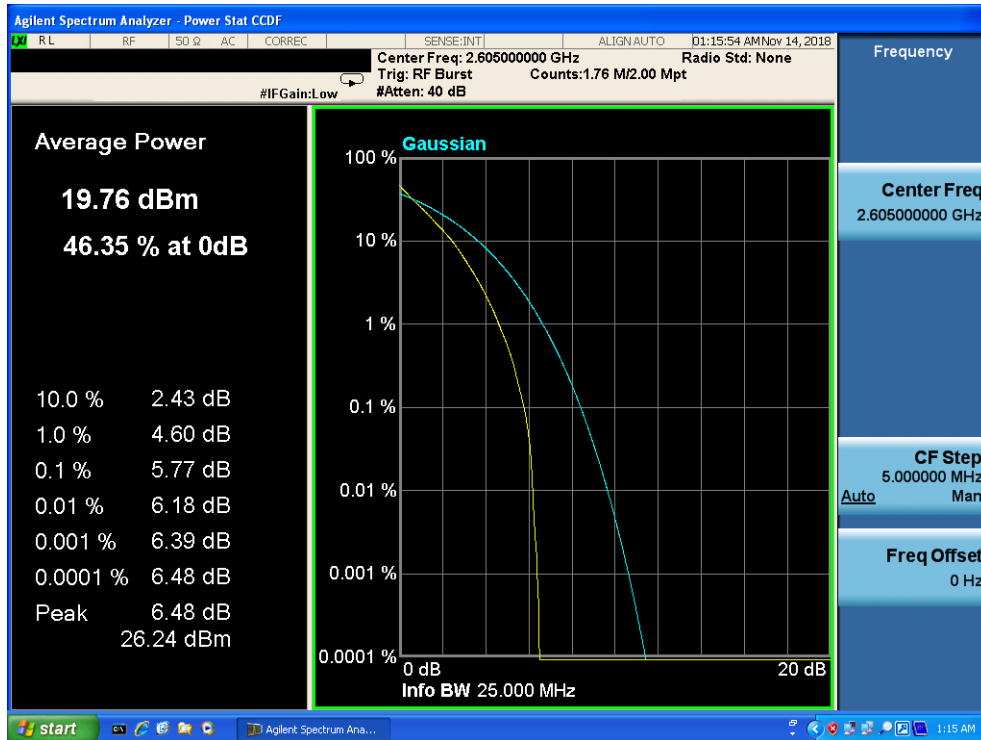
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Band 41, UL Channel 40740, UL Frequency 2605.0, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



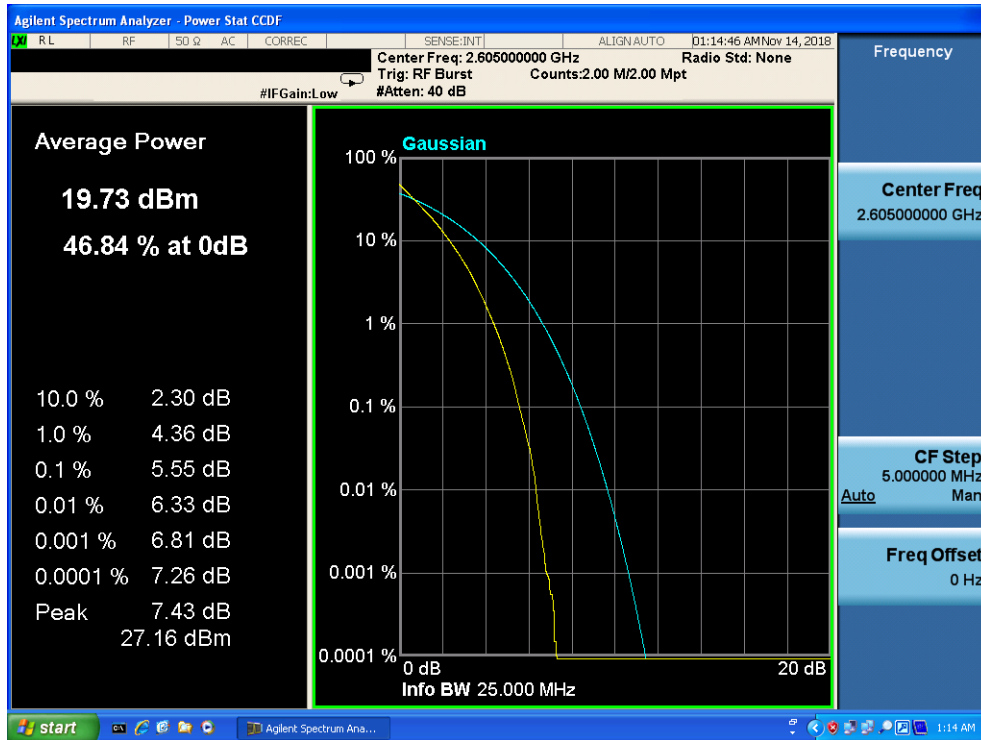
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 15.0, NO. RB 1, RB POS. Low, QPSK



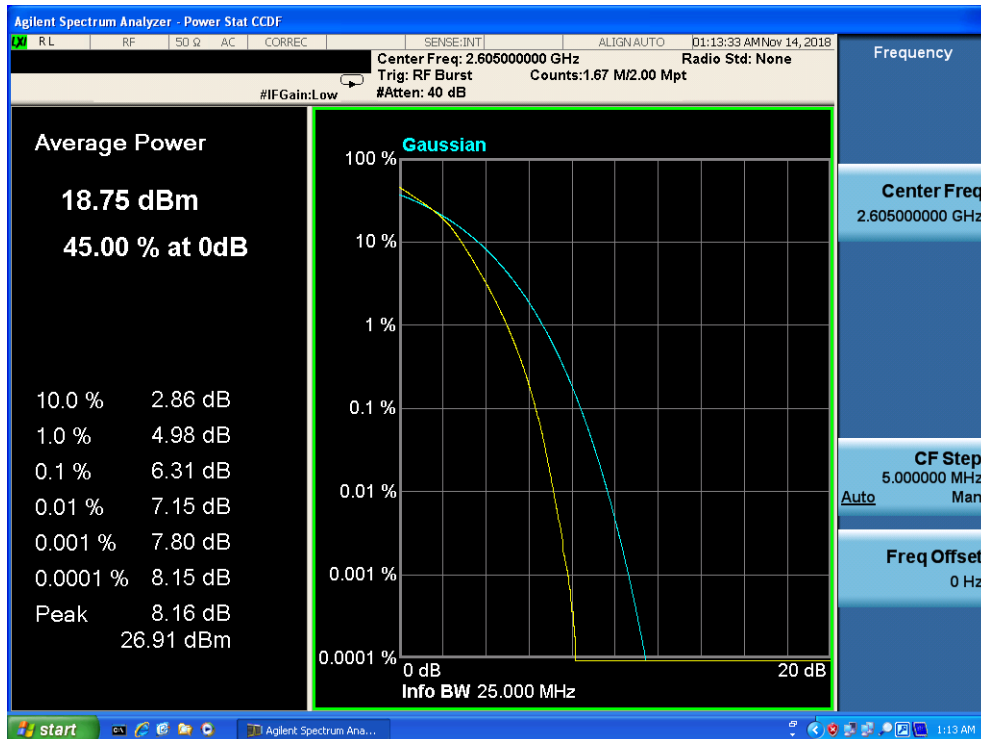
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



Band 41, UL Channel 40740, UL Frequency 2605.0, BW 20.0, NO. RB 1, RB POS. Low, QPSK



Band 41, UL Channel 40740, UL Frequency 2605.0, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM



----END OF REPORT----