

BAND EDGE COMPLIANCE - MULTIBAND



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	AFQ	2022-01-17	2023-01-17
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
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.

All limits were adjusted by a factor of $[-10 \cdot \log(2)]$ dB to account for the device operation as a 2 port MIMO transmitter, as per FCC KDB 622911.

Multicarrier test cases are as shown below:

- a) PCS Multicarrier Multiband Test Case: In the PCS band _Three WCDMA carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (1932.4 & 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (1987.6MHz) at the upper band edge. In the AWS band _ Two WCDMA carriers at the band middle (2137.5 & 2142.5MHz). The carriers are operated at maximum power (~26.6W/PCS carrier and 20W/AWS carrier) with a total port power of 120 watts (80W for PCS band carriers + 40W for AWS band carriers).
- b) AWS Multicarrier Multiband Test Case: In the AWS band _Three WCDMA carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (2112.4 & 2117.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (2167.6MHz) at the upper band edge. In the PCS band: Two WCDMA carriers at band middle (1957.5 & 1962.5MHz). The carriers are operated at maximum power (~26.6W/AWS carrier and 20W/PCS carrier) with a total port power of 120 watts (80W for AWS band carriers + 40W for PCS band carriers).

Per section 27.53(h)(1), RSS-139 6.6 and 24.238(a), RSS-133 6.5 (i), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -16 dBm $[-13 \text{ dBm} - 10 \log(2)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

The RBW to be used for these measurements are per 27.53(h)(3), RSS-139 6.6, 24.238(b), and RSS-133 6.5. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified).

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFII) as the original certification test. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

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TMTx 2022.05.02.0 XMM 2022.02.07.0

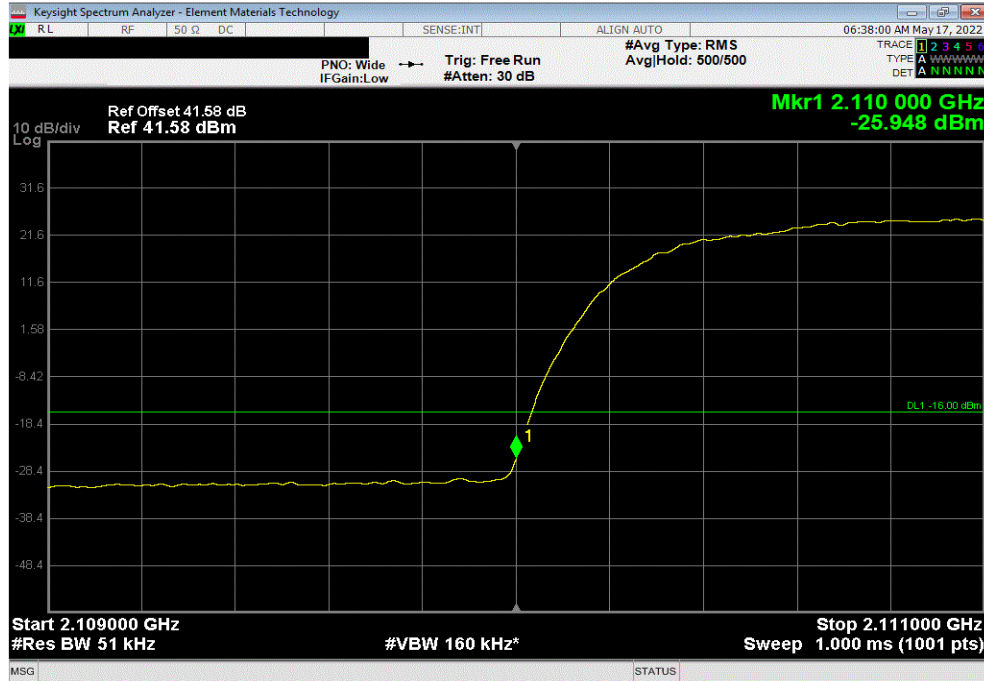
EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0040
Serial Number: YK214000036		Date: 16-May-22
Customer: Nokia Solutions and Networks		Temperature: 22.9 °C
Attendees: David Le, John Rattanavong		Humidity: 48.5% RH
Project: None		Barometric Pres.: 1019 mbar
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05
TEST SPECIFICATIONS		
FCC 24E:2022		Test Method: ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018		RSS-133 Issue 6:2013+A1:2018
FCC 27:2022		ANSI C63.26:2015
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015
COMMENTS		
All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. PCS Band II / AWS Band X carriers were enabled at maximum power (30 watts/carrier).		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	Signature
	Frequency Range	Max Value (dBm) Limit < (dBm) Result
AWS WCDMA, 2110 MHz - 2170 MHz		
Port 1		
5 MHz Bandwidth		
QPSK Modulation		
Low Channel, 2112.4 MHz	1	-26.0 -16 Pass
Low Channel, 2112.4 MHz	2	-18.6 -16 Pass
Low Channel, 2112.4 MHz	3	-21.2 -16 Pass
High Channel, 2167.6 MHz	1	-25.3 -16 Pass
High Channel, 2167.6 MHz	2	-19.3 -16 Pass
High Channel, 2167.6 MHz	3	-24.4 -16 Pass
16-QAM Modulation		
Low Channel, 2112.4 MHz	1	-25.8 -16 Pass
Low Channel, 2112.4 MHz	2	-18.6 -16 Pass
Low Channel, 2112.4 MHz	3	-21.5 -16 Pass
High Channel, 2167.6 MHz	1	-24.8 -16 Pass
High Channel, 2167.6 MHz	2	-19.2 -16 Pass
High Channel, 2167.6 MHz	3	-24.2 -16 Pass
64-QAM Modulation		
Low Channel, 2112.4 MHz	1	-25.8 -16 Pass
Low Channel, 2112.4 MHz	2	-18.7 -16 Pass
Low Channel, 2112.4 MHz	3	-21.7 -16 Pass
High Channel, 2167.6 MHz	1	-24.9 -16 Pass
High Channel, 2167.6 MHz	2	-19.4 -16 Pass
High Channel, 2167.6 MHz	3	-23.9 -16 Pass
PCS WCDMA, 1930 MHz - 1990 MHz		
Port 1		
5 MHz Bandwidth		
QPSK Modulation		
Low Channel, 1932.4 MHz	1	-26.2 -16 Pass
Low Channel, 1932.4 MHz	2	-18.6 -16 Pass
Low Channel, 1932.4 MHz	3	-20.7 -16 Pass
High Channel, 1987.6 MHz	1	-24.8 -16 Pass
High Channel, 1987.6 MHz	2	-18.9 -16 Pass
High Channel, 1987.6 MHz	3	-21.5 -16 Pass
16-QAM Modulation		
Low Channel, 1932.4 MHz	1	-25.7 -16 Pass
Low Channel, 1932.4 MHz	2	-18.7 -16 Pass
Low Channel, 1932.4 MHz	3	-21.4 -16 Pass
High Channel, 1987.6 MHz	1	-24.8 -16 Pass
High Channel, 1987.6 MHz	2	-18.9 -16 Pass
High Channel, 1987.6 MHz	3	-21.8 -16 Pass
64-QAM Modulation		
Low Channel, 1932.4 MHz	1	-25.5 -16 Pass
Low Channel, 1932.4 MHz	2	-18.3 -16 Pass
Low Channel, 1932.4 MHz	3	-20.9 -16 Pass
High Channel, 1987.6 MHz	1	-25.2 -16 Pass
High Channel, 1987.6 MHz	2	-18.8 -16 Pass
High Channel, 1987.6 MHz	3	-21.1 -16 Pass

BAND EDGE COMPLIANCE - MULTIBAND

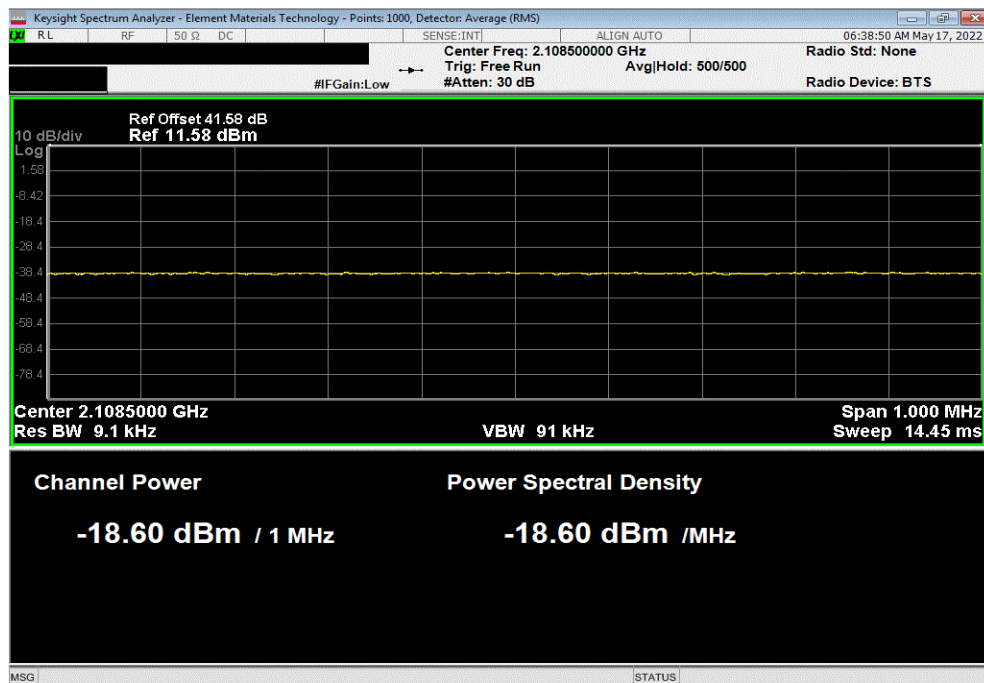


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-26.0	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.6	-16	Pass			

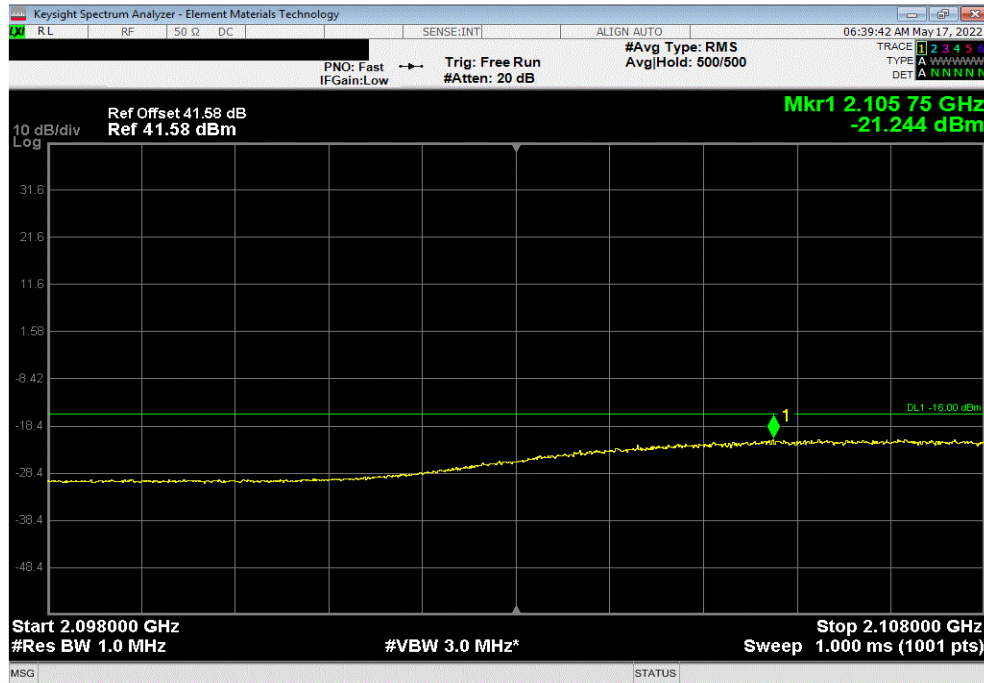


BAND EDGE COMPLIANCE - MULTIBAND

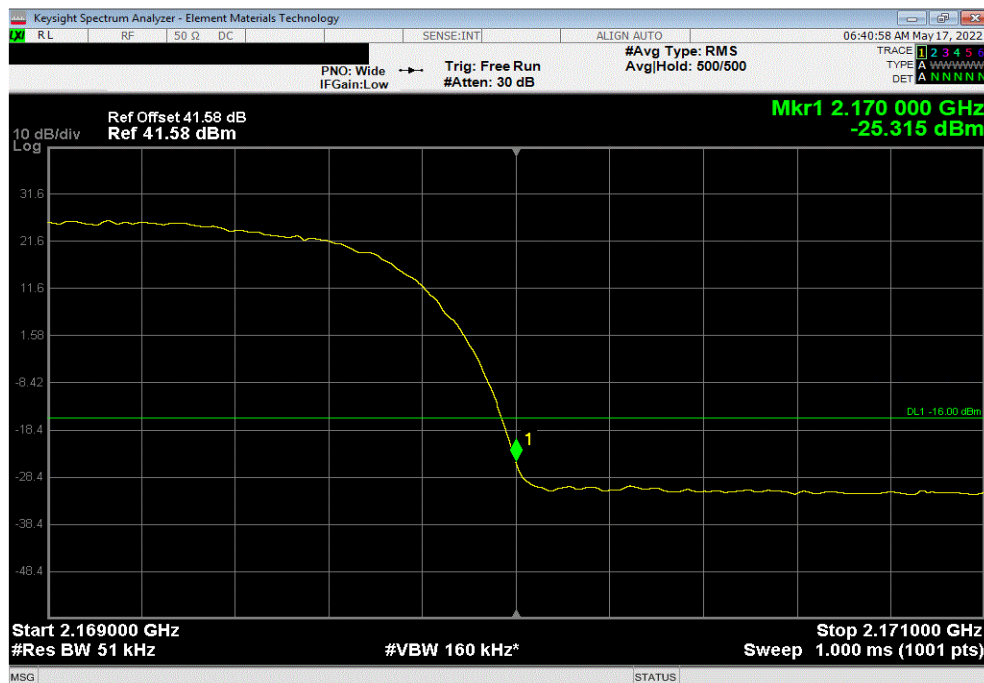


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-21.2	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.3	-16	Pass			

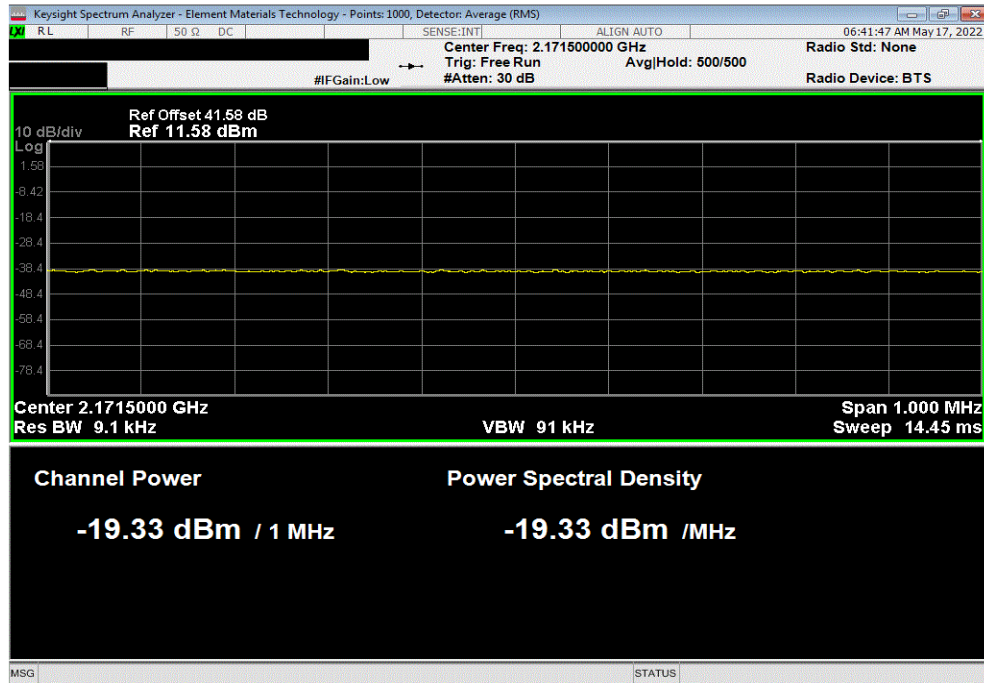


BAND EDGE COMPLIANCE - MULTIBAND

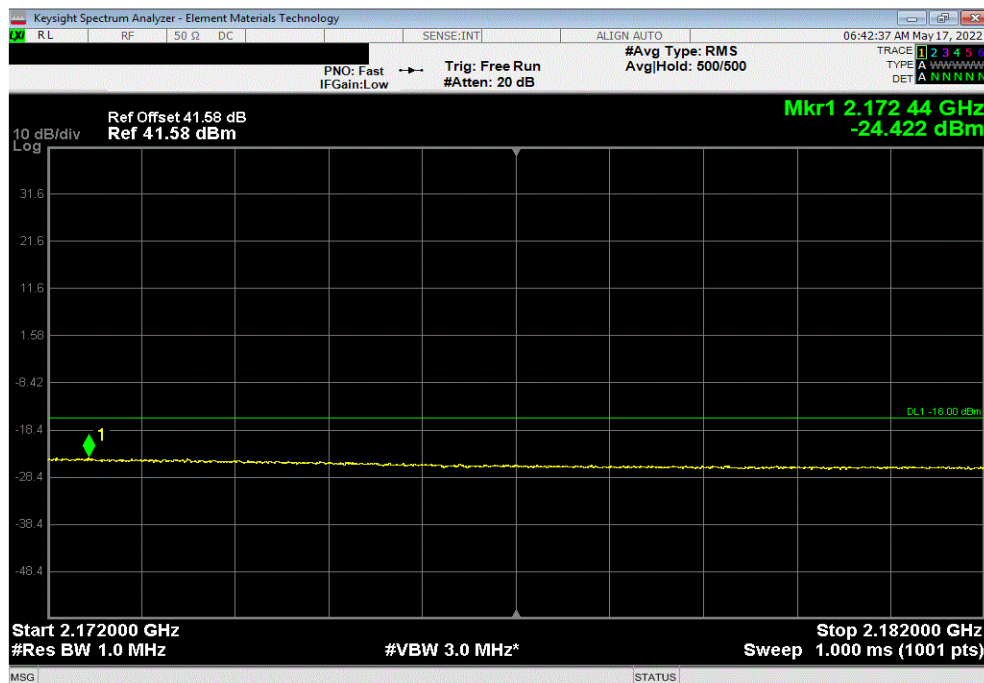


TbTx 2022.05.02.0 XbTx 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-19.3	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-24.4	-16	Pass			

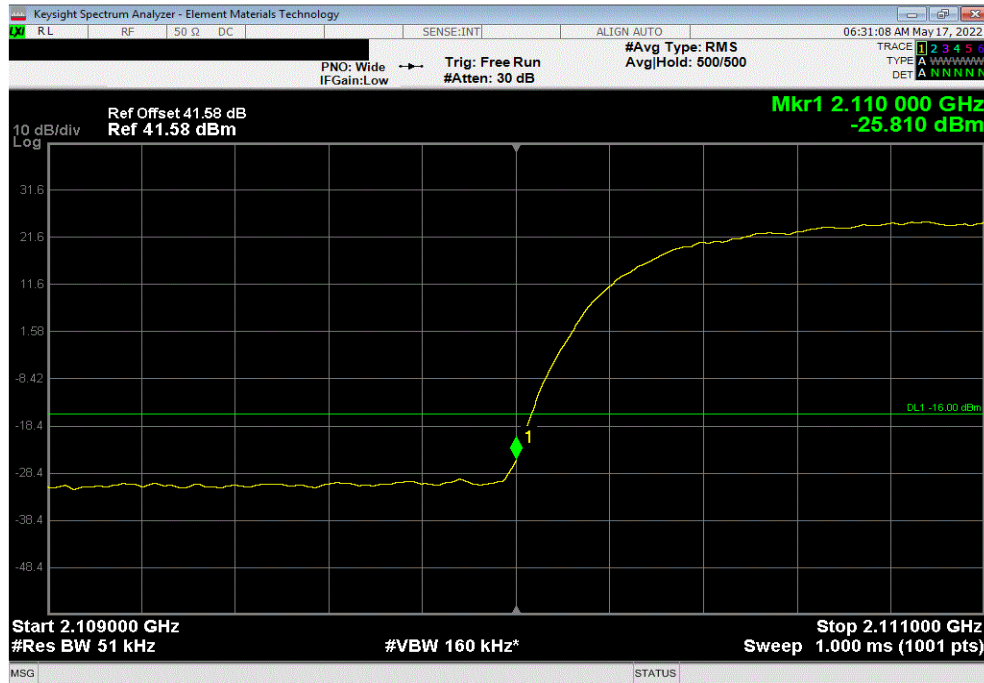


BAND EDGE COMPLIANCE - MULTIBAND

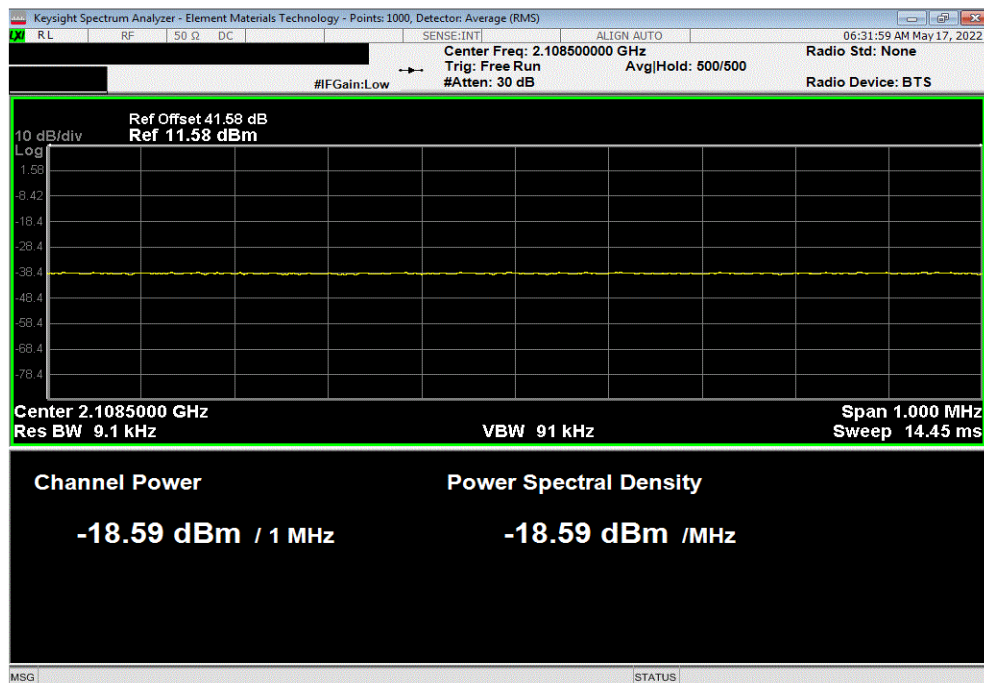


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.8	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.6	-16	Pass			

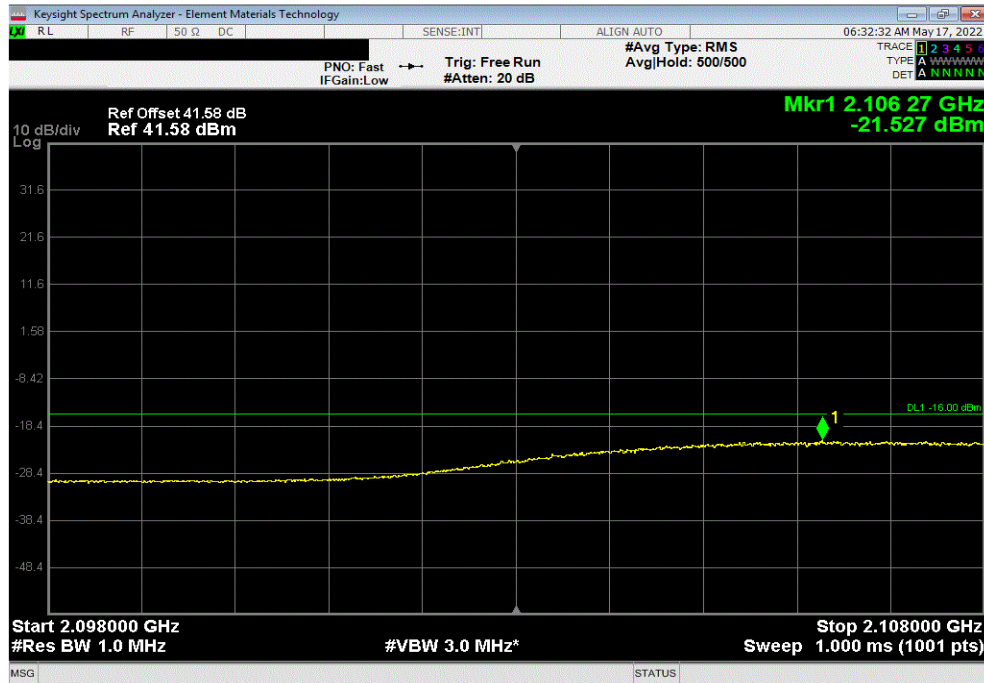


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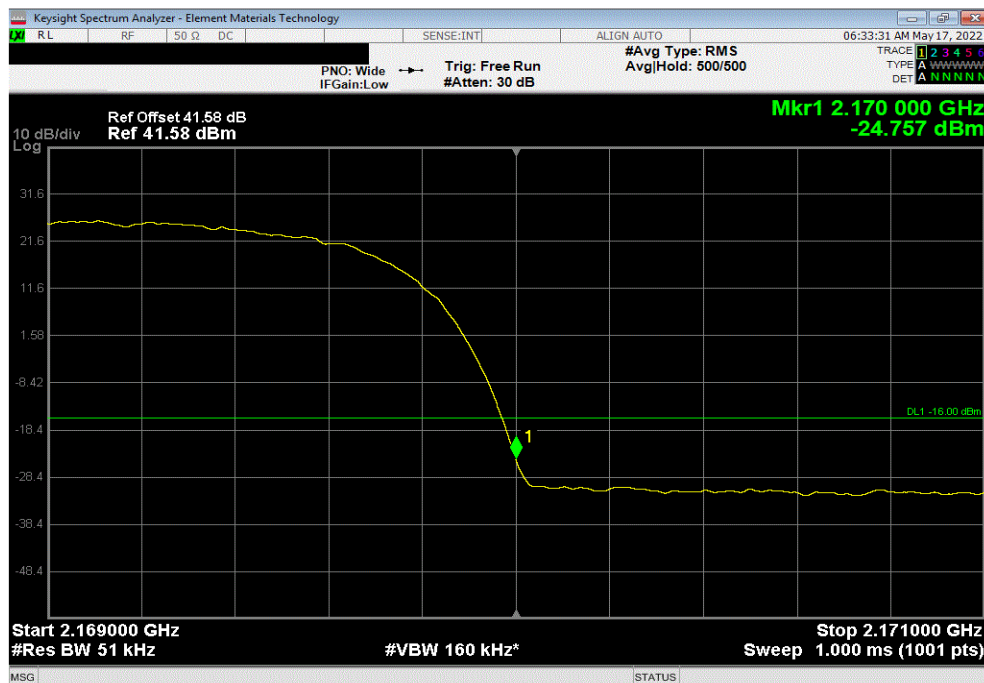


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-21.5	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-24.8	-16	Pass			

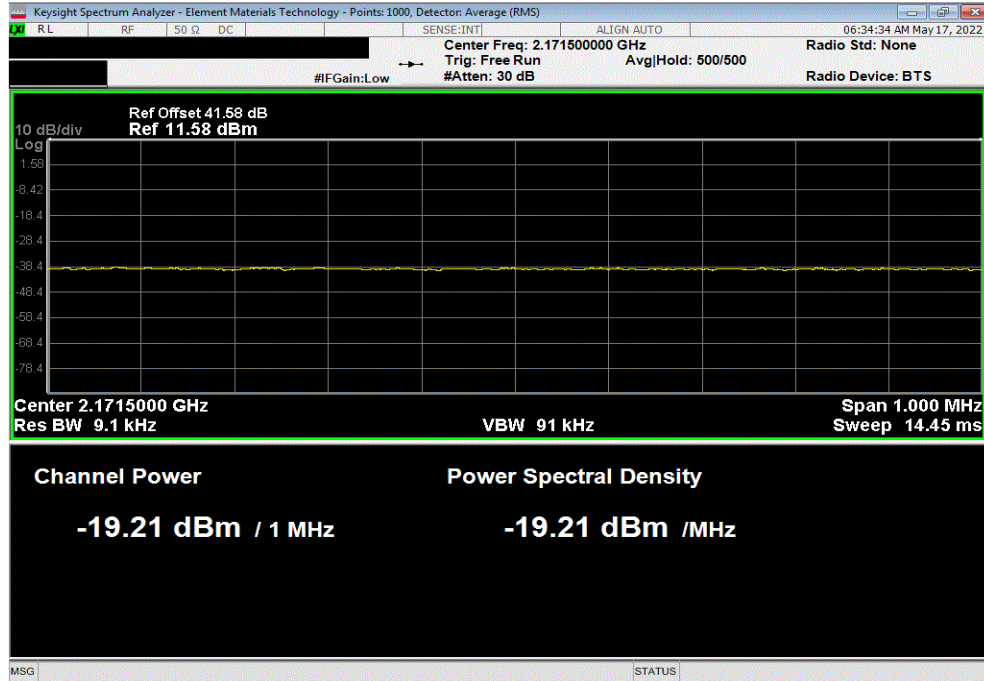


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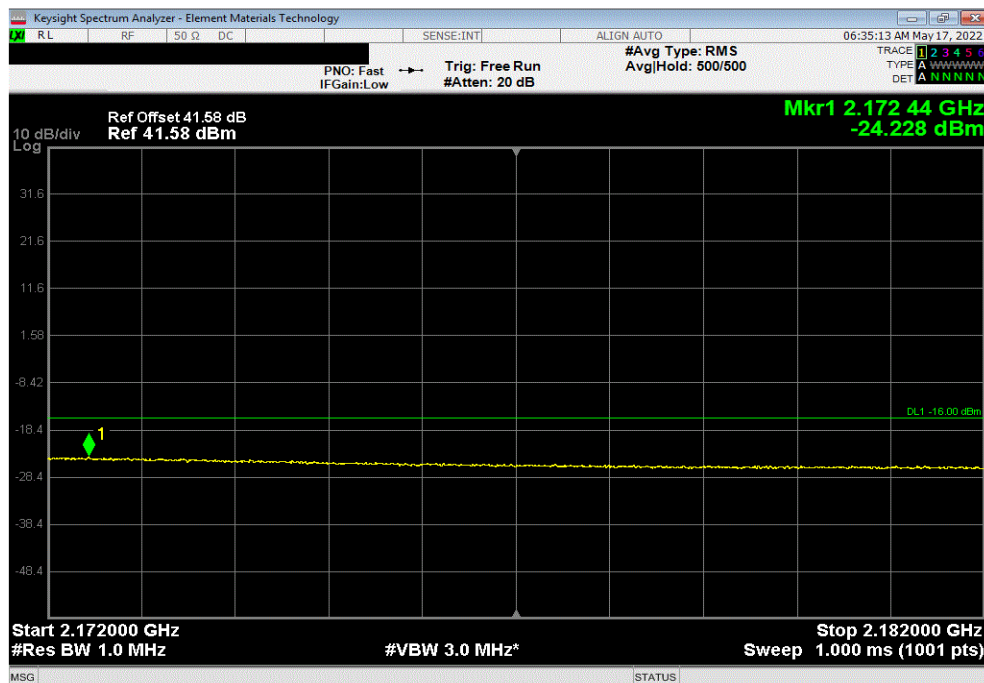


TbTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-19.2	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-24.2	-16	Pass			

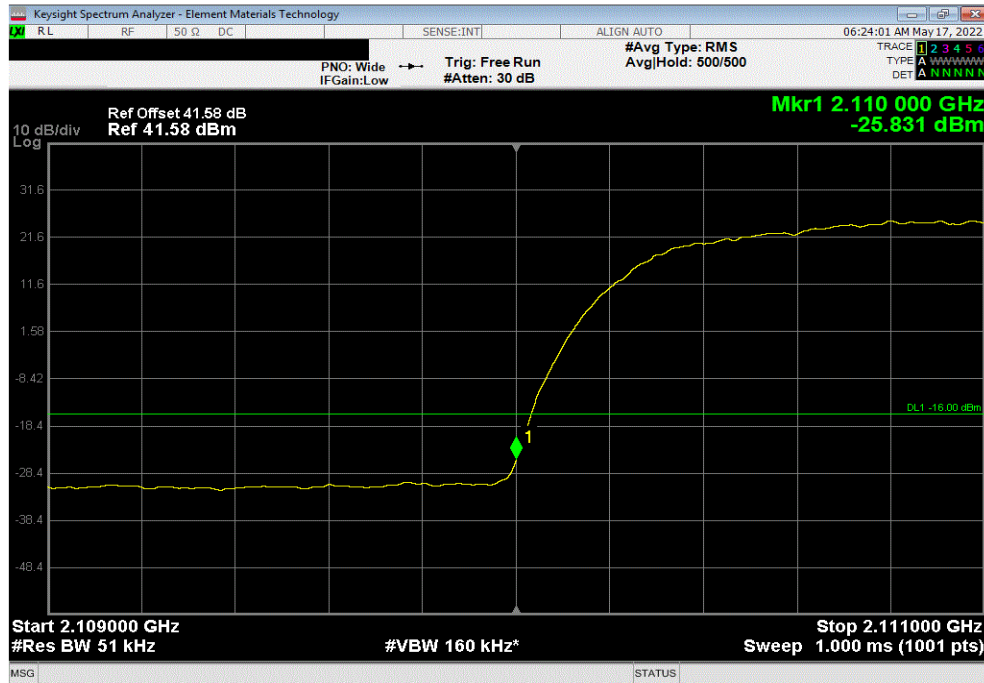


BAND EDGE COMPLIANCE - MULTIBAND

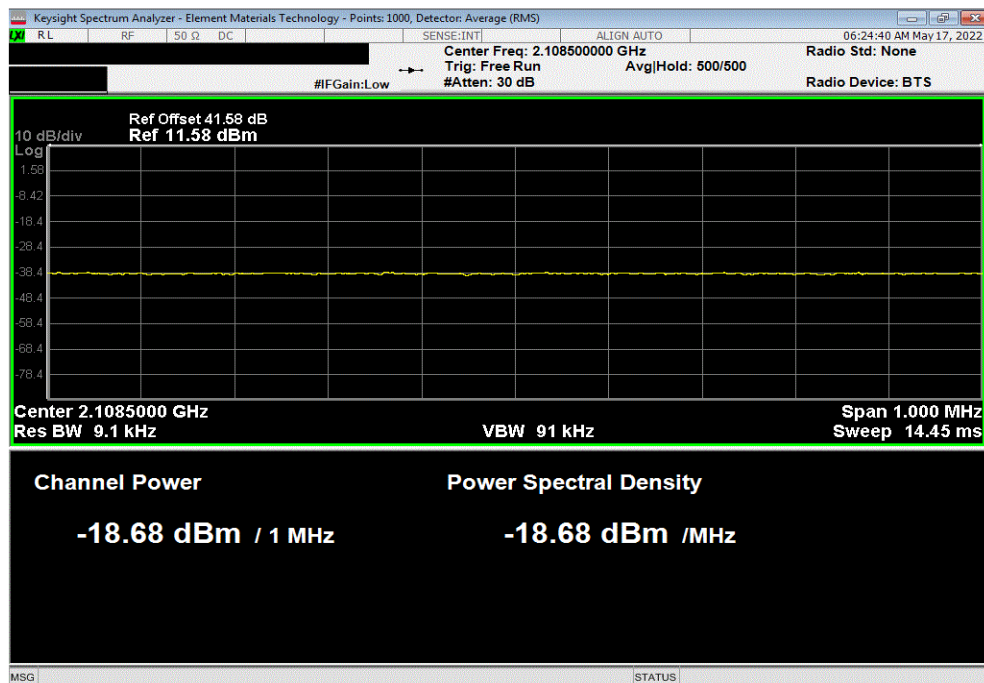


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.8	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.7	-16	Pass			

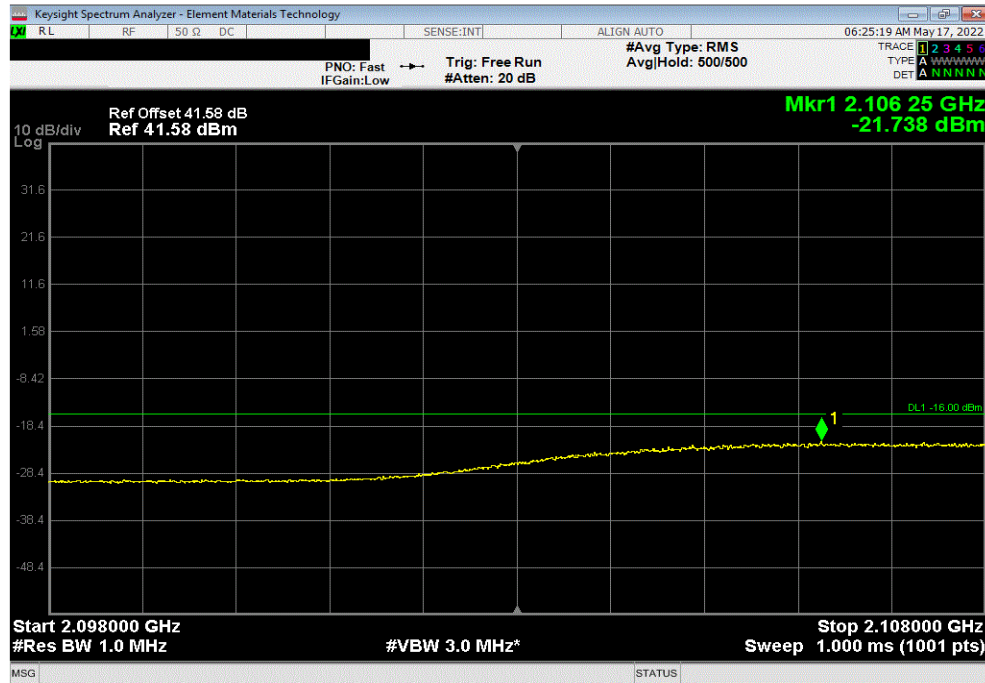


BAND EDGE COMPLIANCE - MULTIBAND

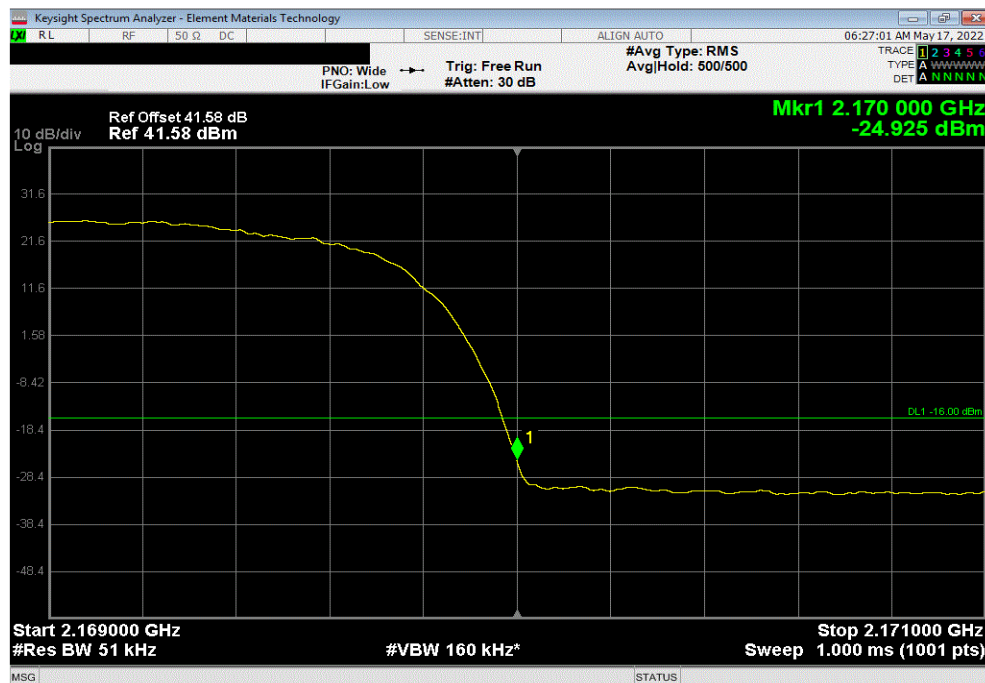


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-21.7	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-24.9	-16	Pass			

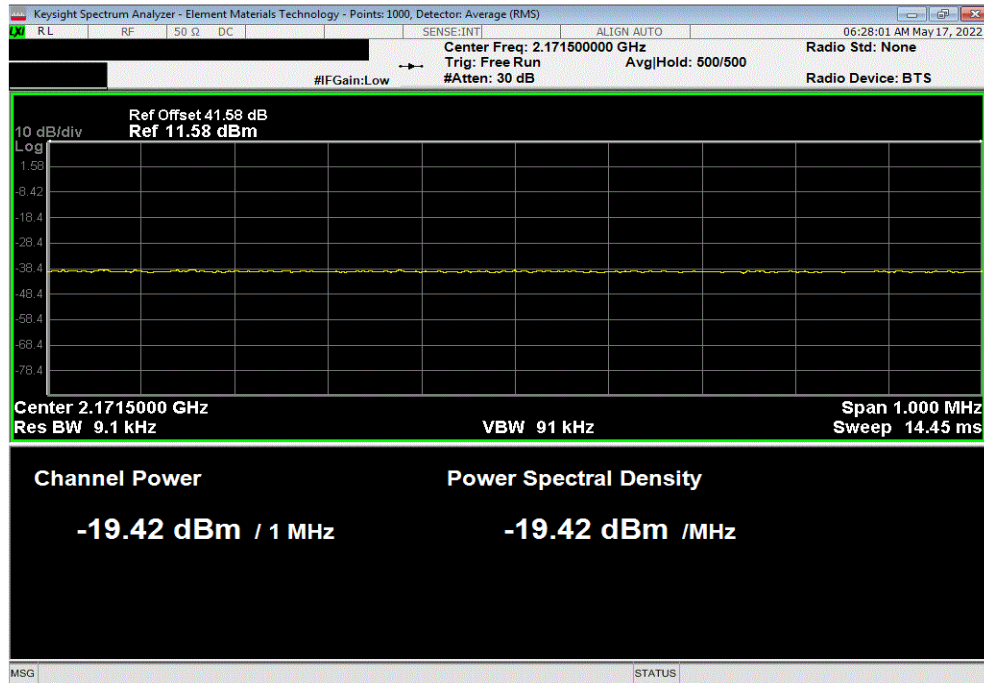


BAND EDGE COMPLIANCE - MULTIBAND

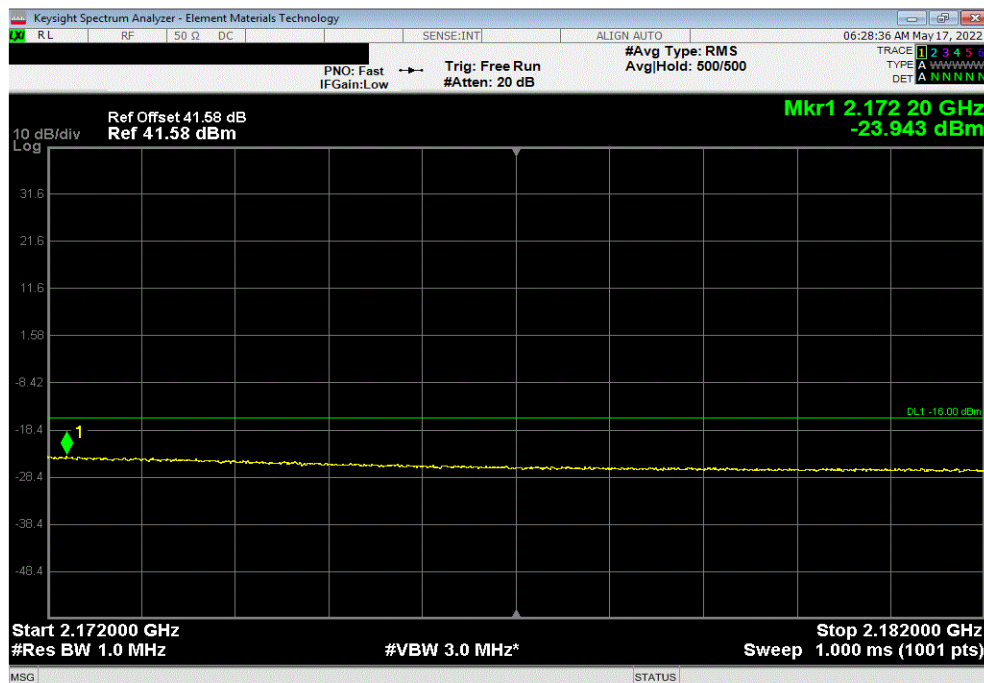


TbTx 2022.05.02.0 XbTx 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-19.4	-16	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-23.9	-16	Pass			

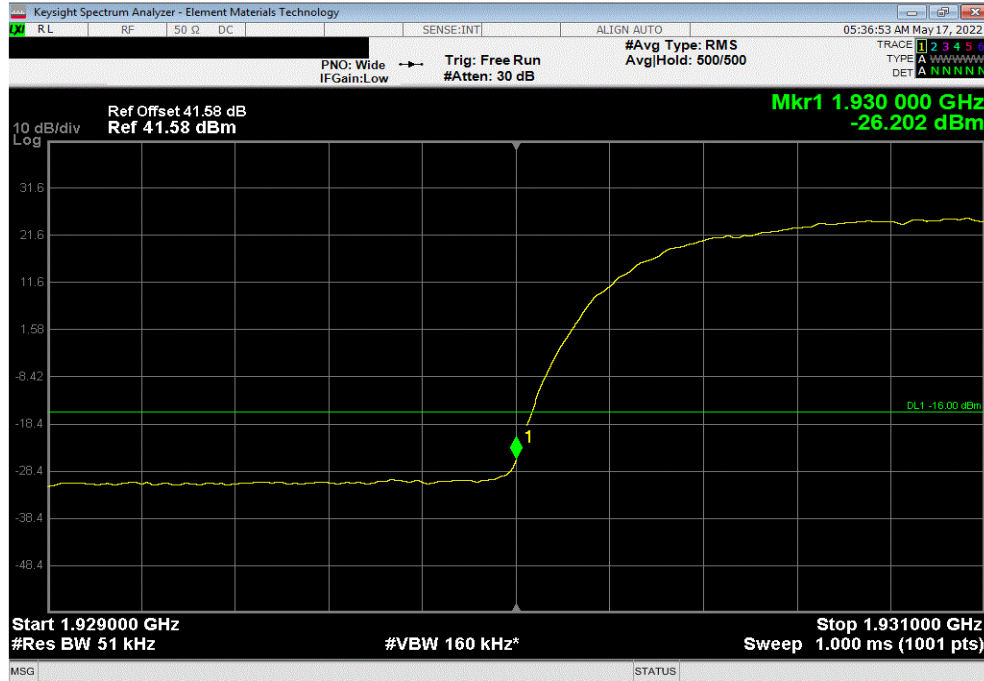


BAND EDGE COMPLIANCE - MULTIBAND

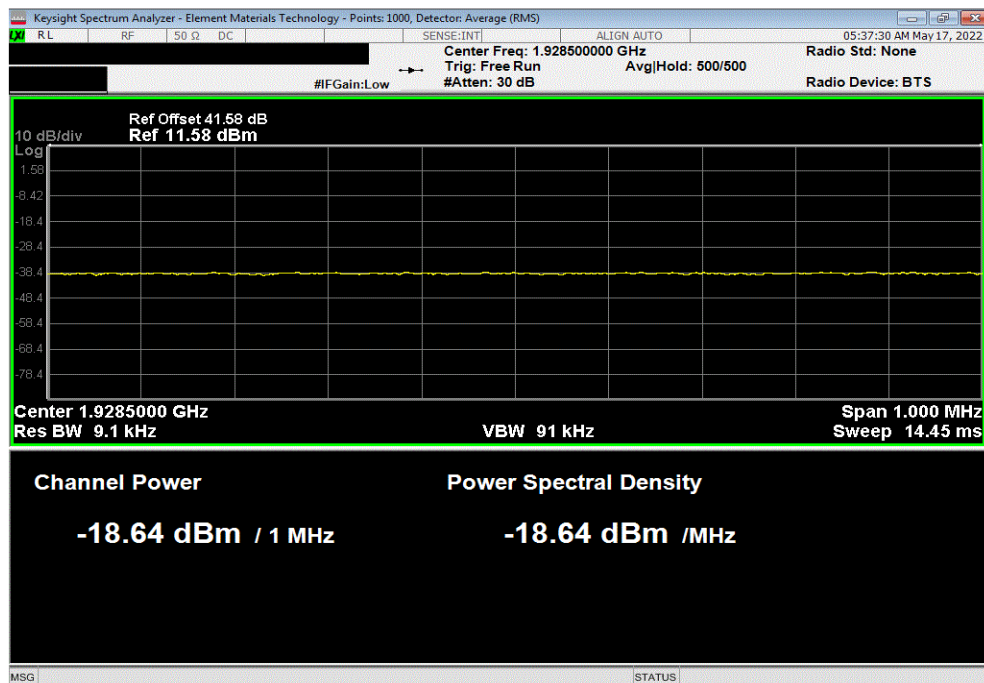


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-26.2	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.6	-16	Pass			

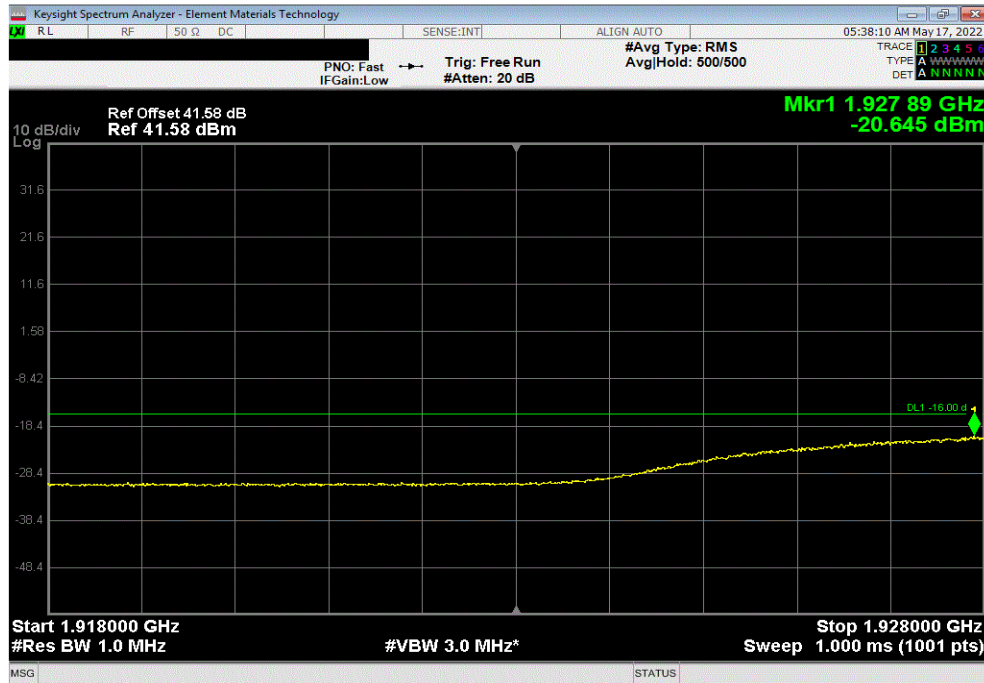


BAND EDGE COMPLIANCE - MULTIBAND

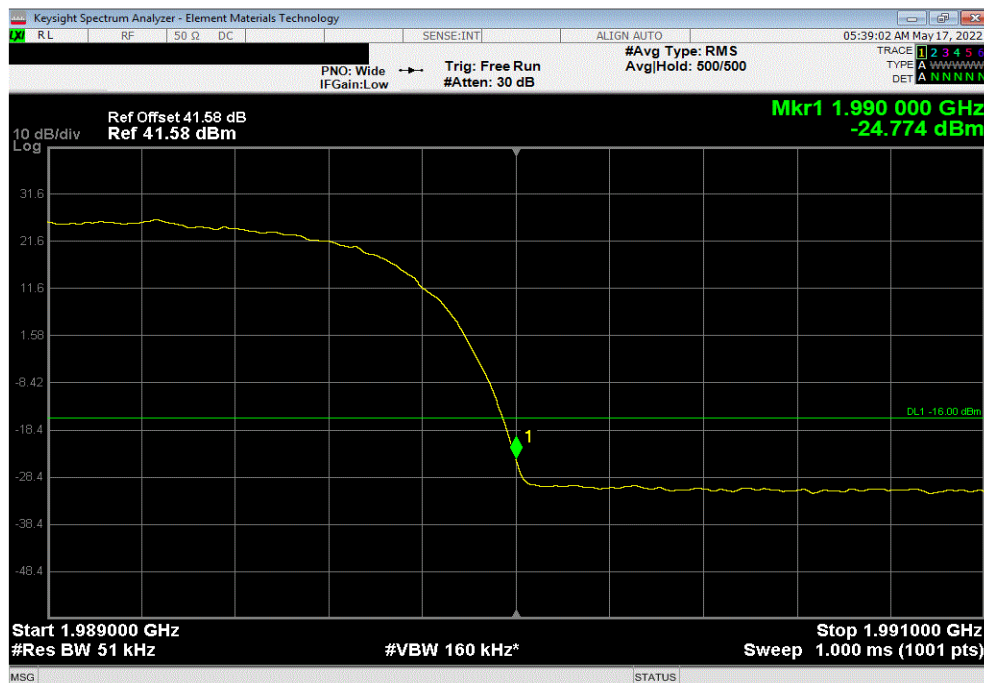


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-20.7	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-24.8	-16	Pass			

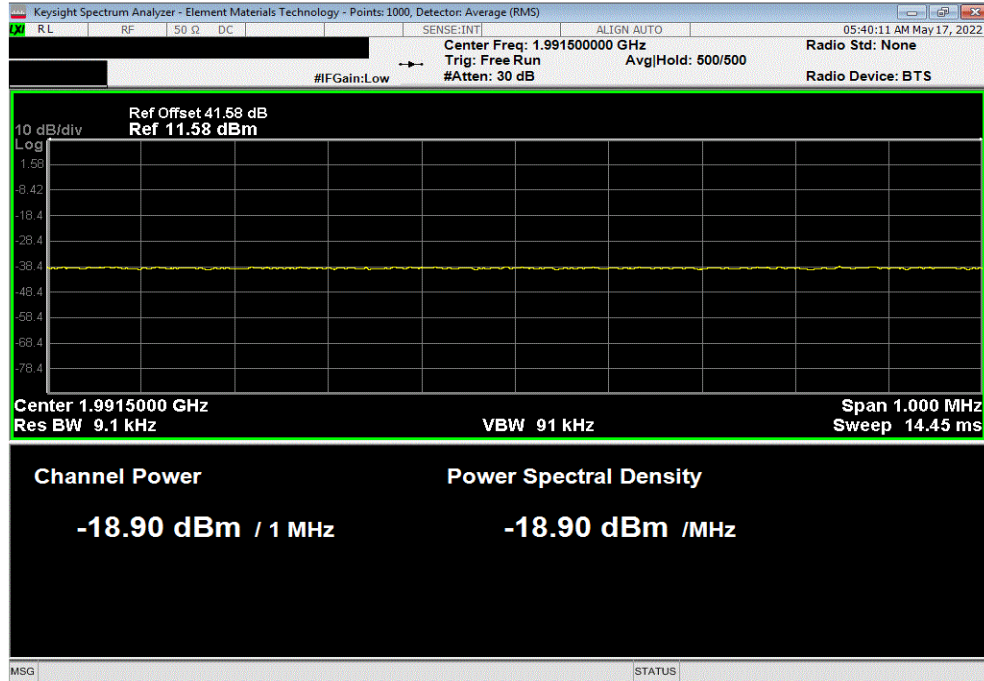


BAND EDGE COMPLIANCE - MULTIBAND

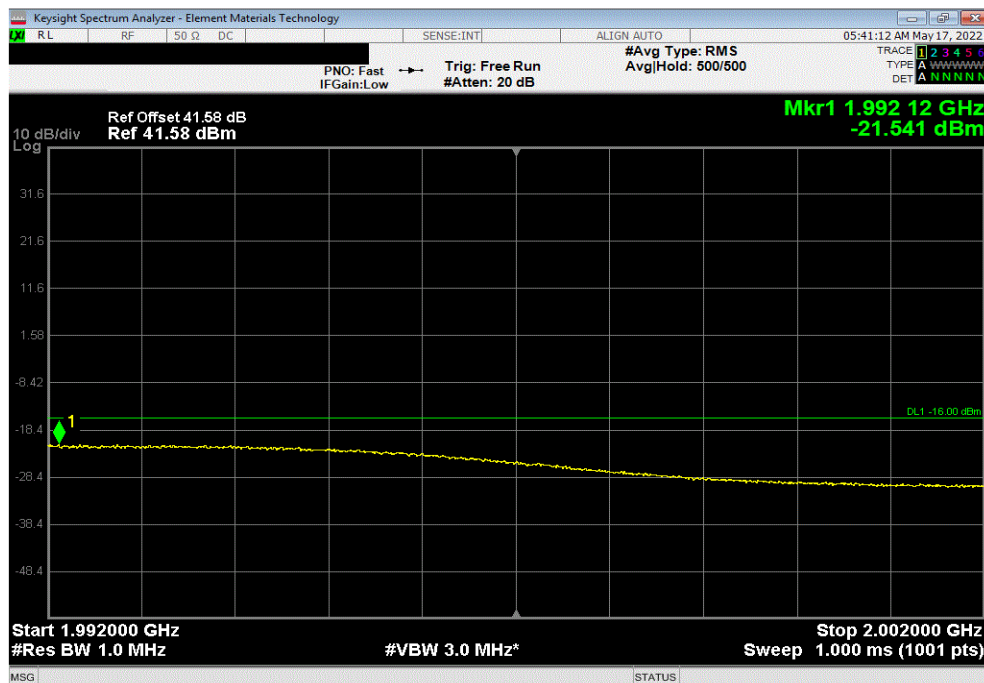


TbTx 2022.05.02.0 XbTx 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 1987.6 MHz						
Frequency Range		Max Value (dBm)		Limit < (dBm)		Result
2		-18.9		-16		Pass



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 1987.6 MHz						
Frequency Range		Max Value (dBm)		Limit < (dBm)		Result
3		-21.5		-16		Pass

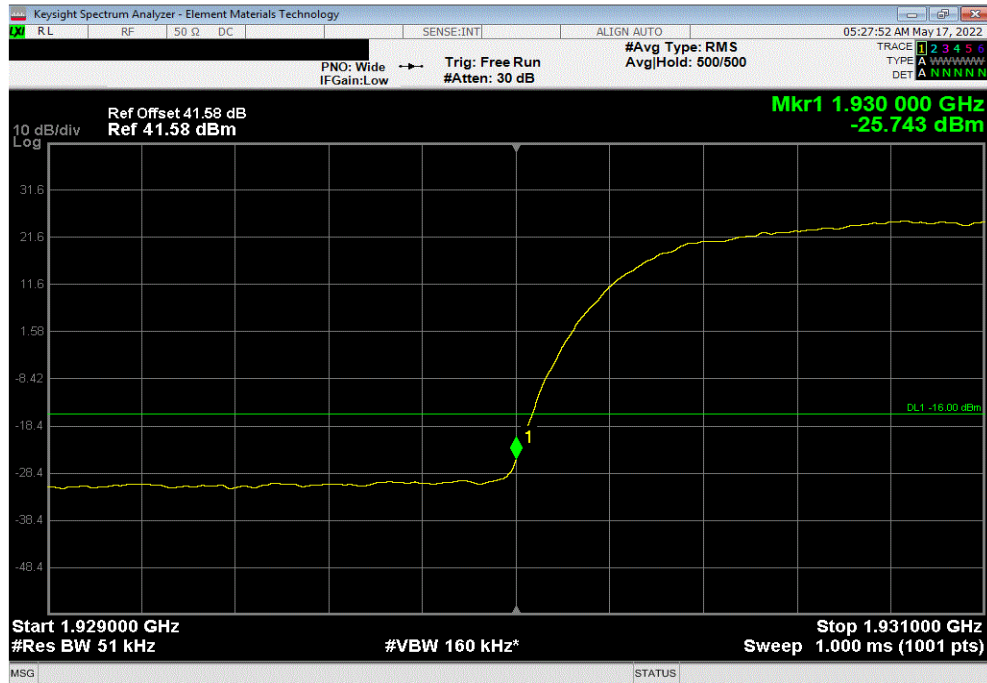


BAND EDGE COMPLIANCE - MULTIBAND

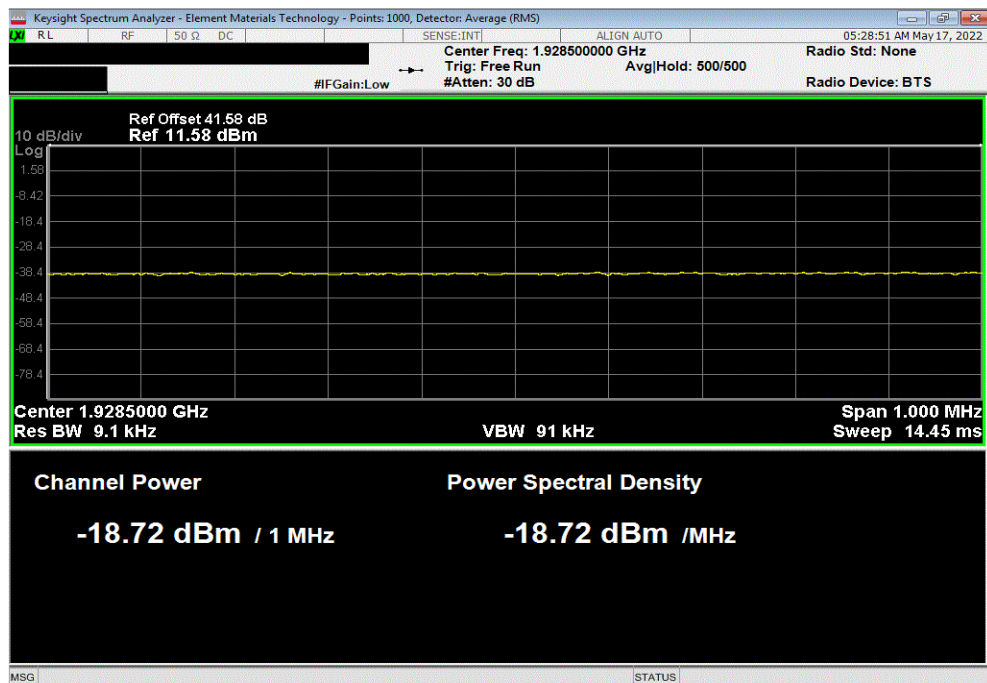


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.7	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.7	-16	Pass			

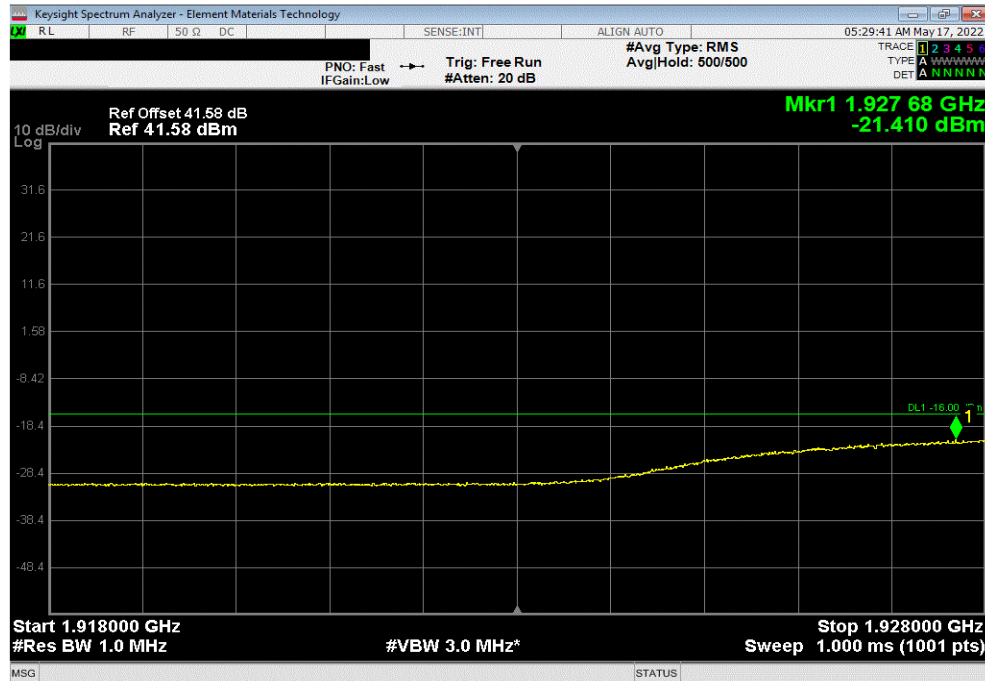


BAND EDGE COMPLIANCE - MULTIBAND

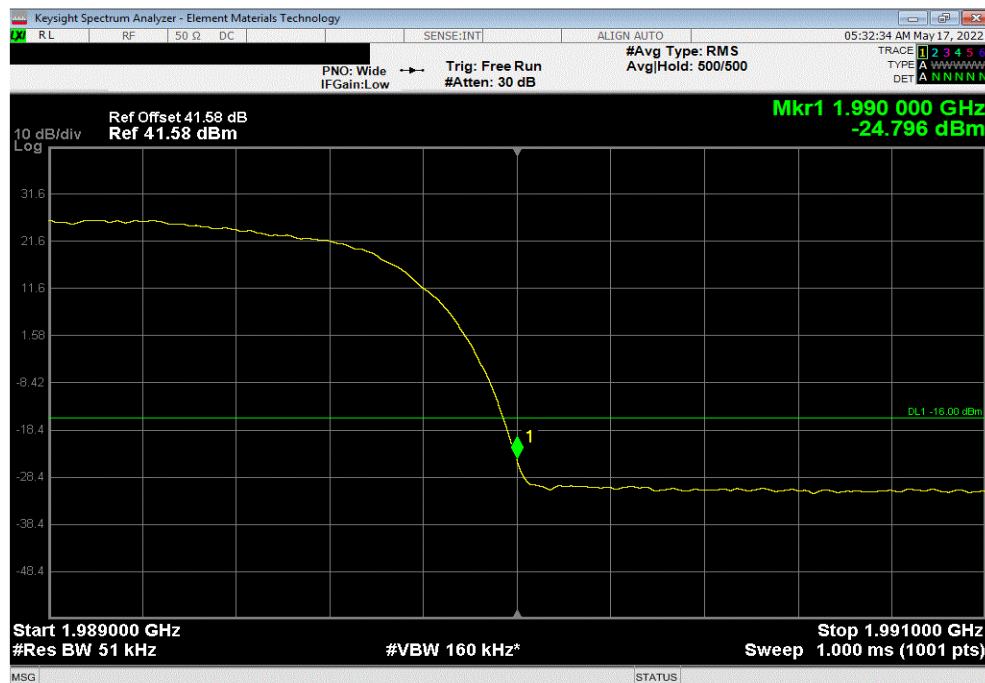


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-21.4	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-24.8	-16	Pass			

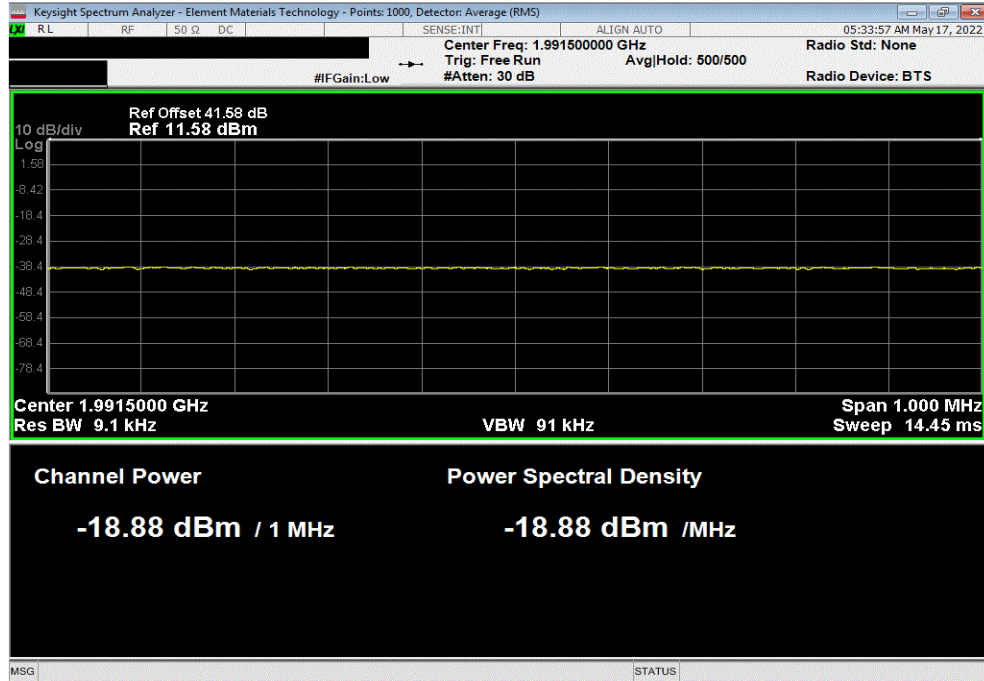


BAND EDGE COMPLIANCE - MULTIBAND

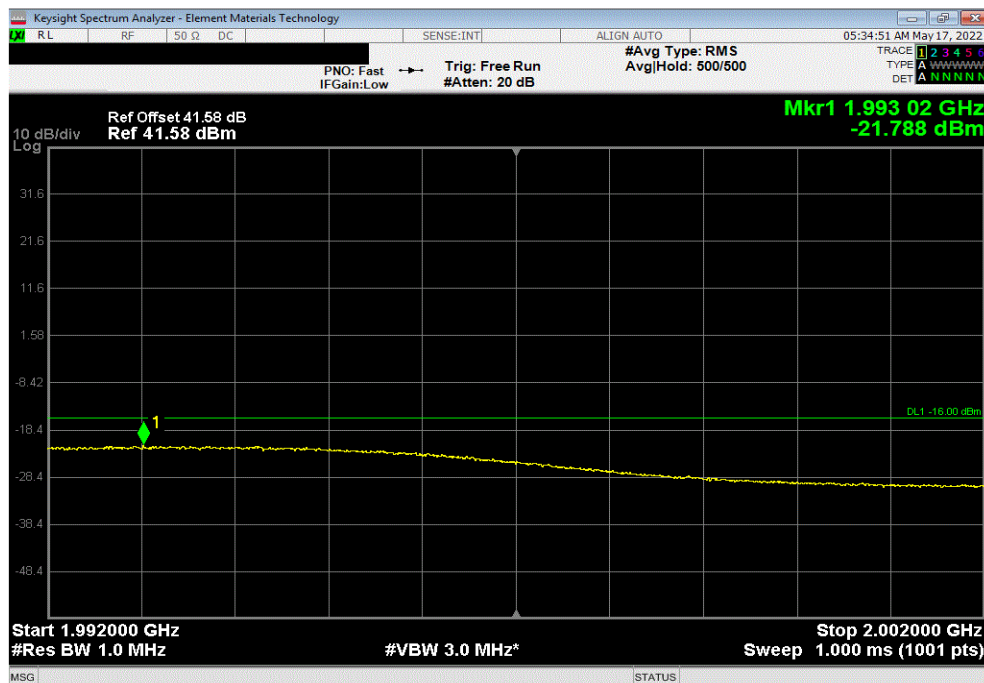


TbTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.9	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-21.8	-16	Pass			

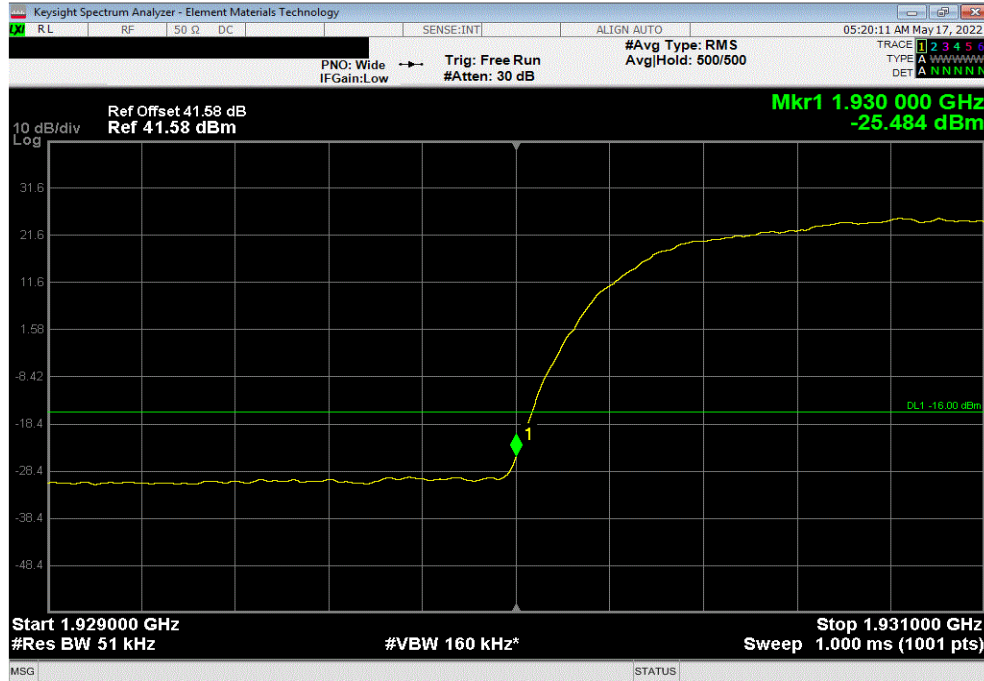


BAND EDGE COMPLIANCE - MULTIBAND

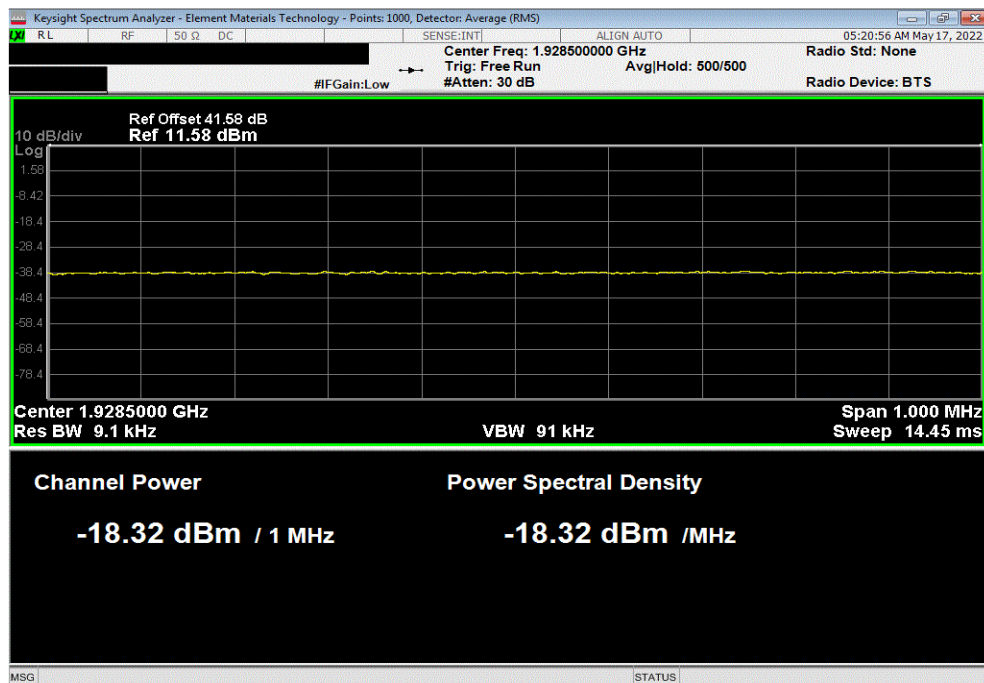


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.5	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-18.3	-16	Pass			

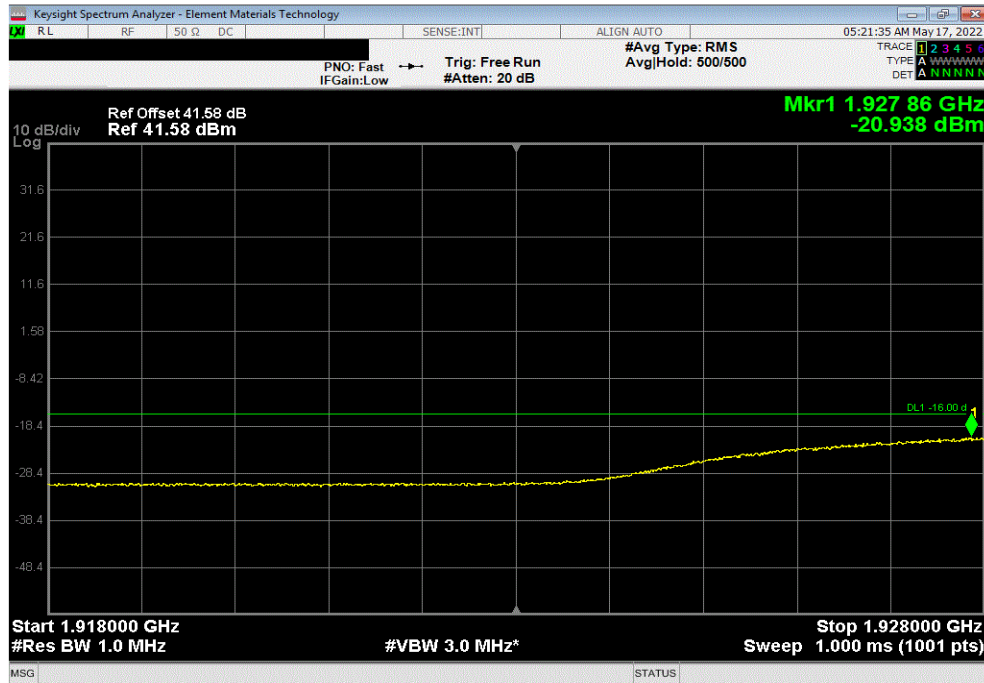


BAND EDGE COMPLIANCE - MULTIBAND

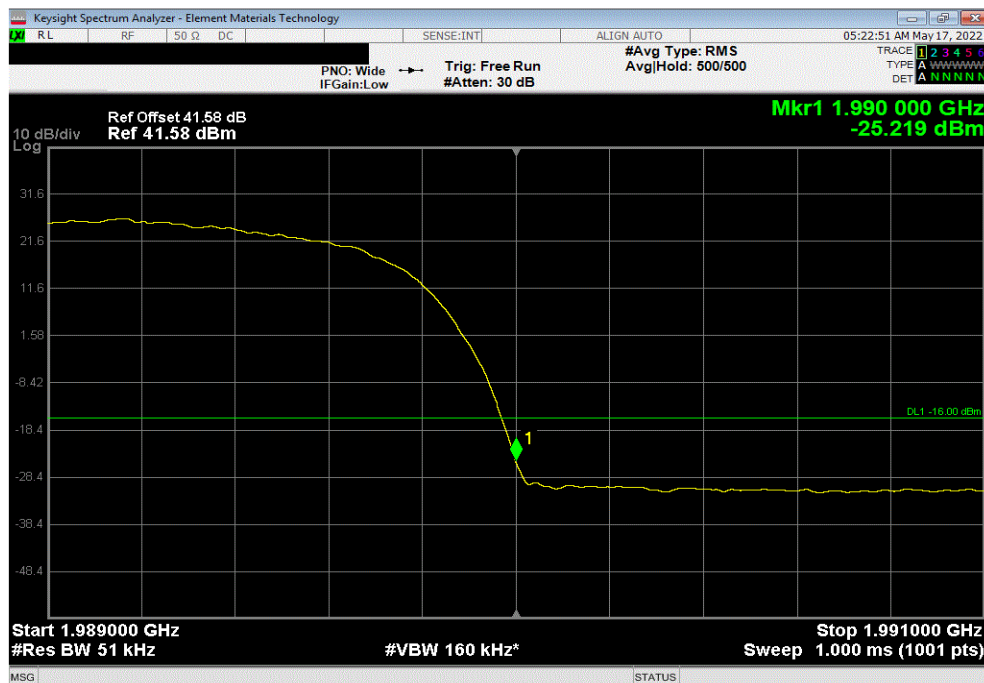


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-20.9	-16	Pass			



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.2	-16	Pass			

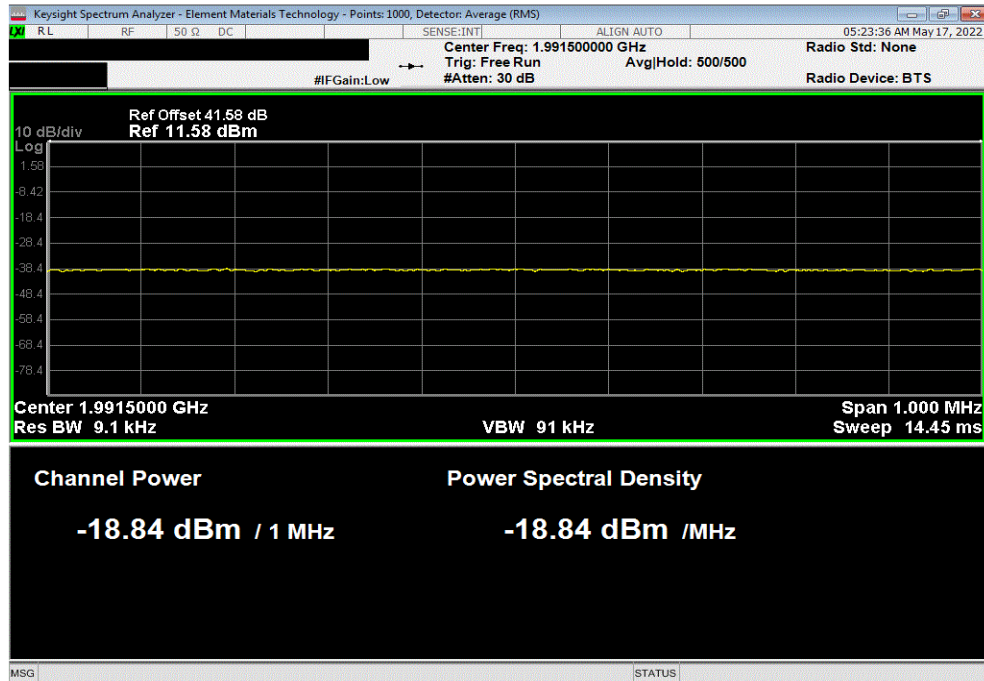


BAND EDGE COMPLIANCE - MULTIBAND

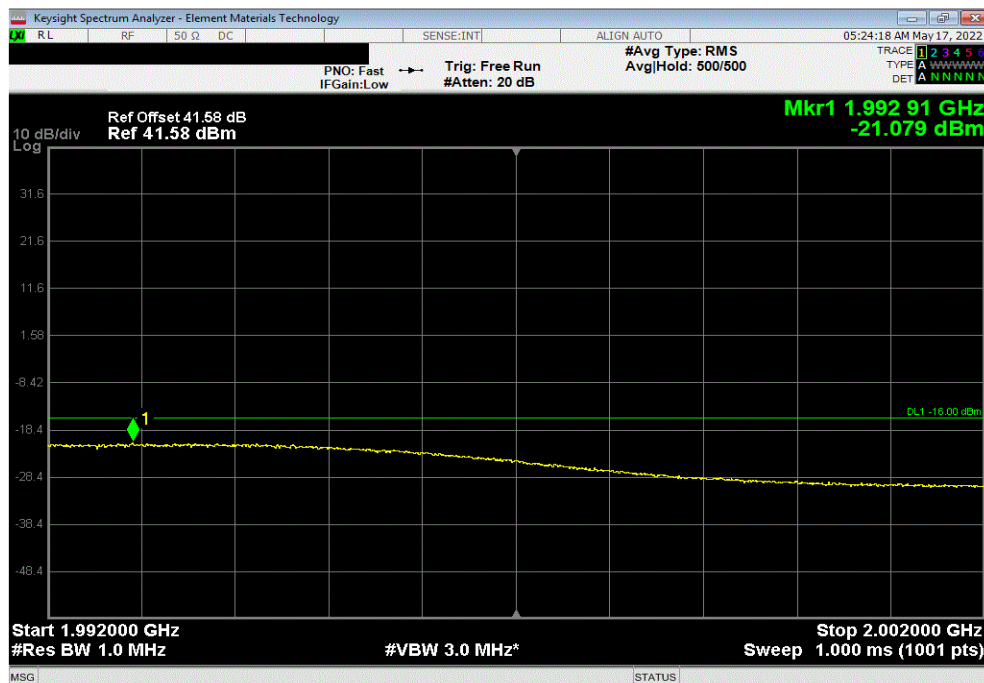


TbTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range		Max Value (dBm)		Limit < (dBm)		Result
2		-18.8		-16		Pass



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range		Max Value (dBm)		Limit < (dBm)		Result
3		-21.1		-16		Pass



SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS



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
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 22 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for the frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

RF conducted emissions testing was performed only on one port. The AHFI antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in output power testing) and antenna port 1 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.

Per section FCC 24.238(a), FCC 27.53(h)(1), RSS 133 6.5 (ii), and RSS-139 6.6 - the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -16 dBm $[-13 \text{ dBm} - 10 \log(2)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to -46dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: $-46\text{dBm} = -16\text{dBm} - 10\log(1\text{MHz}/1\text{kHz})$]. The limit for the 150kHz to 20MHz frequency range was adjusted to -36dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: $-36\text{dBm} = -16\text{dBm} - 10\log(1\text{MHz}/10\text{kHz})$]. The required limit of -16dBm with a RBW of $\geq 1\text{MHz}$ was used for all other frequency ranges. (See ANSI C63.26-2015 paragraph 5.7.2a for details on the Limit/RBW scaling method)

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS



TSTx 2022.05.02.0 XMR 2022.02.07.0

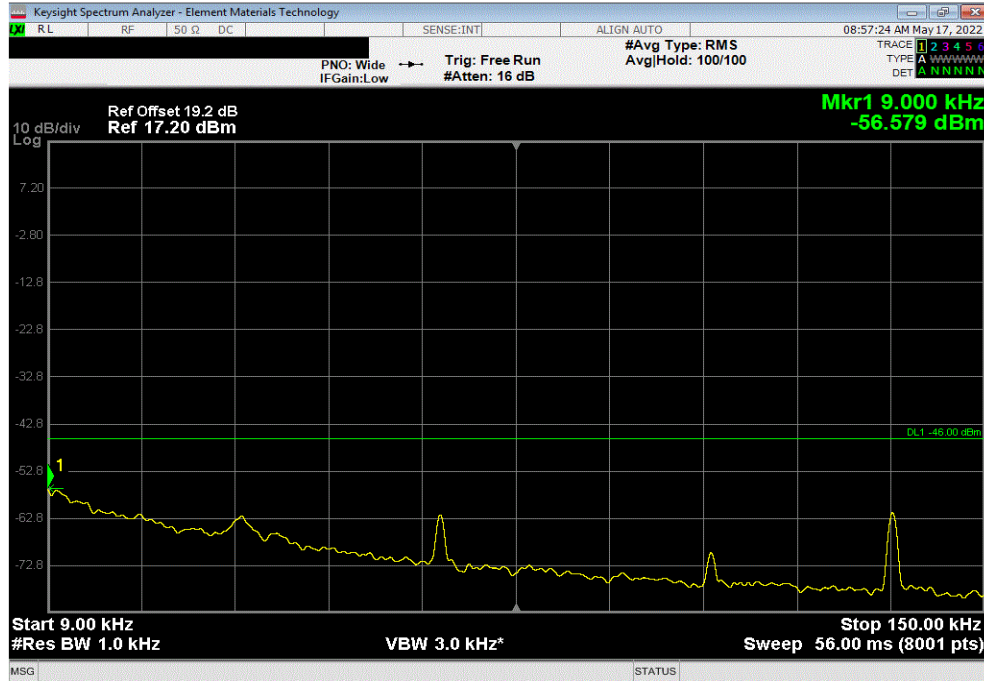
EUT: AHFI (FCC/ISED C2PC)		Work Order: NOKI0040				
Serial Number: YK214000036		Date: 16-May-22				
Customer: Nokia Solutions and Networks		Temperature: 23.3 °C				
Attendees: David Le, John Rattanavong		Humidity: 49.4% RH				
Project: None		Barometric Pres.: 1018 mbar				
Tested by: Brandon Hobbs		Power: 54 VDC	Job Site: TX05			
TEST SPECIFICATIONS		Test Method				
FCC 24E:2022		ANSI C63.26:2015				
RSS-133 Issue 6:2013+A1:2018		RSS-133 Issue 6:2013+A1:2018				
FCC 27:2022		ANSI C63.26:2015				
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015				
COMMENTS						
All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. PCS Band II / AWS Band X carriers were simultaneously enabled at maximum power (30 watts/carrier).						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1,2,3,4	Signature 				
		Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
PCS WCDMA, 1930 MHz - 1990 MHz						
Port 1						
5 MHz Bandwidth						
QPSK Modulation						
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	0.01	-56.58	-46	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	0.15	-58.49	-36	Pass
	Mid Channel, 1960 MHz	20 MHz - 3.5 GHz	3155.05	-22.39	-16	Pass
	Mid Channel, 1960 MHz	1.9 GHz - 2.2 GHz	1996.19	-25.34	-16	Pass
	Mid Channel, 1960 MHz	2.2 GHz - 13 GHz	4027.25	-42.64	-16	Pass
	Mid Channel, 1960 MHz	13 GHz - 22 GHz	20132.05	-23.9	-16	Pass
16-QAM Modulation						
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	0.01	-56.9	-46	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	0.15	-57.76	-36	Pass
	Mid Channel, 1960 MHz	20 MHz - 3.5 GHz	3223.78	-22.3	-16	Pass
	Mid Channel, 1960 MHz	1.9 GHz - 2.2 GHz	1996.98	-26	-16	Pass
	Mid Channel, 1960 MHz	2.2 GHz - 13 GHz	4031.05	-42.41	-16	Pass
	Mid Channel, 1960 MHz	13 GHz - 22 GHz	20094.7	-23.85	-16	Pass
64-QAM Modulation						
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	0.01	-56.63	-46	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	0.15	-56.95	-36	Pass
	Mid Channel, 1960 MHz	20 MHz - 3.5 GHz	3145.48	-22.75	-16	Pass
	Mid Channel, 1960 MHz	1.9 GHz - 2.2 GHz	1998.59	-26.53	-16	Pass
	Mid Channel, 1960 MHz	2.2 GHz - 13 GHz	4002.55	-42.64	-16	Pass
	Mid Channel, 1960 MHz	13 GHz - 22 GHz	20117.2	-23.82	-16	Pass
AWS WCDMA, 2110 MHz - 2170 MHz						
Port 1						
5 MHz Bandwidth						
QPSK Modulation						
	Mid Channel, 2140 MHz	9 kHz - 150 kHz	0.01	-57.08	-46	Pass
	Mid Channel, 2140 MHz	150 kHz - 20 MHz	0.15	-57.97	-36	Pass
	Mid Channel, 2140 MHz	20 MHz - 3.5 GHz	3250.31	-22.28	-16	Pass
	Mid Channel, 2140 MHz	1.9 GHz - 2.2 GHz	1997.01	-26.14	-16	Pass
	Mid Channel, 2140 MHz	2.2 GHz - 13 GHz	3982.6	-43.27	-16	Pass
	Mid Channel, 2140 MHz	13 GHz - 22 GHz	21961.75	-24.49	-16	Pass
16-QAM Modulation						
	Mid Channel, 2140 MHz	9 kHz - 150 kHz	0.01	-57.82	-46	Pass
	Mid Channel, 2140 MHz	150 kHz - 20 MHz	0.15	-57.63	-36	Pass
	Mid Channel, 2140 MHz	20 MHz - 3.5 GHz	3187.24	-22.63	-16	Pass
	Mid Channel, 2140 MHz	1.9 GHz - 2.2 GHz	1995.14	-26.37	-16	Pass
	Mid Channel, 2140 MHz	2.2 GHz - 13 GHz	4019.18	-43.17	-16	Pass
	Mid Channel, 2140 MHz	13 GHz - 22 GHz	21545.05	-23.96	-16	Pass
64-QAM Modulation						
	Mid Channel, 2140 MHz	9 kHz - 150 kHz	0.01	-56.94	-46	Pass
	Mid Channel, 2140 MHz	150 kHz - 20 MHz	0.15	-57.79	-36	Pass
	Mid Channel, 2140 MHz	20 MHz - 3.5 GHz	3254.23	-22.16	-16	Pass
	Mid Channel, 2140 MHz	1.9 GHz - 2.2 GHz	1996.71	-25.68	-16	Pass
	Mid Channel, 2140 MHz	2.2 GHz - 13 GHz	4016.33	-42.44	-16	Pass
	Mid Channel, 2140 MHz	13 GHz - 22 GHz	19963.3	-23.92	-16	Pass

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

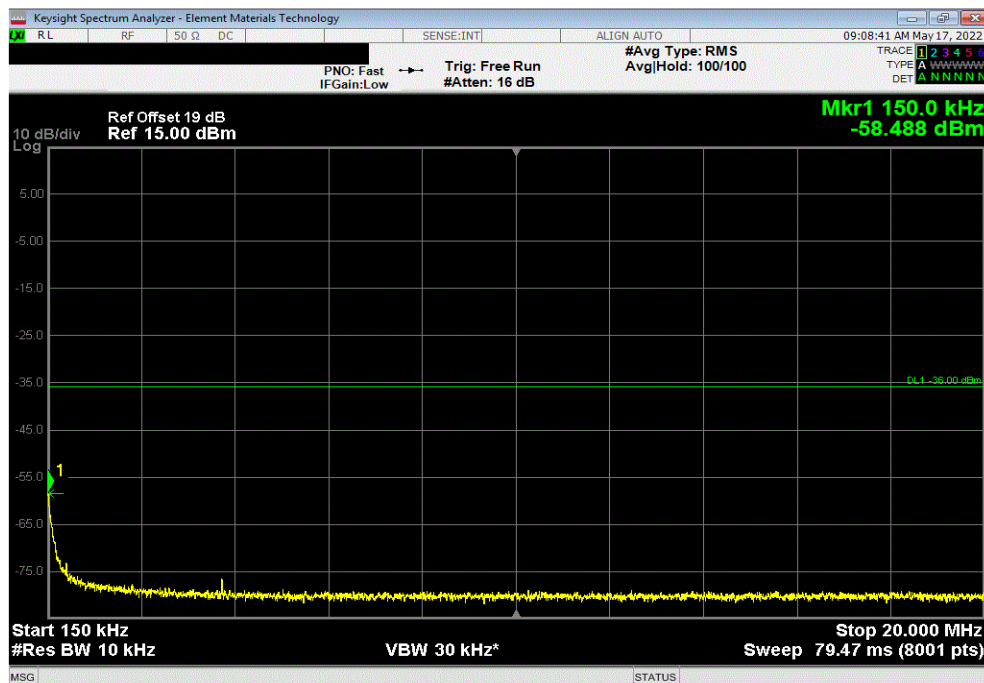


TMTx 2022.05.02.0 XMR 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.58	-46	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-58.49	-36	Pass	

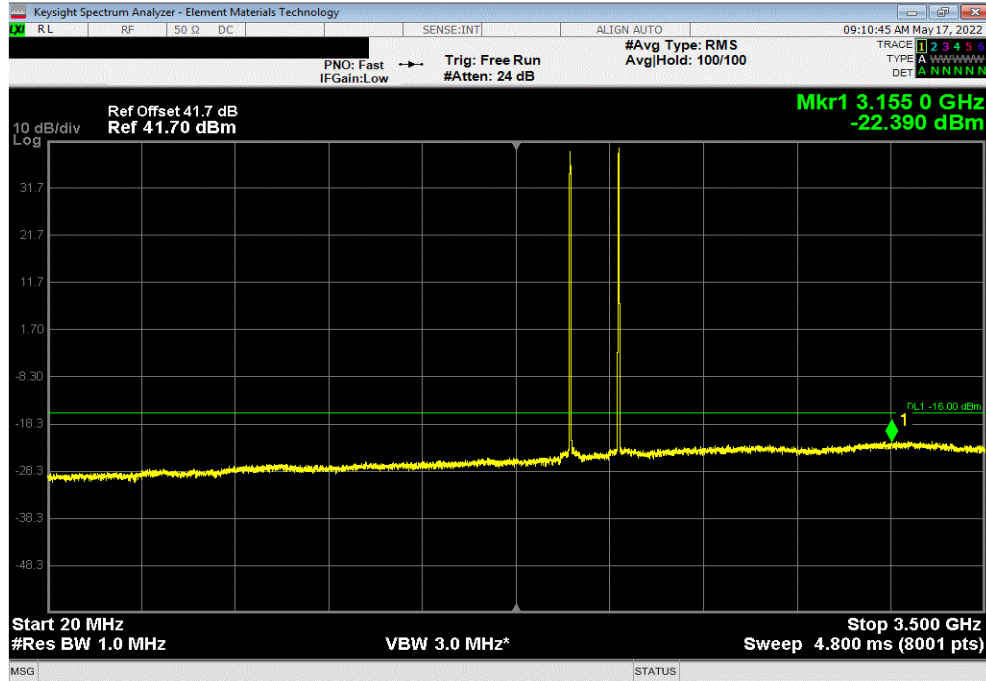


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

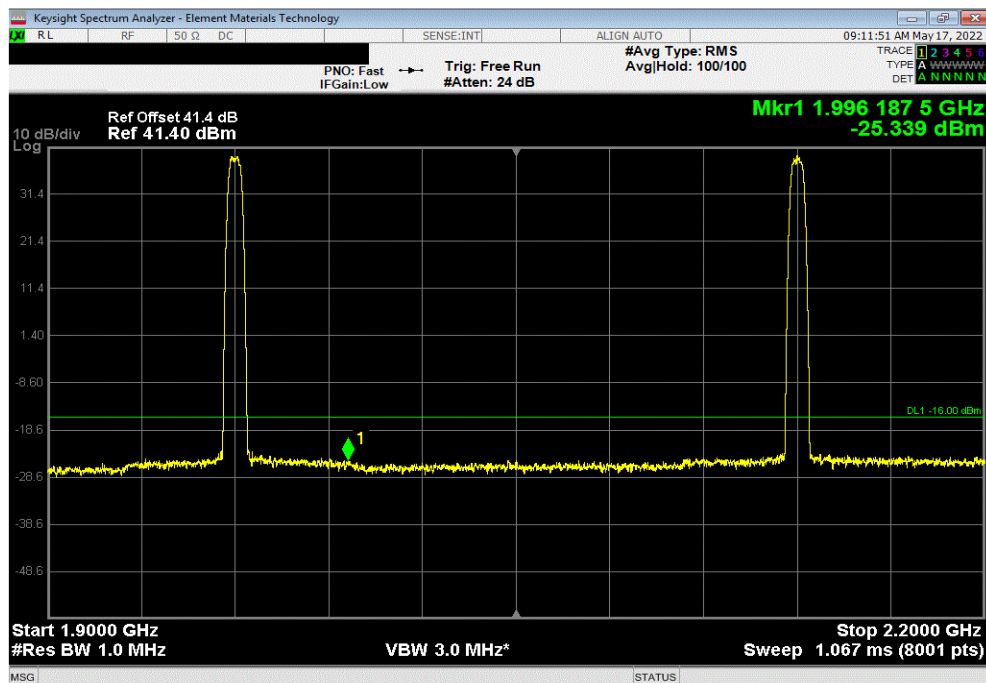


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3155.05	-22.39	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1996.19	-25.34	-16	Pass	

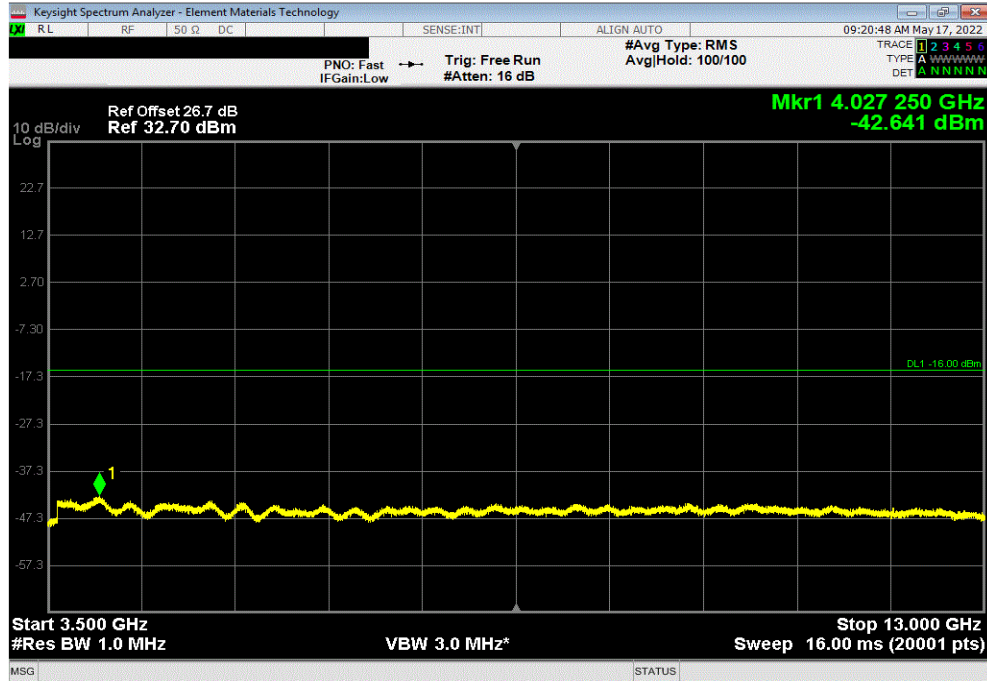


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

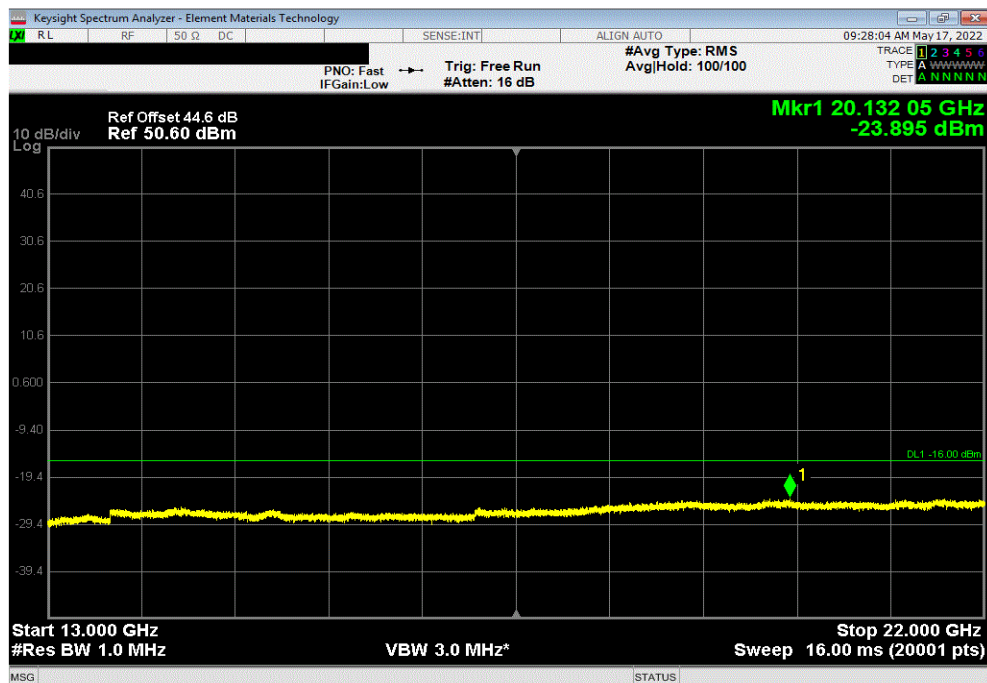


TMTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4027.25	-42.64	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	20132.05	-23.9	-16	Pass	

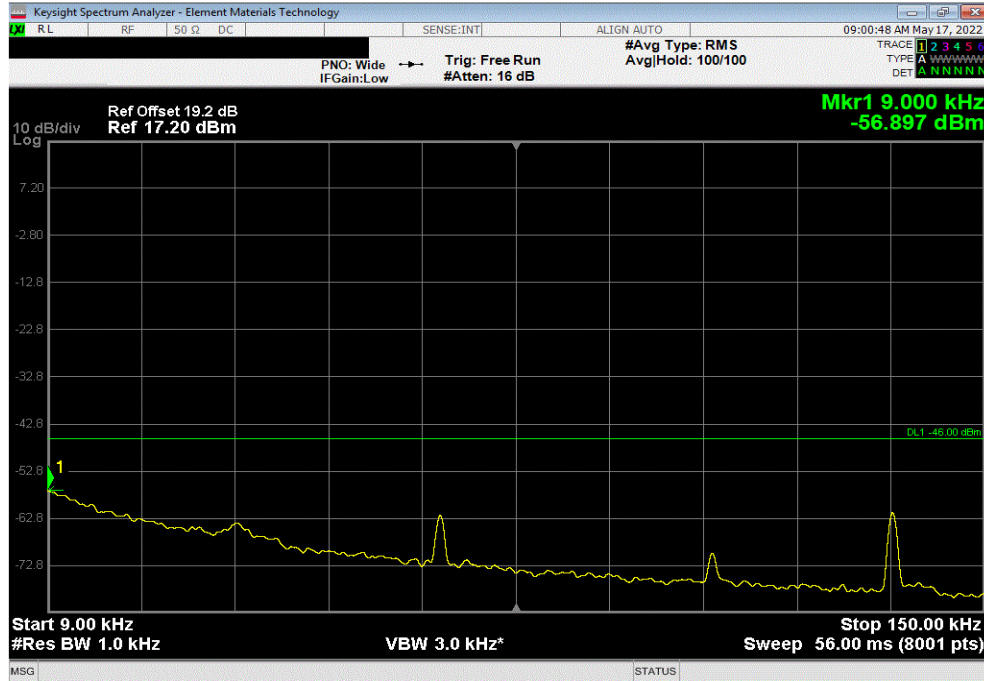


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

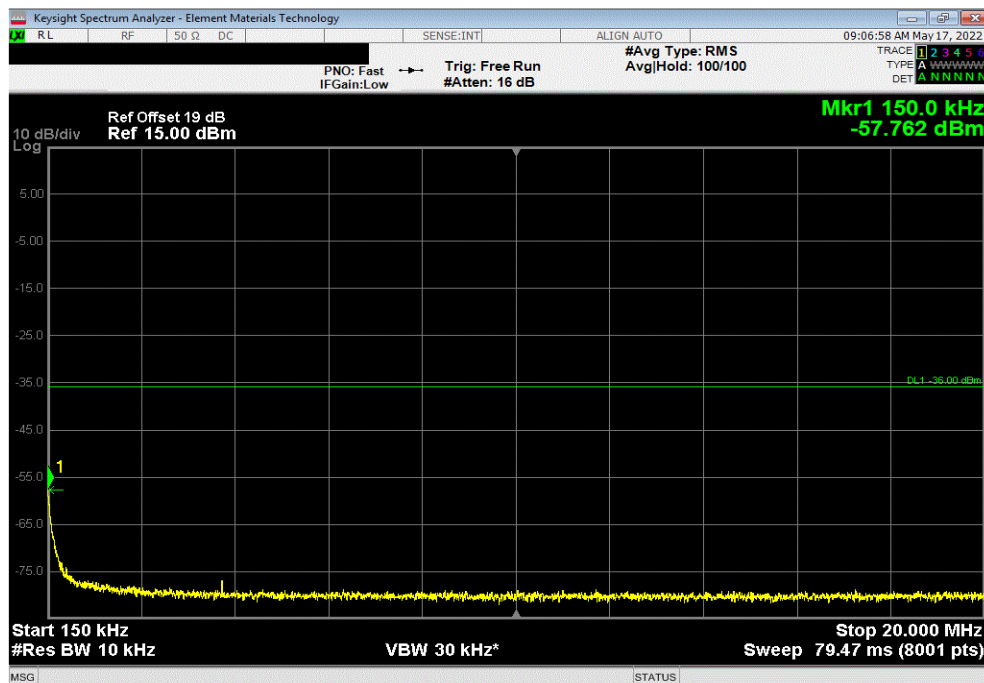


TMTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.9	-46	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-57.76	-36	Pass	

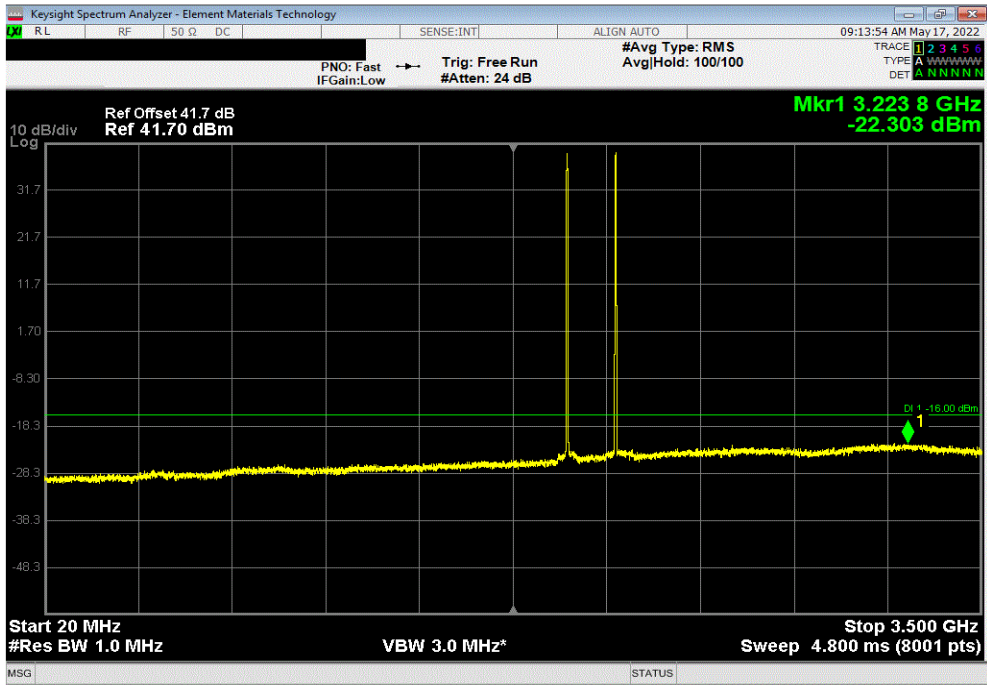


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

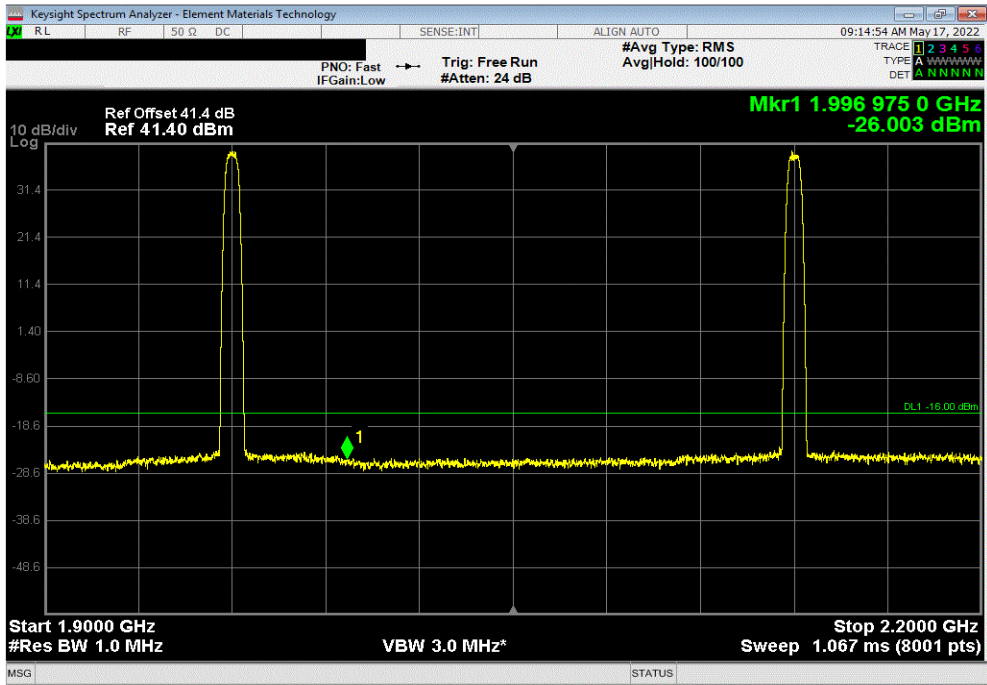


TMTx 2022.05.02.0 XMM 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3223.78	-22.3	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1996.98	-26	-16	Pass	

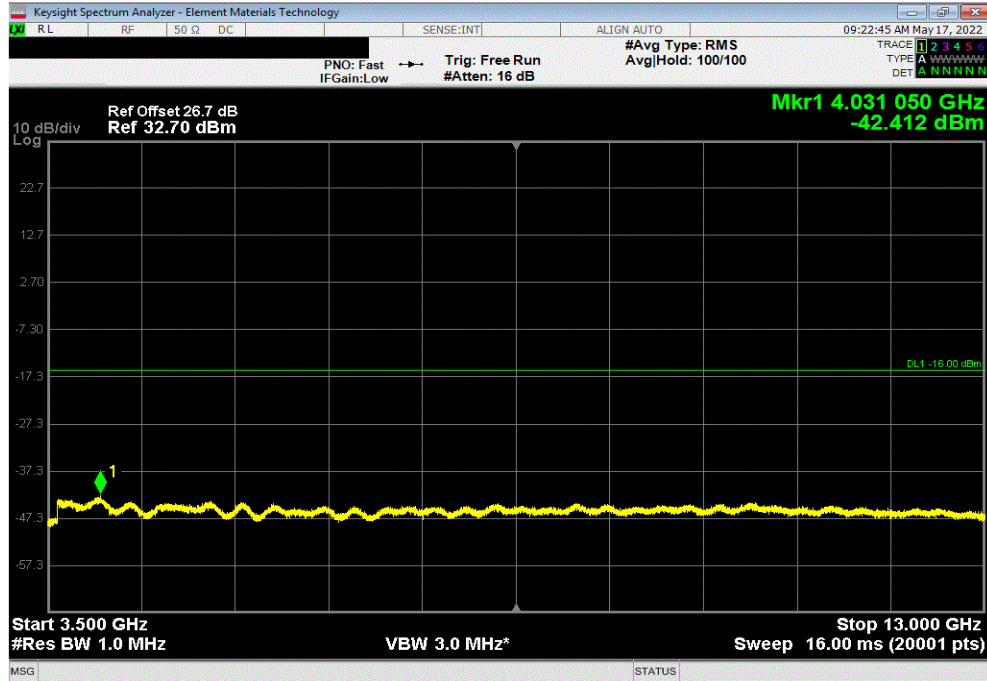


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

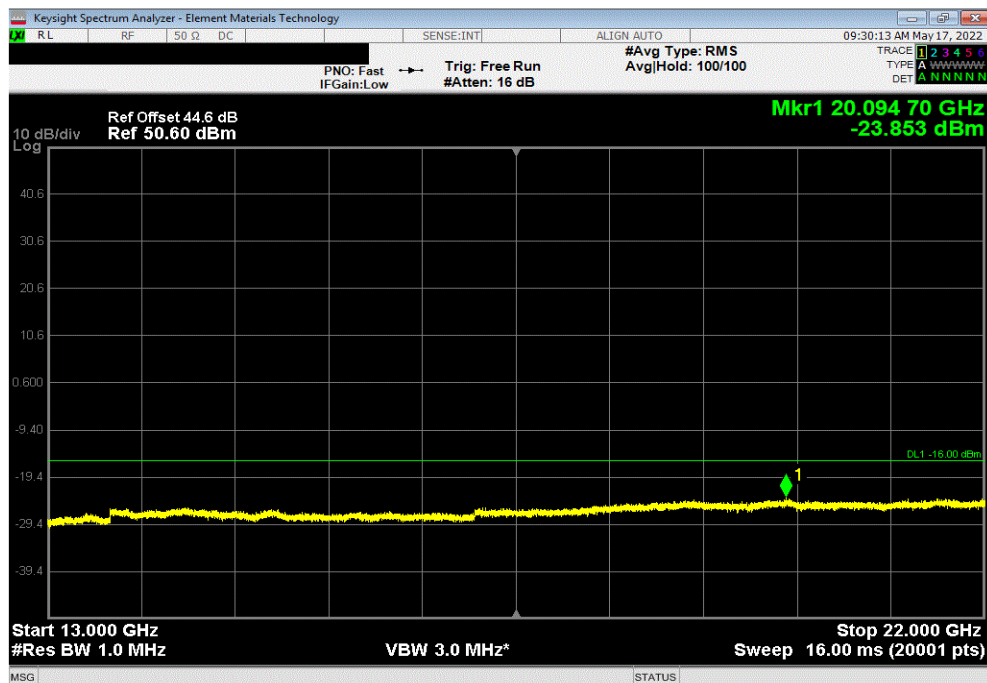


TbTtx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4031.05	-42.41	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	20094.7	-23.85	-16	Pass	

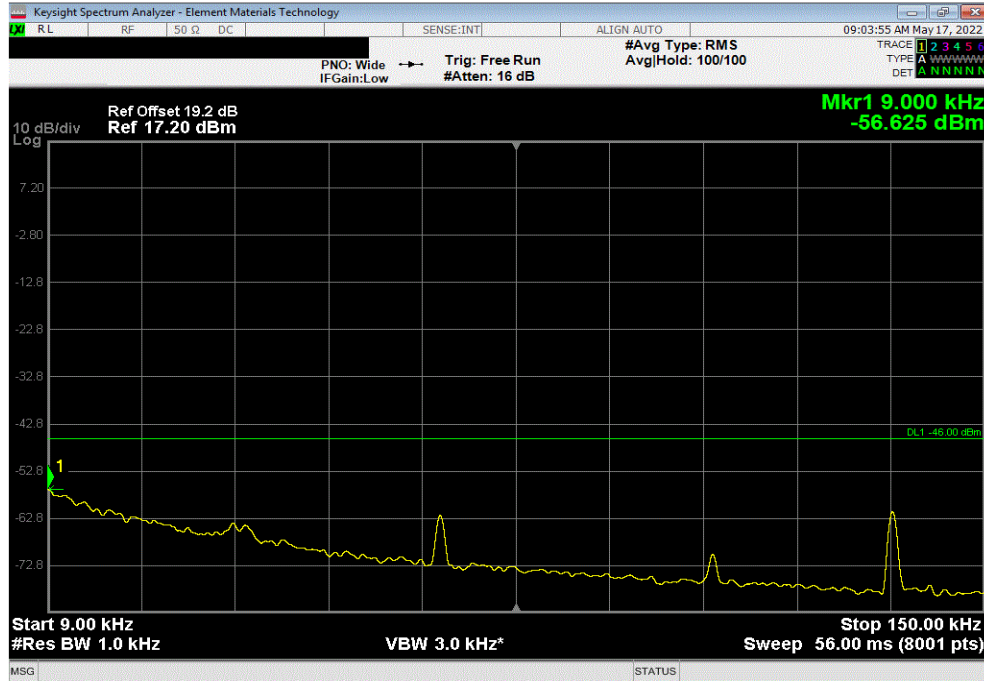


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

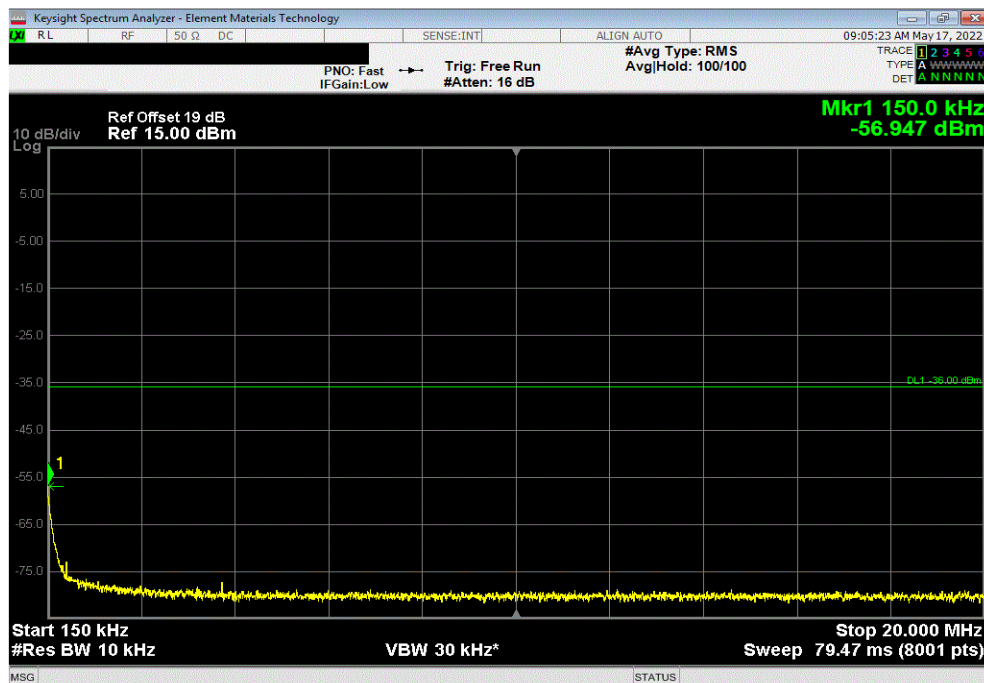


TMTx 2022.05.02.0 XMR 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.63	-46	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-56.95	-36	Pass	

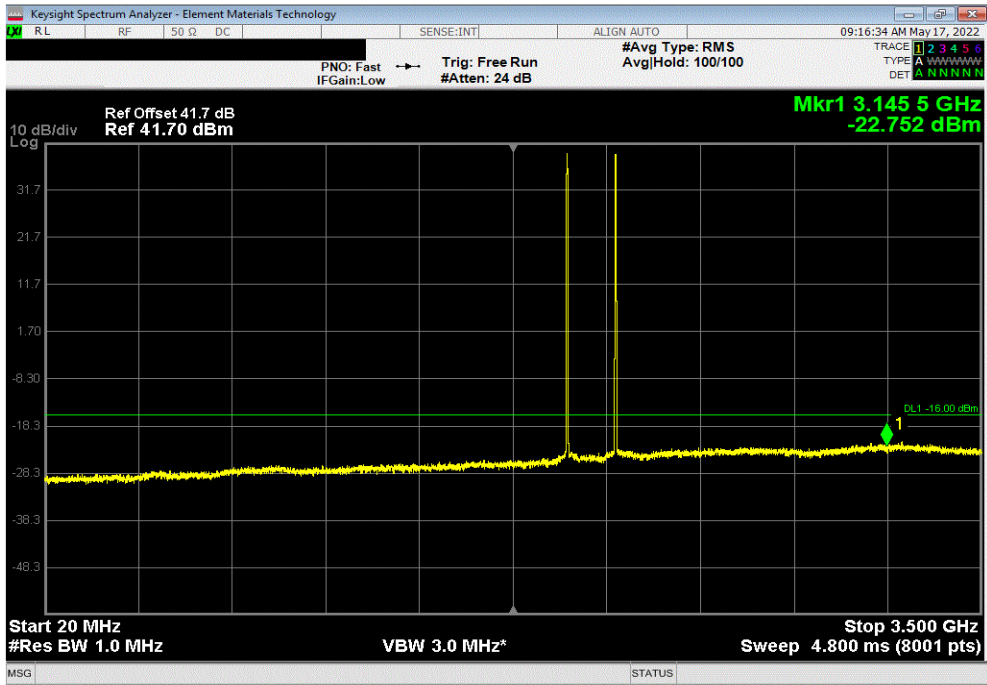


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

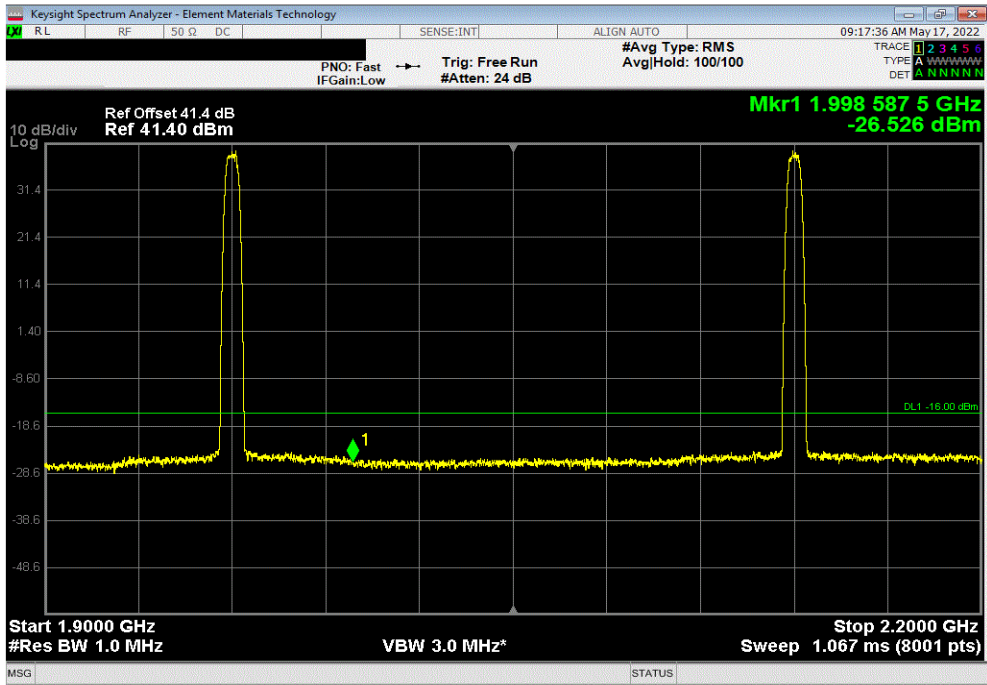


TMTx 2022.05.02.0 XMM 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3145.48	-22.75	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1998.59	-26.53	-16	Pass	

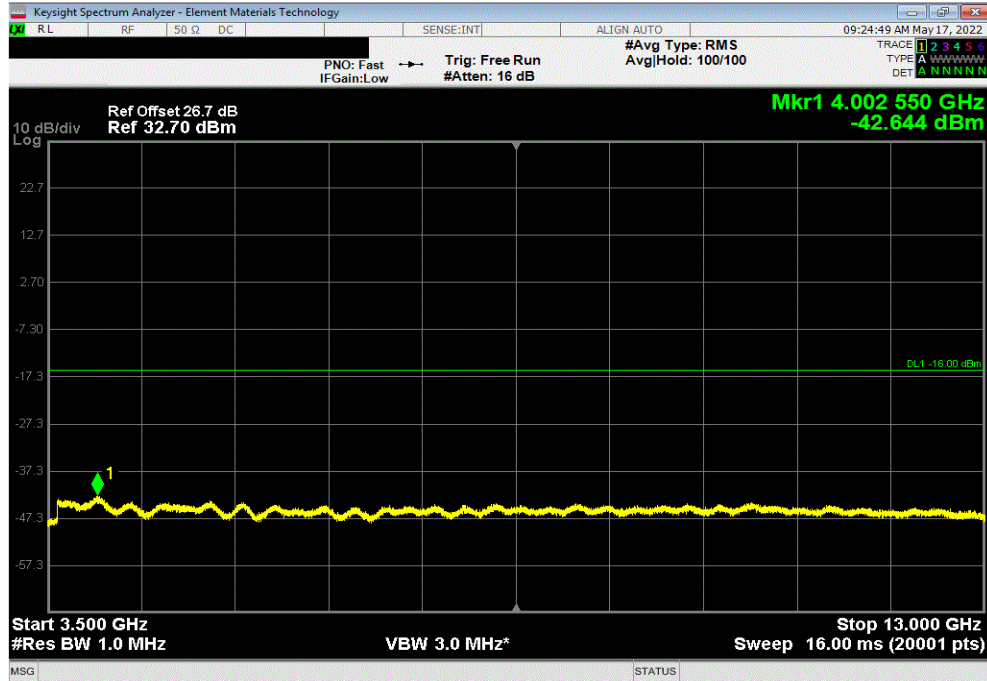


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

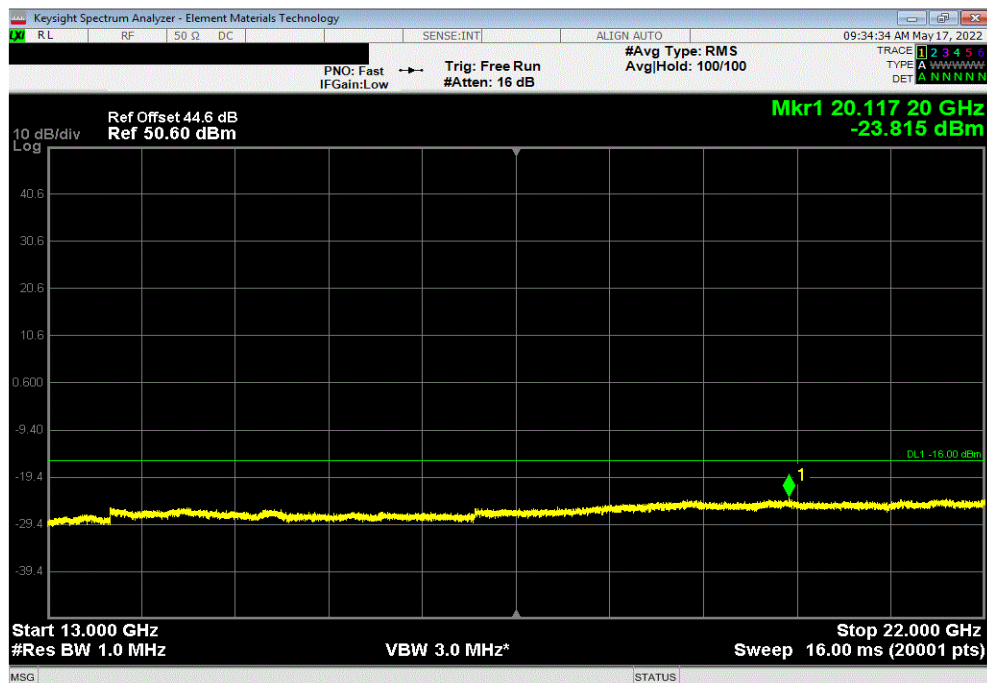


TMTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4002.55	-42.64	-16	Pass	



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	20117.2	-23.82	-16	Pass	

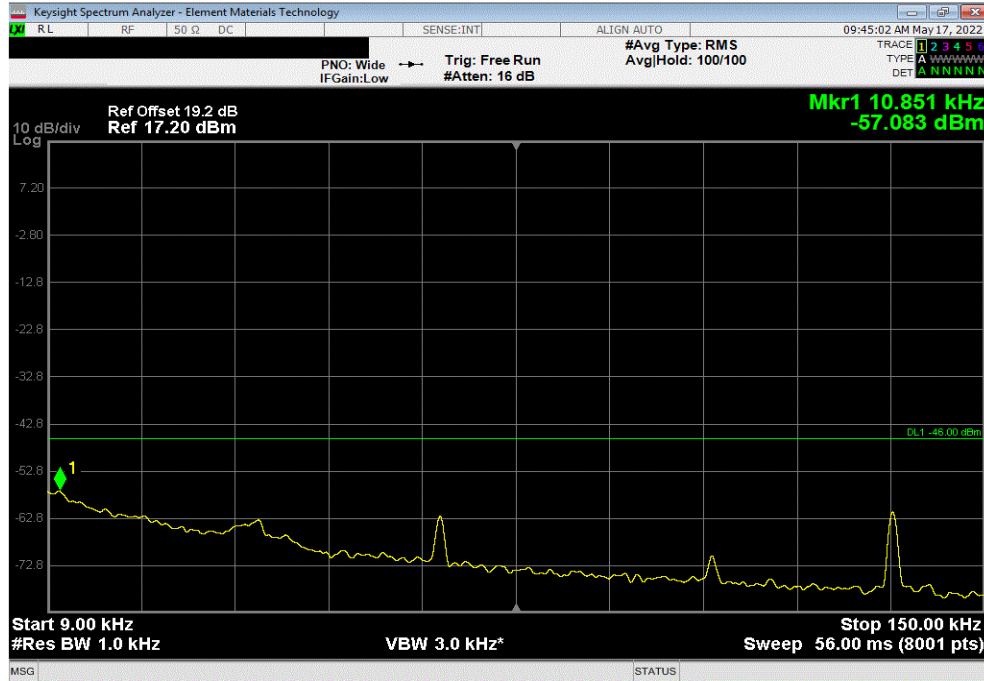


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

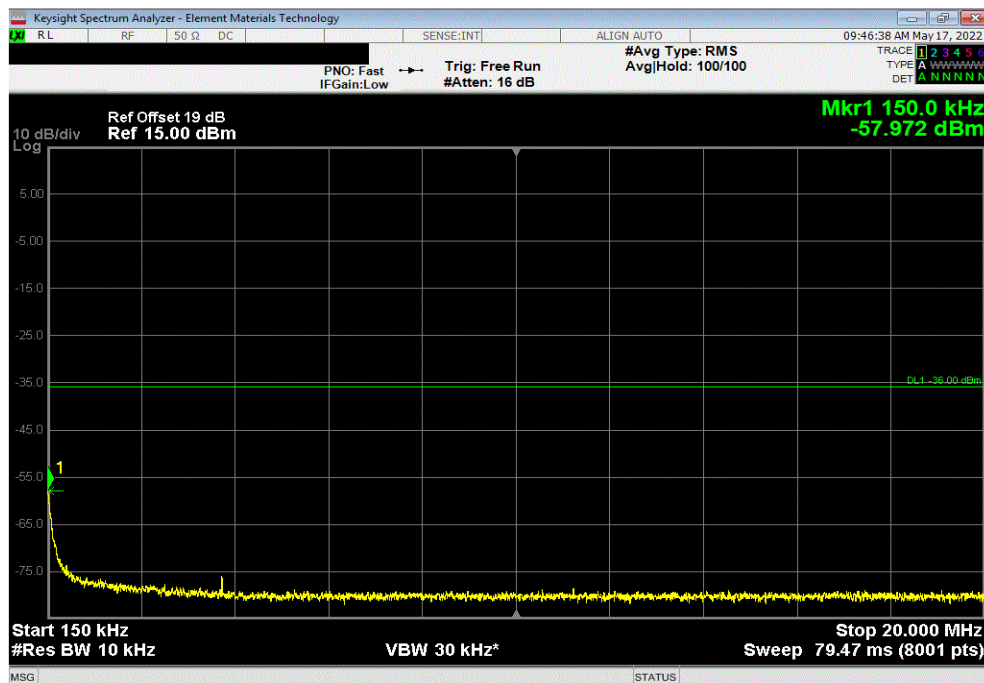


TMTx 2022.05.02.0 XMR 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-57.08	-46	N/A	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-57.97	-36	N/A	

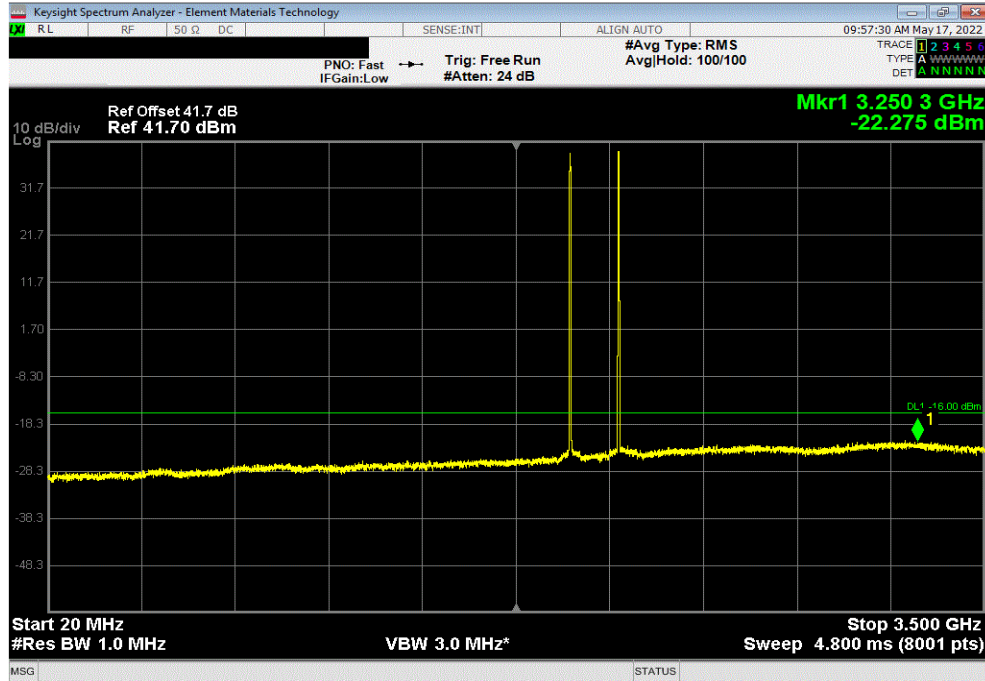


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

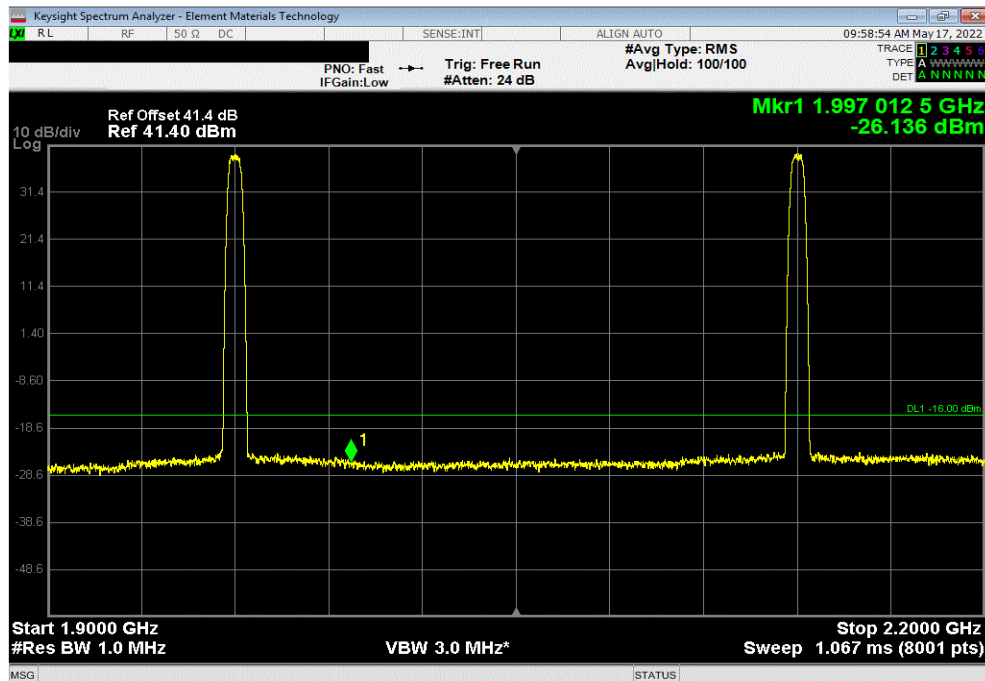


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3250.31	-22.28	-16	Pass	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1997.01	-26.14	-16	Pass	

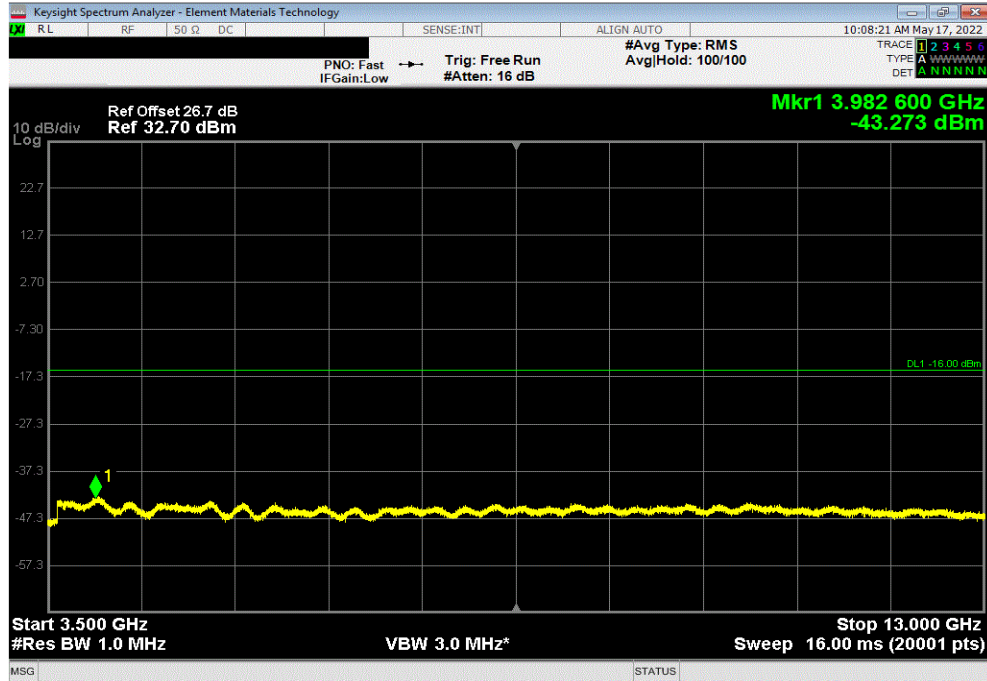


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

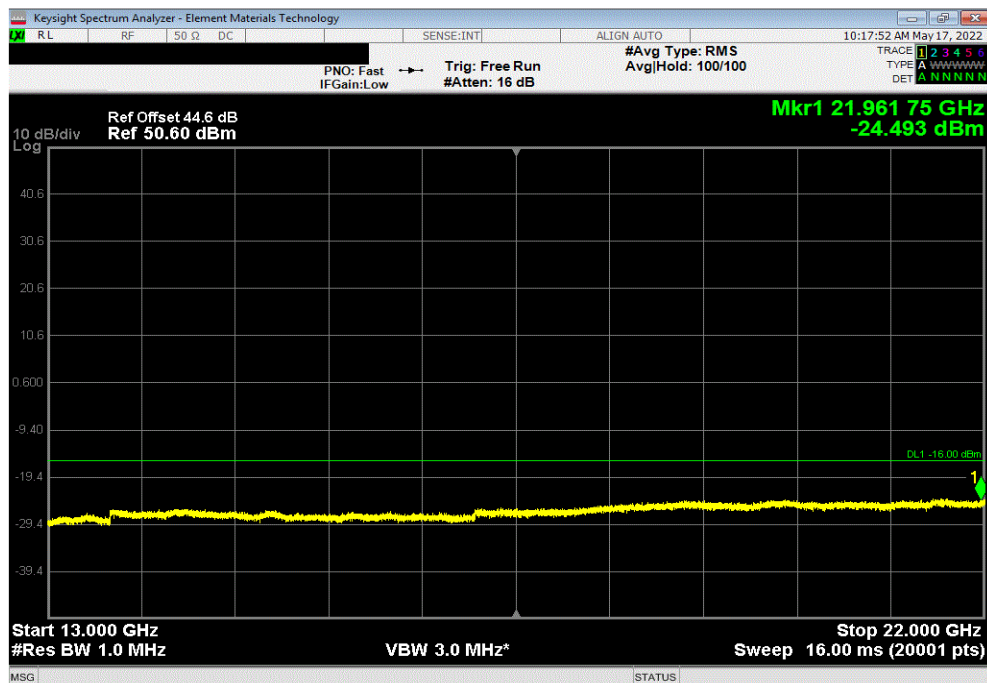


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	3982.6	-43.27	-16	Pass	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	21961.75	-24.49	-16	Pass	

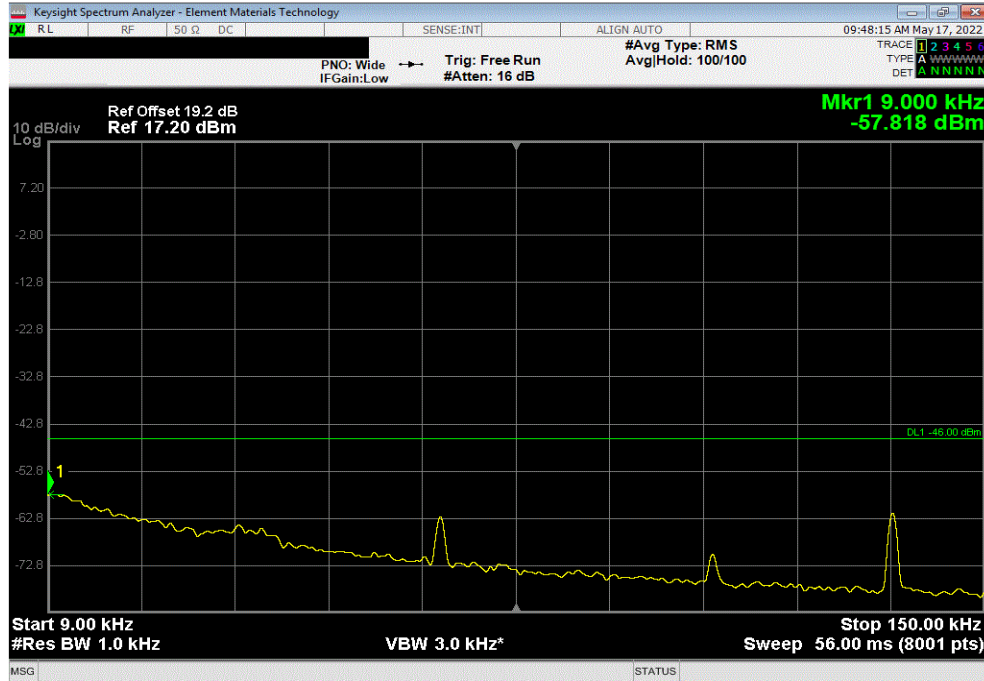


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

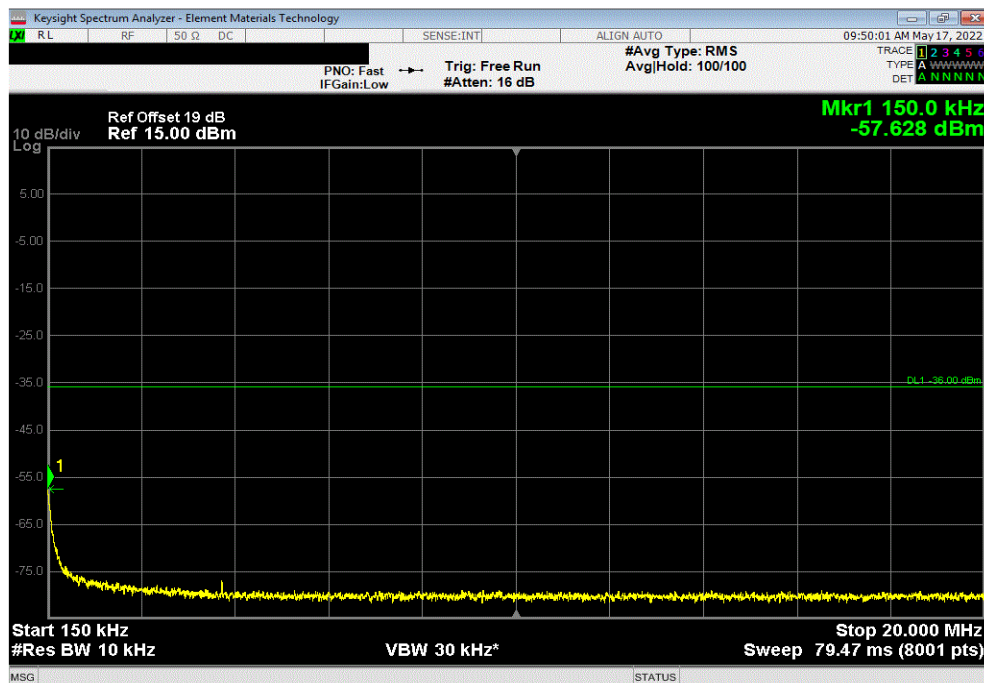


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-57.82	-46	N/A	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-57.63	-36	N/A	



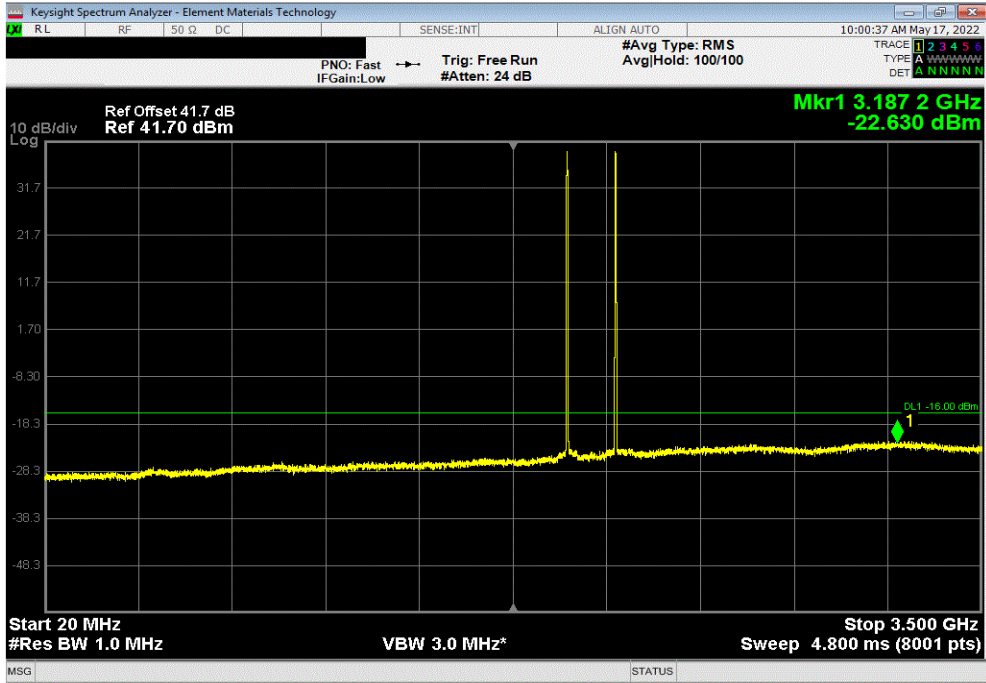
SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS



TMTx 2022.05.02.0 XMM 2022.02.07.0

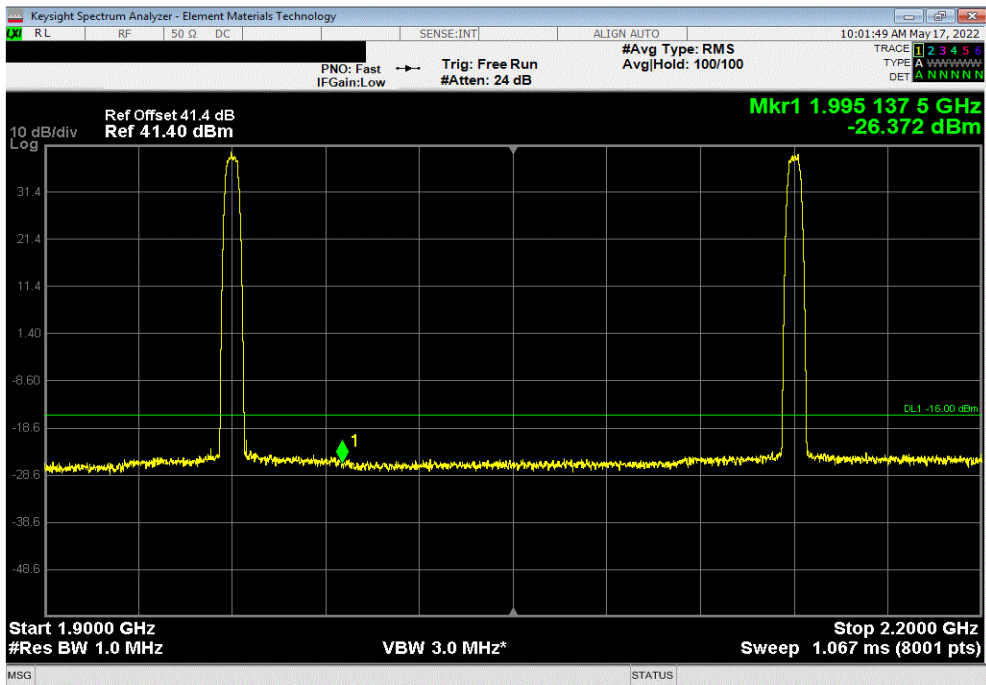
AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
20 MHz - 3.5 GHz	3187.24	-22.63	-16	Pass



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
1.9 GHz - 2.2 GHz	1995.14	-26.37	-16	Pass

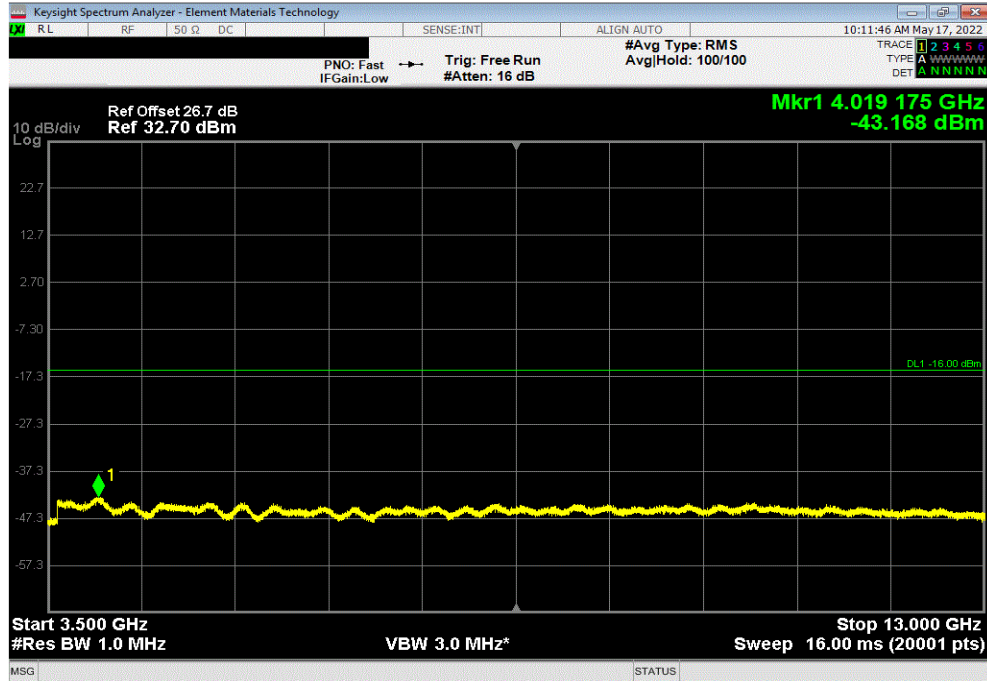


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

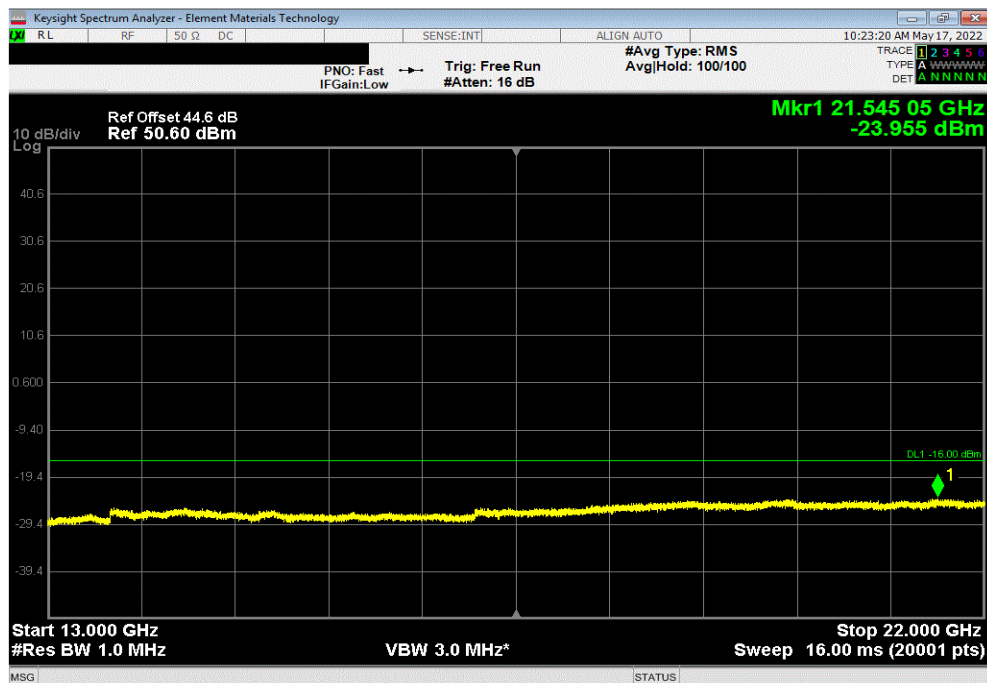


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4019.18	-43.17	-16	Pass	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	21545.05	-23.96	-16	Pass	

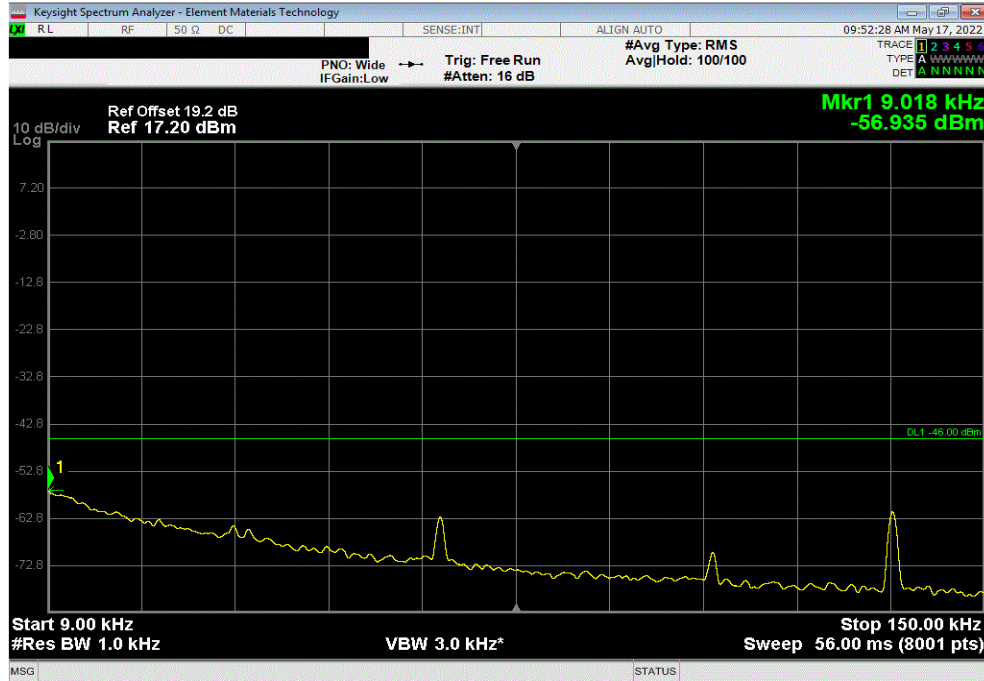


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

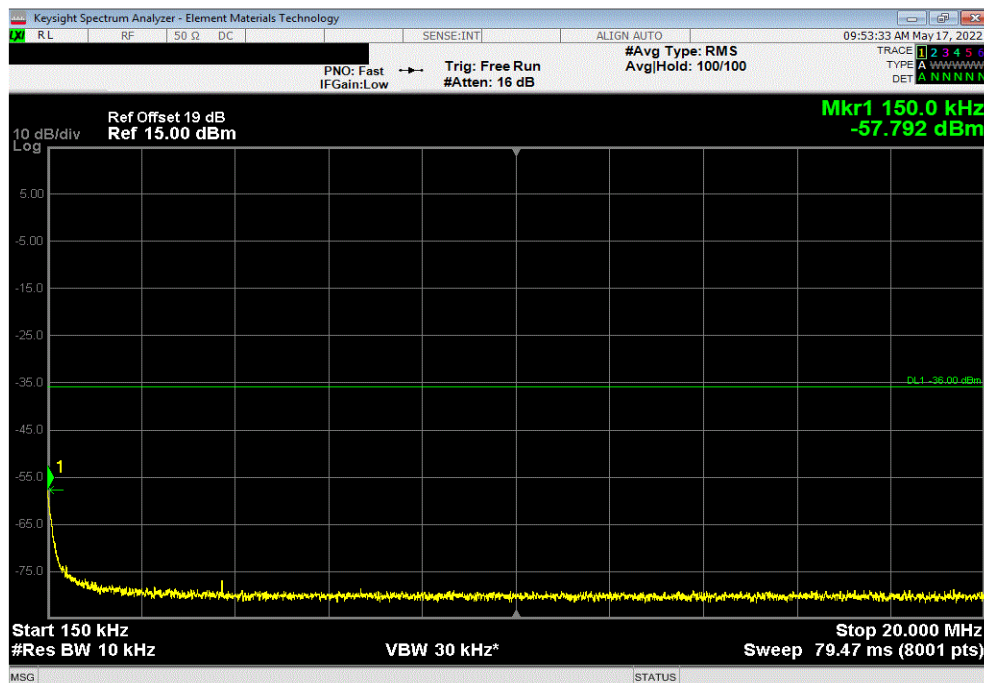


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.94	-46	N/A	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-57.79	-36	N/A	

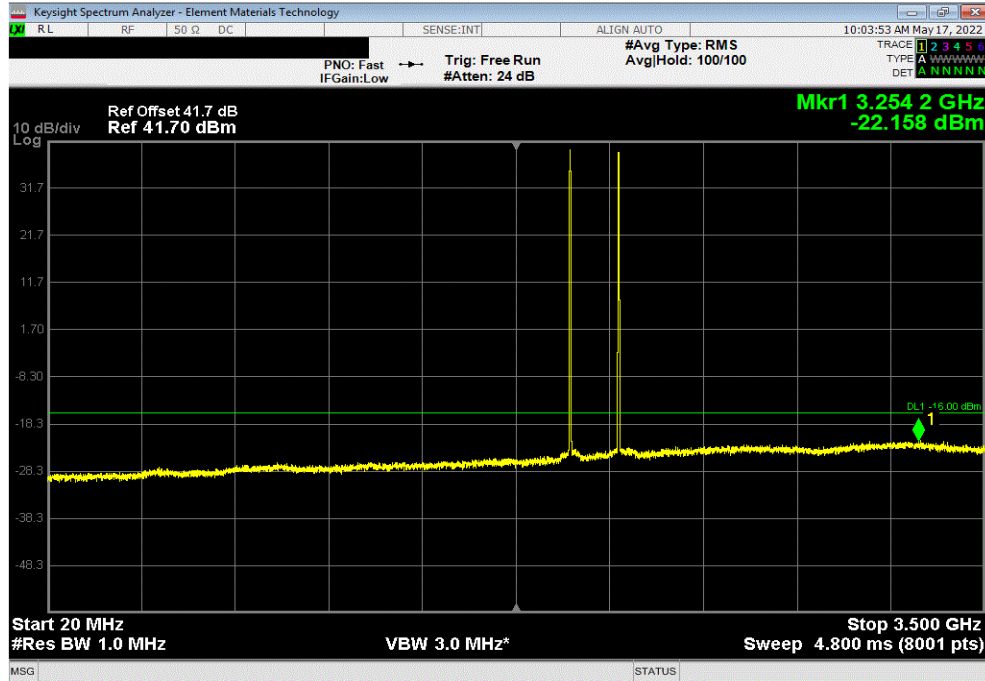


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

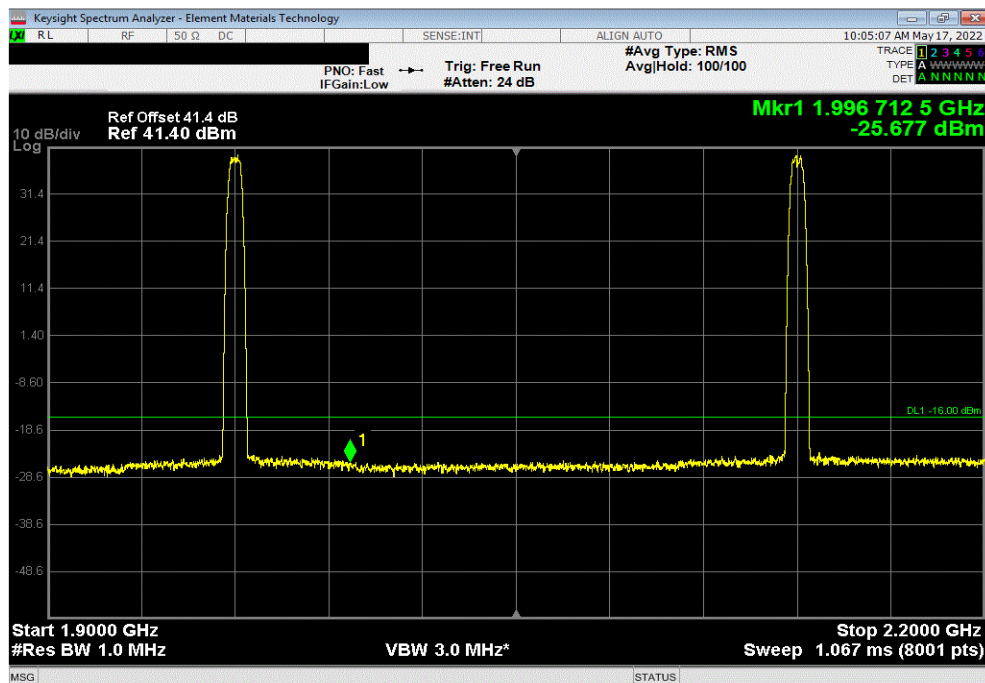


TMTx 2022.05.02.0 XMM 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3254.23	-22.16	-16	Pass	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1996.71	-25.68	-16	Pass	

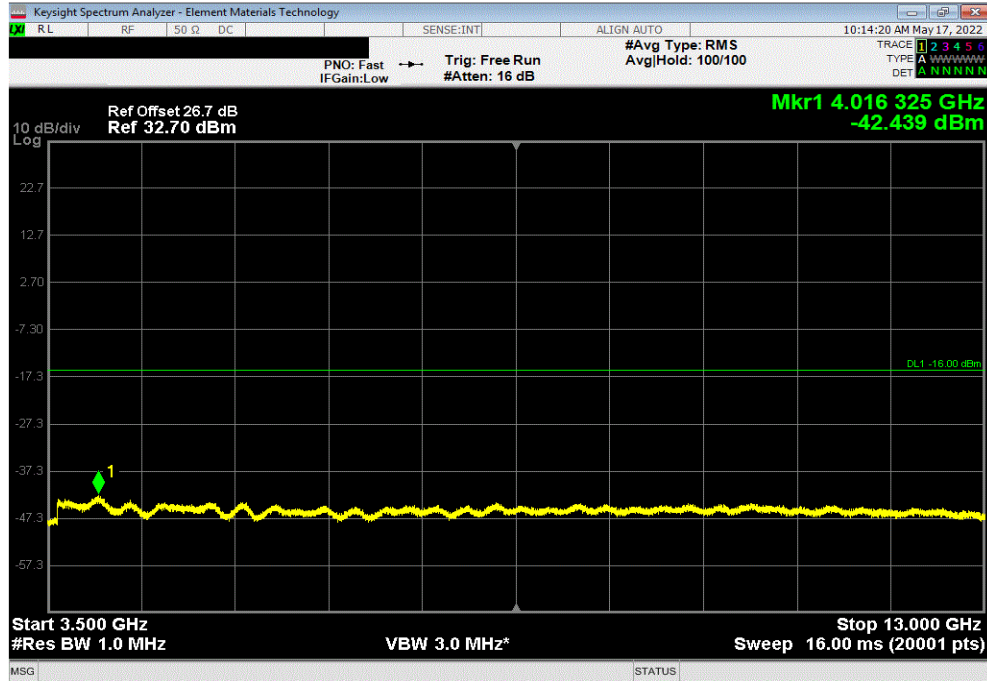


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

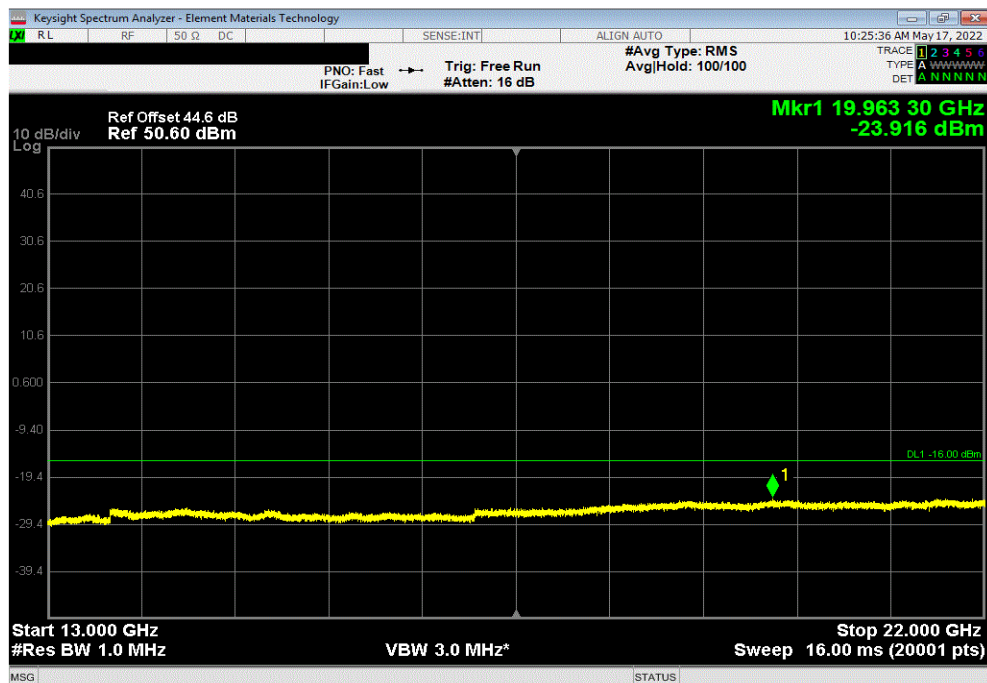


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4016.33	-42.44	-16	Pass	



AWS WCMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	19963.3	-23.92	-16	Pass	



SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND



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
Block - DC	Fairview Microwave	SD3379	AMT	2021-09-14	2022-09-14
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 22 GHz. The conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB 971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for the frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

RF conducted emissions testing was performed only on one port. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in output power testing) and antenna port 1 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.

Multicarrier test cases were developed and tested as shown below:

- PCS Multicarrier Multiband Test Case: In the PCS band _Three WCDMA carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (1932.4 & 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (1987.6MHz) at the upper band edge. In the AWS band _ Two WCDMA carriers at the band middle (2137.5 & 2142.5MHz). The carriers are operated at maximum power (~26.6W/PCS carrier and 20W/AWS carrier) with a total port power of 120 watts (80W for PCS band carriers + 40W for AWS band carriers).
- AWS Multicarrier Multiband Test Case: In the AWS band _Three WCDMA carriers using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (2112.4 & 2117.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (2167.6MHz) at the upper band edge. In the PCS band: Two WCDMA carriers at band middle (1957.5 & 1962.5MHz). The carriers are operated at maximum power (~26.6W/AWS carrier and 20W/PCS carrier) with a total port power of 120 watts (80W for AWS band carriers + 40W for PCS band carriers).

Per section FCC 24.238(a), FCC 27.53(h)(1), RSS 133 6.5 (ii), and RSS-139 6.6 - the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -16 dBm [-13 dBm -10 log (2)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to -46dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -46dBm = -16dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -36dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -36dBm = -16dBm -10log(1MHz/10kHz)]. The required limit of -16dBm with a RBW of $\geq$ 1MHz was used for all other frequency ranges. (See ANSI C63.26-2015 paragraph 5.7.2a for details on the Limit/RBW scaling method)

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND



EUT: AHFIL (FCC/ISED C2PC)		Work Order: NOKI0040	
Serial Number: YK214000036		Date: 16-May-22	
Customer: Nokia Solutions and Networks		Temperature: 23.4 °C	
Attendees: David Le, John Rattanaovong		Humidity: 48.9% RH	
Project: None		Barometric Pres.: 1018 mbar	
Tested by: Brandon Hobbs		Job Site: TX05	
Power: -46			

TEST SPECIFICATIONS		Test Method	
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6:2013+A1:2018		RSS-133 Issue 6:2013+A1:2018	
FCC 27:2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	

COMMENTS

All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. PCS Band II / AWS Band X carriers were enabled at maximum power.

DEVIATIONS FROM TEST STANDARD

None

Configuration #	1,2,3,4	Signature

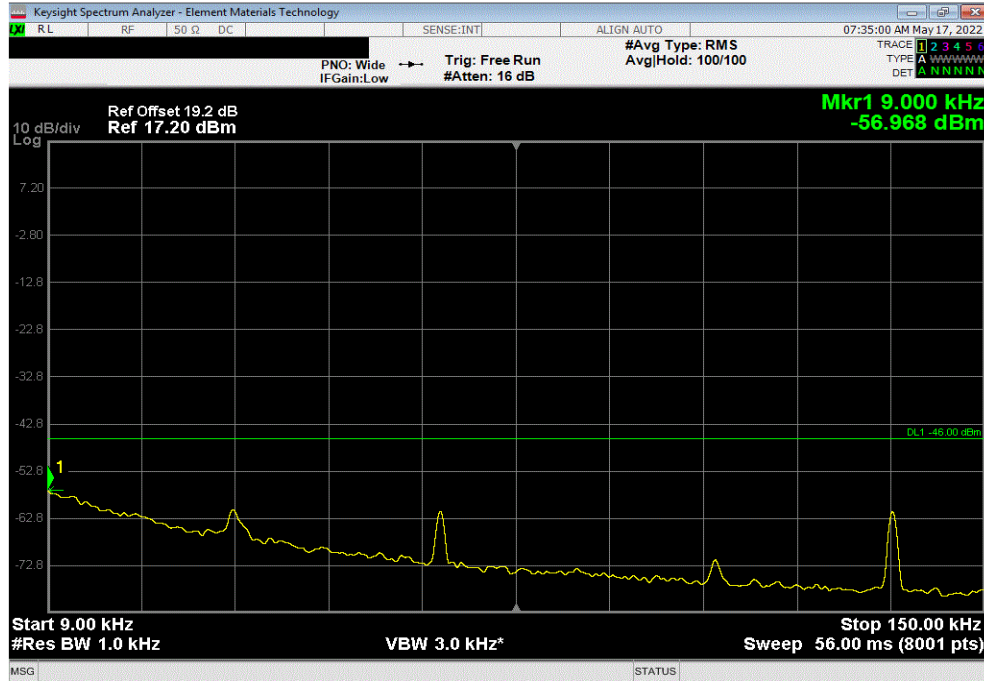
	Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
AWS and PCS BANDS					
Port 1					
5 MHz Bandwidth					
64-QAM Modulation					
Multicarrier Multiband Test Case 2	9 kHz - 150 kHz	0.01	-57.0	-46	Pass
Multicarrier Multiband Test Case 2	150 kHz - 20 MHz	0.15	-57.8	-36	Pass
Multicarrier Multiband Test Case 2	20 MHz - 3.5 GHz	3171.58	-21.9	-16	Pass
Multicarrier Multiband Test Case 2	1.9 GHz - 2.2 GHz	1996.19	-24.7	-16	Pass
Multicarrier Multiband Test Case 2	2.2 GHz - 13 GHz	4011.58	-42.5	-16	Pass
Multicarrier Multiband Test Case 2	1.9 GHz - 2.2 GHz	21534.7	-23.9	-16	Pass
Multicarrier Multiband Test Case 1	9 kHz - 150 kHz	0.01	-56.7	-46	Pass
Multicarrier Multiband Test Case 1	150 kHz - 20 MHz	0.15	-56.7	-36	Pass
Multicarrier Multiband Test Case 1	20 MHz - 3.5 GHz	3209.86	-22.4	-16	Pass
Multicarrier Multiband Test Case 1	1.9 GHz - 2.2 GHz	2177.24	-24.3	-16	Pass
Multicarrier Multiband Test Case 1	2.2 GHz - 13 GHz	3987.83	-43.0	-16	Pass
Multicarrier Multiband Test Case 1	1.9 GHz - 2.2 GHz	21591.4	-23.9	-16	Pass

SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

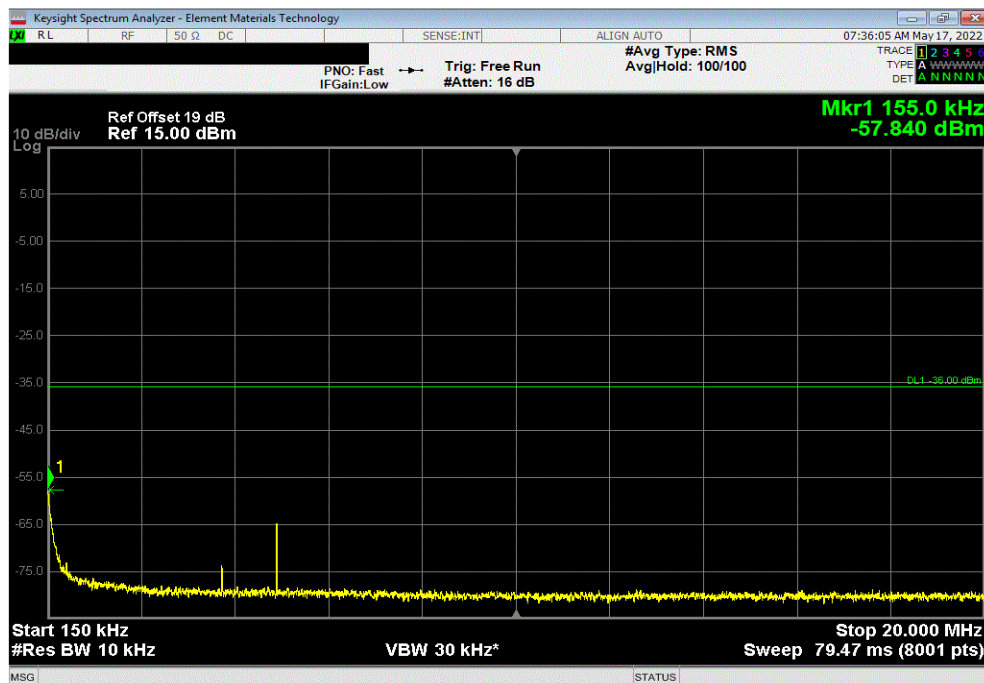


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.97	-46	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-57.84	-36	Pass	

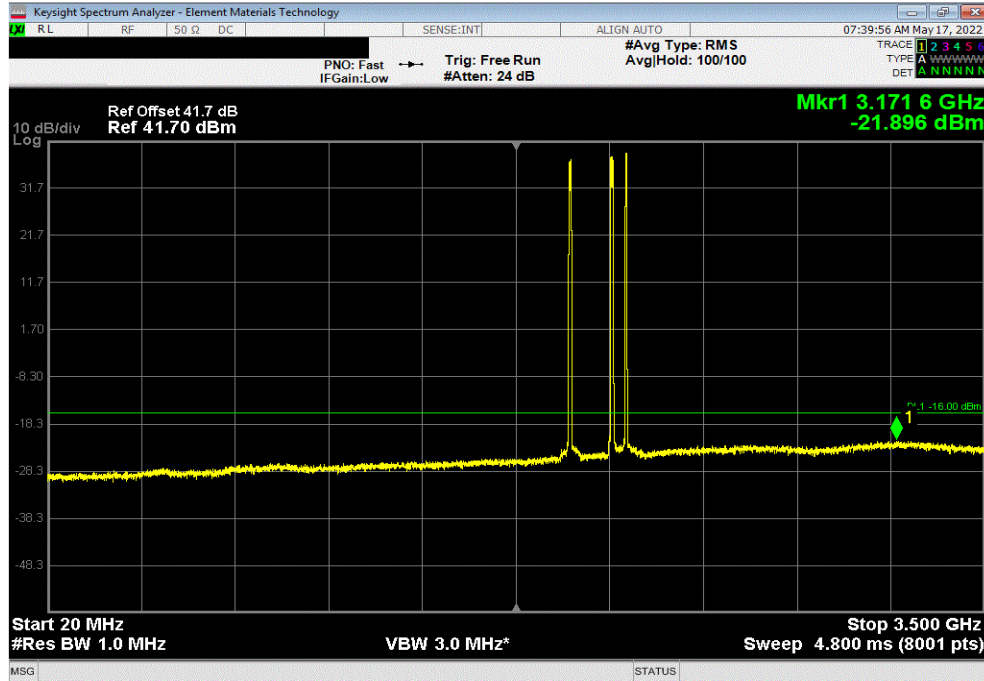


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

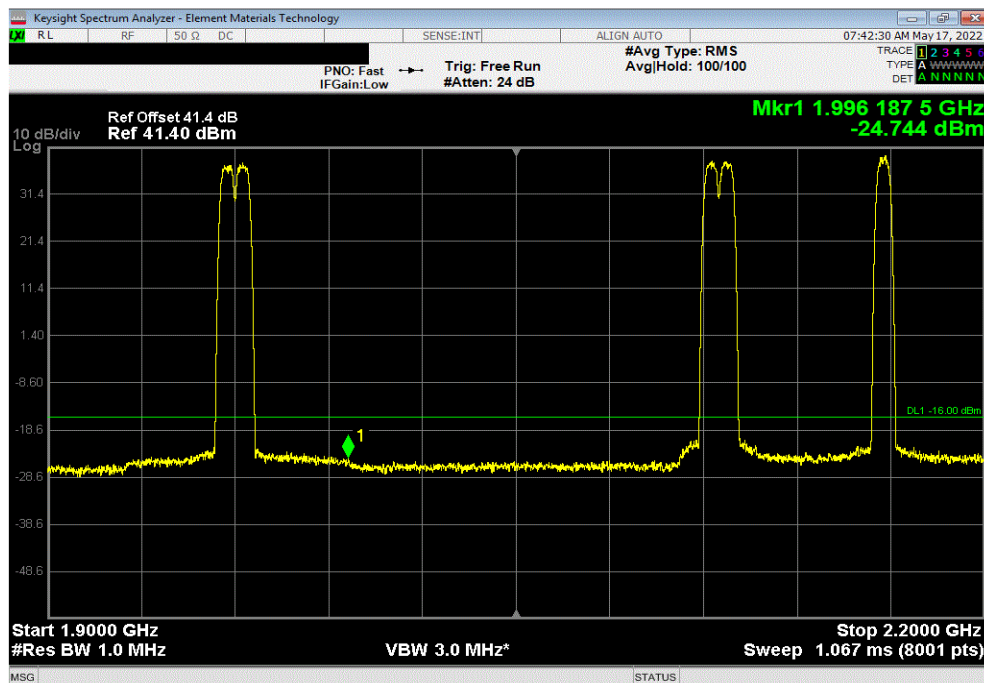


TMTx 2022.05.02.0 XMR 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3171.58	-21.9	-16	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	1996.19	-24.74	-16	Pass	

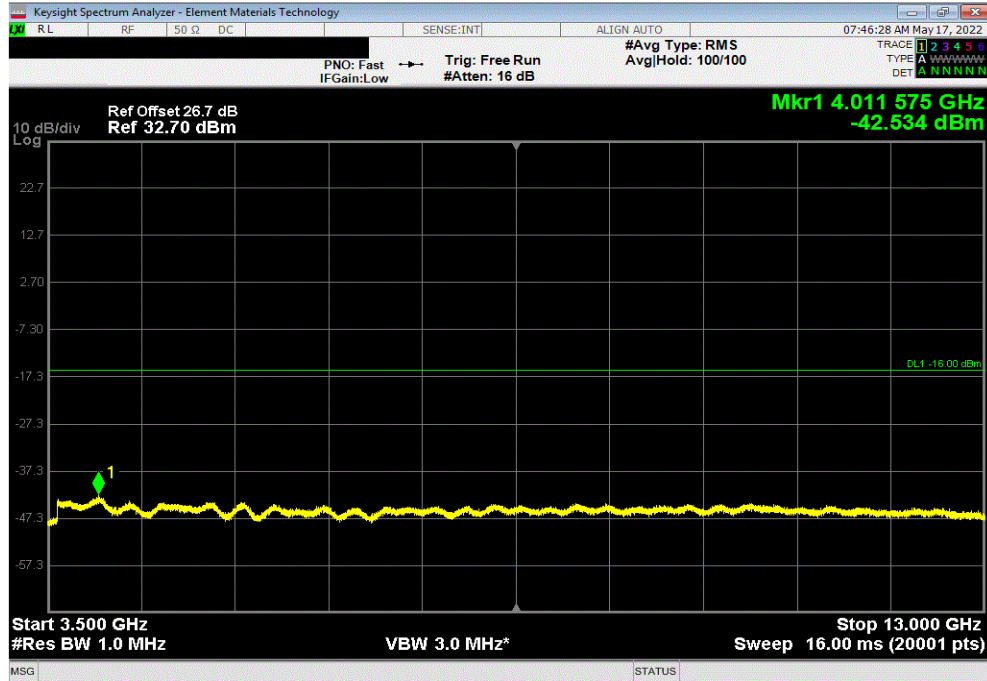


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

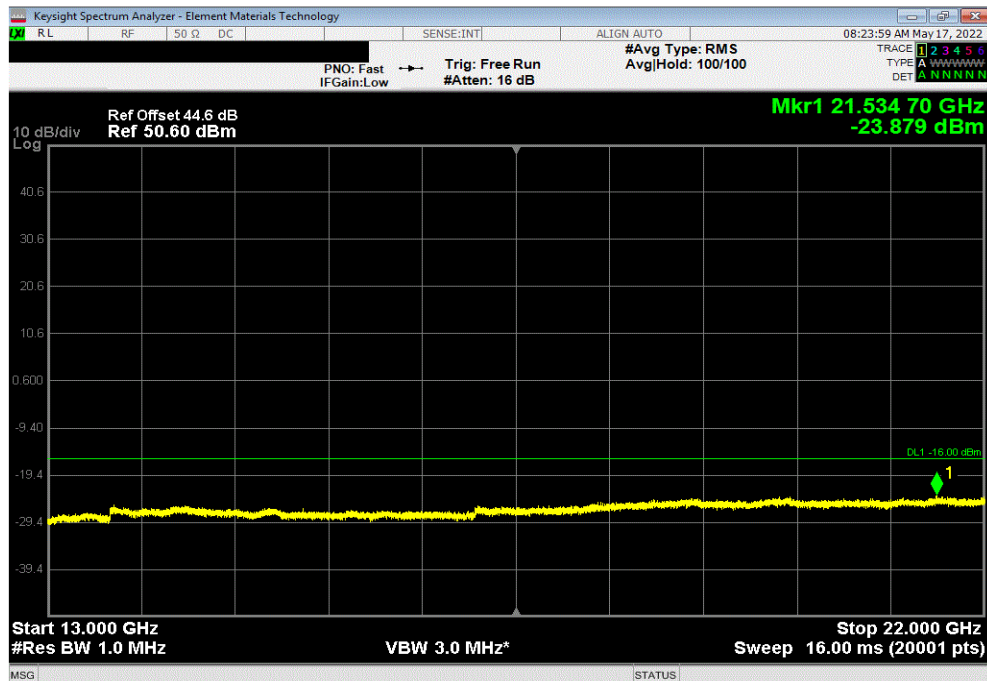


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	4011.58	-42.53	-16	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 2					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	21534.7	-23.88	-16	Pass	

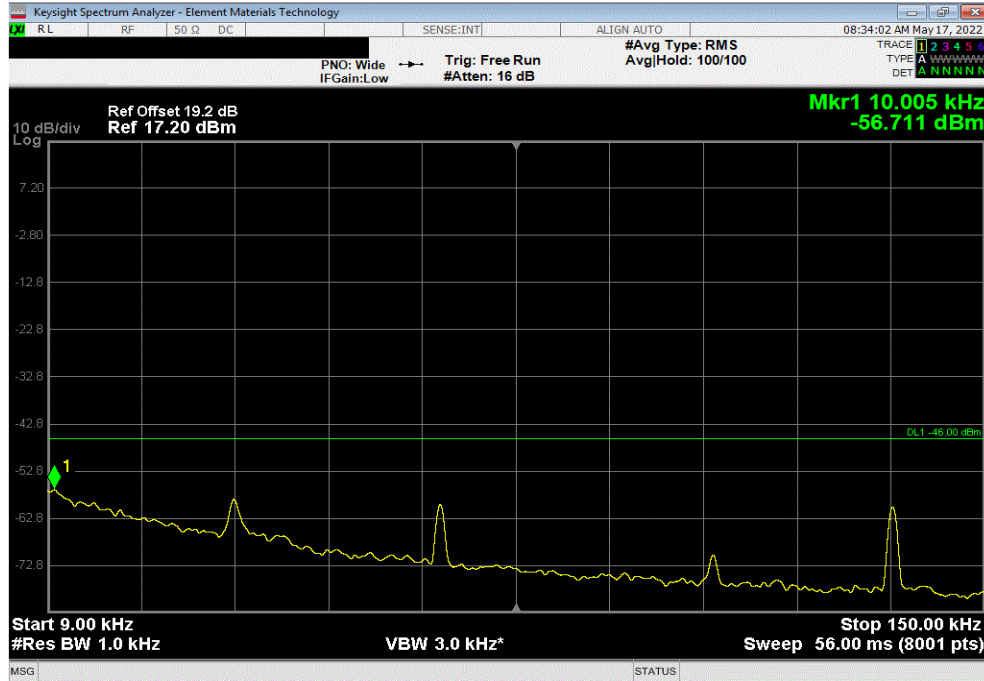


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

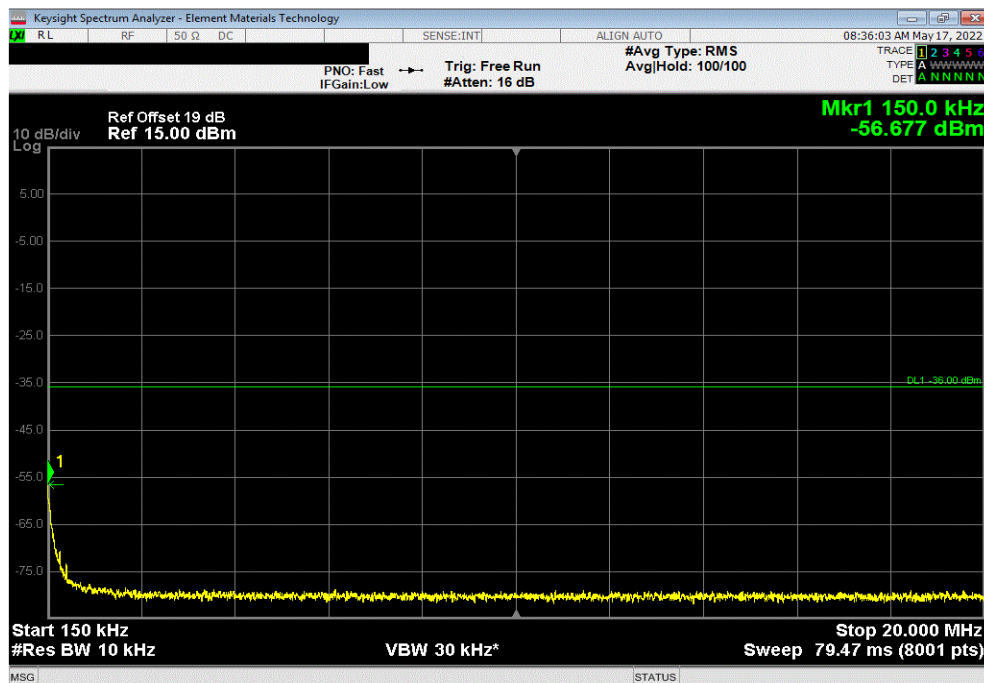


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.01	-56.71	-46	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-56.68	-36	Pass	

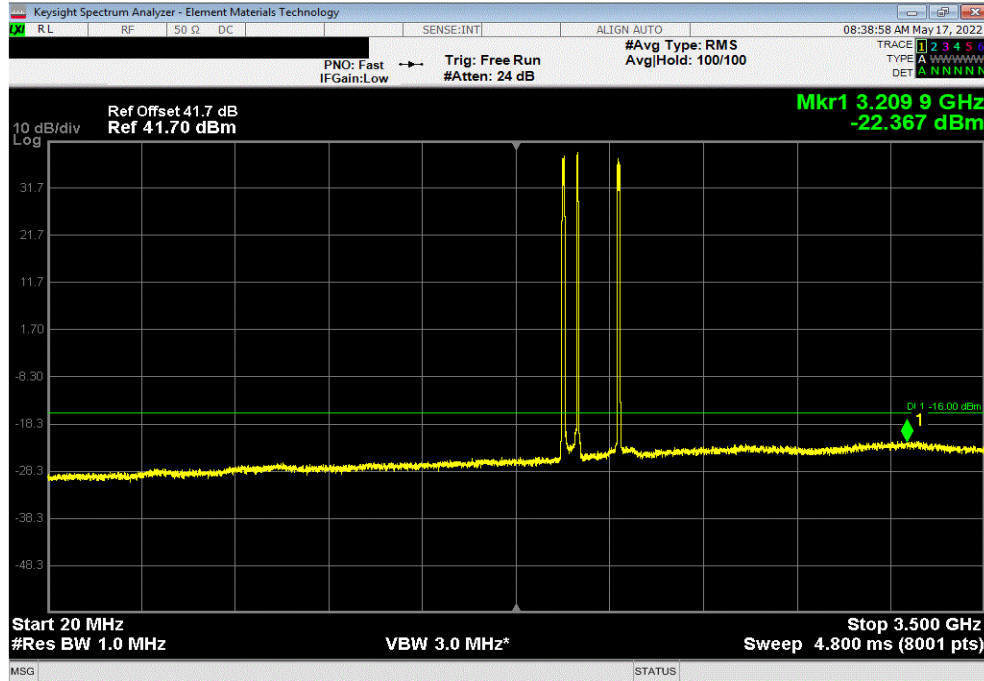


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

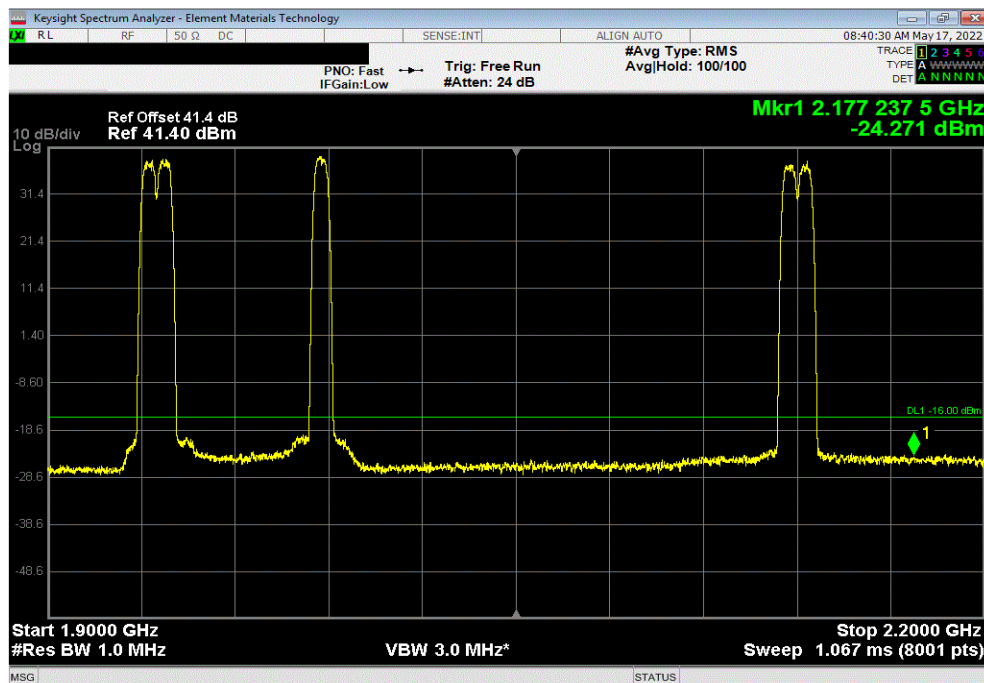


TbTtx 2022.05.02.0 XMt 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3209.86	-22.37	-16	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	2177.24	-24.27	-16	Pass	

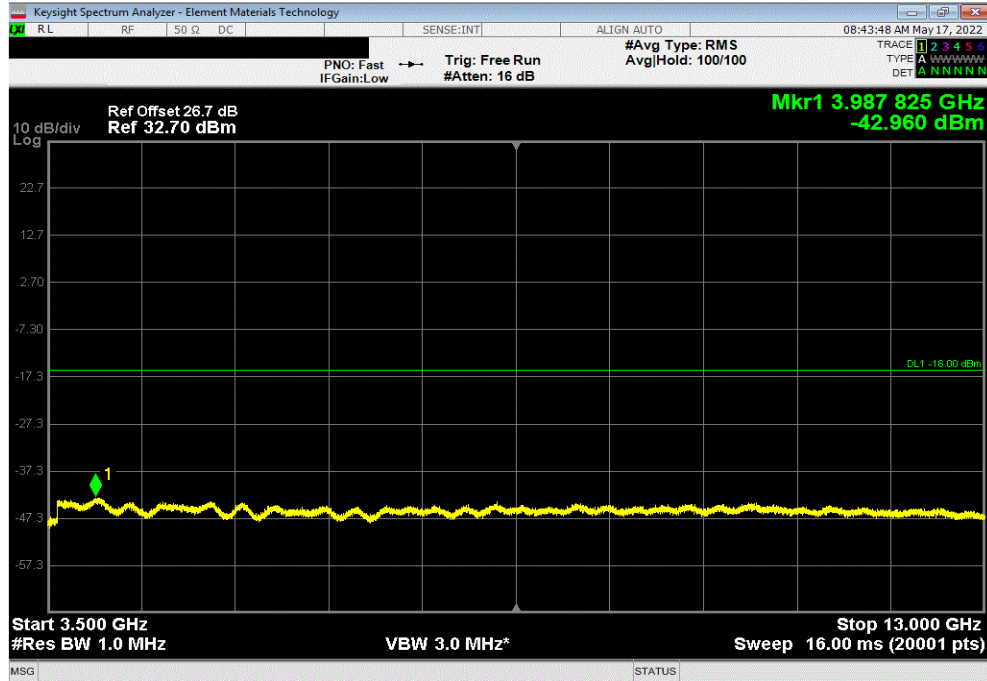


SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - MULTIBAND

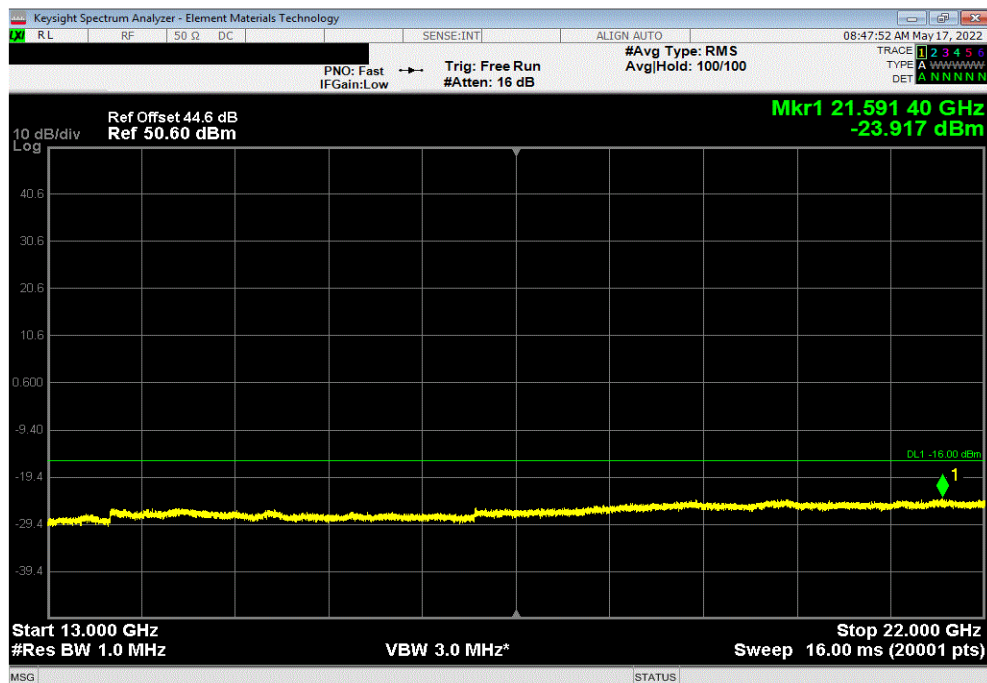


TMTx 2022.05.02.0 XMt 2022.02.07.0

AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
2.2 GHz - 13 GHz	3987.83	-42.96	-16	Pass	



AWS and PCS BANDS, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Multicarrier Multiband Test Case 1					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
1.9 GHz - 2.2 GHz	21591.4	-23.92	-16	Pass	



End of Test Report