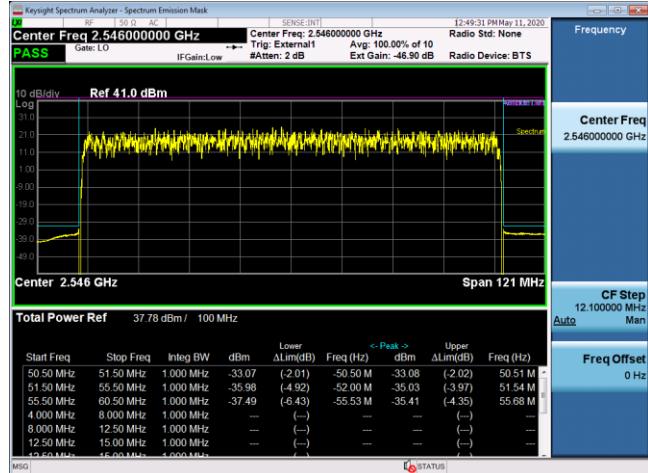
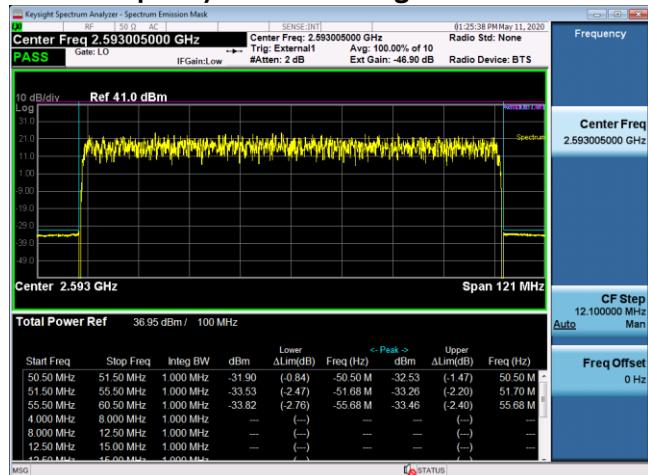


5G 100MHz Data

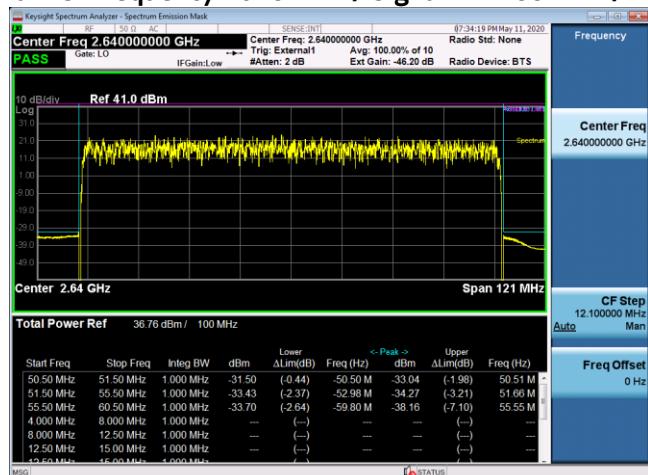
Channel Frequency 2546 MHz / Signal BW 100 MHz / TX1



Channel Frequency 2593 MHz / Signal BW 100 MHz / TX1

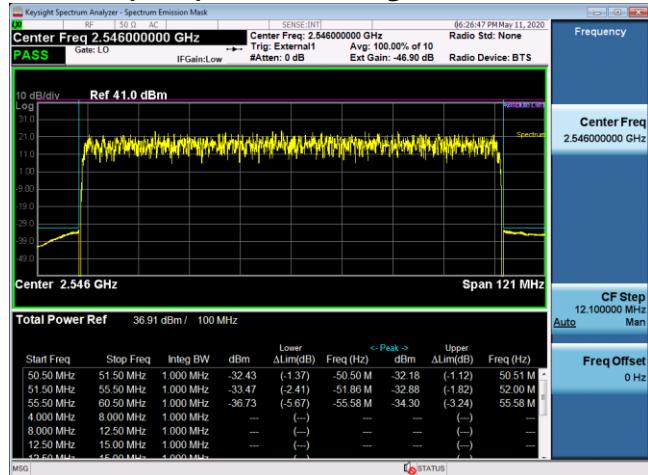


Channel Frequency 2640 MHz / Signal BW 100 MHz / TX2

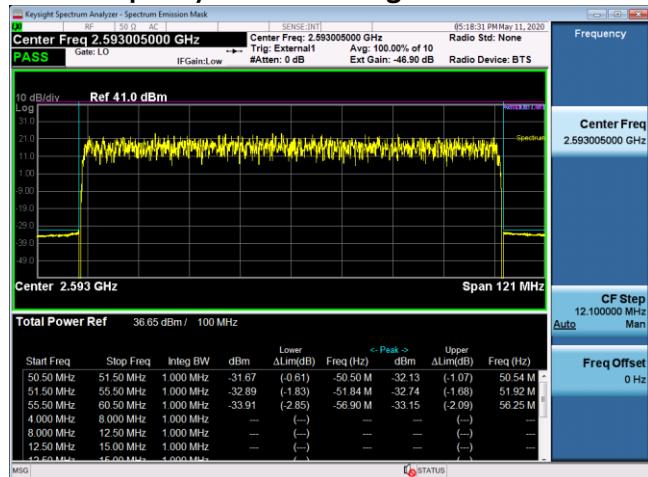


5G 100MHz Data

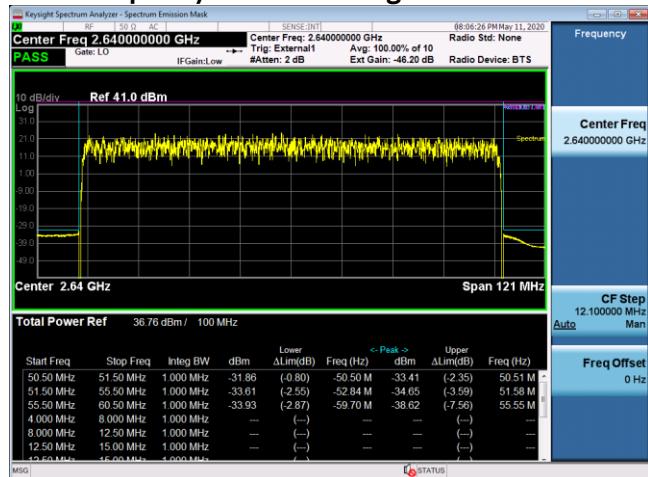
Channel Frequency 2546 MHz / Signal BW 100 MHz / TX17



Channel Frequency 2593 MHz / Signal BW 100 MHz / TX17

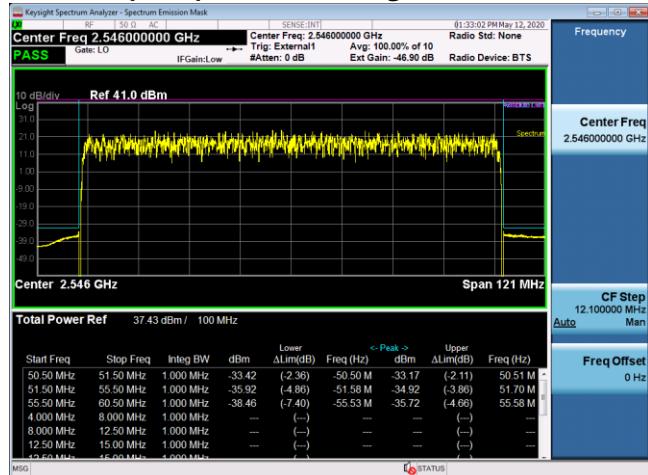


Channel Frequency 2640 MHz / Signal BW 100 MHz / TX17

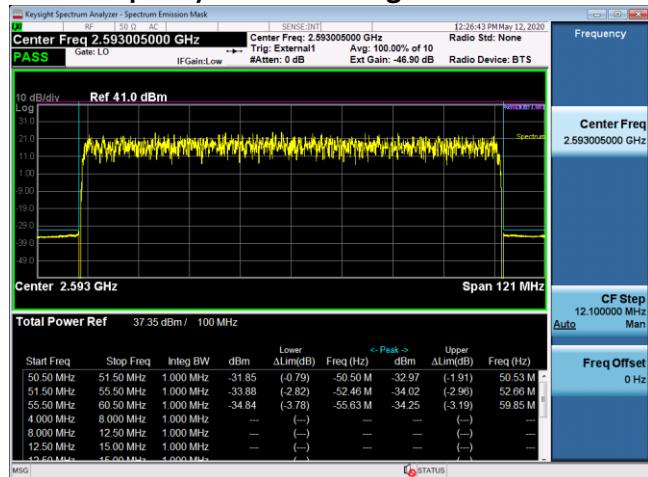


5G 100MHz Data

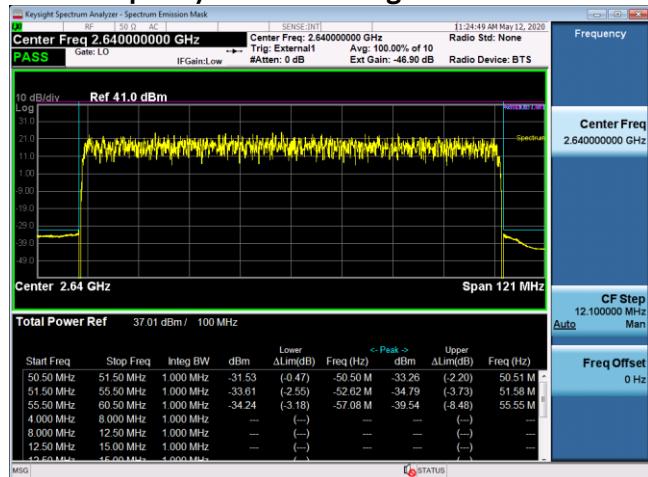
Channel Frequency 2546 MHz / Signal BW 100 MHz / TX33



Channel Frequency 2593 MHz / Signal BW 100 MHz / TX33



Channel Frequency 2640 MHz / Signal BW 100 MHz / TX33

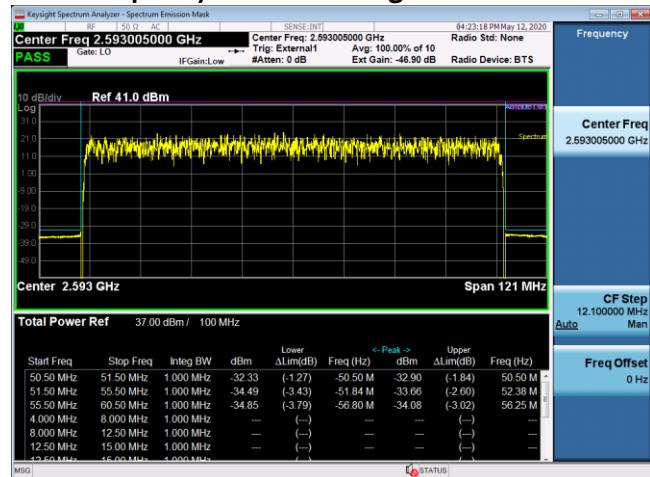


5G 100MHz Data

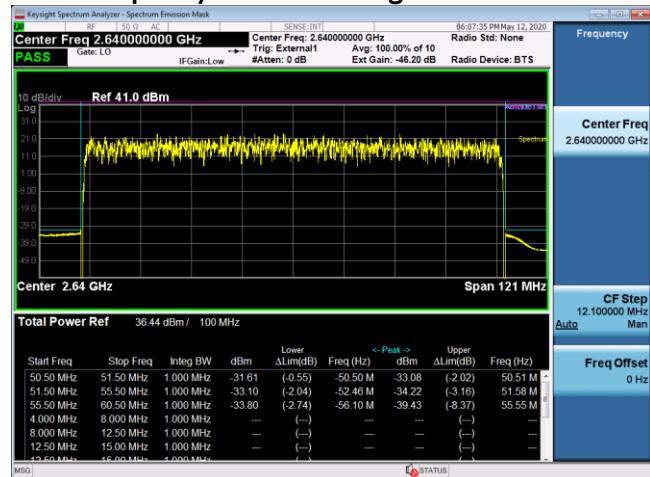
Channel Frequency 2546 MHz / Signal BW 100 MHz / TX49



Channel Frequency 2593 MHz / Signal BW 100 MHz / TX49



Channel Frequency 2640 MHz / Signal BW 100 MHz / TX49



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

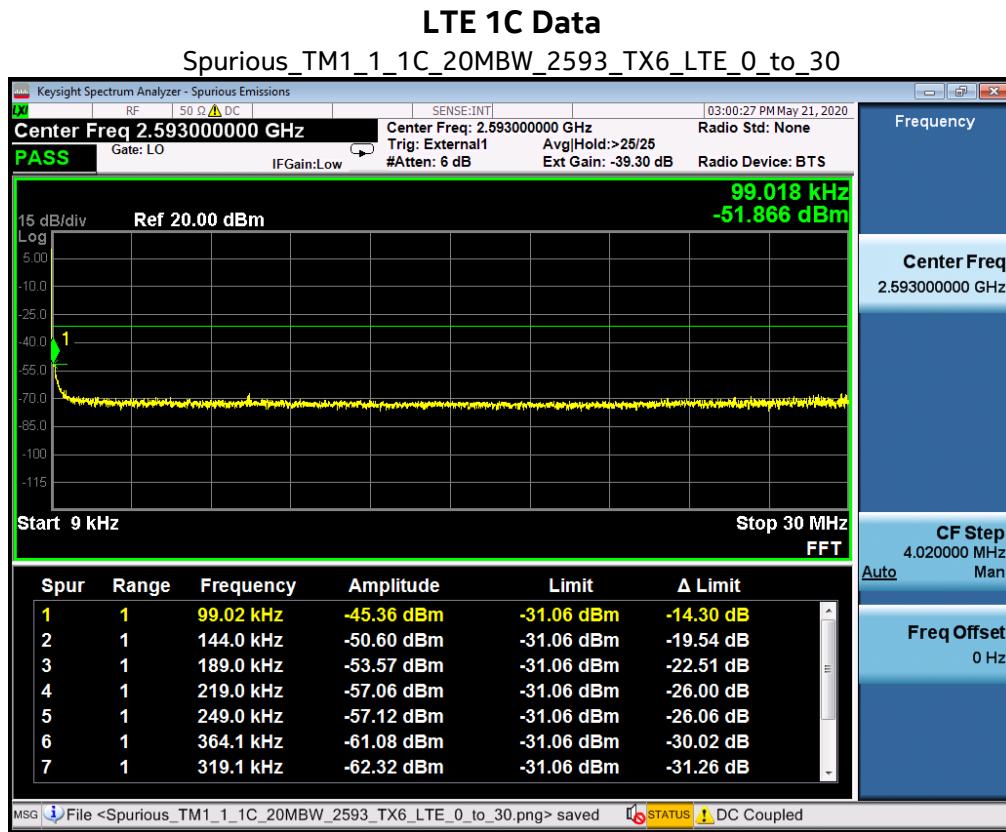
5.1 Measurement of Spurious Emissions at Transmit Antenna Port

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 10 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.

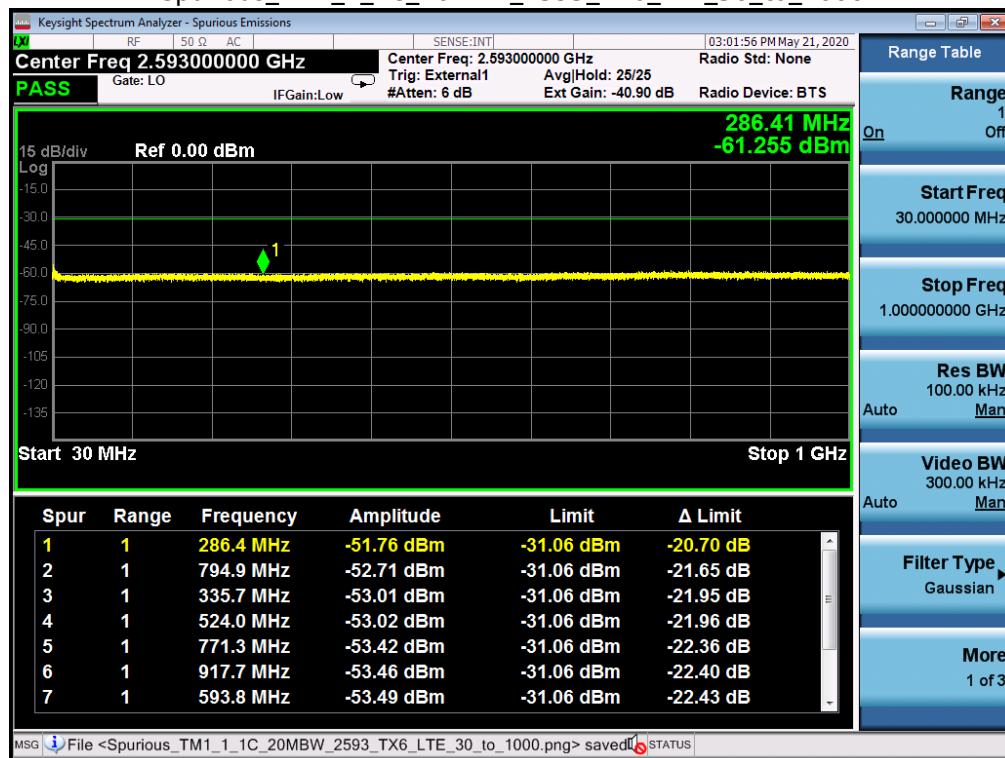
The required emission limitation is specified as appropriate in 27.53. The measured spurious emission levels were plotted for the frequency range as specified in 2.1057. There were no reportable emissions. Data below documents performance up to 27 GHz. The limit is derived using the 10 Log (n) rule for limits with n=64

5.1.1 Spurious Emissions at Tx Port - Plots

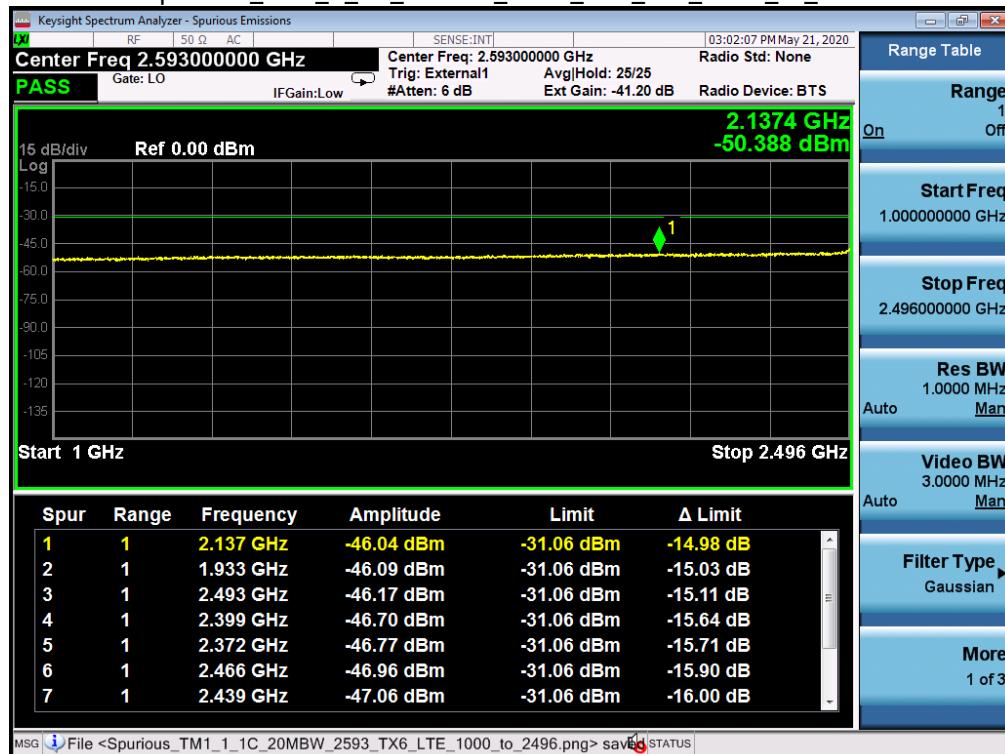
NOTE: Only a sample of the plots are used in this report. The full suite of raw data resides at the MH, New Jersey location.



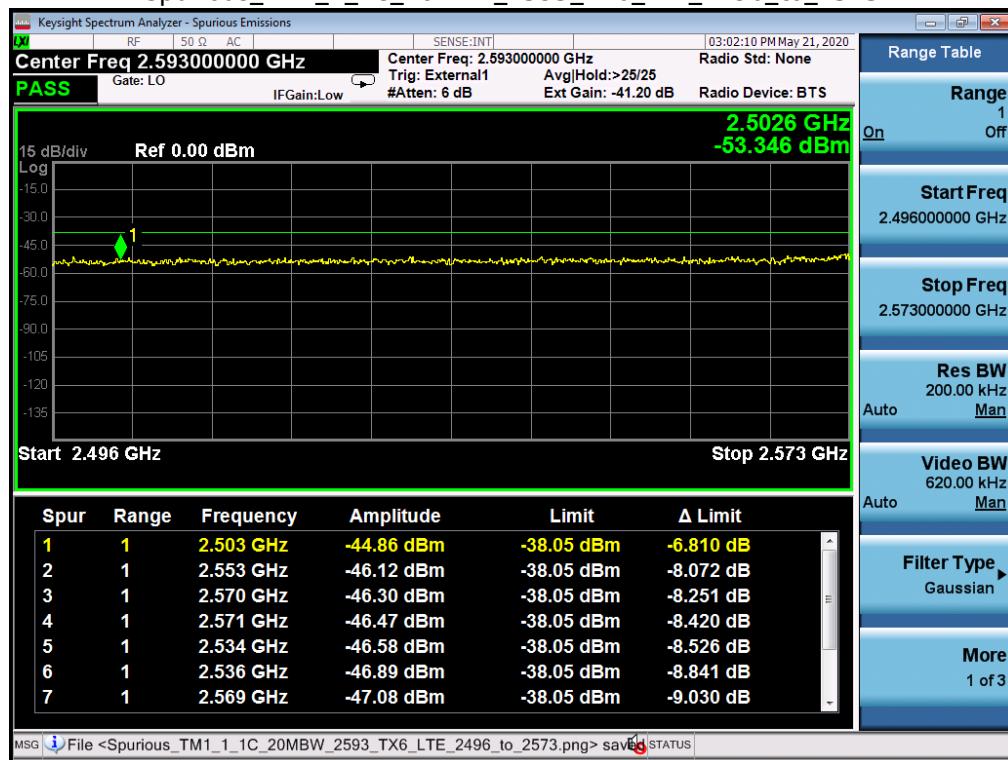
Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_30_to_1000



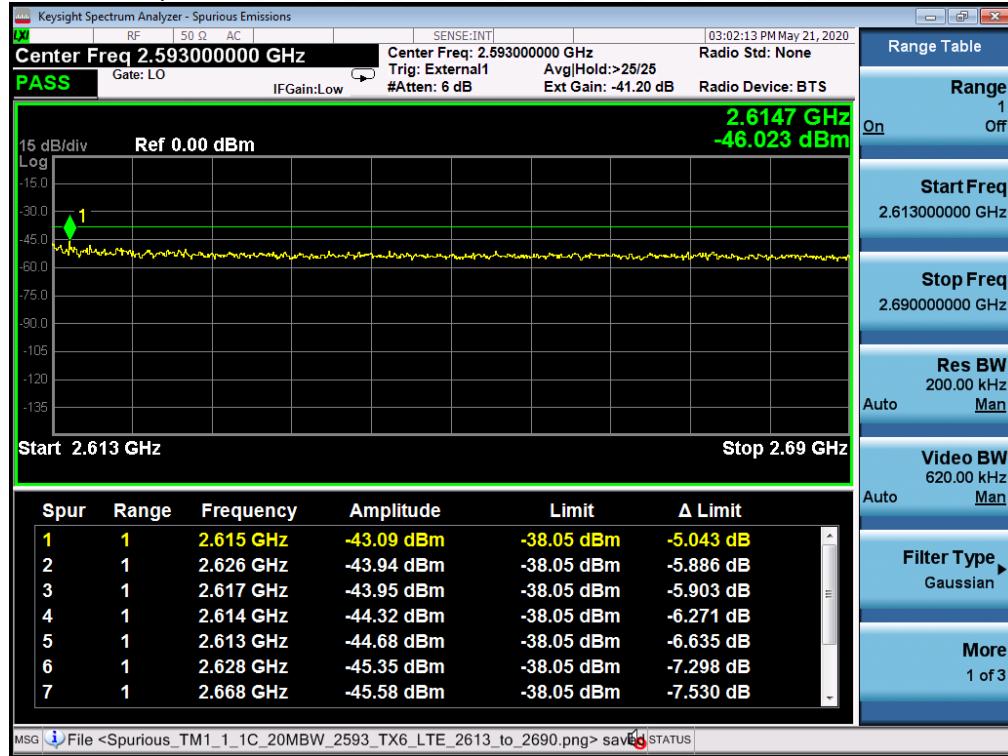
Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_1000_to_2496



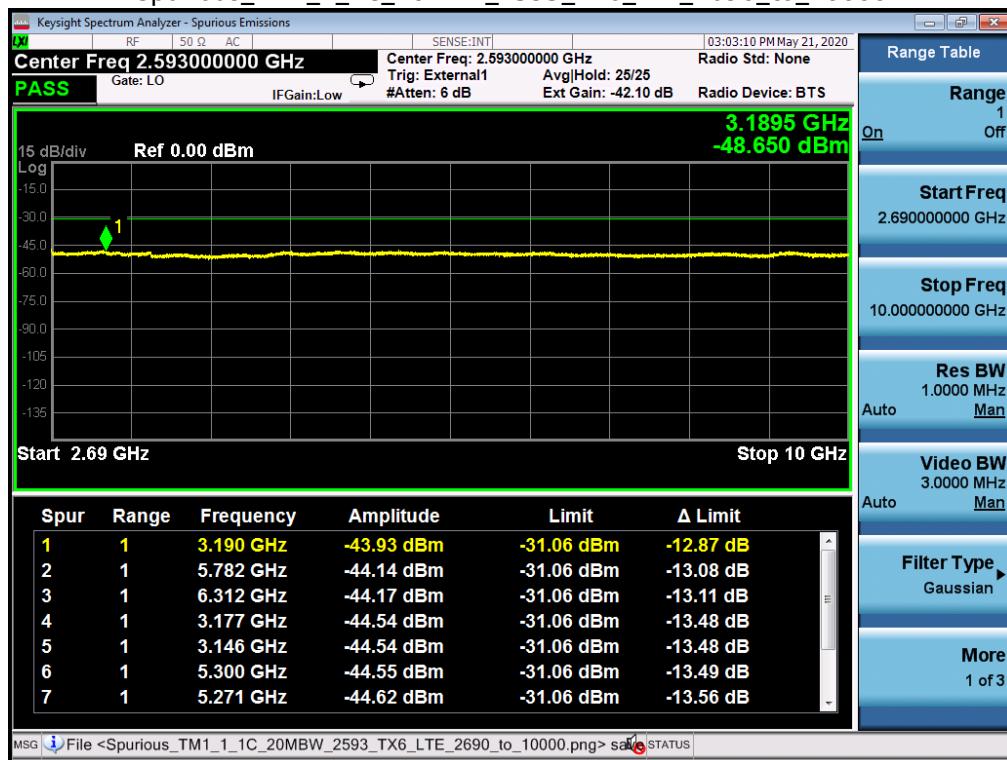
Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_2496_to_2573



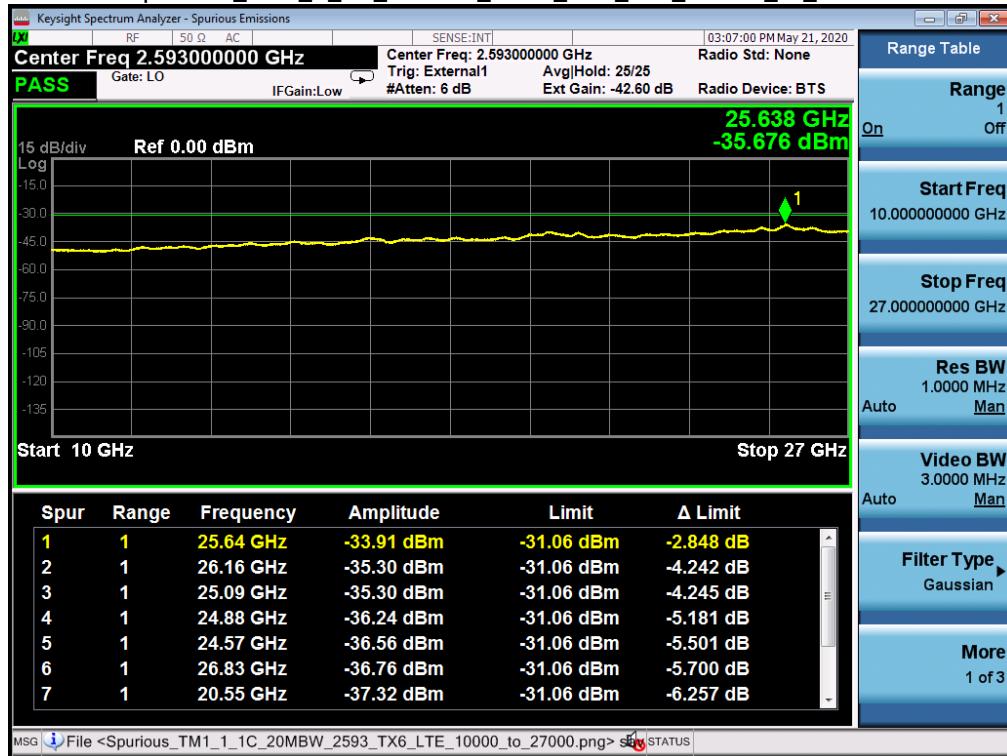
Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_2613_to_2690



Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_2690_to_10000

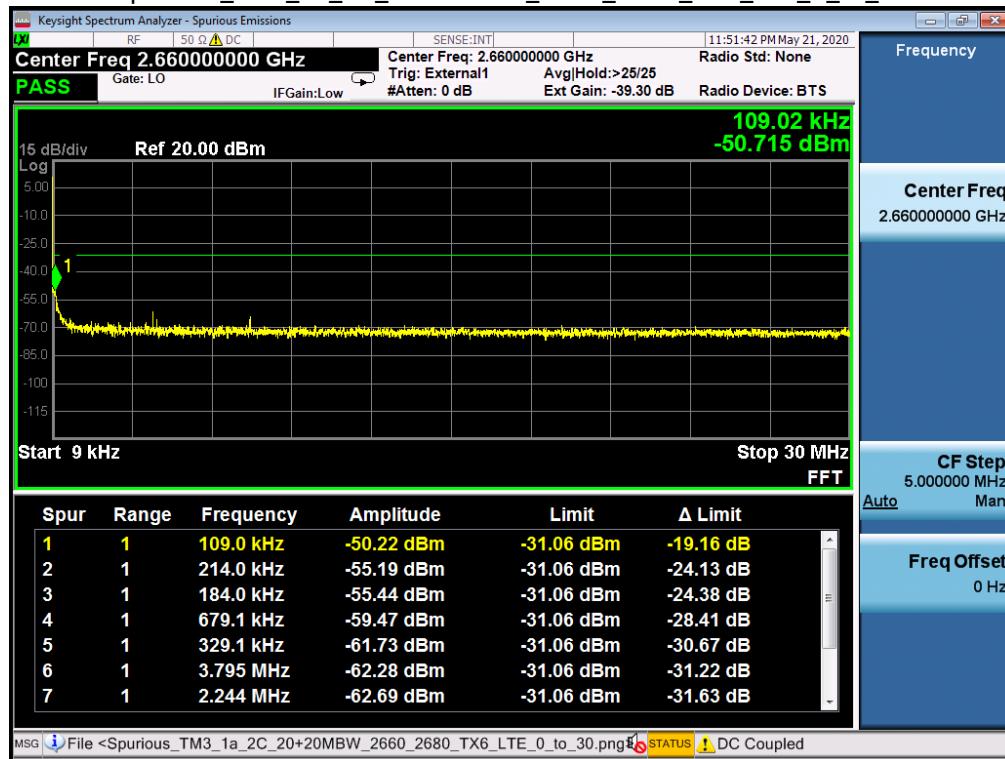


Spurious_TM1_1_1C_20MBW_2593_TX6_LTE_10000_to_27000

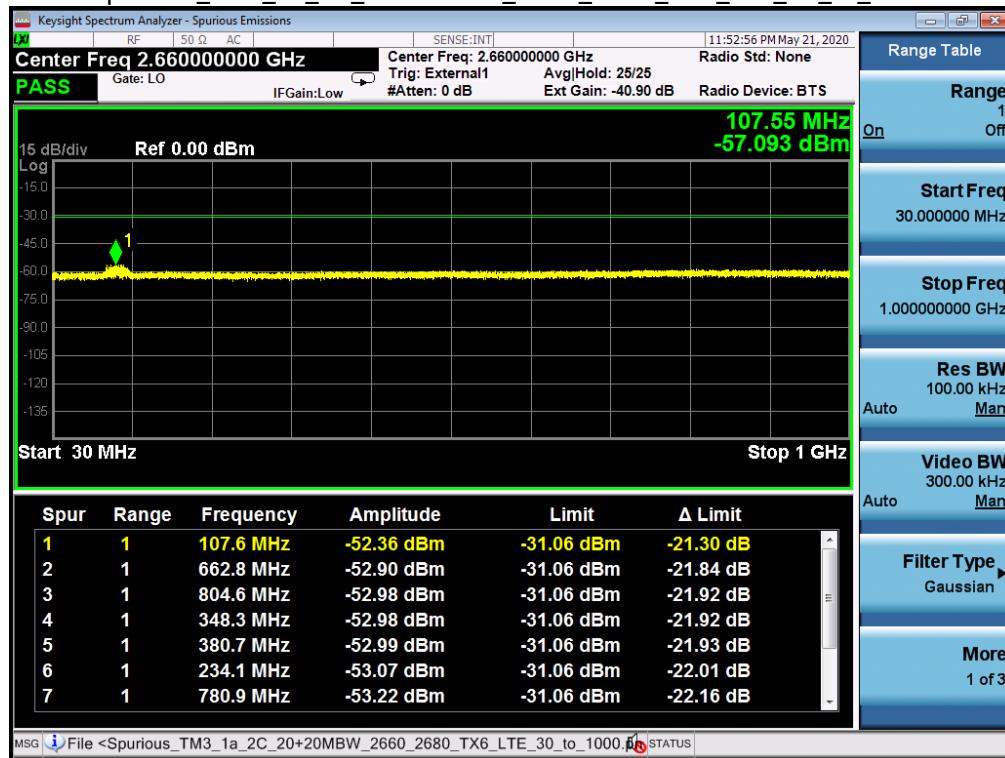


LTE 2C Data

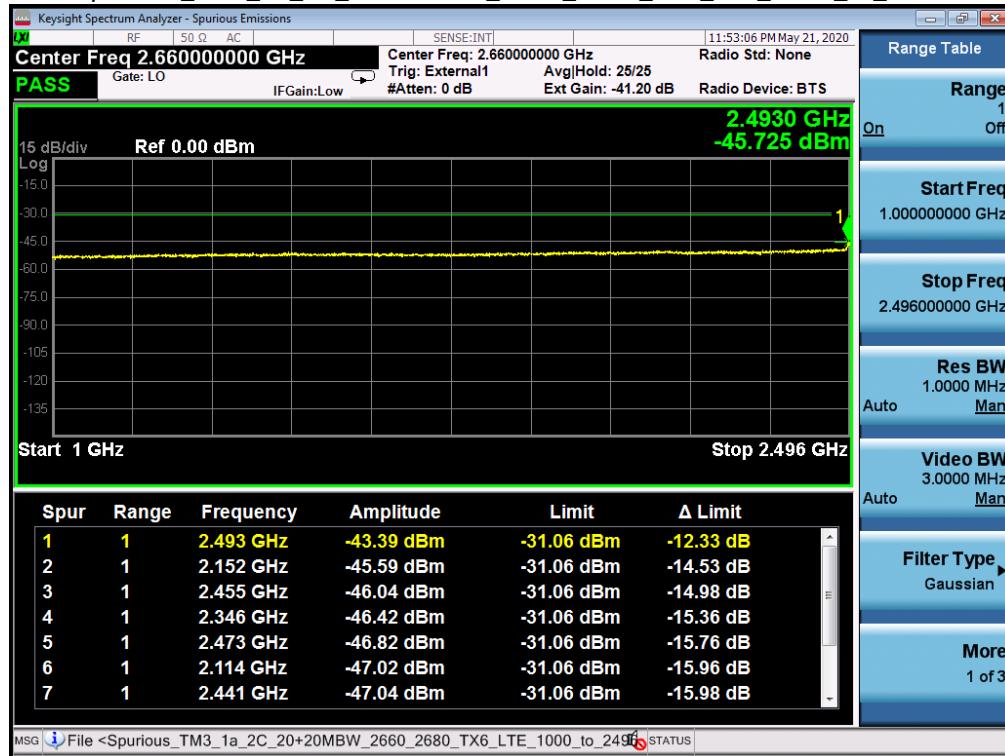
Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_0_to_30



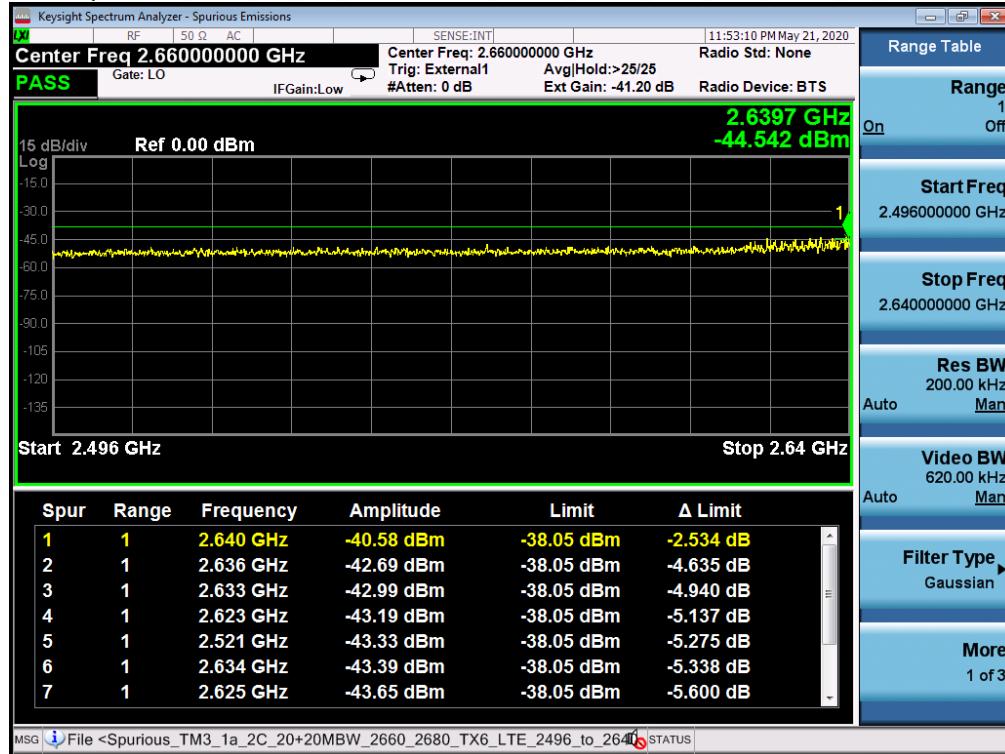
Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_30_to_1000



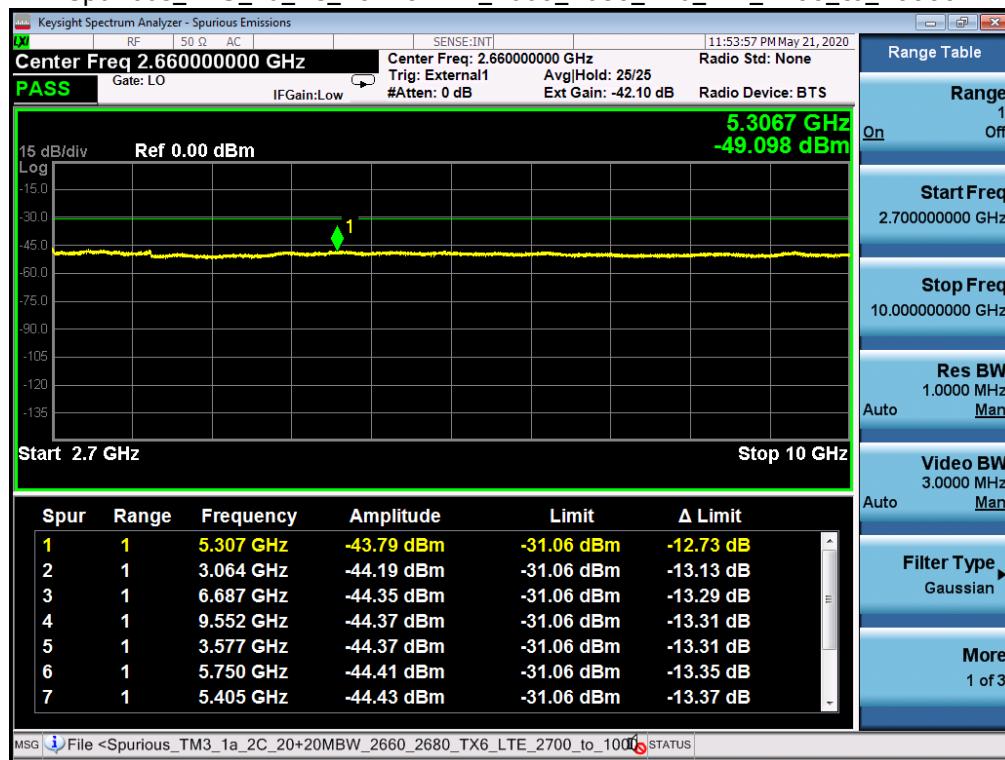
Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_1000_to_2496



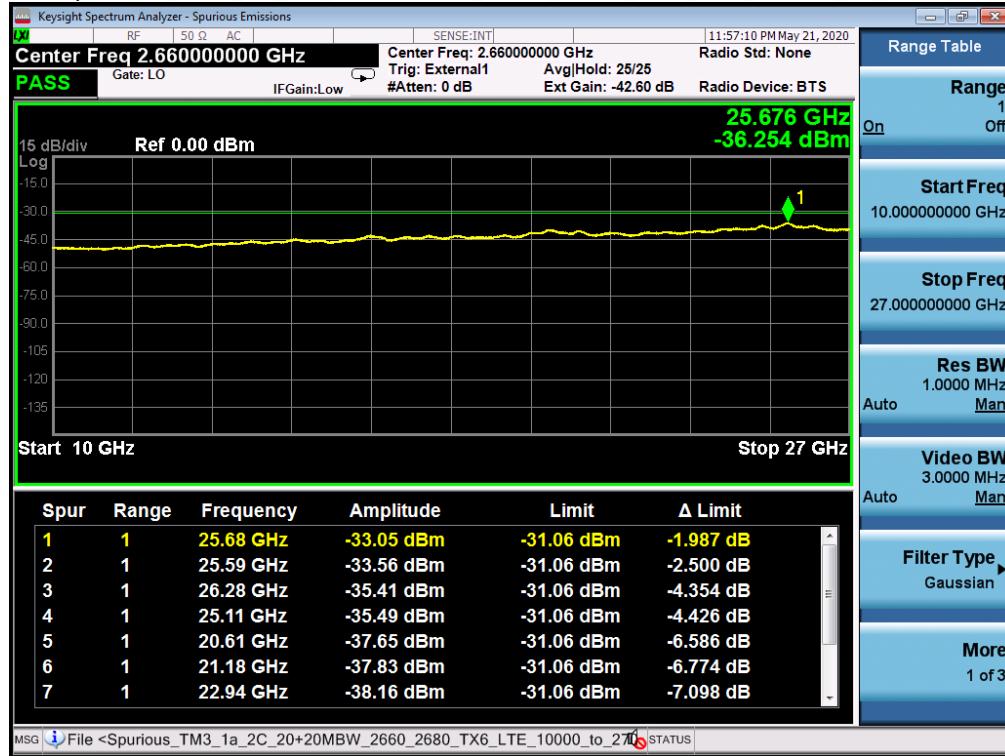
Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_2496_to_2640



Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_2700_to_10000

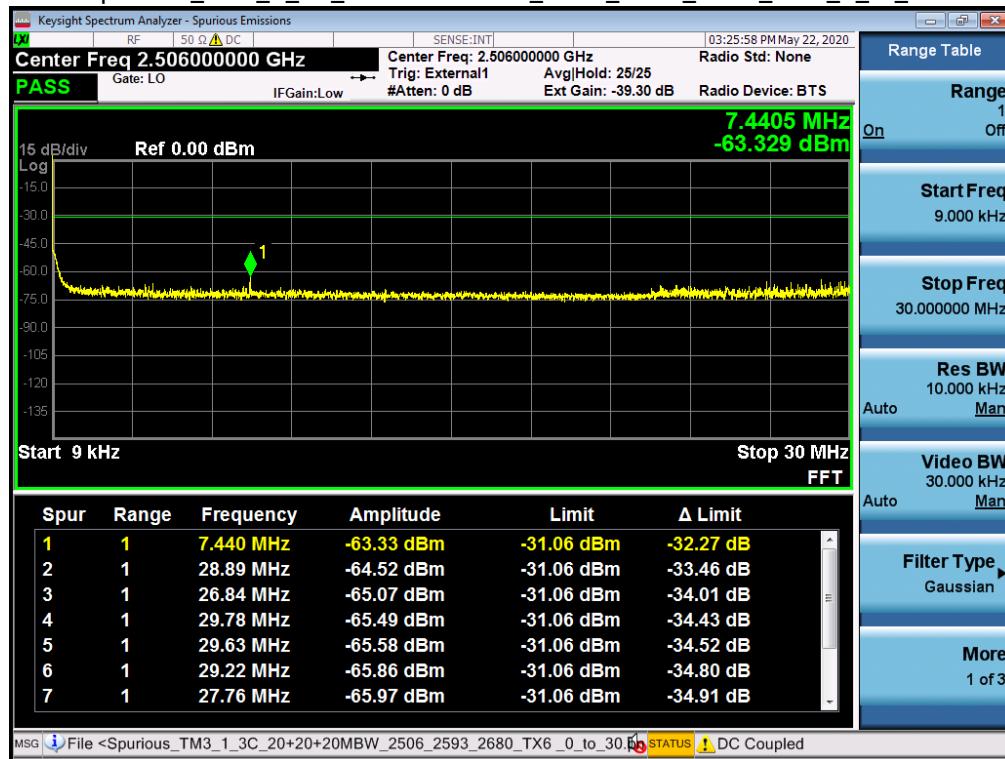


Spurious_TM3_1a_2C_20+20MBW_2660_2680_TX6_LTE_10000_to_27000

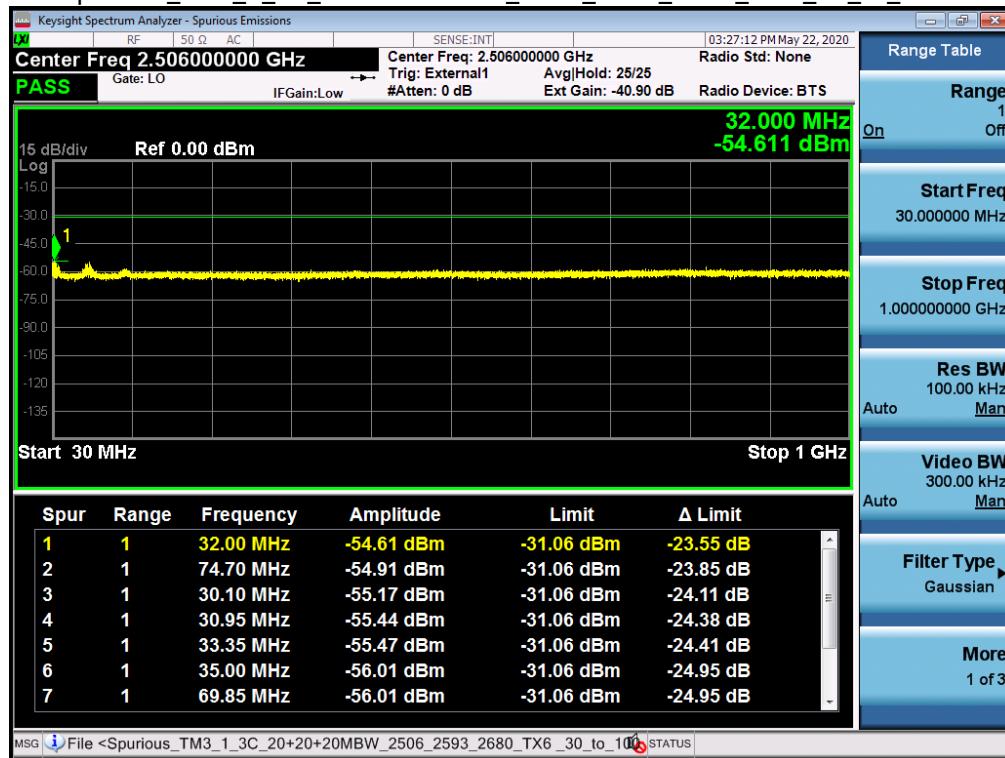


LTE 3C Data

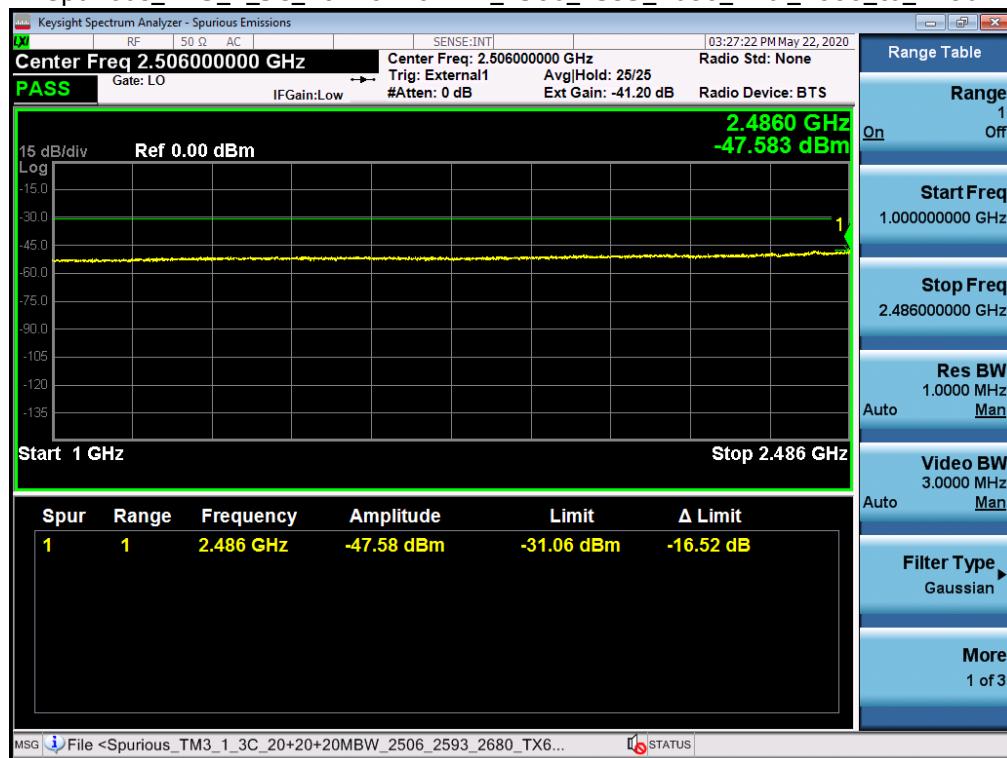
Spurious_TM3_1_3C_20+20+20MBW_2506_2593_2680_TX6_0_to_30



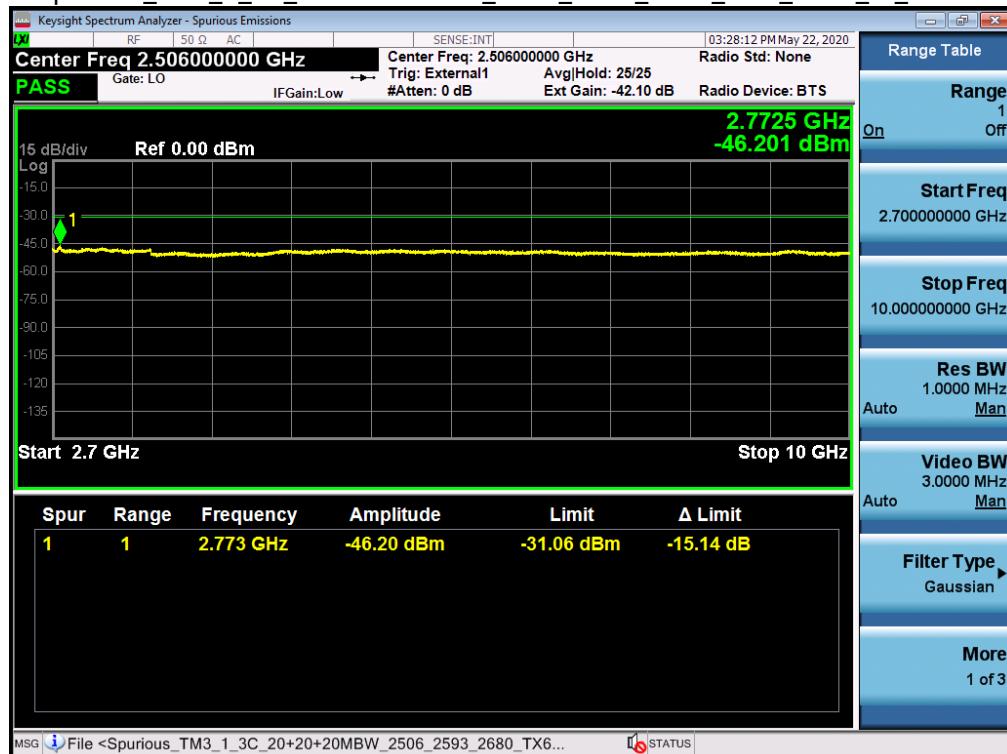
Spurious_TM3_1_3C_20+20+20MBW_2506_2593_2680_TX6_30_to_1000



Spurious_TM3_1_3C_20+20+20MBW_2506_2593_2680_TX6_1000_to_2486



Spurious_TM3_1_3C_20+20+20MBW_2506_2593_2680_TX6_2700_to_10000

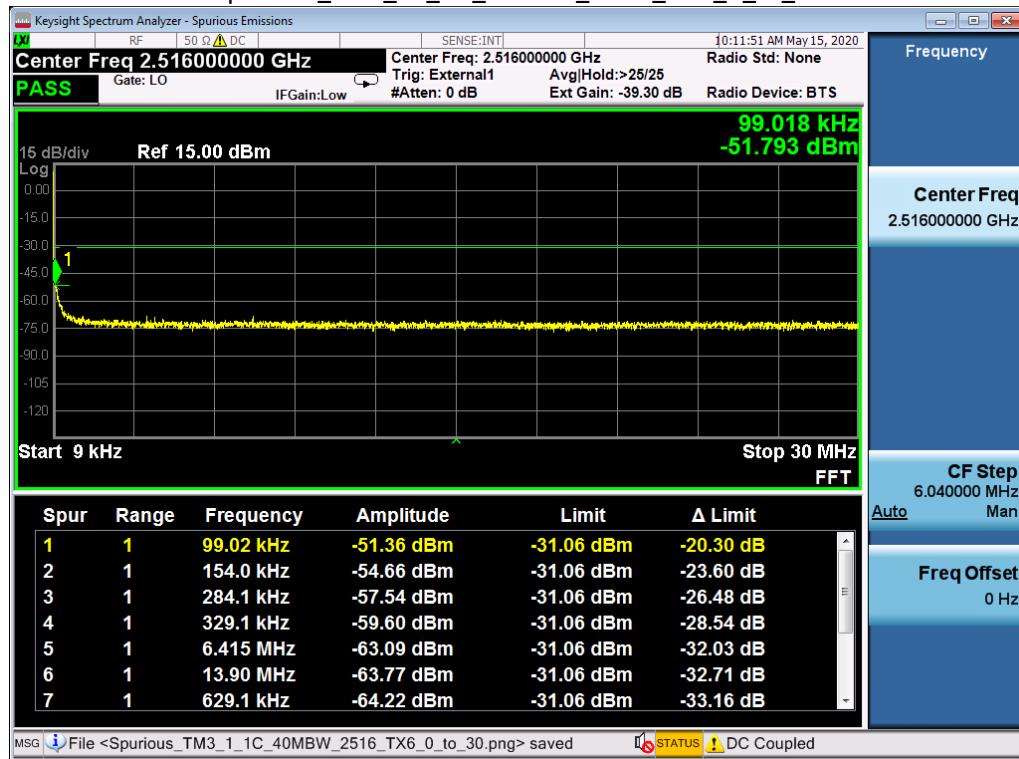


Spurious_TM3_1_3C_20+20+20MBW_2506_2593_2680_TX6_10000_to_27000

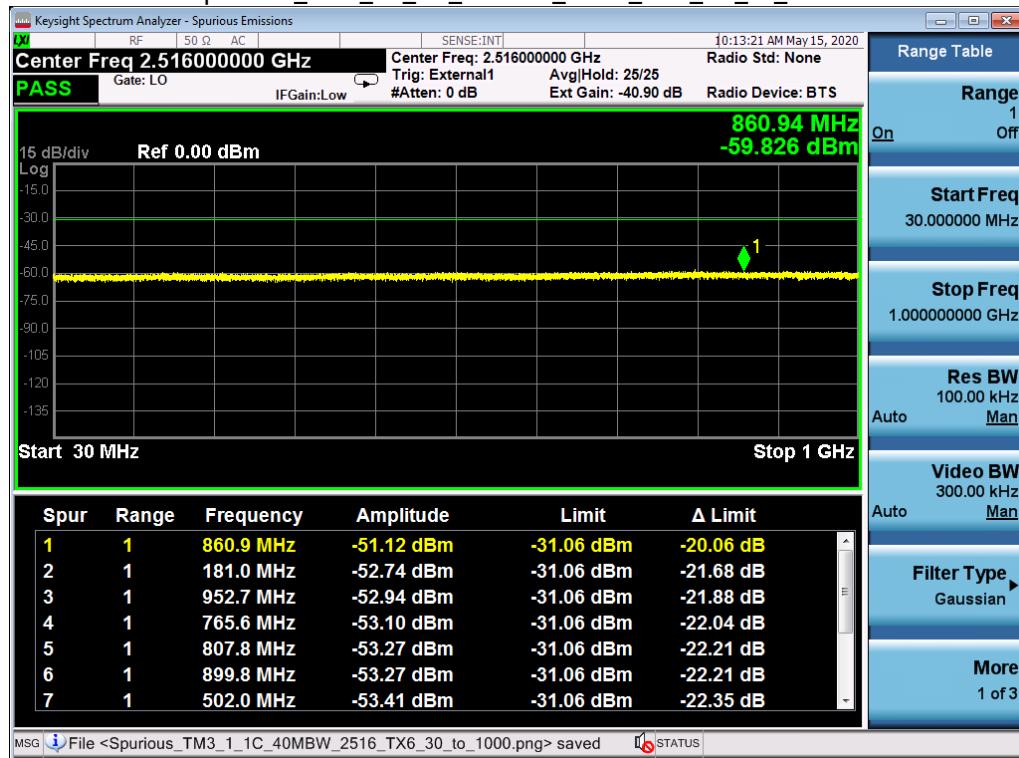


5G 40MHz Data

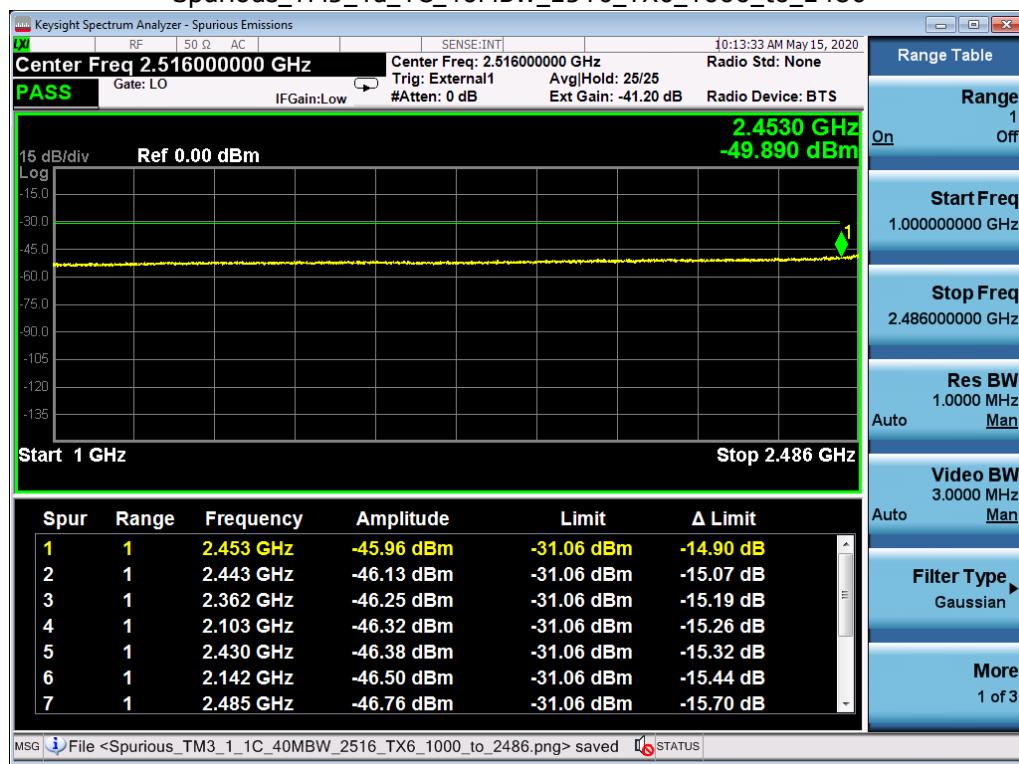
Spurious_TM3_1a_1C_40MBW_2516_TX6_0_to_30



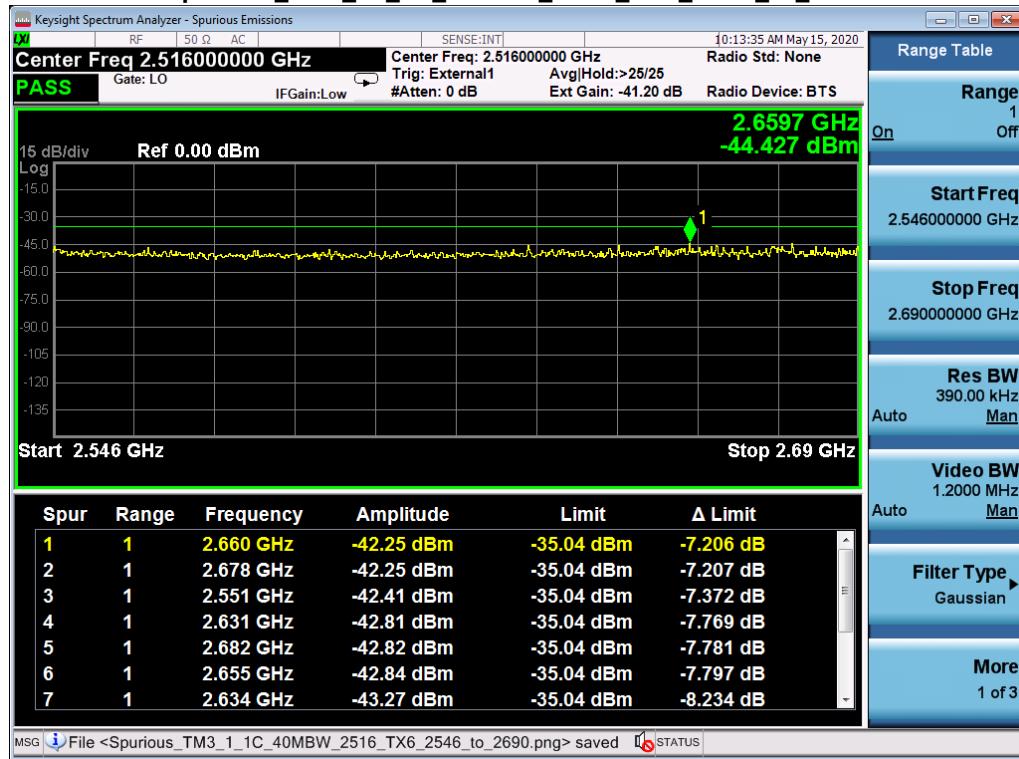
Spurious_TM3_1a_1C_40MBW_2516_TX6_30_to_1000



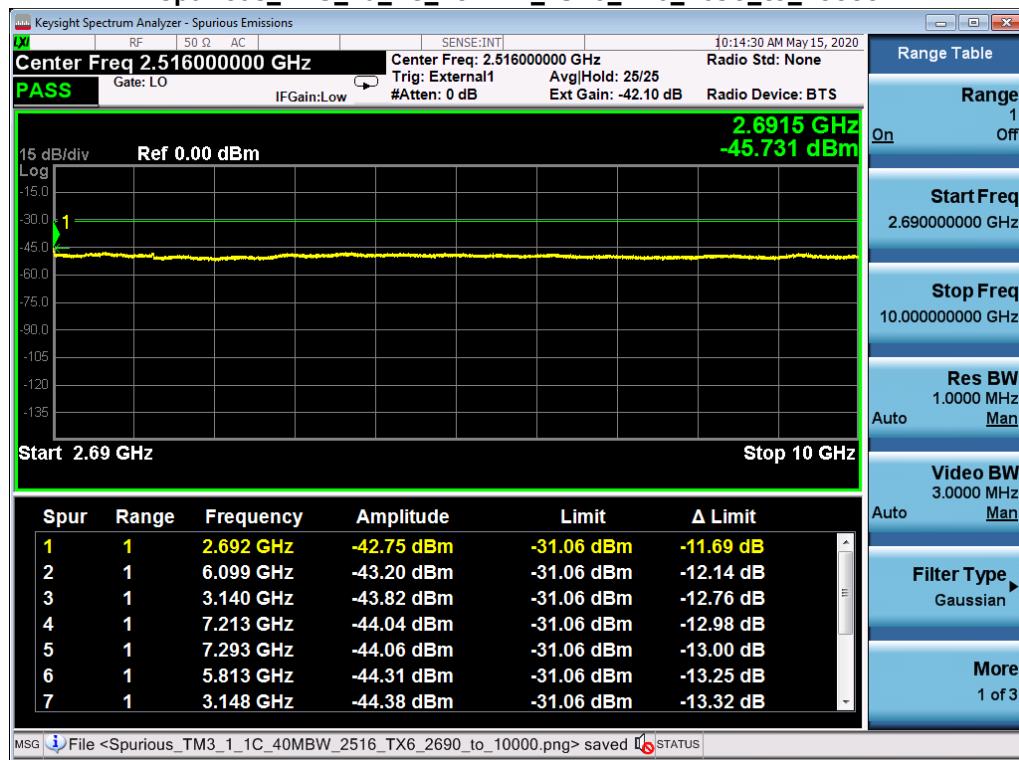
Spurious_TM3_1a_1C_40MBW_2516_TX6_1000_to_2486



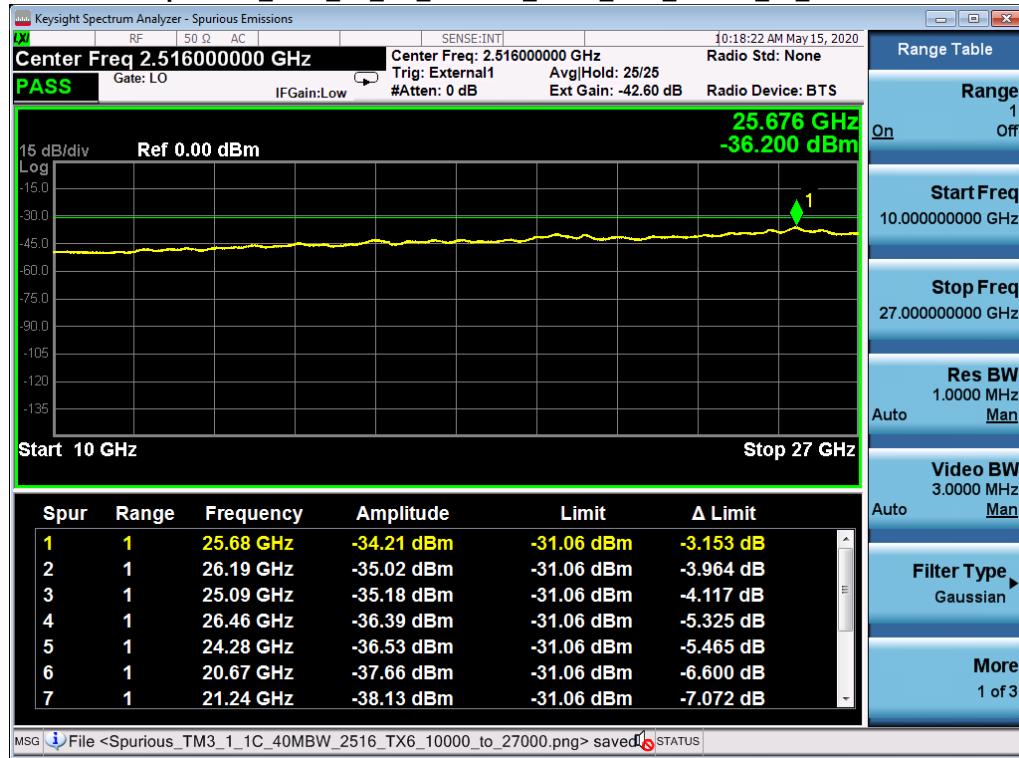
Spurious_TM3_1a_1C_40MBW_2516_TX6_2546_to_2690



Spurious_TM3_1a_1C_40MBW_2516_TX6_2690_to_10000

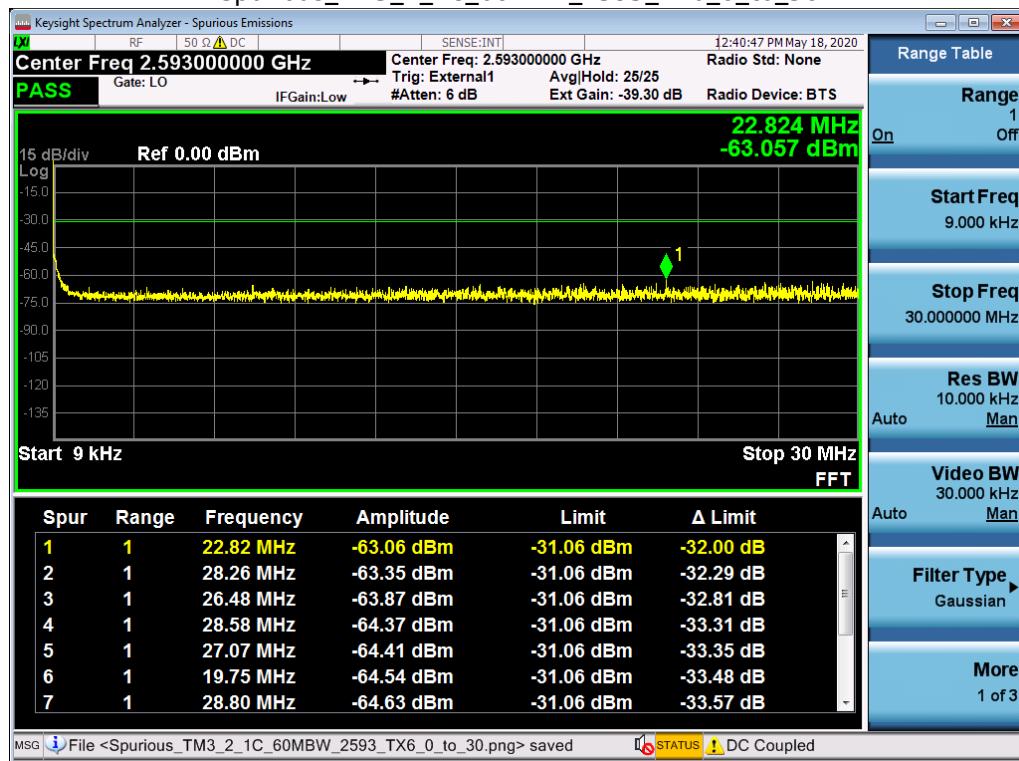


Spurious_TM3_1a_1C_40MBW_2516_TX6_10000_to_27000

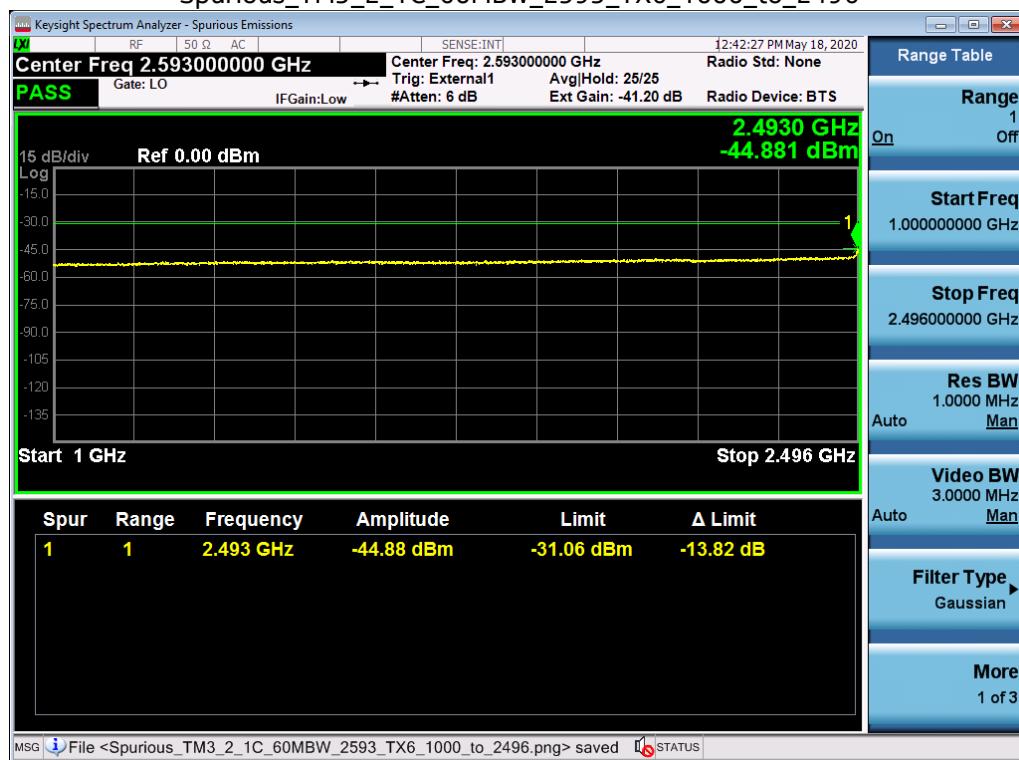


5G 60MHz Data

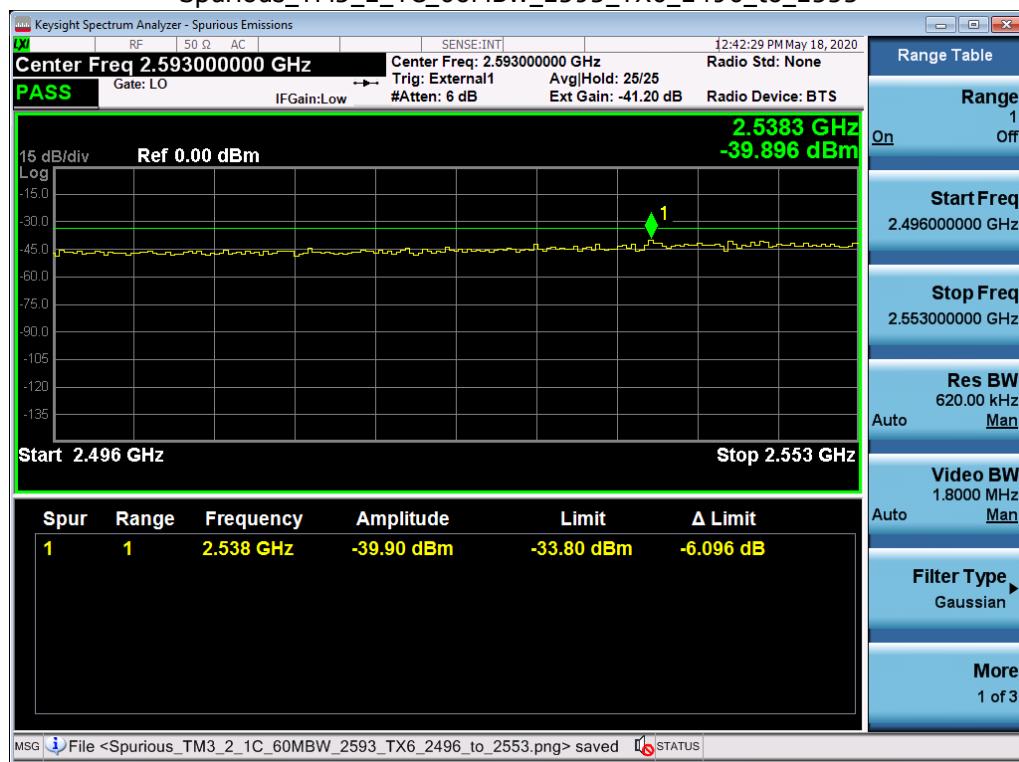
Spurious_TM3_2_1C_60MBW_2593_TX6_0_to_30



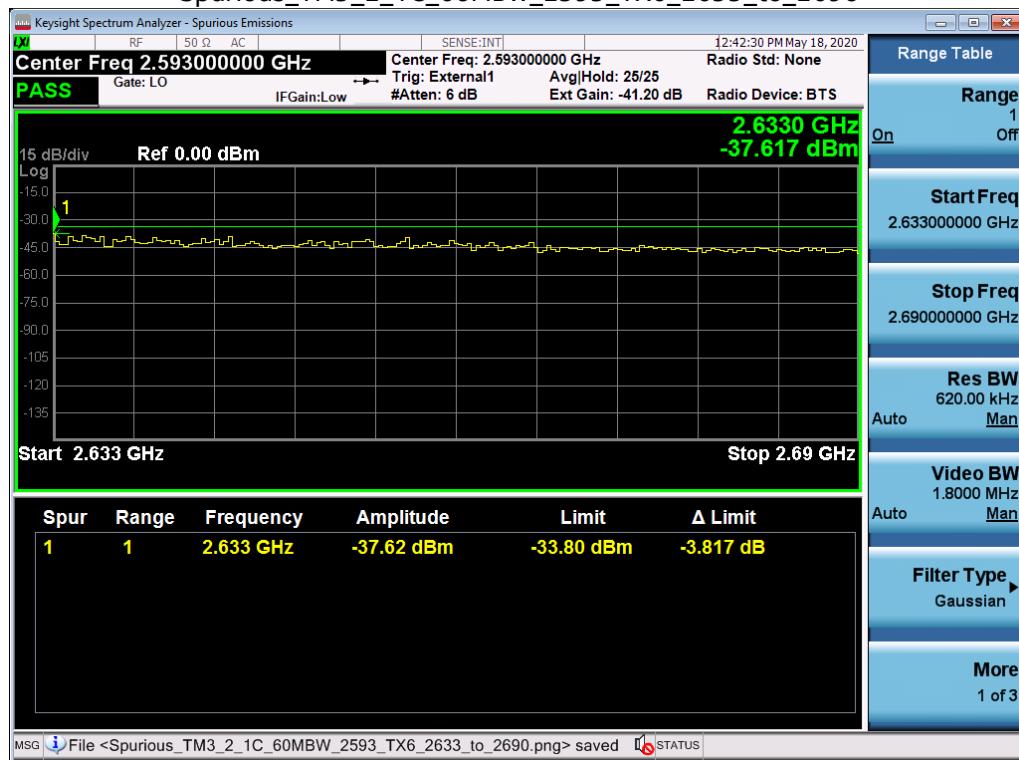
Spurious_TM3_2_1C_60MBW_2593_TX6_1000_to_2496



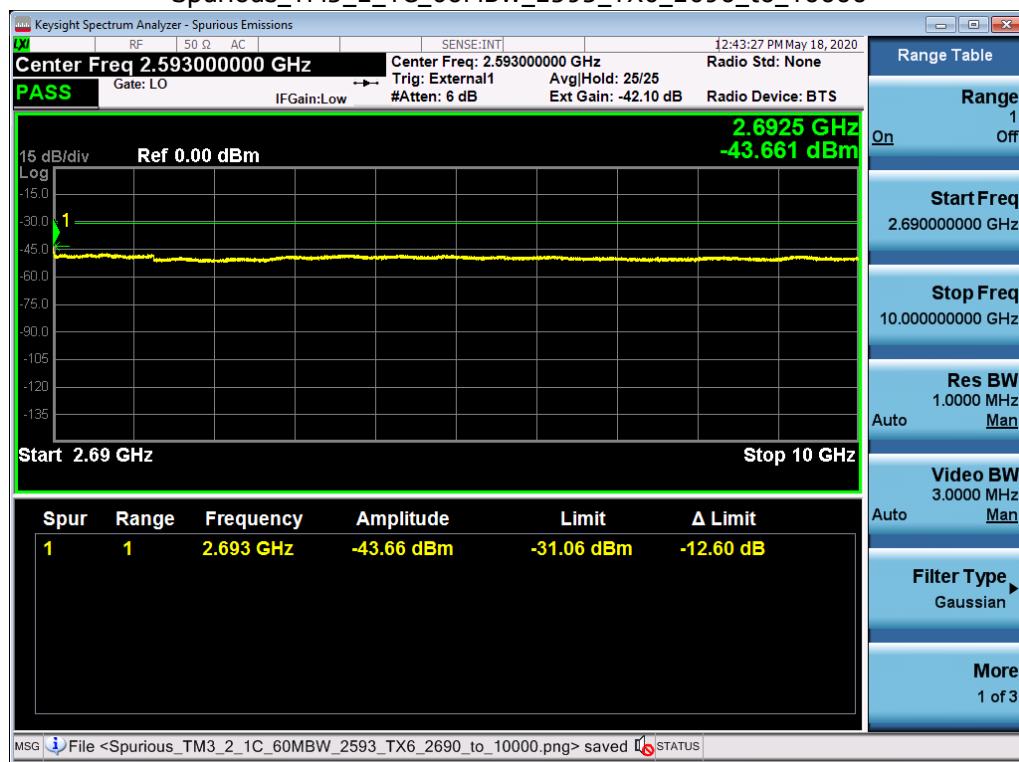
Spurious_TM3_2_1C_60MBW_2593_TX6_2496_to_2553



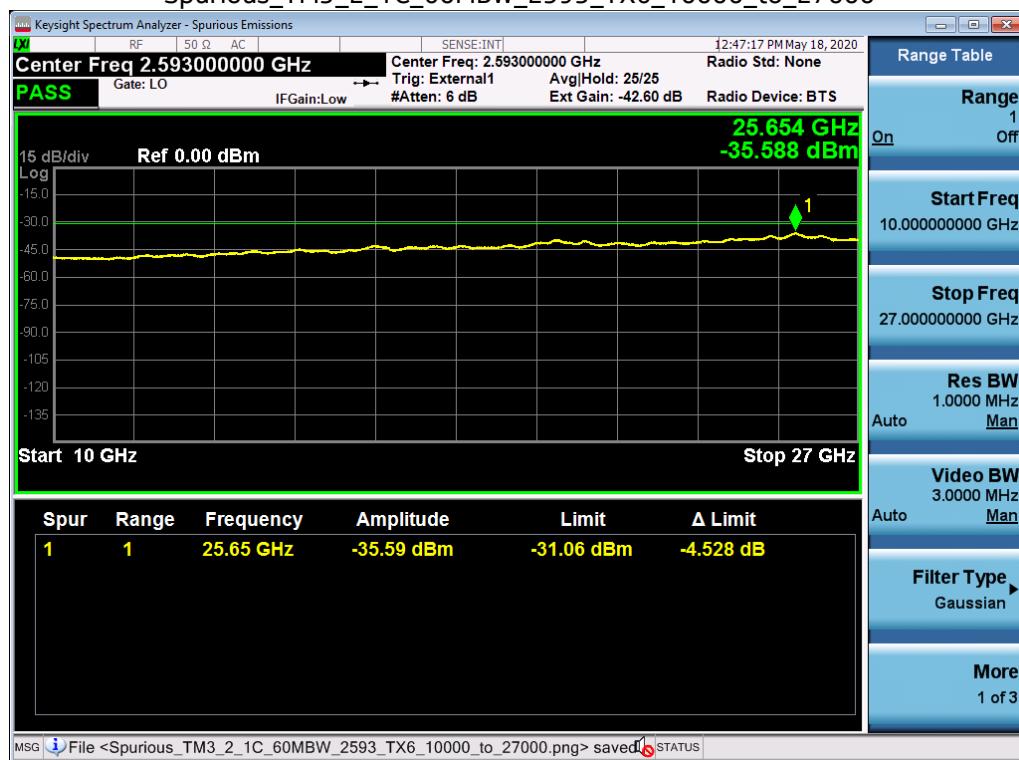
Spurious_TM3_2_1C_60MBW_2593_TX6_2633_to_2690



Spurious_TM3_2_1C_60MBW_2593_TX6_2690_to_10000

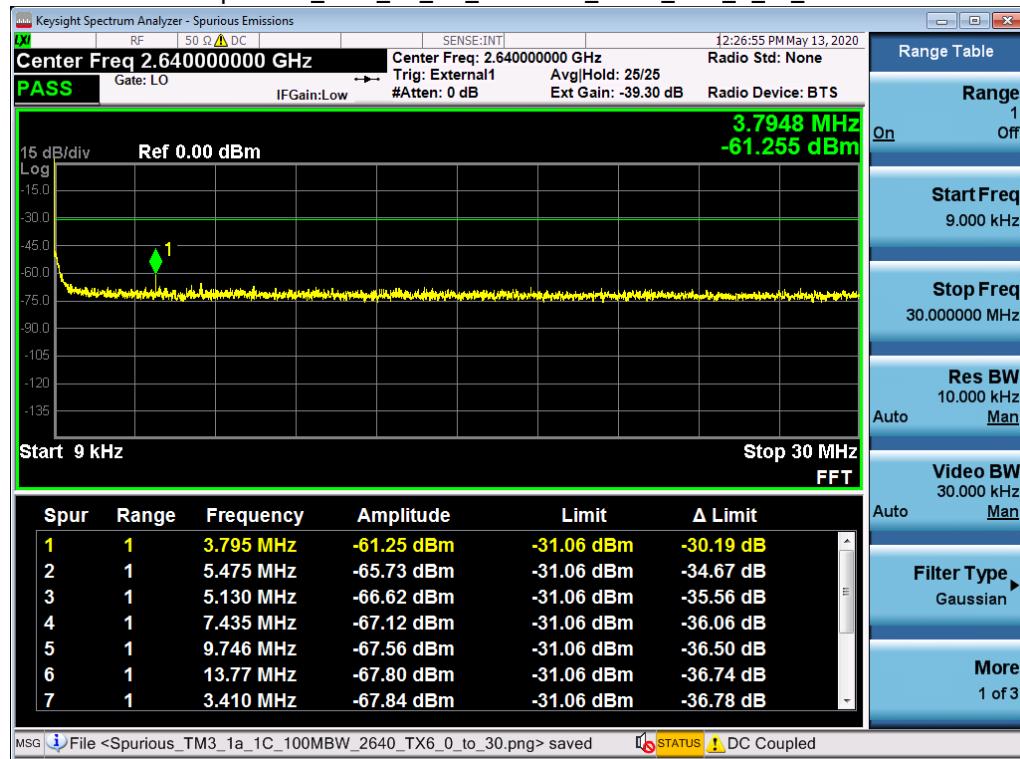


Spurious_TM3_2_1C_60MBW_2593_TX6_10000_to_27000

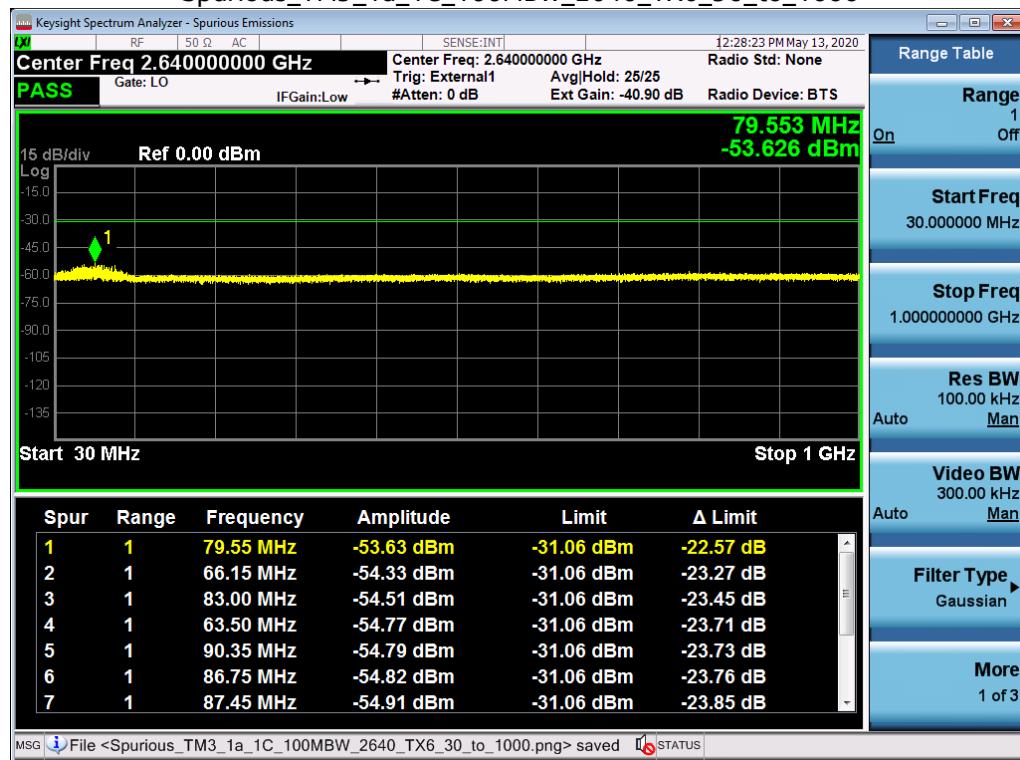


5G 100MHz Data

Spurious_TM3_1a_1C_100MBW_2640_TX6_0_to_30



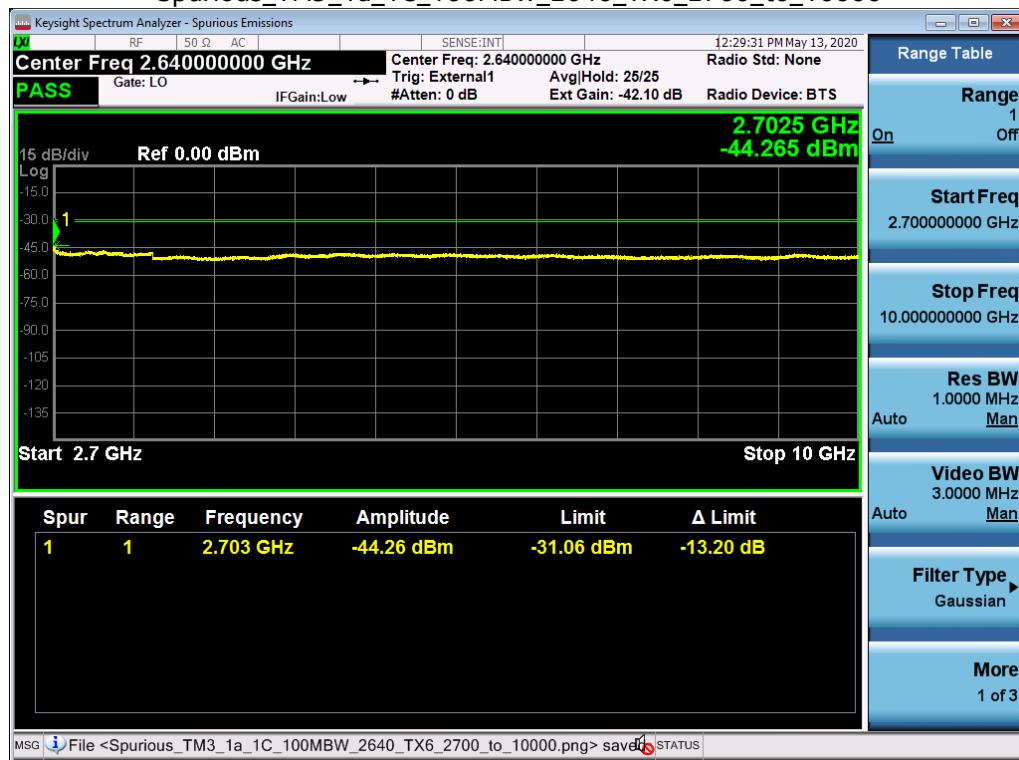
Spurious_TM3_1a_1C_100MBW_2640_TX6_30_to_1000



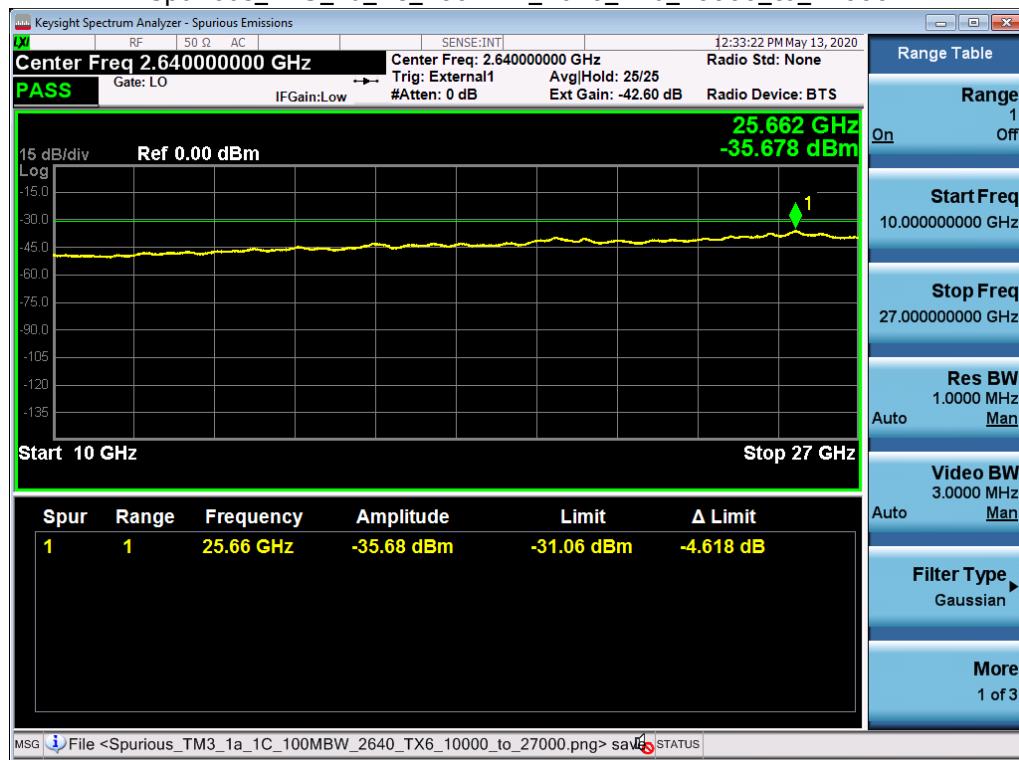
Spurious_TM3_1a_1C_100MBW_2640_TX6_1000_to_2580



Spurious_TM3_1a_1C_100MBW_2640_TX6_2700_to_10000

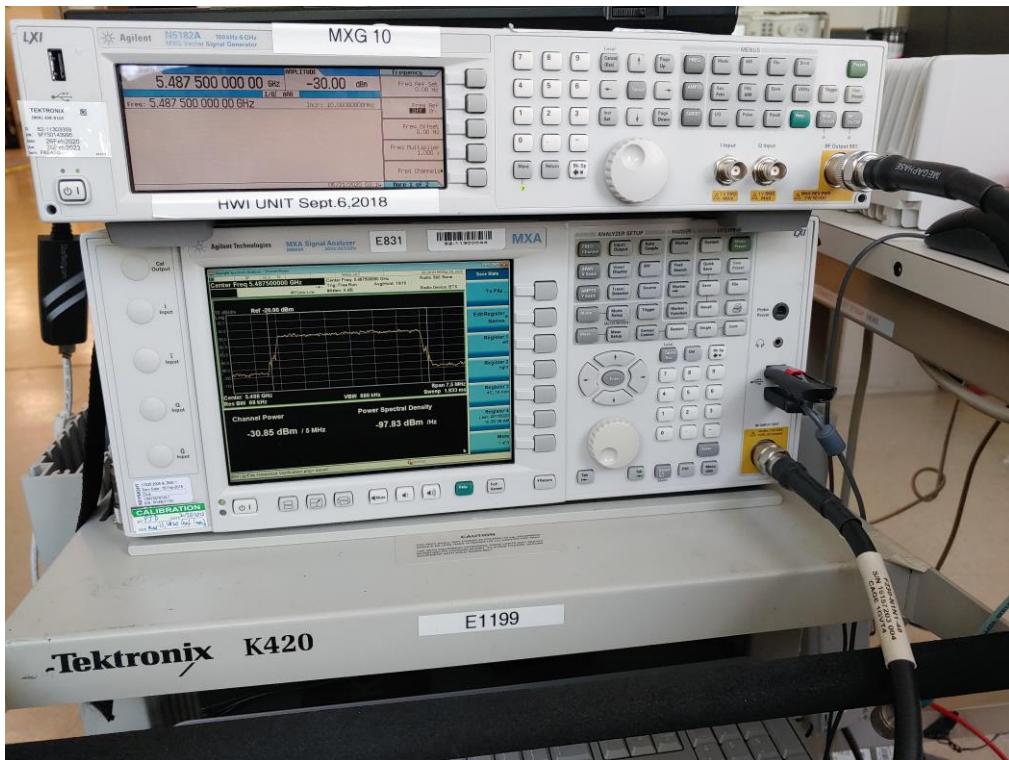
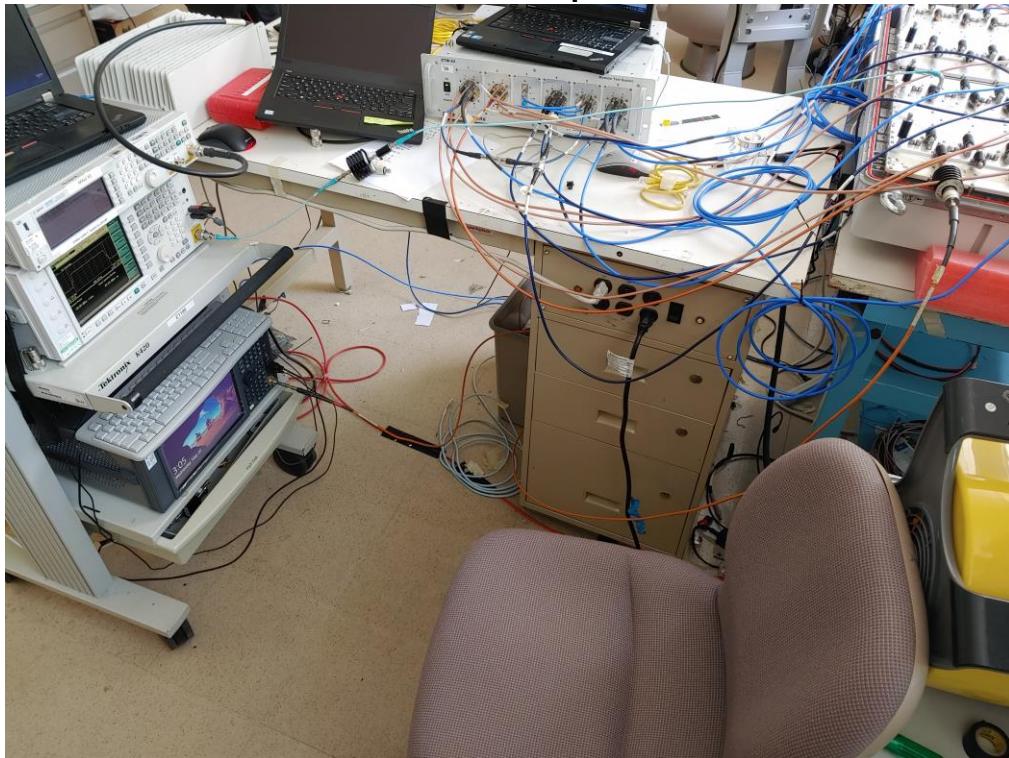


Spurious_TM3_1a_1C_100MBW_2640_TX6_10000_to_27000



Photographs

Test Setup



Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
E831	Agilent Technologies	MXA Signal Analyzer	20Hz-26.5GHz	N9020A	MY48011791	2018-02-15	2020-06-15
E896	Agilent Technologies	Network Analyzer	10 MHz - 40 GHz	N5230C	MY49000897	2019-01-31	2021-01-31
E1344	Macom	Attenuator	3 dB, DC - 4 GHz, 2 watt	2082-6171-03	N/A	CNR-V	CNR-V
E1237	Weinschel	Attenuator	10dB 25 Watt	46-10-34	BH8105	CNR-V	CNR-V
E1155	Weinschel	Attenuator	10dB 25Watt 0.05GHz - 26GHz	74-10-12	1068	CNR-V	CNR-V
E1154	Weinschel	Attenuator	30dB 25W 0.05GHz-26GHz	74-30-12	1065	CNR-V	CNR-V
Customer Provided		Attenuator	dc-6ghz 10w 30db		zsj30-10rs-6ta	CNR-V	CNR-V
Customer Provided	Mini Circuits		Modular Test System	ZTM53		CNR-V	CNR-V

CNR: Calibration Not Required

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, 10 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.

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

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

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 10 GHz), no reportable spurious emissions were detected.

7. FCC Section 2.1055 - Measurement of Frequency Stability

Frequency Block Tested: AEHC 2.6GHz RADIO (CF = 2593MHz)

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-11.118
0.5	+4.4688
1.0	+36.626
1.5	-3.0926
2.0	+28.377
2.5	+8.4454
3.0	-24.502
FCC SPECIFICATION	2593MHz ($\pm 0.05\text{ppm}$) $\pm 0.05\text{ppm} = \pm 129.65\text{Hz}$
FCC RESULT	PASS

Transmit Frequency Deviation at +50°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+17.935
0.5	-27.356
1.0	-59.690
1.5	+15.441
2.0	+50.126
2.5	+11.4050
3.0	-2.4003
FCC SPECIFICATION	2593MHz ($\pm 0.05\text{ppm}$) $\pm 0.05\text{ppm} = \pm 129.65\text{Hz}$
FCC RESULT	PASS

Transmit Frequency Deviation at +40°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+28.269
0.5	-18.653
1.0	+4.5020
1.5	+22.583
2.0	-18.343
2.5	-34.392
3.0	+16.713
FCC SPECIFICATION	2593MHz ($\pm 0.05\text{ppm}$) $\pm 0.05\text{ppm} = \pm 129.65\text{Hz}$
FCC RESULT	PASS

Transmit Frequency Deviation at +30°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+39.486
0.5	+0.67930
1.0	-46.311
1.5	+30.657
2.0	-11.474
2.5	+5.7231
3.0	+35.458
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +20°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-17.232
0.5	+21.331
1.0	+0.5568
1.5	+11.867
2.0	-13240
2.5	-40.280
3.0	+3.7750
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +10°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-35.088
0.5	+11.140
1.0	+0.23575
1.5	-23.231
2.0	-9.7646
2.5	+22.951
3.0	+5.9934
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at 0°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+16.862
0.5	-10.414
1.0	+41.977
1.5	+9.5530
2.0	-17.548
2.5	+8.5091
3.0	-7.5303
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -10°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+40.480
0.5	-14.522
1.0	-31.393
1.5	+18.279
2.0	+2.4699
2.5	+0.99479
3.0	+23.559
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -20°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+0.13430
0.5	-31.002
1.0	-8.0462
1.5	+18.830
2.0	-35.213
2.5	+4.0198
3.0	+38.653
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -30°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+19.332
0.5	-20.759
1.0	+15.557
1.5	-5.0704
2.0	-30.099
2.5	+17.771
3.0	+24.988
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Upon return to +25°C, vary voltage to +15% and -15% of nominal and record frequency difference. Result will be 12 readings for each voltage (nominal, +15%, and nominal, -15%).

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, -48VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+13.800
0.5	-5.6363
1.0	+24.532
1.5	+11.628
2.0	+5.8689
2.5	-12.644
3.0	+6.3749
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 103% of Nominal Voltage, -49.44VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+2.7770
0.5	-30.365
1.0	+6.2207
1.5	-34.512
2.0	+6.4703
2.5	-12.814
3.0	+4.4332
FCC SPECIFICATION	2593MHz (± 0.05 ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 106% of Nominal Voltage, -50.88VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+18.211
0.5	-17.024
1.0	+9.3805
1.5	+44.329
2.0	-20.725
2.5	-45.292
3.0	+29.870
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 109% of Nominal Voltage, -52.32VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+8.0003
0.5	+14.114
1.0	-9.4836
1.5	+33.168
2.0	-26.189
2.5	+39.914
3.0	+29.614
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 112% of Nominal Voltage, -53.76VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+16.486
0.5	-32.557
1.0	+0.7549
1.5	+24.806
2.0	+11.012
2.5	-22.333
3.0	+13.984
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 115% of Nominal Voltage, -55.20VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-6.0343
0.5	+19.885
1.0	+38.262
1.5	-3.4112
2.0	-51.733
2.5	+6.6647
3.0	-13.748
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, -48.0VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-9.8441
0.5	+43.303
1.0	-19.779
1.5	+6.3610
2.0	+1.9958
2.5	-24.432
3.0	-26.499
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -3% of Nominal Voltage, -46.56VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.1922
0.5	+14.440
1.0	-1.9646
1.5	-10.041
2.0	-36.035
2.5	+11.019
3.0	-0.6074
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

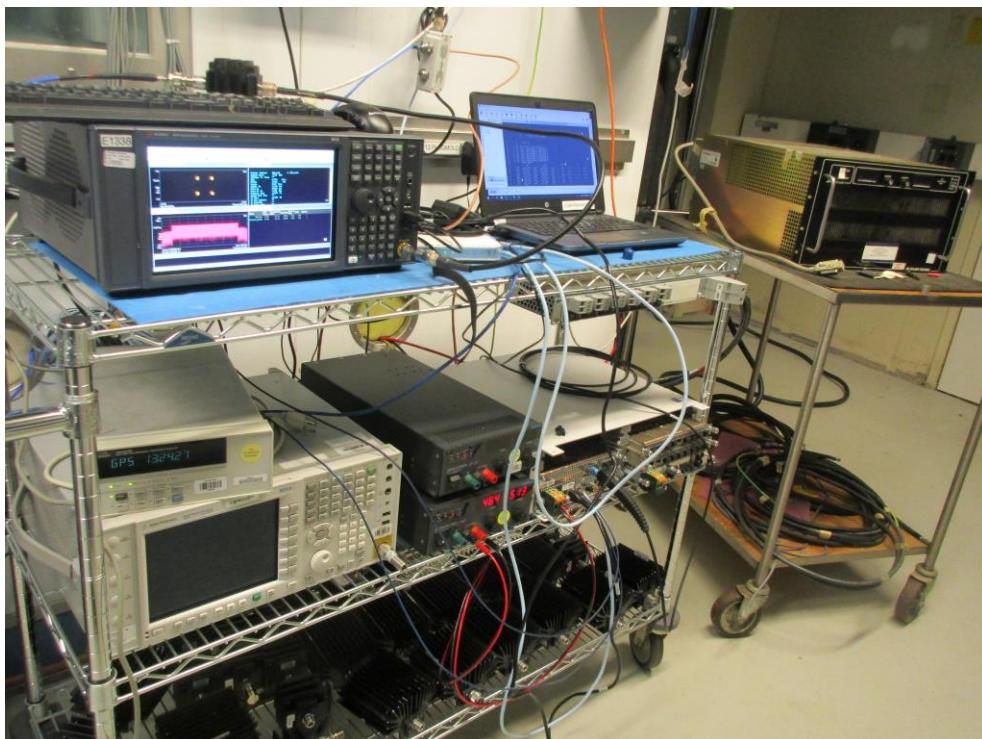
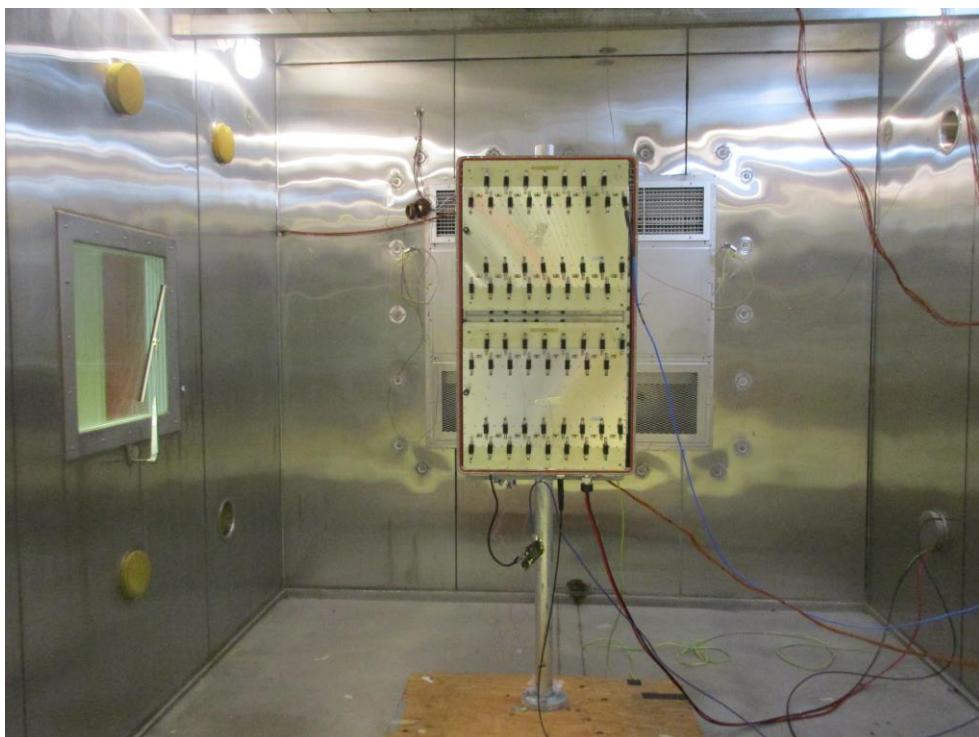
Transmit Frequency Deviation at +25°C at -6% of Nominal Voltage, -45.12VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+23.876
0.5	-16.472
1.0	-2.5009
1.5	+17.911
2.0	-15.386
2.5	-49.179
3.0	+25.053
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -9% of Nominal Voltage, -43.68VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+19.639
0.5	-46.487
1.0	-16.248
1.5	+0.78520
2.0	-24.311
2.5	+11.225
3.0	+29.728
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -12% of Nominal Voltage, -42.24VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	+5.6887
0.5	+22.456
1.0	-12.161
1.5	-9.7767
2.0	-21.746
2.5	-11.410
3.0	-56.891
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05 ppm = ± 129.65 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -15% of Nominal Voltage, -40.80VDC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-20.105
0.5	+25.922
1.0	-36.949
1.5	-25.404
2.0	+56.053
2.5	+15.776
3.0	-3.1975
FCC SPECIFICATION	2593MHz (± 0.05ppm) ± 0.05ppm = ± 129.65Hz
FCC RESULT	PASS

Photographs



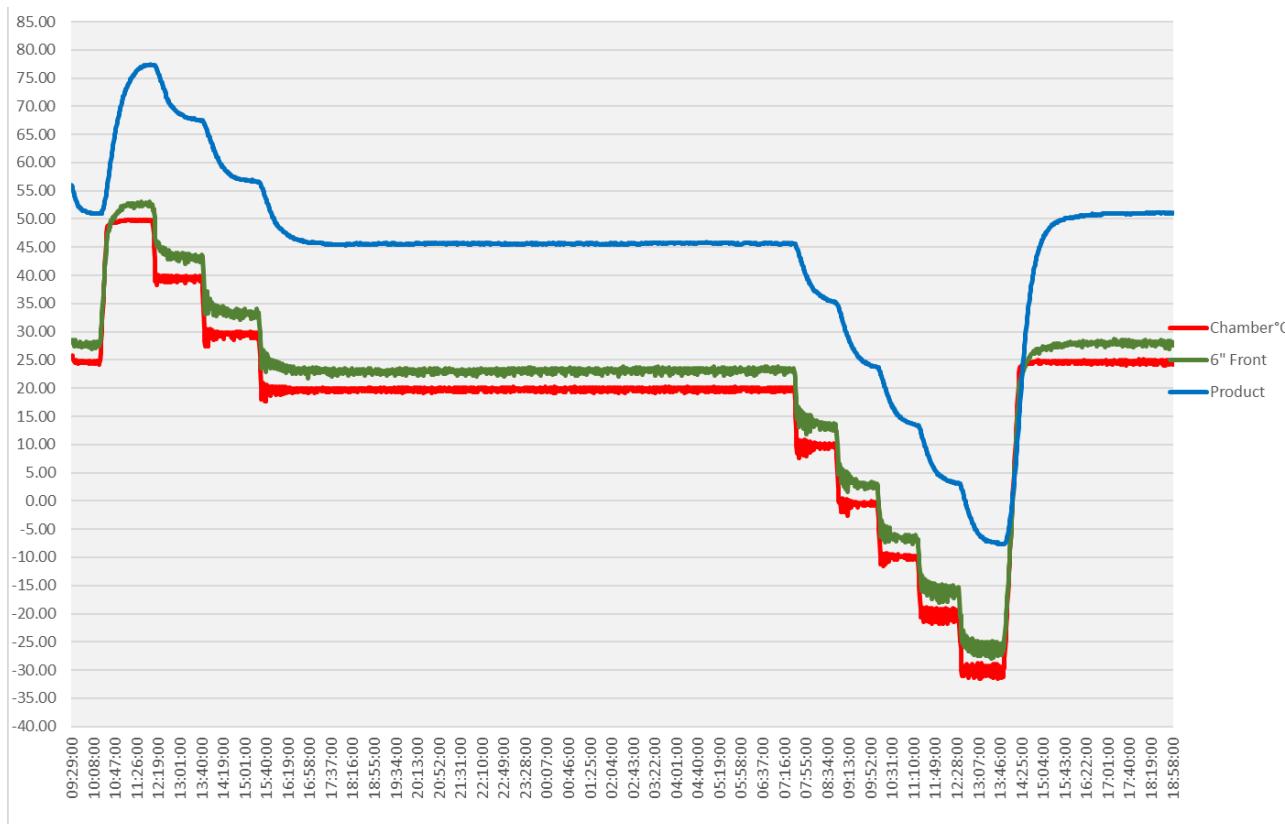
Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
TH534-T13	Envirotronics	Controller		Envirotronics SPPCM	SP000638	2019-05-22	2021-05-226
TH-T13	Envirotronics	Thermal Chamber		N/A	0999-4722	2018-09-20	2020-09-20
TH069	Extech	Data Logger	Barometric Pressure/Humidity/Temperature	SD700	Q690305	2019-06-26	2021-06-26
TH054	Yokogawa	Recorder	MobileCorder Paperless Videographic Recorder	MV2048	S5JC04076	2019-02-26	2021-02-26
TH073	Fluke	Multimeter	Digital	87V	25910080	2020-02-25	2022-02-25
E1338	KeySight Technologies	MXA Signal Analyzer		N9020B	MY57430927	2019-11-14	2021-11-14

AEHC DC Power Frequency Stability Test Chamber Chart

50°C to -30°C

5-27-2020 to 5-28- 2020



8. NVLAP Certificate of Accreditation

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

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 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

2019-09-20 through 2020-09-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program

A handwritten signature in blue ink that reads "Daniel S. Leman".