



# TEST REPORT

**Report Number. :** 13129294-E6V2

**Applicant :** MICROSOFT CORPORATION  
ONE MICROSOFT WAY  
REDMOND, WA 98052, U.S.A.

**Model :** 1930

**FCC ID :** C3K1930

**EUT Description :** PHABLET DEVICE

**Test Standard(s) :** FCC CFR47 PART 22H, 24E, 27, 90

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V1	5/29/2020	Initial Review	---
V2	6/9/2020	EUT updated	Grace Rincand

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# 1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	MICROSOFT CORPORATION ONE MICROSOFT WAY REDMOND, WA 98052, U.S.A.
Model	1930
FCC ID	C3K1930
EUT Description	PHABLET DEVICE
Serial Number	901139500365, 901245700365, 90006061165, 900065101165, 900304501465
Date Tested	FEBRUARY 26, 2020 to MAY 28, 2020
Applicable Standards	FCC CFR47 PART 22H, 24E, 27, 90
Test Results	COMPLIES

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.

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.

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Approved & Released By:  	Reviewed By:  	Prepared By:  
Choose an item. Operations Leader UL Verification Services Inc.	Tina Chu Senior Project Engineer UL Verification Services Inc.	Rolly Alegre 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 22H, Part 24E, Part 27, Part 90.
- [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 Benicia Street, Fremont, California, USA, and 2800 Suite Perimeter Park Dr., Morrisville, North Carolina, 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 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

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

UL Verification Services Inc 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.

2800 Suite Perimeter Park Dr.
<input checked="" type="checkbox"/> North Chamber
<input checked="" type="checkbox"/> South Chamber

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

UL LLC (RTP) test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code: 2180C.



## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable 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	U <sub>Lab</sub>
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%.

### 4.4. SAMPLE CALCULATION

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)  
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.  
36.5 dBuV + 0 dB + 10.1 dB + 0 dB = 46.6 dBuV

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a Phablet Device with 802.11 a/b/g/n/ac 2x2 WLAN, Bluetooth, Bluetooth LE, GSM, WCDMA, and LTE radios.

### 5.2. MAXIMUM OUTPUT POWER

#### EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015  
KDB 971168 D01 Section 5.6

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

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

PMeas = 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.

The transmitter has a maximum average conducted and ERP / EIRP output powers as follows:

**LTE BAND 2**

Part 24 / RSS 133								
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
1.4	QPSK	1850.7	1909.3	23.9	24.30	0.269	1080.6	1M08G7W
	16QAM			23.2	23.60	0.229	1084.6	1M08D7W
3.0	QPSK	1851.5	1908.5	23.9	24.30	0.269	2687.2	2M69G7W
	16QAM			23.3	23.70	0.234	2686.2	2M69D7W
5.0	QPSK	1852.5	1907.5	24.0	24.40	0.275	4497.6	4M50G7W
	16QAM			23.4	23.80	0.240	4497.4	4M50D7W
10.0	QPSK	1855.0	1905.0	23.9	24.30	0.269	8938.9	8M94G7W
	16QAM			23.2	23.60	0.229	8946.1	8M95D7W
15.0	QPSK	1857.5	1902.5	24.0	24.40	0.275	13445	13M4G7W
	16QAM			23.4	23.80	0.240	13418.2	13M4D7W
20.0	QPSK	1860.0	1900.0	24.0	24.40	0.275	17877.9	17M9G7W
	16QAM			23.5	23.90	0.245	17862.3	17M9D7W

**LTE BAND 4**

Part 27 / RSS 139								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		0.60						
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	1710.7	1754.3	23.9	24.50	0.282	1082.5	1M08G7W
	16QAM			23.3	23.90	0.245	1092	1M09D7W
3.0	QPSK	1711.5	1753.5	23.9	24.50	0.282	2687.2	2M69G7W
	16QAM			23.2	23.80	0.240	2682.3	2M68D7W
5.0	QPSK	1712.5	1752.5	24.0	24.60	0.288	4490.2	4M49G7W
	16QAM			23.4	24.00	0.251	4489.6	4M49D7W
10.0	QPSK	1715.0	1750.0	23.9	24.50	0.282	8958.7	8M96G7W
	16QAM			23.3	23.90	0.245	8977.6	8M98D7W
15.0	QPSK	1717.5	1747.5	24.1	24.70	0.295	13402.2	13M4G7W
	16QAM			23.5	24.10	0.257	13422.8	13M4D7W
20.0	QPSK	1720.0	1745.0	24.1	24.70	0.295	17870.5	17M9G7W
	16QAM			23.7	24.30	0.269	17892	17M9D7W

**LTE BAND 5**

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-1.10						
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	23.8	20.55	0.114	1078.8	1M08G7W
	16QAM			23.2	19.95	0.099	1080.1	1M08D7W
3.0	QPSK	825.5	847.5	23.9	20.65	0.116	2682.7	2M68G7W
	16QAM			23.2	19.95	0.099	2676.9	2M68D7W
5.0	QPSK	826.5	846.5	23.9	20.65	0.116	4497.4	4M50G7W
	16QAM			23.3	20.05	0.101	4493.4	4M49D7W
10.0	QPSK	829.0	844.0	24.0	20.75	0.119	8960	8M96G7W
	16QAM			23.3	20.05	0.101	8917.3	8M92D7W

**LTE BAND 7**

Part 27 / RSS 199								
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	23.9	23.50	0.224	4500.7	4M50G7W
	16QAM			23.5	23.10	0.204	4480.4	4M48D7W
10.0	QPSK	2505.0	2565.0	23.9	23.50	0.224	8983.9	8M98G7W
	16QAM			23.3	22.90	0.195	8979.6	8M98D7W
15.0	QPSK	2507.5	2562.5	24.0	23.60	0.229	13421	13M4G7W
	16QAM			23.3	22.90	0.195	13418	13M4D7W
20.0	QPSK	2510.0	2560.0	24.0	23.60	0.229	17877	17M9G7W
	16QAM			23.5	23.10	0.204	17901	17M9D7W

**LTE BAND 12**

Part 27 / RSS 130								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.60						
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	24.6	17.85	0.061	1081.7	1M08G7W
	16QAM			23.9	17.15	0.052	1084.9	1M08D7W
3.0	QPSK	700.5	714.5	24.5	17.75	0.060	2684.3	2M68G7W
	16QAM			24.0	17.25	0.053	2681	2M68D7W
5.0	QPSK	701.5	713.5	24.6	17.85	0.061	4495.2	4M50G7W
	16QAM			24.1	17.35	0.054	4486.1	4M49D7W
10.0	QPSK	704.0	711.0	24.6	17.85	0.061	8940.3	8M94G7W
	16QAM			23.9	17.15	0.052	8941.3	8M94D7W

**LTE BAND 13**

Part 27 / RSS 130								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-2.30						
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	779.5	784.5	24.4	19.95	0.099	4503.9	4M50G7W
	16QAM			23.9	19.45	0.088	4493.3	4M49D7W
10.0	QPSK	782.0	782.0	24.4	19.95	0.099	8955.6	8M96G7W
	16QAM			23.5	19.05	0.080	8927.4	8M93D7W

**LTE BAND 14**

Part 90R / RSS 140								
ERP Limit (W)		3.00						
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
5.0	QPSK	790.5	795.5	24.5	19.85	0.097	4526.3	4M53G7W
	16QAM			24.0	19.35	0.086	4488.6	4M49D7W
10.0	QPSK	793.0	793.0	24.5	19.85	0.097	8995.1	9M00G7W
	16QAM			23.5	18.85	0.077	8932	8M93D7W

**LTE BAND 25**

Part 24 / RSS 133								
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
1.4	QPSK	1850.7	1914.3	24.0	24.40	0.275	1087	1M09G7W
	16QAM			23.2	23.60	0.229	1088.8	1M09D7W
3.0	QPSK	1851.5	1913.5	24.0	24.40	0.275	2676.2	2M68G7W
	16QAM			23.2	23.60	0.229	2688.7	2M69D7W
5.0	QPSK	1852.5	1912.5	24.1	24.50	0.282	4497	4M50G7W
	16QAM			23.5	23.90	0.245	4485.5	4M49D7W
10.0	QPSK	1855.0	1910.0	24.1	24.50	0.282	8952.1	8M95G7W
	16QAM			23.4	23.80	0.240	8956.3	8M96D7W
15.0	QPSK	1857.5	1907.5	24.2	24.60	0.288	13408.4	13M4G7W
	16QAM			23.6	24.00	0.251	13448.1	13M4D7W
20.0	QPSK	1860.0	1905.0	24.2	24.60	0.288	17883.5	17M9G7W
	16QAM			23.7	24.10	0.257	17888.6	17M9D7W

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

Part 90S									
Conducted Limit (W)		100.00							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	Conducted Average (W)	99% BW (kHz)	Emission Designator		
1.4	QPSK	814.7	823.3	23.9	0.245	1086.7	1M09G7W		
	16QAM			23.2	0.209	1094.6	1M09D7W		
3.0	QPSK	815.5	822.5	23.8	0.240	2682	2M68G7W		
	16QAM			23.2	0.209	2684.4	2M68D7W		
5.0	QPSK	816.5	821.5	23.9	0.245	4495.2	4M50G7W		
	16QAM			23.4	0.219	4499.2	4M50D7W		
10.0	QPSK	819.0	819.0	23.9	0.245	8942.3	8M94G7W		
	16QAM			22.9	0.195	8932.3	8M93D7W		

**LTE BAND 26 (FCC Part 22)**

Part 22									
ERP Limit (W)		7.00							
Antenna Gain (dBi)		-1.10							
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	23.8	20.55	0.114	1080.3	1M08G7W	
	16QAM			23.2	19.95	0.099	1086.8	1M09D7W	
3.0	QPSK	825.5	847.5	23.8	20.55	0.114	2690.7	2M69G7W	
	16QAM			23.2	19.95	0.099	2686.7	2M69D7W	
5.0	QPSK	826.5	846.5	23.9	20.65	0.116	4494.5	4M49G7W	
	16QAM			23.3	20.05	0.101	4490.8	4M49D7W	
10.0	QPSK	829.0	844.0	23.9	20.65	0.116	8958.2	8M96G7W	
	16QAM			23.2	19.95	0.099	8951.3	8M95D7W	
15.0	QPSK	831.5	841.5	24.0	20.75	0.119	13397.3	13M4G7W	
	16QAM			23.4	20.15	0.104	13353.8	13M4D7W	

**LTE BAND 30**

Part 27 / RSS 195									
EIRP Limit (W)		0.25							
Antenna Gain (dBi)		0.00							
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	23.0	23.00	0.200	4494.8	4M49G7W	
	16QAM			22.1	22.10	0.162	4487.2	4M49D7W	
10.0	QPSK	2310.0	2310.0	22.9	22.90	0.195	8946.7	8M95G7W	
	16QAM			22.0	22.00	0.158	8943.4	8M94D7W	

**LTE BAND 41**

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		0.70						
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	24.1	24.80	0.302	4505.1	4M51G7W
	16QAM			23.0	23.70	0.234	4486.8	4M49D7W
10.0	QPSK	2501.0	2685.0	23.9	24.60	0.288	8994.5	8M99G7W
	16QAM			22.9	23.60	0.229	8963.5	8M96D7W
15.0	QPSK	2503.5	2682.5	24.3	25.00	0.316	13424	13M4G7W
	16QAM			23.3	24.00	0.251	13433	13M4D7W
20.0	QPSK	2506.0	2680.0	24.2	24.90	0.309	17880	17M9G7W
	16QAM			23.3	24.00	0.251	17891	17M9D7W

**LTE BAND 66**

Part 27 / RSS 139								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		0.60						
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	1710.7	1779.3	23.8	24.40	0.275	1078.9	1M08G7W
	16QAM			23.0	23.60	0.229	1086.1	1M09D7W
3.0	QPSK	1711.5	1778.5	23.7	24.30	0.269	2677.7	2M68G7W
	16QAM			23.0	23.60	0.229	2690.7	2M69D7W
5.0	QPSK	1712.5	1777.5	24.1	24.70	0.295	4509.5	4M51G7W
	16QAM			23.5	24.10	0.257	4497	4M50D7W
10.0	QPSK	1715.0	1775.0	23.9	24.50	0.282	8980.1	8M98G7W
	16QAM			23.3	23.90	0.245	8948.1	8M95D7W
15.0	QPSK	1717.5	1772.5	24.2	24.80	0.302	13410.8	13M4G7W
	16QAM			23.6	24.20	0.263	13386	13M4D7W
20.0	QPSK	1720.0	1770.0	24.1	24.70	0.295	17826.6	17M8G7W
	16QAM			23.7	24.30	0.269	17881.5	17M9D7W

### 5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was Baseband version is .0.c11-00081.1-SM8150\_GEN\_PACK-1

### 5.4. MAXIMUM ANTENNA GAIN

Please see table below:

LTE Bands	Antenna Gain (dBi)
LTE Band 2, 1850 – 1910 MHz	0.4
LTE Band 4, 1710 – 1755 MHz	0.6
LTE Band 5, 824 – 849 MHz	-1.1
LTE Band 7, 2500 – 2570 MHz	-0.4
LTE Band 12, 699 – 716 MHz	-4.6
LTE Band 13, 777 – 787 MHz	-2.3
LTE Band 14, 788 – 798 MHz	-2.5
LTE Band 25, 1850 – 1915 MHz	0.4
LTE Band 26, 814 – 849 MHz	-1.1
LTE Band 30, 2305 – 2315 MHz	0.0
LTE Band 41, 2496 – 2690 MHz	0.7
LTE Band 66, 1710 – 1780 MHz	0.6

### 5.5. WORST-CASE CONFIGURATION AND MODE

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.

The EUT was investigated in three orthogonal orientations X/Y/Z. Additionally, the EUT was investigated in four configurations with both screens: folded and closed/open 90 degrees/flat 180 degrees/folded and open. It was determined that the EUT with both screens folded and closed with X (Flatbed) orientation was worst-case orientation for LTE band 5, LTE band 12, LTE band 13, LTE band 14, and LTE band 26 with the AC/DC adapter; the EUT with both screens flat 180 degrees with Y (Landscape) orientation was worst-case orientation for LTE band 2, LTE band 4, LTE band 7, LTE band 25, LTE band 30, LTE band 41, and LTE band 66 with the 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.

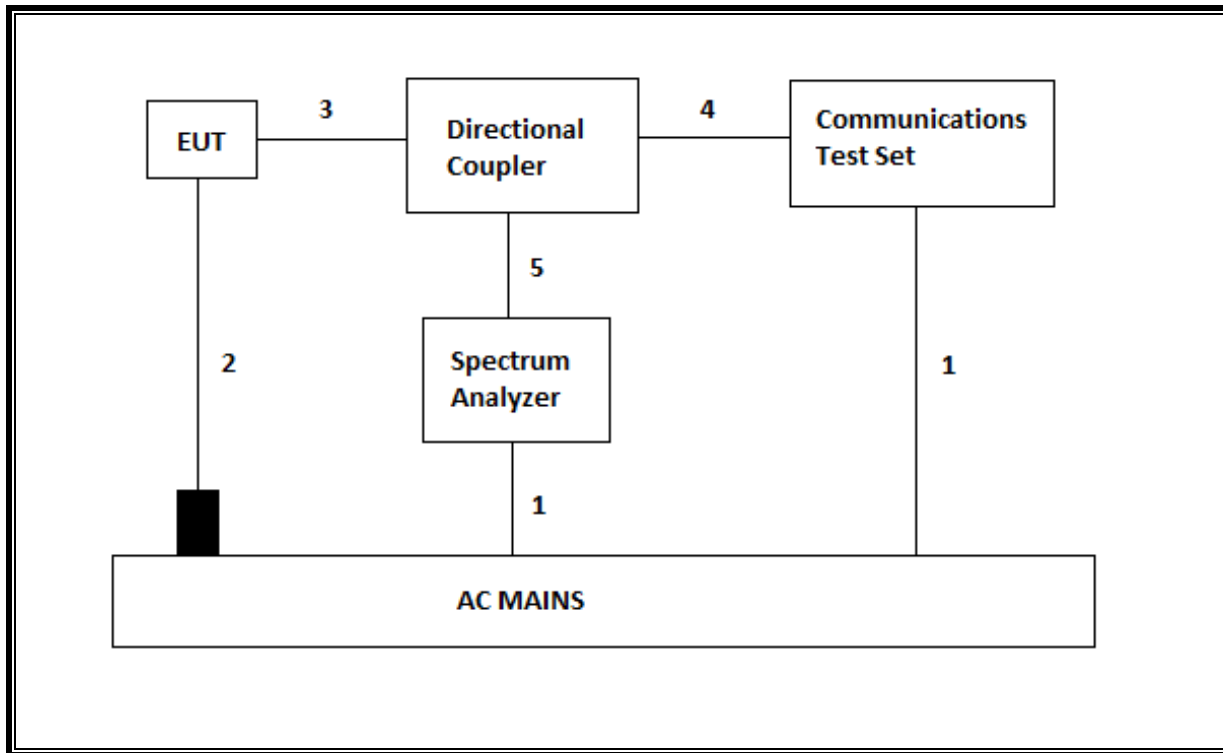
For supported simultaneous transmission of any BT/BLE/WLAN (2.4GHz) and WWAN bands or WLAN 5GHz and WWAN bands, tests were conducted for various configurations having the highest power, least separation in frequencies and widest operation bandwidths. Please refer to 2.4GHz and 5GHz WLAN reports for results.



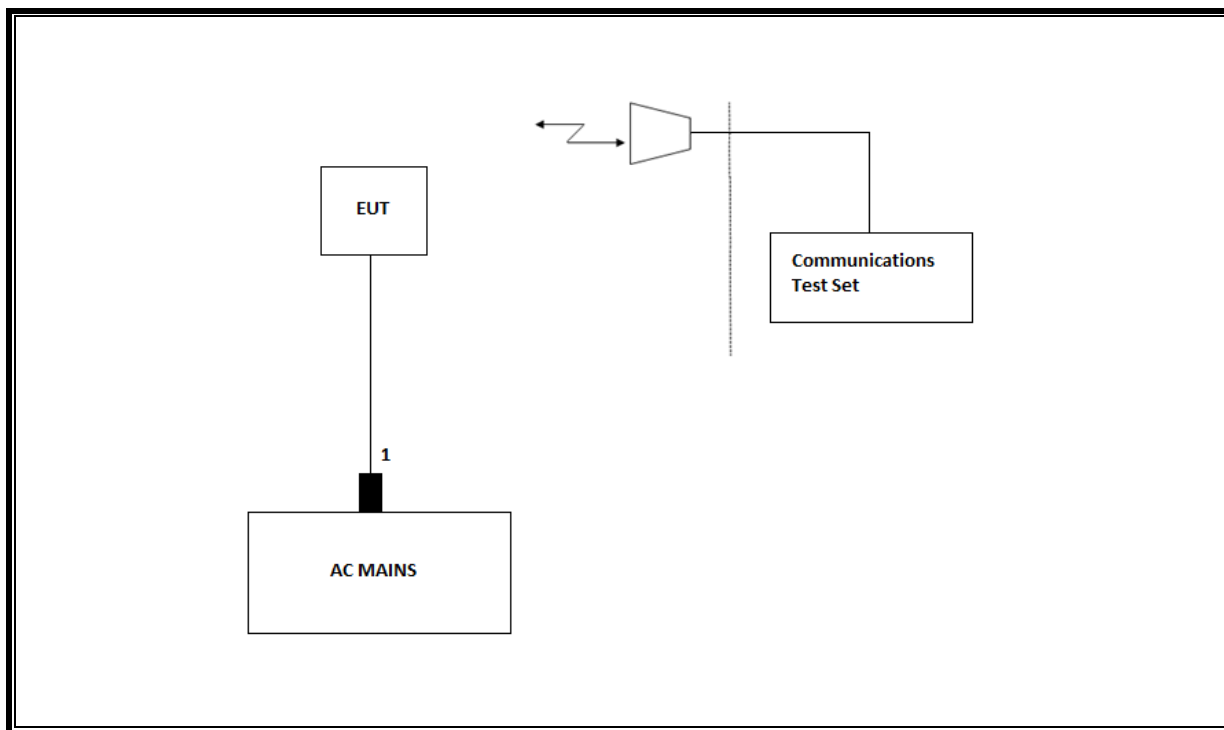
## 5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
AC/DC adapter	Microsoft	1847	0D130V01NZZD9C	DoC		
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	3-prongs	Un-shielded	2.0	N/A
2	DC	1	USB-C	Shielded	1.75	N/A
3	RF In/Out	1	SMA	Un-shielded	0.28	N/A
4	RF In/Out	1	SMA	Un-shielded	1	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	DC	1	USB-C	Shielded	1.75	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 (Fremont Building 1)				
Description	Manufacturer	Model	Asset	Cal Due
Directional Coupler	KRYTAR	152610	T922	07/05/2020
Directional Coupler	Mini-Circuits	ZUDC10-183+	PRE0181619	08/21/2020
Power Meter, P-series single channel	Keysight	N1911A	T1269	01/21/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	T1225	02/13/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T1871	02/25/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T260	02/19/2021
Wideband Communication Test Set, Call Box	R&S	CMW500	T979	02/26/2021
*Chamber, Environmental	Thermotron	SE-600-10-10	T80	05/07/2020
Spectrum Analyzer, PSA 3Hz to 26.5GHz	Agilent (Keysight) Technologies	E4440A	T200	01/24/2021
Spectrum Analyzer, PXA 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/28/2021
DC Power Supply 15V	Sorensen	XT15-4	T463	CnR
UL AUTOMATION SOFTWARE				
CLT Software	UL	UL RF	Ver 2.7 and 2.8.1	
Power Measurement Software	UL	UL RF	Ver 2.7, 2019	

TEST EQUIPMENT LIST(Morrisville - South Chamber)				
Description	Manufacturer	Model	Asset	Cal Due
Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	AT0076	11/07/2020
*Spectrum Analyzer	Agilent	N9030A	SA0027	05/15/2020
Environmental Meter	Fisher Scientific	15-077-963	s/n 181474409	07/27/2020
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T374	07/08/2020
1GHz high-pass filter, 2W, Fhigh =10GHz	Micro-Tronics	HPM17672	HPF009	02/19/2021
UL AUTOMATION SOFTWARE				
Radiated test software	UL	UL RF	Ver 9.5 June 12, 2019	

<b>TEST EQUIPMENT LIST(Morrisville - North Chamber)</b>				
<b>Description</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Asset</b>	<b>Cal Due</b>
Active Loop Antenna	ETS-Lindgren	6502	AT0079	08/08/2020
Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	AT0073	08/08/2020
*Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	AT0069	05/15/2020
Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	AT0072	04/27/2021
*Spectrum Analyzer	Agilent	N9030A	SA0026	03/30/2020
Spectrum Analyzer	Agilent	N9030A	SA0025	03/17/2021
Environmental Meter	Fisher Scientific	15-077-963	s/n 181474341	07/27/2020
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T959	02/19/2021
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T978	02/20/2021
Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	T374	07/08/2020
1GHz high-pass filter, 2W, F <sub>high</sub> =10GHz	Micro-Tronics	HPM17672	HPF009	02/19/2021
4GHz high-pass filter, 2W, F <sub>high</sub> =18GHz	Micro-Tronics	HPM13351	HPF015	02/19/2021
3GHz high-pass filter	Micro-Tronics	HPM17543	HPF014	02/19/2021
DC-1000MHz low-pass filter	Pasternack	PE8720	LPF008	02/19/2021
900MHz notch filter, 2W, F <sub>high</sub> =6GHz	Micro-Tronics	BRM50706	BRF001	02/19/2021
<b>UL AUTOMATION SOFTWARE</b>				
Radiated test software	UL	UL RF	Ver 9.5 June 12, 2019	

**NOTES:**

1. \* 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
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

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".

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

Network Signalling value	Requirements (subclause)	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	N/A

### RESULTS

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 output powers as follows:

## 7.1. LTE BAND 2

Test Engineer ID:	39005 RA	Test Date:	2/26/2020
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### OUTPUT POWER FOR LTE BAND 2 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18607	18900	19193
				1850.7 MHz	1880.0 MHz	1909.3 MHz
1.4	QPSK	1	0	23.8	23.7	23.8
		1	2	23.9	23.9	23.9
		1	5	23.9	23.8	23.8
		3	0	23.8	23.7	23.7
		3	1	23.9	23.8	23.8
		3	2	23.9	23.8	23.8
		6	0	22.9	22.8	22.8
	16QAM	1	0	23.2	22.7	22.9
		1	2	23.2	22.9	23.0
		1	5	23.2	22.9	22.9
		3	0	22.9	22.9	22.8
		3	1	23.0	23.0	22.8
		3	2	23.0	23.0	22.9
		6	0	21.8	22.0	22.0
	64QAM	1	0	22.0	21.7	21.7
		1	2	22.1	21.8	21.8
		1	5	22.0	21.8	21.8
		3	0	21.9	21.7	21.5
		3	1	21.9	21.8	21.6
		3	2	22.0	21.8	21.6
		6	0	20.7	21.0	20.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18615	18900	19185
				1851.5 MHz	1880.0 MHz	1908.5 MHz
3.0	QPSK	1	0	23.8	23.8	23.8
		1	7	23.8	23.8	23.8
		1	14	23.9	23.9	23.9
		8	0	22.9	22.9	22.9
		8	4	23.0	22.9	22.9
		8	7	23.0	23.0	23.0
		15	0	22.9	22.9	22.9
	16QAM	1	0	22.9	22.7	23.2
		1	7	22.9	22.8	23.1
		1	14	22.9	22.8	23.3
		8	0	21.9	21.9	22.0
		8	4	22.0	22.0	22.0
		8	7	22.1	22.1	22.0
		15	0	21.9	21.9	21.9
	64QAM	1	0	21.9	21.9	21.8
		1	7	21.9	22.0	21.8
		1	14	22.0	22.0	21.8
		8	0	20.7	20.7	20.8
		8	4	20.8	20.8	20.8
		8	7	20.8	20.9	20.8
		15	0	20.8	20.7	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18625	18900	19175
				1852.5 MHz	1880.0 MHz	1907.5 MHz
5.0	QPSK	1	0	23.9	23.9	23.8
		1	12	23.9	24.0	23.8
		1	24	24.0	24.0	23.8
		12	0	23.0	22.9	22.9
		12	6	23.0	22.9	23.0
		12	11	23.0	23.0	22.9
		25	0	23.0	22.9	22.9
	16QAM	1	0	23.0	23.0	23.4
		1	12	23.0	23.1	23.4
		1	24	23.0	23.1	23.3
		12	0	22.0	21.9	22.1
		12	6	22.0	22.0	22.1
		12	11	22.1	22.1	22.1
		25	0	21.9	21.9	22.0
	64QAM	1	0	21.9	21.6	22.0
		1	12	22.0	21.7	22.0
		1	24	22.0	21.7	22.0
		12	0	20.8	20.7	20.7
		12	6	20.9	20.8	20.7
		12	11	20.9	20.8	20.7
		25	0	20.8	20.7	20.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18650	18900	19150
				1855.0 MHz	1880.0 MHz	1905.0 MHz
10.0	QPSK	1	0	23.7	23.7	23.9
		1	24	23.7	23.9	23.9
		1	49	23.8	23.8	23.8
		25	0	22.9	22.9	22.9
		25	12	23.0	22.9	22.9
		25	24	22.9	22.9	22.9
		50	0	22.9	22.9	22.9
	16QAM	1	0	23.2	22.8	22.9
		1	24	23.1	22.7	22.8
		1	49	23.2	22.8	22.8
		25	0	22.0	22.0	21.9
		25	12	22.0	22.0	21.9
		25	24	21.9	22.0	21.9
		50	0	21.9	22.0	21.9
	64QAM	1	0	21.7	22.0	21.9
		1	24	21.8	22.0	21.9
		1	49	21.8	22.0	21.8
		25	0	20.8	20.8	20.8
		25	12	20.8	20.8	20.8
		25	24	20.8	20.7	20.8
		50	0	20.7	20.7	20.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18675	18900	19125
				1857.5 MHz	1880.0 MHz	1902.5 MHz
15.0	QPSK	1	0	24.0	24.0	24.0
		1	37	23.9	23.9	23.8
		1	74	24.0	23.9	24.0
		36	0	23.0	23.0	23.0
		36	16	23.1	23.1	23.1
		36	35	23.1	23.1	23.1
		75	0	23.1	23.1	23.0
	16QAM	1	0	23.3	22.9	23.4
		1	37	23.2	22.9	23.2
		1	74	23.4	22.9	23.4
		36	0	22.0	22.0	22.1
		36	16	22.0	22.0	22.1
		36	35	22.1	22.1	22.1
		75	0	22.0	22.0	22.1
	64QAM	1	0	22.3	22.1	21.9
		1	37	22.3	22.0	21.8
		1	74	22.4	22.1	22.0
		36	0	20.8	20.8	20.9
		36	16	20.9	20.9	20.9
		36	35	20.9	20.9	21.0
		75	0	20.9	20.8	20.9

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				18700	18900	19100
				1860.0 MHz	1880.0 MHz	1900.0 MHz
20.0	QPSK	1	0	23.9	24.0	24.0
		1	49	23.9	24.0	23.9
		1	99	23.9	24.0	24.0
		50	0	23.0	23.0	23.0
		50	24	23.0	23.1	23.0
		50	49	23.0	23.1	23.1
		100	0	23.0	23.0	23.0
	16QAM	1	0	23.3	23.4	23.4
		1	49	23.3	23.4	23.4
		1	99	23.3	23.5	23.4
		50	0	22.0	22.0	22.1
		50	24	22.0	22.1	22.1
		50	49	22.0	22.1	22.1
		100	0	22.0	22.1	22.1
	64QAM	1	0	22.0	22.0	22.4
		1	49	22.0	22.1	22.4
		1	99	22.0	22.1	22.5
		50	0	20.8	20.8	20.8
		50	24	20.8	20.9	20.9
		50	49	20.8	20.9	20.9
		100	0	20.8	20.8	20.8



## 7.2. LTE BAND 4

Test Engineer ID:	39005 RA	Test Date:	2/26/2020
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### OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19957	20175	20393
				1710.7 MHz	1732.5 MHz	1754.3 MHz
1.4	QPSK	1	0	23.8	23.8	23.8
		1	2	23.9	23.9	23.9
		1	5	23.8	23.8	23.8
		3	0	23.9	23.9	23.8
		3	1	23.9	23.9	23.9
		3	2	23.9	23.9	23.9
		6	0	22.9	22.9	22.8
	16QAM	1	0	23.2	22.9	22.9
		1	2	23.3	23.0	23.0
		1	5	23.3	23.0	23.0
		3	0	23.1	23.1	22.9
		3	1	23.1	23.2	23.0
		3	2	23.1	23.2	23.0
		6	0	21.8	22.2	22.0
	64QAM	1	0	22.1	21.9	21.9
		1	2	22.3	22.1	22.0
		1	5	22.1	22.0	22.0
		3	0	22.1	22.0	21.7
		3	1	22.1	22.1	21.8
		3	2	22.1	22.1	21.8
		6	0	20.8	21.2	20.9

### OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19965	20175	20385
				1711.5 MHz	1732.5 MHz	1753.5 MHz
3.0	QPSK	1	0	23.8	23.8	23.9
		1	7	23.8	23.9	23.9
		1	14	23.8	23.9	23.8
		8	0	22.9	22.9	22.9
		8	4	22.9	23.0	22.9
		8	7	23.0	23.0	22.9
		15	0	23.0	22.9	23.0
	16QAM	1	0	22.9	22.7	23.2
		1	7	22.9	22.8	23.2
		1	14	22.9	22.8	23.2
		8	0	22.0	22.0	22.0
		8	4	22.0	22.1	22.1
		8	7	22.0	22.2	22.1
		15	0	22.0	22.0	22.0
	64QAM	1	0	22.0	22.1	21.9
		1	7	22.0	22.1	22.0
		1	14	21.9	22.1	22.0
		8	0	20.8	20.9	20.9
		8	4	20.8	20.9	20.9
		8	7	20.8	21.0	20.9
		15	0	20.9	20.8	20.9

**OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				19975	20175	20375
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5.0	QPSK	1	0	23.9	23.9	23.8
		1	12	24.0	<b>24.0</b>	23.9
		1	24	23.8	24.0	23.8
		12	0	22.9	22.9	22.9
		12	6	23.0	22.9	23.0
		12	11	23.0	23.0	23.0
	25	0	23.0	22.9	22.9	
	16QAM	1	0	23.0	23.0	23.4
		1	12	23.0	23.1	<b>23.4</b>
		1	24	23.0	23.0	23.4
		12	0	22.0	22.1	22.1
		12	6	22.1	22.1	22.1
		12	11	22.0	22.1	22.1
	25	0	22.0	22.0	22.0	
	64QAM	1	0	22.0	21.8	22.1
		1	12	22.1	21.9	<b>22.2</b>
		1	24	22.0	21.8	22.1
		12	0	20.8	20.9	20.8
12		6	20.9	21.0	20.8	
12		11	20.9	21.0	20.9	
25	0	20.9	20.9	20.8		

**OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20000	20175	20350
				1715.0 MHz	1732.5 MHz	1750.0 MHz
10.0	QPSK	1	0	23.7	23.8	23.8
		1	24	23.7	<b>23.9</b>	23.8
		1	49	23.8	23.8	23.7
		25	0	22.9	23.0	23.0
		25	12	22.9	23.0	23.0
		25	24	22.9	22.9	22.9
	50	0	22.9	23.0	22.9	
	16QAM	1	0	22.7	23.2	22.9
		1	24	22.8	<b>23.3</b>	23.0
		1	49	22.7	23.2	22.9
		25	0	22.0	22.1	22.1
		25	12	22.0	22.1	22.1
		25	24	21.9	22.0	22.0
	50	0	21.9	22.0	22.0	
	64QAM	1	0	21.9	22.1	21.9
		1	24	22.0	22.0	21.8
		1	49	21.9	<b>22.2</b>	21.9
		25	0	20.9	21.0	21.0
25		12	20.9	21.0	21.0	
25		24	20.8	20.9	20.9	
50	0	20.8	20.9	20.9		

**OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20025	20175	20325
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15.0	QPSK	1	0	23.9	24.0	24.0
		1	37	23.8	23.9	23.9
		1	74	23.9	<b>24.1</b>	24.0
		36	0	23.0	23.1	23.1
		36	16	23.0	23.1	23.1
		36	35	23.0	23.1	23.0
		75	0	23.0	23.1	23.0
	16QAM	1	0	23.0	<b>23.5</b>	23.4
		1	37	23.0	23.3	23.3
		1	74	23.0	23.4	23.4
		36	0	22.1	22.2	22.1
		36	16	22.1	22.2	22.1
		36	35	22.0	22.2	22.0
		75	0	22.1	22.1	22.1
	64QAM	1	0	22.5	22.3	22.2
		1	37	22.4	22.1	22.2
		1	74	<b>22.6</b>	22.4	22.1
		36	0	20.9	21.0	21.0
		36	16	20.9	21.0	21.0
		36	35	20.9	21.0	21.0
		75	0	21.0	21.0	21.0

**OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20050	20175	20300
				1720.0 MHz	1732.5 MHz	1745.0 MHz
20.0	QPSK	1	0	24.1	24.0	<b>24.1</b>
		1	49	24.0	24.0	23.9
		1	99	24.0	24.1	23.9
		50	0	23.1	23.1	23.1
		50	24	23.1	23.2	23.1
		50	49	23.1	23.1	23.1
		100	0	23.1	23.1	23.0
	16QAM	1	0	23.4	23.7	23.6
		1	49	23.3	23.6	23.5
		1	99	23.4	<b>23.7</b>	23.4
		50	0	22.1	22.2	22.2
		50	24	22.1	22.2	22.2
		50	49	22.1	22.2	22.1
		100	0	22.1	22.2	22.1
	64QAM	1	0	22.2	22.4	<b>22.6</b>
		1	49	22.1	22.4	22.6
		1	99	22.2	22.4	22.6
		50	0	20.9	21.1	21.0
		50	24	21.0	21.1	21.1
		50	49	21.0	21.1	21.0
		100	0	20.9	21.0	21.0

### 7.3. LTE BAND 5

Test Engineer ID:	39005 RA	Test Date:	2/28/2020
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#### OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20407	20525	20643
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	23.8	23.7	23.5
		1	2	23.8	23.8	23.7
		1	5	23.8	23.8	23.7
		3	0	23.7	23.7	23.6
		3	1	23.8	23.8	23.7
		3	2	23.8	<b>23.8</b>	23.7
		6	0	22.8	22.8	22.7
	16QAM	1	0	22.8	23.0	22.6
		1	2	22.9	<b>23.2</b>	22.7
		1	5	22.9	23.2	22.8
		3	0	22.8	22.9	22.8
		3	1	22.9	23.0	22.9
		3	2	22.9	23.0	22.9
		6	0	22.0	21.8	21.9
	64QAM	1	0	21.9	21.8	22.0
		1	2	22.0	22.0	<b>22.2</b>
		1	5	21.9	22.0	22.0
		3	0	21.9	21.6	21.9
		3	1	21.9	21.7	22.0
		3	2	21.9	21.8	22.1
		6	0	21.1	20.9	20.6

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20415	20525	20635
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	23.7	23.7	23.7
		1	7	23.7	23.8	23.8
		1	14	23.8	<b>23.9</b>	23.8
		8	0	22.8	22.8	22.7
		8	4	22.9	22.8	22.8
		8	7	23.0	23.0	22.9
		15	0	22.9	22.9	22.8
	16QAM	1	0	22.8	22.7	23.1
		1	7	22.8	22.7	23.2
		1	14	22.9	22.7	<b>23.2</b>
		8	0	21.9	22.0	21.9
		8	4	21.9	22.0	21.9
		8	7	22.0	22.1	22.0
		15	0	21.9	21.9	21.9
	64QAM	1	0	21.9	22.0	21.8
		1	7	22.0	22.1	21.9
		1	14	22.1	<b>22.1</b>	21.8
		8	0	20.8	20.8	20.8
		8	4	20.8	20.8	20.8
		8	7	20.9	20.9	20.9
		15	0	20.9	20.8	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20425	20525	20625
				826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	23.8	23.9	23.7
		1	12	23.9	<b>23.9</b>	23.8
		1	24	23.9	23.9	23.8
		12	0	22.8	22.8	22.8
		12	6	23.0	22.9	22.9
		12	11	23.0	23.0	22.9
	25	0	22.9	22.9	22.8	
	16QAM	1	0	22.9	23.0	23.3
		1	12	23.0	23.0	<b>23.3</b>
		1	24	23.0	23.0	23.3
		12	0	21.9	21.9	22.0
		12	6	22.0	22.0	22.0
		12	11	22.1	22.0	22.1
	25	0	21.9	21.9	21.9	
	64QAM	1	0	22.0	21.7	22.0
		1	12	22.1	21.8	22.1
		1	24	<b>22.1</b>	21.8	22.1
		12	0	20.9	20.8	20.7
12		6	21.0	20.8	20.7	
12		11	21.0	20.9	20.8	
25	0	20.9	20.8	20.7		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20450	20525	20600
				829.0 MHz	836.5 MHz	844.0 MHz
10.0	QPSK	1	0	23.7	23.8	<b>24.0</b>
		1	24	23.6	23.9	23.8
		1	49	23.6	23.8	23.7
		25	0	22.9	22.9	22.9
		25	12	22.9	22.9	22.9
		25	24	22.9	22.9	22.8
	50	0	22.9	22.9	22.9	
	16QAM	1	0	22.8	22.9	<b>23.3</b>
		1	24	22.7	22.7	23.0
		1	49	22.7	22.7	23.1
		25	0	22.0	22.0	22.0
		25	12	22.0	22.0	22.0
		25	24	22.0	21.9	21.9
	50	0	22.0	21.9	21.9	
	64QAM	1	0	22.0	<b>22.2</b>	22.0
		1	24	22.1	22.2	22.0
		1	49	22.0	22.2	21.8
		25	0	20.9	20.9	20.9
25		12	21.0	20.9	20.9	
25		24	20.9	20.8	20.8	
50	0	20.8	20.8	20.8		

### 7.4. LTE BAND 7

Test Engineer ID:	39005 RA	Test Date:	2/28/2020
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#### OUTPUT POWER FOR LTE BAND 7 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20775	21100	21425
				2502.5 MHz	2535.0 MHz	2567.5 MHz
5.0	QPSK	1	0	23.7	23.8	23.7
		1	12	23.8	23.8	23.8
		1	24	23.8	23.9	<b>23.9</b>
		12	0	22.7	22.8	22.8
		12	6	22.9	22.8	22.9
		12	11	22.8	22.8	22.9
		25	0	22.8	22.8	22.9
	16QAM	1	0	22.8	22.9	23.3
		1	12	22.9	22.9	23.4
		1	24	22.9	23.0	<b>23.5</b>
		12	0	21.8	21.9	22.0
		12	6	21.9	22.0	22.1
		12	11	21.9	21.9	22.1
		25	0	21.7	21.9	22.0
	64QAM	1	0	21.5	21.9	21.7
		1	12	21.5	22.0	21.9
		1	24	21.6	21.9	<b>22.1</b>
		12	0	20.6	20.6	20.4
		12	6	20.7	20.6	20.6
		12	11	20.6	20.6	20.8
25	0	20.6	20.6	20.5		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20800	21100	21400
				2505.0 MHz	2535.0 MHz	2565.0 MHz
10.0	QPSK	1	0	23.6	23.7	23.7
		1	24	23.7	23.5	<b>23.9</b>
		1	49	23.6	23.6	23.8
		25	0	22.7	22.8	22.8
		25	12	22.7	22.8	22.8
		25	24	22.7	22.7	22.8
		50	0	22.7	22.8	22.8
	16QAM	1	0	22.7	22.7	23.1
		1	24	22.5	22.5	23.2
		1	49	22.7	22.6	<b>23.3</b>
		25	0	21.8	21.8	21.9
		25	12	21.8	21.8	21.9
		25	24	21.8	21.8	21.9
		50	0	21.7	21.8	21.9
	64QAM	1	0	21.6	21.8	21.6
		1	24	21.7	21.8	21.7
		1	49	21.7	21.8	<b>21.9</b>
		25	0	20.6	20.6	20.4
		25	12	20.6	20.6	20.7
		25	24	20.6	20.6	20.7
50	0	20.5	20.6	20.7		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20825	21100	21375
				2507.5 MHz	2535.0 MHz	2562.5 MHz
15.0	QPSK	1	0	<b>24.0</b>	23.9	23.9
		1	37	23.8	23.7	23.8
		1	74	23.8	23.8	23.9
		36	0	22.8	22.9	22.9
		36	16	22.9	22.9	22.9
		36	35	22.9	22.8	22.9
	16QAM	75	0	22.9	22.9	22.9
		1	0	23.2	22.8	23.3
		1	37	23.2	22.8	23.1
		1	74	23.2	22.7	<b>23.3</b>
		36	0	21.8	21.9	22.0
		36	16	21.9	21.9	22.0
	64QAM	36	35	21.9	21.8	22.0
		75	0	21.9	21.9	22.0
		1	0	22.2	22.0	21.8
		1	37	22.1	22.0	21.6
		1	74	<b>22.3</b>	22.0	22.0
		36	0	20.6	20.7	20.6
		36	16	20.7	20.8	20.7
		36	35	20.7	20.7	20.8
		75	0	20.7	20.7	20.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				20850	21100	21350
				2510.0 MHz	2535.0 MHz	2560.0 MHz
20.0	QPSK	1	0	23.8	23.9	24.0
		1	49	23.9	23.9	23.8
		1	99	23.9	23.9	<b>24.0</b>
		50	0	22.8	22.9	23.0
		50	24	22.9	22.9	22.9
		50	49	22.9	22.8	22.9
	16QAM	100	0	22.9	22.9	22.9
		1	0	23.3	23.4	23.4
		1	49	23.2	23.4	23.2
		1	99	23.2	<b>23.5</b>	23.4
		50	0	21.8	21.9	22.0
		50	24	21.9	22.0	22.0
	64QAM	50	49	21.9	21.9	21.9
		100	0	21.9	21.9	21.9
		1	0	21.8	22.0	22.3
		1	49	21.9	21.9	22.2
		1	99	21.9	22.1	<b>22.5</b>
		50	0	20.7	20.7	20.7
		50	24	20.7	20.8	20.7
		50	49	20.8	20.7	20.7
		100	0	20.7	20.7	20.7

### 7.5. LTE BAND 12

Test Engineer ID:	39005 RA	Test Date:	2/28/2020
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#### OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23017	23095	23173
				699.7 MHz	707.5 MHz	715.3 MHz
1.4	QPSK	1	0	24.5	24.4	24.3
		1	2	24.5	24.6	24.5
		1	5	24.5	24.5	24.4
		3	0	24.5	24.5	24.4
		3	1	24.5	24.5	24.4
		3	2	24.5	<b>24.6</b>	24.5
		6	0	23.5	23.5	23.4
	16QAM	1	0	23.6	23.8	23.4
		1	2	23.6	<b>23.9</b>	23.5
		1	5	23.6	23.9	23.5
		3	0	23.6	23.7	23.6
		3	1	23.6	23.7	23.6
		3	2	23.6	23.8	23.7
		6	0	22.7	22.4	22.7
	64QAM	1	0	22.5	22.8	22.5
		1	2	22.6	<b>23.0</b>	22.6
		1	5	22.6	22.8	22.5
		3	0	22.4	22.7	22.5
		3	1	22.4	22.7	22.6
		3	2	22.4	22.8	22.6
		6	0	21.5	21.4	21.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23025	23095	23165
				700.5 MHz	707.5 MHz	714.5 MHz
3.0	QPSK	1	0	24.4	24.5	24.4
		1	7	<b>24.5</b>	24.5	24.5
		1	14	24.5	24.5	24.4
		8	0	23.5	23.6	23.5
		8	4	23.6	23.5	23.6
		8	7	23.6	23.6	23.6
		15	0	23.7	23.5	23.5
	16QAM	1	0	23.4	23.8	23.5
		1	7	23.5	<b>24.0</b>	23.6
		1	14	23.4	23.9	23.5
		8	0	22.7	22.6	22.6
		8	4	22.8	22.7	22.6
		8	7	22.8	22.8	22.7
		15	0	22.7	22.6	22.5
	64QAM	1	0	21.5	22.6	22.6
		1	7	<b>22.8</b>	22.7	22.7
		1	14	22.8	22.6	22.6
		8	0	21.5	21.5	21.4
		8	4	21.6	21.5	21.5
		8	7	21.6	21.6	21.5
		15	0	21.5	21.5	21.5



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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23035	23095	23155
				701.5 MHz	707.5 MHz	713.5 MHz
5.0	QPSK	1	0	24.4	24.5	24.6
		1	12	24.5	<b>24.6</b>	24.6
		1	24	24.5	24.5	24.6
		12	0	23.5	23.6	23.5
		12	6	23.6	23.6	23.6
		12	11	23.6	23.6	23.6
	25	0	23.6	23.5	23.5	
	16QAM	1	0	24.0	23.5	23.7
		1	12	<b>24.1</b>	23.6	23.7
		1	24	24.0	23.6	23.7
		12	0	22.7	22.6	22.6
		12	6	22.8	22.7	22.7
		12	11	22.8	22.7	22.7
	25	0	22.6	22.6	22.6	
	64QAM	1	0	22.7	22.6	22.4
		1	12	<b>22.8</b>	22.7	22.4
		1	24	22.8	22.7	22.4
		12	0	21.4	21.5	21.5
12		6	21.5	21.6	21.6	
12		11	21.5	21.6	21.6	
25	0	21.5	21.5	21.4		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23060	23095	23130
				704.0 MHz	707.5 MHz	711.0 MHz
10.0	QPSK	1	0	<b>24.6</b>	24.5	24.5
		1	24	24.3	24.2	24.5
		1	49	24.5	24.4	24.5
		25	0	23.6	23.6	23.6
		25	12	23.6	23.6	23.6
		25	24	23.6	23.6	23.5
	50	0	23.6	23.6	23.6	
	16QAM	1	0	<b>23.9</b>	23.6	23.5
		1	24	23.7	23.7	23.5
		1	49	23.8	23.5	23.4
		25	0	22.7	22.7	22.6
		25	12	22.7	22.7	22.6
		25	24	22.6	22.7	22.6
	50	0	22.6	22.7	22.6	
	64QAM	1	0	22.8	22.8	22.7
		1	24	<b>22.9</b>	<b>22.9</b>	22.7
		1	49	22.9	22.9	22.7
		25	0	21.6	21.6	21.6
25		12	21.6	21.6	21.6	
25		24	21.6	21.6	21.6	
50	0	21.5	21.5	21.5		

### 7.6. LTE BAND 13

Test Engineer ID:	39005 RA	Test Date:	2/28/2020
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#### OUTPUT POWER FOR LTE BAND 13 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23205	23230	23255
				779.5 MHz	782.0 MHz	784.5 MHz
5.0	QPSK	1	0	24.3	24.3	24.4
		1	12	24.3	24.4	24.4
		1	24	24.4	24.4	<b>24.4</b>
		12	0	23.4	23.4	23.4
		12	6	23.5	23.4	23.4
		12	11	23.4	23.5	23.4
		25	0	23.5	23.4	23.5
	16QAM	1	0	23.8	23.4	23.5
		1	12	<b>23.9</b>	23.5	23.5
		1	24	23.9	23.5	23.6
		12	0	22.6	22.5	22.4
		12	6	22.6	22.5	22.6
		12	11	22.6	22.5	22.6
		25	0	22.6	22.4	22.5
	64QAM	1	0	22.4	22.5	22.3
		1	12	22.3	22.6	22.2
		1	24	<b>22.6</b>	22.6	22.3
		12	0	21.0	21.4	21.4
		12	6	21.2	21.4	21.5
		12	11	21.3	21.5	21.4
25	0	21.4	21.4	21.4		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				N/A	23230	N/A
				N/A	782.0 MHz	N/A
10.0	QPSK	1	0		24.4	
		1	24		<b>24.4</b>	
		1	49		24.4	
		25	0		23.4	
		25	12		23.4	
		25	24		23.4	
		50	0		23.4	
	16QAM	1	0		23.5	
		1	24		<b>23.5</b>	
		1	49		23.5	
		25	0		22.6	
		25	12		22.5	
		25	24		22.5	
		50	0		22.5	
	64QAM	1	0		22.5	
		1	24		22.6	
		1	49		<b>22.6</b>	
		25	0		21.5	
		25	12		21.5	
		25	24		21.5	
50	0		21.4			

### 7.7. LTE BAND 14

Test Engineer ID:	39005 RA	Test Date:	2/28/2020
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#### OUTPUT POWER FOR LTE BAND 14 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				23305	23330	23355
				790.5 MHz	793.0 MHz	795.5 MHz
5.0	QPSK	1	0	24.3	24.4	24.4
		1	12	24.4	<b>24.5</b>	24.4
		1	24	24.4	24.5	24.5
		12	0	23.4	23.4	23.4
		12	6	23.5	23.5	23.5
		12	11	23.5	23.5	23.5
		25	0	23.5	23.5	23.5
	16QAM	1	0	23.8	23.5	23.5
		1	12	24.0	23.6	23.5
		1	24	<b>24.0</b>	23.6	23.7
		12	0	22.6	22.5	22.5
		12	6	22.7	22.6	22.6
		12	11	22.7	22.6	22.6
		25	0	22.6	22.5	22.5
	64QAM	1	0	22.3	22.7	22.6
		1	12	22.4	<b>22.8</b>	22.6
		1	24	22.5	22.7	22.7
		12	0	21.4	21.4	21.4
		12	6	21.6	21.4	21.5
		12	11	21.6	21.4	21.6
25	0	21.4	21.4	21.5		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				N/A	23330	N/A
				N/A	793.0 MHz	N/A
10.0	QPSK	1	0		24.4	
		1	24		<b>24.5</b>	
		1	49		24.4	
		25	0		23.5	
		25	12		23.5	
		25	24		23.5	
		50	0		23.5	
	16QAM	1	0		<b>23.5</b>	
		1	24		23.5	
		1	49		23.4	
		25	0		22.7	
		25	12		22.6	
		25	24		22.5	
		50	0		22.5	
	64QAM	1	0		22.7	
		1	24		<b>22.7</b>	
		1	49		22.6	
		25	0		21.6	
		25	12		21.5	
		25	24		21.5	
50	0		21.5			

### 7.8. LTE BAND 25

Test Engineer ID:	39005 RA	Test Date:	2/27/2020
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#### OUTPUT POWER FOR LTE BAND 25 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26047	26365	26683
				1850.7 MHz	1882.5 MHz	1914.3 MHz
1.4	QPSK	1	0	23.8	23.9	23.8
		1	2	23.9	<b>24.0</b>	23.9
		1	5	23.9	24.0	23.8
		3	0	23.9	23.8	23.8
		3	1	23.9	23.9	23.9
		3	2	24.0	24.0	23.9
		6	0	23.0	23.0	22.9
	16QAM	1	0	22.9	23.0	23.2
		1	2	23.0	23.1	<b>23.2</b>
		1	5	22.9	23.0	23.2
		3	0	23.0	22.9	23.0
		3	1	23.1	23.1	23.0
		3	2	23.1	23.0	23.1
		6	0	22.2	22.1	21.8
	64QAM	1	0	22.1	21.8	21.8
		1	2	<b>22.2</b>	22.0	21.9
		1	5	22.2	21.9	21.9
		3	0	22.0	21.8	21.6
		3	1	22.1	22.0	21.7
		3	2	22.1	22.0	21.7
		6	0	20.9	21.1	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26055	26365	26675
				1851.5 MHz	1882.5 MHz	1913.5 MHz
3.0	QPSK	1	0	23.9	23.8	23.9
		1	7	23.9	24.0	23.9
		1	14	24.0	<b>24.0</b>	23.8
		8	0	23.0	23.0	23.0
		8	4	23.1	23.1	23.0
		8	7	23.1	23.1	23.0
		15	0	23.1	23.1	23.0
	16QAM	1	0	23.0	22.8	23.2
		1	7	23.0	22.9	<b>23.2</b>
		1	14	23.0	22.9	23.2
		8	0	22.1	22.1	22.0
		8	4	22.2	22.1	22.1
		8	7	22.2	22.3	22.1
		15	0	22.0	22.1	22.1
	64QAM	1	0	21.9	22.0	21.8
		1	7	22.1	<b>22.1</b>	21.9
		1	14	22.0	22.1	21.8
		8	0	20.8	20.9	20.8
		8	4	20.9	21.0	20.9
		8	7	21.0	21.0	20.9
		15	0	20.9	20.8	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26065	26365	26665
				1852.5 MHz	1882.5 MHz	1912.5 MHz
5.0	QPSK	1	0	24.0	24.0	23.8
		1	12	24.0	24.1	23.9
		1	24	24.1	<b>24.1</b>	23.8
		12	0	23.0	23.0	23.0
		12	6	23.1	23.1	23.0
		12	11	23.1	23.1	23.0
		25	0	23.1	23.0	23.0
	16QAM	1	0	23.1	23.1	23.4
		1	12	23.2	23.2	<b>23.5</b>
		1	24	23.1	23.3	23.3
		12	0	22.1	22.1	22.2
		12	6	22.2	22.2	22.2
		12	11	22.2	22.2	22.2
		25	0	22.0	22.1	22.1
	64QAM	1	0	22.0	21.7	22.0
		1	12	22.1	21.8	22.0
		1	24	<b>22.1</b>	21.9	21.9
		12	0	20.9	20.8	20.7
		12	6	21.0	20.9	20.8
		12	11	21.0	21.0	20.8
		25	0	21.0	20.8	20.7

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26090	26365	26640
				1855.0 MHz	1882.5 MHz	1910.0 MHz
10.0	QPSK	1	0	23.8	24.0	23.9
		1	24	23.8	<b>24.1</b>	23.8
		1	49	24.0	23.9	23.9
		25	0	23.1	23.1	23.0
		25	12	23.1	23.1	23.0
		25	24	23.1	23.1	23.0
		50	0	23.1	23.1	23.0
	16QAM	1	0	22.8	23.4	22.9
		1	24	22.9	<b>23.4</b>	23.0
		1	49	22.8	23.3	22.9
		25	0	22.1	22.1	22.1
		25	12	22.1	22.1	22.1
		25	24	22.0	22.1	22.1
		50	0	22.0	22.1	22.0
	64QAM	1	0	<b>22.1</b>	22.0	21.8
		1	24	21.9	21.9	21.8
		1	49	22.0	22.0	21.9
		25	0	20.9	21.0	20.9
		25	12	20.9	21.0	20.9
		25	24	20.9	21.0	20.9
		50	0	20.9	20.9	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26115	26365	26615
				1857.5 MHz	1882.5 MHz	1907.5 MHz
15.0	QPSK	1	0	24.1	<b>24.2</b>	24.2
		1	37	24.0	24.1	24.1
		1	74	24.1	24.1	24.1
		36	0	23.1	23.2	23.2
		36	16	23.2	23.3	23.2
		36	35	23.2	23.3	23.2
		75	0	23.2	23.2	23.2
	16QAM	1	0	23.0	<b>23.6</b>	23.5
		1	37	23.1	23.5	23.5
		1	74	23.0	23.5	23.4
		36	0	22.1	22.2	22.1
		36	16	22.2	22.3	22.2
		36	35	22.2	22.3	22.2
		75	0	22.2	22.3	22.2
	64QAM	1	0	<b>22.5</b>	22.4	22.1
		1	37	22.4	22.4	22.1
		1	74	22.5	22.3	22.1
		36	0	21.0	21.1	21.0
		36	16	21.1	21.1	21.1
		36	35	21.1	21.2	21.1
		75	0	21.0	21.1	21.0

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26140	26365	26590
				1860.0 MHz	1882.5 MHz	1905.0 MHz
20.0	QPSK	1	0	<b>24.2</b>	24.1	24.2
		1	49	24.2	24.2	24.2
		1	99	24.1	24.1	24.2
		50	0	23.2	23.2	23.2
		50	24	23.2	23.3	23.2
		50	49	23.2	23.3	23.2
		100	0	23.1	23.2	23.2
	16QAM	1	0	<b>23.7</b>	23.5	23.5
		1	49	23.6	23.5	23.5
		1	99	23.6	23.5	23.4
		50	0	22.2	22.3	22.1
		50	24	22.2	22.3	22.2
		50	49	22.2	22.3	22.2
		100	0	22.2	22.2	22.2
	64QAM	1	0	<b>22.7</b>	22.2	22.3
		1	49	22.5	22.3	22.3
		1	99	22.5	22.3	22.3
		50	0	21.0	21.1	21.0
		50	24	21.0	21.1	21.1
		50	49	21.0	21.1	21.1
		100	0	20.9	21.0	21.0

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

Test Engineer ID:	50820 EC	Test Date:	3/2/2020
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#### OUTPUT POWER FOR LTE BAND 26 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26697	26740	26783
				814.7 MHz	819.0 MHz	823.3 MHz
1.4	QPSK	1	0	23.8	23.8	23.6
		1	2	<b>23.9</b>	23.8	23.7
		1	5	23.7	23.7	23.7
		3	0	23.8	23.8	23.7
		3	1	23.8	23.8	23.8
		3	2	23.8	23.8	23.8
		6	0	22.8	22.8	22.8
	16QAM	1	0	22.9	23.2	22.7
		1	2	22.9	<b>23.2</b>	22.8
		1	5	22.9	23.1	22.8
		3	0	22.9	23.0	22.9
		3	1	22.9	23.0	23.0
		3	2	22.9	23.0	23.0
		6	0	22.0	21.8	22.0
	64QAM	1	0	22.0	22.1	21.8
		1	2	22.0	<b>22.3</b>	21.9
		1	5	21.9	22.2	21.8
		3	0	21.8	22.1	21.8
		3	1	21.8	22.2	21.9
		3	2	21.8	22.1	21.9
		6	0	20.9	20.8	21.1

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26705	26740	26775
				815.5 MHz	819.0 MHz	822.5 MHz
3.0	QPSK	1	0	23.7	23.8	23.8
		1	7	<b>23.8</b>	23.8	23.7
		1	14	23.8	23.8	23.8
		8	0	22.8	22.9	22.8
		8	4	22.9	22.9	22.9
		8	7	22.9	22.9	22.9
		15	0	22.9	22.9	22.9
	16QAM	1	0	22.6	<b>23.2</b>	22.9
		1	7	22.8	23.1	22.8
		1	14	22.7	23.2	22.8
		8	0	22.0	22.0	21.9
		8	4	22.0	22.0	22.0
		8	7	22.1	22.0	22.0
		15	0	22.0	22.0	21.9
	64QAM	1	0	22.0	22.1	21.8
		1	7	22.0	<b>22.1</b>	21.9
		1	14	22.0	22.1	21.9
		8	0	20.8	20.9	20.8
		8	4	20.9	21.0	20.9
		8	7	20.9	21.0	20.9
		15	0	21.0	20.9	20.9

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26715	26740	26765
				816.5 MHz	819.0 MHz	821.5 MHz
5.0	QPSK	1	0	23.8	23.9	23.8
		1	12	23.9	23.9	23.8
		1	24	23.9	23.9	23.8
		12	0	22.9	22.9	22.9
		12	6	23.0	22.9	23.0
		12	11	23.0	22.9	22.9
	25	0	22.9	23.0	22.9	
	16QAM	1	0	22.9	23.0	23.3
		1	12	23.0	23.0	23.4
		1	24	23.0	23.0	23.3
		12	0	22.0	22.0	22.0
		12	6	22.0	22.0	22.1
		12	11	22.0	22.0	22.1
	25	0	21.9	22.0	22.0	
	64QAM	1	0	22.0	21.8	22.1
		1	12	22.1	21.8	22.1
		1	24	22.1	21.8	22.1
		12	0	21.0	20.9	20.8
12		6	21.1	21.0	20.9	
12		11	21.0	21.0	20.9	
25	0	20.9	20.9	20.9		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				N/A	26740	N/A
				N/A	819.0 MHz	N/A
10.0	QPSK	1	0		23.9	
		1	24		23.9	
		1	49		23.8	
		25	0		22.9	
		25	12		22.9	
		25	24		22.9	
	16QAM	50	0		22.9	
		1	0		22.9	
		1	24		22.9	
		1	49		22.7	
		25	0		22.0	
		25	12		22.0	
	64QAM	25	24		21.9	
		50	0		21.9	
		1	0		22.0	
		1	24		21.8	
		1	49		21.9	
		25	0		21.0	
25	12		21.0			
25	24		21.0			
50	0		20.9			



### 7.10. LTE BAND 26 (FCC Part 22)

Test Engineer ID:	50820 EC	Test Date:	3/2/2020
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#### OUTPUT POWER FOR LTE BAND 26 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26797	26915	27033
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	23.7	23.7	23.6
		1	2	23.8	23.7	23.8
		1	5	23.7	23.7	23.6
		3	0	23.8	23.6	23.6
		3	1	23.8	23.7	23.6
		3	2	23.8	23.7	23.7
		6	0	22.8	22.8	22.7
	16QAM	1	0	23.1	22.7	22.7
		1	2	23.2	22.8	22.8
		1	5	23.1	22.8	22.7
		3	0	23.0	22.8	22.7
		3	1	23.0	22.9	22.7
		3	2	23.0	22.9	22.8
		6	0	21.8	22.0	21.8
	64QAM	1	0	22.1	21.8	21.2
		1	2	22.2	21.9	21.1
		1	5	22.1	21.8	20.7
		3	0	22.0	21.8	20.9
		3	1	22.1	21.9	20.9
		3	2	22.1	21.8	20.8
		6	0	20.9	21.0	19.9

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26805	26915	27025
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	23.7	23.7	23.7
		1	7	23.8	23.7	23.7
		1	14	23.8	23.7	23.5
		8	0	22.8	22.8	22.7
		8	4	22.9	22.8	22.8
		8	7	22.9	22.9	22.8
		15	0	22.8	22.8	22.8
	16QAM	1	0	23.1	22.8	22.6
		1	7	23.2	22.8	22.6
		1	14	23.2	22.8	22.5
		8	0	21.9	21.8	21.9
		8	4	22.0	21.9	21.9
		8	7	22.0	21.9	22.0
		15	0	22.0	21.8	21.9
	64QAM	1	0	22.0	22.1	21.8
		1	7	22.0	22.1	21.4
		1	14	22.0	22.1	20.7
		8	0	20.8	20.9	20.6
		8	4	20.9	20.9	20.4
		8	7	20.9	20.9	20.3
		15	0	20.9	20.8	20.4

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26815	26915	27015
				826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	23.8	23.8	23.8
		1	12	23.8	23.8	<b>23.9</b>
		1	24	23.7	23.8	23.7
		12	0	22.8	22.8	22.7
		12	6	22.9	22.9	22.8
		12	11	22.9	22.9	22.8
	25	0	22.9	22.8	22.8	
	16QAM	1	0	23.3	22.9	22.9
		1	12	<b>23.3</b>	22.9	22.9
		1	24	23.3	22.9	22.9
		12	0	22.0	21.9	21.9
		12	6	22.1	21.9	21.9
		12	11	22.1	21.9	21.9
	25	0	21.9	21.8	21.8	
	64QAM	1	0	22.0	21.7	21.6
		1	12	<b>22.1</b>	21.8	22.0
		1	24	22.0	21.8	20.9
		12	0	20.9	20.8	20.5
12		6	21.0	20.9	20.6	
12		11	20.9	20.9	20.4	
25	0	20.9	20.8	20.4		

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26840	26915	26990
				829.0 MHz	836.5 MHz	844.0 MHz
10.0	QPSK	1	0	23.8	23.8	<b>23.9</b>
		1	24	23.6	23.5	23.8
		1	49	23.7	23.6	23.7
		25	0	22.9	22.9	22.8
		25	12	22.9	22.9	22.8
		25	24	22.9	22.9	22.8
	50	0	22.9	22.9	22.8	
	16QAM	1	0	<b>23.2</b>	22.9	22.8
		1	24	23.0	22.7	22.5
		1	49	23.2	22.7	22.5
		25	0	21.9	22.0	21.9
		25	12	22.0	22.0	21.9
		25	24	21.9	21.9	21.8
	50	0	21.9	21.9	21.8	
	64QAM	1	0	<b>22.2</b>	22.1	21.7
		1	24	22.0	22.0	21.4
		1	49	22.1	21.4	21.0
		25	0	20.9	21.0	20.3
25		12	21.0	20.9	20.4	
25		24	21.0	20.9	20.5	
50	0	20.9	20.9	20.3		

**OUTPUT POWER FOR LTE BAND 26 (15.0 MHz)**

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				26865	26915	26965
				831.5 MHz	836.5 MHz	841.5 MHz
15.0	QPSK	1	0	24.0	24.0	<b>24.0</b>
		1	37	23.9	23.7	23.7
		1	74	23.9	23.8	23.8
		36	0	23.0	23.0	23.0
		36	16	23.0	23.0	23.0
		36	35	22.9	22.9	22.9
		75	0	23.0	22.9	22.9
	16QAM	1	0	22.9	23.3	<b>23.4</b>
		1	37	22.9	23.1	23.0
		1	74	22.9	23.2	23.1
		36	0	22.0	22.1	22.0
		36	16	22.0	22.0	22.0
		36	35	21.9	22.0	21.9
		75	0	22.0	22.0	21.9
	64QAM	1	0	<b>22.5</b>	22.2	22.2
		1	37	22.3	22.0	21.2
		1	74	22.5	21.5	21.2
		36	0	20.8	21.0	21.0
		36	16	21.0	21.0	20.5
		36	35	20.9	20.7	20.4
		75	0	21.0	20.9	20.6

### 7.11. LTE BAND 30

Test Engineer ID:	84445 / 21193	Test Date:	5/22/2020
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#### OUTPUT POWER FOR LTE BAND 30 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)			
				27685	27710	27735	
				2307.5 MHz	2310.0 MHz	2312.5 MHz	
5 MHz	QPSK	1	0	21.1	21.2	21.2	
		1	12	21.2	21.3	21.3	
		1	24	21.2	21.1	21.2	
		8	0	22.8	22.8	22.9	
		8	8	22.9	22.9	<b>23.0</b>	
		8	17	22.9	22.8	22.9	
		9	0	21.9	21.9	22.0	
		9	8	22.0	22.0	22.0	
		9	16	22.0	21.9	22.0	
		12	0	21.9	22.0	22.0	
		12	6	22.0	22.0	22.0	
		12	11	22.0	22.0	22.0	
		25	0	22.0	21.9	22.0	
		16QAM	1	0	21.6	21.2	21.3
			1	12	21.7	21.4	21.3
	1		24	21.7	21.2	21.3	
	8		0	21.9	22.0	22.1	
	8		8	22.0	<b>22.1</b>	<b>22.1</b>	
	8		17	22.0	22.0	22.1	
	9		0	20.9	21.0	21.0	
	9		8	21.1	21.0	21.0	
	9		16	21.0	20.9	21.0	
	12		0	21.1	21.0	21.0	
	12		6	21.1	21.0	21.0	
	12		11	21.1	21.0	21.0	
	25		0	21.1	20.9	20.9	
	64QAM		1	0	21.2	21.1	21.2
			1	12	<b>21.3</b>	21.2	21.2
		1	24	21.2	21.1	21.1	
		8	0	20.9	21.0	21.1	
		8	8	21.1	21.1	21.1	
		8	17	21.0	21.0	21.0	
		9	0	20.0	19.9	20.0	
		9	8	20.1	20.0	20.0	
		9	16	20.0	19.9	19.9	
		12	0	19.9	20.1	20.1	
		12	6	20.0	20.1	20.1	
		12	11	19.9	20.0	20.1	
		25	0	20.0	20.0	20.0	

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				N/A	27710	N/A
				N/A	2310.0 MHz	N/A
10 MHz	QPSK	1	0		21.1	
		1	24		21.3	
		1	49		21.2	
		8	0		22.8	
		8	21		<b>22.9</b>	
		8	42		22.8	
		15	0		21.9	
		15	17		21.9	
		15	35		21.9	
		25	0		22.0	
		25	12		22.0	
		25	24		21.9	
	50	0		21.9		
	16QAM	1	0		21.8	
		1	24		21.3	
		1	49		21.7	
		8	0		<b>22.0</b>	
		8	21		22.0	
		8	42		21.9	
		15	0		21.0	
		15	17		21.0	
		15	35		20.9	
		25	0		21.0	
		25	12		21.0	
		25	24		20.9	
	50	0		20.9		
	64QAM	1	0		<b>21.4</b>	
		1	24		21.3	
		1	49		21.2	
		8	0		21.0	
		8	21		21.0	
		8	42		20.9	
		15	0		20.0	
15		17		20.0		
15		35		19.9		
25		0		20.0		
25		12		20.0		
25		24		20.0		
50	0		20.0			

### 7.12. LTE BAND 41

Test Engineer ID:	50820 EC	Test Date:	3/3/2020
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#### OUTPUT POWER FOR LTE BAND 41 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39675	40620	41565
				2498.5 MHz	2593.0 MHz	2687.5 MHz
5.0	QPSK	1	0	23.7	23.8	24.0
		1	12	23.8	23.9	24.0
		1	24	23.8	23.8	<b>24.1</b>
		12	0	22.8	22.9	23.1
		12	6	22.9	23.0	23.1
		12	11	22.9	22.9	23.1
		25	0	22.9	22.9	23.1
	16QAM	1	0	22.8	22.8	23.0
		1	12	23.0	22.8	23.0
		1	24	22.9	22.8	<b>23.0</b>
		12	0	21.9	21.9	22.0
		12	6	22.0	22.0	22.1
		12	11	22.0	22.0	22.1
		25	0	21.9	21.9	22.1
	64QAM	1	0	21.6	21.3	22.2
		1	12	21.6	21.3	22.2
		1	24	21.6	21.3	<b>22.2</b>
		12	0	20.4	20.6	20.9
		12	6	20.5	20.6	20.9
		12	11	20.5	20.6	21.0
		25	0	20.4	20.6	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39700	40620	41540
				2501.0 MHz	2593.0 MHz	2685.0 MHz
10.0	QPSK	1	0	23.8	23.7	23.9
		1	24	23.7	23.6	23.7
		1	49	23.7	23.7	<b>23.9</b>
		25	0	22.9	22.9	23.1
		25	12	22.9	22.9	23.1
		25	24	22.8	22.9	23.0
		50	0	22.8	22.9	23.0
	16QAM	1	0	22.8	22.7	<b>22.9</b>
		1	24	22.6	22.6	22.7
		1	49	22.7	22.7	22.8
		25	0	21.9	21.9	22.1
		25	12	21.9	21.9	22.1
		25	24	21.8	21.9	22.0
		50	0	21.9	21.9	22.1
	64QAM	1	0	21.5	21.1	22.0
		1	24	21.4	21.1	22.0
		1	49	21.5	21.2	<b>22.1</b>
		25	0	20.5	20.6	20.8
		25	12	20.5	20.6	20.8
		25	24	20.4	20.6	20.8
		50	0	20.5	20.6	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39725	40620	41515
				2503.5 MHz	2593.0 MHz	2682.5 MHz
15.0	QPSK	1	0	24.1	23.9	24.1
		1	37	24.0	23.7	24.2
		1	74	24.0	23.9	<b>24.3</b>
		36	0	22.9	23.0	23.1
		36	16	23.0	23.1	23.2
		36	35	23.0	23.1	23.2
	16QAM	75	0	23.0	23.0	23.1
		1	0	23.1	23.1	23.2
		1	37	23.1	23.1	23.2
		1	74	23.1	23.0	<b>23.3</b>
		36	0	22.0	22.0	22.1
		36	16	22.0	22.1	22.2
	64QAM	36	35	22.0	22.0	22.2
		75	0	22.0	22.0	22.2
		1	0	21.4	21.4	22.2
		1	37	21.2	21.4	22.3
		1	74	21.4	21.4	<b>22.4</b>
		36	0	20.6	20.8	21.0
	36	16	20.6	20.9	21.1	
	36	35	20.6	20.9	21.1	
	75	0	20.7	20.8	21.0	

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				39750	40620	41490
				2506.0 MHz	2593.0 MHz	2680.0 MHz
20.0	QPSK	1	0	24.0	24.0	23.9
		1	49	23.9	24.0	24.0
		1	99	23.9	24.0	<b>24.2</b>
		50	0	23.0	23.1	23.1
		50	24	23.0	23.1	23.2
		50	49	23.0	23.0	23.2
	16QAM	100	0	23.0	23.0	23.2
		1	0	22.8	<b>23.3</b>	23.0
		1	49	22.8	23.3	23.0
		1	99	22.8	23.2	23.2
		50	0	22.0	22.1	22.1
		50	24	22.0	22.1	22.2
	64QAM	50	49	22.0	22.0	22.1
		100	0	22.0	22.0	22.2
		1	0	22.0	21.5	22.0
		1	49	21.9	21.5	22.1
		1	99	22.0	21.6	<b>22.3</b>
		50	0	20.6	20.7	20.9
	50	24	20.7	20.8	21.0	
	50	49	20.7	20.8	21.0	
	100	0	20.6	20.7	21.0	

### 7.13. LTE BAND 66

Test Engineer ID:	39005 RA	Test Date:	3/3/2020
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#### OUTPUT POWER FOR LTE BAND 66 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				131979	132322	132665
				1710.7 MHz	1745.0 MHz	1779.3 MHz
1.4	QPSK	1	0	23.6	23.7	23.6
		1	2	23.6	<b>23.8</b>	23.6
		1	5	23.6	23.7	23.6
		3	0	23.6	23.7	23.5
		3	1	23.6	23.7	23.6
		3	2	23.6	23.7	23.6
		6	0	22.7	22.7	22.6
	16QAM	1	0	22.6	22.8	22.9
		1	2	22.7	22.9	<b>23.0</b>
		1	5	22.7	22.8	22.9
		3	0	22.8	22.7	22.7
		3	1	22.8	22.8	22.8
		3	2	22.8	22.8	22.8
		6	0	21.9	21.9	21.6
	64QAM	1	0	22.1	21.9	21.8
		1	2	<b>22.2</b>	22.1	21.9
		1	5	22.1	21.9	21.9
		3	0	22.0	21.9	21.6
		3	1	22.1	22.0	21.7
		3	2	22.1	22.0	21.7
		6	0	20.8	21.1	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				131987	132322	132657
				1711.5 MHz	1745.0 MHz	1778.5 MHz
3.0	QPSK	1	0	23.6	23.6	23.6
		1	7	23.6	23.7	23.6
		1	14	23.6	<b>23.7</b>	23.6
		8	0	22.7	22.8	22.6
		8	4	22.7	22.8	22.7
		8	7	22.8	22.8	22.7
		15	0	22.7	22.8	22.7
	16QAM	1	0	22.7	22.6	23.0
		1	7	22.7	22.6	23.0
		1	14	22.7	22.6	<b>23.0</b>
		8	0	21.8	21.9	21.7
		8	4	21.8	21.9	21.8
		8	7	21.8	22.0	21.8
		15	0	21.7	21.8	21.7
	64QAM	1	0	22.0	22.1	21.8
		1	7	21.9	22.1	21.8
		1	14	22.0	<b>22.2</b>	21.9
		8	0	20.8	20.9	20.8
		8	4	20.8	20.9	20.8
		8	7	20.9	21.0	20.9
		15	0	20.9	20.9	20.8



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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				131997	132322	132647
				1712.5 MHz	1745.0 MHz	1777.5 MHz
5.0	QPSK	1	0	23.9	23.9	23.9
		1	12	24.0	23.9	23.9
		1	24	24.1	24.0	23.9
		12	0	23.0	23.0	22.9
		12	6	23.0	23.0	23.0
		12	11	23.0	23.0	23.0
		25	0	23.0	23.0	22.9
	16QAM	1	0	23.0	23.4	22.9
		1	12	23.1	23.5	23.0
		1	24	23.2	23.5	23.0
		12	0	22.1	22.1	22.0
		12	6	22.1	22.2	22.0
		12	11	22.1	22.2	22.0
		25	0	22.0	22.0	21.9
	64QAM	1	0	22.0	21.8	22.1
		1	12	22.1	21.8	22.1
		1	24	22.1	21.9	22.1
		12	0	20.9	20.9	20.7
		12	6	20.9	20.9	20.8
		12	11	20.9	20.9	20.8
		25	0	20.9	20.8	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				132022	132322	132622
				1715.0 MHz	1745.0 MHz	1775.0 MHz
10.0	QPSK	1	0	23.8	23.9	23.9
		1	24	23.6	23.8	23.7
		1	49	23.8	23.9	23.8
		25	0	23.0	23.0	22.9
		25	12	23.0	23.0	22.9
		25	24	22.9	23.0	22.9
		50	0	23.0	23.0	22.9
	16QAM	1	0	22.8	23.3	22.8
		1	24	22.8	23.3	22.7
		1	49	22.7	23.2	22.8
		25	0	22.0	22.1	22.0
		25	12	22.0	22.1	22.0
		25	24	21.9	22.0	22.0
		50	0	21.9	22.0	21.9
	64QAM	1	0	22.1	22.0	22.0
		1	24	21.9	22.0	22.0
		1	49	22.1	22.0	21.9
		25	0	20.8	21.0	20.9
		25	12	20.8	21.0	20.9
		25	24	20.8	20.9	20.8
		50	0	20.8	20.9	20.8

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				132047	132322	132597
				1717.5 MHz	1745.0 MHz	1772.5 MHz
15.0	QPSK	1	0	24.2	<b>24.2</b>	24.2
		1	37	24.0	24.0	23.8
		1	74	24.1	24.1	23.9
		36	0	23.1	23.2	23.1
		36	16	23.1	23.2	23.1
		36	35	23.1	23.1	23.0
		75	0	23.1	23.1	23.1
	16QAM	1	0	23.5	<b>23.6</b>	23.0
		1	37	23.3	23.3	22.8
		1	74	23.4	23.4	22.8
		36	0	22.2	22.2	22.1
		36	16	22.2	22.1	22.1
		36	35	22.1	22.1	22.0
		75	0	22.2	22.2	22.1
	64QAM	1	0	22.2	<b>22.7</b>	22.3
		1	37	22.0	22.6	22.2
		1	74	22.1	22.5	22.2
		36	0	21.1	21.1	21.0
		36	16	21.0	21.1	21.0
		36	35	21.0	21.0	20.9
		75	0	21.0	21.1	21.0

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

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)		
				132072	132322	132572
				1720.0 MHz	1745.0 MHz	1770.0 MHz
20.0	QPSK	1	0	24.0	24.1	<b>24.1</b>
		1	49	24.0	24.1	24.0
		1	99	24.1	24.1	23.9
		50	0	23.1	23.2	23.1
		50	24	23.1	23.2	23.1
		50	49	23.1	23.1	23.0
		100	0	23.1	23.1	23.1
	16QAM	1	0	23.5	23.5	<b>23.7</b>
		1	49	23.4	23.5	23.6
		1	99	23.4	23.4	23.5
		50	0	22.2	22.2	22.2
		50	24	22.1	22.2	22.1
		50	49	22.1	22.0	22.0
		100	0	22.1	22.2	22.1
	64QAM	1	0	22.5	22.3	22.3
		1	49	22.6	22.2	22.3
		1	99	<b>22.6</b>	22.2	22.1
		50	0	21.0	21.1	21.0
		50	24	21.0	21.1	21.0
		50	49	20.9	21.0	20.9
		100	0	21.0	21.0	20.9

## 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.

#### RESULTS

There is no limit required and power is the same for low, middle and high channel; therefore, only middle channel was tested. Worst-case plots are reported only.

**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	1.0806	1.220
	1.4MHz, 16QAM			1.0846	1.225
	3MHz, QPSK	15/0		2.6872	2.968
	3MHz, 16QAM			2.6862	2.978
	5MHz, QPSK	25/0		4.4976	4.881
	5MHz, 16QAM			4.4974	4.926
	10MHz, QPSK	50/0		8.9389	9.696
	10MHz, 16QAM			8.9461	9.731
	15MHz, QPSK	75/0		13.4450	14.512
	15MHz, 16QAM			13.4182	14.492
	20MHz, QPSK	100/0		17.8779	19.245
	20MHz, 16QAM			17.8623	19.408
	20MHz, QPSK	1/0		0.261	0.478

**LTE BAND 4**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	1.4MHz, QPSK	6/0	1732.5	1.0825	1.217
	1.4MHz, 16QAM			1.0920	1.240
	3MHz, QPSK	15/0		2.6872	2.968
	3MHz, 16QAM			2.6823	2.973
	5MHz, QPSK	25/0		4.4902	4.914
	5MHz, 16QAM			4.4896	4.926
	10MHz, QPSK	50/0		8.9587	9.742
	10MHz, 16QAM			8.9776	9.664
	15MHz, QPSK	75/0		13.4022	14.540
	15MHz, 16QAM			13.4228	14.366
	20MHz, QPSK	100/0		17.8705	19.364
	20MHz, 16QAM			17.8920	19.272
	20MHz, QPSK	1/0		0.265	0.437

**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	1.0788	1.213
	1.4MHz, 16QAM			1.0801	1.224
	3MHz, QPSK	15/0		2.6827	2.962
	3MHz, 16QAM			2.6769	2.972
	5MHz, QPSK	25/0		4.4974	4.962
	5MHz, 16QAM			4.4934	4.879
	10MHz, QPSK	50/0		8.9600	9.657
	10MHz, 16QAM			8.9173	9.667
	10MHz, QPSK	1/0		0.235	0.376

**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	4.5007	4.931
	5MHz, 16QAM			4.4804	4.908
	10MHz, QPSK	50/0		8.9839	9.730
	10MHz, 16QAM			8.9796	9.778
	15MHz, QPSK	75/0		13.421	14.62
	15MHz, 16QAM			13.418	14.52
	20MHz, QPSK	100/0		17.877	19.29
	20MHz, 16QAM			17.901	19.42

**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	1.0817	1.201
	1.4 MHz, 16QAM			1.0849	1.221
	3 MHz, QPSK	15/0		2.6843	2.995
	3 MHz, 16QAM			2.6810	2.992
	5 MHz, QPSK	25/0		4.4952	4.919
	5 MHz, 16QAM			4.4861	4.900
	10 MHz, QPSK	50/0		8.9403	9.662
	10 MHz, 16QAM			8.9413	9.725
	10 MHz, QPSK	1/0		0.236	0.367

**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	4.5039	4.910
	5 MHz, 16QAM			4.4933	4.953
	10 MHz, QPSK	50/0		8.9556	9.856
	10 MHz, 16QAM			8.9274	9.726
	10 MHz, QPSK	1/0		0.239	0.395

**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	4.5263	4.896
	5 MHz, 16QAM			4.4886	4.939
	10 MHz, QPSK	50/0		8.9951	9.749
	10 MHz, 16QAM			8.9320	9.712
	10 MHz, QPSK	1/0		0.240	0.388

**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	1.0870	1.231
	1.4MHz, 16QAM			1.0888	1.229
	3MHz, QPSK	15/0		2.6762	2.958
	3MHz, 16QAM			2.6887	2.970
	5MHz, QPSK	25/0		4.4970	4.902
	5MHz, 16QAM			4.4855	4.940
	10MHz, QPSK	50/0		8.9521	9.597
	10MHz, 16QAM			8.9563	9.718
	15MHz, QPSK	75/0		13.4084	14.395
	15MHz, 16QAM			13.4481	14.458
	20MHz, QPSK	100/0		17.8835	19.253
	20MHz, 16QAM			17.8886	19.246
	20MHz, QPSK	1/0		0.249	0.463

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

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
	1.4 MHz, QPSK	6/0	819.0	1.0867	1.213
	1.4 MHz, 16QAM			1.0946	1.230
	3 MHz, QPSK	15/0		2.6820	2.971
	3 MHz, 16QAM			2.6844	2.985
	5 MHz, QPSK	25/0		4.4952	4.875
	5 MHz, 16QAM			4.4992	4.916
	10 MHz, QPSK	50/0		8.9423	9.714
	10 MHz, 16QAM			8.9323	9.601
	10 MHz, QPSK	1/0		0.234	0.390

**LTE BAND 26 (FCC PART 22)**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4 MHz, QPSK	6/0	836.5	1.0803	1.216
	1.4 MHz, 16QAM			1.0868	1.236
	3 MHz, QPSK	15/0		2.6907	3.001
	3 MHz, 16QAM			2.6867	2.980
	5 MHz, QPSK	25/0		4.4945	4.932
	5 MHz, 16QAM			4.4908	4.961
	10 MHz, QPSK	50/0		8.9582	9.707
	10 MHz, 16QAM			8.9513	9.719
	15 MHz, QPSK	75/0		13.3973	14.278
	15 MHz, 16QAM			13.3538	14.485

**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	4.4948	4.880
	5MHz, 16QAM			4.4872	4.920
	10MHz, QPSK	50/0		8.9467	9.814
	10MHz, 16QAM			8.9434	9.639

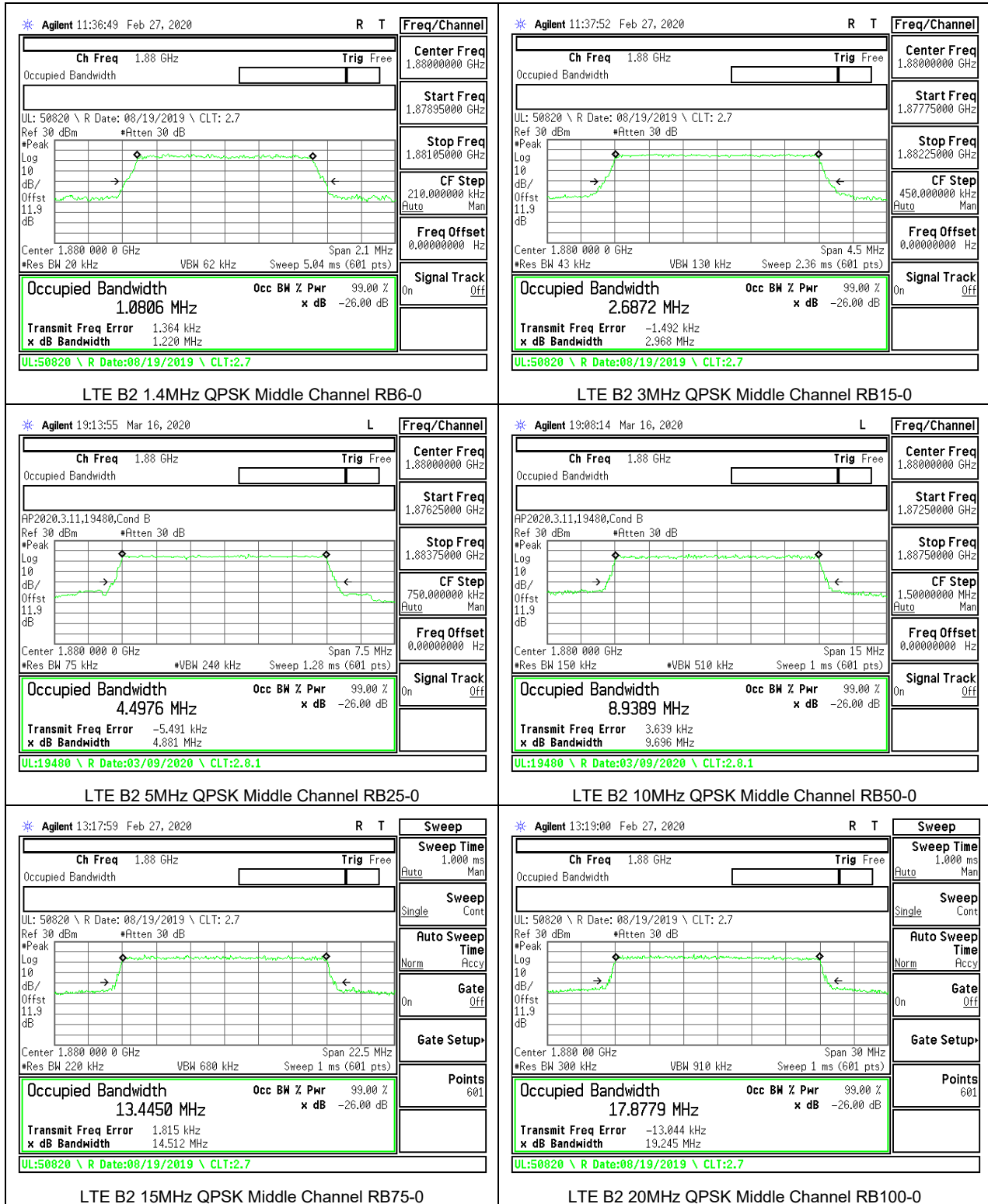
**LTE BAND 41**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.5051	4.874
	5MHz, 16QAM			4.4868	4.916
	10MHz, QPSK	50/0		8.9945	9.776
	10MHz, 16QAM			8.9635	9.738
	15MHz, QPSK	75/0		13.424	14.58
	15MHz, 16QAM			13.433	14.53
	20MHz, QPSK	100/0		17.880	19.27
	20MHz, 16QAM			17.891	19.32

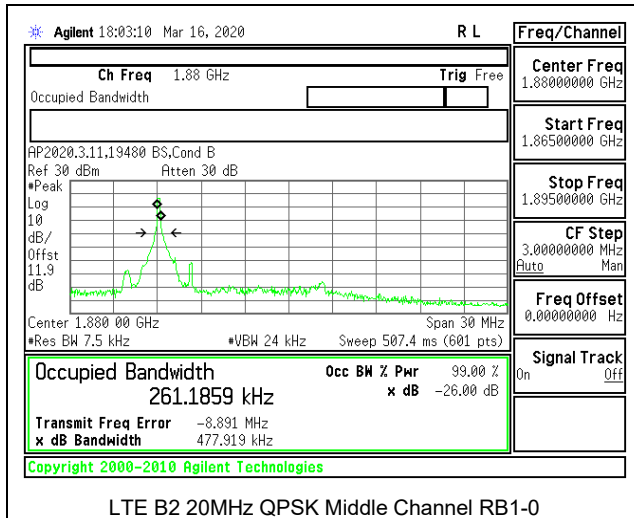
**LTE BAND 66**

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 66	1.4MHz, QPSK	6/0	1745.0	1.0789	1.221
	1.4MHz, 16QAM			1.0861	1.220
	3MHz, QPSK	15/0		2.6777	2.962
	3MHz, 16QAM			2.6907	2.958
	5MHz, QPSK	25/0		4.5095	5.002
	5MHz, 16QAM			4.4970	4.919
	10MHz, QPSK	50/0		8.9801	9.714
	10MHz, 16QAM			8.9481	9.696
	15MHz, QPSK	75/0		13.4108	14.339
	15MHz, 16QAM			13.3860	14.478
	20MHz, QPSK	100/0		17.8266	19.298
	20MHz, 16QAM			17.8815	19.296
	20MHz, QPSK	1/0		0.257	0.459

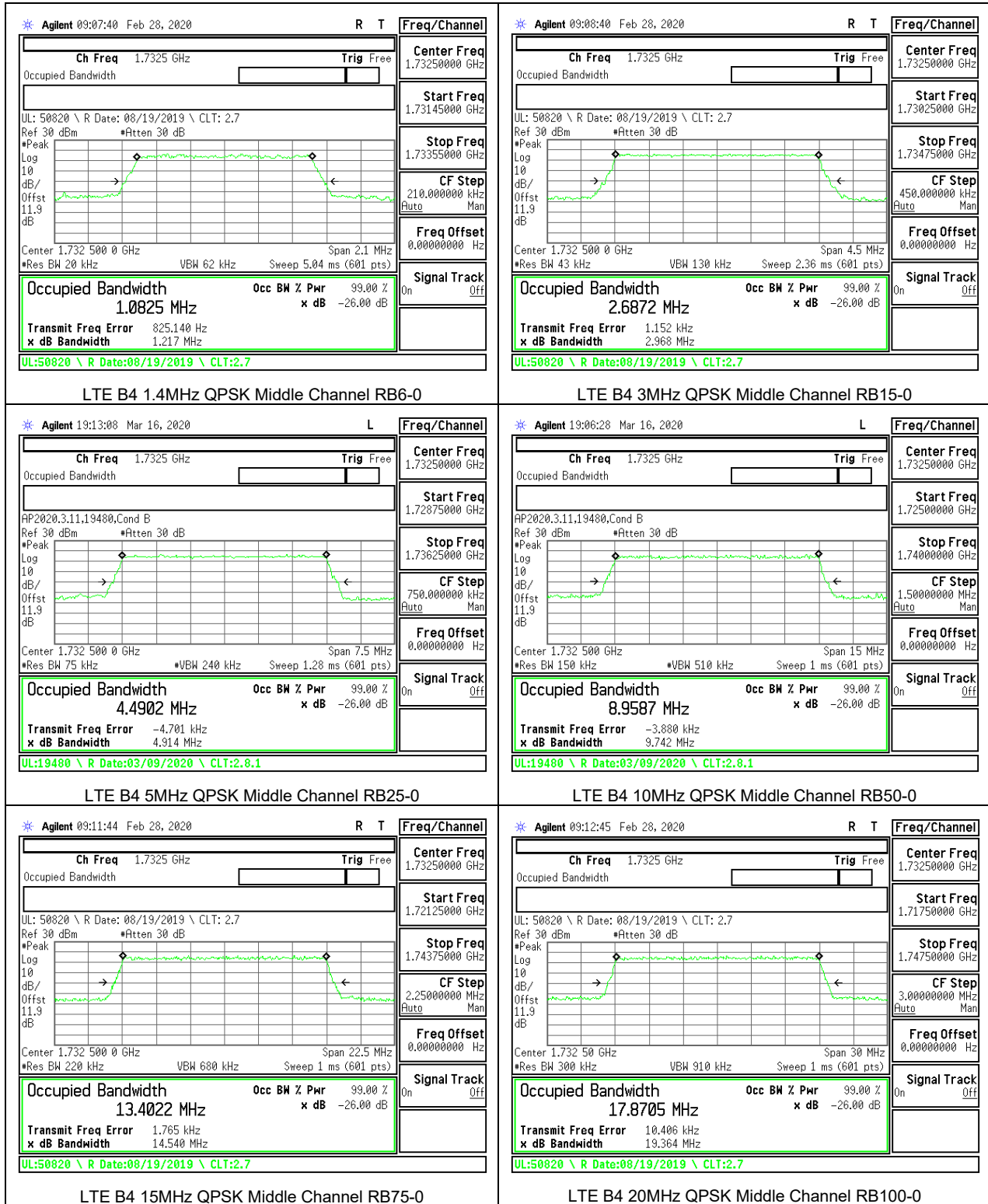
8.1.1. LTE BAND 2

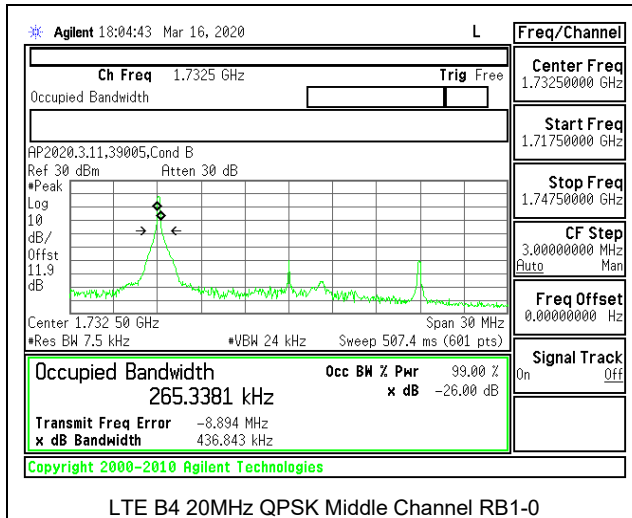




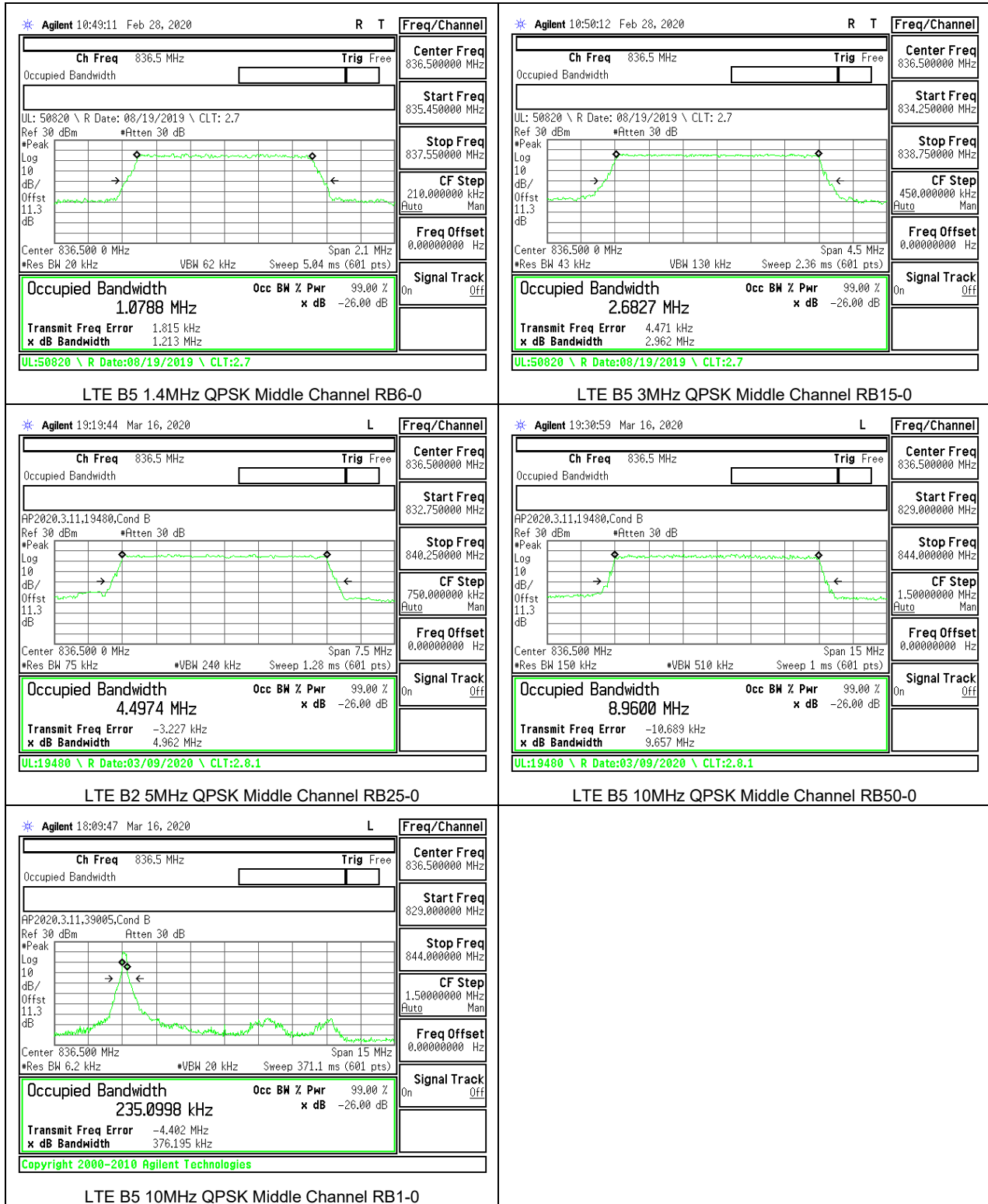


8.1.2. LTE BAND 4





8.1.3. LTE BAND 5



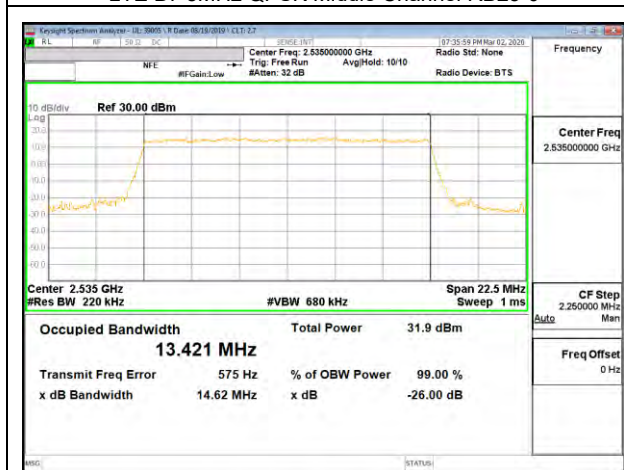
### 8.1.4. LTE BAND 7



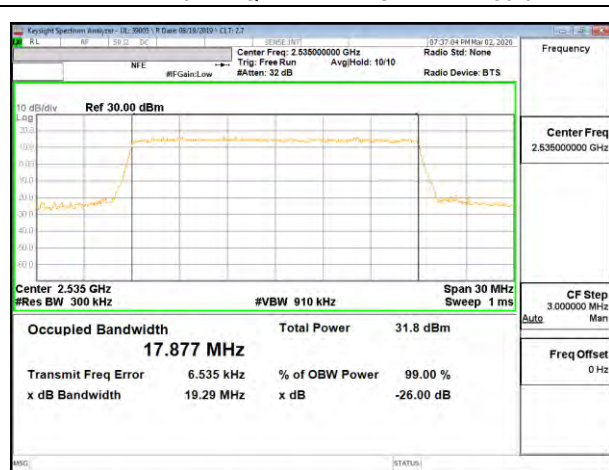
LTE B7 5MHz QPSK Middle Channel RB25-0



LTE B7 10MHz QPSK Middle Channel RB50-0

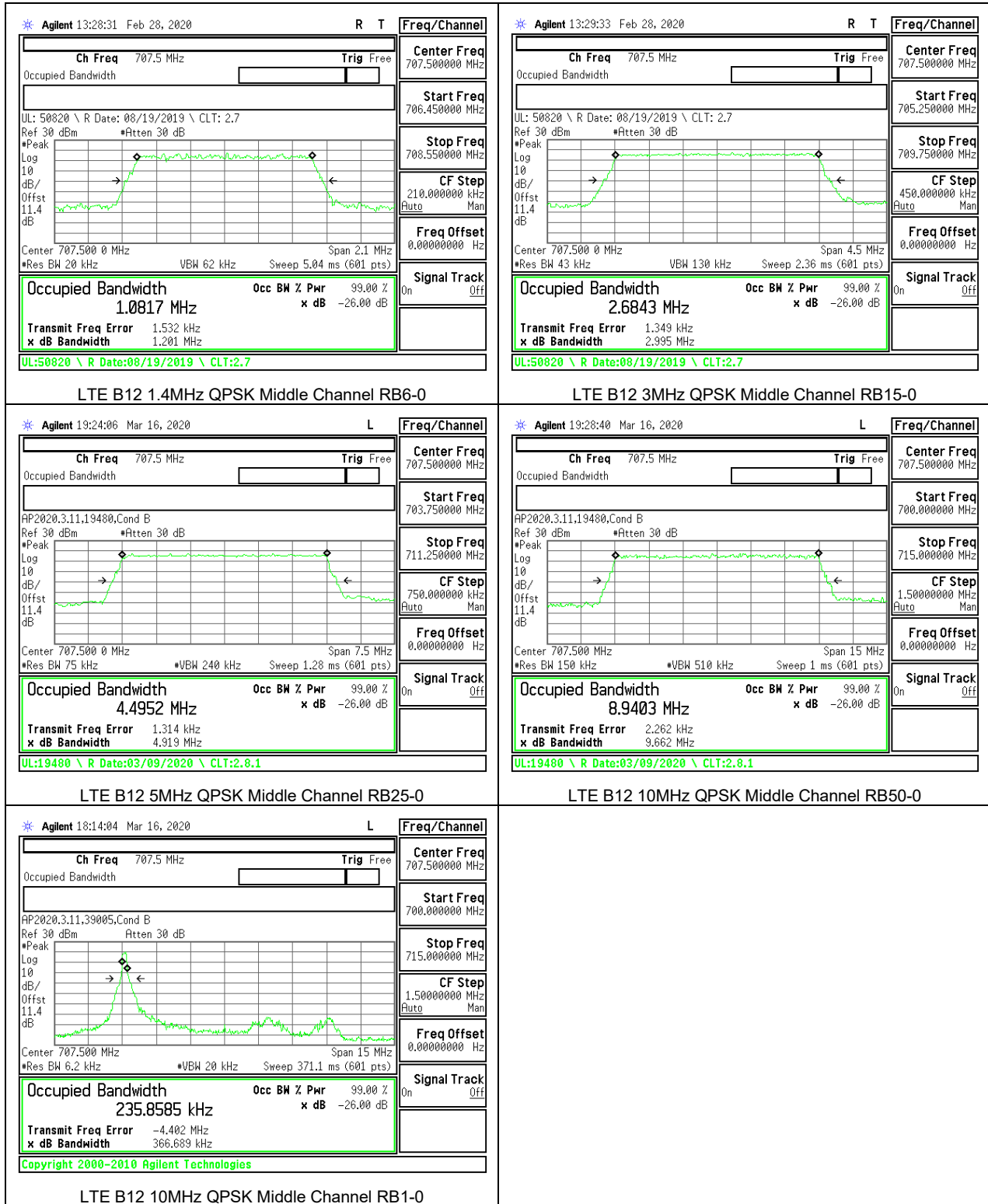


LTE B7 15MHz QPSK Middle Channel RB75-0

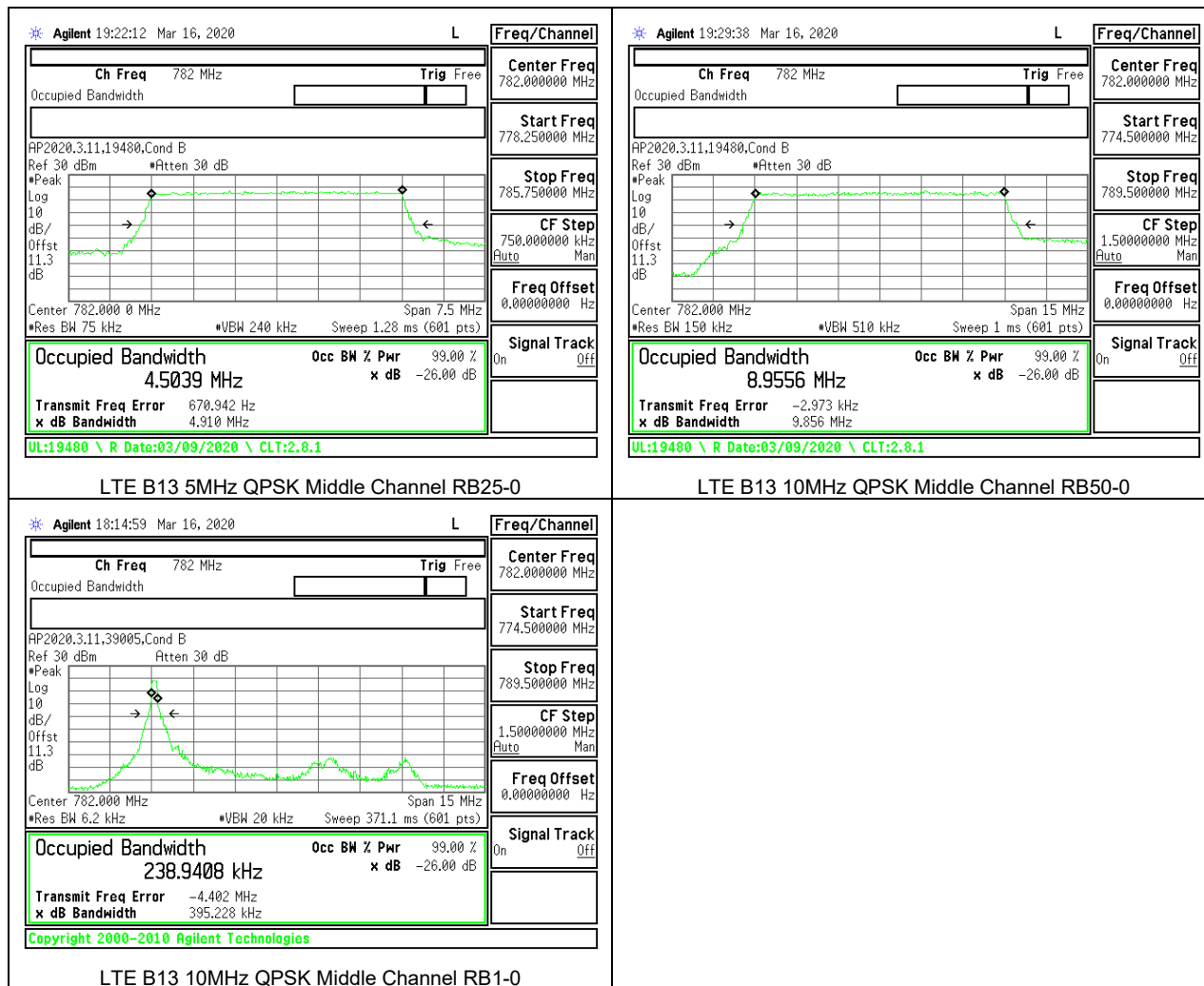


LTE B7 20MHz QPSK Middle Channel RB100-0

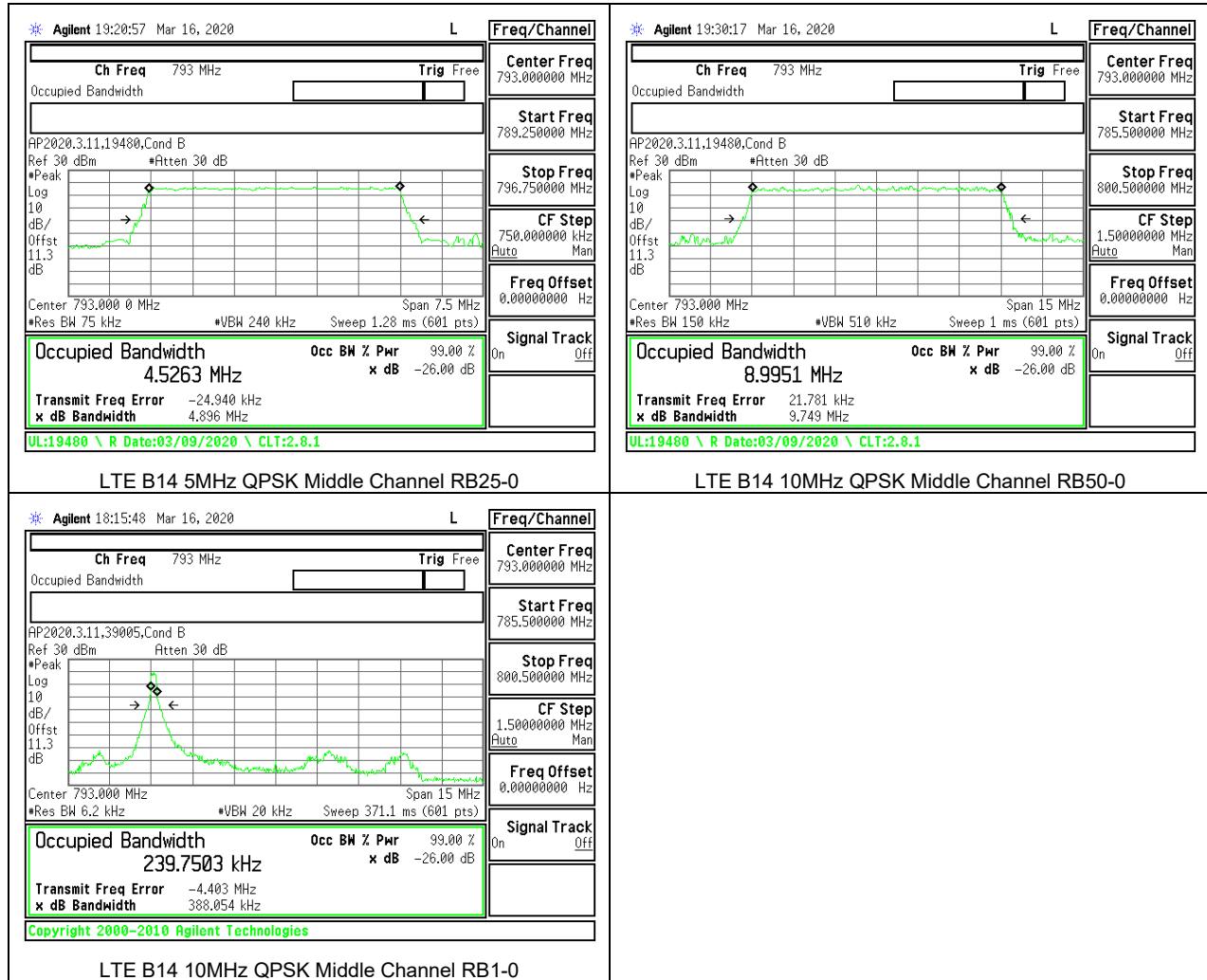
8.1.5. LTE BAND 12



### 8.1.6. LTE BAND 13

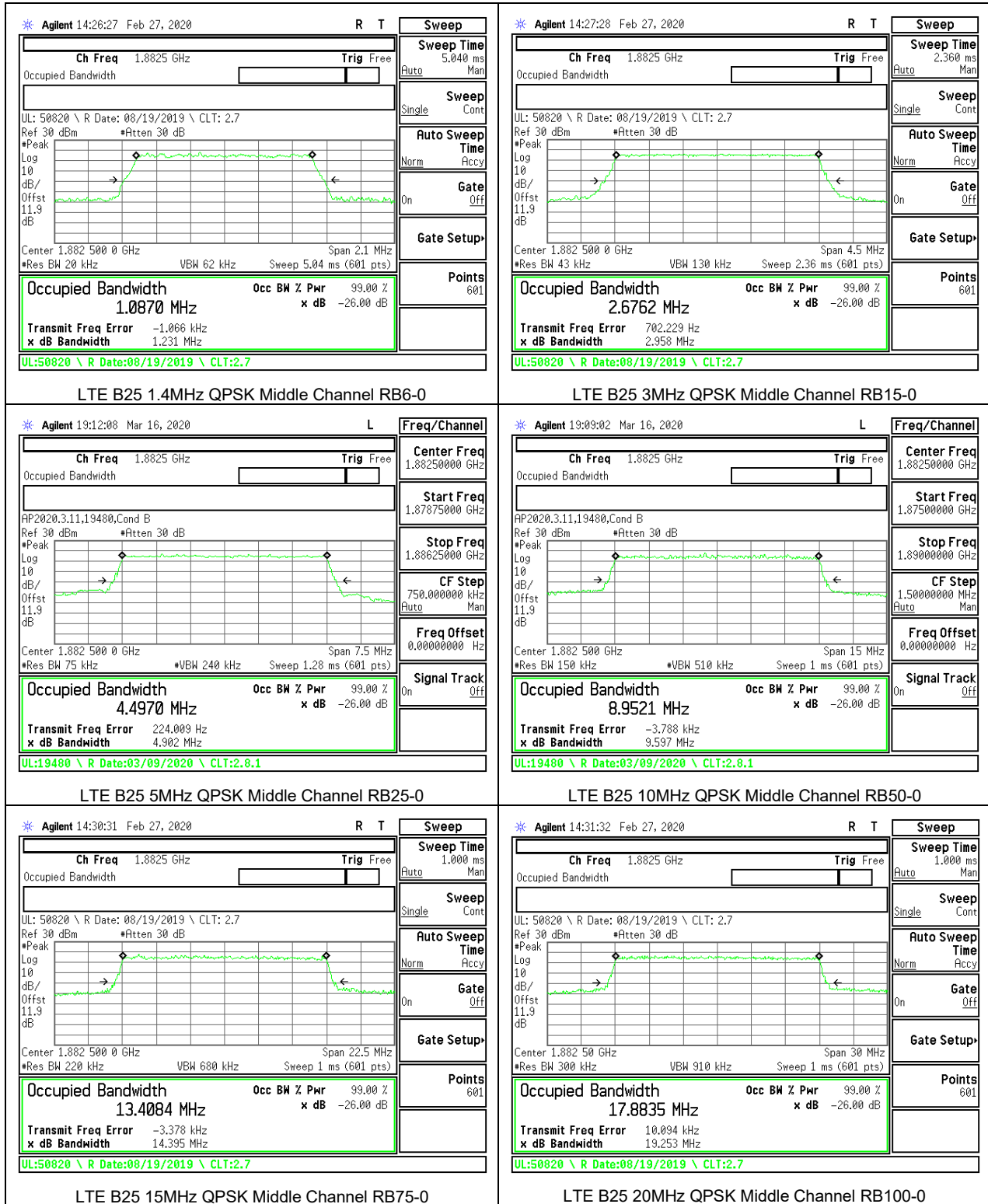


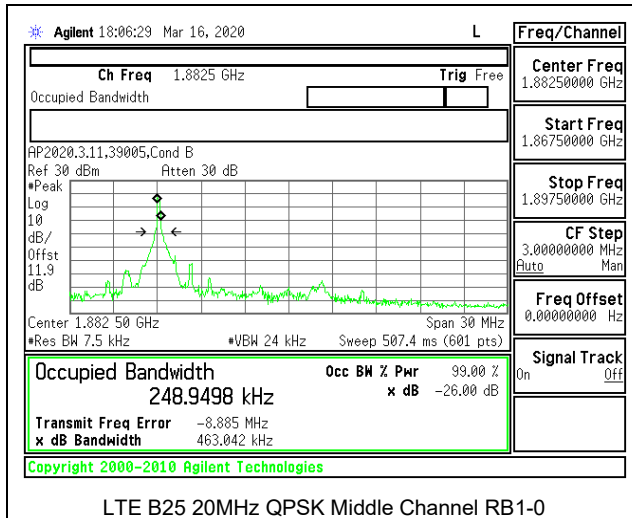
8.1.7. LTE BAND 14



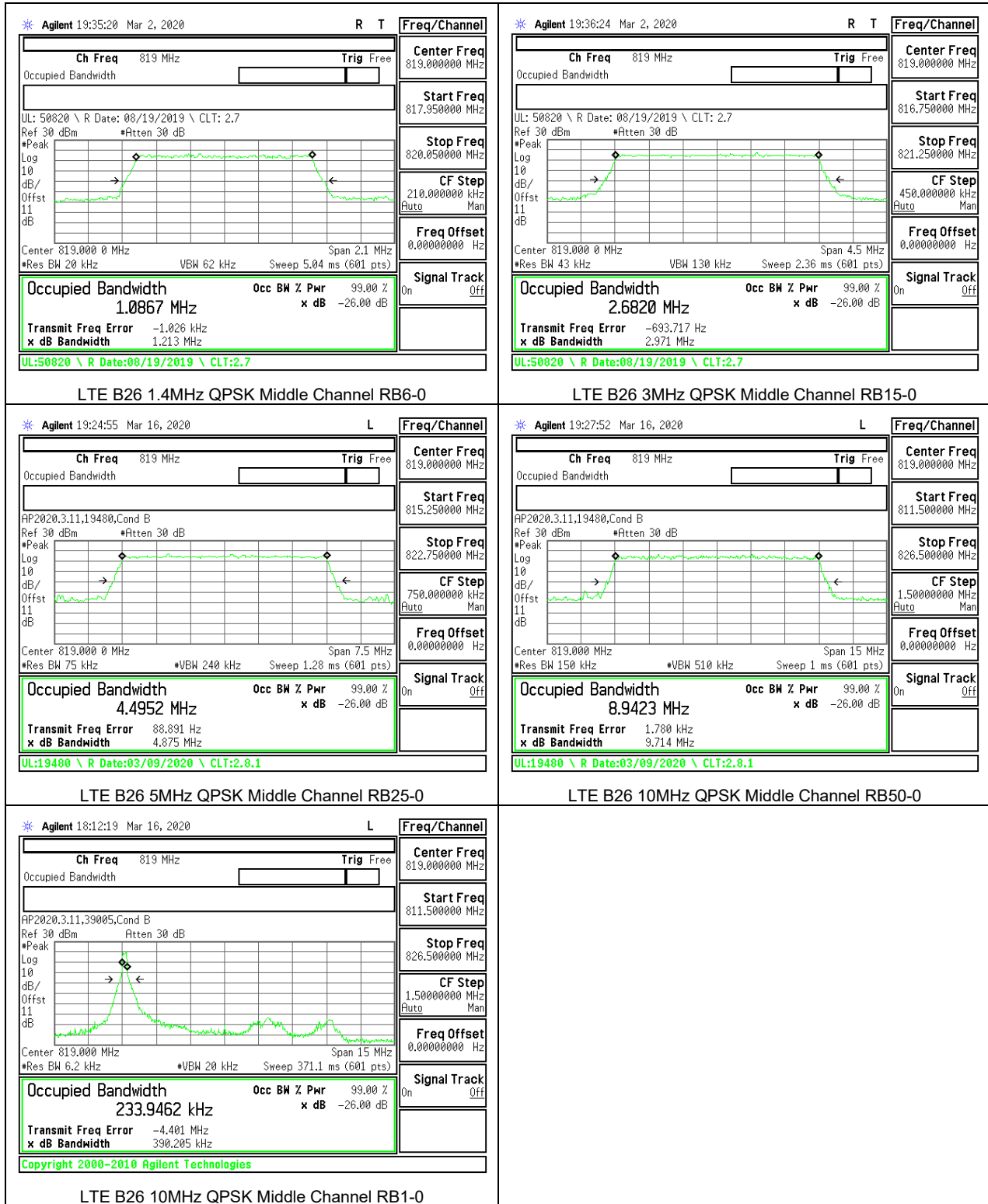


8.1.8. LTE BAND 25

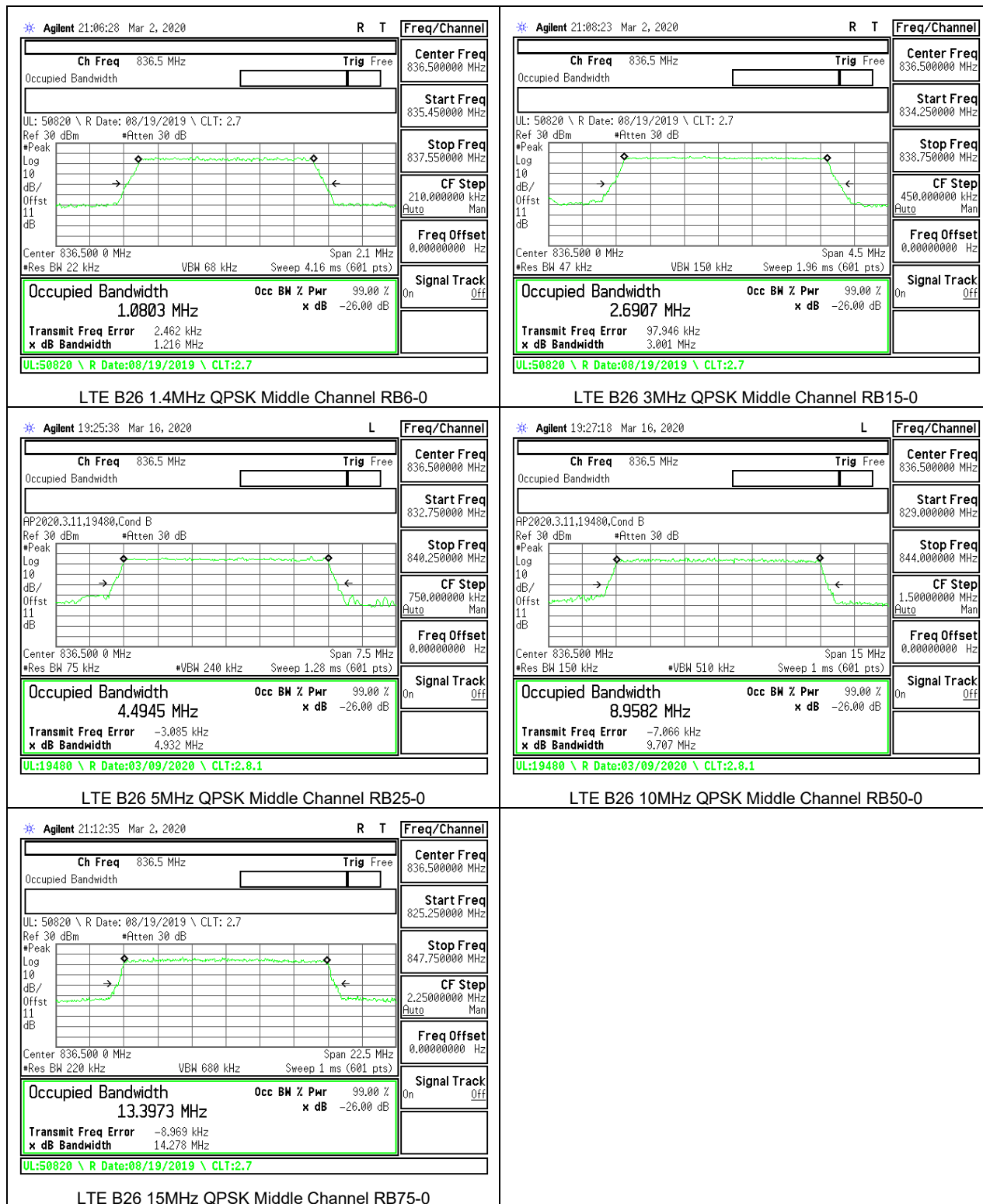




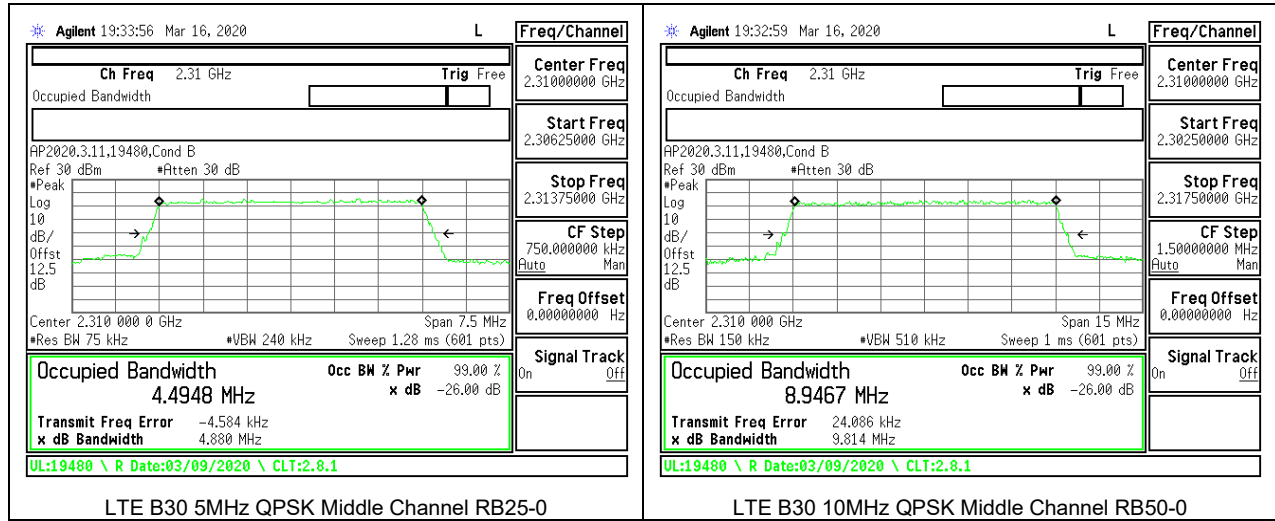
8.1.9. LTE BAND 26 (FCC PART 90S)



8.1.10. LTE BAND 26 (FCC PART 22)



8.1.11. LTE BAND 30



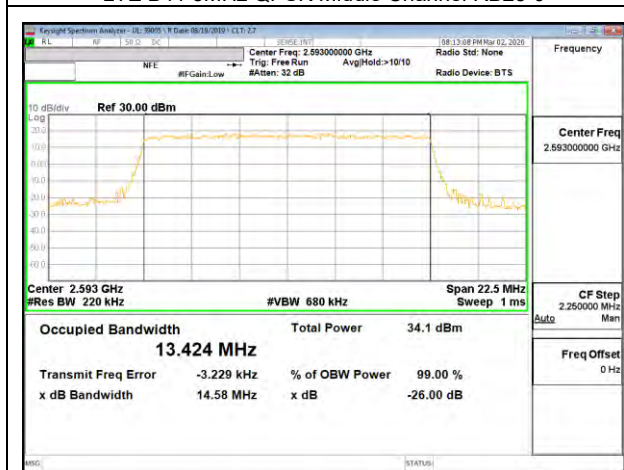
8.1.12. LTE BAND 41



LTE B41 5MHz QPSK Middle Channel RB25-0



LTE B41 10MHz QPSK Middle Channel RB50-0

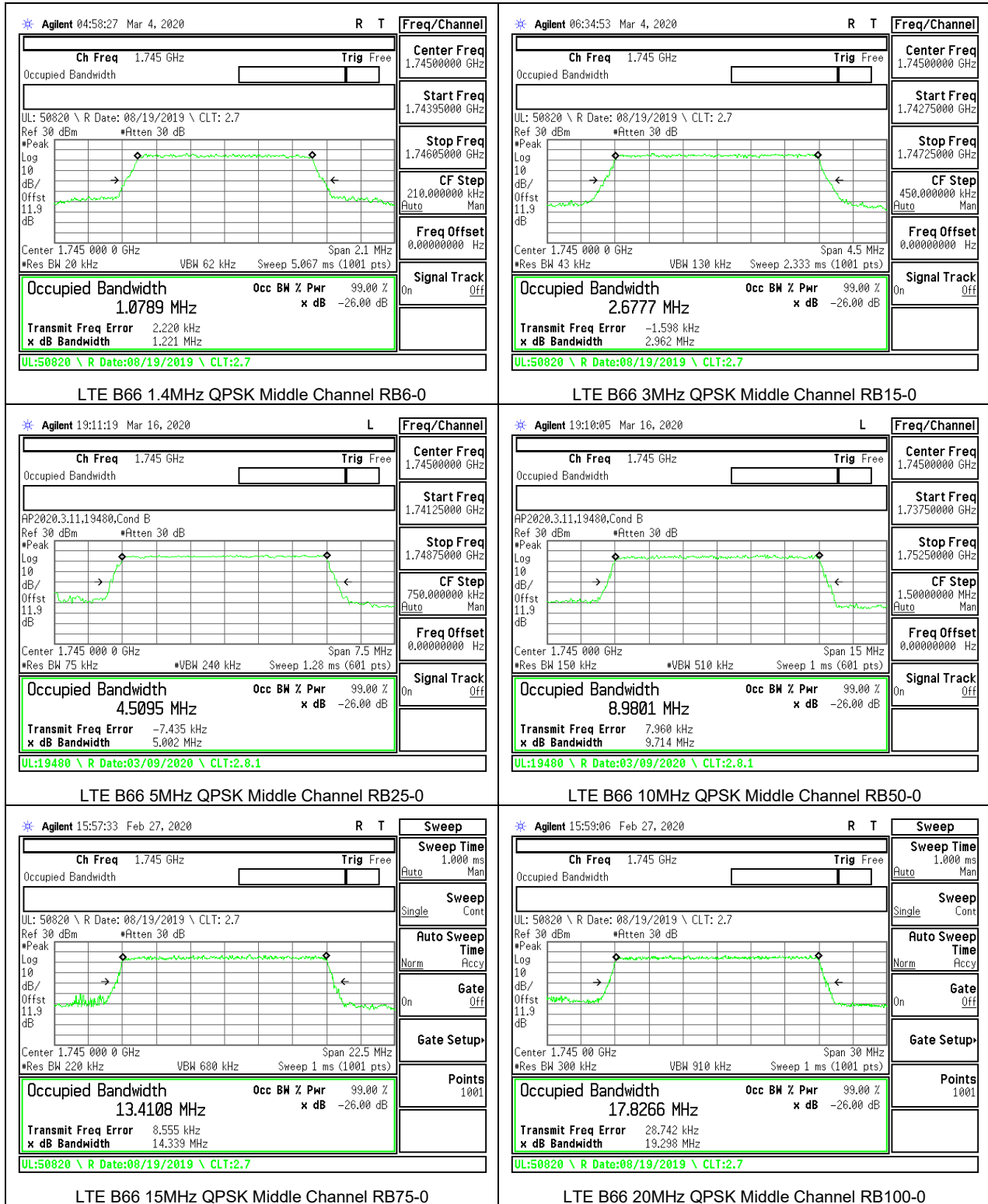


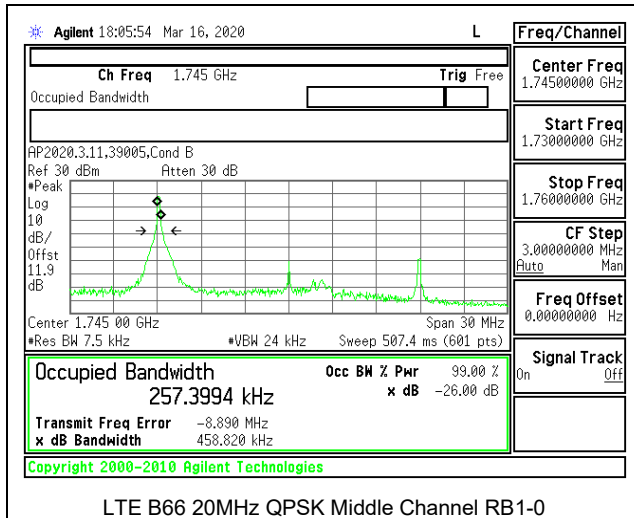
LTE B41 15MHz QPSK Middle Channel RB75-0



LTE B41 20MHz QPSK Middle Channel RB100-0

8.1.13. LTE BAND 66







## 8.2. BAND EDGE AND EMISSION MASK

### 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 (FCC 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 (FCC 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 (FCC LTE BAND 30)**

(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.

### **RESULTS**

### 8.2.1. LTE BAND 2 BANDEDGE

#### LIMITS

FCC: §24.238

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.

