



TEST REPORT

Report Number : R13548896-E5

Applicant : Samsung Electronics Co., LTD.
129 Samsung-Ro, Yeontong-Gu
Suwon-Si, Gyeonggi-Do, 16677 Korea

Model : SM-M127F and SM-M127F/DS

FCC ID : A3LSMM127F

EUT Description : GSM/WCDMA/LTE Phablet with BT/BLE and DTS b/g/n

Test Standard(s) : FCC CFR47 Part 22H, 24E, 27, and 90S

Date Of Issue:
2021-01-05

Prepared by:
UL LLC
12 Laboratory Drive
Research Triangle Park, NC 27709, USA
TEL: (919) 549-1400



REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
1	2020-12-03	Initial Review	Brian T. Kiewra
2	2020-12-08	Removed Appendix A, Pre-Scan Data for 15B Receiver Mode and related setup photos.	Brian T. Kiewra
3	2020-12-15	Separated Part 90S and Part 22 test results for LTE B26. Added LTE B4 data.	Brian T. Kiewra
4	2020-12-16	Report conducted power for Part 90S. Report radiated EIRP/ERP for maximum power. Editorial revisions.	Brian T. Kiewra
5	2021-01-05	Adjust Band 26 Part 90S to cover 814-824.	Brian T. Kiewra

TABLE OF CONTENTS

REVISION HISTORY.....	2
TABLE OF CONTENTS.....	3
1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY.....	6
3. FACILITIES AND ACCREDITATION.....	6
4. DECISION RULES AND MEASUREMENT UNCERTAINTY	7
4.1. METROLOGICAL TRACEABILITY	7
4.2. DECISION RULES	7
4.3. MEASUREMENT UNCERTAINTY	7
4.4. SAMPLE CALCULATION.....	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM OUTPUT POWER	8
5.3. SOFTWARE AND FIRMWARE	12
5.4. MAXIMUM ANTENNA GAIN	12
5.5. WORST-CASE CONFIGURATION AND MODE.....	13
5.6. DESCRIPTION OF TEST SETUP	13
6. TEST AND MEASUREMENT EQUIPMENT.....	14
7. RF OUTPUT POWER VERIFICATION.....	17
7.1.1. LTE BAND 2.....	18
7.1.2. LTE BAND 4.....	21
7.1.3. LTE BAND 5.....	24
7.1.4. LTE BAND 12.....	26
7.1.5. LTE BAND 17.....	28
7.1.6. LTE BAND 26 (FCC PART 90S).....	29
7.1.7. LTE BAND 26 (FCC PART 22).....	32
7.1.8. LTE BAND 41 FCC	35
7.1.9. LTE BAND 66.....	37
8. CONDUCTED TEST RESULTS.....	40
8.1. OCCUPIED BANDWIDTH.....	40
8.1.1. LTE BAND 2.....	41
8.1.2. LTE BAND 4.....	42
8.1.3. LTE BAND 12.....	43
8.1.4. LTE BAND 26 (FCC PART 90S).....	44
8.1.5. LTE BAND 26 (FCC PART 22).....	45
8.1.6. LTE BAND 41 (FCC).....	46
8.1.7. LTE BAND 66.....	47
8.2. BAND EDGE AND EMISSION MASK.....	48
8.2.1. LTE BAND 2 BANDEDGE	50
8.2.2. LTE BAND 4 BANDEDGE	58

8.2.3.	LTE BAND 12 ADJACENT CHANNEL POWER.....	66
8.2.4.	LTE BAND 26 ADJACENT CHANNEL POWER (FCC PART 90S).....	78
8.2.5.	LTE BAND 26 ADJACENT CHANNEL POWER (FCC PART 22).....	88
8.2.6.	LTE BAND 41 ADJACENT CHANNEL POWER (FCC)	104
8.2.7.	LTE BAND 66 BANDEDGE.....	116
8.3.	OUT OF BAND EMISSIONS	124
8.3.1.	LTE BAND 2.....	125
8.3.2.	LTE BAND 4.....	131
8.3.3.	LTE BAND 12.....	138
8.3.4.	LTE BAND 26.....	142
8.3.5.	LTE BAND 41 (FCC)	147
8.3.6.	LTE BAND 66.....	151
8.4.	FREQUENCY STABILITY	158
8.4.1.	LTE BAND 2.....	159
8.4.2.	LTE BAND 4.....	160
8.4.3.	LTE BAND 12.....	161
8.4.4.	LTE BAND 26 (FCC PART 90S).....	162
8.4.5.	LTE BAND 26 (FCC PART 22).....	163
8.4.6.	LTE BAND 41 (FCC)	164
8.4.7.	LTE BAND 66.....	165
8.5.	PEAK-TO-AVERAGE POWER RATIO	166
8.5.1.	LTE BAND 2.....	166
8.5.2.	LTE BAND 4.....	169
8.5.3.	LTE BAND 12.....	171
8.5.4.	LTE BAND 26 (PART 90S).....	173
8.5.5.	LTE BAND 26 (PART 22).....	175
8.5.6.	LTE BAND 41 (FCC)	177
8.5.7.	LTE BAND 66.....	179
9.	RADIATED TEST RESULTS	181
9.1.	EFFECTIVE RADIATED POWER ERP/EIRP	181
9.1.1.	LTE Band 2	182
9.1.2.	LTE Band 4	184
9.1.3.	LTE Band 12	186
9.1.4.	LTE Band 26 (PART 22).....	188
9.1.5.	LTE Band 41 (FCC).....	190
9.1.6.	LTE Band 66	192
9.2.	FIELD STRENGTH OF SPURIOUS RADIATION	194
9.2.1.	LTE BAND 2.....	195
9.2.2.	LTE BAND 4.....	199
9.2.3.	LTE BAND 12.....	203
9.2.4.	LTE BAND 26 (FCC PART 90S).....	207
9.2.5.	LTE BAND 26 (FCC PART 22).....	211
9.2.6.	LTE BAND 41 (FCC)	215
9.2.7.	LTE BAND 66.....	219
10.	SETUP PHOTOS.....	223
END OF REPORT		223

1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	Samsung Electronics Co., LTD. 129 Samsung-Ro, Yeontong-Gu Suwon-Si, Gyeonggi-Do, 16677 Korea
Model	SM-M127F and SM-M127F/DS
FCC ID	A3LSMM127F
EUT Description	GSM/WCDMA/LTE Phablet with BT/BLE and DTS b/g/n
Serial Number	Radiated Samples: TJF2458M, TJF2699M, TJG0353H Conducted: TJF2546M
Date Tested	2020-10-27 to 2021-01-05
Applicable Standards	FCC PART 22H, 24E, 27, and 90S
Test Results	Complies
UL LLC 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. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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, or any agency of the U.S. government.	
Approved & Released By: 	Prepared By: 
Dan Corona Operations Leader UL Verification Services Inc.	Brian T. Kiewra Project Engineer UL LLC

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 24E, and Part 27
- [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.

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

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

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, 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.

12 Laboratory Dr.	2800 Perimeter Park Dr.
☐ Chamber A RTP	☒ North Chamber
☐ Chamber C RTP	☒ South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration # 703469.
UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

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 _{Lab}
Worst Case Radiated Disturbance, 9 kHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Occupied Channel Bandwidth	±1.22 %
Temperature	±0.57 %
Supply voltages	±0.57 %
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 GSM/WCDMA/LTE Phablet with BT/BLE and DTS b/g/n. The model SM-M127F/DS was used for final testing and is representative of the test results in this report.

The models are electronically equivalent with the only difference being that the SM-M127F/DS has dual sim capability.

5.2. MAXIMUM OUTPUT POWER

ERP/EIRP LIMIT

FCC: §2.1046, §22.913, §24.232, §27.50

EIRP/ERP TEST PROCEDURE

ANSI C63.26:2015 Sub-Clause 5.2.7/ TIA-603-E Clause 2.2.17
KDB 971168 D01 Section 5.8
KDB 412172 D01

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

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.

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

LTE BAND 2

Part 24							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
1.4	QPSK	1850.7	1909.3	23.47	0.2223	1085	1M09G7W
	16QAM			23.04	0.2014	1085	1M09D7W
3.0	QPSK	1851.5	1908.5	22.80	0.1905	2696	2M70G7W
	16QAM			23.79	0.2393	2697	2M70D7W
5.0	QPSK	1852.5	1907.5	22.85	0.1928	4491	4M49G7W
	16QAM			23.33	0.2153	4492	4M49D7W
10.0	QPSK	1855.0	1905.0	22.78	0.1897	8974	8M97G7W
	16QAM			22.81	0.1910	8962	8M96D7W
15.0	QPSK	1857.5	1902.5	23.52	0.2249	13747	13M7G7W
	16QAM			22.80	0.1905	13451	13M5D7W
20.0	QPSK	1860.0	1900.0	23.80	0.2399	17913	17M9G7W
	16QAM			21.83	0.1524	17912	17M9D7W

LTE BAND 4

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
1.4	QPSK	1710.7	1754.3	19.70	0.0933	1090	1M09G7W
	16QAM			19.31	0.0853	1086	1M09D7W
3.0	QPSK	1711.5	1753.5	19.67	0.0927	2686	2M69G7W
	16QAM			19.16	0.0824	2697	2M70D7W
5.0	QPSK	1712.5	1452.5	19.73	0.0940	4514	4M51G7W
	16QAM			19.37	0.0865	4500	4M50D7W
10.0	QPSK	1715.0	1750.0	21.16	0.1306	8960	8M96G7W
	16QAM			21.15	0.1303	8945	8M95D7W
15.0	QPSK	1717.5	1747.5	21.83	0.1524	13400	13M4G7W
	16QAM			20.87	0.1222	13437	13M4D7W
20.0	QPSK	1720.0	1745.0	22.77	0.1892	17804	17M8G7W
	16QAM			21.95	0.1567	17856	17M9D7W

LTE BAND 12

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
1.4	QPSK	699.7	715.3	13.85	0.0243	1083	1M08G7W
	16QAM			13.60	0.0229	1083	1M08D7W
3.0	QPSK	700.5	714.5	13.19	0.0208	2691	2M69G7W
	16QAM			13.17	0.0207	2697	2M70D7W
5.0	QPSK	701.5	713.5	12.46	0.0176	4484	4M48G7W
	16QAM			13.12	0.0205	4489	4M49D7W
10.0	QPSK	704.0	711.0	12.54	0.0179	8954	8M95G7W
	16QAM			12.43	0.0175	8954	8M95D7W

LTE BAND 26 (FCC PART 90S)

Part 90S							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted (dBm)	Conducted (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	814.7	823.3	23.80	0.2399	1090	1M09G7W
	16QAM			22.60	0.1820	1085	1M09D7W
3.0	QPSK	815.5	822.5	23.70	0.2344	2670	2M67G7W
	16QAM			22.00	0.1585	2689	2M69D7W
5.0	QPSK	816.5	821.5	23.80	0.2399	4505	4M51G7W
	16QAM			23.60	0.2291	4503	4M50D7W
10.0	QPSK	819.0	819.0	23.80	0.2399	9001	9M00G7W
	16QAM			22.60	0.1820	8964	8M96D7W
15.0	QPSK	821.5	821.5	23.60	0.2291	13409	13M4G7W
	16QAM			22.50	0.1778	13438	13M4D7W

LTE BAND 26 (FCC PART 22)

Part 22							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated ERP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
1.4	QPSK	824.7	848.3	17.36	0.0545	1085	1M09G7W
	16QAM			18.16	0.0655	1085	1M09D7W
3.0	QPSK	825.5	847.5	17.75	0.0596	2695	2M70G7W
	16QAM			17.45	0.0556	2695	2M70D7W
5.0	QPSK	826.5	846.5	18.65	0.0733	4488	4M49G7W
	16QAM			16.96	0.0497	4492	4M49D7W
10.0	QPSK	829.0	844.0	18.37	0.0687	8971	8M97G7W
	16QAM			17.09	0.0512	8968	8M97D7W
15.0	QPSK	831.5	841.5	18.42	0.0695	13408	13M4G7W
	16QAM			17.27	0.0533	13430	13M4D7W

LTE BAND 41 FCC

Part 22							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
5.0	QPSK	2498.5	2687.5	19.25	0.0841	4506	4M51G7W
	16QAM			19.92	0.0982	4498	4M50D7W
10.0	QPSK	2401.0	2685.0	19.23	0.0838	8958	8M96G7W
	16QAM			19.21	0.0834	8948	8M95D7W
15.0	QPSK	2503.5	2682.5	22.74	0.1879	13372	13M4G7W
	16QAM			19.84	0.0964	13430	13M4D7W
20.0	QPSK	2506.0	2680.0	18.66	0.0735	17861	17M9G7W
	16QAM			19.93	0.0984	17867	17M9D7W

LTE BAND 66

Part 27							
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Radiated EIRP		99% BW (kHz)	Emission Designator
				(dBm)	(W)		
1.4	QPSK	1710.7	1754.3	22.08	0.1614	1084	1M08G7W
	16QAM			20.59	0.1146	1085	1M09D7W
3.0	QPSK	1711.5	1753.5	23.08	0.2032	2694	2M69G7W
	16QAM			20.47	0.1114	2694	2M69D7W
5.0	QPSK	1712.5	1452.5	23.24	0.2109	4482	4M48G7W
	16QAM			20.77	0.1194	4483	4M48D7W
10.0	QPSK	1715.0	1750.0	23.51	0.2244	8958	8M96G7W
	16QAM			23.69	0.2339	8955	8M96D7W
15.0	QPSK	1717.5	1747.5	23.94	0.2477	13415	13M4G7W
	16QAM			23.61	0.2296	13427	13M4D7W
20.0	QPSK	1720.0	1745.0	21.16	0.1306	17894	17M9G7W
	16QAM			23.51	0.2244	17888	17M9D7W

5.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was HW: REV 0.1, SW [vendor.ril.sw_ver]: [M127FXXU0FCC_test].

5.4. MAXIMUM ANTENNA GAIN

Please see table below:

Bands	Antenna Gain (dBi)
LTE Band 2, 1850 – 1910 MHz	2.0
LTE Band 4, 1710 – 1756 MHz	0.4
LTE Band 5, 824 – 849 MHz	-2.3
LTE Band 12, 699 – 716 MHz	-4.8
LTE Band 17, 704 – 716 MHz	-4.8
LTE Band 26, 814 – 849 MHz	-2.3
LTE Band 41, 2496 – 2690 MHz (FCC)	1.1
LTE Band 66, 1710 – 1780 MHz	0.4

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports LTE Bands of:

Band 2, Band 4, Band 5, Band 12, Band 17, Band 26, Band 41, and Band 66.

LTE Band 5 (824-849 MHz) is covered by LTE Band 26 Part 22 (824-849 MHz) due to overlapping frequency range, same or higher tune-up limit, and similar channel bandwidth.

LTE Band 17 (704-716 MHz) is covered by LTE Band 12 (699-716 MHz) due to overlapping frequency range, same or higher tune-up limit, and similar channel bandwidth.

For the unintentional/receive spurious it was determined that X-axis was the worst-case.

All radios that can be transmitted simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance.

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 30MHz.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
AC Adapter		Samsung	EP-TA200	R37M3FV0M01DK3		N/A
Earbud		Samsung	N/A	N/A		N/A
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	N/A
2	Antenna Port	1	EUT	Shielded	0.1m	N/A
3	RF In/Out	1	Communication Test Set	Shielded	1m	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	AC Adapter	Shielded	1	N/A
2	Earbud	1	USB	Un-shielded	1	N/A
3	RF In/out	1	Communication Test Set	Un-shielded	2	N/A

SETUP DIAGRAM

Refer to R13548896-EP3 for setup diagrams and photos.

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used – Power Verification (FRE)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
2237A31744	Power Sensor	Agilent	8481A	2020-02-26	2021-02-26
2702A60780	Power Sensor	Agilent	8481A	2020-02-12	2021-02-12
3125U16345	Power Meter	HP	437B	2020-01-22	2021-01-22
3125U12345	Power Meter	HP	437B	2020-01-22	2021-01-22
1802A01877	Regulated DC Power Supply	Ametek	XT15-4	NA	NA

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA027	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
PWM001 (PRE0136343)	RF Power Meter	Keysight Technologies	N1912A	2020-07-17	2021-07-17
PWS002 (PRE0137348)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2020-09-10	2021-09-10
76023 (EC0225)	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2020-05-27	2021-05-27
HI0090 (PRE0191271)	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
76021	DC Regulated Power Supply	Circuit Specialists	CSI3005X5	NA	NA
SOFTEMI	EMC Software	UL	Version 2020.10.14		
80579 (T374)	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500 (SN 132911)	2020-08-07	2021-08-07

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
30-1000 MHz					
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-07-27	2021-07-27
Gain-Loss Chains					
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-29	2021-07-29
Receiver & Software					
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
SOFTEMI	EMI Software	UL	Version 9.5 (2020.08.18)		
Additional Equipment used					
s/n 200037610	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500		
BRF001	900MHz notch filter, 2W, F _{high} =6GHz	Micro-Tronics	BRM50706	2020-07-15	2021-07-15
LPF008	DC-1000MHz low-pass filter	LPF008	DC-1000MHz low-pass filter	LPF008	DC-1000MHz low-pass filter

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2020-03-26	2021-03-26
HI0091	Environmental Meter	Fisher Scientific	14-650-118	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2020-08-18	2021-08-18
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2020-08-18	2021-08-18
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2020-03-26	2021-03-26
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2020-08-08	2021-08-08

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz (Loop Ant.)					
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
30-1000 MHz					
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
1-18 GHz					
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
18-40 GHz					
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
AT0077	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2019-11-07	2020-11-07
Gain-Loss Chains					
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2020-07-06
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-07	2021-07-07
Receiver & Software					
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5 (2020.08.18)		
Additional Equipment used					
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
T918	Wideband Radio Communications Tester	Rohde and Schwartz	CMW500	2020-04-02	2021-04-02
HPF012	1GHz high-pass filter, 2W, F _{high} =18GHz	Micro-Tronics	HPM18129	2020-02-19	2021-02-19
HPF015	4GHz high-pass filter, 2W, F _{high} =18GHz	Micro-Tronics	HPM13351	2020-08-29	2021-08-29
LPF008	DC-1000MHz low-pass filter	Pasternack	PE8720	2020-07-15	2021-07-15
BRF001	900MHz notch filter, 2W, F _{high} =6GHz	Micro-Tronics	BRM50706	2020-07-15	2021-07-15
AT0062	Double-Ridged Waveguide Horn Ant, 1 to 18 GHz (TX Antenna)	ETS Lindgren	3117	2020-01-30	2021-01-30
EMC 4075	Log Periodic Antenna (TX Antenna)	Chase	UPA6109	2020-10-08	2021-10-08
SIG005	Signal Generator	Agilent	83640B	2020-08-19	2021-08-19

7. RF OUTPUT POWER VERIFICATION

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:

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
256 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:

7.1.1. LTE BAND 2

Test Engineer ID:	10615	Test Date:	2020-10-27
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 2 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1850.7 MHz	1880.0 MHz	1909.3 MHz
1.4	QPSK	1	0	23.6	23.3	23.3
		1	3	23.6	23.3	23.3
		1	5	23.6	23.3	23.3
		3	0	23.5	23.2	23.3
		3	1	23.5	23.2	23.3
		3	3	23.5	23.2	23.3
		6	0	22.5	22.3	22.4
	16QAM	1	0	22.6	22.1	22.4
		1	3	22.4	22.1	22.4
		1	5	22.5	22.2	22.4
		3	0	22.6	22.3	22.3
		3	1	22.6	22.3	22.4
		3	3	22.6	22.3	22.3
		6	0	21.5	21.3	21.3

OUTPUT POWER FOR LTE BAND 2 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1851.5 MHz	1880.0 MHz	1908.5 MHz
3.0	QPSK	1	0	23.5	23.1	23.3
		1	8	23.5	23.2	23.3
		1	14	23.5	23.2	23.3
		8	0	22.5	22.2	22.3
		8	4	22.6	22.2	22.3
		8	7	22.6	22.2	22.3
		15	0	22.6	22.3	22.4
	16QAM	1	0	22.4	22.3	22.5
		1	8	22.4	22.2	22.5
		1	14	22.4	22.3	22.5
		8	0	21.5	21.3	21.4
		8	4	21.5	21.3	21.4
		8	7	21.5	21.3	21.4
		15	0	21.6	21.2	21.3

OUTPUT POWER FOR LTE BAND 2 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1852.5 MHz	1880.0 MHz	1907.5 MHz
5.0	QPSK	1	0	23.6	23.2	23.3
		1	12	23.5	23.2	23.2
		1	24	23.6	23.2	23.3
		12	0	22.6	22.3	22.4
		12	7	22.6	22.3	22.4
		12	13	22.6	22.3	22.4
		25	0	22.6	22.3	22.4
	16QAM	1	0	22.6	22.3	22.2
		1	12	22.6	22.3	22.2
		1	24	22.6	22.3	22.2
		12	0	21.5	21.3	21.4
		12	7	21.5	21.3	21.3
		12	13	21.5	21.3	21.3
		25	0	21.6	21.3	21.4

OUTPUT POWER FOR LTE BAND 2 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1855.0 MHz	1880.0 MHz	1905.0 MHz
10.0	QPSK	1	0	23.5	23.2	23.3
		1	25	23.5	23.2	23.3
		1	49	23.5	23.2	23.3
		25	0	22.6	22.3	22.4
		25	12	22.6	22.3	22.4
		25	25	22.6	22.3	22.4
		50	0	22.6	22.3	22.4
	16QAM	1	0	22.5	22.3	22.4
		1	25	22.4	22.3	22.4
		1	49	22.4	22.3	22.4
		25	0	21.6	21.2	21.4
		25	12	21.7	21.3	21.4
		25	25	21.6	21.2	21.4
		50	0	21.6	21.3	21.4

OUTPUT POWER FOR LTE BAND 2 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1857.5 MHz	1880.0 MHz	1902.5 MHz
15.0	QPSK	1	0	23.5	23.2	23.4
		1	37	23.5	23.2	23.4
		1	74	23.5	23.1	23.3
		36	0	22.6	22.3	22.4
		36	20	22.6	22.3	22.5
		36	39	22.6	22.3	22.4
		75	0	22.6	22.3	22.4
	16QAM	1	0	22.6	22.2	22.5
		1	37	22.6	22.2	22.5
		1	74	22.6	22.2	22.5
		36	0	21.6	21.3	21.5
		36	20	21.6	21.3	21.5
		36	39	21.6	21.3	21.5
		75	0	21.6	21.2	21.4

OUTPUT POWER FOR LTE BAND 2 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1860.0 MHz	1880.0 MHz	1900.0 MHz
20.0	QPSK	1	0	23.5	23.2	23.4
		1	49	23.5	23.2	23.4
		1	99	23.4	23.2	23.4
		50	0	22.6	22.3	22.4
		50	24	22.6	22.3	22.4
		50	50	22.6	22.3	22.4
		100	0	22.6	22.3	22.4
	16QAM	1	0	22.5	22.5	22.7
		1	49	22.5	22.4	22.6
		1	99	22.5	22.3	22.6
		50	0	21.6	21.3	21.4
		50	24	21.6	21.3	21.4
		50	50	21.6	21.3	21.4
		100	0	21.6	21.3	21.4

7.1.2. LTE BAND 4

Test Engineer ID:	52300	Test Date:	2020-10-28
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 4 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1710.7 MHz	1732.5 MHz	1754.3 MHz
1.4	QPSK	1	0	23.0	22.9	22.5
		1	3	22.9	22.9	22.5
		1	5	23.0	22.9	22.5
		3	0	22.9	22.8	22.5
		3	1	22.8	22.9	22.5
		3	3	22.9	22.8	22.5
		6	0	21.8	21.9	21.5
	16QAM	1	0	21.9	21.7	21.5
		1	3	21.5	21.6	21.5
		1	5	21.9	21.8	21.5
		3	0	21.9	21.9	21.5
		3	1	21.9	21.9	21.5
		3	3	21.9	21.9	21.5
		6	0	21.0	20.8	20.5

OUTPUT POWER FOR LTE BAND 4 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1711.5 MHz	1732.5 MHz	1753.5 MHz
3.0	QPSK	1	0	22.9	22.9	22.5
		1	8	22.9	22.9	22.5
		1	14	22.9	22.9	22.5
		8	0	21.9	21.9	21.5
		8	4	21.9	21.9	21.5
		8	7	21.9	21.9	21.5
		15	0	21.9	21.9	21.5
	16QAM	1	0	21.7	21.7	21.5
		1	8	21.7	21.7	21.5
		1	14	21.8	21.7	21.5
		8	0	21.0	21.0	20.5
		8	4	21.0	21.0	20.5
		8	7	21.0	21.0	20.5
		15	0	20.9	20.9	20.5

OUTPUT POWER FOR LTE BAND 4 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5.0	QPSK	1	0	23.0	22.9	22.5
		1	12	22.9	22.9	22.5
		1	24	22.9	22.9	22.5
		12	0	21.9	21.9	21.5
		12	7	21.9	21.9	21.5
		12	13	21.9	21.9	21.5
		25	0	21.9	21.9	21.5
	16QAM	1	0	21.8	21.9	21.5
		1	12	21.7	21.9	21.5
		1	24	21.7	21.9	21.5
		12	0	20.9	21.0	20.5
		12	7	20.9	21.0	20.5
		12	13	20.9	21.0	20.5
		25	0	21.0	20.9	20.5

OUTPUT POWER FOR LTE BAND 4 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1715 MHz	1732.5 MHz	1750 MHz
10.0	QPSK	1	0	22.9	23.0	22.6
		1	25	22.9	22.9	22.5
		1	49	22.9	23.0	22.5
		25	0	21.9	21.9	21.5
		25	12	21.9	21.9	21.5
		25	25	21.9	21.9	21.5
		50	0	21.9	21.9	21.5
	16QAM	1	0	21.9	21.8	21.5
		1	25	21.8	21.8	21.5
		1	49	21.8	21.8	21.5
		25	0	20.9	21.0	20.6
		25	12	20.9	21.0	20.6
		25	25	20.9	20.9	20.6
		50	0	20.9	20.9	20.5

OUTPUT POWER FOR LTE BAND 4 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15.0	QPSK	1	0	22.9	23.0	22.6
		1	37	22.8	22.9	22.6
		1	74	22.8	22.9	22.6
		36	0	21.9	21.9	21.5
		36	20	21.9	21.9	21.5
		36	39	21.9	21.9	21.5
		75	0	21.9	21.9	21.5
	16QAM	1	0	21.8	22.1	21.5
		1	37	21.7	22.0	21.5
		1	74	21.7	22.0	21.5
		36	0	20.9	21.0	20.5
		36	20	20.9	21.0	20.5
		36	39	20.9	21.0	20.5
		75	0	20.9	20.9	20.5

OUTPUT POWER FOR LTE BAND 4 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1720 MHz	1732.5 MHz	1745 MHz
20.0	QPSK	1	0	23.2	23.0	22.8
		1	49	23.1	23.0	22.8
		1	99	23.1	23.0	22.7
		50	0	22.0	22.1	21.8
		50	24	22.0	22.0	21.7
		50	50	22.0	22.1	21.7
		100	0	22.0	22.0	21.7
	16QAM	1	0	22.2	22.0	22.0
		1	49	22.1	22.0	21.9
		1	99	22.0	22.0	21.8
		50	0	21.0	21.0	20.7
		50	24	21.0	21.0	20.7
		50	50	21.0	21.0	20.7
		100	0	21.1	21.0	20.8

7.1.3. LTE BAND 5

Test Engineer ID:	52300	Test Date:	2020-10-27
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 5 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	22.6	23.8	23.7
		1	3	23.9	23.9	23.7
		1	5	23.8	23.8	23.7
		3	0	23.7	23.6	23.6
		3	1	23.7	23.7	23.6
		3	3	23.7	23.7	23.6
		6	0	22.5	22.5	22.4
	16QAM	1	0	22.5	22.4	22.4
		1	3	22.5	22.4	22.2
		1	5	22.5	22.5	22.4
		3	0	22.7	22.6	22.4
		3	1	22.7	22.7	22.4
		3	3	22.7	22.7	22.4
		6	0	21.6	21.6	21.5

OUTPUT POWER FOR LTE BAND 5 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	23.6	23.8	23.8
		1	8	23.6	23.8	23.7
		1	14	23.6	23.8	23.7
		8	0	22.6	22.6	22.5
		8	4	22.6	22.6	22.5
		8	7	22.6	22.6	22.5
		15	0	22.5	22.6	22.5
	16QAM	1	0	22.6	22.4	22.1
		1	8	22.5	22.5	22.1
		1	14	22.6	22.4	22.1
		8	0	21.6	21.7	21.6
		8	4	21.6	21.7	21.5
		8	7	21.6	21.7	21.5
		15	0	21.6	21.7	21.6

OUTPUT POWER FOR LTE BAND 5 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				826.5 MHz	836.5 MHz	846.5 MHz
5.0	QPSK	1	0	23.6	23.8	23.8
		1	12	23.6	23.8	23.7
		1	24	23.6	23.8	23.7
		12	0	22.5	22.6	22.5
		12	7	22.5	22.6	22.5
		12	13	22.5	22.6	22.5
		25	0	22.5	22.5	22.5
	16QAM	1	0	22.5	22.6	22.4
		1	12	22.4	22.6	22.4
		1	24	22.4	22.7	22.4
		12	0	21.5	21.7	21.5
		12	7	21.5	21.7	21.5
		12	13	21.5	21.7	21.5
		25	0	21.6	21.6	21.6

OUTPUT POWER FOR LTE BAND 5 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				829 MHz	836.5 MHz	844 MHz
10.0	QPSK	1	0	23.6	23.9	23.8
		1	25	23.6	23.8	23.8
		1	49	23.6	23.8	23.7
		25	0	22.5	22.6	22.5
		25	12	22.5	22.6	22.5
		25	25	22.5	22.6	22.5
		50	0	22.5	22.6	22.5
	16QAM	1	0	22.4	22.6	22.4
		1	25	22.3	22.6	22.3
		1	49	22.4	22.7	22.3
		25	0	21.5	21.6	21.6
		25	12	21.5	21.6	21.6
		25	25	21.5	21.6	21.5
		50	0	21.6	21.6	21.5

7.1.4. LTE BAND 12

Test Engineer ID:	52300	Test Date:	2020-10-27
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				699.7 MHz	707.5 MHz	715.3 MHz
1.4	QPSK	1	0	22.1	23.2	23.1
		1	3	23.3	23.2	23.0
		1	5	23.2	23.2	23.1
		3	0	23.0	23.0	22.9
		3	1	23.0	23.0	22.9
		3	3	23.0	23.0	22.9
		6	0	22.0	22.0	21.9
	16QAM	1	0	21.8	21.8	21.6
		1	3	21.9	21.8	21.7
		1	5	21.8	21.7	22.0
		3	0	22.1	22.0	22.0
		3	1	22.1	22.0	22.0
		3	3	22.1	22.1	22.0
		6	0	20.9	20.9	20.8

OUTPUT POWER FOR LTE BAND 12 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				700.5 MHz	707.5 MHz	714.5 MHz
3.0	QPSK	1	0	22.9	23.0	23.0
		1	8	22.9	23.0	23.0
		1	14	22.9	23.0	23.0
		8	0	21.9	21.9	21.9
		8	4	21.9	22.0	21.9
		8	7	21.8	22.0	21.9
		15	0	21.8	22.0	21.9
	16QAM	1	0	21.7	22.0	21.6
		1	8	21.7	22.0	21.7
		1	14	21.7	22.0	21.9
		8	0	20.8	21.0	20.7
		8	4	20.8	20.9	20.8
		8	7	20.8	21.0	20.8
		15	0	20.8	20.9	20.9

OUTPUT POWER FOR LTE BAND 12 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				701.5 MHz	707.5 MHz	713.5 MHz
5.0	QPSK	1	0	22.9	23.1	22.9
		1	12	22.9	23.0	22.9
		1	24	22.9	23.0	23.0
		12	0	21.9	22.0	21.9
		12	7	21.9	22.0	22.0
		12	13	21.9	22.0	22.0
		25	0	21.8	22.0	21.9
	16QAM	1	0	21.9	22.0	21.9
		1	12	21.9	22.0	22.0
		1	24	21.9	22.0	22.0
		12	0	20.7	20.9	20.8
		12	7	20.7	21.0	20.8
		12	13	20.7	21.0	20.9
		25	0	20.8	20.9	20.9

OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
					707.5 MHz	
10.0	QPSK	1	0		23.1	
		1	25		23.1	
		1	49		23.1	
		25	0		22.1	
		25	12		22.0	
		25	25		22.0	
		50	0		22.1	
	16QAM	1	0		22.1	
		1	25		22.1	
		1	49		22.1	
		25	0		21.0	
		25	12		21.0	
		25	25		21.0	
		50	0		21.0	

7.1.5. LTE BAND 17

Test Engineer ID:	52300	Test Date:	2020-10-27
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 17 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
					710 MHz	
5.0	QPSK	1	0		22.4	
		1	12		22.4	
		1	24		22.4	
		12	0		21.3	
		12	7		21.3	
		12	13		21.3	
		25	0		21.3	
	16QAM	1	0		21.2	
		1	12		21.2	
		1	24		21.3	
		12	0		20.1	
		12	7		20.1	
		12	13		20.1	
		25	0		20.1	

OUTPUT POWER FOR LTE BAND 17 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
					707.5 MHz	
10.0	QPSK	1	0		22.4	
		1	25		22.3	
		1	49		22.4	
		25	0		21.3	
		25	12		21.3	
		25	25		21.3	
		50	0		21.3	
	16QAM	1	0		21.4	
		1	25		21.4	
		1	49		21.5	
		25	0		20.2	
		25	12		20.2	
		25	25		20.2	
		50	0		20.1	

7.1.6. LTE BAND 26 (FCC PART 90S)

Test Engineer ID:	40882	Test Date:	2020-12-09
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 26 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				814.7	819.0	823.3 MHz
1.4	QPSK	1	0	23.7	23.7	23.8
		1	3	23.8	23.7	23.8
		1	5	23.7	23.7	23.6
		3	0	23.4	23.5	23.5
		3	1	23.5	23.5	23.5
		3	3	23.5	23.5	23.5
	16QAM	6	0	22.6	22.5	22.4
		1	0	22.6	22.2	22.6
		1	3	22.5	22.6	22.1
		1	5	22.6	22.5	22.6
		3	0	22.5	22.4	22.3
		3	1	22.3	22.5	22.4
		3	3	22.5	22.4	22.5
		6	0	21.4	21.5	21.4

OUTPUT POWER FOR LTE BAND 26 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				815.5	819.0	822.5MHz
3.0	QPSK	1	0	23.7	23.6	23.7
		1	8	23.6	23.5	23.5
		1	14	23.5	23.5	23.5
		8	0	22.4	22.4	22.4
		8	4	22.3	22.4	22.4
		8	7	22.4	22.3	22.4
		15	0	22.4	22.4	22.4
	16QAM	1	0	21.9	22.0	21.9
		1	8	21.7	21.9	21.8
		1	14	21.7	21.8	21.9
		8	0	21.6	21.5	21.5
		8	4	21.6	21.6	21.3
		8	7	21.3	21.3	21.5
		15	0	21.4	21.4	21.3

OUTPUT POWER FOR LTE BAND 26 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				816.5	819.0 MHz	821.5 MHz
5.0	QPSK	1	0	23.7	23.6	23.8
		1	12	23.6	23.6	23.5
		1	24	23.6	23.6	23.6
		12	0	22.5	22.4	22.5
		12	7	22.5	22.5	22.5
		12	13	22.5	22.5	22.6
		25	0	22.5	22.4	22.5
	16QAM	1	0	22.1	22.2	22.3
		1	12	22.2	22.2	22.2
		1	24	23.5	23.5	23.6
		12	0	22.4	22.5	22.4
		12	7	21.5	21.5	21.4
		12	13	21.4	21.5	21.4
		25	0	21.6	21.6	21.7

OUTPUT POWER FOR LTE BAND 26 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
					819.0 MHz	
10.0	QPSK	1	0		23.8	
		1	25		23.6	
		1	49		23.5	
		25	0		22.5	
		25	12		22.4	
		25	25		22.4	
		50	0		22.5	
	16QAM	1	0		22.6	
		1	25		22.3	
		1	49		22.2	
		25	0		21.5	
		25	12		21.5	
		25	25		21.4	
		50	0		21.5	

OUTPUT POWER FOR LTE BAND 26 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
					821.5MHz	
15.0	QPSK	1	0		23.6	
		1	25		23.4	
		1	49		23.5	
		25	0		22.5	
		25	12		22.4	
		25	25		22.4	
		50	0		22.4	
	16QAM	1	0		22.4	
		1	25		22.4	
		1	49		22.2	
		25	0		22.5	
		25	12		21.5	
		25	25		21.4	
		50	0		21.4	

7.1.7. LTE BAND 26 (FCC PART 22)

Test Engineer ID:	40882	Test Date:	2020-12-09
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 26 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	23.7	23.7	23.8
		1	3	23.8	23.7	23.3
		1	5	23.8	23.8	23.8
		3	0	23.7	23.7	23.7
		3	1	23.8	23.7	23.8
		3	3	23.8	23.8	23.8
		6	0	22.5	22.6	22.6
	16QAM	1	0	22.5	22.5	22.7
		1	3	22.7	22.6	22.5
		1	5	22.5	22.5	22.5
		3	0	22.7	22.5	22.5
		3	1	22.8	22.8	22.8
		3	3	22.7	22.8	22.7
		6	0	21.5	21.6	21.6

OUTPUT POWER FOR LTE BAND 26 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				825.5 MHz	836.5 MHz	847.5 MHz
3.0	QPSK	1	0	23.9	23.8	23.9
		1	8	23.8	23.8	23.9
		1	14	23.9	23.9	23.7
		8	0	22.7	22.6	22.6
		8	4	22.7	22.6	22.6
		8	7	22.7	22.6	22.7
		15	0	22.6	22.5	22.7
	16QAM	1	0	22.4	22.4	22.3
		1	8	22.2	22.3	22.4
		1	14	22.3	22.2	22.2
		8	0	21.6	21.7	21.7
		8	4	21.7	21.7	21.7
		8	7	21.9	21.7	21.7
		15	0	21.7	21.7	21.7

OUTPUT POWER FOR LTE BAND 26 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				826.5	836.5	846.5 MHz
5.0	QPSK	1	0	24.0	24.0	24.0
		1	12	23.9	23.9	23.9
		1	24	23.9	24.0	23.9
		12	0	22.7	22.7	22.7
		12	7	22.7	22.6	22.6
		12	13	22.7	22.6	22.7
		25	0	22.6	22.6	22.6
	16QAM	1	0	22.5	22.5	22.5
		1	12	22.5	22.4	22.5
		1	24	22.4	22.5	22.5
		12	0	21.7	21.8	21.8
		12	7	21.7	21.7	21.7
		12	13	21.7	21.7	21.7
		25	0	21.7	21.7	21.8

OUTPUT POWER FOR LTE BAND 26 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				829.0 MHz	836.5 MHz	844 MHz
10.0	QPSK	1	0	23.8	23.7	23.7
		1	25	23.7	23.8	23.8
		1	49	23.8	23.8	23.7
		25	0	22.6	22.7	22.6
		25	12	22.7	22.6	22.6
		25	25	22.6	22.6	22.5
		50	0	22.6	22.6	22.7
	16QAM	1	0	22.1	22.3	22.3
		1	25	22.3	22.4	22.4
		1	49	22.3	22.3	22.4
		25	0	21.7	21.6	21.8
		25	12	21.6	21.6	21.7
		25	25	21.7	21.7	21.6
		50	0	21.7	21.7	21.7

OUTPUT POWER FOR LTE BAND 26 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				831.5 MHz	836.5 MHz	841.5 MHz
15.0	QPSK	1	0	23.8	23.8	23.8
		1	37	23.8	23.8	23.7
		1	74	23.7	23.7	23.7
		36	0	22.7	22.7	22.7
		36	20	22.7	22.7	22.6
		36	39	22.7	22.7	22.7
		75	0	22.6	22.7	22.6
	16QAM	1	0	22.5	22.4	22.4
		1	37	22.5	22.4	22.4
		1	74	22.4	22.5	22.5
		36	0	21.6	21.7	21.7
		36	20	21.6	21.7	21.7
		36	39	21.7	21.7	21.8
		75	0	21.7	21.8	21.6

7.1.8. LTE BAND 41 FCC

Test Engineer ID:	52300	Test Date:	2020-10-27
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 41 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power				
				Conducted Average (dBm)				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
5.0	QPSK	1	0	22.0	22.3	22.3	22.4	22.4
		1	12	22.0	22.3	22.3	22.3	22.4
		1	24	22.0	22.3	22.3	22.3	22.4
		12	0	21.3	21.6	21.6	21.6	21.6
		12	7	21.3	21.6	21.6	21.6	21.6
		12	13	21.3	21.6	21.6	21.6	21.6
		25	0	21.3	21.6	21.6	21.7	21.6
	16QAM	1	0	20.8	21.6	21.5	21.5	21.7
		1	12	20.8	21.6	21.5	21.5	21.7
		1	24	20.8	21.6	21.5	21.5	21.7
		12	0	20.2	20.5	20.6	20.5	20.5
		12	7	20.2	20.5	20.6	20.5	20.5
		12	13	20.3	20.5	20.6	20.5	20.5
		25	0	20.3	20.6	20.6	20.7	20.6

OUTPUT POWER FOR LTE BAND 41 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power				
				Conducted Average (dBm)				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
10.0	QPSK	1	0	22.2	22.3	22.3	22.4	22.4
		1	25	22.2	22.3	22.2	22.3	22.4
		1	49	22.2	22.3	22.2	22.3	22.4
		25	0	21.6	21.6	21.6	21.6	21.6
		25	12	21.5	21.6	21.6	21.6	21.6
		25	25	21.5	21.6	21.6	21.6	21.6
		50	0	21.5	21.6	21.6	21.6	21.6
	16QAM	1	0	21.7	21.5	21.4	21.9	21.6
		1	25	21.6	21.5	21.4	21.8	21.6
		1	49	21.6	21.5	21.4	21.8	21.6
		25	0	20.6	20.5	20.5	20.7	20.6
		25	12	20.6	20.6	20.5	20.6	20.6
		25	25	20.6	20.5	20.5	20.6	20.6
		50	0	20.5	20.6	20.5	20.6	20.6

OUTPUT POWER FOR LTE BAND 41 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power				
				Conducted Average (dBm)				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
15.0	QPSK	1	0	22.3	22.3	22.3	22.4	22.3
		1	37	22.3	22.3	22.2	22.3	22.3
		1	74	22.3	22.3	22.2	22.3	22.4
		36	0	21.7	21.6	21.6	21.6	21.7
		36	20	21.7	21.6	21.6	21.6	21.7
		36	39	21.6	21.6	21.6	21.6	21.7
		75	0	21.7	21.6	21.6	21.6	21.7
	16QAM	1	0	21.5	21.2	21.3	21.6	21.3
		1	37	21.5	21.3	21.8	21.7	21.4
		1	74	21.4	21.6	21.7	21.7	21.3
		36	0	20.7	20.6	20.6	20.7	20.7
		36	20	20.6	20.6	20.5	20.6	20.7
		36	39	20.7	20.5	20.5	20.6	20.6
		75	0	20.7	20.5	20.6	20.6	20.6

OUTPUT POWER FOR LTE BAND 41 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power				
				Conducted Average (dBm)				
				2506 MHz	2549.5 MHz	2593 MHz	2636.5 MHz	2680 MHz
20.0	QPSK	1	0	22.2	22.1	22.1	22.1	22.1
		1	49	22.1	22.0	22.1	22.1	22.1
		1	99	22.1	22.0	22.0	22.0	22.0
		50	0	21.2	21.1	21.1	21.2	21.2
		50	24	21.1	21.1	21.1	21.2	21.2
		50	50	21.1	21.1	21.1	21.2	21.1
		100	0	21.1	21.1	21.1	21.2	21.1
	16QAM	1	0	21.0	20.8	21.5	20.9	21.3
		1	49	20.9	20.8	21.4	20.8	21.2
		1	99	20.9	20.7	21.3	20.8	21.2
		50	0	20.3	20.2	20.3	20.3	20.2
		50	24	20.3	20.2	20.2	20.2	20.2
		50	50	20.3	20.2	20.2	20.2	20.2
		100	0	20.2	20.2	20.2	20.3	20.2

7.1.9. LTE BAND 66

Test Engineer ID:	52300	Test Date:	2020-12-03
-------------------	-------	------------	------------

OUTPUT POWER FOR LTE BAND 66 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1710.7 MHz	1745.0 MHz	1779.3 MHz
1.4	QPSK	1	0	23.2	22.8	23.1
		1	3	23.3	22.8	23.1
		1	5	23.3	22.8	23.1
		3	0	23.1	22.7	22.9
		3	1	23.1	22.8	22.9
		3	3	23.1	22.8	22.9
		6	0	22.1	21.8	21.9
	16QAM	1	0	22.0	21.7	22.0
		1	3	21.9	21.8	22.0
		1	5	22.1	21.8	21.9
		3	0	22.1	21.7	21.9
		3	1	22.1	21.8	21.9
		3	3	22.1	21.8	21.9
		6	0	21.1	20.7	21.0

OUTPUT POWER FOR LTE BAND 66 (3.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1711.5 MHz	1745.0 MHz	1778.5 MHz
3.0	QPSK	1	0	23.1	22.7	23.0
		1	8	23.1	22.7	23.0
		1	14	23.1	22.7	22.9
		8	0	22.0	21.7	21.9
		8	4	22.0	21.7	21.9
		8	7	22.0	21.7	21.9
		15	0	22.1	21.8	21.9
	16QAM	1	0	21.8	21.7	21.9
		1	8	21.9	21.6	21.7
		1	14	21.7	21.7	21.9
		8	0	21.0	20.8	21.0
		8	4	21.0	20.8	21.0
		8	7	21.0	20.8	21.0
		15	0	21.1	20.7	20.9

OUTPUT POWER FOR LTE BAND 66 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1712.5 MHz	1745.0 MHz	1777.5 MHz
5.0	QPSK	1	0	23.1	22.8	22.9
		1	12	23.1	22.8	22.9
		1	24	23.1	22.8	22.9
		12	0	22.1	21.8	21.9
		12	7	22.0	21.8	21.9
		12	13	22.0	21.8	21.9
		25	0	22.0	21.8	21.9
	16QAM	1	0	22.0	21.9	21.9
		1	12	22.0	21.9	21.9
		1	24	22.0	21.9	21.9
		12	0	21.0	20.9	20.9
		12	7	21.0	20.9	20.8
		12	13	21.0	20.9	20.9
		25	0	21.1	20.8	20.9

OUTPUT POWER FOR LTE BAND 66 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1715.0 MHz	1745.0 MHz	1775.0 MHz
10.0	QPSK	1	0	23.1	22.7	22.9
		1	25	23.1	22.7	22.9
		1	49	23.1	22.7	22.9
		25	0	22.0	21.8	21.9
		25	12	22.0	21.8	21.9
		25	25	22.0	21.7	21.9
		50	0	22.0	21.8	21.9
	16QAM	1	0	22.0	21.7	21.7
		1	25	22.0	21.7	21.7
		1	49	22.0	21.6	21.7
		25	0	21.1	20.8	20.9
		25	12	21.1	20.8	20.9
		25	25	21.1	20.7	20.9
		50	0	21.0	20.8	20.9

OUTPUT POWER FOR LTE BAND 66 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1717.5 MHz	1745.0 MHz	1772.5 MHz
15.0	QPSK	1	0	23.1	22.9	23.0
		1	37	23.1	22.8	22.9
		1	74	23.0	22.8	22.9
		36	0	22.1	21.8	21.9
		36	20	22.1	21.8	21.9
		36	39	22.0	21.8	21.9
		75	0	22.0	21.8	21.9
	16QAM	1	0	22.1	21.6	22.0
		1	37	22.0	21.6	21.9
		1	74	22.0	21.5	21.9
		36	0	21.0	20.8	20.9
		36	20	21.0	20.8	20.9
		36	39	21.0	20.8	20.9
		75	0	21.0	20.8	20.8

OUTPUT POWER FOR LTE BAND 66 (20.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Power		
				Conducted Average (dBm)		
				1720.0 MHz	1745.0 MHz	1770.0 MHz
20.0	QPSK	1	0	23.2	22.8	22.8
		1	49	23.2	22.7	22.8
		1	99	23.1	22.7	22.7
		50	0	22.1	21.8	21.8
		50	24	22.1	21.8	21.7
		50	50	22.1	21.7	21.7
		100	0	22.1	21.7	21.7
	16QAM	1	0	22.1	21.9	22.0
		1	49	22.0	21.8	21.9
		1	99	21.9	21.7	21.8
		50	0	21.1	20.8	20.7
		50	24	21.1	20.7	20.7
		50	50	21.1	20.7	20.7
		100	0	21.1	20.8	20.8

8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only.

TEST PROCEDURE

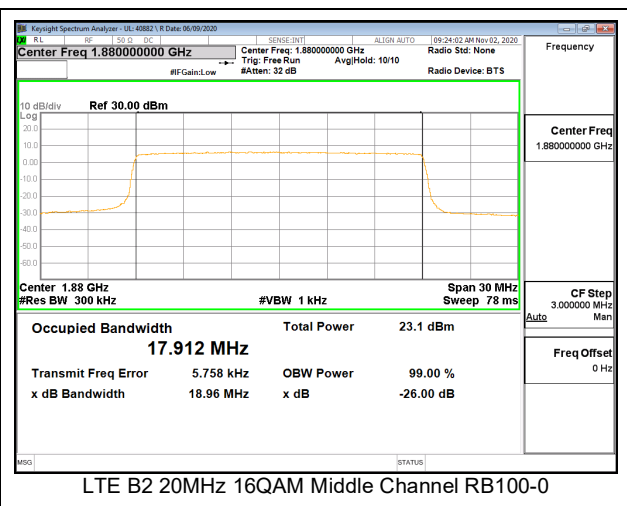
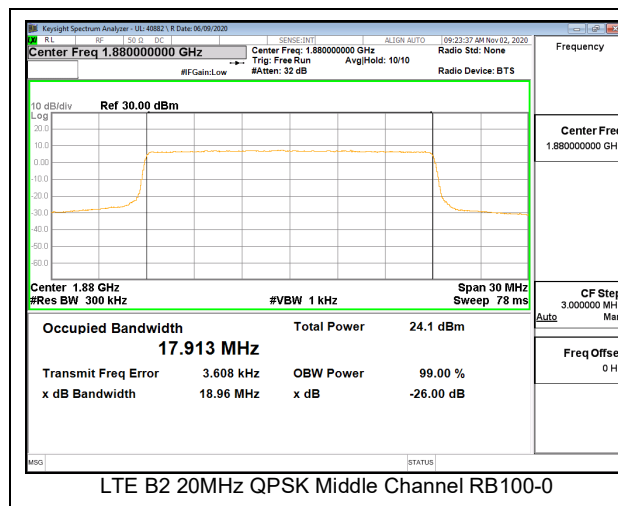
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the middle channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

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 (QPSK/16QAM modes and highest bandwidth) are reported only.

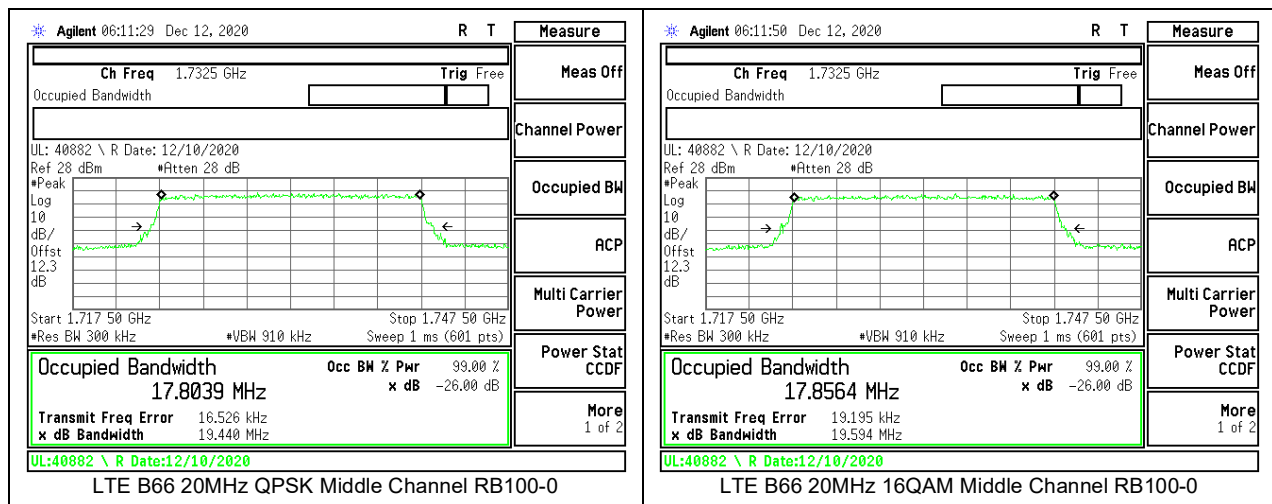
8.1.1. LTE BAND 2

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 2	1.4MHz, QPSK	6/0	1880.0	1.0848	1.278
	1.4MHz, 16QAM			1.0852	1.283
	3MHz, QPSK	15/0		2.6960	2.999
	3MHz, 16QAM			2.6970	2.988
	5MHz, QPSK	25/0		4.4907	4.958
	5MHz, 16QAM			4.4919	4.950
	10MHz, QPSK	50/0		8.9637	9.611
	10MHz, 16QAM			8.9616	9.580
	15MHz, QPSK	75/0		13.474	14.32
	15MHz, 16QAM			13.451	14.31
	20MHz, QPSK	100/0		17.913	18.96
	20MHz, 16QAM			17.912	18.96



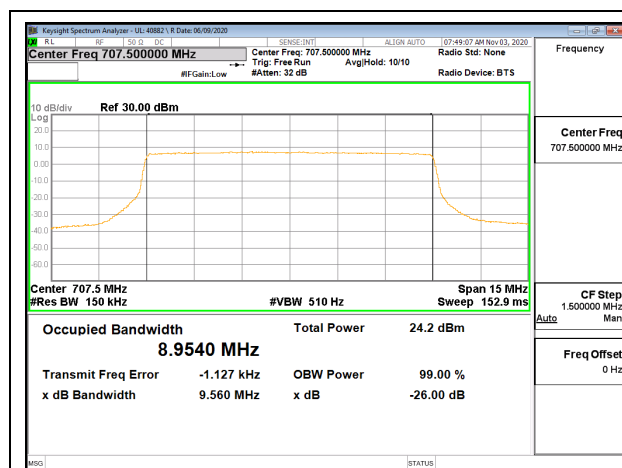
8.1.2. LTE BAND 4

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 4	1.4MHz, QPSK	6/0	1732.5	1.0902	1.293
	1.4MHz, 16QAM			1.0855	1.282
	3MHz, QPSK	15/0		2.6863	3.005
	3MHz, 16QAM			2.6970	3.084
	5MHz, QPSK	25/0		4.5137	5.291
	5MHz, 16QAM			4.5001	5.145
	10MHz, QPSK	50/0		8.9600	10.229
	10MHz, 16QAM			8.9453	9.8795
	15MHz, QPSK	75/0		13.3996	14.603
	15MHz, 16QAM			13.4368	15.063
	20MHz, QPSK	100/0		17.8039	19.440
	20MHz, 16QAM			17.8564	19.594

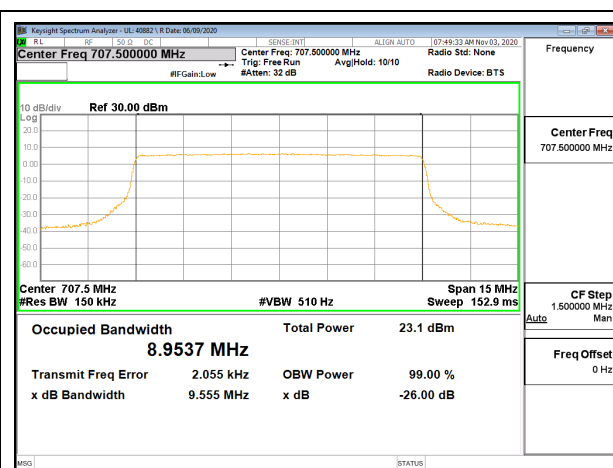


8.1.3. LTE BAND 12

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	1.0831	1.271
	1.4 MHz, 16QAM			1.0828	1.264
	3 MHz, QPSK	15/0		2.6911	2.973
	3 MHz, 16QAM			2.6970	2.977
	5 MHz, QPSK	25/0		4.4839	4.926
	5 MHz, 16QAM			4.4894	4.920
	10 MHz, QPSK	50/0		8.9540	9.560
	10 MHz, 16QAM			8.9540	9.555



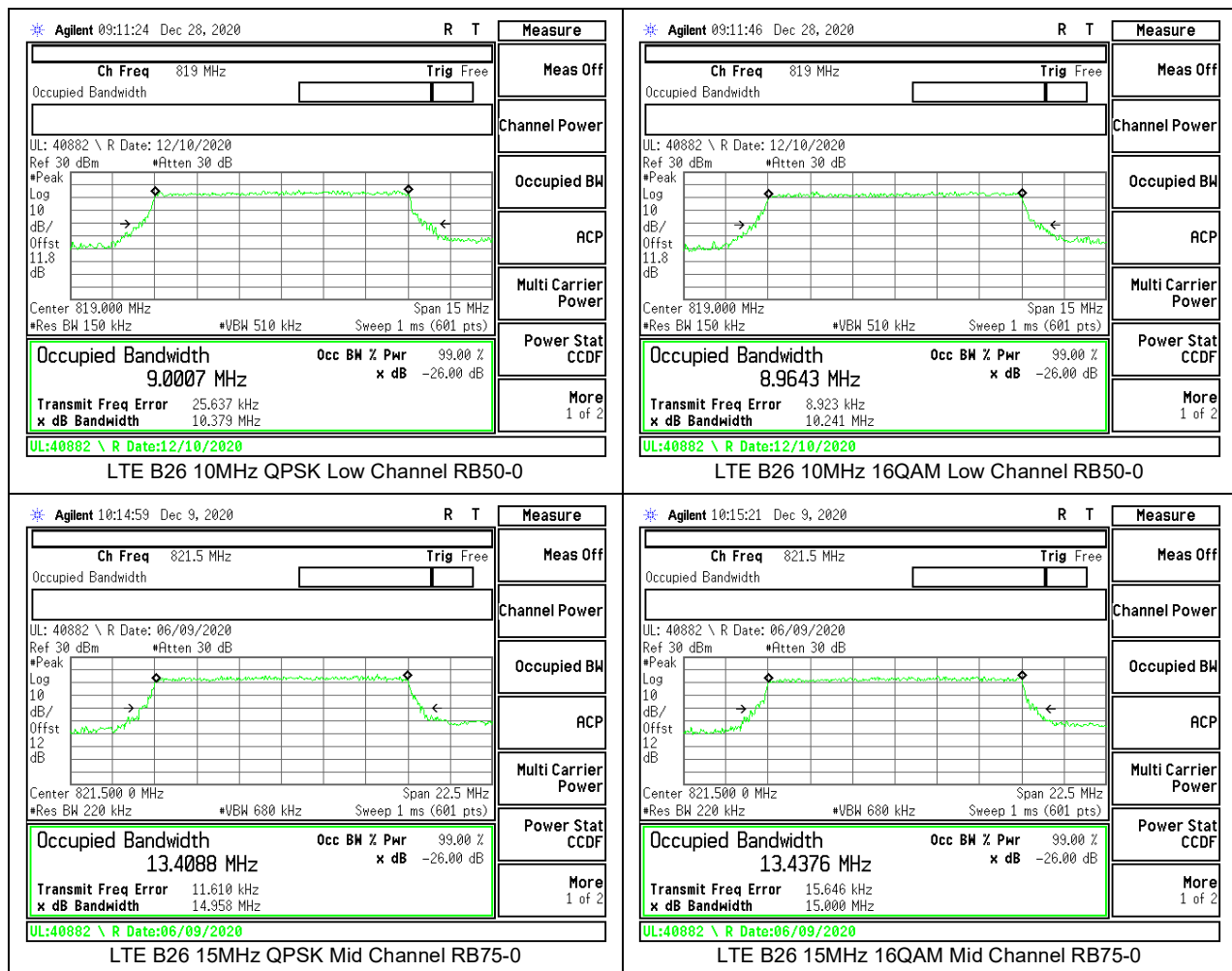
LTE B12 10MHz QPSK Middle Channel RB50-0



LTE B12 10MHz 16QAM Middle Channel RB50-0

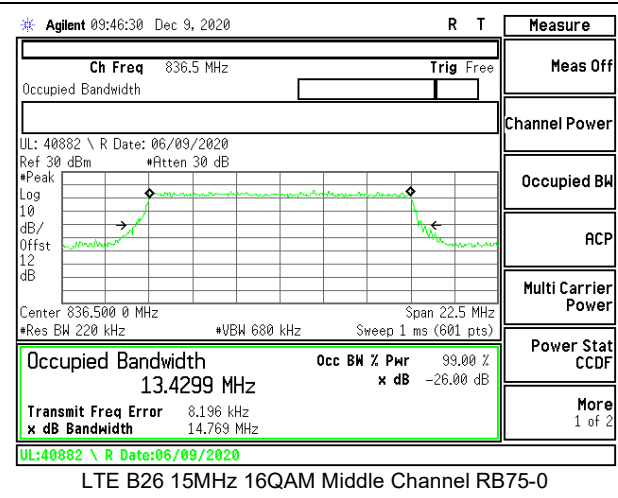
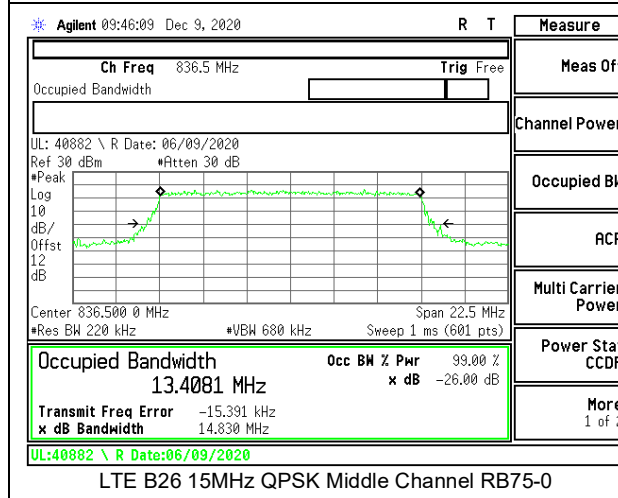
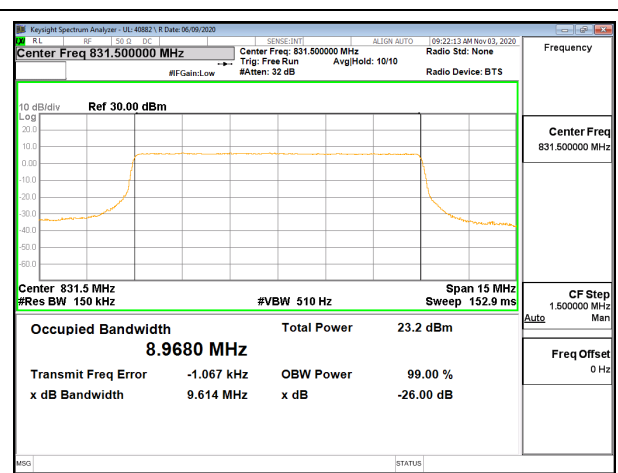
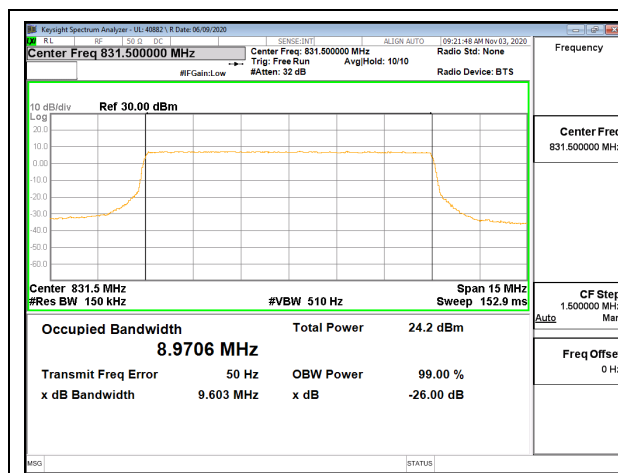
8.1.4. LTE BAND 26 (FCC PART 90S)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4 MHz, QPSK	6/0	819.0	1.0895	1.293
	1.4 MHz, 16QAM			1.0849	1.289
	3 MHz, QPSK	15/0		2.6998	3.021
	3 MHz, 16QAM			2.6894	3.035
	5 MHz, QPSK	25/0	821.5	4.5046	5.196
	5 MHz, 16QAM			4.5027	5.220
	10 MHz, QPSK	50/0		9.0007	10.379
	10 MHz, 16QAM			8.9643	10.241
	15 MHz, QPSK	75/0		13.4088	14.958
	15 MHz, 16QAM			13.4376	15.000



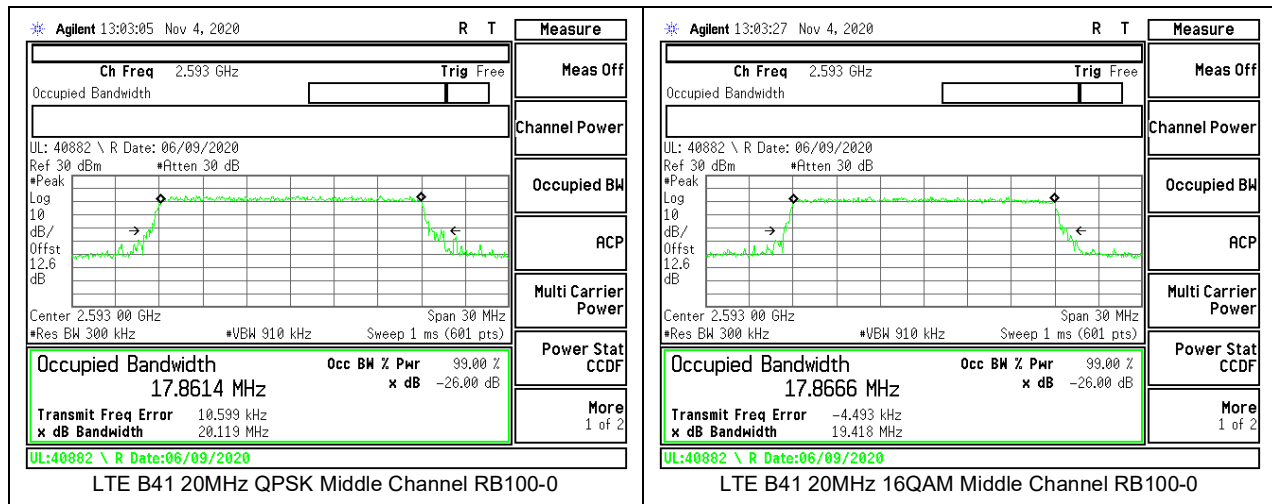
8.1.5. LTE BAND 26 (FCC PART 22)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4 MHz, QPSK	6/0	831.5 836.5 (15MHz)	1.0845	1.280
	1.4 MHz, 16QAM			1.0848	1.276
	3 MHz, QPSK	15/0		2.6947	2.961
	3 MHz, 16QAM			2.6951	2.973
	5 MHz, QPSK	25/0		4.4881	4.934
	5 MHz, 16QAM			4.4921	4.959
	10 MHz, QPSK	50/0		8.9706	9.603
	10 MHz, 16QAM			8.9680	9.614
	15 MHz, QPSK	75/0		13.4081	14.830
	15 MHz, 16QAM			13.4299	14.769



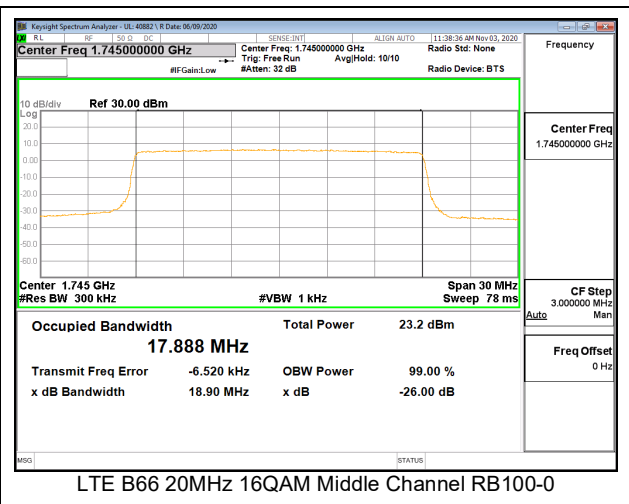
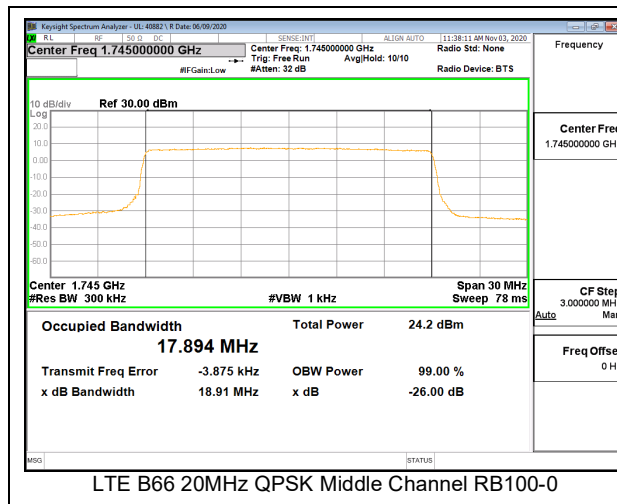
8.1.6. LTE BAND 41 (FCC)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 41	5MHz, QPSK	25/0	2593.0	4.5062	5.205
	5MHz, 16QAM			4.4981	5.162
	10MHz, QPSK	50/0		8.9581	10.088
	10MHz, 16QAM			8.9481	9.992
	15MHz, QPSK	75/0		13.3724	14.842
	15MHz, 16QAM			13.4296	14.911
	20MHz, QPSK	100/0		17.8614	20.119
	20MHz, 16QAM			17.8666	19.418



8.1.7. 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	1.0837	1.278
	1.4MHz, 16QAM			1.0850	1.283
	3MHz, QPSK	15/0		2.6944	2.978
	3MHz, 16QAM			2.6935	2.980
	5MHz, QPSK	25/0		4.4818	4.939
	5MHz, 16QAM			4.4829	4.915
	10MHz, QPSK	50/0		8.9580	9.549
	10MHz, 16QAM			8.9546	9.575
	15MHz, QPSK	75/0		13.415	14.23
	15MHz, 16QAM			13.427	14.26
	20MHz, QPSK	100/0		17.894	18.91
	20MHz, 16QAM			17.888	18.90



8.2. BAND EDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051, §22.917, §24.238, §27.53

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

§27.53 (Band 12)

(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.

§27.53 (Band 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.

§ 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 $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ 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 $43 + 10 \log_{10}(P)$ 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.

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:

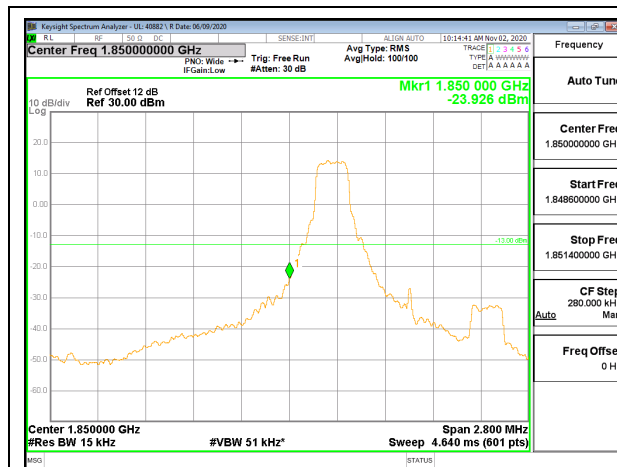
1. Set the spectrum analyzer span to include the block edge frequency.
2. Set a marker to point the corresponding band edge frequency in each test case.
3. Set display line at -13 dBm
4. Set resolution bandwidth to at least 1% of emission bandwidth.

TEST PROCEDURE (FCC LTE BAND 41)

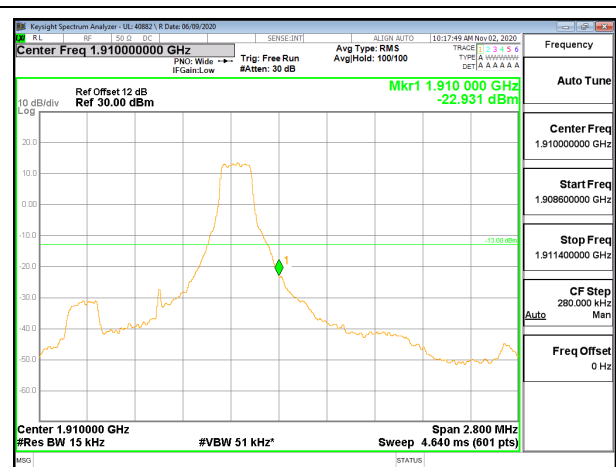
(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of 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.

RESULTS

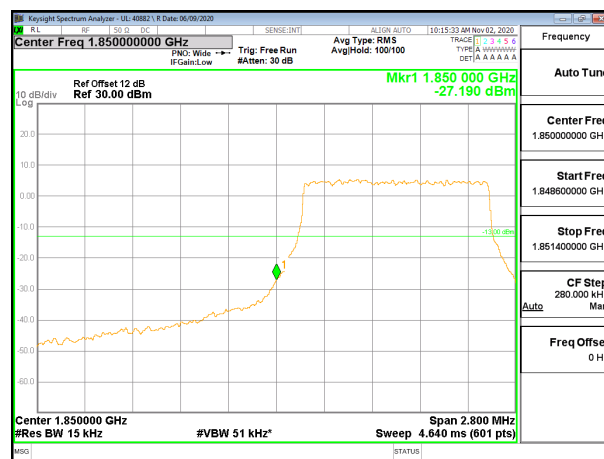
8.2.1. LTE BAND 2 BANDEDGE



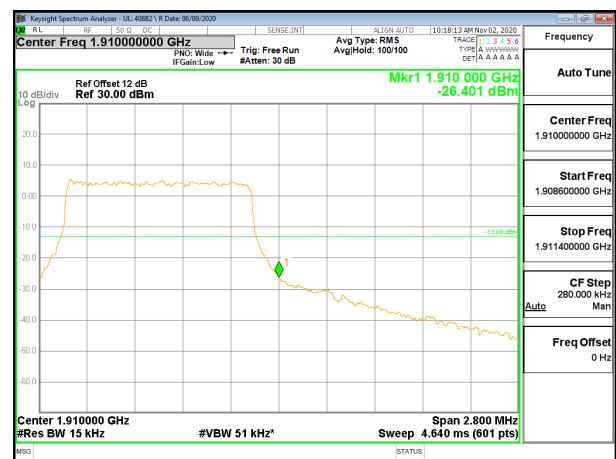
LTE B2 1.4MHz QPSK Low Channel RB1-0



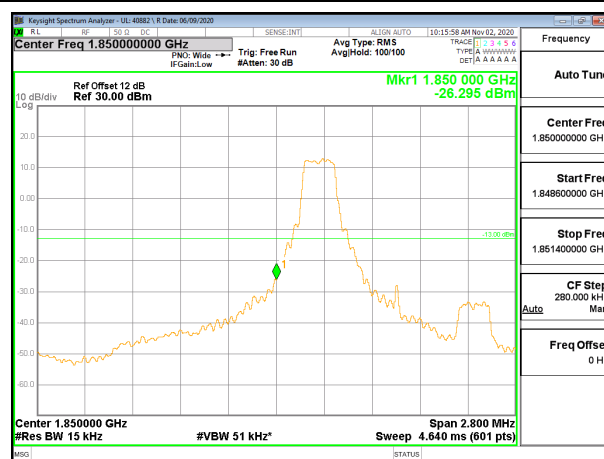
LTE B2 1.4MHz QPSK High Channel RB1-5



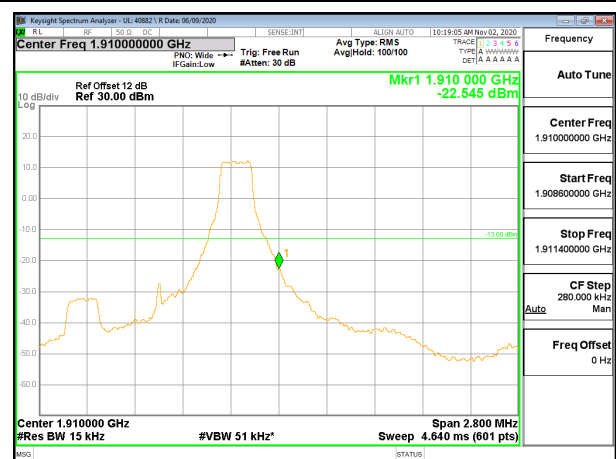
LTE B2 1.4MHz QPSK Low Channel RB6-0



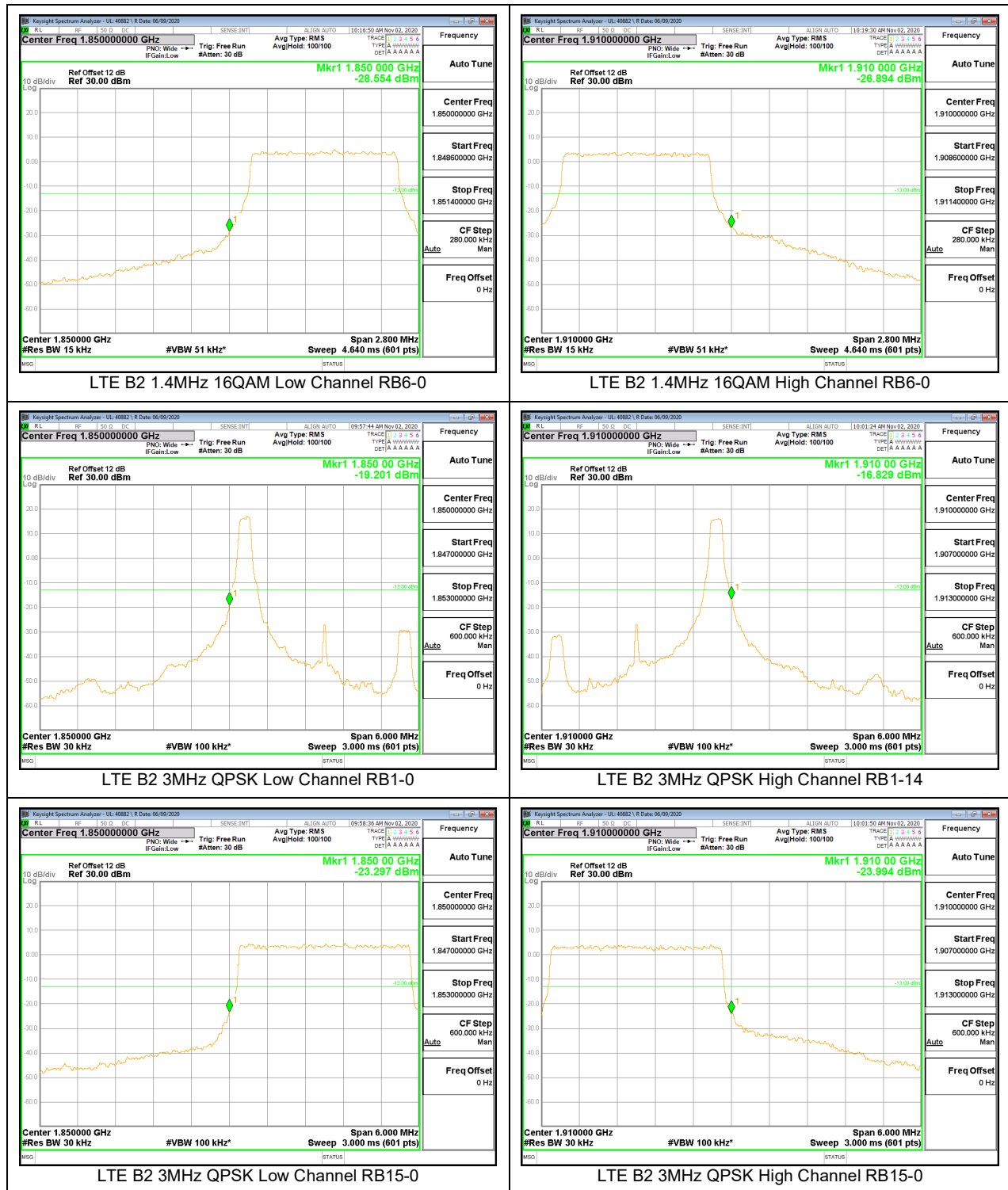
LTE B2 1.4MHz QPSK High Channel RB6-0

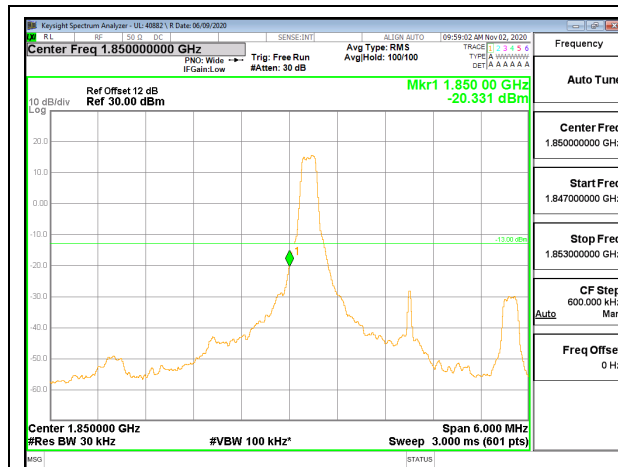


LTE B2 1.4MHz 16QAM Low Channel RB1-0

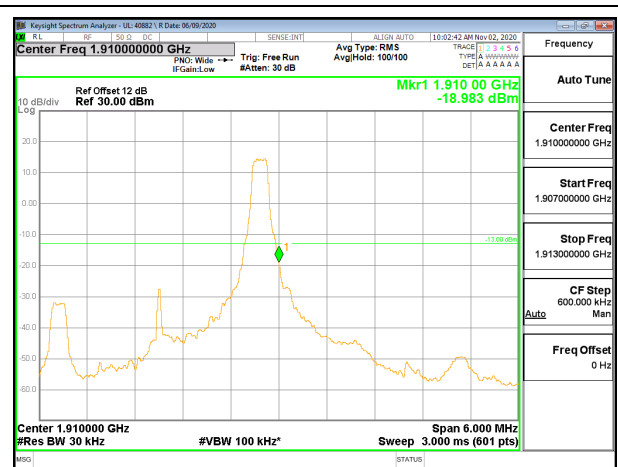


LTE B2 1.4MHz 16QAM High Channel RB1-5

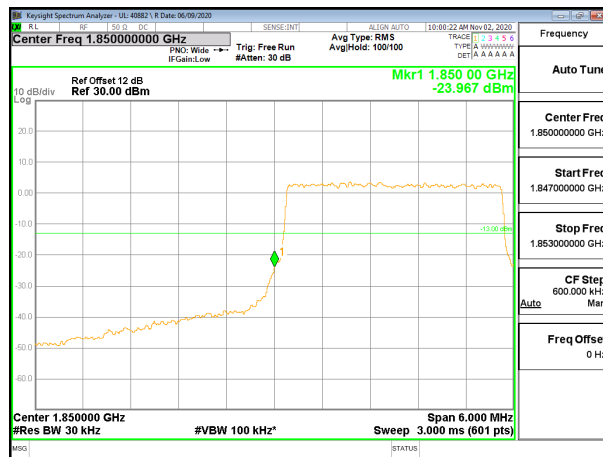




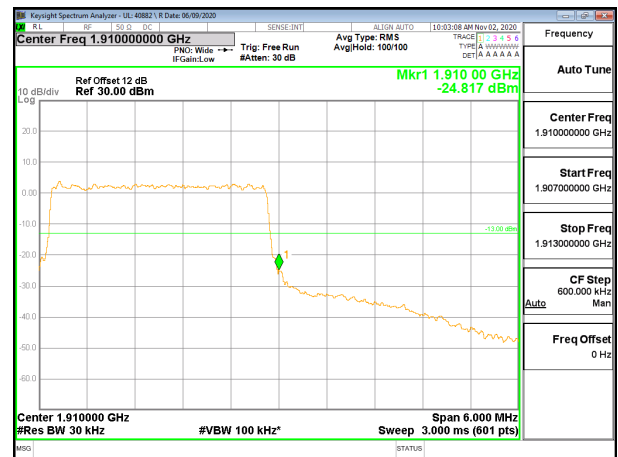
LTE B2 3MHz 16QAM Low Channel RB1-0



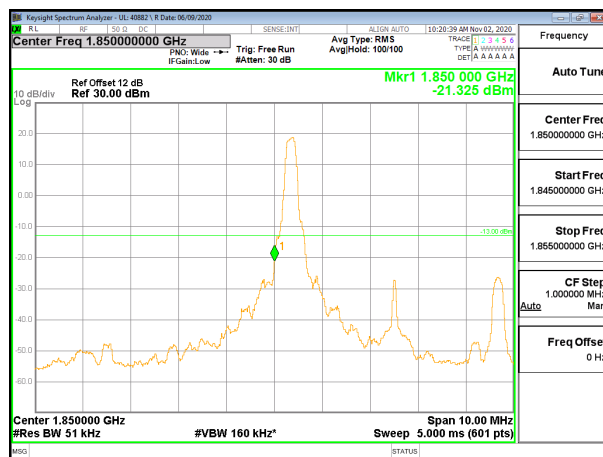
LTE B2 3MHz 16QAM High Channel RB1-14



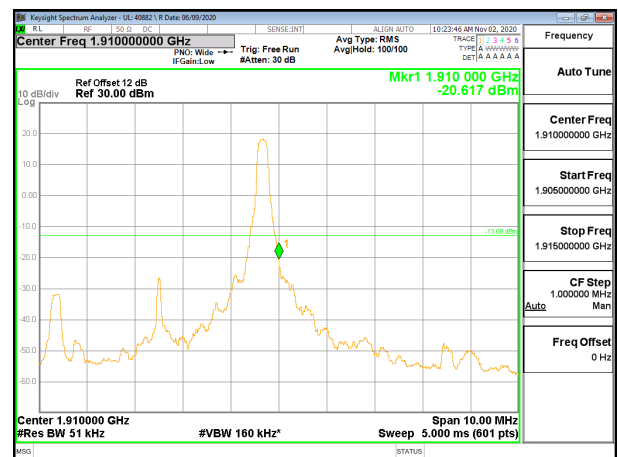
LTE B2 3MHz 16QAM Low Channel RB15-0



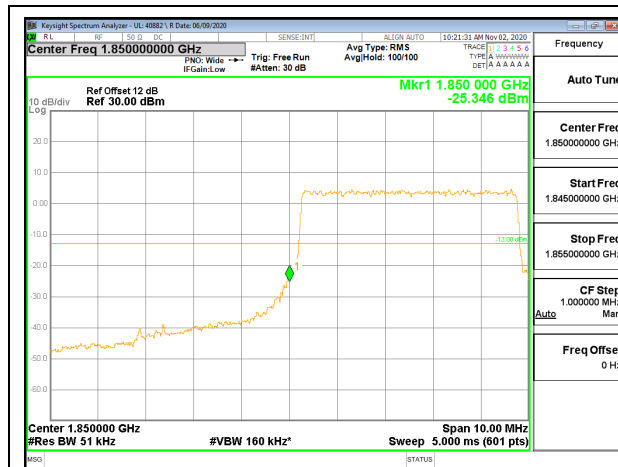
LTE B2 3MHz 16QAM High Channel RB15-0



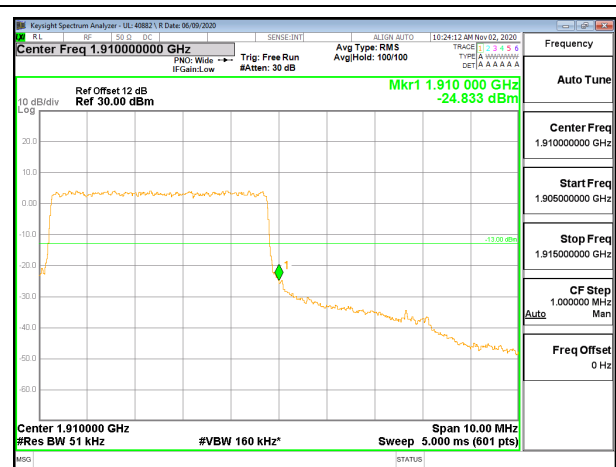
LTE B2 5MHz QPSK Low Channel RB1-0



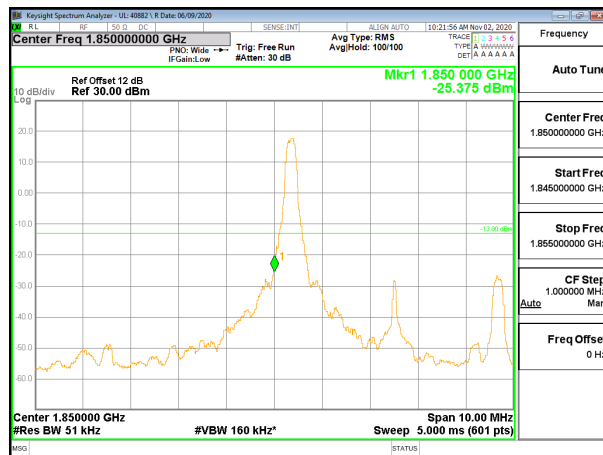
LTE B2 5MHz QPSK High Channel RB1-24



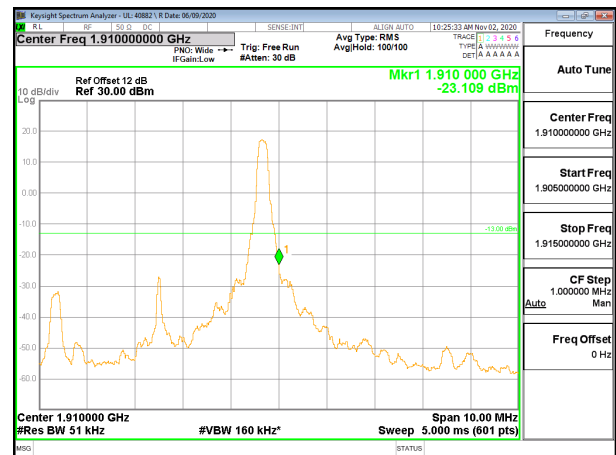
LTE B2 5MHz QPSK Low Channel RB25-0



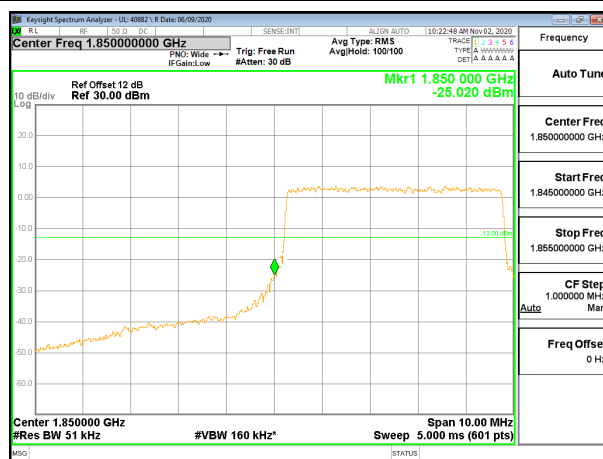
LTE B2 5MHz QPSK High Channel RB25-0



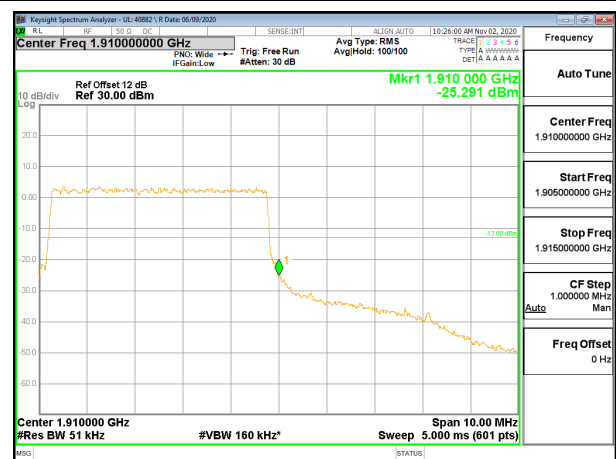
LTE B2 5MHz 16QAM Low Channel RB1-0



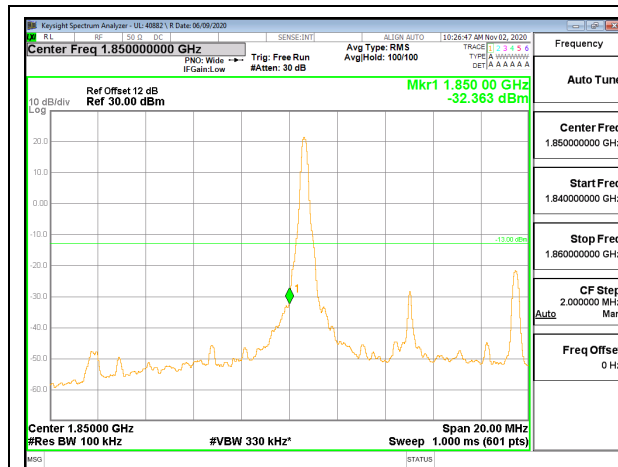
LTE B2 5MHz 16QAM High Channel RB1-24



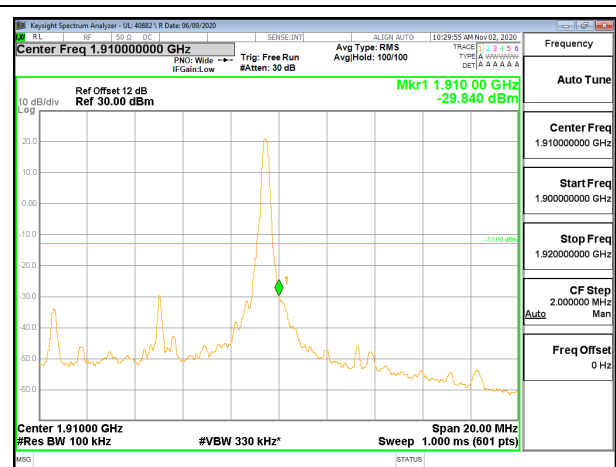
LTE B2 5MHz 16QAM Low Channel RB25-0



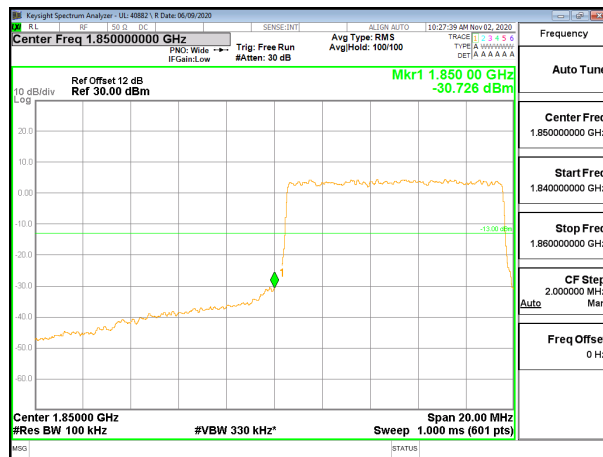
LTE B2 5MHz 16QAM High Channel RB25-0



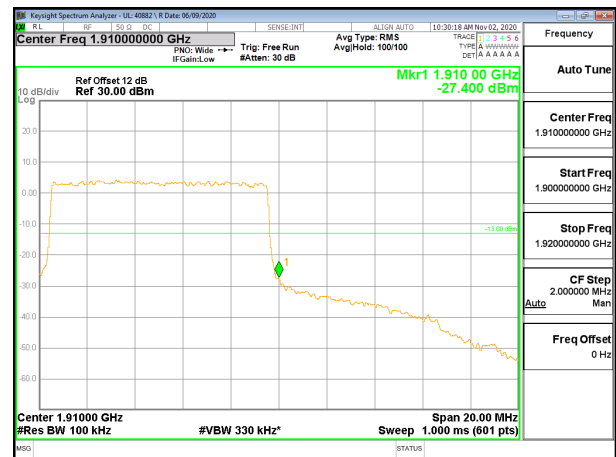
LTE B2 10MHz QPSK Low Channel RB1-0



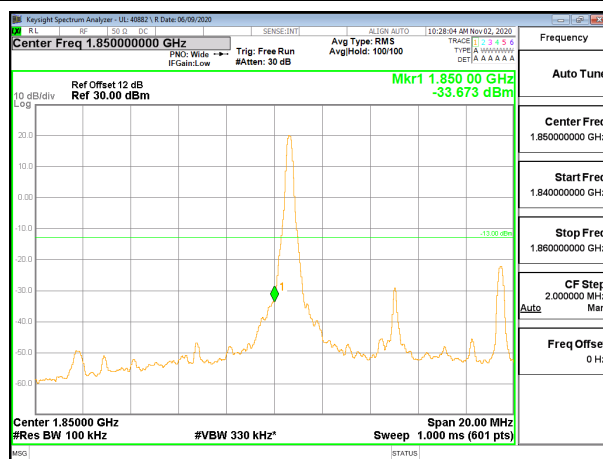
LTE B2 10MHz QPSK High Channel RB1-49



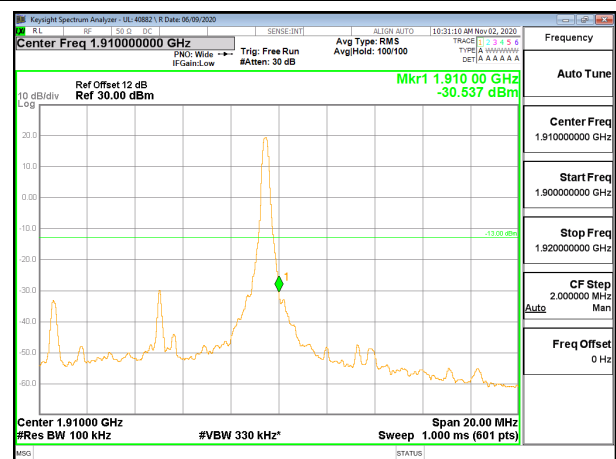
LTE B2 10MHz QPSK Low Channel RB50-0



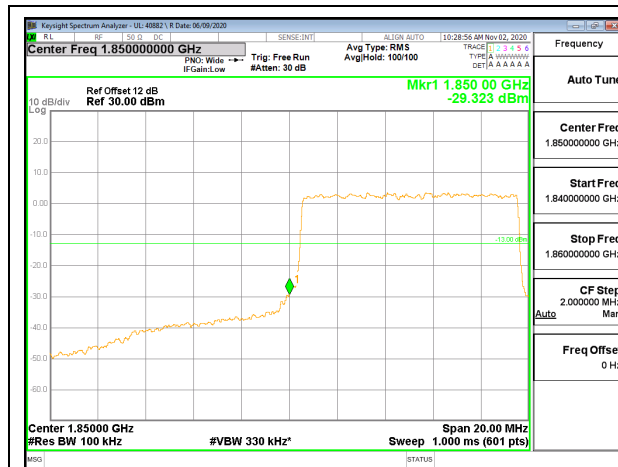
LTE B2 10MHz QPSK High Channel RB50-0



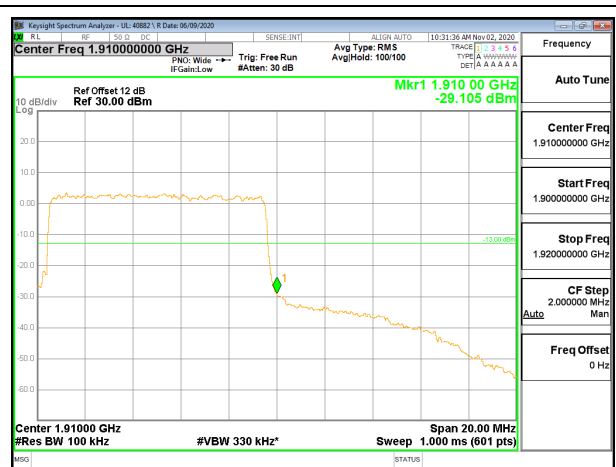
LTE B2 10MHz 16QAM Low Channel RB1-0



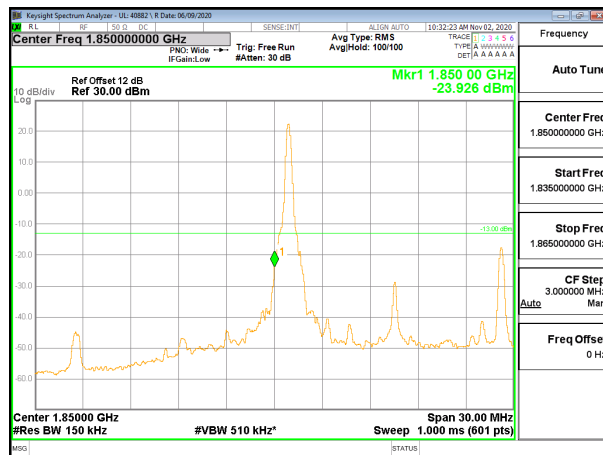
LTE B2 10MHz 16QAM High Channel RB1-49



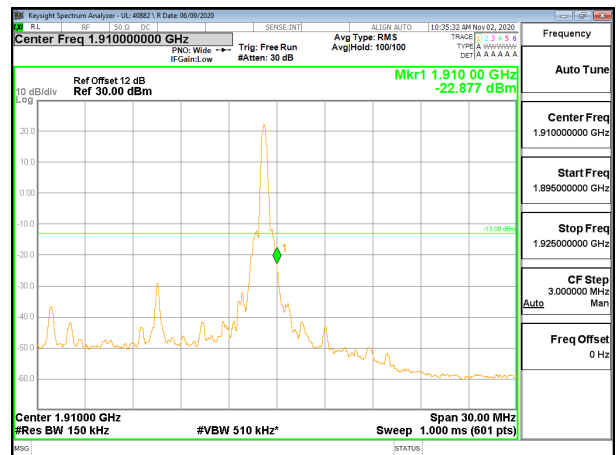
LTE B2 10MHz 16QAM Low Channel RB50-0



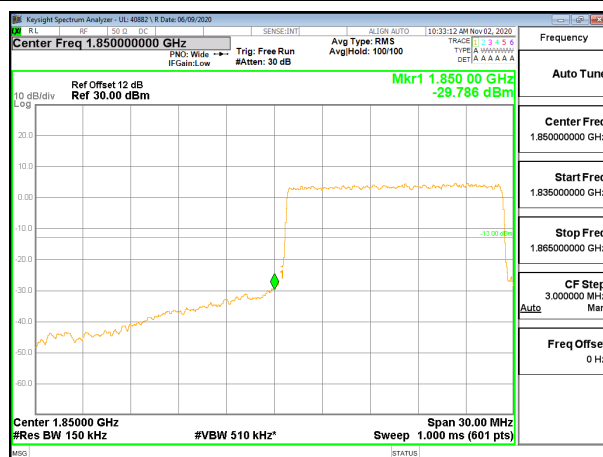
LTE B2 10MHz 16QAM High Channel RB50-0



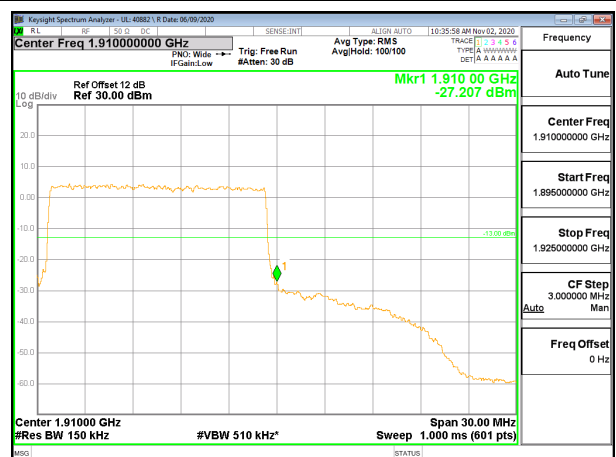
LTE B2 15MHz QPSK Low Channel RB1-0



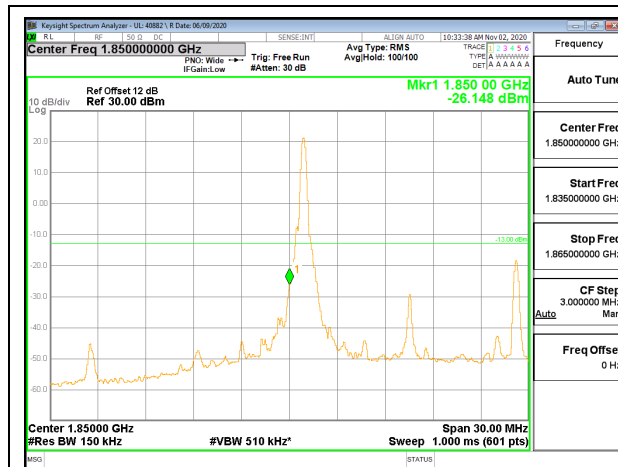
LTE B2 15MHz QPSK High Channel RB1-74



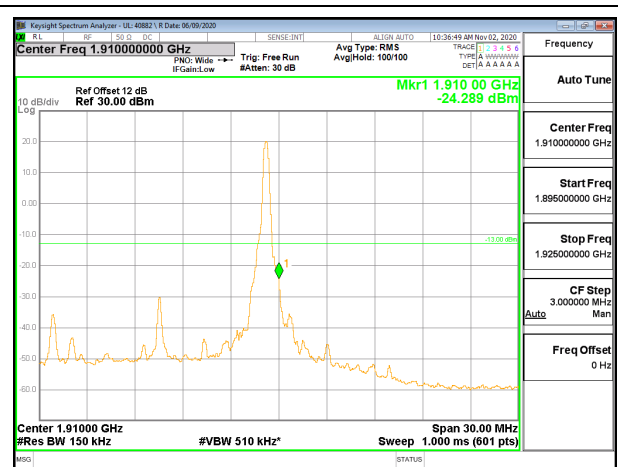
LTE B2 15MHz QPSK Low Channel RB75-0



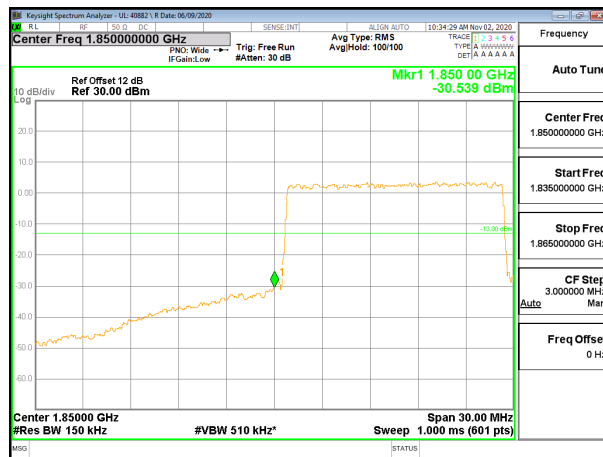
LTE B2 15MHz QPSK High Channel RB75-0



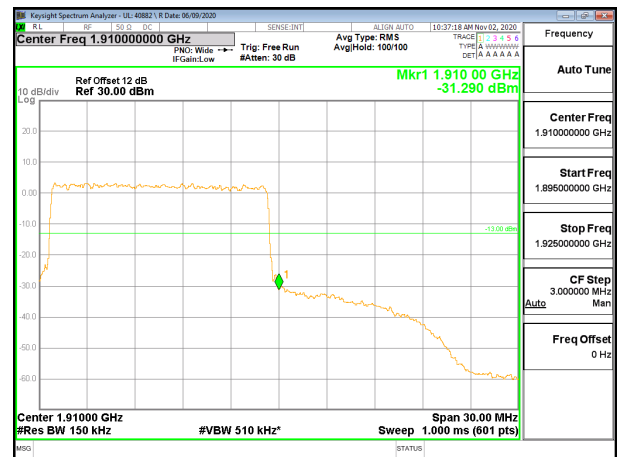
LTE B2 15MHz 16QAM Low Channel RB1-0



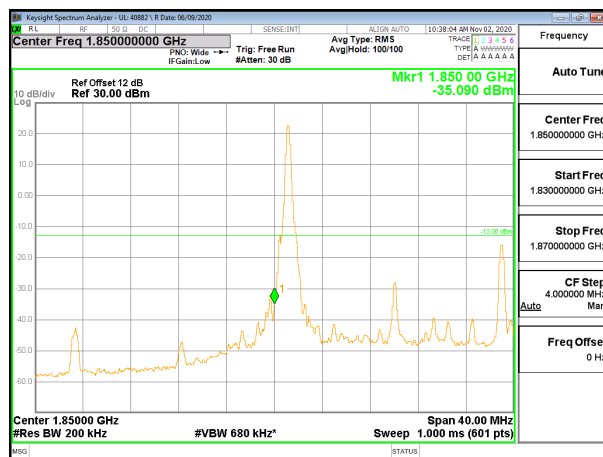
LTE B2 15MHz 16QAM High Channel RB1-74



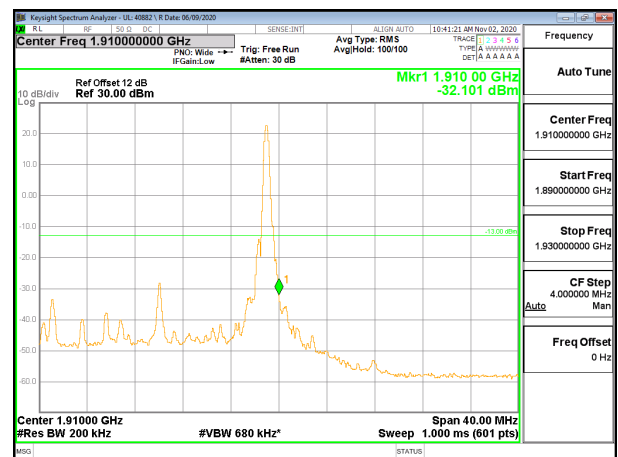
LTE B2 15MHz 16QAM Low Channel RB75-0



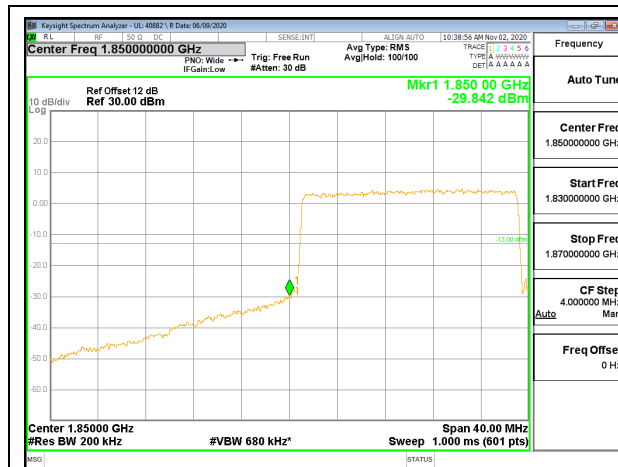
LTE B2 15MHz 16QAM High Channel RB75-0



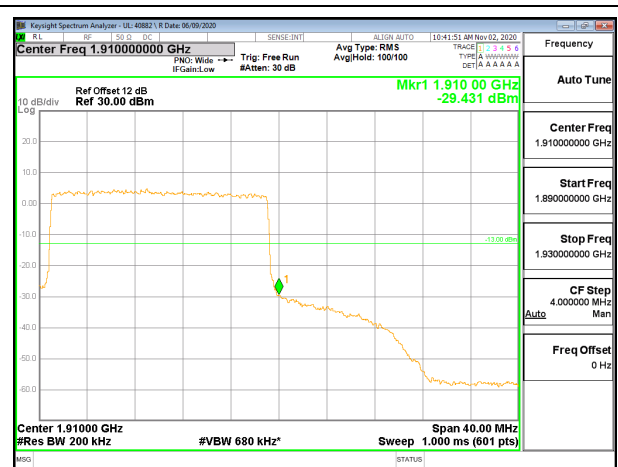
LTE B2 20MHz QPSK Low Channel RB1-0



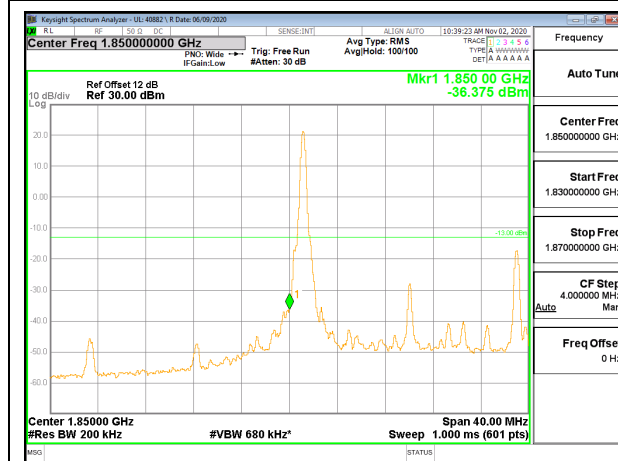
LTE B2 20MHz QPSK High Channel RB1-99



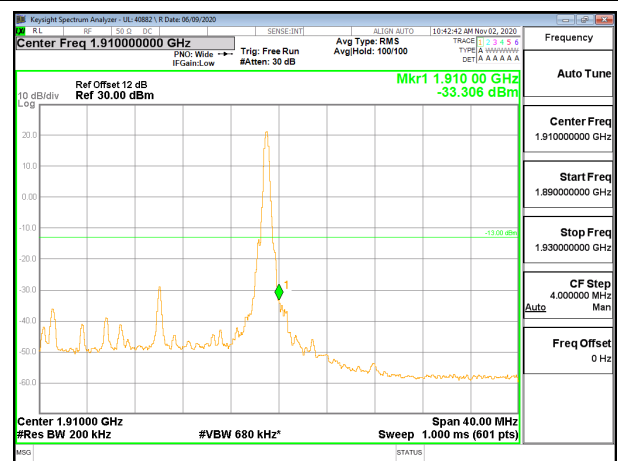
LTE B2 20MHz QPSK Low Channel RB100-0



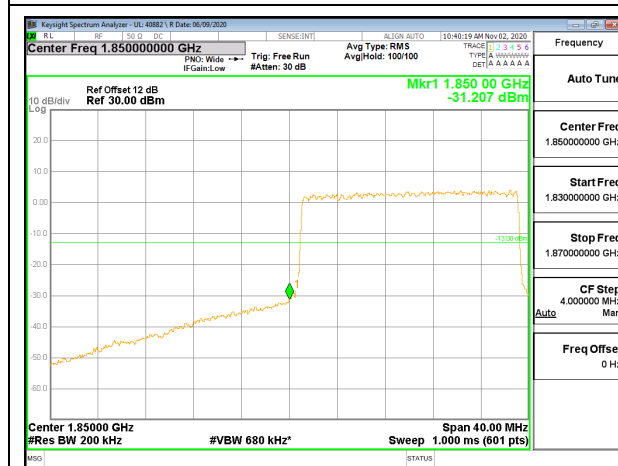
LTE B2 20MHz QPSK High Channel RB100-0



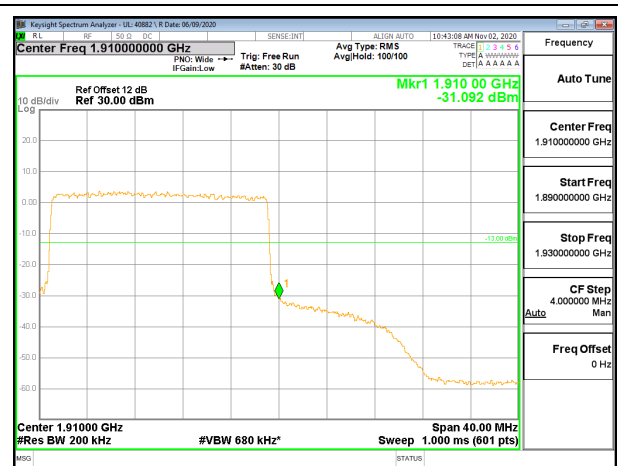
LTE B2 20MHz 16QAM Low Channel RB1-0



LTE B2 20MHz 16QAM High Channel RB1-99

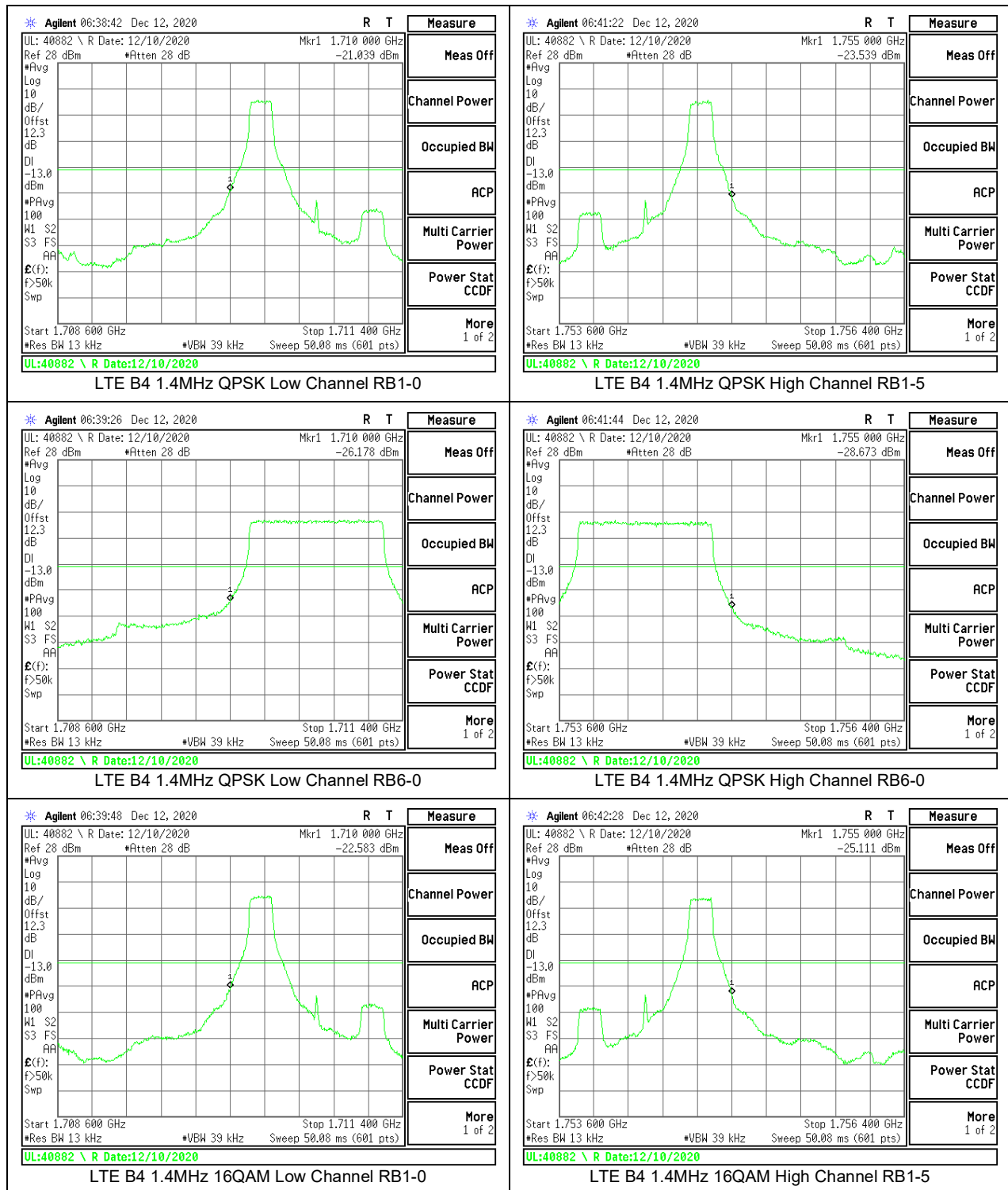


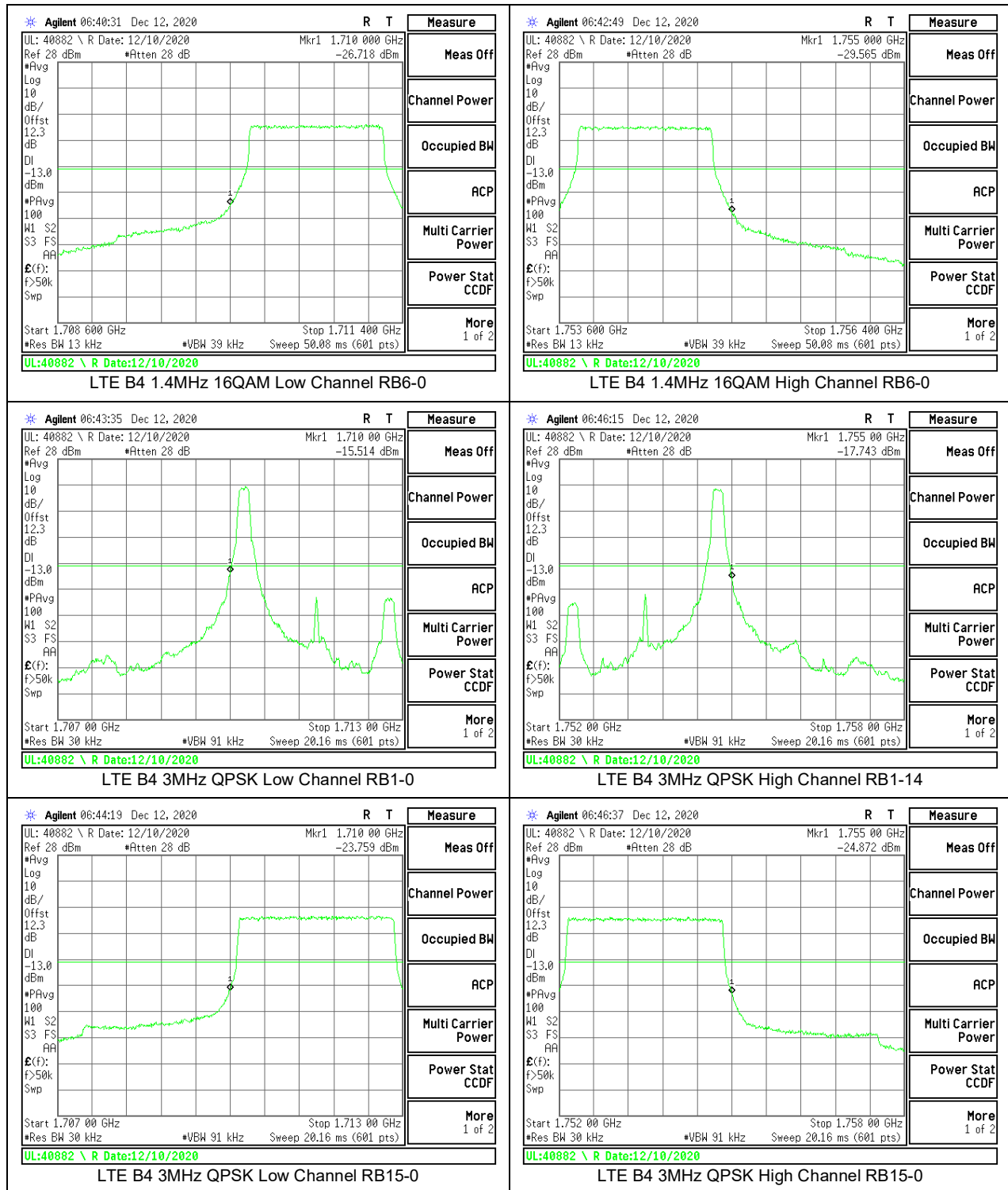
LTE B2 20MHz 16QAM Low Channel RB100-0

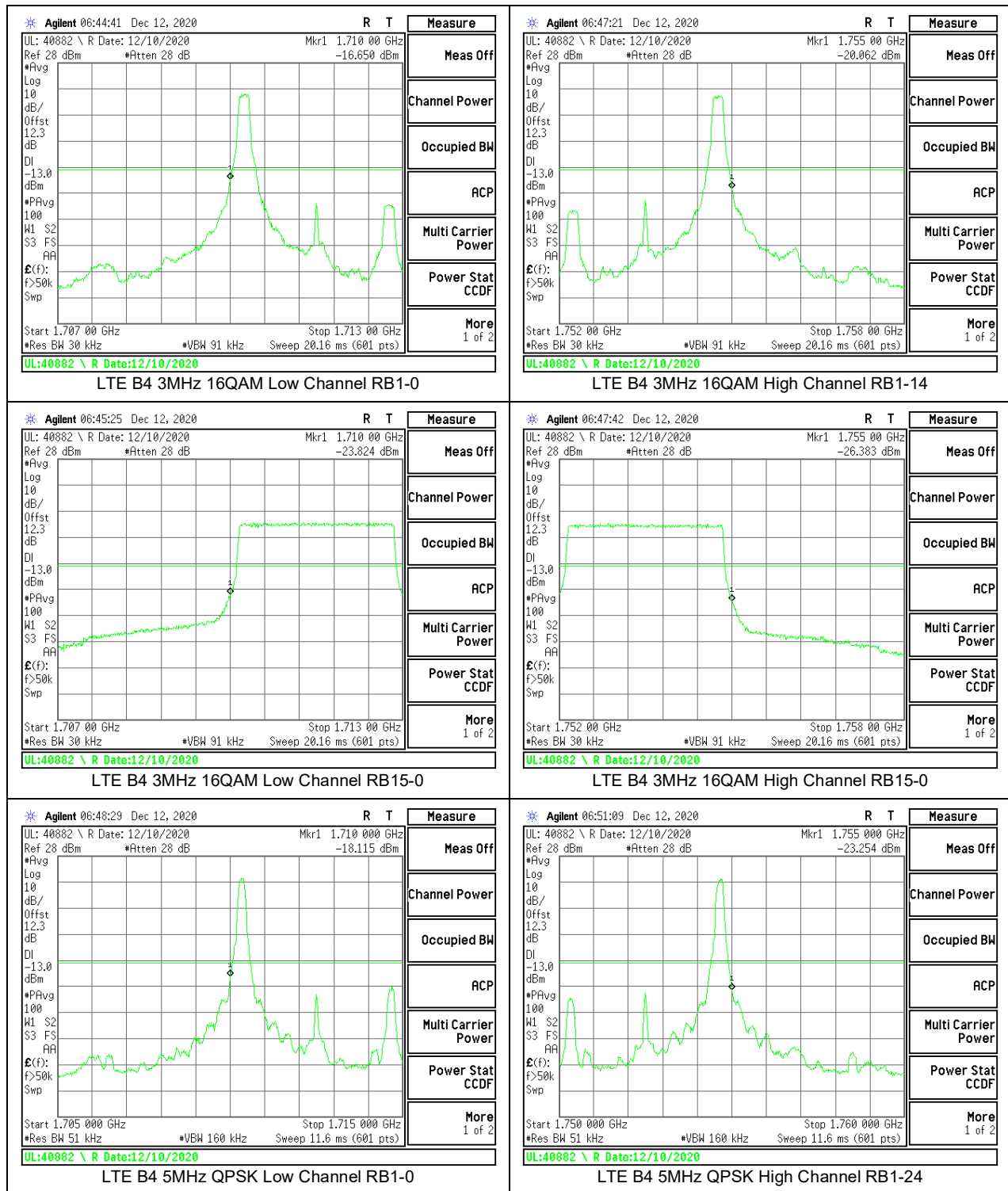


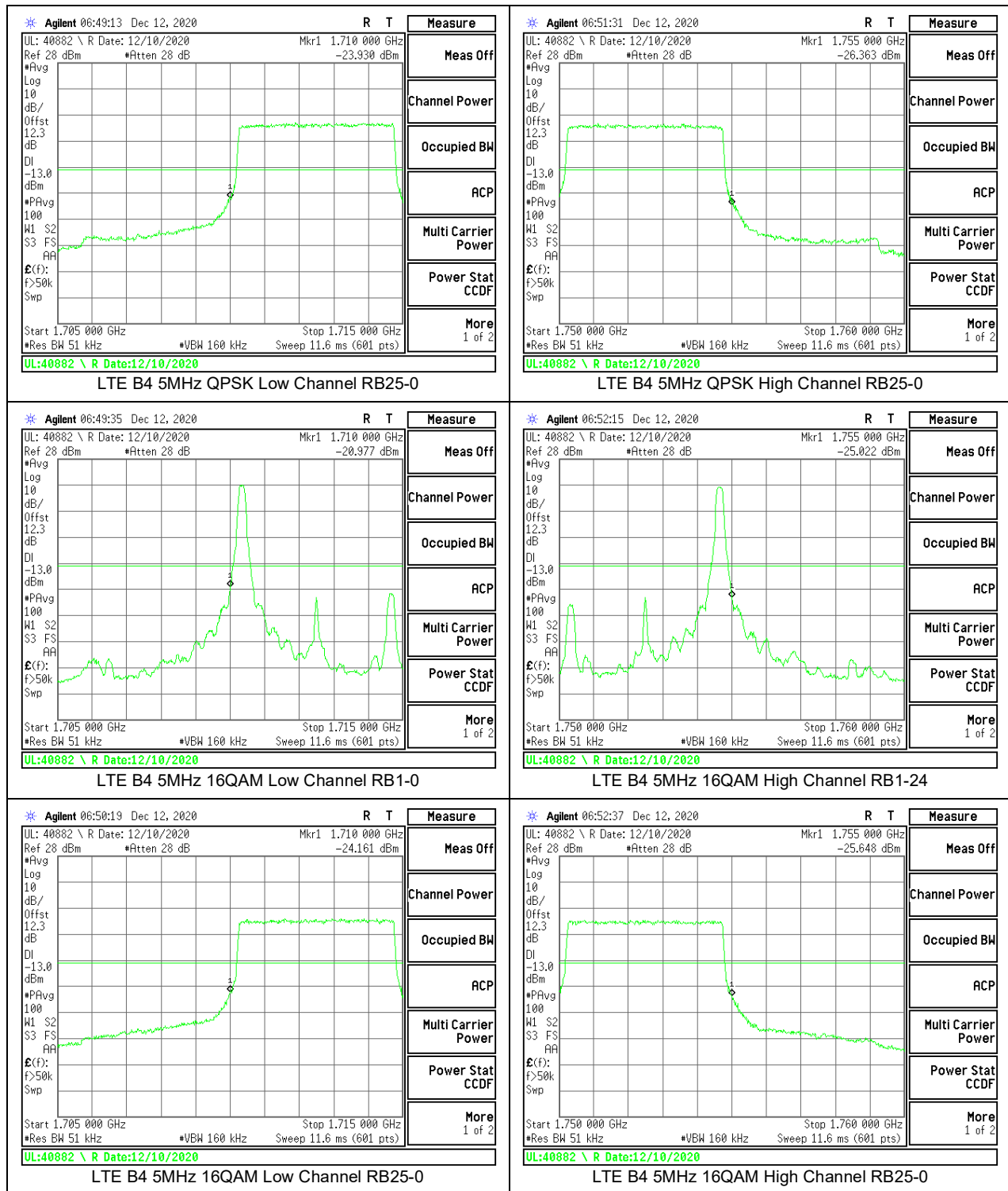
LTE B2 20MHz 16QAM High Channel RB100-0

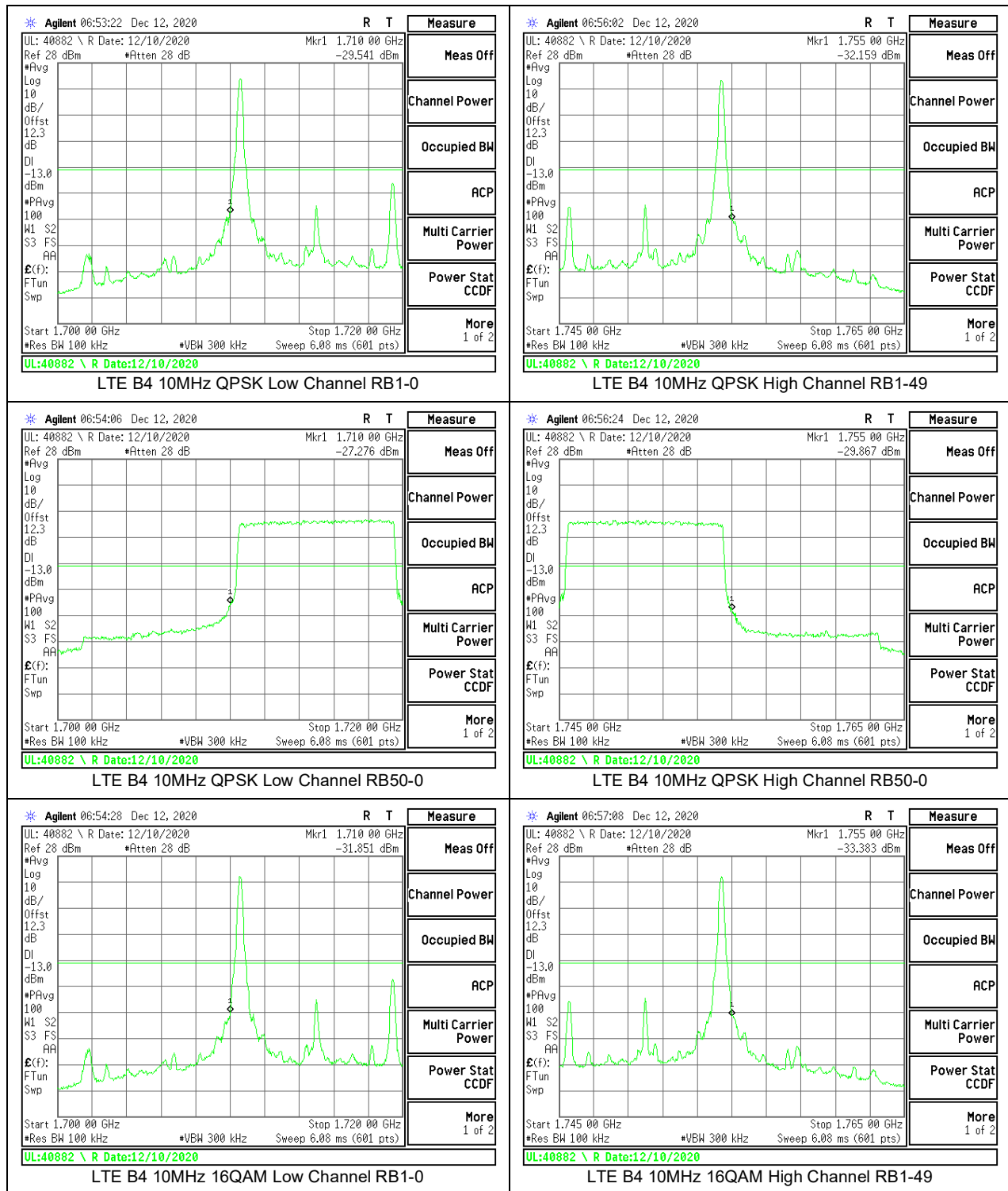
8.2.2. LTE BAND 4 BANDEDGE

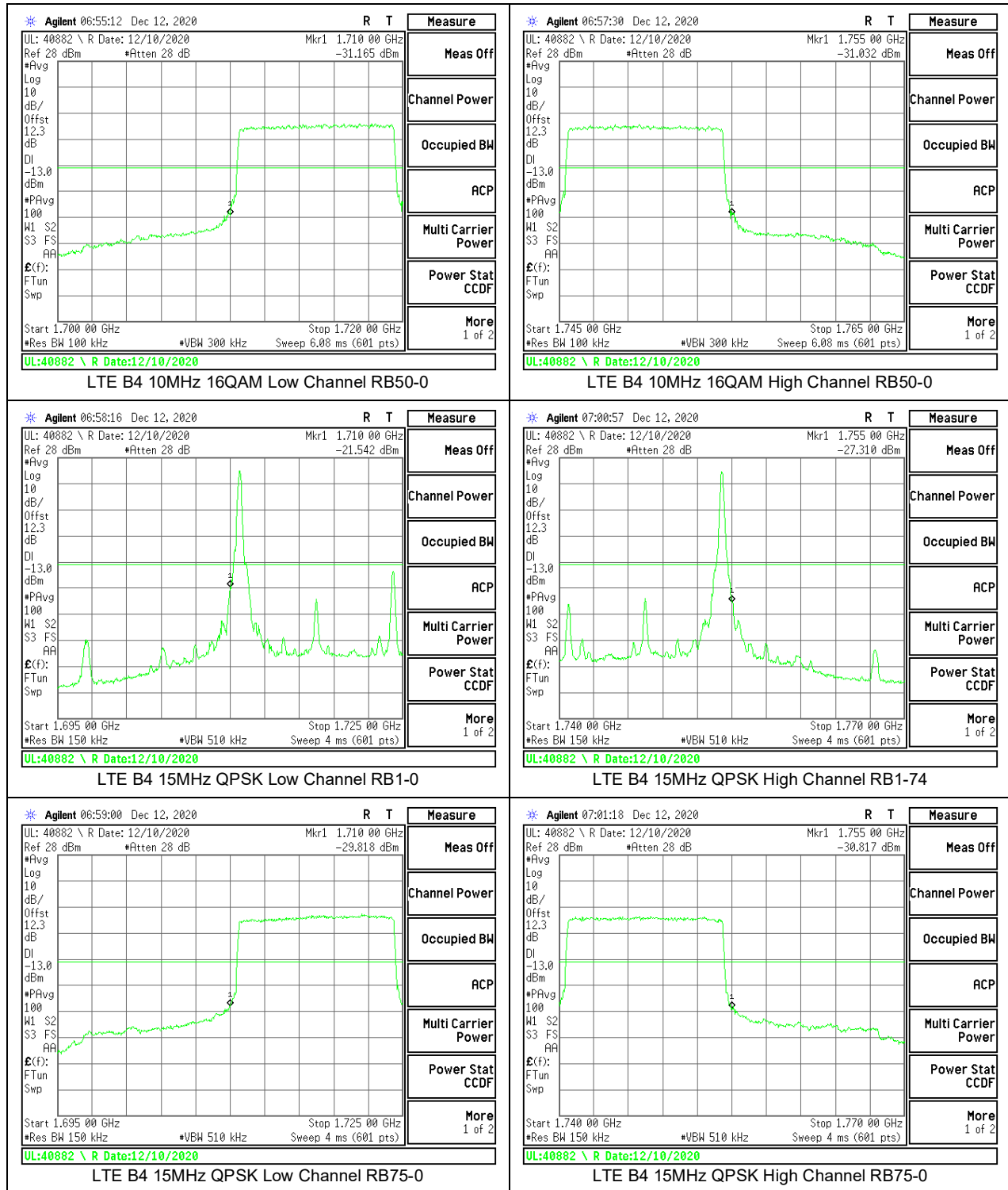


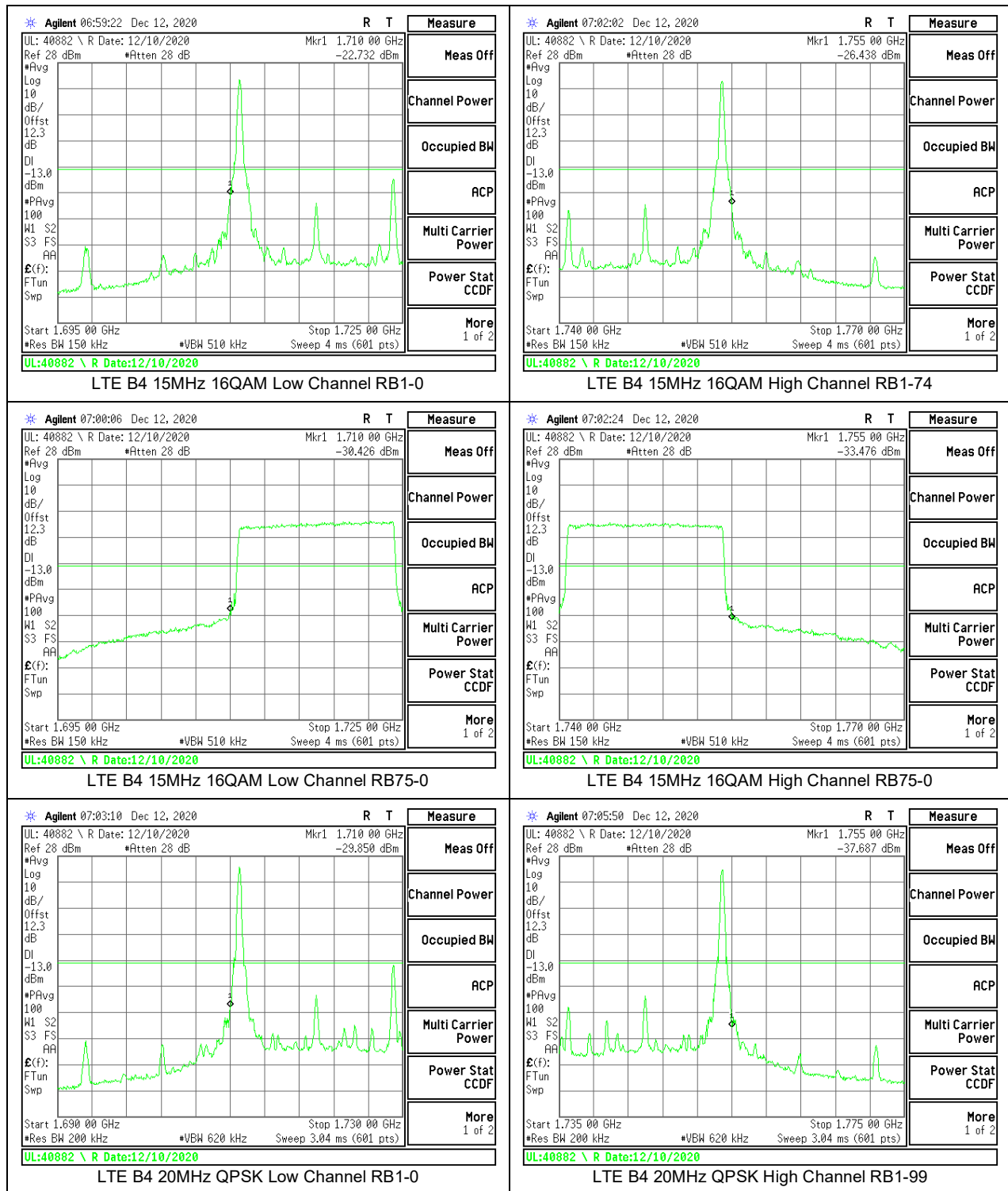


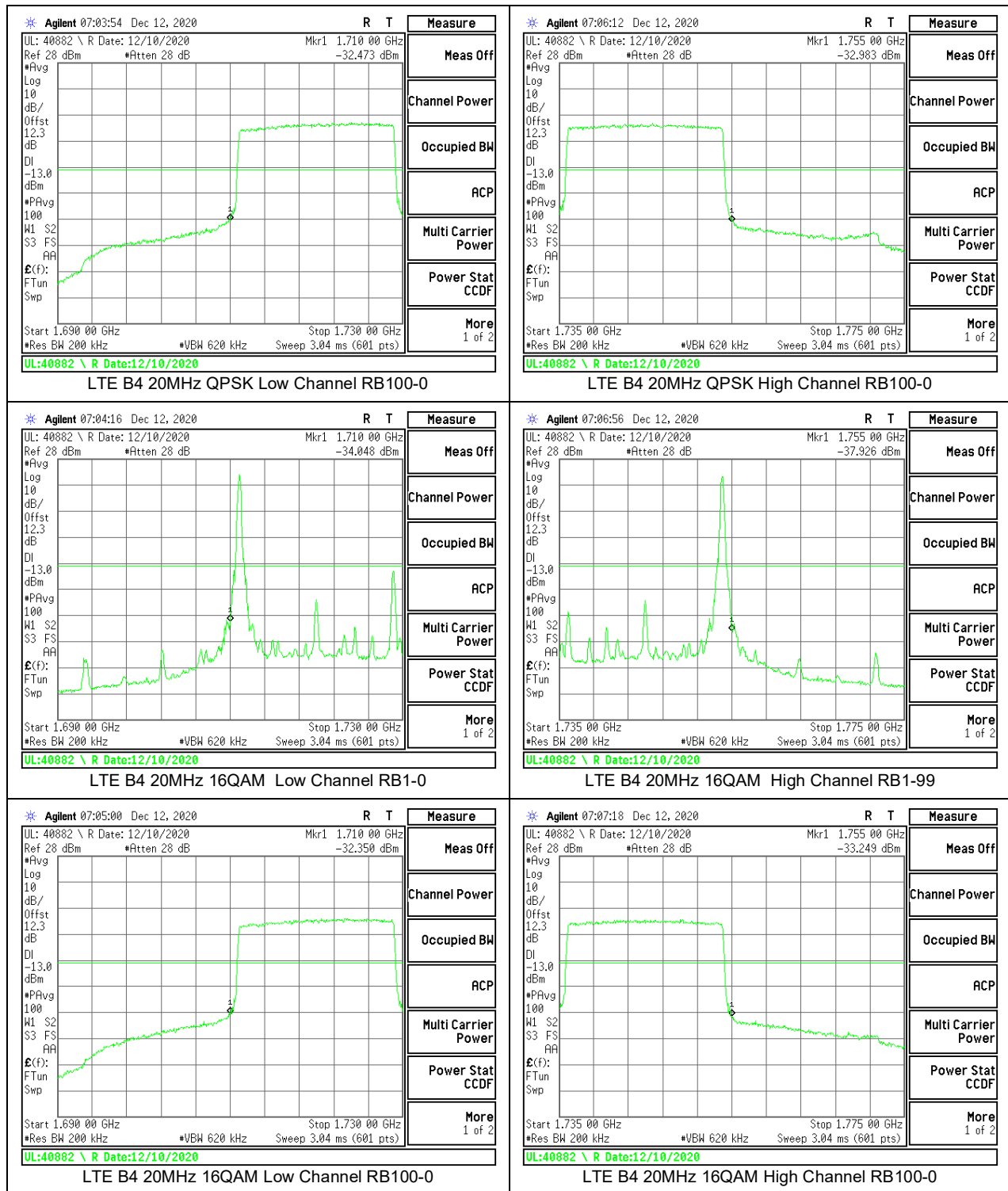












8.2.3. LTE BAND 12 ADJACENT CHANNEL POWER









