



TEST REPORT

Report Number : 13573771-E8V2

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

Model : A2484

Brand : APPLE

FCC ID : BCG-E4003A

EUT Description : SMARTPHONE

Test Standard(s) : FCC CFR47 PART 2, 22H, 24E, 27, 90S, 90R, AND 96

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Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538, U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888



Revision History

Rev.	Issue Date	Revisions	Revised By
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V2	8/9/2021	Addressed TCB Questions	Mengistu Mekuria

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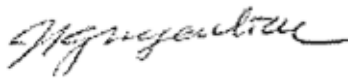
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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE, INC 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.	
Model	A2484	
Brand	APPLE	
FCC ID	BCG-E4003A	
EUT Description	SMARTPHONE	
Serial Number	C07103500480G3H2 (CONDUCTED), XKX609QCDP (RADIATED)	
Sample Receipt Date	04/09/2021 (CONDUCTED), 05/21/2021 (RADIATED)	
Date Tested	APRIL 13, 2021 to AUGUST 05, 2021	
Applicable Standards	FCC CFR47 PART 2, 22H, 24E, 27, 90S, 90R, AND 96	
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. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.		
Approved & Released By:	Reviewed By:	Prepared By:
		
Dan Corona Operations Leader UL Verification Services Inc.	Lieu Nguyen Project Engineer UL Vérification Services Inc.	Tony Li Test Engineer UL Verification Services Inc.

2. SUMMARY OF TEST RESULTS

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

Requirement Description	Band	Requirement Clause Number (FCC)	Result	Remarks
RF Conducted Output Power	26 (90S)	2.1046 , 90.635 (b)	Complies	
Effective Radiated Power	5, 26	22.913 (a)(5)	Complies	
	12	27.50 (c) (10)	Complies	
	13	27.50 (b) (10)	Complies	
	14	90.541 (d)	Complies	
	17	27.50 (c) (10)	Complies	
Equivalent Isotropic Radiated	2, 25	24.232 (c)	Complies	
	4, 66	27.50 (d) (4)	Complies	
	30	27.50 (a) (3)	Complies	
	7, 41	27.50 (h) (2)	Complies	
	48	96.41 (b)	Complies	
	71	27.50 (c) (10)	Complies	
	77	96.41 (b), 27.50 (j) (3), (k) (3)	Complies	

Requirement Description	Requirement Clause Number (FCC)	Result	Remarks
Occupied Bandwidth	2.1049	Complies	
Band Edge and Emission Mask	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m) (6), 96.41(e) , 27.53 (g), 27.53 (c) (f), 27.53(a), 27.53(l), 90.543 (e)(f), 90.691 (a), 96.41(e)	Complies	
Out of Band Emissions	2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m) (6), 96.41(e) , 27.53 (g), 27.53 (c) (f), 27.53(a), 27.53(l), 90.543 (e)(f), 90.691 (a), 96.41(e)	Complies	
Frequency Stability	2.1055, 22.355, 24.235, 27.54, 90.539, 90.213	Complies	
Peak-to-Average Ratio	22.913 (d), 24.232 (d), 27.50 (d) (5), 27.50 (j) (4), 96.41 (g)	Complies	
Field Strength of Spurious Radiation	2.1053, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (m)(4) & (m) (6), 96.41(e) , 27.53 (g), 27.53 (c) (f), 27.53(a), 27.53(l), 90.543 (e)(f), 90.691 (a), 96.41(e)	Complies	

3. TEST METHODOLOGY

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

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

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	208313
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	208313
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	208313

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. 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.

5.2. 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.)

5.3. 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, 9KHz 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
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Occupied Channel Bandwidth	±1.22 %
Temperature	±2.26%
Supply voltages	±0.57 %
Time	±3.39 %

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

5.4. 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

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS and NFC. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

Test was performed on the parent model and is used to support the application for the parent and variant identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC.

6.2. 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.

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

5G NR n5 (Ant 1)

Part 22H								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-5.20						
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	BPSK	826.5	846.5	25.70	18.35	0.068	4480.2	4M48G7W
	QPSK			25.68	18.33	0.068	4503.9	4M50G7W
	16QAM			24.69	17.34	0.054	4483.7	4M48D7W
10.0	BPSK	829.0	844.0	25.70	18.35	0.068	8958.9	8M96G7W
	QPSK			25.69	18.34	0.068	8942.2	8M94G7W
	16QAM			24.68	17.33	0.054	8933.4	8M93D7W
15.0	BPSK	831.5	841.5	25.70	18.35	0.068	13439	13M4G7W
	QPSK			25.67	18.32	0.068	13439	13M4G7W
	16QAM			24.68	17.33	0.054	13347	13M3D7W
20.0	BPSK	834.0	839.0	25.70	18.35	0.068	17888	17M9G7W
	QPSK			25.65	18.30	0.068	17818	17M8G7W
	16QAM			24.69	17.34	0.054	17842	17M8D7W

LTE BAND 7 (Ant 3)

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		1.40						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2502.5	2567.5	25.20	26.60	0.457	4495.5	4M50G7W
	16QAM			24.29	25.69	0.371	4501.5	4M50D7W
10.0	QPSK	2505.0	2565.0	25.20	26.60	0.457	8922.8	8M92G7W
	16QAM			24.35	25.75	0.376	8929.7	8M93D7W
15.0	QPSK	2507.5	2562.5	25.20	26.60	0.457	13380.5	13M4G7W
	16QAM			24.78	26.18	0.415	13394.2	13M4D7W
20.0	QPSK	2510.0	2560.0	25.20	26.60	0.457	17830	17M8G7W
	16QAM			24.56	25.96	0.394	17820.5	17M8D7W

5G NR n7 (Ant 3)

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		1.40						
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	BPSK	2502.5	2567.5	25.20	26.60	0.457	4479.9	4M48G7W
	QPSK			25.18	26.58	0.455	4523.8	4M52G7W
	16QAM			24.18	25.58	0.361	4484.3	4M48D7W
10.0	BPSK	2505.0	2565.0	25.20	26.60	0.457	8965	8M97G7W
	QPSK			25.18	26.58	0.455	8966.1	8M97G7W
	16QAM			24.19	25.59	0.362	8958.9	8M96D7W
15.0	BPSK	2507.5	2562.5	25.20	26.60	0.457	13375	13M4G7W
	QPSK			25.13	26.53	0.450	13436	13M4G7W
	16QAM			24.18	25.58	0.361	13355	13M4D7W
20.0	BPSK	2510.0	2560.0	25.20	26.60	0.457	17843	17M8G7W
	QPSK			25.17	26.57	0.454	17811	17M8G7W
	16QAM			24.19	25.59	0.362	17858	17M9D7W
25.0	BPSK	2512.5	2557.5	23.20	24.60	0.288	22950	23M0G7W
	QPSK			23.17	24.57	0.286	22858	22M9G7W
	16QAM			22.19	23.59	0.229	22832	22M8D7W
30.0	BPSK	2515.0	2555.0	23.20	24.60	0.288	28613	28M6G7W
	QPSK			23.16	24.56	0.286	28634	28M6G7W
	16QAM			22.17	23.57	0.228	28579	28M6D7W
40.0	BPSK	2520.0	2550.0	23.20	24.60	0.288	38555	38M6G7W
	QPSK			23.19	24.59	0.288	38601	38M6G7W
	16QAM			22.18	23.58	0.228	38532	38M5D7W

LTE BAND 12 (Ant 1)

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-5.10						
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	699.7	715.3	25.70	18.45	0.070	1084.8	1M08G7W
	16QAM			24.85	17.60	0.058	1082.5	1M08D7W
3.0	QPSK	700.5	714.5	25.70	18.45	0.070	2686.5	2M69G7W
	16QAM			24.83	17.58	0.057	2685	2M69D7W
5.0	QPSK	701.5	713.5	25.70	18.45	0.070	4495.8	4M50G7W
	16QAM			24.89	17.64	0.058	4490.8	4M49D7W
10.0	QPSK	704.0	711.0	25.70	18.45	0.070	8905.8	8M91G7W
	16QAM			24.83	17.58	0.057	8925.6	8M93D7W

5G NR n12 (Ant 1)

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-5.10						
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	BPSK	701.5	713.5	25.70	18.45	0.070	4473	4M47G7W
	QPSK			25.69	18.44	0.070	4515.2	4M52G7W
	16QAM			24.67	17.42	0.055	4490.8	4M49D7W
10.0	BPSK	704.0	711.0	25.70	18.45	0.070	8945.8	8M95G7W
	QPSK			25.68	18.43	0.070	8957.8	8M96G7W
	16QAM			24.69	17.44	0.055	8929	8M93D7W
15.0	BPSK	706.5	708.5	25.70	18.45	0.070	13469	13M5G7W
	QPSK			25.68	18.43	0.070	13472	13M5G7W
	16QAM			24.68	17.43	0.055	13410	13M4D7W

LTE BAND 13 (Ant 1)

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.90						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	779.5	784.5	25.70	18.65	0.073	4498.6	4M50G7W
	16QAM			24.91	17.86	0.061	4498.2	4M50D7W
10.0	QPSK	782.0	782.0	25.70	18.65	0.073	8932.8	8M93G7W
	16QAM			24.77	17.72	0.059	8920.2	8M92D7W

LTE BAND 14 (Ant 1)

Part 90R								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-4.90						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	790.5	795.5	25.70	18.65	0.073	4492.7	4M49G7W
	16QAM			24.83	17.78	0.060	4492.7	4M49D7W
10.0	QPSK	793.0	793.0	25.70	18.65	0.073	8916.9	8M92G7W
	16QAM			24.87	17.82	0.061	8926.7	8M93D7W

LTE BAND 17 Ant 1)

Part 27								
ERP Limit (W)		3.00						
Antenna Gain (dBi)		-5.10						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	706.5	713.5	25.70	18.45	0.070	4499.2	4M50G7W
	16QAM			24.77	17.52	0.056	4507	4M51D7W
10.0	QPSK	709.0	711.0	25.70	18.45	0.070	8938.7	8M94G7W
	16QAM			24.80	17.55	0.057	8960.9	8M96D7W

LTE BAND 25 (Ant 3)

Part 24								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		1.10						
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	25.20	26.30	0.427	1076.9	1M08G7W
	16QAM			24.46	25.56	0.360	1085.3	1M09D7W
3.0	QPSK	1851.5	1913.5	25.20	26.30	0.427	2690.8	2M69G7W
	16QAM			24.34	25.44	0.350	2681.5	2M68D7W
5.0	QPSK	1852.5	1912.5	25.20	26.30	0.427	4485.5	4M49G7W
	16QAM			24.37	25.47	0.352	4491.5	4M49D7W
10.0	QPSK	1855.0	1910.0	25.20	26.30	0.427	8937.8	8M94G7W
	16QAM			24.36	25.46	0.352	8923.4	8M92D7W
15.0	QPSK	1857.5	1907.5	25.20	26.30	0.427	13421.9	13M4G7W
	16QAM			24.68	25.78	0.378	13398.3	13M4D7W
20.0	QPSK	1860.0	1905.0	25.20	26.30	0.427	17900.7	17M9G7W
	16QAM			24.67	25.77	0.378	17899.2	17M9D7W

5G NR n25 (Ant 3)

Part 24								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		1.10						
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	BPSK	1852.5	1912.5	25.20	26.30	0.427	4478.1	4M48G7W
	QPSK			25.17	26.27	0.424	4513.6	4M51G7W
	16QAM			24.19	25.29	0.338	4491.4	4M49D7W
10.0	BPSK	1855.0	1910.0	25.20	26.30	0.427	8974.6	8M97G7W
	QPSK			25.15	26.25	0.422	8958.2	8M96G7W
	16QAM			24.18	25.28	0.337	8931.8	8M93D7W
15.0	BPSK	1857.5	1907.5	25.20	26.30	0.427	13381	13M4G7W
	QPSK			25.18	26.28	0.425	13454	13M5G7W
	16QAM			24.19	25.29	0.338	13438	13M4D7W
20.0	BPSK	1860.0	1905.0	25.20	26.30	0.427	17881	17M9G7W
	QPSK			25.18	26.28	0.425	17890	17M9G7W
	16QAM			24.18	25.28	0.337	17869	17M9D7W
25.0	BPSK	1862.5	1902.5	23.20	24.30	0.269	22973	23M0G7W
	QPSK			23.13	24.23	0.265	22902	22M9G7W
	16QAM			22.18	23.28	0.213	22913	22M9D7W
30.0	BPSK	1865.0	1900.0	23.20	24.30	0.269	28587	28M6G7W
	QPSK			23.17	24.27	0.267	28691	28M7G7W
	16QAM			22.16	23.26	0.212	28629	28M6D7W
40.0	BPSK	1870.0	1895.0	23.20	24.30	0.269	38617	38M6G7W
	QPSK			23.18	24.28	0.268	38606	38M6G7W
	16QAM			22.16	23.26	0.212	38607	38M6D7W

LTE BAND 26 (Part 90S) (Ant 1)

Part 90S							
Conducted Limit (W)		100.00					
Antenna Gain (dBi)		-5.20					
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	814.7	823.3	25.70	0.372	1083.4	1M08G7W
	16QAM			25.26	0.336	1089.8	1M09D7W
3.0	QPSK	815.5	822.5	25.70	0.372	2682.4	2M68G7W
	16QAM			25.48	0.353	2688.5	2M69D7W
5.0	QPSK	816.5	821.5	25.70	0.372	4506.9	4M51G7W
	16QAM			25.27	0.337	4501.9	4M50D7W
10.0	QPSK	819.0	819.0	25.69	0.371	8943.6	8M94G7W
	16QAM			25.15	0.327	8941	8M94D7W

LTE BAND 26 (Part 22) (Ant 1)

Part 22								
ERP Limit (W)		7.00						
Antenna Gain (dBi)		-5.20						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	ERP Average (dBm)	ERP Average (W)	99% BW (kHz)	Emission Designator
1.4	QPSK	824.7	848.3	25.70	18.35	0.068	1079.8	1M08G7W
	16QAM			25.58	18.23	0.067	1083.7	1M08D7W
3.0	QPSK	825.5	847.5	25.70	18.35	0.068	2679.6	2M68G7W
	16QAM			25.03	17.68	0.059	2685.7	2M69D7W
5.0	QPSK	826.5	846.5	25.70	18.35	0.068	4491.7	4M49G7W
	16QAM			25.09	17.74	0.059	4495.2	4M50D7W
10.0	QPSK	829.0	844.0	25.70	18.35	0.068	8948.7	8M95G7W
	16QAM			25.02	17.67	0.058	8951.2	8M95D7W

LTE BAND 30 (Ant 3)

Part 27								
EIRP Limit (W)		0.25						
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	2307.5	2312.5	23.00	23.40	0.219	4507.4	4M51G7W
	16QAM			22.12	22.52	0.179	4496.3	4M50D7W
10.0	QPSK	2310.0	2310.0	23.00	23.40	0.219	8960.5	8M96G7W
	16QAM			22.16	22.56	0.180	8944.7	8M94D7W

5G NR n30 (Ant 3)

Part 27								
EIRP Limit (W)		0.25						
Antenna Gain (dBi)		0.40						
Bandwidth (MHz)	Modulation	Low Frequency	Upper Frequency	Conducted Average	EIRP Average	EIRP Average	99% BW (kHz)	Emission Designator
5.0	BPSK	2307.5	2312.5	23.00	23.40	0.219	4471.6	4M47G7W
	QPSK			22.99	23.39	0.218	4519.9	4M52G7W
	16QAM			21.98	22.38	0.173	4492.8	4M49D7W
10.0	BPSK	2310.0	2310.0	23.00	23.40	0.219	9003.8	9M00G7W
	QPSK			22.97	23.37	0.217	8956.6	8M96G7W
	16QAM			21.93	22.33	0.171	8939.8	8M94D7W

LTE BAND 41 (Ant 3)

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		1.40						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	2498.5	2687.5	26.50	27.90	0.617	4416.4	4M42G7W
	16QAM			25.40	26.80	0.479	4480.6	4M48D7W
10.0	QPSK	2501.0	2685.0	26.50	27.90	0.617	8918.9	8M92G7W
	16QAM			25.57	26.97	0.498	8957.7	8M96D7W
15.0	QPSK	2503.5	2682.5	26.50	27.90	0.617	13384.1	13M4G7W
	16QAM			25.67	27.07	0.509	13411	13M4D7W
20.0	QPSK	2506.0	2680.0	26.50	27.90	0.617	17842.1	17M8G7W
	16QAM			25.60	27.00	0.501	17858.5	17M9D7W

5G NR n41 (Ant 4)

Part 27								
EIRP Limit (W)		2.00						
Antenna Gain (dBi)		-0.20						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
20.0	BPSK	2506.5	2680.0	27.20	27.00	0.501	17938	17M9G7W
	QPSK			27.20	27.00	0.501	17862	17M9G7W
	16QAM			26.54	26.34	0.431	17872	17M9D7W
30.0	BPSK	2511.0	2675.0	27.20	27.00	0.501	26913	26M9G7W
	QPSK			27.20	27.00	0.501	26879	26M9G7W
	16QAM			26.73	26.53	0.450	26879	26M9D7W
40.0	BPSK	2516.0	2670.0	27.20	27.00	0.501	35831	35M8G7W
	QPSK			27.14	26.94	0.494	35866	35M9G7W
	16QAM			26.30	26.10	0.407	35885	35M9D7W
50.0	BPSK	2521.0	2665.0	27.20	27.00	0.501	45986	46M0G7W
	QPSK			27.19	26.99	0.500	46067	46M1G7W
	16QAM			26.42	26.22	0.419	46019	46M0D7W
60.0	BPSK	2526.0	2660.0	27.20	27.00	0.501	58185	58M2G7W
	QPSK			27.20	27.00	0.501	58210	58M2G7W
	16QAM			26.32	26.12	0.409	58271	58M3D7W
80.0	BPSK	2536.0	2650.0	27.20	27.00	0.501	77757	77M8G7W
	QPSK			27.03	26.83	0.482	77762	77M8G7W
	16QAM			26.59	26.39	0.436	77716	77M7D7W
90.0	BPSK	2541.0	2645.0	27.20	27.00	0.501	87575	87M6G7W
	QPSK			27.19	26.99	0.500	87705	87M7G7W
	16QAM			26.28	26.08	0.406	87517	87M5D7W
100.0	BPSK	2546.0	2640.0	27.20	27.00	0.501	97229	97M2G7W
	QPSK			27.20	27.00	0.501	97231	97M2G7W
	16QAM			26.42	26.22	0.419	97264	97M3D7W

LTE BAND 48 (Ant 7)

Part 96								
EIRP Limit (W)/ 10MHz		0.20						
Antenna Gain (dBi)		-2.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
5.0	QPSK	3552.5	3697.5	24.80	22.50	0.178	4468.7	4M47G7W
	16QAM			24.06	21.76	0.150	4459.8	4M46D7W
10.0	QPSK	3555.0	3695.0	24.80	22.50	0.178	9023.2	9M02G7W
	16QAM			24.31	22.01	0.159	8947.4	8M95D7W
15.0	QPSK	3557.5	3692.5	24.80	22.50	0.178	13374	13M4G7W
	16QAM			24.21	21.91	0.155	13382	13M4D7W
20.0	QPSK	3560.0	3690.0	24.80	22.50	0.178	17766	17M8G7W
	16QAM			24.25	21.95	0.157	17800	17M8D7W

LTE BAND 66 (Ant 3)

Part 27								
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	25.20	24.60	0.288	1080.8	1M08G7W
	16QAM			24.44	23.84	0.242	1083.6	1M08D7W
3.0	QPSK	1711.5	1778.5	25.20	24.60	0.288	2688.7	2M69G7W
	16QAM			24.34	23.74	0.237	2677.6	2M68D7W
5.0	QPSK	1712.5	1777.5	25.20	24.60	0.288	4490.9	4M49G7W
	16QAM			24.38	23.78	0.239	4503.4	4M50D7W
10.0	QPSK	1715.0	1775.0	25.20	24.60	0.288	8957.7	8M96G7W
	16QAM			24.31	23.71	0.235	8956.6	8M96D7W
15.0	QPSK	1717.5	1772.5	25.20	24.60	0.288	13406.9	13M4G7W
	16QAM			24.71	24.11	0.258	13419.8	13M4D7W
20.0	QPSK	1720.0	1770.0	25.20	24.60	0.288	17852	17M9G7W
	16QAM			24.60	24.00	0.251	17867.9	17M9D7W

5G NR n77 (Part 27 3450-3550MHz) (Ant 7)

Part 27								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		-4.30						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
20.0	BPSK	3460.0	354.0	27.70	23.40	0.219	18003	18M0G7W
	QPSK			27.69	23.39	0.218	17944	17M9G7W
	16QAM			26.66	22.36	0.172	17949	17M9D7W
30.0	BPSK	3465.0	3535.0	27.70	23.40	0.219	26798	26M8G7W
	QPSK			27.65	23.35	0.216	27021	27M0G7W
	16QAM			26.68	22.38	0.173	26937	26M9D7W
40.0	BPSK	3470.0	3530.0	27.70	23.40	0.219	35908	35M9G7W
	QPSK			27.69	23.39	0.218	35799	35M8G7W
	16QAM			26.67	22.37	0.173	35914	35M9D7W
50.0	BPSK	3475.0	3525.0	27.70	23.40	0.219	46090	46M1G7W
	QPSK			27.69	23.39	0.218	46017	46M0G7W
	16QAM			26.68	22.38	0.173	45986	46M0D7W
60.0	BPSK	3480.0	3520.0	27.70	23.40	0.219	58165	58M2G7W
	QPSK			27.64	23.34	0.216	58206	58M2G7W
	16QAM			26.61	22.31	0.170	58167	58M2D7W
70.0	BPSK	3485.0	3515.0	27.70	23.40	0.219	64694	64M7G7W
	QPSK			27.66	23.36	0.217	64692	64M7G7W
	16QAM			26.66	22.36	0.172	64804	64M8D7W
80.0	BPSK	3490.0	3510.0	27.70	23.40	0.219	77963	78M0G7W
	QPSK			27.67	23.37	0.217	77663	77M7G7W
	16QAM			26.68	22.38	0.173	77610	77M6D7W
90.0	BPSK	3495.0	3505.0	27.70	23.40	0.219	87316	87M3G7W
	QPSK			27.69	23.39	0.218	87288	87M3G7W
	16QAM			26.68	22.38	0.173	87274	87M3D7W
100.0	BPSK	3500.0	3500.0	27.70	23.40	0.219	96990	97M0G7W
	QPSK			27.66	23.36	0.217	97214	97M2G7W
	16QAM			26.65	22.35	0.172	96907	96M9D7W

5G NR n77 (Part 27 3700-3980MHz) (Ant 7)

Part 27								
EIRP Limit (W)		1.00						
Antenna Gain (dBi)		-4.60						
Bandwidth (MHz)	Modulation	Low Frequency (MHz)	Upper Frequency (MHz)	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Average (W)	99% BW (kHz)	Emission Designator
20.0	BPSK	3710.0	3970.0	27.70	23.10	0.204	17888	17M9G7W
	QPSK			27.67	23.07	0.203	17947	17M9G7W
	16QAM			26.69	22.09	0.162	17908	17M9D7W
30.0	BPSK	3715.0	3965.0	27.70	23.10	0.204	26916	26M9G7W
	QPSK			27.68	23.08	0.203	26887	26M9G7W
	16QAM			26.64	22.04	0.160	26904	26M9D7W
40.0	BPSK	3720.0	3960.0	27.70	23.10	0.204	35642	35M6G7W
	QPSK			27.67	23.07	0.203	35675	35M7G7W
	16QAM			26.65	22.05	0.160	35573	35M6D7W
50.0	BPSK	3725.0	3955.0	27.70	23.10	0.204	45596	45M6G7W
	QPSK			27.68	23.08	0.203	45675	45M7G7W
	16QAM			26.67	22.07	0.161	45606	45M6D7W
60.0	BPSK	3730.0	3950.0	27.70	23.10	0.204	57745	57M7G7W
	QPSK			27.66	23.06	0.202	57981	58M0G7W
	16QAM			26.67	22.07	0.161	57802	57M8D7W
70.0	BPSK	3735.0	3945.0	27.70	23.10	0.204	64656	64M7G7W
	QPSK			27.66	23.06	0.202	64879	64M9G7W
	16QAM			26.68	22.08	0.161	64723	64M7D7W
80.0	BPSK	3740.0	3940.0	27.70	23.10	0.204	77050	77M1G7W
	QPSK			27.68	23.08	0.203	77012	77M0G7W
	16QAM			26.68	22.08	0.161	77187	77M2D7W
90.0	BPSK	3745.0	3935.0	27.70	23.10	0.204	86712	86M7G7W
	QPSK			27.68	23.08	0.203	86650	86M7G7W
	16QAM			26.68	22.08	0.161	86713	86M7D7W
100.0	BPSK	3500.0	3930.0	27.70	23.10	0.204	96396	96M4G7W
	QPSK			27.69	23.09	0.204	96310	96M3G7W
	16QAM			26.67	22.07	0.161	96314	96M3D7W

6.3. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version 0.21.02-1.

6.4. MAXIMUM ANTENNA GAIN

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

LTE Bands	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	ANT 4 Antenna Gain (dBi)	ANT 7 Antenna Gain (dBi)	ANT 8 Antenna Gain (dBi)	ANT 9 Antenn a Gain (dBi)
5G NR n5, 824 – 849 MHz	-5.2	-6.5					
LTE Band 7, n7, 2500 – 2570 MHz	-1.9	-1.1	1.4	-0.2			
LTE Band 12, 5G NR n12, 699 – 716 MHz	-5.1	-5.9					
LTE Band 13, 777 – 787 MHz	-4.9	-5.9					
LTE Band 14, 788 – 798 MHz	-4.9	-5.9					
LTE Band 17, 704 – 716 MHz	-5.1	-5.9					
LTE Band 25, 5G NR n25, 1850 – 1915 MHz	-3.1	-1.2	1.1	-2.1			
LTE Band 26, 814 – 849 MHz	-5.2	-6.5					
LTE Band 30, 5G NR n30, 2305 – 2315 MHz	-1.6	-2.4	0.4	-1.6			
LTE Band 41, 5G NR n41, 2496 – 2690 MHz	-1.8	-1.1	1.4	-0.2			
LTE Band 48, 3550 – 3700 MHz				0.8	-2.3	-3.8	-5.5
LTE Band 66, 5G NR n66, 1710 – 1780 MHz	-2.6	-2.6	-0.6	-1.7			
LTE Band 71, 5G NR n71 663 – 698 MHz	-5.5	-6.3					
5G NR n77 3450 – 3550MHz (Part 27)				-1.8	-4.3	-5.5	-5.5
5G NR n77 3700 – 3980 MHz (Part 27)				-1.8	-4.6	-3.5	-8.3

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports the following LTE and 5G NR Bands:

Band 2, Band 4, Band 5, Band 7, Band 12, Band 13, Band 14, Band 17, Band 25, Band 26, Band 30, Band 41, Band 48, Band 66, Band 71, 5G NR n2, 5G NR n5, 5G NR n7, 5G NR n12, 5G NR n25, 5G NR n30, 5G NR n41, 5G NR n48, 5G NR n66, 5G NR n71, and 5G NR n77.

LTE Band 2 and 5G NR n2 (1850-1910MHz) are covered by LTE Band 25 and 5G NR n25 respectively. Because they are the subset of LTE band 25 and 5G NR n25 with the same output power and supported bandwidths.

LTE Band 4 (1710-1755MHz) is covered by LTE Band 66 of same rule. Because it is a subset of LTE band 66 with the same output power and supported bandwidths.

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

BPSK modulation applied only for 5G NR frequencies and has the same tune up power as QPSK modulations.

The DFT-s-OFDM and CP-OFDM waveforms were investigated, and DFT-s-OFDM was found to be the worst case.

For 5G NRs, conducted spurious emission tests were conducted on wider bandwidth with inner 1RB since this is the worst bandwidth and the highest output power.

The worst-case scenario for all measurements is based on an engineering evaluation and QPSK was observed as the worst one and set for all conducted and radiated. Output power measurements were measured on QPSK, 16QAM, 64QAM, 256QAM, and BPSK, modulations. For testing purposes emissions on sections 8 and 9 were measured while QPSK was set at or above target power for all bands. Conducted tests were performed on the worst case antenna port because it has the highest conducted power. ANT1 is the worst case antenna port for all bands except Band 48, 5G NR n41, and 5G NR n77. For 5G NR n41 ANT2 is the worst case antenna port. For bands 48 ANT7 is the worst case antenna port and 5G NR n77 ANT7 is the worst case antenna port.

For 5G NR n41 20MHz BW, antenna 2 and antenna 4 powers are higher than LTE band 41. Therefore, additional power measurements and occupied bandwidth tests were performed on antenna 2 and antenna 4 for 20MHz BW. Since LTE antenna 1 the highest output power of all (LTE band 41 and 5G NR n41) antennas, all other conducted tests for 20MHz BW were performed only on LTE antenna 1.

The EUT was investigated in three orthogonal orientations X/Y/Z on all ANT 1, ANT2, ANT3, ANT4, ANT7, ANT8 and ANT 9 antennas to determine the worst case orientation. The following table exhibit the worst case orientation for different frequency bands. The full tests of the EUT have made upon the orientations that shown in the table below.

Frequency Bands	ANT1	ANT2	ANT3	ANT4	ANT7	ANT8	ANT9
663 – 849 MHz	X	X	N/A	N/A	N/A	N/A	N/A
1710 – 1915 MHz	Y	Y	X	X	N/A	N/A	N/A
2300 – 2700 MHz	X	X	X	Z	N/A	N/A	N/A
3300 – 3980 MHz	N/A	N/A	N/A	Y	X	X	Y

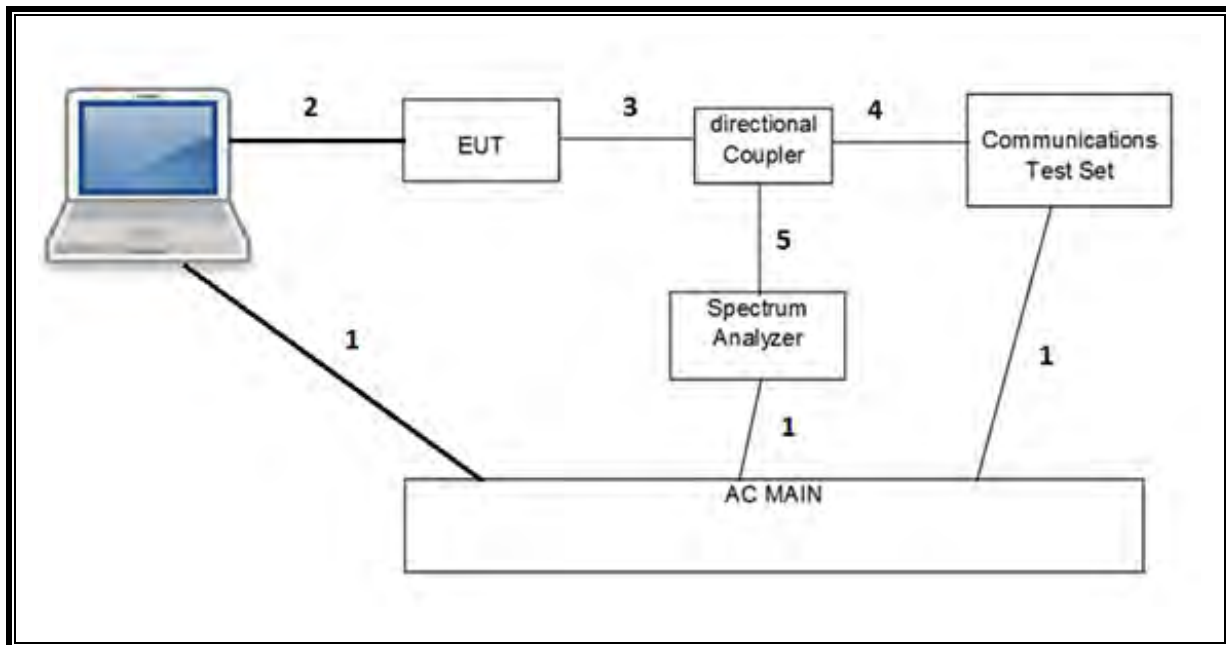
Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. There were no emissions found with less than 20dB of margin from 9kHz to 1GHz.

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

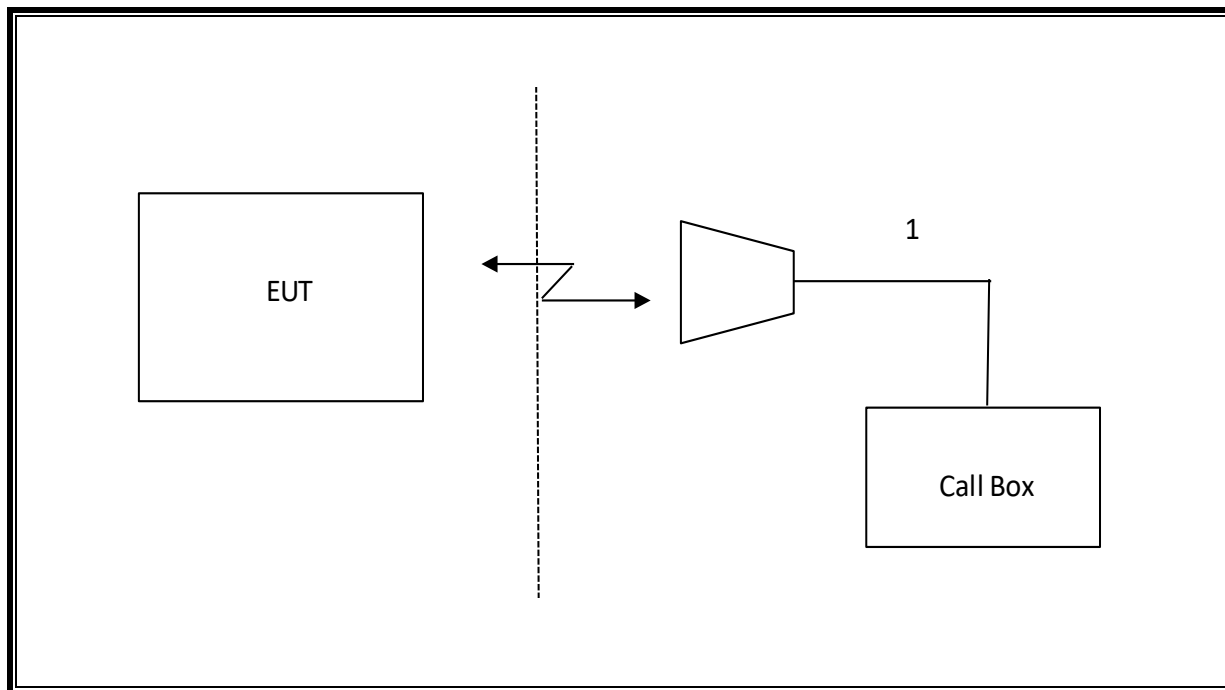
6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		A1398	C02PM012G3QD	QDS-BRCM1069		A1398
AC/DC adapter		PA-1450-BA1	B123	N/A		PA-1450-BA1
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	3	US 115V	Un-shielded	2.0	N/A
2	USB	1	DC	Un-shielded	1.0	N/A
3	RF In/Out	1	EUT	Un-shielded	0.6	N/A
4	RF In/Out	1	Communication Test Set	Un-shielded	1.2	N/A
5	RF In/Out	1	Barrel	N/A	N/A	N/A
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF In/Out	1	Antenna	Un-shielded	5.0	N/A

CONDUCTED SETUP



RADIATED SETUP



7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T136	7/7/2021
Antenna, Active Loop 9KHz to 30MHz	EMCO	6502	T1616	12/02/2021
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T899	9/14/2021
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	T1165	8/10/2021
Amplifier, 100KHz to 1GHz, 32dB	Keysight	8447D	T15	01/14/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1450	1/21/2022
Wideband Communication Test Set, Call Box	R&S GmbH Co. KG	CMW500	T260	Connection Purposes Only
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	5/26/2022
RF Device, Active, Amplifier	AMPLICAL	AMP1G18-35	205885	6/1/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T907	1/27/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	PRE0213973	2/16/2022
RF Device, Active, Amplifier	AMPLICAL	AMP0.1G18-47-20	207180	3/14/2022
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201499	2/26/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	PRE0213972	8/20/2021
Amplifier 1-18GHz, 45dB Min	AMPLICAL	AMP0.1G18-47-20	172123	1/23/2022
EMI TEST RECEIVER	R&S GmbH Co. KG	ESW44	201497	2/25/2022
Wideband Communication Test Set, Call Box	R&S GmbH Co. KG	CMW500	T703	Connection Purposes Only
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	PRE0213831	12/3/2021
RF Amplifier 1-18GHz, 45dB Min	AMPLICAL	AMP0.1G18-47-20	172122	12/31/2021
EMI TEST RECEIVER	R&S GmbH Co. KG	ESW44	201498	2/25/2022
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	PRE0213833	2/16/2022
RF Device, Active, Amplifier	AMPLICAL	AMP0.1G18-47-20	206055	5/13/2022
EMI TEST RECEIVER	R&S GmbH Co. KG	ESW44	201500	2/26/2022
Wideband Radio Communications Tester	R&S GmbH Co. KG	CMW500	T964	2/17/2022
Wideband Communication Test Set, Call Box	R&S GmbH Co. KG	CMW500	T972	2/20/2022
Directional Coupler	KRYTAR	152610	T1161	9/16/2021
Directional Coupler	KRYTAR	152610	T1536	9/16/2021
Directional Coupler	KRYTAR	152610	T1537	9/16/2021
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T754	6/21/2021
Chamber, Environmental	Cincinnati Sub Zero	ZPHS-8-3.5-SCT/WC	T1154	6/21/2021
Filter, 2.7 to 18GHz High Pass	MICROWAVE CIRCUITS	H2G518G6	T772	1/22/2022
Filter, HPF 1.2GHz 18GHz Max	MICRO-TRONICS	HPM50108	PRE0182423	4/22/2022
Filter, High Pass 1.2GHz	MICRO-TRONICS	HPM50108	T1737	6/23/2021

TEST EQUIPMENT LIST (Cont.)				
Description	Manufacturer	Model	Asset	Cal Due
Filter, BRF 2495 to 2690MHz	MICRO-TRONICS	BRM50709-02	T790	6/23/2021
Filter, BRF 3400 to 3800MHz	MICRO-TRONICS	BRM50711-02	T1792	6/23/2021
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	T449	4/22/2022
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Keysight	8449B	T404	4/19/2022
Antenna, Horn 26.5 to 40GHz	A.R.A.	MWH-2640/B	PRE0182201	4/22/2022
Amplifier, 26 - 40GHz	MITEQ	TTA2640-35-HG	T1864	4/19/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1454	1/27/2022
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight	E4440A	T200	2/19/2022
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4446A	T146	2/16/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T908	1/28/2022
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T341	1/28/2022
Power Meter, P-series single channel	Keysight	N1911A	T1271	1/20/2022
*Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	T1228	4/13/2021
Power Meter, P-series single channel	Keysight	N1912A	T1245	1/21/2022
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight	N1921A	T1226	2/19/2022

UL AUTOMATION SOFTWARE			
CLT Software	UL	UL RF	Ver 3.2.5, 4/13/2021
Power Measurement Software	UL	UL RF	Ver 3.1.2 5/17/2021
Radiated test software	UL	UL RF	Ver 9.5, 4/14/2021

NOTES:

- * Testing is completed before equipment expiration date.

8. 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 TS136.101 specification.

UE Power Class: 3 (23 +/- 2dBm). Band 41 UE Power Class: 2 (26 +/-2 dBm).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 TS136.101.

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 following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS138.521-1 specification.

The allowed MPR for SRS, PUCCH formats 0, 1, 3 and 4, and PRACH shall be as specified for QPSK modulated DFTs-OFDM of equivalent RB allocation. The allowed MPR for PUCCH format 2 shall be as specified for QPSK modulated CP-OFDM of equivalent RB allocation.

Table 6.2.2.3-1: Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$		0^2
	Pi/2 BPSK w Pi/2 BPSK DMRS	$\leq 0.5^2$		0^2
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		
NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability <i>powerBoosting-pi2BPSK</i> and if the IE <i>powerBoostPi2BPSK</i> is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0dB MPR is 26dBm.				
NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE <i>powerBoostPi2BPSK</i> is set to 0 and if more than 40% of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.				

Table 6.2.2.3-2: Maximum power reduction (MPR) for power class 2

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5	≤ 0.5	0
	QPSK	≤ 3.5	≤ 1	0
	16 QAM	≤ 3.5	≤ 2	≤ 1
	64 QAM	≤ 3.5	≤ 2.5	
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3.5	≤ 3	≤ 1.5
	16 QAM	≤ 3.5	≤ 3	≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS136.101 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
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36, 66, 70	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2, 6.6.3.3.19	41	5, 10, 15, 20	Table 6.2.4-4, Table 6.2.4-4a	

The allowed A-MPR values specified below in Table 6.2.3.3.1-1 of 3GPP TS 38.521-1 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 6.2.3.3.1-1: Additional maximum power reduction (A-MPR)

Network signalling label	Requirements (subclause)	NR Band	Channel bandwidth (MHz)	Resources blocks (N_{RB})	A-MPR (dB)
NS_01		Table 5.2-1	5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 90, 100	Table 5.3.2-1	N/A
NS_03	6.5.2.3.3.3	n2, n25, n66, n70, n86			Clause 6.2.3.3.7
NS_03U	6.5.2.3.3.3, 6.5.2.4.2.3	n2, n25, n66, n86			Clause 6.2.3.3.7
NS_04	6.5.2.3.3.2, 6.5.3.3.3.1	n41	10, 15, 20, 40, 50, 60, 80, 90, 100		Clause 6.2.3.3.2

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:

8.3. LTE BAND 12 AND 5G NR n12

LTE BAND 12

Test Engineer ID:	39004	Test Date:	4/13/2021
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OUTPUT POWER FOR LTE BAND 12 (1.4 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)					
				ANT 1			ANT 2		
				23017	23095	23173	23017	23095	23173
1.4	QPSK	1	0	25.63	25.50	25.54	24.53	24.57	24.58
		1	2	25.70	25.59	25.55	24.60	24.67	24.70
		1	5	25.64	25.52	25.55	24.52	24.56	24.58
		3	0	25.57	25.52	25.50	24.53	24.59	24.56
		3	1	25.60	25.59	25.53	24.60	24.65	24.62
		3	2	25.62	25.56	25.52	24.57	24.63	24.67
		6	0	24.66	24.63	24.58	23.63	23.66	23.64
		1	0	24.70	24.60	24.63	23.61	23.67	23.73
		1	2	24.82	24.74	24.70	23.75	23.80	23.86
	16QAM	1	5	24.73	24.63	24.68	23.65	23.72	23.77
		3	0	24.67	24.81	24.79	23.84	23.87	23.84
		3	1	24.72	24.84	24.80	23.87	23.94	23.89
		3	2	24.76	24.85	24.81	23.89	23.93	23.97
		6	0	23.79	23.78	23.75	22.81	22.85	22.84
		1	0	22.56	22.82	22.78	22.63	22.67	22.81
	64QAM	1	2	23.89	22.94	22.82	22.74	22.76	22.94
		1	5	23.88	22.90	22.76	22.64	22.70	22.83
		3	0	23.91	22.64	22.75	22.77	22.79	22.64
		3	1	23.91	22.68	22.82	22.79	22.81	22.71
		3	2	23.89	22.66	22.76	22.79	22.80	22.77
		6	0	23.88	21.72	21.88	21.58	21.66	21.68
	256QAM	1	0	20.69	20.62	19.87	19.61	19.64	18.86
		1	2	20.83	20.76	20.51	19.75	19.81	19.92
		1	5	20.66	20.63	20.30	19.65	19.64	19.79
		3	0	20.64	20.73	20.52	19.77	19.77	19.63
		3	1	20.68	20.78	20.52	19.78	19.81	19.69
		3	2	20.65	20.73	20.52	19.79	19.80	19.75
		6	0	20.58	20.70	20.66	19.74	19.75	19.61

OUTPUT POWER FOR LTE BAND 12 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)					
				ANT 1			ANT 2		
				23060	23095	23130	23060	23095	23130
				704.0	707.5	711.0	704.0	707.5	711.0
10.0	QPSK	1	0	25.67	25.67	25.69	24.67	24.70	24.68
		1	24	25.66	25.66	25.67	24.61	24.67	24.66
		1	49	25.62	25.65	25.70	24.61	24.59	24.69
		25	0	24.78	24.78	24.80	23.77	23.80	23.80
		25	12	24.83	24.82	24.86	23.82	23.83	23.78
		25	24	24.76	24.79	24.77	23.76	23.73	23.81
		50	0	24.80	24.80	24.84	23.80	23.83	23.78
	16QAM	1	0	24.83	24.82	24.74	23.79	23.84	23.80
		1	24	24.71	24.73	24.75	23.71	23.74	23.72
		1	49	24.70	24.79	24.77	23.73	23.74	23.79
		25	0	23.86	23.88	23.88	22.87	22.89	22.92
		25	12	23.91	23.93	23.95	22.92	22.96	22.85
		25	24	23.87	23.87	23.92	22.86	22.89	22.93
		50	0	23.84	23.86	23.88	22.83	22.87	22.80
	64QAM	1	0	23.09	23.07	22.93	22.75	22.85	22.78
		1	24	23.05	23.08	22.94	22.65	22.73	22.67
		1	49	23.03	23.10	22.93	22.73	22.74	22.76
		25	0	21.87	21.85	21.87	21.84	21.84	21.85
		25	12	21.90	21.91	21.93	21.89	21.90	21.85
		25	24	21.86	21.86	21.92	21.83	21.81	21.85
		50	0	21.85	21.84	21.85	21.86	21.85	21.77
	256QAM	1	0	21.18	21.13	20.79	19.80	19.80	19.84
		1	24	21.15	21.20	20.82	19.83	19.83	19.76
		1	49	21.22	21.31	20.90	19.90	19.89	19.89
		25	0	20.82	20.81	20.89	19.87	19.86	19.88
		25	12	20.88	20.89	20.93	19.92	19.93	19.87
		25	24	20.85	20.88	20.88	19.91	19.88	19.90
		50	0	20.89	20.92	20.86	19.86	19.88	19.81

OUTPUT POWER FOR 5G NR BAND n12 (15.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)					
				ANT 1			ANT 2		
				141300	141500	141700	141300	141500	141700
15.0	BPSK	1	0	25.14	25.19	25.16	24.16	24.12	24.18
		1	1	25.70	25.68	25.65	24.67	24.69	24.68
		1	77	25.70	25.68	25.62	24.70	24.63	24.63
		1	78	25.11	25.17	25.12	24.11	24.17	24.10
		36	18	25.18	25.17	25.17	24.12	24.11	24.18
		75	0	25.15	25.13	25.17	24.14	24.11	24.17
	QPSK	1	0	24.63	24.61	24.65	23.61	23.63	23.68
		1	1	25.61	25.61	25.68	24.68	24.68	24.63
		1	77	25.66	25.65	25.61	24.68	24.66	24.61
		1	78	24.61	24.61	24.64	23.65	23.62	23.67
		36	18	24.61	24.63	24.60	23.63	23.65	23.68
		75	0	24.63	24.63	24.63	23.66	23.65	23.66
	16QAM	1	0	23.63	23.63	23.61	22.69	22.66	22.64
		1	1	24.68	24.67	24.61	23.63	23.62	23.65
		1	77	24.64	24.67	24.62	23.61	23.62	23.63
		1	78	23.61	23.66	23.67	22.67	22.60	22.60
		36	18	23.67	23.61	23.64	22.64	22.67	22.61
		75	0	23.64	23.64	23.60	22.60	22.69	22.63
	64QAM	1	0	23.19	23.19	23.14	22.12	22.11	22.14
		1	1	23.12	23.18	23.14	22.15	22.15	22.15
		1	77	23.13	23.10	23.15	22.14	22.13	22.13
		1	78	23.15	23.15	23.15	22.16	22.17	22.15
		36	18	23.15	23.16	23.15	22.18	22.15	22.17
		75	0	23.19	23.19	23.11	22.10	22.17	22.12
	256QAM	1	0	21.18	21.16	21.18	20.11	20.12	20.19
		1	1	21.17	21.16	21.14	20.12	20.12	20.14
		1	77	21.15	21.14	21.13	20.17	20.15	20.15
		1	78	21.12	21.12	21.17	20.19	20.14	20.12
		36	18	21.16	21.16	21.16	20.11	20.14	20.13
		75	0	21.13	21.16	21.14	20.13	20.18	20.13

8.5. LTE BAND 14

Test Engineer ID:	39004	Test Date:	4/13/2021
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OUTPUT POWER FOR LTE BAND 14 (5.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)					
				ANT 1			ANT 2		
				23305	23330	23355	23305	23330	23355
5.0	QPSK	1	0	790.5	793.0	795.5	790.5	793.0	795.5
		1	0	25.70	25.65	25.19	24.66	24.60	24.58
		1	12	25.60	25.64	25.25	24.70	24.63	24.60
		1	24	25.69	25.64	25.30	24.69	24.62	24.62
		12	0	24.65	24.62	24.14	23.66	23.62	23.59
		12	6	24.67	24.62	24.16	23.68	23.66	23.65
		12	11	24.62	24.57	24.19	23.63	23.63	23.61
		25	0	24.63	24.59	24.17	23.63	23.64	23.62
	16QAM	1	0	24.80	24.72	24.29	23.77	23.74	23.73
		1	12	24.83	24.73	24.39	23.86	23.76	23.81
		1	24	24.75	24.81	24.40	23.85	23.83	23.75
		12	0	23.73	23.67	23.21	22.70	22.65	22.68
		12	6	23.72	23.69	23.26	22.75	22.72	22.71
		12	11	23.72	23.67	23.28	22.70	22.69	22.68
		25	0	23.66	23.62	23.15	22.66	22.57	22.55
	64QAM	1	0	22.93	22.83	22.09	22.69	22.68	22.66
		1	12	22.98	22.94	22.21	22.77	22.69	22.76
		1	24	22.88	22.93	22.17	22.74	22.76	22.70
		12	0	21.75	21.70	21.19	21.61	21.54	21.54
		12	6	21.74	21.76	21.27	21.63	21.60	21.64
		12	11	21.70	21.70	21.30	21.62	21.59	21.62
		25	0	21.68	21.65	21.14	21.69	21.64	21.66
	256QAM	1	0	20.66	20.63	19.90	19.64	19.62	19.64
		1	12	20.71	20.63	19.99	19.67	19.63	19.71
		1	24	20.67	20.63	19.99	19.70	19.70	19.67
		12	0	20.70	20.65	20.17	19.67	19.58	19.59
		12	6	20.68	20.67	20.18	19.65	19.64	19.67
		12	11	20.64	20.60	20.22	19.65	19.62	19.62
		25	0	20.67	20.65	20.20	19.66	19.62	19.66

OUTPUT POWER FOR LTE BAND 14 (10.0 MHz)

Bandwidth (MHz)	Modulation	RB Allocation	RB Offset	Conducted Average (dBm)					
				ANT 1			ANT 2		
				N/A	23330	N/A	N/A	23330	N/A
				N/A	793.0	N/A	N/A	793.0	N/A
10.0	QPSK	1	0		25.70			24.69	
		1	24		25.67			24.68	
		1	49		25.68			24.70	
		25	0		24.74			23.73	
		25	12		24.82			23.78	
		25	24		24.78			23.75	
		50	0		24.83			23.75	
	16QAM	1	0		24.87			23.72	
		1	24		24.78			23.62	
		1	49		24.82			23.66	
		25	0		23.87			22.72	
		25	12		23.92			22.78	
		25	24		23.89			22.75	
		50	0		23.87			22.73	
	64QAM	1	0		23.07			22.80	
		1	24		23.02			22.68	
		1	49		22.99			22.74	
		25	0		21.86			21.71	
		25	12		21.91			21.79	
		25	24		21.93			21.77	
		50	0		21.86			21.78	
	256QAM	1	0		20.81			19.72	
		1	24		20.86			19.84	
		1	49		20.94			19.89	
		25	0		20.85			19.80	
		25	12		20.93			19.88	
		25	24		20.92			19.84	
		50	0		20.89			19.80	

9. CONDUCTED TEST RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

ISED: RSS130§4.5, RSS132; RSS133 §2.3, RSS139, RSS 140, RSS192§8.3, RSS195, RSS199§4.2

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 (highest bandwidth) are reported only.

5G NR n5

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n5	5MHz, BPSK	25/0	836.5	4.4802	4.993
	5MHz, QPSK			4.5039	5.027
	5MHz, 16QAM			4.4837	4.982
	10MHz, BPSK	50/0		8.9589	9.623
	10MHz, QPSK			8.9422	9.552
	10MHz, 16QAM			8.9334	9.641
	15MHz, BPSK	75/0		13.439	14.27
	15MHz, QPSK			13.439	14.24
	15MHz, 16QAM			13.347	14.19
	20MHz, BPSK	100/0		17.888	18.75
	20MHz, QPSK			17.818	18.86
	20MHz, 16QAM			17.842	18.82
	20MHz, BPSK	1/0		0.2789	0.4758

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	4.4955	4.925
	5MHz, 16QAM			4.5015	4.911
	10MHz, QPSK	50/0		8.9228	9.595
	10MHz, 16QAM			8.9297	9.765
	15MHz, QPSK	75/0		13.3805	14.411
	15MHz, 16QAM			13.3942	14.445
	20MHz, QPSK	100/0		17.8300	19.041
	20MHz, 16QAM			17.8205	19.222
	20MHz, QPSK	1/0		0.28595	0.4735

5G NR n7

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n7	5MHz, BPSK	25/0	2535.0	4.4799	5.003
	5MHz, QPSK			4.5238	5.04
	5MHz, 16QAM			4.4843	4.975
	10MHz, BPSK	50/0		8.9650	9.654
	10MHz, QPSK			8.9661	9.557
	10MHz, 16QAM			8.9589	9.615
	15MHz, BPSK	75/0		13.375	14.12
	15MHz, QPSK			13.436	14.26
	15MHz, 16QAM			13.355	14.16
	20MHz, BPSK	100/0		17.843	18.76
	20MHz, QPSK			17.811	18.88
	20MHz, 16QAM			17.858	18.81
	25MHz, BPSK	128/0		22.950	24.06
	25MHz, QPSK			22.858	24.07
	25MHz, 16QAM			22.832	24.02
	30MHz, BPSK	160/0		28.613	30.20
	30MHz, QPSK			28.634	30.16
	30MHz, 16QAM			28.579	30.11
	40MHz, BPSK	216/0		38.555	40.65
	40MHz, QPSK			38.601	40.67
	40MHz, 16QAM			38.532	40.54
	40MHz, BPSK	1/0		0.30081	0.4998

LTE BAND 12

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 12	1.4MHz, QPSK	6/0	707.5	1.0848	1.232
	1.4MHz, 16QAM			1.0825	1.214
	3MHz, QPSK	15/0		2.6865	2.976
	3MHz, 16QAM			2.6850	2.972
	5MHz, QPSK	25/0		4.4958	4.963
	5MHz, 16QAM			4.4908	4.953
	10MHz, QPSK	50/0		8.9058	9.609
	10MHz, 16QAM			8.9256	9.658
	10MHz, QPSK	1/0		0.24781	0.3703

5G NR n12

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n12	5MHz, BPSK	25/0	707.5	4.4730	4.948
	5MHz, QPSK			4.5152	5.014
	5MHz, 16QAM			4.4908	4.991
	10MHz, BPSK	50/0		8.9458	9.635
	10MHz, QPSK			8.9578	9.642
	10MHz, 16QAM			8.9290	9.671
	15MHz, BPSK	75/0		13.469	14.27
	15MHz, QPSK			13.472	14.27
	15MHz, 16QAM			13.410	14.20
	15MHz, BPSK	1/0		0.23098	0.3898

LTE BAND 13

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 13	5MHz, QPSK	25/0	782.0	4.4986	4.966
	5MHz, 16QAM			4.4982	4.953
	10MHz, QPSK	50/0		8.9328	9.601
	10MHz, 16QAM			8.9202	9.722
	10MHz, QPSK	1/0		0.23712	0.4021

LTE BAND 14

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 14	5MHz, QPSK	25/0	793.0	4.4927	4.892
	5MHz, 16QAM			4.4927	4.909
	10MHz, QPSK	50/0		8.9169	9.699
	10MHz, 16QAM			8.9267	9.589
	10MHz, QPSK	1/0		0.25159	0.4023

LTE BAND 17

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 17	5MHz, QPSK	25/0	710.0	4.4992	4.887
	5MHz, 16QAM			4.5070	4.960
	10MHz, QPSK	50/0		8.9387	9.682
	10MHz, 16QAM			8.9609	9.630
	10MHz, QPSK	1/0		0.24504	0.3882

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	1.0769	1.218
	1.4MHz, 16QAM			1.0853	1.228
	3MHz, QPSK	15/0		2.6908	2.978
	3MHz, 16QAM			2.6815	2.985
	5MHz, QPSK	25/0		4.4855	4.954
	5MHz, 16QAM			4.4915	4.948
	10MHz, QPSK	50/0		8.9378	9.663
	10MHz, 16QAM			8.9234	9.677
	15MHz, QPSK	75/0		13.4219	14.306
	15MHz, 16QAM			13.3983	14.523
	20MHz, QPSK	100/0		17.9007	19.450
	20MHz, 16QAM			17.8992	19.072
	20MHz, QPSK	1/0		0.26406	0.4488

5G NR n25

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n25	5MHz, BPSK	25/0	1882.5	4.4781	4.958
	5MHz, QPSK			4.5136	5.028
	5MHz, 16QAM			4.4914	5.006
	10MHz, BPSK	50/0		8.9746	9.652
	10MHz, QPSK			8.9582	9.572
	10MHz, 16QAM			8.9318	9.582
	15MHz, BPSK	75/0		13.381	14.22
	15MHz, QPSK			13.454	14.42
	15MHz, 16QAM			13.438	14.18
	20MHz, BPSK	100/0		17.881	18.90
	20MHz, QPSK			17.890	18.96
	20MHz, 16QAM			17.869	18.86
	25MHz, BPSK	128/0		22.973	24.18
	25MHz, QPSK			22.902	24.14
	25MHz, 16QAM			22.913	24.12
	30MHz, BPSK	160/0		28.587	30.22
	30MHz, QPSK			28.691	30.18
	30MHz, 16QAM			28.629	30.15
	40MHz, BPSK	216/0		38.617	41.63
	40MHz, QPSK			38.606	40.69
	40MHz, 16QAM			38.607	40.64
		40MHz, BPSK		1/0	

LTE BAND 26(PART 90S)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4MHz, QPSK	6/0	819.0	1.0834	1.230
	1.4MHz, 16QAM			1.0898	1.228
	3MHz, QPSK	15/0		2.6824	2.963
	3MHz, 16QAM			2.6885	2.961
	5MHz, QPSK	25/0		4.5069	4.929
	5MHz, 16QAM			4.5019	4.944
	10MHz, QPSK	50/0		8.9436	9.689
	10MHz, 16QAM			8.9410	9.596
	10MHz, QPSK	1/0		0.25214	0.4116

LTE BAND 26 (PART 22)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 26	1.4MHz, QPSK	6/0	836.5	1.0798	1.218
	1.4MHz, 16QAM			1.0837	1.225
	3MHz, QPSK	15/0		2.6796	2.923
	3MHz, 16QAM			2.6857	2.946
	5MHz, QPSK	25/0		4.4917	4.914
	5MHz, 16QAM			4.4952	4.945
	10MHz, QPSK	50/0		8.9487	9.722
	10MHz, 16QAM			8.9512	9.791
	15MHz, QPSK	75/0		13.3837	14.546
	15MHz, 16QAM			13.3931	14.410
	15MHz, QPSK	1/0		0.25352	0.4326

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	4.5074	4.891
	5MHz, 16QAM			4.4963	4.911
	10MHz, QPSK	50/0		8.9605	9.710
	10MHz, 16QAM			8.9447	9.664
	10MHz, QPSK	1/0		0.23758	0.3847

5G NR n30

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 30	5MHz, BPSK	25/0	2310.0	4.4716	5.007
	5MHz, QPSK			4.5199	4.999
	5MHz, 16QAM			4.4928	4.998
	10MHz, BPSK	50/		9.0038	9.693
	10MHz, QPSK			8.9566	9.695
	10MHz, 16QAM			8.9398	9.685
	10MHz, QPSK	1/0		0.22826	0.3807

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	4.4164	4.871
	5MHz, 16QAM			4.4806	4.775
	10MHz, QPSK	50/0		8.9189	9.461
	10MHz, 16QAM			8.9577	9.617
	15MHz, QPSK	75/0		13.3841	14.242
	15MHz, 16QAM			13.4110	14.420
	20MHz, QPSK	100/0		17.8421	18.999
	20MHz, 16QAM			17.8585	18.912
	20MHz, QPSK	1/0		0.26605	0.4283

5G NR n41

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n41FCC	20MHz, BPSK	50/0	2593	17.938	19.21
	20MHz, QPSK			17.862	18.97
	20MHz, 16QAM			17.872	19.33
	30MHz, BPSK	75/0		26.913	28.57
	30MHz, QPSK			26.879	28.59
	30MHz, 16QAM			26.879	28.49
	40MHz, BPSK	100/0		35.831	37.69
	40MHz, QPSK			35.866	37.96
	40MHz, 16QAM			35.885	37.77
	50MHz, BPSK	128/0		45.986	48.17
	50MHz, QPSK			46.067	48.27
	50MHz, 16QAM			46.019	48.33
	60MHz, BPSK	162/0		58.185	60.98
	60MHz, QPSK			58.210	60.90
	60MHz, 16QAM			58.271	61.05
	80MHz, BPSK	216/0		77.757	81.35
	80MHz, QPSK			77.762	81.35
	80MHz, 16QAM			77.716	81.25
	90MHz, BPSK	243/0		87.575	91.47
	90MHz, QPSK			87.705	91.48
	90MHz, 16QAM			87.517	91.58
	100MHz, BPSK	270/0		97.229	101.6
	100MHz, QPSK			97.231	101.6
	100MHz, 16QAM			97.264	101.7
		100MHz, BPSK		1/0	

LTE BAND 48

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 48	5MHz, QPSK	25/0	3625.0	4.4687	4.917
	5MHz, 16QAM			4.4598	4.809
	10MHz, QPSK	50/0		9.0232	9.470
	10MHz, 16QAM			8.9474	9.368
	15MHz, QPSK	75/0		13.374	14.08
	15MHz, 16QAM			13.382	14.31
	20MHz, QPSK	100/0		17.766	18.89
	20MHz, 16QAM			17.800	18.89
	20MHz, QPSK	1/0		.25804	.4475

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	1.0808	1.213
	1.4MHz,16QAM			1.0836	1.224
	3MHz, QPSK	15/0		2.6887	2.961
	3MHz, 16QAM			2.6776	2.949
	5MHz, QPSK	25/0		4.4909	4.875
	5MHz, 16QAM			4.5034	4.913
	10MHz, QPSK	50/0		8.9577	9.729
	10MHz, 16QAM			8.9566	9.669
	15MHz, QPSK	75/0		13.4069	14.434
	15MHz, 16QAM			13.4198	14.466
	20MHz, QPSK	100/0		17.8520	19.126
	20MHz, 16QAM			17.8679	19.066
	20MHz, QPSK	1/0		.26586	.4443

5G NR n665G NR n66

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n66	5MHz, BPSK	25/0	1745.0	4.4917	4.804
	5MHz, QPSK			4.4465	4.832
	5MHz, 16QAM			4.4694	4.774
	10MHz, BPSK	50/0		8.9377	9.450
	10MHz, QPSK			8.9435	9.327
	10MHz, 16QAM			8.9172	9.436
	15MHz, BPSK	75/0		13.456	14.12
	15MHz, QPSK			13.347	13.98
	15MHz, 16QAM			13.427	13.97
	20MHz, BPSK	100/0		17.891	18.65
	20MHz, QPSK			17.874	18.67
	20MHz, 16QAM			17.695	18.63
	30MHz, BPSK	160/0		28.557	29.49
	30MHz, QPSK			28.723	29.51
	30MHz, 16QAM			28.405	29.45
	40MHz, BPSK	216/0		38.714	40.65
	40MHz, QPSK			38.552	39.95
	40MHz, 16QAM			38.485	39.86
	40MHz, BPSK	1/0		.28598	.4690

LTE BAND 71

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE BAND 71	5MHz, QPSK	25/0	680.5	4.4824	4.790
	5MHz, 16QAM			4.4883	4.885
	10MHz, QPSK	50/0		8.9526	9.696
	10MHz, 16QAM			8.9501	9.625
	15MHz, QPSK	75/0		13.4399	14.513
	15MHz, 16QAM			13.3854	14.540
	20MHz, QPSK	100/0		17.8498	19.049
	20MHz, 16QAM			17.8495	19.012
	20MHz, QPSK	1/0		.28195	.4685

5G NR n71

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n71	5MHz, BPSK	25/0	680.5	4.5518	5.082
	5MHz, QPSK			4.5569	5.041
	5MHz, 16QAM			4.5789	5.049
	10MHz, BPSK	50/0		8.9734	9.673
	10MHz, QPSK			8.9816	9.571
	10MHz, 16QAM			8.9629	9.644
	15MHz, BPSK	75/0		13.431	14.16
	15MHz, QPSK			13.424	14.24
	15MHz, 16QAM			13.525	14.21
	20MHz, BPSK	100/0		17.911	18.94
	20MHz, QPSK			17.964	18.99
	20MHz, 16QAM			17.999	19.00
	20MHz, BPSK	1/0		0.25066	0.4218

5G NR n77(Part 27 3450-3550MHz)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n77 (FCC Part 27 3450- 3550MHz)	20MHz, BPSK	50/0	3500.0	18.003	19.22
	20MHz, QPSK			17.944	19.30
	20MHz, 16QAM			17.949	19.13
	30MHz, BPSK	75/0		26.798	28.09
	30MHz, QPSK			27.021	28.47
	30MHz, 16QAM			26.937	28.36
	40MHz, BPSK	100/0		35.908	37.93
	40MHz, QPSK			35.799	37.75
	40MHz, 16QAM			35.914	37.84
	50MHz, BPSK	128/0		46.090	48.27
	50MHz, QPSK			46.017	48.36
	50MHz, 16QAM			45.986	48.23
	60MHz, BPSK	162/0		58.165	60.95
	60MHz, QPSK			58.206	60.97
	60MHz, 16QAM			58.167	60.95
	70MHz, BPSK	180/0		64.694	68.03
	70MHz, QPSK			64.692	68.20
	70MHz, 16QAM			64.804	68.12
	80MHz, BPSK	216/0		77.963	81.37
	80MHz, QPSK			77.663	81.44
	80MHz, 16QAM			77.610	81.29
	90MHz, BPSK	243/0		87.316	91.57
	90MHz, QPSK			87.288	91.49
	90MHz, 16QAM			87.274	91.48
	100MHz, BPSK	270/0		96.990	101.6
	100MHz, QPSK			97.214	101.6
	100MHz, 16QAM			96.907	101.4
	100MHz, BPSK	1/0		0.5939	0.9702

5G NR n77(Part 27 3700-3980MHz)

Band	Mode	RB Allocation/RB Offset	f(MHz)	99% BW (MHz)	-26dB BW (MHz)
5G NR n77(FCC Part 27 3700- 3980MHz)	20MHz, BPSK	50/0	3840	17.888	19.07
	20MHz, QPSK			17.947	18.99
	20MHz, 16QAM			17.908	19.09
	30MHz, BPSK	75/0		26.916	28.51
	30MHz, QPSK			26.887	28.45
	30MHz, 16QAM			26.904	28.43
	40MHz, BPSK	100/0		35.642	37.48
	40MHz, QPSK			35.675	37.32
	40MHz, 16QAM			35.573	37.53
	50MHz, BPSK	128/0		45.596	47.79
	50MHz, QPSK			45.675	47.88
	50MHz, 16QAM			45.606	47.72
	60MHz, BPSK	162/0		57.745	60.54
	60MHz, QPSK			57.981	60.27
	60MHz, 16QAM			57.802	60.28
	70MHz, BPSK	180/0		64.656	68.16
	70MHz, QPSK			64.879	68.28
	70MHz, 16QAM			64.723	68.08
	80MHz, BPSK	216/0		77.050	80.40
	80MHz, QPSK			77.012	80.27
	80MHz, 16QAM			77.187	80.43
	90MHz, BPSK	243/0		86.712	90.24
	90MHz, QPSK			86.650	90.16
	90MHz, 16QAM			86.713	90.42
	100MHz, BPSK	270/0		96.396	100.3
	100MHz, QPSK			96.310	100.5
	100MHz, 16QAM			96.314	100.4
	100MHz, BPSK	1/0		.59557	.9891

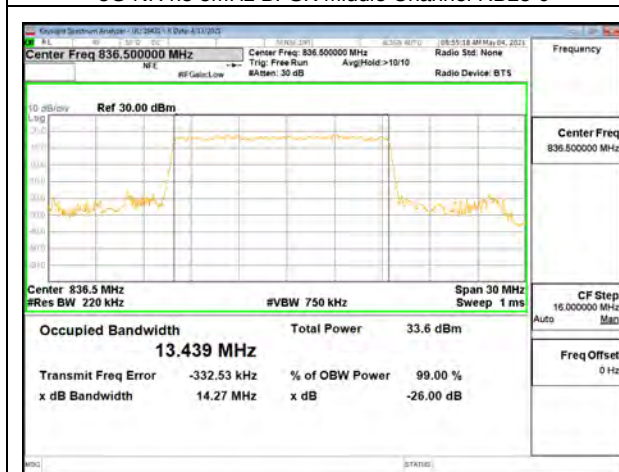
9.1.1. 5G NR n5



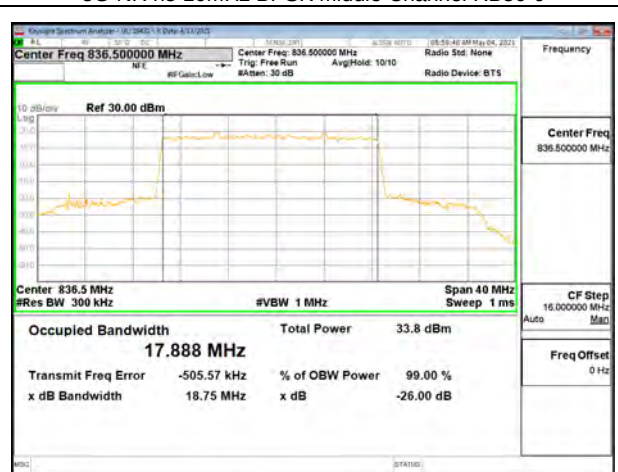
5G NR n5 5MHz BPSK Middle Channel RB25-0



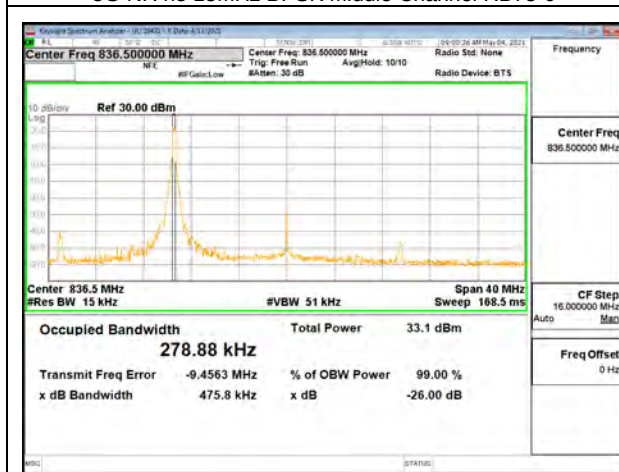
5G NR n5 10MHz BPSK Middle Channel RB50-0



5G NR n5 15MHz BPSK Middle Channel RB75-0



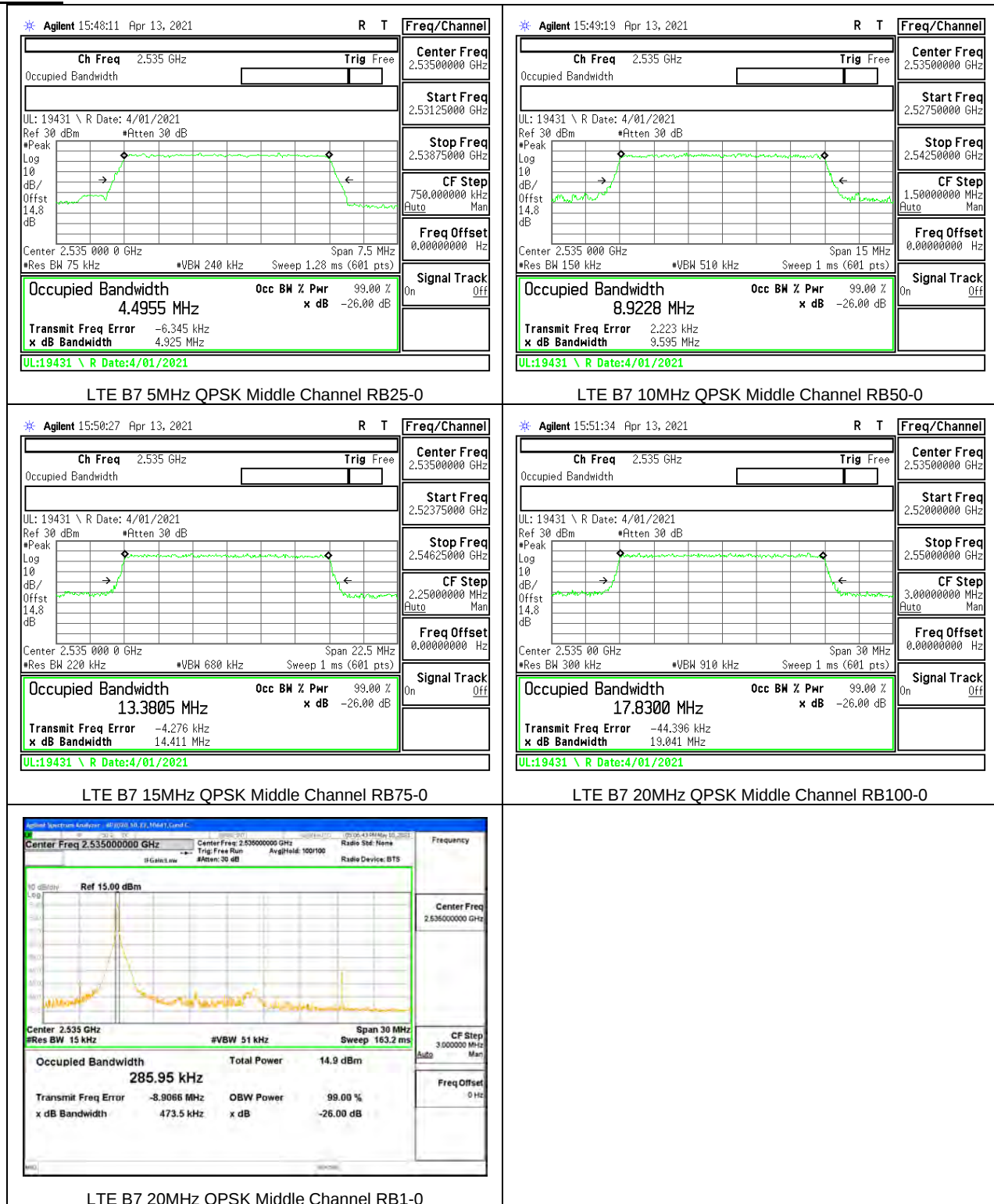
5G NR n5 20MHz BPSK Middle Channel RB100-0



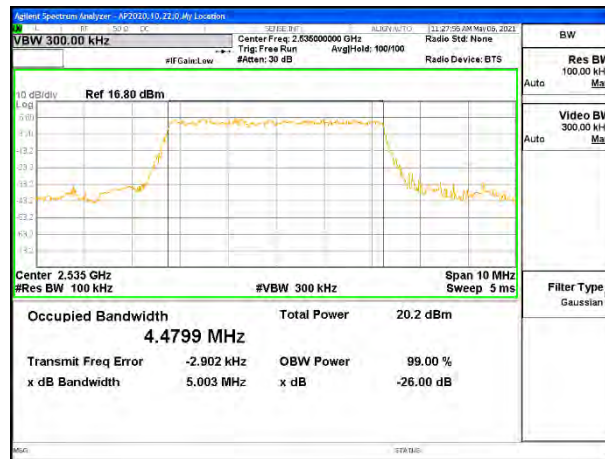
5G NR n5 20MHz BPSK Middle Channel RB1-0

9.1.2. LTE BAND 7 AND 5G NR n7

LTE BAND 7



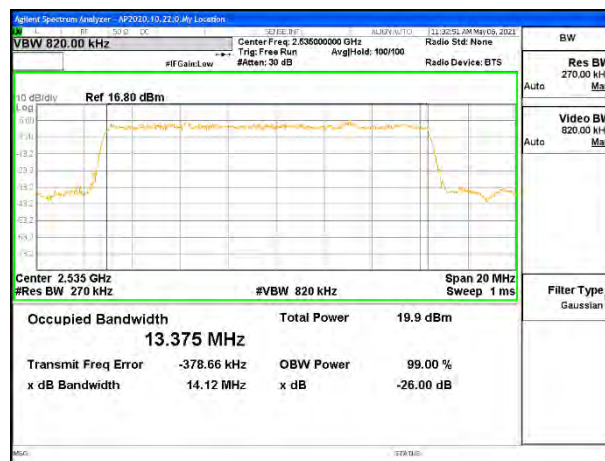
5G NR n7



5G NR n7 5MHz BPSK Middle Channel RB25-0



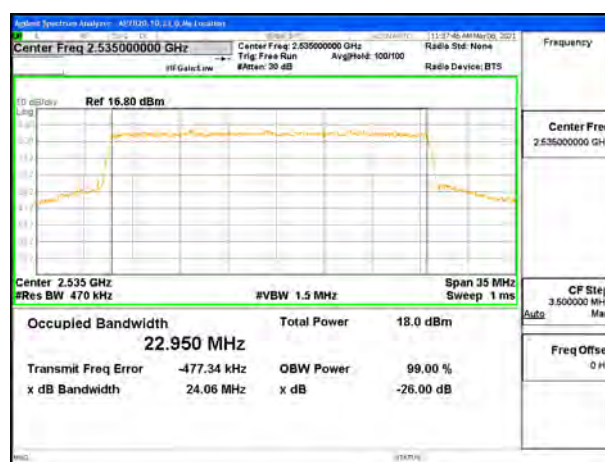
5G NR n7 10MHz BPSK Middle Channel RB50-0



5G NR n7 15MHz BPSK Middle Channel RB75-0



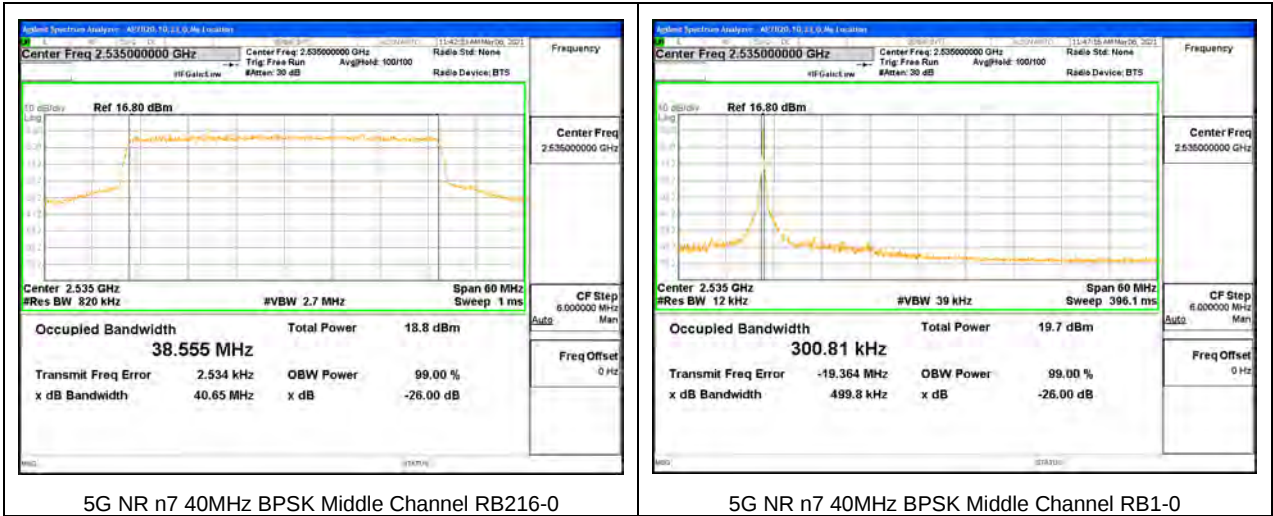
5G NR n7 20MHz BPSK Middle Channel RB100-0



5G NR n7 25MHz BPSK Middle Channel RB128-0

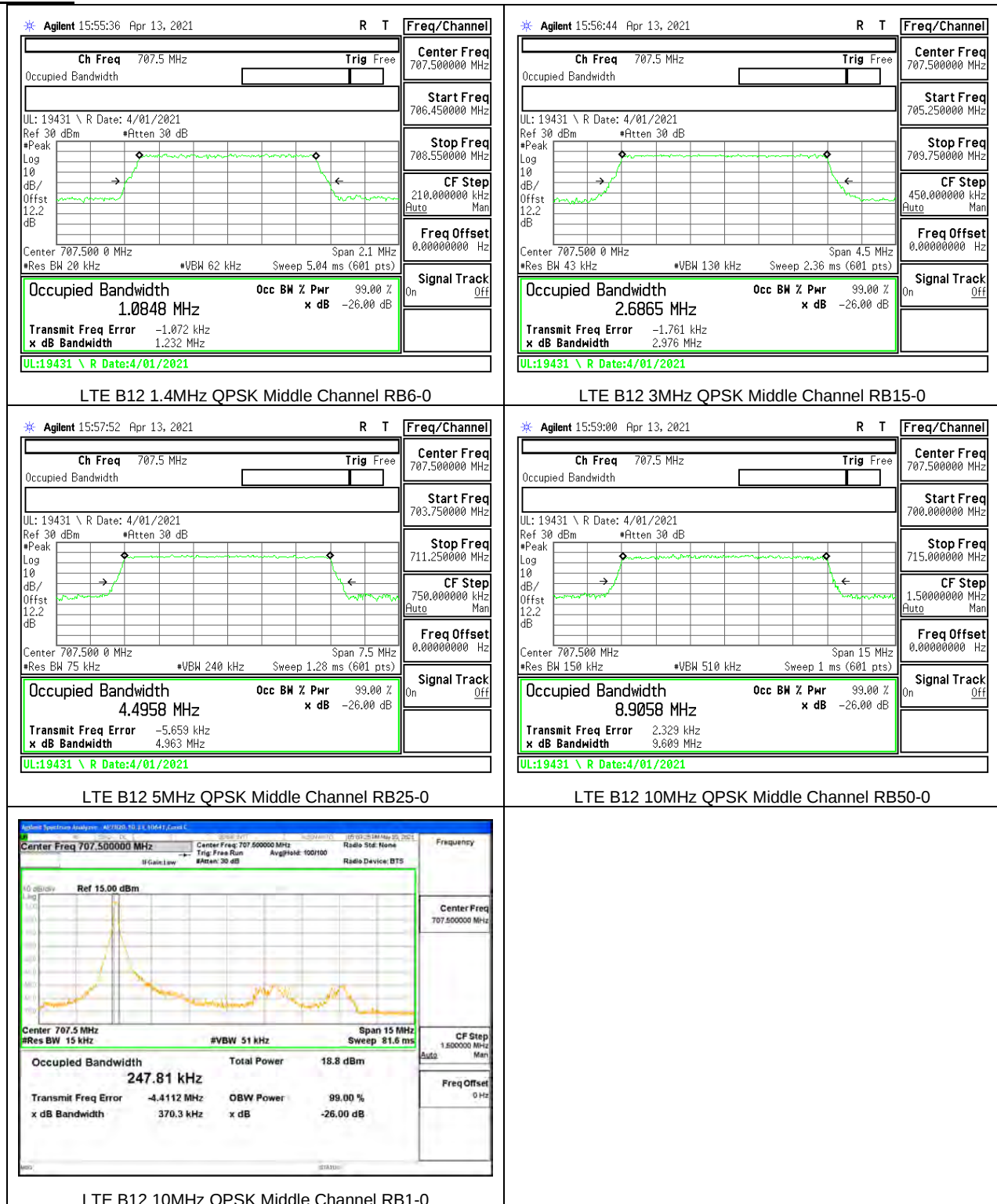


5G NR n7 30MHz BPSK Middle Channel RB160-0

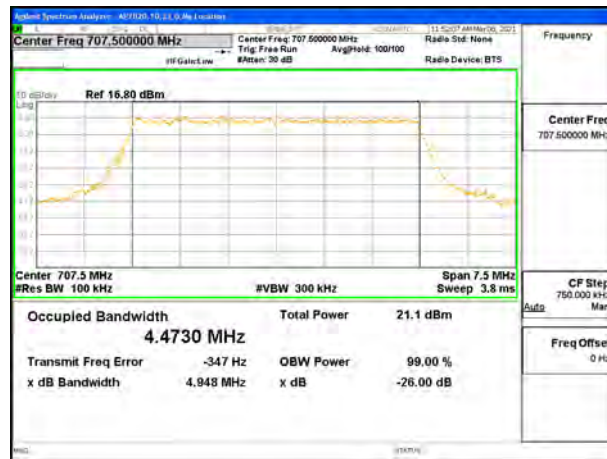


9.1.3. LTE BAND 12 AND 5G NR n12

LTE BAND 12



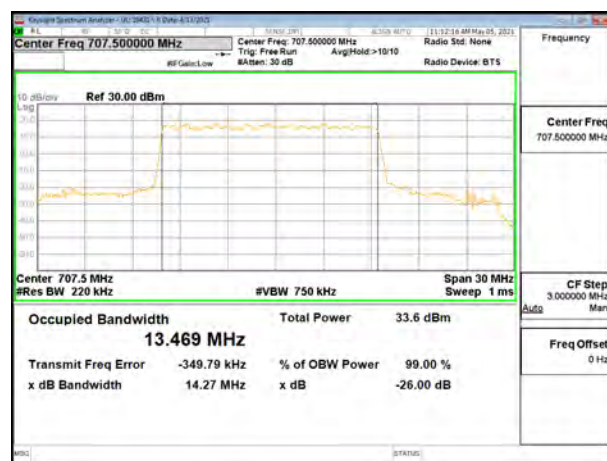
5G NR n12



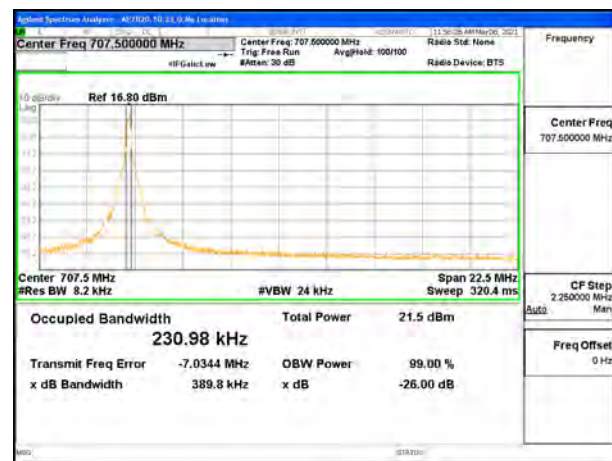
5G NR n12 5MHz BPSK Middle Channel RB25-0



5G NR n12 10MHz BPSK Middle Channel RB50-0

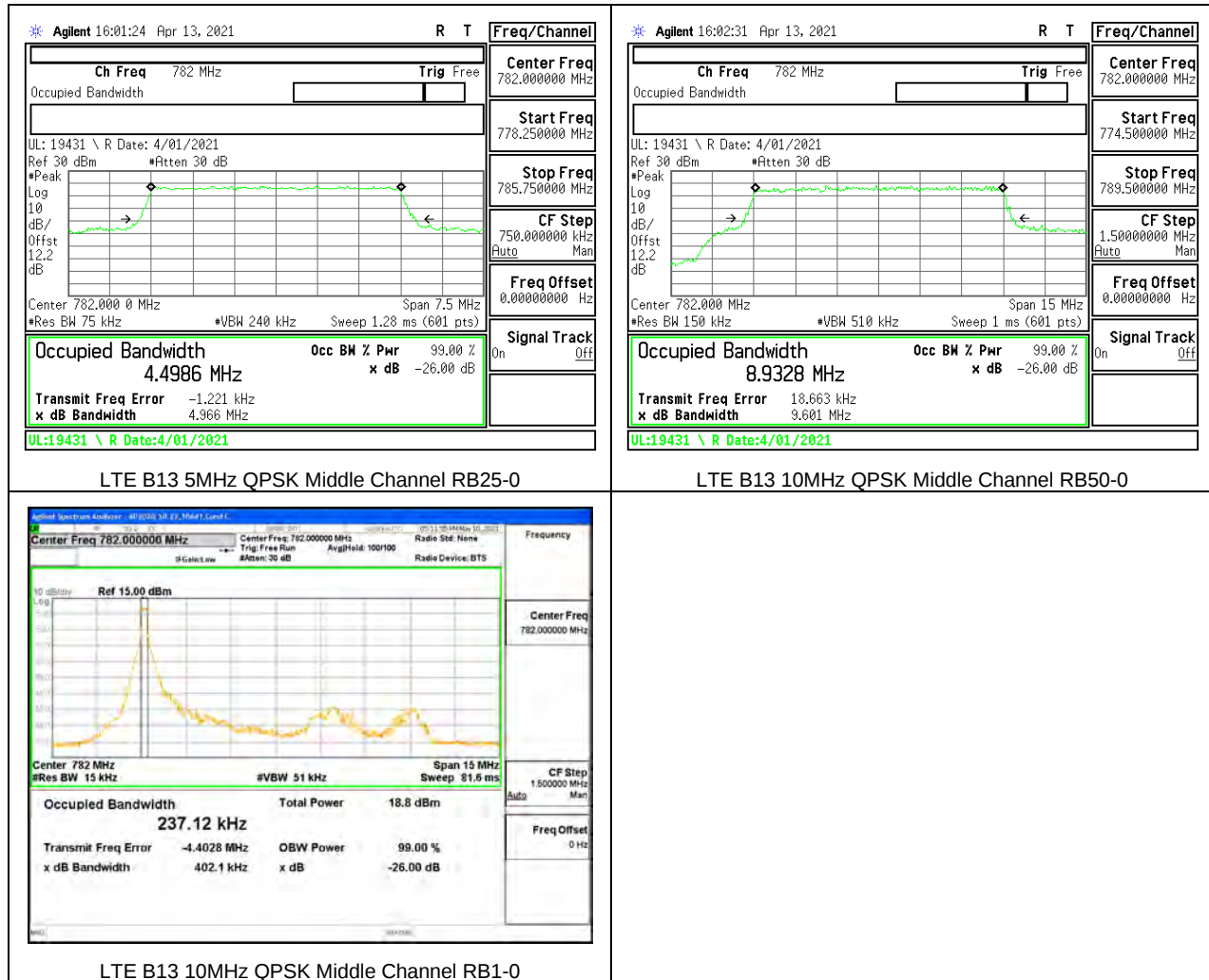


5G NR n12 15MHz BPSK Middle Channel RB75-0

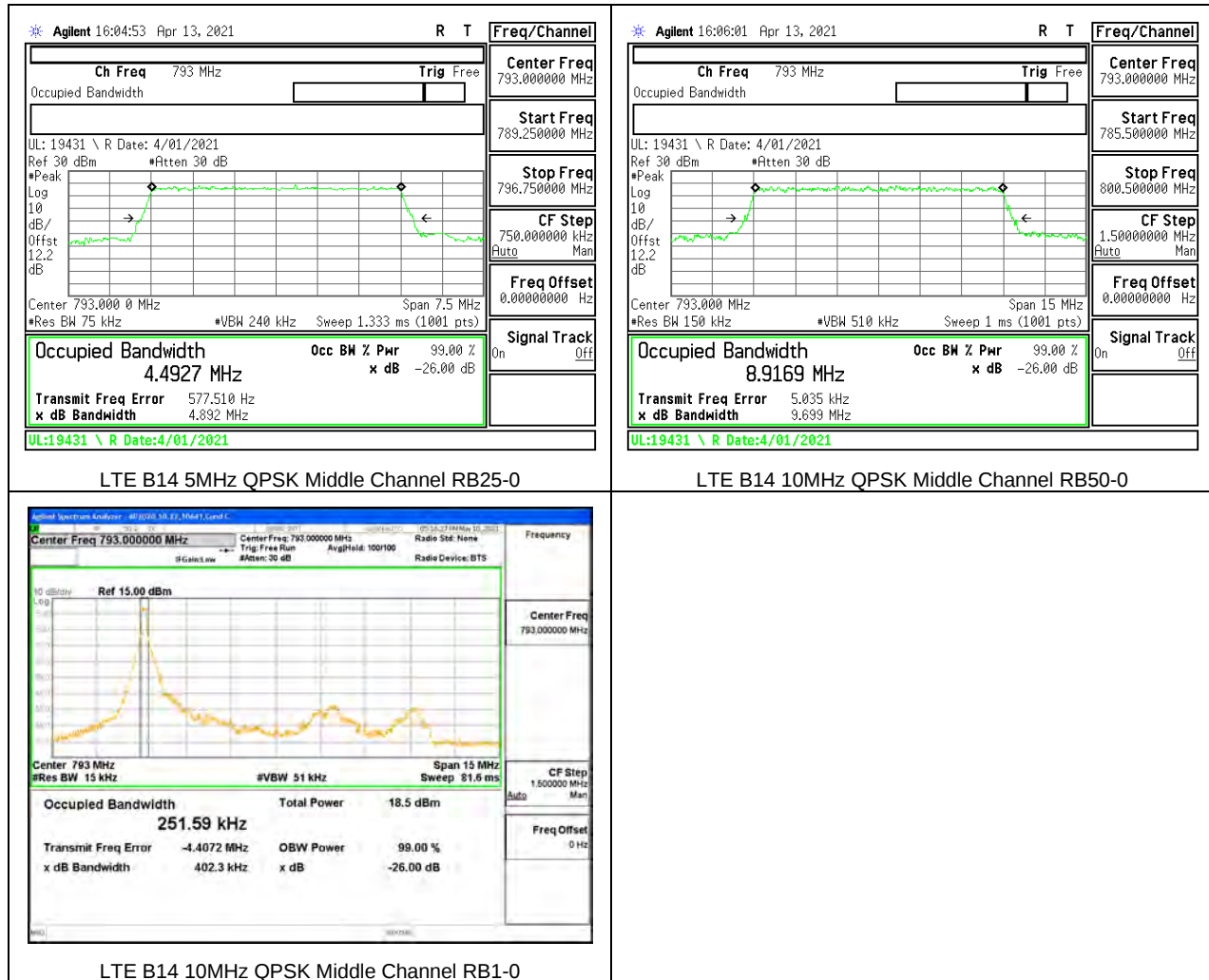


5G NR n12 15MHz BPSK Middle Channel RB1-0

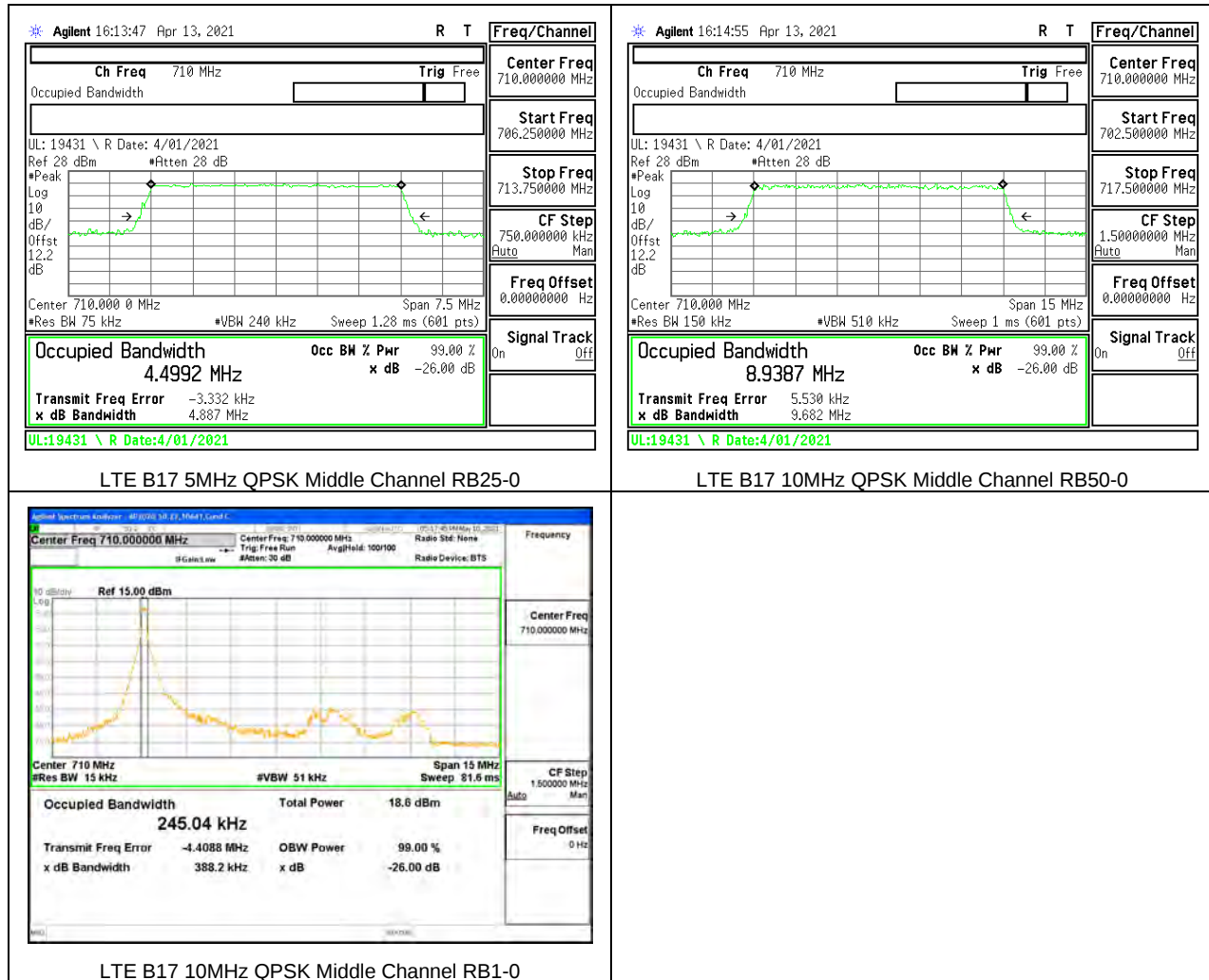
9.1.4. LTE BAND 13



9.1.5. LTE BAND 14

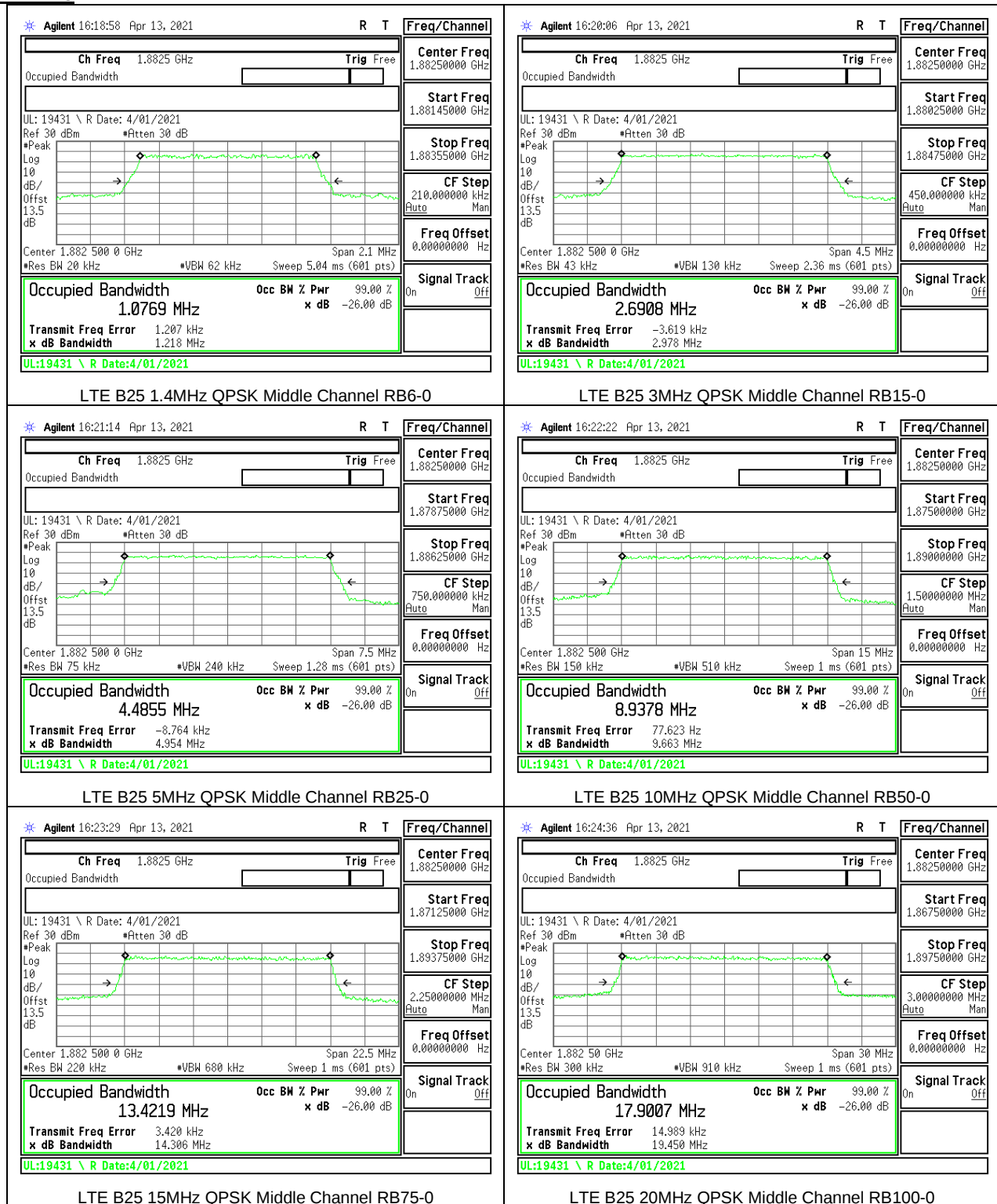


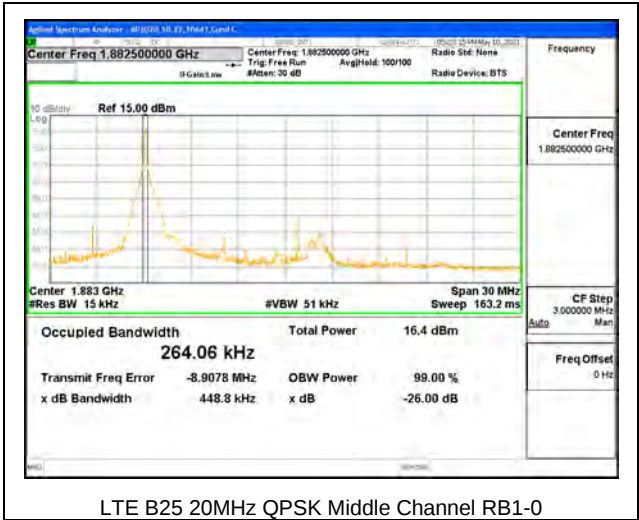
9.1.6. LTE BAND 17



9.1.7. LTE BAND 25 AND 5G NR n25

LTE BAND 25





LTE B25 20MHz QPSK Middle Channel RB1-0

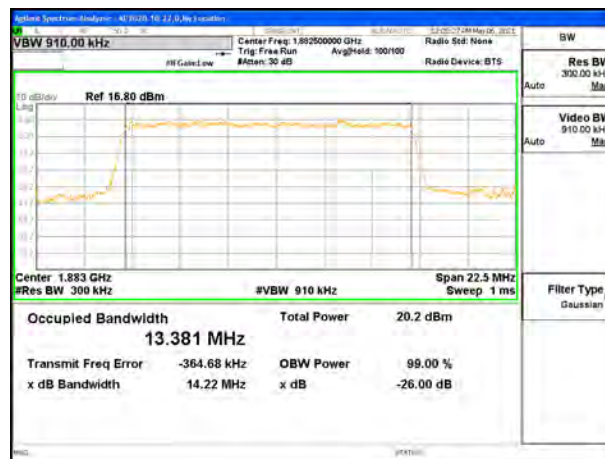
5G NR n25



5G NR n25 5MHz BPSK Middle Channel RB25-0



5G NR n25 10MHz BPSK Middle Channel RB50-0



5G NR n25 15MHz BPSK Middle Channel RB75-0



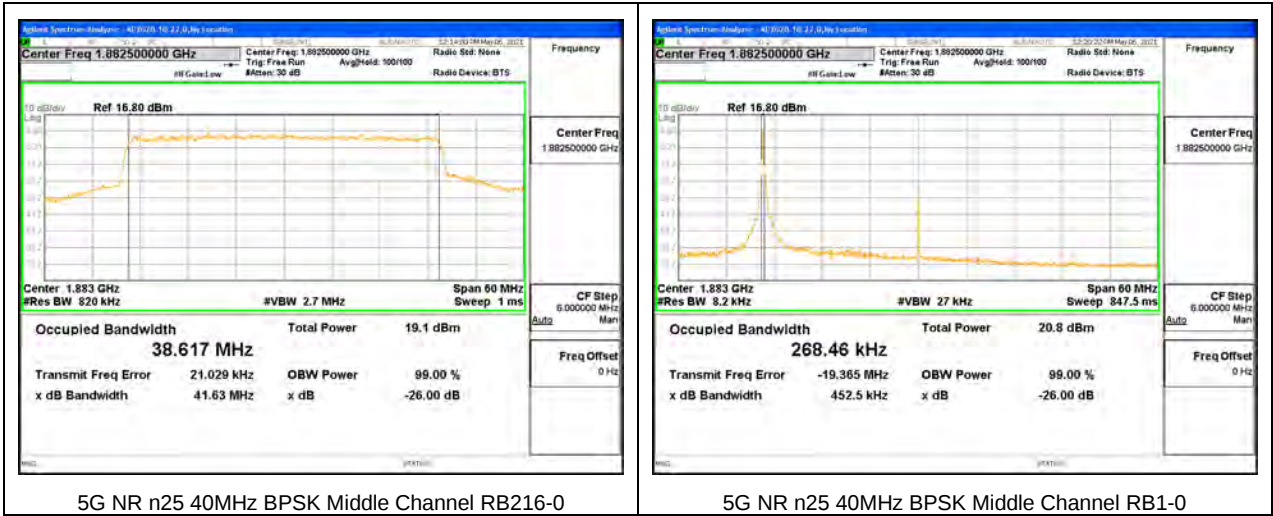
5G NR n25 20MHz BPSK Middle Channel RB100-0



5G NR n25 25MHz BPSK Middle Channel RB128-0



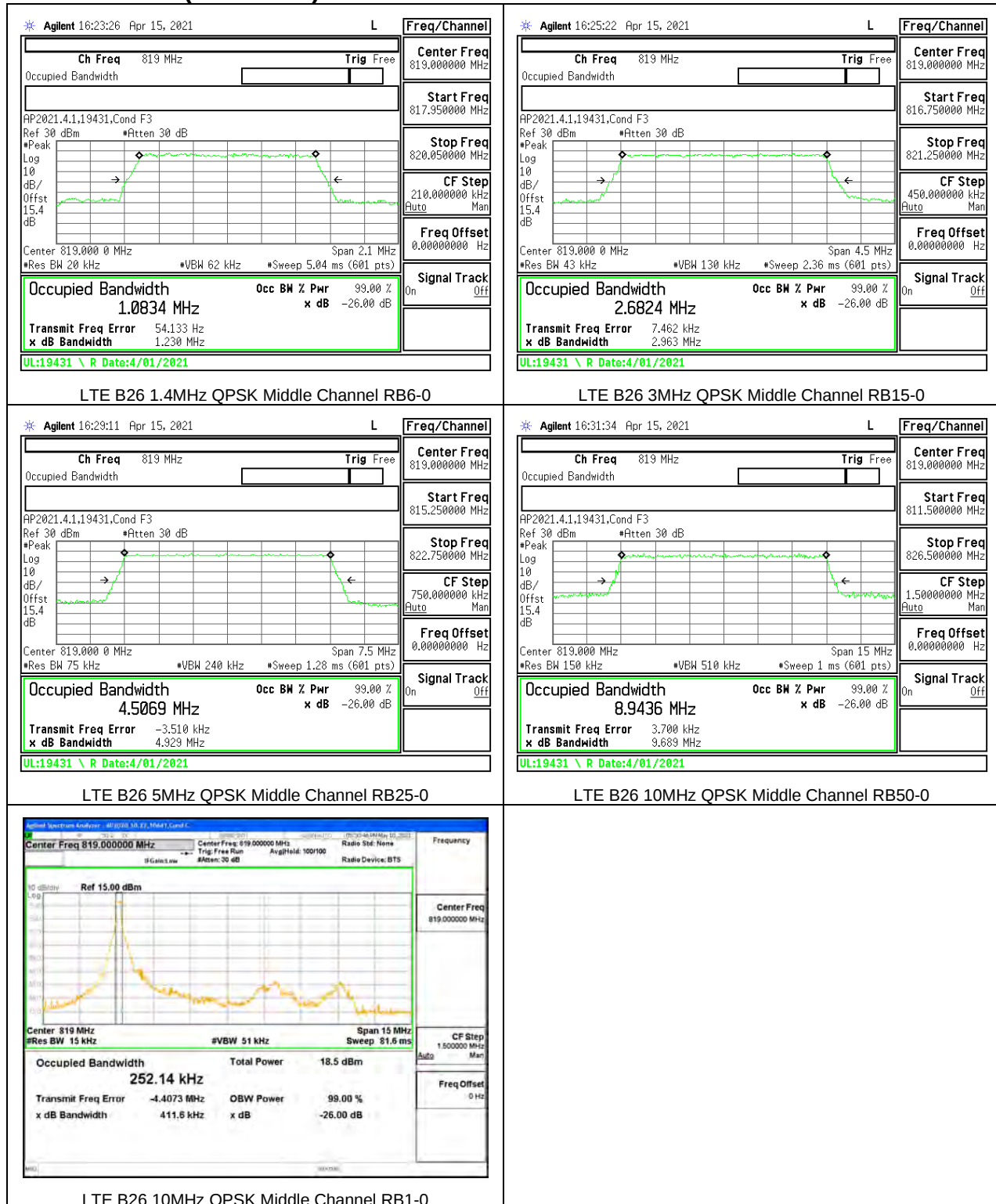
5G NR n25 30MHz BPSK Middle Channel RB160-0



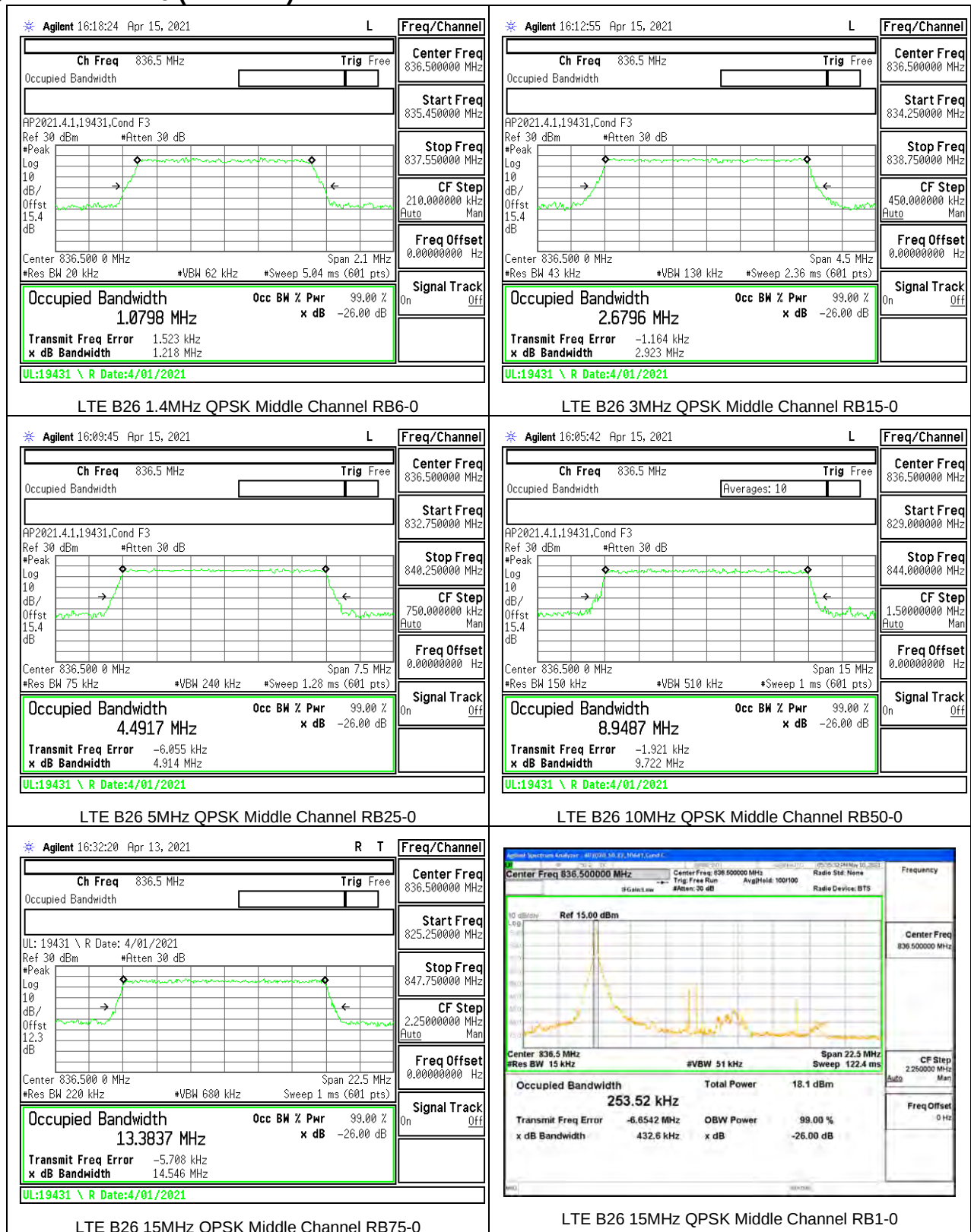
5G NR n25 40MHz BPSK Middle Channel RB216-0

5G NR n25 40MHz BPSK Middle Channel RB1-0

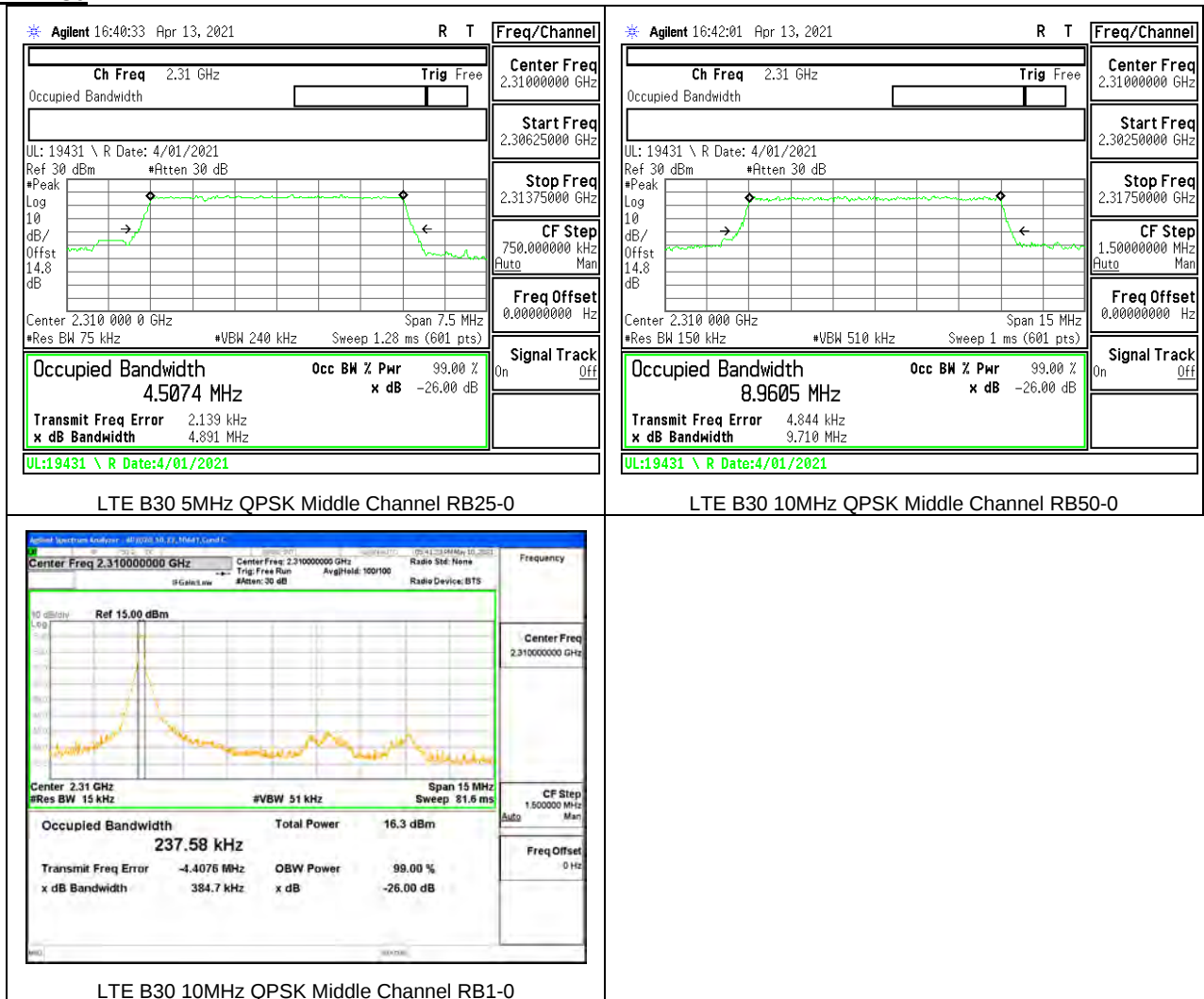
9.1.8. LTE BAND 26 (PART 90S)



9.1.9. LTE BAND 26 (PART 22)



9.1.10. LTE BAND 30 AND 5G NR 30 LTE BAND 30



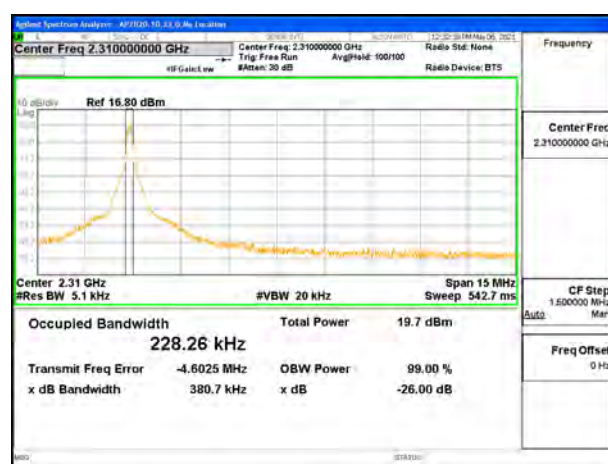
5G NR n30



5G NR n30 5MHz BPSK Middle Channel RB25-0



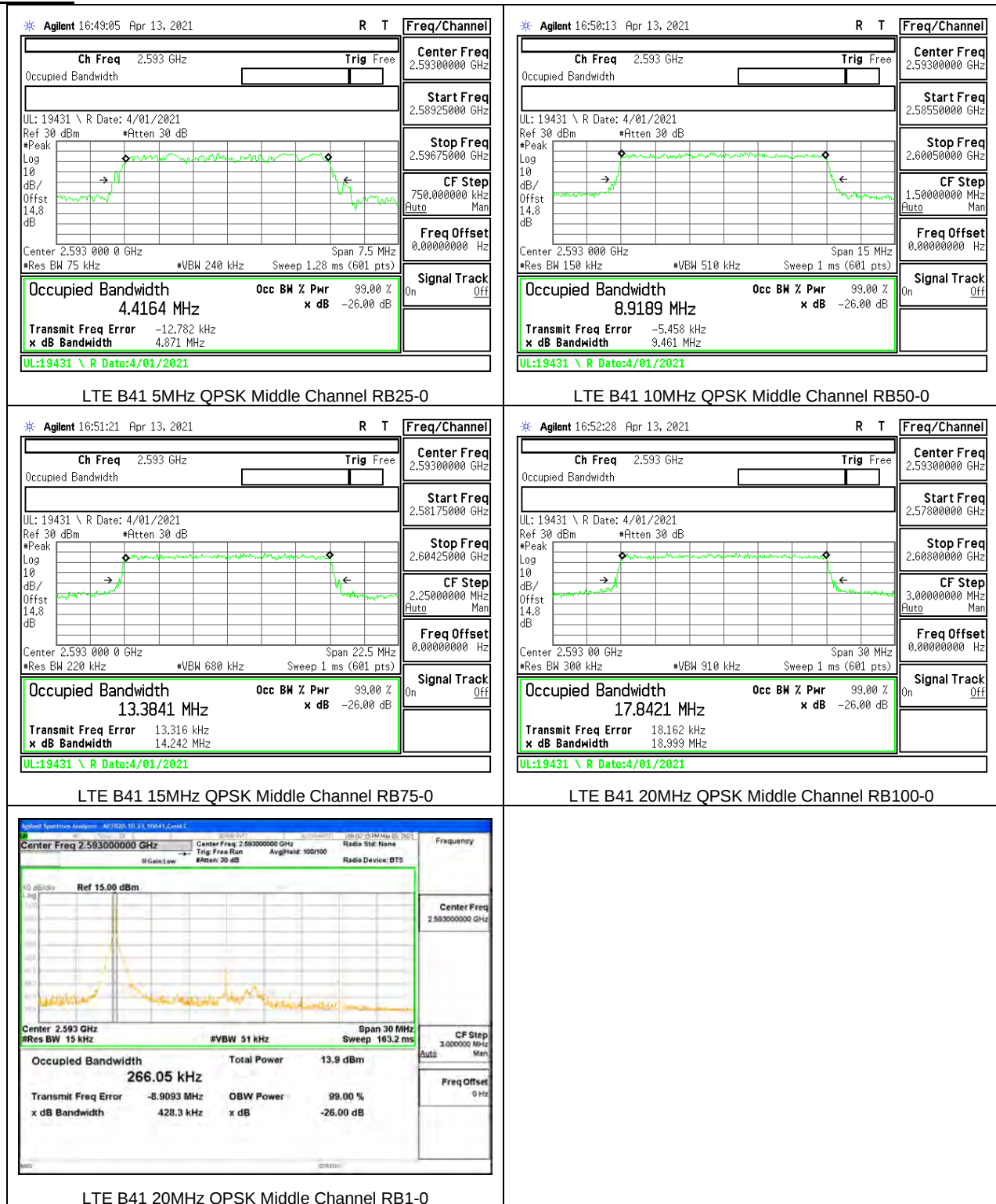
5G NR n30 10MHz BPSK Middle Channel RB50-0



5G NR n30 10MHz BPSK Middle Channel RB1-0

9.1.11. LTE BAND 41 AND 5G NR n41

LTE BAND 41



5G NR n41



5G NR n41 20MHz BPSK Middle Channel RB50-0



5G NR n41 30MHz BPSK Middle Channel RB75-0



5G NR n41 40MHz BPSK Middle Channel RB100-0



5G NR n41 50MHz BPSK Middle Channel RB128-0



5G NR n41 60MHz BPSK Middle Channel RB162-0



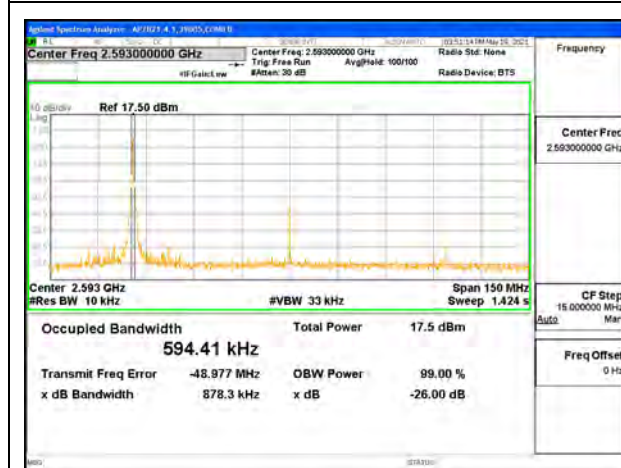
5G NR n41 80MHz BPSK Middle Channel RB216-0



5G NR n41 90MHz BPSK Middle Channel RB243-0



5G NR n41 100MHz BPSK Middle Channel RB270-0

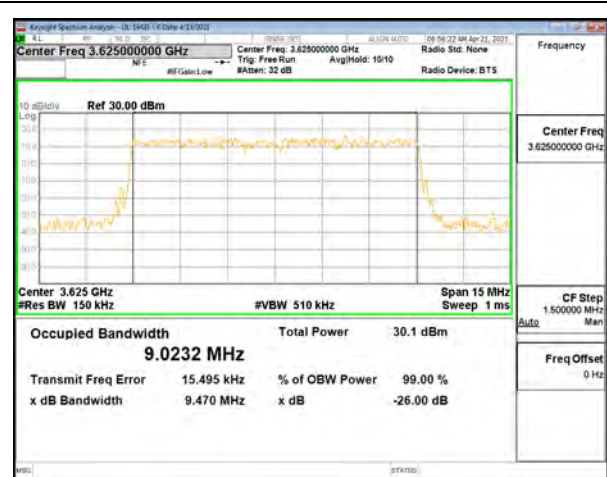


5G NR n41 100MHz BPSK Middle Channel RB1-0

9.1.12. LTE BAND 48



LTE B48 5MHz QPSK Middle Channel RB25-0



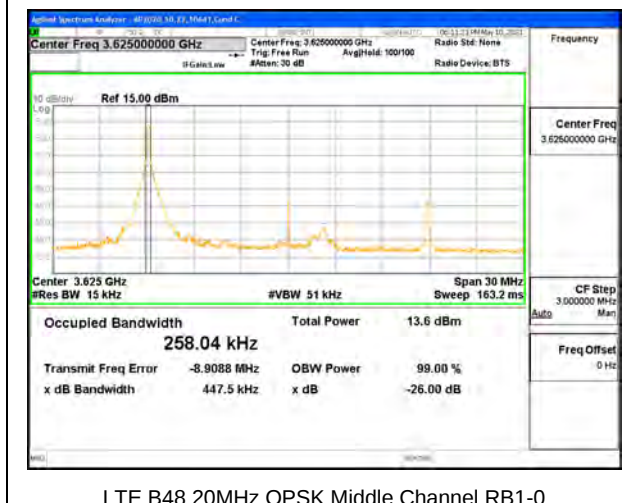
LTE B48 10MHz QPSK Middle Channel RB50-0



LTE B48 15MHz QPSK Middle Channel RB75-0



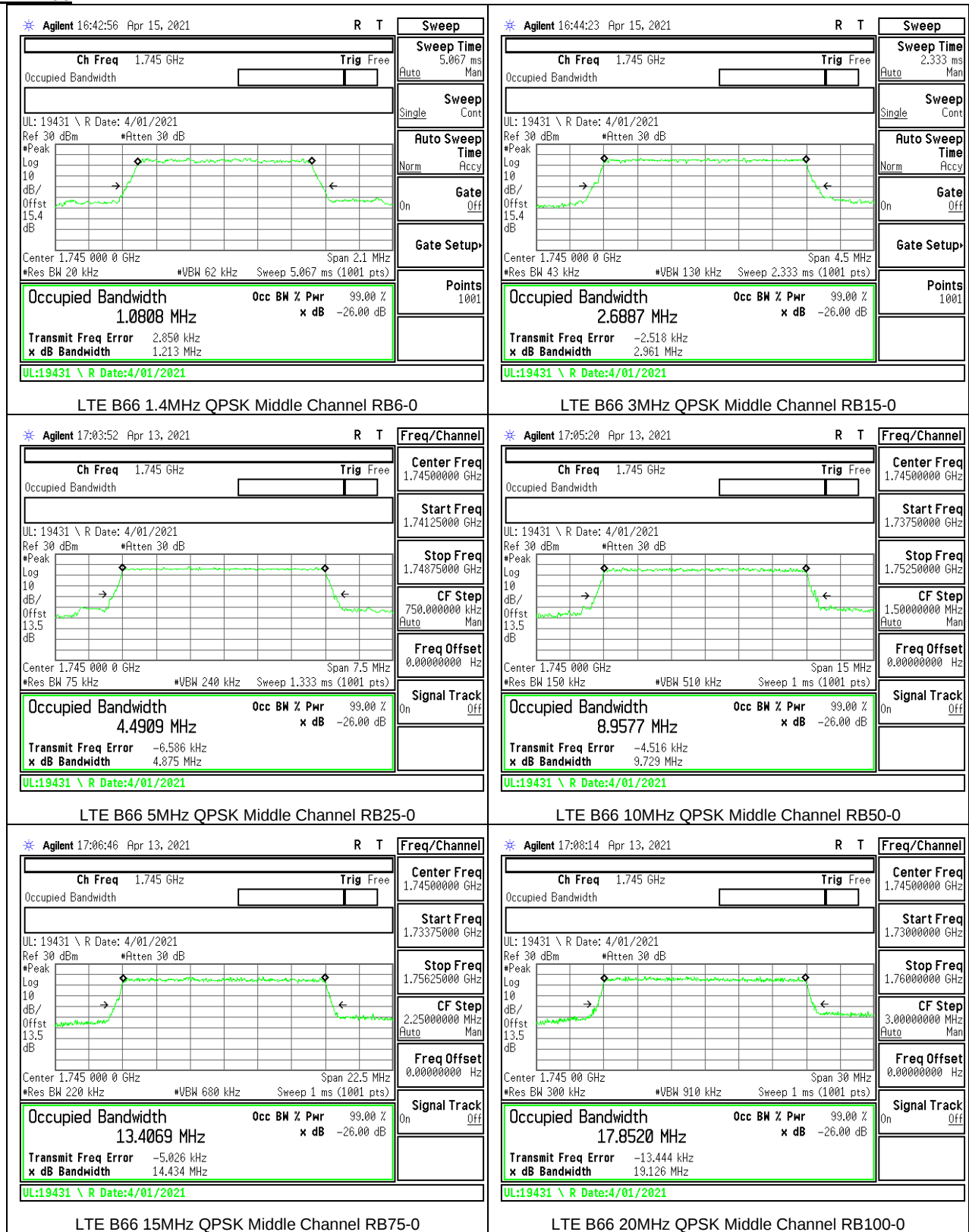
LTE B48 20MHz QPSK Middle Channel RB100-0

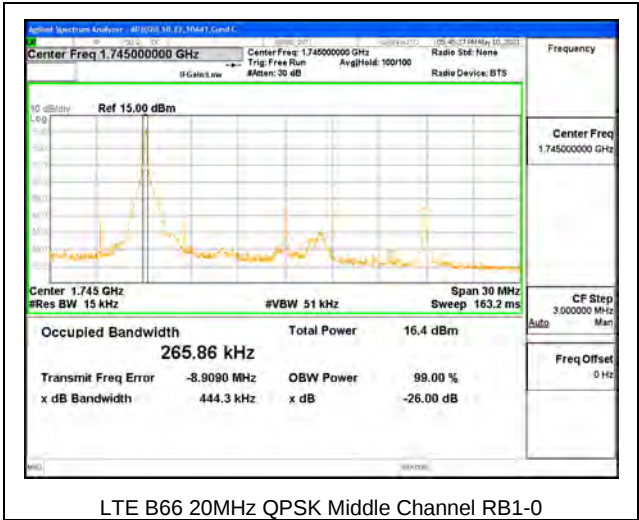


LTE B48 20MHz QPSK Middle Channel RB1-0

9.1.13. LTE BAND 66 AND 5G NR n66

LTE BAND 66





5G NR n66



5G NR n66 5MHz BPSK Middle Channel RB25-0



5G NR n66 10MHz BPSK Middle Channel RB50-0



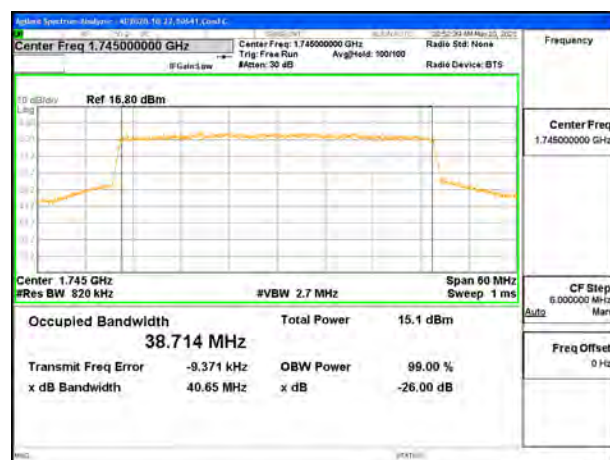
5G NR n66 15MHz BPSK Middle Channel RB75-0



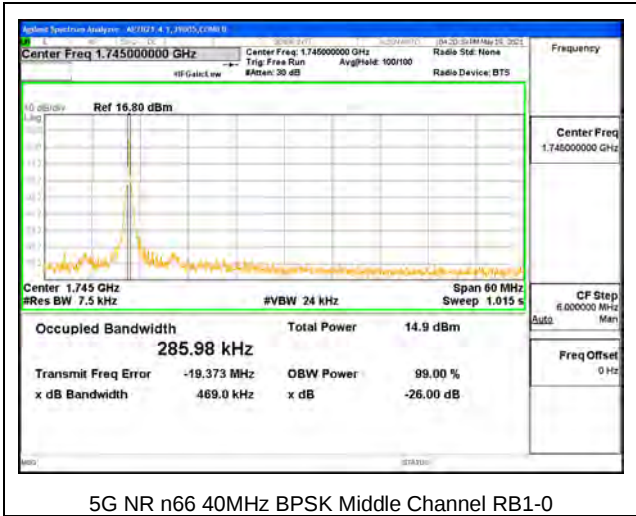
5G NR n66 20MHz BPSK Middle Channel RB100-0



5G NR n66 30MHz BPSK Middle Channel RB160-0

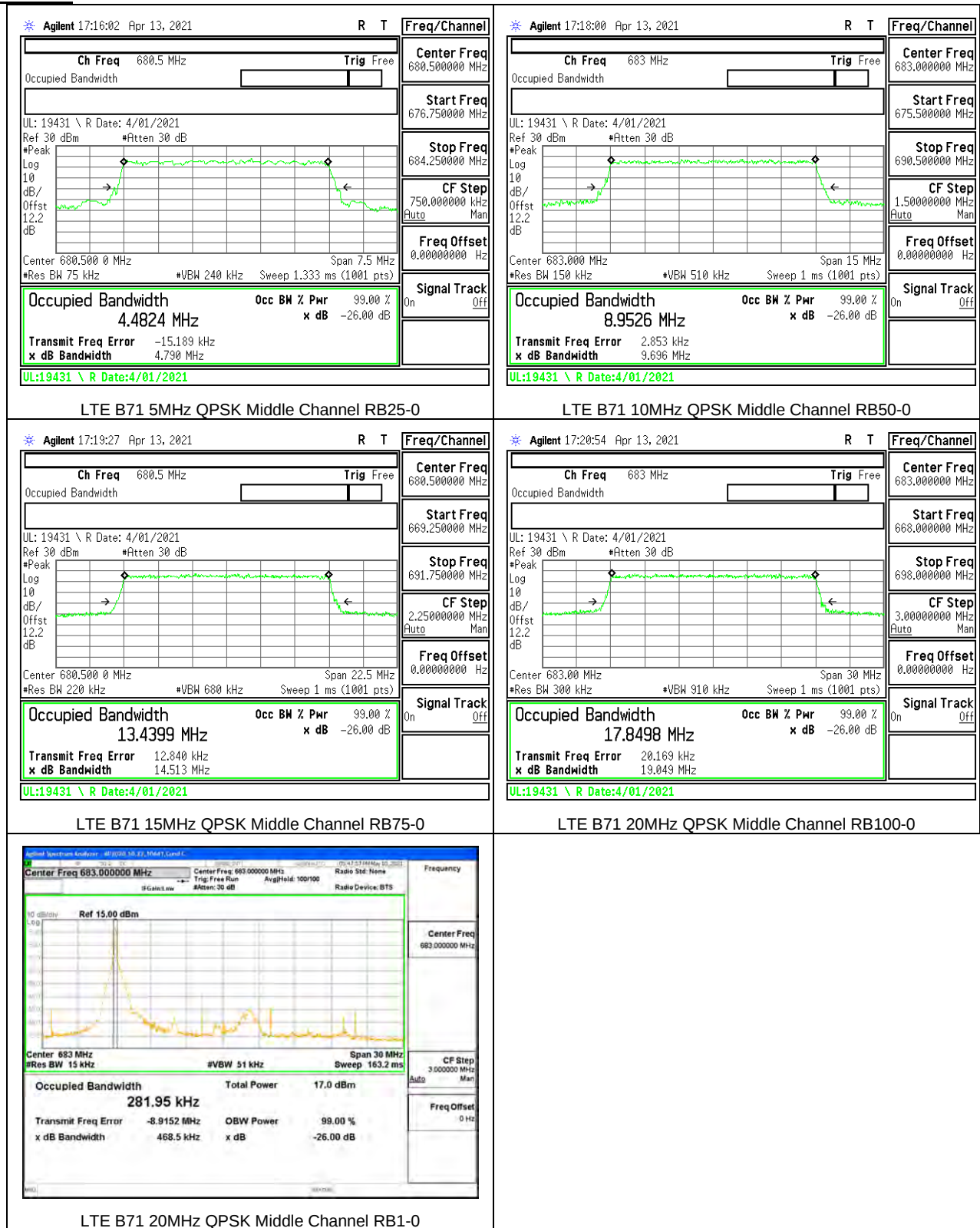


5G NR n66 40MHz BPSK Middle Channel RB216-0

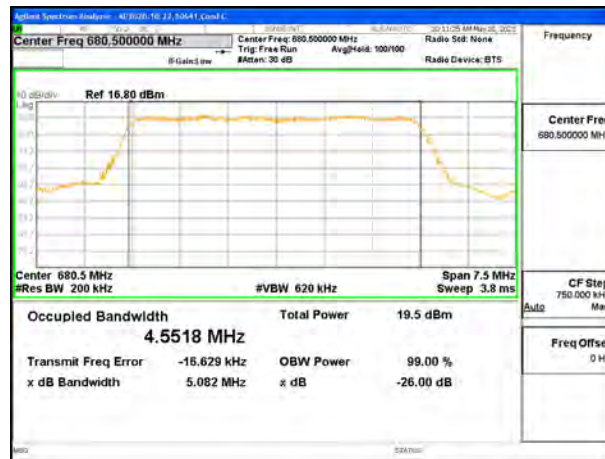


9.1.14. LTE BAND 71 AND 5G NR n71

LTE BAND 71



5G NR n71



5G NR n71 5MHz BPSK Middle Channel RB25-0



5G NR n71 10MHz BPSK Middle Channel RB50-0



5G NR n71 15MHz BPSK Middle Channel RB75-0



5G NR n71 20MHz BPSK Middle Channel RB100-0



5G NR n71 20MHz BPSK Middle Channel RB1-0

9.1.15. 5G NR n77 (Part 27 3450-3550MHz)



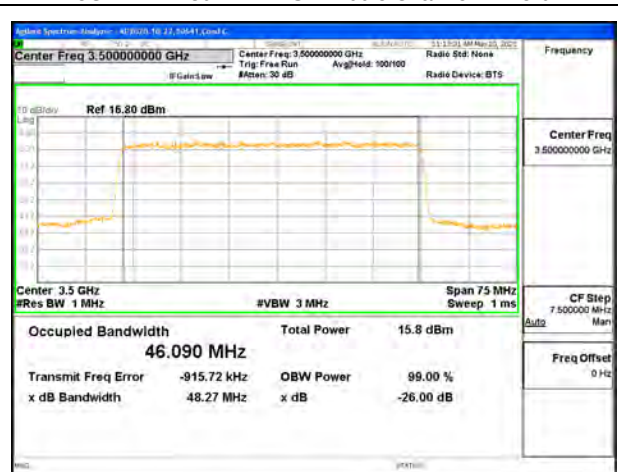
5G NR n77 20MHz BPSK Middle Channel RB50-0



5G NR n77 30MHz BPSK Middle Channel RB75-0



5G NR n77 40MHz BPSK Middle Channel RB100-0



5G NR n77 50MHz BPSK Middle Channel RB128-0



5G NR n77 60MHz BPSK Middle Channel RB162-0



5G NR n77 70MHz BPSK Middle Channel RB180-0



5G NR n77 80MHz BPSK Middle Channel RB216-0



5G NR n77 90MHz BPSK Middle Channel RB243-0

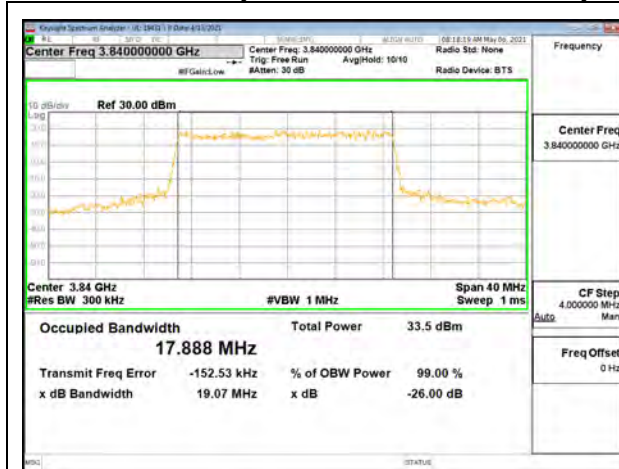


5G NR n77 100MHz BPSK Middle Channel RB270-0



5G NR n77 100MHz BPSK Middle Channel RB1-0

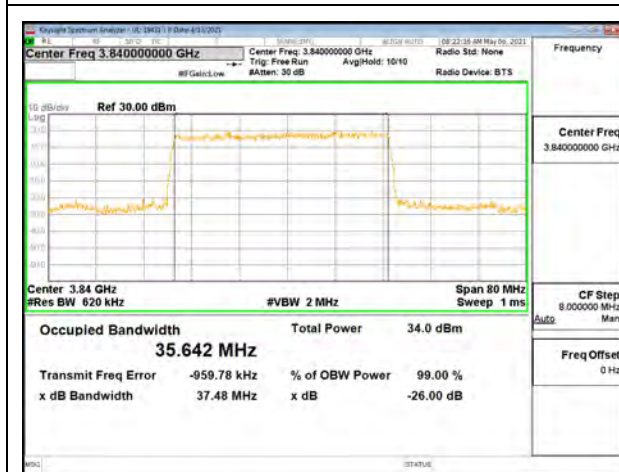
9.1.16. 5G NR n77 (Part 27 3700-3980MHz)



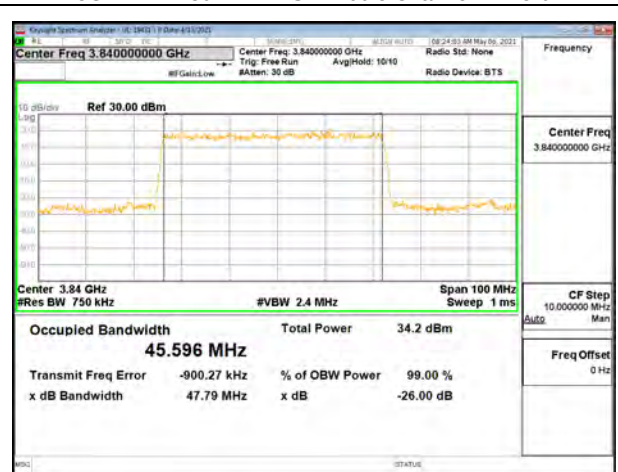
5G NR n77 20MHz BPSK Middle Channel RB50-0



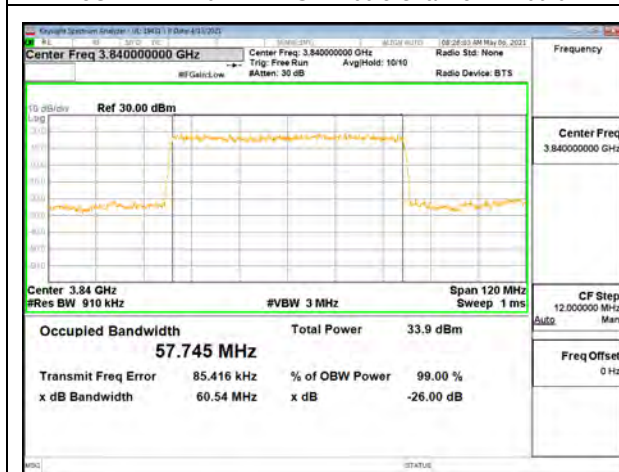
5G NR n77 30MHz BPSK Middle Channel RB75-0



5G NR n77 40MHz BPSK Middle Channel RB100-0



5G NR n77 50MHz BPSK Middle Channel RB128-0



5G NR n77 60MHz BPSK Middle Channel RB162-0



5G NR n77 70MHz BPSK Middle Channel RB180-0



9.2. EMISSION MASK AND ADJACENT CHANNEL POWER

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.

TEST PROCEDURE (FCC LTE BAND 48, 5G NR n77 FCC Part 96)

(i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

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

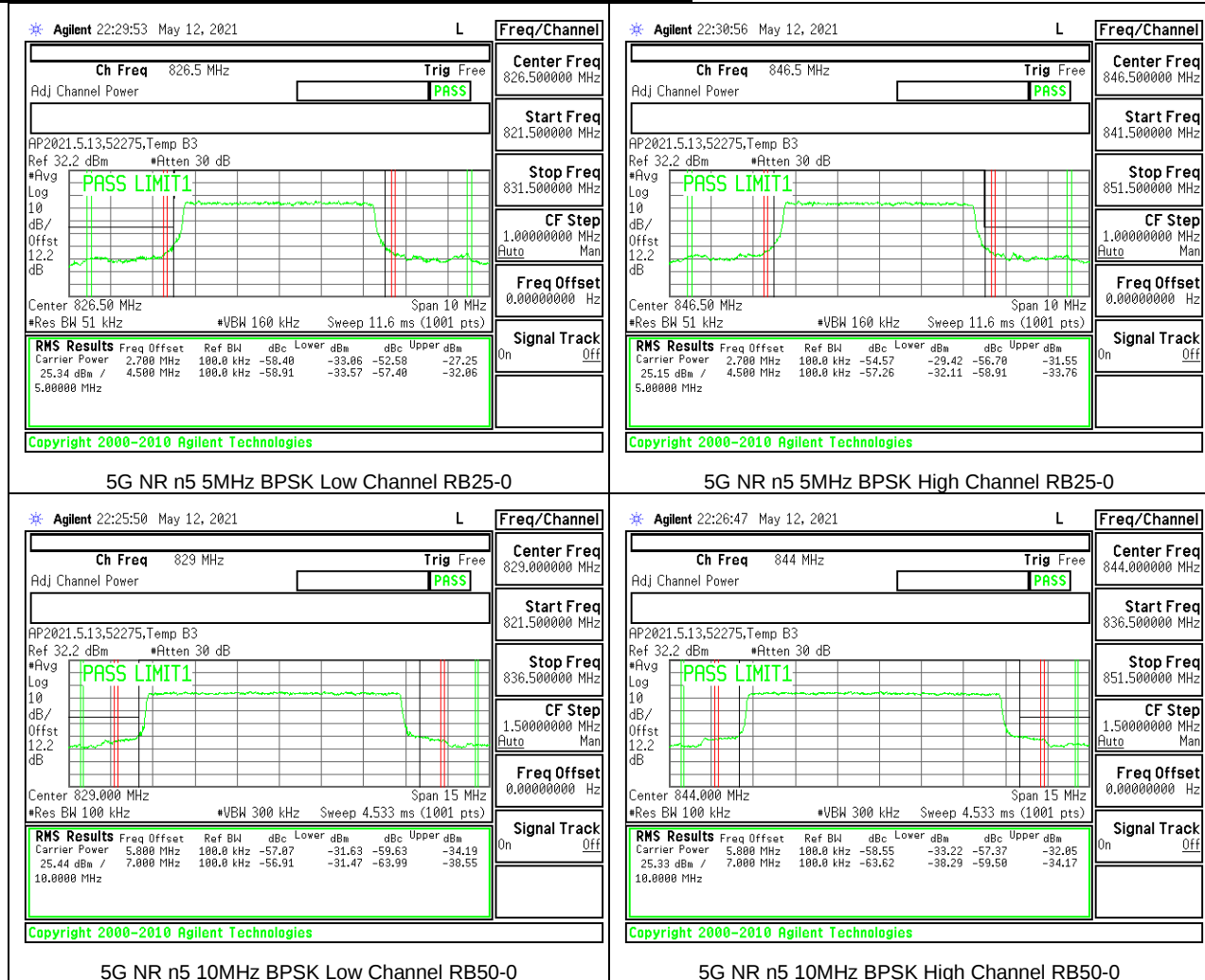
RESULTS

9.2.1. LTE BAND 5 AND 5G NR n5 ADJACENT CHANNEL POWER LIMITS

FCC: §22.917 (a)

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.

5G NR n5 ADJACENT CHANNEL POWER AND EMISSION MASK





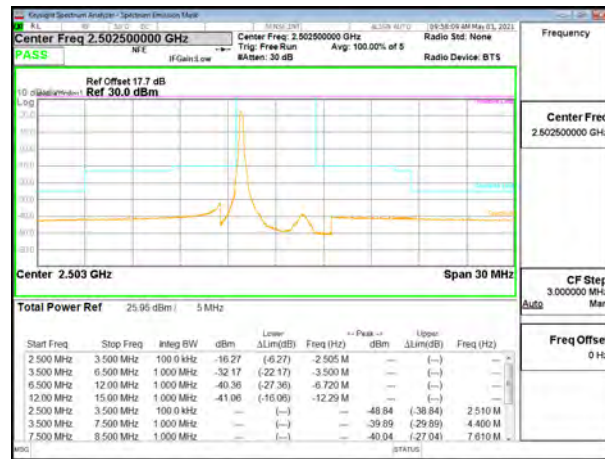
9.2.2. LTE BAND 7 ADJACENT CHANNEL POWER AND EMISSION MASK

LIMITS

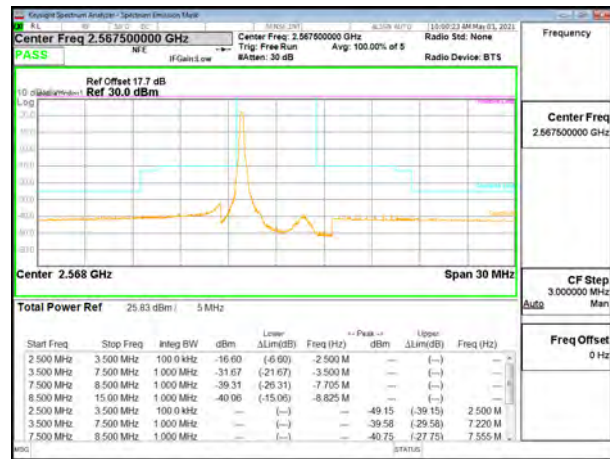
FCC: §27.53

(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.

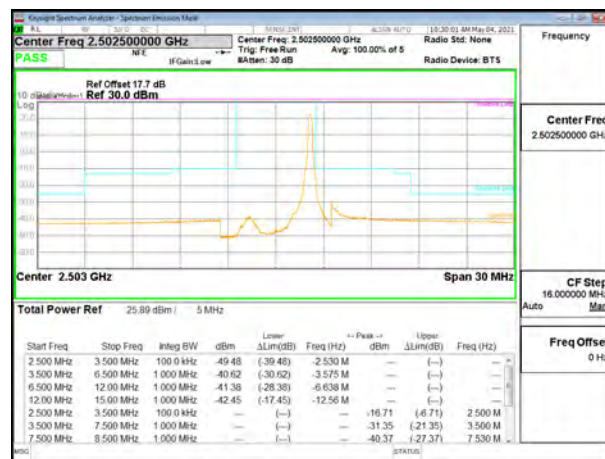
LTE BAND 7 EMISSION MASK



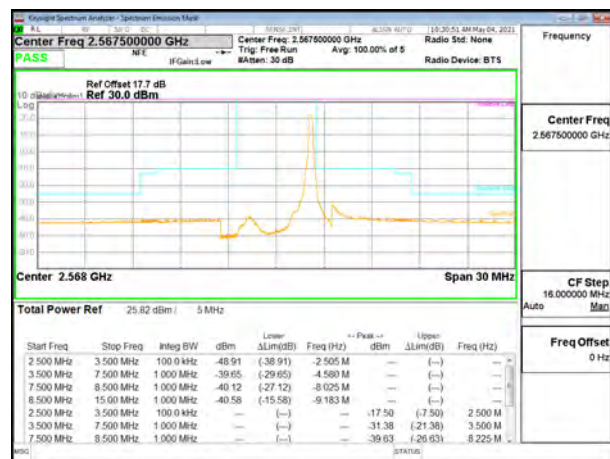
LTE B7 5MHz QPSK Low Channel RB1-0



LTE B7 5MHz QPSK Middle Channel RB1-0



LTE B7 5MHz QPSK Low Channel RB1-24



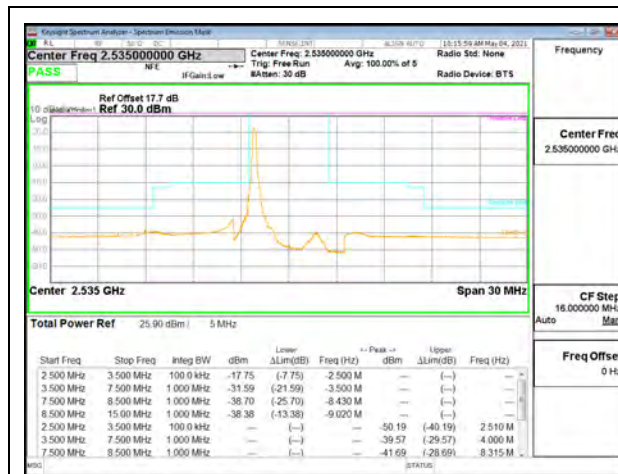
LTE B7 5MHz QPSK Middle Channel RB1-24



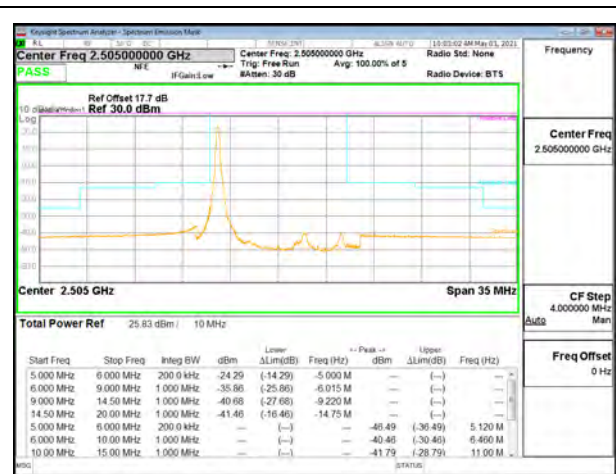
LTE B7 5MHz QPSK Low Channel RB25-0



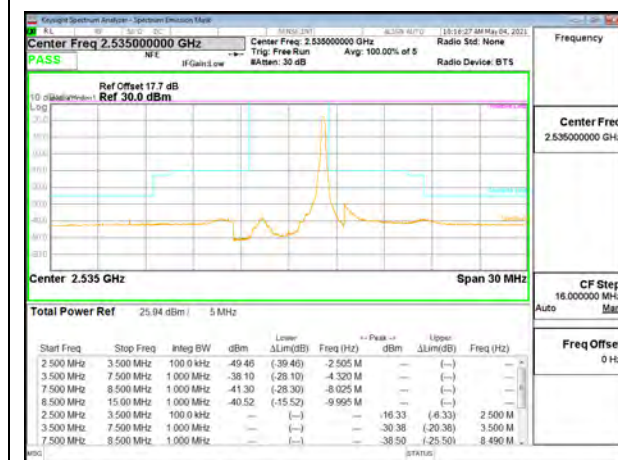
LTE B7 5MHz QPSK Middle Channel RB25-0



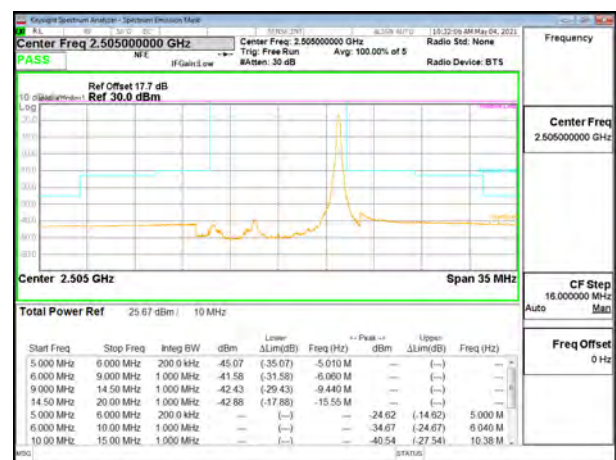
LTE B7 5MHz QPSK High Channel RB1-0



LTE B7 10MHz QPSK Low Channel RB1-0



LTE B7 5MHz QPSK High Channel RB1-24



LTE B7 10MHz QPSK Low Channel RB1-49



LTE B7 5MHz QPSK High Channel RB25-0



LTE B7 10MHz QPSK Low Channel RB50-0

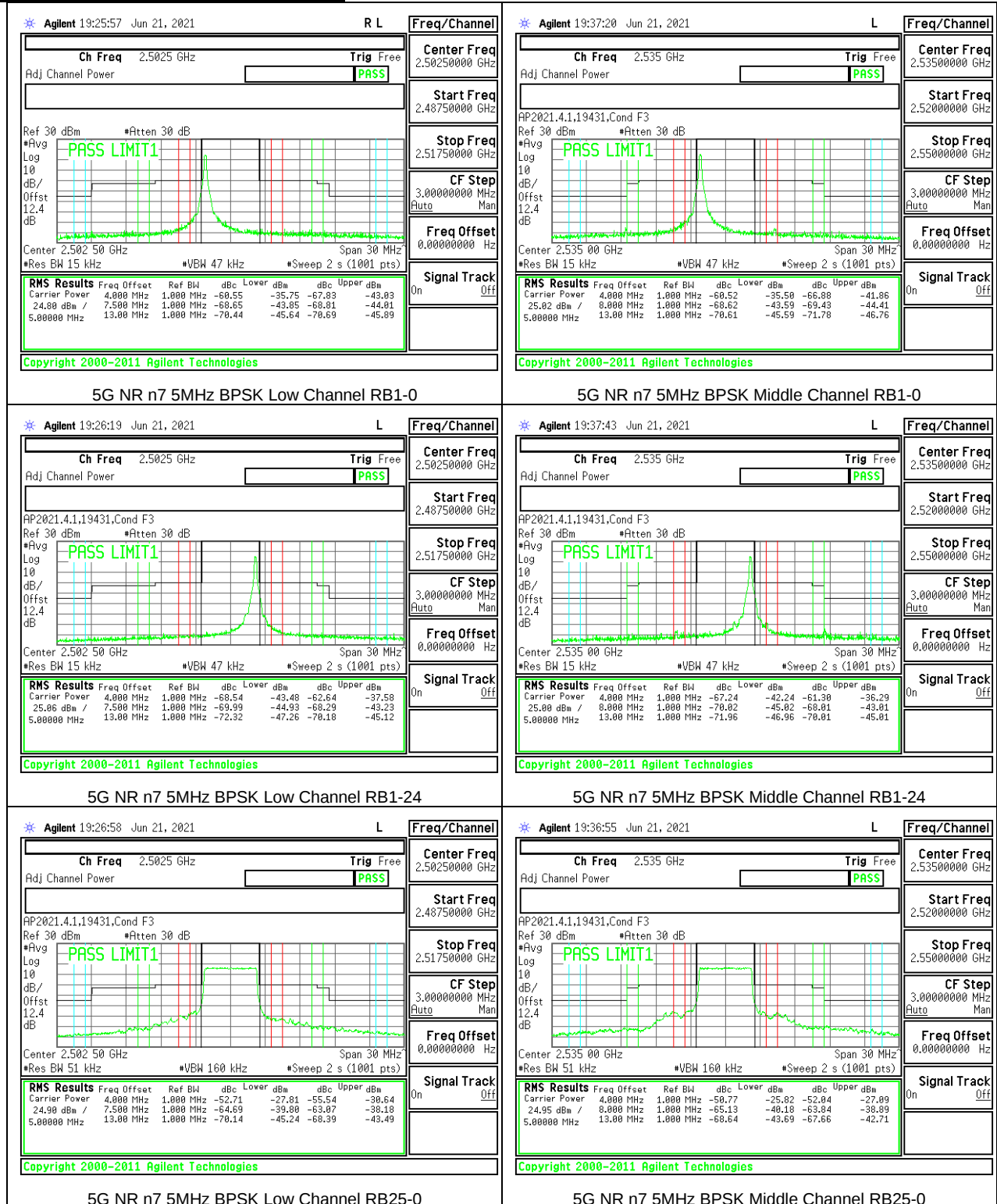


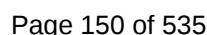


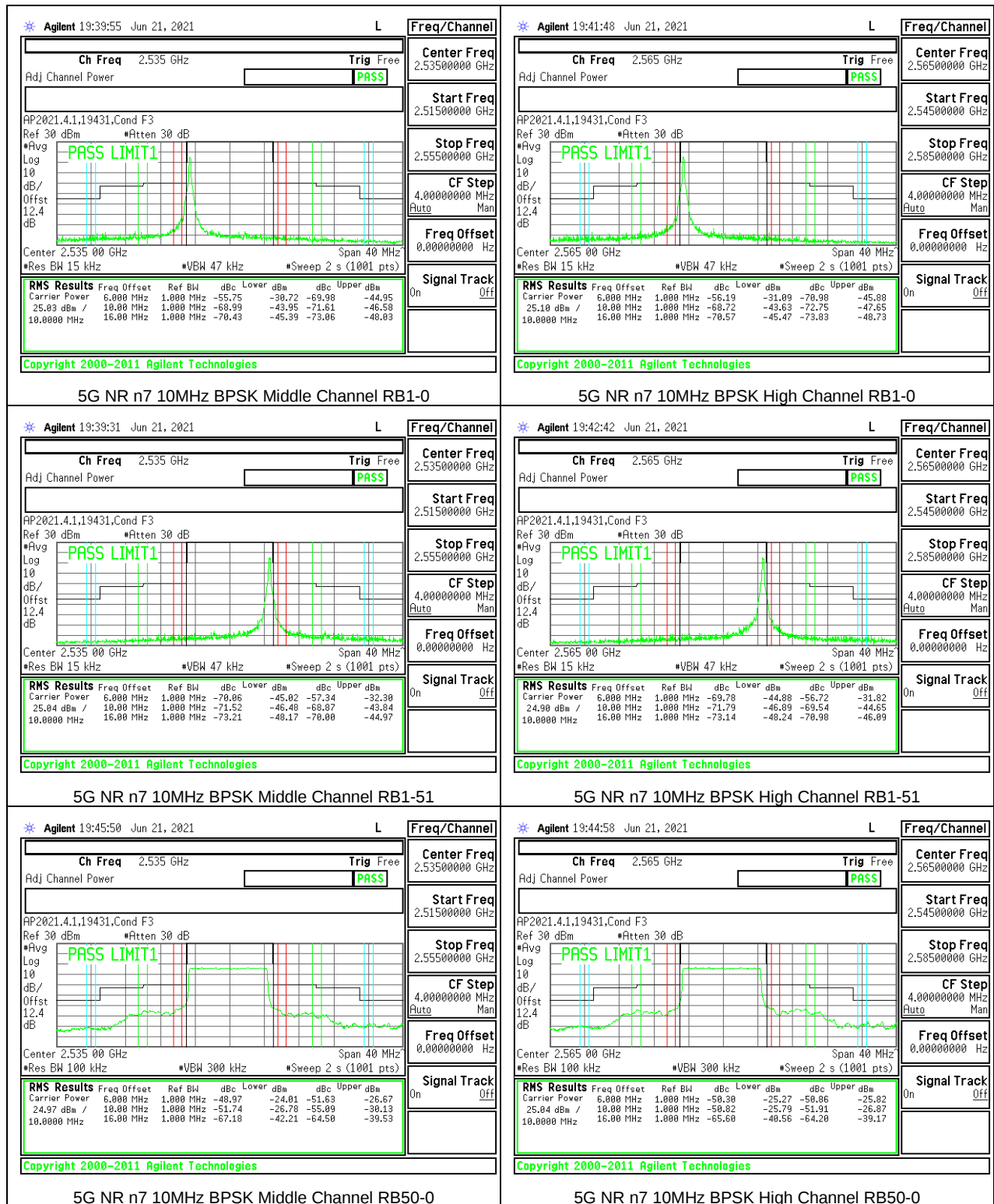


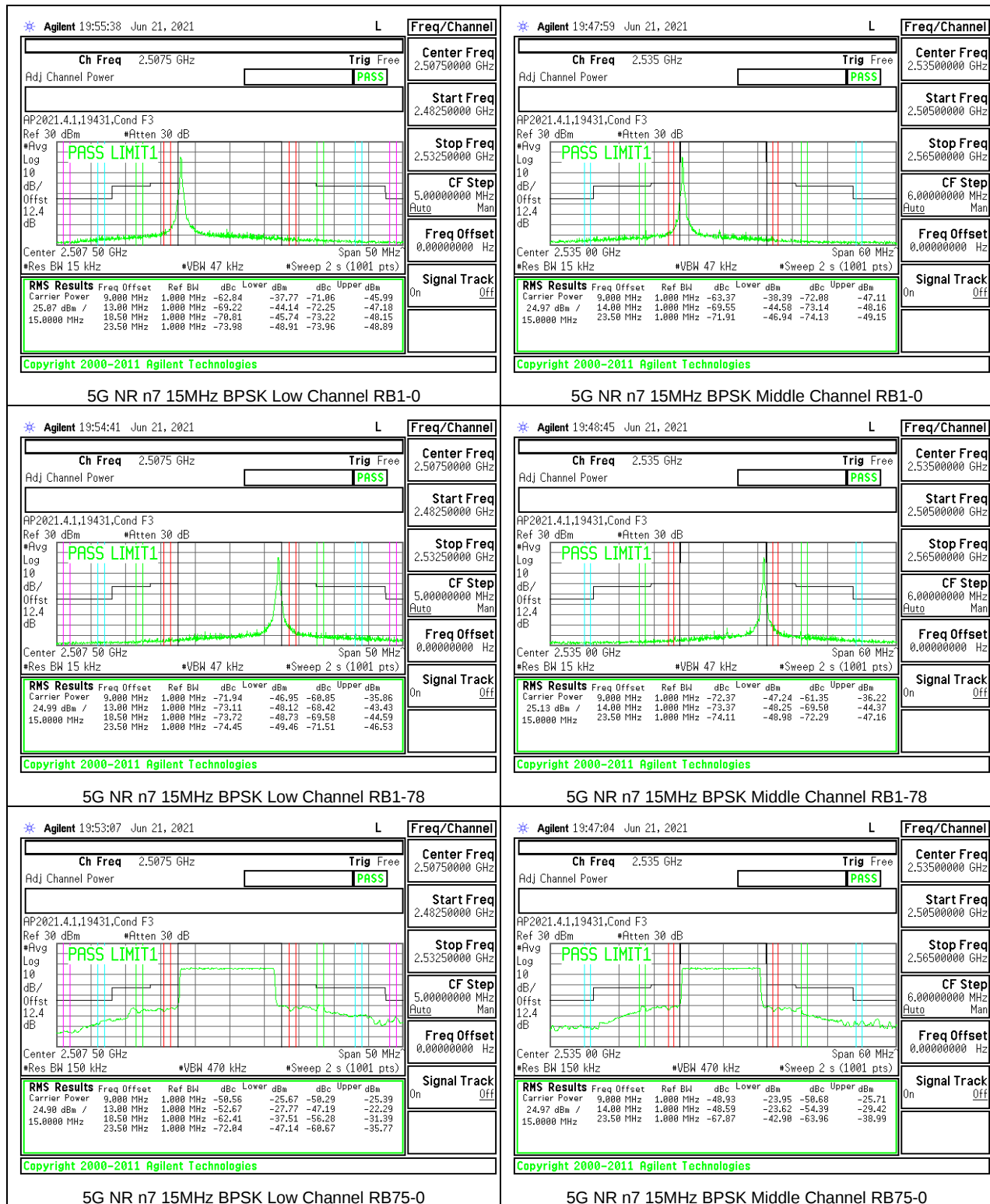


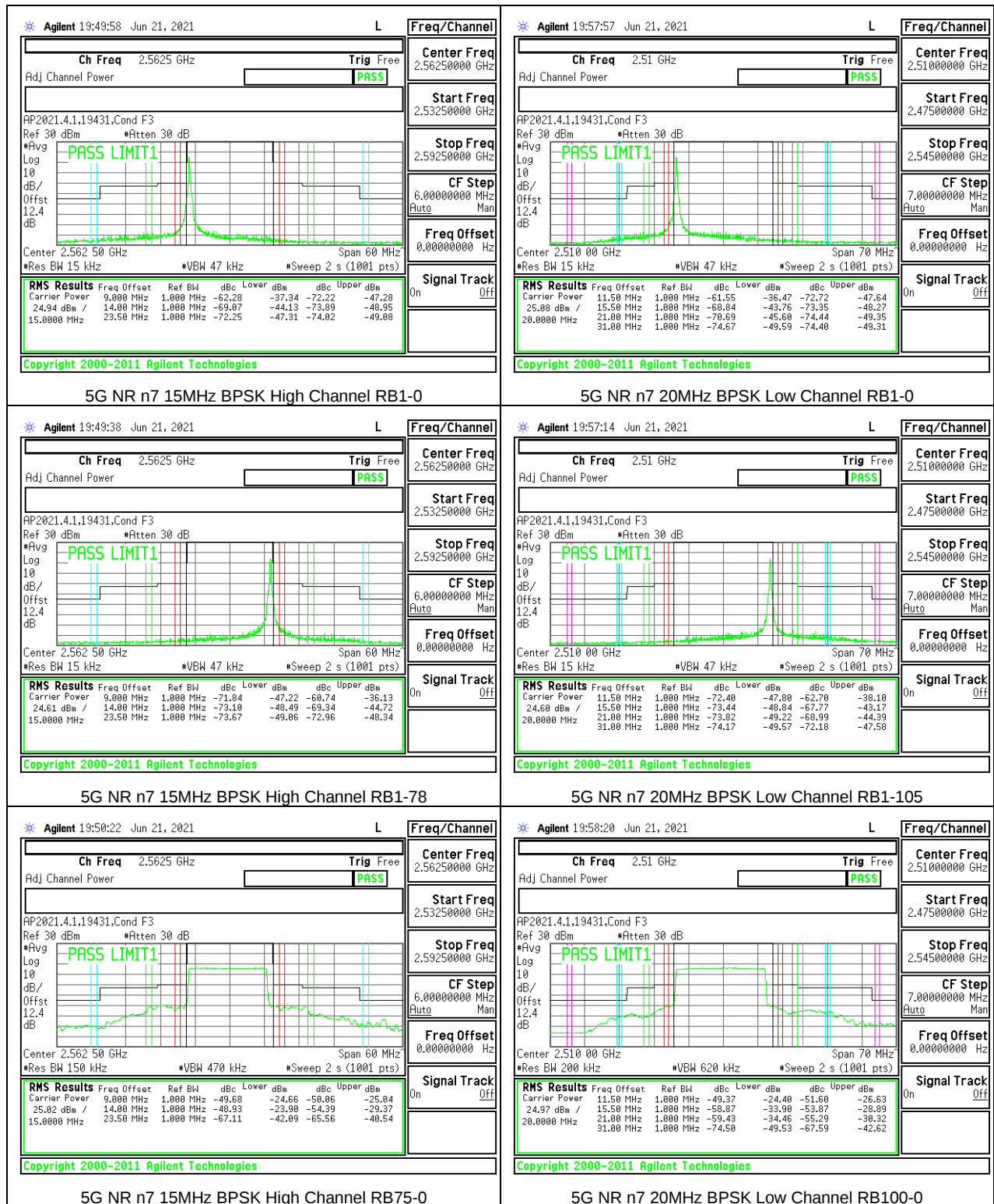
5G NR n7 ADJACENT CHANNEL POWER

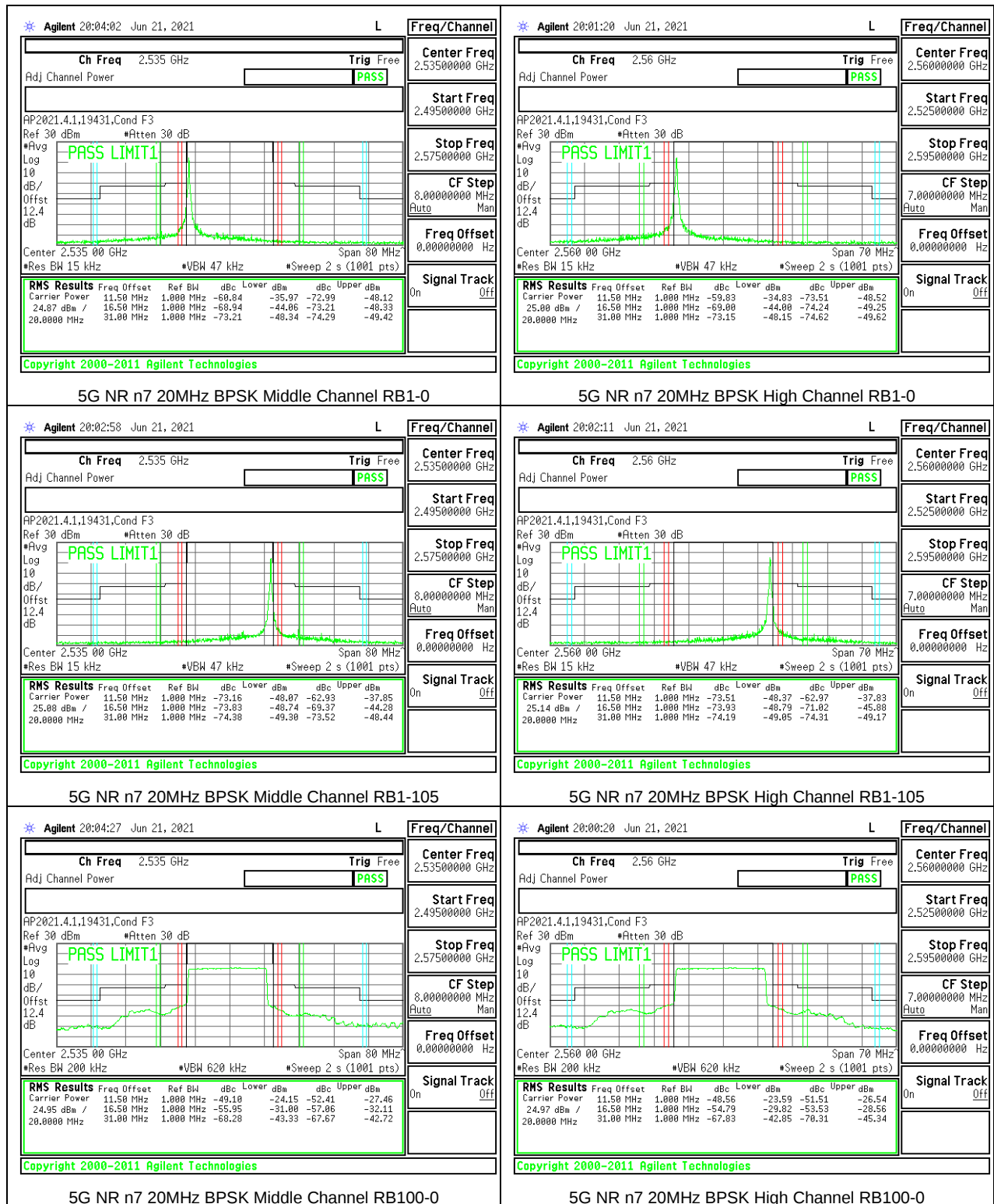


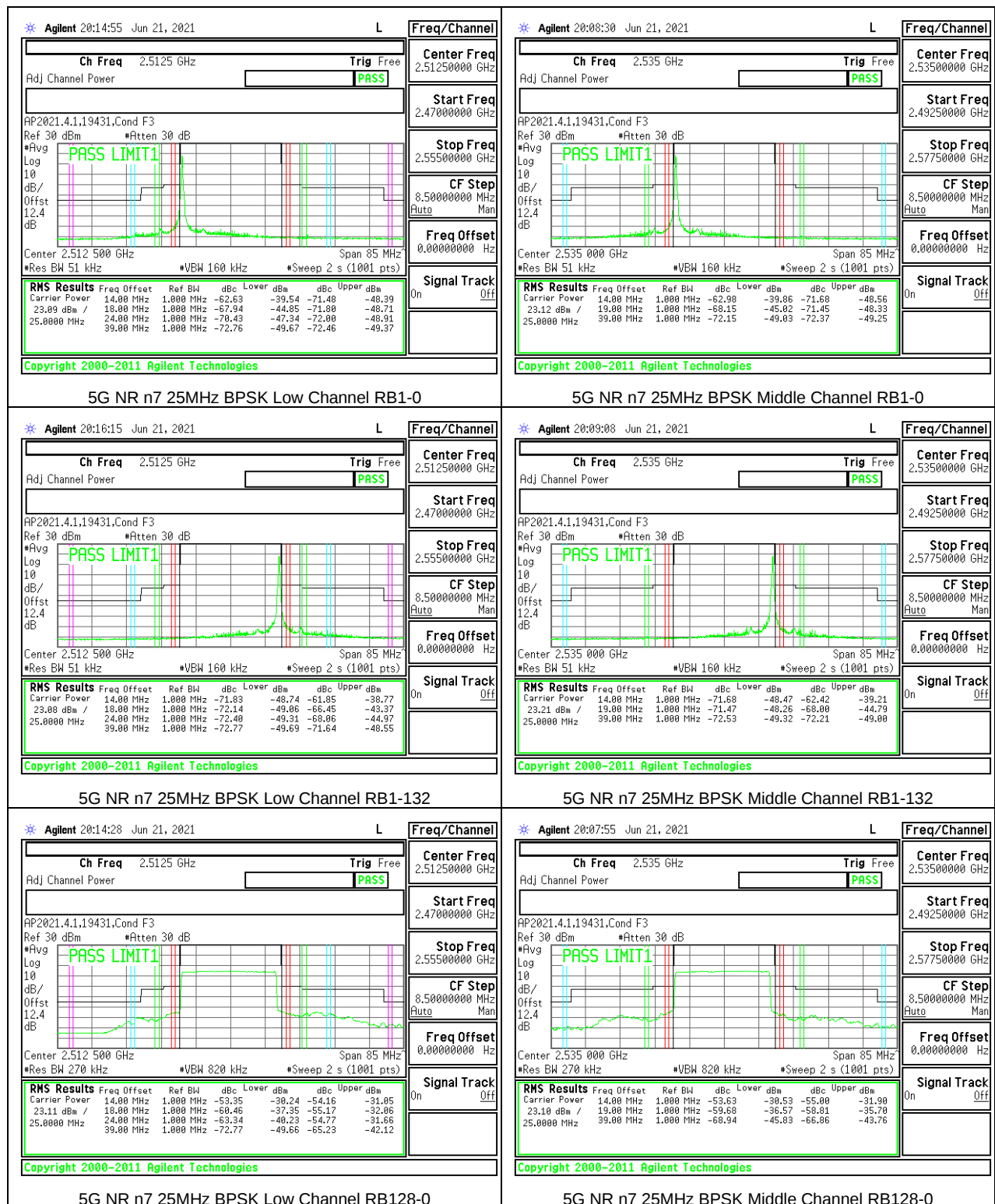


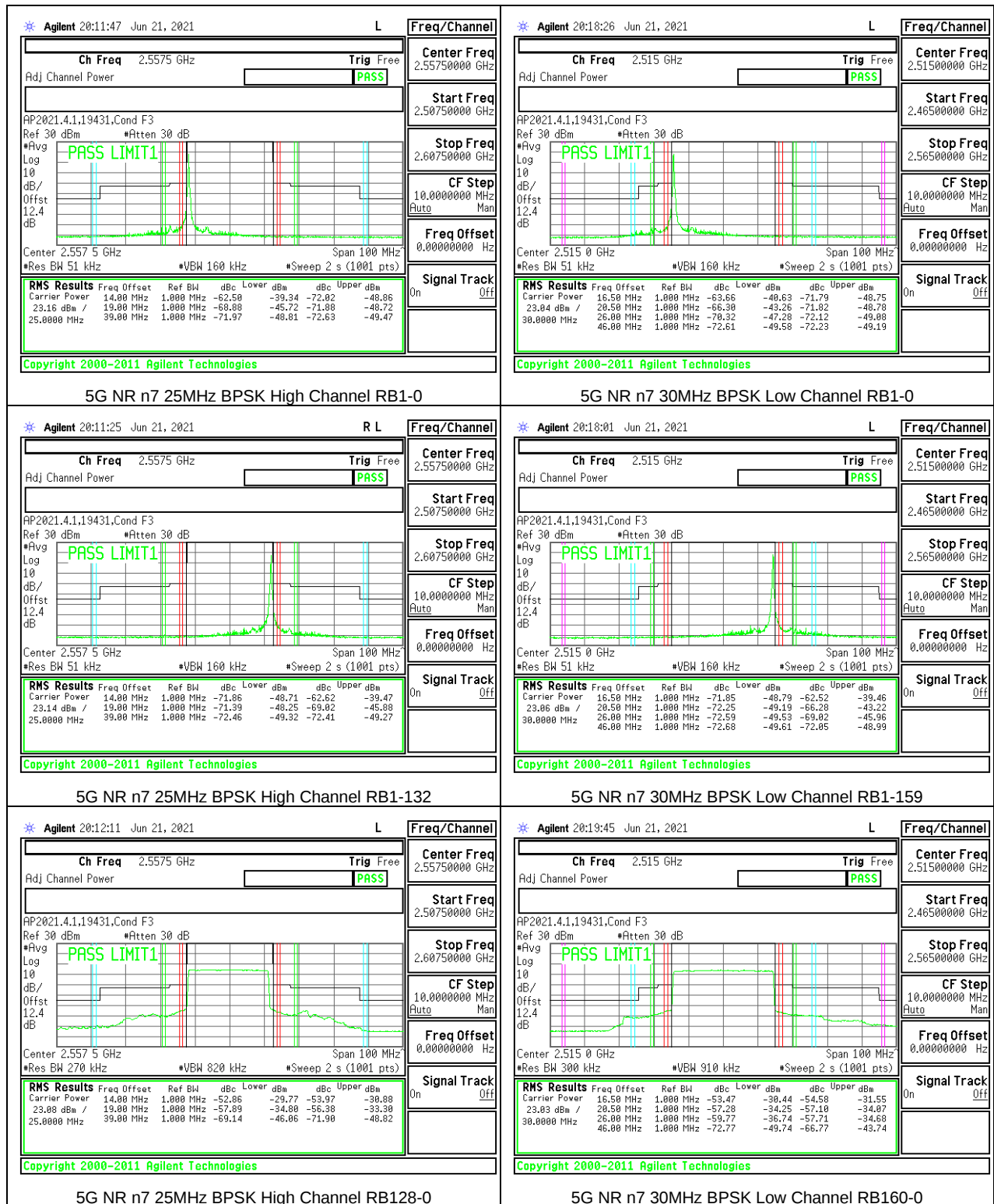


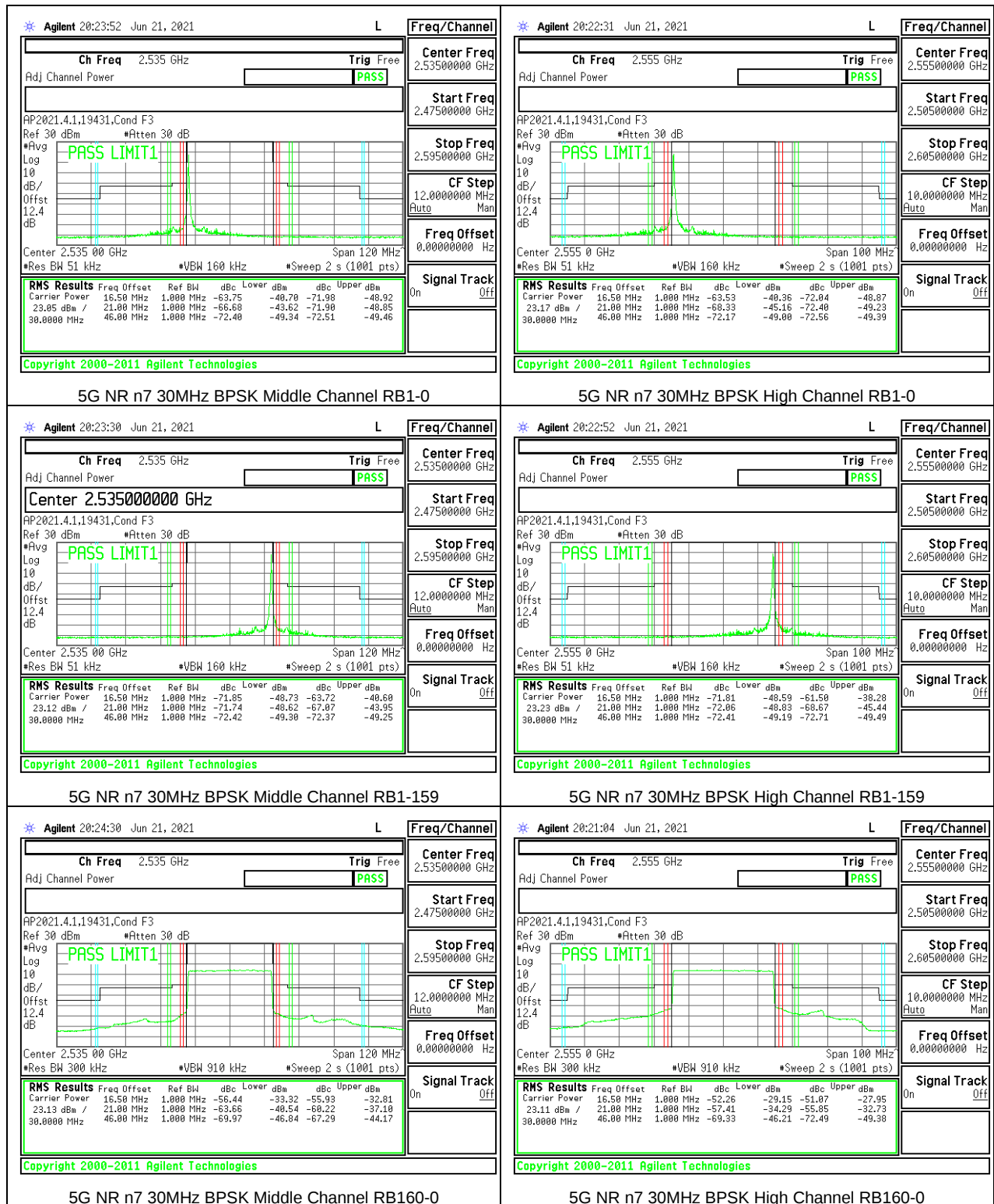


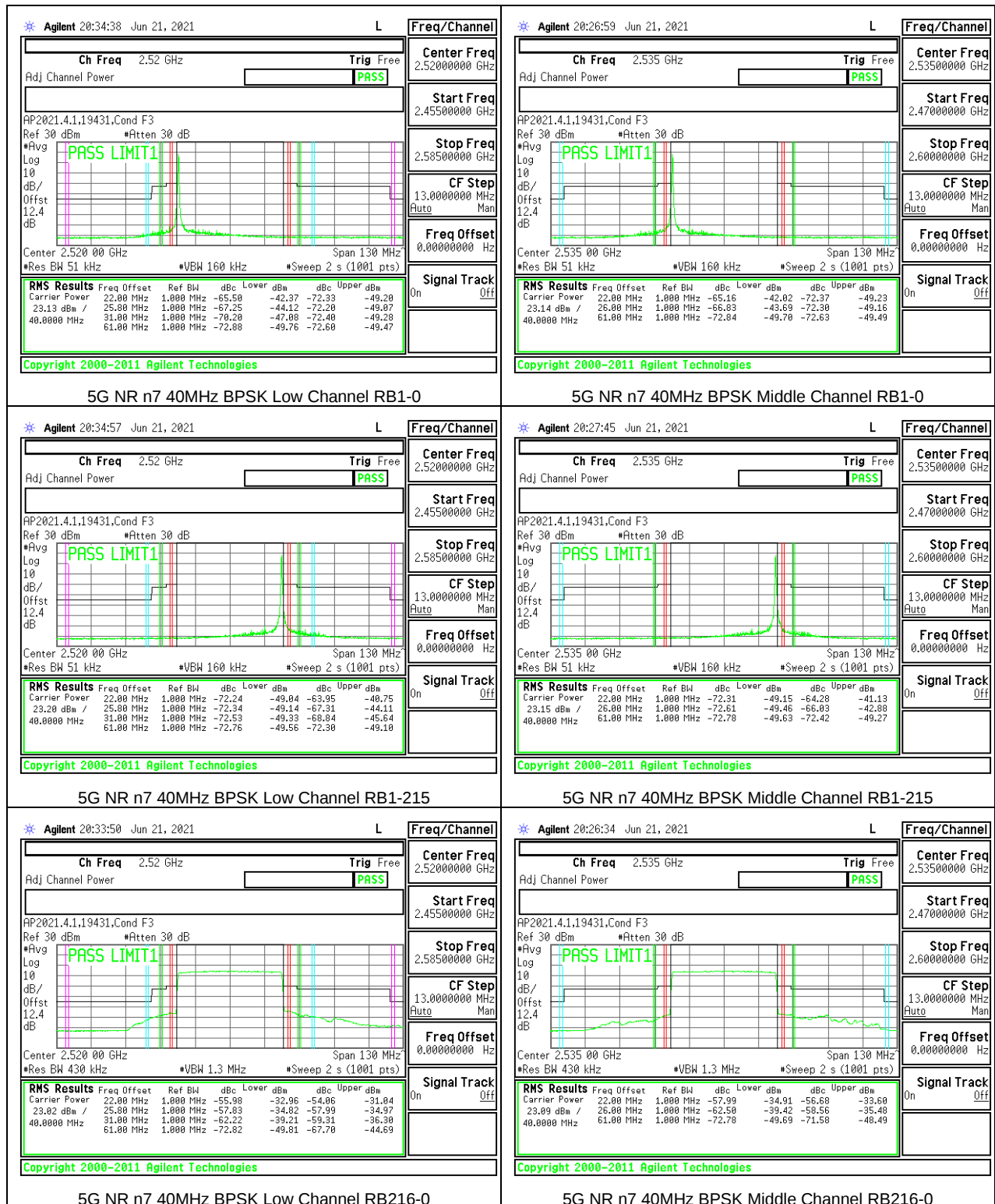


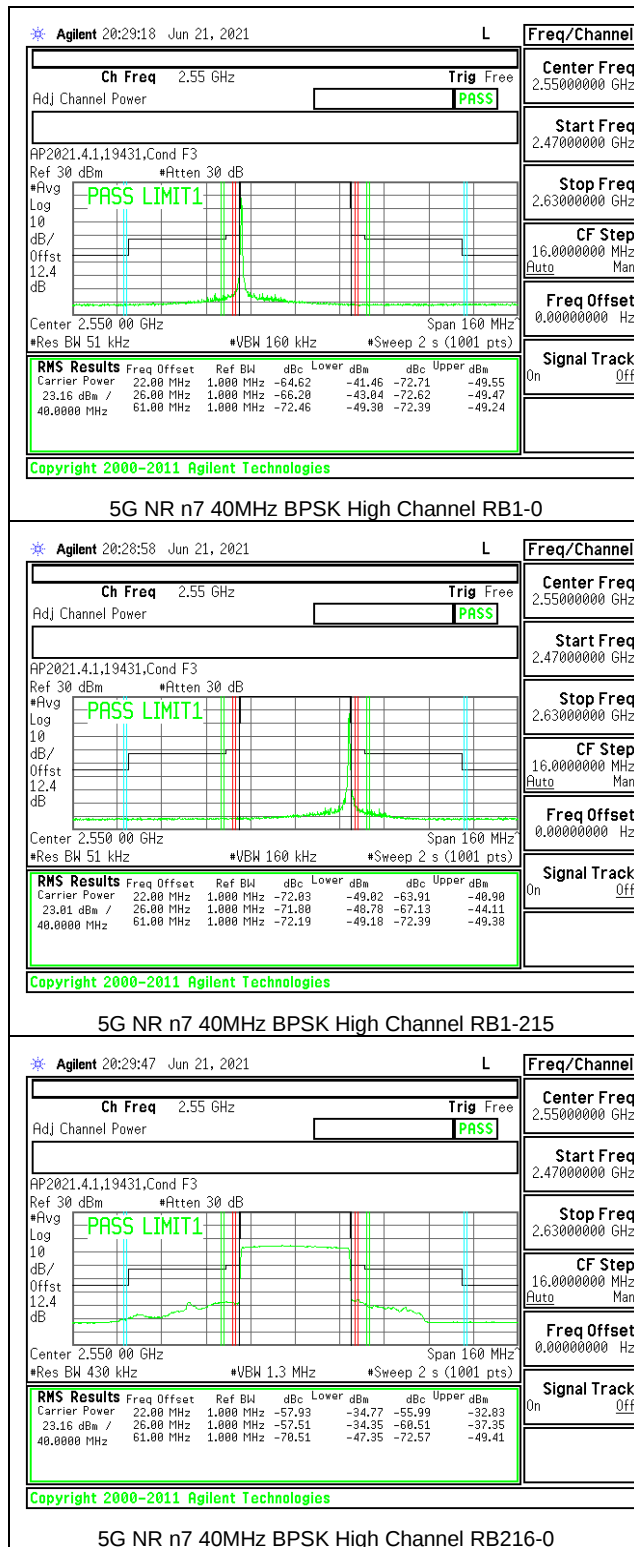










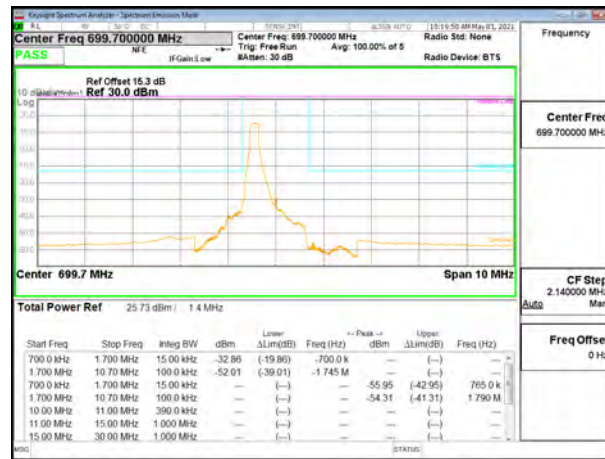


9.2.3. LTE BAND 12 AND 5G NR n12 ADJACENT CHANNEL POWER AND EMISSION MASK LIMITS

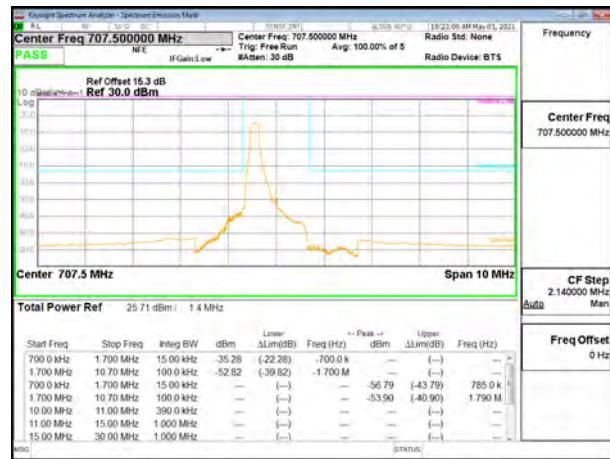
FCC: §27.53

(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.

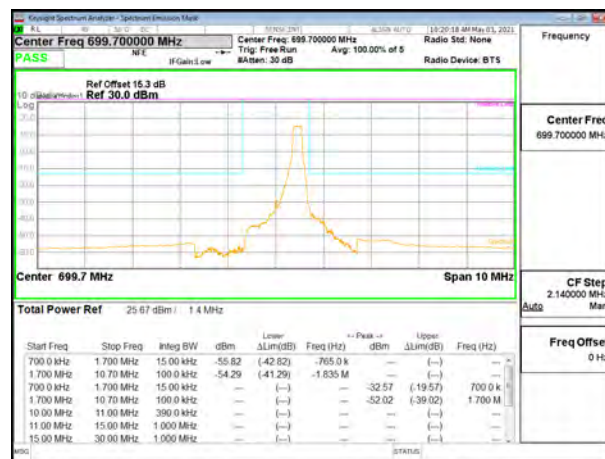
LTE BAND 12 EMISSION MASK



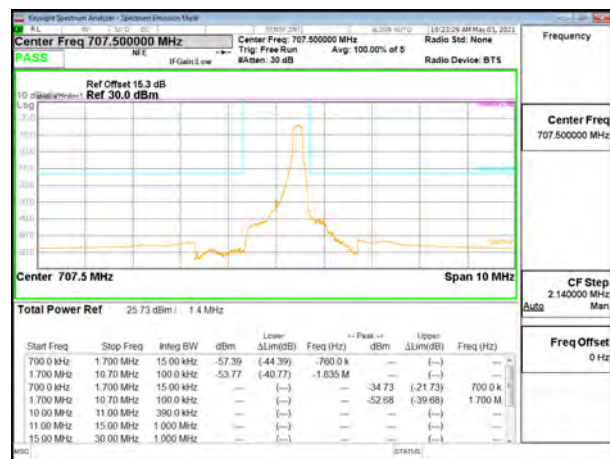
LTE B12 1.4MHz QPSK Low Channel RB1-0



LTE B12 1.4MHz QPSK Middle Channel RB1-0



LTE B12 1.4MHz QPSK Low Channel RB1-5



LTE B12 1.4MHz QPSK Middle Channel RB1-5

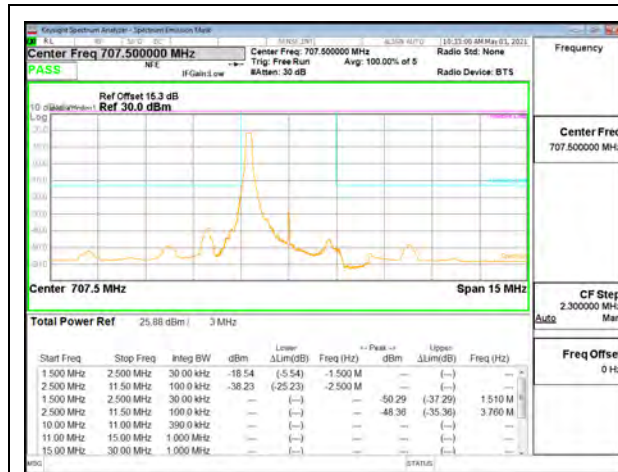


LTE B12 1.4MHz QPSK Low Channel RB6-0

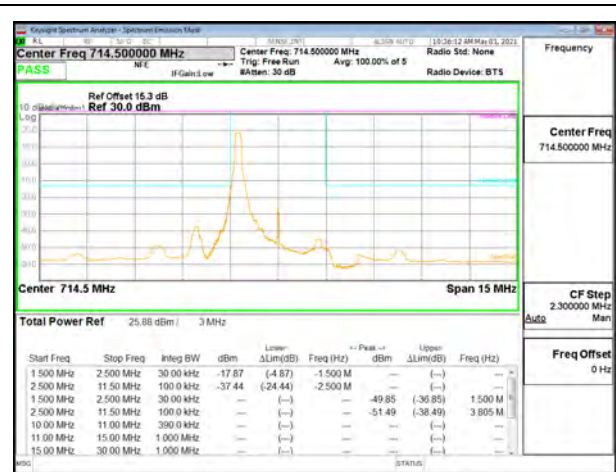


LTE B12 1.4MHz QPSK Middle Channel RB6-0

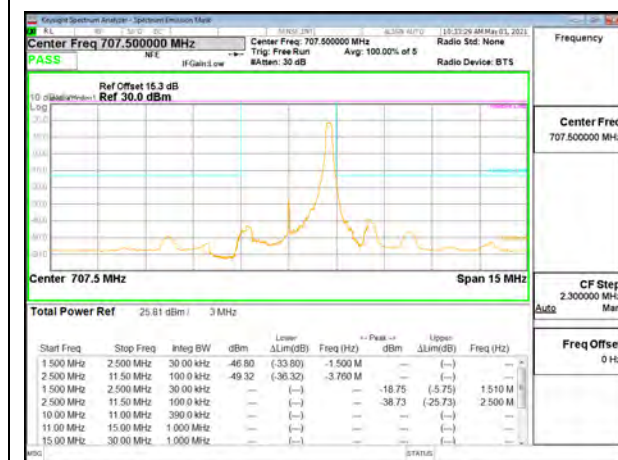




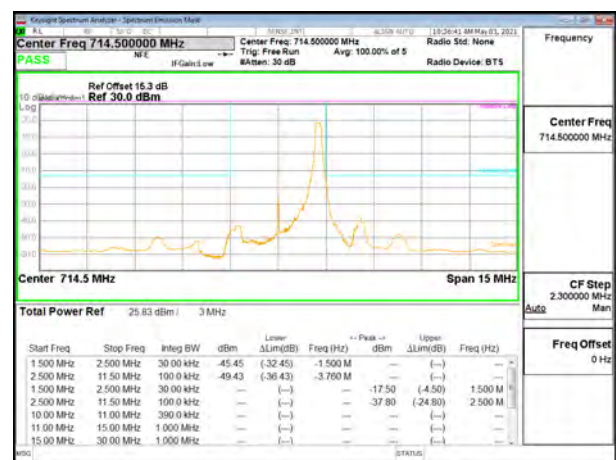
LTE B12 3MHz QPSK Middle Channel RB1-0



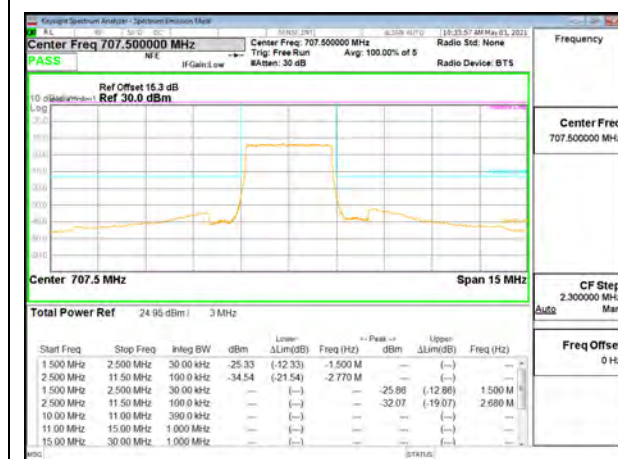
LTE B12 3MHz QPSK High Channel RB1-0



LTE B12 3MHz QPSK Middle Channel RB1-14



LTE B12 3MHz QPSK High Channel RB1-14



LTE B12 3MHz QPSK Middle Channel RB15-0



LTE B12 3MHz QPSK High Channel RB15-0