Global Product Compliance Laboratory
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TESTING
NVLAP LAB CODE: 100275-0

Title 47 Code of Federal Regulations Test Report

Regulation:
FCC Part 2 and 27

Client:
NOKIA SOLUTIONS AND NETWORKS

Product Evaluated:
AEQK Airscale MAA 64T64R 192AE n77 200W

Report Number:
TR-2021-0029-FCC2-27

Date Issued:
May 10, 2021

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Revisions

Date	Revision	Section	Change
5/10/2021	0		Initial Release

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1. System Information and Requirements

Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in Murray-Hill, NJ.

Equipment Under Test (EUT):	**AEQK Airscale MAA 64T64R 192AE n77 200W**
Serial Number:	1M203637096
FCC ID:	VBNAEQK-01
Hardware Version:	475589A.X21
Software Version:	5G21A
Frequency Range:	3700-3980 MHz
GPCL Project Number:	2021-0029
Applicant	Nokia Solutions and Networks Steve Mitchell 3201 Olympus Blvd Dallas, TX 75019
Test Requirement(s):	Title 47 CFR Parts 2 and 27
Test Standards:	• Title 47 CFR Parts 2 and 27 • KDB 971168 D01 Power Measurement License Digital Systems v03r01 April 9, 2018. • KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013 • ANSI C63.26 (2015) • ANSI C63.4 (2014)
Measurement Procedure(s):	• FCC-IC-OB - GPCL Power Measurement, Occupied Bandwidth & Modulation Test Procedure 6-20-2019 • FCC-IC-SE - GPCL Spurious Emissions Test Procedure 6-20-2019
Test Date(s):	3/19/2021 – 4/9/2021
Test Performed By:	Nokia Global Product Compliance Laboratory 600-700 Mountain Ave. P.O. Box 636 Murray Hill, NJ 07974-0636
Product Engineer(s):	Ron Remy
Lead Engineer:	Steve Gordon
Test Engineer (s):	Jaideep Yadav
Test Results: The EUT, *as tested* met the above listed Test Requirements. The decision rule employed is binary (Pass/Fail) based on the measured values without accounting for Measurement Uncertainty or any Guard Band. The measured values obtained during testing were compared to a value given in the referenced regulation or normative standard. Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in New Providence, NJ.	

1.1 Introduction

This Conformity test report applies to the AEQK **Airscale MAA 64T64R 192AE n77 200W**, hereinafter referred to as the Equipment Under Test (EUT).

1.2 Purpose and Scope

The purpose of this document is to provide the testing data required for qualifying the EUT in compliance with FCC Parts 2 and 27 measured in accordance with the procedures set out in Section 2.1033 (c) (14) of the Rules.

The original filing for this product was documented in GPCL project 2020-0149 for FCC ID: VBNAEQK-01which includes 20 MHz at 100 W, 40 MHz at 200 W, and 100 MHz at 200 W in the 5G-NR mode of operation in the frequency range of 3700 – 3980 MHz. The maximum power was determined through the measurement and summing of the 64 ports in Watts. Each port is rated for 3.125 W (34.95 dBm) per port or 200 W for the 64 ports (53.01 dBm +/- 2.0 dBm)

This test program demonstrates compliance of the following additional configurations:

Single Carrier
- 50 MHz at 200 W,
- 60 MHz at 200 W
- 80 MHz at 200 W
- 90 MHz at 200 W

Dual Carrier both Contiguous and Non-Contiguous
- 20+20 MHz at 200W
- 40+40 MHz at 200W
- 50+50 MHz at 200W

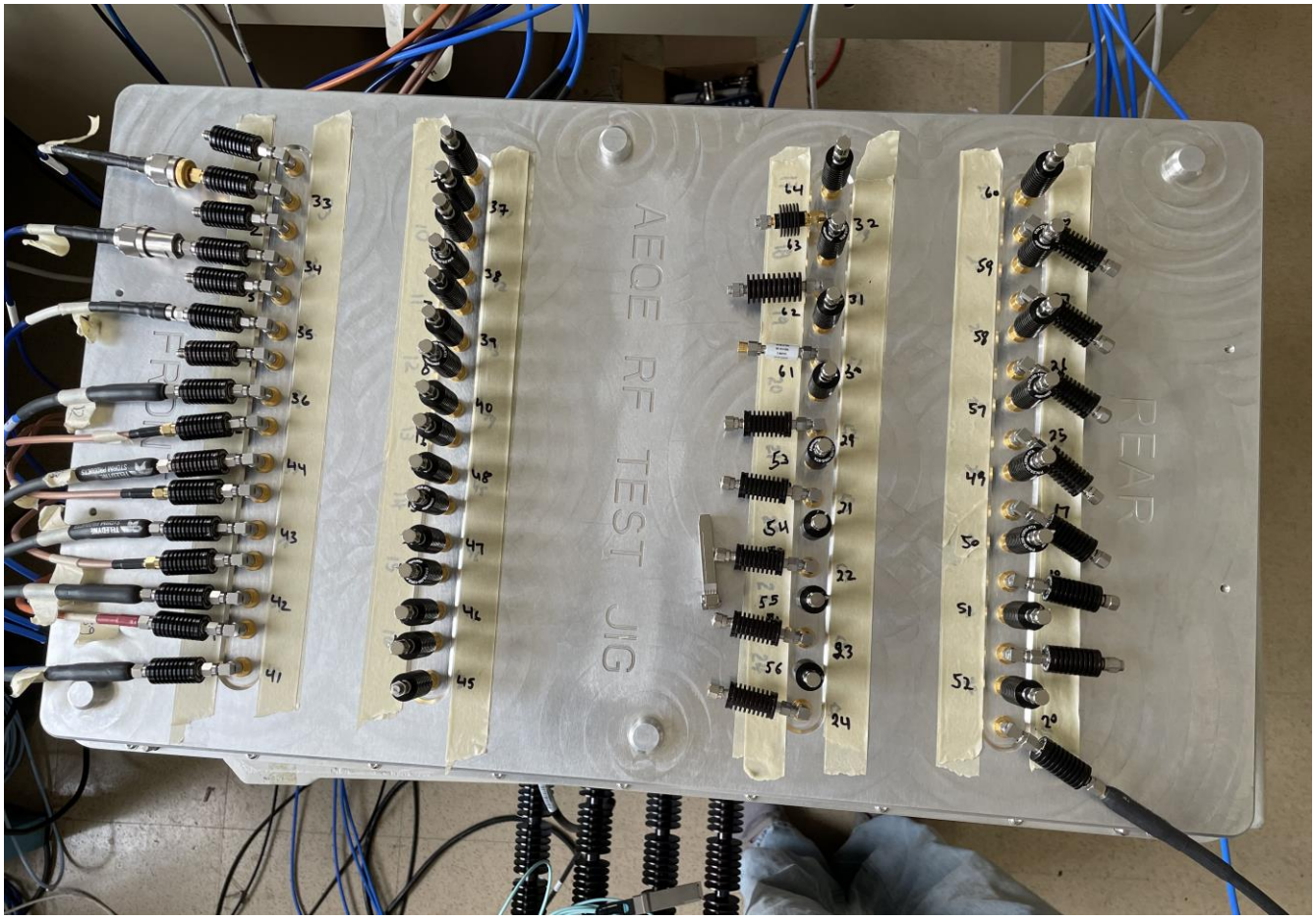
No Frequency Stability testing was considered necessary for this test program since there were no changes to the basic frequency determining and stabilizing circuitry (including clock and data rates.)

1.3 EUT Details

1.3.1 Specifications

Radio Characteristics	
Max RF Output Power	200W (3.125W per TRX)
TX/RX	64T64R
Band/Frequency Range	n77: 3700 - 3980 MHz
Instantaneous bandwidth (IBW)	200MHz (HW ready: 200+200 in split mode)
Occupied bandwidth (OBW)	100 MHz (HW ready: 100+100 in split mode)
Carrier bandwidth	20, 40, 50, 60, 70, 80,90, 100MHz; 20+20, 40+40, 40+50 MHz
Operating mode	64TRx Digital Beamforming
Other Characteristic	
External Interfaces	2 * SFP28 for CPRI 9.8Gbps, DC -48 V, AISG-ES-RAE 2.1, ext. alarms MDR-26
Installation Options	Pole / Wall with mechanical adjustment Fit into sPAA (stacked Hybrid Antenna)
Antenna Characteristics	
Antenna configurations	physical: 12, 8, 2 (192 AE) logical: 4, 8, 2
Minimum beamwidth	horizontal: 15° (boresight) vertical: 6° (boresight)
Beamsteering angle	horizontal: ±45° vertical: +6° (pre-tilt) ±7° (SLS>6dB)
Maximum antenna gain	>=24.5 dBi

1.3.2 Photographs



1.4 Test Requirements

Each required measurement is listed below:

47 CFR FCC Sections	Description of Tests	Test Required
2.1046, 27.53	RF Power Output	Yes
2.1047, 27.53	Modulation Characteristics	Yes
2.1049, 27.53	(a) Occupied Bandwidth (b) Out-of-Band Emissions	Yes
2.1051, 27.53	Spurious Emissions at Antenna Terminals	Yes
2.1053, 27.53	Field Strength of Spurious Radiation	Yes
2.1055, 27.53	Frequency Stability	No*

*Previously evaluated under GPCL Project 2020-0149

1.5 Test Standards & Measurement Procedures

1.5.1 Test Standards

- Title 47 Code of Federal Regulations, Federal Communications Commission Part 2.
- Title 47 Code of Federal Regulations, Federal Communications Commission Part 27.
- KDB 971168 D01 Power Measurement License Digital Systems v03r01 April 9, 2018.
- KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013
- ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
- ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.5.2 Measurement Procedures

- FCC-IC-OB - GPCL Power Measurement, Occupied Bandwidth & Modulation Test Procedure 6-20-2019
- FCC-IC-SE - GPCL Spurious Emissions Test Procedure 6-20-2019

1.6 MEASUREMENT UNCERTAINTY

The results of the calculations to estimate uncertainties for the several test methods and standards are shown in the Table below. These are the worst-case values.

Worst-Case Estimated Measurement Uncertainties

Standard, Method or Procedure	Condition	Frequency MHz	Expanded Uncertainty (k=2)
a. Classical Emissions, (*e.g.*, ANSI C63.4, CISPR 11, 14, 32, *etc.*, using ESHS 30,	Conducted Emissions	0.009 - 30	±3.5 dB
	Radiated Emissions (AR-6 Semi-Anechoic Chamber)	30 MHz – 200MHz H 30 MHz – 200 MHz V 200 MHz – 1000 MHz H 200 MHz – 1000 MHz V 1 GHz - 18 GHz	±5.1 dB ±5.1 dB ±4.7 dB ±4.7 dB ±3.3 dB

Antenna Port Test	Signal Bandwidth	Frequency Range	Expanded Uncertainty (k=2), Amplitude
Occupied Bandwidth, Edge of Band, Conducted Spurious Emissions	10 Hz 100 Hz 10 kHz to 1 MHz 1MHz	9 kHz to 20 MHz 20 MHz to 1 GHz 1 GHz to 10 GHz 10 GHz to 40 GHz:	1.78 dB
RF Power	10 Hz to 20 MHz	50 MHz to 18 GHz	0.5 dB

1.7 Executive Summary

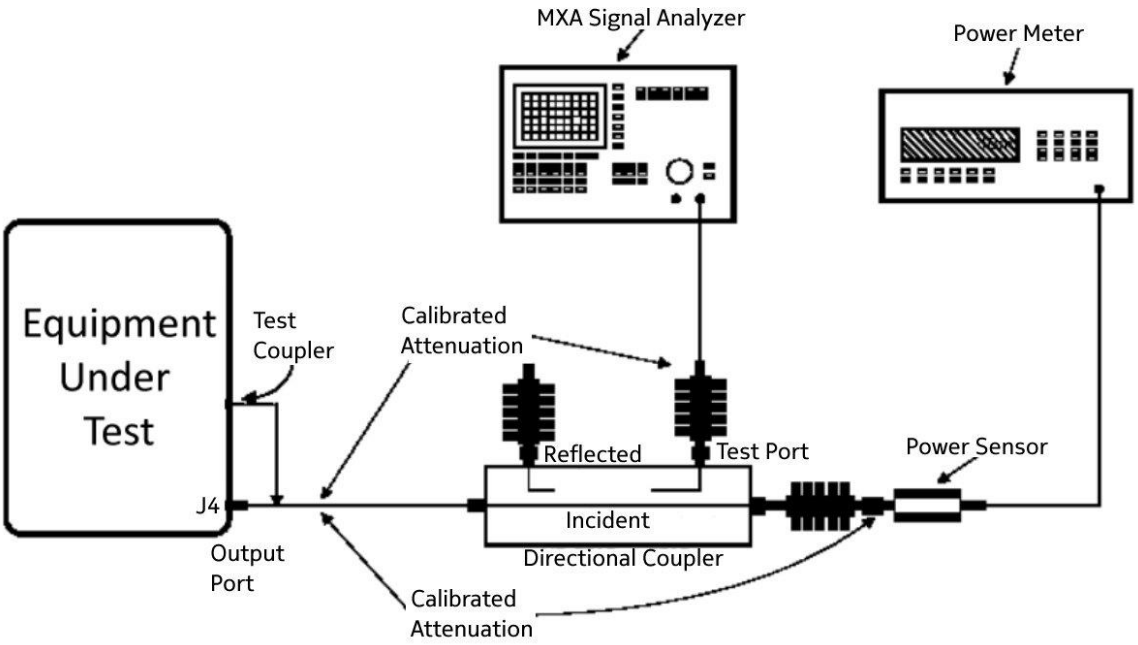
Requirement	Description	Result
47 CFR FCC Parts 2 and 27		
2.1046, 27.50	RF Power Output Peak to Average Power Ratio	COMPLIES
2.1047	Modulation Characteristics	COMPLIES
2.1049, 27.53	(a) Occupied Bandwidth (b) Edge of Band Emissions	COMPLIES
2.1051, 27.53	Spurious Emissions at Antenna Terminals	COMPLIES
2.1053, 27.53	Field Strength of Spurious Radiation	COMPLIES
2.1055, 27.54	Frequency Stability	NT*

*Previously evaluated under GPCL Project 2020-0149

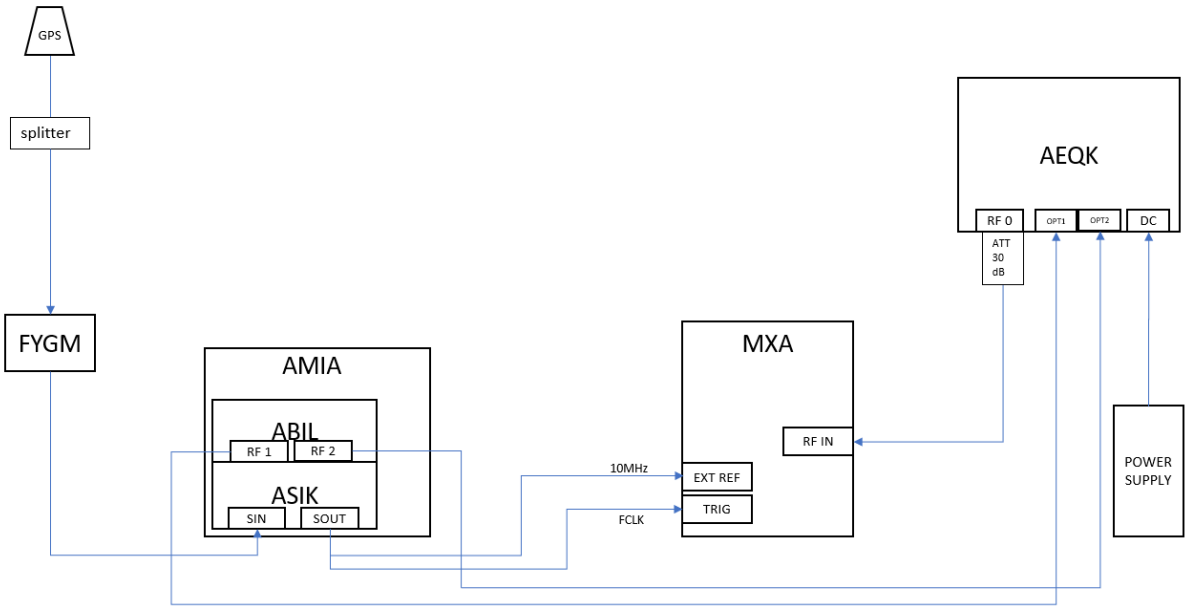
1. **COMPLIES -** Passed all applicable tests.
2. **N/A –** Not Applicable.
3. **NT –** Not Tested.

1.8 Test Configurations

Test Setup for all Antenna Port Measurements



Test Setup for Frequency Stability Test



2. FCC Section 2.1046 - RF Power Output

2.1 RF Power Output

This test is a measurement of the total RF power level transmitted at the antenna-transmitting terminal. The product was configured for test as shown in section above and allowed to warm up and stabilize per KDB 971168 D01 and ANSI C63.26. Power measurements were made with an MXA Signal Analyzer.

Per FCC 27.50(J)(2), the power of each fixed or base station transmitting in the 3700-3980MHz band is limited to an EIRP of 1640W/MHz, i.e., 62.15dBm/MHz EIRP. With 24.5dBi antenna gain, the total conducted Power Spectral Density limit is 38dBm/MHz per 32 ports (per polarization). See **Summary of PSD Results** Table below.

The Average Max RF Power Values are bolded in each configuration.

Summary of PSD Results

Channel Bandwidth	Maximum Channel Power (dBm)	Correction for 32 Ports (10 Log n)	Conversion Power/MHz	Maximum PSD (dBm)/ MHz	PSD Limit (dBm/MHz)	Margin (dBm/MHz)
50	35.037	15	-16.99	33.037	38	4.963
60	35.277	15	-17.78	32.497	38	5.503
80	35.282	15	-19.03	31.252	38	6.748
90	35.200	15	-19.54	30.660	38	7.340

2.1.1 1 Carrier Data

Channel RF Power 50MHz BW

Channel Power - 5G-NR 50MHz BW					
Test Model 1.1 Modulation QPSK Channel Frequency 3725.01MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3954.99MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	34.619	1	34.737	1	34.814
2	34.679	2	34.663	2	34.757
3	34.405	3	34.596	3	34.713
4	34.753	4	34.812	4	34.958
9	34.510	9	34.523	9	34.874
10	34.732	10	34.758	10	35.154
11	34.340	11	34.415	11	34.754
12	34.357	12	34.301	12	34.658
33	34.452	33	34.463	33	34.590
34	34.562	34	34.637	34	34.722
35	34.771	35	34.750	35	34.921
36	**34.851**	36	**34.907**	36	**35.037**
41	34.667	41	34.637	41	34.729
42	34.822	42	34.712	42	34.853
43	34.584	43	34.600	43	34.790
44	34.569	44	34.562	44	34.730

Channel RF Power 60MHz BW

Channel Power - 5G-NR 60MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3730.02MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3949.98MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	34.621	1	34.685	1	34.855
2	34.593	2	34.584	2	34.688
3	34.349	3	34.539	3	34.662
4	34.683	4	34.722	4	34.886
9	34.466	9	34.442	9	34.810
10	34.805	10	34.891	10	**35.277**
11	34.308	11	34.321	11	34.696
12	34.322	12	34.204	12	34.590
33	34.432	33	34.384	33	34.490
34	34.579	34	34.684	34	34.787
35	34.725	35	34.788	35	34.934
36	**34.981**	36	**34.931**	36	35.071
41	34.560	41	34.541	41	34.656
42	34.690	42	34.601	42	34.762
43	34.559	43	34.561	43	34.751
44	34.530	44	34.499	44	34.713

Channel RF Power 80MHz BW

Channel Power - 5G-NR 80MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3740.01MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3939.99MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	34.651	1	34.831	1	34.862
2	34.572	2	34.689	2	34.645
3	34.354	3	34.650	3	34.627
4	34.646	4	34.826	4	34.825
9	34.531	9	34.521	9	34.778
10	34.881	10	**34.973**	10	**35.282**
11	34.336	11	34.411	11	34.604
12	34.358	12	34.322	12	34.541
33	34.430	33	34.408	33	34.410
34	34.597	34	34.778	34	34.735
35	34.751	35	34.799	35	34.827
36	**35.031**	36	34.968	36	35.002
41	34.545	41	34.580	41	34.585
42	34.649	42	34.671	42	34.679
43	34.543	43	34.591	43	34.688
44	34.551	44	34.563	44	34.609

Channel RF Power 90MHz BW

Channel Power - 5G-NR 90MHz					
Test Model 1.1 Modulation QPSK Channel Frequency 3745.02MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3934.98MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	34.572	1	34.894	1	34.763
2	34.544	2	34.749	2	34.613
3	34.347	3	34.712	3	34.623
4	34.604	4	34.880	4	34.822
9	34.531	9	34.594	9	34.789
10	35.018	10	35.077	10	**35.200**
11	34.322	11	34.451	11	34.628
12	34.360	12	34.370	12	34.535
33	34.382	33	34.505	33	34.387
34	34.610	34	34.851	34	34.718
35	34.746	35	34.865	35	34.817
36	**35.039**	36	**35.119**	36	35.046
41	34.510	41	34.636	41	34.561
42	34.654	42	34.749	42	34.649
43	34.502	43	34.658	43	34.721
44	34.532	44	34.618	44	34.600

2.1.2 2 Carrier Contiguous Data

Channel RF Power Contiguous 20+20MHz BW

Channel Power - Contiguous 5G-NR 20MHz + 20MHz					
Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3710.01+ 3729.99 MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 + 3859.99 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3950 + 3969.99 MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	31.097+31.288	1	31.606+31.444	1	31.642+31.281
2	31.084+31.230	2	31.478+31.258	2	31.522+31.150
3	30.922+31.067	3	31.504+31.293	3	31.597+31.222
4	31.141+31.315	4	31.583+31.431	4	31.725+31.361
9	30.956+31.077	9	31.464+31.177	9	31.670+31.276
10	31.313+31.547	10	31.809+31.614	10	**31.985+31.641**
11	30.662+30.843	11	31.163+30.977	11	31.444+31.090
12	30.619+30.878	12	31.039+30.849	12	31.424+30.958
33	30.763+30.947	33	31.165+31.112	33	31.202+30.938
34	31.122+31.240	34	31.576+31.512	34	31.560+31.261
35	31.156+31.340	35	31.636+31.590	35	31.660+31.342
36	**31.494+31.655**	36	**31.857+31.841**	36	31.882+31.558
41	31.097+31.186	41	31.477+31.437	41	31.455+31.140
42	31.042+31.139	42	31.366+31.407	42	31.419+31.120
43	31.000+31.156	43	31.403+31.366	43	31.429+31.159
44	30.987+31.113	44	31.392+31.325	44	31.454+31.120

Channel RF Power Contiguous 40+40MHz BW

Channel Power - Contiguous 5G-NR 40MHz + 40MHz					
Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3720 + 3759.99 MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 + 3859.99 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3920.01 + 3960 MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	31.050+31.165	1	31.532+31.402	1	31.664+31.424
2	31.088+31.150	2	31.368+31.148	2	31.447+31.205
3	30.955+31.044	3	31.427+31.295	3	31.541+31.272
4	31.146+31.256	4	31.504+31.357	4	31.560+31.399
9	31.017+31.218	9	31.371+31.216	9	31.584+31.387
10	31.456+31.640	10	31.718+31.620	10	**32.006+31.788**
11	30.770+30.939	11	31.080+31.021	11	31.416+31.154
12	30.770+30.947	12	31.003+30.921	12	31.388+31.067
33	30.814+30.934	33	31.071+31.129	33	31.252+30.914
34	31.082+31.240	34	31.468+31.496	34	31.576+31.203
35	31.205+31.299	35	31.523+31.566	35	31.657+31.341
36	**31.503+31.631**	36	**31.664+31.678**	36	31.847+31.422
41	31.086+31.237	41	31.416+31.355	41	31.567+31.187
42	31.066+31.232	42	31.290+31.385	42	31.514+31.130
43	31.031+31.154	43	31.361+31.316	43	31.562+31.148
44	31.058+31.163	44	31.397+31.334	44	31.550+31.156

Channel RF Power Contiguous 50+50MHz BW

Channel Power - Contiguous 5G-NR 50MHz + 50MHz					
Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3725.01 + 3774.99 MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3840 + 3889.99 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3905.01 + 3954.99 MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	31.146+31.235	1	31.496+31.304	1	31.629+31.389
2	31.153+31.195	2	31.353+31.131	2	31.445+31.240
3	31.023+31.103	3	31.416+31.267	3	31.574+31.327
4	31.234+31.266	4	31.495+31.293	4	31.602+31.404
9	31.171+31.275	9	31.396+31.202	9	31.586+31.399
10	31.549+31.655	10	31.759+31.613	10	**31.987+31.795**
11	30.881+30.985	11	31.104+31.008	11	31.409+31.203
12	30.875+30.987	12	31.053+30.946	12	31.389+31.104
33	30.926+31.006	33	31.083+31.034	33	31.275+30.926
34	31.246+31.340	34	31.518+31.433	34	31.652+31.320
35	31.288+31.314	35	31.522+31.427	35	31.673+31.396
36	**31.590+31.695**	36	**31.783+31.623**	36	31.860+31.447
41	31.190+31.278	41	31.410+31.255	41	31.602+31.233
42	31.116+31.199	42	31.259+31.233	42	31.529+31.157
43	31.102+31.174	43	31.364+31.224	43	31.596+31.152
44	31.166+31.229	44	31.424+31.240	44	31.578+31.212

2.1.3 2 Carrier Non-Contiguous Data

Channel RF Power Non-Contiguous 20+20MHz BW

Channel Power - non-Contiguous 5G-NR 20MHz + 20MHz			
Test Model 1.1 Modulation QPSK Channel Frequency 3789.99+ 3969.99 MHz		Test Model 1.1 Modulation QPSK Channel Frequency 3710.01 + 3890.01 MHz	
TX Port	(dBm)	TX Port	(dBm)
1	31.371+30.959	1	31.105+31.361
2	31.277+30.899	2	31.062+31.160
3	31.280+30.953	3	30.974+31.287
4	31.350+30.983	4	31.119+31.295
9	31.295+31.045	9	30.970+31.297
10	**31.763+31.405**	10	31.387+31.691
11	31.104+30.839	11	30.664+31.040
12	31.187+30.627	12	30.672+30.953
33	30.948+30.690	33	30.628+31.135
34	31.365+31.024	34	31.065+31.445
35	31.301+31.019	35	31.100+31.470
36	31.731+31.208	36	**31.367+31.745**
41	31.445+30.967	41	31.049+31.293
42	31.315+30.858	42	30.998+31.314
43	31.357+30.870	43	30.939+31.262
44	31.390+30.837	44	31.053+31.274

Channel RF Power Non-Contiguous 40+40MHz BW

Channel Power - non-Contiguous 5G-NR 40MHz + 40MHz			
Test Model 1.1 Modulation QPSK Channel Frequency 3720 + 3879.99 MHz		Test Model 3.1 Modulation 64QAM Channel Frequency 3800.01 + 3960 MHz	
TX Port	(dBm)	TX Port	(dBm)
1	31.257+31.492	1	31.294+31.361
2	31.224+31.319	2	31.200+31.301
3	31.147+31.410	3	31.227+31.383
4	31.289+31.456	4	31.304+31.427
9	31.113+31.384	9	31.226+31.457
10	31.502+31.696	10	**31.719+31.842**
11	30.850+31.135	11	31.016+31.230
12	30.878+31.033	12	31.055+31.078
33	30.820+31.320	33	30.875+31.041
34	31.222+31658	34	31.291+31.397
35	31.308+31.694	35	31.252+31.404
36	**31.520+31.989**	36	31.647+31.563
41	31.236+31.566	41	31.317+31.331
42	31.120+31.519	42	31.194+31.191
43	31.108+31.494	43	31.282+31.191
44	31.206+31.511	44	31.316+31.243

Channel RF Power Non-Contiguous 50+50MHz BW

Channel Power - non-Contiguous 5G-NR 50MHz + 50MHz			
Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3725.01 + 3875.01 MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3804.99 + 3954.99 MHz	
TX Port	(dBm)	TX Port	(dBm)
1	30.674+30.923	1	31.361+31.357
2	30.692+30.820	2	31.261+31.292
3	30.595+30.874	3	31.317+31.407
4	30.769+30.953	4	31.380+31.417
9	30.609+30.869	9	31.305+31.454
10	31.090+31.260	10	**31.710+31.770**
11	30.334+30.599	11	31.082+31.255
12	30.367+30.501	12	31.091+31.087
33	30.301+30.780	33	30.941+31.030
34	30.746+31.147	34	31.380+31.428
35	30.808+31.170	35	31.355+31.445
36	**30.999+31.461**	36	31.744+31.602
41	30.711+31.036	41	31.357+31.311
42	30.662+31.014	42	31.232+31.192
43	30.637+31.011	43	31.376+31.218
44	30.697+30.996	44	31.379+31.264

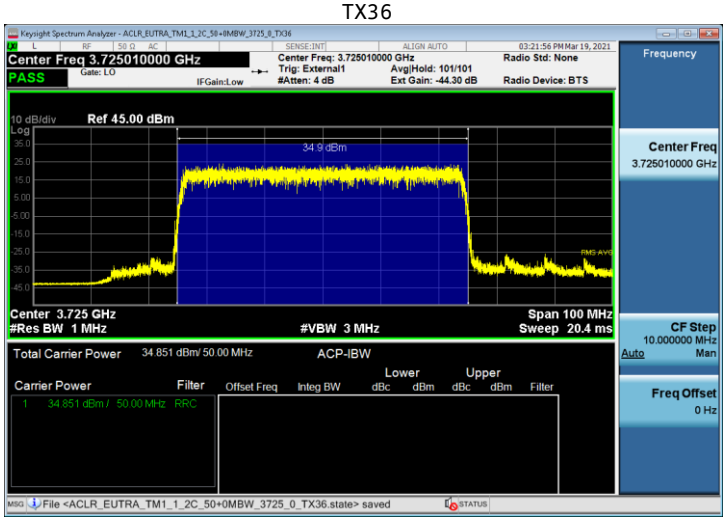
2.2 Channel RF Power – Plots

NOTE: Only a sample of the plots are used in this report. The full suite of raw data resides at the MH, New Jersey location.

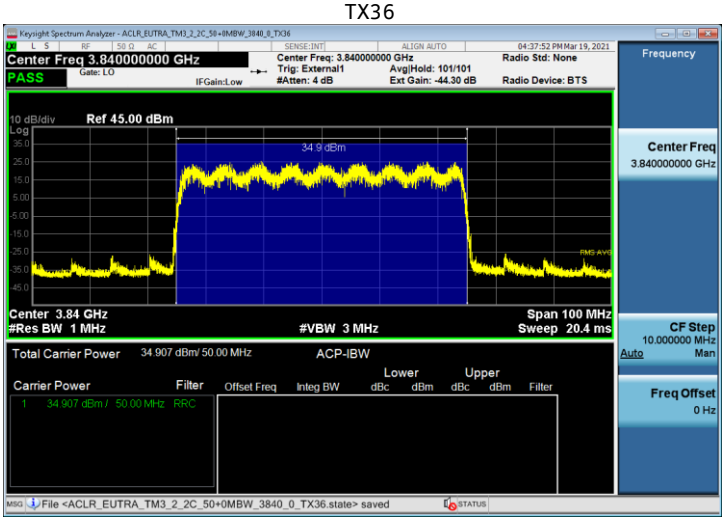
2.2.1 1 Carrier Plots

Channel RF Power 50MHz BW

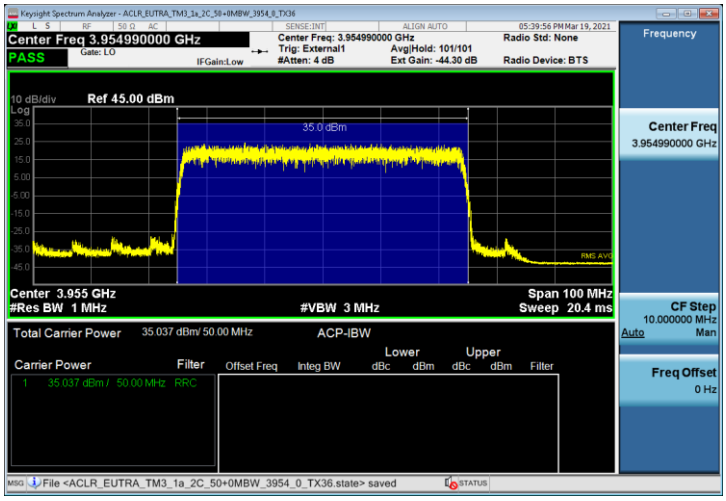
Test Model 1.1
Modulation QPSK
Channel Frequency 3725.01MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36

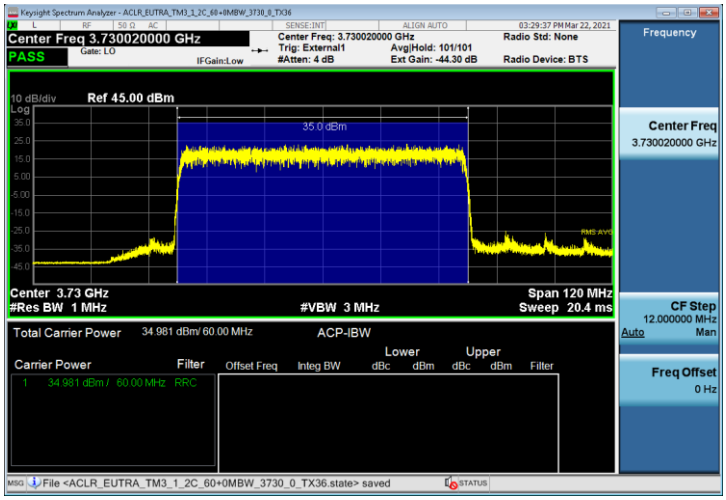


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3954.99MHz
TX36

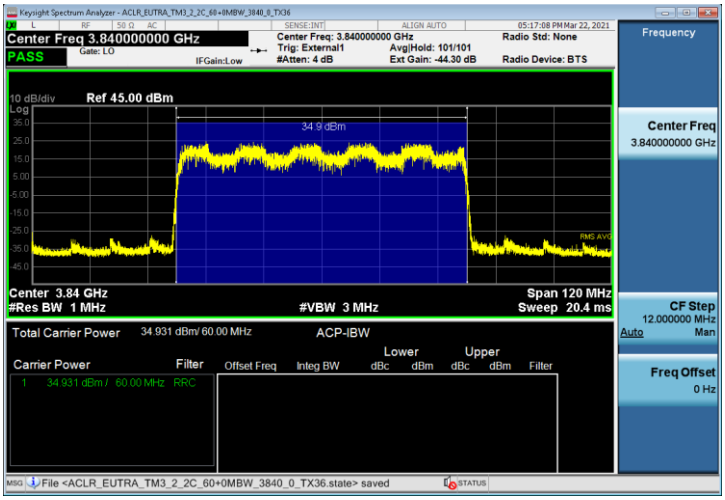


Channel RF Power 60MHz BW

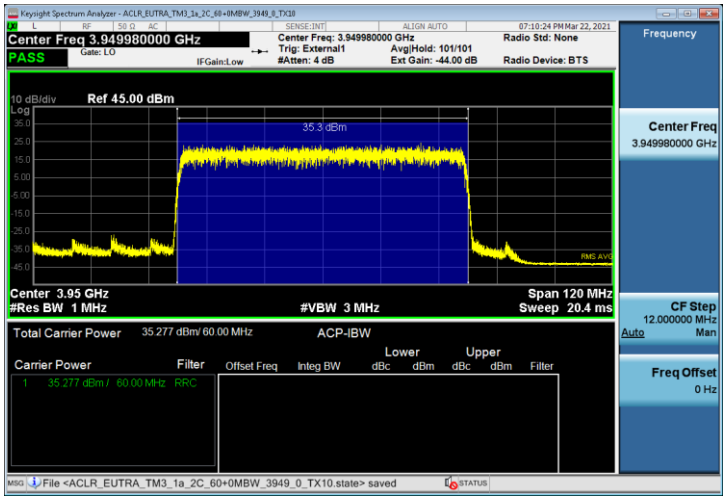
Test Model 3.1
Modulation 64QAM
Channel Frequency 3730.02MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36

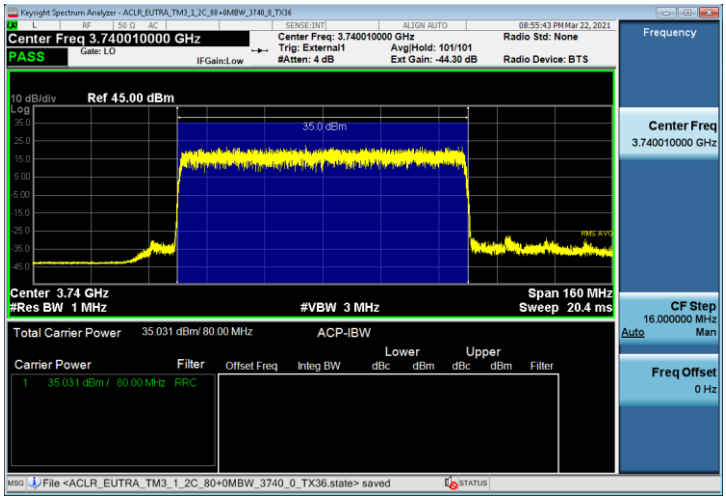


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3949.98MHz
TX10

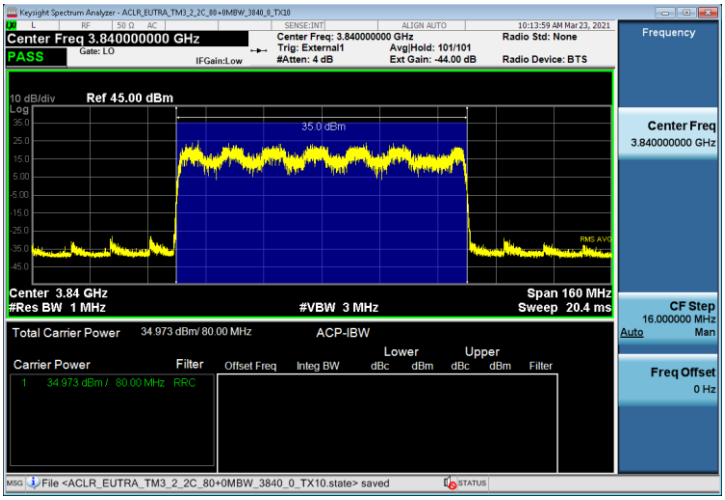


Channel RF Power 80MHz BW

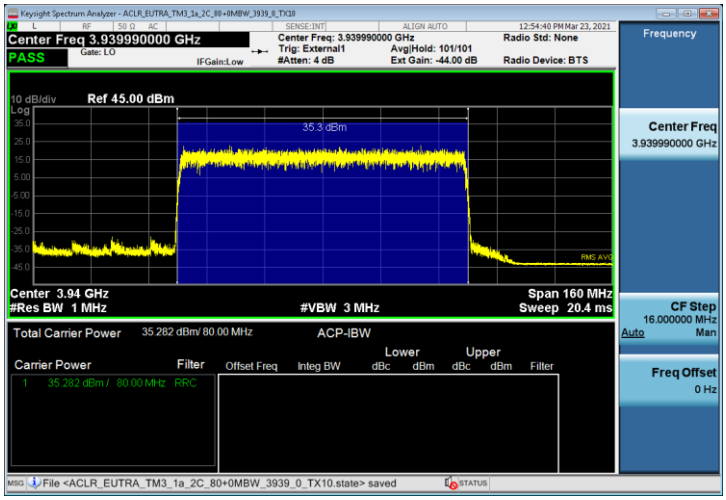
Test Model 3.1
Modulation 64QAM
Channel Frequency 3740.01MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX10

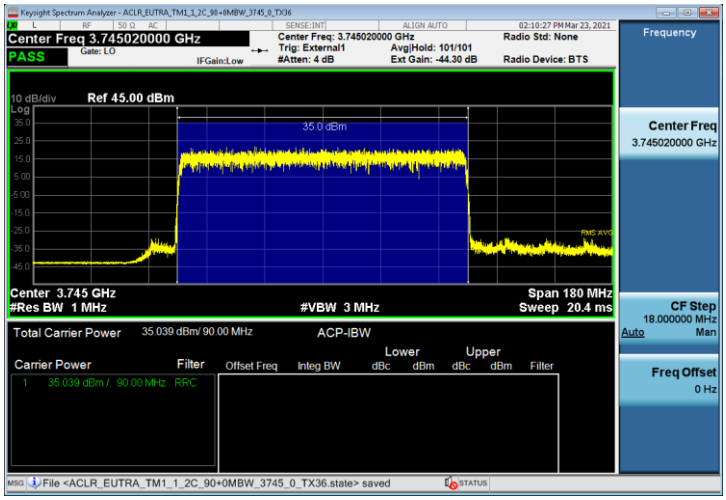


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3939.99MHz
TX10

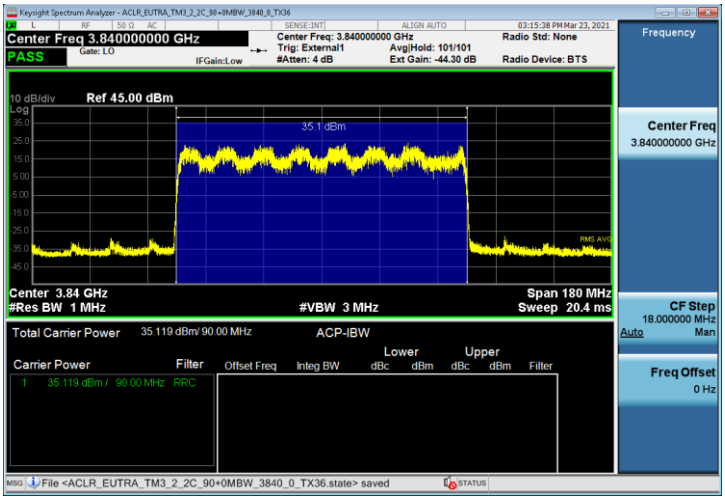


Channel RF Power 90MHz BW

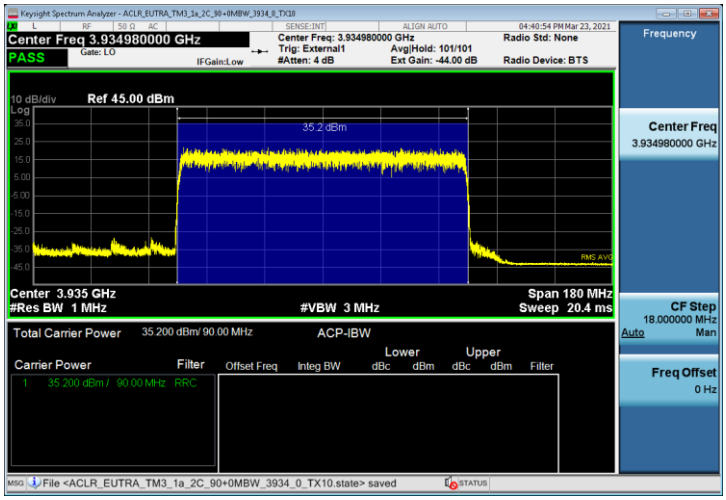
Test Model 1.1
Modulation QPSK
Channel Frequency 3745.02MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36



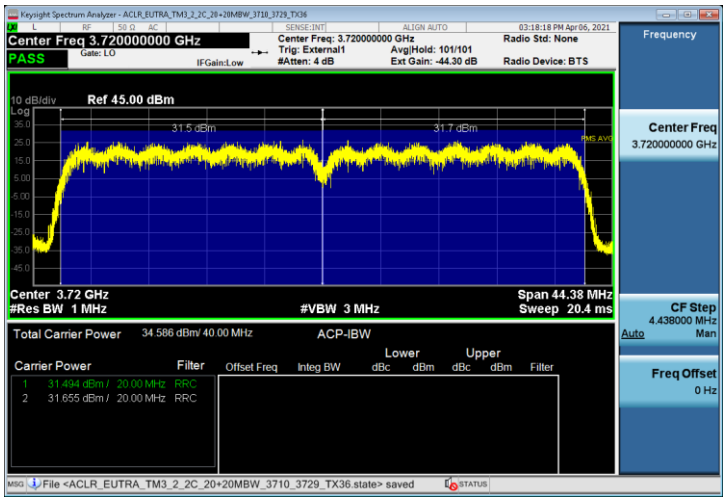
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3934.98MHz
TX10



2.2.2 2 Carrier Contiguous Plots

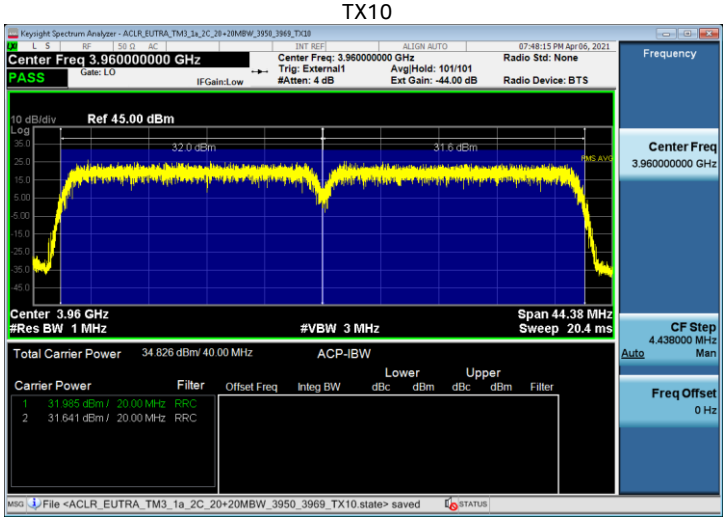
Channel RF Power Contiguous 20+20MHz BW

Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3710.01+ 3729.99 MHz
TX36



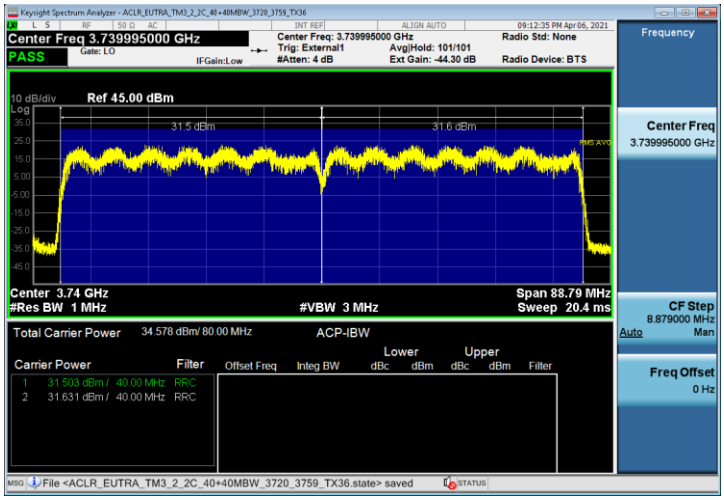
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3859.99 MHz
TX36

Test Model 3.1a
Modulation 256QAM
Channel Frequency 3950 + 3969.99 MHz
TX10

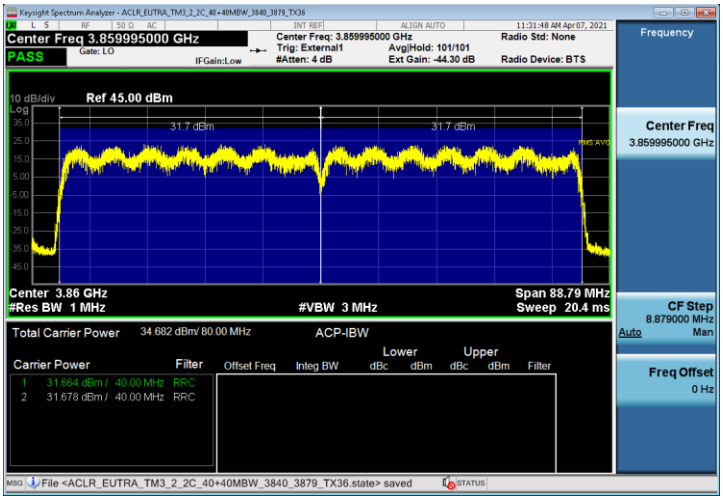


Channel RF Power Contiguous 40+40MHz BW

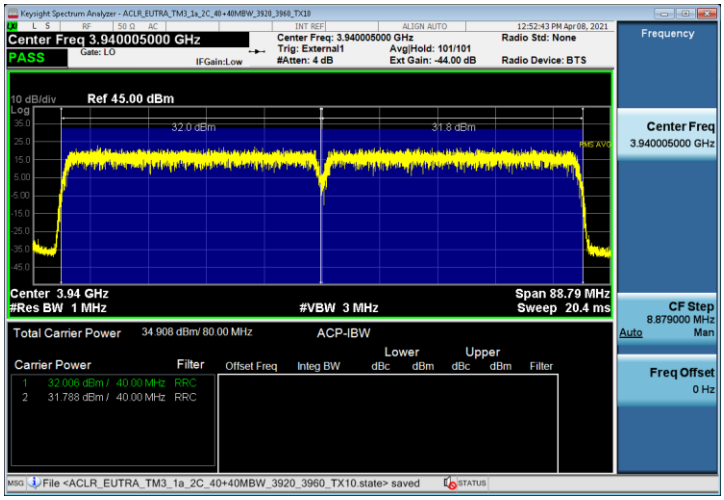
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3720 + 3759.99 MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3859.99 MHz
TX36

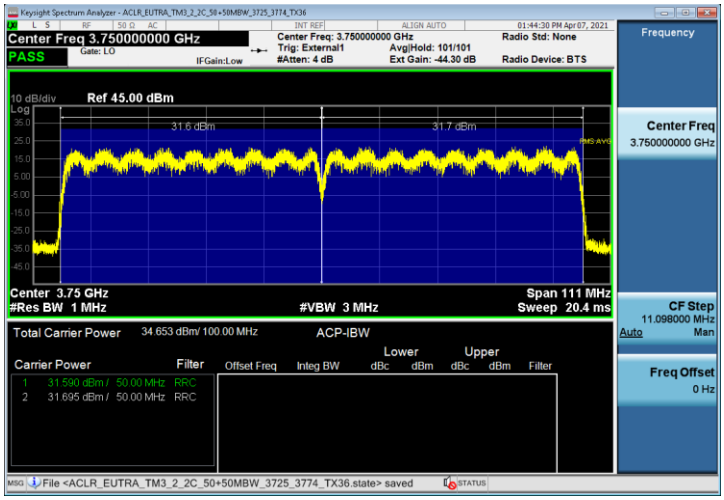


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3920.01 + 3960 MHz
TX10

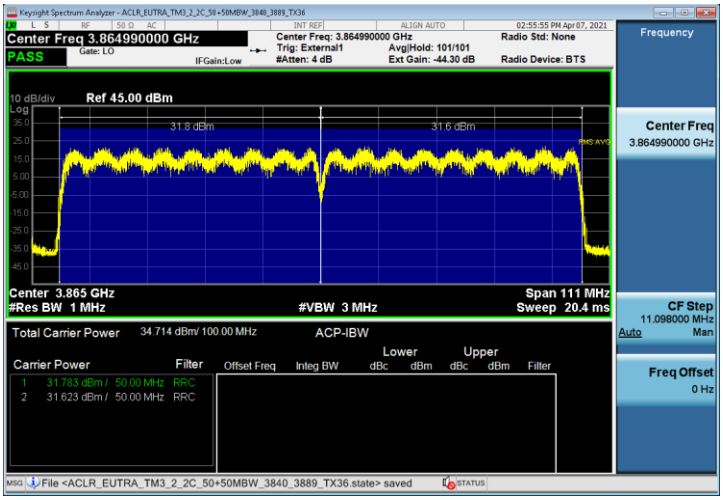


Channel RF Power Contiguous 50+50MHz BW

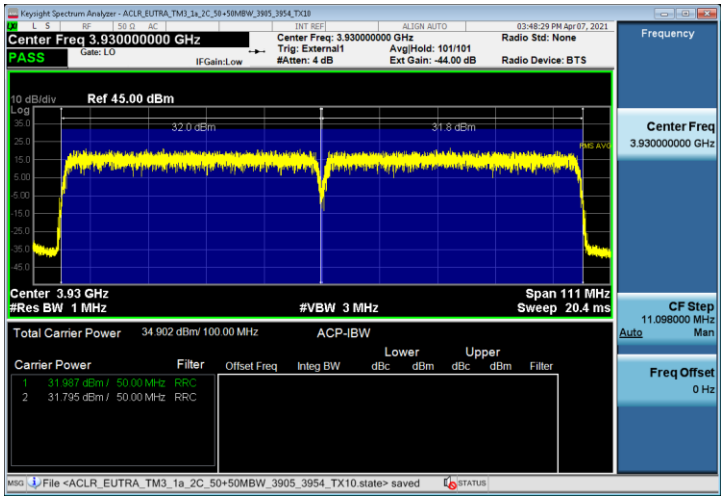
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3725.01 + 3774.99 MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3889.99 MHz
TX36



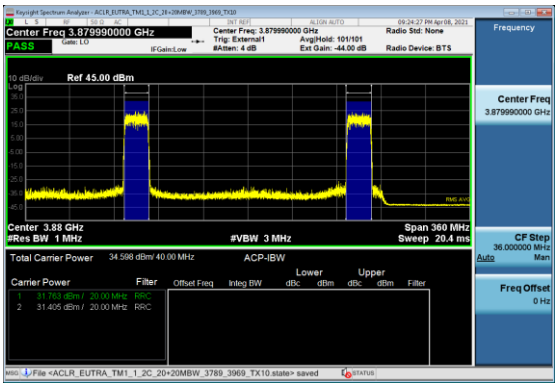
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3905.01 + 3954.99 MHz
TX10



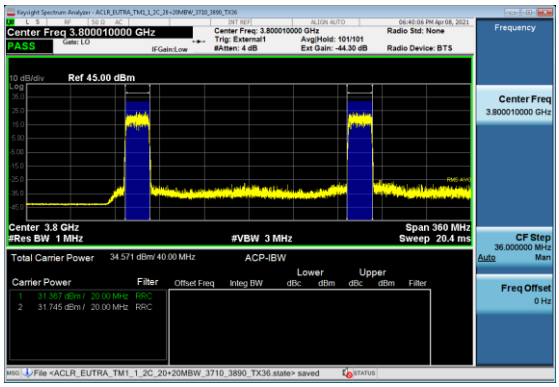
2.2.3 2 Carrier Non-Contiguous Plots

Non-Contiguous 20+20MHz BW

Test Model 1.1
Modulation QPSK
Channel Frequency 3789.99+ 3969.99 MHz
TX10

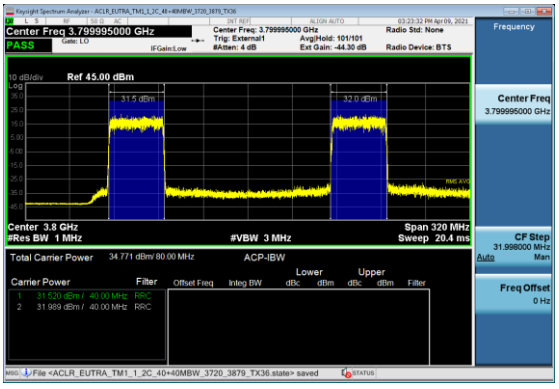


Test Model 1.1
Modulation QPSK
Channel Frequency 3710.01 + 3890.01 MHz
TX36

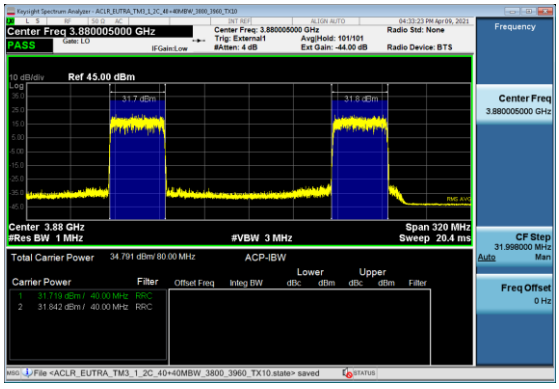


Non-Contiguous 40+40MHz BW

Test Model 1.1
Modulation QPSK
Channel Frequency 3720 + 3879.99 MHz
TX36



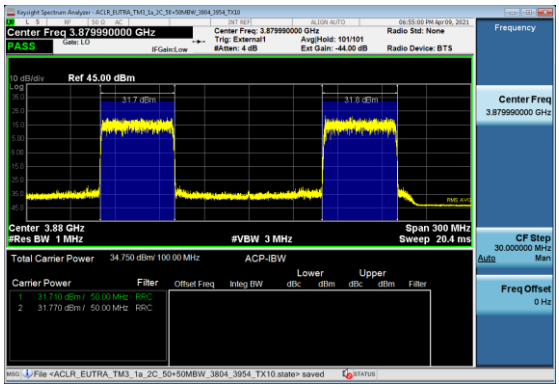
Test Model 3.1
Modulation 64QAM
Channel Frequency 3800.01 + 3960 MHz
TX10



Non-Contiguous 50+50MHz BW

Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3725.01 + 3875.01 MHz
TX36

Test Model 3.1a
Modulation 256QAM
Channel Frequency 3804.99 + 3954.99 MHz
TX10



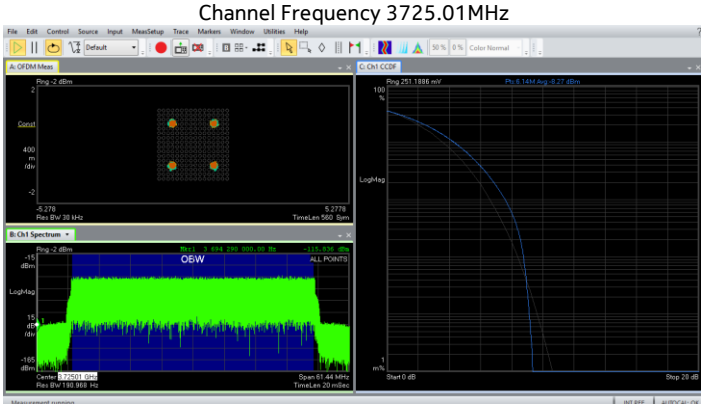
2.3 Peak-to-Average Power Ratio (PAPR)

2.3.1 Peak-to-Average Power Ratio - 1 Carrier Plots

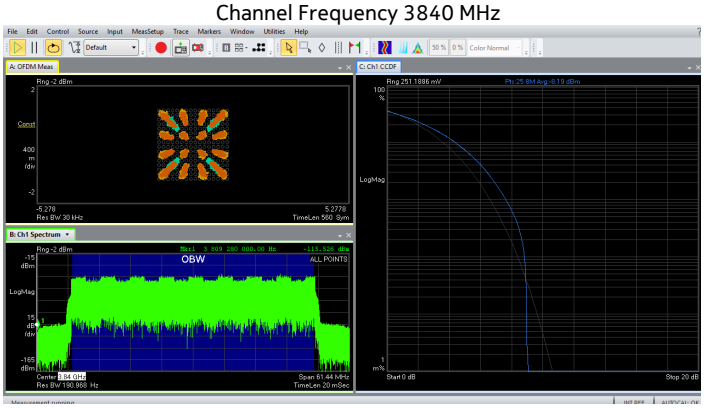
The Peak-to-Average Power Ratio (PAPR) was evaluated per KDB 971168. The PAPR values of all carriers measured are below 13dB.

Peak-to-Average Power Ratio (PAPR) 50MHz BW

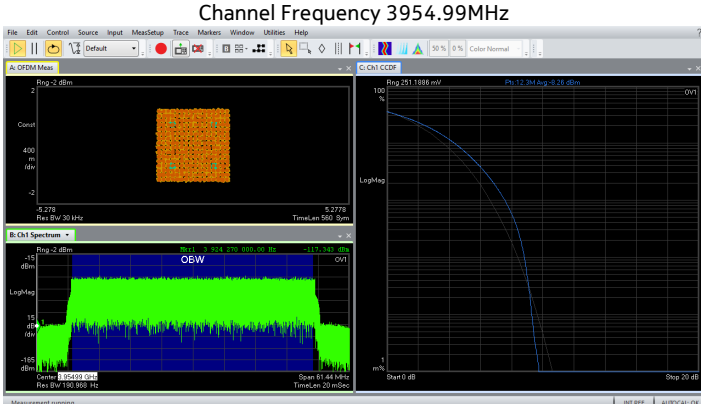
Test Model 1.1
Modulation QPSK
Channel Frequency 3725.01MHz



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz

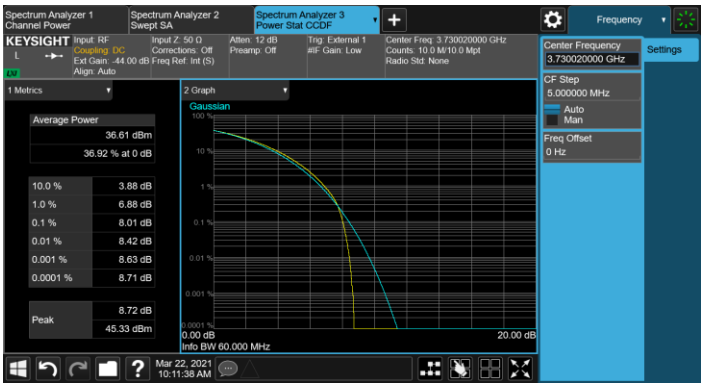


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3954.99MHz

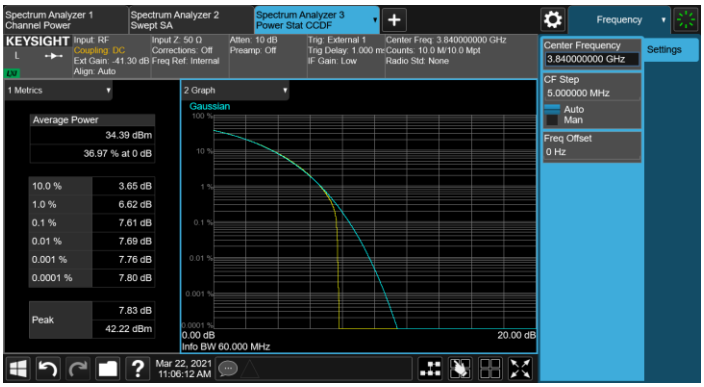


Peak-to-Average Power Ratio (PAPR) 60MHz BW

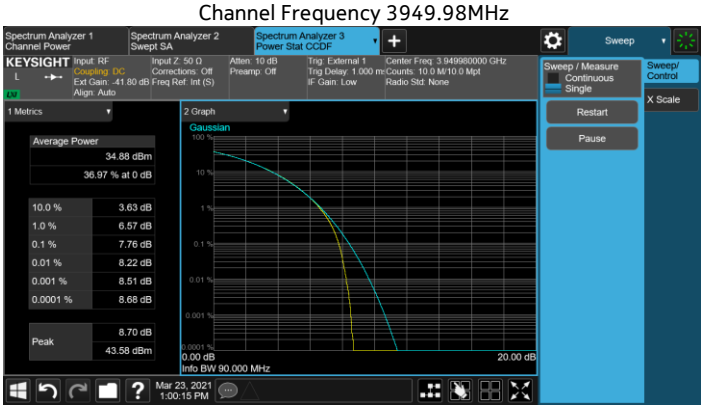
Test Model 3.1
Modulation 64QAM
Channel Frequency 3730.02MHz
TX36



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36

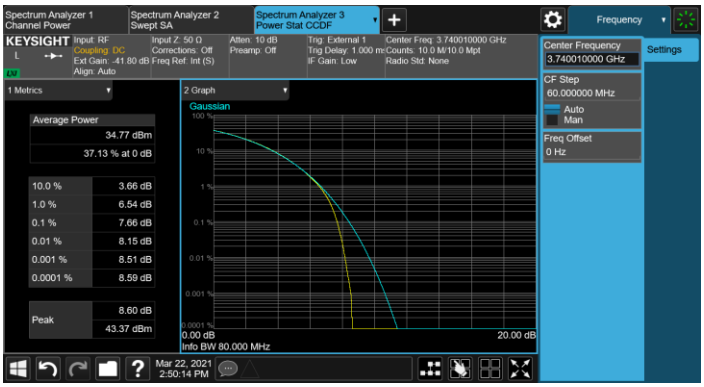


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3949.98MHz

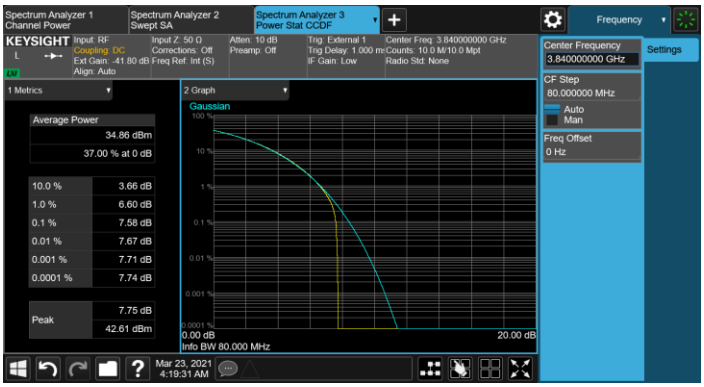


Peak-to-Average Power Ratio (PAPR) 80MHz BW

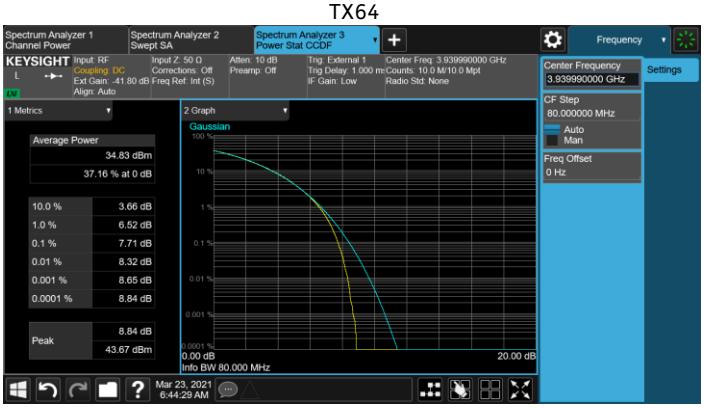
Test Model 3.1
Modulation 64QAM
Channel Frequency 3740.01MHz
TX64



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX64

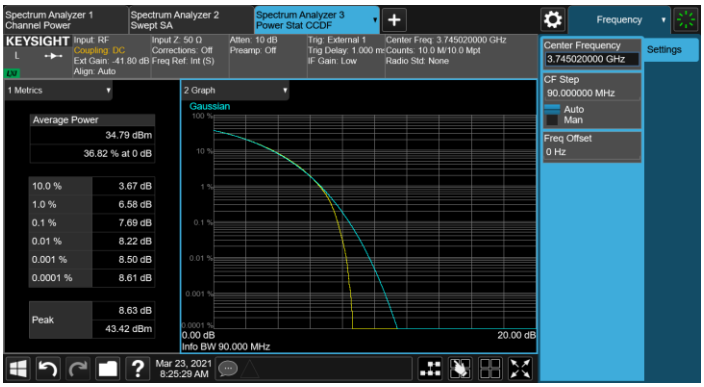


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3939.99MHz
TX64

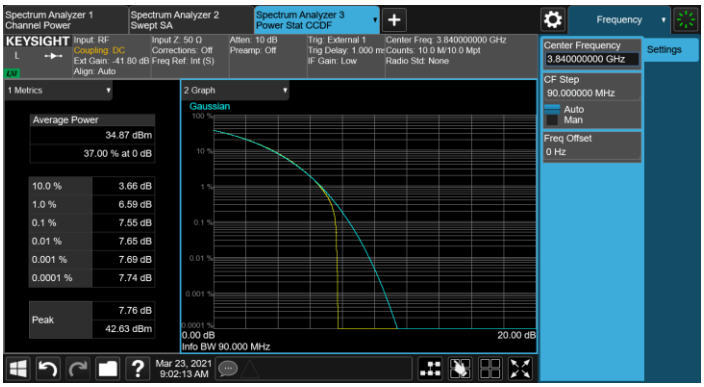


Peak-to-Average Power Ratio (PAPR) 90MHz BW

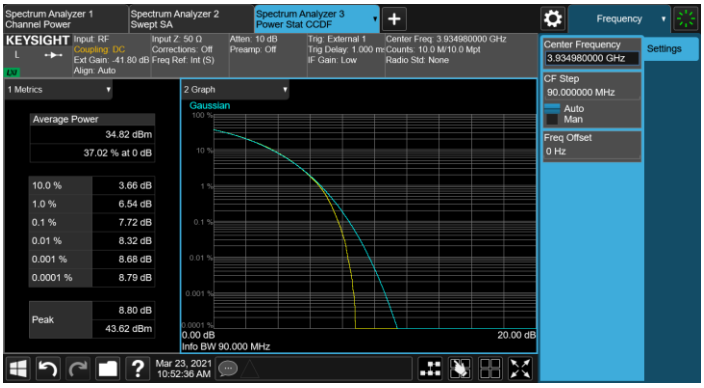
Test Model 1.1
Modulation QPSK
Channel Frequency 3745.02MHz
TX64



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX64



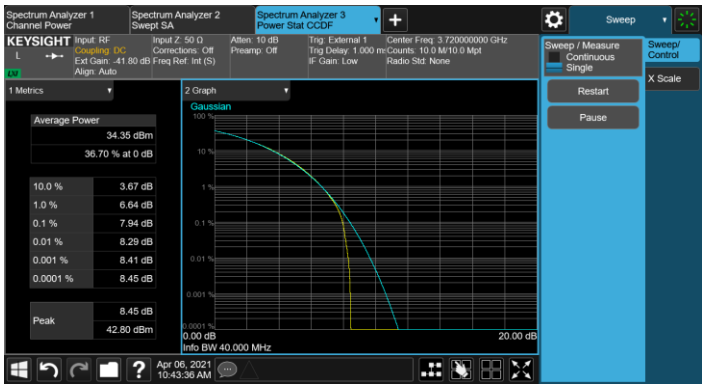
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3934.98MHz
TX64



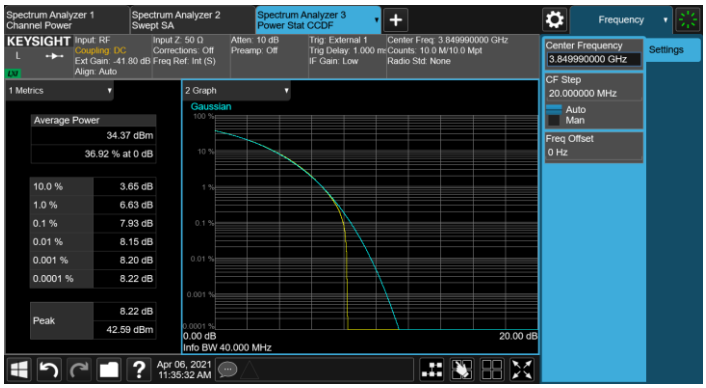
2.3.2 Peak-to-Average Power Ratio (PAPR)- 2 Carrier Contiguous Plots

Peak-to-Average Power Ratio (PAPR) Contiguous 20+20MHz BW

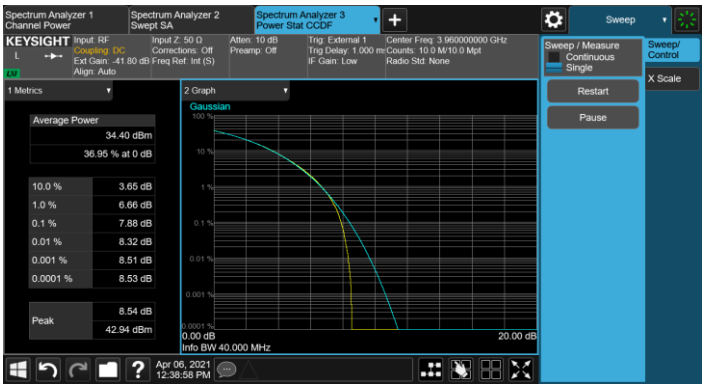
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3710.01+ 3729.99 MHz
TX64



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3859.99 MHz
TX64

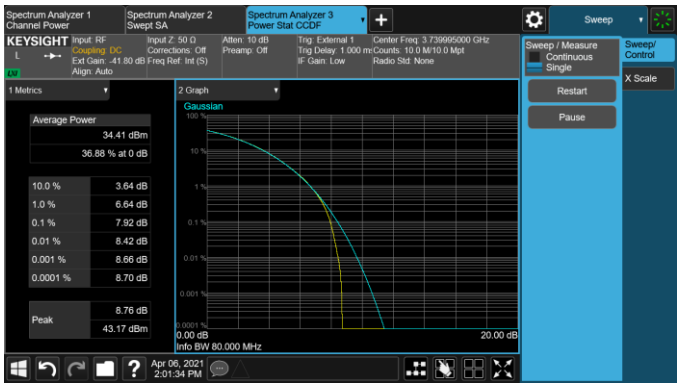


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3950 + 3969.99 MHz
TX64

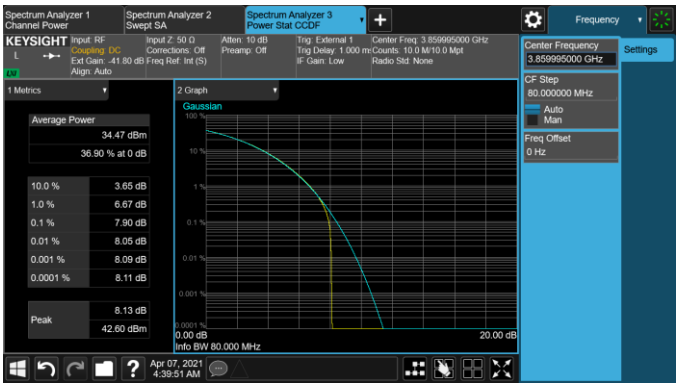


Peak-to-Average Power Ratio (PAPR) Contiguous 40+40MHz BW

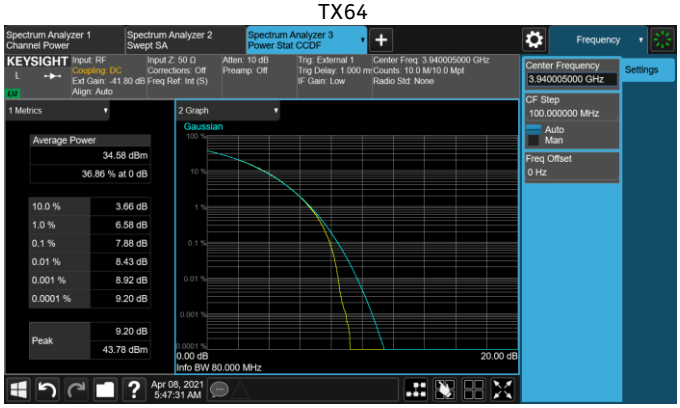
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3720 + 3759.99 MHz
TX64



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3859.99 MHz
TX64

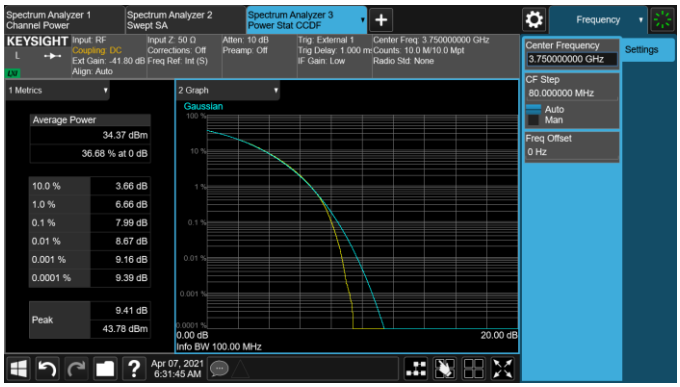


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3920.01 + 3960 MHz
TX64

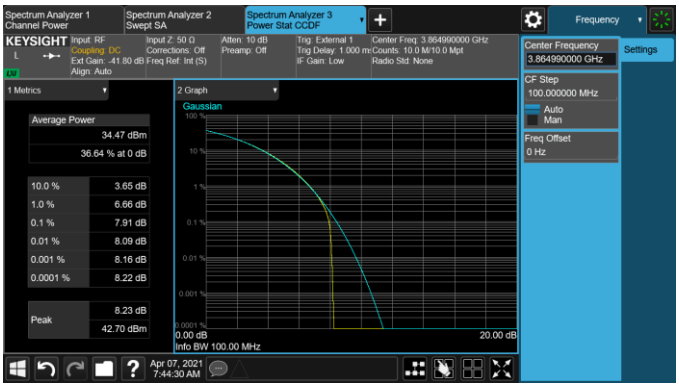


Peak-to-Average Power Ratio (PAPR) Contiguous 50+50MHz BW

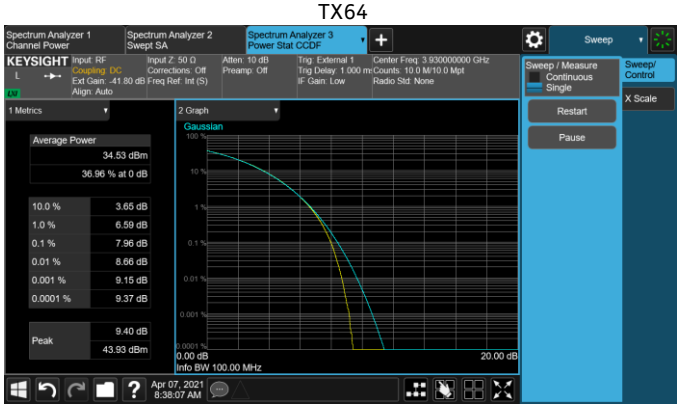
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3725.01 + 3774.99 MHz
TX64



Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 + 3889.99 MHz
TX64



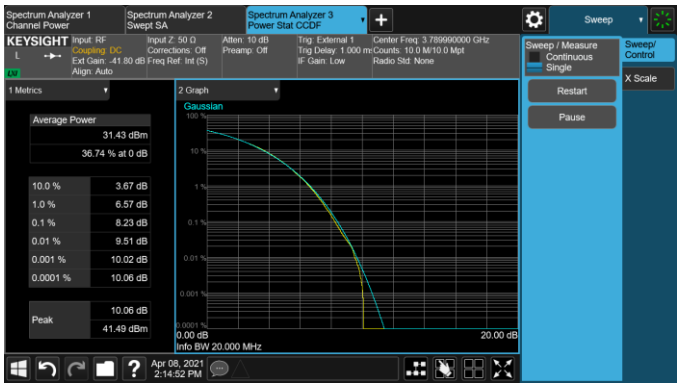
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3905.01 + 3954.99 MHz
TX64

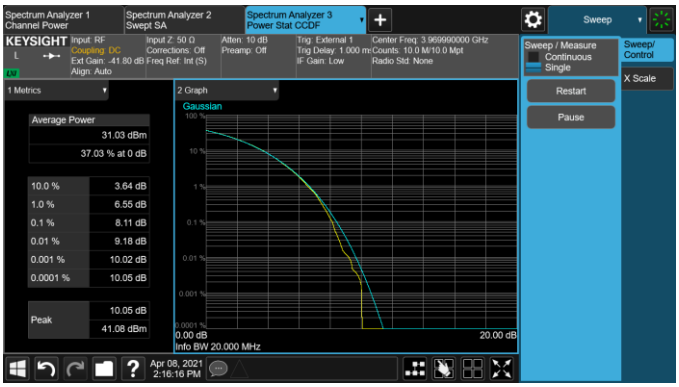


2.3.3 Peak-to-Average Power Ratio (PAPR)- 2 Carrier Non-Contiguous Plots

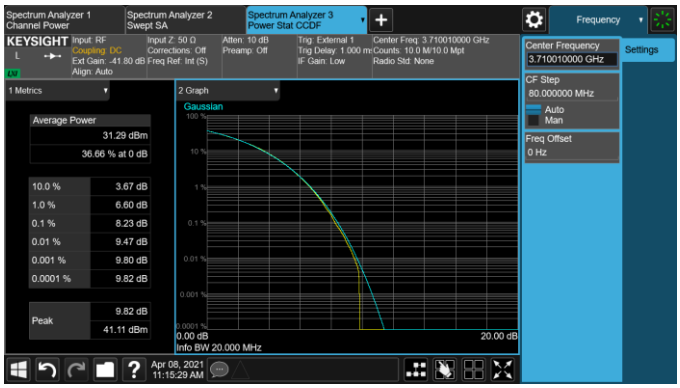
Peak-to-Average Power Ratio (PAPR) Non-Contiguous 20+20MHz BW

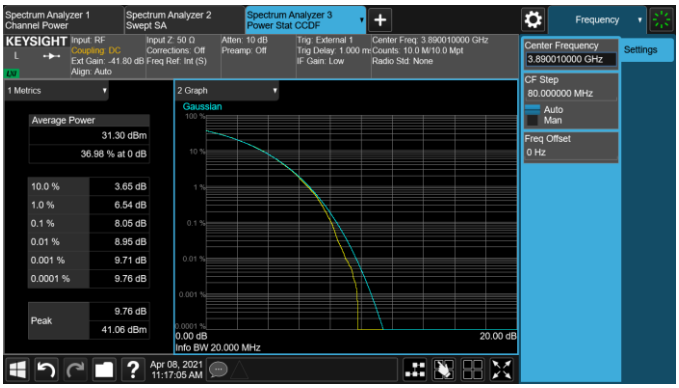
Test Model 1.1
Modulation QPSK
Channel Frequency 3789.99+ 3969.99 MHz
TX64





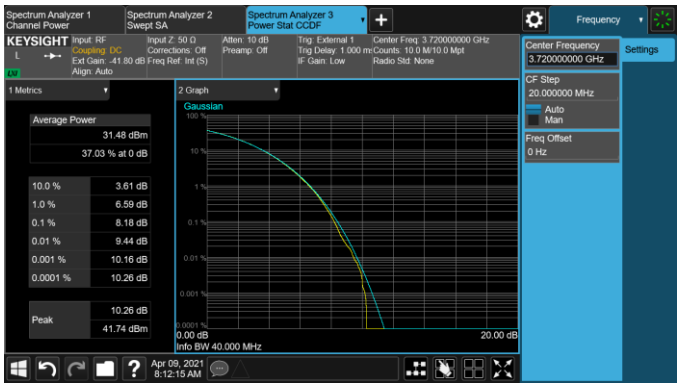
Test Model 1.1
Modulation QPSK
Channel Frequency 3710.01 + 3890.01 MHz
TX64

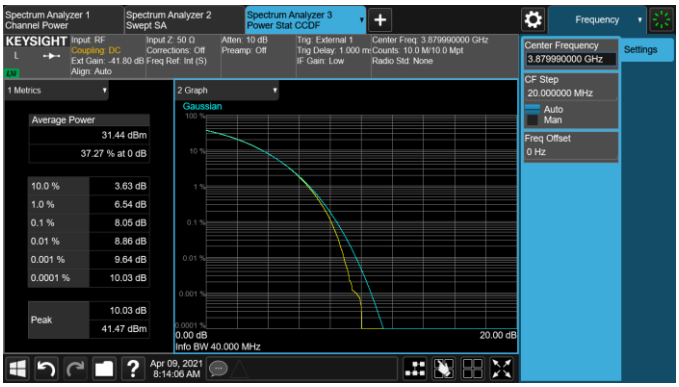




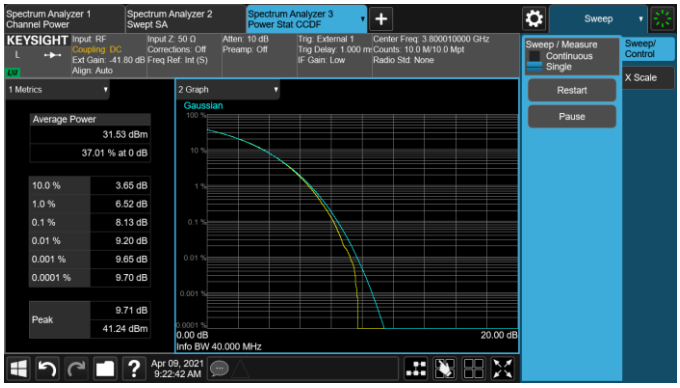
Peak-to-Average Power Ratio (PAPR) Non-Contiguous 40+40MHz BW

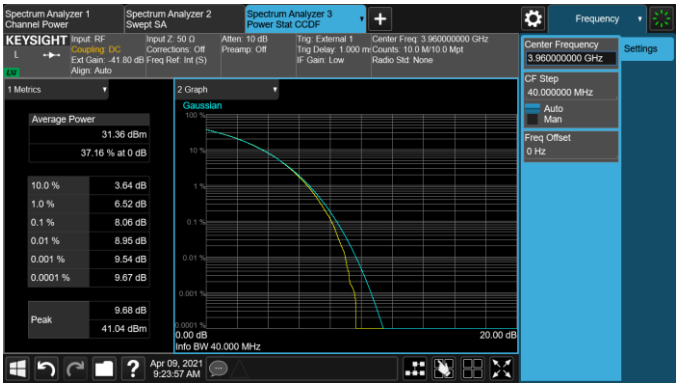
Test Model 1.1
Modulation QPSK
Channel Frequency 3720 + 3879.99 MHz
TX64





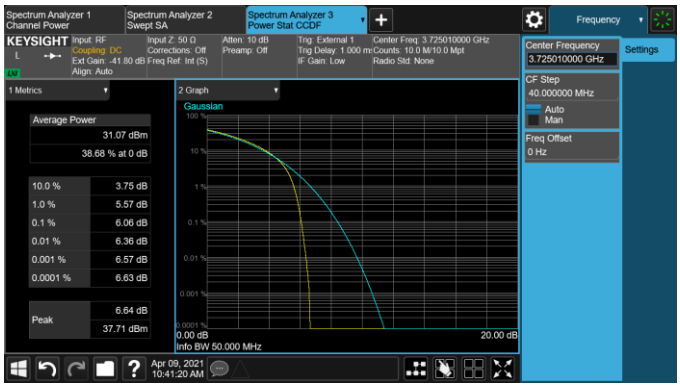
Test Model 3.1
Modulation 64QAM
Channel Frequency 3800.01 + 3960 MHz
TX64

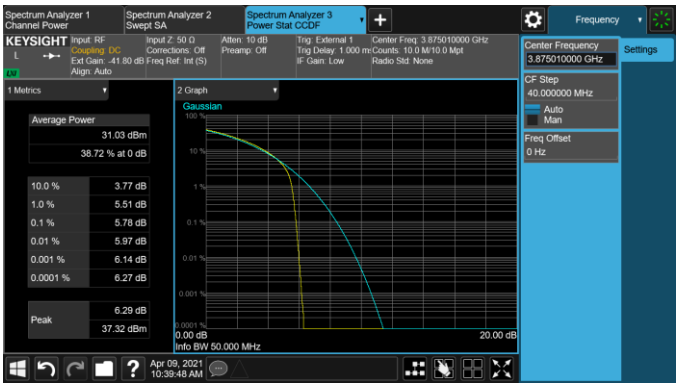




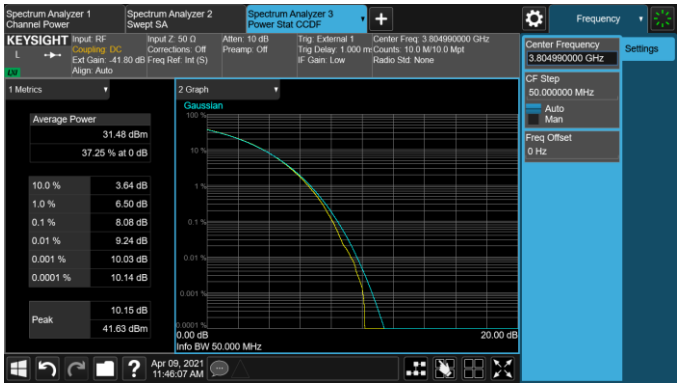
Peak-to-Average Power Ratio (PAPR) Non-Contiguous 50+50MHz BW

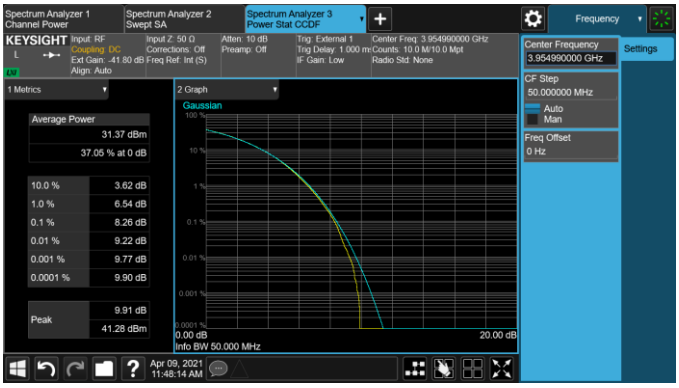
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3725.01 + 3875.01 MHz
TX64





Test Model 3.1a
Modulation 256QAM
Channel Frequency 3804.99 + 3954.99 MHz
TX64





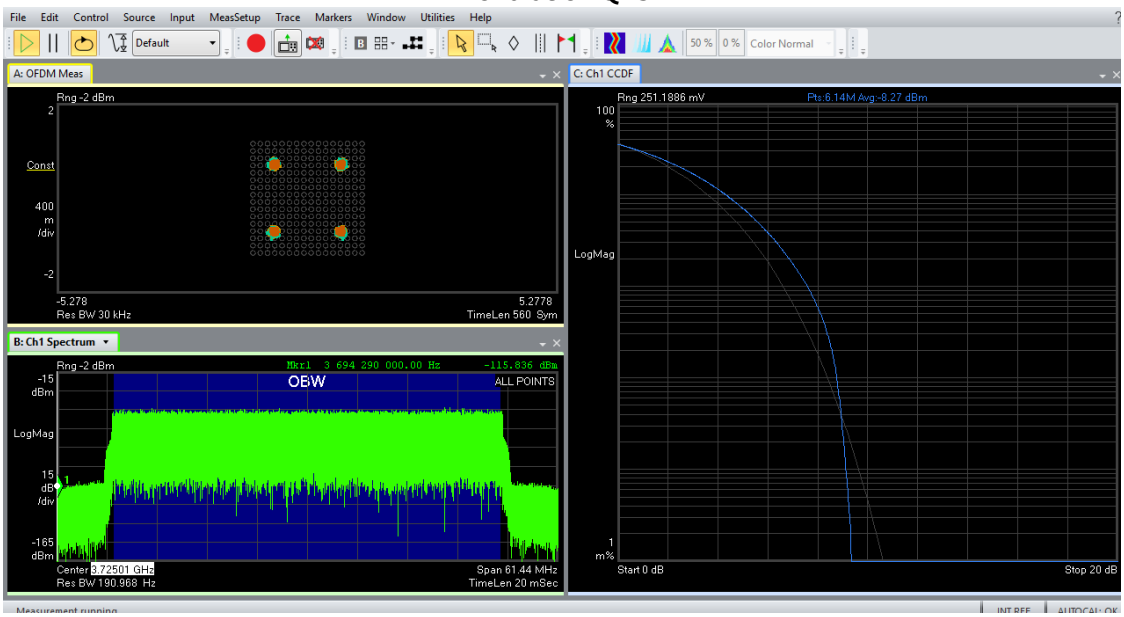
3. FCC Section 2.1047 - Modulation Characteristics

3.1 Modulation Characteristics

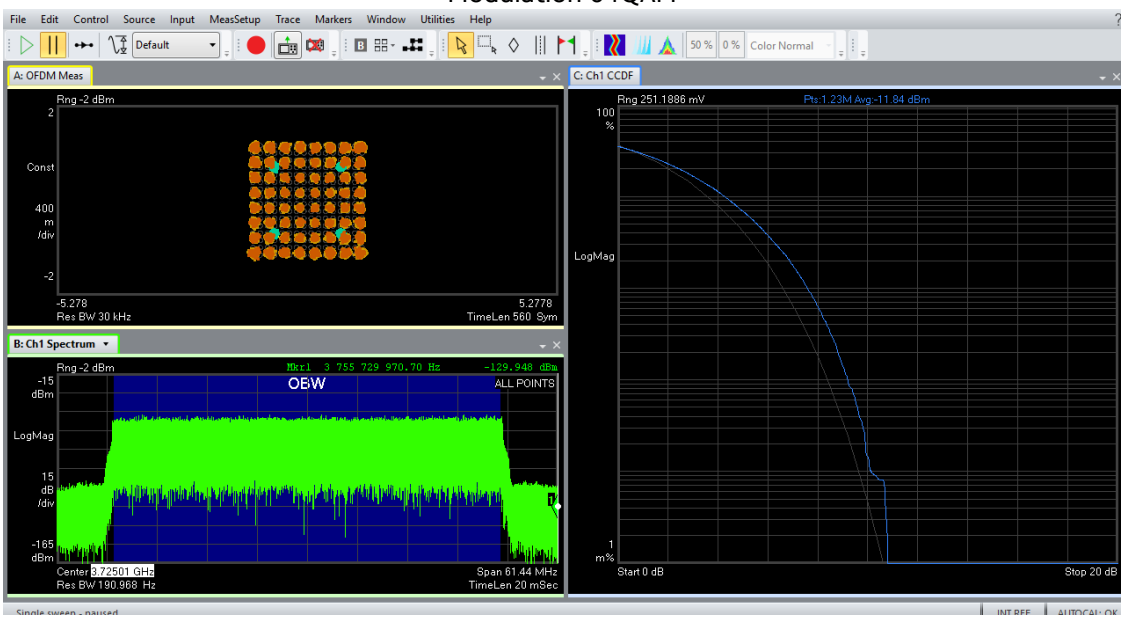
The RF signal at the antenna port was demodulated and verified for correctness of the modulation signal used before each test was performed.

3.1.1 Modulation Characteristics – Plots

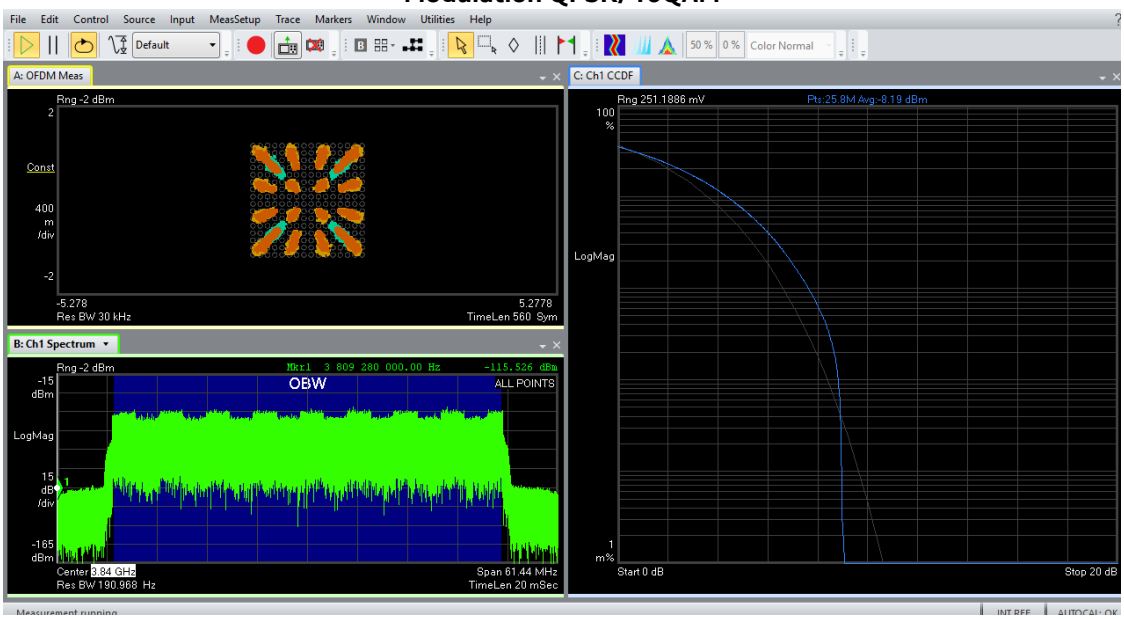
Modulation QPSK



Modulation 64QAM



Modulation QPSK/16QAM



Modulation 256QAM