



# **TEST REPORT**

**Report Number :** 13018973-E8V3

**Applicant :** APPLE INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A

**Model :** A2275, A2297, A2298

**FCC ID :** BCG-E3500A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC CFR47 PART 22H, 24E, 27, 90S, 90R, 95L AND 96

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Revision History



NVLAP Lab code: 200065-0

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V1	2/11/2020	Initial Review	Elizabeth Lopez
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V3	3/25/2020	Updated power for LTE30 LAT1	John Thompson

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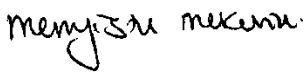

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# 1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A	
Model	A2275, A2297, A2298	
FCC ID	BCG-E3500A	
EUT Description	SMARTPHONE	
Serial Number	FFMZV06DPM63, FFMZW0BLPM63	
Date Tested	SEPTEMBER 11, 2019 to NOVEMBER 27, 2019	
Applicable Standards	CFR47 PART 22H, 24E, 27, 90S AND 96	
Test Results	COMPLIES	
<p>UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.</p> <p>This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.</p>		
Approved & Released By:	Prepared By:	
		
Mengistu Mekuria Operations Leader UL Verification Services Inc.	Lieu Nguyen Laboratory Engineer UL Verification Services Inc	



## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the following:

- ANSI C63.26:2015
- FCC CFR 47 Part 2, Part 22, Part 24, Part 27, Part 90, and Part 96
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Road
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input type="checkbox"/> Chamber I
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Radiated Disturbance, 26000 to 40000 MHz	5.17 dB
Occupied Channel Bandwidth	±0.39 %
Temperature	±0.9 °C
Supply voltages	±0.45 %
Time	±0.02 %

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, TD-SCDMA, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, GPS and NFC. All models support at least one UICC based SIM. The second SIM, if present, is either UICC based pSIM (physical SIM) or e-SIM (electronic SIM). The device has a built-in inductive charging receiver. The rechargeable battery is also not user accessible.

### 5.2. MAXIMUM OUTPUT POWER

#### ERP/EIRP LIMIT

§2.1046, §22.913, §24.232, §27.50, §90.635, §90.541

#### EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015  
KDB 971168 D01 Section 5.6

$ERP/EIRP = P_{Meas} + GT - LC$

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as  $P_{Meas}$ , typically dBW or dBm);

$P_{Meas}$  = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:

**LTE BAND 2**

Part 24								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-1.60						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1850.7	1909.3	23.7	22.15	0.164	1086.6	1M09G7W
	16QAM			23.0	21.41	0.138	1092.2	1M09D7W
	64QAM			22.0	20.39	0.109	1086.6	1M09D7W
3.0	QPSK	1851.5	1908.5	23.7	22.14	0.164	2686	2M69G7W
	16QAM			23.2	21.62	0.145	2699.5	2M70D7W
	64QAM			22.0	20.40	0.110	2701.6	2M70D7W
5.0	QPSK	1852.5	1907.5	23.7	22.06	0.161	4486	4M49G7W
	16QAM			23.3	21.74	0.149	4499.2	4M50D7W
	64QAM			22.7	21.13	0.130	4489.9	4M49D7W
10.0	QPSK	1855.0	1905.0	23.7	22.15	0.164	8950.1	8M95G7W
	16QAM			23.3	21.74	0.149	8901.9	8M90D7W
	64QAM			22.4	20.83	0.121	8949.1	8M95D7W
15.0	QPSK	1857.5	1902.5	23.7	22.15	0.164	13429	13M4G7W
	16QAM			23.4	21.75	0.150	13440	13M4D7W
	64QAM			22.5	20.87	0.122	13413.4	13M4D7W
20.0	QPSK	1860.0	1900.0	23.7	22.11	0.163	17909.9	17M9G7W
	16QAM			23.3	21.67	0.147	17893.9	17M9D7W
	64QAM			22.4	20.80	0.120	17873.8	17M9D7W

**LTE BAND 5**

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-1.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	824.7	848.3	25.2	21.25	0.133	1088.8	1M09G7W
	16QAM			24.4	20.45	0.111	1083.9	1M08D7W
	64QAM			23.6	19.65	0.092	1086	1M09D7W
3.0	QPSK	825.5	847.5	25.2	21.25	0.133	2692.2	2M69G7W
	16QAM			24.5	20.55	0.114	2688.2	2M69D7W
	64QAM			23.9	19.95	0.099	2688.5	2M69D7W
5.0	QPSK	826.5	846.5	25.2	21.25	0.133	4490.3	4M49G7W
	16QAM			24.5	20.55	0.114	4486	4M49D7W
	64QAM			23.6	19.65	0.092	4495.3	4M50D7W
10.0	QPSK	829.0	844.0	25.2	21.25	0.133	8948.7	8M95G7W
	16QAM			24.6	20.65	0.116	8941.9	8M94D7W
	64QAM			23.6	19.65	0.092	8863.3	8M86D7W

**LTE BAND 7**

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-0.40						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2502.5	2567.5	25.2	24.77	0.300	4484.6	4M48G7W
	16QAM			24.6	24.17	0.261	4475.2	4M48D7W
	64QAM			23.6	23.20	0.209	4507.1	4M51D7W
10.0	QPSK	2505.0	2565.0	25.2	24.79	0.301	8981.1	8M98G7W
	16QAM			24.6	24.16	0.261	8963.3	8M96D7W
	64QAM			23.5	23.12	0.205	8995.4	9M00D7W
15.0	QPSK	2507.5	2562.5	25.2	24.80	0.302	13419.4	13M4G7W
	16QAM			24.5	24.11	0.258	13438.2	13M4D7W
	64QAM			23.5	23.12	0.205	13429	13M4D7W
20.0	QPSK	2510.0	2560.0	25.2	24.78	0.300	17882.5	17M9G7W
	16QAM			24.5	24.11	0.258	17910	17M9D7W
	64QAM			23.7	23.29	0.213	17918.6	17M9D7W

**LTE BAND 12**

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	699.7	715.3	25.2	18.25	0.067	1086.3	1M09G7W
	16QAM			24.4	17.45	0.056	1091.7	1M09D7W
	64QAM			23.4	16.45	0.044	1088.1	1M09D7W
3.0	QPSK	700.5	714.5	25.2	18.25	0.067	2693.5	2M69G7W
	16QAM			24.6	17.65	0.058	2687.4	2M69D7W
	64QAM			23.6	16.65	0.046	2910	2M91D7W
5.0	QPSK	701.5	713.5	25.2	18.25	0.067	4500.3	4M50G7W
	16QAM			24.7	17.75	0.060	4475.4	4M48D7W
	64QAM			23.6	16.65	0.046	4521	4M52D7W
10.0	QPSK	704.0	711.0	25.2	18.25	0.067	8976.8	8M98G7W
	16QAM			24.6	17.65	0.058	8933.3	8M93D7W
	64QAM			23.9	16.95	0.050	8967.1	8M97D7W

**LTE BAND 13**

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-3.50						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	779.5	784.5	25.2	19.55	0.090	4488.5	4M49G7W
	16QAM			24.5	18.85	0.077	4475	4M48D7W
	64QAM			23.8	18.15	0.065	4495.4	4M50D7W
10.0	QPSK	782.0	782.0	25.2	19.55	0.090	8900.2	8M90G7W
	16QAM			24.4	18.75	0.075	8953.8	8M95D7W
	64QAM			23.8	18.15	0.065	8949.9	8M95D7W

**LTE BAND 14**

Part 90R								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-3.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	790.5	795.5	25.2	19.75	0.094	4503.7	4M50G7W
	16QAM			24.5	19.05	0.080	4452.6	4M45D7W
	64QAM			23.6	18.15	0.065	4475.6	4M48D7W
10.0	QPSK	793.0	793.0	25.2	19.75	0.094	8936.8	8M94G7W
	16QAM			24.5	19.05	0.080	8962.1	8M96D7W
	64QAM			23.3	17.85	0.061	8963.6	8M96D7W

**LTE BAND 17**

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	706.5	713.5	25.2	18.25	0.067	4481.9	4M48G7W
	16QAM			24.7	17.75	0.060	4496	4M50D7W
	64QAM			23.9	16.95	0.050	4473.5	4M47D7W
10.0	QPSK	709.0	711.0	25.2	18.25	0.067	8940.2	8M94G7W
	16QAM			24.5	17.55	0.057	8961.9	8M96D7W
	64QAM			23.5	16.55	0.045	8915.9	8M92D7W

**LTE BAND 25**

Part 24								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-1.60						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1850.7	1914.3	23.7	22.13	0.163	1090.8	1M09G7W
	16QAM			22.9	21.29	0.134	1090.5	1M09D7W
	64QAM			22.1	20.47	0.111	1094	1M09D7W
3.0	QPSK	1851.5	1913.5	23.7	22.07	0.161	2698.5	2M70G7W
	16QAM			23.3	21.66	0.147	2696.8	2M70D7W
	64QAM			22.3	20.69	0.117	2693.4	2M69D7W
5.0	QPSK	1852.5	1912.5	23.7	22.09	0.162	4485.8	4M49G7W
	16QAM			23.4	21.79	0.151	4459	4M46D7W
	64QAM			22.3	20.74	0.119	4495.3	4M50D7W
10.0	QPSK	1855.0	1910.0	23.7	22.06	0.161	8935.8	8M94G7W
	16QAM			23.3	21.69	0.147	8963.7	8M96D7W
	64QAM			22.4	20.85	0.122	8912	8M91D7W
15.0	QPSK	1857.5	1907.5	23.7	22.15	0.164	13454.7	13M5G7W
	16QAM			23.1	21.46	0.140	13423.1	13M4D7W
	64QAM			22.3	20.68	0.117	13417.1	13M4D7W
20.0	QPSK	1860.0	1905.0	23.7	22.06	0.161	17868.7	17M9G7W
	16QAM			23.3	21.66	0.146	17913.9	17M9D7W
	64QAM			22.1	20.52	0.113	17881.1	17M9D7W

**LTE BAND 26 (Part 90S)**

Part 90S								
ERP Limit (W)		100.00						
Antenna Gain (dBi)		-2.50						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	814.7	823.3	25.2	20.55	0.114	1084.4	1M08G7W
	16QAM			24.5	19.85	0.097	1090.4	1M09D7W
	64QAM			23.5	18.85	0.077	1086.4	1M09D7W
3.0	QPSK	815.5	822.5	25.2	20.55	0.114	2687.9	2M69G7W
	16QAM			24.3	19.65	0.092	2687	2M69D7W
	64QAM			23.6	18.95	0.079	2689.6	2M69D7W
5.0	QPSK	816.5	821.5	25.2	20.55	0.114	4500.6	4M50G7W
	16QAM			24.7	20.05	0.101	4525.7	4M53D7W
	64QAM			23.9	19.25	0.084	4480.7	4M48D7W
10.0	QPSK	819.0	819.0	25.2	20.55	0.114	8973.3	8M97G7W
	16QAM			24.3	19.65	0.092	8915.6	8M92D7W
	64QAM			23.7	19.05	0.080	8977.8	8M98D7W

**LTE BAND 30**

Part 27								
EIRP Limit (W)		0.25						
Antenna Gain (dBi)		-0.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2307.5	2312.5	24.0	23.20	0.209	4495.5	4M50G7W
	16QAM			23.5	22.70	0.186	4486.3	4M49D7W
	64QAM			22.6	21.80	0.151	4489.2	4M49D7W
10.0	QPSK	2310.0	2310.0	24.0	23.20	0.209	8929.9	8M93G7W
	16QAM			23.5	22.70	0.186	8956.1	8M96D7W
	64QAM			22.2	21.40	0.138	8961.6	8M96D7W

**LTE BAND 41**

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-0.40						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2498.5	2687.5	28.0	27.60	0.575	4499.9	4M50G7W
	16QAM			27.5	27.10	0.513	4490.3	4M49D7W
	64QAM			26.1	25.70	0.372	4493.7	4M49D7W
10.0	QPSK	2501.0	2685.0	28.0	27.60	0.575	8926.2	8M93G7W
	16QAM			27.7	27.30	0.537	8925.3	8M93D7W
	64QAM			27.1	26.70	0.468	8949.9	8M95D7W
15.0	QPSK	2503.5	2682.5	28.0	27.60	0.575	13432.7	13M4G7W
	16QAM			27.3	26.90	0.490	13408.8	13M4D7W
	64QAM			26.1	25.70	0.372	13394.2	13M4D7W
20.0	QPSK	2506.0	2680.0	28.0	27.60	0.575	17859.5	17M9G7W
	16QAM			27.4	27.00	0.501	17914.5	17M9D7W
	64QAM			26.6	26.20	0.417	17925.8	17M9D7W



**LTE BAND 48**

Part 96								
EIRP Limit (W)		0.20						
Antenna Gain (dBi)		-2.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	3552.5	3697.5	25.0	22.20	0.166	4478.9	4M48G7W
	16QAM			24.5	21.70	0.148	4489.4	4M49D7W
	64QAM			23.4	20.60	0.115	4483.6	4M48D7W
10.0	QPSK	3555.0	3695.0	25.0	22.20	0.166	8987.3	8M99G7W
	16QAM			24.3	21.50	0.141	8958.2	8M96D7W
	64QAM			23.3	20.50	0.112	8934.1	8M93D7W
15.0	QPSK	3557.5	3692.5	25.0	22.20	0.166	13425	13M4G7W
	16QAM			24.4	21.60	0.145	13443	13M4D7W
	64QAM			23.2	20.40	0.110	13447	13M4D7W
20.0	QPSK	3560.0	3690.0	25.0	22.20	0.166	17948	17M9G7W
	16QAM			24.5	21.70	0.148	17946	17M9D7W
	64QAM			23.4	20.60	0.115	17930	17M9D7W

**LTE BAND 66**

Part 27 / RSS 139								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		-3.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	1710.7	1779.3	25.2	21.90	0.155	1090.7	1M09G7W
	16QAM			24.7	21.38	0.137	1091.3	1M09D7W
	64QAM			23.7	20.40	0.110	1087.5	1M09D7W
3.0	QPSK	1711.5	1778.5	25.2	21.90	0.155	2688	2M69G7W
	16QAM			24.7	21.40	0.138	2692.6	2M69D7W
	64QAM			23.6	20.31	0.107	2695.4	2M70D7W
5.0	QPSK	1712.5	1777.5	25.2	21.85	0.153	4497.7	4M50G7W
	16QAM			24.7	21.36	0.137	4477.5	4M48D7W
	64QAM			23.8	20.48	0.112	4492.8	4M49D7W
10.0	QPSK	1715.0	1775.0	25.2	21.89	0.155	8957.8	8M96G7W
	16QAM			24.6	21.30	0.135	8941.4	8M94D7W
	64QAM			23.6	20.31	0.107	8946.1	8M95D7W
15.0	QPSK	1717.5	1772.5	25.2	21.90	0.155	13448.9	13M4G7W
	16QAM			24.6	21.32	0.136	13430.8	13M4D7W
	64QAM			23.7	20.36	0.109	13401.4	13M4D7W
20.0	QPSK	1720.0	1770.0	25.2	21.90	0.155	17932.9	17M9G7W
	16QAM			24.5	21.21	0.132	17918.1	17M9D7W
	64QAM			23.8	20.50	0.112	17904.7	17M9D7W

**LTE BAND 71**

Part 27 / RSS 130								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.80						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	665.5	695.5	25.2	18.25	0.067	4475.7	4M48G7W
	16QAM			24.8	17.85	0.061	4491.3	4M49D7W
	64QAM			23.9	16.95	0.050	4501.5	4M50D7W
10.0	QPSK	668.0	693.0	25.2	18.25	0.067	8922.8	8M92G7W
	16QAM			24.8	17.85	0.061	8944.7	8M94D7W
	64QAM			23.8	16.85	0.048	8953.7	8M95D7W
15.0	QPSK	670.5	690.5	25.2	18.25	0.067	13527.5	13M5G7W
	16QAM			24.8	17.85	0.061	13544.9	13M5D7W
	64QAM			23.9	16.95	0.050	13521.7	13M5D7W
20.0	QPSK	673.0	688.0	25.2	18.25	0.067	17976.2	18M0G7W
	16QAM			24.7	17.75	0.060	18026.7	18M0D7W
	64QAM			24.1	17.15	0.052	17976.8	18M0D7W

### 5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 19-1.05.18

### 5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	LAT 1 Antenna Gain (dBi)	UAT 1 Antenna Gain (dBi)	UAT 2 Antenna Gain (dBi)
LTE Band 2, 1850 – 1910 MHz	-1.60	1.90	
LTE Band 4, 1710 – 1755 MHz	-3.70	2.40	
LTE Band 5, 824 – 849 MHz	-1.80	-2.30	
LTE Band 7, 2500 – 2570 MHz	-0.40	2.20	
LTE Band 12, 699 – 716 MHz	-4.80	-4.00	
LTE Band 13, 777 – 787 MHz	-3.50	-4.50	
LTE Band 14, 788 – 798 MHz	-3.30	-4.50	
LTE Band 17, 704 – 716 MHz	-4.80	-4.00	
LTE Band 25, 1850 – 1915 MHz	-1.60	1.90	
LTE Band 26 (22H), 824 – 849 MHz	-1.80	-2.30	
LTE Band 26 (90S), 814 – 824 MHz	-2.50	-3.50	
LTE Band 30, 2305 – 2315 MHz	-0.80	1.10	
LTE Band 41, 2496 – 2690 MHz	-0.40	2.20	
LTE Band 48, 3550 – 3700 MHz	-2.80		-5.20
LTE Band 66, 1710 – 1780 MHz	-3.30	2.40	
LTE Band 71, 663 – 698 MHz	-4.80	-5.40	

## 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:

Band 2, Band 4, Band 5, Band 7, Band 12, Band 13, Band 14, Band 17, Band 25, Band 26, Band 30, Band 41, Band 48, Band 66 and Band 71.

LTE Band 4 (1710-1755MHz, 5/10/15/20MHz bandwidth) is covered by LTE Band 66 because it is a subset of LTE band 66 and they have same output power.

FCC rule Part 22.905 of LTE Band 26 (824-849MHz) is covered by LTE Band 5 of same rule since they have the same output power and supported bandwidths.

The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM and 64QAM modulations. It was found that QPSK and 16QAM results were worst case. All testing was performed using QPSK and 16QAM modulations to represent the worst case. Tests were performed on the conducted test at LAT 1 antenna as worst case since it has higher output powers.

The EUT was investigated in three orthogonal orientations X/Y/Z on both LAT 1 and UAT 1 antennas. For LAT 1 antenna, it was determined that X (Flatbed) orientation was worst-case orientation for cell , pcs and bands and Band 7, 30, and 41 without AC/DC adapter; Y (Landscape) orientation was worst-case orientation for Band 48.

For UAT 1 antenna, it was determined that Y (Landscape) orientation was worst-case orientation for cell , pcs and band 48;X(Flatbed) orientation was worst-case orientation for Band 7,30, and 41 without AC/DC adapter.

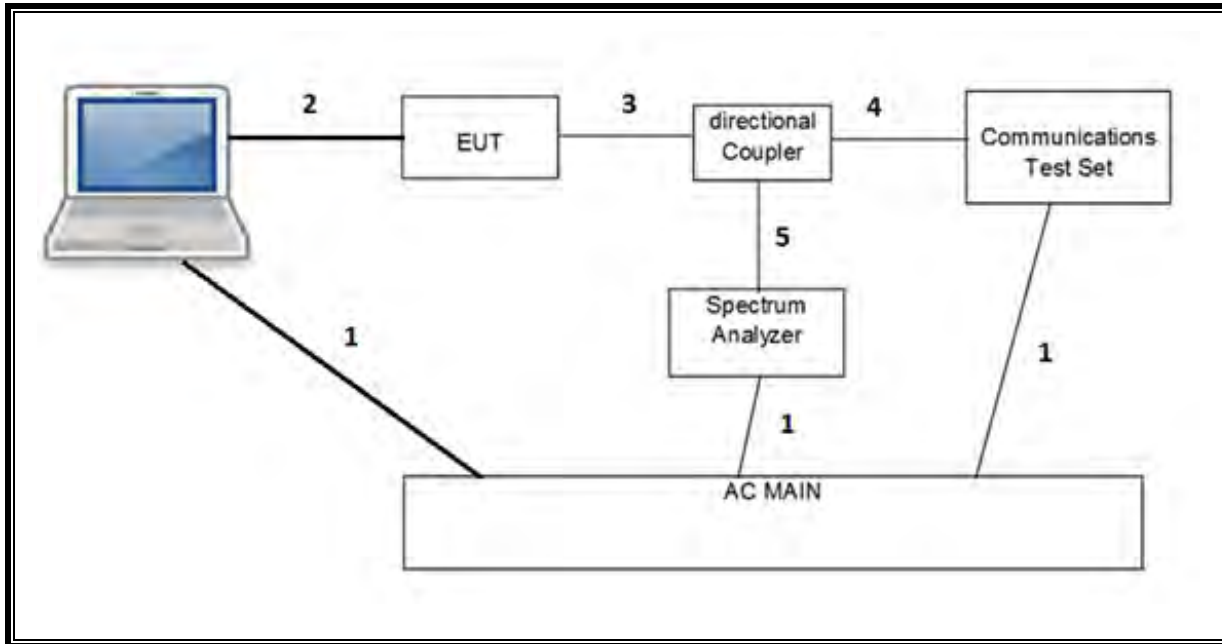
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

For simultaneous transmission of multiple channels in the 2.4GHz/5GH WLAN, UWB, and Cellular bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. No noticeable new emission was found.

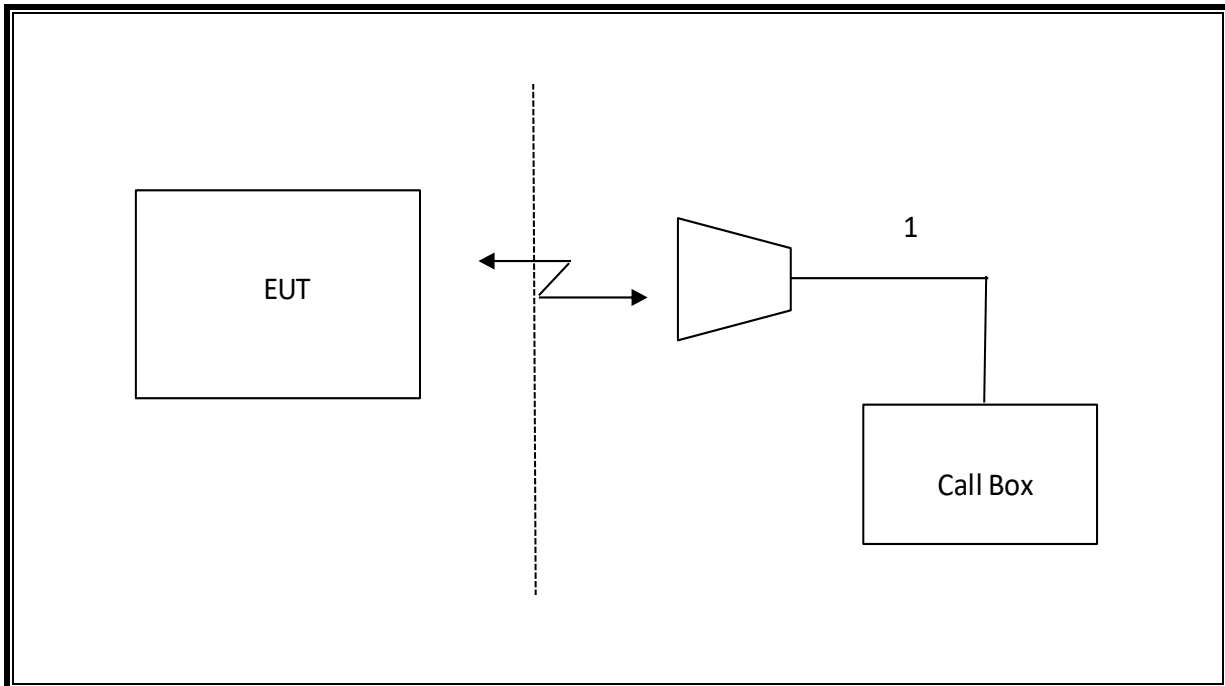
## 5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Laptop AC/DC adapter	Apple	85W MagSafe 2	C0651730MMM6P4AL			
Laptop	Apple	Macbook Pro	C02PM012G3QD			
Laptop	Apple	Macbook Pro	C02P52HGG085			
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Shielded	5.0	N/A

**CONDUCTED SETUP**



**RADIATED SETUP**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Amplifier, 18-26GHz	Agilent	8449B	T404	03/23/2020
Amplifier, 26-40GHz	Miteq	TTA2640	T1804	03/23/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1454	01/23/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T908	01/23/2020
*Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T339	01/29/2020
Amplifier, 1 to 18GHz	MITEQ	AFS42-00101800-25-S-42	T931	05/11/2020
*Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	PRE0180176	11/01/2019
*Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4446A	T123	01/28/2020
*Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4440A	T99	01/28/2020
Directional Coupler	KRYTAR	152610	T1536	07/09/2020
Directional Coupler	KRYTAR	152610	T1537	07/08/2020
Wireless Communications Test Set, 8960 Series 10	Agilent	E5515C	T211	05/10/2020
*Filter, HPF 3.0GHz	Micro-Tronics	HPM17543	T487	12/04/2019
Filter, HPF 1.2GHz	Micro-Tronics	WHKX1.2/15G-6ST	T1182	05/30/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T459	01/24/2020
*Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T1871	02/18/2020
*Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T921	02/18/2020
*Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T376	02/21/2020
*Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T958	02/20/2020
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T754	07/28/2020
*Power Meter, P-series single channel	Keysight	N1911A	T1268	01/31/2020
Power Sensor	Keysight	N1921A	T1228	03/01/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T346	05/14/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T344	05/07/2020
Antenna, Horn 18-26GHz	ARA	MWH-1826/B	T447	08/13/2020
Antenna, Horn 26-40GHz	ARA	MWH-2640/B	T446	08/13/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0181574	10/14/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	PRE0077974	05/13/2020
Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T1616	10/28/2020
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 2.8.1 Mar 11, 2020	
Power Measurement Software	UL	UL RF	Ver 2.7, 2019	
Radiated test software	UL	UL RF	Ver 9.5 June 15, 2019	

\*Testing is completed before equipment expiration date

## 7. RF OUTPUT POWER VERIFICATION

### CONDUCTED OUTPUT POWER MEASUREMENT PROCEDURE

All LTE bands conducted average power is 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 1, 2 and 3**

Modulation	Channel bandwidth / Transmission bandwidth ( $N_{RB}$ )						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
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

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	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 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	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 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.



**MODES TESTED**

- LTE Band 2
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 14
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 48
- LTE Band 66
- LTE Band 71

**RESULTS**

### 7.1. LTE BAND 2

Test Engineer ID:	39004	Test Date:	9/25/2019
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#### OUTPUT POWER FOR LTE BAND 2 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18607	18900	19193	18607	18900	19193
1.4	QPSK	1	0	23.7	23.6	23.7	17.8	17.9	17.9
		1	2	23.7	23.5	23.7	17.8	17.8	17.8
		1	5	23.7	23.5	23.7	17.8	17.9	17.9
		3	0	23.7	23.5	23.6	17.8	17.9	17.9
		3	1	23.7	23.5	23.6	17.8	17.8	17.9
		3	2	23.7	23.5	23.6	17.8	17.8	17.9
	16QAM	6	0	23.7	23.5	23.6	17.9	17.9	17.8
		1	0	23.0	22.9	22.9	18.0	17.9	17.9
		1	2	22.9	22.8	22.9	17.9	17.9	17.9
		1	5	23.0	22.8	22.9	17.9	17.9	17.8
		3	0	22.8	22.8	22.8	17.8	17.8	17.9
		3	1	22.8	22.8	22.8	17.8	17.8	18.0
	64QAM	3	2	22.8	22.7	22.8	17.8	17.7	18.0
		6	0	22.8	22.7	22.8	17.8	17.9	17.8
		1	0	21.9	21.9	21.9	18.0	17.9	17.9
		1	2	21.8	21.9	21.9	17.9	17.9	17.9
		1	5	22.0	21.9	21.9	18.0	17.6	18.0
		3	0	21.9	21.8	21.8	17.9	17.8	17.8
		3	1	21.2	21.8	21.8	17.9	17.9	17.8
		3	2	21.2	21.9	21.8	17.9	18.0	17.9
		6	0	21.2	21.7	21.8	17.9	17.8	17.8

#### OUTPUT POWER FOR LTE BAND 2 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18615	18900	19185	18615	18900	19185
3.0	QPSK	1	0	23.7	23.6	23.6	17.8	17.9	17.8
		1	7	23.7	23.6	23.6	17.8	18.0	17.9
		1	14	23.7	23.7	23.5	17.7	17.9	17.9
		8	0	23.4	23.5	23.3	17.9	17.9	18.0
		8	4	23.4	23.5	23.3	17.9	17.9	17.9
		8	7	23.4	23.5	23.3	17.9	17.9	17.9
	16QAM	15	0	23.4	23.1	23.2	17.9	17.9	17.9
		1	0	23.2	23.1	23.1	18.0	18.0	18.0
		1	7	23.2	23.1	23.2	18.0	17.8	17.9
		1	14	23.2	23.1	23.1	18.0	17.8	17.9
		8	0	23.2	23.1	23.2	17.8	17.7	17.8
		8	4	23.2	23.1	23.1	17.7	17.9	17.8
	64QAM	8	7	23.2	23.1	23.1	17.7	17.9	17.8
		15	0	23.2	22.9	23.1	17.7	17.9	17.8
		1	0	22.0	21.9	21.9	18.0	18.0	17.9
		1	7	22.0	21.9	22.0	18.0	18.0	18.0
		1	14	22.0	21.8	21.9	17.9	17.9	18.0
		8	0	21.9	21.8	21.8	17.8	17.7	17.9
		8	4	21.9	21.8	21.8	17.7	17.9	18.0
		8	7	21.9	21.8	21.8	17.7	17.9	18.0
		15	0	21.9	21.8	21.7	18.0	17.7	18.0

**OUTPUT POWER FOR LTE BAND 2 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18625	18900	19175	18625	18900	19175
				1852.5 MHz	1880.0 MHz	1907.5 MHz	1852.5 MHz	1880.0 MHz	1907.5 MHz
5.0	QPSK	1	0	23.5	<b>23.7</b>	23.6	17.8	17.9	17.8
		1	12	23.5	23.6	23.6	17.7	17.8	17.8
		1	24	23.6	23.6	23.6	17.7	17.8	17.9
		12	0	23.2	23.3	23.2	17.9	17.9	<b>17.9</b>
		12	6	23.2	23.3	23.2	17.9	17.8	17.7
		12	11	23.3	23.3	23.2	17.9	17.8	17.8
		25	0	23.2	23.2	23.2	17.8	17.9	17.7
	16QAM	1	0	23.1	<b>23.3</b>	23.2	<b>18.0</b>	18.0	17.9
		1	12	23.1	23.2	23.2	17.9	17.7	17.8
		1	24	23.2	23.3	23.2	17.9	17.7	17.9
		12	0	23.1	23.2	23.2	17.6	17.8	17.9
		12	6	23.1	23.2	23.2	17.6	17.7	17.6
		12	11	23.2	23.2	23.1	17.6	17.7	17.7
		25	0	23.1	23.2	23.2	17.9	17.7	17.6
	64QAM	1	0	<b>22.7</b>	22.7	22.6	17.9	17.9	17.9
		1	12	22.6	22.6	22.4	17.8	17.9	17.9
		1	24	22.7	22.7	22.5	17.8	17.8	18.0
		12	0	22.3	22.5	22.2	17.8	17.9	17.8
		12	6	22.3	22.5	22.2	17.8	17.7	17.8
		12	11	22.4	22.4	22.2	17.8	17.6	17.8
25		0	22.3	22.4	22.2	17.9	<b>18.0</b>	17.8	
25		0	22.3	22.4	22.2	17.9	<b>18.0</b>	17.8	

**OUTPUT POWER FOR LTE BAND 2 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18650	18900	19150	18650	18900	19150
				1855.0 MHz	1880.0 MHz	1905.0 MHz	1855.0 MHz	1880.0 MHz	1905.0 MHz
10.0	QPSK	1	0	23.5	<b>23.7</b>	23.6	17.9	18.0	17.6
		1	24	23.4	23.6	23.6	17.8	17.9	17.6
		1	49	23.6	23.6	23.5	17.8	17.9	17.8
		25	0	23.2	23.3	23.2	<b>18.0</b>	17.9	17.7
		25	12	23.2	23.3	23.2	17.9	17.8	17.5
		25	24	23.3	23.3	23.2	17.9	17.8	17.6
		50	0	23.2	23.2	23.2	17.8	17.8	17.6
	16QAM	1	0	23.2	<b>23.3</b>	23.3	<b>18.0</b>	18.0	17.7
		1	24	23.2	23.2	23.2	17.9	17.7	17.7
		1	49	23.3	23.2	23.2	17.9	17.7	17.9
		25	0	23.1	23.3	23.2	17.6	17.8	17.9
		25	12	23.2	23.2	23.1	17.5	17.7	17.8
		25	24	23.2	23.2	23.1	17.5	17.7	17.9
		50	0	23.2	23.2	23.2	17.9	17.7	17.9
	64QAM	1	0	22.3	22.4	<b>22.4</b>	17.8	17.9	17.7
		1	24	22.3	22.3	22.3	17.7	17.9	17.6
		1	49	22.4	22.3	22.3	17.7	17.8	17.7
		25	0	22.1	22.2	22.2	17.8	<b>18.0</b>	17.6
		25	12	22.2	22.1	22.1	17.8	17.8	17.8
		25	24	22.2	22.1	22.1	17.8	17.6	17.9
50		0	22.1	22.1	22.2	17.9	17.9	17.8	
50		0	22.1	22.1	22.2	17.9	17.9	17.8	

**OUTPUT POWER FOR LTE BAND 2 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18675	18900	19125	18675	18900	19125
				1857.5 MHz	1880.0 MHz	1902.5 MHz	1857.5 MHz	1880.0 MHz	1902.5 MHz
15.0	QPSK	1	0	23.4	<b>23.7</b>	23.6	17.9	18.0	17.8
		1	37	23.6	23.5	23.7	17.9	18.0	17.7
		1	74	23.6	23.5	23.5	17.9	17.9	17.8
		36	0	23.2	23.3	23.2	<b>18.0</b>	18.0	17.8
		36	16	23.3	23.3	23.2	18.0	18.0	17.7
		36	35	23.2	23.2	23.2	18.0	17.9	17.7
		75	0	23.3	23.2	23.2	17.9	17.9	17.7
	16QAM	1	0	23.1	<b>23.4</b>	23.2	18.0	17.9	18.0
		1	37	23.2	23.2	23.2	<b>18.0</b>	17.7	17.8
		1	74	23.3	23.1	23.2	18.0	17.6	18.0
		36	0	23.2	23.2	23.1	17.6	17.9	17.9
		36	16	23.2	23.2	23.2	17.6	17.8	17.9
		36	35	23.2	23.2	23.2	17.7	17.7	18.0
		75	0	23.2	23.2	23.2	17.9	17.8	18.0
	64QAM	1	0	22.4	22.4	22.2	17.9	17.9	17.9
		1	37	<b>22.5</b>	22.3	22.3	17.8	<b>18.0</b>	17.7
		1	74	22.4	22.3	22.3	18.0	17.8	17.7
		36	0	22.1	22.2	22.1	17.9	17.9	17.8
		36	16	22.2	22.2	22.2	17.9	17.9	18.0
		36	35	22.2	22.1	22.1	17.9	17.7	18.0
		75	0	22.2	22.1	22.2	17.9	17.9	18.0

**OUTPUT POWER FOR LTE BAND 2 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				18700	18900	19100	18700	18900	19100
				1860.0 MHz	1880.0 MHz	1900.0 MHz	1860.0 MHz	1880.0 MHz	1900.0 MHz
20.0	QPSK	1	0	23.4	<b>23.7</b>	23.3	17.8	17.9	17.9
		1	49	23.4	23.6	23.4	17.8	17.9	17.6
		1	99	23.6	23.5	23.4	17.9	17.9	17.7
		50	0	23.1	23.3	23.1	17.9	17.9	17.9
		50	24	23.1	23.1	23.1	17.9	17.9	17.6
		50	49	23.2	23.1	23.1	<b>18.0</b>	17.9	17.5
		100	0	23.1	23.1	23.1	17.9	17.9	17.6
	16QAM	1	0	23.0	23.2	22.9	17.8	<b>18.0</b>	18.0
		1	49	23.1	23.1	23.1	17.9	17.8	17.8
		1	99	23.2	23.0	23.1	18.0	17.8	17.9
		50	0	23.0	<b>23.3</b>	23.0	17.6	17.9	17.8
		50	24	23.1	23.1	23.1	17.5	17.7	17.8
		50	49	23.2	23.1	23.1	17.7	17.7	17.8
		100	0	23.1	23.1	23.1	17.8	17.7	17.9
	64QAM	1	0	22.0	<b>22.4</b>	22.2	<b>18.0</b>	18.0	17.8
		1	49	22.0	22.2	22.3	17.9	18.0	17.5
		1	99	22.1	22.1	22.2	18.0	18.0	17.6
		50	0	22.0	22.1	21.9	17.8	17.7	17.8
		50	24	22.0	21.9	22.0	17.8	17.8	17.9
		50	49	22.1	21.9	21.9	17.8	17.6	17.8
		100	0	22.0	21.9	22.0	17.9	17.8	17.9

## 7.2. LTE BAND 5

Test Engineer ID:	39004	Test Date:	9/25/2019
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### OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20407	20525	20643	20407	20525	20643
1.4	QPSK	1	0	25.2	25.1	25.2	23.4	<b>23.5</b>	23.3
		1	2	25.2	25.1	25.1	23.3	23.5	23.3
		1	5	<b>25.2</b>	25.1	25.1	23.3	23.5	23.3
		3	0	25.0	25.0	24.9	23.4	23.5	23.2
		3	1	25.0	25.0	24.9	23.3	23.5	23.2
		3	2	25.0	25.0	24.9	23.3	23.5	23.2
	16QAM	6	0	25.0	24.9	24.8	22.3	22.4	22.2
		1	0	<b>24.4</b>	24.3	24.2	22.6	<b>22.8</b>	22.6
		1	2	24.3	24.3	24.2	22.5	22.7	22.5
		1	5	24.4	24.3	24.2	22.5	22.7	22.6
		3	0	24.3	24.3	24.2	22.5	22.5	22.4
		3	1	24.3	24.3	24.2	22.4	22.6	22.4
	64QAM	3	2	24.3	24.3	24.2	22.4	22.6	22.3
		6	0	24.3	24.3	24.2	21.4	21.5	21.3
		1	0	23.6	23.4	23.2	21.9	21.8	21.5
		1	2	<b>23.6</b>	23.2	23.2	<b>21.9</b>	21.7	21.5
		1	5	23.6	23.3	23.1	21.7	21.6	21.5
		3	0	23.4	23.3	23.1	21.7	21.6	21.4
		3	1	23.4	23.2	23.1	21.6	21.6	21.4
		3	2	23.4	23.3	23.1	21.6	21.6	21.4
		6	0	23.3	23.2	23.1	20.5	20.6	20.4

### OUTPUT POWER FOR LTE BAND 5 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20415	20525	20635	20415	20525	20635
3.0	QPSK	1	0	25.2	25.2	25.1	23.4	23.5	23.3
		1	7	<b>25.2</b>	25.2	25.2	23.4	<b>23.5</b>	23.3
		1	14	25.2	25.1	25.1	23.3	23.4	23.3
		8	0	24.9	24.9	24.9	22.4	22.5	22.3
		8	4	25.0	24.9	24.9	22.4	22.5	22.3
		8	7	24.9	24.9	24.9	22.4	22.5	22.3
	16QAM	15	0	25.0	24.9	24.9	22.4	22.5	22.3
		1	0	24.4	24.5	24.4	22.7	22.8	22.6
		1	7	24.4	24.5	24.4	22.7	<b>22.8</b>	22.6
		1	14	24.5	24.4	24.3	22.6	22.7	22.6
		8	0	24.4	<b>24.5</b>	24.4	21.5	21.5	21.3
		8	4	24.4	24.5	24.4	21.4	21.6	21.4
	64QAM	8	7	24.4	24.5	24.4	21.4	21.6	21.4
		15	0	24.5	24.5	24.4	21.4	21.6	21.4
		1	0	23.5	23.6	23.8	21.6	<b>21.8</b>	21.7
		1	7	23.6	23.5	<b>23.9</b>	21.6	21.7	21.6
		1	14	23.6	23.4	23.8	21.6	21.6	21.6
		8	0	23.5	23.5	23.7	20.5	20.6	20.5
		8	4	23.6	23.4	23.7	20.5	20.6	20.5
		8	7	23.6	23.4	23.7	20.5	20.6	20.5
		15	0	23.6	23.4	23.7	20.5	20.6	20.4

**OUTPUT POWER FOR LTE BAND 5 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20425	20525	20625	20425	20525	20625
				826.5 MHz	836.5 MHz	846.5 MHz	826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	25.2	25.1	25.1	23.3	23.4	23.4
		1	12	25.2	25.0	24.9	23.3	23.4	23.2
		1	24	25.2	25.0	24.9	23.3	23.5	23.2
		12	0	24.9	24.8	24.8	22.3	22.4	22.2
		12	6	24.9	24.7	24.7	22.3	22.4	22.2
		12	11	24.8	24.7	24.7	22.2	22.4	22.2
	16QAM	25	0	24.8	24.8	24.6	22.3	22.4	22.2
		1	0	24.4	24.4	24.4	22.7	22.8	22.7
		1	12	24.4	24.3	24.3	22.7	22.7	22.6
		1	24	24.5	24.3	24.3	22.7	22.8	22.5
		12	0	24.5	24.4	24.4	21.3	21.4	21.3
		12	6	24.5	24.3	24.2	21.3	21.4	21.2
	64QAM	12	11	24.5	24.3	24.3	21.3	21.4	21.2
		25	0	24.5	24.4	24.2	21.3	21.4	21.2
		1	0	23.4	23.5	23.5	21.7	21.8	21.7
		1	12	23.6	23.3	23.4	21.7	21.7	21.5
		1	24	23.6	23.3	23.4	21.8	21.8	21.6
		12	0	23.3	23.3	23.3	20.4	20.6	20.4
	64QAM	12	6	23.3	23.2	23.2	20.4	20.6	20.3
		12	11	23.3	23.2	23.2	20.4	20.5	20.3
		25	0	23.3	23.2	23.2	20.4	20.5	20.3

**OUTPUT POWER FOR LTE BAND 5 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20450	20525	20600	20450	20525	20600
				829.0 MHz	836.5 MHz	844.0 MHz	829.0 MHz	836.5 MHz	844.0 MHz
10.0	QPSK	1	0	25.1	25.2	25.0	23.4	23.4	23.5
		1	24	25.1	25.0	25.0	23.3	23.4	23.3
		1	49	25.1	24.9	25.1	23.4	23.5	23.2
		25	0	24.9	24.8	24.7	22.2	22.4	22.3
		25	12	24.9	24.7	24.7	22.2	22.3	22.3
		25	24	25.0	24.7	24.6	22.3	22.4	22.1
	16QAM	50	0	24.9	24.7	24.7	22.3	22.4	22.3
		1	0	24.5	24.5	24.4	22.6	22.6	22.8
		1	24	24.5	24.3	24.3	22.6	22.7	22.6
		1	49	24.5	24.2	24.4	22.7	22.7	22.4
		25	0	24.5	24.4	24.3	21.2	21.4	21.4
		25	12	24.5	24.3	24.3	21.2	21.4	21.3
	64QAM	25	24	24.6	24.3	24.2	21.3	21.4	21.2
		50	0	24.5	24.3	24.3	21.3	21.4	21.3
		1	0	23.3	23.3	23.4	21.6	21.7	21.7
		1	24	23.6	23.2	23.4	21.5	21.6	21.6
		1	49	23.5	23.2	23.4	21.7	21.7	21.5
		25	0	23.4	23.2	23.2	20.3	20.6	20.4
	64QAM	25	12	23.3	23.1	23.2	20.3	20.5	20.4
		25	24	23.4	23.0	23.1	20.4	20.6	20.3
		50	0	23.3	23.1	23.2	20.4	20.5	20.4

### 7.3. LTE BAND 7

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 7 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20775	21100	21425	20775	21100	21425
				2502.5 MHz	2535.0 MHz	2567.5 MHz	2502.5 MHz	2535.0 MHz	2567.5 MHz
5.0	QPSK	1	0	25.1	<b>25.2</b>	25.1	18.7	18.6	18.6
		1	12	25.1	25.0	25.0	18.5	18.5	18.6
		1	24	25.1	25.0	25.0	18.7	18.4	18.7
		12	0	24.1	24.1	23.8	18.6	18.6	18.7
		12	6	24.1	24.1	23.8	18.5	18.5	18.7
		12	11	24.0	24.0	23.8	18.6	18.5	18.7
	16QAM	25	0	24.1	24.0	23.7	18.6	18.5	<b>18.7</b>
		1	0	24.4	24.4	24.5	18.6	18.6	18.6
		1	12	24.4	24.3	24.5	18.5	18.6	18.7
		1	24	24.3	24.3	<b>24.6</b>	18.5	18.6	18.7
		12	0	23.1	23.1	23.2	18.5	18.7	<b>18.7</b>
		12	6	23.1	23.1	23.2	18.6	18.6	18.5
	64QAM	12	11	23.1	23.1	23.2	18.7	18.6	18.5
		25	0	23.1	23.0	23.2	18.7	18.5	18.5
		1	0	23.3	23.4	23.5	18.7	18.7	18.7
		1	12	23.2	23.3	23.6	18.5	18.7	<b>18.7</b>
		1	24	23.3	23.3	<b>23.6</b>	18.6	18.6	18.6
		12	0	23.1	23.2	23.2	18.6	18.7	18.5
	64QAM	12	6	23.0	23.2	23.3	18.7	18.7	18.7
		12	11	23.0	23.2	23.2	18.7	18.6	18.6
		25	0	23.1	23.2	23.3	18.7	18.7	18.7

#### OUTPUT POWER FOR LTE BAND 7 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20800	21100	21400	20800	21100	21400
				2505.0 MHz	2535.0 MHz	2565.0 MHz	2505.0 MHz	2535.0 MHz	2565.0 MHz
10.0	QPSK	1	0	25.2	25.2	24.9	18.6	<b>18.7</b>	18.7
		1	24	25.1	25.1	25.0	18.5	18.7	18.7
		1	49	<b>25.2</b>	25.0	25.1	18.6	18.7	18.7
		25	0	24.1	24.1	24.0	18.7	18.7	18.7
		25	12	24.1	24.1	24.0	18.7	18.6	18.6
		25	24	24.1	24.0	24.1	18.7	18.5	18.7
	16QAM	50	0	24.1	24.0	24.0	18.6	18.6	18.6
		1	0	24.5	24.3	24.2	18.6	18.7	18.6
		1	24	24.4	24.3	24.4	18.7	18.7	18.6
		1	49	<b>24.6</b>	24.2	24.4	<b>18.7</b>	18.5	18.7
		25	0	23.1	23.1	23.0	18.5	18.7	18.7
		25	12	23.1	23.1	23.0	18.7	18.6	18.6
	64QAM	25	24	23.2	23.0	23.2	18.7	18.5	18.5
		50	0	23.2	23.1	23.0	18.7	18.5	18.7
		1	0	23.4	23.5	23.4	18.7	18.5	18.6
		1	24	23.3	<b>23.5</b>	23.4	18.7	18.6	18.6
		1	49	23.4	23.5	23.5	18.7	18.5	18.6
		25	0	23.2	23.4	23.2	18.7	<b>18.7</b>	18.6
	64QAM	25	12	23.2	23.4	23.3	18.7	18.6	18.6
		25	24	23.2	23.3	23.3	18.7	18.5	18.6
		50	0	23.2	23.3	23.2	18.7	18.7	18.6

**OUTPUT POWER FOR LTE BAND 7 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20825	21100	21375	20825	21100	21375
				2507.5 MHz	2535.0 MHz	2562.5 MHz	2507.5 MHz	2535.0 MHz	2562.5 MHz
15.0	QPSK	1	0	25.0	25.2	25.0	18.7	18.6	18.7
		1	37	25.1	25.2	25.0	18.7	18.4	18.7
		1	74	25.2	25.1	25.2	18.6	18.3	18.7
		36	0	24.1	24.2	24.1	18.6	18.7	18.6
		36	16	24.1	24.2	24.1	18.6	18.6	18.6
		36	35	24.1	24.1	24.1	18.5	18.5	18.6
	16QAM	75	0	24.1	24.2	24.1	18.6	18.6	18.6
		1	0	24.3	24.5	24.3	18.6	18.6	18.6
		1	37	24.3	24.4	24.4	18.7	18.6	18.6
		1	74	24.3	24.4	24.5	18.6	18.7	18.6
		36	0	23.0	23.3	23.0	18.5	18.6	18.7
		36	16	23.1	23.3	23.1	18.7	18.6	18.6
	64QAM	36	35	23.1	23.2	23.1	18.7	18.5	18.7
		75	0	23.1	23.2	23.1	18.7	18.5	18.7
		1	0	23.5	23.5	23.3	18.7	18.6	18.6
		1	37	23.5	23.5	23.4	18.6	18.6	18.5
		1	74	23.4	23.4	23.5	18.5	18.6	18.6
		36	0	23.2	23.4	23.2	18.6	18.7	18.6
		36	16	23.2	23.4	23.3	18.7	18.6	18.6
		36	35	23.2	23.3	23.3	18.6	18.5	18.6
		75	0	23.2	23.3	23.3	18.6	18.5	18.6

**OUTPUT POWER FOR LTE BAND 7 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				20850	21100	21350	20850	21100	21350
				2510.0 MHz	2535.0 MHz	2560.0 MHz	2510.0 MHz	2535.0 MHz	2560.0 MHz
20.0	QPSK	1	0	24.8	25.1	25.0	18.7	18.6	18.6
		1	49	24.9	25.1	24.9	18.6	18.5	18.6
		1	99	25.1	25.0	25.2	18.6	18.6	18.7
		50	0	23.9	24.1	23.9	18.6	18.5	18.7
		50	24	23.9	24.0	23.9	18.6	18.7	18.7
		50	49	24.0	23.9	24.0	18.5	18.6	18.7
	16QAM	100	0	23.9	24.0	23.9	18.6	18.6	18.7
		1	0	24.1	24.5	24.3	18.6	18.7	18.5
		1	49	24.2	24.4	24.2	18.6	18.6	18.5
		1	99	24.5	24.3	24.5	18.6	18.6	18.6
		50	0	22.9	23.1	22.9	18.6	18.5	18.6
		50	24	22.9	23.0	22.9	18.6	18.7	18.7
	64QAM	50	49	22.9	22.9	23.0	18.6	18.6	18.7
		100	0	22.9	23.3	22.9	18.7	18.6	18.7
		1	0	23.3	23.7	23.5	18.7	18.6	18.7
		1	49	23.2	23.6	23.4	18.6	18.6	18.5
		1	99	23.5	23.4	23.6	18.6	18.5	18.5
		50	0	23.2	23.3	23.2	18.6	18.7	18.5
		50	24	23.2	23.2	23.2	18.6	18.6	18.6
		50	49	23.2	23.1	23.2	18.5	18.5	18.6
		100	0	23.2	23.2	23.2	18.5	18.6	18.6



### 7.4. LTE BAND 12

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23017	23095	23173	23017	23095	23173
				699.7 MHz	707.5 MHz	715.3 MHz	699.7 MHz	707.5 MHz	715.3 MHz
1.4	QPSK	1	0	25.1	25.1	25.1	23.5	<b>23.5</b>	23.4
		1	2	25.1	25.1	25.0	23.4	23.4	23.3
		1	5	<b>25.2</b>	25.1	25.1	23.4	23.5	23.4
		3	0	25.0	24.9	24.9	23.4	23.4	23.3
		3	1	25.0	24.8	24.9	23.4	23.4	23.3
		3	2	25.0	24.8	24.9	23.4	23.4	23.3
		6	0	25.0	24.8	24.9	22.4	22.5	22.3
	16QAM	1	0	24.2	24.3	24.4	<b>22.8</b>	22.8	22.5
		1	2	24.2	24.2	24.4	22.8	22.7	22.5
		1	5	24.1	24.2	<b>24.4</b>	22.8	22.8	22.6
		3	0	24.1	24.2	24.3	22.5	22.6	22.4
		3	1	24.1	24.2	24.3	22.5	22.6	22.4
		3	2	24.1	24.2	24.3	22.5	22.6	22.4
		6	0	24.1	24.2	24.3	21.5	21.6	21.5
	64QAM	1	0	23.3	23.3	23.4	21.9	21.8	21.7
		1	2	23.2	23.3	23.4	21.9	21.7	21.6
		1	5	23.4	23.3	<b>23.4</b>	<b>21.9</b>	21.8	21.7
		3	0	23.2	23.2	23.3	21.7	21.7	21.6
		3	1	22.6	23.2	23.3	21.7	21.6	21.5
		3	2	22.6	23.2	23.3	21.7	21.6	21.6
		6	0	22.6	23.1	23.3	20.6	20.6	20.5

#### OUTPUT POWER FOR LTE BAND 12 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23025	23095	23165	23025	23095	23165
				700.5 MHz	707.5 MHz	714.5 MHz	700.5 MHz	707.5 MHz	714.5 MHz
3.0	QPSK	1	0	25.1	25.1	25.1	<b>23.5</b>	23.4	23.4
		1	7	25.2	25.2	<b>25.2</b>	23.5	23.4	23.4
		1	14	25.0	25.2	25.2	23.4	23.3	23.3
		8	0	24.8	24.8	25.0	22.5	22.5	22.4
		8	4	24.9	24.9	25.0	22.5	22.5	22.4
		8	7	24.8	24.8	25.0	22.5	22.5	22.4
		15	0	24.8	24.8	25.0	22.5	22.5	22.4
	16QAM	1	0	24.4	24.5	<b>24.6</b>	<b>22.8</b>	22.8	22.8
		1	7	24.4	24.5	24.5	22.8	22.8	22.7
		1	14	24.3	24.6	24.5	22.6	22.8	22.6
		8	0	24.5	24.5	24.6	21.6	21.6	21.5
		8	4	24.5	24.5	24.5	21.6	21.5	21.5
		8	7	24.5	24.5	24.5	21.5	21.6	21.5
		15	0	24.5	24.5	24.5	21.5	21.5	21.5
	64QAM	1	0	23.4	23.5	23.5	21.7	<b>21.8</b>	21.7
		1	7	23.4	<b>23.6</b>	23.5	21.7	21.7	21.6
		1	14	23.3	23.5	23.4	21.5	21.7	21.7
		8	0	23.4	23.4	23.4	20.6	20.7	20.6
		8	4	23.4	23.4	23.3	20.6	20.7	20.6
		8	7	23.4	23.4	23.3	20.6	20.7	20.6
		15	0	23.3	23.4	23.3	20.6	20.6	20.6

**OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23035	23095	23155	23035	23095	23155
				701.5 MHz	707.5 MHz	713.5 MHz	701.5 MHz	707.5 MHz	713.5 MHz
5.0	QPSK	1	0	25.2	25.0	25.0	23.5	23.5	23.4
		1	12	24.9	25.0	25.1	23.3	23.4	23.3
		1	24	25.0	25.0	25.0	23.3	23.4	23.2
		12	0	24.7	24.6	24.7	22.5	22.4	22.4
		12	6	24.6	24.6	24.7	22.4	22.4	22.3
		12	11	24.6	24.7	24.7	22.4	22.4	22.3
	16QAM	25	0	24.6	24.6	24.7	22.4	22.4	22.3
		1	0	24.7	24.6	24.7	22.8	22.8	22.8
		1	12	24.5	24.6	24.7	22.6	22.7	22.7
		1	24	24.6	24.6	24.7	22.6	22.8	22.7
		12	0	24.6	24.6	24.6	21.6	21.5	21.4
		12	6	24.5	24.6	24.6	21.4	21.5	21.4
	64QAM	12	11	24.5	24.6	24.6	21.4	21.5	21.4
		25	0	24.5	24.6	24.7	21.4	21.5	21.4
		1	0	23.5	23.4	23.5	21.9	21.9	21.8
		1	12	23.3	23.4	23.6	21.8	21.7	21.6
		1	24	23.4	23.4	23.6	21.7	21.7	21.7
		12	0	23.3	23.1	23.2	20.7	20.7	20.5
		12	6	23.1	23.1	23.2	20.4	20.6	20.4
		12	11	23.1	23.2	23.2	20.4	20.6	20.5
		25	0	23.1	23.2	23.3	20.5	20.6	20.5

**OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23060	23095	23130	23060	23095	23130
				704.0 MHz	707.5 MHz	711.0 MHz	704.0 MHz	707.5 MHz	711.0 MHz
10.0	QPSK	1	0	25.1	25.0	25.0	23.4	23.3	23.5
		1	24	25.0	25.1	25.0	23.4	23.3	23.2
		1	49	25.1	25.2	25.1	23.3	23.4	23.2
		25	0	24.6	24.7	24.8	22.6	22.6	22.6
		25	12	24.7	24.7	24.8	22.6	22.6	22.5
		25	24	24.7	24.7	24.9	22.4	22.5	22.5
		50	0	24.7	24.7	24.8	22.5	22.6	22.5
	16QAM	1	0	24.4	24.4	24.4	22.9	22.9	23.0
		1	24	24.3	24.4	24.5	22.8	22.9	22.8
		1	49	24.4	24.5	24.6	22.8	23.0	22.8
		25	0	24.2	24.3	24.4	21.5	21.6	21.6
		25	12	24.3	24.3	24.4	21.6	21.7	21.5
		25	24	24.3	24.4	24.5	21.5	21.6	21.5
		50	0	24.4	24.4	24.5	21.5	21.7	21.5
	64QAM	1	0	23.5	23.8	23.7	21.9	21.7	21.7
		1	24	23.3	23.7	23.8	21.7	21.7	21.7
		1	49	23.5	23.9	23.9	21.7	21.8	21.5
		25	0	23.2	23.5	23.6	20.6	20.6	20.4
		25	12	23.2	23.5	23.6	20.5	20.6	20.5
		25	24	23.2	23.6	23.7	20.5	20.5	20.3
		50	0	23.2	23.5	23.6	20.5	20.6	20.4

### 7.5. LTE BAND 13

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23205 779.5 MHz	23230 782.0 MHz	23255 784.5 MHz	23205 779.5 MHz	23230 782.0 MHz	23255 784.5 MHz
5.0	QPSK	1	0	25.1	25.1	25.1	23.3	<b>23.5</b>	23.5
		1	12	25.0	25.1	25.0	23.5	23.3	23.4
		1	24	<b>25.2</b>	25.1	25.0	23.3	23.3	23.4
		12	0	24.7	24.7	24.6	22.8	22.6	22.7
		12	6	24.7	24.7	24.6	22.7	22.6	22.8
		12	11	24.7	24.7	24.6	22.7	22.6	22.7
	16QAM	25	0	24.6	24.7	24.6	22.8	22.7	22.8
		1	0	24.5	24.3	24.5	22.8	<b>23.1</b>	23.0
		1	12	24.4	24.3	24.3	23.0	22.9	23.1
		1	24	<b>24.5</b>	24.3	24.3	22.8	22.9	23.1
		12	0	24.3	24.2	24.2	21.8	21.8	21.7
		12	6	24.3	24.4	24.3	21.8	21.7	21.9
	64QAM	12	11	24.3	24.3	24.3	21.7	21.7	21.8
		25	0	24.3	24.3	24.3	21.8	21.7	21.8
		1	0	23.6	23.6	<b>23.8</b>	21.0	<b>21.3</b>	21.1
		1	12	23.5	23.6	23.6	21.2	21.0	21.1
		1	24	23.7	23.6	23.6	21.1	21.1	21.2
		12	0	23.2	23.3	23.3	19.9	19.9	20.0
		12	6	23.3	23.3	23.3	20.0	19.8	20.0
		12	11	23.2	23.3	23.3	19.9	19.8	20.0
		25	0	23.3	23.3	23.3	20.0	19.9	20.0

#### OUTPUT POWER FOR LTE BAND 13 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				N/A	23230 782.0 MHz	N/A	N/A	23230 782.0 MHz	N/A
10.0	QPSK	1	0		25.1			<b>23.5</b>	
		1	24		25.1			23.4	
		1	49		<b>25.2</b>			23.3	
		25	0		24.7			22.8	
		25	12		24.8			22.7	
		25	24		24.8			22.7	
	16QAM	50	0		24.7			22.8	
		1	0		<b>24.4</b>			<b>22.9</b>	
		1	24		24.4			22.9	
		1	49		24.4			22.9	
		25	0		24.3			21.8	
		25	12		24.4			21.7	
	64QAM	25	24		24.3			21.8	
		50	0		24.3			21.8	
		1	0		23.6			20.9	
		1	24		<b>23.8</b>			21.0	
		1	49		23.5			<b>21.0</b>	
		25	0		23.3			20.0	
		25	12		23.4		19.9		
		25	24		23.4		20.0		
		50	0		23.3		20.0		

### 7.6. LTE BAND 14

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 14 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23305	23330	23355	23305	23330	23355
				790.5 MHz	793.0 MHz	795.5 MHz	790.5 MHz	793.0 MHz	795.5 MHz
5.0	QPSK	1	0	25.2	25.1	25.2	<b>23.5</b>	23.4	23.5
		1	12	25.0	25.1	25.1	23.4	23.4	23.3
		1	24	25.1	<b>25.2</b>	25.2	23.4	23.4	23.3
		12	0	24.9	24.7	24.8	22.6	22.7	22.6
		12	6	24.8	24.8	24.9	22.6	22.6	22.6
		12	11	24.9	24.9	24.8	22.6	22.7	22.6
		25	0	24.8	24.8	24.9	22.7	22.6	22.6
	16QAM	1	0	24.5	24.3	24.5	23.0	23.0	<b>23.1</b>
		1	12	24.3	24.4	24.4	22.9	23.1	23.0
		1	24	24.4	<b>24.5</b>	24.5	23.0	23.0	22.9
		12	0	24.4	24.4	24.4	21.7	21.7	21.7
		12	6	24.3	24.4	24.4	21.7	21.7	21.6
		12	11	24.4	24.5	24.4	21.7	21.8	21.7
		25	0	24.4	24.5	24.5	21.7	21.7	21.6
	64QAM	1	0	23.5	23.4	23.6	21.1	<b>21.1</b>	21.1
		1	12	23.3	23.5	23.6	21.0	21.1	20.9
		1	24	23.5	23.5	<b>23.6</b>	21.1	21.1	20.9
		12	0	23.3	23.2	23.2	19.8	19.8	19.9
		12	6	23.2	23.2	23.2	19.8	19.8	19.8
		12	11	23.2	23.3	23.3	19.9	19.9	19.8
		25	0	23.2	23.2	23.3	19.8	19.8	19.7

**OUTPUT POWER FOR LTE BAND 14 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				N/A	23330	N/A	N/A	23330	N/A
				N/A	793.0 MHz	N/A	N/A	793.0 MHz	N/A
10.0	QPSK	1	0		25.1			<b>23.5</b>	
		1	24		25.0			23.3	
		1	49		<b>25.2</b>			23.3	
		25	0		24.7			22.7	
		25	12		24.8			22.6	
		25	24		24.9			22.5	
		50	0		24.9			22.6	
	16QAM	1	0		24.4			<b>22.9</b>	
		1	24		24.4			22.9	
		1	49		<b>24.5</b>			22.8	
		25	0		24.3			21.6	
		25	12		24.3			21.6	
		25	24		24.4			21.6	
		50	0		24.4			21.6	
	64QAM	1	0		23.3			20.9	
		1	24		23.3			<b>20.9</b>	
		1	49		<b>23.3</b>			20.9	
		25	0		23.0			19.9	
		25	12		23.0			19.8	
		25	24		23.1			19.7	
		50	0		23.2			19.8	

### 7.7. LTE BAND 17

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 17 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23755 706.5 MHz	23790 710.0 MHz	23825 713.5 MHz	23755 706.5 MHz	23790 710.0 MHz	23825 713.5 MHz
5.0	QPSK	1	0	25.0	24.9	25.0	<b>23.5</b>	23.4	23.4
		1	12	25.0	25.0	<b>25.2</b>	23.4	23.4	23.2
		1	24	25.1	25.2	25.1	23.4	23.3	23.2
		12	0	24.7	24.6	24.7	22.7	22.6	22.5
		12	6	24.7	24.6	24.7	22.7	22.6	22.5
		12	11	24.8	24.6	24.7	22.7	22.7	22.5
		25	0	24.7	24.6	24.8	22.7	22.7	22.6
	16QAM	1	0	24.7	24.5	24.6	23.0	<b>23.1</b>	23.0
		1	12	24.7	24.5	24.7	22.9	23.1	22.9
		1	24	24.7	24.7	24.6	22.9	23.1	22.8
		12	0	24.6	24.5	24.7	21.8	21.7	21.6
		12	6	24.6	24.5	24.7	21.8	21.6	21.6
		12	11	24.7	24.5	24.6	21.8	21.7	21.6
		25	0	24.6	24.5	<b>24.7</b>	21.8	21.8	21.6
	64QAM	1	0	23.7	23.7	23.7	21.2	21.2	21.1
		1	12	23.7	23.7	23.8	21.2	<b>21.3</b>	20.9
		1	24	23.9	<b>23.9</b>	23.8	21.1	21.2	20.9
		12	0	23.5	23.4	23.5	19.9	19.8	19.8
		12	6	23.5	23.4	23.5	19.9	19.8	19.8
		12	11	23.5	23.4	23.5	19.9	19.9	19.8
		25	0	23.5	23.4	23.5	19.9	19.9	19.8

**OUTPUT POWER FOR LTE BAND 17 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				23780	23790	23800	23780	23790	23800
				709.0 MHz	710.0 MHz	711.0 MHz	709.0 MHz	710.0 MHz	711.0 MHz
10.0	QPSK	1	0	24.8	25.0	25.1	23.4	<b>23.5</b>	23.4
		1	24	24.8	25.1	24.9	23.3	23.3	23.4
		1	49	25.1	<b>25.2</b>	25.0	23.2	23.2	23.2
		25	0	24.4	24.7	25.0	22.6	22.6	22.5
		25	12	24.4	24.7	24.6	22.5	22.5	22.6
		25	24	24.5	24.9	24.6	22.5	22.5	22.4
		50	0	24.5	24.7	24.7	22.5	22.6	22.5
	16QAM	1	0	24.3	24.4	24.2	23.0	22.9	23.0
		1	24	24.3	24.4	24.3	22.9	22.8	<b>23.0</b>
		1	49	24.5	<b>24.5</b>	24.4	22.8	22.7	22.7
		25	0	24.2	24.4	24.3	21.6	21.6	21.6
		25	12	24.3	24.4	24.3	21.5	21.6	21.6
		25	24	24.3	24.5	24.3	21.5	21.6	21.5
		50	0	24.3	24.4	24.3	21.6	21.7	21.6
	64QAM	1	0	23.3	23.3	23.3	21.0	21.0	21.0
		1	24	23.3	23.3	23.4	20.9	20.8	<b>21.1</b>
		1	49	23.5	<b>23.5</b>	23.5	20.9	20.7	20.8
		25	0	23.1	23.2	23.1	19.8	19.8	19.8
		25	12	23.1	23.2	23.1	19.7	19.7	19.8
		25	24	23.2	23.4	23.3	19.8	19.6	19.7
		50	0	23.1	23.2	23.2	19.7	19.8	19.7

### 7.8. LTE BAND 25

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 25 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1			
				Conducted Average (dBm)			Conducted Average (dBm)			
				26047	26365	26683	26047	26365	26683	
1.4	QPSK	1	0	23.6	23.5	<b>23.7</b>	17.9	17.9	17.9	
		1	2	23.6	23.5	23.6	17.8	17.9	17.9	
		1	5	23.6	23.5	23.6	17.8	17.9	17.9	
		3	0	23.5	23.4	23.3	17.8	17.9	<b>18.0</b>	
		3	1	23.5	23.4	23.3	17.8	17.9	18.0	
		3	2	23.5	23.4	23.3	17.8	17.9	18.0	
	16QAM	6	0	23.4	23.4	23.2	17.9	17.9	17.7	
		1	0	<b>22.9</b>	22.8	22.8	17.9	17.7	17.8	
		1	2	22.9	22.8	22.8	17.8	17.7	17.9	
		1	5	22.9	22.8	22.8	17.8	17.8	17.8	
		3	0	22.9	22.8	22.8	17.7	17.6	17.9	
		3	1	22.9	22.7	22.7	17.7	17.6	<b>18.0</b>	
	64QAM	3	2	22.8	22.8	22.8	17.8	17.6	17.9	
		6	0	22.8	22.8	22.7	17.7	17.7	17.8	
		1	0	22.0	21.9	21.9	17.7	17.8	17.8	
		1	2	<b>22.1</b>	21.9	21.9	17.6	17.6	17.8	
		1	5	22.0	21.9	21.9	17.7	17.6	17.7	
		3	0	21.9	21.8	21.8	17.7	<b>17.9</b>	17.7	
			3	1	21.9	21.8	21.8	17.6	17.8	17.6
			3	2	21.9	21.7	21.7	17.7	17.8	17.6
			6	0	21.8	21.7	21.7	17.6	17.8	17.6

#### OUTPUT POWER FOR LTE BAND 25 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1			
				Conducted Average (dBm)			Conducted Average (dBm)			
				26055	26365	26675	26055	26365	26675	
3.0	QPSK	1	0	23.6	23.6	23.7	17.7	17.9	17.9	
		1	7	<b>23.7</b>	23.6	23.7	17.8	17.9	17.9	
		1	14	23.5	23.5	23.7	17.7	17.8	17.8	
		8	0	23.3	23.4	23.3	17.9	17.9	<b>18.0</b>	
		8	4	23.3	23.4	23.3	17.9	17.9	17.9	
		8	7	23.3	23.4	23.3	17.9	17.9	17.8	
	16QAM	15	0	23.3	23.4	23.3	17.8	17.9	17.8	
		1	0	22.9	23.0	<b>23.3</b>	17.9	17.8	<b>18.0</b>	
		1	7	23.0	23.0	23.0	17.8	17.7	17.8	
		1	14	22.9	23.0	22.9	17.7	17.7	17.7	
		8	0	22.9	23.0	23.0	17.6	17.5	17.7	
		8	4	22.9	23.0	22.9	17.6	17.7	17.7	
	64QAM	8	7	22.9	23.0	22.9	17.6	17.7	17.7	
		15	0	22.9	23.0	23.0	17.6	17.7	17.7	
		1	0	21.9	22.1	21.9	17.6	<b>17.9</b>	17.8	
		1	7	22.0	22.1	<b>22.3</b>	17.6	17.9	17.8	
		1	14	21.9	22.1	22.2	17.6	17.9	17.6	
		8	0	21.9	21.9	22.1	17.9	17.7	17.8	
			8	4	21.8	21.9	22.1	17.9	17.8	17.8
			8	7	21.8	22.0	22.0	17.9	17.8	17.8
			15	0	21.8	21.9	22.0	17.8	17.8	17.7



**OUTPUT POWER FOR LTE BAND 25 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26065	26365	26665	26065	26365	26665
				1852.5 MHz	1882.5 MHz	1912.5 MHz	1852.5 MHz	1882.5 MHz	1912.5 MHz
5.0	QPSK	1	0	23.6	23.6	23.6	17.8	<b>18.0</b>	17.8
		1	12	23.5	23.6	<b>23.7</b>	17.7	17.9	17.8
		1	24	23.6	23.6	23.7	17.7	17.9	17.8
		12	0	23.2	23.3	23.3	17.9	17.9	18.0
		12	6	23.2	23.3	23.3	17.9	17.9	17.8
		12	11	23.2	23.3	23.3	17.9	17.9	17.8
		25	0	23.1	23.2	23.3	17.8	17.9	17.8
	16QAM	1	0	23.1	23.2	23.3	18.0	18.0	18.0
		1	12	23.0	23.2	23.4	17.8	17.7	17.9
		1	24	23.2	23.2	<b>23.4</b>	17.8	17.7	17.9
		12	0	23.0	23.2	23.2	17.6	17.8	17.9
		12	6	23.1	23.2	23.2	17.6	17.7	17.7
		12	11	23.1	23.2	23.3	17.6	17.7	17.6
		25	0	23.1	23.2	23.3	<b>18.0</b>	17.8	17.6
	64QAM	1	0	22.1	22.2	22.3	17.7	17.7	17.7
		1	12	22.1	22.1	<b>22.3</b>	17.7	17.8	17.8
		1	24	22.2	22.2	22.3	17.7	17.7	17.6
		12	0	21.8	22.0	22.0	17.6	17.7	17.5
		12	6	21.8	22.0	22.1	17.6	17.6	17.6
		12	11	21.8	22.0	22.1	17.6	17.7	17.6
25		0	21.8	21.9	22.1	17.7	<b>17.8</b>	17.6	

**OUTPUT POWER FOR LTE BAND 25 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26090	26365	26640	26090	26365	26640
				1855.0 MHz	1882.5 MHz	1910.0 MHz	1855.0 MHz	1882.5 MHz	1910.0 MHz
10.0	QPSK	1	0	23.5	23.6	23.6	17.7	<b>18.0</b>	17.6
		1	24	23.6	23.5	23.5	17.7	17.9	17.7
		1	49	23.6	23.5	<b>23.7</b>	17.7	17.9	17.8
		25	0	23.1	23.2	23.2	17.8	17.9	17.8
		25	12	23.2	23.2	23.2	17.8	17.9	17.7
		25	24	23.3	23.3	23.3	17.8	17.9	17.8
		50	0	23.2	23.2	23.3	17.7	17.9	17.8
	16QAM	1	0	23.2	23.3	23.2	17.9	<b>18.0</b>	17.8
		1	24	23.2	23.2	23.1	17.8	17.8	17.9
		1	49	23.3	23.2	<b>23.3</b>	17.8	17.7	17.9
		25	0	23.1	23.2	23.1	17.7	17.9	17.9
		25	12	23.1	23.2	23.1	17.7	17.8	17.9
		25	24	23.2	23.2	23.3	17.7	17.8	18.0
		50	0	23.2	23.2	23.2	17.9	17.8	18.0
	64QAM	1	0	22.4	22.4	22.3	17.6	17.8	17.9
		1	24	22.4	<b>22.4</b>	22.3	17.7	17.8	17.7
		1	49	22.4	22.4	22.4	17.7	17.6	17.6
		25	0	22.1	22.3	22.1	17.9	17.8	17.8
		25	12	22.2	22.3	22.1	17.8	17.7	17.7
		25	24	22.3	22.3	22.2	17.8	17.7	<b>17.9</b>
50		0	22.2	22.3	22.1	17.8	17.6	17.8	

**OUTPUT POWER FOR LTE BAND 25 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26115	26365	26615	26115	26365	26615
				1857.5 MHz	1882.5 MHz	1907.5 MHz	1857.5 MHz	1882.5 MHz	1907.5 MHz
15.0	QPSK	1	0	23.5	23.7	23.7	17.8	17.9	17.9
		1	37	23.7	23.6	23.6	17.7	17.9	17.9
		1	74	23.7	23.4	23.7	17.8	17.8	17.8
		36	0	23.4	23.3	23.3	17.9	17.9	17.7
		36	16	23.5	23.2	23.2	17.9	17.8	17.6
		36	35	23.4	23.2	23.3	17.9	17.7	17.7
		75	0	23.4	23.3	23.3	17.8	17.8	17.6
	16QAM	1	0	22.9	23.0	22.9	17.8	17.8	17.7
		1	37	23.0	22.8	22.9	17.8	17.6	17.8
		1	74	23.1	22.6	22.9	17.8	17.6	17.9
		36	0	22.9	22.8	22.9	17.7	17.8	17.7
		36	16	23.0	22.8	22.8	17.6	17.7	17.8
		36	35	23.0	22.8	22.9	17.7	17.6	18.0
		75	0	23.0	22.8	22.8	17.7	17.7	17.9
	64QAM	1	0	22.1	22.2	22.1	17.6	17.7	17.7
		1	37	22.2	22.1	22.0	17.6	17.7	17.7
		1	74	22.3	22.0	22.1	17.6	17.7	17.7
		36	0	21.9	21.9	21.9	17.6	17.7	17.8
		36	16	22.0	21.9	21.8	17.6	17.7	18.0
		36	35	21.9	21.9	21.9	17.8	17.6	17.8
		75	0	21.9	21.9	21.8	17.6	17.8	17.6

**OUTPUT POWER FOR LTE BAND 25 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26140	26365	26590	26140	26365	26590
				1860.0 MHz	1882.5 MHz	1905.0 MHz	1860.0 MHz	1882.5 MHz	1905.0 MHz
20.0	QPSK	1	0	23.4	23.6	23.5	17.8	17.9	17.7
		1	49	23.5	23.6	23.6	17.7	17.9	17.5
		1	99	23.7	23.5	23.6	17.9	17.8	17.8
		50	0	23.2	23.2	23.3	17.9	17.9	17.7
		50	24	23.2	23.2	23.3	17.9	17.8	17.5
		50	49	23.4	23.2	23.2	18.0	17.8	17.7
		100	0	23.2	23.2	23.3	17.8	17.9	17.5
	16QAM	1	0	23.1	23.1	23.0	17.8	17.8	17.9
		1	49	23.2	22.9	23.1	17.8	17.6	17.8
		1	99	23.3	22.8	23.1	17.9	17.6	18.0
		50	0	23.1	23.0	23.1	17.6	17.8	17.6
		50	24	23.2	22.9	23.0	17.6	17.7	17.7
		50	49	23.3	22.9	23.0	17.7	17.6	18.0
		100	0	23.2	22.9	23.1	17.8	17.7	17.9
	64QAM	1	0	21.9	22.1	22.0	17.7	17.9	17.8
		1	49	21.9	22.0	21.9	17.6	17.6	17.6
		1	99	22.1	21.8	22.0	17.9	17.6	17.7
		50	0	21.8	21.7	21.6	17.8	17.7	17.7
		50	24	21.9	21.7	21.6	17.8	17.6	17.6
		50	49	22.0	21.6	21.6	17.6	17.7	17.7
		100	0	21.9	21.7	21.6	17.6	17.8	17.7

### 7.9. LTE BAND 26 (Part 90S)

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 26 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26697 814.7 MHz	26740 819.0 MHz	26783 823.3 MHz	26697 814.7 MHz	26740 819.0 MHz	26783 823.3 MHz
1.4	QPSK	1	0	25.1	25.2	25.2	23.3	23.4	23.5
		1	2	25.2	25.1	25.2	23.1	23.4	23.5
		1	5	25.1	25.1	<b>25.2</b>	23.2	23.4	<b>23.5</b>
		3	0	25.1	25.1	25.2	23.2	23.4	23.5
		3	1	25.1	25.1	25.2	23.2	23.4	23.5
		3	2	25.1	25.1	25.1	23.1	23.4	23.5
	16QAM	6	0	25.1	25.1	25.2	22.2	22.4	22.5
		1	0	24.4	24.4	24.4	22.5	22.7	<b>22.8</b>
		1	2	24.4	24.4	24.4	22.4	22.7	22.7
		1	5	24.3	24.4	<b>24.5</b>	22.5	22.7	22.7
		3	0	24.3	24.2	24.3	22.6	22.5	22.6
		3	1	24.2	24.2	24.3	22.5	22.5	22.6
	64QAM	3	2	24.2	24.2	24.3	22.5	22.5	22.6
		6	0	24.2	24.1	24.2	21.5	21.4	21.6
		1	0	23.5	23.4	23.2	21.9	21.7	21.6
		1	2	<b>23.5</b>	23.3	23.3	<b>21.9</b>	21.6	21.6
		1	5	23.4	23.3	23.4	21.9	21.5	21.7
		3	0	23.4	23.3	23.2	21.8	21.6	21.6
	64QAM	3	1	23.3	23.3	23.2	21.8	21.5	21.6
		3	2	23.4	23.3	23.2	21.7	21.5	21.6
		6	0	23.2	23.2	23.3	20.6	20.5	20.6

#### OUTPUT POWER FOR LTE BAND 26 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				26705 815.5 MHz	26740 819.0 MHz	26775 822.5 MHz	26705 815.5 MHz	26740 819.0 MHz	26775 822.5 MHz
3.0	QPSK	1	0	<b>25.2</b>	25.0	25.1	23.4	23.3	23.5
		1	7	25.1	25.0	25.1	23.4	23.3	<b>23.5</b>
		1	14	25.0	25.1	25.1	23.3	23.3	23.4
		8	0	25.1	25.0	25.1	22.4	22.3	22.5
		8	4	25.0	25.0	25.1	22.3	22.3	22.5
		8	7	25.0	25.0	25.1	22.3	22.3	22.5
	16QAM	15	0	25.0	25.0	25.1	22.3	22.3	22.5
		1	0	24.3	24.2	24.2	22.6	22.6	22.7
		1	7	24.3	24.3	24.3	22.6	22.6	<b>22.8</b>
		1	14	24.1	24.3	<b>24.3</b>	22.6	22.5	22.7
		8	0	24.1	24.0	24.0	21.4	21.3	21.6
		8	4	24.0	24.0	24.0	21.4	21.4	21.6
	64QAM	8	7	24.0	24.0	24.0	21.4	21.4	21.6
		15	0	24.0	24.0	24.0	21.5	21.4	21.6
		1	0	<b>23.6</b>	23.5	23.4	21.6	21.6	21.6
		1	7	23.6	23.5	23.5	21.7	21.6	<b>21.7</b>
		1	14	23.5	23.4	23.5	21.5	21.5	21.7
		8	0	23.5	23.4	23.4	20.5	20.5	20.6
	64QAM	8	4	23.4	23.4	23.4	20.5	20.5	20.6
		8	7	23.5	23.4	23.4	20.5	20.5	20.6
		15	0	23.4	23.4	23.4	20.5	20.5	20.6

**OUTPUT POWER FOR LTE BAND 26 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1			
				Conducted Average (dBm)			Conducted Average (dBm)			
				26715	26740	26765	26715	26740	26765	
				816.5 MHz	819.0 MHz	821.5 MHz	816.5 MHz	819.0 MHz	821.5 MHz	
5.0	QPSK	1	0	25.1	25.1	25.0	23.4	<b>23.5</b>	23.3	
		1	12	25.0	25.0	25.1	23.3	23.4	23.3	
		1	24	25.0	25.1	<b>25.2</b>	23.3	23.4	23.3	
		12	0	25.0	25.0	25.1	22.3	22.4	22.3	
		12	6	25.0	25.0	25.1	22.3	22.4	22.3	
		25	0	25.0	25.1	25.2	22.4	22.4	22.3	
	16QAM	1	0	24.6	24.4	24.5	<b>22.8</b>	22.7	22.6	
		1	12	24.4	24.4	24.6	22.7	22.6	22.6	
		1	24	24.5	24.5	<b>24.7</b>	22.6	22.7	22.7	
		12	0	24.1	24.2	24.3	21.4	21.4	21.4	
		12	6	24.1	24.2	24.3	21.3	21.5	21.4	
		25	0	24.1	24.2	24.3	21.3	21.5	21.4	
	64QAM	1	0	23.6	<b>23.9</b>	23.8	21.8	<b>21.8</b>	21.6	
		1	12	23.6	23.8	23.7	21.6	21.6	21.5	
		1	24	23.5	23.8	23.7	21.6	21.6	21.6	
		12	0	23.3	23.6	23.5	20.5	20.5	20.4	
		12	6	23.3	23.6	23.5	20.4	20.5	20.4	
		12	11	23.4	23.5	23.4	20.4	20.5	20.4	
			25	0	23.3	23.6	23.5	20.4	20.5	20.4

**OUTPUT POWER FOR LTE BAND 26 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				N/A	26740	N/A	N/A	26740	N/A
				N/A	819.0 MHz	N/A	N/A	819.0 MHz	N/A
10.0	QPSK	1	0		<b>25.2</b>			<b>23.5</b>	
		1	24		25.0			23.4	
		1	49		25.1			23.4	
		25	0		24.9			22.4	
		25	12		25.0			22.3	
		25	24		25.0			22.3	
	16QAM	50	0		25.0			22.4	
		1	0		<b>24.3</b>			22.7	
		1	24		24.1			22.6	
		1	49		24.2			<b>22.7</b>	
		25	0		23.8			21.4	
		25	12		23.9			21.3	
	64QAM	25	24		24.0			21.4	
		50	0		23.9			21.4	
		1	0		<b>23.7</b>			<b>21.7</b>	
		1	24		23.4			21.5	
		1	49		23.3			21.6	
		25	0		23.4			20.5	
			25	12		23.3		20.4	
			25	24		23.3		20.5	
			50	0		23.4		20.5	

### 7.10. LTE BAND 30

Test Engineer ID:	39004	Test Date:	9/26/2019
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#### OUTPUT POWER FOR LTE BAND 30 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				27685 2307.5 MHz	27710 2310.0 MHz	27735 2312.5 MHz	27685 2307.5 MHz	27710 2310.0 MHz	27735 2312.5 MHz
5.0	QPSK	1	0	23.9	23.9	24.0	17.7	17.8	18.0
		1	12	23.9	23.9	23.9	17.7	17.7	17.9
		1	24	23.8	23.9	24.0	17.9	17.8	18.0
		12	0	23.9	23.9	24.0	18.0	17.9	17.9
		12	6	23.8	23.8	23.9	17.8	17.9	17.9
		12	11	23.8	24.0	23.9	17.8	18.0	18.0
		25	0	23.9	23.9	23.9	17.8	17.9	18.0
	16QAM	1	0	23.3	23.4	23.5	18.0	18.0	18.0
		1	12	23.3	23.4	23.4	18.0	18.0	18.0
		1	24	23.3	23.4	23.4	18.0	18.0	18.0
		12	0	23.0	23.0	23.1	17.9	17.7	18.0
		12	6	23.0	23.0	23.0	17.8	17.7	18.0
		12	11	23.0	23.1	23.0	17.7	17.8	18.0
		25	0	23.0	23.0	23.0	17.7	17.9	18.0
	64QAM	1	0	22.3	22.6	22.4	17.9	18.0	17.9
		1	12	22.2	22.6	22.4	17.9	18.0	17.9
		1	24	22.3	22.6	22.4	17.9	18.0	17.9
		12	0	22.1	22.4	22.2	18.0	17.9	18.0
		12	6	22.0	22.4	22.2	17.9	17.8	18.0
		12	11	22.0	22.6	22.4	17.9	17.9	18.0
		25	0	22.0	22.4	22.2	17.9	17.8	18.0

#### OUTPUT POWER FOR LTE BAND 30 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				N/A	27710 2310.0 MHz	N/A	N/A	27710 2310.0 MHz	N/A
10.0	QPSK	1	0		23.9			18.0	
		1	24		23.9			17.9	
		1	49		24.0			18.0	
		25	0		23.9			17.8	
		25	12		23.8			17.8	
		25	24		23.9			18.0	
		50	0		23.9			17.9	
	16QAM	1	0		23.3			17.9	
		1	24		23.3			17.9	
		1	49		23.5			17.7	
		25	0		23.0			17.6	
		25	12		23.0			17.6	
		25	24		23.0			17.8	
		50	0		23.1			17.8	
	64QAM	1	0		22.1			17.9	
		1	24		22.1			18.0	
		1	49		22.2			17.9	
		25	0		20.9			17.8	
		25	12		20.9			17.7	
		25	24		20.9			17.9	
		50	0		19.0			17.8	

### 7.11. LTE BAND 41

Test Engineer ID:	39004	Test Date:	10/31/2019
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#### OUTPUT POWER FOR LTE BAND 41 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				39675	40620	41565	39675	40620	41565
5.0	QPSK	1	0	24.2	<b>28.0</b>	28.0	19.9	19.8	20.0
		1	12	27.0	28.0	27.9	20.0	19.8	19.9
		1	24	26.9	28.0	27.9	20.0	19.8	<b>20.0</b>
		12	0	23.1	28.0	26.9	19.8	19.8	19.9
		12	6	23.1	27.9	26.8	19.8	19.8	19.9
		12	11	26.9	27.9	26.8	19.8	19.8	19.9
		25	0	25.1	28.0	26.8	19.8	19.8	19.9
	16QAM	1	0	25.5	<b>27.5</b>	27.1	20.0	19.9	20.0
		1	12	26.4	27.4	27.0	20.0	19.9	20.0
		1	24	26.3	27.4	27.0	20.0	19.9	20.0
		12	0	24.1	27.2	26.0	19.8	19.8	19.9
		12	6	24.2	27.2	25.9	19.8	19.9	<b>20.0</b>
		12	11	26.1	27.2	25.9	19.7	19.7	19.6
		25	0	24.2	27.2	25.9	19.8	19.7	20.0
	64QAM	1	0	25.1	<b>26.1</b>	25.7	<b>20.0</b>	19.7	19.9
		1	12	25.0	26.0	25.6	20.0	19.8	19.9
		1	24	25.0	26.0	25.6	19.9	19.8	20.0
		12	0	24.1	25.8	25.4	19.8	19.6	20.0
		12	6	24.1	25.7	25.4	19.8	19.6	20.0
		12	11	24.1	25.6	25.4	19.8	19.6	20.0
		25	0	24.1	25.6	25.4	19.8	19.6	20.0

#### OUTPUT POWER FOR LTE BAND 41 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				39700	40620	41540	39700	40620	41540
10.0	QPSK	1	0	22.3	<b>28.0</b>	27.9	20.0	19.8	20.0
		1	24	27.0	28.0	27.9	20.0	19.8	20.0
		1	49	27.0	28.0	27.9	<b>20.0</b>	19.8	20.0
		25	0	23.2	28.0	27.9	19.9	19.8	20.0
		25	12	26.9	28.0	27.9	19.9	19.8	19.9
		25	24	26.1	28.0	27.9	19.9	19.8	19.9
		50	0	23.2	28.0	27.9	19.9	19.8	19.9
	16QAM	1	0	21.7	<b>27.7</b>	27.3	19.9	19.9	20.0
		1	24	26.3	27.6	27.2	20.0	19.9	20.0
		1	49	26.3	27.6	27.2	19.9	19.9	20.0
		25	0	22.3	26.5	26.2	19.9	19.7	20.0
		25	12	25.2	26.5	26.1	19.8	19.6	<b>20.0</b>
		25	24	24.2	26.5	26.1	19.8	19.7	20.0
		50	0	23.2	26.5	26.1	19.8	19.8	19.9
	64QAM	1	0	20.8	<b>27.1</b>	25.4	20.0	19.7	20.0
		1	24	24.4	27.0	25.4	20.0	19.8	20.0
		1	49	24.4	27.0	25.3	20.0	19.9	<b>20.0</b>
		25	0	22.6	26.9	25.1	19.9	19.7	20.0
		25	12	24.1	26.8	25.1	19.9	19.7	20.0
		25	24	24.2	26.9	25.0	19.9	19.7	20.0
		50	0	22.1	26.8	25.1	19.8	19.7	20.0

**OUTPUT POWER FOR LTE BAND 41 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				39725	40620	41515	39725	40620	41515
				2503.5 MHz	2593.0 MHz	2682.5 MHz	2503.5 MHz	2593.0 MHz	2682.5 MHz
15.0	QPSK	1	0	22.1	<b>28.0</b>	28.0	20.0	20.0	19.9
		1	37	27.0	27.9	27.9	19.9	20.0	19.8
		1	74	26.3	27.8	27.9	20.0	20.0	19.7
		36	0	22.0	27.9	28.0	19.8	20.0	19.8
		36	16	26.1	27.9	28.0	19.8	20.0	20.0
		36	35	23.2	27.8	27.9	19.8	20.0	19.9
		75	0	22.4	27.9	28.0	19.8	20.0	<b>20.0</b>
	16QAM	1	0	21.5	<b>27.3</b>	27.2	20.0	20.0	19.9
		1	37	26.0	27.2	27.2	19.9	<b>20.0</b>	20.0
		1	74	26.0	27.1	27.2	19.9	20.0	19.9
		36	0	21.4	26.2	26.1	19.7	19.8	19.9
		36	16	25.6	26.1	26.1	19.7	19.8	20.0
		36	35	22.6	26.1	26.0	19.7	19.8	20.0
		75	0	21.7	26.1	26.0	19.7	19.7	20.0
	64QAM	1	0	25.3	<b>26.1</b>	26.0	20.0	19.8	19.8
		1	37	25.3	26.1	26.1	<b>20.0</b>	20.0	19.8
		1	74	25.3	25.9	26.0	19.9	20.0	19.7
		36	0	25.0	25.9	25.7	19.7	19.9	19.8
		36	16	24.9	25.8	25.7	19.8	19.9	19.8
		36	35	21.9	25.8	25.7	19.8	19.9	19.8
		75	0	21.1	25.8	25.7	19.7	19.9	19.8

**OUTPUT POWER FOR LTE BAND 41 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				39750	40620	41490	39750	40620	41490
				2506.0 MHz	2593.0 MHz	2680.0 MHz	2506.0 MHz	2593.0 MHz	2680.0 MHz
20.0	QPSK	1	0	22.2	<b>28.0</b>	27.9	19.9	19.9	19.8
		1	49	26.9	27.8	27.8	20.0	19.8	19.7
		1	99	27.0	27.7	27.8	20.0	19.9	19.6
		50	0	22.1	27.8	27.8	19.8	19.9	20.0
		50	24	26.8	27.8	27.8	19.7	20.0	19.9
		50	49	23.1	27.8	27.8	19.8	20.0	19.8
		100	0	22.0	27.8	27.8	19.7	<b>20.0</b>	19.9
	16QAM	1	0	21.5	<b>27.4</b>	27.2	20.0	20.0	19.8
		1	49	26.2	27.2	27.1	20.0	<b>20.0</b>	19.9
		1	99	26.3	27.2	27.1	20.0	20.0	19.8
		50	0	21.5	26.1	27.0	19.7	19.8	19.8
		50	24	26.0	26.5	27.0	19.7	19.7	20.0
		50	49	22.5	26.7	27.0	19.7	20.0	19.8
		100	0	21.4	26.3	27.0	19.6	19.9	19.9
	64QAM	1	0	20.8	<b>26.6</b>	25.3	20.0	19.8	19.8
		1	49	24.4	26.4	25.2	20.0	20.0	19.6
		1	99	24.4	26.3	25.2	20.0	20.0	19.6
		50	0	21.1	26.1	25.0	19.7	20.0	19.7
		50	24	24.1	26.0	25.0	19.7	<b>20.0</b>	19.7
		50	49	22.1	25.9	25.0	19.8	20.0	19.7
		100	0	20.7	26.0	25.0	19.7	20.0	19.7

### 7.12. LTE BAND 48

Test Engineer ID:	39004	Test Date:	10/31/2019
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#### OUTPUT POWER FOR LTE BAND 48 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 2		
				Conducted Average (dBm)			Conducted Average (dBm)		
				55265	55990	56715	55260	55990	56715
5.0	QPSK	1	0	20.8	<b>25.0</b>	20.6	18.4	<b>20.7</b>	18.5
		1	12	20.5	24.7	20.3	18.3	20.4	18.1
		1	24	20.8	24.8	20.6	18.5	20.6	18.5
		12	0	20.9	24.3	20.9	18.0	20.1	17.8
		12	6	20.9	24.3	20.9	18.0	20.1	17.7
		12	11	20.9	24.3	20.9	18.0	20.1	17.8
	16QAM	25	0	21.0	24.4	21.0	18.0	20.2	17.9
		1	0	20.1	24.2	19.9	17.5	18.4	17.8
		1	12	19.8	24.2	19.7	17.4	<b>19.9</b>	17.4
		1	24	20.1	<b>24.5</b>	20.1	18.1	19.7	17.7
		12	0	20.1	23.2	19.9	16.8	18.8	16.8
		12	6	20.1	23.1	19.8	16.7	17.4	16.6
	64QAM	12	11	20.1	23.1	19.8	16.8	17.1	16.7
		25	0	20.2	23.3	20.0	16.9	17.2	16.7
		1	0	19.3	<b>23.4</b>	19.3	16.5	<b>17.6</b>	16.4
		1	12	18.3	23.3	19.0	16.3	17.2	16.1
		1	24	18.6	23.4	19.2	16.4	17.3	16.3
		12	0	18.7	21.8	19.3	15.8	15.8	15.6
		12	6	18.8	21.9	19.1	15.6	16.0	15.3
		12	11	18.8	21.9	19.1	15.7	16.0	15.4
		25	0	18.9	22.2	19.3	15.9	16.2	15.8

#### OUTPUT POWER FOR LTE BAND 48 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 2		
				Conducted Average (dBm)			Conducted Average (dBm)		
				55290	55990	56690	55290	55990	56690
10.0	QPSK	1	0	21.0	25.0	20.8	18.5	<b>20.7</b>	18.5
		1	24	20.7	24.7	20.4	18.4	20.5	18.3
		1	49	21.0	<b>25.0</b>	20.8	18.5	20.7	18.5
		25	0	21.0	24.0	20.8	17.6	19.7	17.7
		25	12	20.8	24.0	20.8	17.6	19.6	17.5
		25	24	20.9	24.0	20.9	17.7	19.7	17.5
	16QAM	50	0	20.9	24.0	21.0	17.7	19.7	17.6
		1	0	20.2	24.2	20.1	17.7	<b>19.9</b>	17.7
		1	24	19.9	24.1	19.8	17.6	19.6	17.5
		1	49	20.2	<b>24.3</b>	20.1	17.9	19.9	17.6
		25	0	20.0	22.9	19.6	16.5	18.6	16.5
		25	12	20.0	22.9	19.6	16.5	18.5	16.4
	64QAM	25	24	20.0	22.9	19.7	16.5	18.6	16.4
		50	0	20.1	23.0	19.9	16.7	18.7	16.5
		1	0	19.7	23.3	19.5	16.4	<b>18.6</b>	16.4
		1	24	19.5	22.9	19.3	16.3	18.3	16.1
		1	49	19.7	<b>23.3</b>	19.5	16.6	18.6	16.3
		25	0	19.4	21.9	19.3	15.4	17.6	15.5
		25	12	19.4	21.8	19.3	15.5	17.5	15.4
		25	24	19.4	21.9	19.3	15.6	17.5	15.4
		50	0	19.5	22.0	19.4	15.6	17.6	15.6



**OUTPUT POWER FOR LTE BAND 48 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 2		
				Conducted Average (dBm)			Conducted Average (dBm)		
				55315	55990	56665	55315	55990	56665
				3557.5 MHz	3625.0 MHz	3692.5 MHz	3557.5 MHz	3625.0 MHz	3692.5 MHz
15.0	QPSK	1	0	20.9	24.9	20.9	18.4	<b>20.7</b>	18.3
		1	37	20.9	24.7	20.7	18.5	20.6	18.5
		1	74	21.0	<b>25.0</b>	20.9	18.5	20.7	18.4
		36	0	21.0	23.9	21.0	17.5	19.7	17.5
		36	16	21.0	23.9	20.9	17.5	19.7	17.6
		36	35	21.0	23.9	21.0	17.6	19.7	17.6
		75	0	21.0	24.0	21.0	17.6	19.8	17.7
	16QAM	1	0	20.3	24.2	20.4	17.6	19.9	17.5
		1	37	20.2	24.1	20.3	17.7	19.8	17.7
		1	74	20.3	<b>24.4</b>	20.4	17.8	<b>20.0</b>	17.6
		36	0	20.1	22.9	20.1	16.4	18.7	16.4
		36	16	20.1	22.8	20.0	16.5	18.7	16.5
		36	35	20.1	22.9	20.1	16.6	18.7	16.5
		75	0	20.2	23.0	20.1	16.5	18.7	16.5
	64QAM	1	0	19.3	23.0	19.2	16.5	18.9	16.5
		1	37	19.2	22.9	19.1	16.6	18.8	16.5
		1	74	19.3	<b>23.2</b>	19.2	16.6	<b>18.9</b>	16.6
		36	0	18.9	21.8	18.7	15.4	17.7	15.4
		36	16	18.8	21.8	18.7	15.5	17.7	15.5
		36	35	18.9	21.9	18.8	15.6	17.6	15.5
		75	0	18.9	21.9	18.8	15.5	17.7	15.6

**OUTPUT POWER FOR LTE BAND 48 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 2		
				Conducted Average (dBm)			Conducted Average (dBm)		
				55340	55990	56640	55340	55990	56640
				3560 MHz	3625.0 MHz	3690 MHz	3560 MHz	3625.0 MHz	3690 MHz
20.0	QPSK	1	0	21.0	24.8	21.0	18.5	<b>20.7</b>	18.2
		1	49	20.7	24.6	20.6	18.5	20.6	18.2
		1	99	21.0	<b>25.0</b>	20.9	18.5	20.7	18.5
		50	0	21.0	23.9	20.8	17.5	19.7	17.3
		50	24	20.9	23.8	20.8	17.5	19.7	17.4
		50	49	20.9	23.9	20.8	17.5	19.7	17.5
		100	0	21.0	23.9	20.9	17.6	19.7	17.4
	16QAM	1	0	20.3	24.4	20.1	17.7	20.1	17.5
		1	49	20.0	24.0	19.9	17.7	19.9	17.5
		1	99	20.4	<b>24.5</b>	20.2	17.8	<b>20.1</b>	17.7
		50	0	19.9	22.8	19.8	16.4	18.7	16.2
		50	24	19.9	22.8	19.8	16.5	18.7	16.3
		50	49	19.9	22.9	19.8	16.4	18.7	16.4
		100	0	20.0	22.9	19.9	16.6	18.7	16.4
	64QAM	1	0	19.4	23.2	19.6	16.7	<b>19.0</b>	16.4
		1	49	19.1	23.0	19.4	16.7	18.7	16.4
		1	99	19.4	<b>23.4</b>	19.7	16.8	18.9	16.6
		50	0	18.9	21.8	19.2	15.4	17.6	15.2
		50	24	18.8	21.8	19.2	15.5	17.6	15.3
		50	49	18.8	21.9	19.2	15.4	17.6	15.4
		100	0	18.9	21.9	19.3	15.6	17.7	15.4

### 7.13. LTE BAND 66

Test Engineer ID:	39004	Test Date:	9/27/2019
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#### OUTPUT POWER FOR LTE BAND 66 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131979 1710.7 MHz	132322 1745.0 MHz	132665 1779.3 MHz	131979 1710.7 MHz	132322 1745.0 MHz	132665 1779.3 MHz
1.4	QPSK	1	0	25.2	<b>25.2</b>	25.1	19.0	18.9	19.0
		1	2	25.1	25.2	25.0	18.9	18.9	18.9
		1	5	25.0	25.2	25.1	19.0	18.8	19.0
		3	0	25.1	25.2	25.0	19.0	18.9	19.0
		3	1	25.0	25.2	25.0	19.0	18.9	19.0
		3	2	25.0	25.2	25.0	19.0	18.8	<b>19.0</b>
	16QAM	6	0	25.0	25.2	25.0	19.0	18.9	18.9
		1	0	24.5	<b>24.7</b>	24.4	19.0	18.7	18.9
		1	2	24.3	24.6	24.4	18.9	18.7	18.9
		1	5	24.4	24.7	24.4	19.0	18.7	19.0
		3	0	24.3	24.4	24.2	18.9	18.6	<b>19.0</b>
		3	1	24.3	24.4	24.2	18.9	18.6	19.0
	64QAM	3	2	24.2	24.4	24.2	18.9	18.6	19.0
		6	0	24.2	24.3	24.2	18.9	18.7	18.8
		1	0	23.7	23.6	23.5	<b>19.0</b>	19.0	18.9
		1	2	23.7	23.6	23.5	19.0	18.9	19.0
		1	5	<b>23.7</b>	23.5	23.4	19.0	18.8	19.0
		3	0	23.6	23.4	23.4	18.9	18.9	19.0
	3	1	23.5	23.4	23.4	19.0	18.9	18.9	
	3	2	23.5	23.4	23.4	19.0	19.0	18.9	
	6	0	23.5	23.4	23.4	18.9	19.0	19.0	

#### OUTPUT POWER FOR LTE BAND 66 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131987 1711.5 MHz	132322 1745.0 MHz	132657 1778.5 MHz	131987 1711.5 MHz	132322 1745.0 MHz	132657 1778.5 MHz
3.0	QPSK	1	0	25.1	25.1	25.0	18.9	18.8	18.8
		1	7	25.1	25.2	25.1	19.0	18.8	19.0
		1	14	25.0	25.1	25.0	18.9	18.8	18.9
		8	0	25.1	<b>25.2</b>	25.0	18.9	18.9	<b>19.0</b>
		8	4	25.1	25.2	25.0	18.9	18.9	18.9
		8	7	25.1	25.2	25.0	18.9	18.8	18.9
	16QAM	15	0	25.1	25.2	25.0	18.9	18.9	18.9
		1	0	24.4	24.6	24.5	18.9	18.9	19.0
		1	7	24.5	<b>24.7</b>	24.5	<b>19.0</b>	18.6	18.9
		1	14	24.3	24.5	24.4	19.0	18.5	18.9
		8	0	24.3	24.3	24.2	18.9	18.6	18.7
		8	4	24.2	24.3	24.2	18.9	18.8	18.8
	64QAM	8	7	24.2	24.3	24.1	18.9	18.8	18.8
		15	0	24.2	24.3	24.2	18.9	18.7	18.8
		1	0	23.6	<b>23.6</b>	23.4	18.9	18.9	18.8
		1	7	23.6	23.6	23.5	18.9	18.8	19.0
		1	14	23.5	23.6	23.4	<b>19.0</b>	18.7	19.0
		8	0	23.5	23.6	23.4	18.9	18.7	19.0
	8	4	23.4	23.6	23.4	18.9	18.9	19.0	
	8	7	23.4	23.6	23.3	18.9	18.9	19.0	
	15	0	23.4	23.5	23.4	18.9	19.0	19.0	

**OUTPUT POWER FOR LTE BAND 66 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				131997	132322	132647	131997	132322	132647
				1712.5 MHz	1745.0 MHz	1777.5 MHz	1712.5 MHz	1745.0 MHz	1777.5 MHz
5.0	QPSK	1	0	25.2	25.2	25.0	18.9	18.8	18.9
		1	12	25.1	25.2	25.1	18.9	18.6	18.8
		1	24	25.1	25.2	25.1	19.0	18.6	19.0
		12	0	25.1	25.1	25.1	19.0	18.7	19.0
		12	6	25.1	25.1	25.1	18.9	18.7	18.9
		12	11	25.1	25.1	25.1	19.0	18.6	18.9
		25	0	25.1	25.1	25.1	18.9	18.7	18.9
	16QAM	1	0	24.7	24.5	24.6	19.0	18.8	19.0
		1	12	24.6	24.6	24.6	19.0	18.8	19.0
		1	24	24.6	24.6	24.6	18.9	18.8	18.9
		12	0	24.3	24.3	24.2	18.8	18.7	19.0
		12	6	24.3	24.3	24.3	18.8	18.6	18.7
		12	11	24.2	24.3	24.2	18.9	18.6	18.8
		25	0	24.3	24.3	24.3	18.9	18.6	18.7
	64QAM	1	0	23.8	23.6	23.6	19.0	18.9	19.0
		1	12	23.7	23.6	23.7	19.0	18.9	18.9
		1	24	23.7	23.7	23.7	19.0	18.7	19.0
		12	0	23.6	23.5	23.3	19.0	18.8	19.0
		12	6	23.6	23.4	23.4	19.0	18.7	18.9
		12	11	23.5	23.5	23.4	18.9	18.8	19.0
25		0	23.5	23.5	23.4	19.0	18.9	19.0	

**OUTPUT POWER FOR LTE BAND 66 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				132022	132322	132622	132022	132322	132622
				1715.0 MHz	1745.0 MHz	1775.0 MHz	1715.0 MHz	1745.0 MHz	1775.0 MHz
10.0	QPSK	1	0	25.2	25.1	25.1	18.8	18.8	18.8
		1	24	25.2	25.2	25.0	18.9	18.7	18.7
		1	49	25.1	25.2	25.0	19.0	18.7	18.8
		25	0	25.2	25.1	25.0	19.0	18.8	19.0
		25	12	25.1	25.2	25.0	18.9	18.7	18.7
		25	24	25.1	25.2	25.1	19.0	18.6	18.6
		50	0	25.1	25.2	25.1	19.0	18.7	18.7
	16QAM	1	0	24.5	24.5	24.5	19.0	18.9	19.0
		1	24	24.4	24.5	24.4	19.0	19.0	18.9
		1	49	24.4	24.6	24.5	19.0	18.6	18.9
		25	0	24.2	24.2	24.1	18.9	18.8	19.0
		25	12	24.2	24.2	24.1	19.0	18.6	19.0
		25	24	24.1	24.2	24.1	19.0	18.7	19.0
		50	0	24.2	24.2	24.1	19.0	18.6	19.0
	64QAM	1	0	23.5	23.6	23.4	18.8	18.9	18.8
		1	24	23.4	23.6	23.3	18.9	18.8	18.9
		1	49	23.4	23.6	23.4	19.0	18.7	18.8
		25	0	23.4	23.4	23.2	18.9	19.0	18.8
		25	12	23.3	23.4	23.2	19.0	18.7	19.0
		25	24	23.3	23.4	23.3	19.0	18.8	19.0
50		0	23.4	23.4	23.2	19.0	18.7	19.0	

**OUTPUT POWER FOR LTE BAND 66 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				132047	132322	132597	132047	132322	132597
				1717.5 MHz	1745.0 MHz	1772.5 MHz	1717.5 MHz	1745.0 MHz	1772.5 MHz
15.0	QPSK	1	0	25.2	25.2	25.2	18.8	18.9	18.8
		1	37	25.1	25.2	25.0	18.9	18.6	19.0
		1	74	24.9	25.1	25.0	18.9	18.9	18.8
		36	0	25.1	25.1	25.1	19.0	18.8	19.0
		36	16	25.1	25.2	25.0	19.0	18.7	18.9
		36	35	25.1	25.2	25.0	18.9	18.8	18.8
		75	0	25.1	25.2	25.0	19.0	18.6	18.9
	16QAM	1	0	24.6	24.6	24.6	18.7	18.9	19.0
		1	37	24.5	24.6	24.5	18.9	18.7	18.9
		1	74	24.2	24.6	24.4	18.9	18.7	19.0
		36	0	24.2	24.3	24.2	18.8	18.8	19.0
		36	16	24.3	24.4	24.1	18.8	18.6	19.0
		36	35	24.3	24.4	24.1	18.8	18.8	19.0
		75	0	24.3	24.4	24.1	19.0	18.9	19.0
	64QAM	1	0	23.6	23.6	23.7	19.0	19.0	19.0
		1	37	23.6	23.6	23.4	18.9	18.8	19.0
		1	74	23.3	23.6	23.4	18.9	18.7	18.9
		36	0	23.4	23.4	23.4	18.7	18.9	19.0
		36	16	23.4	23.4	23.3	19.0	18.9	19.0
		36	35	23.3	23.4	23.3	19.0	18.7	19.0
		75	0	23.3	23.4	23.3	18.9	19.0	19.0

**OUTPUT POWER FOR LTE BAND 66 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				132072	132322	132572	132072	132322	132572
				1720.0 MHz	1745.0 MHz	1770.0 MHz	1720.0 MHz	1745.0 MHz	1770.0 MHz
20.0	QPSK	1	0	25.2	25.1	25.2	18.9	18.9	18.8
		1	49	25.1	25.2	25.0	19.0	18.6	18.9
		1	99	25.0	25.2	25.0	18.9	18.4	18.9
		50	0	25.2	25.1	25.1	19.0	18.7	19.0
		50	24	25.1	25.2	25.0	19.0	18.7	18.9
		50	49	24.9	25.2	24.9	19.0	18.9	18.9
		100	0	25.1	25.2	25.1	19.0	18.7	18.8
	16QAM	1	0	24.5	24.4	24.5	18.8	18.9	18.8
		1	49	24.4	24.5	24.3	19.0	18.8	19.0
		1	99	24.2	24.5	24.3	19.0	18.6	19.0
		50	0	24.1	24.1	24.1	18.9	18.7	19.0
		50	24	24.1	24.1	24.0	18.8	18.8	19.0
		50	49	24.0	24.1	24.0	18.8	18.7	19.0
		100	0	24.1	24.2	24.1	19.0	18.8	19.0
	64QAM	1	0	23.7	23.6	23.6	19.0	19.0	19.0
		1	49	23.6	23.7	23.4	19.0	18.8	19.0
		1	99	23.4	23.8	23.5	19.0	18.6	19.0
		50	0	23.6	23.3	23.3	19.0	18.9	18.9
		50	24	23.5	23.4	23.2	18.8	18.6	19.0
		50	49	23.4	23.4	23.2	19.0	18.6	19.0
		100	0	23.5	23.4	23.2	18.9	18.8	18.9

### 7.14. LTE BAND 71

Test Engineer ID:	39004	Test Date:	9/27/2019
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#### OUTPUT POWER FOR LTE BAND 71 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				133147	133297	133447	133147	133297	133447
5.0	QPSK	1	0	25.1	25.2	25.1	23.4	23.3	23.4
		1	12	25.0	25.1	25.2	23.3	23.4	23.4
		1	24	24.9	25.1	<b>25.2</b>	23.5	<b>23.5</b>	23.3
		12	0	25.2	25.1	25.1	22.3	22.4	22.4
		12	6	25.1	25.0	25.2	22.3	22.4	22.4
		12	11	25.1	25.0	25.2	22.4	22.4	22.3
	16QAM	25	0	25.1	25.1	25.2	22.3	22.4	22.4
		1	0	24.5	24.6	24.6	22.7	22.8	22.8
		1	12	24.3	24.6	24.7	22.6	22.8	22.8
		1	24	24.2	24.6	<b>24.8</b>	22.9	<b>22.9</b>	22.6
		12	0	24.2	24.3	24.2	21.4	21.5	21.5
		12	6	24.1	24.3	24.3	21.4	21.5	21.5
	64QAM	12	11	24.1	24.2	24.3	21.4	21.5	21.4
		25	0	24.1	24.3	24.3	21.4	21.5	21.5
		1	0	23.8	<b>23.9</b>	23.6	21.8	21.8	<b>22.0</b>
		1	12	23.6	23.8	23.7	21.6	21.8	21.9
		1	24	23.6	23.8	23.8	21.9	21.9	21.5
		12	0	23.5	23.6	23.4	20.5	20.6	20.7
	64QAM	12	6	23.5	23.6	22.9	20.5	20.5	20.6
		12	11	23.5	23.5	23.0	20.5	20.6	20.5
		25	0	23.5	23.5	22.9	20.4	20.6	20.6

#### OUTPUT POWER FOR LTE BAND 71 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				133172	133322	133422	133172	133322	133422
10.0	QPSK	1	0	25.0	25.1	24.8	23.3	23.4	23.2
		1	24	24.8	25.0	25.1	23.3	23.5	23.4
		1	49	24.8	24.9	25.1	<b>23.5</b>	23.2	23.3
		25	0	25.0	25.0	24.9	22.2	22.4	22.4
		25	12	24.8	24.9	25.1	22.3	22.5	22.4
		25	24	24.9	24.9	<b>25.2</b>	22.4	22.3	22.4
	16QAM	50	0	24.9	24.8	25.1	22.4	22.4	22.4
		1	0	24.4	24.6	24.4	22.7	22.6	22.7
		1	24	24.2	24.5	24.7	22.7	22.8	22.9
		1	49	24.4	24.4	<b>24.8</b>	<b>23.0</b>	22.5	22.6
		25	0	24.2	24.3	24.2	21.3	21.5	21.5
		25	12	24.1	24.2	24.3	21.4	21.6	21.5
	64QAM	25	24	24.1	24.2	24.4	21.5	21.5	21.5
		50	0	24.1	24.1	24.3	21.4	21.5	21.5
		1	0	23.6	23.7	23.4	21.6	21.7	21.6
		1	24	23.6	23.6	23.7	21.7	21.8	21.9
		1	49	23.6	23.5	<b>23.8</b>	<b>21.9</b>	21.6	21.6
		25	0	23.6	23.5	23.3	20.3	20.6	20.6
	64QAM	25	12	23.4	23.4	23.5	20.5	20.7	20.6
		25	24	23.5	23.5	23.6	20.6	20.5	20.7
		50	0	23.6	23.3	23.5	20.5	20.6	20.5

**OUTPUT POWER FOR LTE BAND 71 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				133197	133297	133397	133197	133297	133397
				670.5 MHz	680.5 MHz	690.5 MHz	670.5 MHz	680.5 MHz	690.5 MHz
15.0	QPSK	1	0	25.1	25.2	25.0	23.3	23.2	<b>23.5</b>
		1	37	25.0	25.1	25.0	23.4	23.5	23.3
		1	74	24.8	25.0	<b>25.2</b>	23.5	23.4	23.2
		36	0	25.0	25.0	24.9	22.3	22.3	22.4
		36	16	25.0	25.1	24.9	22.4	22.5	22.4
		36	35	24.9	24.9	25.1	22.6	22.5	22.4
		75	0	25.0	25.1	25.0	22.4	22.5	22.4
	16QAM	1	0	24.5	24.6	24.5	22.6	22.5	<b>22.9</b>
		1	37	24.3	24.5	24.5	22.8	22.7	22.7
		1	74	24.1	24.4	<b>24.8</b>	22.9	22.8	22.6
		36	0	24.2	24.2	24.1	21.3	21.4	21.5
		36	16	24.2	24.2	24.1	21.5	21.6	21.4
		36	35	24.1	24.1	24.3	21.7	21.6	21.5
		75	0	24.2	24.2	24.2	21.5	21.5	21.4
	64QAM	1	0	23.7	23.8	23.7	21.4	21.6	21.8
		1	37	23.7	23.8	<b>23.6</b>	21.8	<b>21.9</b>	21.6
		1	74	23.4	23.6	<b>23.9</b>	21.8	21.8	21.5
		36	0	23.7	23.5	23.4	20.4	20.5	20.6
		36	16	23.7	23.6	23.5	20.6	20.7	20.6
		36	35	23.5	23.5	23.6	20.7	20.7	20.6
		75	0	23.5	23.6	23.5	20.6	20.6	20.5

**OUTPUT POWER FOR LTE BAND 71 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	LAT 1			UAT 1		
				Conducted Average (dBm)			Conducted Average (dBm)		
				133222	133322	133372	133222	133322	133372
				673.0 MHz	683.0 MHz	688.0 MHz	673.0 MHz	683.0 MHz	688.0 MHz
20.0	QPSK	1	0	25.1	25.2	25.0	23.2	23.3	23.4
		1	49	24.9	25.0	24.8	<b>23.5</b>	23.5	23.3
		1	99	24.9	25.1	<b>25.2</b>	23.4	23.3	23.3
		50	0	25.0	25.0	24.8	22.3	22.3	22.6
		50	24	24.9	24.9	24.8	22.5	22.4	22.3
		50	49	24.8	24.9	25.0	22.4	22.3	22.4
		100	0	24.9	24.9	24.8	22.5	22.4	22.3
	16QAM	1	0	24.5	24.6	24.4	22.5	22.5	<b>22.9</b>
		1	49	24.2	24.5	24.2	22.8	22.8	22.7
		1	99	24.2	24.6	<b>24.7</b>	22.7	22.7	22.7
		50	0	24.1	24.2	23.8	21.3	21.4	21.6
		50	24	24.0	24.1	23.7	21.6	21.5	21.3
		50	49	23.9	24.1	24.0	21.5	21.4	21.4
		100	0	24.0	24.1	23.7	21.6	21.5	21.3
	64QAM	1	0	23.8	23.9	23.9	21.6	21.4	21.9
		1	49	23.5	23.8	23.6	<b>21.9</b>	21.7	21.7
		1	99	23.5	23.8	<b>24.1</b>	21.8	21.6	21.7
		50	0	23.5	23.6	23.4	20.4	20.5	20.7
		50	24	23.4	23.4	23.4	20.6	20.5	20.4
		50	49	23.4	23.4	23.6	20.5	20.4	20.5
		100	0	23.5	23.5	23.4	20.6	20.5	20.4

## 8. CONDUCTED TEST RESULTS

### 8.1. 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 middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

#### MODES TESTED

- LTE Band 2
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 14
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 30
- LTE Band 41
- LTE Band 48
- LTE Band 66
- LTE Band 71

#### RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested.

**LTE BAND 2**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 2	1.4MHz, QPSK	6/0	1880.0	1.0866	1.244
	1.4MHz, 16QAM			1.0922	1.247
	1.4MHz 64QAM			1.0866	1.240
	3MHz, QPSK	15/0		2.6860	2.986
	3MHz, 16QAM			2.6995	2.980
	3MHz 64QAM			2.7016	2.989
	5MHz, QPSK	25/0		4.4860	4.876
	5MHz, 16QAM			4.4992	4.801
	5MHz 64QAM			4.4899	4.845
	10MHz, QPSK	50/0		8.9501	9.725
	10MHz, 16QAM			8.9019	9.916
	10MHz 64QAM			8.9491	9.415
	15MHz, QPSK	75/0		13.4290	14.734
	15MHz, 16QAM			13.4400	14.760
	15MHz 64QAM			13.4134	14.863
	20MHz, QPSK	100/0		17.9099	19.583
	20MHz, 16QAM			17.8939	19.729
	20MHz 64QAM			17.8738	19.561

**LTE BAND 5**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 5	1.4MHz, QPSK	6/0	836.5	1.0888	1.244
	1.4MHz, 16QAM			1.0839	1.242
	1.4MHz 64QAM			1.0860	1.237
	3MHz, QPSK	15/0		2.6922	2.986
	3MHz, 16QAM			2.6882	2.992
	3MHz 64QAM			2.6885	2.975
	5MHz, QPSK	25/0		4.4903	4.761
	5MHz, 16QAM			4.4860	4.831
	5MHz 64QAM			4.4953	4.788
	10MHz, QPSK	50/0		8.9487	9.753
	10MHz, 16QAM			8.9419	9.451
	10MHz 64QAM			8.8633	9.880



**LTE BAND 7**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 7	5MHz, QPSK	25/0	2535.0	4.4846	4.793
	5MHz, 16QAM			4.4752	4.910
	5MHz 64QAM			4.5071	4.898
	10MHz, QPSK	50/0		8.9811	9.682
	10MHz, 16QAM			8.9633	9.731
	10MHz 64QAM			8.9954	9.536
	15MHz, QPSK	75/0		13.4194	14.878
	15MHz, 16QAM			13.4382	15.082
	15MHz 64QAM			13.4290	15.097
	20MHz, QPSK	100/0		17.8825	19.509
	20MHz, 16QAM			17.9100	19.754
	20MHz 64QAM			17.9186	19.848

**LTE BAND 12**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4 MHz, QPSK	6/0	707.5	1.0863	1.240
	1.4 MHz, 16QAM			1.0917	1.240
	1.4 MHz 64QAM			1.0881	1.243
	3 MHz, QPSK	15/0		2.6935	2.983
	3 MHz, 16QAM			2.6874	2.976
	3 MHz 64QAM			2.6910	2.977
	5 MHz, QPSK	25/0		4.5003	4.844
	5 MHz, 16QAM			4.4754	4.887
	5 MHz 64QAM			4.5210	4.858
	10 MHz, QPSK	50/0		8.9768	9.533
	10 MHz, 16QAM			8.9333	9.596
	10 MHz 64QAM			8.9671	9.601

**LTE BAND 13**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5 MHz, QPSK	25/0	782.0	4.4885	4.897
	5 MHz, 16QAM			4.4750	4.857
	5 MHz 64QAM			4.4954	4.885
	10 MHz, QPSK	50/0		8.9002	9.726
	10 MHz, 16QAM			8.9538	9.769
	10 MHz 64QAM			8.9499	9.713

**LTE BAND 14**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 14	5 MHz, QPSK	25/0	793.0	4.5037	4.772
	5 MHz, 16QAM			4.4526	4.880
	5M Hz 64QAM			4.4756	4.921
	10 MHz, QPSK	50/0		8.9368	9.734
	10 MHz, 16QAM			8.9621	9.700
	10 MHz 64QAM			8.9636	9.490

**LTE BAND 17**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 17	5 MHz, QPSK	25/0	710.0	4.4819	4.854
	5 MHz, 16QAM			4.4960	4.848
	5 MHz 64QAM			4.4735	4.815
	10 MHz, QPSK	50/0		8.9402	9.923
	10 MHz, 16QAM			8.9619	9.586
	10 MHz 64QAM			8.9159	9.774

**LTE BAND 25**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 25	1.4MHz, QPSK	6/0	1882.5	1.0908	1.236
	1.4MHz, 16QAM			1.0905	1.243
	1.4MHz 64QAM			1.0940	1.246
	3MHz, QPSK	15/0		2.6985	2.981
	3MHz, 16QAM			2.6968	2.990
	3MHz 64QAM			2.6934	2.969
	5MHz, QPSK	25/0		4.4858	4.867
	5MHz, 16QAM			4.4590	4.875
	5MHz 64QAM			4.4953	4.872
	10MHz, QPSK	50/0		8.9358	9.715
	10MHz, 16QAM			8.9637	9.696
	10MHz 64QAM			8.9120	9.582
	15MHz, QPSK	75/0		13.4547	14.957
	15MHz, 16QAM			13.4231	14.890
	15MHz 64QAM			13.4171	14.809
	20MHz, QPSK	100/0		17.8687	19.064
	20MHz, 16QAM			17.9139	19.473
	20MHz 64QAM			17.8811	19.502

**LTE BAND 26(PART 90S)**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4 MHz, QPSK	1/0	819.0	0.2544	0.360
	1.4 MHz, 16QAM			0.2551	0.336
	1.4 MHz, 64QAM			0.2815	0.356
	1.4 MHz, QPSK	6/0		1.0844	1.241
	1.4 MHz, 16QAM			1.0904	1.238
	1.4 MHz 64QAM			1.0864	1.233
	3 MHz, QPSK	1/0		0.2630	0.394
	3 MHz, 16QAM			0.2873	0.438
	3 MHz, 64QAM			0.3079	0.446
	3 MHz, QPSK	15/0		2.6879	2.969
	3 MHz, 16QAM			2.6870	2.963
	3 MHz 64QAM			2.6896	2.963
	5 MHz, QPSK	1/0		0.2388	0.402
	5 MHz, 16QAM			0.2517	0.414
	5 MHz, 64QAM			0.2567	0.405
	5 MHz, QPSK	25/0		4.5006	4.915
	5 MHz, 16QAM			4.5257	4.872
	5 MHz 64QAM			4.4807	4.890
	10 MHz, QPSK	1/0		0.2427	0.378
	10 MHz, 16QAM			0.2611	0.429
	10 MHz, 64QAM			0.2436	0.354
	10 MHz, QPSK	50/0		8.9733	9.860
	10 MHz, 16QAM			8.9156	9.708
	10 MHz 64QAM			8.9778	9.768

**LTE BAND 30**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 30	5MHz, QPSK	25/0	2310.0	4.4955	4.859
	5MHz, 16QAM			4.4863	4.845
	5MHz 64QAM			4.4892	4.824
	10MHz, QPSK	50/0		8.9299	9.786
	10MHz, 16QAM			8.9561	9.822
	10MHz 64QAM			8.9616	9.705

**LTE BAND 41**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.4999	4.797
	5MHz, 16QAM			4.4903	4.746
	5MHz 64QAM			4.4937	4.738
	10MHz, QPSK	50/0		8.9262	9.879
	10MHz, 16QAM			8.9253	10.387
	10MHz 64QAM			8.9499	9.742
	15MHz, QPSK	75/0		13.4327	14.567
	15MHz, 16QAM			13.4088	15.861
	15MHz 64QAM			13.3942	15.216
	20MHz, QPSK	100/0		17.8595	21.133
	20MHz, 16QAM			17.9145	21.509
	20MHz 64QAM			17.8258	25.552

**LTE BAND 48**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 48	5MHz, QPSK	25/0	3625.0	4.4789	4.796
	5MHz, 16QAM			4.4894	4.867
	5MHz 64QAM			4.4836	4.826
	10MHz, QPSK	50/0		8.9873	9.896
	10MHz, 16QAM			8.9582	9.592
	10MHz 64QAM			8.9341	9.637
	15MHz, QPSK	75/0		13.425	14.25
	15MHz, 16QAM			13.443	14.59
	15MHz 64QAM			13.447	14.26
	20MHz, QPSK	100/0		17.948	18.92
	20MHz, 16QAM			17.946	19.26
	20MHz 64QAM			17.930	19.79

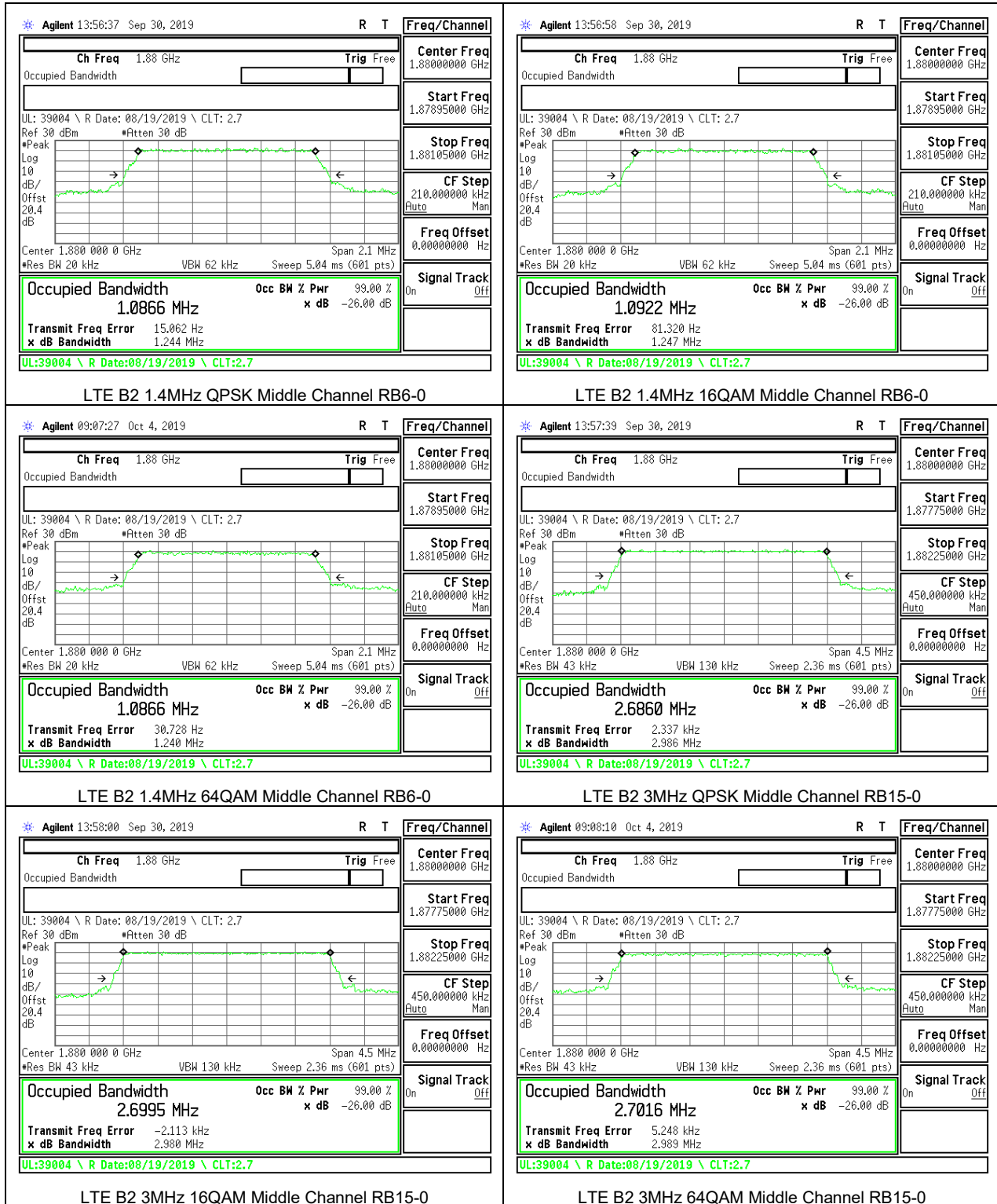
**LTE BAND 66**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 66	1.4MHz, QPSK	6/0	1745.0	1.0907	1.248
	1.4MHz, 16QAM			1.0913	1.236
	1.4MHz 64QAM			1.0875	1.243
	3MHz, QPSK	15/0		2.6880	2.995
	3MHz, 16QAM			2.6926	2.994
	3MHz 64QAM			2.6954	2.995
	5MHz, QPSK	25/0		4.4977	4.952
	5MHz, 16QAM			4.4775	4.800
	5MHz 64QAM			4.4928	4.970
	10MHz, QPSK	50/0		8.9578	9.765
	10MHz, 16QAM			8.9414	9.578
	10MHz 64QAM			8.9461	9.487
	15MHz, QPSK	75/0		13.4489	15.011
	15MHz, 16QAM			13.4308	15.077
	15MHz 64QAM			13.4014	14.894
	20MHz, QPSK	100/0		17.9329	19.849
	20MHz, 16QAM			17.9181	19.617
	20MHz 64QAM			17.9047	19.674

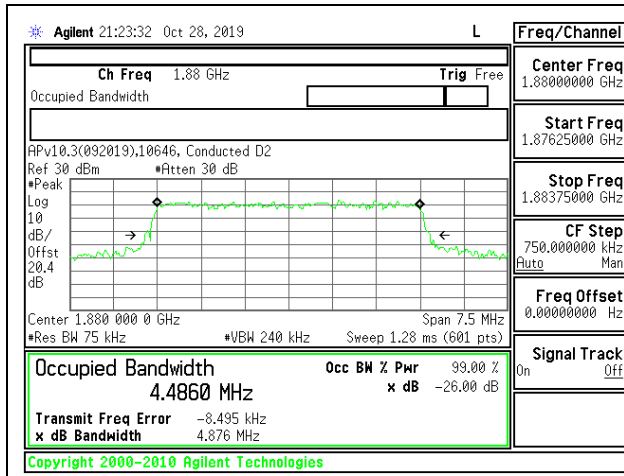
**LTE BAND 71**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 71	5MHz, QPSK	1/0	680.5	0.2612	0.387
	5MHz, 16QAM			0.3059	0.439
	5MHz, 64QAM			0.3106	0.383
	5MHz, QPSK	25/0		4.4757	4.939
	5MHz, 16QAM			4.4913	4.969
	5MHz 64QAM			4.5015	5.001
	10MHz, QPSK	1/0		0.2983	0.458
	10MHz, 16QAM			0.3466	0.537
	10MHz, 64QAM			0.2839	0.440
	10MHz, QPSK	50/0		8.9228	9.906
	10MHz, 16QAM			8.9447	9.716
	10MHz 64QAM			8.9537	10.182
	15MHz, QPSK	1/0		0.2910	0.471
	15MHz, 16QAM			0.3170	0.487
	15MHz, 64QAM			0.3160	0.466
	15MHz, QPSK	75/0		13.5275	19.458
	15MHz, 16QAM			13.5449	18.966
	15MHz 64QAM			13.5217	18.414
	20MHz, QPSK	1/0		0.2815	0.424
	20MHz, 16QAM			0.3146	0.463
20MHz, 64QAM	0.2800		0.419		
20MHz, QPSK	100/0	17.9762	26.500		
20MHz, 16QAM		18.0267	25.755		
20MHz 64QAM		17.9768	23.890		

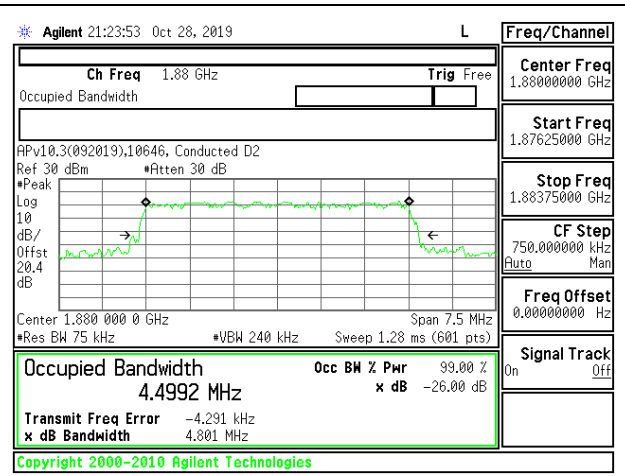
8.1.1. LTE BAND 2



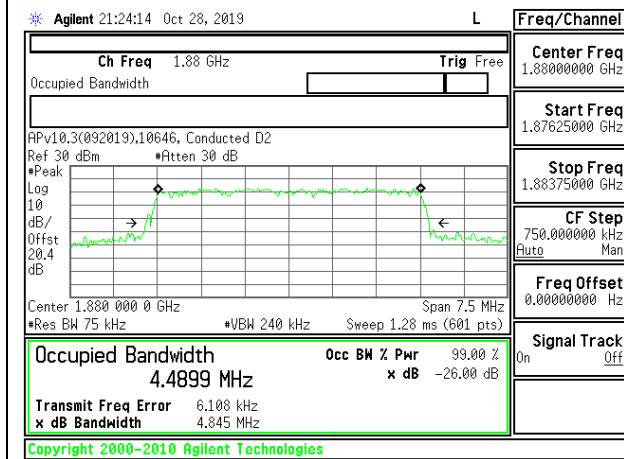




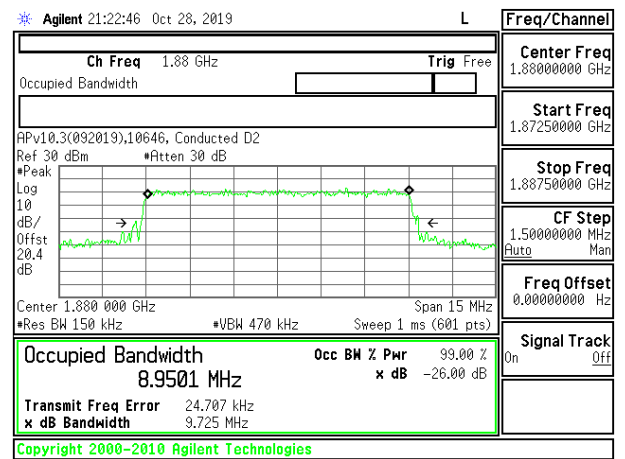
LTE B2 5MHz QPSK Middle Channel RB25-0



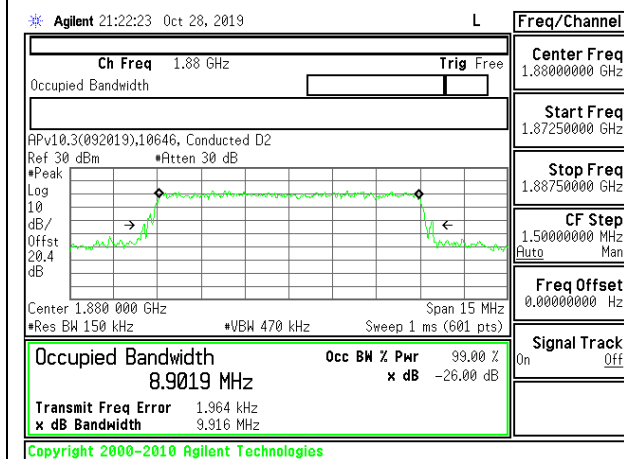
LTE B2 5MHz 16QAM Middle Channel RB25-0



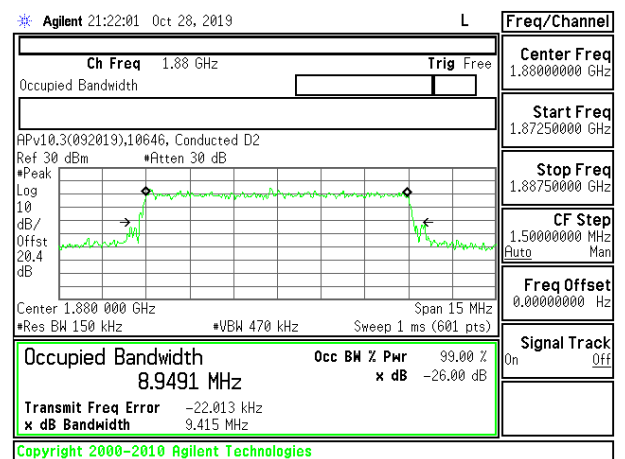
LTE B2 5MHz 64QAM Middle Channel RB25-0



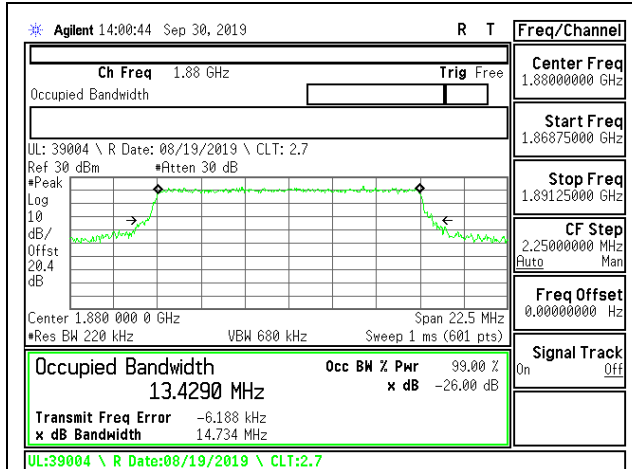
LTE B2 10MHz QPSK Middle Channel RB50-0



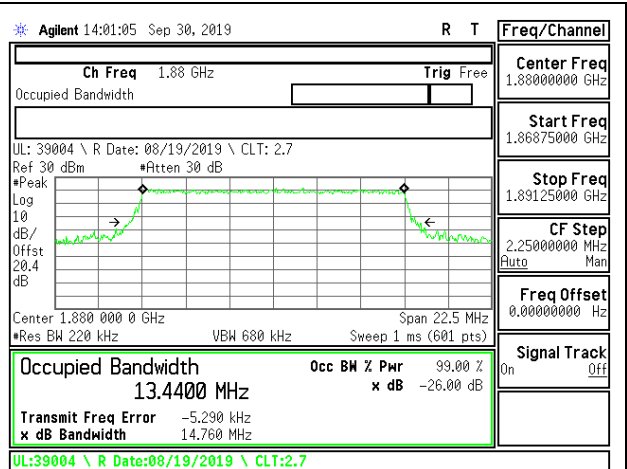
LTE B2 10MHz 16QAM Middle Channel RB50-0



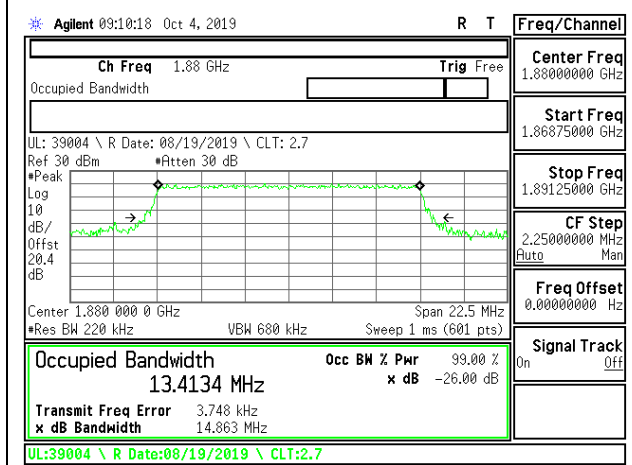
LTE B2 10MHz 64QAM Middle Channel RB50-0



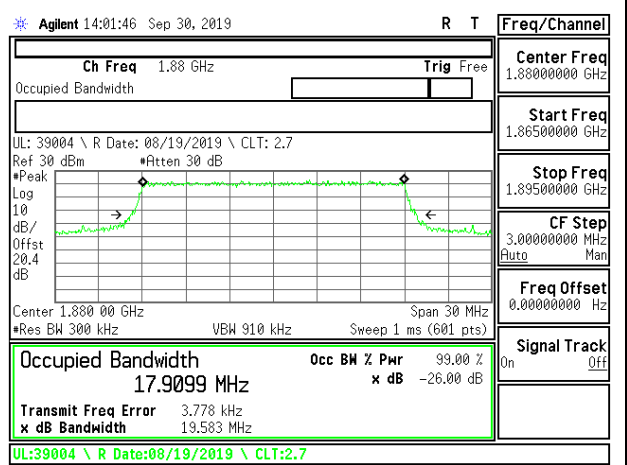
LTE B2 15MHz QPSK Middle Channel RB75-0



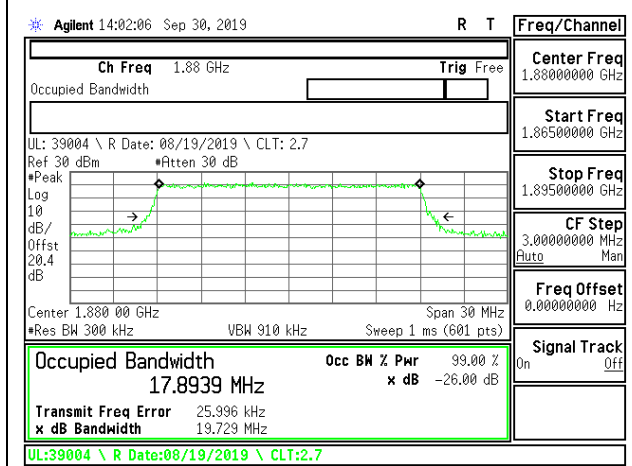
LTE B2 15MHz 16QAM Middle Channel RB75-0



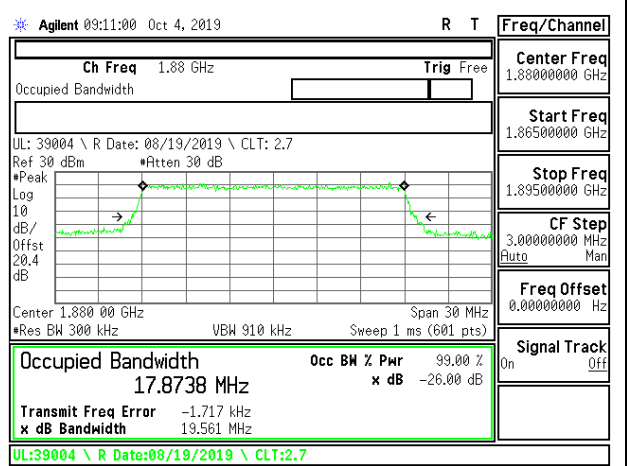
LTE B2 15MHz 64QAM Middle Channel RB75-0



LTE B2 20MHz QPSK Middle Channel RB100-0

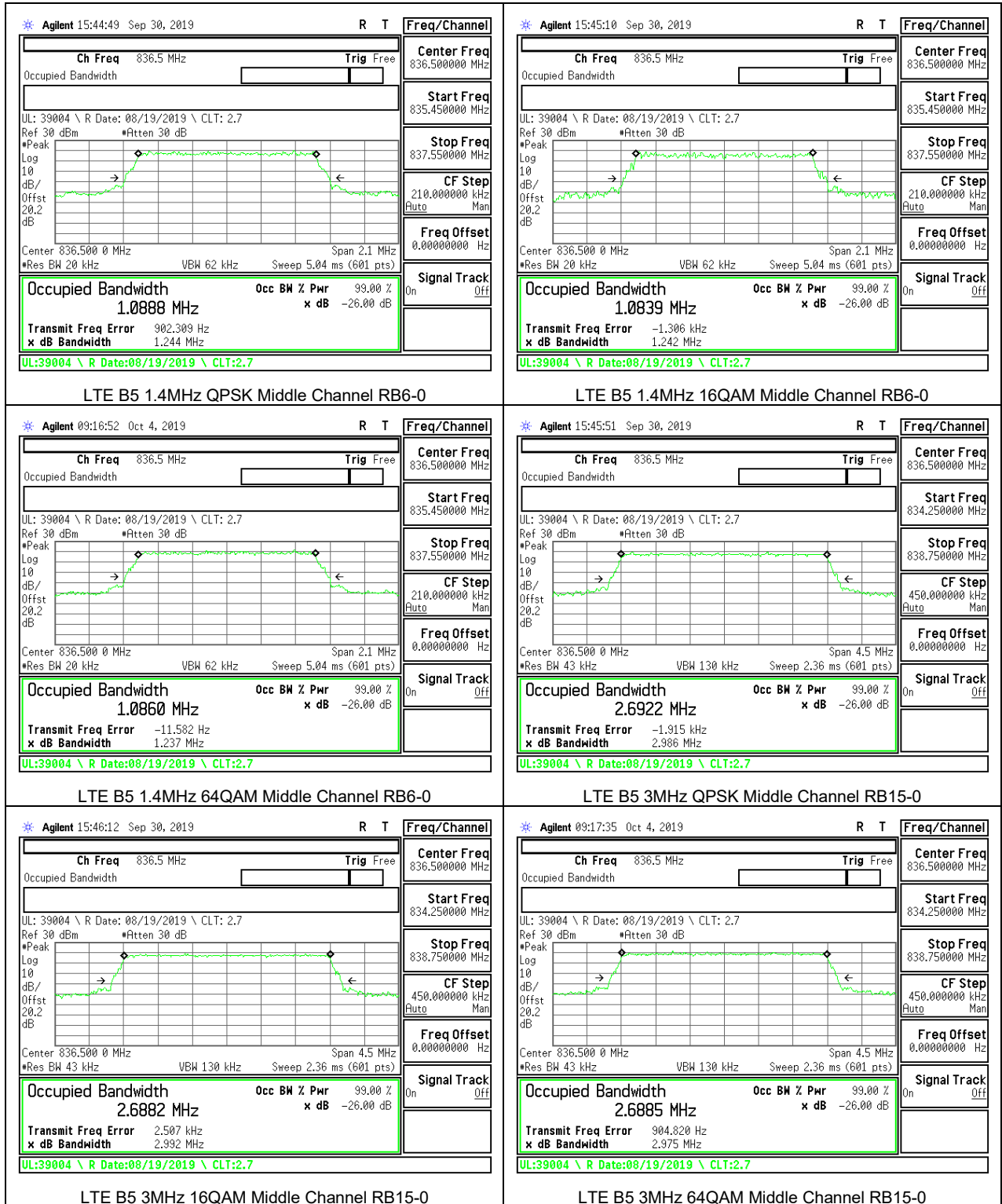


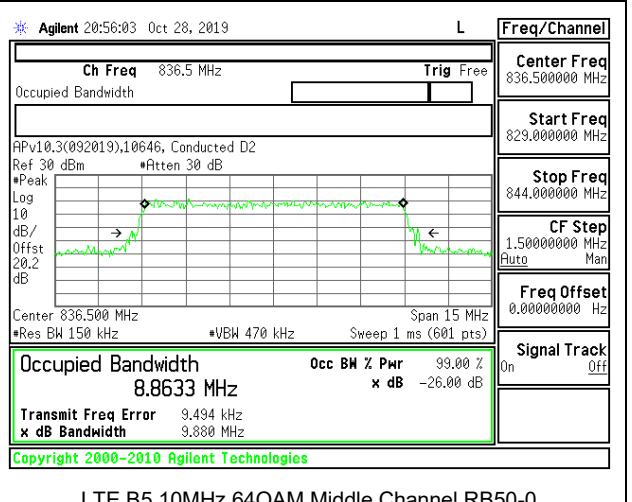
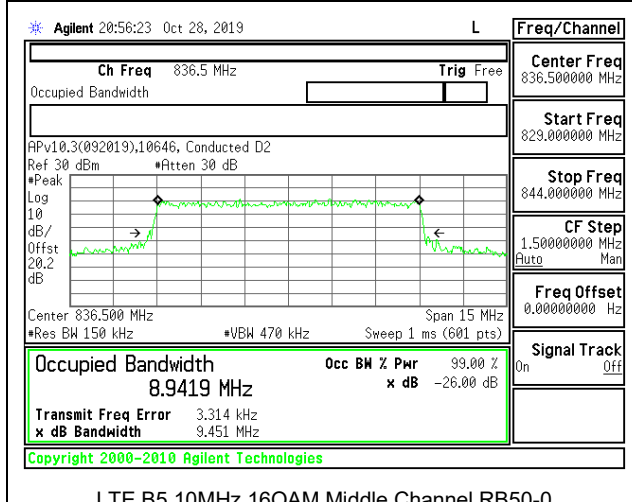
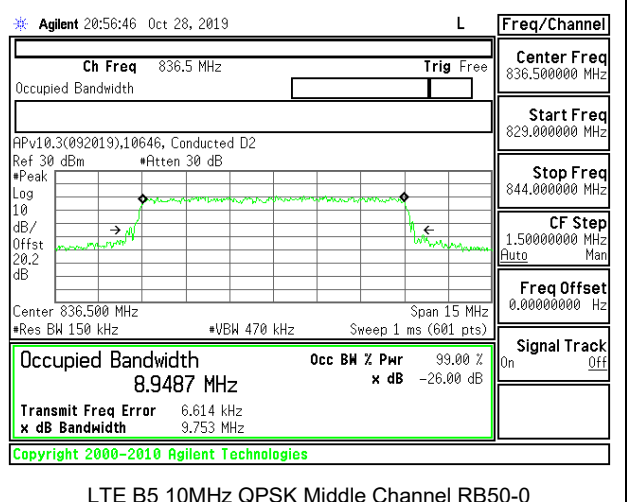
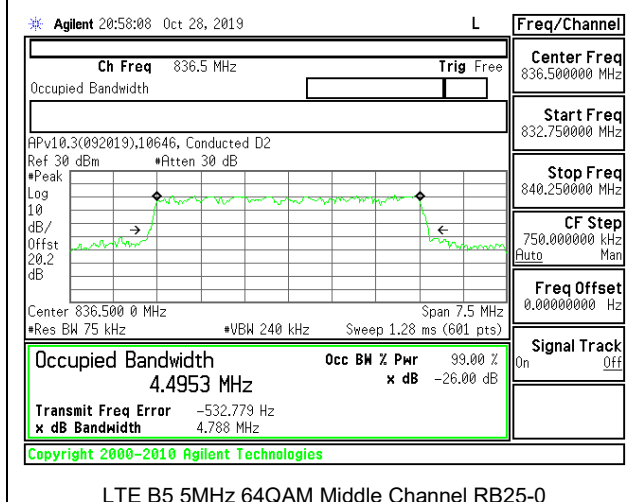
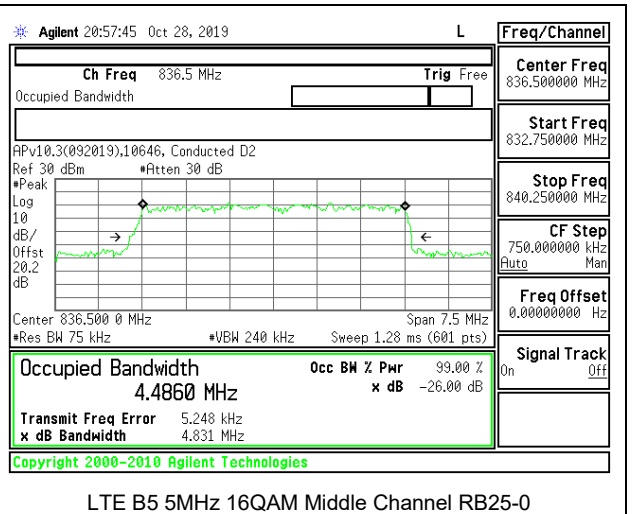
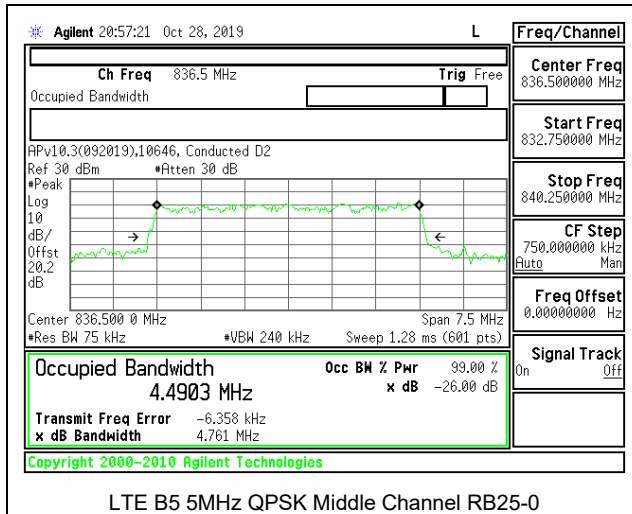
LTE B2 20MHz 16QAM Middle Channel RB100-0



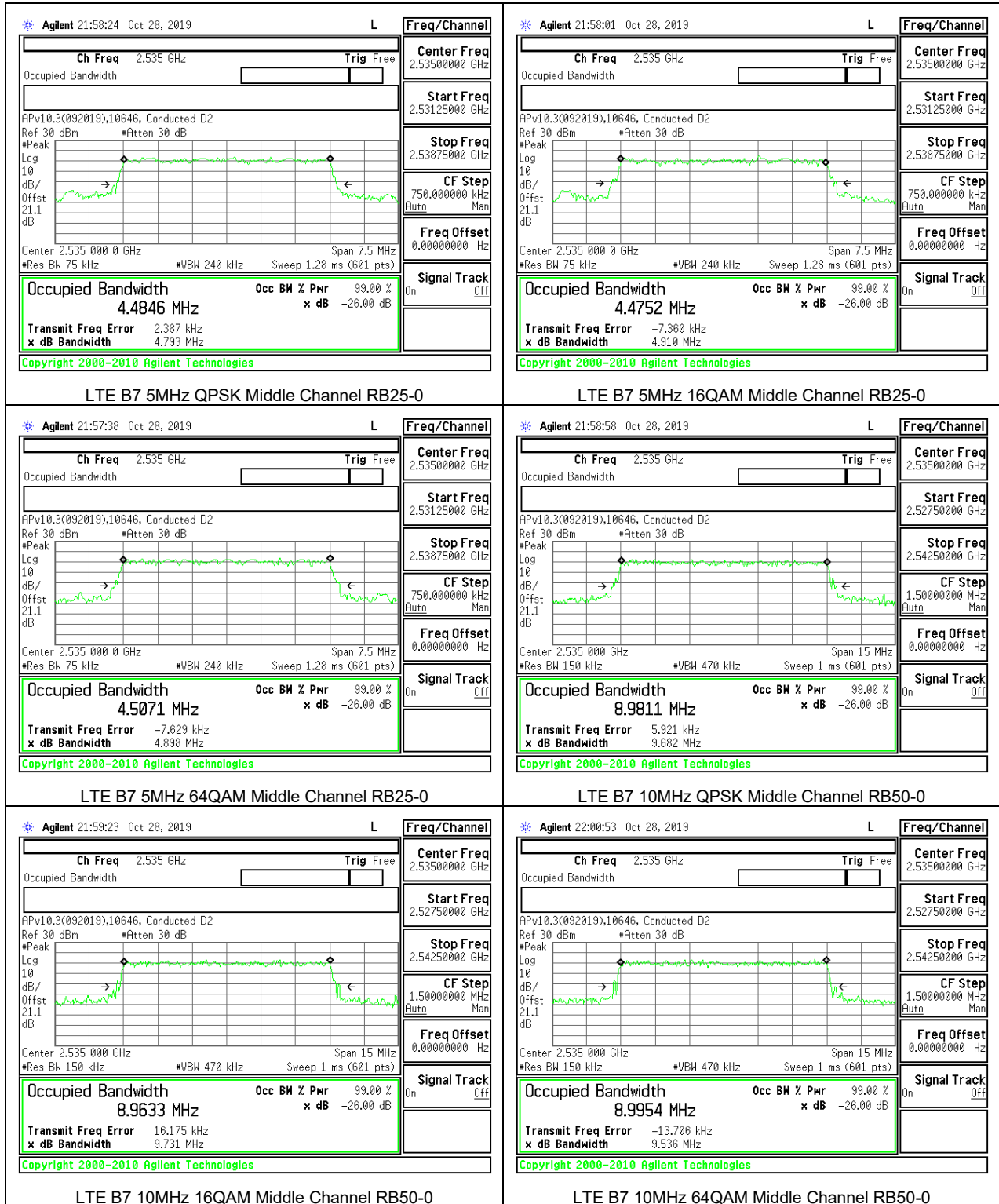
LTE B2 20MHz 64QAM Middle Channel RB100-0

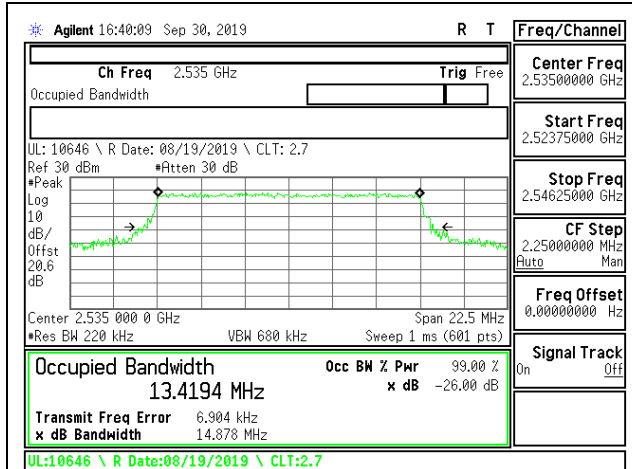
8.1.2. LTE BAND 5



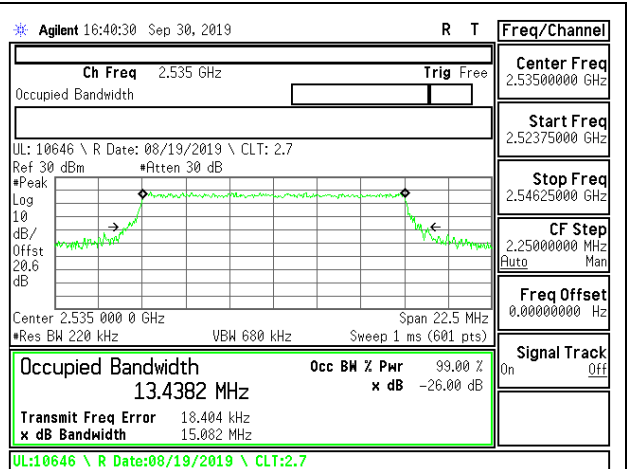


8.1.3. LTE BAND 7

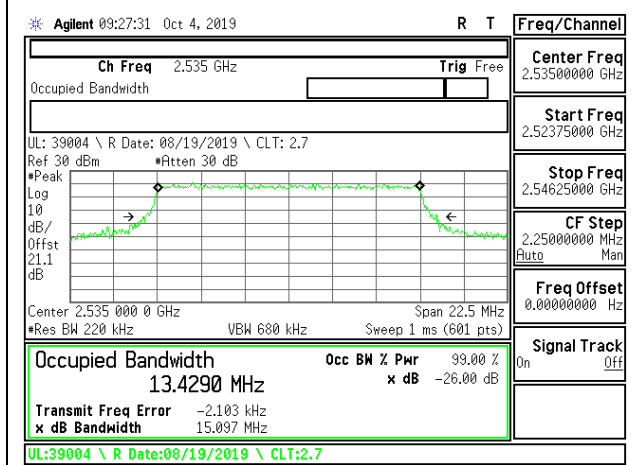




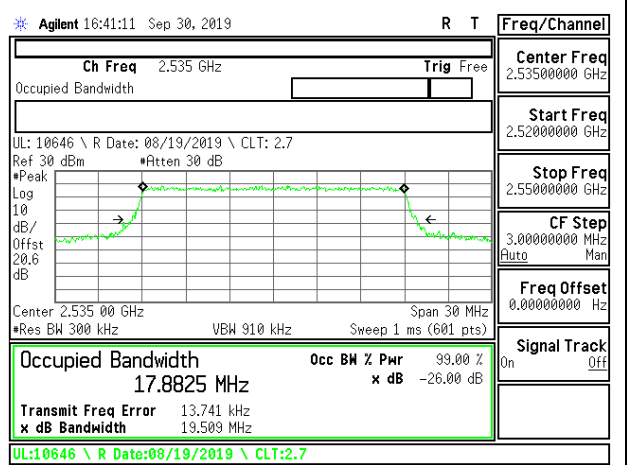
LTE B7 15MHz QPSK Middle Channel RB75-0



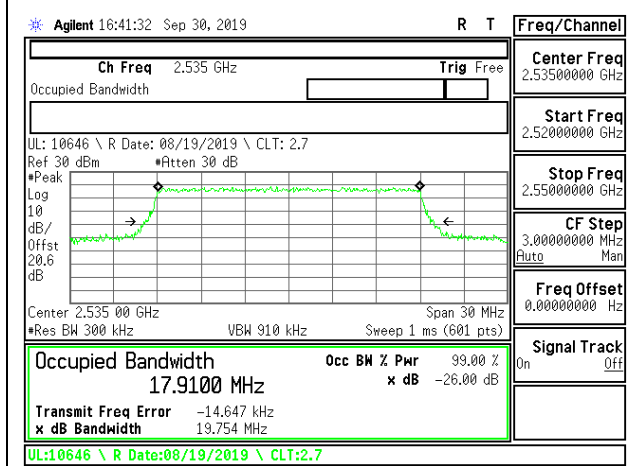
LTE B7 15MHz 16QAM Middle Channel RB75-0



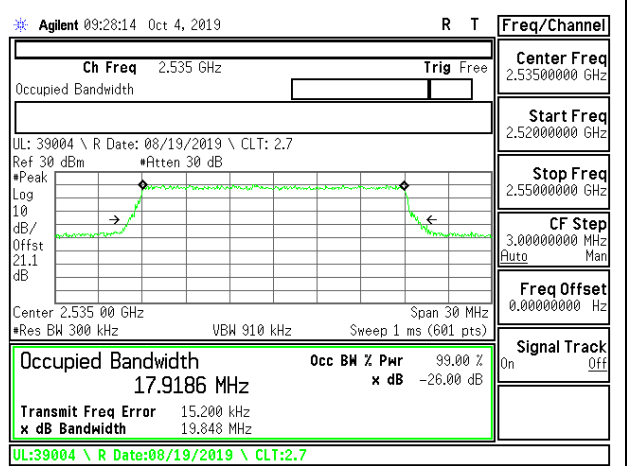
LTE B7 15MHz 64QAM Middle Channel RB75-0



LTE B7 20MHz QPSK Middle Channel RB100-0

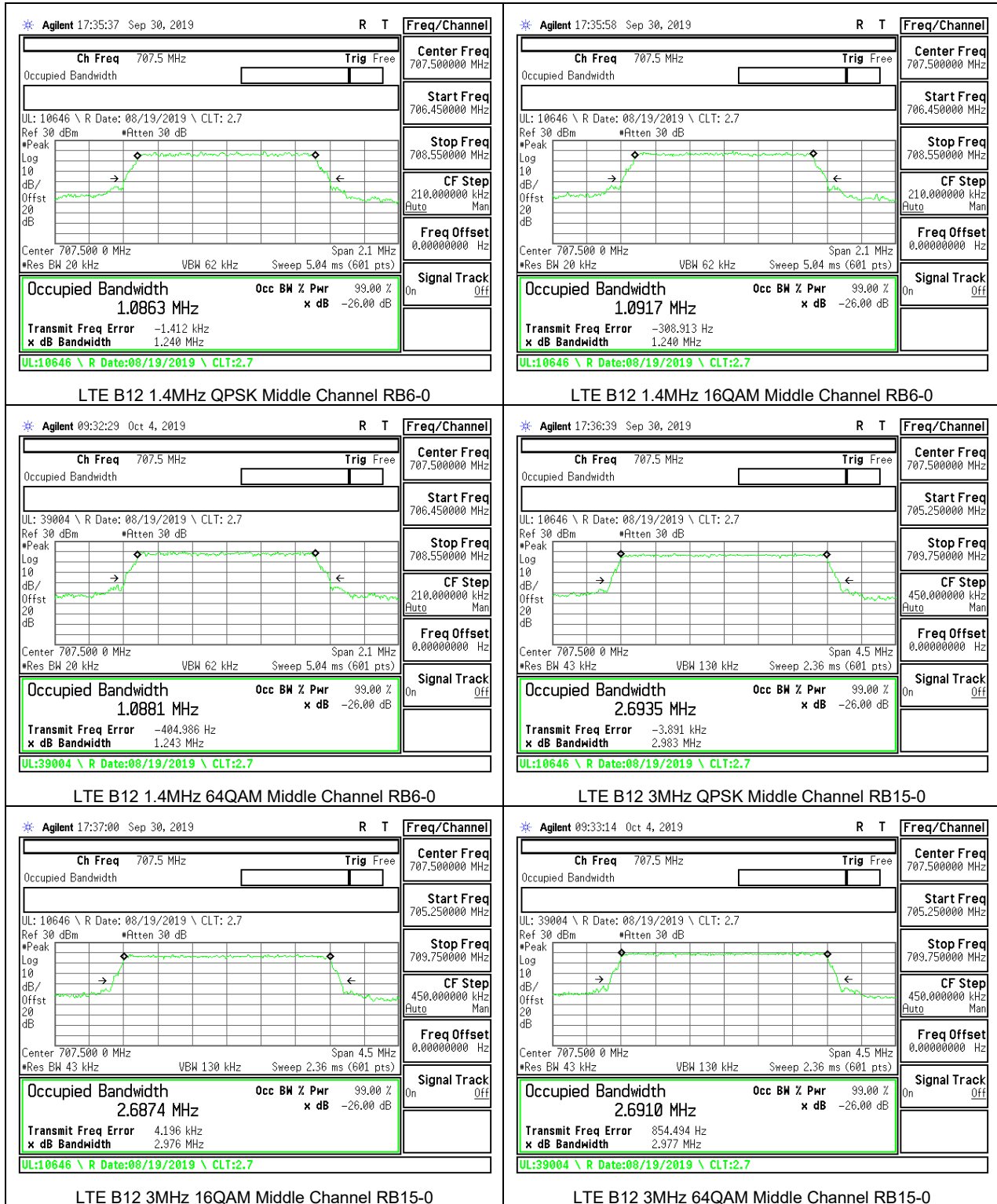


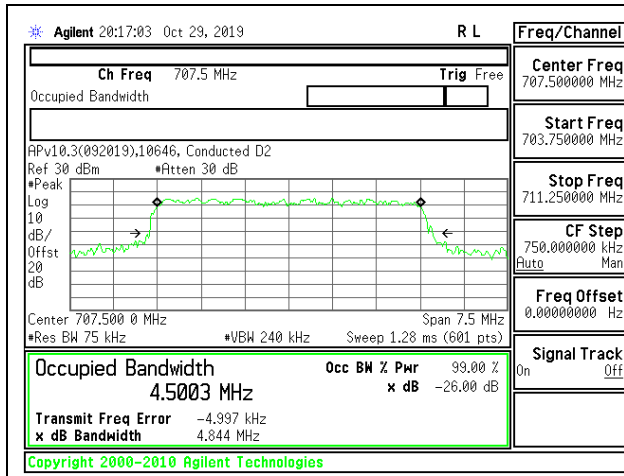
LTE B7 20MHz 16QAM Middle Channel RB100-0



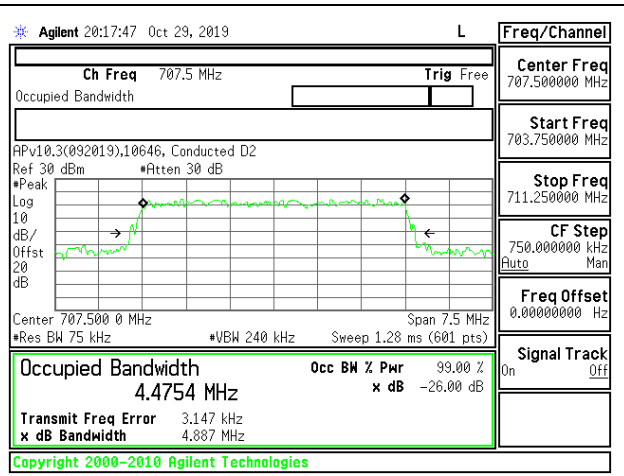
LTE B7 20MHz 64QAM Middle Channel RB100-0

8.1.4. LTE BAND 12

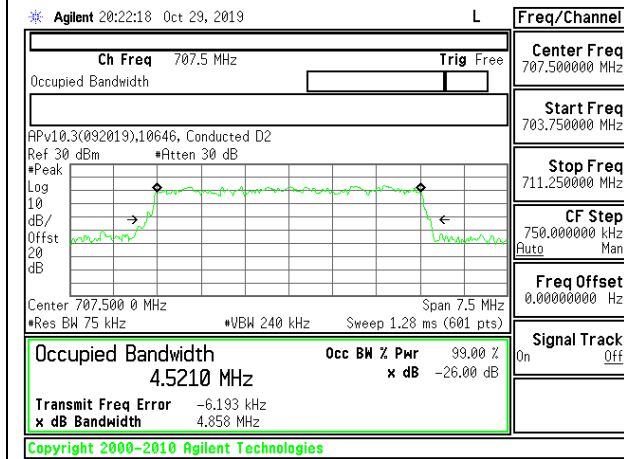




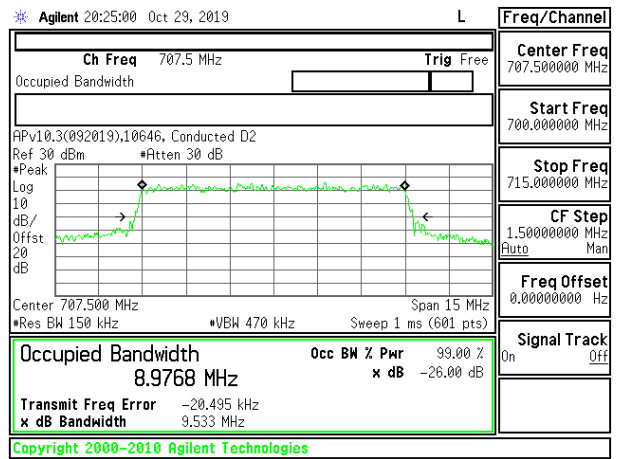
LTE B12 5MHz QPSK Middle Channel RB25-0



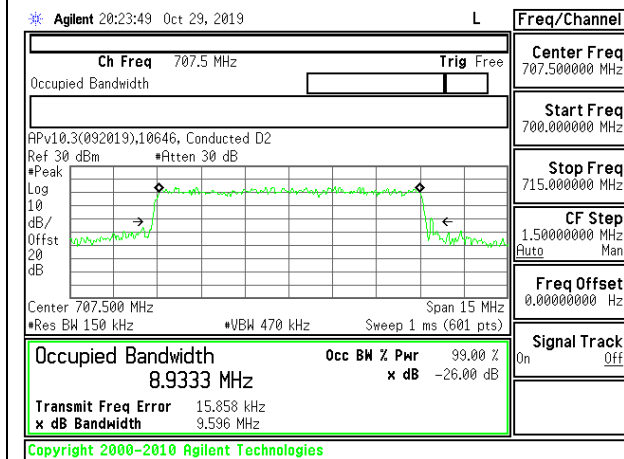
LTE B12 5MHz 16QAM Middle Channel RB25-0



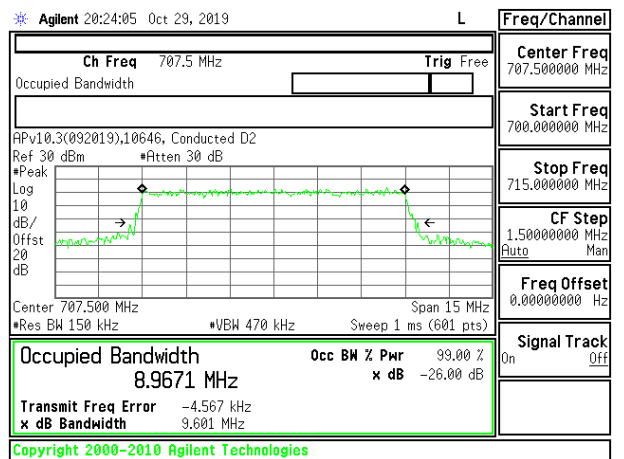
LTE B12 5MHz 64QAM Middle Channel RB25-0



LTE B12 10MHz QPSK Middle Channel RB50-0



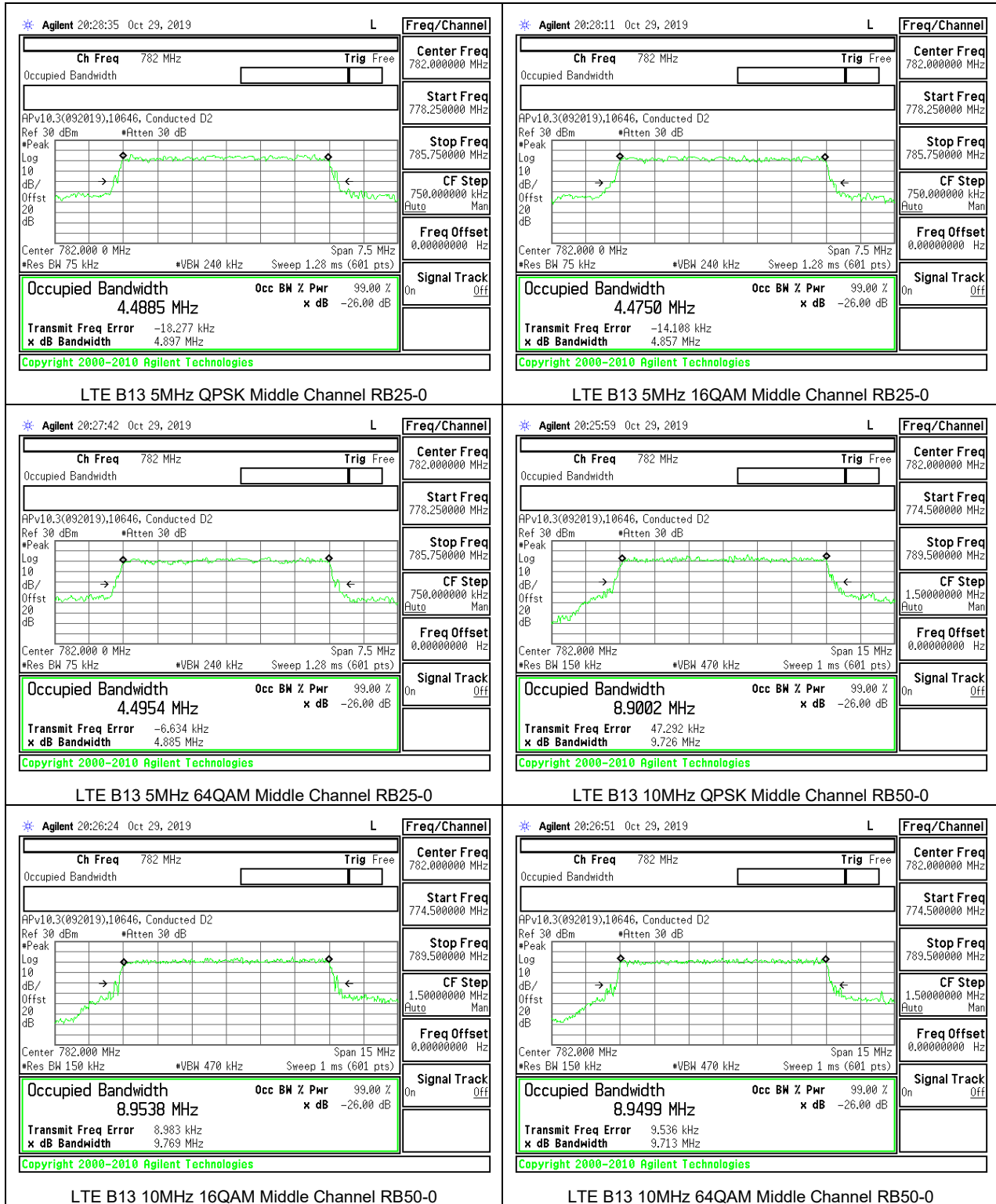
LTE B12 10MHz 16QAM Middle Channel RB50-0



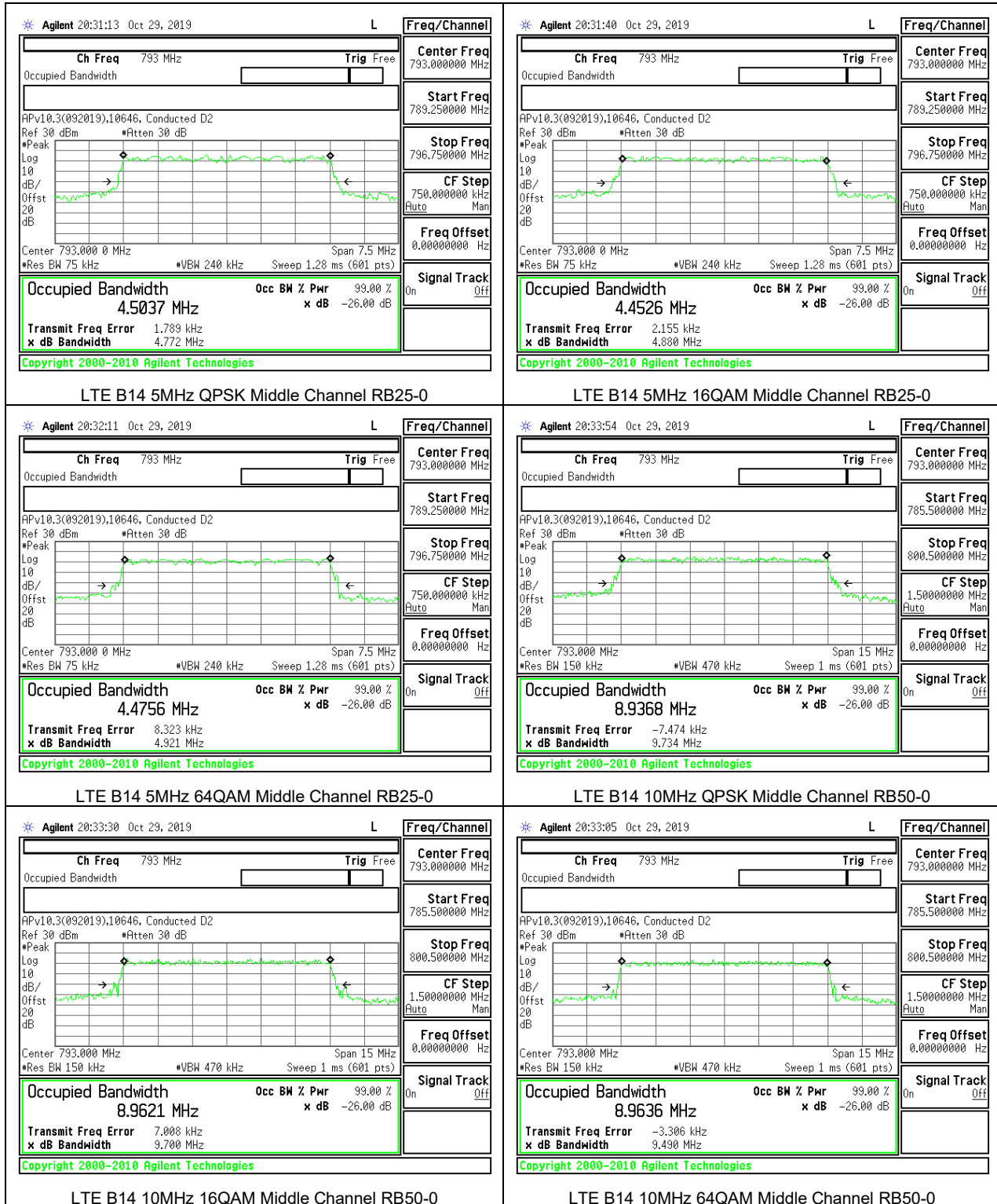
LTE B12 10MHz 64QAM Middle Channel RB50-0



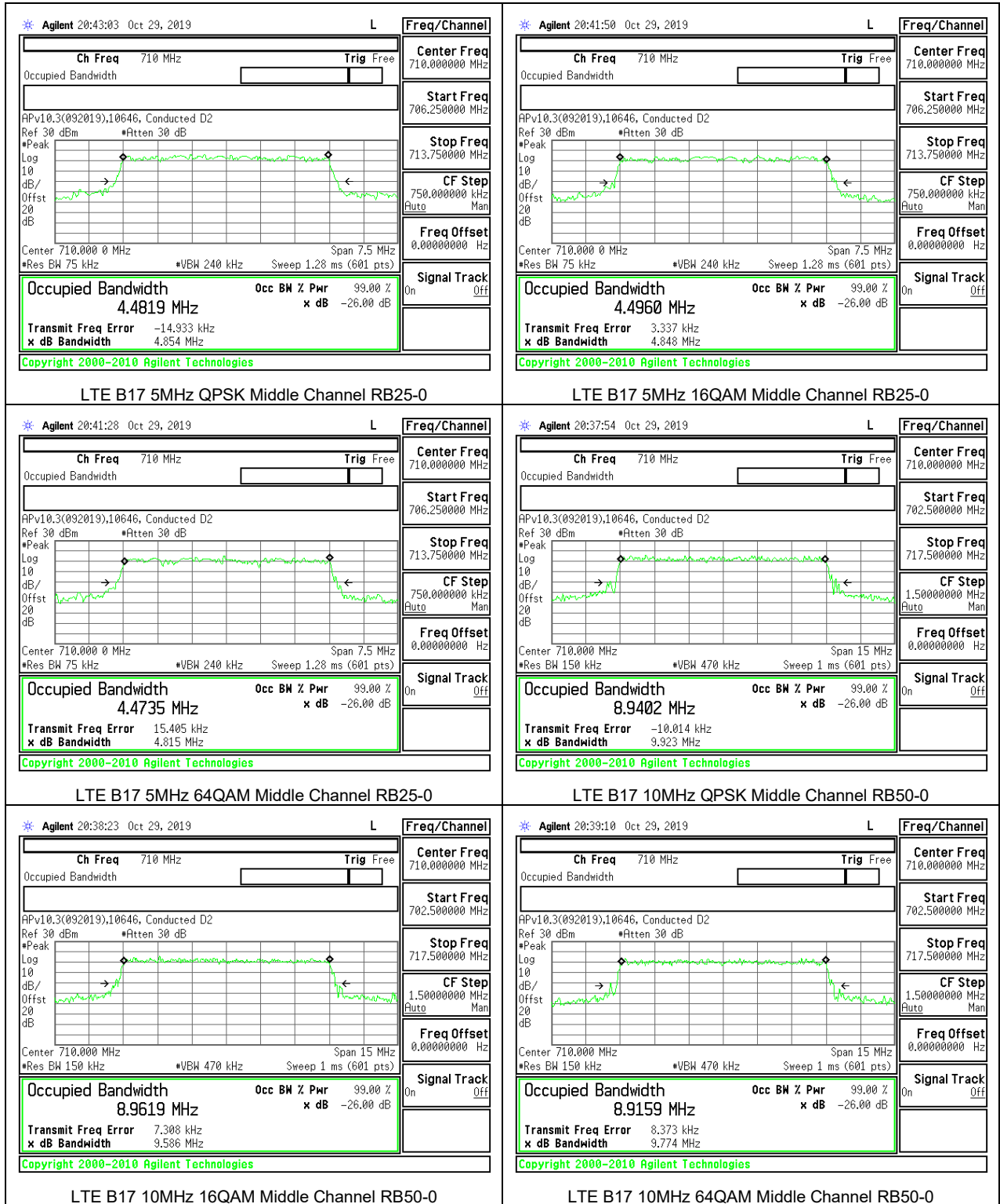
8.1.5. LTE BAND 13



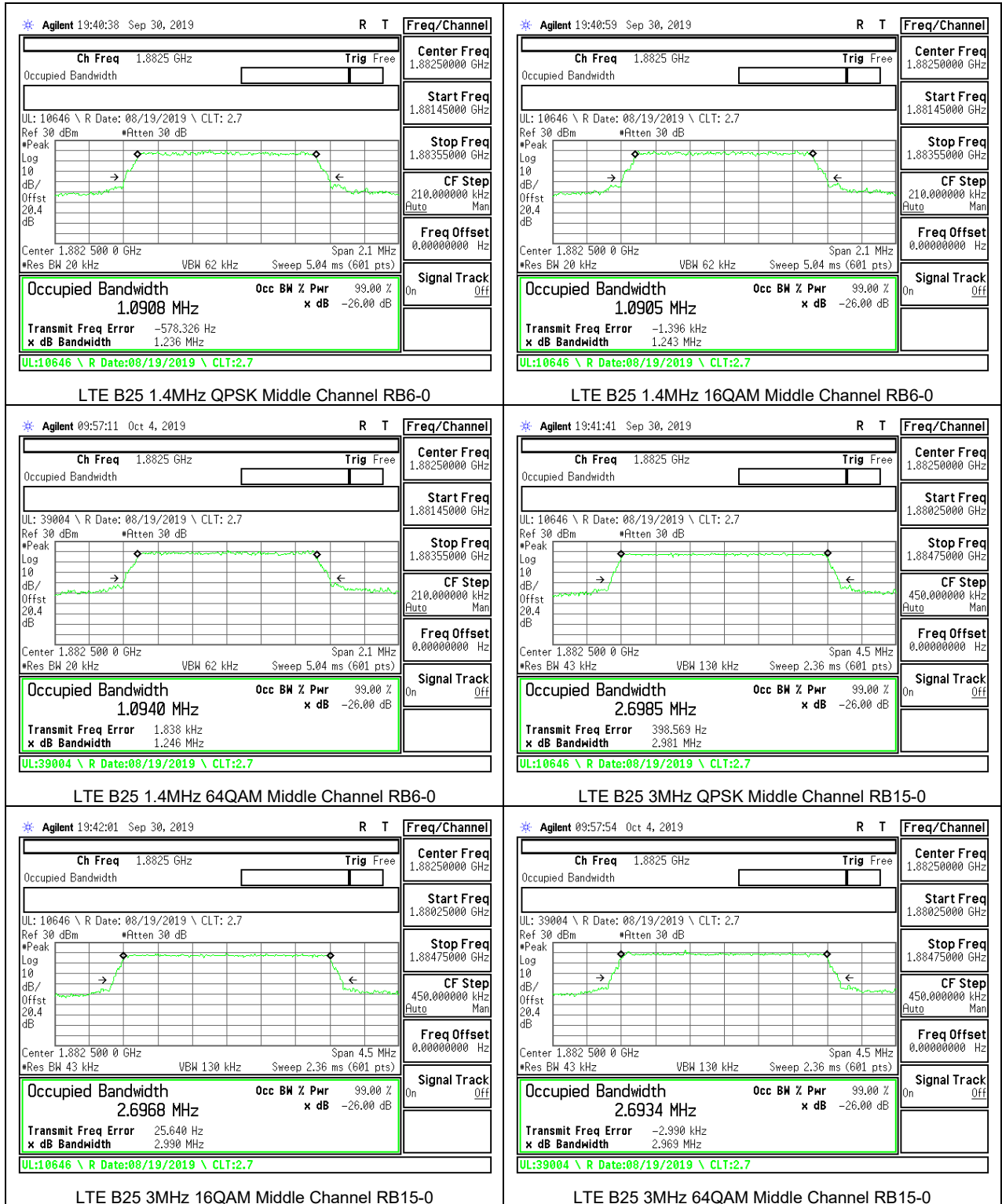
8.1.6. LTE BAND 14

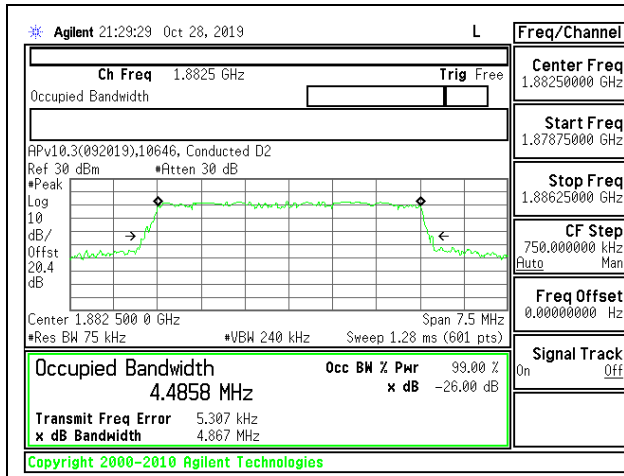


8.1.7. LTE BAND 17

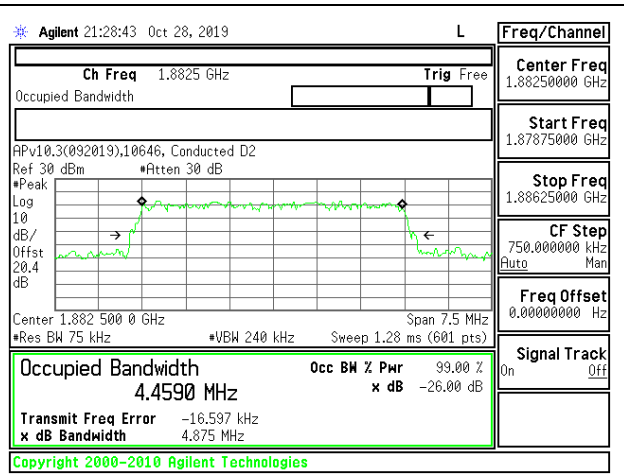


8.1.8. LTE BAND 25

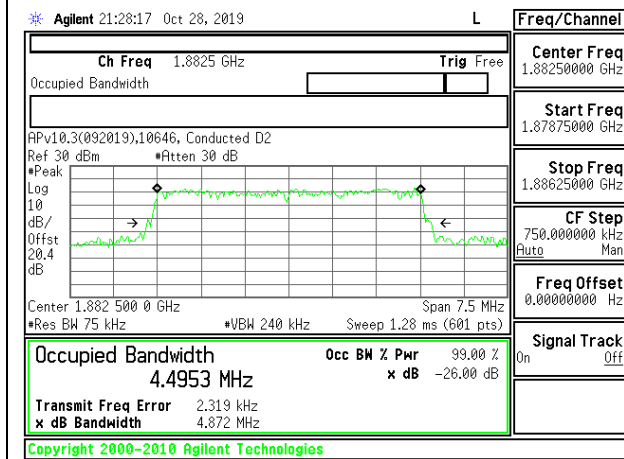




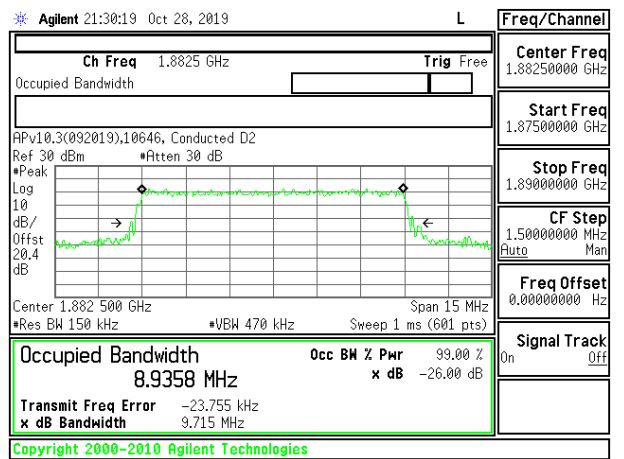
LTE B25 5MHz QPSK Middle Channel RB25-0



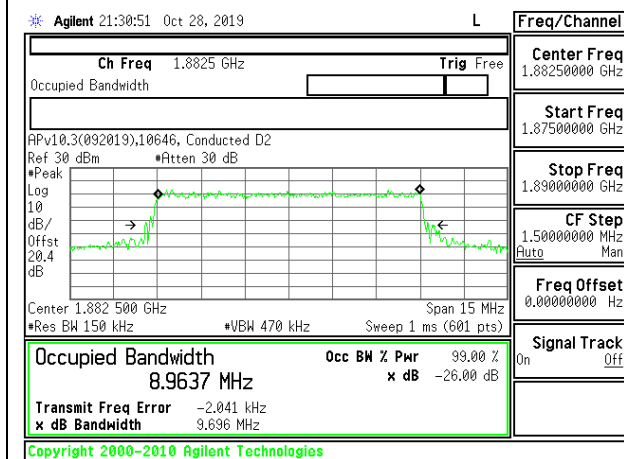
LTE B25 5MHz 16QAM Middle Channel RB25-0



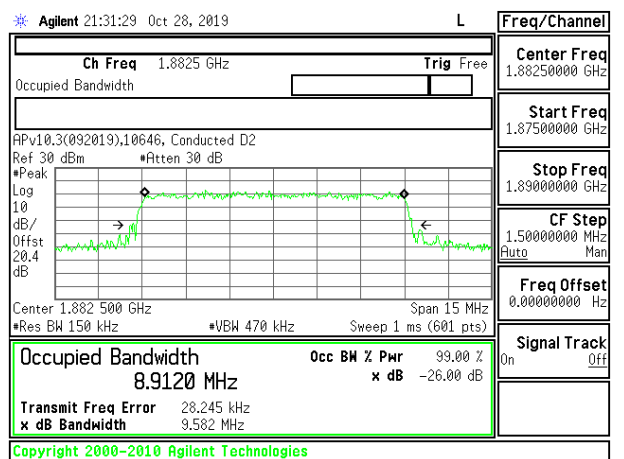
LTE B25 5MHz 64QAM Middle Channel RB25-0



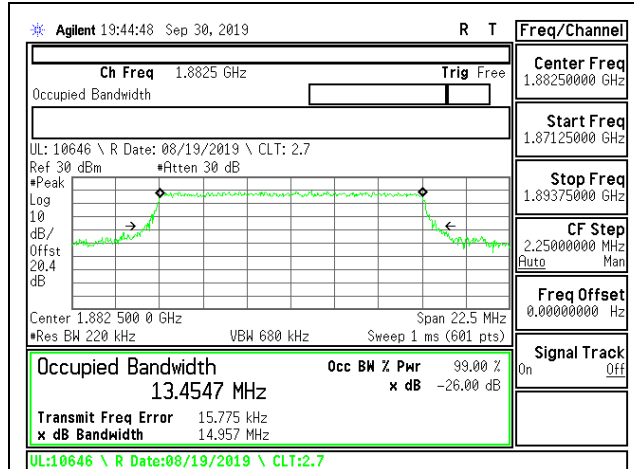
LTE B25 10MHz QPSK Middle Channel RB50-0



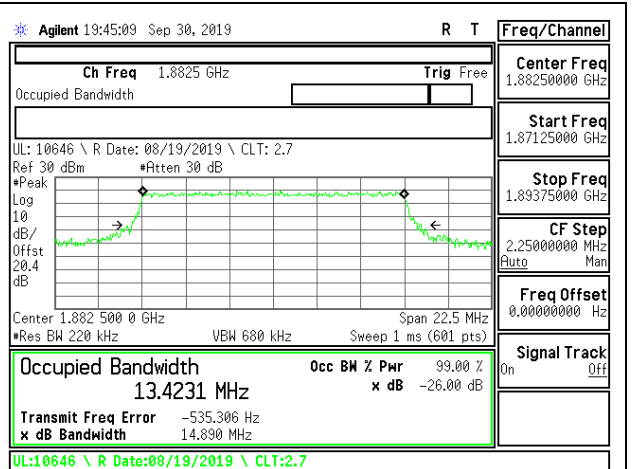
LTE B25 10MHz 16QAM Middle Channel RB50-0



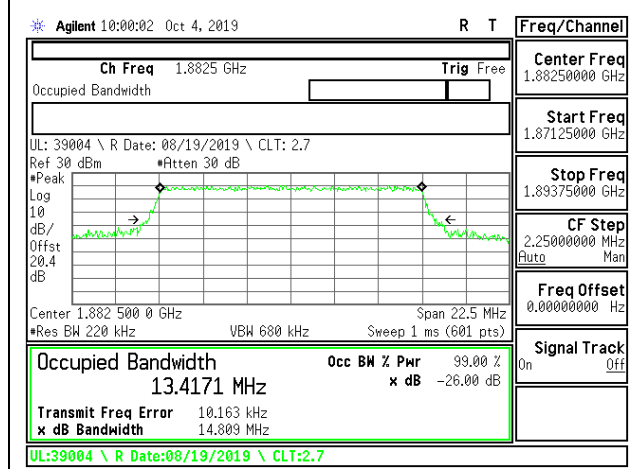
LTE B25 10MHz 64QAM Middle Channel RB50-0



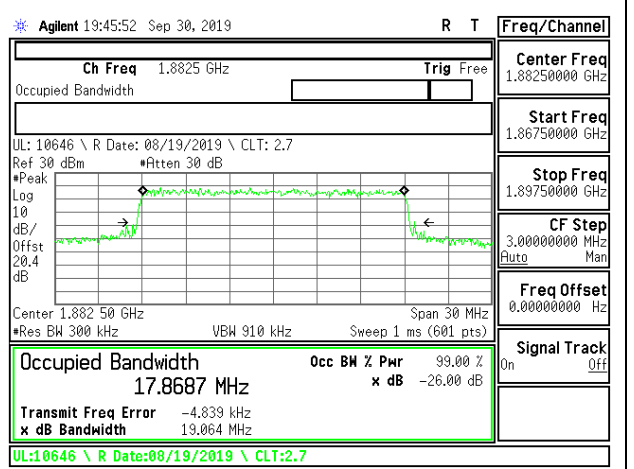
LTE B25 15MHz QPSK Middle Channel RB75-0



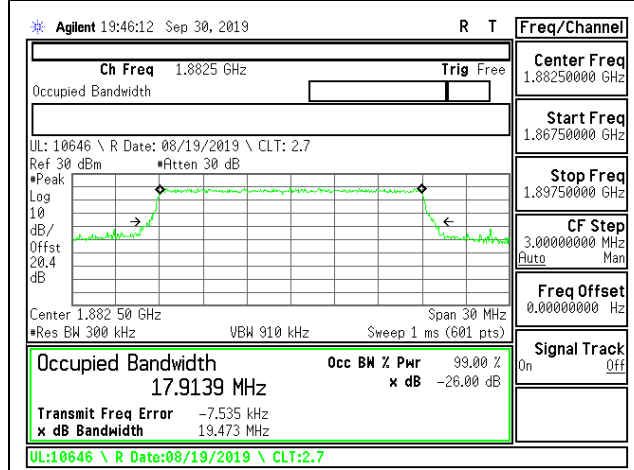
LTE B25 15MHz 16QAM Middle Channel RB75-0



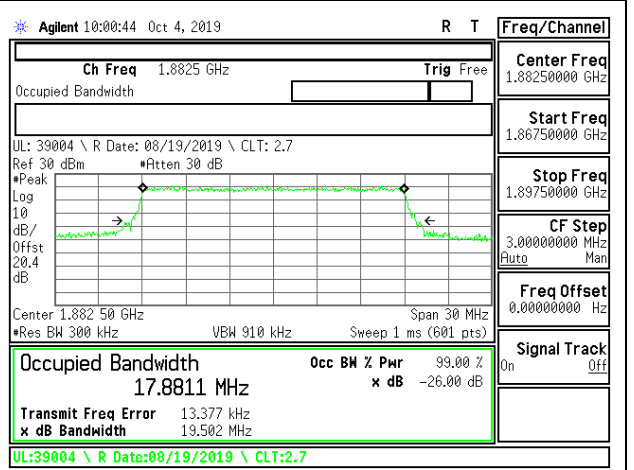
LTE B25 15MHz 64QAM Middle Channel RB75-0



LTE B25 20MHz QPSK Middle Channel RB100-0

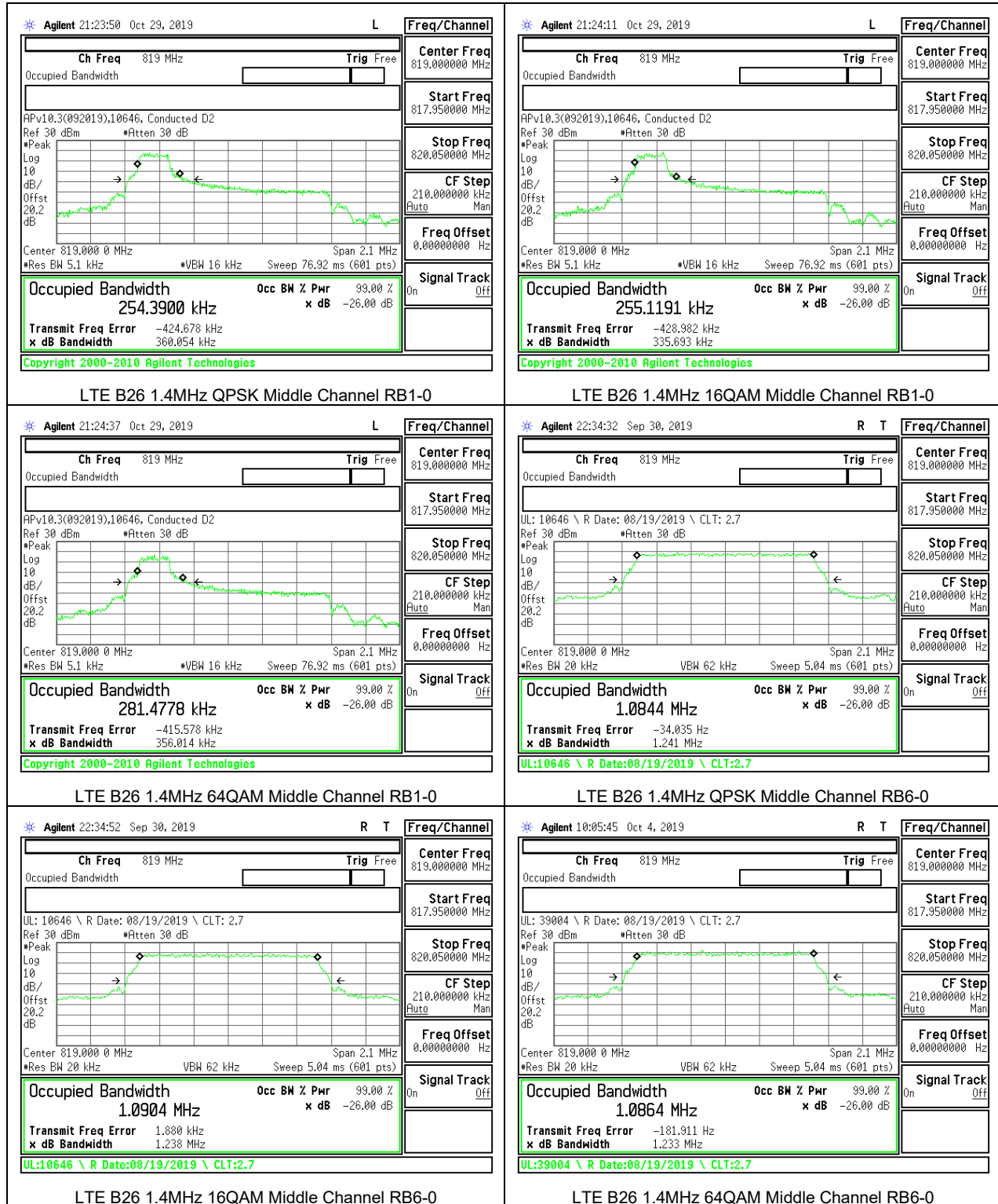


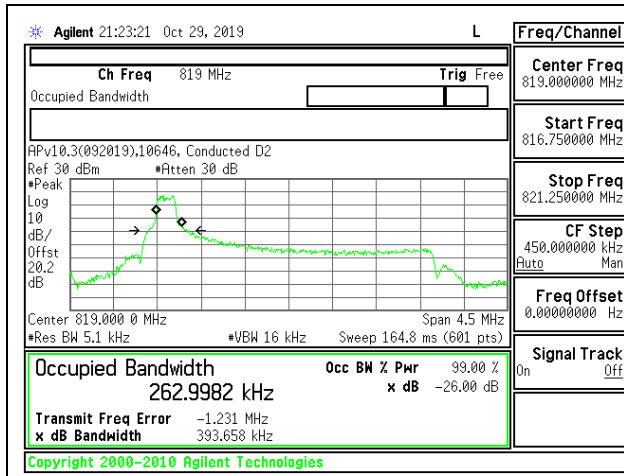
LTE B25 20MHz 16QAM Middle Channel RB100-0



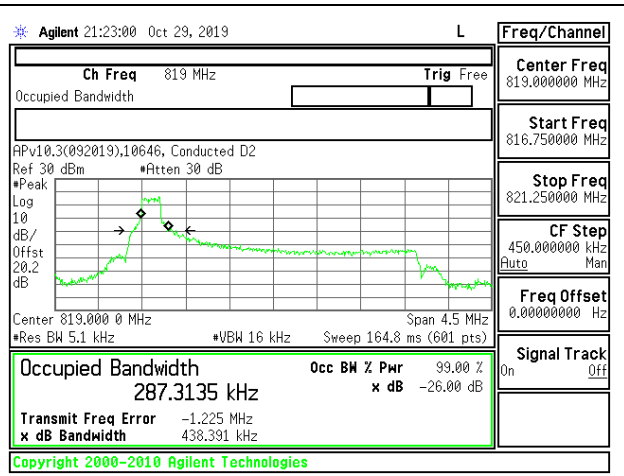
LTE B25 20MHz 64QAM Middle Channel RB100-0

8.1.9. LTE BAND 26 (PART 90S)

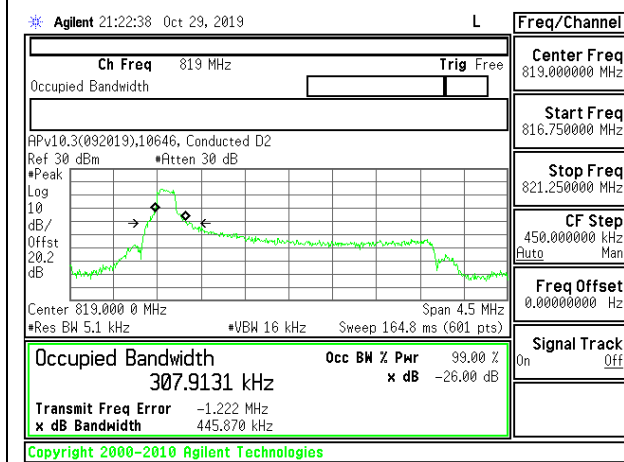




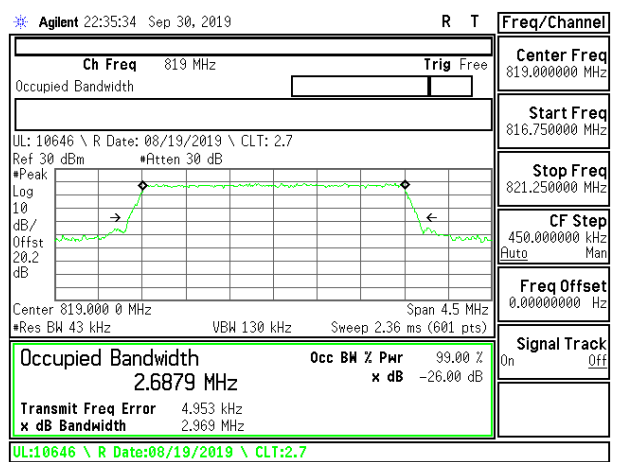
LTE B26 3MHz QPSK Middle Channel RB1-0



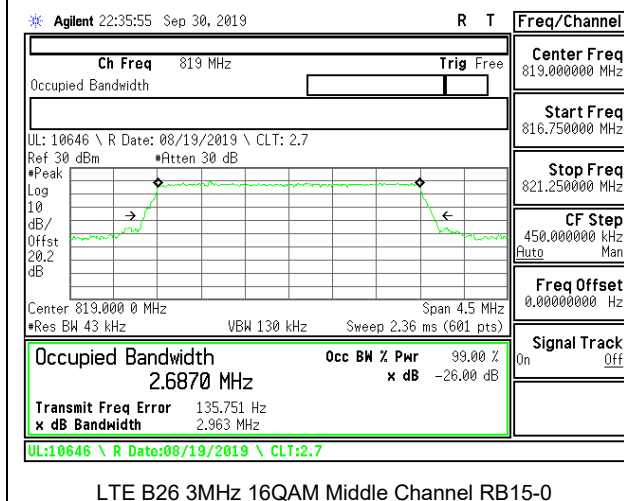
LTE B26 3MHz 16QAM Middle Channel RB1-0



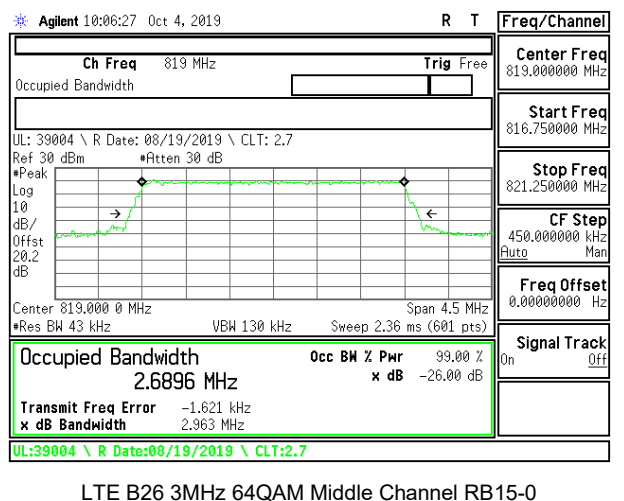
LTE B26 3MHz 64QAM Middle Channel RB1-0



LTE B26 3MHz QPSK Middle Channel RB15-0

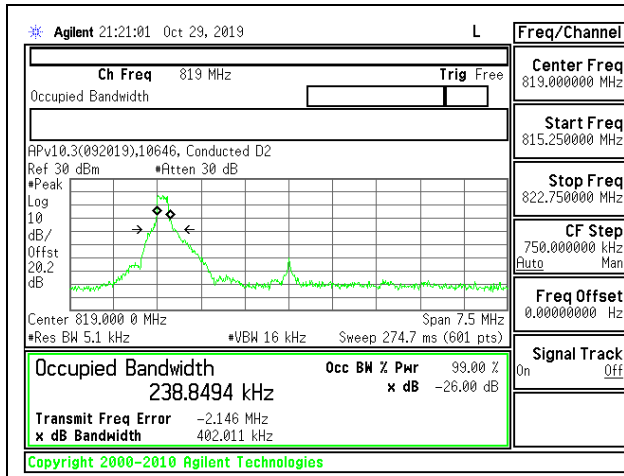


LTE B26 3MHz 16QAM Middle Channel RB15-0

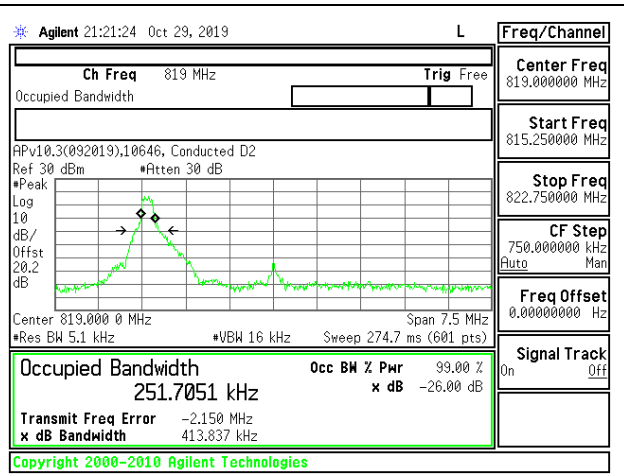


LTE B26 3MHz 64QAM Middle Channel RB15-0

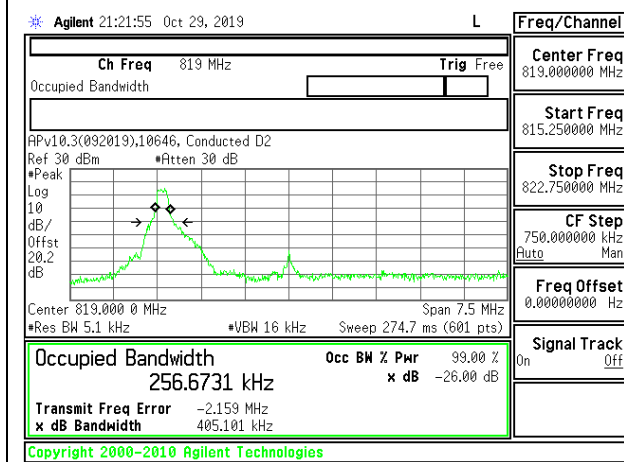




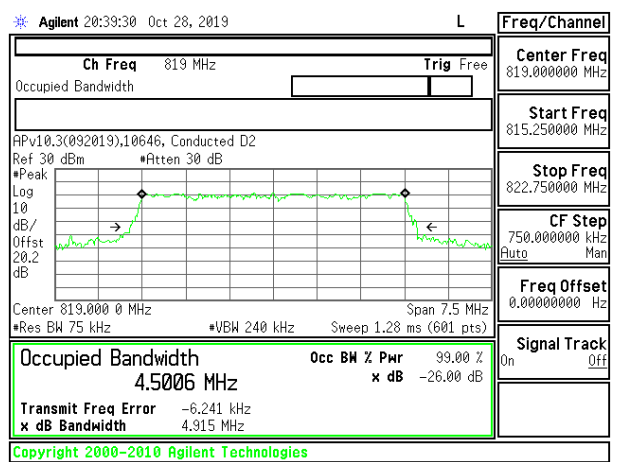
LTE B26 5MHz QPSK Middle Channel RB1-0



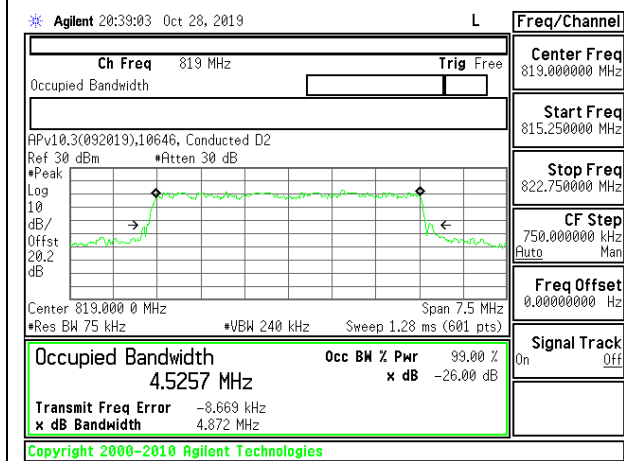
LTE B26 5MHz 16QAM Middle Channel RB1-0



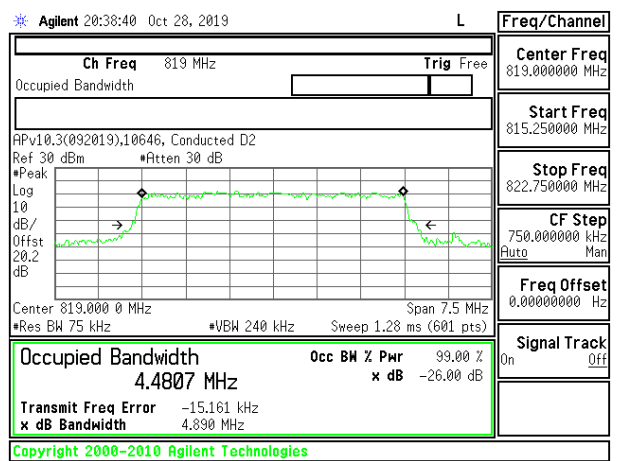
LTE B26 5MHz 64QAM Middle Channel RB1-0



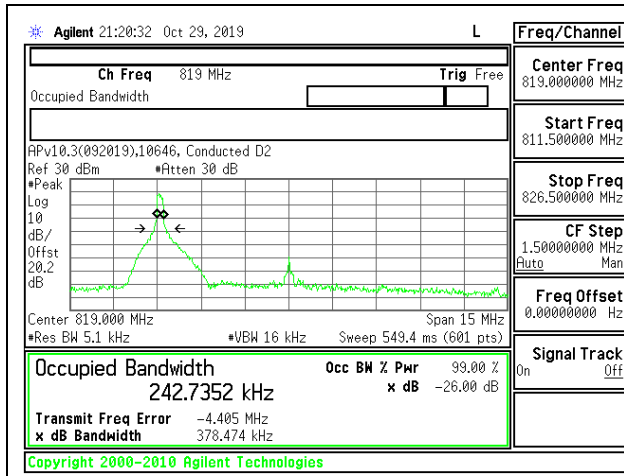
LTE B26 5MHz QPSK Middle Channel RB25-0



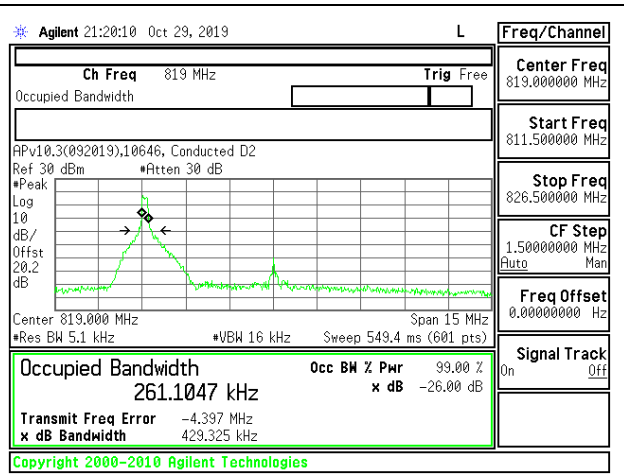
LTE B26 5MHz 16QAM Middle Channel RB25-0



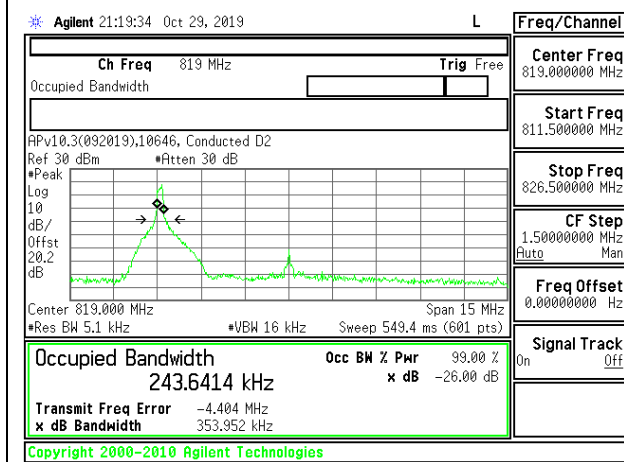
LTE B26 5MHz 64QAM Middle Channel RB25-0



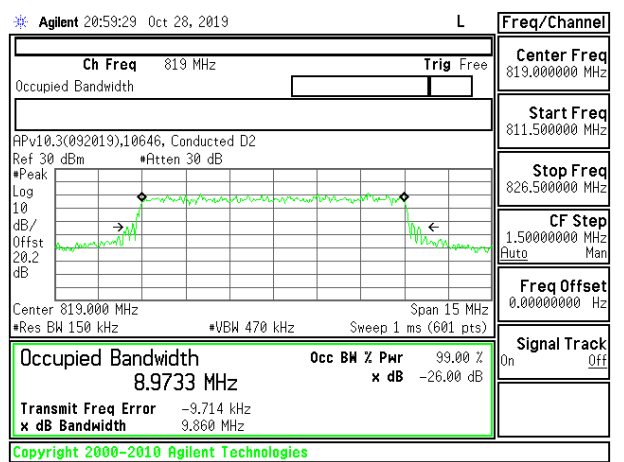
LTE B26 10MHz QPSK Middle Channel RB1-0



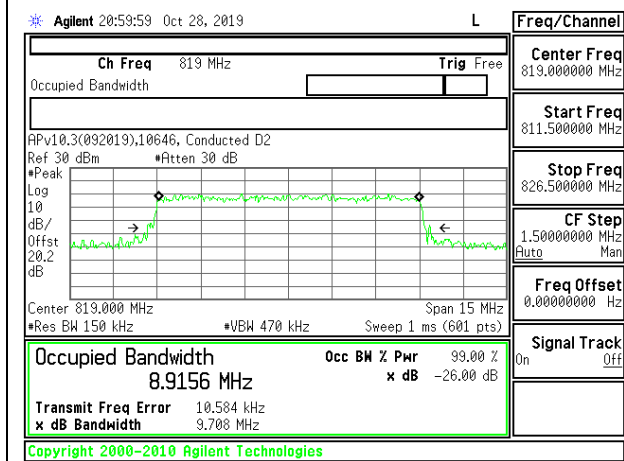
LTE B26 10MHz 16QAM Middle Channel RB1-0



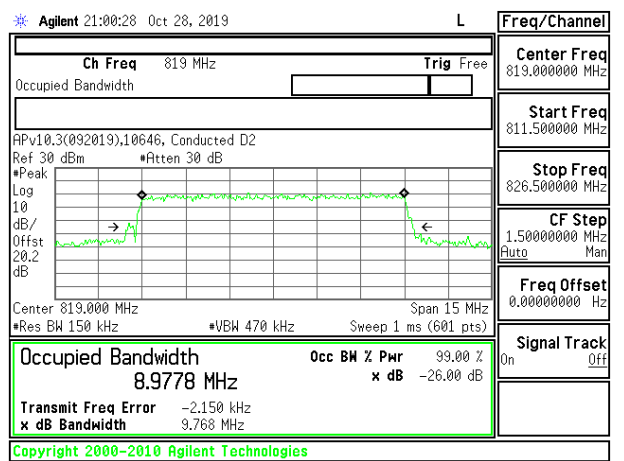
LTE B26 10MHz 64QAM Middle Channel RB1-0



LTE B26 10MHz QPSK Middle Channel RB50-0

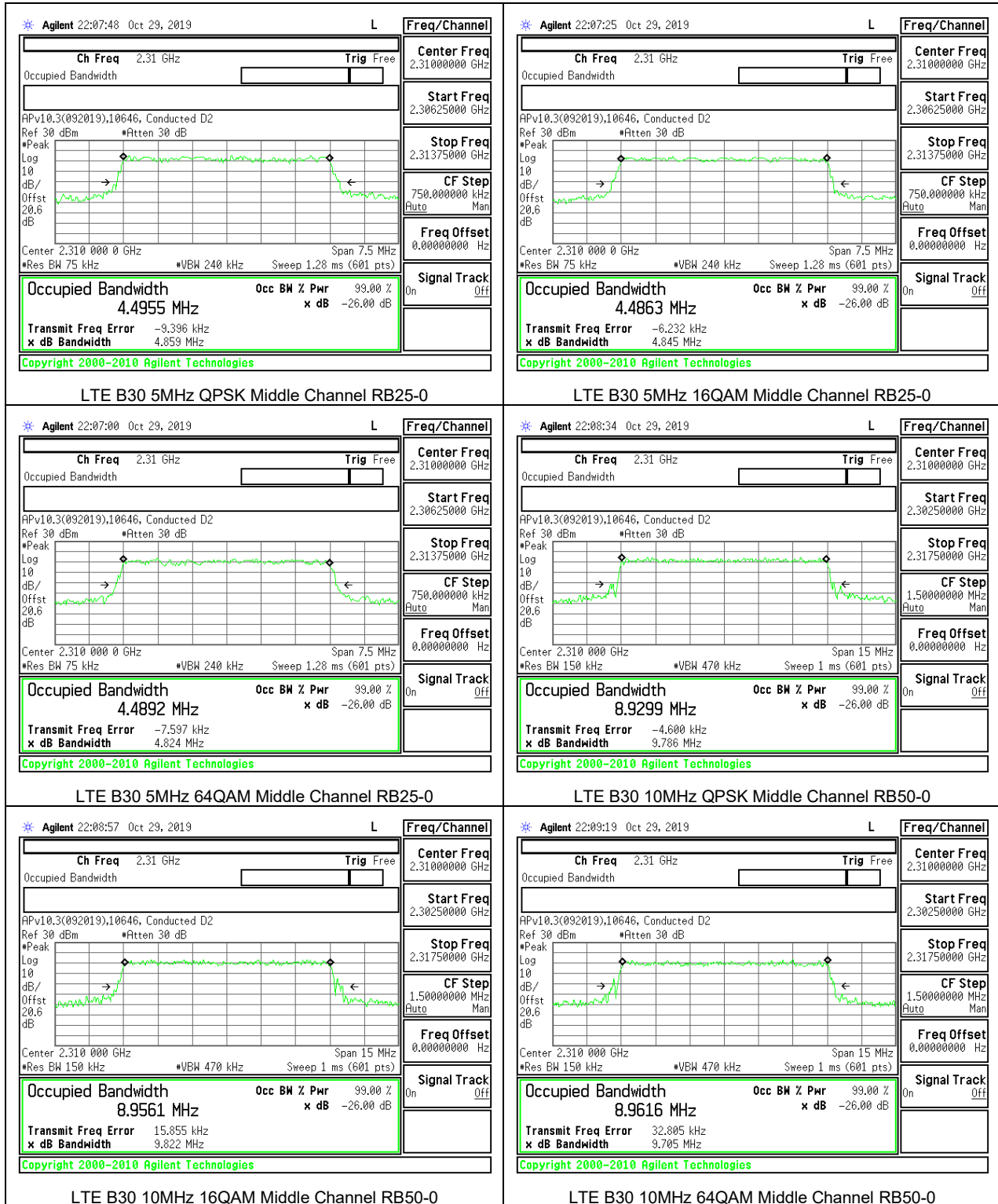


LTE B26 10MHz 16QAM Middle Channel RB50-0

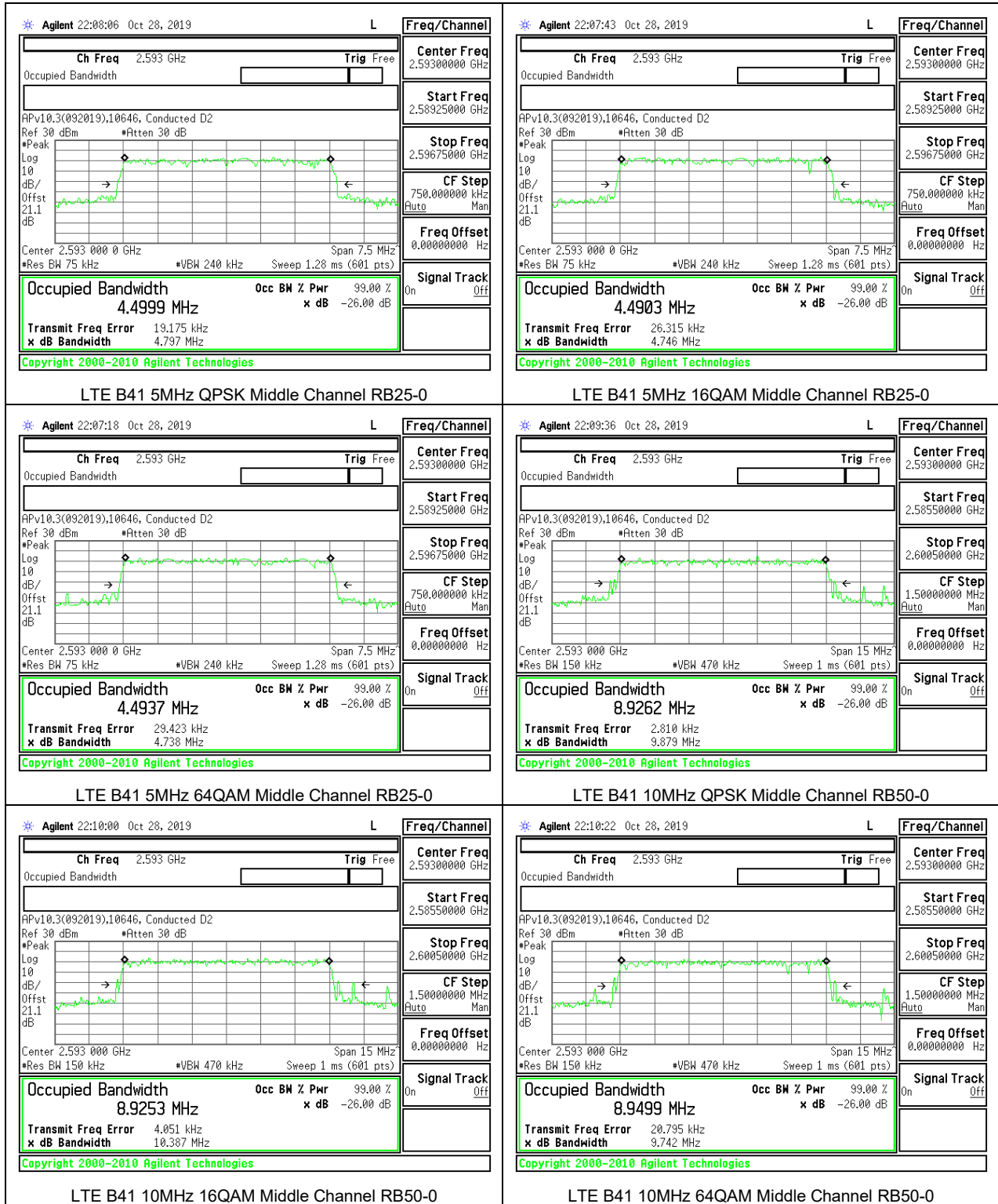


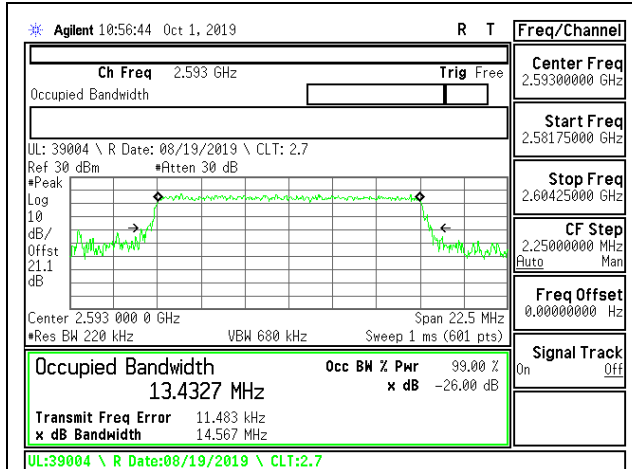
LTE B26 10MHz 64QAM Middle Channel RB50-0

8.1.10. LTE BAND 30

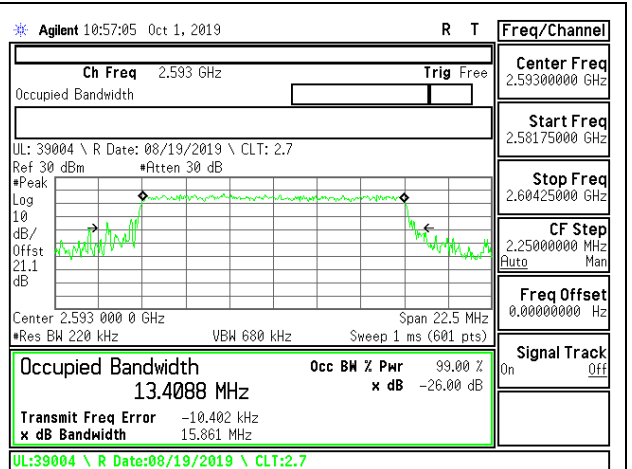


8.1.11. LTE BAND 41

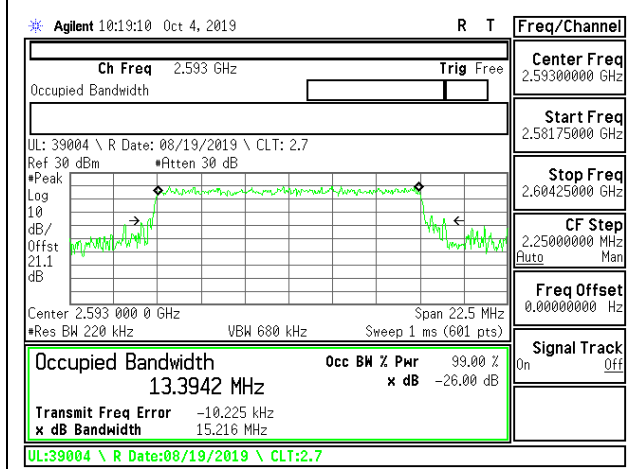




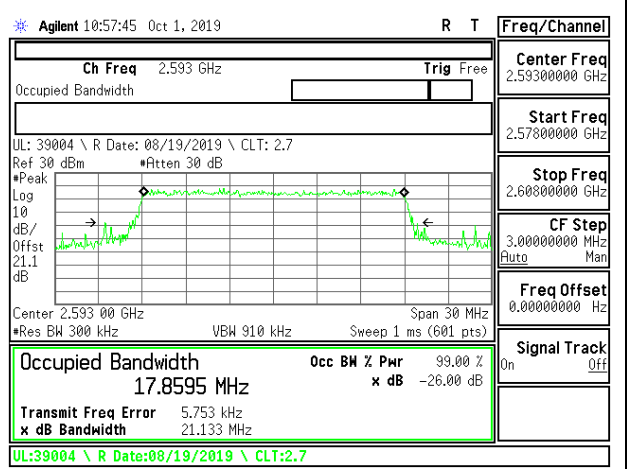
LTE B41 15MHz QPSK Middle Channel RB75-0



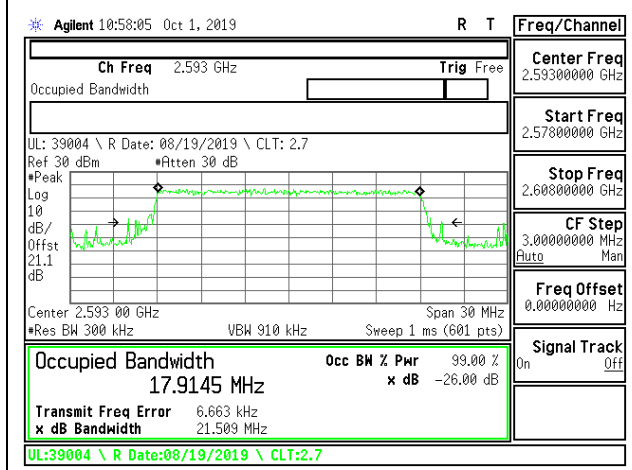
LTE B41 15MHz 16QAM Middle Channel RB75-0



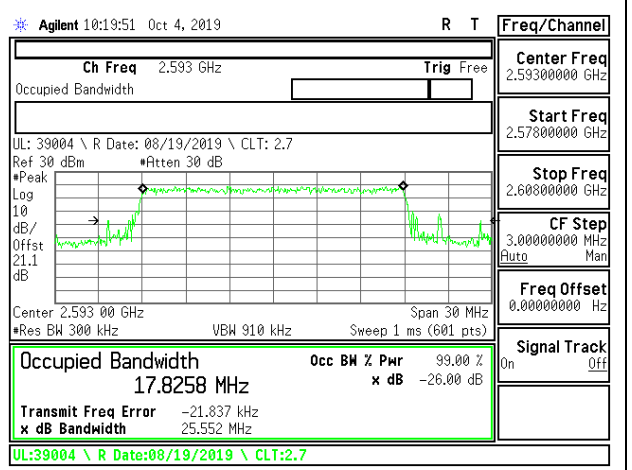
LTE B41 15MHz 64QAM Middle Channel RB75-0



LTE B41 20MHz QPSK Middle Channel RB100-0



LTE B41 20MHz 16QAM Middle Channel RB100-0



LTE B41 20MHz 64QAM Middle Channel RB100-0

8.1.12. LTE BAND 48



LTE B48 5MHz QPSK Middle Channel RB25-0



LTE B48 5MHz 16QAM Middle Channel RB25-0



LTE B48 5MHz 64QAM Middle Channel RB25-0



LTE B48 10MHz QPSK Middle Channel RB50-0



LTE B48 10MHz 16QAM Middle Channel RB50-0



LTE B48 10MHz 64QAM Middle Channel RB50-0



LTE B48 15MHz QPSK Middle Channel RB75-0



LTE B48 15MHz 16QAM Middle Channel RB75-0



LTE B48 15MHz 64QAM Middle Channel RB75-0



LTE B48 20MHz QPSK Middle Channel RB100-0

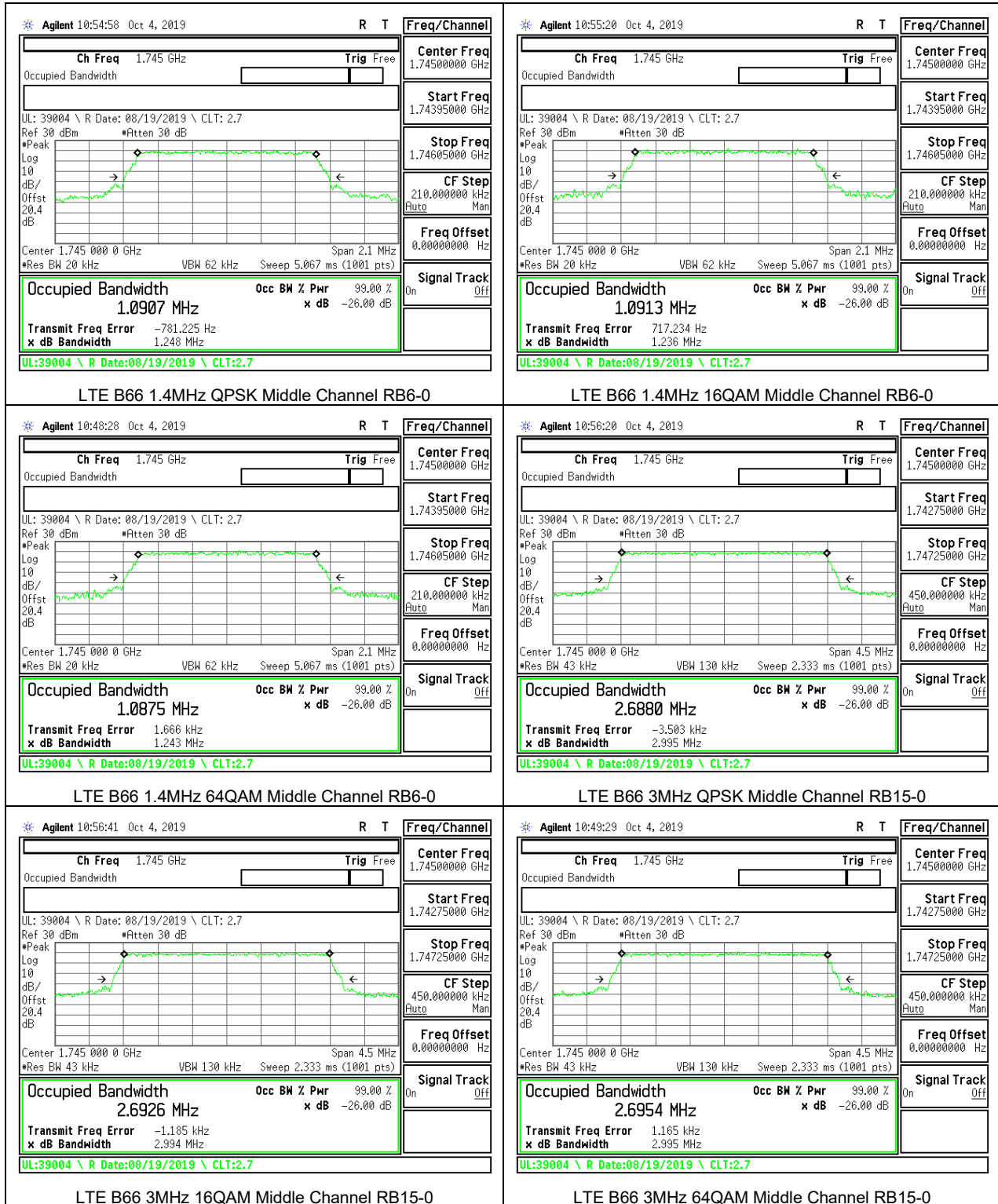


LTE B48 20MHz 16QAM Middle Channel RB100-0

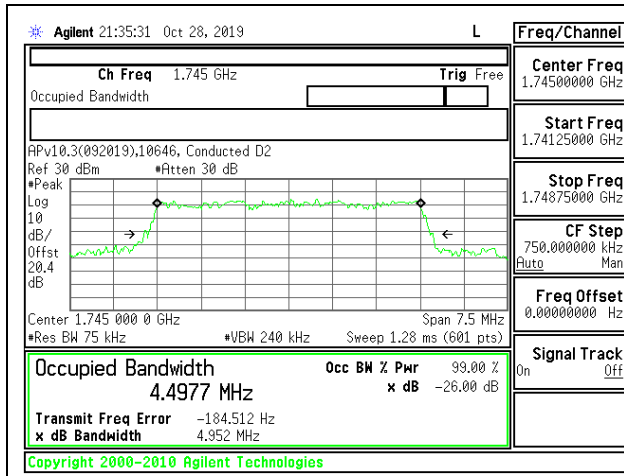


LTE B48 20MHz 64QAM Middle Channel RB100-0

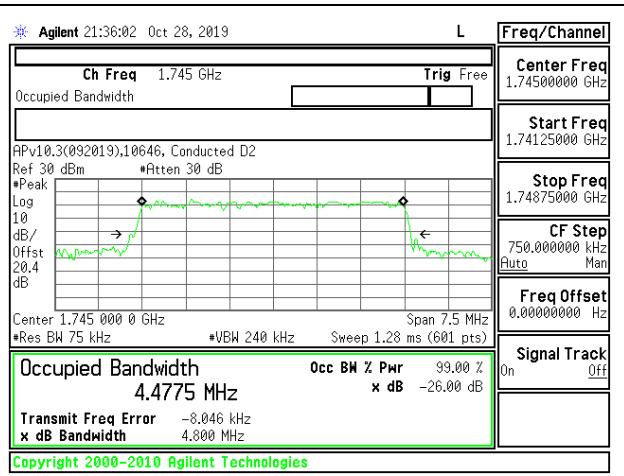
8.1.13. LTE BAND 66



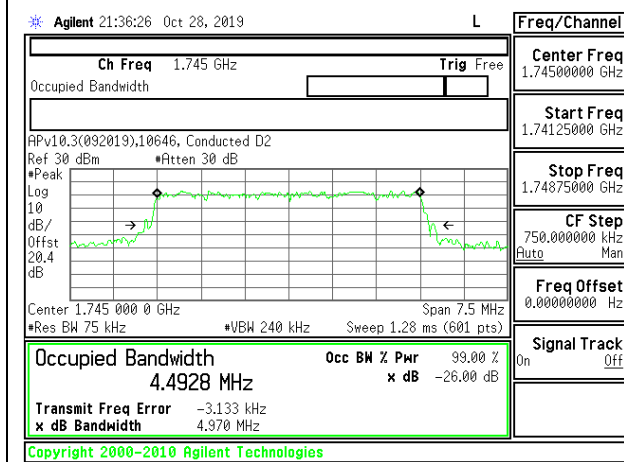




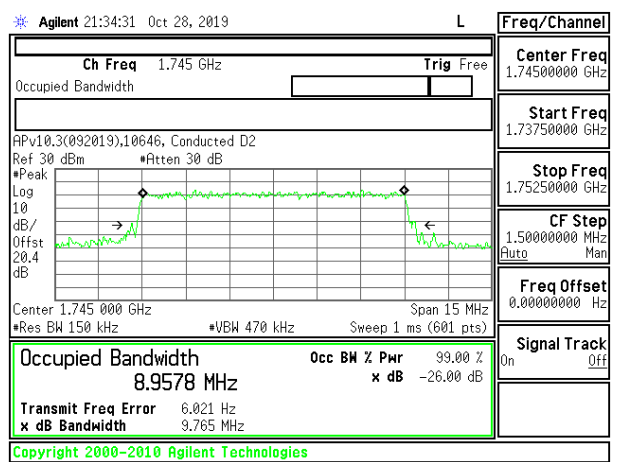
LTE B66 5MHz QPSK Middle Channel RB25-0



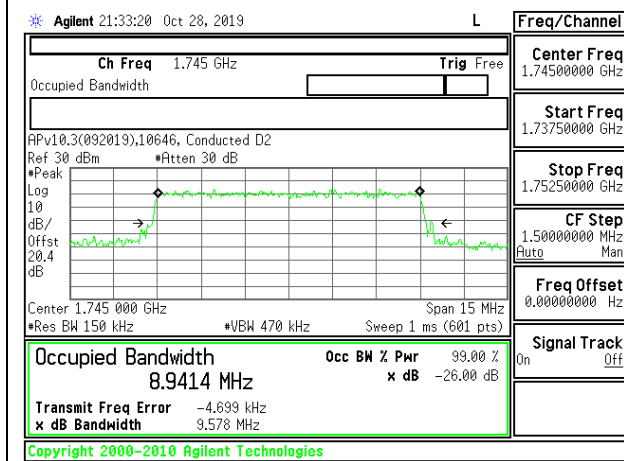
LTE B66 5MHz 16QAM Middle Channel RB25-0



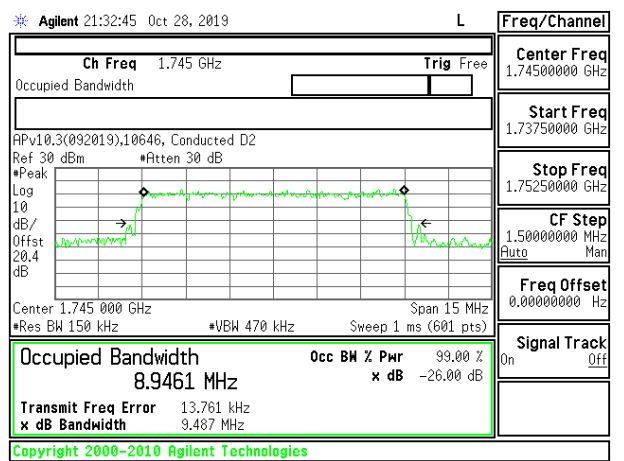
LTE B66 5MHz 64QAM Middle Channel RB25-0



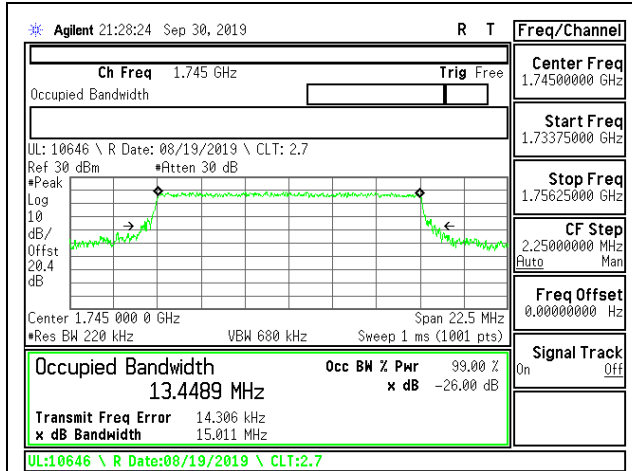
LTE B66 10MHz QPSK Middle Channel RB50-0



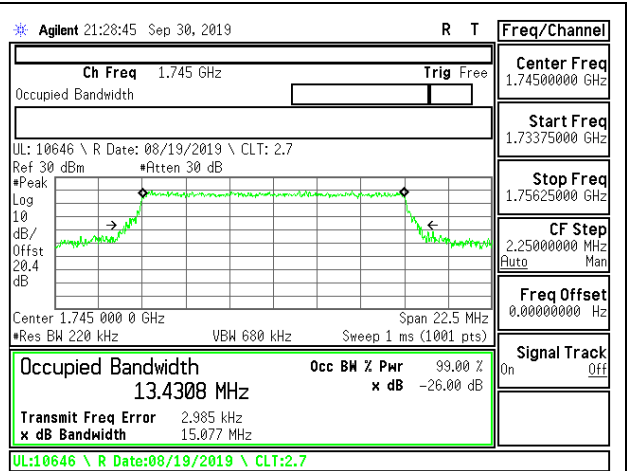
LTE B66 10MHz 16QAM Middle Channel RB50-0



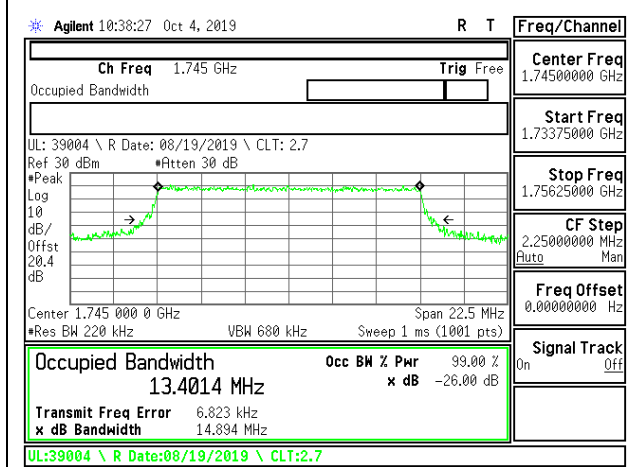
LTE B66 10MHz 64QAM Middle Channel RB50-0



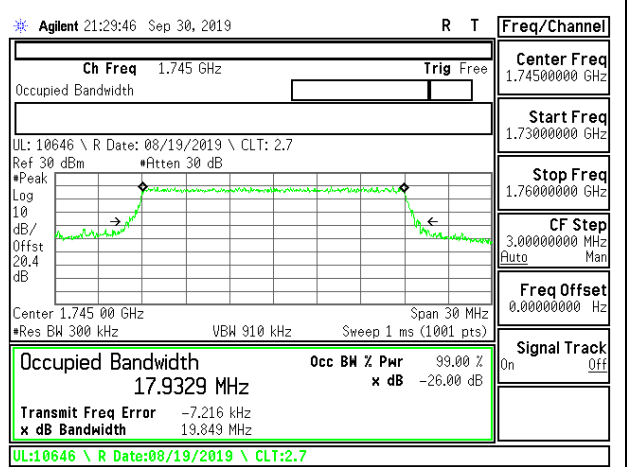
LTE B66 15MHz QPSK Middle Channel RB75-0



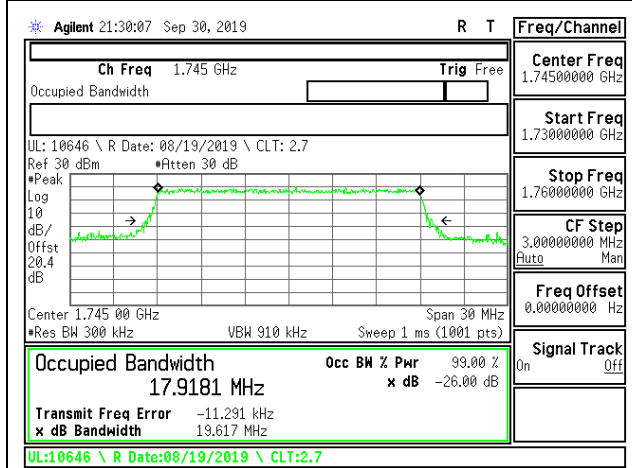
LTE B66 15MHz 16QAM Middle Channel RB75-0



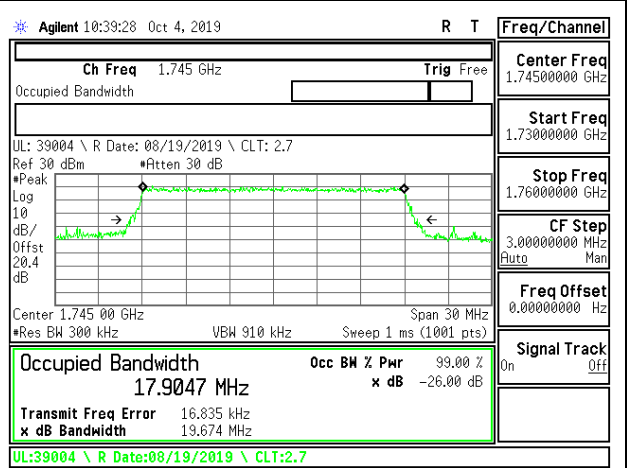
LTE B66 15MHz 64QAM Middle Channel RB75-0



LTE B66 20MHz QPSK Middle Channel RB100-0

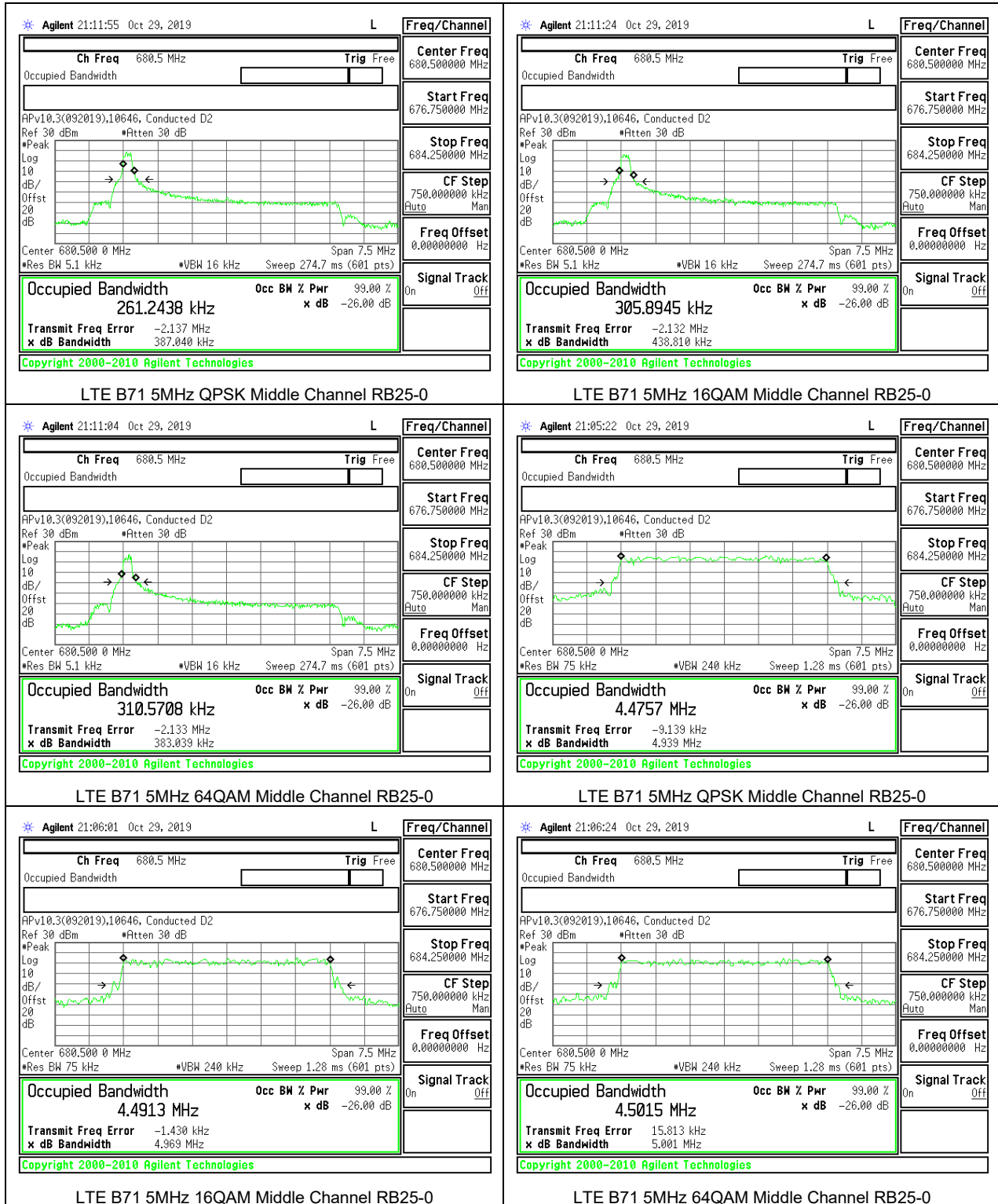


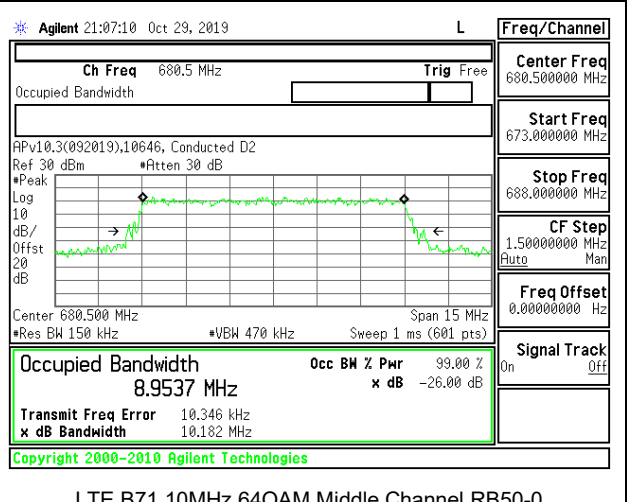
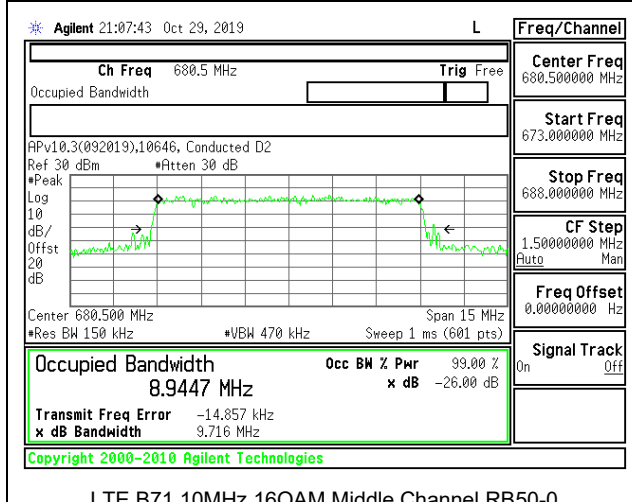
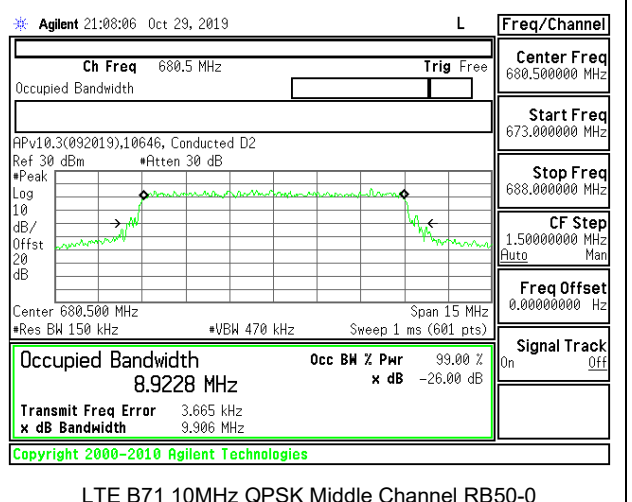
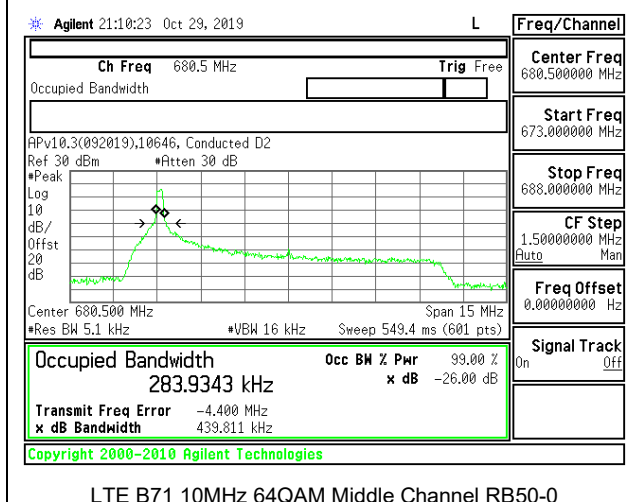
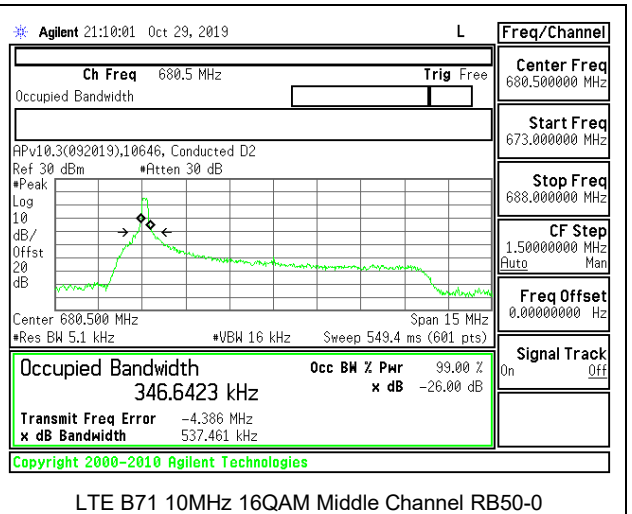
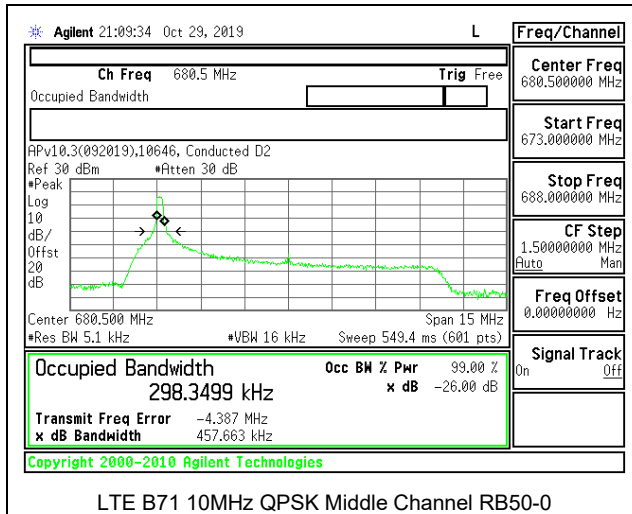
LTE B66 20MHz 16QAM Middle Channel RB100-0

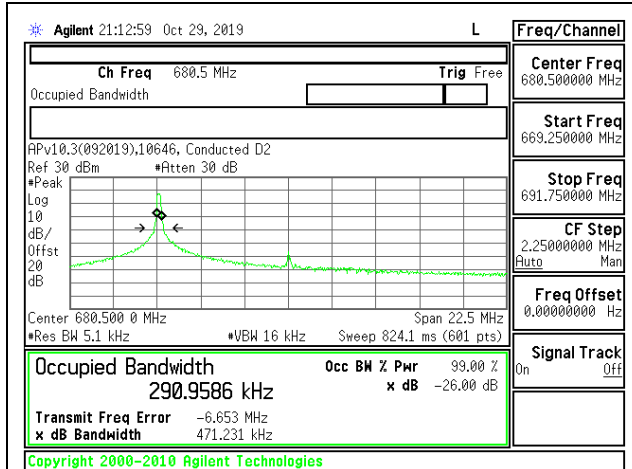


LTE B66 20MHz 64QAM Middle Channel RB100-0

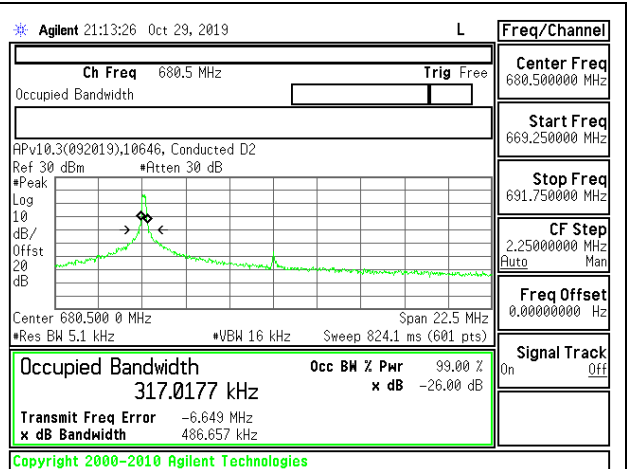
8.1.14. LTE BAND 71



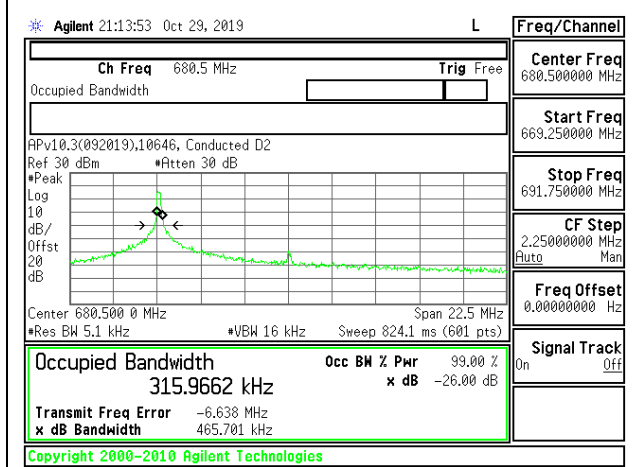




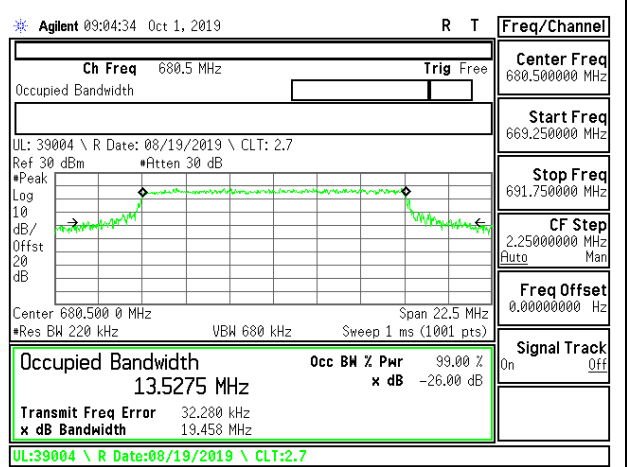
LTE B71 15MHz QPSK Middle Channel RB75-0



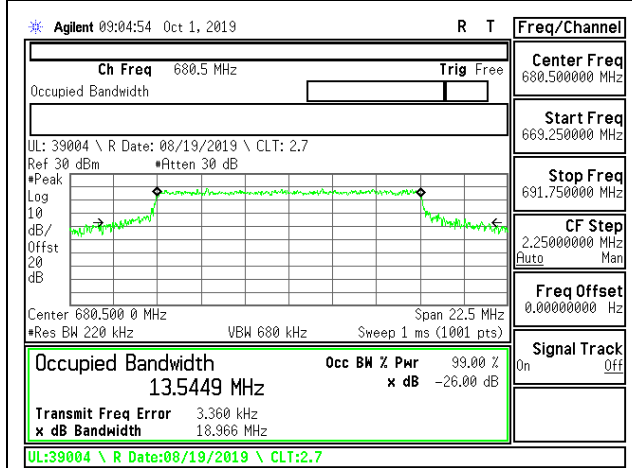
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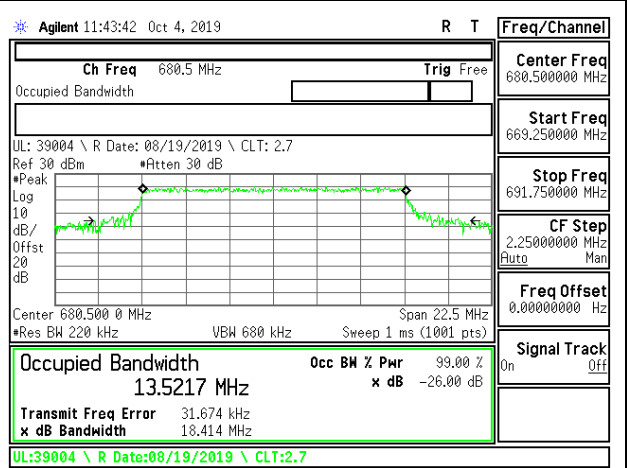
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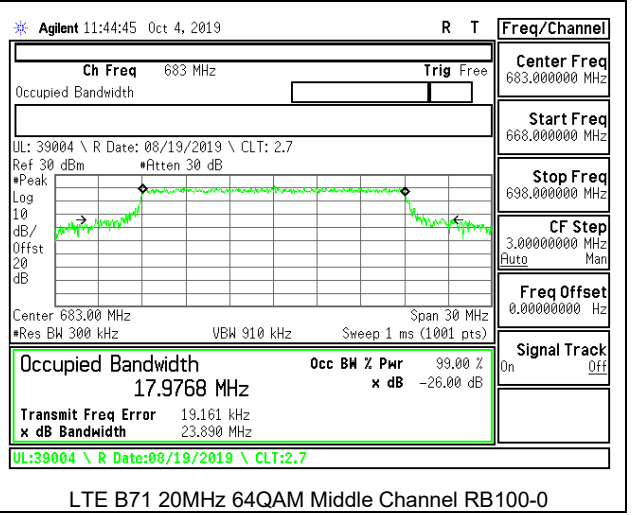
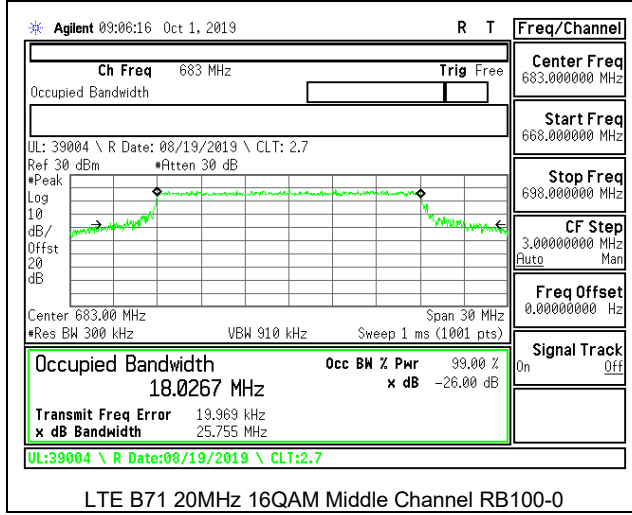
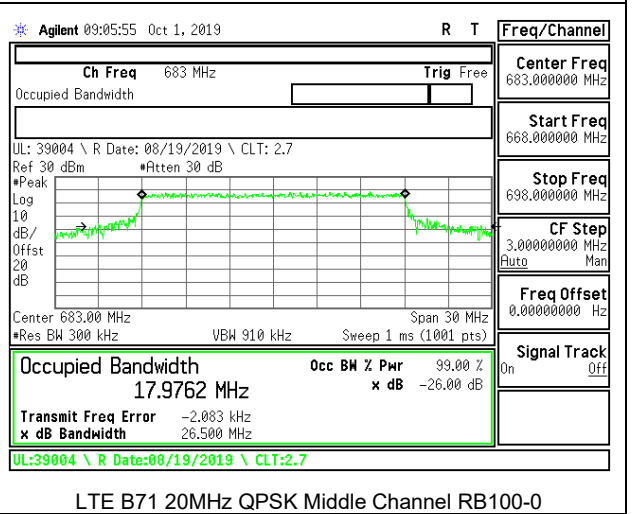
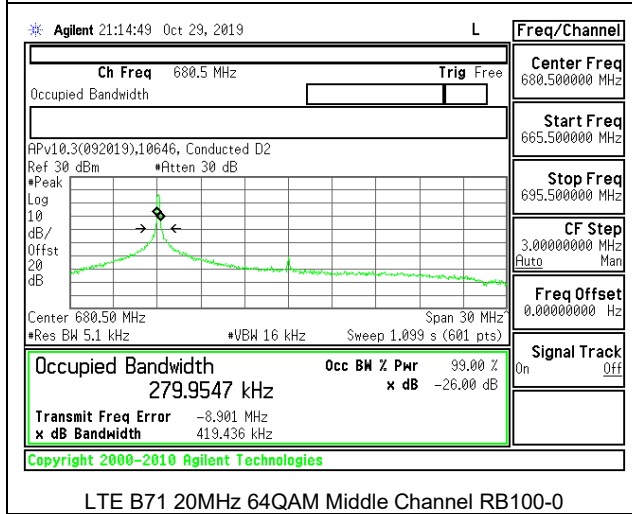
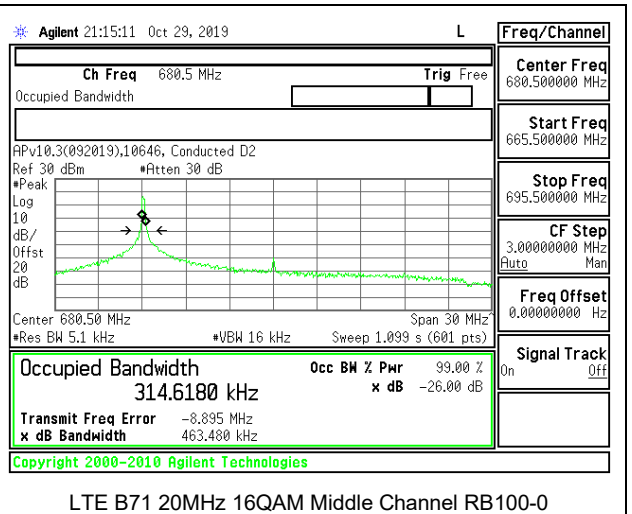
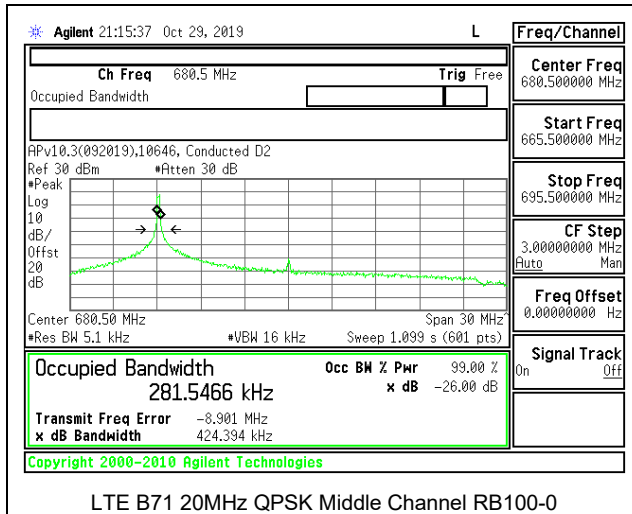
LTE B71 15MHz QPSK Middle Channel RB75-0



LTE B71 15MHz 16QAM Middle Channel RB75-0



LTE B71 15MHz 64QAM Middle Channel RB75-0



## 8.2. BAND EDGE AND EMISSION MASK

### RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53, §90.691 §90.543 and §96.41

### LIMITS

FCC: §22.917, §24.238, §27.53(h)

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.

FCC: §90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{ Log}_{10}(f/6.1)$  decibels or  $50 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

FCC: §90.543 Emission Limitations. (Band 14)

(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the 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, in accordance with the following:

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least  $43 + 10 \log (P)$  dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

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

FCC: §27.53 (Band 30)

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than:  $43 + 10 \log (P)$  dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than  $55 + 10 \log (P)$  dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than  $61 + 10 \log (P)$  dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than  $67 + 10 \log (P)$  dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2300 and 2305 MHz,  $55 + 10 \log (P)$  dB on all frequencies between 2296 and 2300 MHz,  $61 + 10 \log (P)$  dB on all frequencies between 2292 and 2296 MHz,  $67 + 10 \log (P)$  dB on all frequencies between 2288 and 2292 MHz, and  $70 + 10 \log (P)$  dB below 2288 MHz;

(iii) By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2360 and 2365 MHz, and not less than  $70 + 10 \log (P)$  dB above 2365 MHz.

FCC: §27.53 (Band 13)

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) Emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals. ( $-70$  dBW/MHz =  $-40$  dBm/MHz).

FCC: §27.53 (Band 12, 17, 71)

(g) For operations in the 600 MHz band and 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC: §27.53 (Band 7, 41)

(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.



FCC: §96.41 (Band 48)

(e) 3.5 GHz Emissions and Interference Limits—

(1) General protection levels

(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed  $-13$  dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed  $-25$  dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed  $-25$  dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed  $-40$  dBm/MHz.

## **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:

1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at  $-13$  dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

## **TEST PROCEDURE ( LTE BAND 14)**

(b) ACP measurement procedure. The following are the procedures for making the transmitter ACP measurements. For all measurements modulate the transmitter as it would be modulated in normal operating conditions. For time division multiple access (TDMA) systems, the measurements are to be made under TDMA operation only during time slots when the transmitter is active. All measurements are made at the transmitter's output port. If a transmitter has an integral antenna, a suitable power coupling device shall be used to couple the RF signal to the measurement instrument. The coupling device shall substantially maintain the proper transmitter load impedance. The ACP measurements may be made with a spectrum analyzer capable of making direct ACP measurements. "Measurement bandwidth", as used for non-swept measurements, implies an instrument that measures the power in many narrow bandwidths equal to the nominal resolution bandwidth and integrates these powers to determine the total power in the specified measurement bandwidth.

(1) Setting reference level. Set transmitter to maximum output power. Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth to the channel size. For example, for a 6.25 kHz transmitter set the measurement bandwidth to 6.25 kHz. Set the frequency offset of the measurement bandwidth to zero and adjust the center frequency of the instrument to the assigned center frequency to measure the average power level of the transmitter. Record this power level in dBm as the "reference power level."

(2) Non-swept power measurement. Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth and frequency offset from the assigned center frequency as shown in the tables in §90.543 (a) above. Any value of resolution bandwidth may be used as long as it does not exceed 2 percent of the specified measurement bandwidth. Measure the power level in dBm. These measurements should be made at maximum power. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute

value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

(3) Swept power measurement. Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth and average, sample, or RMS detection. Set the reference level of the spectrum analyzer to the RMS value of the transmitter power. Sweep above and below the carrier frequency to the limits defined in the tables. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

#### **TEST PROCEDURE (LTE BAND 7, 41)**

(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.

#### **TEST PROCEDURE (LTE BAND 30, BAND 40)**

(5) Measurement procedure. 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 channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 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). 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.

#### **TEST PROCEDURE (LTE BAND 48)**

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth 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 reference 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.

(ii) When measuring unwanted emissions to demonstrate compliance with the limits, the CBSD and End User Device nominal carrier frequency/channel shall be adjusted as close to the licensee's authorized frequency block edges, both upper and lower, as the design permits.

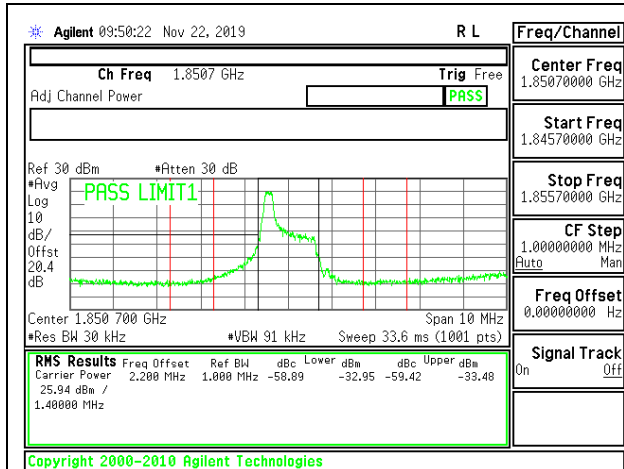
(iii) Compliance with emission limits shall be demonstrated using either average (RMS)-detected or peak-detected power measurement techniques.

**MODES TESTED**

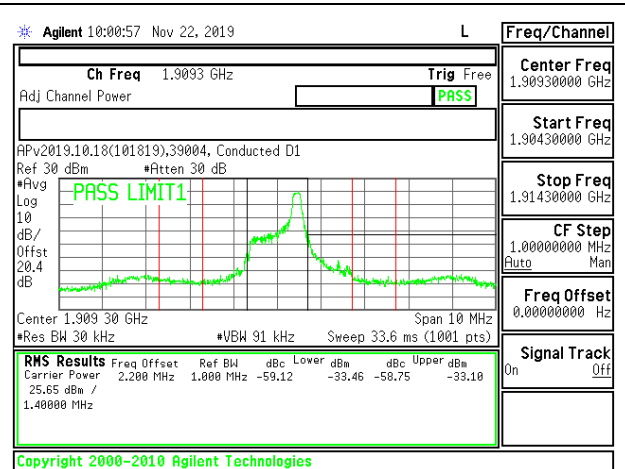
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- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 14
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- LTE Band 26
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- LTE Band 41
- LTE Band 48
- LTE Band 66
- LTE Band 71

**RESULTS**

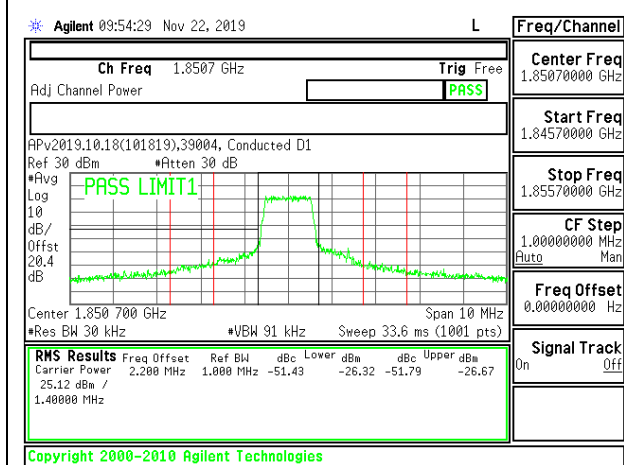
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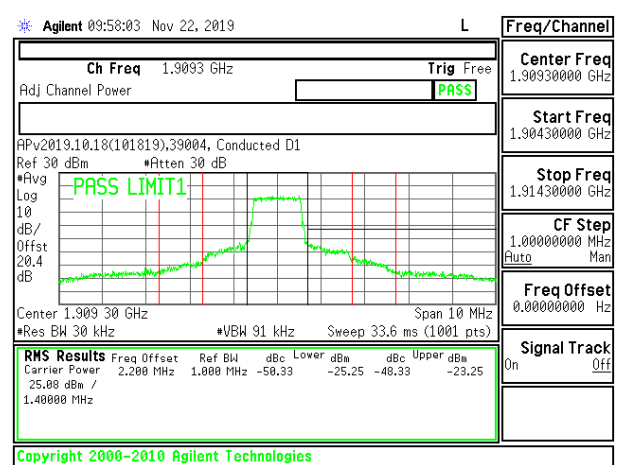
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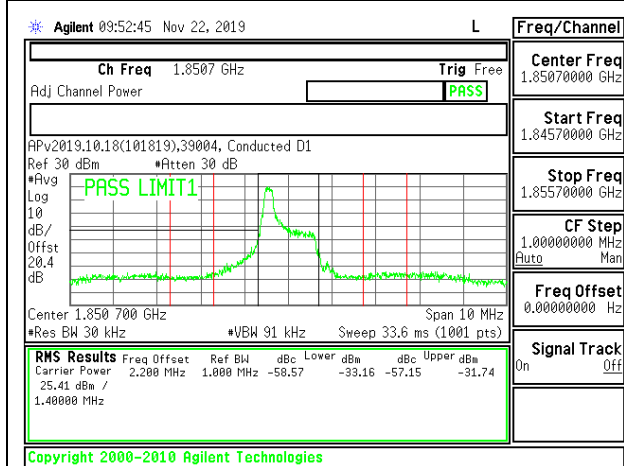
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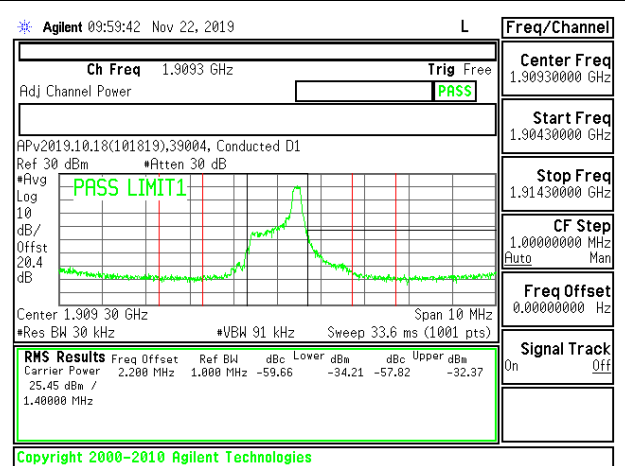
LTE B2 1.4MHz QPSK Low Channel RB6-0



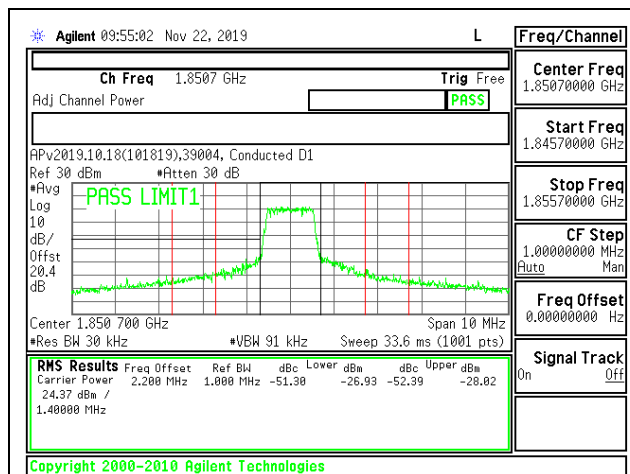
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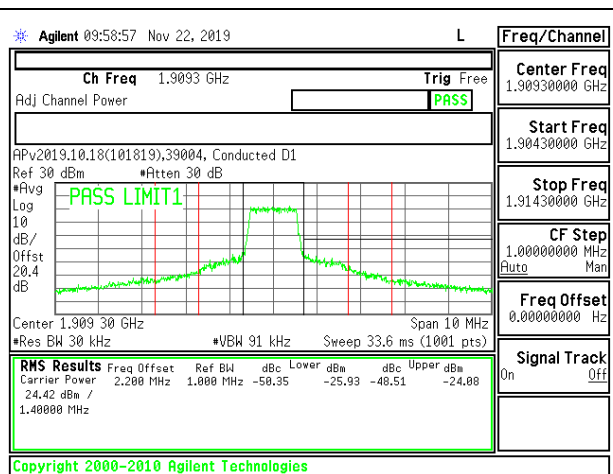
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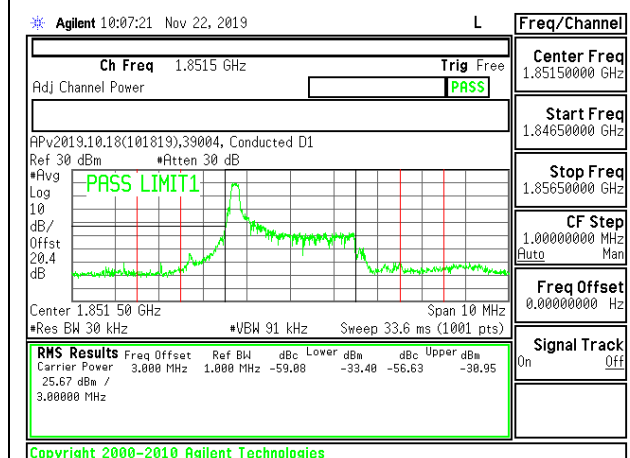
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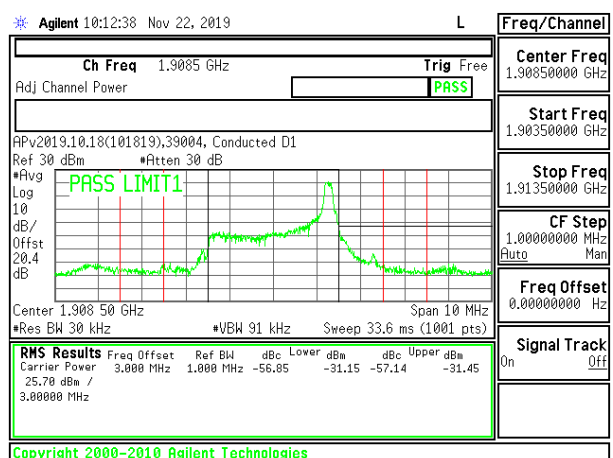
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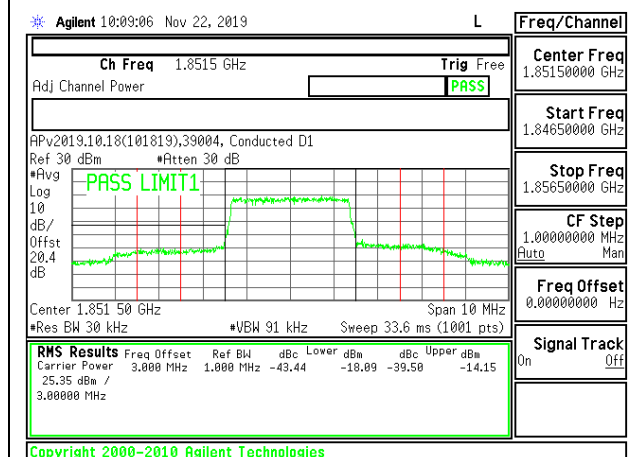
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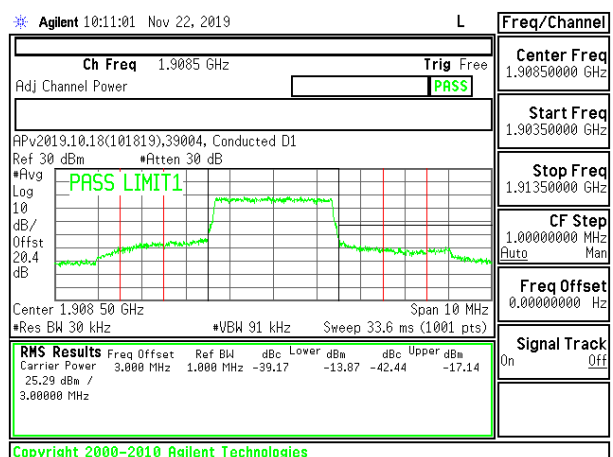
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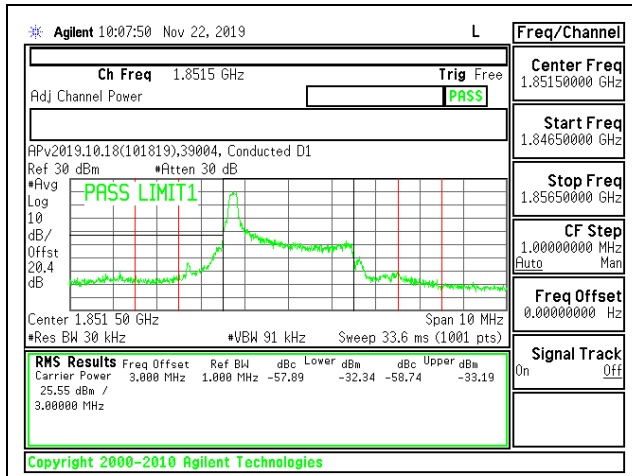
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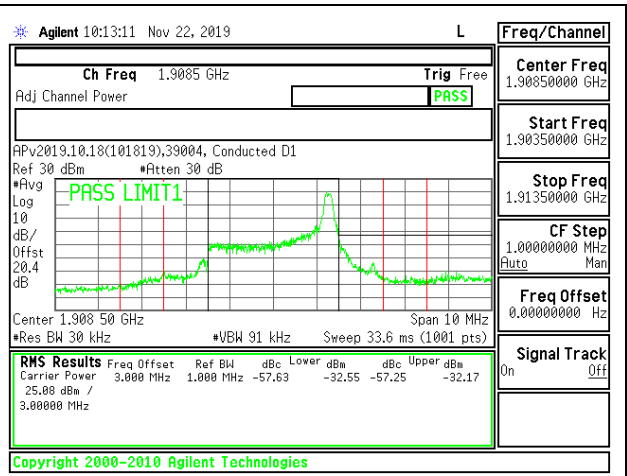
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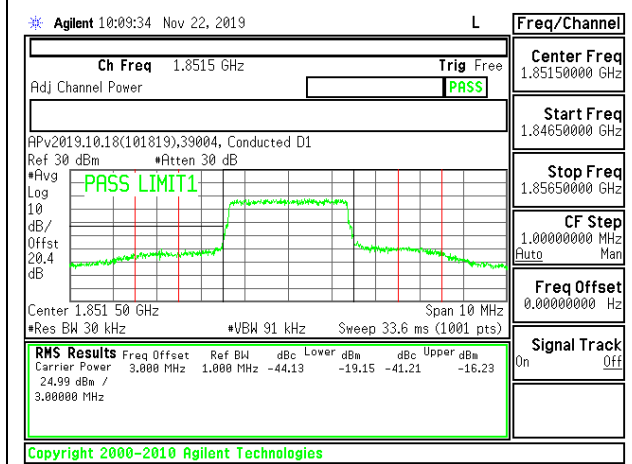
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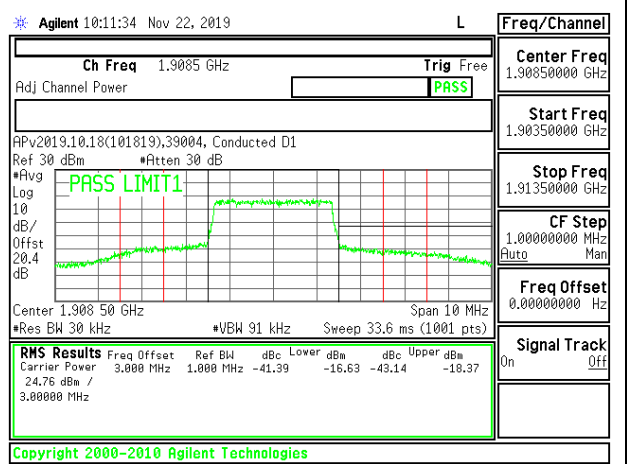
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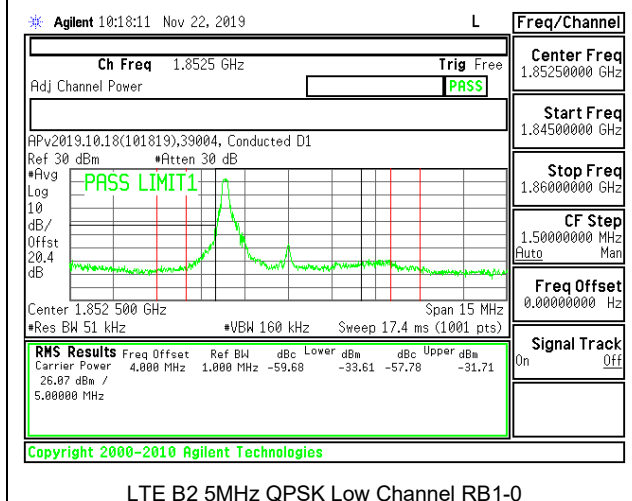
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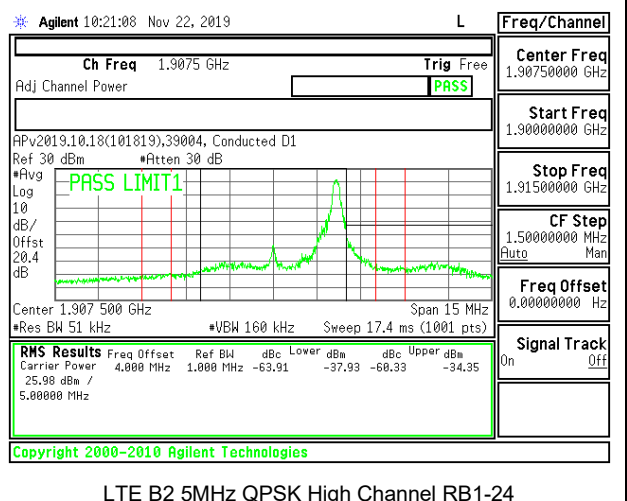
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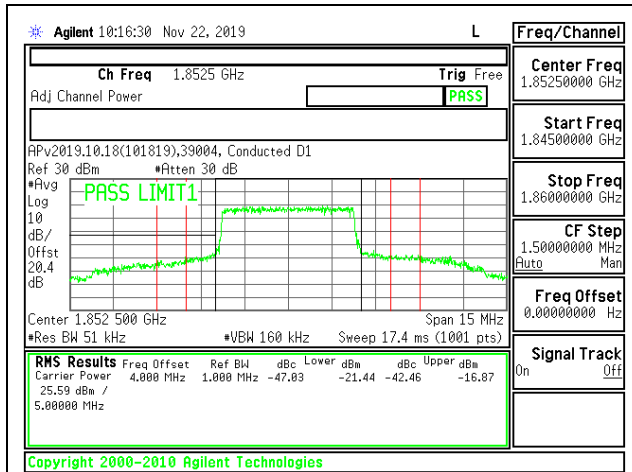
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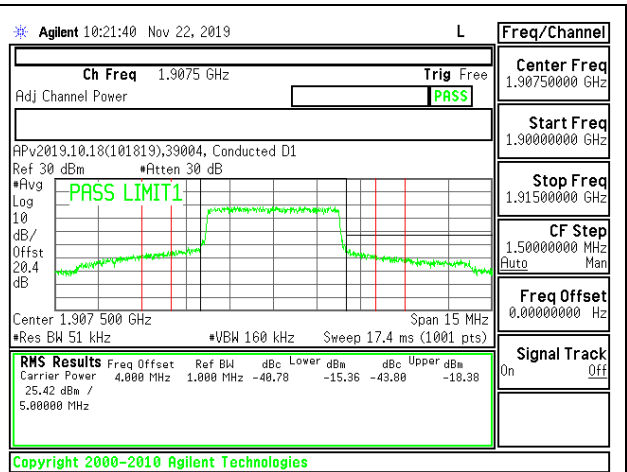
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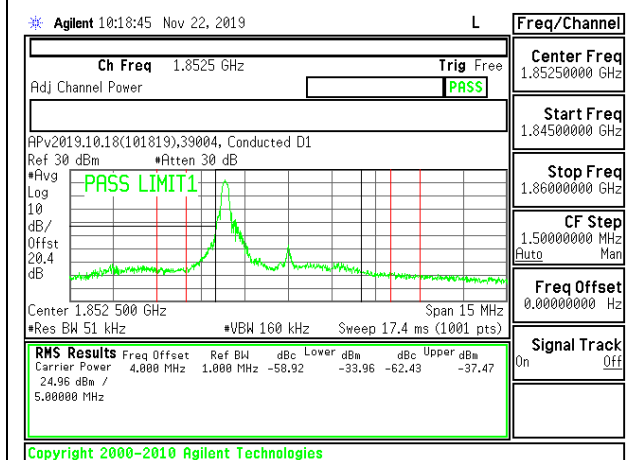
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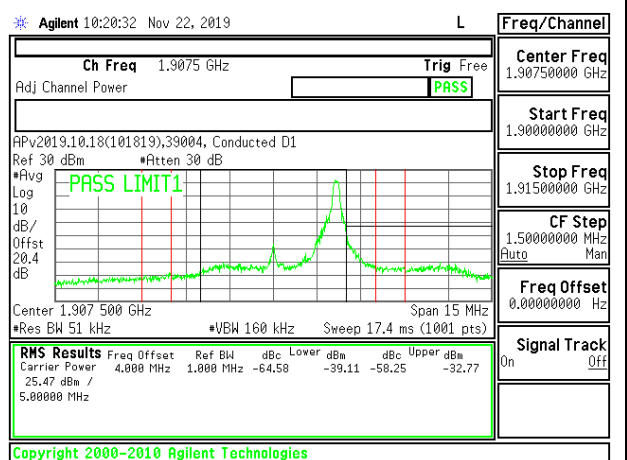
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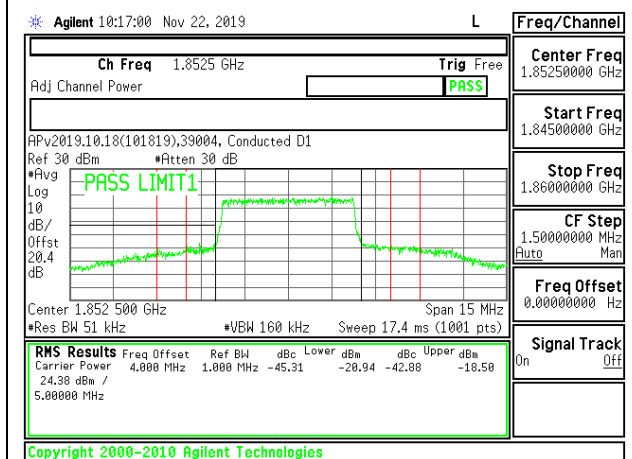
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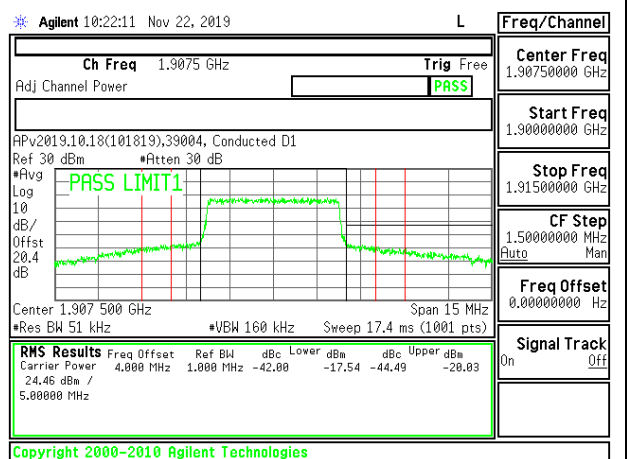
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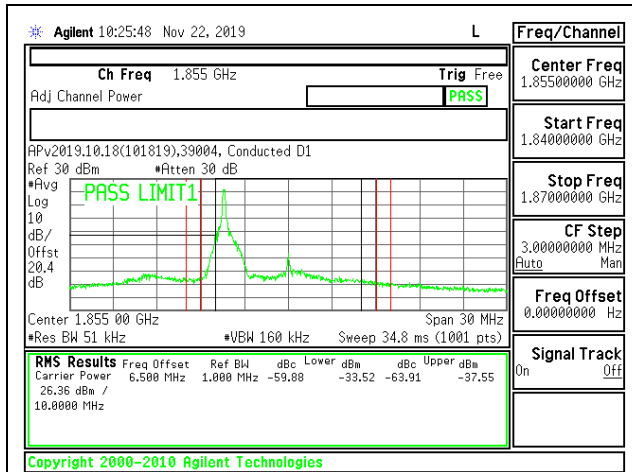
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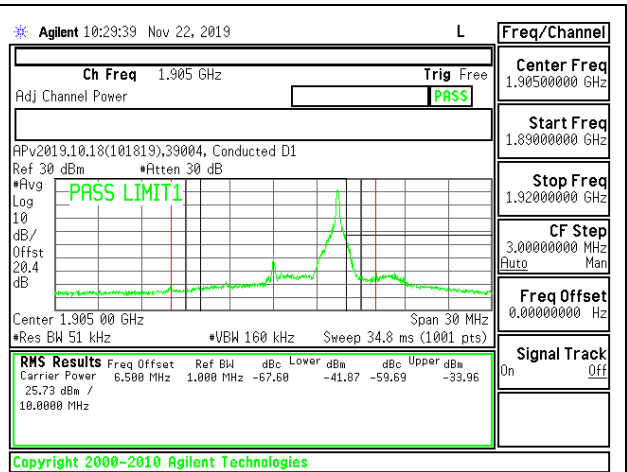
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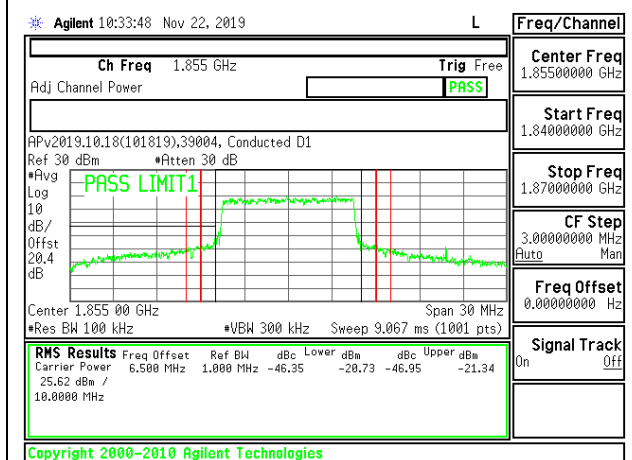
LTE B2 5MHz 16QAM High Channel RB25-0



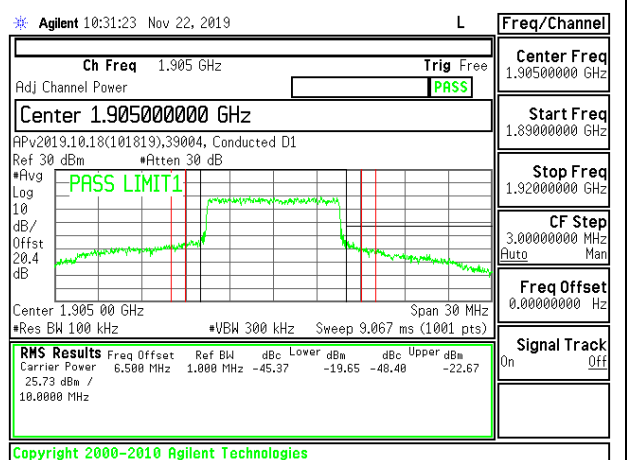
LTE B2 10MHz QPSK Low Channel RB1-0



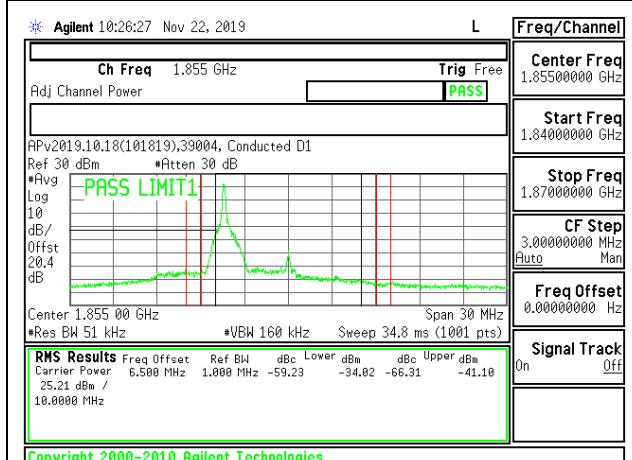
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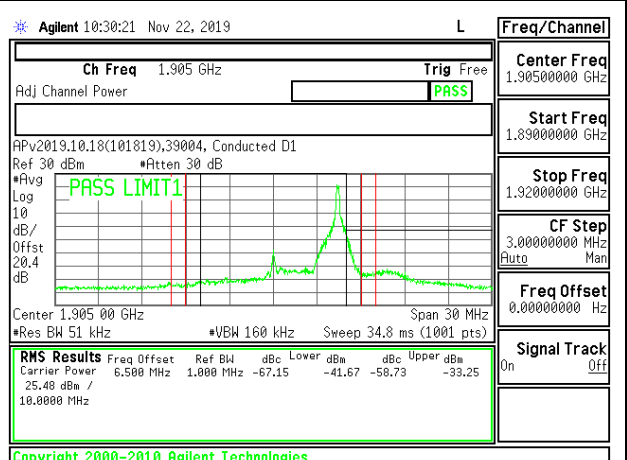
LTE B2 10MHz QPSK Low Channel RB50-0



LTE B2 10MHz QPSK High Channel RB50-0

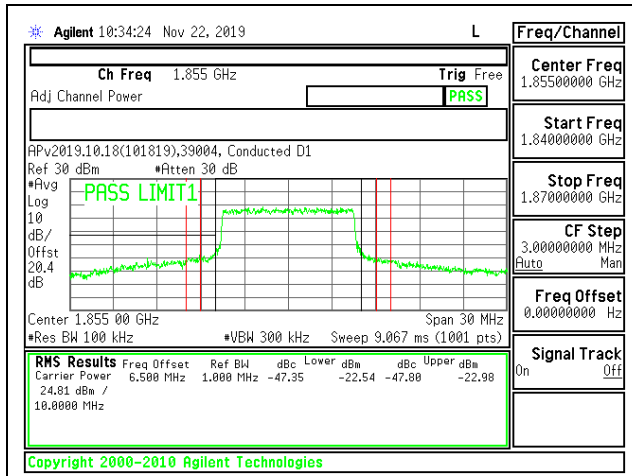


LTE B2 10MHz 16QAM Low Channel RB1-0

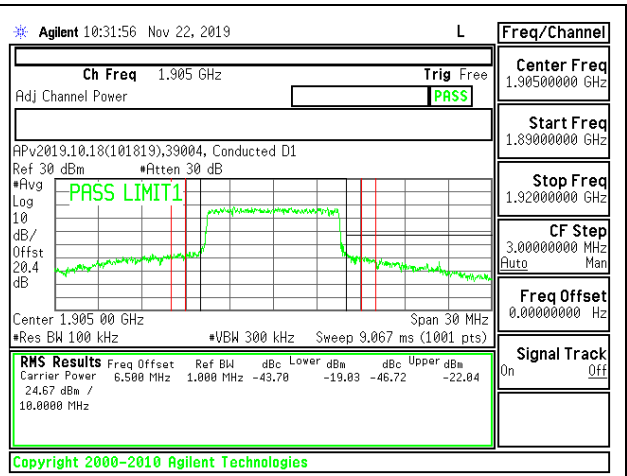


LTE B2 10MHz 16QAM High Channel RB1-49

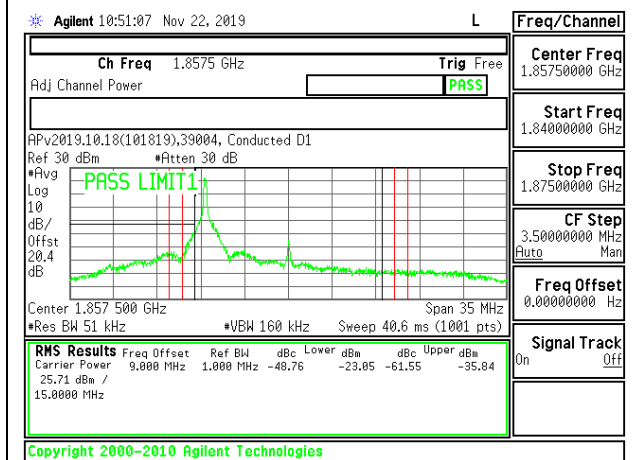




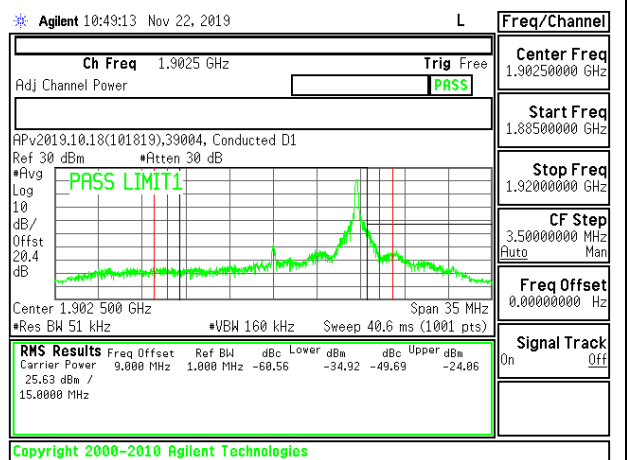
LTE B2 10MHz 16QAM Low Channel RB50-0



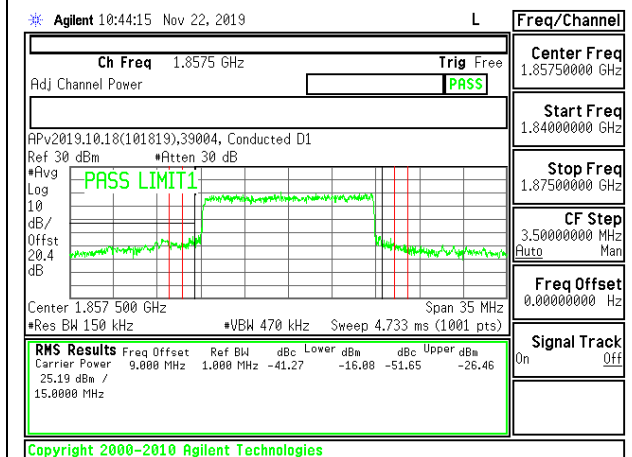
LTE B2 10MHz 16QAM High Channel RB50-0



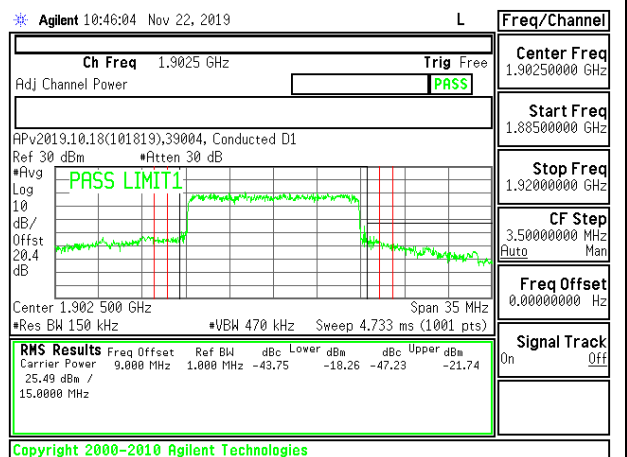
LTE B2 15MHz QPSK Low Channel RB1-0



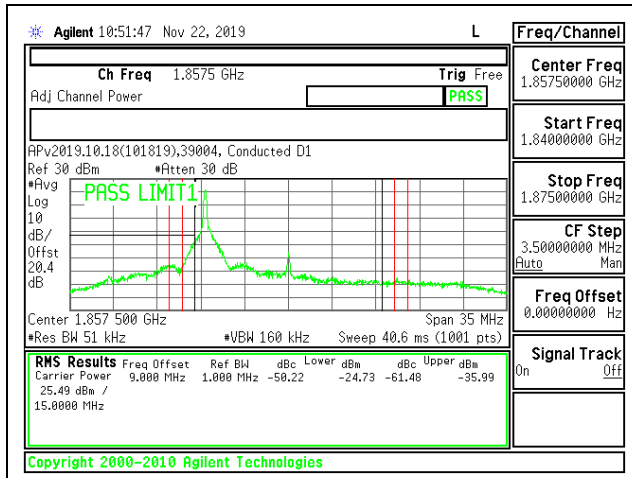
LTE B2 15MHz QPSK High Channel RB1-74



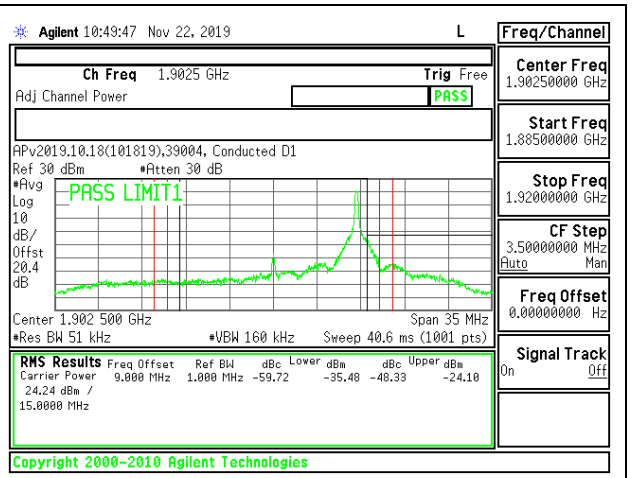
LTE B2 15MHz QPSK Low Channel RB75-0



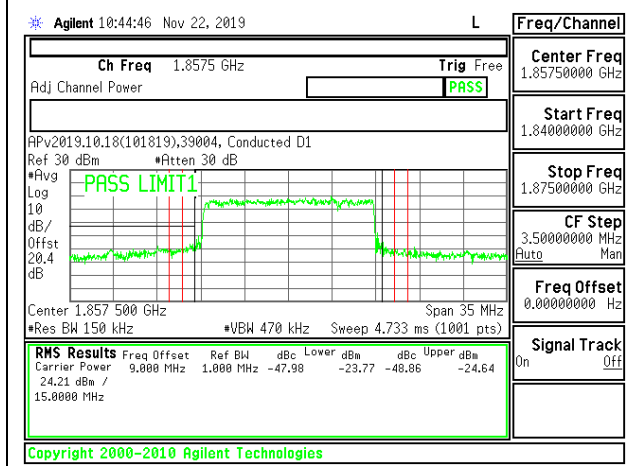
LTE B2 15MHz QPSK High Channel RB75-0



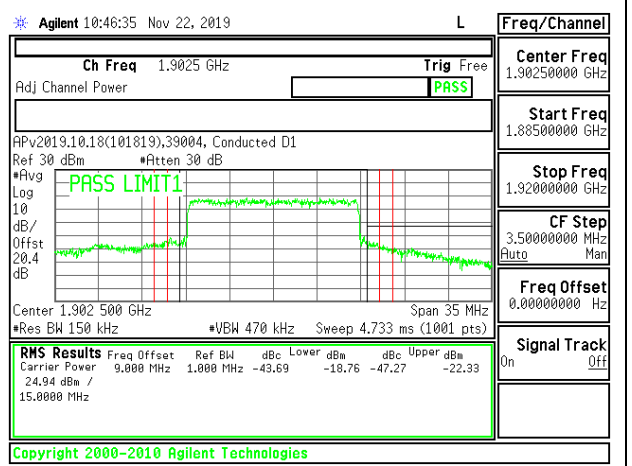
LTE B2 15MHz 16QAM Low Channel RB1-0



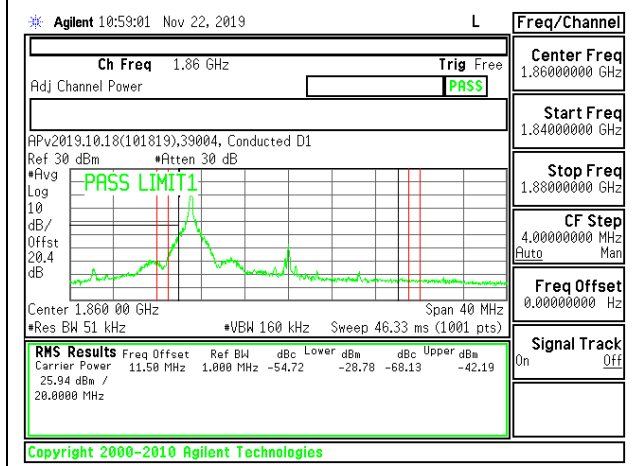
LTE B2 15MHz 16QAM High Channel RB1-74



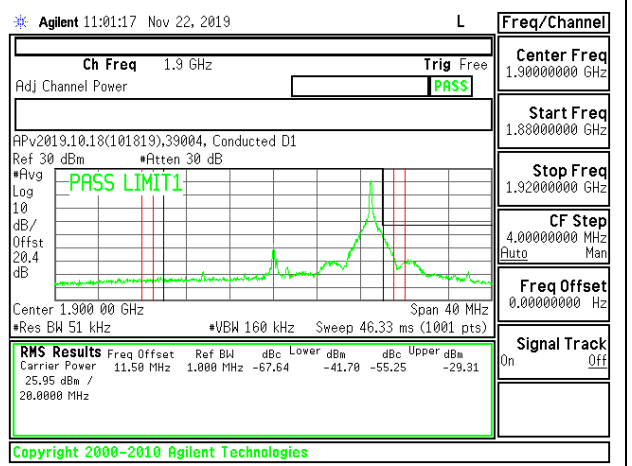
LTE B2 15MHz 16QAM Low Channel RB75-0



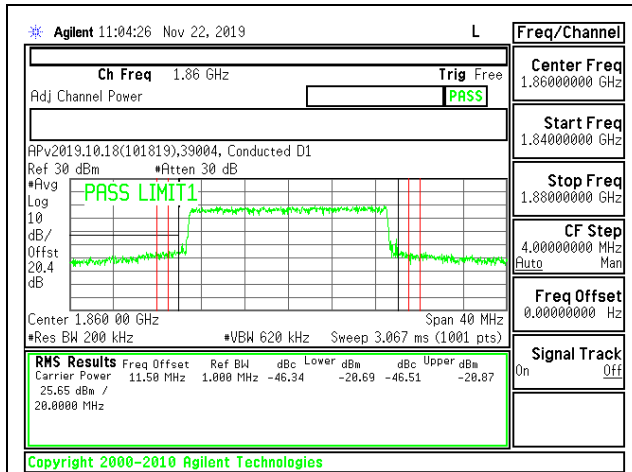
LTE B2 15MHz 16QAM High Channel RB75-0



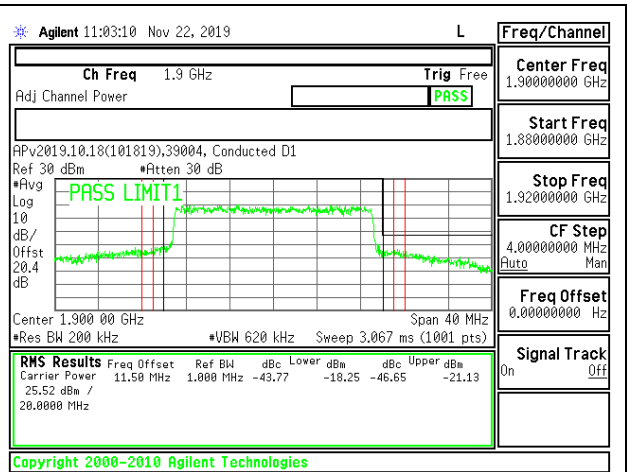
LTE B2 20MHz QPSK Low Channel RB1-0



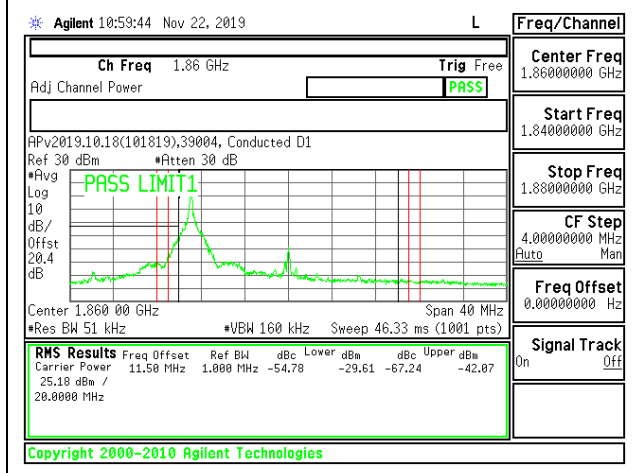
LTE B2 20MHz QPSK High Channel RB1-99



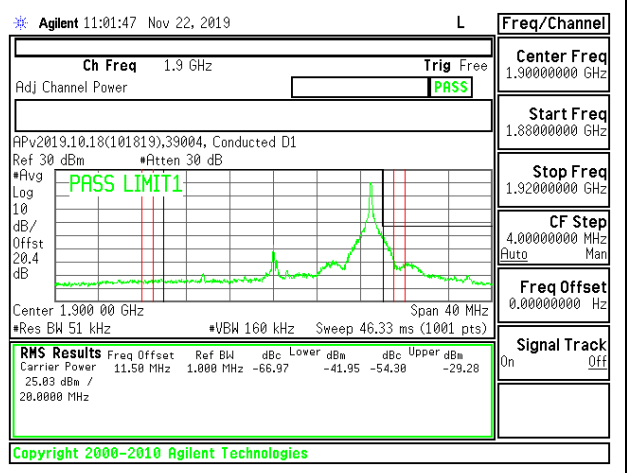
LTE B2 20MHz QPSK Low Channel RB100-0



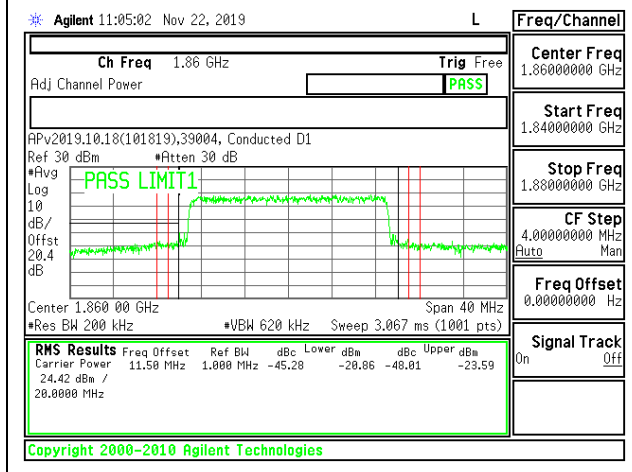
LTE B2 20MHz QPSK High Channel RB100-0



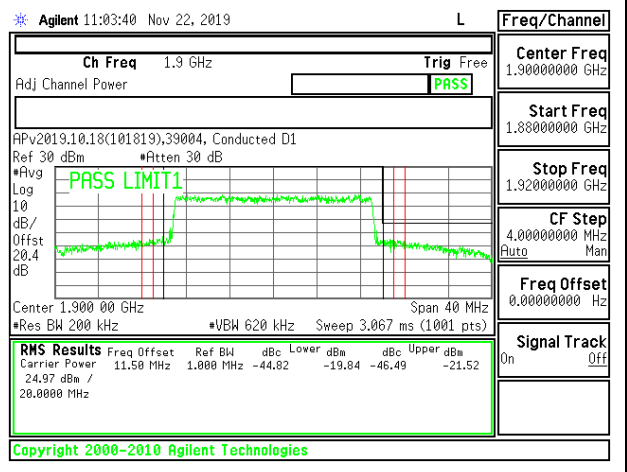
LTE B2 20MHz 16QAM Low Channel RB1-0



LTE B2 20MHz 16QAM High Channel RB1-99

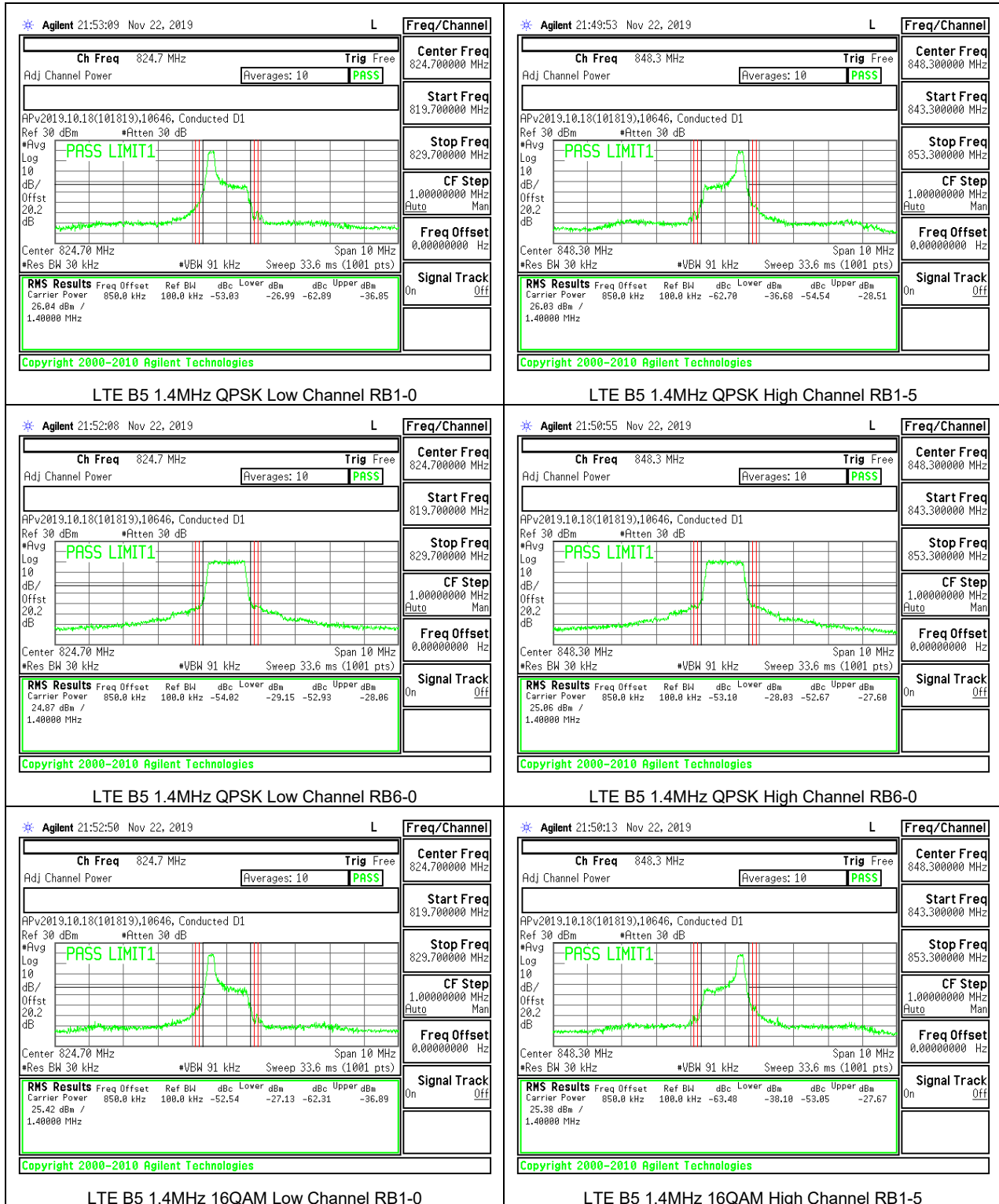


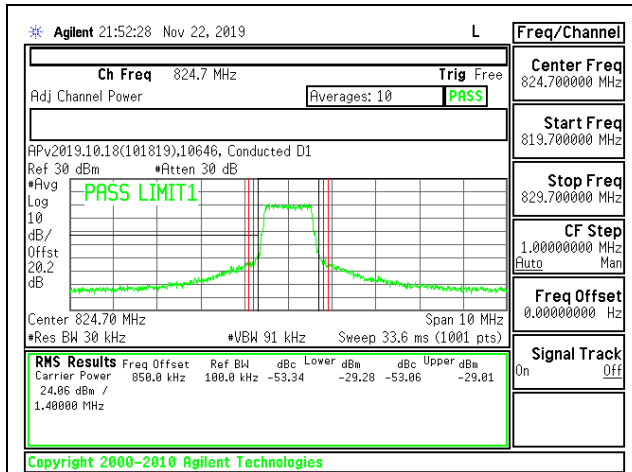
LTE B2 20MHz 16QAM Low Channel RB100-0



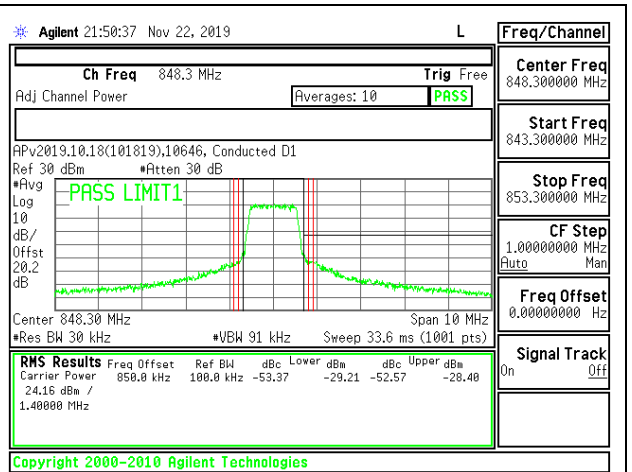
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8.2.2. LTE BAND 5 ADJACENT CHANNEL POWER

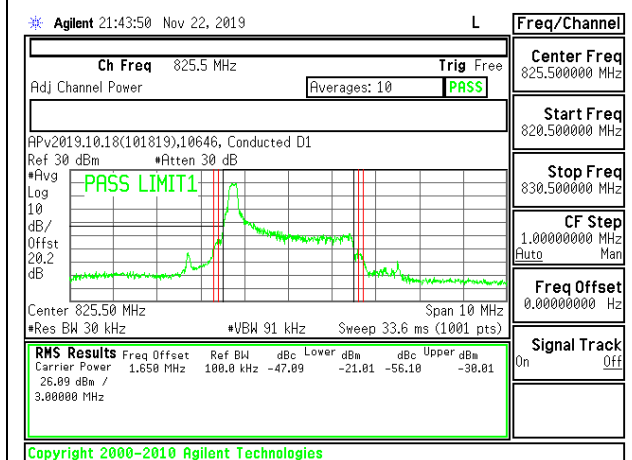




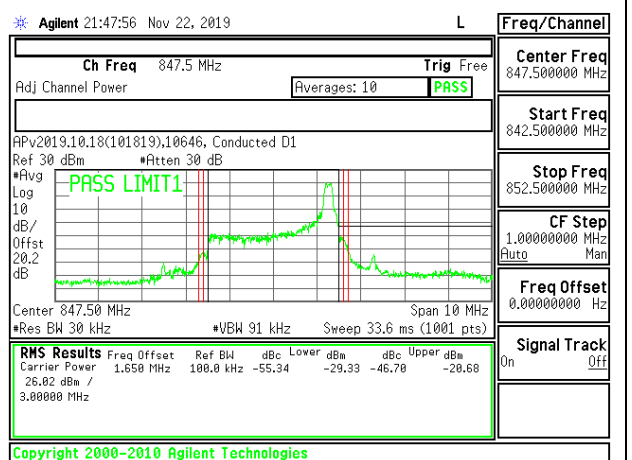
LTE B5 1.4MHz 16QAM Low Channel RB6-0



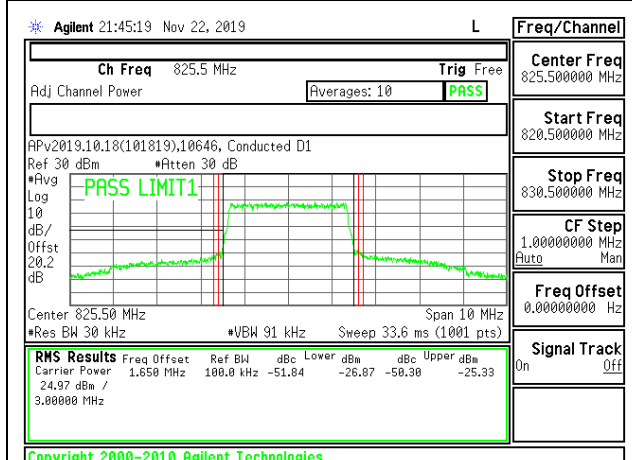
LTE B5 1.4MHz 16QAM High Channel RB6-0



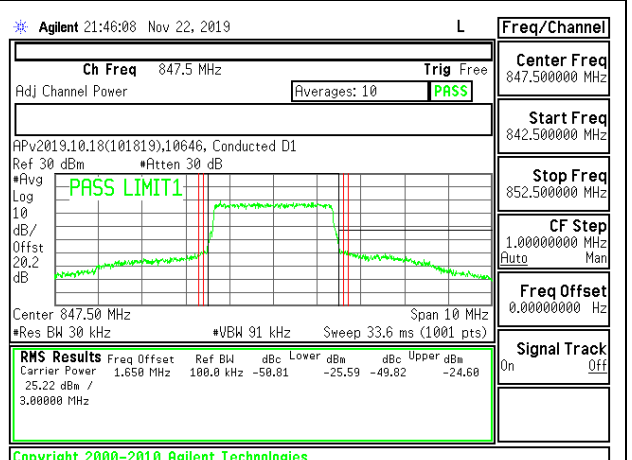
LTE B5 3MHz QPSK Low Channel RB1-0



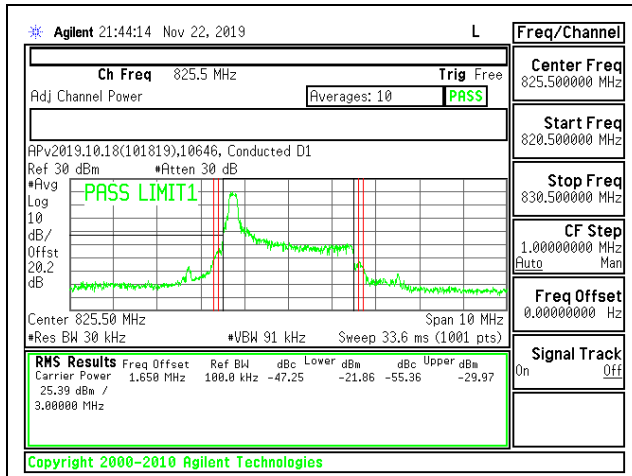
LTE B5 3MHz QPSK High Channel RB1-14



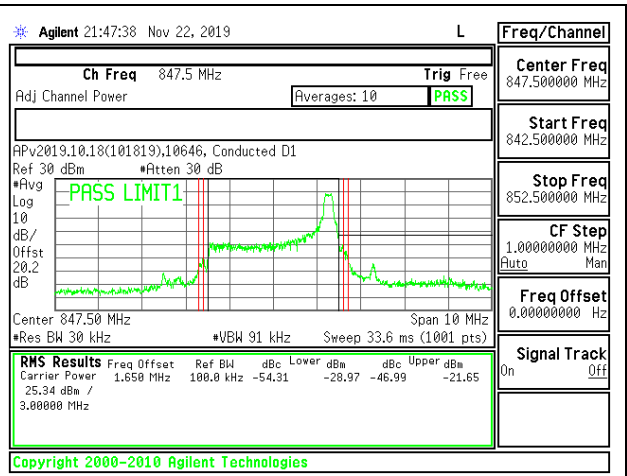
LTE B5 3MHz QPSK Low Channel RB15-0



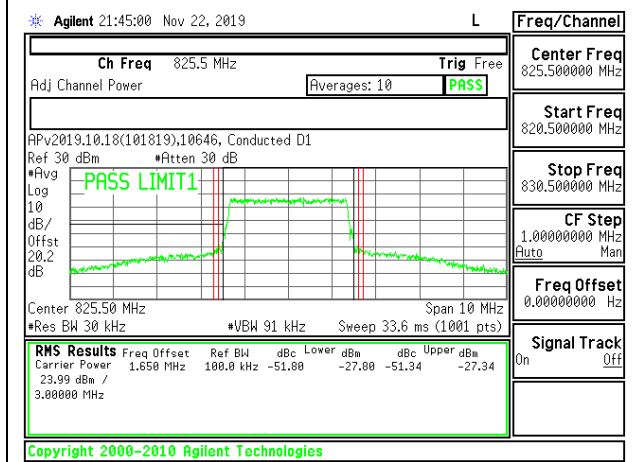
LTE B5 3MHz QPSK High Channel RB15-0



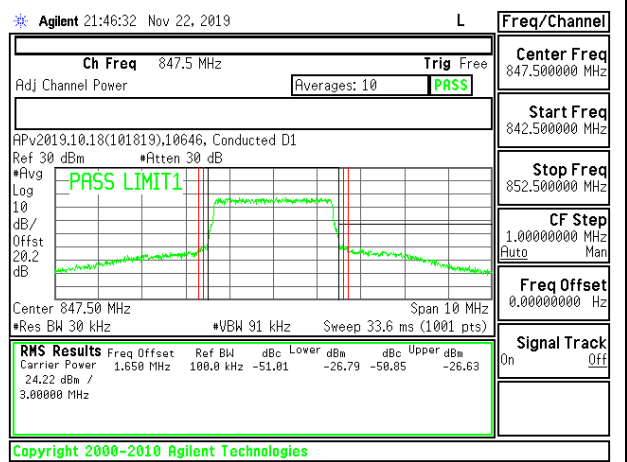
LTE B5 3MHz 16QAM Low Channel RB1-0



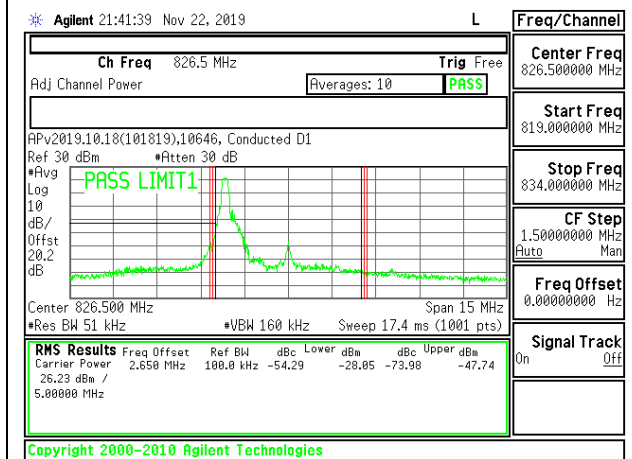
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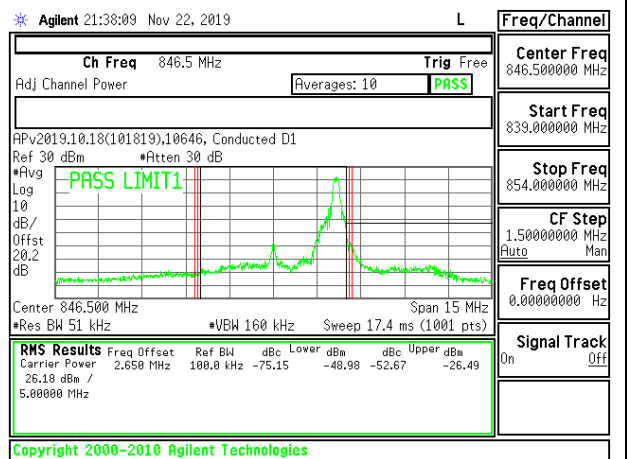
LTE B5 3MHz 16QAM Low Channel RB15-0



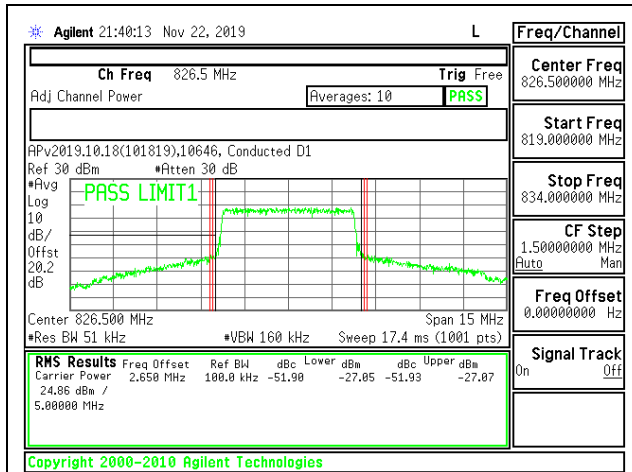
LTE B5 3MHz 16QAM High Channel RB15-0



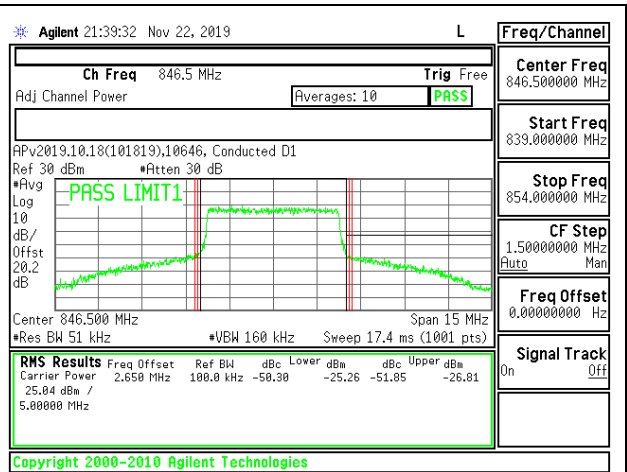
LTE B5 5MHz QPSK Low Channel RB1-0



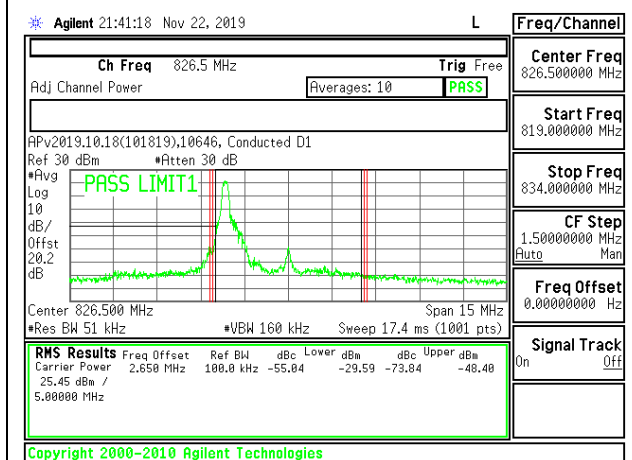
LTE B5 5MHz QPSK High Channel RB1-24



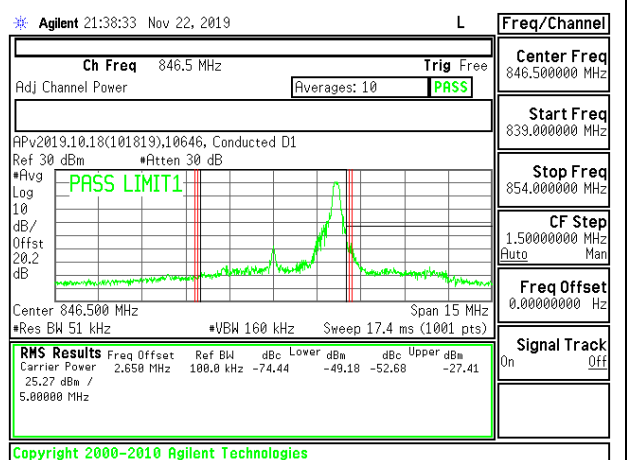
LTE B5 5MHz QPSK Low Channel RB25-0



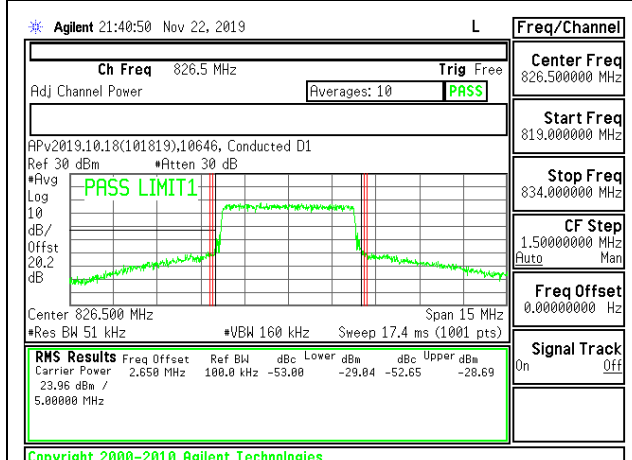
LTE B5 5MHz QPSK High Channel RB25-0



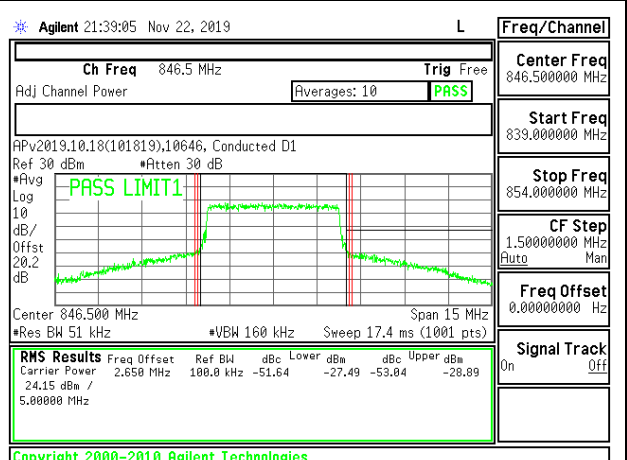
LTE B5 5MHz 16QAM Low Channel RB1-0



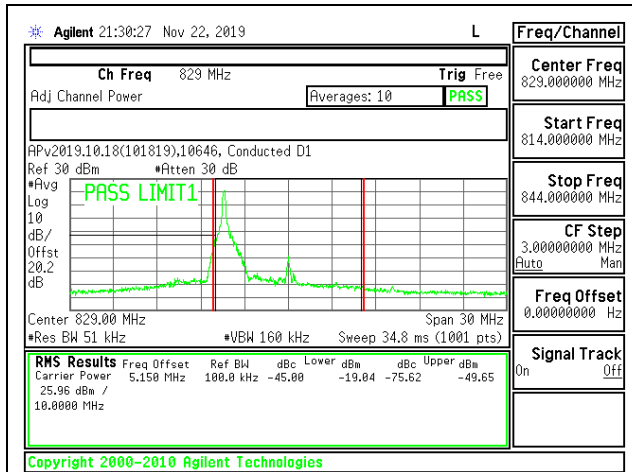
LTE B5 5MHz 16QAM High Channel RB1-24



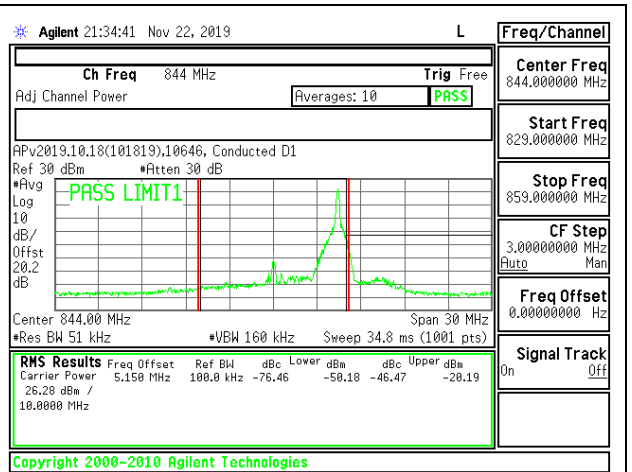
LTE B5 5MHz 16QAM Low Channel RB25-0



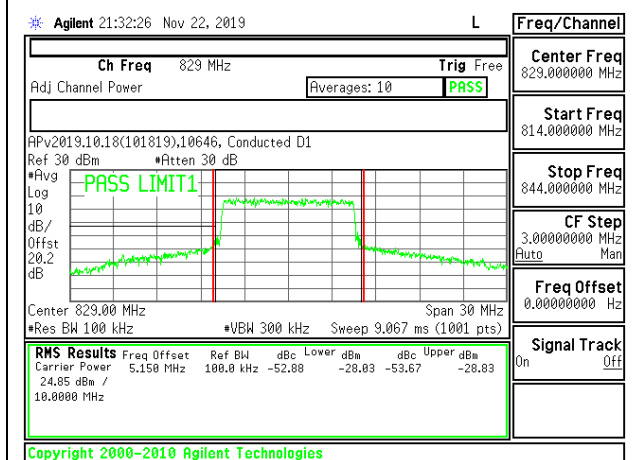
LTE B5 5MHz 16QAM High Channel RB25-0



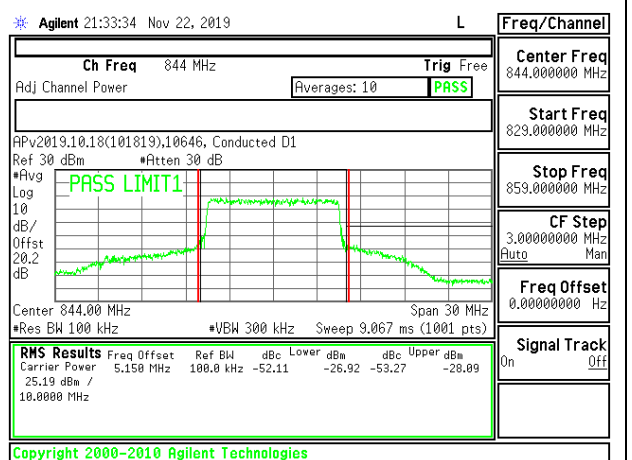
LTE B5 10MHz QPSK Low Channel RB1-0



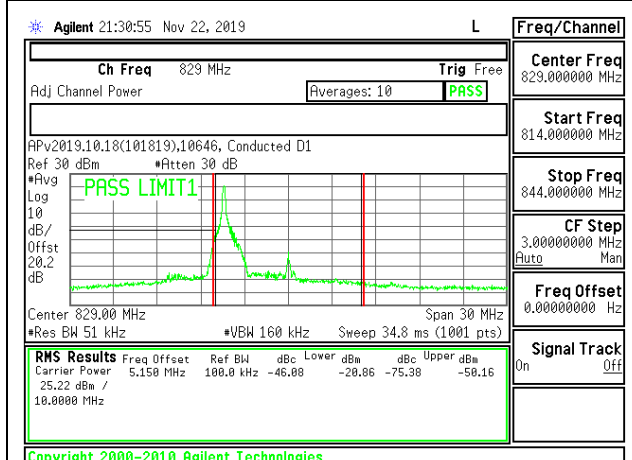
LTE B5 10MHz QPSK High Channel RB1-49



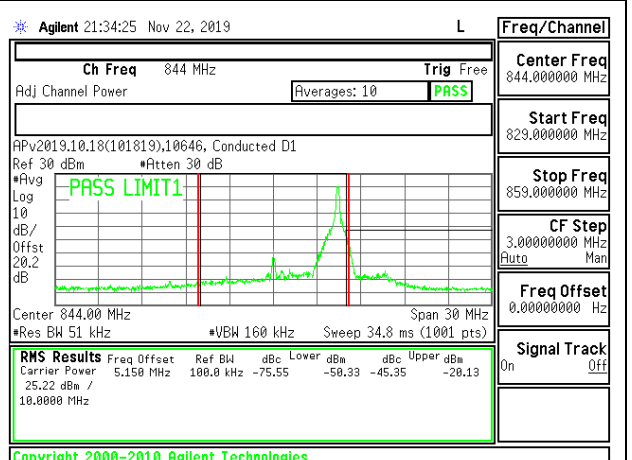
LTE B5 10MHz QPSK Low Channel RB50-0



LTE B5 10MHz QPSK High Channel RB50-0

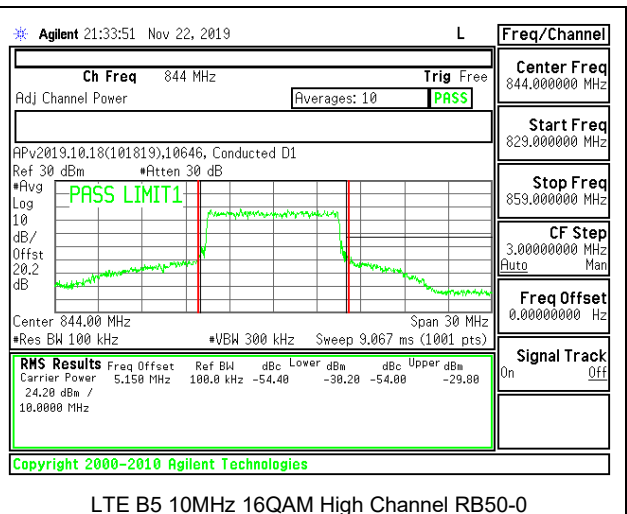
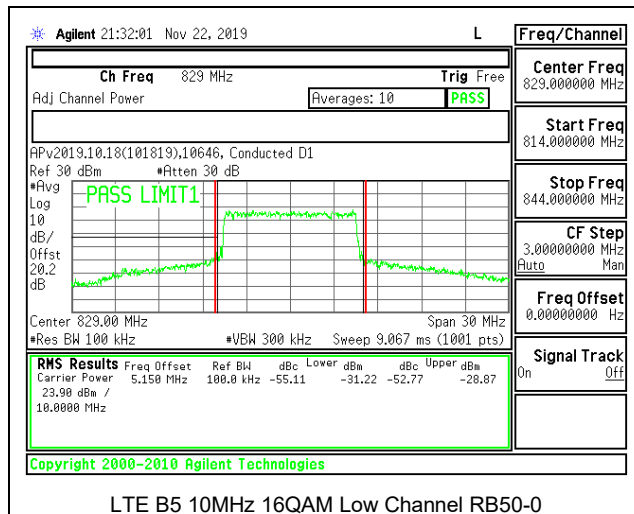


LTE B5 10MHz 16QAM Low Channel RB1-0

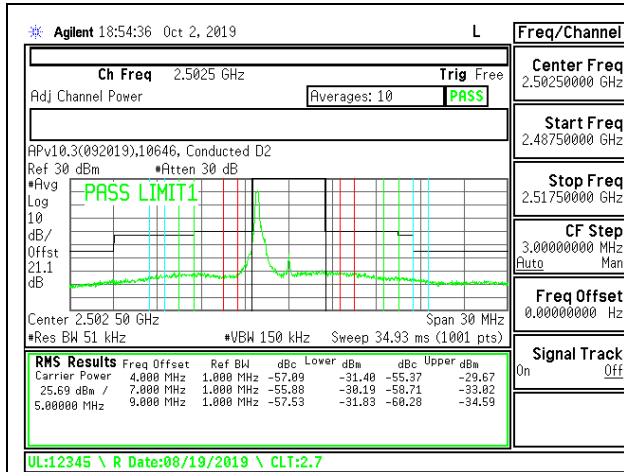


LTE B5 10MHz 16QAM High Channel RB1-49

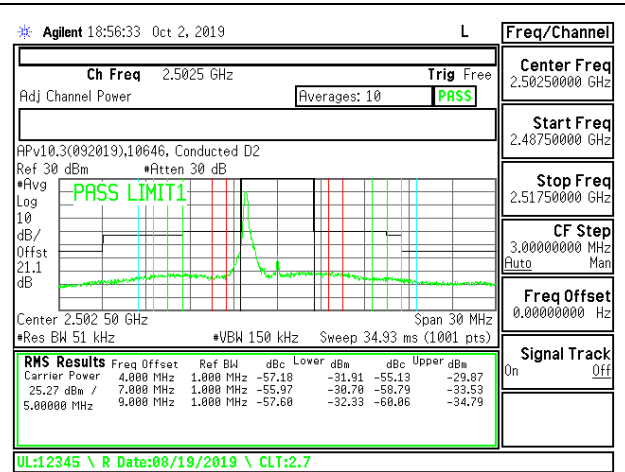




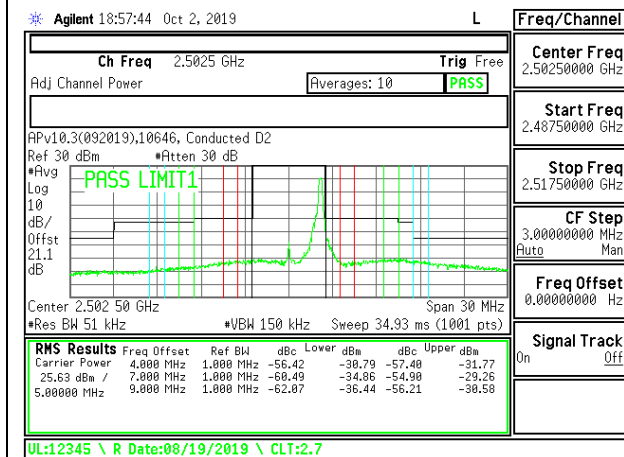
8.2.3. LTE BAND 7 ADJACENT CHANNEL POWER



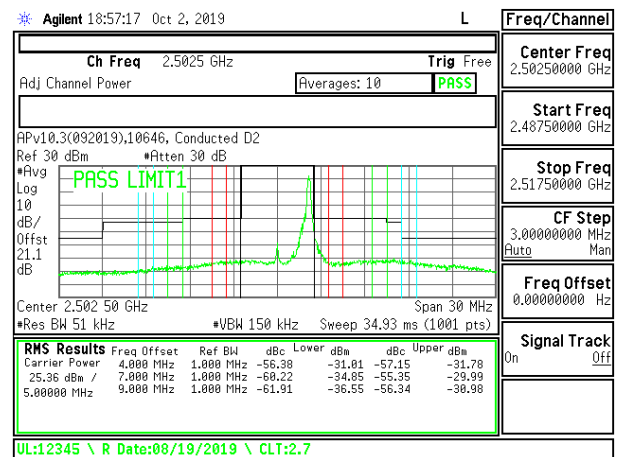
LTE B7 5MHz QPSK Low Channel RB1-0



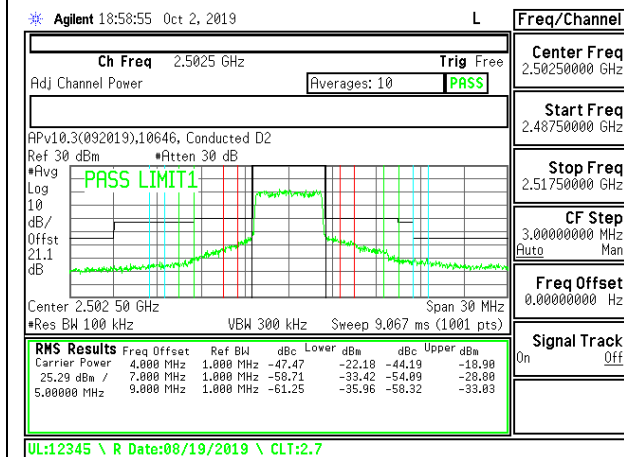
LTE B7 5MHz 16QAM Low Channel RB1-0



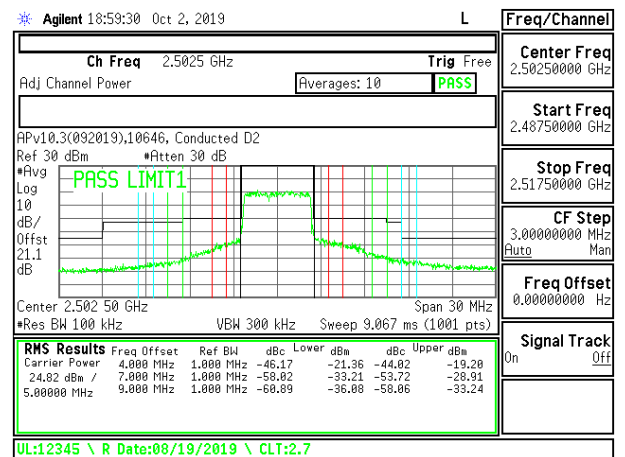
LTE B7 5MHz QPSK Low Channel RB1-24



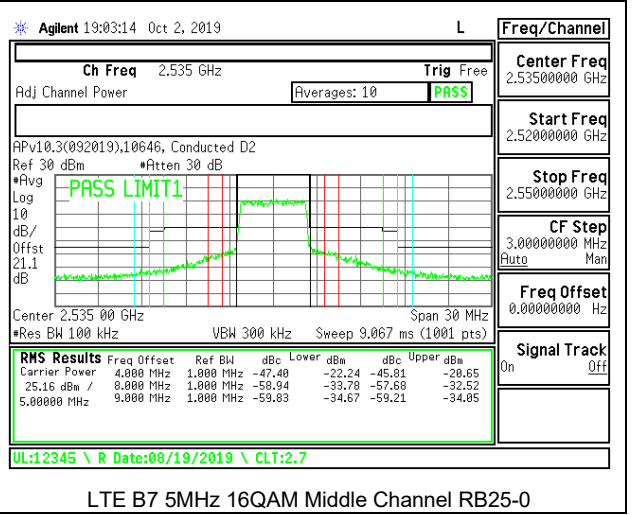
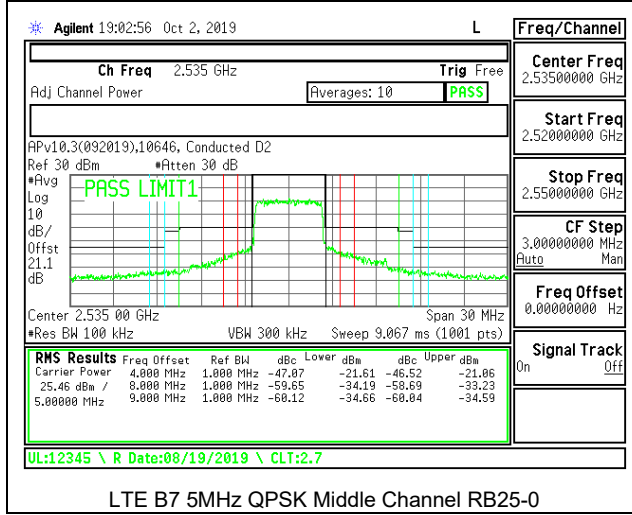
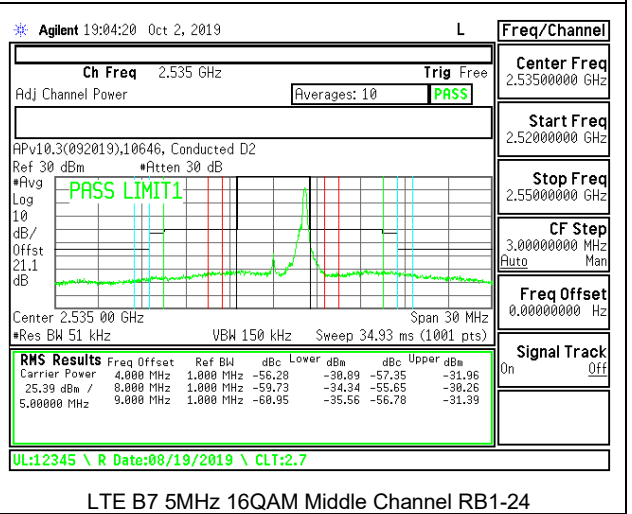
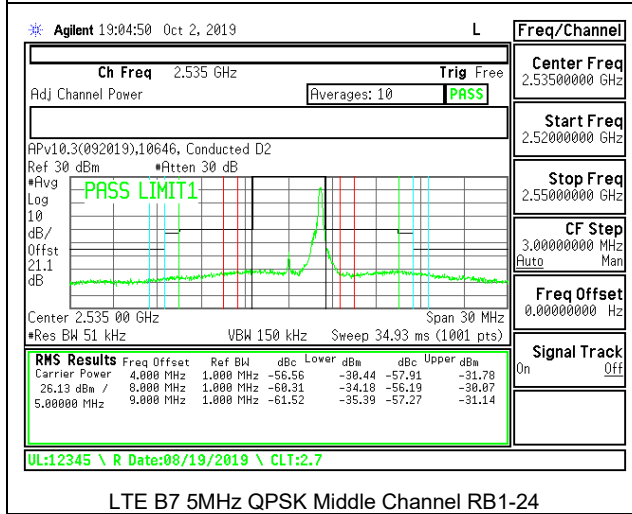
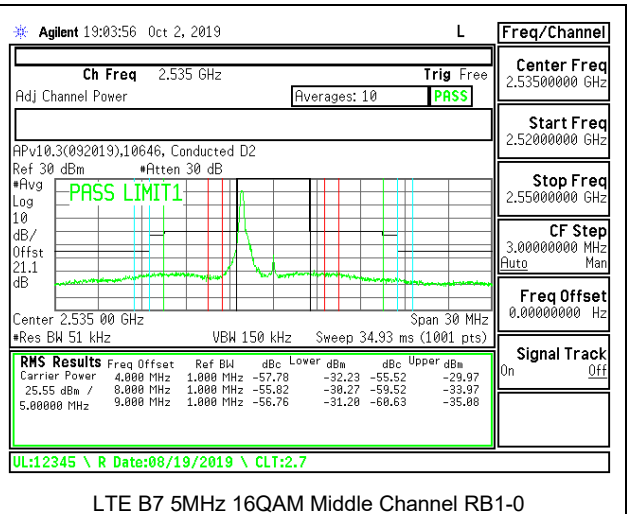
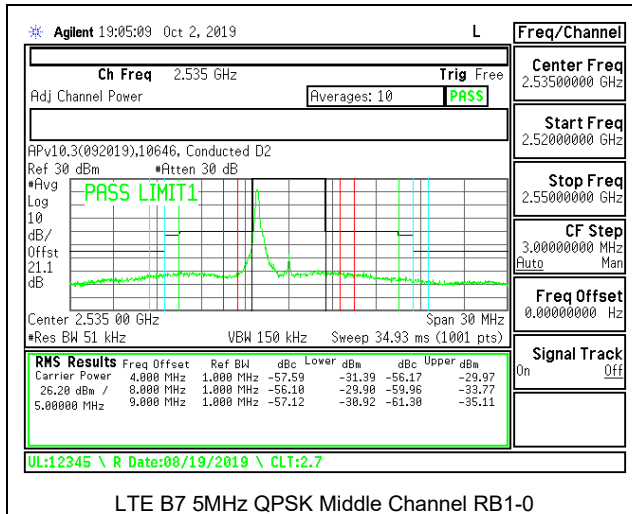
LTE B7 5MHz 16QAM Low Channel RB1-24

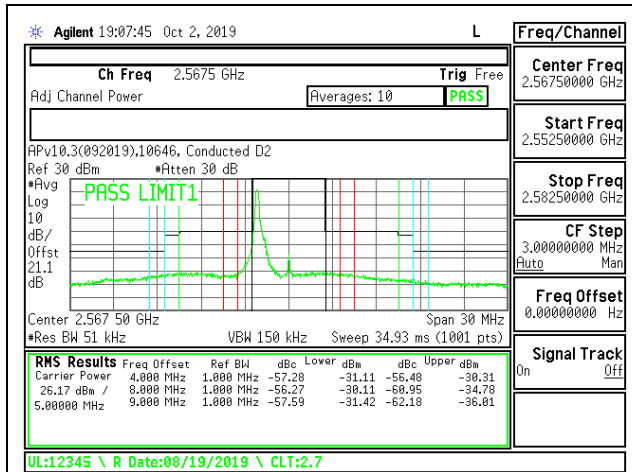


LTE B7 5MHz QPSK Low Channel RB25-0

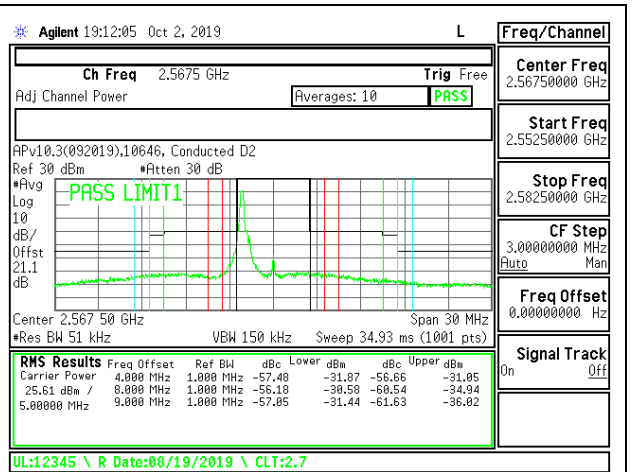


LTE B7 5MHz 16QAM Low Channel RB25-0

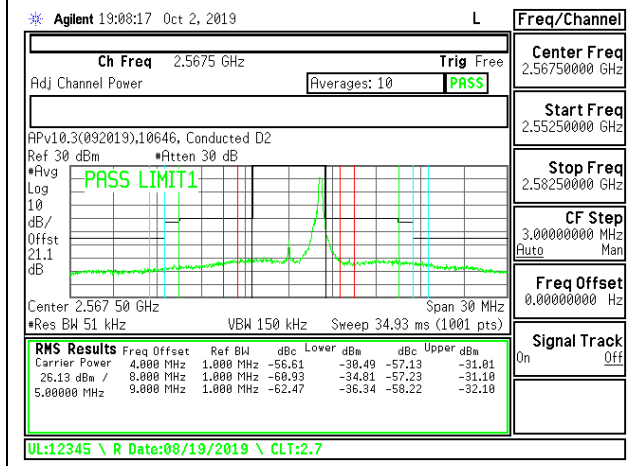




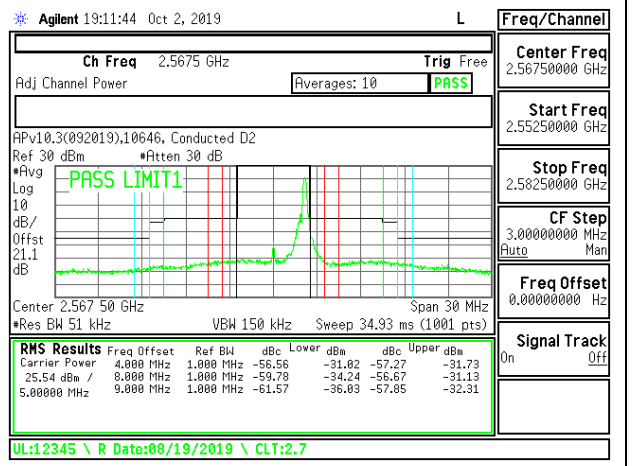
LTE B7 5MHz QPSK High Channel RB1-0



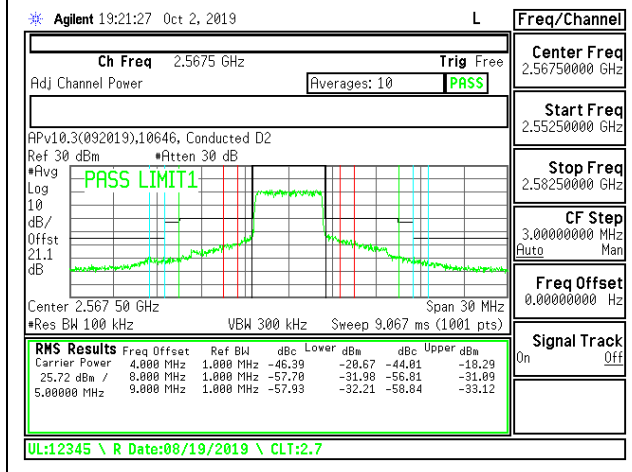
LTE B7 5MHz 16QAM High Channel RB1-0



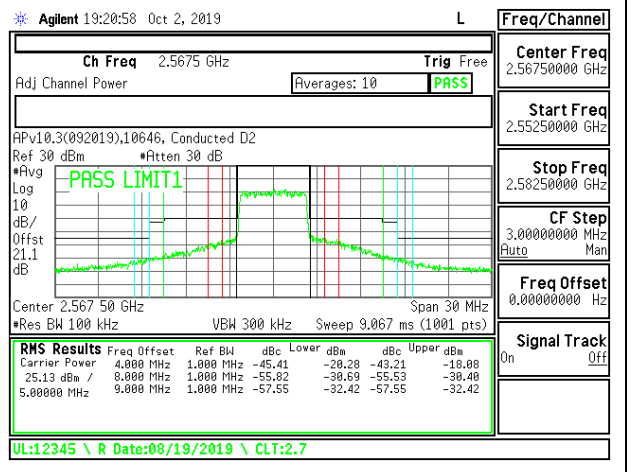
LTE B7 5MHz QPSK High Channel RB1-24



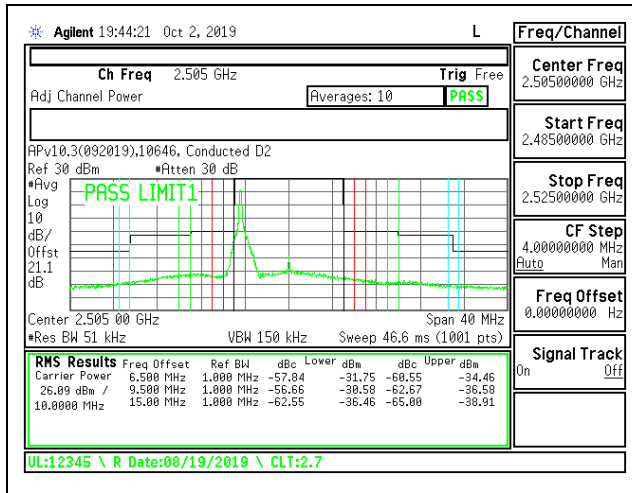
LTE B7 5MHz 16QAM High Channel RB1-24



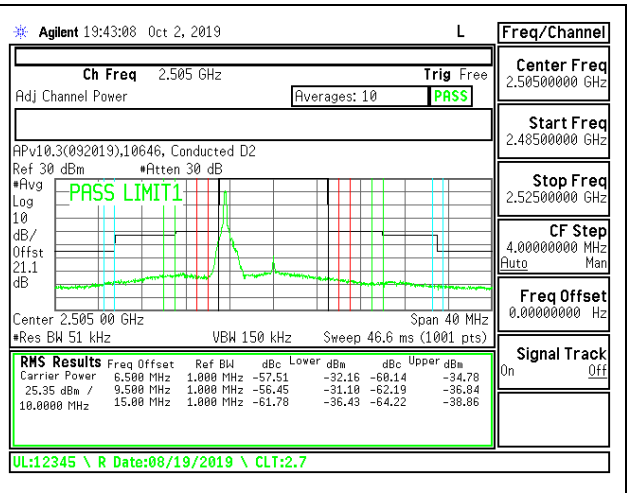
LTE B7 5MHz QPSK High Channel RB25-0



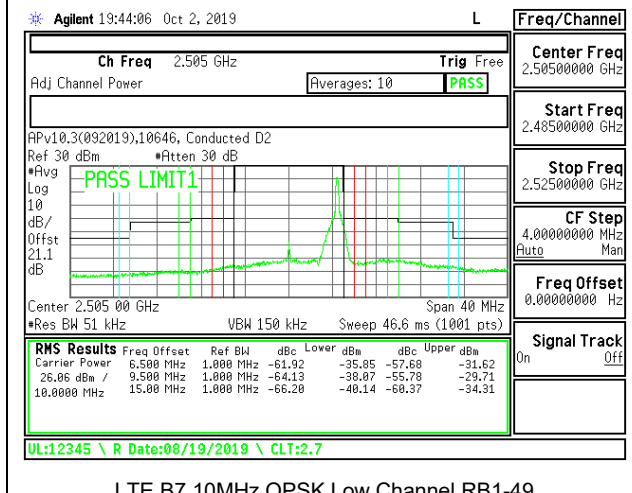
LTE B7 5MHz 16QAM High Channel RB25-0



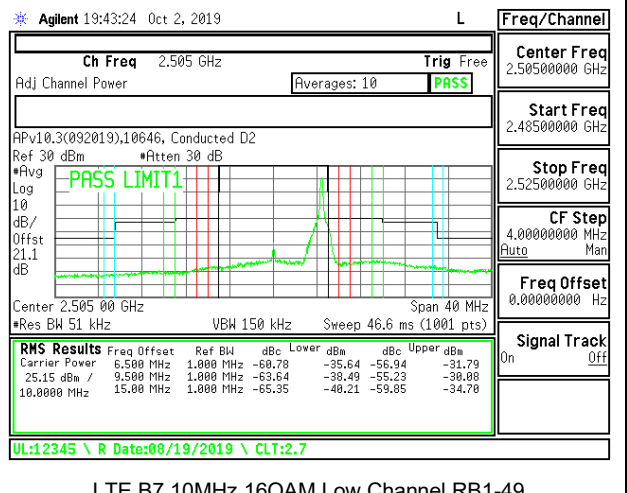
LTE B7 10MHz QPSK Low Channel RB1-0



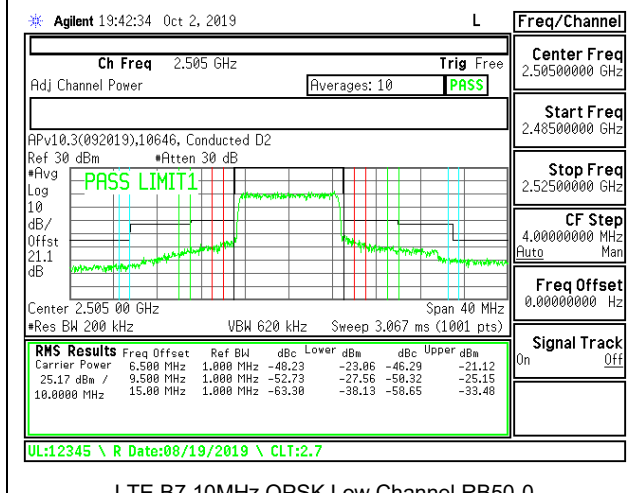
LTE B7 10MHz 16QAM Low Channel RB1-0



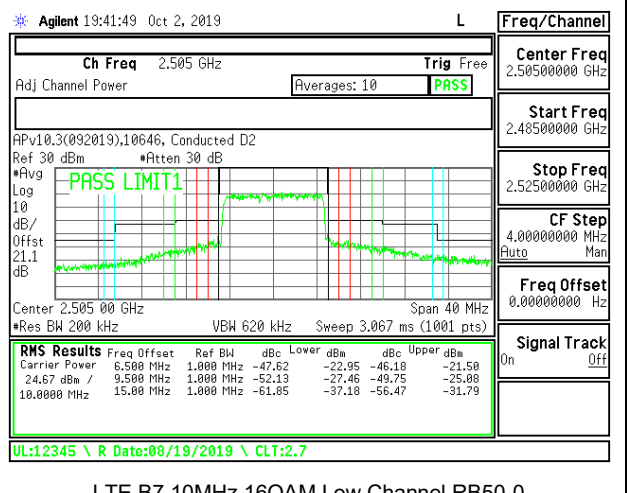
LTE B7 10MHz QPSK Low Channel RB1-49



LTE B7 10MHz 16QAM Low Channel RB1-49



LTE B7 10MHz QPSK Low Channel RB50-0



LTE B7 10MHz 16QAM Low Channel RB50-0