

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi



XMIT 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2022-01-19	2023-01-19
Block - DC	Fairview Microwave	SD3235-2148	ANF	2022-05-27	2023-05-27
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXK	2021-09-13	2022-09-13
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

Per FCC Part 25.253(b), the power of any emission outside of the authorized operating frequency range cannot exceed the band edge limit of -57.9 dBW/MHz converted to -27.9 dBm/MHz. The Remote Radio Head (RRH) may operate as a 4 port MIMO transmitter with transmitter outputs connected to two cross-polarized antennas [two transmitter outputs are connected to (+) radiators and two transmitter outputs are connected to (-) radiators]. The limit is adjusted to -30.9 dBm [-27.9 dBm -10 log (2)] per FCC KDB 662911D01 v02r01, ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

Per FCC ANSI C63.26-2015 section 5.7.2 the first and second frequency ranges use the integration method across the full measurement bandwidth.

RF conducted emissions testing was performed only on one port. The RRH antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown during output power testing) and antenna port 3 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi



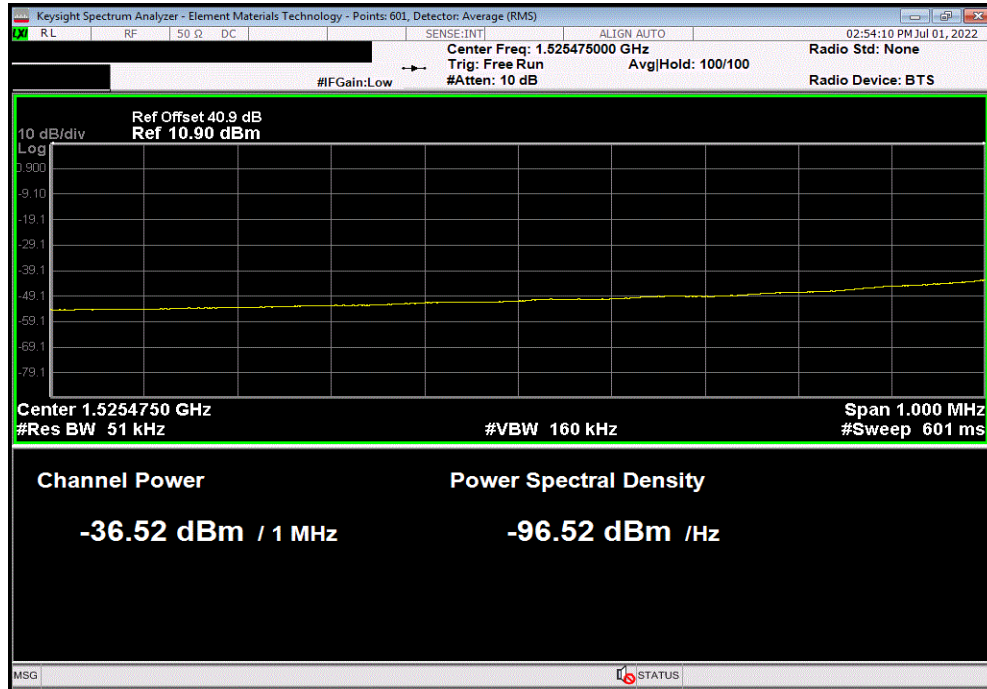
EUT: TR44KA Base Station		Work Order: MASY0006	
Serial Number: SV2146TR44KA000001		Date: 9-Aug-22	
Customer: Mavenir Systems, Inc		Temperature: 21.1 °C	
Attendees: None		Humidity: 56.3% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Brandon Hobbs		Power: 48 VDC	Job Site: TX09
TEST SPECIFICATIONS		Test Method	
FCC 25:2022		ANSI C63.26:2015	
COMMENTS			
All conducted path losses were accounted for: cables, attenuators, adapters, DC block and notch filter. The PA gain was adjusted for a 3dBi antenna (Final software value of 42). The initial limit was adjusted to -30.9 dBm [-27.9 dBm -10 log (2)] per FCC KDB 662911D01 v02r01, ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators). The single available Resource Block / Offset configuration was used.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature	
		Frequency Range	Max Value (dBm) Limit (dBm) Result
5G NR, Band n24, SCS 15kHz			
5 MHz Bandwidth			
QPSK Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-36.5 -30.9 Pass
	25 RB/0 Offset	2	-42.0 -30.9 Pass
	25 RB/0 Offset	3	-41.5 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-33.9 -30.9 Pass
	25 RB/0 Offset	2	-39.7 -30.9 Pass
	25 RB/0 Offset	3	-40.8 -30.9 Pass
16-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-36.4 -30.9 Pass
	25 RB/0 Offset	2	-42.0 -30.9 Pass
	25 RB/0 Offset	3	-41.5 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-34.7 -30.9 Pass
	25 RB/0 Offset	2	-39.7 -30.9 Pass
	25 RB/0 Offset	3	-40.7 -30.9 Pass
64-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-36.8 -30.9 Pass
	25 RB/0 Offset	2	-42.0 -30.9 Pass
	25 RB/0 Offset	3	-41.5 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-34.5 -30.9 Pass
	25 RB/0 Offset	2	-39.8 -30.9 Pass
	25 RB/0 Offset	3	-40.7 -30.9 Pass
256-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-36.8 -30.9 Pass
	25 RB/0 Offset	2	-42.0 -30.9 Pass
	25 RB/0 Offset	3	-41.5 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-34.3 -30.9 Pass
	25 RB/0 Offset	2	-39.6 -30.9 Pass
	25 RB/0 Offset	3	-40.7 -30.9 Pass

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

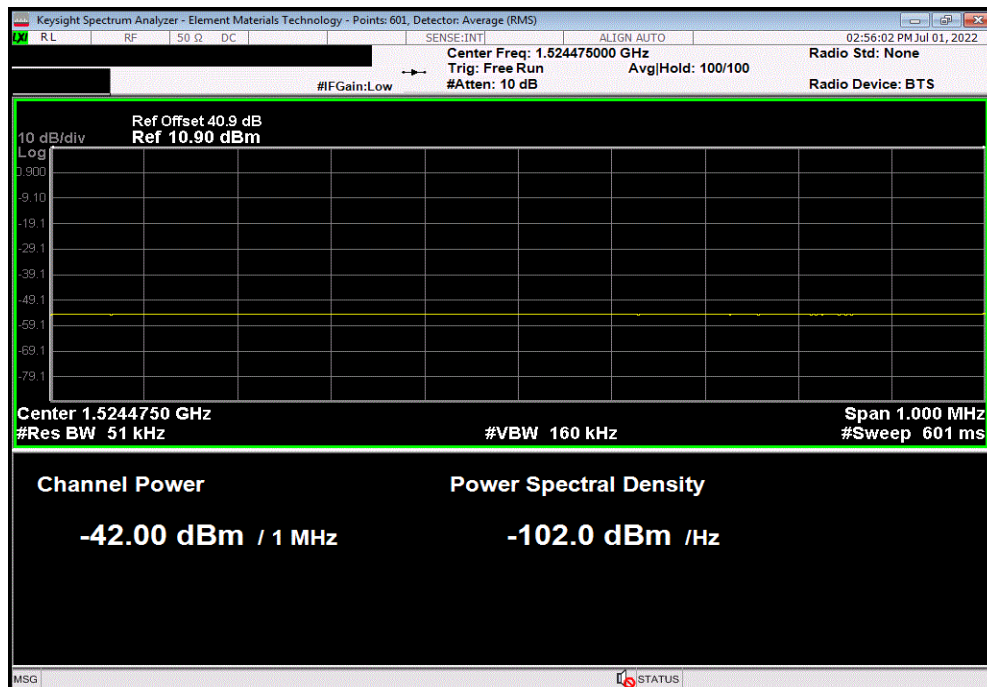


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-36.52		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-42.00		-30.9	Pass	

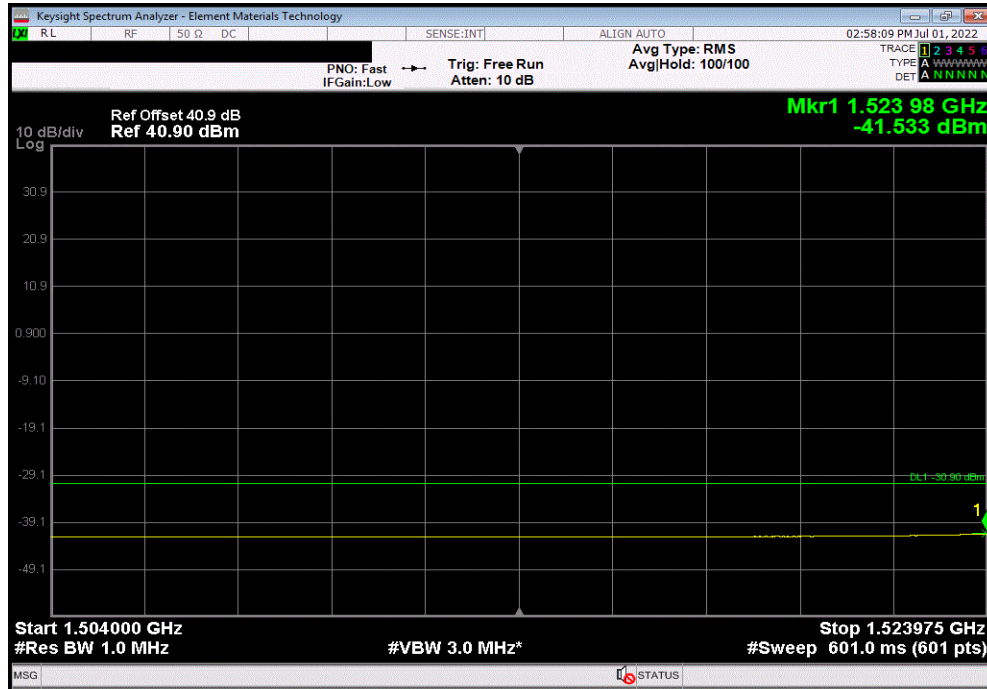


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

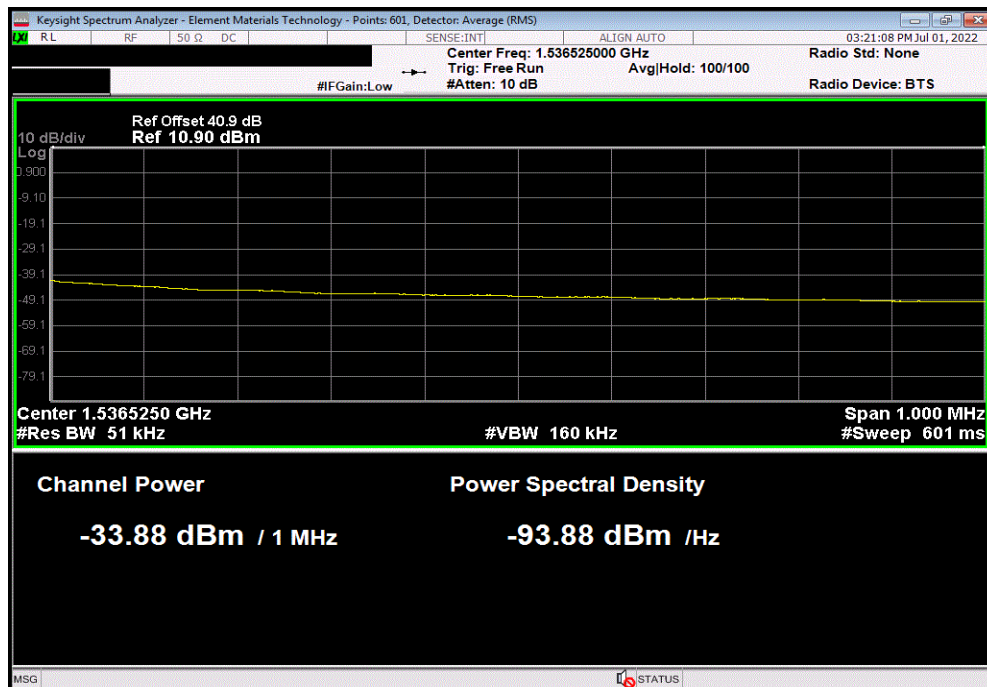


TbTtX 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.53		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-33.88		-30.9	Pass	

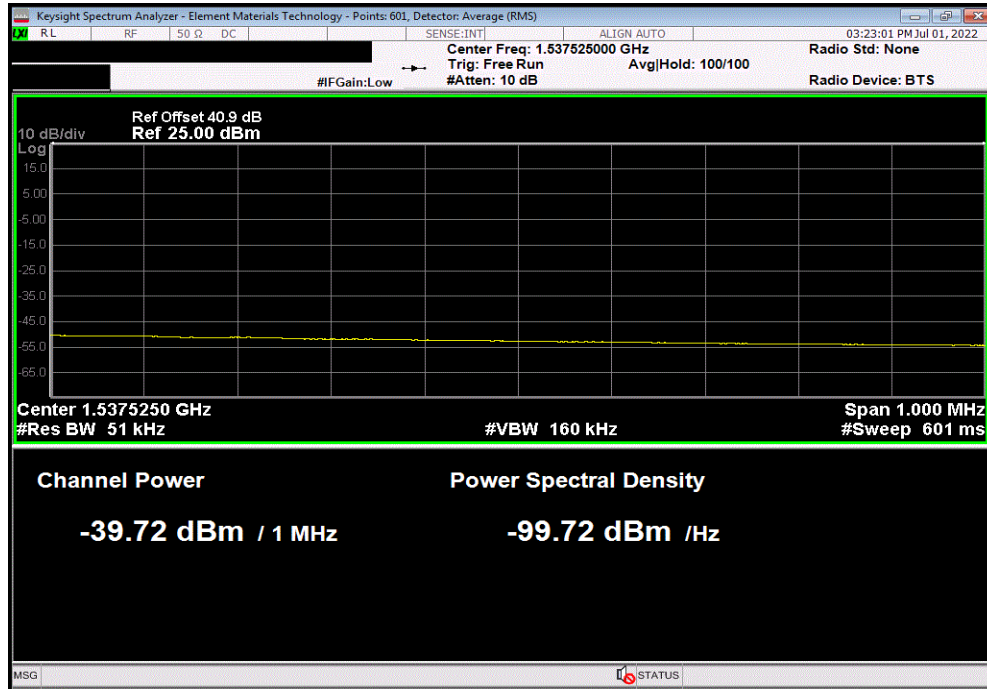


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

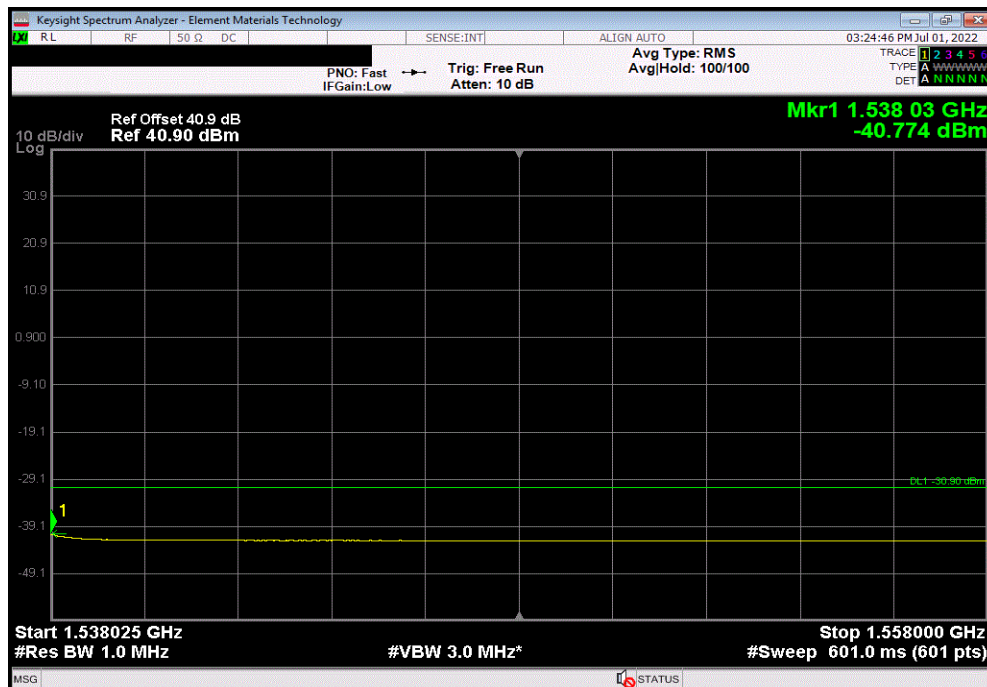


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
2	-39.72	-30.9	Pass			



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
3	-40.77	-30.9	Pass			

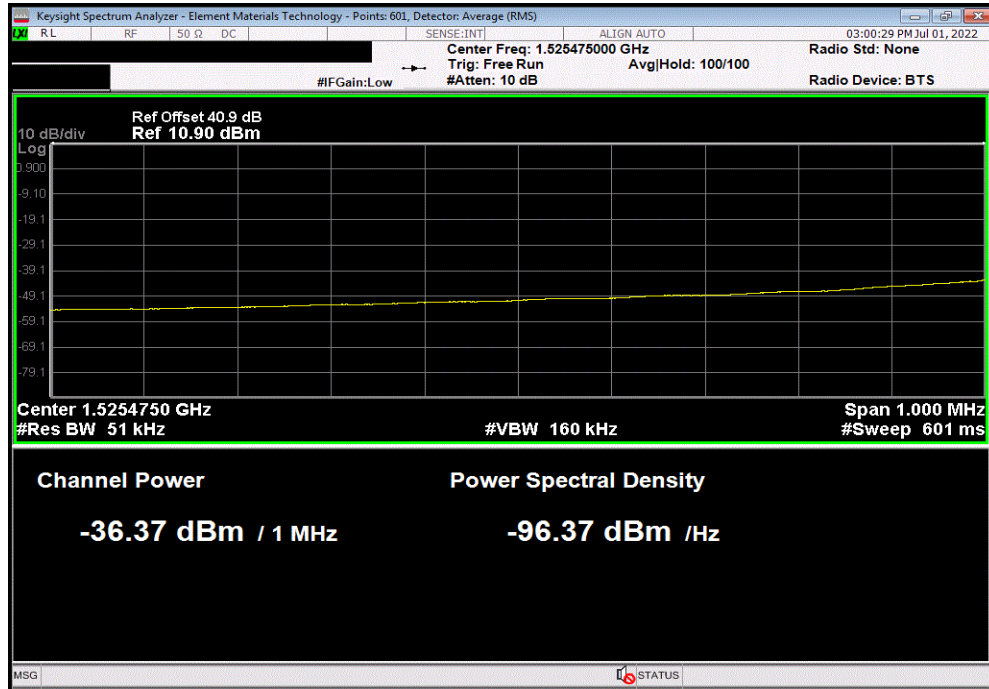


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

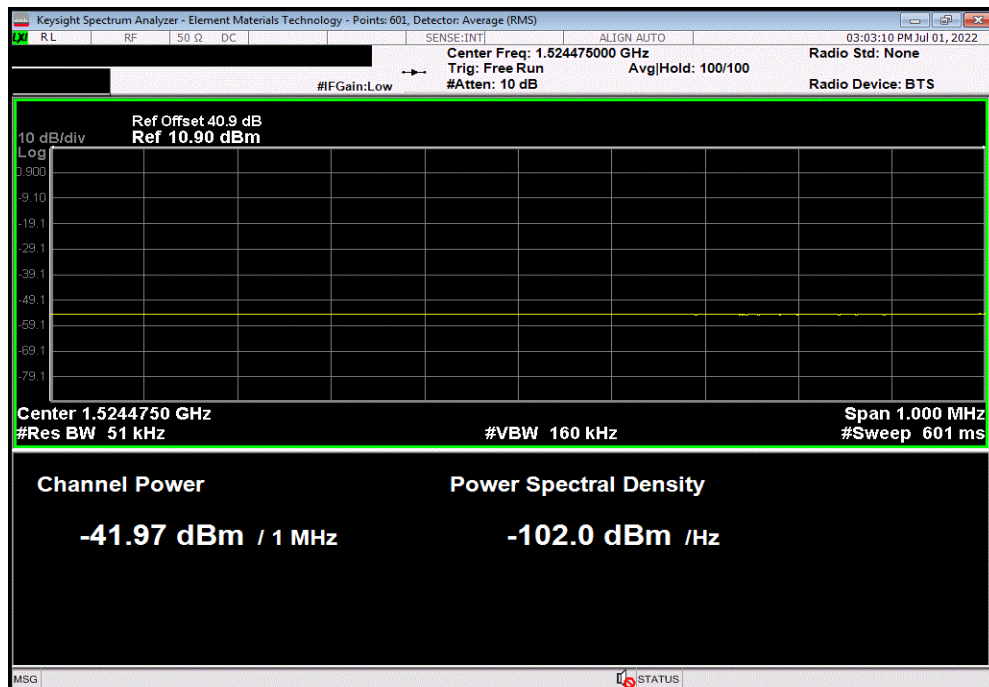


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-36.37		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-41.97		-30.9	Pass	

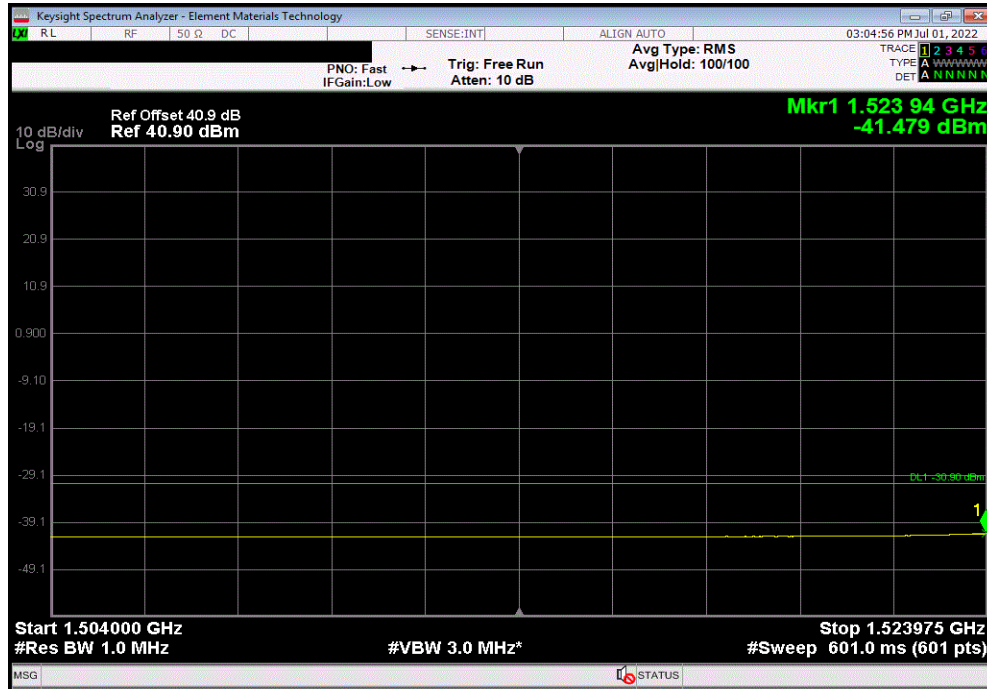


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

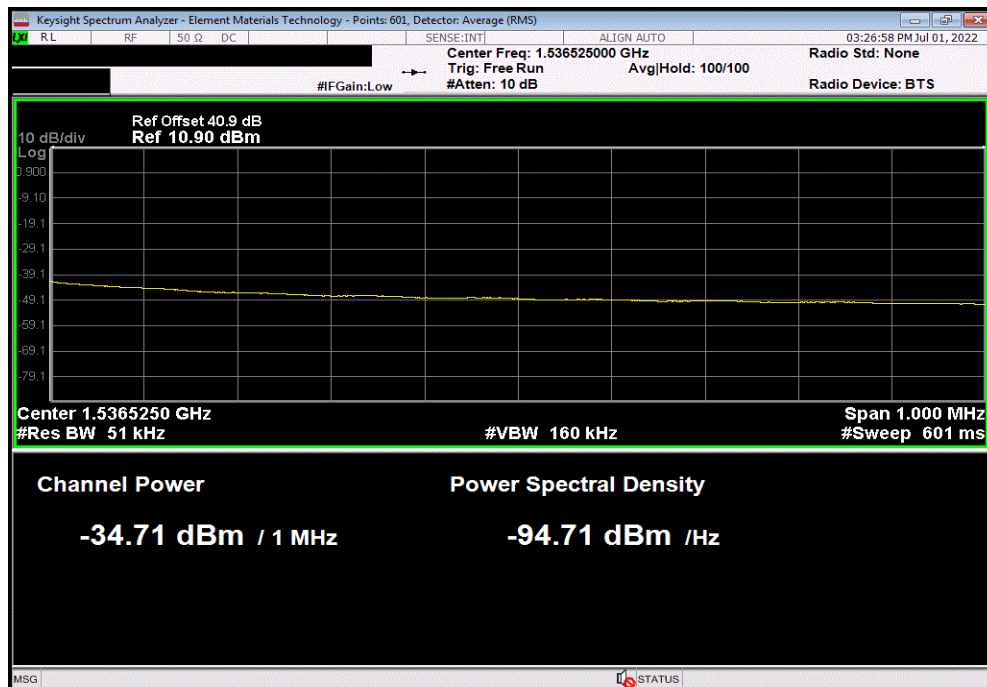


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
3	-41.48	-30.9	Pass			



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
1	-34.71	-30.9	Pass			

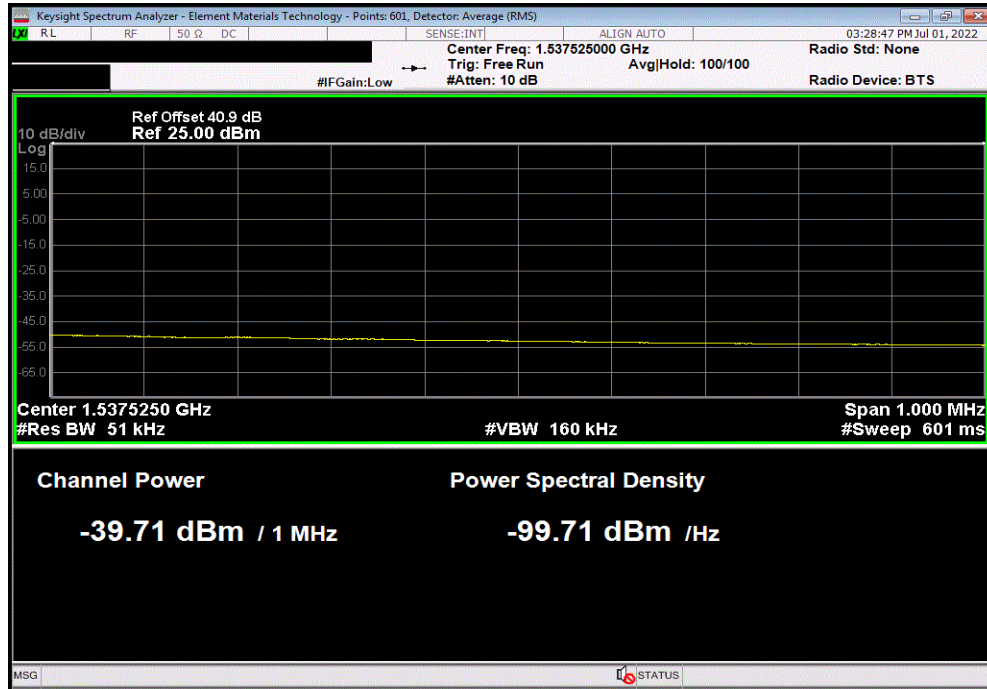


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

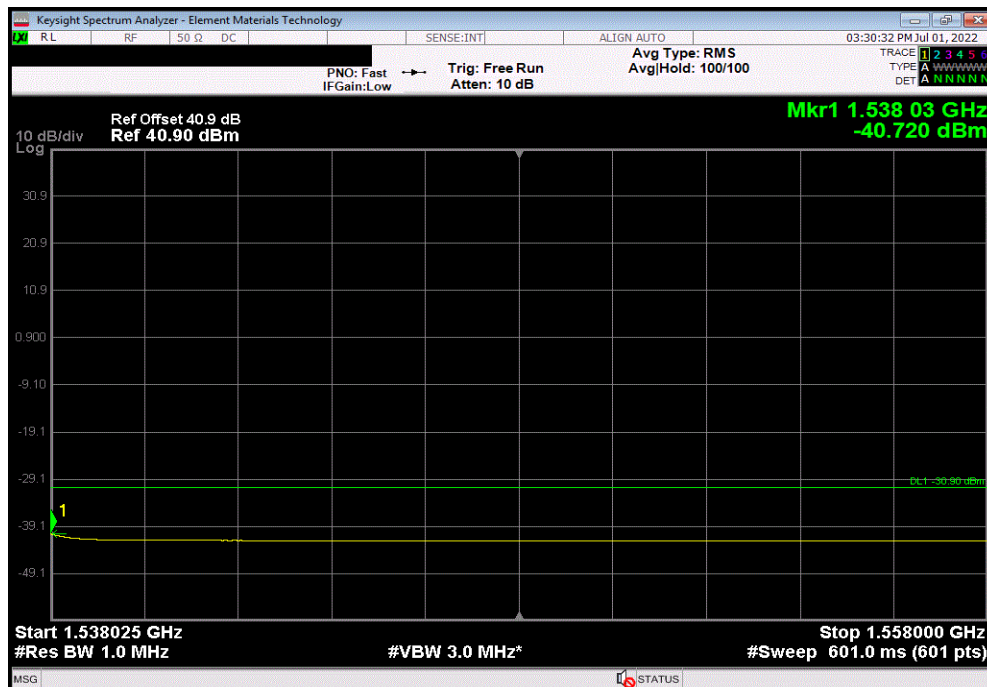


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)		Result
2		-39.71		-30.9		Pass



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)		Result
3		-40.72		-30.9		Pass

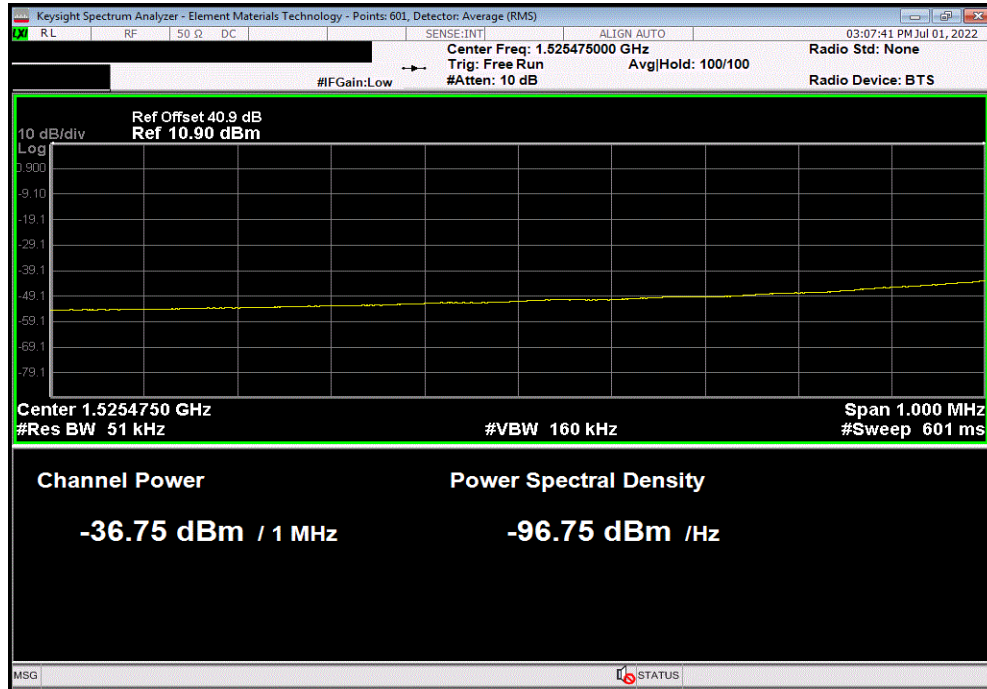


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

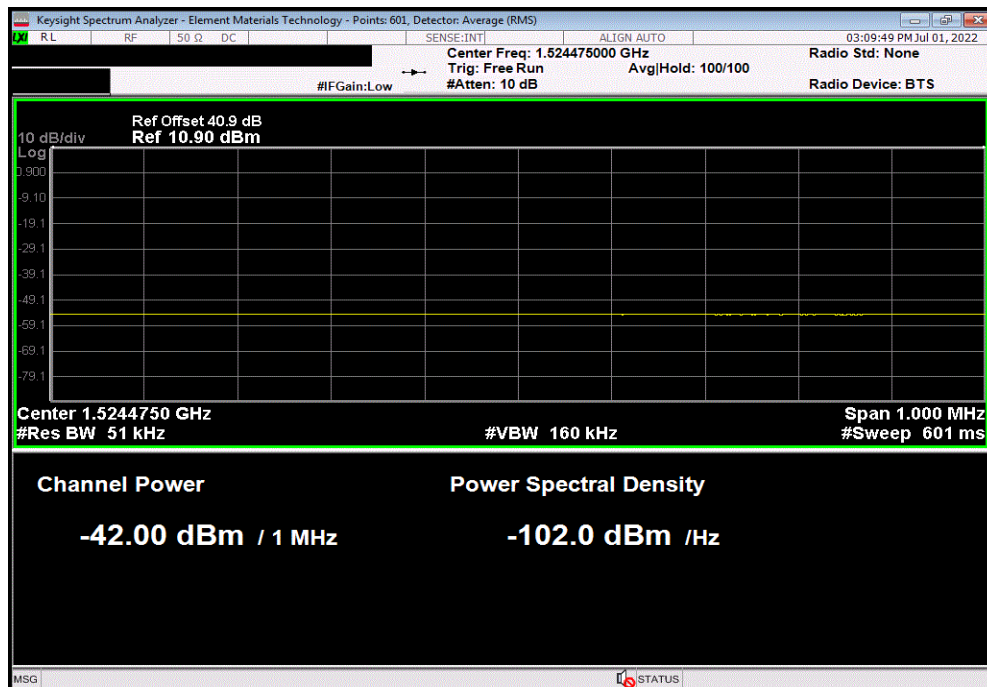


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-36.75		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-42.00		-30.9	Pass	

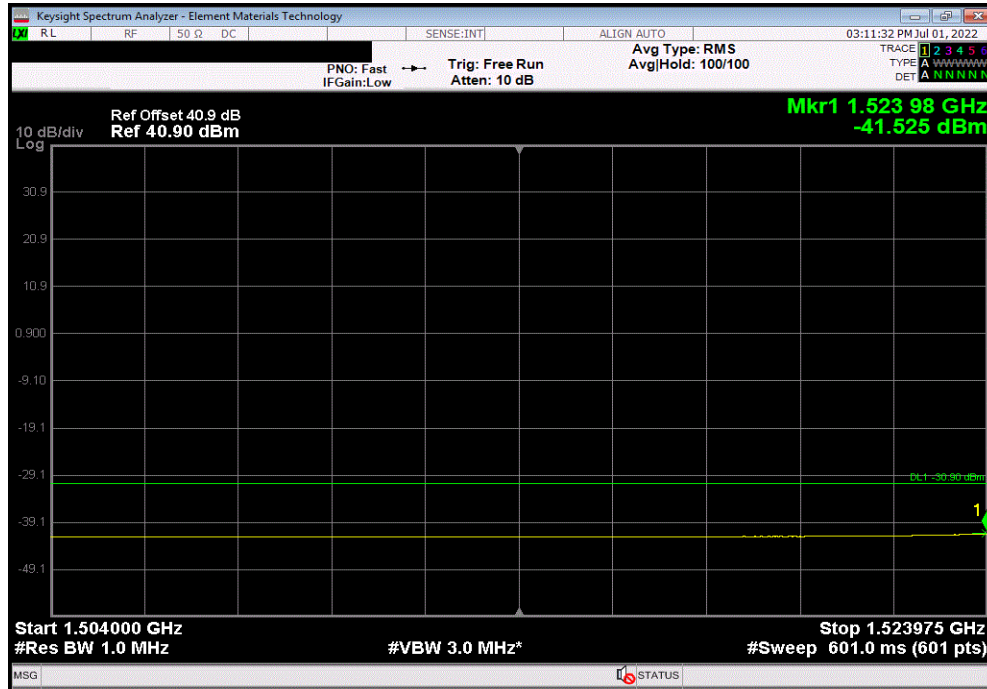


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

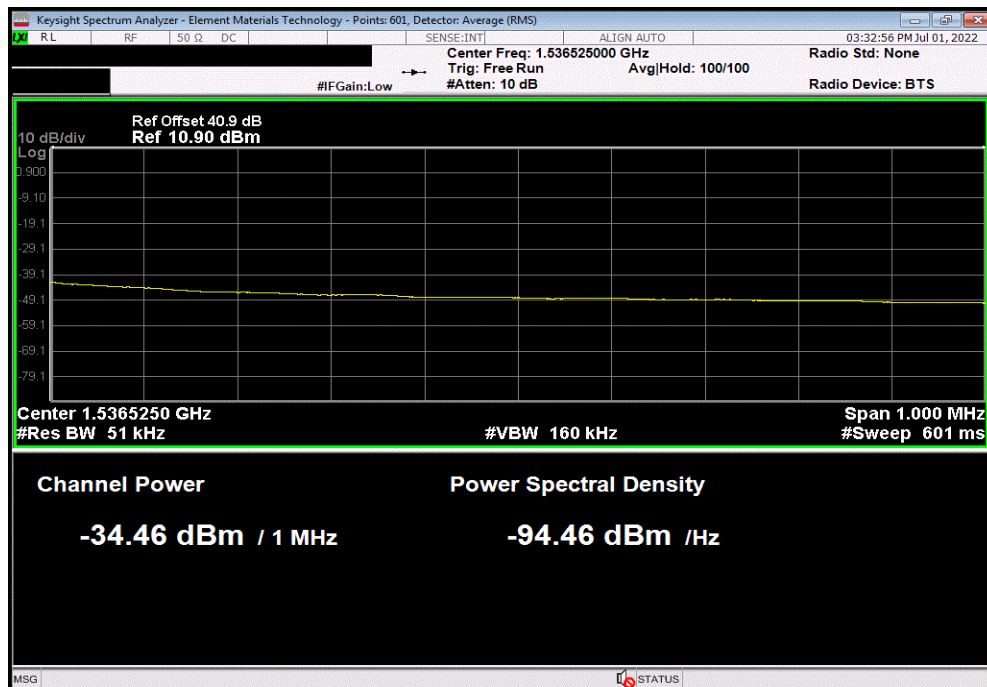


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.53		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-34.46		-30.9	Pass	

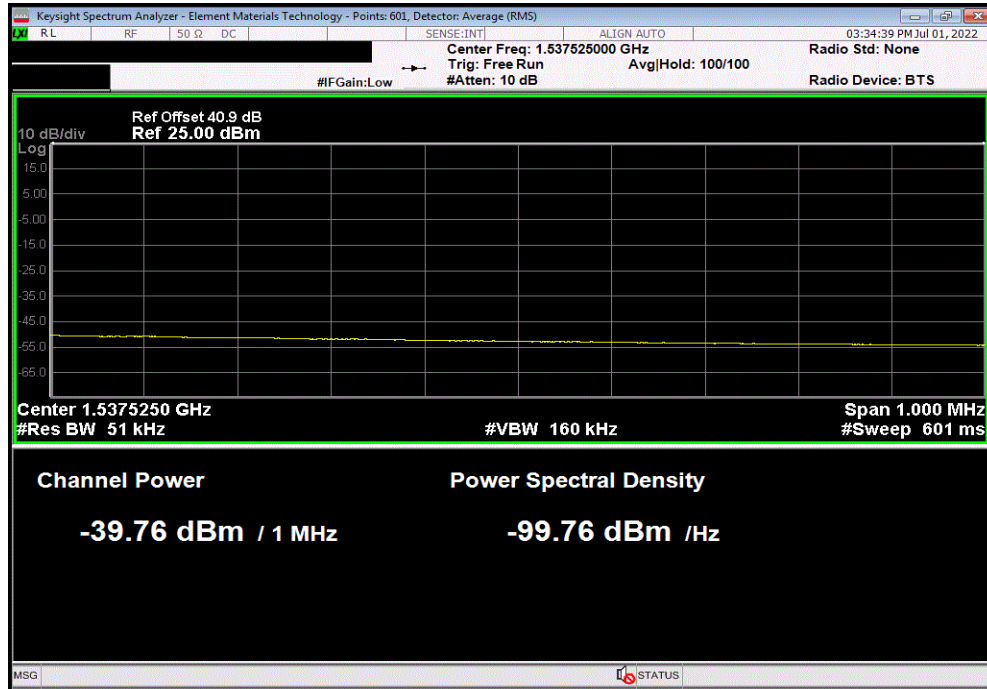


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

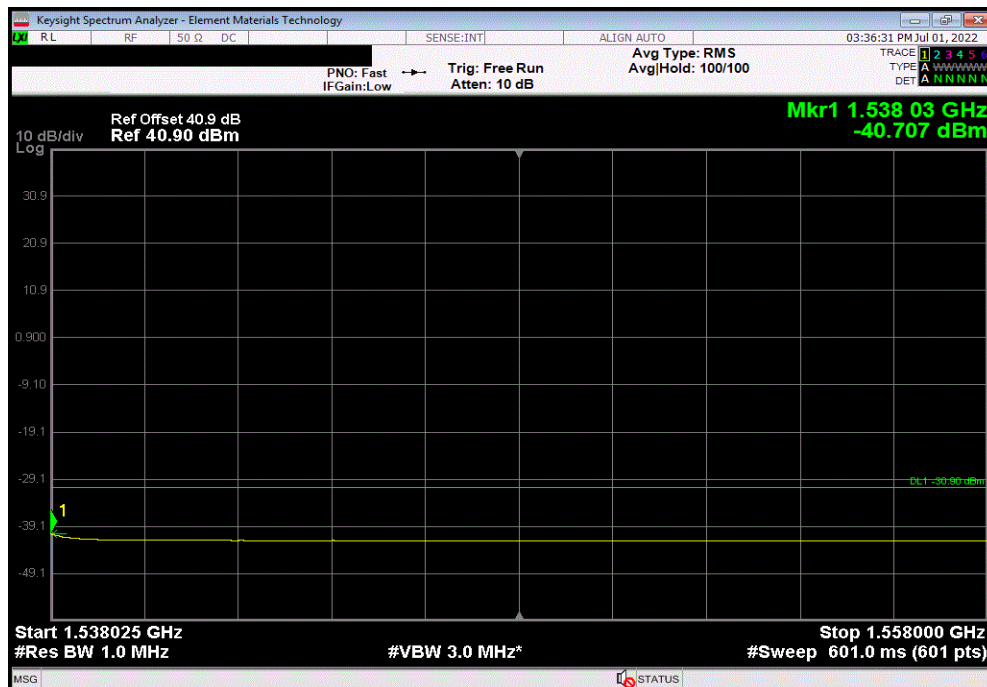


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-39.76		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-40.71		-30.9	Pass	

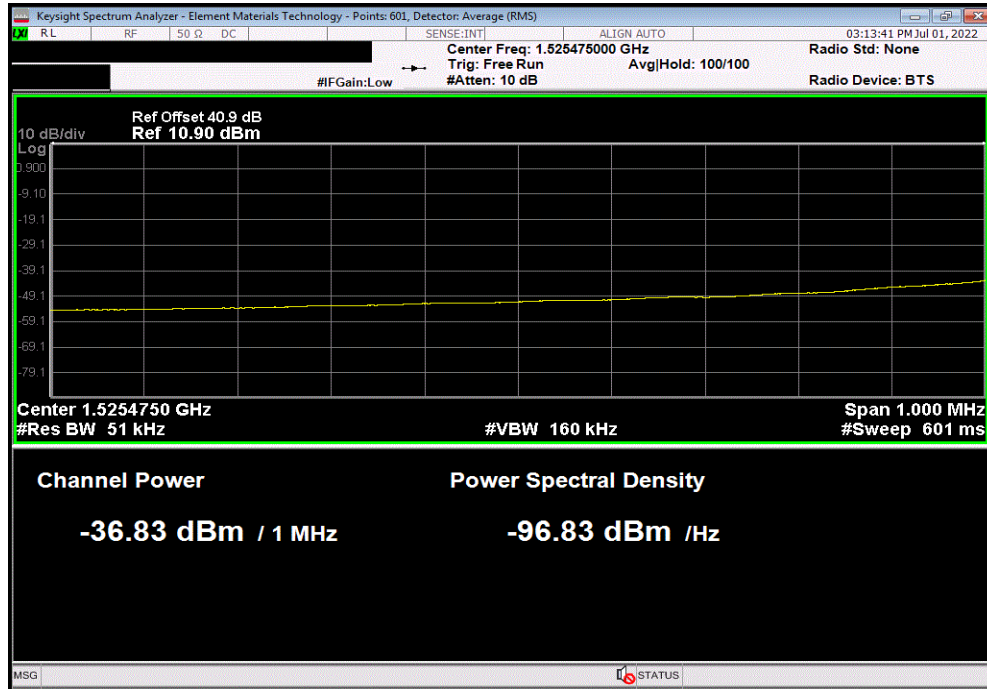


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

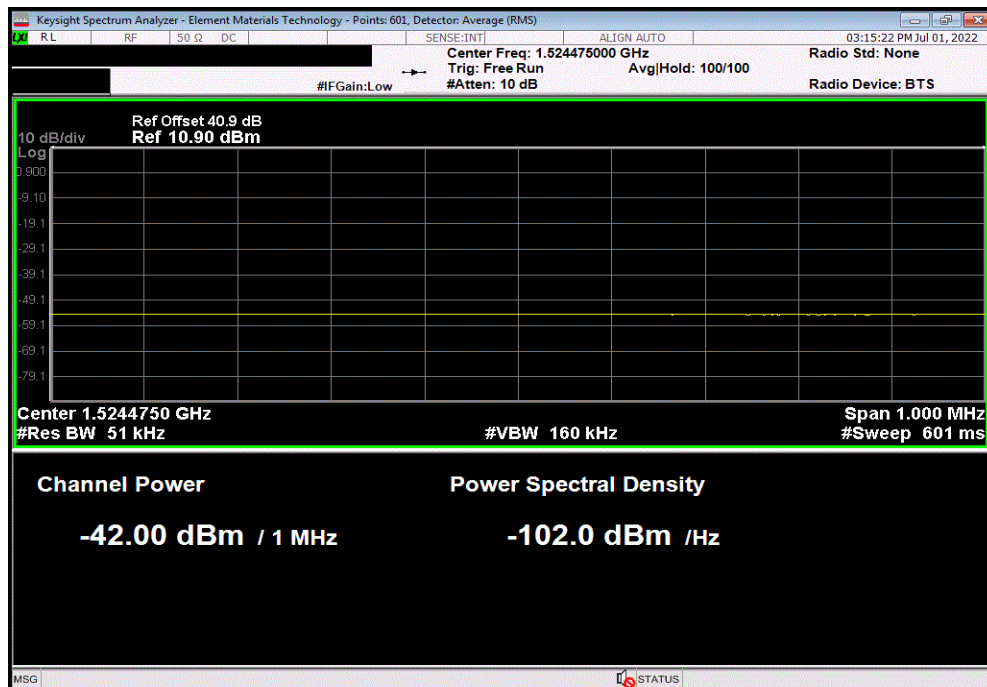


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-36.83		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-42.00		-30.9	Pass	

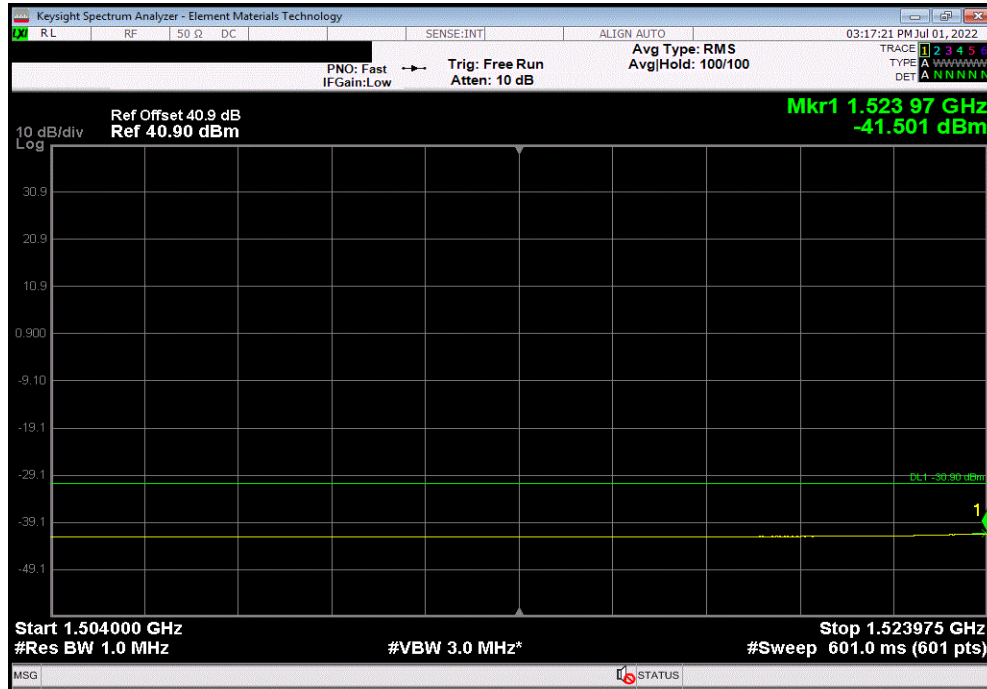


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

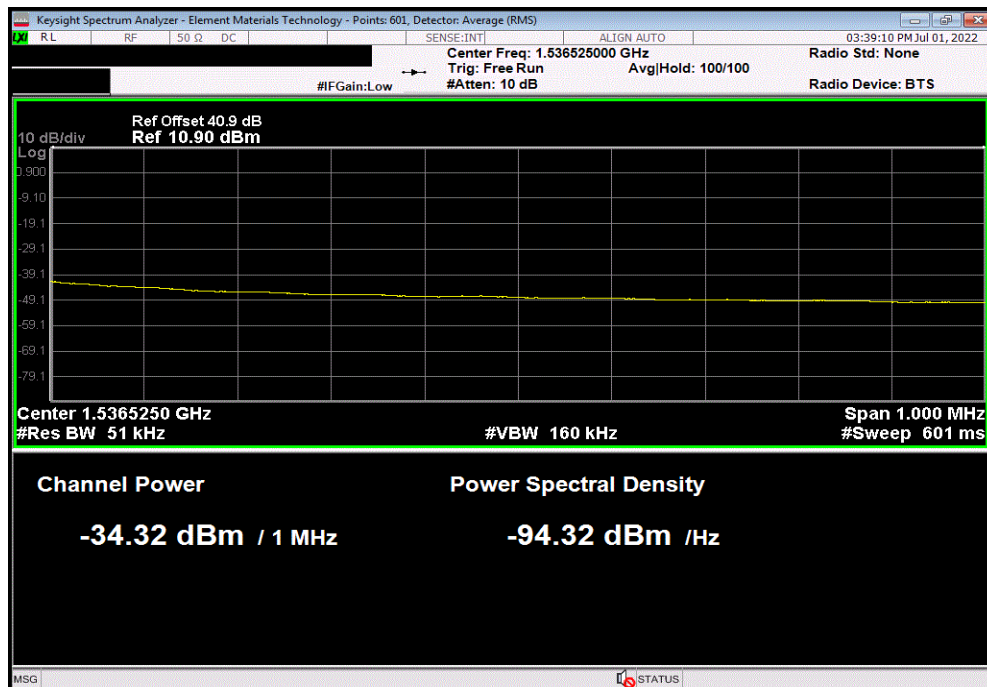


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.50		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-34.32		-30.9	Pass	

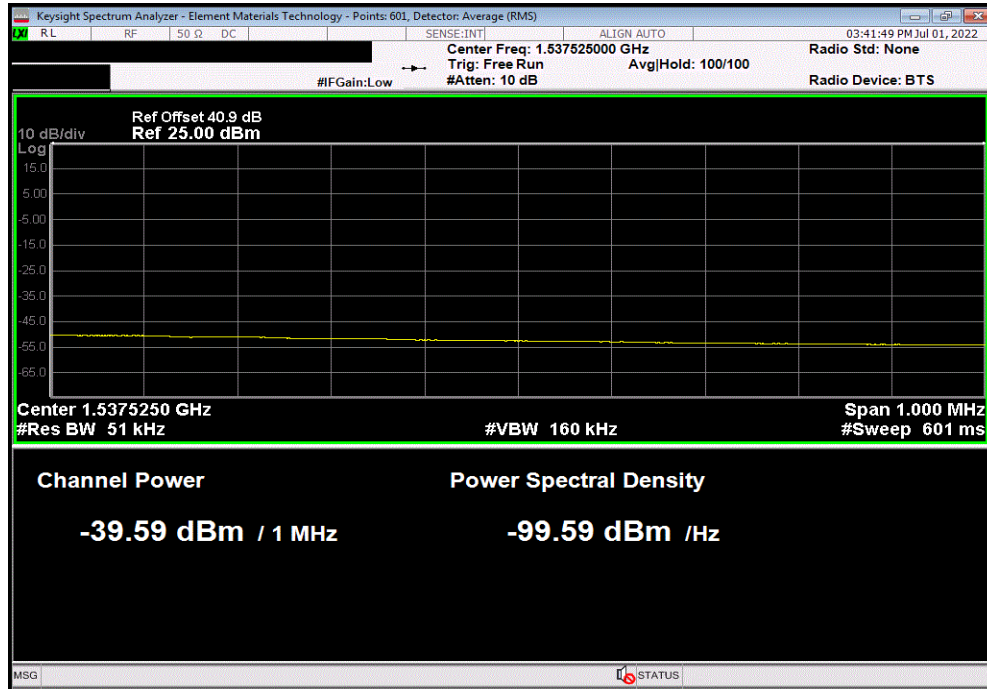


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS BAND EDGE - 5MHz, 3dBi

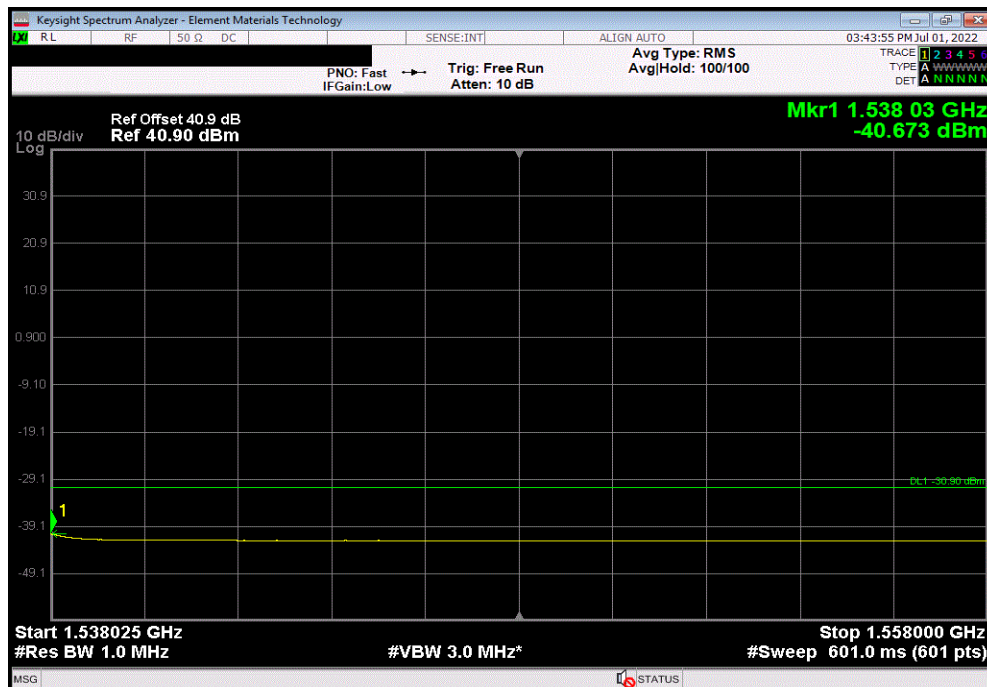


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-39.59		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-40.67		-30.9	Pass	



SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi



XMI 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3235-2148	ANF	2022-05-27	2023-05-27
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2022-01-19	2023-01-19
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXK	2021-09-13	2022-09-13

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

Per FCC Part 25.253(b), the power of any emission outside of the authorized operating frequency range cannot exceed the band edge limit of -57.9 dBW/MHz converted to -27.9 dBm/MHz. The Remote Radio Head (RRH) may operate as a 4 port MIMO transmitter with transmitter outputs connected to two cross-polarized antennas [two transmitter outputs are connected to (+) radiators and two transmitter outputs are connected to (-) radiators]. The limit is adjusted to -30.9 dBm [-27.9 dBm -10 log (2)] per FCC KDB 662911D01 v02r01, ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

Per FCC ANSI C63.26-2015 section 4.2.3 and 5.7.2 the first frequency range uses the limit correction factor of: $10 \log [(reference\ bandwidth) / (resolution\ or\ measurement\ bandwidth)] = 10 \log (1M/51K) = 12.9dB$ limit correction (RBW can be no smaller than 1% of the OBW or roughly 50kHz), and section 5.7.2 specifically allows for the second frequency range integration across the full measurement bandwidth.

RF conducted emissions testing was performed only on one port. The RRH antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown during output power testing) and antenna port 3 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi



TbT v 2022.05.02.0 XMin 2022.02.07.0

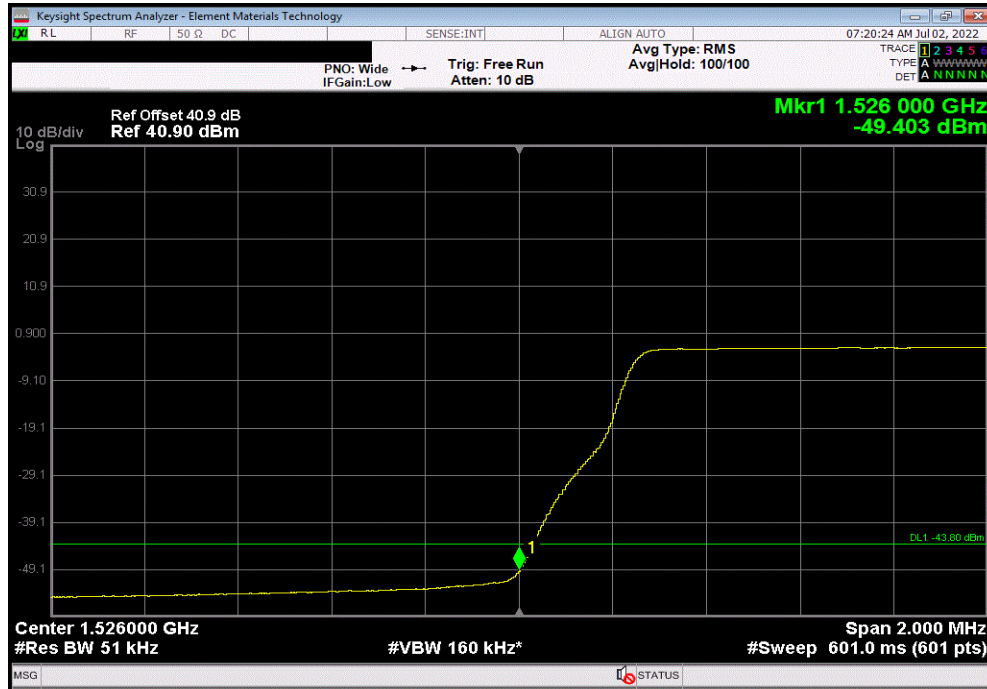
EUT: TR44KA Base Station		Work Order: MASY0006	
Serial Number: SV2146TR44KA000001		Date: 10-Aug-22	
Customer: Mavenir Systems, Inc		Temperature: 20.9 °C	
Attendees: None		Humidity: 56.8% RH	
Project: None		Barometric Pres.: 1021 mbar	
Tested by: Brandon Hobbs		Power: 48 VDC	Job Site: TX09
TEST SPECIFICATIONS		Test Method	
FCC 25:2022		ANSI C63.26:2015	
COMMENTS			
All conducted path losses were accounted for: cables, attenuators, adapters, DC block and notch filter. The PA gain was adjusted for a 16dBi antenna (Final software value of 29). The initial limit was adjusted to -30.9 dBm [-27.9 dBm -10 log (2)] per FCC KDB 662911D01 v02r01, ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators). The single available Resource Block / Offset configuration was used.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature	
		Frequency Range	Max Value (dBm) Limit (dBm) Result
5G NR, Band n24, SCS 15kHz			
5 MHz Bandwidth			
QPSK Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-49.4 -43.8 Pass
	25 RB/0 Offset	2	-42.4 -30.9 Pass
	25 RB/0 Offset	3	-42.0 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-48.8 -43.8 Pass
	25 RB/0 Offset	2	-41.9 -30.9 Pass
	25 RB/0 Offset	3	-41.8 -30.9 Pass
16-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-49.7 -43.8 Pass
	25 RB/0 Offset	2	-42.5 -30.9 Pass
	25 RB/0 Offset	3	-42.0 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-48.8 -43.8 Pass
	25 RB/0 Offset	2	-41.9 -30.9 Pass
	25 RB/0 Offset	3	-41.8 -30.9 Pass
64-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-49.6 -43.8 Pass
	25 RB/0 Offset	2	-42.5 -30.9 Pass
	25 RB/0 Offset	3	-42.0 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-49.1 -43.8 Pass
	25 RB/0 Offset	2	-42.0 -30.9 Pass
	25 RB/0 Offset	3	-41.8 -30.9 Pass
256-QAM Modulation			
Low Channel 1528.5 MHz			
	25 RB/0 Offset	1	-49.7 -43.8 Pass
	25 RB/0 Offset	2	-42.5 -30.9 Pass
	25 RB/0 Offset	3	-42.0 -30.9 Pass
High Channel 1533.5 MHz			
	25 RB/0 Offset	1	-48.9 -43.8 Pass
	25 RB/0 Offset	2	-41.9 -30.9 Pass
	25 RB/0 Offset	3	-41.8 -30.9 Pass

SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

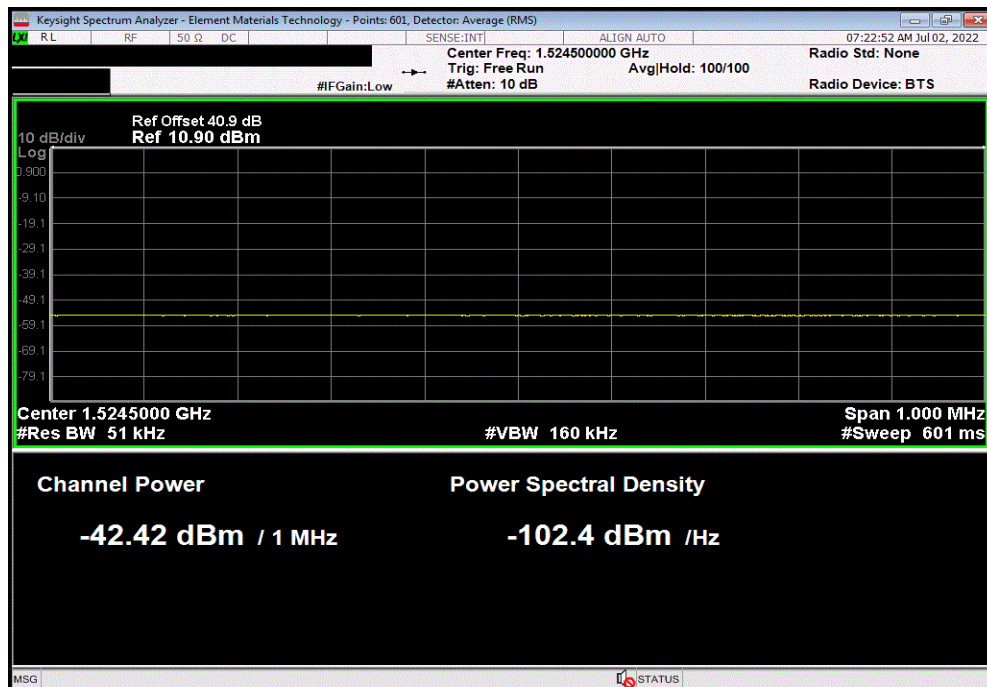


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range				Max Value (dBm)	Limit (dBm)	Result
1				-49.40	-43.8	Pass



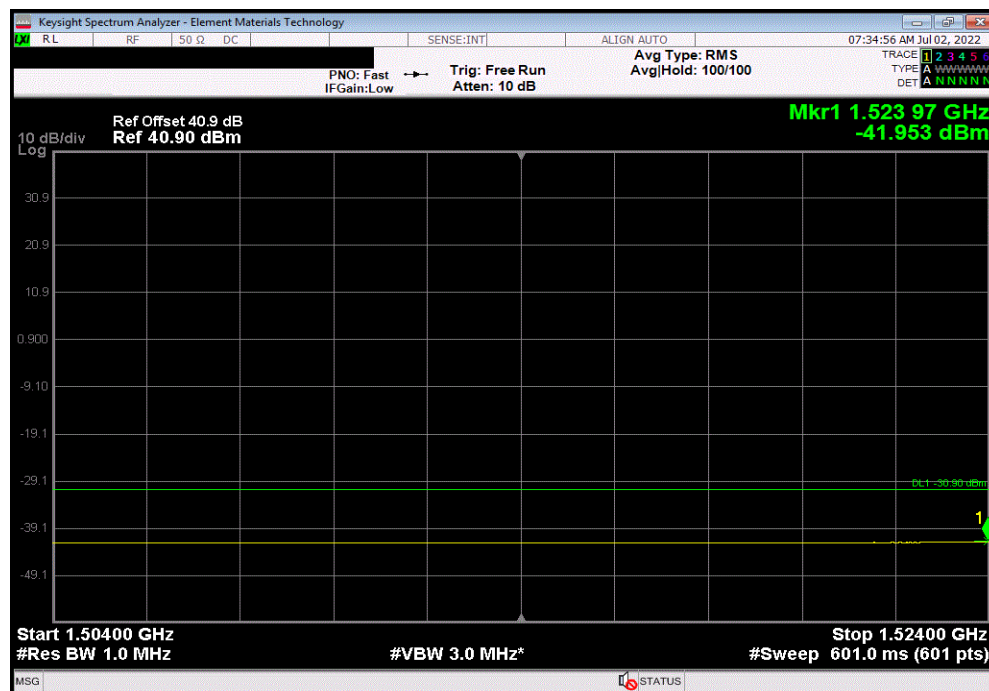
5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range				Max Value (dBm)	Limit (dBm)	Result
2				-42.42	-30.9	Pass



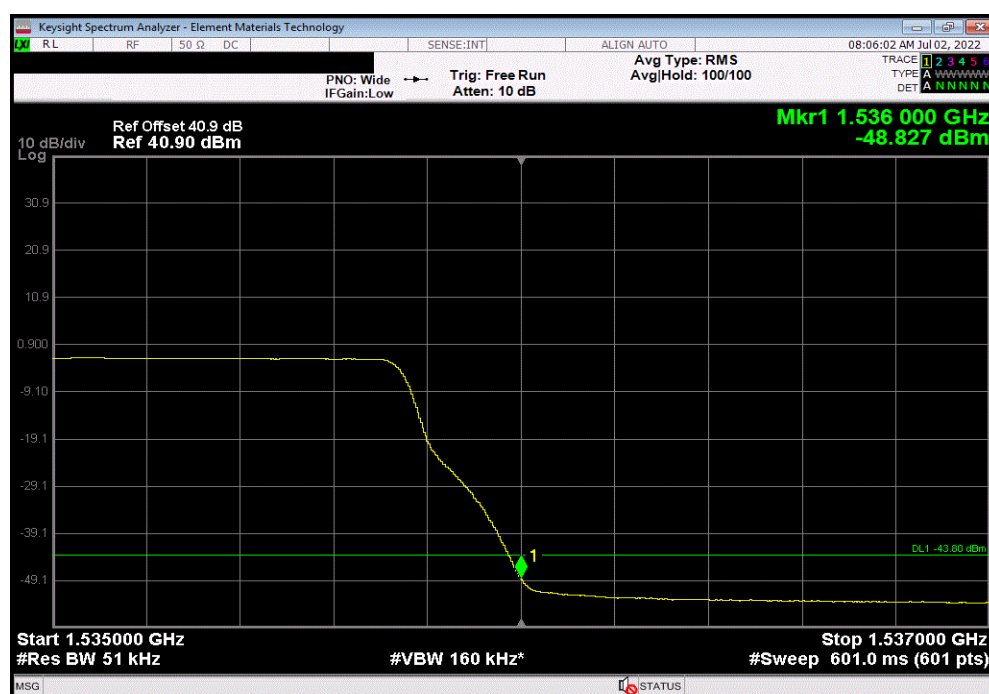


TbTb 2022.06.02.0 YMJ 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range			Max Value (dBm)	Limit (dBm)	Result	
	3		-41.95	-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range			Max Value (dBm)	Limit (dBm)	Result	
	1		-48.83	-43.8	Pass	

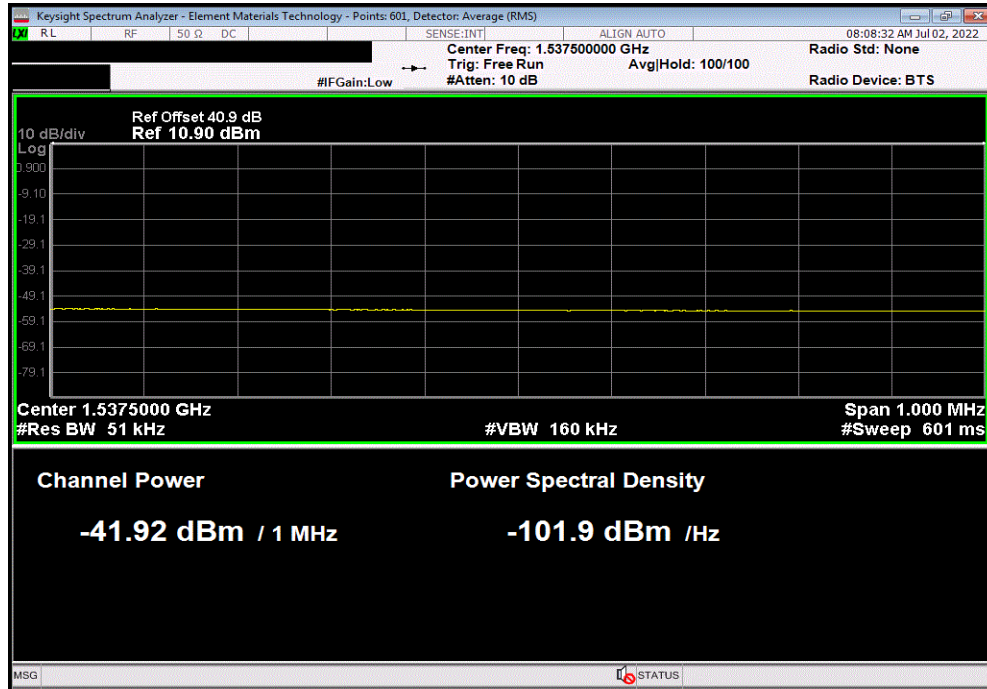


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

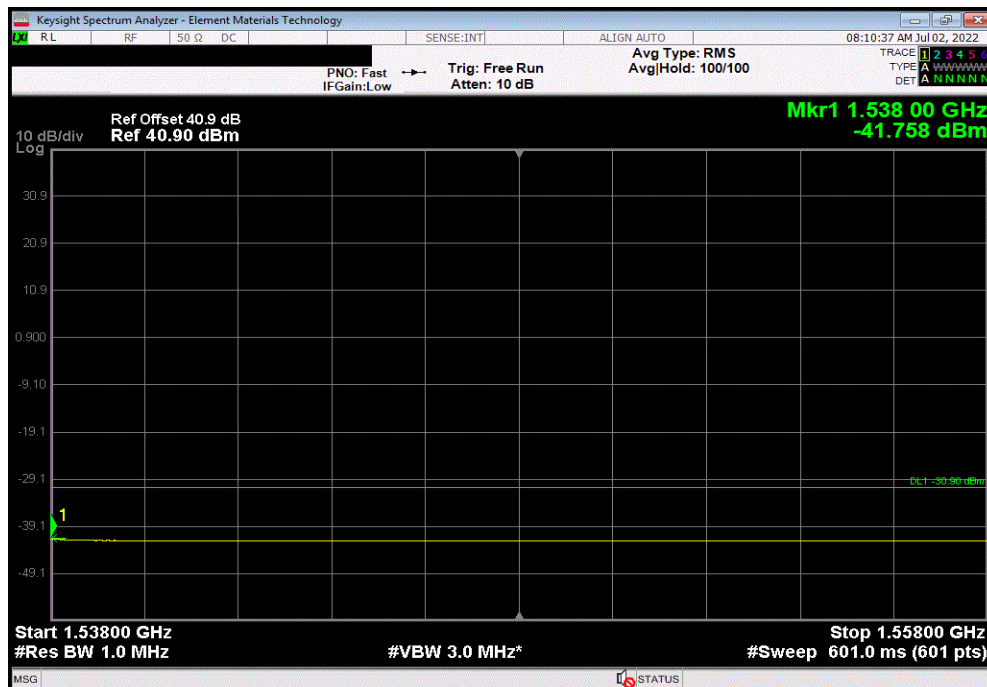


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-41.92		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.76		-30.9	Pass	

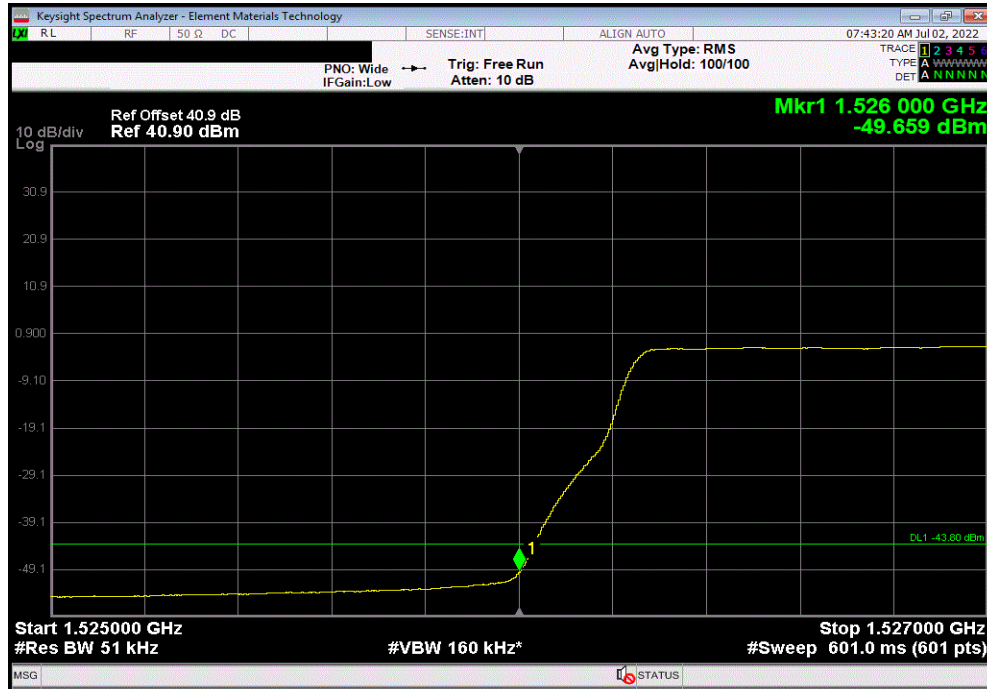


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

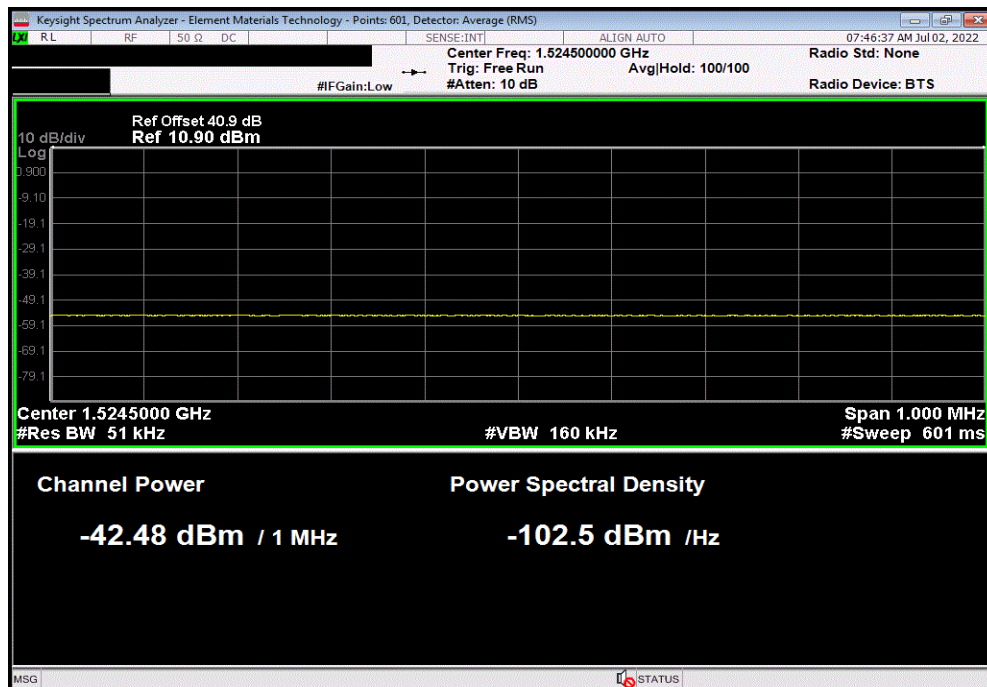


TbTtX 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)		Result
1		-49.66		-43.8		Pass



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)		Result
2		-42.48		-30.9		Pass

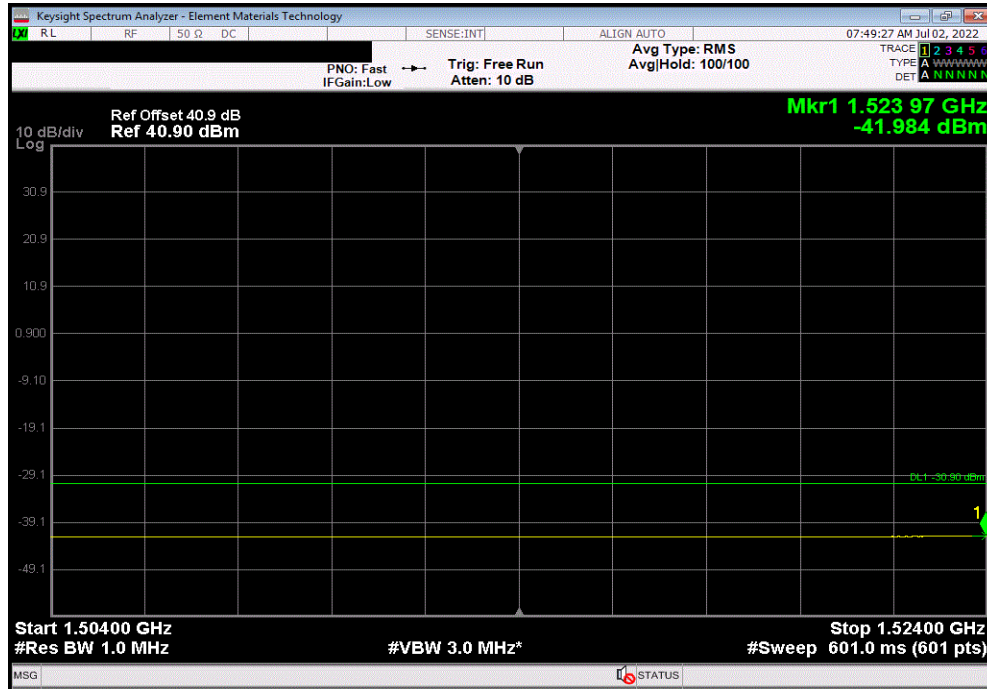


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

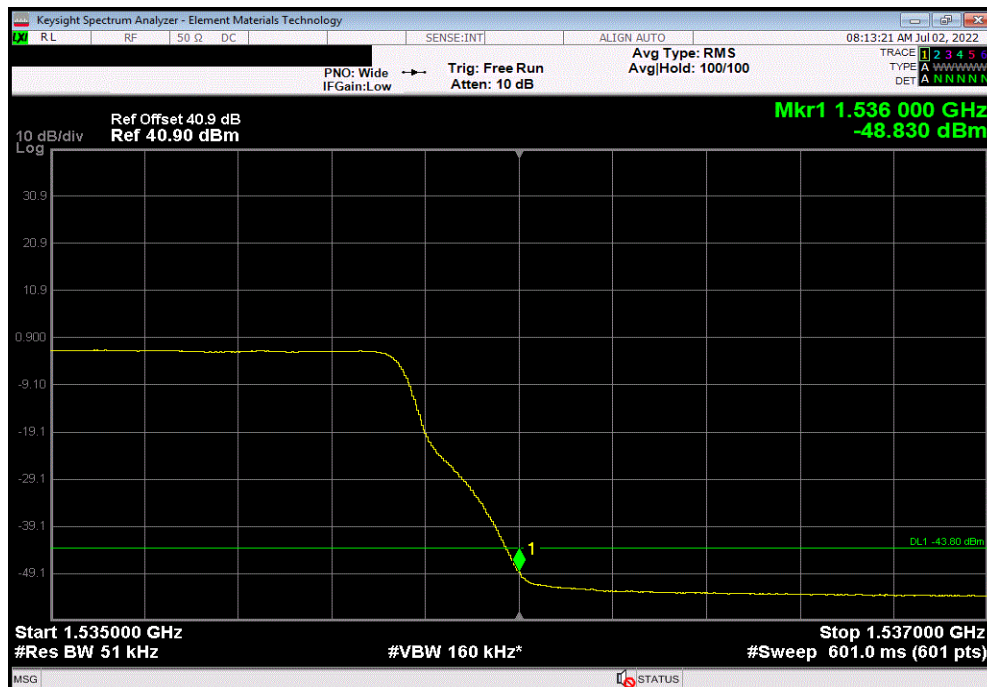


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
3	-41.98	-30.9	Pass			



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range	Max Value (dBm)	Limit (dBm)	Result			
1	-48.83	-43.8	Pass			

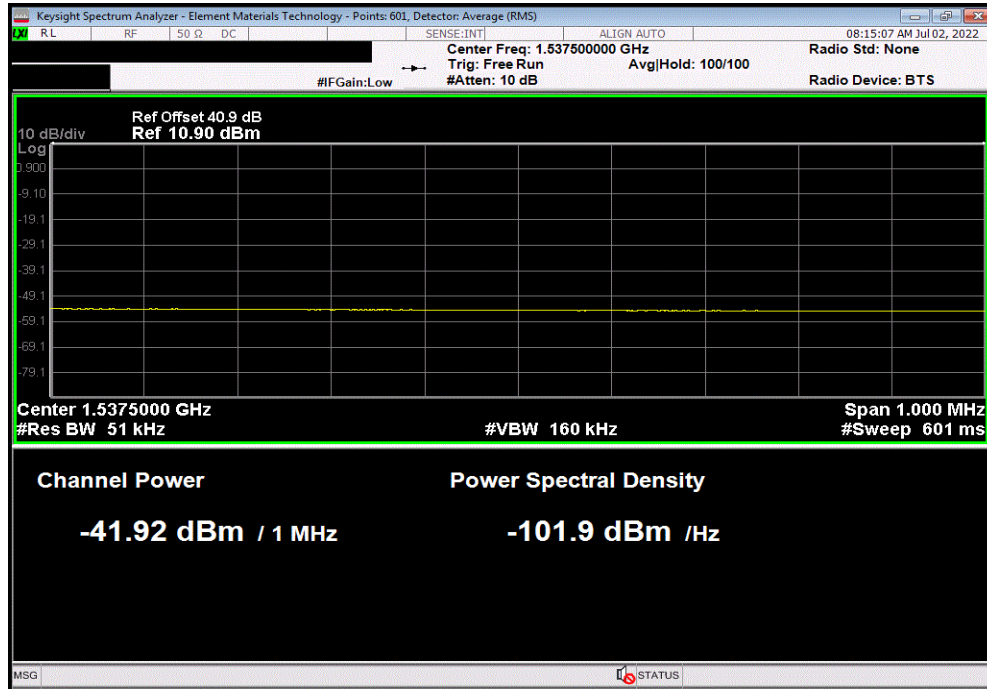


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

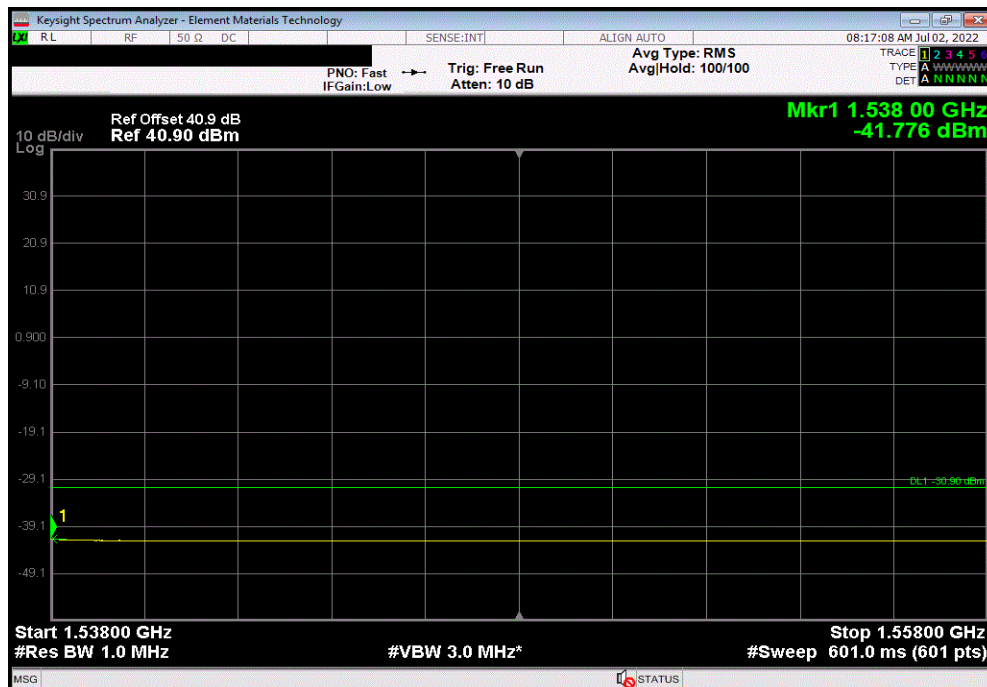


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-41.92		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.78		-30.9	Pass	

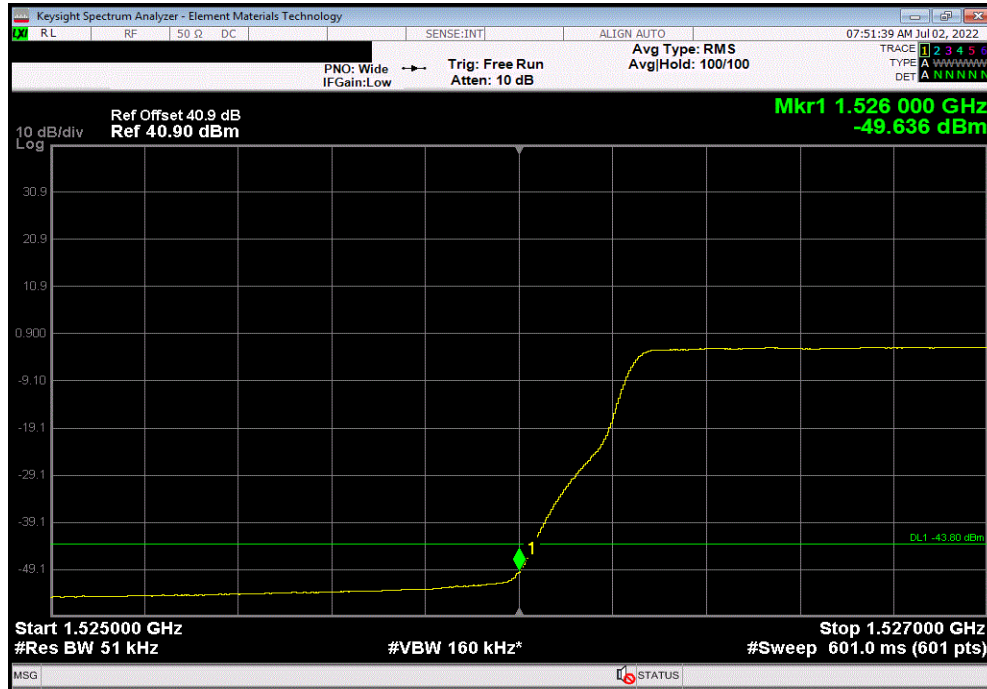


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

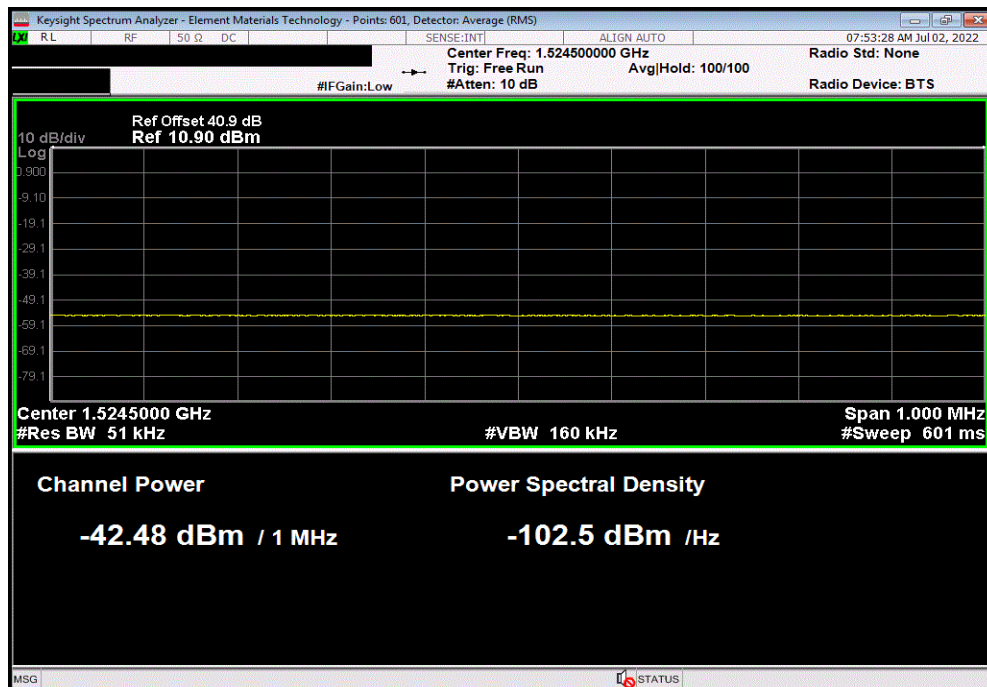


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-49.64		-43.8	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-42.48		-30.9	Pass	

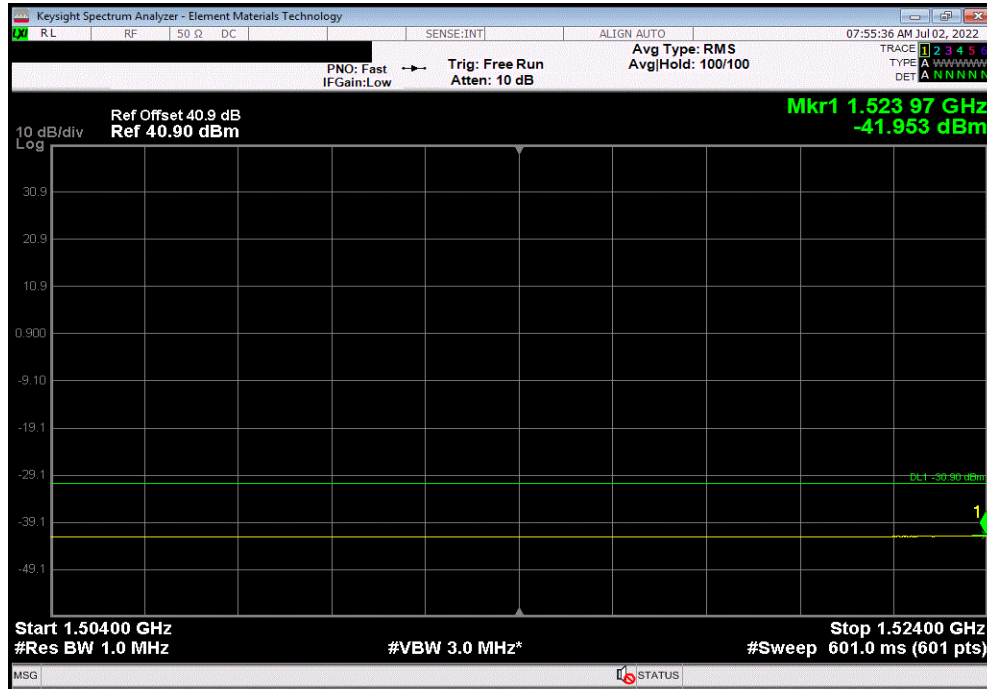


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

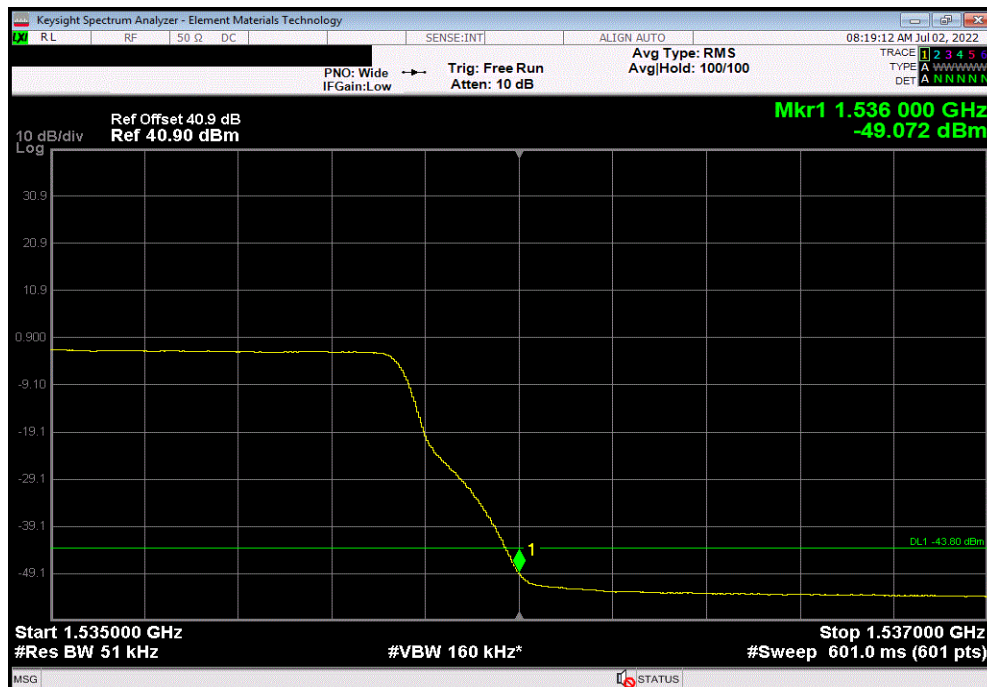


TbTtX 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.95		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-49.07		-43.8	Pass	

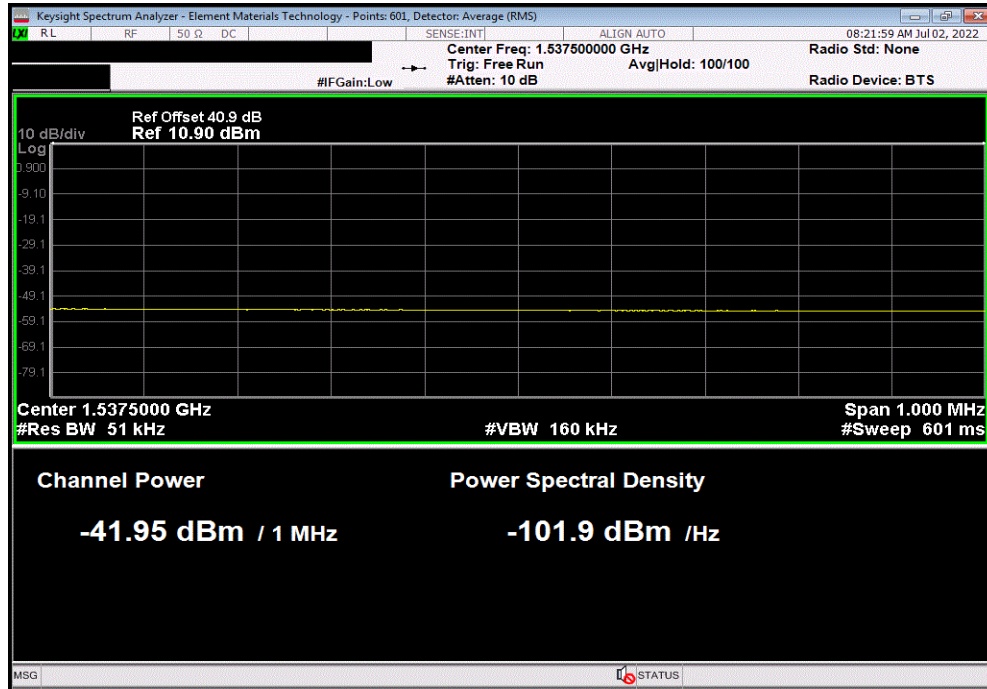


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

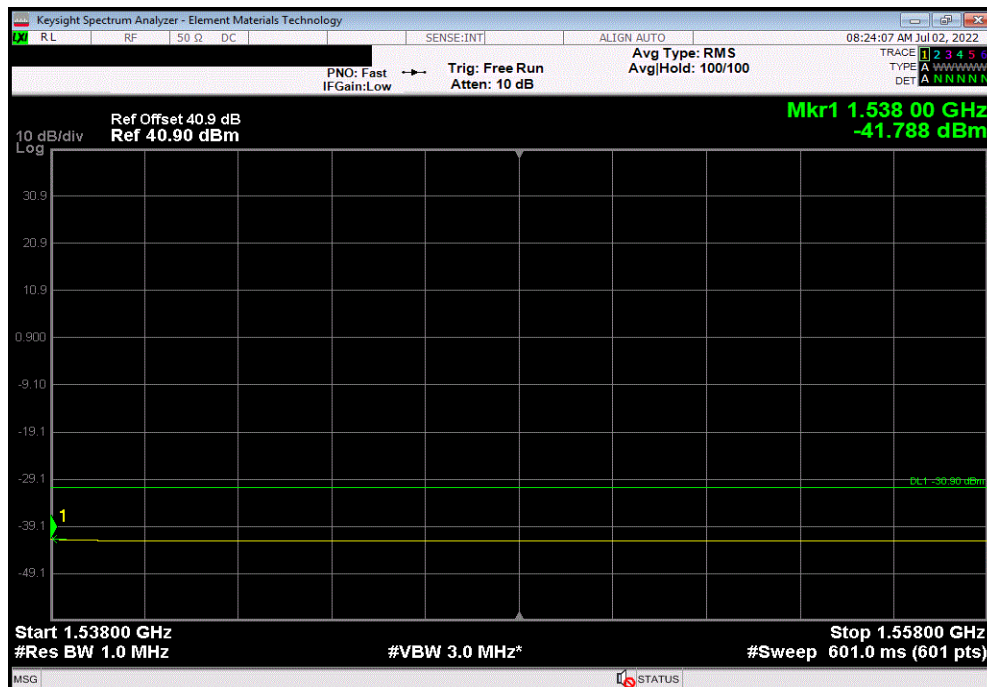


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-41.95		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.79		-30.9	Pass	

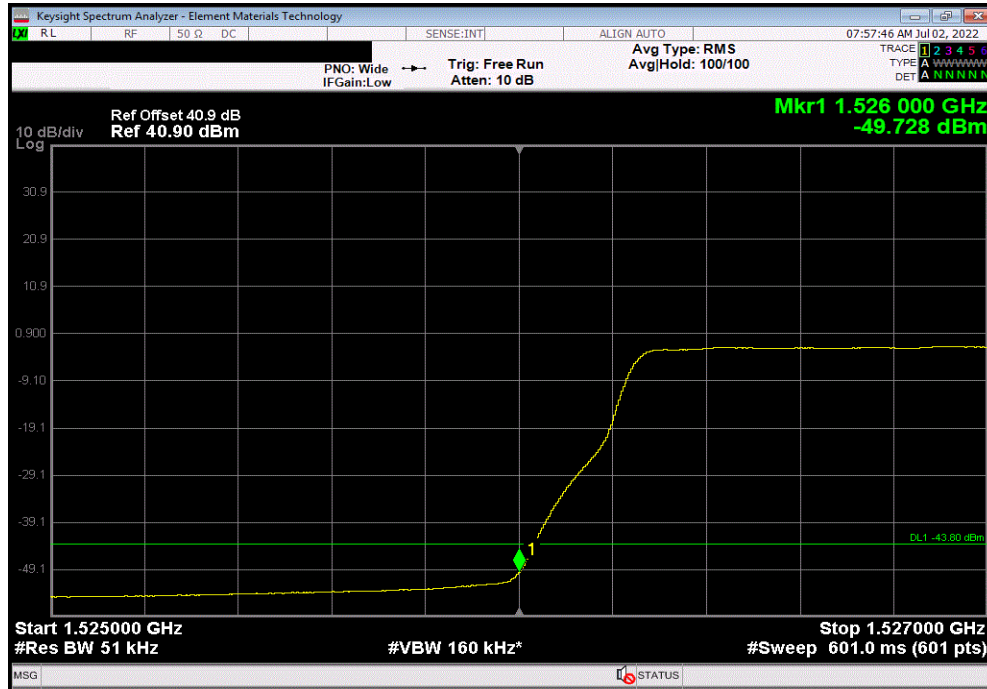


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

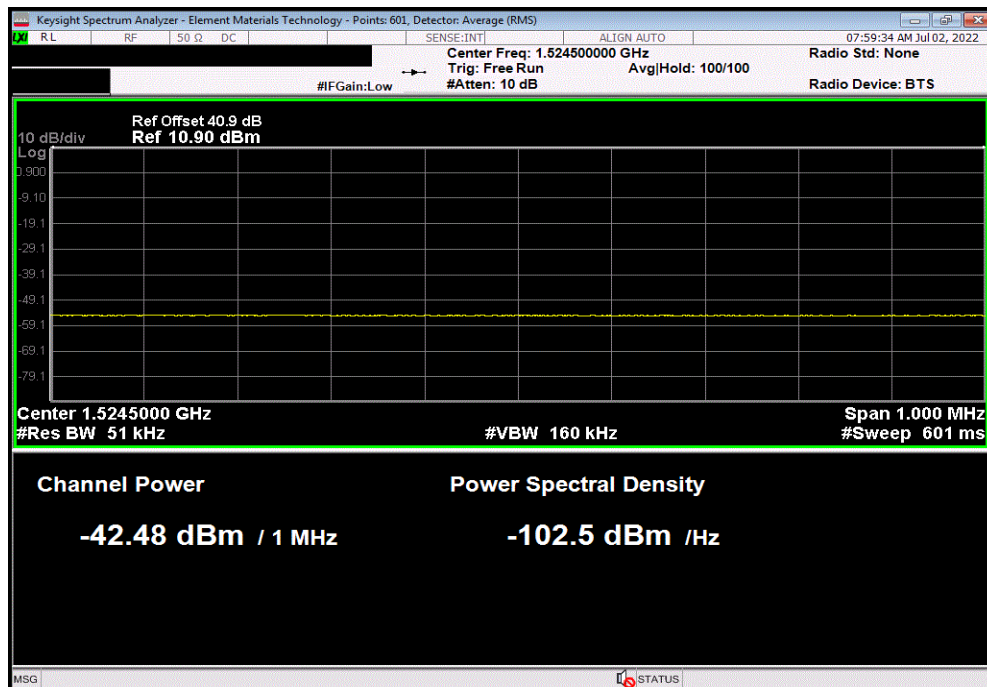


TbTtx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-49.73		-43.8	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-42.48		-30.9	Pass	

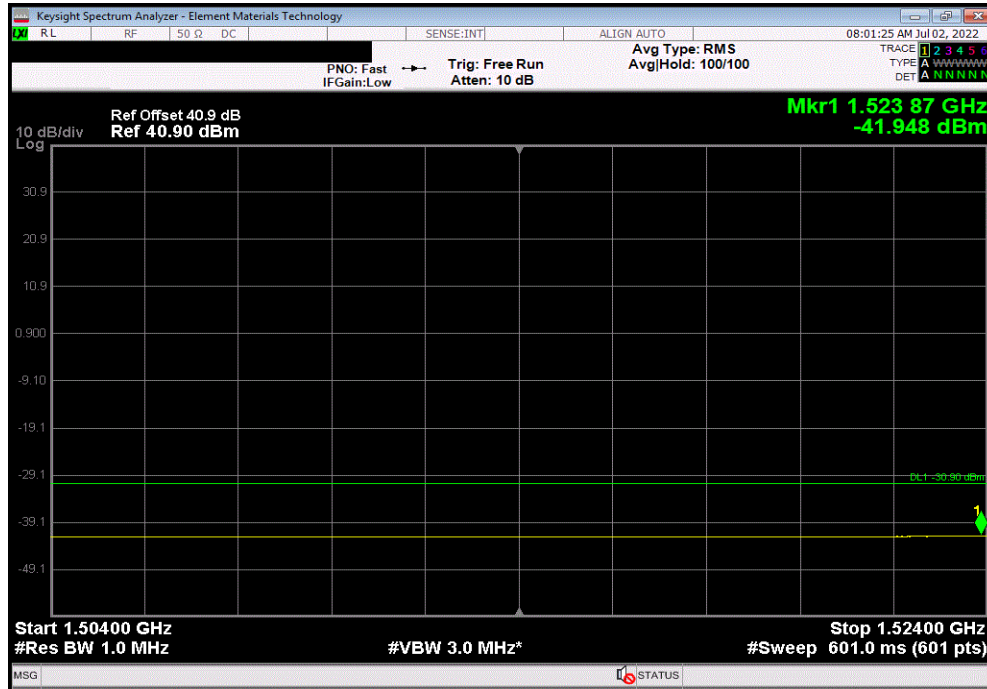


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

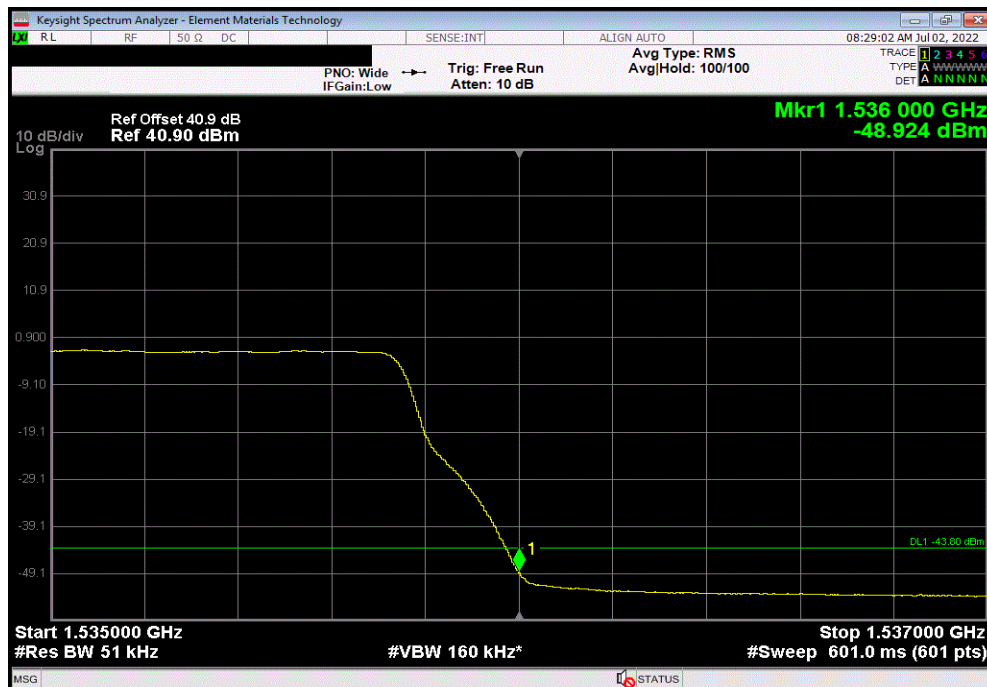


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1528.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.95		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
1		-48.92		-43.8	Pass	

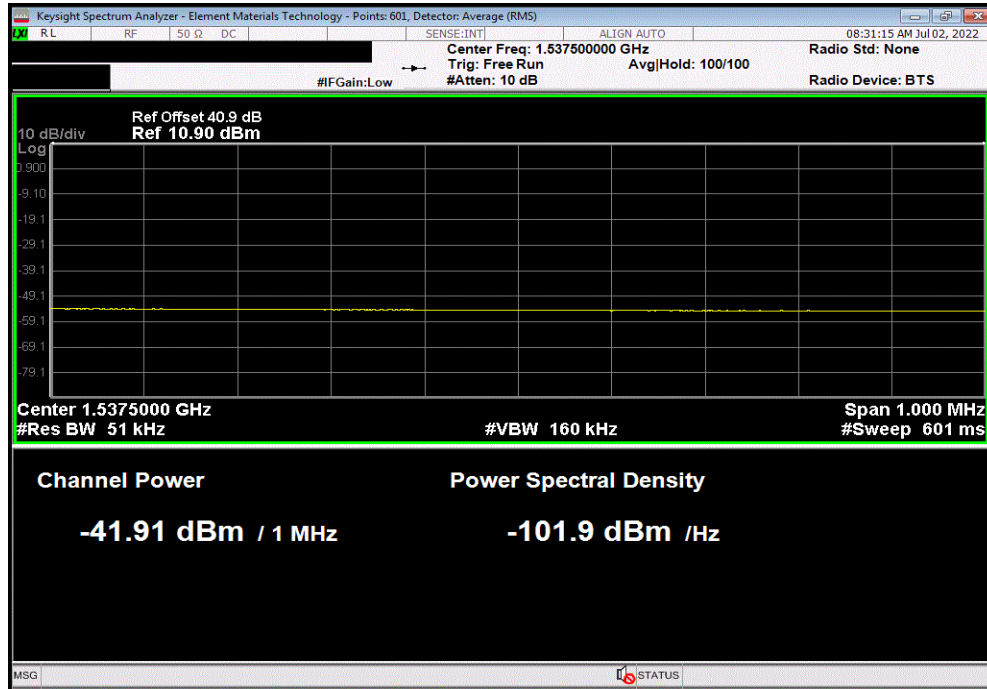


SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL BAND EDGE - 5MHz, 16dBi

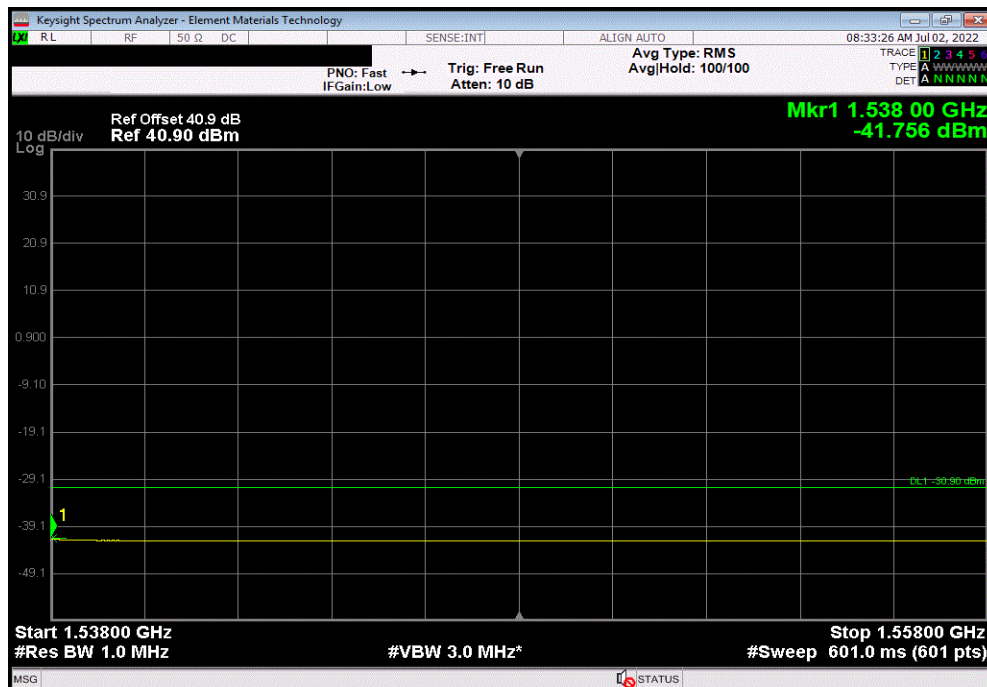


TbTx 2022.05.02.0 XMt 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
2		-41.91		-30.9	Pass	



5G NR, Band n24, SCS 15kHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1533.5 MHz, 25 RB/0 Offset						
Frequency Range		Max Value (dBm)		Limit (dBm)	Result	
3		-41.76		-30.9	Pass	



SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi



XMit 2022.02.07.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

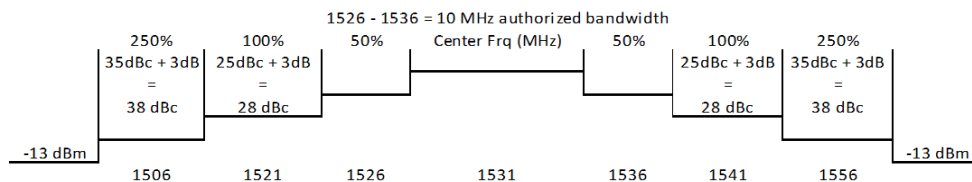
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2022-01-19	2023-01-19
Block - DC	Fairview Microwave	SD3235-2148	ANF	2022-05-27	2023-05-27
Cable	UtiFlex Micro-Coax	UFD1150A-1-0720-200200	TXK	2021-09-13	2022-09-13
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The emission mask defined by 25.202 (f) for 10 MHz authorized bandwidth terrestrial devices is shown on each plot. The 0 dB reference for the mask is the measured output power of the modulated carrier at that frequency.

The relative limits were adjusted by $3 [10 \log (2)]$ per FCC KDB 662911D01 v02r01, ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).




A 40 dB external attenuator was used. The attenuator and coaxial cable loss were compensated in the spectrum analyzer. A 4 kHz resolution bandwidth while using a RMS average detector.

RF conducted emissions testing was performed only on one port. The Remote Radio Head (RRH) antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown during output power testing) and antenna port 3 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi



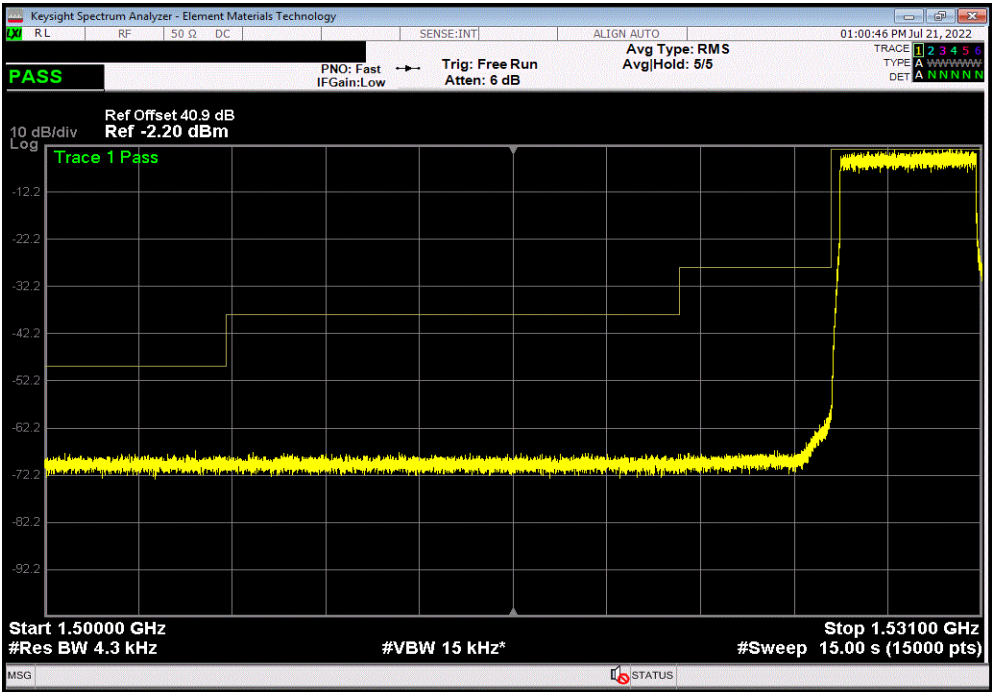
EUT: TR44KA Base Station		Work Order: MASY0006	
Serial Number: SV2146TR44KA000001		Date: 9-Aug-22	
Customer: Mavenir Systems, Inc		Temperature: 21.1 °C	
Attendees: None		Humidity: 55% RH	
Project: None		Barometric Pres.: 1019 mbar	
Tested by: Brandon Hobbs		Power: 48 VDC	
Job Site: TX09			
TEST SPECIFICATIONS		Test Method	
FCC 25:2022		ANSI C63.26:2015	
COMMENTS			
All conducted path losses were accounted for: cables, attenuators, adapters and DC block. The emission mask was normalized to the fundamental before capture. The PA Gain was set for a 3 dBi antenna gain (Final software value set to 42) . Per KDB 662911 D01 single antenna port testing with [10 log (Nant)] added to the relative limits. The Widest and Narrowest available Resource Block / Offset configurations were used.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		From 38 dBc Limit Value (dBc)	Limit 38 dBc
		From 28 dBc Limit Value (dBc)	Limit 28 dBc
			Result
5G NR, Band n24, SCS 15kHz			
10 MHz Bandwidth			
QPSK Modulation			
Low Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
High Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
16-QAM Modulation			
Low Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
High Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
64-QAM Modulation			
Low Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
High Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
256-QAM Modulation			
Low Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph
High Side Channel 1531 MHz			
	25 RB/0 Offset	> 20	See Graph
	25 RB/27 Offset	> 20	See Graph
	52 RB/0 Offset	> 20	See Graph

SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

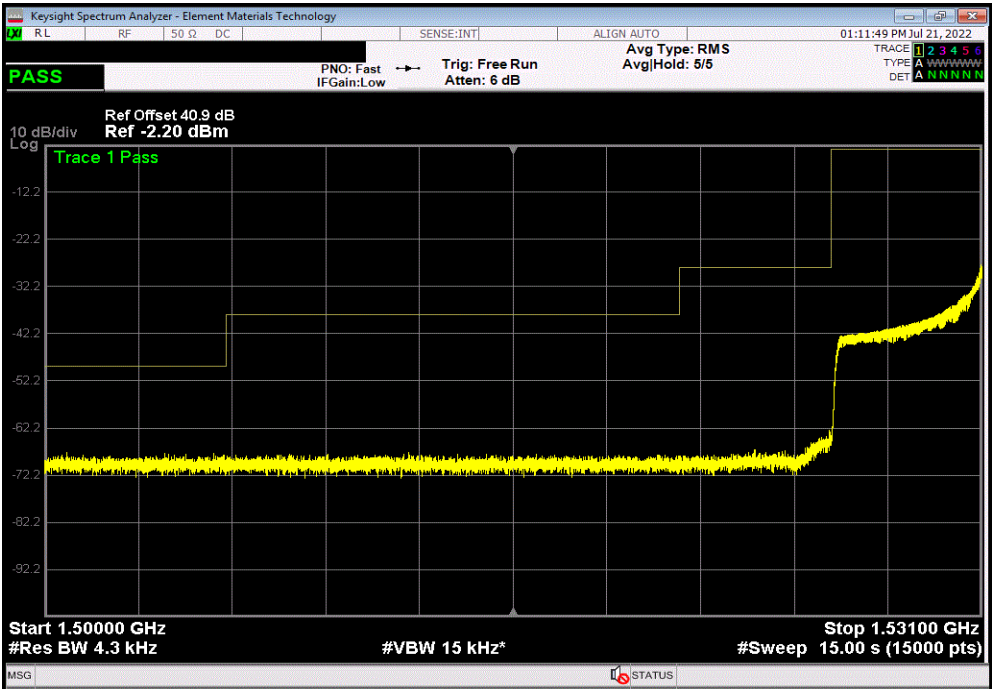


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, Low Side Channel 1531 MHz, 25 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, Low Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

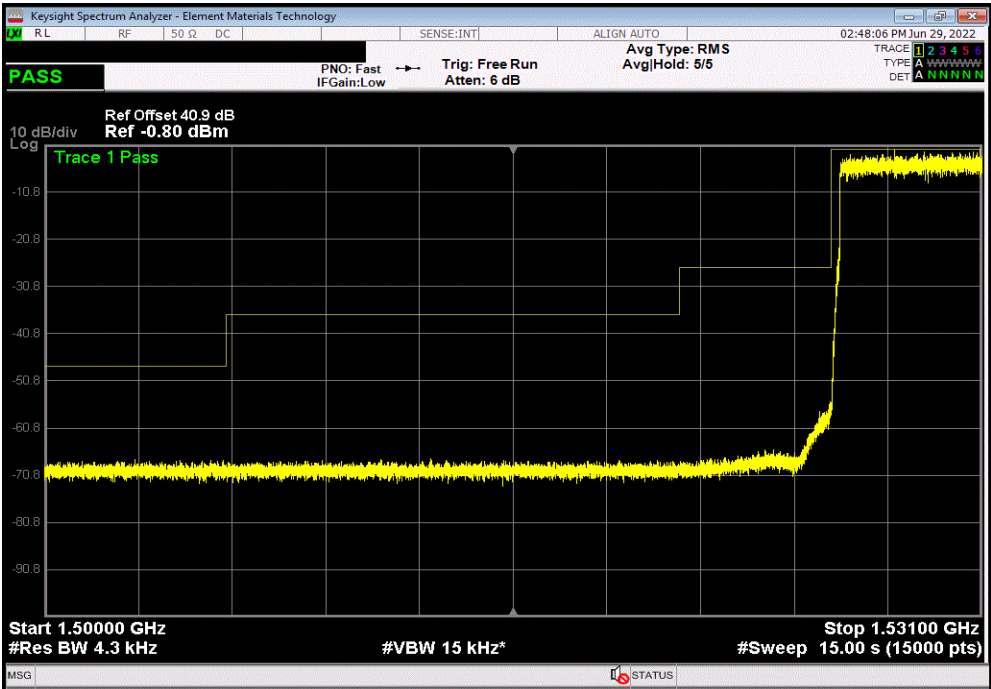


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

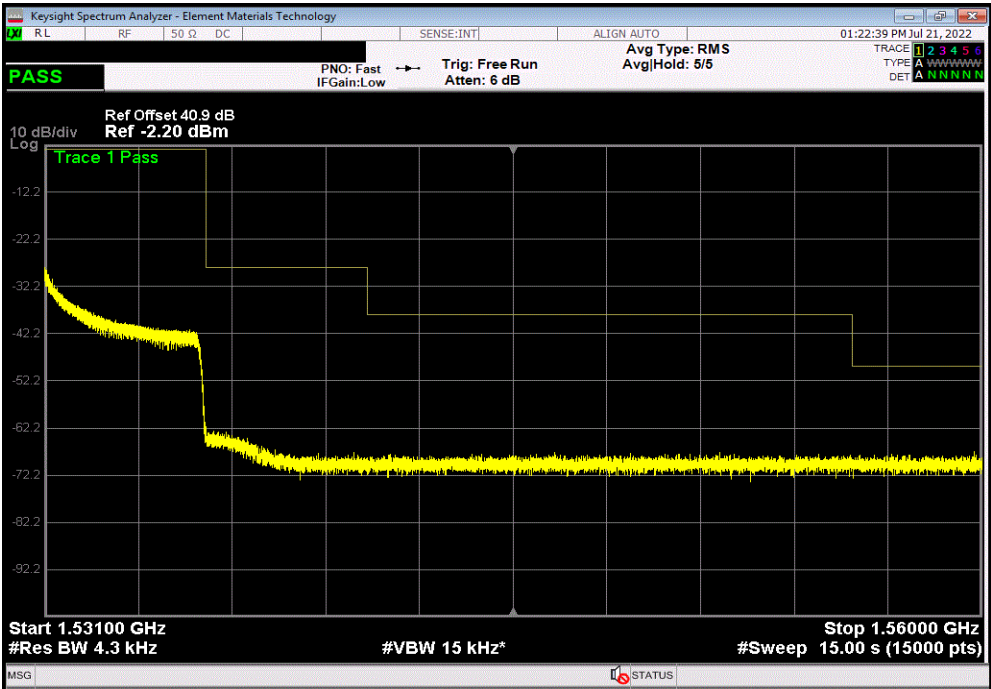


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, Low Side Channel 1531 MHz, 52 RB/0 Offset					
From 38 dBc Limit		Limit	From 28 dBc Limit		Limit
Value (dBc)		38 dBc	Value (dBc)		28 dBc
	> 20	See Graph	> 20	See Graph	Pass



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, High Side Channel 1531 MHz, 25 RB/0 Offset					
From 38 dBc Limit		Limit	From 28 dBc Limit		Limit
Value (dBc)		38 dBc	Value (dBc)		28 dBc
	> 20	See Graph	> 20	See Graph	Pass

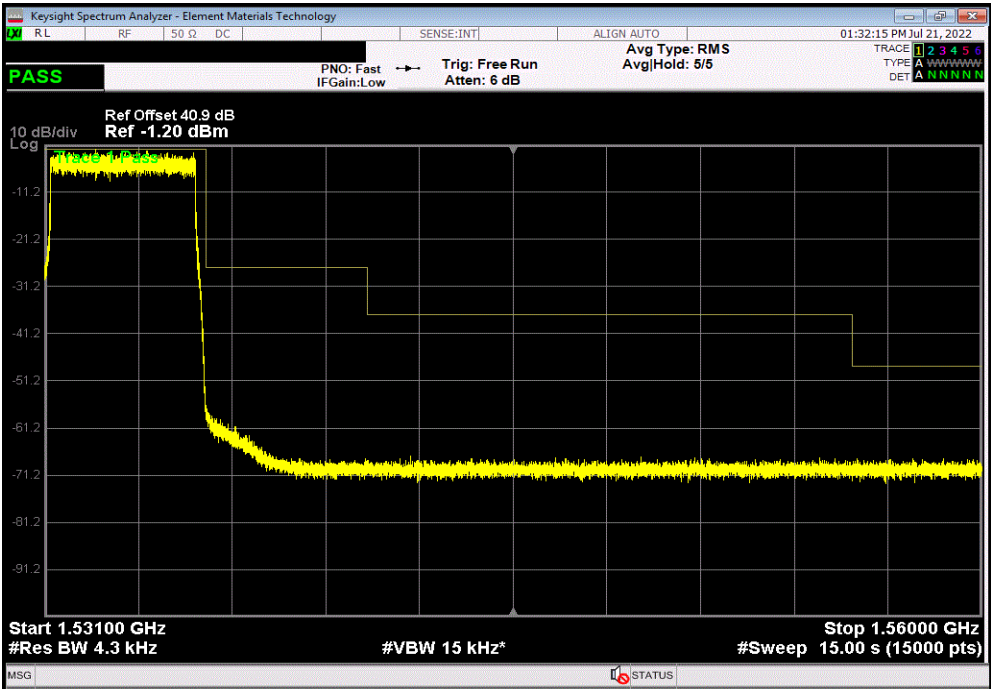


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

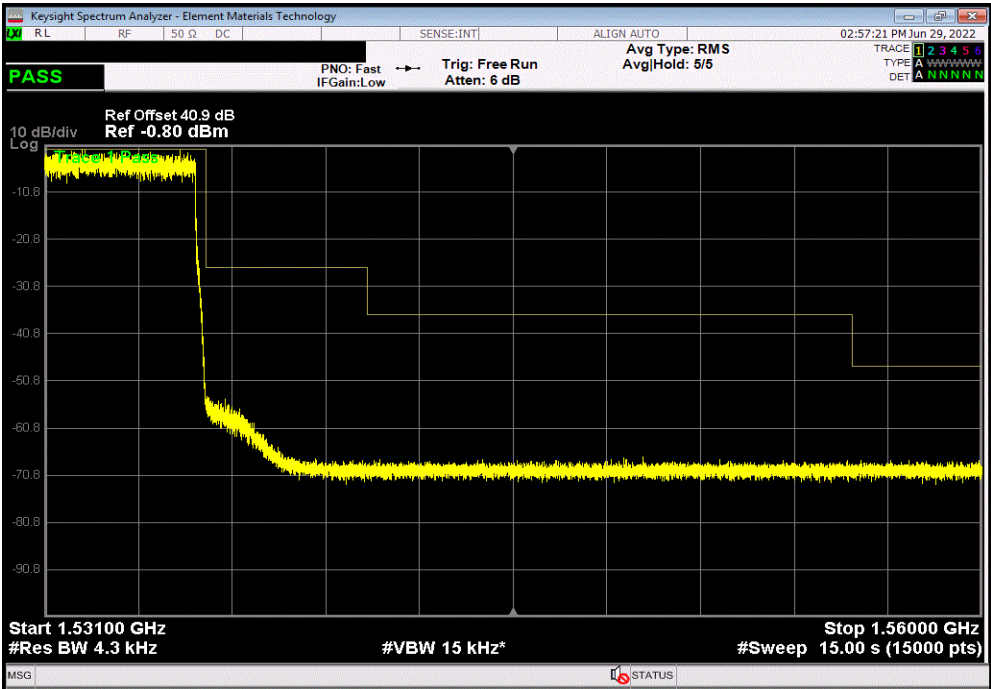


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, High Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, QPSK Modulation, High Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

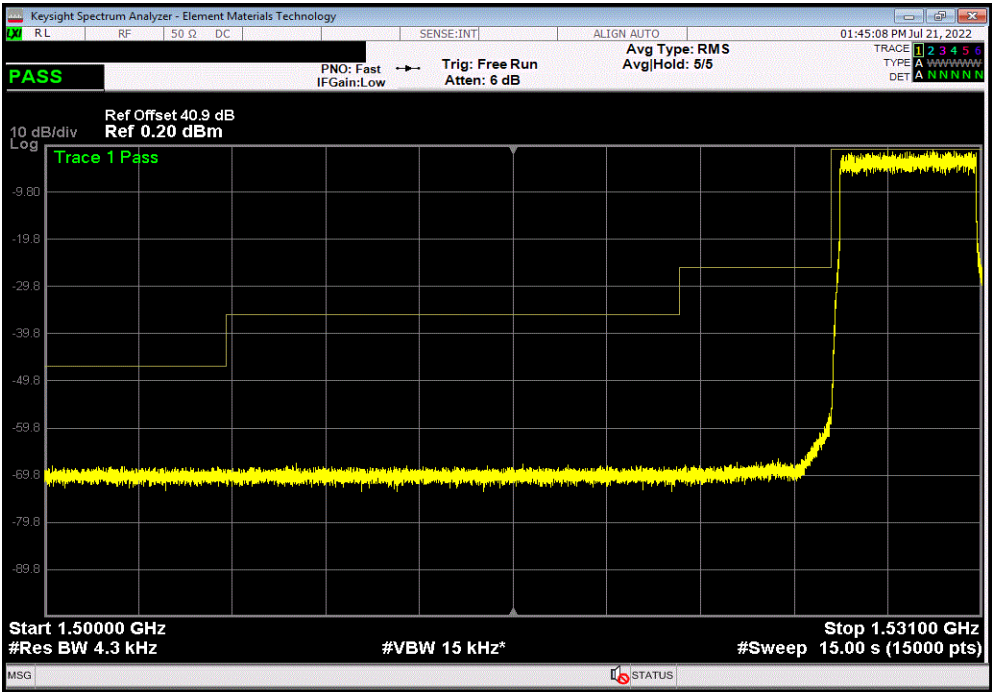


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

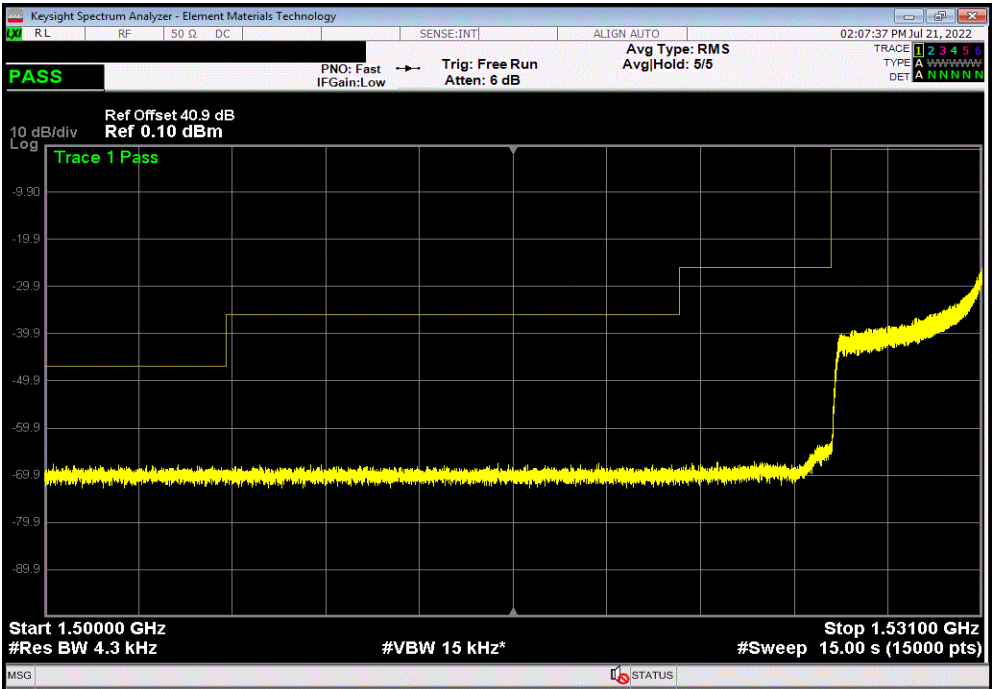


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/0 Offset						
From 38 dBc Limit		Limit	From 28 dBc Limit		Limit	Result
Value (dBc)		38 dBc	Value (dBc)		28 dBc	
> 20		See Graph	> 20		See Graph	Pass



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/27 Offset						
From 38 dBc Limit		Limit	From 28 dBc Limit		Limit	Result
Value (dBc)		38 dBc	Value (dBc)		28 dBc	
> 20		See Graph	> 20		See Graph	Pass

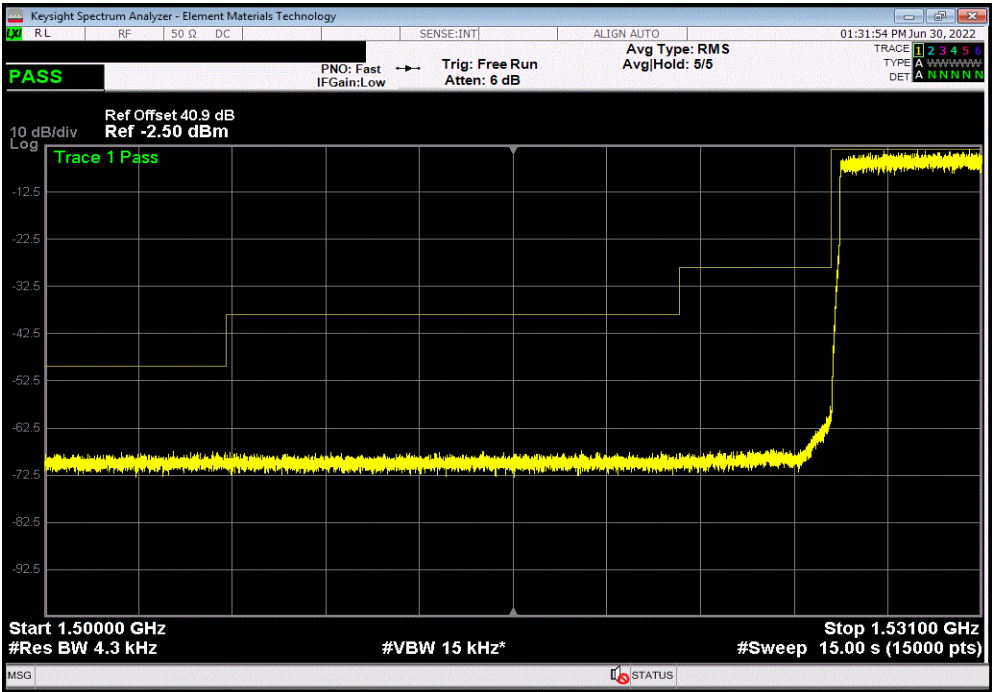


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

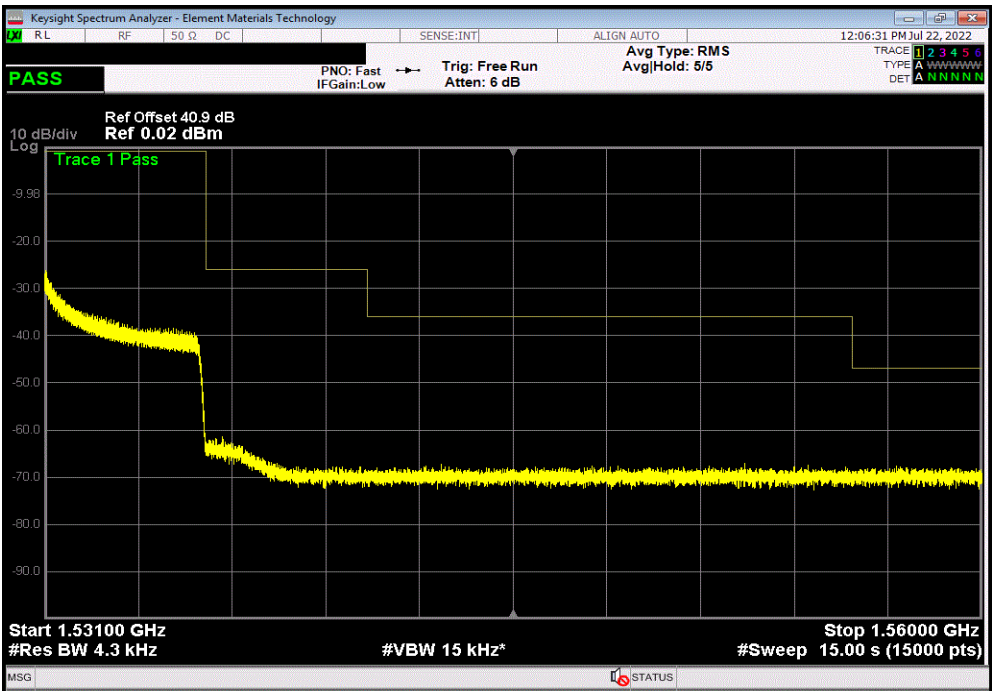


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, Low Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, High Side Channel 1531 MHz, 25 RB/0 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	

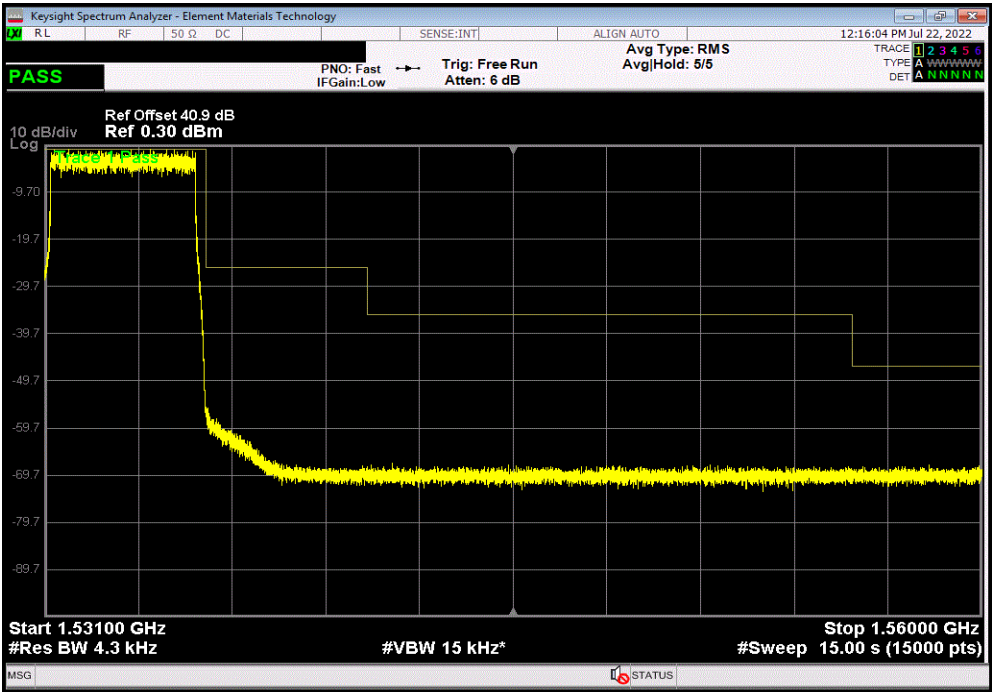


SPURIOUS EMISSION AT THE ANTENNA TERMINALS -
EMISSION MASK - 10MHz, 3dBi

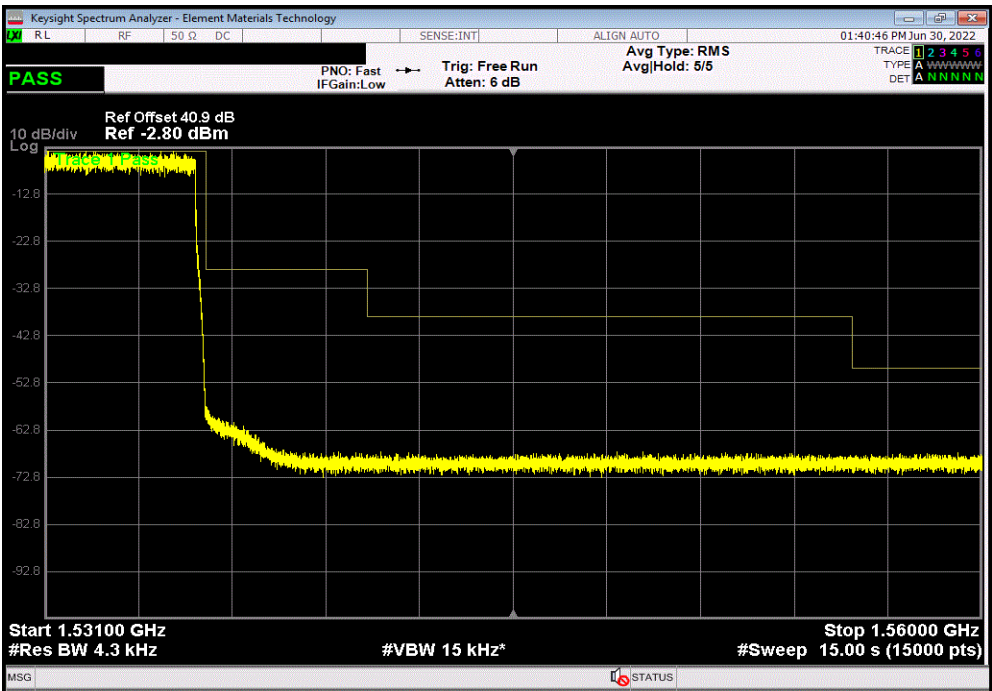


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, High Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 16-QAM Modulation, High Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

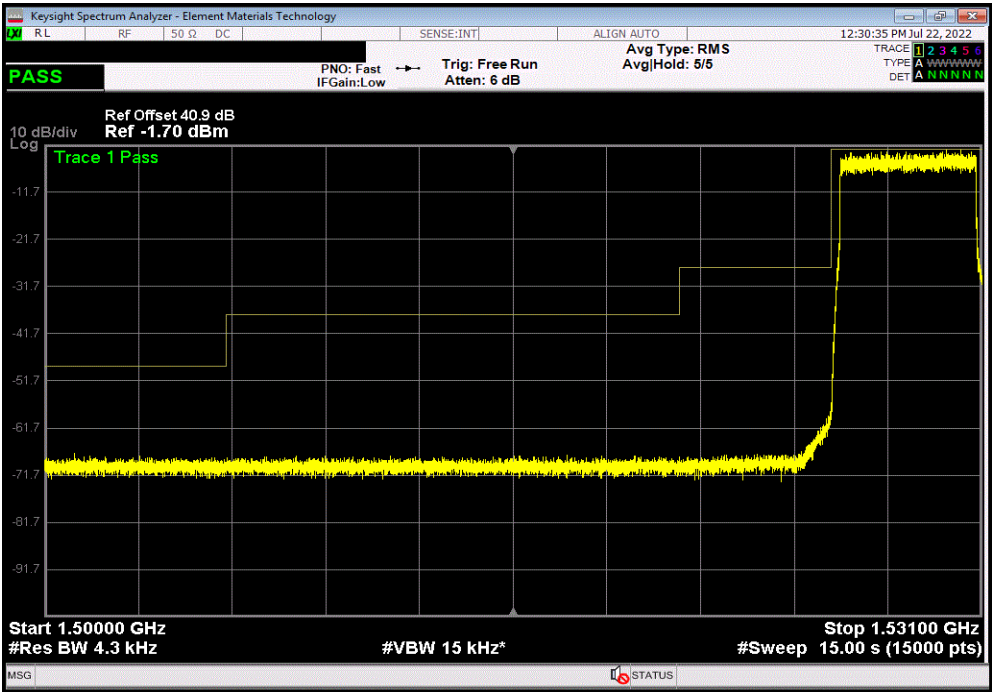


SPURIOUS EMISSION AT THE ANTENNA TERMINALS -
EMISSION MASK - 10MHz, 3dBi

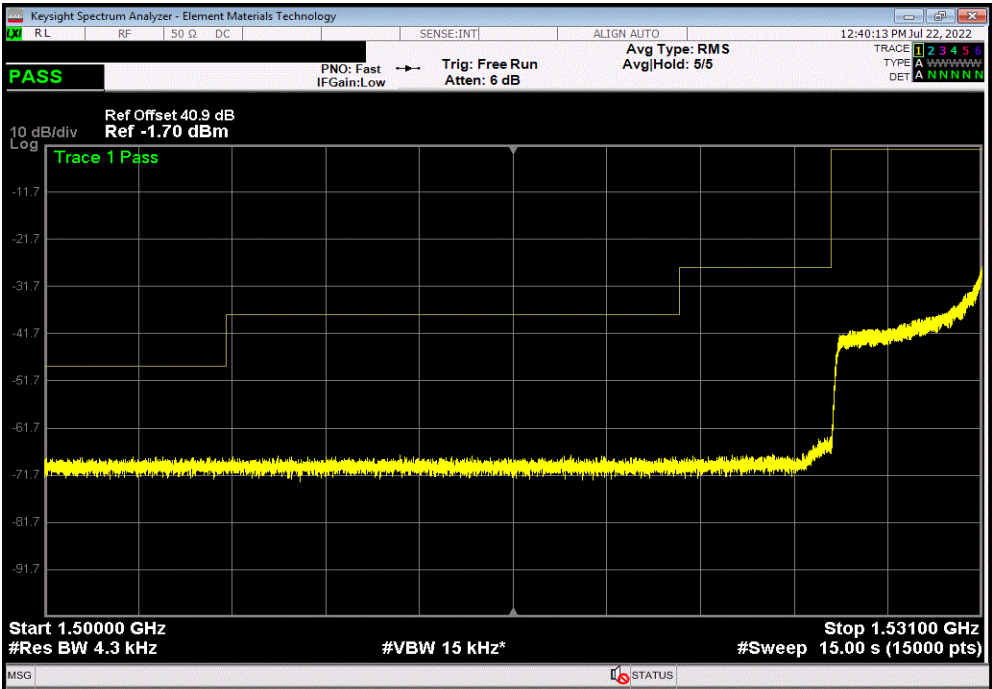


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

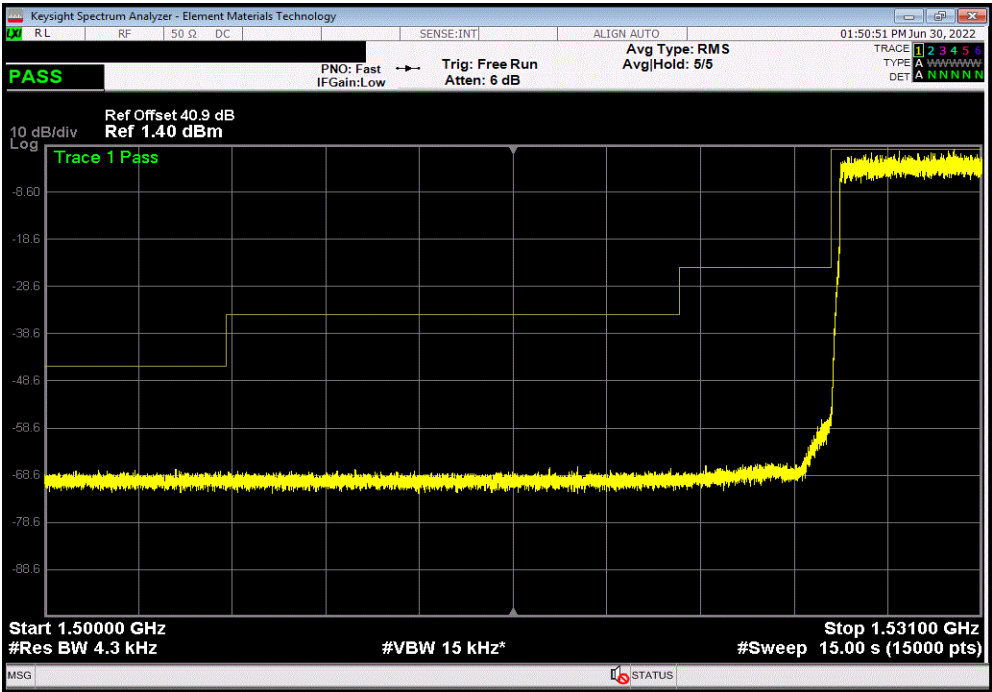


SPURIOUS EMISSION AT THE ANTENNA TERMINALS -
EMISSION MASK - 10MHz, 3dBi

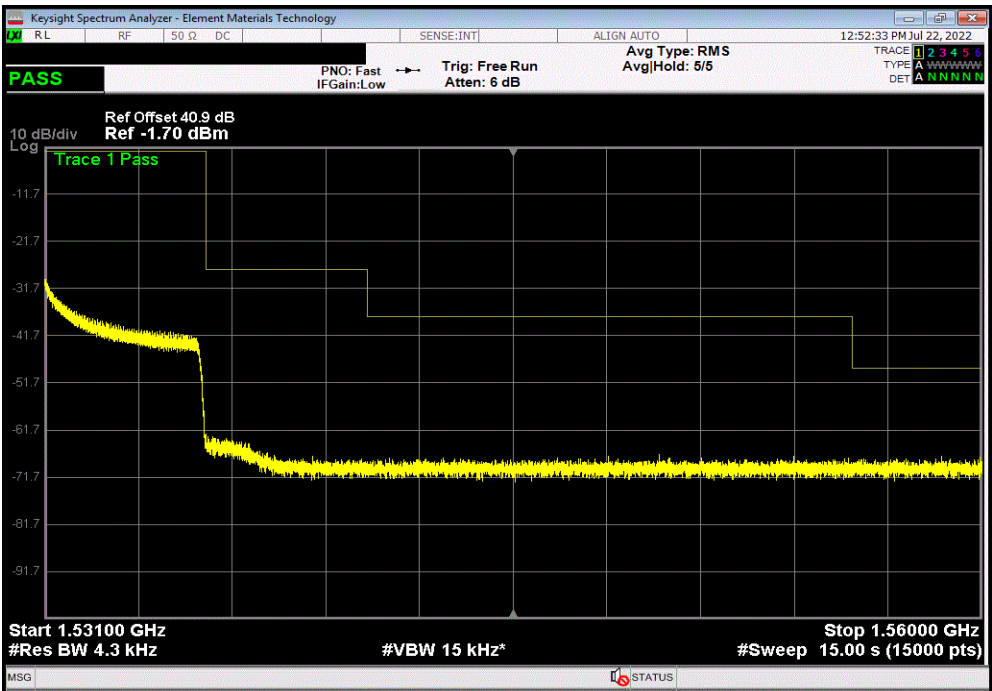


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, Low Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, High Side Channel 1531 MHz, 25 RB/0 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	

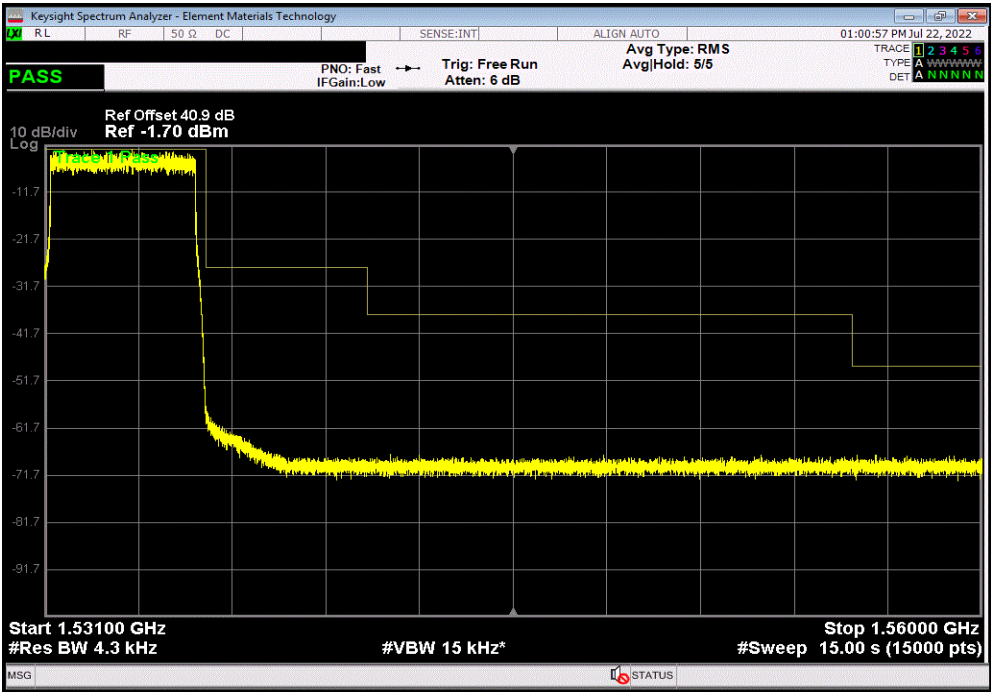


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

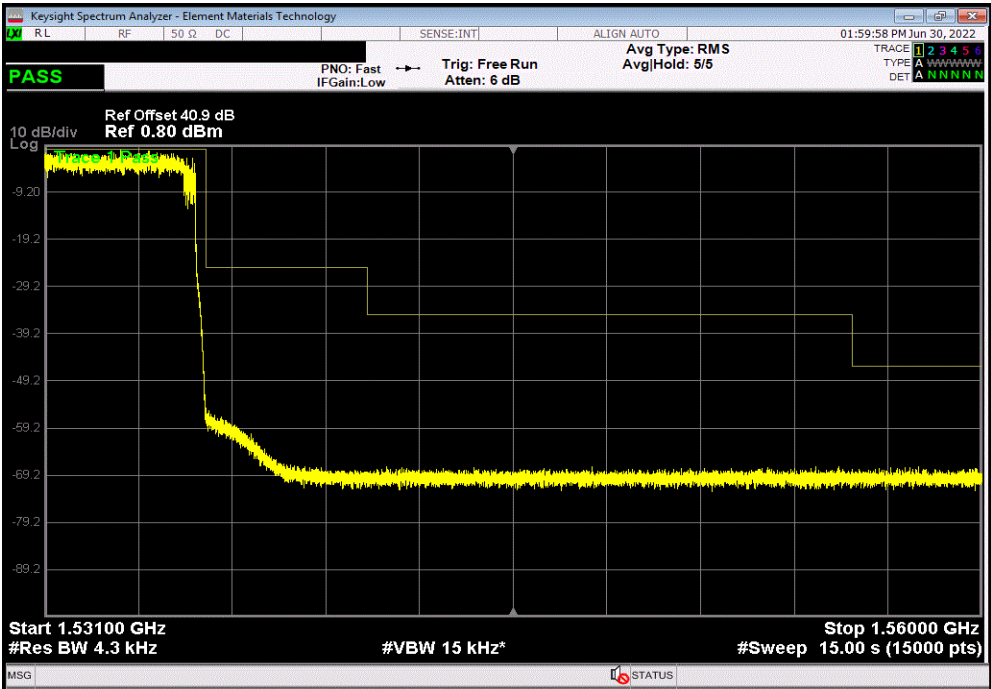


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, High Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 64-QAM Modulation, High Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

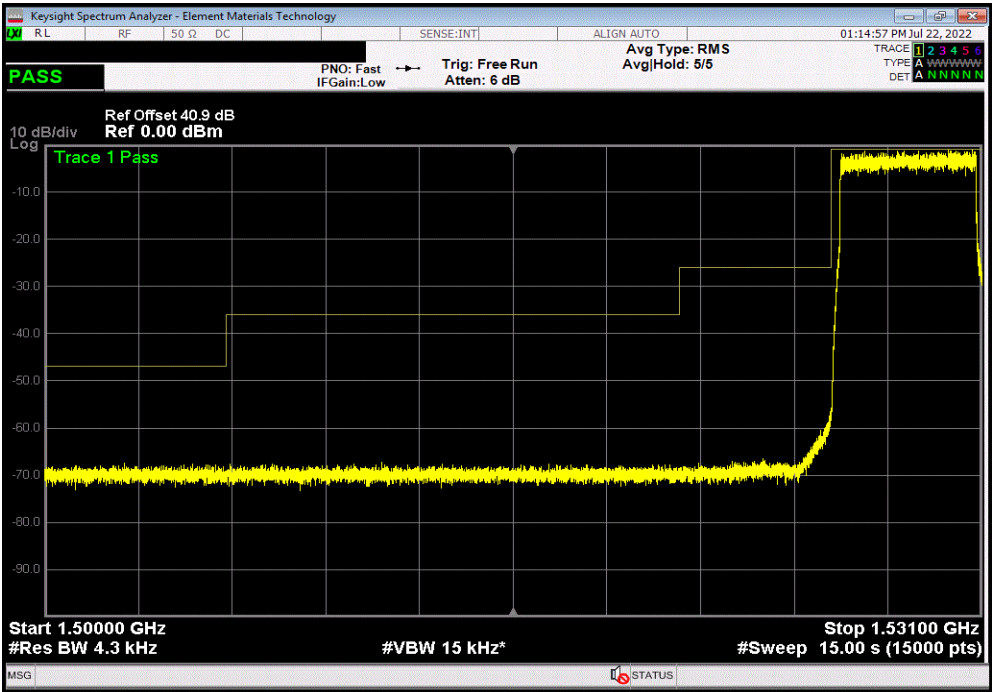


SPURIOUS EMISSION AT THE ANTENNA TERMINALS - EMISSION MASK - 10MHz, 3dBi

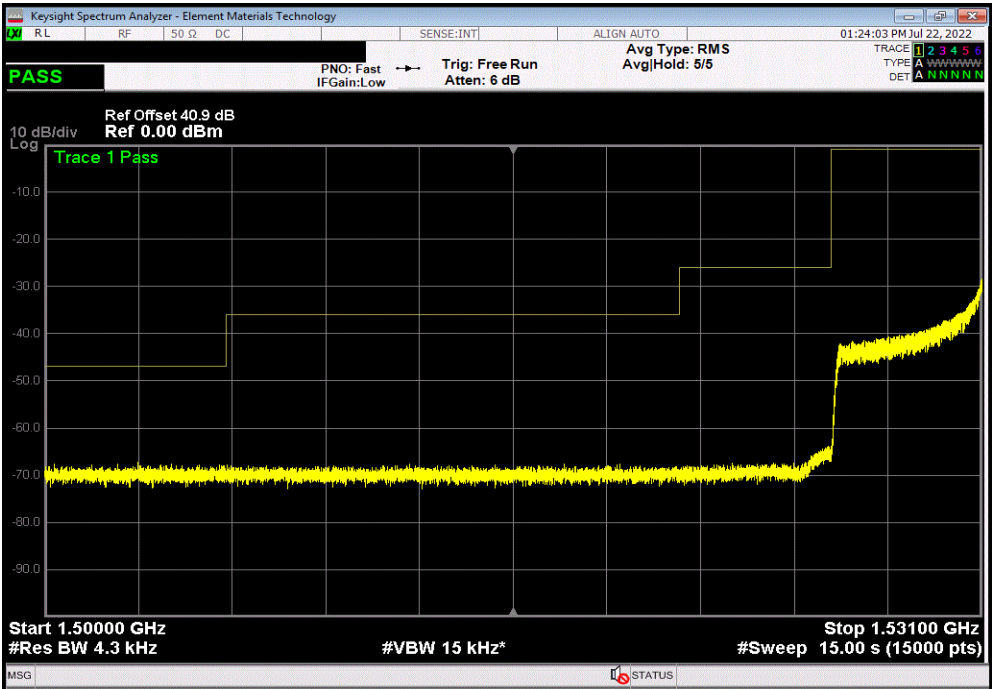


TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 256-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/0 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	

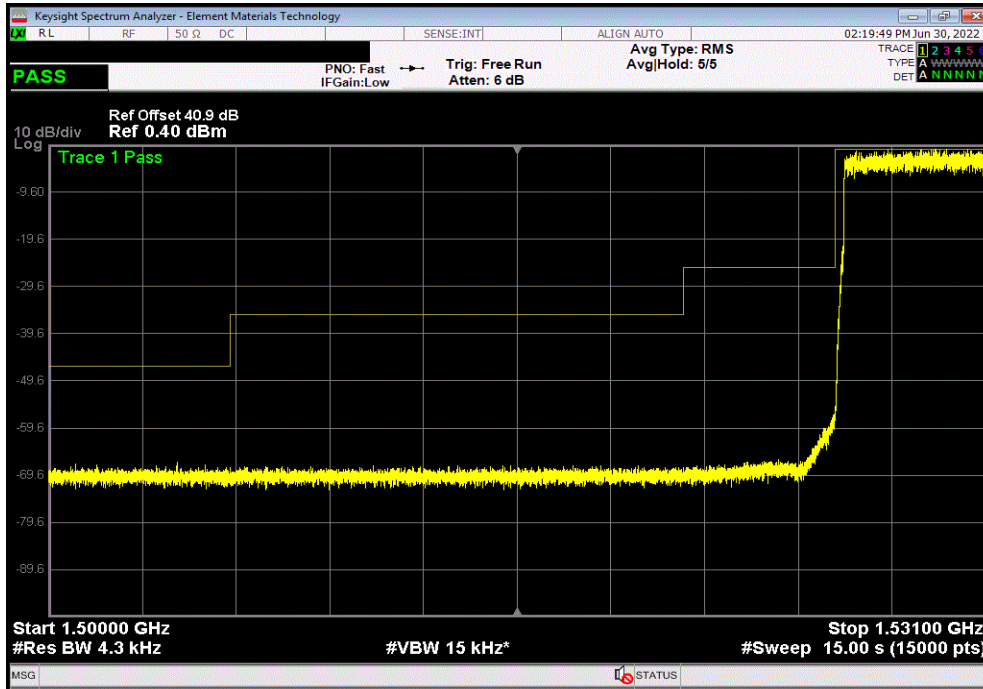


5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 256-QAM Modulation, Low Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result	
	> 20	See Graph	> 20	See Graph	Pass	

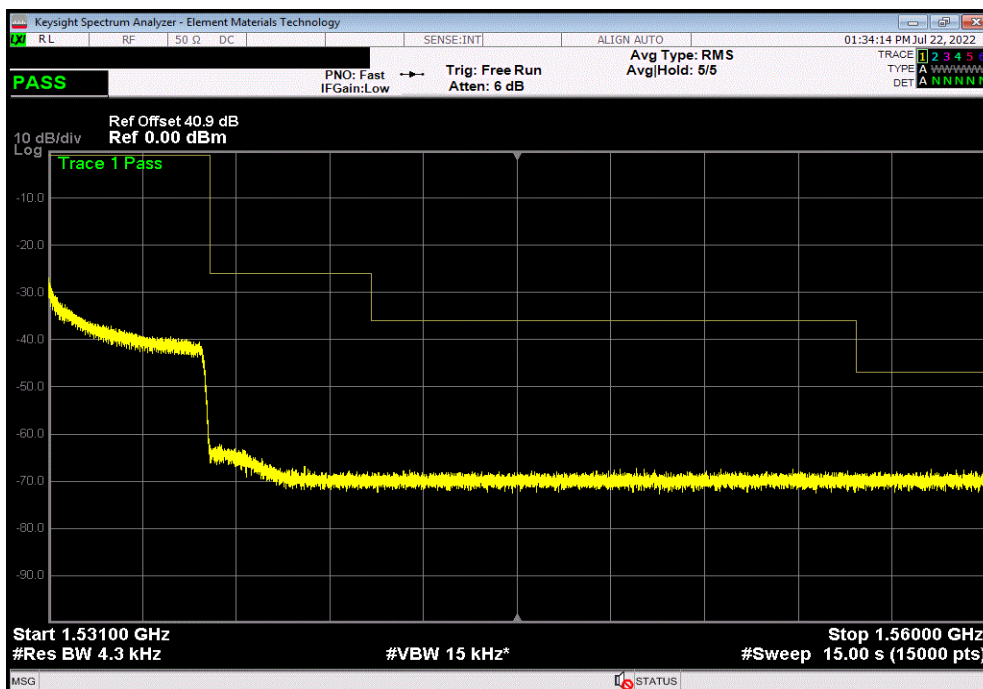




From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result
> 20	See Graph	> 20	See Graph	Pass



From 38 dBc Limit Value (dBc)	Limit 38 dBc	From 28 dBc Limit Value (dBc)	Limit 28 dBc	Result
> 20	See Graph	> 20	See Graph	Pass

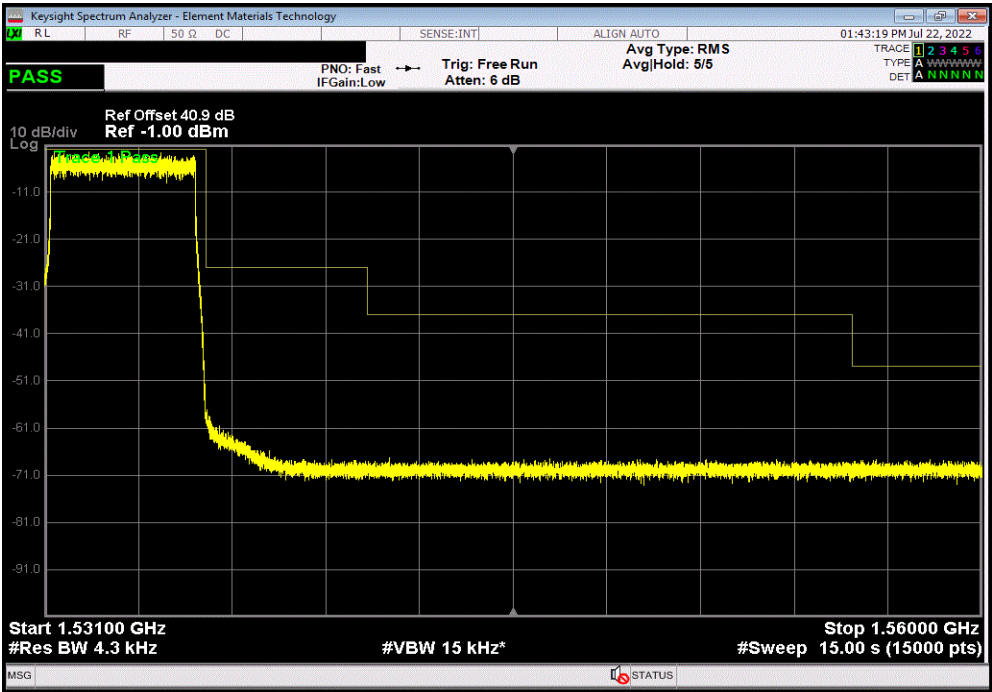


SPURIOUS EMISSION AT THE ANTENNA TERMINALS -
EMISSION MASK - 10MHz, 3dBi



TbTx 2022.05.02.0 XMit 2022.02.07.0

5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 256-QAM Modulation, High Side Channel 1531 MHz, 25 RB/27 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	



5G NR, Band n24, SCS 15kHz, 10 MHz Bandwidth, 256-QAM Modulation, High Side Channel 1531 MHz, 52 RB/0 Offset						
	From 38 dBc Limit	Limit	From 28 dBc Limit	Limit	Result	
	Value (dBc)	38 dBc	Value (dBc)	28 dBc		
	> 20	See Graph	> 20	See Graph	Pass	

