

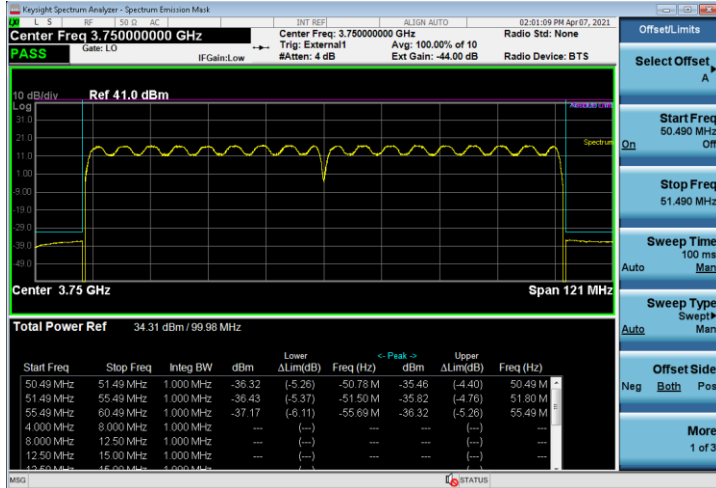
Edge of Band Emissions Contiguous 50+50MHz BW

Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3725.01 + 3774.99 MHz

TX36

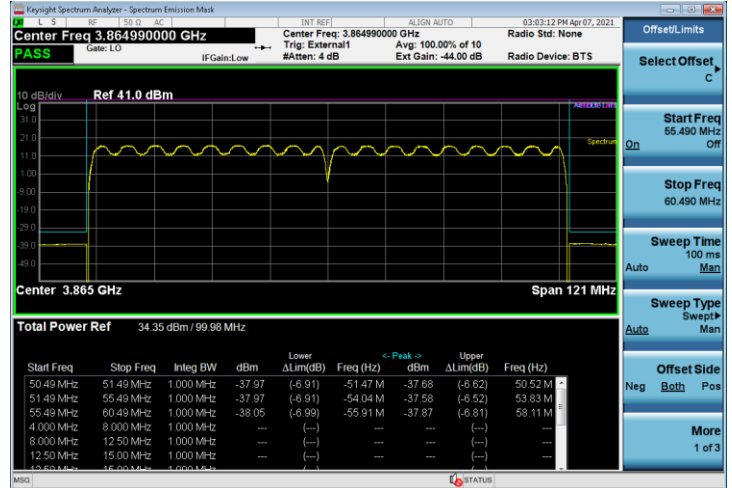


Test Model 3.2

Modulation QPSK/16QAM

Channel Frequency 3840 + 3889.99 MHz

TX36

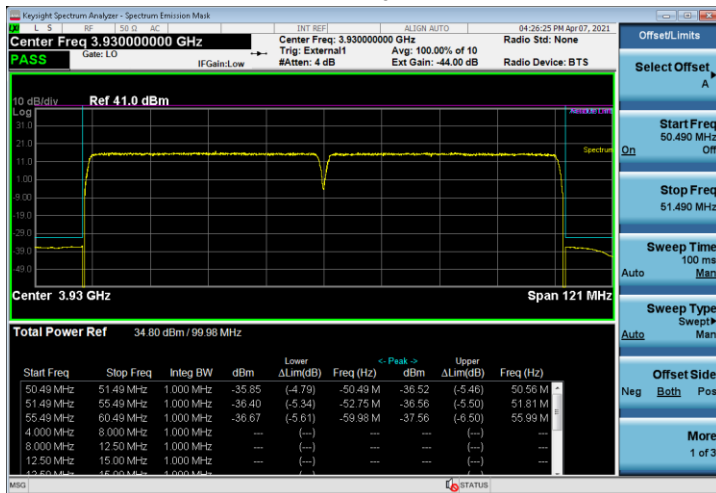


Test Model 3.1a

Modulation 256QAM

Channel Frequency 3905.01 + 3954.99 MHz

TX10



4.2.3 Edge of Band Emissions - 2 Carrier Non-Contiguous Plots

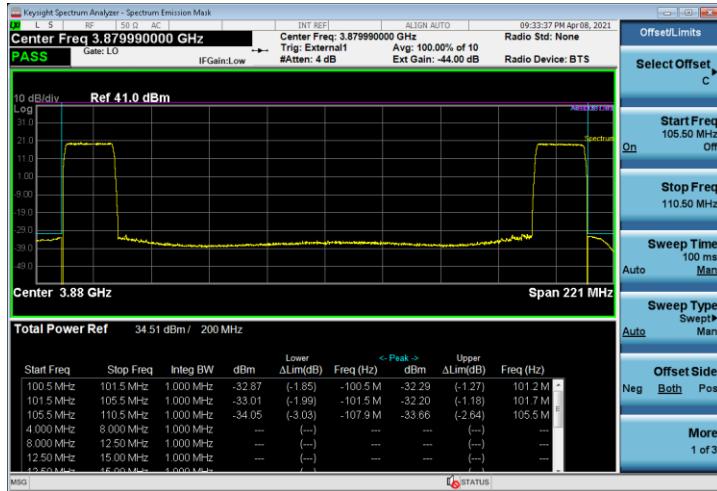
Edge of Band Emissions Non-Contiguous 20+20MHz BW

Test Model 1.1

Modulation QPSK

Channel Frequency 3789.99 + 3969.99 MHz

TX10

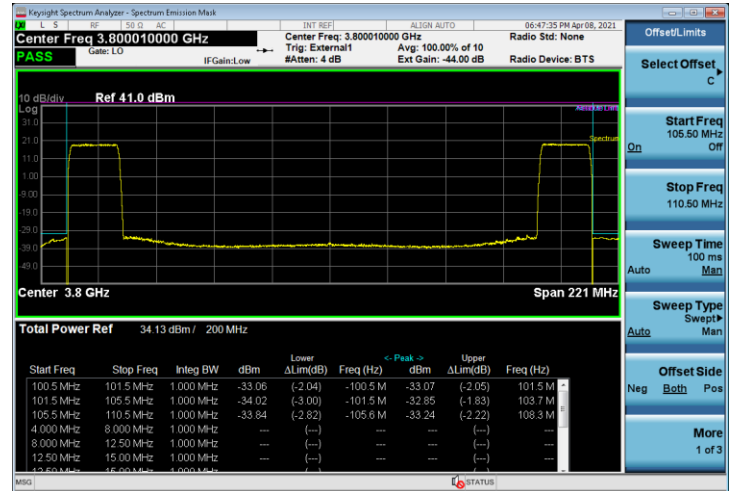


Test Model 1.1

Modulation QPSK

Channel Frequency 3710.01 + 3890.01 MHz

TX36



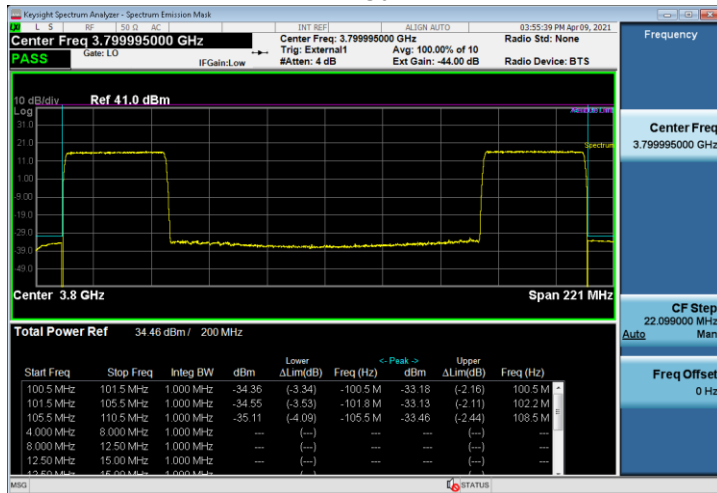
Edge of Band Emissions Non-Contiguous 40+40MHz BW

Test Model 1.1

Modulation QPSK

Channel Frequency 3720 + 3879.99 MHz

TX36

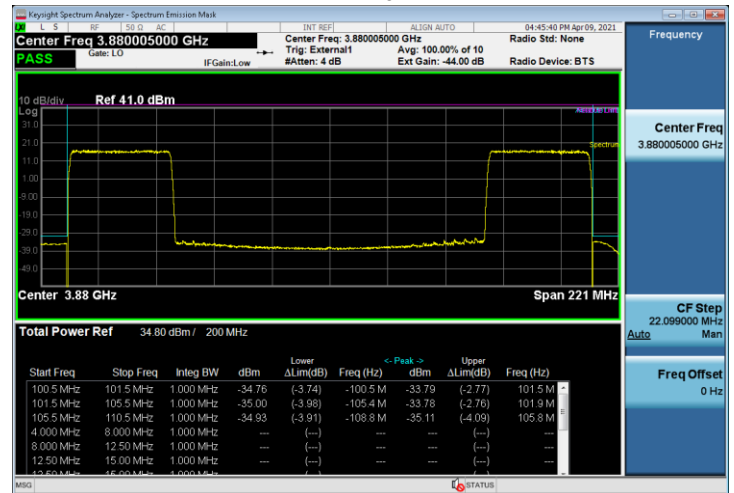


Test Model 3.1

Modulation 64QAM

Channel Frequency 3800.01 + 3960 MHz

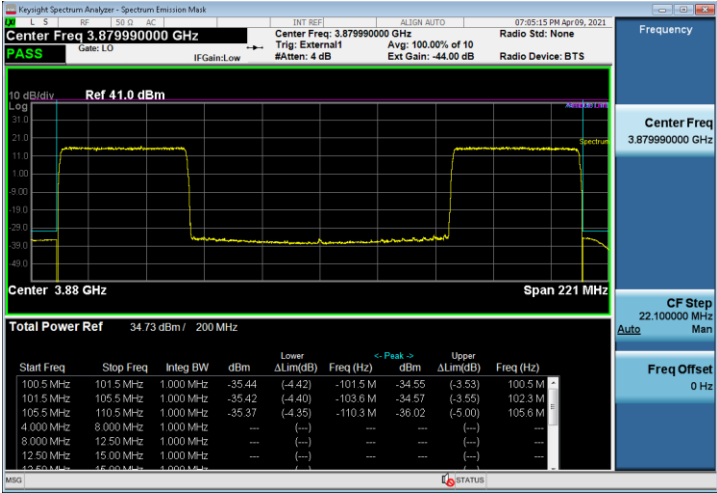
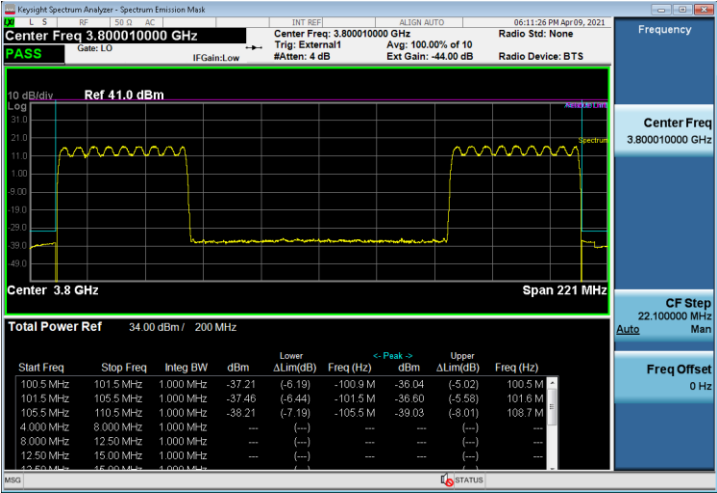
TX10



Edge of Band Emissions 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



5. FCC Section 2.1051 - Spurious Emissions at Transmit Antenna Port

5.1 Measurement of Spurious Emissions at Transmit Antenna Port

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 10 MHz to beyond the 10th harmonic of the specific transmit band. Carrier Bandwidth is exempt. For this band of operation, the measurements were performed up to 37 GHz. Measurements were made using a Keysight MXA Signal Analyzer. The RF output from the transmitter was reduced (to an amplitude usable by the receivers) using calibrated attenuators. The RF power level was continuously monitored via a coupled RF Power Meter.

The required emission limitation is specified as appropriate in 27.53. The measured spurious emission levels were plotted for the frequency range as specified in 2.1057. For 64 ports where $10\log(64) = 18\text{dBm}$, the limit is 31dBm/MHz.. Data below documents performance up to 37 GHz.

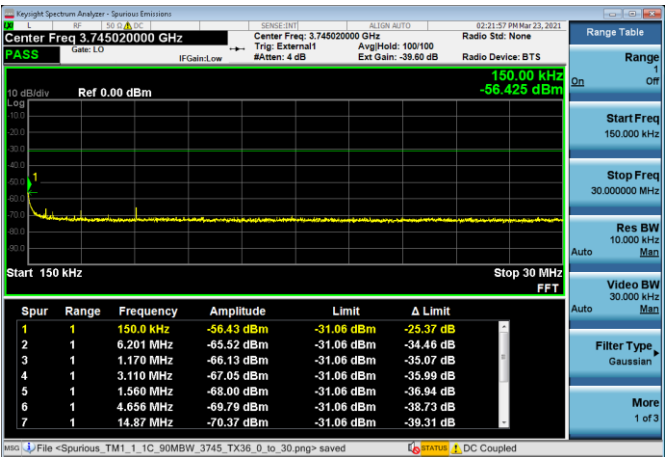
NOTE: Only a sample of the plots are used in this report. The full suite of raw data resides at the MH, New Jersey location.

1 Carrier Data
90MHz BW
Test Model 1.1
Modulation QPSK
Channel Frequency 3745.02MHz

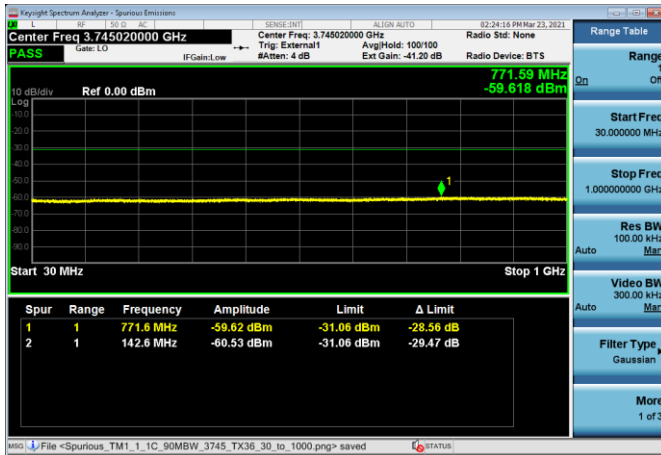
9KHz – 150KHz



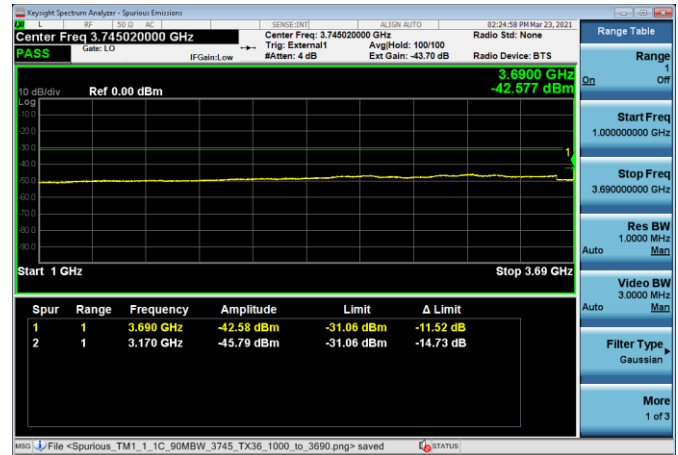
150KHz – 30MHz



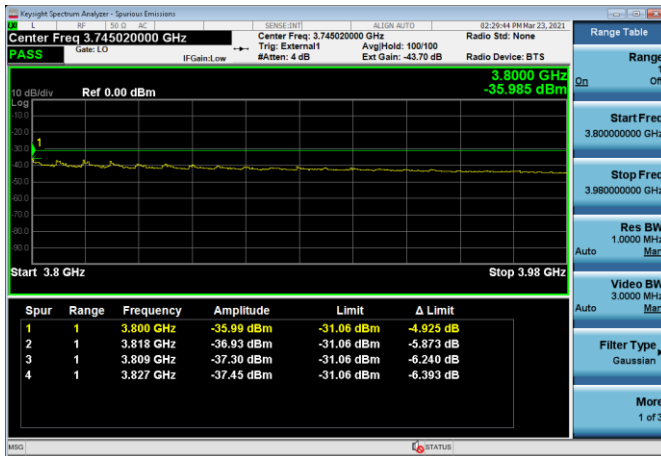
30MHz – 1GHz



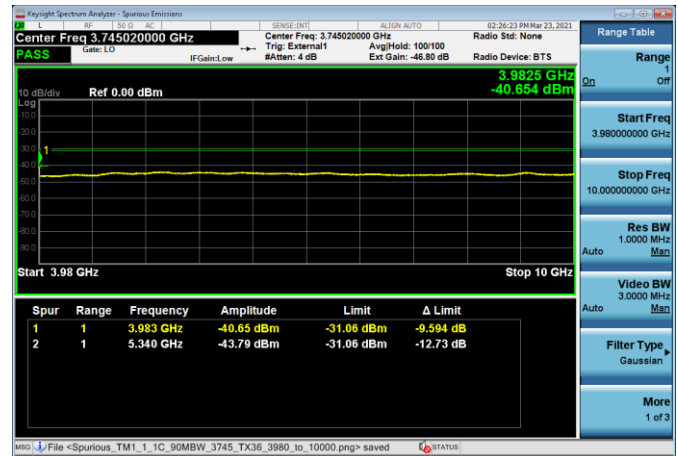
1GHz – 3.69GHz



3.80GHz – 3.98GHz



3.98GHz – 10GHz



10GHz – 40GHz



2 Carrier Contiguous Data

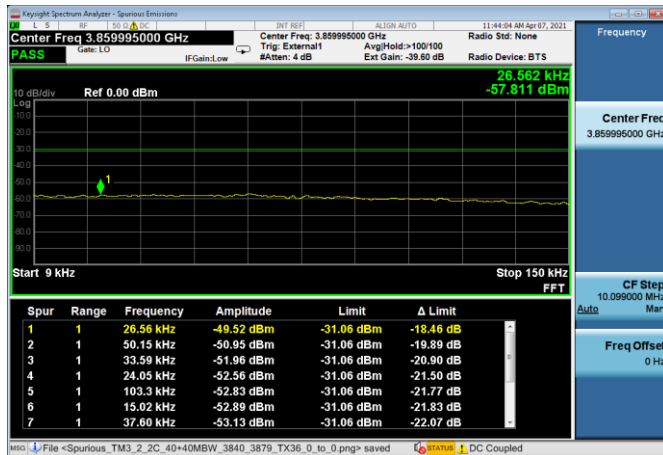
40+40 MHz BW

Test Model 3.2

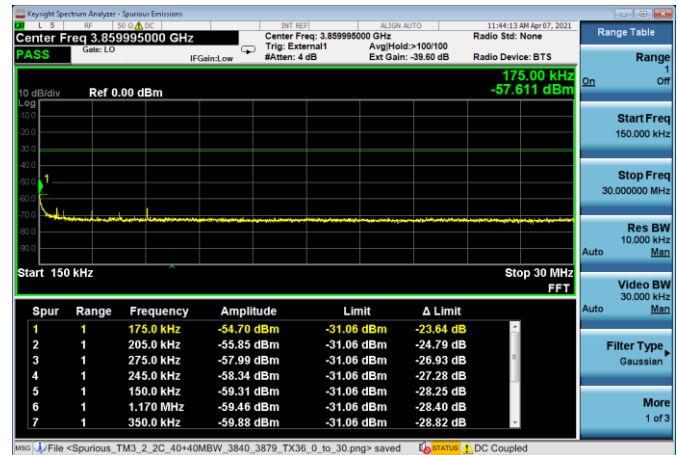
Modulation QPSK/16QAM

Channel Frequency 3840 + 3859.99 MHz

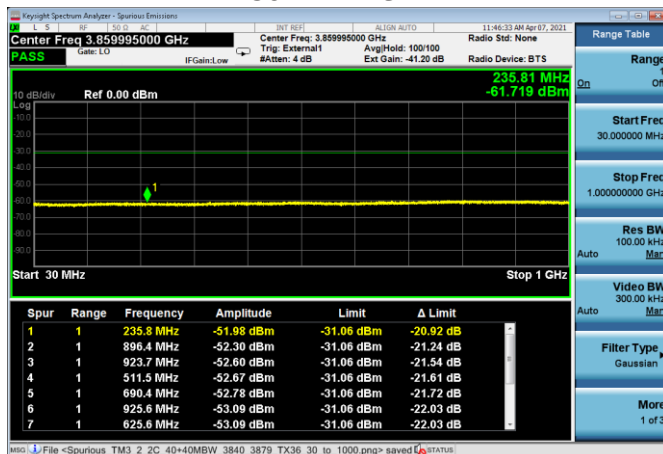
9KHz – 150kHz



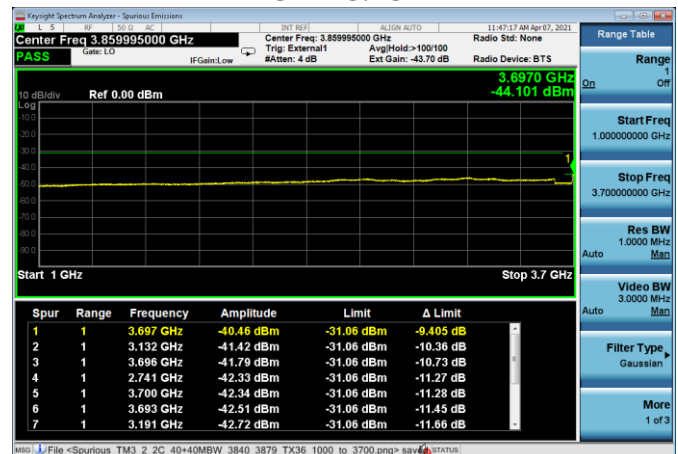
150KHz – 30MHz



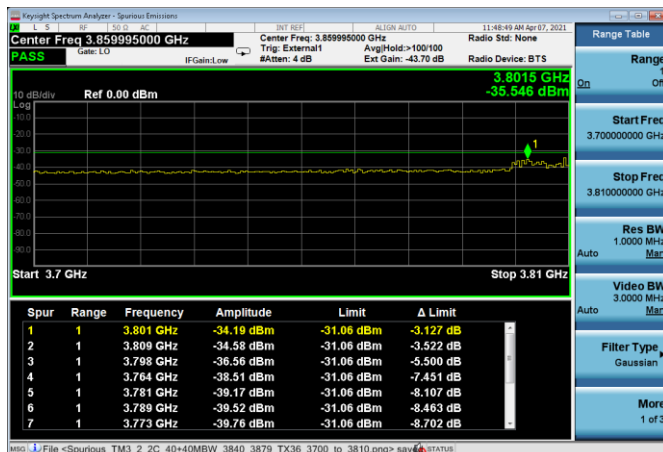
30MHz – 1GHz



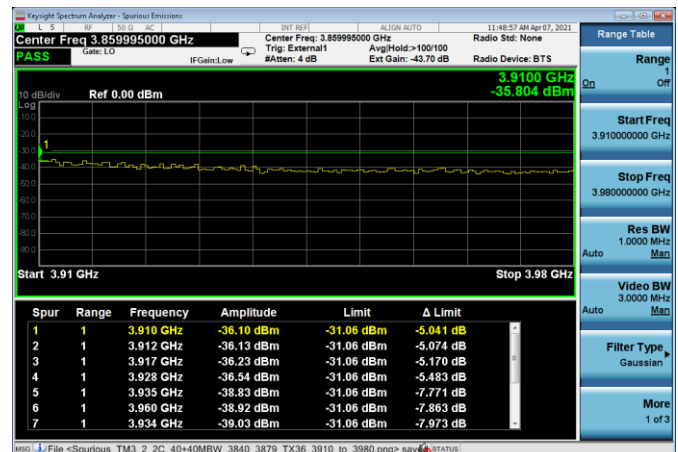
1GHz – 3.7GHz



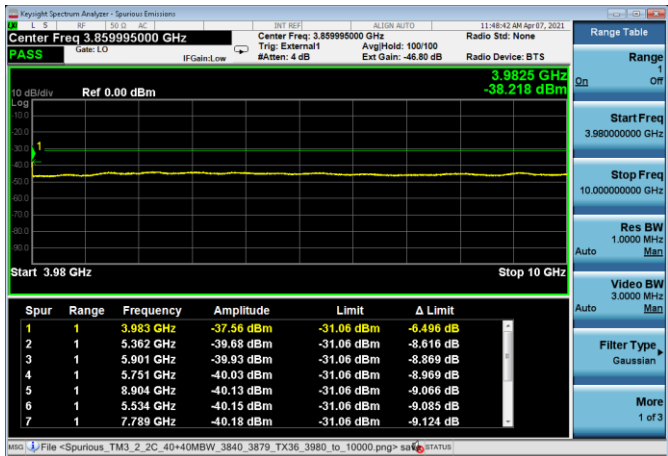
3.7GHz – 3.81GHz



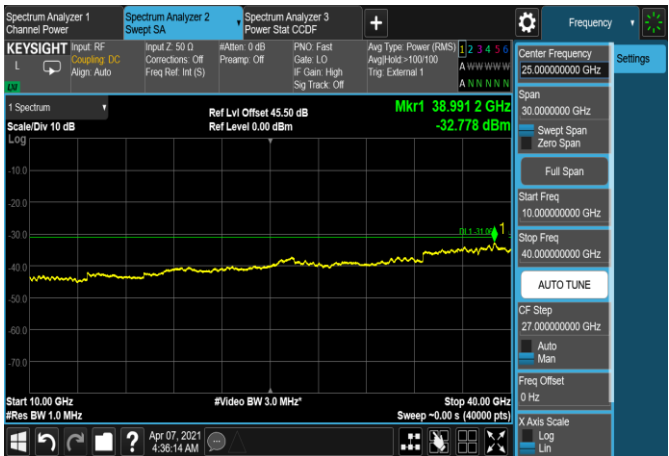
3.91GHz – 3.98GHz

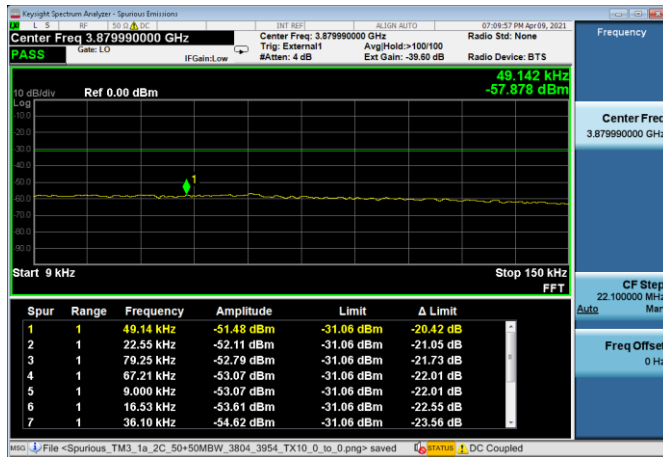
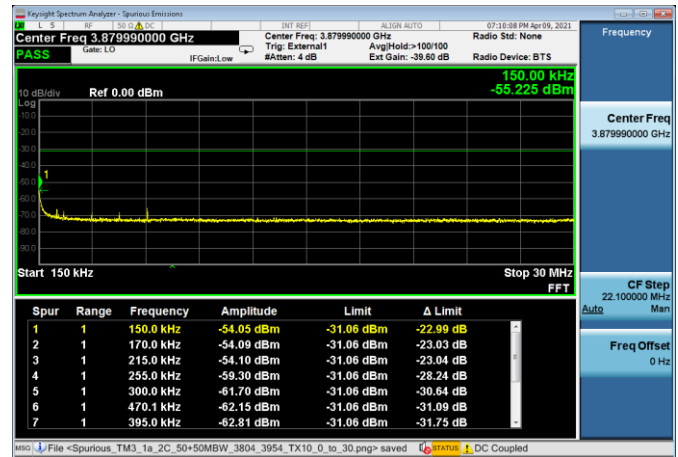
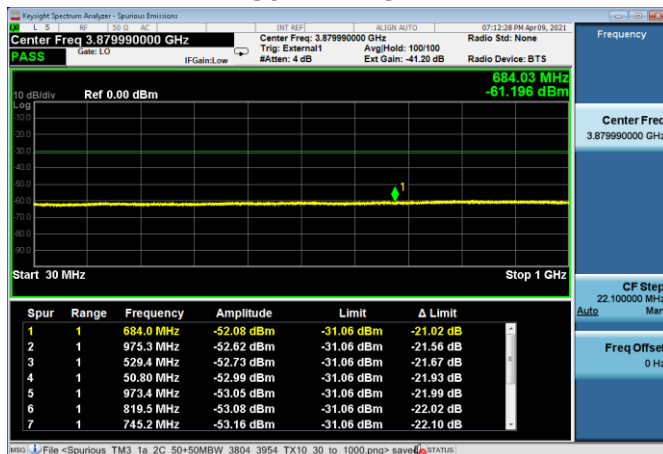
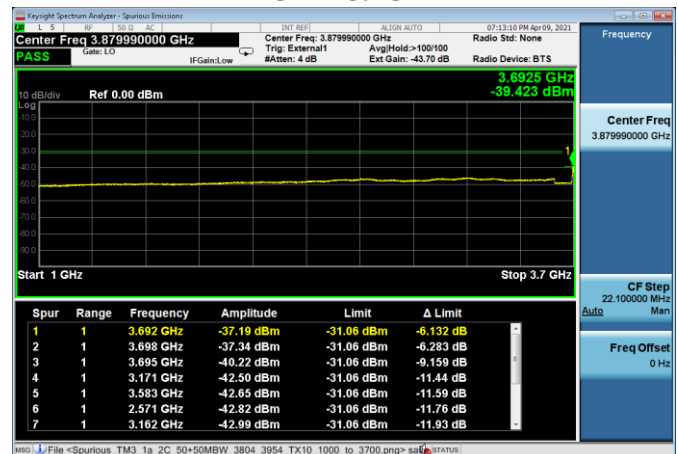
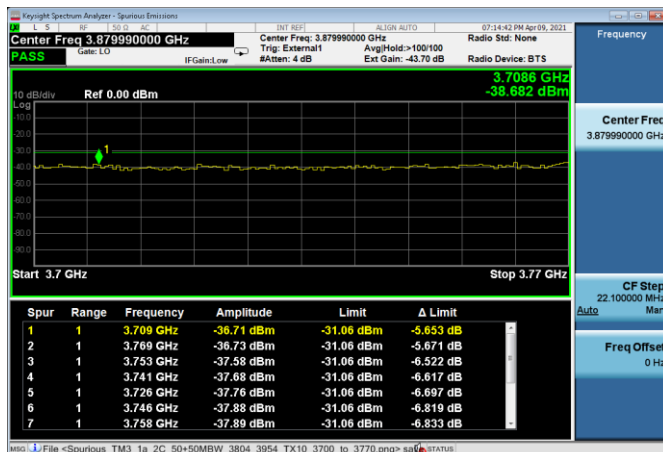
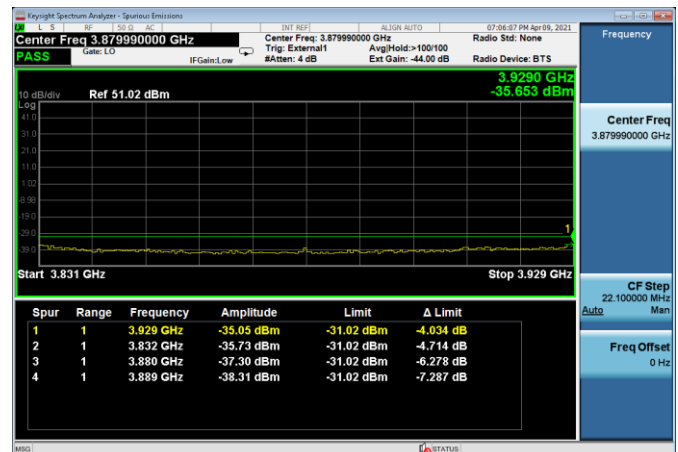


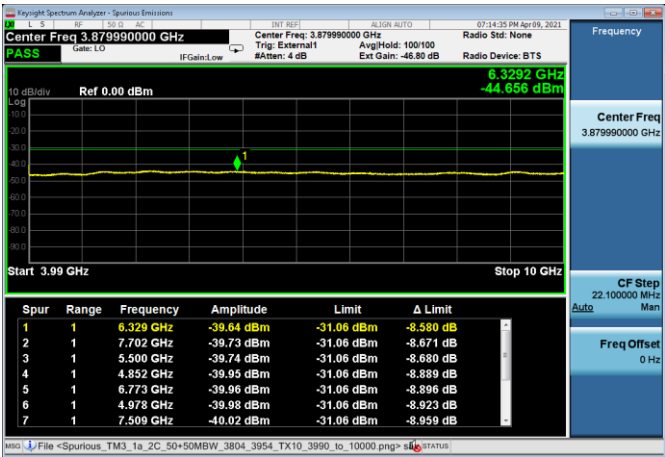
3.98GHz – 10GHz



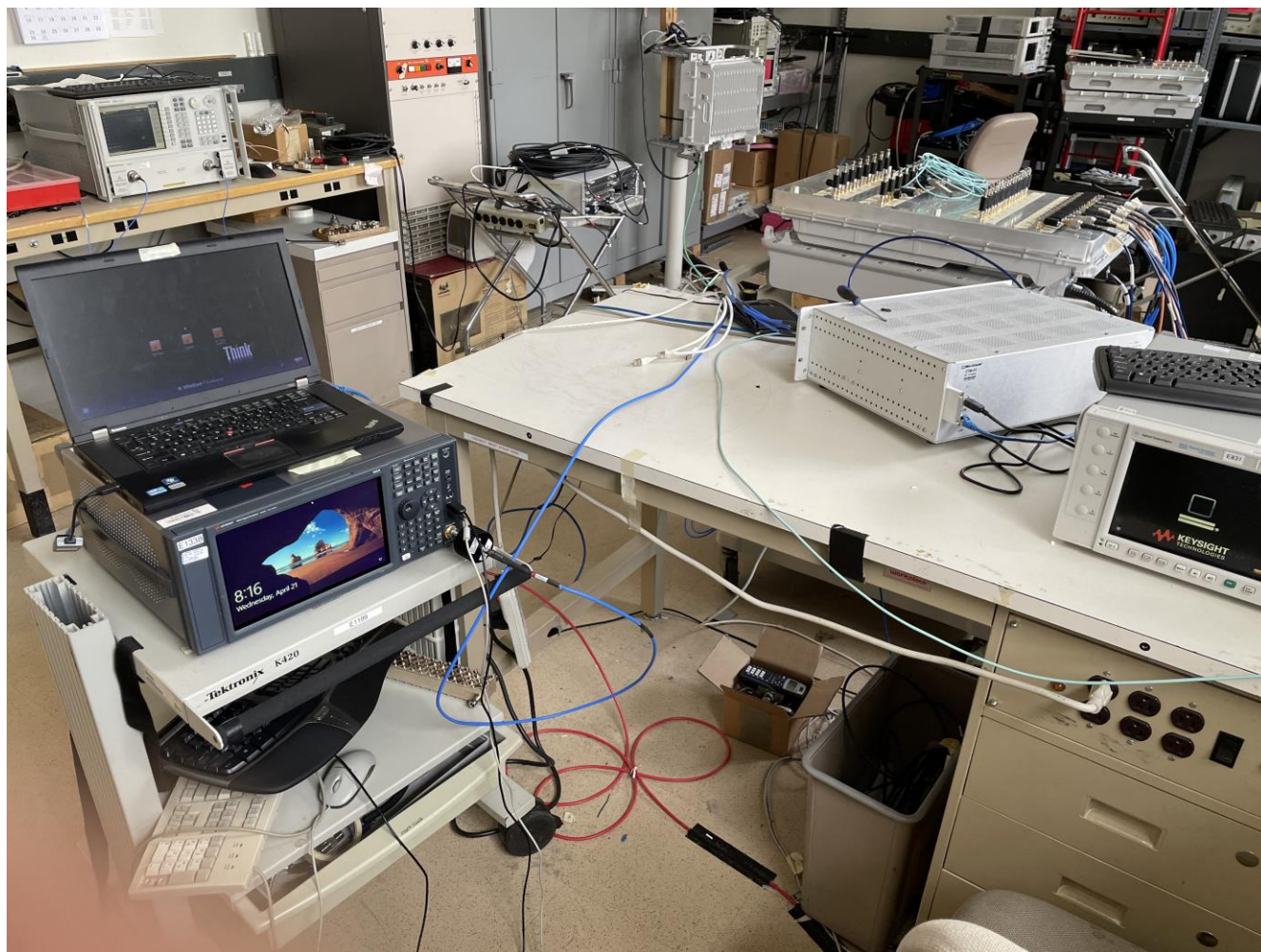
10GHz – 40GHz



2 Carrier Non - Contiguous Data
50+50 MHz BW
Test Model 3.1a
Modulation 256QAM
Channel Frequency 3804.99 + 3954.99 MHz**9KHz – 150kHz****150KHz – 30MHz****30MHz – 1GHz****1GHz – 3.7GHz****3.7GHz – 3.77GHz****3.831GHz – 3.929GHz****3.99GHz – 10GHz****10GHz – 40GHz**



Photographs



Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
E831	Agilent Technologies	MXA Signal Analyzer	20Hz-26.5GHz	N9020A	MY48011791	2020-06-16	2022-06-16
E896	Agilent Technologies	Network Analyzer	10 MHz - 40 GHz	N5230C	MY49000897	2021-03-03	2023-03-03
E1338	KeySight Technologies	MXA Signal Analyzer		N9020B	MY57430927	2019-11-14	2021-11-14
E1156	Weinschel	Attenuator	10dB 0.05GHz-26GHz 25W	74-10-12	1069	CNR-V	CNR-V
E1155	Weinschel	Attenuator	10dB 25Watt 0.05GHz - 26GHz	74-10-12	1068	CNR-V	CNR-V

Customer Provided Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
	Mini Circuit	Modular Test System	ZTM-53	ZTM-52	11701250030	CNR-V	CNR-V

CNR-V: Calibration Not Required, Must Be Verified

6. FCC Section 2.1053 - Field strength of spurious radiation

6.1 Section 2.1053 Field Strength of Spurious Emissions

Field strength measurements of radiated spurious emissions were made in an FCC registered 3m Semi-Anechoic Chamber which is maintained by Nokia Bell Labs in Murray Hill, New Jersey. A complete description and full measurement data for the site is on file with the Commission (Site Registration Number: 515091).

The spectrum from 30 MHz to beyond the tenth harmonic of the carrier, 40 GHz, was searched for spurious radiation. Measurements were made using both horizontally and vertically polarized broadband antennas. Per FCC regulations, the comparison of out of band spurious emissions directly to the limit is appropriately made using the substitution method. However, when the emissions are more than 20 dB below the specification limit, the use of field strength measurements for compliance determination is acceptable and those emissions are considered not reportable (Section 2.1053 and the FCC Interpretive database for 2.1053). For this case the evaluation of acceptable radiated field strength is as follows.

6.2 Field Strength of Spurious Emissions - Limits

Sections 2.1053 and 27.53 contain the requirements for the levels of spurious radiation as a function of the level of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an ideal dipole excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 676, 4th edition, IT&T Corp.

$$E = [(30 \cdot P)^{1/2}] / R$$

$$20 \log (E \cdot 10^6) - (43 + 10 \log P) = 82.23 \text{ dB}\mu\text{V/meter}$$

Where:

E = Field Intensity in Volts/meter

P = Transmitted Power in Watts

R = Measurement distance in meters = 3 m

The Part 27 Limit is 82.23 dB μ V/m at 3m and 91.77 dB μ V/m at 1m

The Part 27 non-report level is 62.23 dB μ V/m at 3m.

The calculated emission levels were found by:

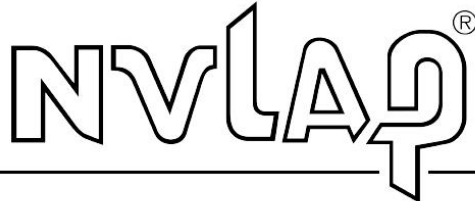
$$\text{Measured level (dB}\mu\text{V)} + \text{Cable Loss(dB)} + \text{Antenna Factor(dB)} = \text{Field Strength (dB}\mu\text{V/m)}$$

RESULTS:

For compliance with 47CFR Parts 2 and 27, the field strength of any spurious radiation, measured at 3m, is required to be less than 82.23 dB μ V/meter (82.23 @ 3m). Emissions equal to or less than 62.23 dB μ V/meter at 3m are not reportable and may be verified using field strength measurements and broadband antennas. Over the out of band spectrum investigated from 30 MHz to beyond the tenth harmonic of the carrier (up to 40 GHz), no reportable spurious emissions were detected.

7. NVLAP Certificate of Accreditation

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 100275-0

Nokia, Global Product Compliance Lab
Murray Hill, NJ

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2020-09-25 through 2021-09-30
Effective Dates



A handwritten signature in blue ink, appearing to read "David S. Laman".

For the National Voluntary Laboratory Accreditation Program