

4. FCC Section 2.1049 – Occupied Bandwidth/Edge of Band Emissions

4.1 Occupied Bandwidth

In 47CFR 2.1049 the FCC requires:

“The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.”

This required measurement is the 99% Occupied Bandwidth, also called the designated signal bandwidth and needs to be within the parameters of the products specified emissions designator. During these measurements it is customary to evaluate the Edge of Band emissions at block/band edges.

The transmitted signal occupied bandwidth was measured using a Keysight MXA Signal Analyzer. All emissions were within the parameters as required.

Tabular Data – 99% Occupied Bandwidth

	# of Carriers	Test Model	Modulation	TX Port	Channel Frequency MHz	Signal BW MHz	Occupied BW MHz
	1	1.1	QPSK	36	3725.01	50	47.556
	1	3.2	QPSK/16QAM	36	3840	50	47.855
	1	3.1a	256QAM	10	3954.99	50	47.691
	1	3.1	64QAM	36	3730.02	60	57.961
	1	3.2	QPSK/16QAM	36	3840	60	57.892
	1	3.1a	256QAM	10	3949.98	60	57.922
	1	3.1	64QAM	36	3740.01	80	77.699
	1	3.2	QPSK/16QAM	36	3840	80	77.731
	1	3.1a	256QAM	10	3939.99	80	77.147
	1	1.1	QPSK	36	3745.02	90	86.96
	1	3.2	QPSK/16QAM	36	3840	90	87.484
	1	3.1a	256QAM	10	3934.98	90	87.077
contiguous	2	3.2	QPSK/16QAM	36	3710.01 + 3729.99	20+20	38.252
	2	3.2	QPSK/16QAM	36	3840 + 3859.99	20+20	38.244
	2	3.1a	256QAM	10	3950 + 3969.99	20+20	38.217
	2	3.2	QPSK/16QAM	36	3720 + 3759.99	40+40	77.877
	2	3.2	QPSK/16QAM	36	3840 + 3859.99	40+40	77.911
	2	3.1a	256QAM	10	3920.01 + 3960	40+40	77.272
	2	3.2	QPSK/16QAM	36	3725.01 + 3774.99	50+50	97.141
	2	3.2	QPSK/16QAM	36	3840 + 3889.99	50+50	97.181
	2	3.1a	256QAM	10	3905.01 + 3954.99	50+50	96.714
non-contiguous	2	1.1	QPSK	10	3789.99 + 3969.99	20+20	18.519+18.781
	2	1.1	QPSK	36	3710.01 + 3890.01	20+20	18.474+18.780
	2	1.1	QPSK	36	3720 + 3879.99	40+40	37.857+37.996
	2	1.1	QPSK	10	3800.01 + 3960	40+40	38.190+38.065
	2	3.2	QPSK/16QAM	36	3725.01 + 3875.01	50+50	47.832+47.833
	2	3.1a	256QAM	10	3804.99 + 3954.99	50+50	47.715+47.485

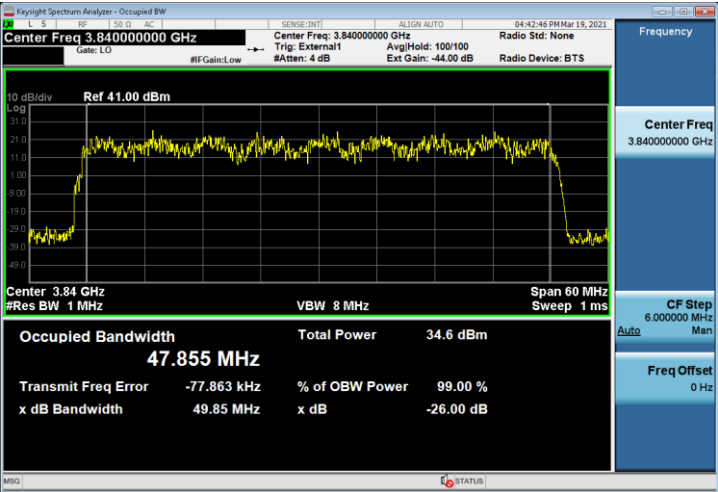
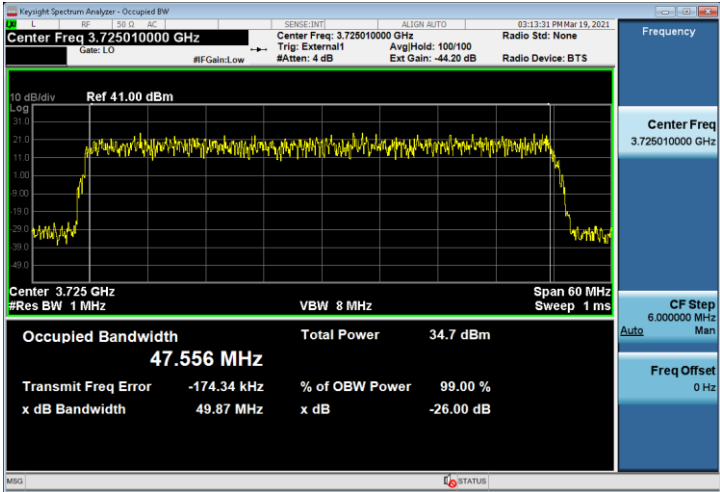
4.1.1 Occupied Bandwidth - 1 Carrier Plots

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.

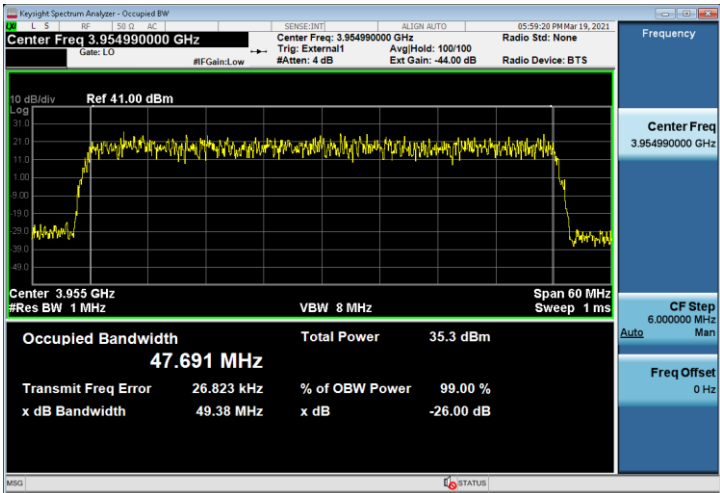
Occupied Bandwidth 50MHz BW

Test Model 1.1
Modulation QPSK
Channel Frequency 3725.01MHz
TX36

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

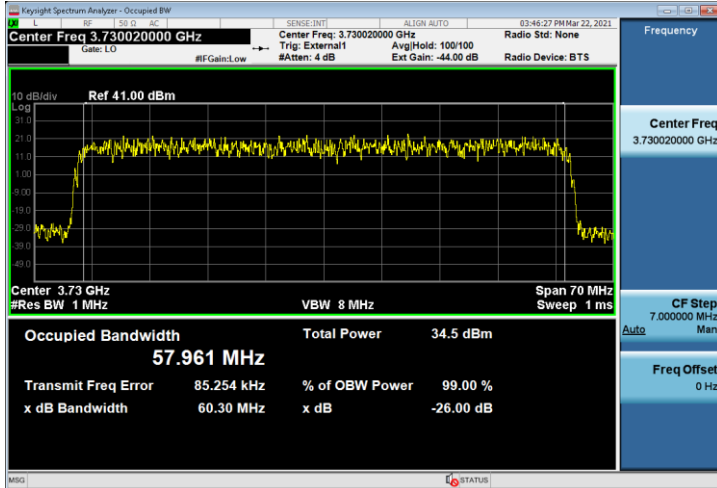


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3954.99MHz
TX10

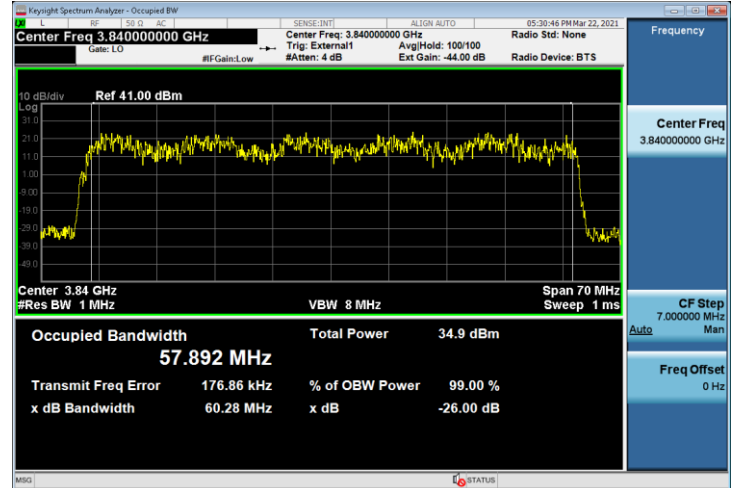


Occupied Bandwidth 60MHz BW

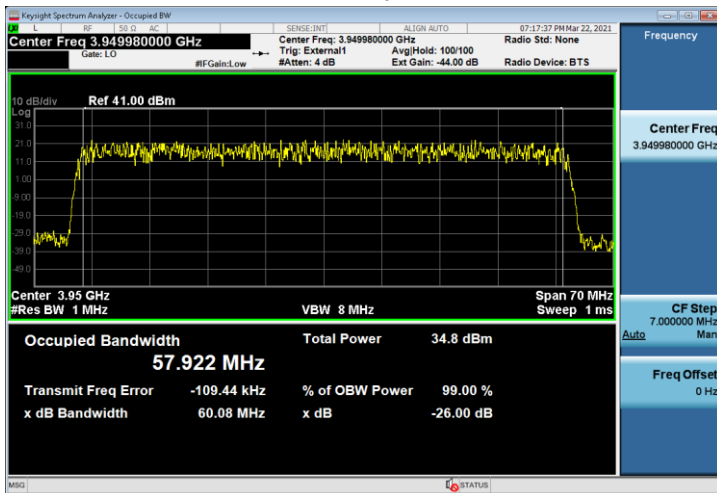
Test Model 3.1
Modulation 64QAM
Channel Frequency 3730.02MHz
TX36



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

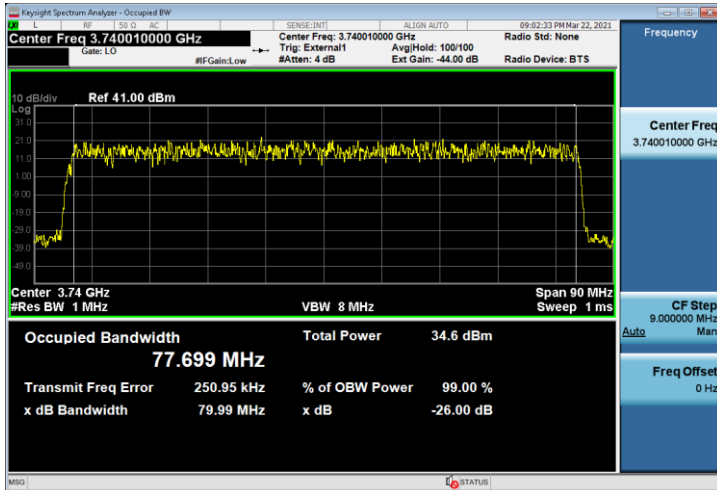


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3949.98MHz
TX10

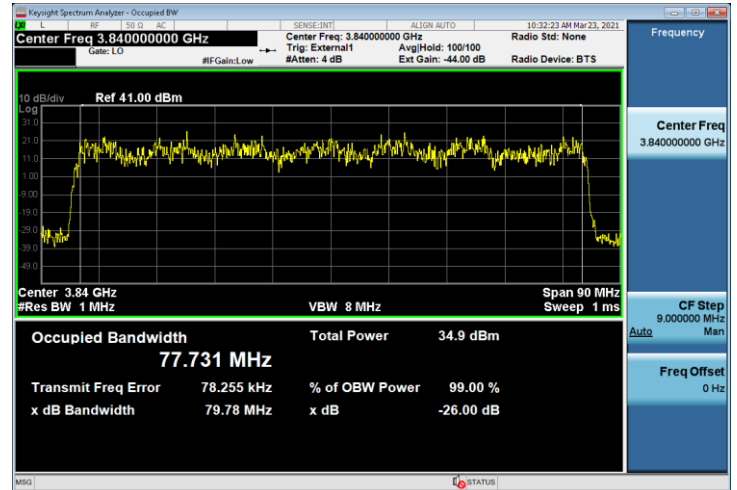


Occupied Bandwidth 80MHz BW

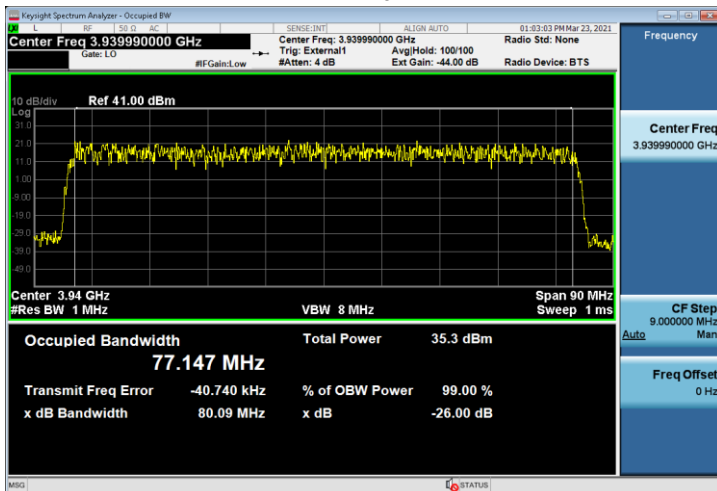
Test Model 3.1
Modulation 64QAM
Channel Frequency 3740.01MHz
TX36



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

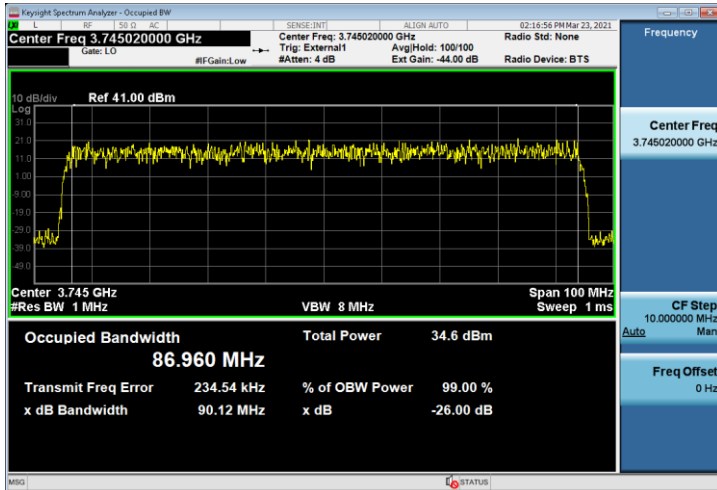


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3939.99MHz
TX10

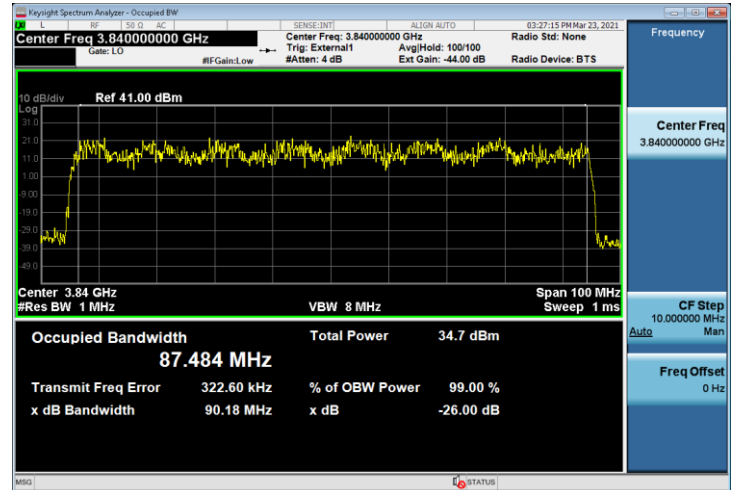


Occupied Bandwidth 90MHz BW

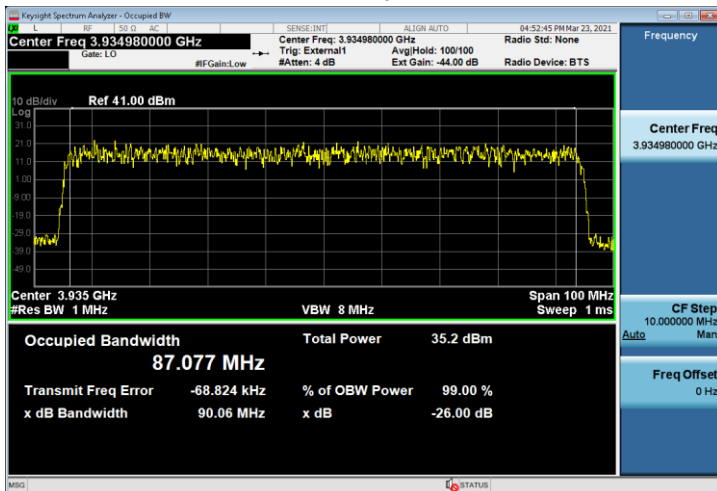
Test Model 1.1
Modulation QPSK
Channel Frequency 3745.02MHz
TX36



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



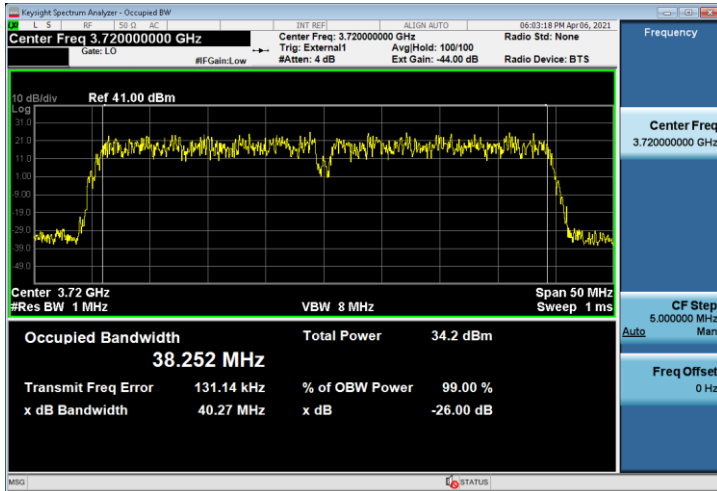
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3934.98MHz
TX10



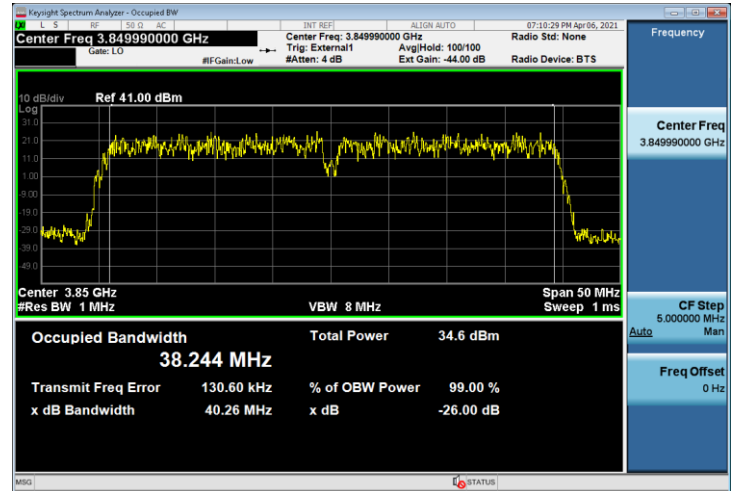
4.1.2 Occupied Bandwidth - 2 Carrier Contiguous Plots

Occupied Bandwidth Contiguous 20+20MHz BW

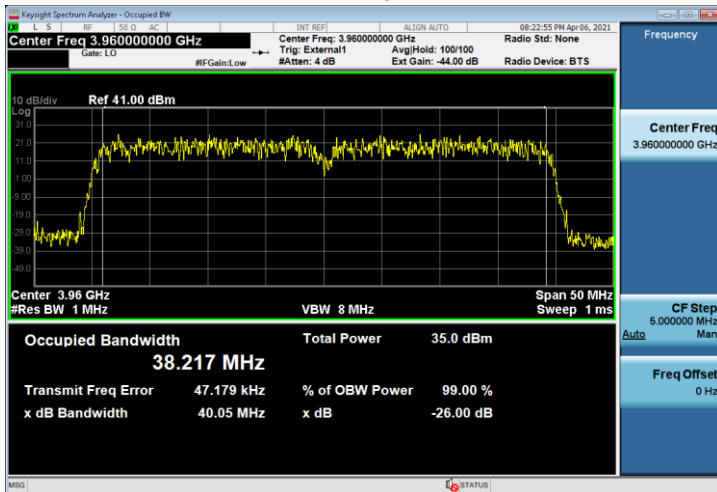
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3710.01 + 3729.99 MHz
TX36



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

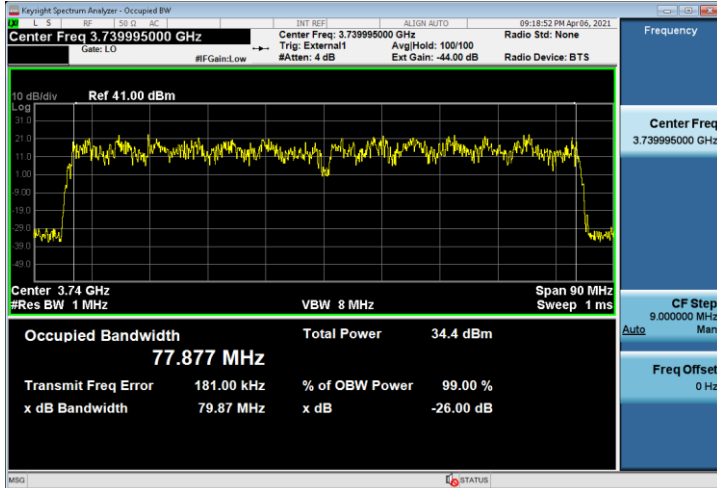


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3950 + 3969.99 MHz
TX10

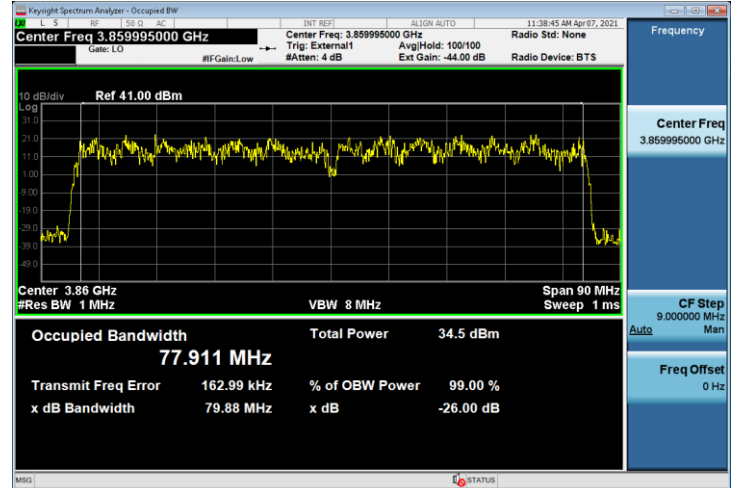


Occupied Bandwidth Contiguous 40+40MHz BW

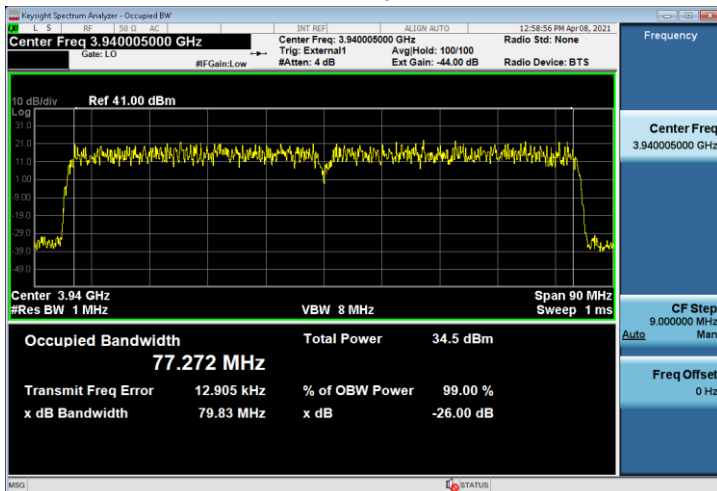
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3720 + 3759.99 MHz
TX36



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

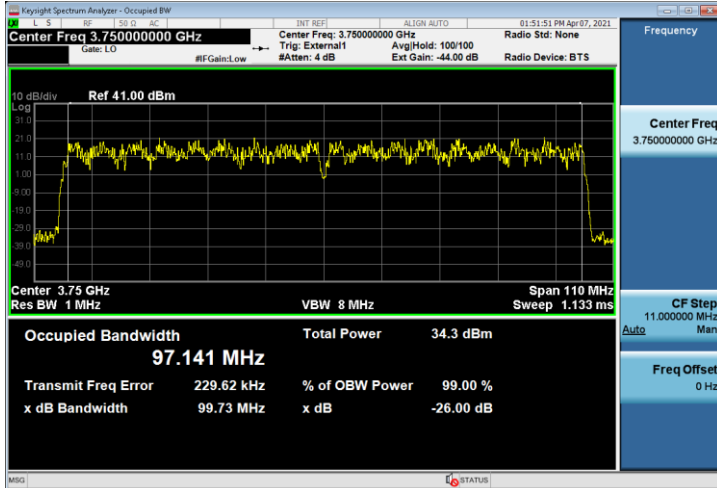


Test Model 3.1a
Modulation 256QAM
Channel Frequency 3920.01 + 3960 MHz
TX10

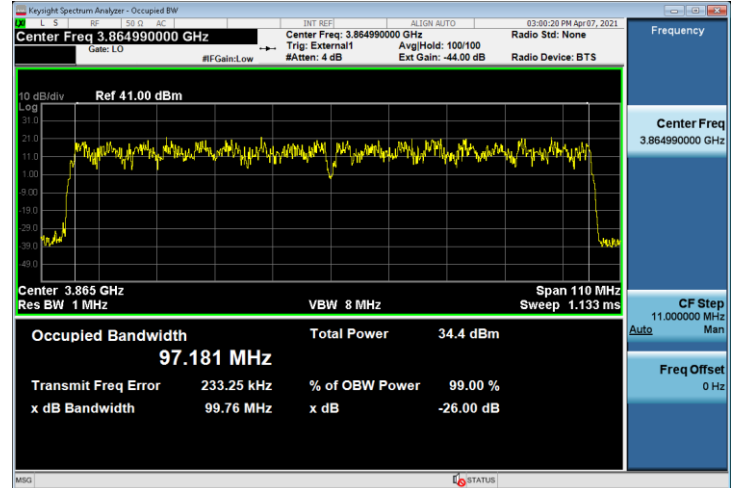


Occupied Bandwidth Contiguous 50+50MHz BW

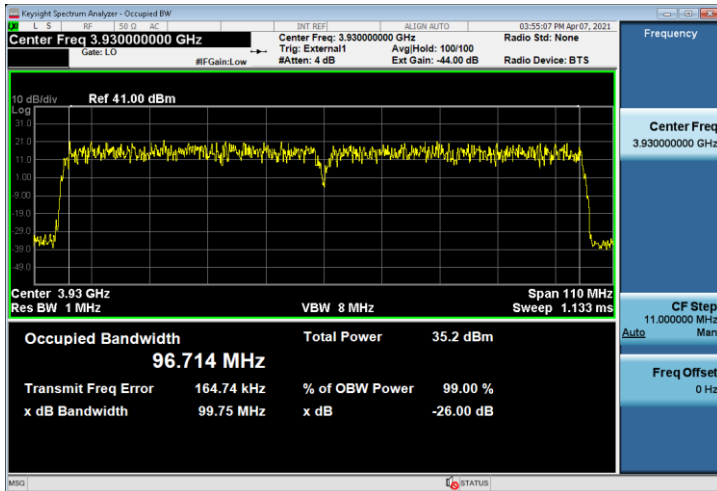
Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3725.01 + 3774.99 MHz
TX36



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



4.1.3 Occupied Bandwidth - 2 Carrier Non-Contiguous Plots

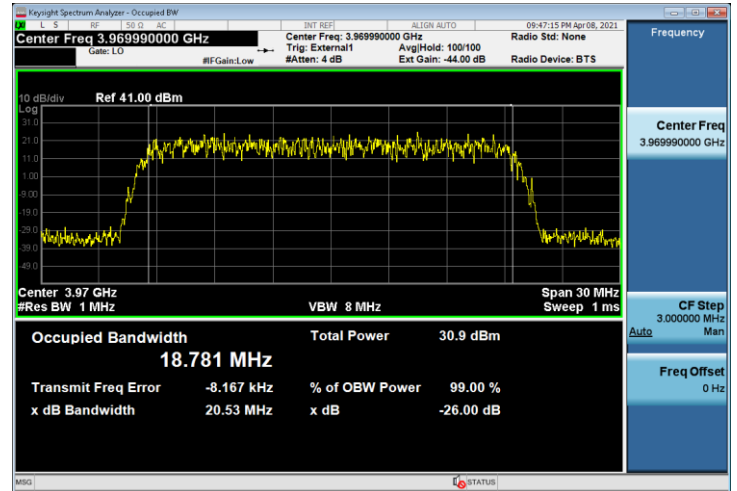
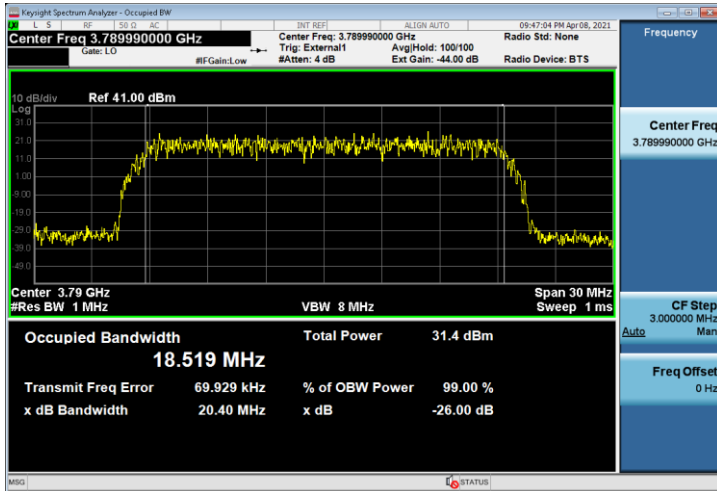
Occupied Bandwidth Non-Contiguous 20+20MHz BW

Test Model 1.1

Modulation QPSK

Channel Frequency 3789.99+ 3969.99 MHz

TX10

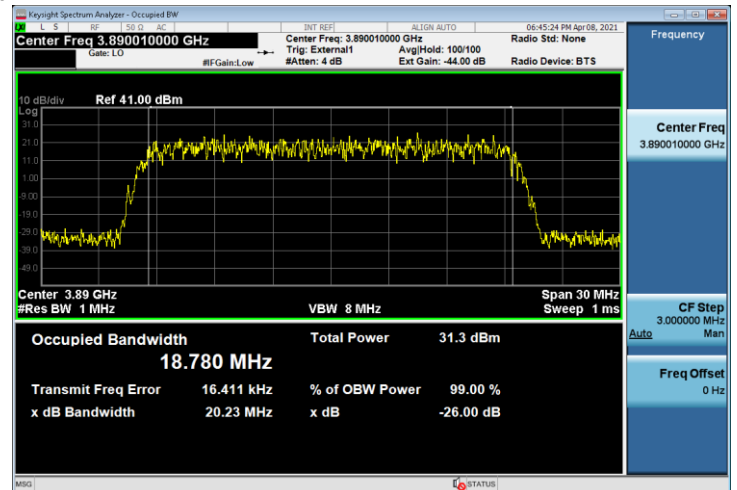
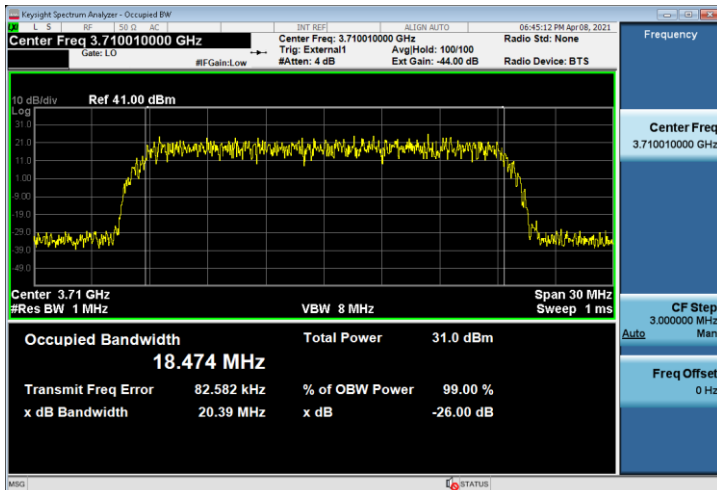


Test Model 1.1

Modulation QPSK

Channel Frequency 3710.01 + 3890.01 MHz

TX36



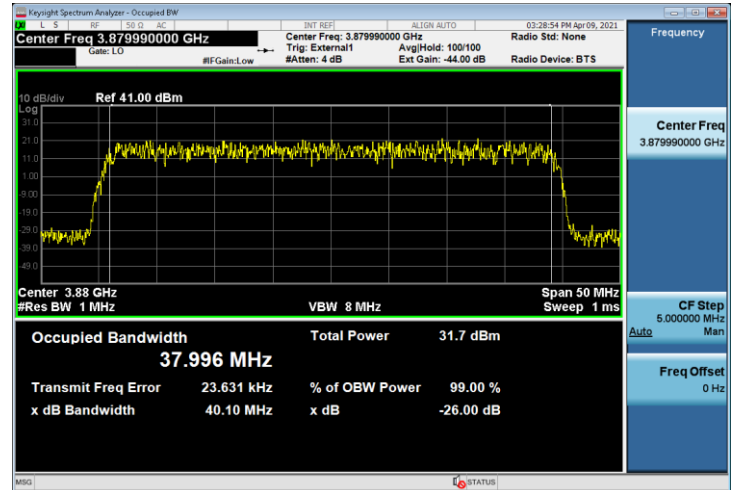
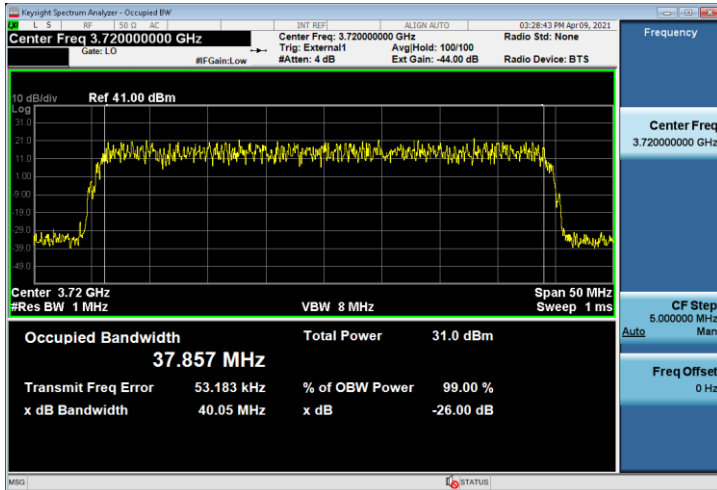
Occupied Bandwidth Non-Contiguous 40+40MHz BW

Test Model 1.1

Modulation QPSK

Channel Frequency 3720 + 3879.99 MHz

TX36

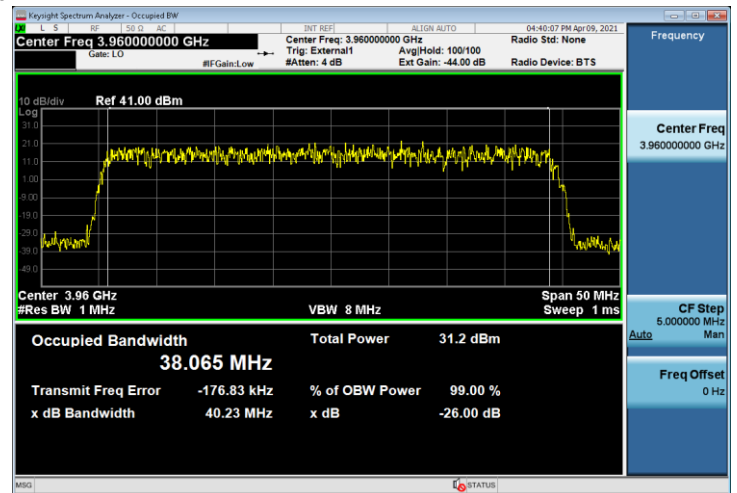
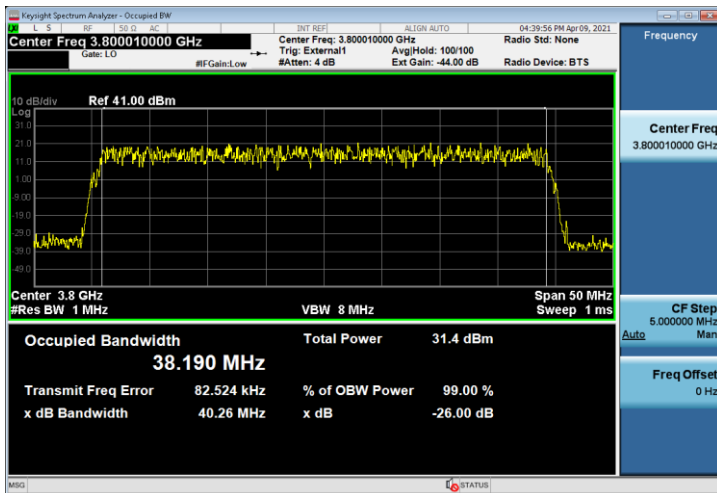


Test Model 3.1

Modulation 64QAM

Channel Frequency 3800.01 + 3960 MHz

TX10



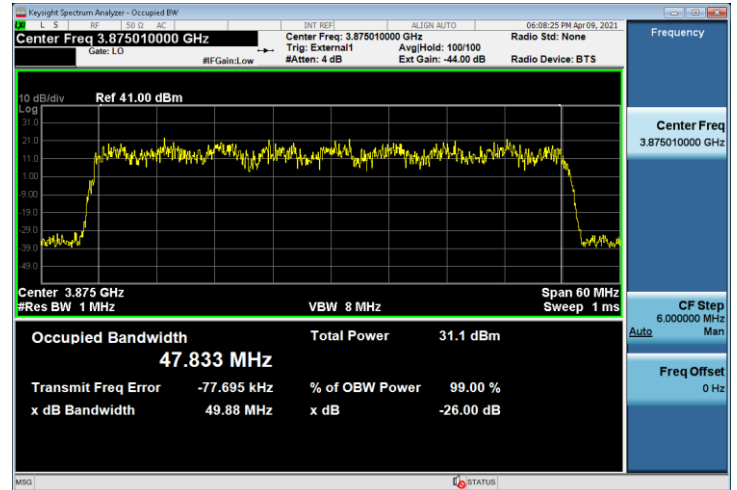
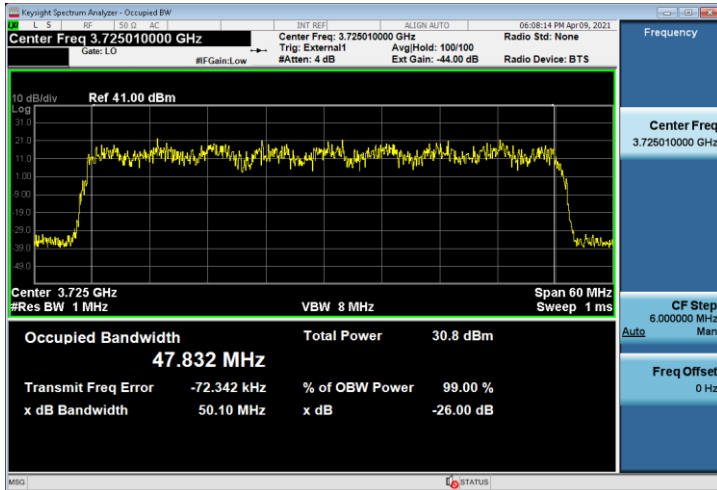
Occupied Bandwidth Non-Contiguous 50+50MHz BW

Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3725.01 + 3875.01 MHz

TX36

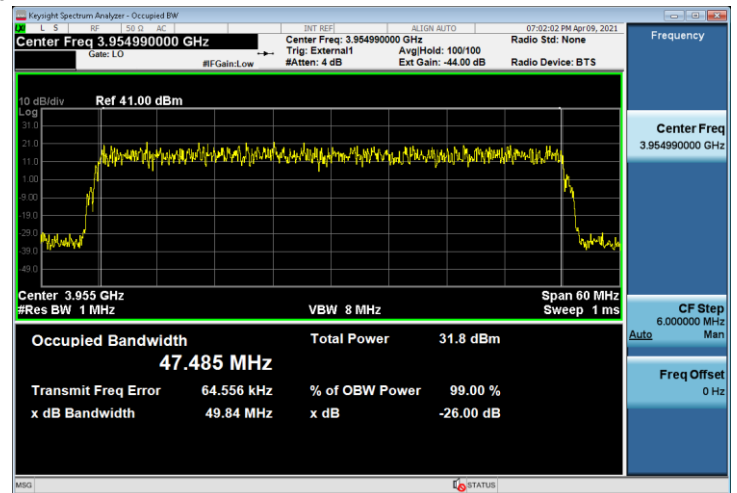
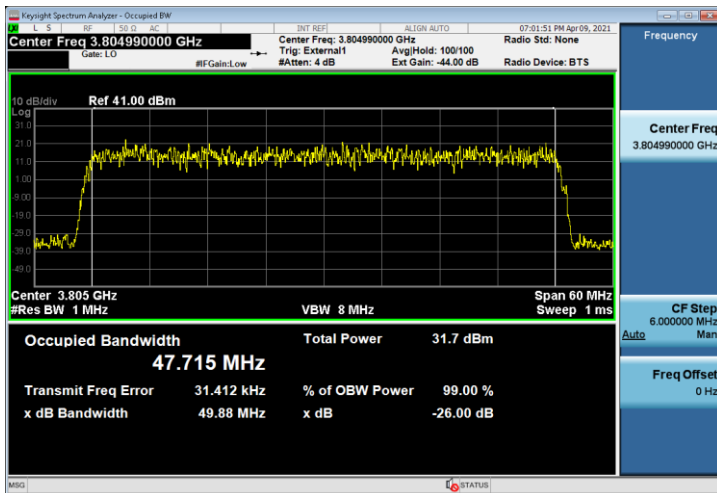


Test Model 3.1a

Modulation 256QAM

Channel Frequency 3804.99 + 3954.99 MHz

TX10



4.2 Edge of band Emissions

The Edge of Band emissions of the EUT at the external antenna connector (EAC) were measured using a Keysight MXA Signal Analyzer. The RF power level was continuously measured using a RF broadband power meter. The RF output from the EAC port to signal analyzer was reduced (to an amplitude usable by the signal analyzer) by using a calibrated attenuator and test coupler. The path attenuation was offset on the display and the signal for the carrier was adjusted to the corrected RF power level for the resolution bandwidth used for the transmit signal. All mask values were adjusted based upon the designated signal bandwidth and measurement bandwidths. The Top of Mask corresponds to the set rated power level as confirmed by the RF power meter.

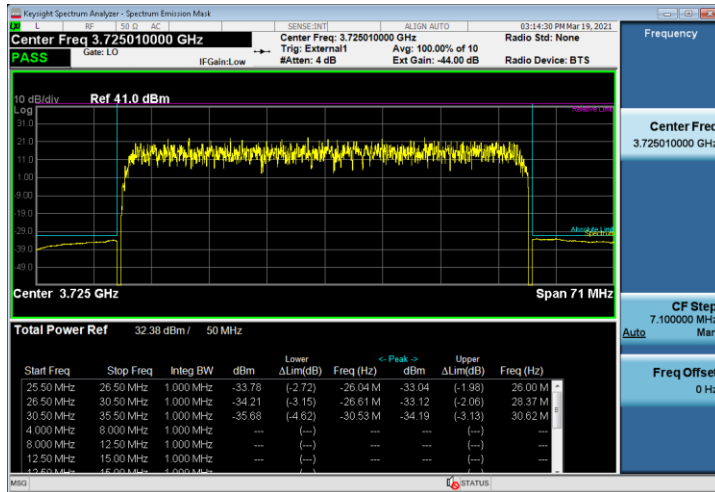
Per FCC Part 27.53 (L)(1), for base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (L)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the 26dB emission bandwidth of the fundamental emission of the transmitter may be employed. Therefore, with 64 TX ports, the conducted limit per port is -31 dBm/1% BW in the 1MHz immediately outside and adjacent to the licensee's frequency block and -31 dBm/MHz outside the 1MHz.

4.2.1 Edge of Band Emissions – 1 Carrier Plots

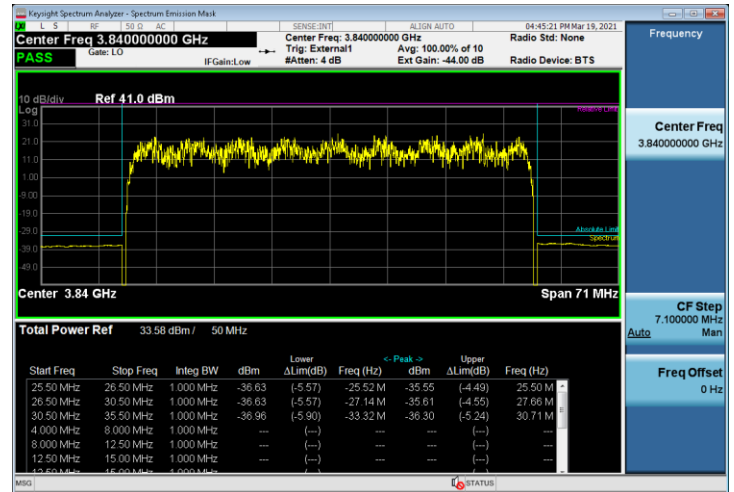
All of the measurements met the requirements of Part 27.53 when measured per Part 2.1049.

Edge of Band Emissions 50MHz BW

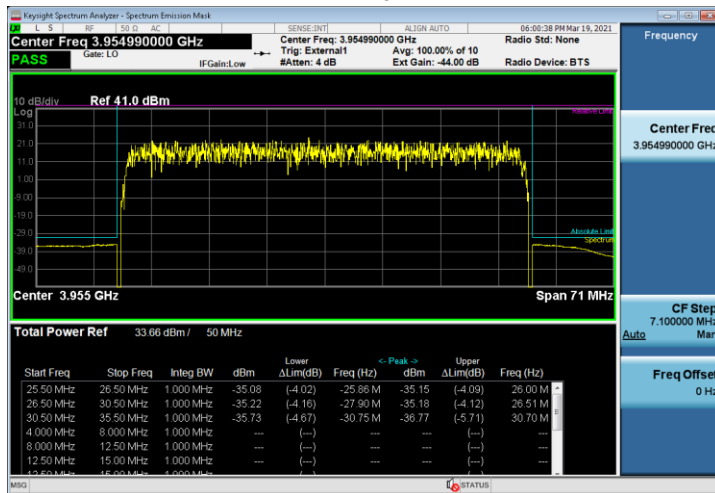
Test Model 1.1
Modulation QPSK
Channel Frequency 3725.01MHz
TX36



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



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



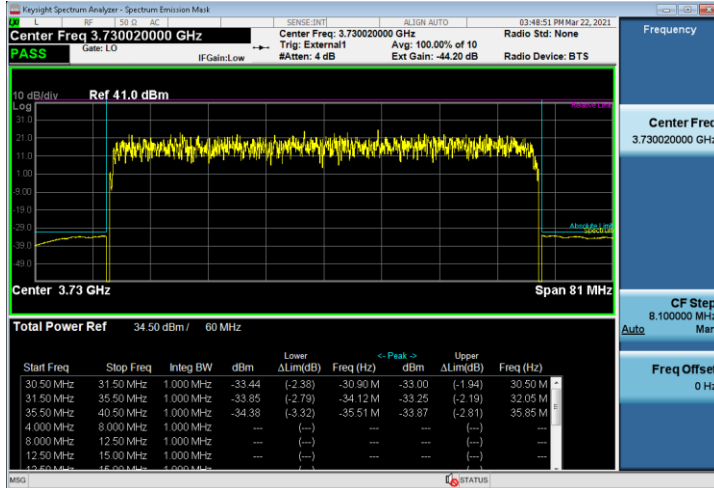
Edge of Band Emissions 60MHz BW

Test Model 3.1

Modulation 64QAM

Channel Frequency 3730.02MHz

TX36

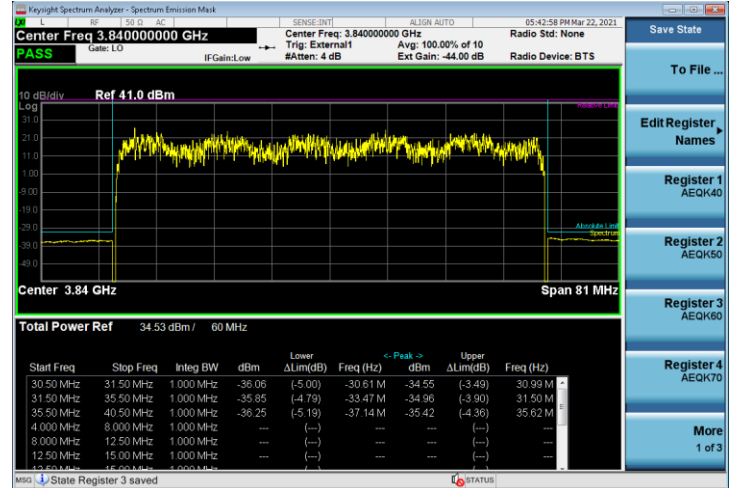


Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3840 MHz

TX36

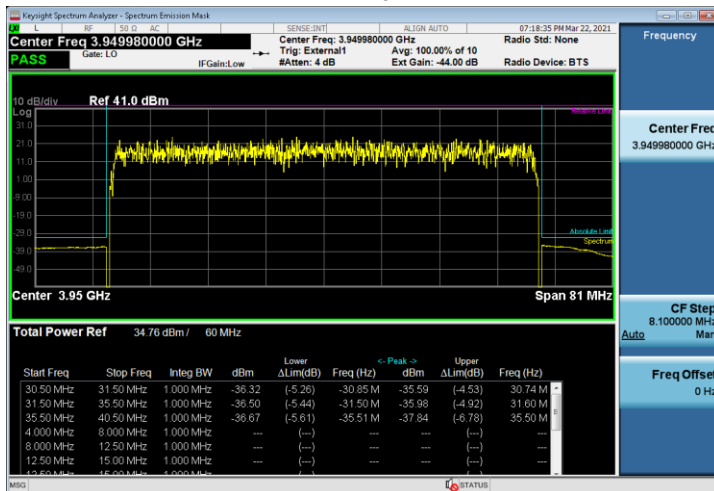


Test Model 3.1a

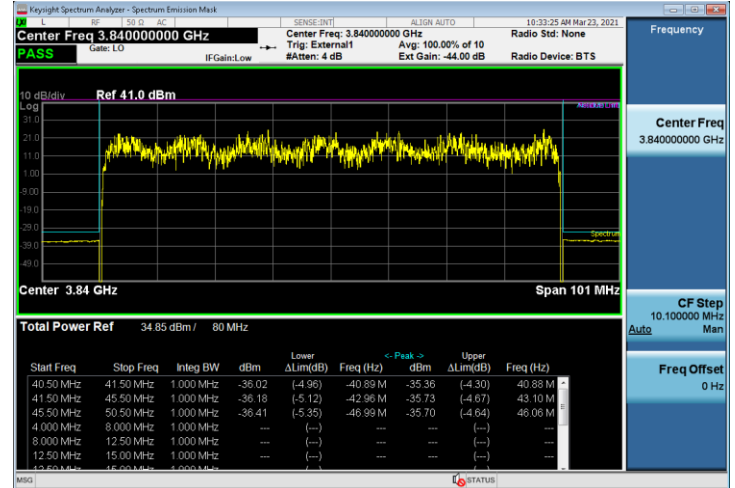
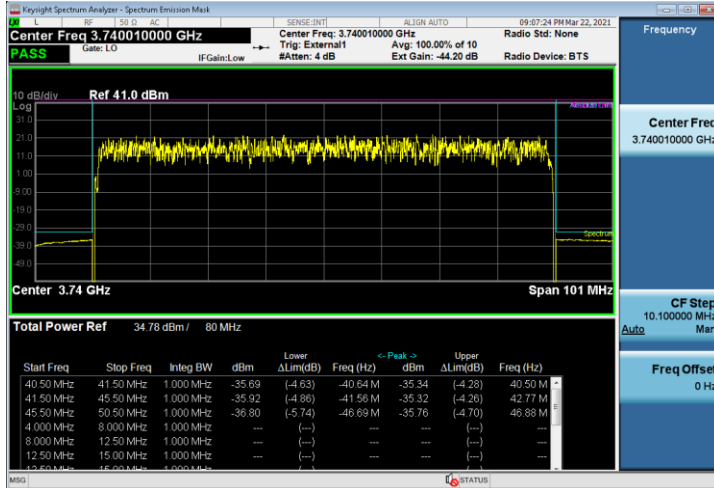
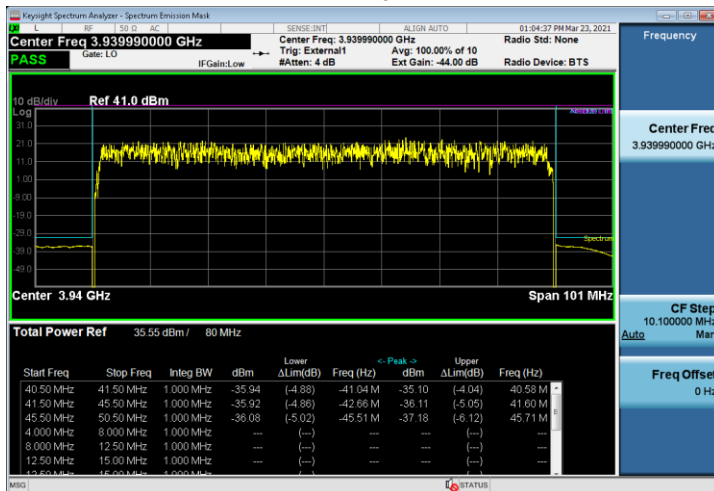
Modulation 256QAM

Channel Frequency 3949.98MHz

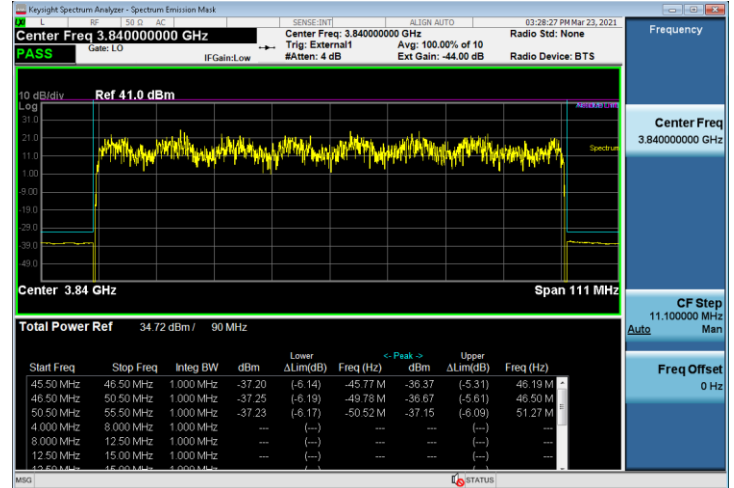
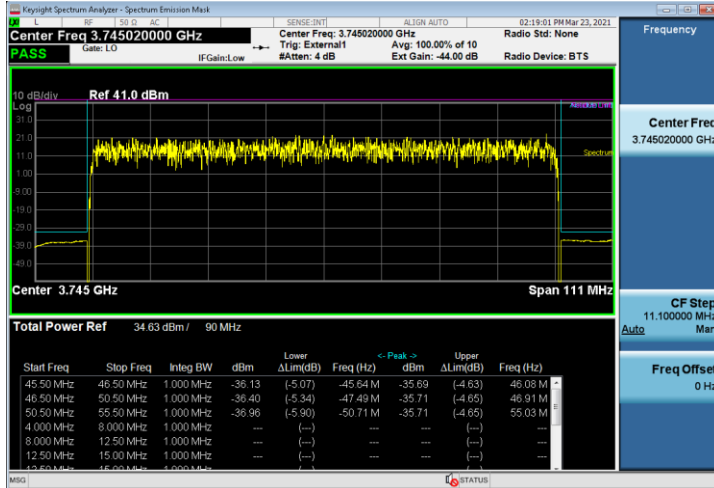
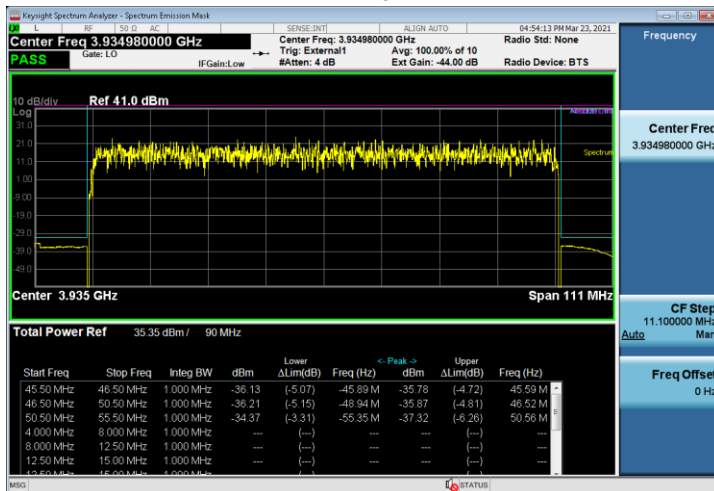
TX10



Edge of Band Emissions 80MHz BW

Test Model 3.1
Modulation 64QAM
Channel Frequency 3740.01MHz
TX36Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36Test Model 3.1a
Modulation 256QAM
Channel Frequency 3939.99MHz
TX10

Edge of Band Emissions 90MHz BW

Test Model 1.1
Modulation QPSK
Channel Frequency 3745.02MHz
TX36Test Model 3.2
Modulation QPSK/16QAM
Channel Frequency 3840 MHz
TX36Test Model 3.1a
Modulation 256QAM
Channel Frequency 3934.98MHz
TX10

4.2.2 Edge of Band Emissions - 2 Carrier Contiguous Plots

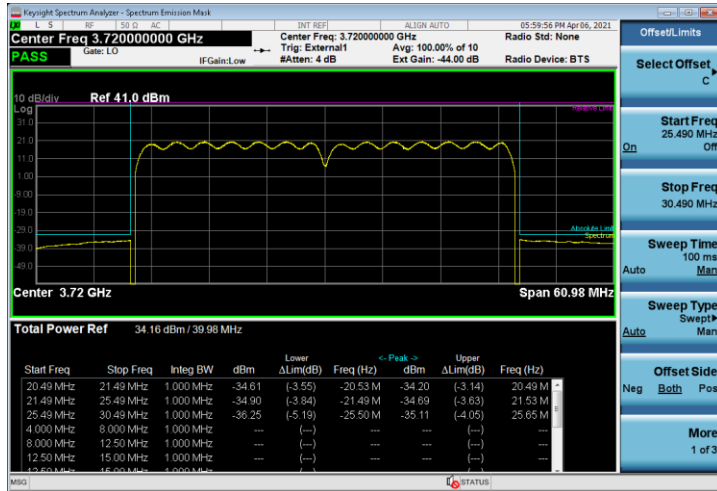
Edge of Band Emissions Contiguous 20+20MHz BW

Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3710.01 + 3729.99 MHz

TX36

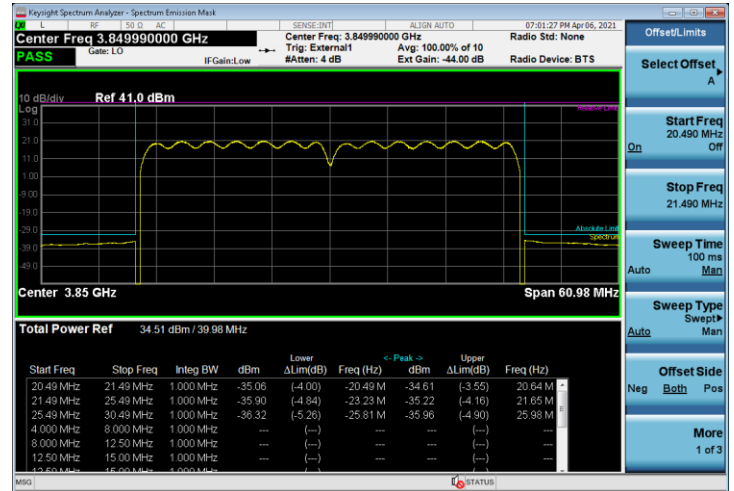


Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3840 + 3859.99 MHz

TX36

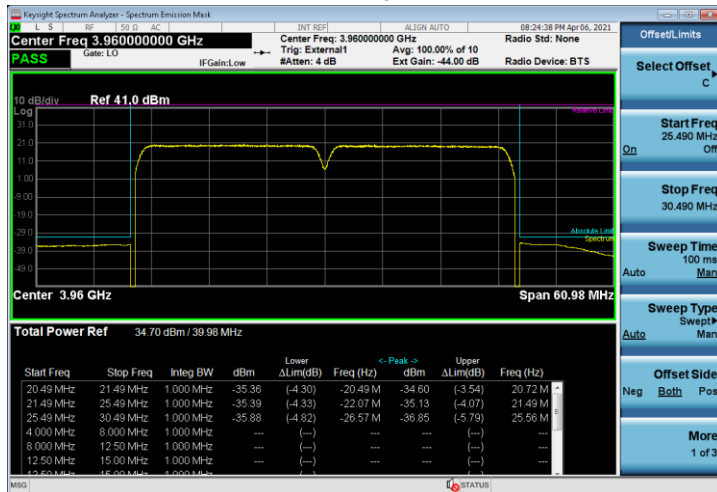


Test Model 3.1a

Modulation 256QAM

Channel Frequency 3950 + 3969.99 MHz

TX10



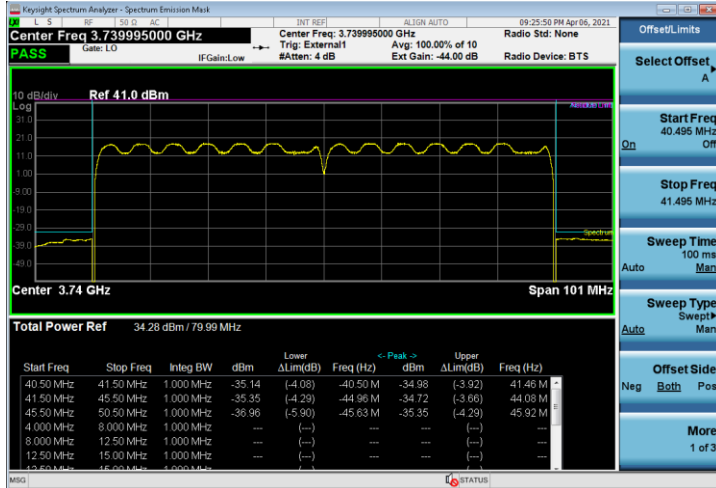
Edge of Band Emissions Contiguous 40+40MHz BW

Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3720 + 3759.99 MHz

TX36

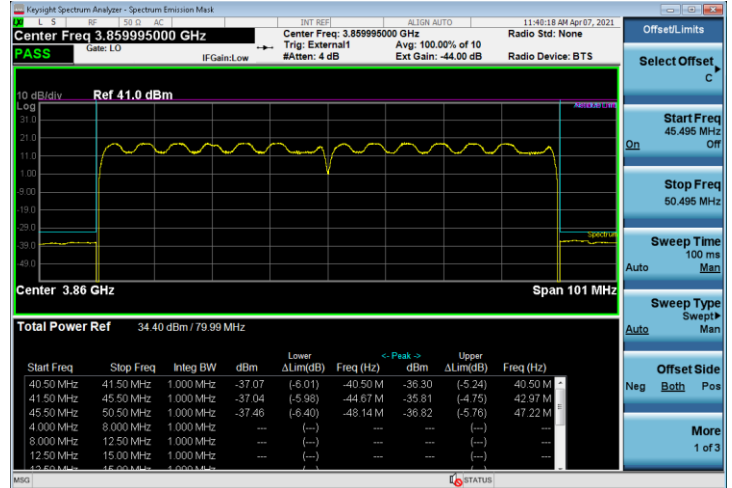


Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3840 + 3859.99 MHz

TX36



Test Model 3.1a

Modulation 256QAM

Channel Frequency 3920.01 + 3960 MHz

TX10

